Commercial Net-pen Aquaculture in the Great Lakes

Public Input and Comment

January 28, 2016

Michigan Departments of:

Agriculture and Rural Development

Environmental Quality

Natural Resources

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Background

Net-pen aquaculture is the process of growing young fish in a land-based aquaculture facility and then transferring them to a mesh netpen or hard cage structure in the open water of a lake or ocean for final grow out. Fish are raised in the netpens, often for more than one year, to achieve marketable size. The open water facilities are often connected to the shoreline with a dock. The location of the netpen determines the necessary requirements for flow around the pens or cages to maintain adequate growing conditions and sheltered environments are required to protect the netpens from wave, wind, and ice damage.

Netpens are currently used for aquaculture internationally in many countries and along the coasts of the United States. A few countries and states have either banned the use of netpen or cage structures or are reversing their decisions to allow the activities. The only commercial aquaculture net-pen facilities in the Great Lakes are located in Lake Huron's Georgian Bay and North Channel in Ontario waters. State fisheries agencies may use individual netpens at desired locations to serve as imprinting stations for young salmon and steelhead to cue them in to homing back to a particular river. In these cases, the usage is temporary for a few weeks and the facilities are referred to as "imprinting" netpens.

In late 2014, the Michigan Departments of Agriculture and Rural Development (MDARD), Environmental Quality (MDEQ), and Natural Resources (MDNR) (the Departments) were presented with two separate proposals desiring to utilize Michigan's near-shore waters in the Great Lakes. One was proposed for northern Lake Michigan and the other was proposed for northern Lake Huron.

This document is intended to serve as an overview of the process that the Departments have used in considering the issue of commercial net-pen aquaculture in the Great Lakes and to provide a summary of concerns, issues, and support generated through the public input process. While distilled summaries are provided as an overview in this document, the letters and emails from the many individuals, governments (tribal and state), and non-governmental organizations who dedicated their time to provide input on this issue are included in the appendices.

Process of Evaluation of Commercial Net-Pen Aquaculture in the Great Lakes

Because this would be a new use for Michigan's waters of the Great Lakes and because of previous agency concerns regarding Ontario's net-pen operations, the Departments chose to use an ecosystem management approach to evaluate the prospect of this activity in the Great Lakes.

Under an ecosystem management paradigm, the Departments sought to develop a thorough understanding of the scientific environmental and ecological issues regarding commercial net-pen aquaculture, the regulatory authorities, the economic aspects for both opportunity and risk, and the social or public opinions and concerns. To explore the environmental and ecological issues, a multi-disciplinary science panel of experts on hydrodynamics, fisheries management, waste engineering, aquaculture, ecology, and nutrients was convened to review and assess the scientific literature and provide a report that outlined the risks and issues with net-pen

aquaculture and provide advice on protective measures and programming if this activity were to be pursued. Regulatory authorities were evaluated and compiled by the Departments. The economics studies were commissioned through the Michigan Small Business Development Center and Michigan State University (MSU). The public was provided the opportunity to provide input and comment after the reports were completed and a special consultation was conducted with the Michigan federally recognized tribal nations.

All five of the reports were made publicly available through the Department's website in early November (all reports can be found at: www.michigan.gov/aquaculture). A press release was issued regarding the availability of the reports and announcing the public meeting that was held in Gaylord, Michigan on November 19, 2015.

Consultation and Input

At the initiation of the external Science Panel and after the reports were provided to the public, the Departments sought formal public input and comment on the issue. Written comment was received by mail and electronically through December 4, 2015.

Tribal Nation Consultation Process and Input

There are 12 federally recognized tribes in Michigan. Six tribal nations have a recognized treaty right for fisheries in the Great Lakes and five of those are signatory to the Great Lakes Consent Decree regarding fisheries management in the Great Lakes. As such, they are legally recognized as co-managers in the treaty-ceded areas of Michigan's jurisdictional waters. On November 2, 2015, the Departments met with representatives of the interested tribal nations and provided an overview of the process used to evaluate the issue and a brief overview of the findings of each report (Appendix A). Nine of the 12 tribes participated. The following bullets are from concerns, questions, and issues voiced at this meeting. The points below illustrate their input and are not meant to be exact quotes of any single individual or tribe.

Concerns and Opinions of the Tribal Nation Representatives

- *The perception that the state was moving ahead with netpens in the Great Lakes without further process*
- *That enough time has been spent on the issue and a decision should be made*
- *Locations of the proposed net-pen operation in Northern Lake Huron in relation to treaty-ceded waters*
- *There needs to be recognition of the property rights in treaty-ceded areas of the Great Lakes in the process*
- *The economic effects on the subsistence and commercial fisheries were not studied in-depth*
- *Perception that Ontario companies were coming to Michigan waters because they couldn't grow any further in Canadian waters due to fouling of their current sites*
- *That feeding fish with PCB residues will result in contaminated fish, and general concern over bioaccumulation of toxins from fish feed*
- *Questions regarding current levels of phosphorous loading into the Great Lakes and the effect that netpens would have on those amounts*
- *Unknown fate of phosphorous inputs from netpens in terms of nuisance cladophora or some other negative effect*
- *Concerns that monitoring data on the existing netpens is not being shared by the Ontario operators*

- *Whether or not tribal water quality standards were considered*
- *Issues pertaining to fish disease and escape from the nets*

The general tone of the tribal nations' input was grave concern for degradation of water quality in the lakes, threats to tribal fisheries, and the lack of a real cost-benefit analysis for venturing forward with commercial net-pen aquaculture in the Great Lakes. The Hannahville Indian Community was initially an active partner in the proposed Northern Lake Michigan venture, however subsequent to this consultation meeting, they notified the state that they had suspended their participation in the project although their land was still a potential site for commercial net-pen aquaculture development. Hannahville Indian Community is one of the 12 federally recognized tribal nations in Michigan, but is not signatory to the Great Lakes Consent Decree as a co-manager of the Great Lakes.

Written input was received from the Little Traverse Bay Bands of Odawa Indians and the Grand Portage Reservation Tribal Council (Appendix B). Both letters conveyed opposition to commercial aquaculture netpens in the Great Lakes. Concerns included disease, parasites, water quality, fish waste products, accidental introductions, genetic integrity and that all parties that are co-managers in the Great Lakes should have signatory authority in the decision regarding allowing this activity in the Great Lakes.

Interested Stakeholder Groups and General Public Input Process

Interested stakeholders and the general public had two opportunities for public input to the process. The first opportunity was on June 25, 2015 to the Science Panel to which the tribal nations were also invited. The purpose of input at that time was to provide the external Science Panel addressing the environmental and ecological issues with any additional data or information that the Panel may need to consider. This opportunity was *not* intended to provide a general input forum for public views on the issue as that was the intended purpose of the second public input process scheduled for a later date after all of the reports were assembled and provided publicly. On November 19, 2015, the second public meeting was held.

Public Meeting for Input to the External Science Panel

Approximately 30 people attended the meeting and 22 people spoke or requested their letters to be provided to the Panel. Approximately half of the input received was in support of commercial net-pen aquaculture in the Great Lakes while the other half was opposed or requested due diligence in the consideration and governance of this activity. However, the focus of the meeting was to provide the opportunity for individuals or organizations to provide the external Science Panel with additional data or information for consideration. Several types of information were brought forward for the Panel's consideration.

- A Trout Unlimited policy document covering information on water temperature and dissolved oxygen, nutrients, antibiotics and growth hormones, diseases, fish escapes, interruption of existing uses and overall regulatory standards.
- A draft paper of GIS site suitability selection for Great Lakes aquaculture systems.
- Reference to a National Oceanic and Atmospheric Administration (NOAA) 2013 report on Marine Cage Aquaculture and the Environment.
- Information on the annual temperature profile of Northern Lake Huron along Presque Isle County.

- A binder of information to each of the Science Panel members that included 24 scientific research papers regarding net-pen aquaculture for the Panel's consideration.

Additionally, two formally adopted resolutions were submitted from: 1) Michigan United Conservation Clubs, and 2) the Committee of Advisors of the Great Lakes Fishery.

Public Meeting Input to the State Agencies

On November 19, 2015, after publicly posting the five reports regarding the legal authorities, economics, and environmental and ecological issues (www.michigan.gov/aquaculture), a public meeting was held to provide interested stakeholders and general public an overview of the reports and an opportunity for verbal input. Over 60 non-state agency participants attended the meeting at Treetops Resort in Gaylord, Michigan (Appendix C). Participants were asked to keep their comments to a length that respected the ability of others to share their thoughts, but were not given any time limitations. An overview of the issue and process was provided as a presentation (Appendix D). Livestreaming and recording of the event was provided by Michigan United Conservation Clubs. The meeting began at 1:03 p.m. and concluded at 4:41 p.m. after all those who desired to publicly comment were heard. Two-thirds of the speakers were in general opposition with the remainder in support of commercial net-pen aquaculture in the Great Lakes. Many of those individuals also provided written comments for the record. The following bullets are a distillation of the personal opinions, concerns, and views that were presented in addition to many general statements of support or opposition. These viewpoints are summarized below by topic area. In some case the same points were presented several times, but they are not repeated below. The agencies did not attempt to correct or revise any statements that were factually incorrect and are providing this summary as a broad overview of the issues stated.

Aquaculture

- *If netpens are allowed, the state would be going backwards, recirculating aquaculture is the way forward*
- *Michigan needs to do its part to feed the world and it can be done without impacting natural resources; and there is a demand for fresh products from aquaculture systems*
- *Could consider a zoning approach in the lakes to identify where netpens could be and where they could be prohibited*
- *Can learn from Ontario*
- *Use an adaptive management approach with the precautionary principle as a way forward*
- *Concerns for the viability of aquaculture with the cold temperatures of the Great Lakes*
- *Learn from Norway and Chile who have had disasters, people don't generally want this in their line of view or along their beaches*
- *The Bay of Fundy experience of thousands of pounds of feed going out, pollution of the water, replaced artisanal fishery, and divided communities*
- *Reliance upon wild-caught fish will result in overharvest*
- *Netpens will produce jobs*
- *There is a balance that can be achieved with use of the natural resources and economic development*
- *Establish rules and regulations to follow*
- *Call for advanced research and development on netpens which are seen as a necessary element to growth of the industry*

- *Overharvesting wild fish stocks is not the way of the future*
- *Have to grow fish more economically which is what net-pen aquaculture provides*
- *Netpens provide economic disadvantages for the environmentally friendly approaches to aquaculture and recirculating systems are a better way*
- *Because there are global issues with water stress and food production, Michigan is the logical place for this to occur*
- *A pilot project is the place to start; wants to use state facilities to get started*
- *Need to manage in a sustainable manner for the Great Lakes, food and waste could benefit the environment by supplementing the food chain*
- *Still waiting for someone to be successful with recirculating aquaculture*
- *Have not seen disease issues in Ontario netpens*
- *Need to conduct a business case study, there is no infrastructure to support the activity*
- *None of the studies address the risk of wind and ice, and large ice heaves on beaches should be a concern for netpens*
- *Makes no sense to be planning for cleanup of phosphorous in one place and then allow it to be added this way*
- *Michigan should ban netpens and Canada should stop this activity*
- *Encourage MEDC, state agencies, and universities to continue to address the regulatory needs and address the growth of the industry by streamlining regulation and providing access to capital*
- *Alaska does not allow this why should Michigan*
- *Should look towards land based recirculating and flow through systems for future aquaculture development*

<u>Environmental and Ecological Issues</u>

- *Lack of documentation of the harm that netpens have caused in other locations such as Denmark, Norway, and Nova Scotia*
- *Concerns over yet another contribution of antibiotics, hormones, etc. to the lakes and their ability to recover*
- *Potential harm to native fish populations as a result of fish escaping from netpens*
- *The paper on environmental and ecological effects missed the mark and did not document the information available on how netpens can harm the lakes and it did not delve deep enough into the water quality issues*
- *Adaptive management is not an appropriate approach to moving forward with netpens*
- *Concern for the Great Lakes ecosystem - fish that escape will cause problems*
- *Nitrate, ammonia, bacteria, copper, and mercury would increase in locations with these facilities*
- *Question how can the state of Michigan require farms to do everything possible to keep nutrients on the farms and out of waterways and then allow fish facilities to allow untreated effluent from the netpens directly into the Great Lakes*
- *23 studies show effects from the fish that escape from netpens on wild populations*
- *Disease concerns, fish food into the water and subsequent effect*
- *Desired the Science Panel report to have gone into greater detail regarding the disease, nutrient input, and escaped fish issues on wild population*
- *Concerns for wild fish populations- reflections on the problems with netpens in Chile*
- *Unclear as to how the contribution of additional phosphorous from netpens is in line with the State's approach to reducing phosphorous loading overall*
- *Should not use the lakes as an experiment under the adaptive management design*

- *Nutrients, fish waste, escape of fish from nets at very small sizes and as a result of net failures*
- *Netpens in the Great Lakes are clearly not economically justifiable and poses concerns for the Great Lakes in terms of fish escapes, effluent, toxins, and invasive species*

Public Use of Great Lakes

- *Concerns that netpens in the Great Lakes present an inappropriate use of the public's resource for commercial ventures*
- *Necessary to review the public trust doctrine for this activity*
- *Could contribute to vital working waterfronts*
- *The Great Lakes are a public resource; consider all of the opposition and points provided, and just say no*
- *Questions about whether or not netpens in the Great Lakes are subject to the public trust doctrine and large issues with whether there would be significant material impairment for the public trust of the waters in all public use – navigation, boating, fishing, swimming, duck hunting, drinking water, etc.*
- *State has a duty to protect and prevent, not minimize*
- *Even a de Minimis demonstration scale pilot project would be unacceptable relative to public trust doctrine as it would be seen as precedent setting*
- *Given all of the technical issues and the science, few people are willing to take a big risk for things that belong to the state of Michigan for the benefit of a few*

Sport and Commercial Fisheries

- *General concerns for the recreational and commercial fisheries from commercial net-pen aquaculture*
- *Concern for all fisheries stated many times*

A video stream of the actual presenters and their input can be viewed online:

- Part 1: https://www.youtube.com/watch?v=G1dtMcf1QDY; and
- Part 2: https://www.youtube.com/watch?v=W1t-tZIYEkE.

Written Comments Received

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

Tribal nation comments are characterized in the section above, the rest of the comments are characterized below and the letters are provided in the appendices as noted.

Comments Opposed to Commercial Net-Pen Aquaculture in the Great Lakes

Other Great Lakes States

The Director of Indiana Division of Fish and Wildlife stated a common interest between the states in the prudent management for Great Lakes fisheries and habitat. The Indiana agency supported the work of the Science Panel, but stated opposition to the expansion of net-pen aquaculture in the Great Lakes citing the connected nature of the system and concern for invasive species, foreign genetics, parasites, and novel/highly pathogenic disease issues threatening the sport fish strains, and overall integrity to the health of the Great Lakes ecosystem (Appendix E).

Stakeholder Groups

The following non-governmental stakeholder groups submitted comments, all in opposition to commercial net-pen aquaculture in the Great Lakes: Alliance for the Great Lakes, Anglers of the Au Sable, Hammond Bay Anglers Association, International Federation of Fly Fishers, For Love of Water (FLOW), Food and Water Watch, Lone Tree Council, Michigan Trout Unlimited, Michigan Environmental Council (MUCC), Izaak Walton League of America, Northern Michigan Environmental Action Council, Michigan United Conservation Clubs jointly with National Wildlife Federation, Schrems West Michigan Chapter of Trout Unlimited, Sierra Club Michigan Chapter, Straits Area Audubon Society, Watershed Center Grand Traverse Bay, and the Upper Peninsula Environmental Coalition (Appendix F).

The concerns in many of the letters were similar but many additional unique points were contributed. Summarized issues and concerns from those letters are noted below.

- *Excessive nitrogen and phosphorous contributions*
- *Disease issues*
- *Non-native fish introductions*
- *Unfairly compete with environmentally friendly aquaculture systems*
- *Support for closed-loop or recirculating aquaculture systems*
- *Support for MUCC resolution*
- *Activity is not currently legal under the Michigan Aquaculture Development Act*
- *Require significant oversight and regulation to avoid ecological harm*
- *Economic uncertainties outweigh the economic impact*
- *Perception that Ontario operators may be moving to Michigan resulting from tightening of requirements in Ontario*
- *Agree with adaptive management approach provided by Science Panel if the risks are deemed ultimately worth taking*
- *Need more understanding of fish disease and surveillance*
- *Concern that "dilution is the solution for pollution" regarding net-pen effluent*
- *Concerns with the completeness of the Science Panel's report in in-depth understanding of the consequences of net-pen aquaculture in the Great Lakes*
- *Concerns with overestimation of the economic benefits*
- *NPDES permit may not be adequate to ensure water quality and designated uses;*
- *Concern for injury to recreational and commercial fisheries*
- *Concern for disease, specifically Infectious Salmon Anemia*
- *Need to develop regulatory certainty for land-based aquaculture such as developing a general permit for recirculating aquaculture systems*

- *The bottomlands of the state are in public trust and the net-pen proposals are not in the best interest of the public*
- *Concern for antibiotics and growth hormones in the water*
- *Perception of "factory farming" in the Great Lakes and its effects on tourism and recreation*
- *The agencies need to conduct an in-depth review of the Public Trust Doctrine as it pertains to the activity of commercial net-pen aquaculture in the Great Lakes*

General Public

The majority (90%) of the general public comments came in from the Food and Water Watch organization's website with a common statement while. Comments were also received from 90 individuals not associated with the Food and Water Watch website.

Food and Water Watch is a Washington D.C. based consumer advocacy organization focusing on accountability relating to food, water, and fishing. The local chapter is based out of Detroit and claims over 27,000 supporters in Michigan. Formal comments were read at the November 19th meeting in Gaylord as well as submitted in writing by their Michigan Senior Organizer, Lynna Kaucheck. Over 1,400 form letters were received from their supporters, the vast majority of these letters were identical, however, a few added additional thoughts in addition to the topics already outlined in the form letter (Appendices G and H). The letter mirrored the sentiments of the formal comments with three main concerns: 1) waste, including uneaten feed and feces being released directly into the water and the ability for that effluent to travel and effect a broad area: 2) the risk of escapement and the potential harm that could pose to the wild fish populations; and 3) disease and ability for rapid spread due to close captivity. Food and Water Watch states support for the development of recirculating aquaculture, however, remains opposed to open net pen aquaculture in the Great Lakes.

The remaining public input comments from 90 individuals cited natural resource concerns regarding genetic threats to the fishery, fish escapes from netpens, disease, pollution, nutrients, threats to the commercial and recreational fisheries, disadvantages to businesses using environmentally friendly approaches to aquaculture, beach contamination concerns, and many of the same types of concerns that have been articulated in previous sections. Additional comments were those that simply stated that commercial net-pen aquaculture in the Great Lakes is a bad idea and were incredulous that it was even being considered for the Great Lakes (Appendix I).

Comments in Support

Eleven comments were received in support of developing net pen aquaculture in the Great Lakes. Seven of the comments received represented an organization and the remaining four were from individual stakeholders (Appendix J).

The most frequently mentioned reason for support was the economic opportunity that net pens could provide to a community as well as the state of Michigan. Additional points of support included: the opportunity for job creation, both that direct jobs would be created from the opening of a facility and indirectly from processing, etc.; Michigan can do more to feed the world's growing population and rising global demand for seafood; and there is a need and a demand for this food type and the market already exists.

In addition to taking a stance and providing reasoning, a few of the comments cited concerns with the published reports themselves. One concern was with the use of the term “flushing” in regards to waste management. The commenter believed that the term flushing was used to mean dilution when that is not the intent by the net-pen aquaculture project proposals. Additionally, there were concerns with the overall economic analysis, saying it was “scattered” and that that information was missing. There was a desire for more of the potential benefits to be explored as well as the risks. Issues with the legal authorities were also raised, as one commenter disagreed with the fundamental interpretation of the 1996 Michigan Aquaculture Development Act.

Other Comments Regarding Commercial Net-Pen Aquaculture in the Great Lakes

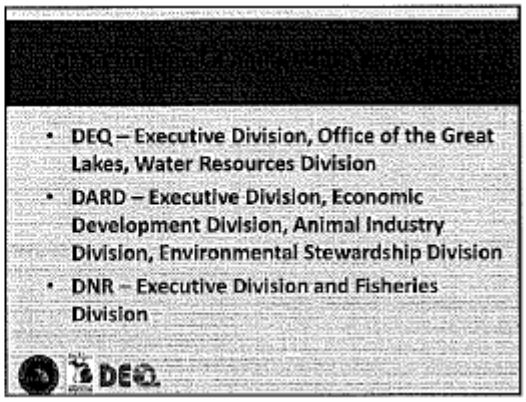
The Commissioners of the Great Lakes Fishery Commission provided a letter that did not take a position, but supported the careful approach that was being used by the state of Michigan in evaluating the issue. The letter requests careful consideration of the nutrient loading issue and other sources that influence the nutrient loading targets. The Commissioners state that siting is a critical issue to be addressed and this would be an important determinant to success of any netpens in the Great Lakes. They support a multi-faceted, stakeholder-shared spatial decision support tool for the siting question. Lastly, they pointed to the shared governance issue regarding the *Joint Strategic Plan for Fisheries Management in the Great Lakes* and asked that Michigan continue to seek input and recommendations from partners around the lakes for consensus about actions related to net-pen aquaculture facilities from the fishery agencies (Appendix K).

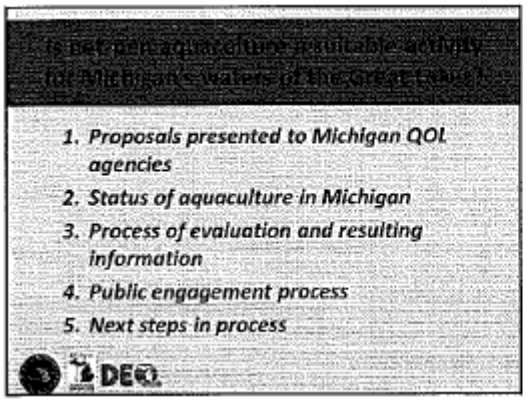
Summary

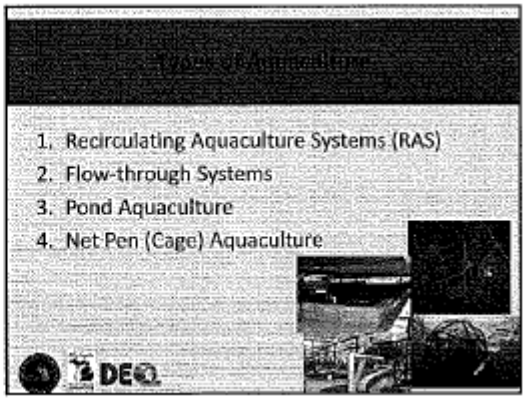
To summarize, of the people who commented, far more have concerns over many aspects related to commercial net-pen aquaculture in the Great Lakes than those who are supportive of the activity. Many posed similar issues of concern regarding environmental and ecological issues. Several novel issues were addressed as well regarding the agencies’ roles in considering the Public Trust Doctrine, potential for issues with tourism and recreation based on perceptions, concern for recognizing the importance of collaborative agreements for managing fisheries in the Great Lakes, and tribal rights in Great Lakes fisheries management issues. Those who are in support point to a need for a growth in the aquaculture industry and that industry growth would provide additional jobs and a desired commercial product. Many of those in opposition to commercial netpens in the Great Lakes also voiced support for aquaculture as a growth industry in regards to closed-loop or recirculating aquaculture and a few also supported properly designed flow- through systems.

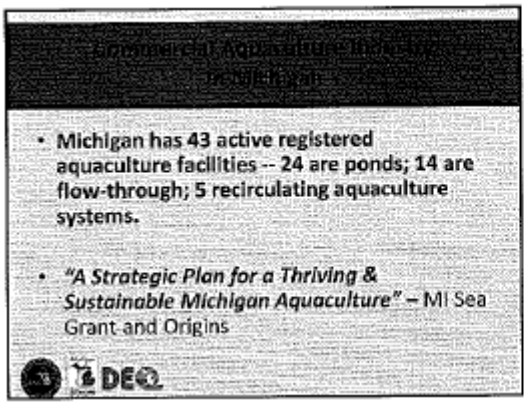
Appendices

Appendix A. Presentation given at tribal nation consultation.









Proposals Presented to EQE Agencies

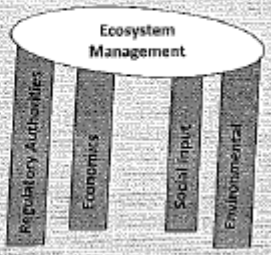
Coldwater Fisheries, Inc.

- Currently in Ontario waters of Lake Huron
- Proposing two sites in Bays de Noc
- Targeting 385,000 lbs of RBT

Project Rainbow

- Aquaculture Research Corp.
- Three possible sites in NLH
- Targeting 500,000 lbs of RBT

Framework for Analysis



Regulatory Framework

Based on current state law, [illegible]

- 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 to register a commercial net-pen aquaculture facility in the Great Lakes.

Economic Analysis

1. Small Business Development Corporation – *broad overview of aquaculture industry globally*
2. MSU Mr. Steve Miller, et al. – *economic models developed for site specific examples*
3. MSU Dr. Frank Lupi – *balance of natural resource assets with critique of economic model*

The Business Case

- The US imports about 75 percent of the seafood it consumes.
- Growth constraints include feed costs, processing capacity, financing and experienced labor.
- Locating two one million pound facilities in Michigan would lead to up to 17 direct jobs, generating annual personal income of $1.2 million.
- This volume of production would likely contribute $4.3 million in annual gross domestic product, provided fish processing is done in Michigan.
- Recreational fishing in the Great Lakes is about $1 billion per year plus other tourism values.

Key Issues or Areas of Uncertainty

1. Environmental and ecosystem effects
2. Fish health and disease concerns
3. Effects of fish escapes on wild populations
4. Human health concerns
5. Siting considerations
6. Gaps in existing body of scientific literature

DEQ

October 10, 2015

Great Lakes Net-Pen Commercial Aquaculture: A Short Summary of the Science

Submitted to the departments of Agriculture and Rural Development, Environmental Quality and Natural Resources

Eric J. Anderson, NOAA, Great Lakes Environmental Research Laboratory
John M. Dettmers, Great Lakes Fishery Commission
James S. Diana, University of Michigan, Sea Grant
Keith McCormack, Hubbell, Roth & Clark
James A. Morris, NOAA, National Ocean Service
David Scarfe, Aquatic Veterinary Associates LLC, USDA-APHIS-VS
Craig Stow, NOAA, Great Lakes Environmental Research Laboratory
Roy A. Stein, Chair, The Ohio State University

Science and Net Pen Aquaculture in the Great Lakes

The Panel Process

- Two meetings
- Agency presentations
- Conference calls with agency and industry personnel
- Multiple panel conference calls
- e-mail correspondence among panelists
- Three drafts discussed by panel
- Consensus-generated report, independent from agencies

Science and Net Pen Aquaculture in the Great Lakes

Overarching Management Approach - Active Adaptive Management

- Learn by doing net-pen aquaculture
- Sample Before, After, Control, Impact – BACI design
- Quantify net-pen effects, differentiate from ongoing changes in Great Lakes
- Goal to increase production and mediate environmental effects

Science and Net Pen Aquaculture in the Great Lakes

Operations

- Use sterile/triploid, native or naturalized fishes
- Monitor net-pen and cage operations
- Provide bonds to cover decommissioning costs
- Respond to Great Lakes issues, such as ice, zebra mussels, invasive species, etc.

Science and Net Pen Aquaculture in the Great Lakes

Fish Disease and Human Health

- No concerns with fish health advisories
- Use disease-free fish
- Work to improve disease surveillance, monitoring, and reporting
- Use licensed and USDA-accredited veterinarians for disease treatments requiring antibiotics, etc.
- Adopt biosecurity plans - disease prevention highest priority

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Science and Net Pen Aquaculture in the Great Lakes

Siting

- Recognize how much we know and don't know
- Use rigorous data-driven modeling to characterize important site-specific metrics such as flushing
- Develop siting tool, similar that developed for siting windpower in the Great Lakes (Lakebed Alteration Decision Support Tool)

Relevant Data Sets for Assessing Siting Conditions in the Great Lakes

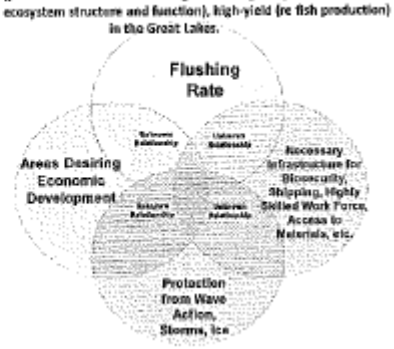
Data	Source	Link
Meteorological conditions	NOAA National Center for Environmental Information (NCEI)	http://www.ncei.noaa.gov/
Oceanographic conditions	NOAA National Ocean Service (NOS) NOAA Great Lakes Environmental Research Laboratory (GLERL)	http://tidesandcurrents.noaa.gov/ http://www.glerl.noaa.gov/res/glcfs/
Bathymetric data	Great Lakes Observing System (GLOS) NOAA National Center for Environmental Information (NCEI) U.S. Army Corps of Engineers	http://www.glos.us/ https://www.ngdc.noaa.gov/ http://www.usace.army.mil/
Lakebed Alteration Tool	University of Michigan	http://www.glisa.umich.edu/
Ecological Data	EPA	http://www.epa.gov/glnpo/
General Information	NOAA GLERL	http://www.glerl.noaa.gov

Science and Net Pen Aquaculture in the Great Lakes

Panel Reflections

- Consent Decree, Joint Strategic Plan, GLWQA 2012, LAMP
- The Precautionary Principle: Adopt, err on the side of caution because we don't have much experience
- Finite Phosphorus Loadings: QOL group limits P loading through regulation
- Critical siting considerations

Critical Siting Considerations: The challenge of finding net-pen sites with low-impact (re ecosystem structure and function), high-yield (re fish production) in the Great Lakes.



- **Web site with reports and ability to provide written input: http://www.michigan.gov/aquaculture**
- **Public meeting in mid-November**
- **Compilation of comments into last report**

Dr. Tammy Newcomb, Senior Water Policy Advisor
Michigan Department of Natural Resources
P.O. Box 30028
Lansing, MI 48933

Questions:
(517)284-5832
newcombt@michigan.gov

Thank You

Appendix B. Letters received from tribal nations on commercial net-pen aquaculture in the Great Lakes.

GRAND PORTAGE RESERVATION TRIBAL COUNCIL

Norman W. Deschampe - Chairman • Dennis B. Morrison - Secretary/Treasurer • John Morrin - Councilman
Marie Spry - Councilwoman • Rob Roll - Councilman

December 4, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer, Executive Office
525 West Allegan Street
P.O. Box 30028
Lansing, MI 48909-7528

Dear Ms. Guyer:

On behalf of the Grand Portage Band of Lake Superior Chippewa and as a signatory to the Joint Strategic Plan For the Great Lakes, I am providing comments regarding the State of Michigan's review of proposals to institute commercial net-pen aquaculture in its' Great Lakes waters. For reference, the Grand Portage Band of Chippewa is represented on the Council of Lake Committees by the 1854 Treaty Authority and became signatory to the Joint Strategic Plan in 2014. The CLC oversees the development of shared fishery objectives and facilitates consistent, science-based fishery management as outlined in the Great Lakes Fishery Commission's (GLFC) *A Joint Strategic Plan for Management of Great Lakes Fisheries.*

The interconnected ecosystem of the Great Lakes basin dictates that decisions made by one jurisdiction can affect all. For that reason it is appropriate to thoroughly evaluate decisions that will affect the ecology of the Great Lakes basin.

I must be clear that the Grand Portage Band does not support net-pen aquaculture in the Great Lakes for several reasons. I have serious concern about risk of concentrated aquaculture facilities in the Great Lakes including disease outbreaks, parasites, nutrient-rich waste, accidental introductions, and potential genetic introgression from escaped fish. Furthermore, the fact that these commercial enterprises would occur in public and treaty waters of Michigan means all co-managing parties should agree on permitting and siting.

I have reviewed the Science Advisory Panel's (Panel) report to the Michigan Quality of Life Group (QOL) entitled *Great Lakes Net-Pen Commercial Aquaculture: A Short Summary of the Science*, and commend the Panel on their examination of ecological issues surrounding commercial net-pen aquaculture. Although some of the ecological risks are discussed in the panel report, the concerns have not been fully resolved. As a neighboring government that collectively manages fisheries in the Great Lakes for the benefit of all, we must live with the ecological consequences of actions taken within the Great Lakes basin and its ecosystem. It is our opinion that the risks of concentrated aquaculture in the Great Lakes greatly outweigh the predicted societal benefits.

P.O. Box 428 Grand Portage, Minnesota 55605 (218) 475-2277 or 475-2239 Fax: (218) 475-2284

Furthermore, Michigan DNR, as a signatory to the Joint Strategic Plan for the Great Lakes, has a responsibility to consult with affected governments before making any decisions about whether to place facilities in the Great Lakes.

While I agree with the Science Advisory Panel's recommendation that, if Michigan were to allow commercial net-pen aquaculture, all commercial aquaculturists would be directed to participate in a rigorous adaptive management (AM) process using the before-after, control-impact (BACI) approach, I strongly believe that these facilities should not occur in Great Lakes waters.

Sincerely,

Norman W. Deschampe

Norman W. Deschampe, Chairman Grand Portage Band of Lake Superior Chippewa
Chairman, Governing Board of 1854 Treaty Authority

cc:

Council of Lake Committees

Little Traverse Bay Bands of Odawa Indians
Natural Resource Department
7500 Odawa Circle
Harbor Springs, MI 49740
Phone: (231)242-1670
Fax: (231)242-1690

WAGANAKISING ODAWA

December 2, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528
DNR-Net-Pen-Comments@michigan.gov

Subject: Net Pen Aquaculture

Dear Ms. Guyer,

The Little Traverse Bay Bands of Odawa Indians Natural Resource Department (LTBB NRD) appreciates the opportunity to provide comments on the State of Michigan's review of the aspects of commercial net-pen aquaculture. As a Sovereign Nation and co-manager of our shared natural resources with the State, LTBB NRD would like to express that we are opposed to allowing commercial net-pen aquaculture on the Great Lakes. LTBB's concerns include the risk of water quality deterioration, disease, increased contaminants, and escaped farmed fish.

LTBB was federally reaffirmed on Sept. 21, 1994 with the signing of Public Law 103-324. LTBB's boundaries lie in the area reserved in the 1855 Treaty of Detroit encompassing the north-western part of Michigan's Lower Peninsula. LTBB has 110 miles of Great Lakes Shoreline, 394 miles of creeks, rivers, and streams, 27,553 acres of lakes, and 35,647 acres of wetlands. Our traditional rights to hunt, fish and gather in the Ceded Territory as reserved in the 1836 Treaty of Washington and reaffirmed in the 2000 Great Lakes and 2007 Inland Consent Decrees are part of our way of life. These traditional rights in the Ceded Territory, which includes portions of Lake Superior, Lake Michigan, and Lake Huron, may be impinged upon by the allowance of commercial net-pen aquaculture.

Water quality is a concern to LTBB as the concentration of fish in net-pens will increase the amount of nutrients in a concentrated area. An excess of nutrients in an area may contribute to vegetation and algal blooms, perhaps leading to toxic Harmful Algal Blooms (HABs).

Diseases that are naturally found in the ecosystem could be amplified by the close-quarters and large numbers of fish in a net-pen. Any escaped fish could infect natural fish populations.

Contaminants in fish food are an unavoidable reality in aquaculture. LTBB is against putting additional contaminants in the Great Lakes through fish food or any other vector.

Allowing commercial net-pen aquaculture would benefit a limited number of individual entities, at the expense of the environment and tribal and non-tribal citizens alike. For LTBB, the risk to the fishery and our Treaty Reserved Rights is too great to allow commercial net-pen aquaculture. Commercial net-pens do not coincide with LTBB's prerogative to build a sustainable

environment and fishery for the next seven generations. We look forward to working with the Michigan Department of Natural Resources in the future. Please contact me (231) 242-1678 if you have any questions.

In a good way,

Douglas Craven, Director
Natural Resource Department
Little Traverse Bay Bands of Odawa Indians

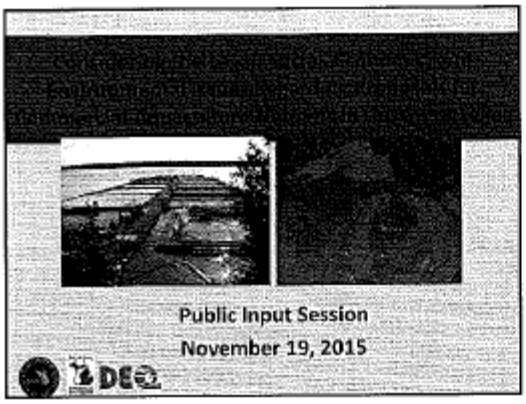
Appendix C. Partcipants at the November 19, 2015 public input meeting on commercial net-pen aquaculture in the Great Lakes.

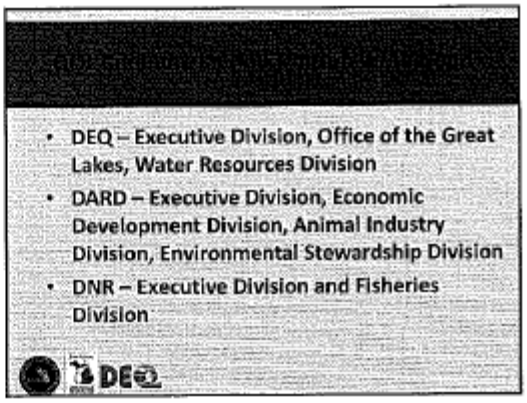
Attendees		
Last Name	**First Name**	**Title/ Affiliation**
Averill	Jess	Legislative Director, Sen. Jones
Balmer	Lyn	
Bordear	Pat	
Cahn	Jack & Jeff	
Cieslinski	Ed	Pine River TU
Coddens	Barry	Council of Trout Unlimited
Cozad	David	
Douglas	Denny	Pine River Area TU
Glaspie	Stevie	Inspector
Green	Mike	State Senator
Harrison	Karen	President, Mason-Griffith Founders TV
Haslett	Richard	Vice President, MCBA
Isaman	Gary	
Jaredci	Joe & Judi	
Lathrop	Bob	
Lienczewski	Larry	Captain, MI Charter Boat Association
McCormack	Spencer	Board Member, Miller VanWinkle TU
Meyer	Don	Vice President, Mershon TU
Meyers	Dave & Shelia	Grand Traverse Area Sport Fishing Association
Olsen	Erik	Lead Great Lakes Fisheries Biologist, Grand Traverse Band of Ottawa and Chippewa Indians
Osge	James	Bay Mills Indian Community
Schroeder	Brandon	Extension Educator, Michigan Sea Grant Extension
Shiflett	Jim	Anglers of the AuSable
Smith	David	Anglers of the AuSable
Truchan	John	Vice President, Traverse City Area Steelheaders
Vetter	Gary & Barb	
Walsh	Terry	Michigan Charter Boat Association
Weyeneth	Lance	Anglers of the AuSable

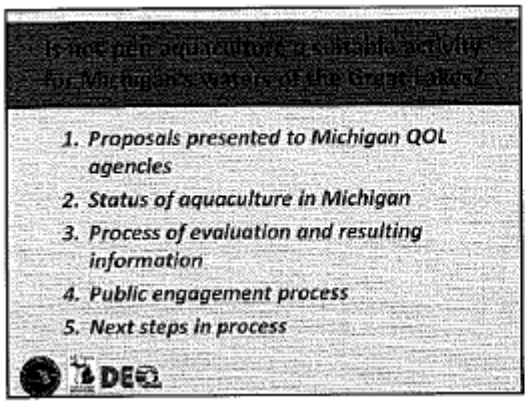
Attendees That Provided Public Comment		
Last Name	**First Name**	**Title/Affiliation**
Andersen	Eric	President, Michigan Charter Boat Association
Boersen	Gary	
Burroughs	Bryan	Executive Director, Michigan Trout Unlimited

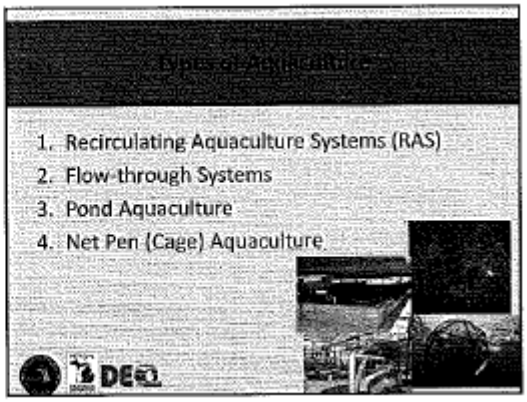
Colyn	Joe	Originz, LLC - Food systems for a healthier world
DeClerck	Jim	
Earnst	John	
Frank	Krist	Hammond Bay Areas Anglers Assoc.
Gleason	Rick	Regional Representative, Michigan Farm Bureau
Hammond	Sean	Deputy Policy Director, Michigan Environmental Council
Hamper	Louis	Aquaculture Consultant
Heritier	Thomas	State-wide President, MUCC
Herrick	Kent	President, Aquaculture Research Corporation
Johnson	Jim	Retired DNR Fisheries Research Biologist
Kaucheck	Lynna	Senior Organizer, Food & Water Watch
Marek	Gary	
McClintic	Gavin	
Merckel	Ken	President, Michigan Steelhead and Salmon Fishermen's Association; Lake Huron Sport Fishing Advisor, Great Lakes Fisheries Commission
Meyer	Don	Vice President, Trout Unlimited, Mershon Chapter
Olson	Jim	President, FLOW (Flow for Love of Water), Great Lakes Policy Center
Schwab	Vicki	Director, Delta County Economic Development Alliance
Smethurst	Dave	
Tanner	Howard	Retired DNR Director
Thomassey	Grenetta	Program Director, Tip of the Mitt Watershed Council
Vogler	Dan	President, Michigan Aquaculture Association
Walters	John	State Chairman, Michigan Trout Unlimited
Weeks	Chris	Aquaculture Extension Specialist, Michigan State University
YoungeDyke	Drew	Chief Information Officer, Michigan United Conservation Club

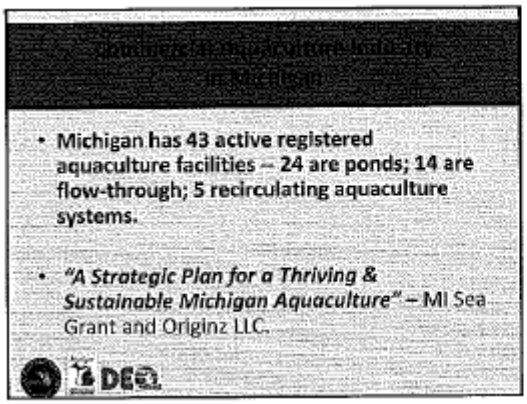
Appendix D. Presentation provided at the November 19, public meeting.











Proposals Presented to DEQ Agencies

Coldwater Fisheries, Inc.

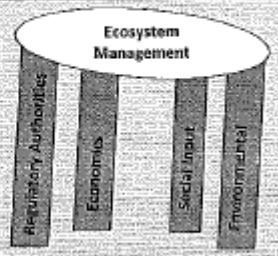
- Currently in Ontario waters of Lake Huron
- Proposing two sites in Bays de Noc
- Targeting 385,000 lbs of RBT

Project Rainbow

- Aquaculture Research Corp.
- Three possible sites in NLH
- Targeting 500,000 lbs of RBT

DEQ

Framework for Analysis



DEQ

Regulatory Framework

DEQ

Regulatory Framework – Current Legal Impediments to Expansion

- 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 to register a commercial net-pen aquaculture facility in the Great Lakes.

DEQ

Economic Analyses

Do the market and cost projections justify investment?

1. Small Business Development Corporation – *broad overview of aquaculture industry globally*
2. MSU Mr. Steve Miller, et al. – *economic models developed for site specific examples*
3. MSU Dr. Frank Lupi – *balance of natural resource assets with critique of economic model*

DEQ

The Business Case

- The US imports about 75 percent of the seafood it consumes.
- Growth constraints include feed costs, processing capacity, financing and experienced labor.
- Locating two one million pound facilities in Michigan would lead to up to 17 direct jobs, generating annual personal income of $1.2 million.
- This volume of production would likely contribute $4.3 million in annual gross domestic product, provided fish processing is done in Michigan.
- Recreational fishing in the Great Lakes is about $1 billion per year plus other tourism values.

DEQ

Key Issues or Areas of Uncertainty

1. Environmental and ecosystem effects
2. Fish health and disease concerns
3. Effects of fish escapes on wild populations
4. Human health concerns
5. Siting considerations
6. Gaps in existing body of scientific literature

DEQ

October 15, 2015

Great Lakes Net-Pen Commercial Aquaculture: A Short Summary of the Science

Submitted to the departments of Agriculture and Rural Development, Environmental Quality and Natural Resources

Eric J. Anderson, NOAA, Great Lakes Environmental Research Laboratory
John M. Dettmers, Great Lakes Fishery Commission
James S. Diana, University of Michigan, Sea Grant
Keith McCormack, Hubbell, Roth & Clark
James A. Morris, NOAA, National Ocean Service
David Scarfo, Aquatic Veterinary Associates LLC, USDA-APHIS-VS
Craig Stow, NOAA, Great Lakes Environmental Research Laboratory
Roy A. Stein, Chair, The Ohio State University

Science and Net Pen Aquaculture in the Great Lakes

The Panel Process

- Two meetings
- Agency presentations
- Conference calls with agency and industry personnel
- Multiple panel conference calls
- e-mail correspondence among panelists
- Three drafts discussed by panel
- Consensus-generated report, independent from agencies

Science and Net Pen Aquaculture in the Great Lakes

Overarching Management Approach - Active Adaptive Management

- Sample Before, After, Control, Impact – BACI design
- Quantify net-pen effects, differentiate from ongoing changes in Great Lakes
- Goal to increase production and mediate environmental effects

Science and Net Pen Aquaculture in the Great Lakes

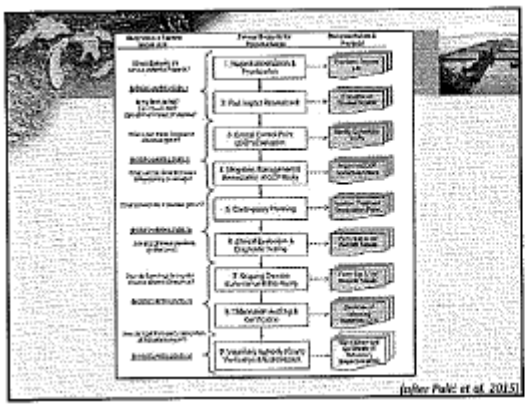
Operations

- Use sterile/triploid, native or naturalized fishes
- Monitor net-pen and cage operations
- Provide bonds to cover decommissioning costs
- Respond to Great Lakes issues, such as ice, zebra mussels, invasive species, etc.

Science and Net Pen Aquaculture in the Great Lakes

Fish Disease and Human Health

- No concerns with fish health advisories
- Use disease-free fish
- Work to improve disease surveillance, monitoring, and reporting
- Use licensed and USDA-accredited veterinarians for disease treatments requiring antibiotics, etc.
- Adopt biosecurity plans - disease prevention highest priority



(after Pahl et al. 2015)

Science and Net Pen Aquaculture in the Great Lakes

Ecological Interactions

- Effluents
  - ✓Capture/treat effluents – technologically infeasible
  - ✓Minimize ecosystem impacts by siting appropriately
  - ✓Use native or naturalized fishes
  - ✓Follow rigorous principles in Waples (2012) to reduce genetic impacts

Science and Net Pen Aquaculture in the Great Lakes

Siting

- Recognize how much we know and don't know
- Use rigorous data-driven modeling to characterize important site-specific metrics such as flushing
- Develop siting tool, similar that developed for siting wind power in the Great Lakes (Lakebed Alteration Decision Support Tool)

Relevant Data Sets for Assessing Siting Conditions in the Great Lakes

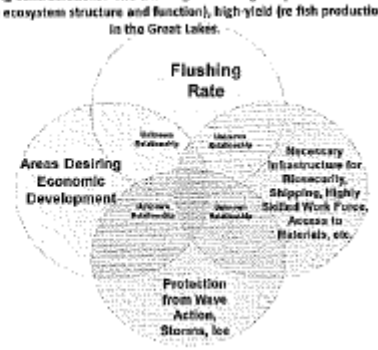
Data	Source	Link
Meteorological conditions	NOAA National Center for Environmental Information (NCEI)	http://www.ncdc.noaa.gov/
Oceanographic conditions	NOAA National Ocean Service (NOS) NOAA Great Lakes Environmental Research Laboratory (GLERL)	http://tidesandcurrents.noaa.gov/ http://www.glerl.noaa.gov/res/glofs/
Bathymetric data	Great Lakes Observing System (GLOS) NOAA National Center for Environmental Information (NCEI) U.S. Army Corps of Engineers	http://www.glos.us/ https://www.ncdc.noaa.gov/ http://www.usace.army.mil/
Lakebed Alteration Tool	University of Michigan	http://www.glpa.org/lakat
Ecological Data	EPA	http://www.epa.gov/glnpo/
General Information	NOAA-GLERL	http://www.glerl.noaa.gov

Science and Net Pen Aquaculture in the Great Lakes

Panel Reflections

- Consent Decree, Joint Strategic Plan, GLWQA 2012, LAMP
- The Precautionary Principle: Adopt, err on the side of caution because we don't have much experience
- Finite Phosphorus Loadings: QOL group limits P loading through regulation
- Critical siting considerations

Critical Siting Considerations: The challenge of finding net-pen sites with low-impact (re ecosystem structure and function), high-yield (re fish production) in the Great Lakes.



- **Web site with reports and ability to provide written input: http://www.michigan.gov/aquaculture**
- **Public meeting November 19, 2015**
- **Compilation of comments into last report**

- Email: DNR-Net-Pen-Comments@michigan.gov
- Regular mail:

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528

Thank You

Appendix E. Input received from the Indiana Department of Natural Resources.

DNR Indiana Department of Natural Resources

Michael R. Pence, Governor
Cameron F. Clark, Director

December 4, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer, Executive Office
525 West Allegan Street
P.O. Box 30028
Lansing, MI 48909-7528

Dear Ms. Guyer:

The Indiana Division of Fish and Wildlife (IDFW) would like to provide comments regarding the State of Michigan's review of proposals to allow commercial net-pen aquaculture in the waters of the Great Lakes. As a signatory to the Joint Strategic Plan for Management of Great Lakes Fisheries (JSP) and managing partner through the Lake Michigan Committee, the State of Indiana shares a common interest in the prudent management of Great Lakes fisheries and habitat.

IDFW applauds the efforts of Michigan's Quality of Life agencies effort to investigate the potential impacts associated with net-pen aquaculture. The document *Great Lakes Net-Pen Commercial Aquaculture: A Short Summary of the Science* provides a good review of those risks and the many uncertainties that surround such an endeavor. As the fishery resource agency tasked with protecting the public trust on behalf of our stakeholders, IDFW would like to express its opposition to expansion of net-pen aquaculture in the Great Lakes. The highly-connected nature of the Great Lakes ecosystem facilitates the spread of problems arising from invasive species, foreign genetics, parasites, or novel/highly-pathogenic diseases to waters far beyond the site of introduction. Such problems pose increased risks to the genetic integrity of economically valuable strains of sport fish propagated by Great Lakes fishery agencies and biosecurity of hatcheries relying on wild-caught broodstock, but more importantly the ecological integrity of the system as a whole.

As a signatory to the JSP, we strongly encourage Michigan to continue working cooperatively with other signatory agencies around the basin in selecting consensus approach to net-pen aquaculture on the Great Lakes. IDFW greatly appreciates the opportunity to comment on this and requests to be kept apprised of developments relating to this important issue.

Sincerely,

Mark Reiter, Director
Indiana Division of Fish & Wildlife

Appendix F. Stakeholder groups in opposition of commercial net-pen aquaculture in the Great Lakes.

ALLIANCE FOR THE GREAT LAKES

ENSURING A LIVING RESOURCE FOR ALL GENERATIONS

December 4, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 W. Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528

Re: Commercial Net-Pen Aquaculture

Dear Michigan Department of Natural Resources

These comments are submitted in reference to the science, regulatory and economic reviews done by the State of Michigan on commercial net-pen aquaculture by the Alliance for the Great Lakes (Alliance), a nonprofit organization that has advocated on behalf of the Great Lakes and the people who enjoy them for decades. The Alliance's mission is to conserve and restore the world's largest freshwater resource using policy, education, and local efforts, ensuring a healthy Great Lakes and clean water for generations of people and wildlife.

Net pen aquaculture, a form of aquaculture that only represents 2% of all aquaculture facilities in the United States,[1] does not currently exist in the United States' Great Lakes' waters. In 2014, proposals for net pen operations were submitted from Coldwater Fisheries Inc. for Little and Big Bays de Noc off Michigan's Upper Peninsula and from Project Rainbow for several locations in Northern Lake Huron. These proposals began the state of Michigan's investigation into the potential impacts of this type of aquaculture. This process culminated with the release of five reports in October of 2015 from the state of Michigan's Departments of Natural Resources, Environmental Quality, Agriculture and Rural Development, Michigan State University, and the Michigan Small Business Development Center. These reports analyzed the potential ecological and economic impact of net-pen aquaculture in Michigan's Great Lakes' waters.

Based upon these reports as well as additional literature, the Alliance for the Great Lakes believes that net pen aquaculture is not suitable for the Michigan's Great Lakes waters for the following reasons:

Net-pen aquaculture in Michigan's Great Lakes' waters is not currently legal. The Michigan Aquaculture Development Act, Act 199 of 1996, only allows aquaculture in privately held waters. The Great Lakes and their bottomlands are held by the state in trust for the benefit of the public.

[1] *Aquaculture Effluents and Waste By-Products Characteristics, Potential Recovery, and Beneficial Reuse. http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1014&context=ncrac_techbulletins*

150 N. Michigan Ave. • Suite 700 • Chicago, Illinois 60601 • (312) 939-0838 • alliance@greatlakes.org • www.greatlakes.org

Buffalo • Chicago • Cleveland • Detroit • Grand Haven • Milwaukee

Economic uncertainties outweigh the potential economic impact of net-pen aquaculture and should not put the Great Lakes at risk.

Estimates based on the two proposed net-pen aquaculture facilities in Michigan's Great Lakes indicate that create 17 jobs would be directly created, with $1.2 million in personal income, and with an additional 27 jobs indirectly created, with $2.5 million in personal income. Together, they are estimated to have a $4.3 million impact on GDP.[7] However, research has shown that jobs in the aquaculture industry are being automated at a rate of 2.4% annually and since 2011 international seafood has gained increasing share of domestic demand.[8] Additionally, there are industry related limitations currently present in Michigan that must be considered and could present challenges to potential growth of the industry. These limitations include the absence of a feed mill in Michigan, lack of access to financial capital, and limited supply of labor, skill, and expertise in the net-pen aquaculture industry in Michigan.[9]

When these economic doubts are combined with the potential ecological impacts from uncaptured feed and fish effluent and fish escapement, the potential benefit of net pen aquaculture does not justify the negative impacts that could be felt. Clean and healthy water in the Great Lakes is vital to the economy of Michigan, as well as the entire region. Tourism has $37 billion impact in Michigan, coming from millions of dollars spent on recreational fishing, charter fishing, and recreational boating. Additionally, these sectors provide over 21,000 jobs throughout the state. Commercial fishing, another sector reliant on a healthy Great Lakes provides a $14 million impact.[10]

The Alliance for the Great Lakes supports a healthy environment and a healthy economy throughout the basin. Net-pen aquaculture in the open waters of the Great Lakes, under the current regulatory, economic, and technological realities, is not suitable for a healthy environment and economy. Other forms of aquaculture, such as closed recirculating systems and flow through systems, should be explored in the level of detail that net-pen aquaculture has been to understand their potential impacts that will help Michigan provide economic opportunity while also protecting our most precious resource, the Great Lakes. Thank you for your consideration of our comments. Please contact Nate Drag, Alliance for the Great Lakes Watershed Program Coordinator, at ndrag@greatlakes.org or (716) 261-9393 or Molly Flanagan, Vice President of Policy, at mflanagan@greatlakes.org or (312) 445-9741

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[7] *Expected Economic Impact of Cage Trout Aquaculture on Michigan's Great Lakes*
[8] *Aquaculture Industry Report from IBIS World Industry Report 11251- Fish & Seafood Aquaculture in the US.*
http://www.michigan.gov/documents/mdard/Aquaculture-MI-SBDC_504298_7.pdf
[9] *Expected Economic Impact of Cage Trout Aquaculture on Michigan's Great Lakes*
[10] *Overview of Natural Resource Values Potentially at Risk from Consequences of Net-Pen Aquaculture.*
http://www.michigan.gov/documents/mdard/MSU-Dr-Lupi_504300_7.pdf

Anglers of the Au Sable Comments on
Great Lakes Net Pens and
State of Michigan Reports on Net Penning

December 4, 2015

The Anglers of the Au Sable are primarily interested in land based aquaculture, due to the ill conceived proposal for an industrial scale fish farm to be located at the old Grayling fish hatchery on the East Branch of the Au Sable River. Several aspects of the recent panel reports are germane to that interest. In general, we agree with the comments of Michigan Trout Unlimited, and would add the following:

Process Issues

There is a major concern with the makeup of the panel, which includes several members who are employed by organizations charged with promoting aquaculture in Michigan. As such, the panel cannot be said to be unbiased. This problem evidenced itself throughout the reports, especially the science and legal reports.

Legal Issues

There are several areas where we have disagreements with the authors. Most importantly, the appropriation of public waters and bottom lands, installation of the net pen structures and accoutrements, the pollution and impairment of the resource, and the interference of these operations with traditional public uses violates the public trust, other statutes, and the Michigan constitution. These legal barriers are, under the circumstances, insurmountable.

Scientific Issues

The scientific papers were particularly wanting. First, the research was incomplete, for example, with respect to the worldwide literature on disease and aquaculture. Second, the reports soft-pedaled the adverse effects that were identified. Finally, there was an assumption throughout that adverse effects could be dealt with by "minimizing" them, i.e., that some damage is both inevitable and acceptable. That is in

fact unacceptable, especially where public trust resources are concerned.

Land Based Aquaculture

Almost no attention was given to land based systems, especially flow through fish farms. This is a remarkable omission given the stated goal of using these systems for production of fish stock for net pens. A blind eye was turned on the damage that can be anticipated from net penning in the Great Lakes and its relationship to flow through systems.

Economic Issues – Costs and Benefits

As Dr. Lupi pointed out, the economic analyses being floated by boosters of aquaculture is severely flawed. First, they are based on very optimistic assumptions, such as an inflated market price for trout. Second, the economic risks are being downplayed, especially those related to tourism, recreational fishing, and waterfront property values, which have barely been considered. Finally, as MITU points out, the use of public trust waters for free, without any water treatment costs, using our rivers and lakes as sewers is not only totally inappropriate in and of itself, but ignores the competitive advantage it gives to net pen and flow through operations relative to responsible sustainable recirculating systems.

Adaptive Management

It has been pointed that the so-called adaptive management model that is being suggested by the aquaculture industry is not really the model. It is rather a model of trial and error; an uncontrolled experiment in our public trust waters. The burden needs to be placed on industry to show, prior to even considering these operations, that they will not damage, to any degree, our waters and bottom lands.

Respectfully submitted

Thomas A Baird, President
Anglers of the Au Sable

FLOW
FOR LOVE OF WATER

Protecting the Common Waters of the Great Lakes Basin
Through Public Trust Solutions

BEFORE THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES,
DEPARTMENT OF AGRICULTURE AND
RURAL DEVELOPMENT,
AND DEPARTMENT OF ENVIRONMENTAL QUALITY

COMMENTS ON AQUACULTURE FISH FARMING IN THE GREAT LAKES AND TRIBUTARIES OF MICHIGAN

Submitted by

James M. Olson

President
FLOW (For Love of Water)
Great Lakes Water Law & Policy Center
Traverse City, Michigan

November 19, 2015

153½ EAST FRONT STREET SUITE 203C
TRAVERSE CITY, MI 49684

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OVERVIEW

Aquaculture –often in the form of networks of enclosed pens that exclusively occupy a large area of surface water and underlying bottomlands—raises substantial legal, environmental, aquatic resource, and water use impact issues. Specifically, the use of public waters and bottomlands for the occupancy and operation of concentrated fish production raises a number of grave concerns, including: (1) exclusion of public access and other uses, (2) likely impacts from wastes and nutrient loading, (3) escaped fish pumped with antibiotics, and (4) interference with rights of boating, fishing, swimming, and other forms of paramount public uses that are protected by the public trust doctrine.

By definition concentrated aquaculture or fish farms that occupy surface and deeper water areas and occupy or are anchored or supported by bottomlands of the Great Lakes are subject to the common law public trust doctrine. Accordingly, any decision involving enclosed, pen concentrated fish-farming operations must be framed through the standards set forth under the public trust doctrine. This comment outlines the public trust framework critical to any state decision involving aquaculture in the Great Lakes and connected navigable waterways.[1]

I. The Common Law Pubic Trust Doctrine's Principles, Standards, Solemn Duties and Framework Apply to Proposed Pens or Fenced Concentrated Fish-Farming or Aquaculture in the Great Lakes and Tributary Navigable Waters.

By definition concentrated aquaculture or fish farms that occupy surface and deeper water areas and occupy or are anchored or supported by bottomlands of the Great Lakes are subject to the common law public trust doctrine. The public trust doctrine applies to all bottomlands and waters of the Great Lakes up to the ordinary highwater mark, whether by common law[2] or statute – the Great Lakes Submerged Lands Act (GLSLA).[3]

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1 The scope of these threshold comments does not address additional legal framework, because the public trust law and the MEPA questions are primary and controlling. FLOW's research on other applicable federal and state laws and central scientific and likely pollution and substantive issues is continuing. FLOW reserves the right to comment on these and related matters in the future.

2 *Illinois Central Railroad v. Illinois*, 146 US 387 (1892); *Obrecht v National Gypsum Co.*, 361 Mich 399 (1960); *Glass v. Goeckel*, 703 N.W.2d 58, 64–65, 73–74 (Mich. 2005); Joe Sax, The Public Trust Doctrine in Natural Resource Law, 68 Mich L. Rev. 41 (1970); James M. Olson, All Aboard: Navigating the Course for Universal Adoption of the Public Trust Doctrine, 15 Vt. J. Env. L. 148-151 (2014). All eight Great Lakes states recognize these public trust protected uses, which cannot be impaired or subordinated to private uses; private riparian uses on navigable waters are those connected to use and enjoyment of riparian land, such as docks, wharves, fishing, drinking and domestic water, irrigation for growing food, and commercial use of water, so long as it is reasonable.

The same is true for the provinces of Canada.[4] In the states, the doctrine also protects public trust waters and bottomlands, and aquatic and water related resources and public uses, from conduct or activities on land or tributary waters that impact navigable public trust waters.[5] They can occupy from 10 to 500 acres of surface water, the water column, and in some instances are anchored to bottomlands. This occupancy and the operation of concentrated fish production, in the nature of upland farm feeding animal production operations, necessarily excludes public access and uses, and carries with it likely impacts from wastes and nutrient loading, escaped fish pumped with antibiotics, and interference with rights of boating, fishing, swimming, and other forms of paramount public uses that are protected by the public trust doctrine.

The basic principles of the public trust doctrine are described below:

a. The Story of *Illinois Central Railroad v. Illinois*

In the late 1800s, Illinois Central Railroad persuaded the Illinois legislature to deed nearly a square mile of Lake Michigan for a showcase industrial beachhead for its operations. Not long after a newly elected legislature, emboldened from a continuing outcry from Chicago voters over the conveyance of Great Lakes waters and bottomlands, rescinded the deed. The state attorney general sent notice to the company that the deed had been nullified and to return it. The company responded with a firm "no," the deed was authorized by the legislature, signed and delivered; the property belonged to the

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While private uses are not property rights, the right to use is subject to 'reasonableness" and the public trust and protected uses in the navigable water. Maude Barlow and James Olson, Report to the International Joint Commission on the Principles of the Public Trust Doctrine, supra, at 8-25, 28-31; see also James Olson, All Aboard, supra, at 151-163. Along with the states, Canada and the provinces recognize in some form that water is public or held by the Crown in trust to assure navigation, boating and fishing (distinct from exclusive occupation of public waters for private fish-farming operations. Id. pp. 164-166.

3 Hereafter "GLSLA." MCL 324.32501 et seq.; Id., *Glass v. Goeckel.*

4 Id.; *Queen v. Meyers* [1853] 3 U.C.P. 305, 357 (Can.) (the right of the crown or sovereign is paramount to private uses: "Great Lakes and streams which are in fact navigable … must be regarded as vested in the Crown in trust for the public uses for which nature intended them – that the Crown, as the guardian of public rights, is entitled to prosecute [for the removal of impairment or obstruction] … which it is bound to protect and preserve for public use."

5 *Audubon v. Superior Court*, 33 Cal. 3d. 419, 434, 437 (1983); While not necessary for the scope of these comments regarding navigable public trust waters and bottomlands, the scope of the doctrine extends to nonnavigable streams use or impacts that feed navigable waterways, expanded the purpose of the doctrine to the "preservation of water's function as natural habitat." Id. "An important purpose of the public trust over bodies of water is to protect habitat for wildlife." Id.; Jack Tuholske, Trusting the Public Trust: Application of the Public Trust Doctrine to Groundwater Resources, 9 Vt. J. Env. L. 189 (2008); *Kauai Springs Inc. v. Planning Comm. of the County of Kaua'i*, 324 P.2d 951 (Haw. 2014).

railroad.

Not surprisingly, after a state and federal lawsuits, the case ended up in the U.S Supreme Court, which agreed with the State of Illinois. Conveyed or not, the deed was void because the state did not have the authority to convey Lake Michigan and its bottomlands in the first place. Why? Because all of the Great Lakes, their connecting waters, and navigable lakes and streams in the states are owned by the state, from admission on statehood, were subject to a public trust which forbids transfers, alienation and subordination of the surface waters and bottomlands of the Great Lakes for primarily private purposes.

The Supreme Court characterized these waters and bottomlands as a "title held in trust for the people of the state, that they may enjoy the navigation of waters, carry on commerce over them, and have liberty of fishing therein free from the obstruction or interference of private parties."[6]

"The trust devolving upon the State for the public, and which can only be discharged by the management and control of the property in which the public has an interest, cannot be relinquished by a transfer of the property."[7]

Nearly a century later, the Illinois Supreme Court rejected a transfer of public trust property to a steel company that was managed by the Chicago Park District on the grounds that it was primarily a private purpose. Moreover, incidental economic benefits such as taxes and jobs did not satisfy the public purpose requirement under the public trust doctrine standards articulated in the *Illinois Central Railroad* case.[8]

b. The Story of Michigan's *Obrecht v. National Gypsum Company*

In the late 1950s, after the passage of the Great Lakes Submerged Lands Act, a major industrial dock was allowed to be constructed far out into Lake Huron for loading and unloading ships in connection with an industrial mining operation. In 1960, the Michigan Supreme Court, noting the decision was a "forerunner" over the treasured inland seas

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[6] 146 US 452.

[7] 146 US at 460. The only exception to the rule against alienation or transfer is where there is (1) a predominant public purpose and (2) no substantial, meaning material, impairment of the public trust water, natural resources, or protected public trust uses. 146 US at 455-456; *Obrecht v National Gypsum Co*, 361 Mich 399 (1960).

[8] *People exc rel Scott v Park District*, 360 E2d 773 (1976).

known as the Great Lakes, ruled that the private industrial dock had been authorized contrary to the rule in *Illinois Central Railroad*. The Michigan Court adopted the principles in *Illinois Central Railroad*, holding (1) that generally that the dock could not be authorized by the state because the state did not have authority to relinquish control, lease or transfer the waters and bottomlands of Lake Huron for private industrial purposes[9] unless (2) the legislature expressly authorized it and the proposed or existing use or transfer was determined on the facts to constitute (a) a primarily private purpose, and (b) would not substantially impair or significantly harm or interfere with the public trust waters, natural resources, or public trust uses.

c. Public Trust Principles in Michigan

As characterized by the Michigan Supreme Court in a dispute over private or public control of a trout stream, "[W]hen Michigan entered the union of States, she became vested with the same qualified title that the United States had; that these waters and the soil under them passed to the State in its sovereign capacity, impressed with a perpetual trust to secure to the people their rights of navigation, fishing, and fowling."[10]

As noted above, public trust lands and waters cannot be exclusively controlled or occupied for primarily private purposes or operations to the exclusion of the public from its access or enjoying any one of the protected trust uses. Protected public uses include navigation, boating, hunting and fishing, swimming, and drinking water, and these protected public trust uses are paramount to any lawful and reasonable riparian uses, and exclusive to any other nonriparian uses. The public trust extends to the entire surface of a lake or stream and the lands beneath then,[11] and the trust also protects fish and fish habitat and other valuable aquatic natural resources in these public trust waters or on the bottomlands.[12]

Further, "trifling impacts" is no justification for finding no impairment, because cumulative or precedential effect, if a single project is authorized, must be considered as part of the impairment analysis.[13] The Michigan Supreme Court rejected a developer's argument that filling a few lots was de minimis in relation to the whole of Lake St. Clair and the Great Lakes, and ruled "[a]pplication of the [de minimis] doctrine . . . may involve making it equally so elsewhere. In total consequence, the state's trust interests ...

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[9] *Obrecht*, supra.
[10] *Collins v Gerhardt*, 237 Mich 38, 45-46, 211 NW 115 (1926).
[11] *Michigan v. Broedell*, 112 N.W.2d 517, 518-519 (Mich. 1965).
[12] *People v Babcock*, 38 Mich App 336 (1972).
[13] *Broedell*, supra; *Hixon v. Pub. Serv. Comm'n*, 146 N.W.2d 577, 589 (Wis. 1966).

public rights could be affected to an extent ... considerably more than a trifling matter."[14]

In addition, the public value of public trust waters, bottomlands, natural resources and public uses are presumed; anyone seeking to alter, use, control, or occupy these public trust waters has the burden of proof showing no public value, and no material impairment. Courts have readily imposed a burden of proof on the person proposing the use or transfer of a public trust resource.[15] The burden is based on the government's duty to ensure there is no improper alienation or impairment, and the fact that the public value of public trust waters or resources is presumed to be substantial or immeasurable.[16]

Finally, the duty on the state to affirmatively protect these waters, bottomlands, natural resources and ecosystem, and public trust uses is "solemn" and "perpetual." In North Dakota, the Supreme Court ruled that this duty included a duty to evaluate and establish a long term water plan to ensure no impairment of water resources under the state's public trust responsibility. In Michigan, courts have imposed a procedural duty to ensure that public trust standards or principles have been met based on duly recorded findings of fact.[17]

In summary, the following common law public trust standards and principles apply:

(1) No alienation, transfer, lease, deed, occupancy agreement for use and control for primarily private purposes.

(2) Even if primary public purpose, there can be no alienation, transfer, lease, occupancy, deed or permit for public trust purpose unless it is established based on consideration of substantial evidence that there will be no material impairment to public trust waters, natural resources, and/or public trust uses.

(3) There is a stringent "solemn" affirmative duty to protect the public trust waters, lands, natural resources, and public trust uses, and this includes consideration of all effects, necessity, alternatives, of a proposed project.

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[14] *Id.*

[15] *Grosse Isle Twp v Dunbar & Sullivan Dredging Co.*, 167 N.W.2d 311, 316 (Mich. Ct. App. 1969) (holding that substantial public value of navigable waters for public use is presumed); *In re Water Use Applications (Waiahole II)*, 93 P.3d 643, 657-658 (Haw. 2004).

[16] *Obrecht*, 105 N.W.2d at 149-151; *Ill. Cent. R.R. Co. v. Illinois*, 146 U.S. 387 (1892).This is akin to the precautionary principle, in that it would require, as a result of the nature of the public trust itself, a denial of the application to use until adequate information was submitted to establish no violation of the basic public trust principles would occur.

[17] *United Plainsmen Ass'n v. Water Conservation Comm'n*, 247 N.W.2d 457 (N.D. 1976).

(4) The burden of proof is on the applicant or person regarding public trust and no impairment standards.

(5) De minimus or "trifling impact" arguments do not apply to public trust questions when it comes to purpose and impairment; in other words, precedent and cumulative effects of precedent must be considered.

II. Proposed Pens or Fenced Concentrated Fish-Farming or Aquaculture in the Great Lakes and Tributary Navigable Waters Violate the Public Trust Principle Against Alienation, Subordination, Transfer, or Exclusive Control and Occupancy for a Private Purpose.

The substantive nature and purpose of proposed pen/enclosed fence and occupancy farming of the service waters of the Great Lakes and bottomlands constitutes an alienation, transfer, occupancy, control for a primarily private purpose. Therefore, the state cannot and should not entertain authorization of and/or allowance of if a statute is passed, for private fish-farming and aquaculture in the Great Lakes.

In addition, the Great Lakes Submerged Lands Act does not authorize this type of control or occupancy for private purposes and operations because the proposed conduct is not a lawfully recognized riparian use, and only a riparian owner can request authority and approval of projects that fall within recognized exercise of riparian rights on or in the Great Lakes. Fish farming and concentrated aquaculture operations are not riparian uses, and upland options exist for constructing, controlling, and growing or producing fish. Fish farming is agricultural production, not a recognized fishing or riparian and public trust use. Moreover, the Great Lakes Submerged Lands Act, even if deemed to authorize an application for aquaculture, authorizes only riparians, with the requirement of consent by adjoining riparians and the local community in which the land and waters are located.[18]

[18] MCL 324.32501 et seq.

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November 19, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
P.O. Box 30028
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Re: Net Pen Aquaculture in the Great Lakes

Dear Ms. Guyer,

We would like to thank the Michigan Department of Natural Resources for hosting a public meeting to discuss issues related to net pen aquaculture in the Great Lakes. Please accept these comments on behalf of Food & Water Watch and our over 27,000 Michigan supporters. Food & Water Watch is a national consumer advocacy organization that has worked for several years on fisheries management issues, including the impact of large-scale aquaculture on the environment, fishing communities, and aquatic ecosystems.

Two companies have approached the state with proposals to raise rainbow trout using net pens aquaculture systems in Lakes Huron and Michigan. Net pen aquaculture has never been practiced in Michigan's Great Lakes waters, and were it to be allowed, this experiment in aquaculture could wreak havoc on our Great Lakes ecosystem, drinking water for millions of people, and the economy.

The Great Lakes contain roughly 20 percent of the world's available, fresh surface water and with this incredible resource comes a tremendous amount of responsibility. The lakes provide drinking water for over 35 million people[1]. The lakes are home to various species of flora and fauna, several of which are endangered of threatened. One in every five jobs in Michigan is linked to the high quality and quantity of fresh water here in Michigan[2]. Tourism in one of the state's largest industries and is dependent on a healthy Great Lakes ecosystem[3]. Our agriculture, fisheries and shipping industries also depend on the Great Lakes[4]. Fishing contributes $3.8-billion to the Great Lakes Gross Domestic Product, and here in Michigan it creates almost 38,000

[1] University of Wisconsin, SeaGrant Institute. "Great Lakes and Wisconsin Water Facts." Available at http://seagrant.wixk.edu/Home/AboutUsSection/PressRomm/Details.aspx?PostID=796. Accessed March 4, 2015; NOAA. "About Our Great Lakes: Great Lakes Basin Facts."
[2] Mason, Jeff and Brittany Affolter-Caine. "Michigan's Blue Economy and the University Research Corridor." In *State of the Great Lakes 2014* at 22.
[3] Michigan State University, Extension. "Tourism." Available at http://bookstore.msue.msu.edu/topic/info/tourism. Accessed March 2, 2015.
[4] Snyder, Rick. "Governor's message." *State of the Great Lakes* 2014 at 4.

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jobs[5].

Net pens aren't a good idea in the oceans where there are strong currents and tides to move waste, net pens in the Great Lakes would present a whole host of challenges and unintended consequences that put our lakes and the life they support at an unacceptable risk.

We have three major concerns with net pen aquaculture systems in the Great Lakes: the waste produced, escapement and the spread of disease.

Waste:

Open net pen aquaculture releases effluent directly into the water. The waste, which includes uneaten feed and feces that contain nitrate, nitrite, ammonia, phosphorous, bacteria, and heavy metals such as mercury, copper, zinc, cadmium, and arsenic, settles in the sediment below the cages. The effects of these nutrient and chemical pollutants have been well documented, and increase with the size and concentration of the aquaculture operation[6].

A Canadian study of a trout cage aquaculture facility found that fingernail clams experienced 100 percent mortality when exposed to the sediment directly below the cage[7]. The scientists determined that the mortality could have been due to the increased copper, zinc, and ammonia concentrations in the sediment. Additionally, the clams sank completely into the sediment from under the cage, which likely inhibited their feeding and respiration.

The negative effects of net pen or cage culture are not limited to shallow areas with low rates of water exchange. In open ocean systems with heavy currents, the effluents can travel in the water column a significant distance from the cage. In fact, a review of existing studies on the environmental effects of offshore aquaculture found that the most significant effects in the water column 100-300 meters from the cage[8].

In the summers of 2014 and 2015 we saw two of the largest toxic algal blooms in Lake Erie in Michigan's history. In 2014, the toxic algal bloom contaminated the drinking water of roughly 400,000 people in the Toledo, Ohio area for three days. The business community suffered the consequences alongside residents as restaurants were forced to close for three days because they didn't have safe water to use for cooking or cleaning or safe drinking water to provide

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[5] American Sportfishing Association. Sportfishing in America: An Economic Force for Conservation. January 2013.

[6] Brambilla, et al. "A Meramod® model approach from the environmental impact assessment (EIA) of the offshore aquaculture improvement in the Algero Bay (Northwestern Sardenia, Italy)." Ital. J. Anim. Sci., 6(Suppl. 1): 791-793, 2007.

[7] Kullman, Marilynn, et al. "A sediment bioassay to assess the effects of aquaculture waste on growth, reproduction, and survival of Sphaerium simile (Say) (Bivalvia: Sphaeriidae)." Aquaculture, 266: 144-152, 2007.

[8] Sará, Gianluca. "Ecological effects of aquaculture on living and non-living suspended fractions of the water column: a meta-analysis." Water Research, 41: 3187-3200, 2007.

patrons. One of the largest contributing factors to the toxic algal bloom in Lake Erie is phosphorous from run-off from factory farms upstream of Lake Erie. Net pens would be contributing that same phosphorous directly into Lakes Huron and Michigan.

Escapes:

Escapes are an inevitable part of fish farming. Major escape events are common in the aquaculture industry, and these disasters can release hundreds of thousands of fish into the open ocean. For example, in 2011, 11 cages were destroyed in a storm in Scotland, releasing 300,000 salmon into the Atlantic[9]. Escaped fish can intermix with or displace wild populations, altering the integrity of an ecosystem. A review of 23 peer-reviewed studies concluded that hatchery-raised fish can harm wild fish through competition for food and habitat, harming the genetic diversity of wild populations and causing wild population declines[10].

Disease:

Farm fished can spread disease to wild populations before they even escape,[11] Disease is an unavoidable consequence of fish farming.[12] Diseases in fish farms can spread rapidly among fish grown in close captivity, which can result in spreading infection to wild populations. The spread of disease from salmon farms in Norway and the Pacific Northwest was explained at the Organic Aquaculture Symposium in 2007 and we urge you to study the impact that open net pens have on surrounding wild fish populations.

There is a way to farm fish in Michigan without causing damage to our Great Lakes; on land recirculation. Recirculation aquaculture utilizes closed systems, indoors to raise fish, but the aquaculture companies don't like this option. The start-up costs are significant because the companies are responsible for figuring out how to deal with their own waste. They'd much prefer an open, net pen system, where the impacts from the waste produced fall on the shoulders of taxpaying Michiganders. Net pens don't make sense in the Great Lakes, as such we urge the Department of Natural Resources to protect our Great Lakes, and the communities and industries they support and reject any proposals for net pen aquaculture systems in the Great Lakes.

Thank you for the opportunity to comment.

Respectfully submitted,

Lynna Kaucheck
Senior Organizer
Food & Water Watch

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[9] Thorsad. 2008 at 26 to 28.
[10] Wild Salmon Center.[Press Release}. "Growing risks from hatchery fish." May 24, 2012.
[11] Naylor and Burke. 2005 at 203.
[12] Asche, Frank et al. "The salmon disease crisis in Chile." *Marine Resource Economics, vol. 24.* 2010 at 406.

Great Lakes Committee
Izaak Walton League of America
10351 Decatur Avenue South
Bloomington, MN 55438
November 30, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
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Lansing, MI 48909-7528

To Whom It May Concern:

The Great Lakes Committee of the Izaak Walton League of America is composed of representatives of each of the Great Lakes States. Our primary purpose is to review and provide input on fisheries and water quality issues affecting the Great Lakes to our National office and work with colleague groups on common issues affecting the Great Lakes. Our members including several professional fisheries biologists have reviewed the materials available on this proposal.

We **OPPOSE** the proposal to allow aquaculture (net pen) operations to begin in Michigan **or any other waters** of the Great Lakes for the following reasons:

1. An operation of any magnitude would impact water quality and would be in violation of Michigan's water quality standards, the Great Lakes Water Quality Compact, the National Pollution Discharge Elimination System Program (NPDEP) and Concentrated Aquatic Animal Production (CAAP) because the fish feces and excess fish food cannot be collected and treated.
2. Escapement of net penned fish can potentially impact the genetics and health of native and naturalized species and compete for natural foods necessary for their survival and growth.
3. The bottomlands of the Great Lakes are a public trust and this proposal is not in the best interest of the public; endemic fisheries protection and water quality require decisions based on science not subject to profit interests.
4. An aquaculture operation in the Great Lakes would endanger the 7 billion dollar economy generated by sport fishery available to and enjoyed by the public.
5. It is doubtful water temperatures in Great Lakes waters are suitable for year around rearing of food fish to remain competitive with other aquaculture operations rearing the same or similar species at more consistent water temperatures.
6. Net pen operations will interfere with navigation of commercial, sport fishing and recreational vessels, a public resource.

All of these points of objection have been documented in the literature.

We recognize the necessity for increasing the availability of fresh fish for human consumption. However, we believe there are better suited facilities and means to meet this demand. As an example, it has been suggested that abandoned auto production facilities in Michigan could be retrofitted to accommodate aquaculture and would have access to treatment facilities to handle the waste products and prevent escapement.

We appreciate the opportunity to comment on this issue important to the future of the Great Lakes.

Sincerely,

Great Lakes Committee
Izaak Walton League of America

Jeanne Agneessens
Jill Crafton
Jerry Ernst
Rick Graham
George Guyant
Les Monostory
Charlotte Read
Robert Stegmier
Jim Sweeney
E John Trimberger
David Zentner

Comments concerning proposed Great Lakes Net Pen aquaculture

Frank Krist

November 27, 2015

Hammond Bay Area Anglers Association

I am a Board member of the Hammond Bay Area Anglers Association and our organization has concerns about the proposal to allow cage aquaculture in the Michigan waters of the Great Lakes.

Disease

I have reviewed the five reports on aquaculture issued by the State along with much other information. There are many aspects of cage aquaculture that could impact the wild fisheries and other uses of the waters but disease appears to be the largest threat. The State Science Panel Report (State, 2015b) provides the following recommended protocol for minimizing disease risks:

- Surveillance
- Reporting
- Prevention (biosecurity, best practices)
- Control (vaccinations, drugs, biologics and parasiticides)
- Eradication

It is mentioned in the Science Panel Report (State, 2015b) that when a large number of animals are concentrated in environments like fish cages, an outbreak of disease can be amplified. The five items above stated in the report are the suggested protocol for reducing and dealing with disease outbreaks in the Great Lakes, however, there was no discussion of the most debated and controversial aspect of cage aquaculture which is globally virulent fish diseases consistently plaguing cage operations with threats to wild fish populations (Ford, J. S. et al., 2008, Naylor R. et al, 2005 and Taranger G. L. et al., 2014). In addition, when fish or other species are crowded into unnatural environments like cages, the chances increase for a relatively benign disease organism mutating into a virulent form that could potentially spread to the wild fish populations (Godoy M G, 2014 and Pulkkinen, K et al., 2009).

Many proponents of the Michigan Aquaculture Association, 2014 Strategic Plan for a Thriving & Sustainable Michigan Aquaculture often use the Ontario Canada Lake Huron rainbow trout aquaculture industry as an example to show that there should be few problems if the industry is expanded in the Michigan waters of the Great Lakes. The operations in Ontario are very poor examples because the total cage fish production has been nearly stable and has annually averaged less than 8 million pounds over the last 15 years (Moccia R. D, 2015). On the other hand, the goal of the Strategic Plan which initiated the discussion of cage aquaculture in the Great Lakes, establishes an annual production goal of 1 billion dollars resulting in about ½ billion pounds of fish being produced yearly. The proposal is to reach this goal within 10 years with the majority of the fish raised in Great Lakes cages. In order to provide a realistic review, locations around the world with cage culture operations at high production levels must be evaluated and compared to the conditions in the Great Lakes.

Norway is an excellent example and has a large cage farming industry that produces annually about 2 billion pounds of mostly Atlantic salmon and rainbow trout. This industry has over 30 years of experience and in spite of a strict disease prevention protocol more stringent than the disease prevention protocol recommended above by the Michigan Science Panel, fish disease is a huge problem in Norway (Johansen R, 2013). Up to 15 to 20% of the cage fish production each year is lost to diseases which include: infectious salmon anemia (ISA), pancreas disease (PD), infectious pancreatic necrosis (IPN), skeletal muscle inflammation (HSMI), cardiomyopathy syndrome (CMS),

bacterial kidney disease (BKD), salmon lice, and other bacterial and viral diseases (Johansen R, Norwegian Veterinary Institute, 2010). Over 20 different diseases are being encountered.

It is very likely that if there is a major expansion of cage aquaculture in the Great Lakes, disease will become a serious concern. Since the cages placed in the Great Lakes would be open to the environment the disease organisms released by farmed fish through urine, feces and other fluids would accumulate in waste and water near the cage sites allowing wild fish to be exposed. In addition, it has been shown that disease organisms can be moved long distances from the cages by currents (Taranger G. L. et al., 2014).

A major shortcoming of the suggested State disease prevention protocol is the protocol focuses mainly on fish being disease free before they are placed in the cages. The protocol, however, does not discuss the problems of these caged fish being exposed to disease organisms that are naturally present in the environment around the open cages. Most of the diseases that currently cause problems with fish farms likely originate from wild fish (Taranger G. L. et al., 2014). Once infected, the large number of crowded fish in the cages increases the chances of disease outbreaks which can spread to the wild fish populations. In addition, these crowded cages provide a favorable environment for disease organisms to mutate.

Viral hemorrhagic septicemia (VHS) is an example of a disease present in the Great Lakes that exists worldwide in several strains (USDA, 2006). The most virulent strain originated in Europe and is prevalent in salt water. The strain present in the Great Lakes region has adapted to fresh water and it appears to have mutated from the European strain. The VHS virus is prone to mutating and it could change again. Another example is infectious salmon anemia (ISA) which devastated fish farms in Norway, Scotland, Chili, New Brunswick, Maine and other locations (The Center for Food Security and Public Health, 2010). The infectious salmon anemia virus has a tendency to mutate and evolve into virulent strains (Godoy M G, 2014) Currently, there is an intense unsettled debate that fish from cage farms in British Columbia are releasing infectious salmon anemia disease organisms into the rivers and infecting juvenile fish that are migrating to the ocean (Salmon Confidential documentary, 2013). A global assessment of the impacts of cage aquaculture on wild salmonids showed that in numerous areas wild salmonid numbers decreased steadily as cage farming increased (Ford, J. S. et al., 2008). Crowding fish together in cages increases the likelihood of diseases occurring and disease organisms mutating into virulent strains.

To deal with the waste and disease, the trend in Norway is to place the cages in deeper water up to about 1,000 feet deep (Taranger G. L. et al., 2014) in areas where the tides are strong. Water circulation near the cages is an important factor that is considered and the action of aggressive flushing with tides is vital. The State of Maine cage farming permitting protocol outlined in the State Regulatory Analysis report (State 2015a), stresses the importance of tides to facilitate removal of wastes. Cage permits are only issued in Maine for sites that experience a significant tide. Of course, in the Great Lakes the tides are minimal and flushing rates are much less. The main point to acknowledge is that even with heavy tidal flushing under the cages, disease and waste are still major problems globally.

Fish raised in cages are often bred to be more resistant to certain diseases (Johansen R, 2013 and Yanez, J. M., 2014) and this could make the wild fish populations more susceptible to virulent strains of disease organisms since the wild fish would have a lower level of resistance than the caged fish. The State Science Panel disease protocol did not address disease organisms genetically changing to more virulent strains in the crowded cages. As mentioned above, research has shown that the genetic mutation of disease organisms is a concern with fish cage farming (Godoy M G, 2014 and Pulkkinen, K et al., 2009). With the food web constantly changing and forage fish numbers fluctuating there is the potential of wild fish stocks being stressed from time to time and becoming even more susceptible to diseases released from the cages.

The Science Panel disease control protocol suggested by the report would only work effectively for closed recirculating systems and would not prevent disease organisms from escaping into the water from the open cages or diseases organisms in the environment from entering the cages. The Science Panel report notes that the prevention and control of diseases in wild populations is typically extremely difficult or impractical so once a disease spreads to the wild population there are usually few or no options.

Flow-Ice and impacts of strong winds.

During the 41 years that I have lived in Rogers City, Lake Huron has never froze solid enough from Cheboygan to Alpena to safely walk on it. This includes the last two extremely cold winters. Flow-ice during the winter moves daily down Lake Huron and normally each day the pattern of the ice changes.

Contrary to the cage farm sites located in Ontario that are surrounded by land and shallow reefs, nearly all the Michigan shorelines along Lakes Michigan and Huron are wide open and exposed to violent waves. There is a reason that harbors and other facilities are protected by large rocky breakwalls; the waves and ice flows are brutal.

During the public aquaculture meeting held in St. Ignace on August 24, 2015 it was stressed by one of the largest cage aquaculture operators in Ontario that he thought there would probably be no more than 3 or 4 suitable locations for cage operations in Lakes Michigan and Huron because of the wide open nature of the shorelines and lack of protection from the ice and waves.

Benthification of Lake Huron

Cladophora enrichment on a reef off of Alpena

Cladophora Muck along the shore in Thunder Bay MI

If cage fish farming in the Great Lakes became established, most likely the operations would be concentrated in a few bays because of the brutal nature of the waves and flow-ice along the mostly open shorelines in lakes Michigan and Huron as mentioned above. This would concentrate the nutrients and other waste in the bays and possibly increase significantly benthification or the concentration of plant matter and other organic material on the lake bottom because of the waste being deposited there and the filtering action of the quagga mussels.

I worked for the District Health Department in Presque Isle County for over 34 years starting in 1974. For the first time beginning in 2005, I received complaints of cladophora muck being deposited in rows along the beaches in Hammond Bay and along the northern shore of Rogers City during the summer and fall. These layers, which were composed of Cladophora, Chara and other organic debris were often 12 to 18 inches high. Many property owners and others were concerned about wading through the muck to reach a clean swimming area. There was also much concern from adults about the safety of children and pets when they wandered into the material.

This condition is occurring in spite of the open waters of Northern Lake Huron being extremely oligotrophic or nutrient poor. The question is, would the placement of several aquaculture cages in an area intensify this localized problem of accumulating cladophora muck on the shoreline along with the fouling of reefs.

The two photos above show the impacts of nutrient enrichment after the quagga mussels became established in Thunder Bay.

Conclusions

According to the 2015 Aquaculture Industry Report, over the last 5 years the aquaculture industry has suffered competition and declining demand. Since seafood is more expensive than other forms of protein such as chicken, the cost conscious consumers during this era of declining income levels are often electing lower priced options. Therefore, with the strong competition worldwide and the difficult environmental conditions for raising caged fish in the Great Lakes there will be pressure to reduce operating costs which could reduce emphasis on environmental concerns.

The industry is beginning to move slowly toward enclosed land based recirculating systems since disease is much easier to control in these facilities and no waste is discharged to the environment. The Hammond Bay Area Anglers Association does not support cage aquaculture in the Great Lakes but we do support the expansion of aquaculture in Michigan with the use of closed recirculating operations.

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Thank you for this opportunity to provide comments.

Frank Krist
515 S First St
Rogers City MI 49779
989 734-3100

International Federation of
FLY FISHERS
Conserving, Restoring, Educating Through Fly Fishing

Testimony on Net Pen Aquaculture and Fish Farms
Presented to the Michigan Department of Natural Resources

November 30, 2015

We are presenting these comments on behalf of the Great Lakes Council of the International Federation of Fly Fishers. The Great Lakes Council represents the interests of fly fishing anglers in Michigan, Indiana and Northwest Ohio. The Board of Directors of the GLC is unequivocally opposed to the establishment of cage pen fish farms in the Great Lakes as well the establishment of flow through fish growing operations like the one proposed for the AuSable River. Simply put, the risks to our cold water resources are too great to turn our Great Lakes and pristine trout streams into experimental sites for aquaculture.

The risks have been well articulated in much of the testimony presented at the November 19, 2015 meeting in Gaylord. These risks include: 1) escapement of farmed fish and subsequent degradation of wild fish genetics; 2) excessive amounts of fish waste and accompanying nutrients polluting our Great Lakes and stream habitats; and 3) the risk of disease spreading from farmed fish to wild stocks which has occurred in other fish farming operations.

Michigan is blessed with the world's greatest supply of fresh water through our Great Lakes and is home to some of the world's iconic trout streams. We cannot comprehend why our state leaders would experiment with unproven fish farming technologies that hold the potential to damage these irreplaceable natural resources and place our sport fishery and tourism industry at risk. While aquaculture may have a future in Michigan it should pursue that future using proven closed loop recirculating systems that are based on land.

Invasive species and other environmental threats already challenge our lakes and streams. We should not allow another threat to our greatest resource. The State of Michigan needs to take immediate and decisive action to stop the threat of cage pen Aquaculture in the Great Lakes and fish farms in our rivers.

Respectfully submitted,

Jim Schramm
President

Dave Peterson
Vice President for Conservation

Great Lakes Council
International Federation of Fly Fishers

Lone Tree Council
P.O. 1251, Bay City, Michigan 48706
(Fighting for environmental justice since 1978)

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan Street
P.O. Box 30028
Lansing, MI 48909-7528
RE: Great Lakes Aquaculture

Dear Ms. Guyer,

The Lone Tree Council (LTC) is an environmental non-profit based in the Saginaw Bay Watershed and we appreciate the opportunity to comment on Great Lakes Aquaculture, specifically net-pen fish farming. LTC and our members are strongly against any sort of net-pen fish farm in Michigan's Great Lakes, streams, inland lakes and wetlands. We urge the Department of Natural Resources (DNR) to protect our precious natural resources for today and tomorrow.

Reviewing the reports from the scientific advisory panel established by the DNR, Department of Environmental Quality (DEQ) and Department of Agriculture and Rural Development (MDARD) it is clear that establishing privately owned net-pen operations in public waters of the Great Lakes is not economically justifiable and poses too great of risk to our waters and public health.

The panel's reports proposed fish farms would:

- Dump untreated waste directly into the lakes, adding tons of phosphorus and nitrogen each year and potentially triggering toxic algae outbreaks like the one that shut down Toledo's drinking water source is 2014.
- Provide a breeding ground for diseases that could spread from caged fish to wild populations, putting the Great Lakes fishery and ecosystem at risk.
- Inevitably lead to the escapes that can have wide-ranging negative genetic effects on native populations and erode our wild fish population's ability to adapt and survive.
- Lead to introduction of invasive species if non-native species are raised in net-pens.
- Disadvantage environmentally friendly aquaculture systems, since these responsible, self-contained projects must capture and treat the waste they produce, rather than dumping its untreated waste into a public waterbody for free.

There can be benefits from aquaculture in Michigan, estimated that facilities could generate up to one million pounds of rainbow trout a year for human consumption. However, there is a better way to do aquaculture. Michigan already has closed-loop aquaculture ideally suited to the vacant warehouses plentiful in rebounding cities, these promising ventures re-circulate water and capture the waste. Completely separate from Great Lakes, streams, in-land lakes or wetlands, these operations can be a sustainable source of nutritious local food and economic development, while we keep the waters of Michigan protected.

LTC along with many other groups view the introduction of net pen fish farms into Great Lakes waters as one of the largest threats facing our cold water fisheries today. We urge the DNR to protect the "Pure Michigan" image and ban this practice.

Respectfully,

Terry R. Miller, Chair

DNR-Net-Pen-Comments@michigan.gov

From:	Adam Trenz [redacted]
Sent:	Wednesday, November 18, 2015 8:44 AM
To:	DNR-Net-Pen-Comments@michigan.gov
Subject:	Fwd: FW: Michigan United Conservation Club - Metro-West Steelheaders / Great Lakes aquaculture meeting November 19
Attachments:	Expansion of Aquaculture Resolution 06 2015.pdf
Categories:	Multiple Concerns

To whom it may concern. Please see below:

---------- Forwarded message ----------
From: **Matt Lubaway** [redacted]
Date: Wed, Nov 18, 2015 at 8:02 AM
Subject: FW: Michigan United Conservation Club - Metro-West Steelheaders / Great Lakes aquaculture meeting November 19
To: guyerh@michigan.gov
[redacted]

Dear Hanna Guyer,

I tried but am not able free myself travel to this meeting due to my work commitments. This issue is important enough that I would like put the our position on the record regarding The Expansion of Aquaculture in Michigan.

Metro-West Steelheaders chapter Michigan Steelhead and Salmon Fisherman's Association felt strong enough about constraining expansion that we presented a proposal to Michigan United Conservation Club last summer, which was accepted and is now their policy position, too.

Position in Summary

1. Works with state and federal agencies, First Nations, sporting groups, universities, private industry and others to evaluate the potential expansion of aquaculture in Michigan and assist regulators with risk assessment, planning and compliance with water quality and disease prevention regulations, recreational impacts, and other associated issues;

2. Works to establish state law which would include the Michigan Department of Natural Resources as having an equal voice in regulation of aquacultural practices which may be injurious to natural resources and especially the waters of the state which harbor sport fisheries upon which the fishing and boating industries depend;

3. Works to assure the protection of natural and developed populations of fish stocks and the accompanying recreational and commercial fishing and boating industries via establishment of mitigation procedures and monetary means to achieve these mitigations via adequate insurance policies or surety bonds procured by the aquaculture industry prior to any newly established aquaculture on, or discharging into the waters of the state.

We understand that the requested operations would be open net pens, which we are opposed to for aquaculture (with a possible exception to temporary holding pens to acclimate fish for imprinting). We have observed other open net pen operations in the Great Lakes and are keenly aware of the failing, pollution and disease resulting from those operations.

I note that safe aquaculture operations are possible, and we urge the DNR to hold for only safe (closed system or zero effluent) fish farms.

Please feel free to contact me if you have any questions.

Matt Lubaway

Metro-West Steelheaders Director

Michigan United Conservation Club Director

MUCC Fisheries Committee Chair

"The secret of success is to make your vocation your vacation." Mark Twain

THE EXPANSION OF AQUACULTURE IN MICHIGAN Resolution
Michigan United Conservation Clubs and Metro-West Steelheaders, June 2015

WHEREAS, aquaculture had grown tremendously around the world in recent decades and now meets nearly half the world's seafood demand, and
WHEREAS, marketing projections indicate that the demand will continue to grow, and
WHEREAS, recently there is more and more interest in farming aquatic organisms in Michigan, and
WHEREAS, expansion of aquaculture enterprises could lead to economic growth and job creation in Michigan, and
WHEREAS, Michigan has abundant aquatic resources which could supply an expansion of aquacultural activities, and
WHEREAS, many types of aquaculture exist from closed indoor systems, to pond culture, to flow-through pond/lake culture, to open lake net pens, and
WHEREAS, many of these aquacultural techniques and enterprises have at least some potential impacts on the surrounding natural ecosystem and recreational use of natural resources, and
WHEREAS, Michigan governmental agencies and the federal government have worked long and hard to strongly protect Michigan's water resources and associated ecosystem from pollution, invasive species and genetic manipulation of wild stocks of aquatic organisms, and
WHEREAS, since some past aquacultural enterprises in Michigan have resulted in disease transference to wild stocks, pollution to public waterways and releases of domesticated stocks into natural waters, and
WHEREAS, releases of domesticated or transgenic fish stocks into the environment may result in issues with cross breeding and reduction of genetic fitness in wild fish populations, and
WHEREAS, releases of excessive fish waste and unused fish foods from concentrated fish rearing facilities can cause high biological oxygen demand in surrounding and/or downstream public waters, reducing dissolved oxygen content and thereby negatively affecting native fish and wildlife populations, and
WHEREAS, any aquaculture enterprise on public waterways will restrict the public use of such waters and thereby diminish recreational use, and
WHEREAS, the establishment and success of one aquacultural operation in a specific region will likely lead to the desire for more development in the same region and the potential cumulative effects of aforementioned water quality, fish genetics and public use issues would be compounded and cumulative in these regions raising the need for strong safeguarding policies for water quality, native species, public recreation, and
WHEREAS, Michigan's many lakes and streams are extremely diverse in nutrient content, biological resiliency, diversity of species, thermal dynamics, watershed influences, socially acceptable uses, long-established recreational values, and many other factors, and these factors must be considered when proposing the location of any aquacultural practice.
THEREFORE BE IT RESOLVED, MUCC works with state and federal agencies, First Nations, sporting groups, universities, private industry and others to evaluate the potential expansion of aquaculture in Michigan and assist regulators with risk assessment, planning and compliance with water quality and disease prevention regulations, recreational impacts, and other associated issues;
BE IT FURTHER RESOLVED, that MUCC works to establish state law which would include the Michigan Department of Natural Resources as having an equal voice in regulation of aquacultural practices which may be injurious to natural resources and especially the waters of the state which harbor sport fisheries upon which the fishing and boating industries depend;
BE IT FURTHER RESOLVED, that MUCC works to assure the protection of natural and developed populations of fish stocks and the accompanying recreational and commercial fishing and boating industries via establishment of mitigation procedures and monetary means to achieve these mitigations via adequate insurance policies or surety bonds procured by the aquaculture industry prior to any newly established aquaculture on, or discharging into the waters of the state.

December 4, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528
Email: DNR-Net-Pen-Comments@michigan.gov

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.

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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 accidently 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,

Sean Hammond
Deputy Policy Director
Michigan Environmental Council

Judy Karandjeff
President
League of Women Voters of Michigan

Liz Kirkwood
Executive Director
For Love Of Water

Alexis Blizman
Legislative & Policy Director
Ecology Center

John Stegmier
Conservation Chair
Dwight Lydell Chapter of the Izaak Walton League of America

Michigan Trout Unlimited's Comments on Great Lakes Net Penning and State of Michigan Reports on Net Penning

December 4, 2015

Outline:

Introduction

Michigan Trout Unlimited (MITU) is opposed to allowing Great Lakes fish net penning, also referred to as cage aquaculture. MITU has an aquaculture policy adopted, which addresses all forms of aquaculture systems (http://www.michigantu.org/index.php/michigan-tu-contacts-2/michigan-tu-contacts-4/wild-fisheries-conservation/aquaculture-policy), and sets forth our opposition to any form of aquaculture or individual private aquaculture operation that does not or cannot prevent impacts and risks of their operation on our coldwater fisheries. We have extensively reviewed information from around the world for both freshwater and marine net penning operations, and conclude that this form of aquaculture is unable to prevent impacts or eliminate risks from their operation, and thus oppose any allowance of these operations in Michigan or the Great Lakes.

Net penning poses numerous vectors of degradation to public waters, public fisheries, and public uses of those. Among those vectors of damage are nutrient pollution, diseases, escapement and genetic dilution of wild fish stocks, chemical pollution, and interference with existing public trust uses. Net penning, by the implicit virtue of their mode of operation is unable to contain their nutrients, diseases, or domesticated fish livestock, and therefore is unable to prevent the impacts and risks they pose. Research from around the world confirms this fact. Net pens at best, can only seek to manage or minimize these impacts and risks, but are unable to prevent them. When global experience with net penning is combined with the unique physical, chemical and biological characteristics of the Great Lakes, we conclude that localized degradation is certain and far-reaching degradation of our fisheries is highly likely.

The Great Lakes ecosystem is one of tremendous current value. Its ecosystem goods and services are profound to Michigan's economy, livelihood, quality of life, and long-term viability and

vibrancy. We know that Michigan's high quality aquatic landscape is our key to attracting and retaining people and businesses; and conversely degradation to the quality of those waters will lead to lower desirability of people to live by them, businesses to locate by them to competitively attract skilled workers, and loss of tourism economies dependent on the quality of those waters. We also know that our Great Lakes are foundational to myriad forms of economic activity today, especially tourism related activities which are dependent on the high-quality of the Great Lakes and it natural resources (for affirmation of this, see Public Act 106 of 1945, the "Michigan Tourism Policy Act", section 2.101., and Michigan Tourism Council Strategic Plan http://www.michigan.org/lib/files/Industry/Tourism_Strategic_Plan/Tourism_Strategic_Plan.pdf and its list of top identified threats to health of the tourism sector http://msue.anr.msu.edu/news/what_are_the_greatest_threats_to_michigans_tourism_industry). The degradation of these existing economic activities posed by Great Lakes net penning is severe and unacceptable. MITU is especially concerned with the health of the recreational fishing economy that could be jeopardized. Michigan's recreational fishing economy is profound; supporting 1.7 million anglers, $2.4 billion in direct expenditures with $4.2 billion in economic impact (#3 nationally); supporting 38,000 jobs and $287 million in state and local tax revenue; and hosts 347,000 out-of-state anglers annually (#2 nationally). Allowing net penning puts that tremendous economic benefit at severe risk, is a bad business proposition (more to lose than can possibly be gained) and is unacceptable.

Some forms of aquaculture, principally recirculating aquaculture systems, offer a manner for commercial fish production to be done in a contained, controlled, and ecologically responsible manner. This form of aquaculture has traditionally been at economic disadvantage due to higher initial capital investment costs needed for the equipment which inherently makes them more ecological sustainable than other forms like net penning. These recirculating system operations have continued to develop despite this, due in some part to growing consumer awareness of net penning impacts, and demand for responsible fish products. Michigan is well positioned to support developing recirculating system aquaculture, however, allowance of net penning will create a further economic disincentive for it to proliferate (it also creates a competitiveness gap with other protein production such as beef, pork and chicken, which must pay to manage their wastes as well). Net penning inherently asks the public to subsidize its economic profitably by eliminating their requirement to manage their wastes, freeing them of the cost, which is shouldered by the public in the form of aquatic degradation and losses to well-developed public trust uses and economies. Michigan should not be subsidizing net pens in this way, nor should it be disadvantaging the competitiveness of the recirculating aquaculture system sector.

We found the panel report on ecological impacts of net penning, and the other accompanying reports to be useful in many regards, yet in no way effectively comprehensive in their search of useful information to frame this issue. We will discuss specific issues with the reports in a following section of this letter. However, one key overarching issue is important to highlight here. The panel proposed an Adaptive Management framework as a possible means to overcome the uncertainty surrounding Great Lakes net penning. First, we believe that there is sufficient certainty about the risks and impacts net penning is likely to cause in the Great Lakes (both brought forward in the panel report, and also provided in numerous other white papers and literature reviews on this subject which were more

comprehensive) that an experiment with the Great Lakes in the form of the so-called "adaptive management" is inappropriate, because it has no probability of success in testing a hypothesis that net penning will have no impacts. Second, the "adaptive management" framework proposed is not true adaptive management at all. Adaptive management is experimental manipulation of a system under management, to learn something new and useful about its behavior, such that it can possibly be managed in the future to provide greater benefit than possible without that information on its behavior. What the panel actually proposed was allowing a new activity with high certainty of numerous impacts and risks to be monitored extensively (at partial public expense), so those suspected impacts could possibly be documented; presumably with the intent to then ask the operators of the net pens to fix something about their operation which we know in most ways, they are unable to effectively fix. This proposed framework of the panel is not adaptive management, not responsible, not equitable, and is not acceptable.

Michigan Trout Unlimited's Policy on Aquaculture

MITU's board of directors adopted a policy on aquaculture in 2015. This policy can be accessed at (http://www.michigantu.org/index.php/michigan-tu-contacts-2/michigan-tu-contacts-4/wild-fisheries-conservation/aquaculture-policy). It addresses aquaculture as a whole, in all of its types. Please refer to this document in considering our comments on net penning. It covers all of the issues of concern we currently see with aquaculture and puts forth conditions for each in which we would need to see with an operation before we could support it. Our position, is that we oppose and expansion of aquaculture in Michigan unless it can be done so as to prevent any impacts, and eliminate risks of impacts. We recognize a spectrum of impacts and risks posed by different forms of aquaculture, with net penning being on the side of that spectrum where its impacts and risks cannot be prevented currently. As such, we are opposed to Great Lakes net penning. This policy can be found in Appendix A of this comment letter.

Comments on State of Michigan Reports on Net Penning

Panel Report on Ecological Factors

- Panel Members. Some panel members were selected who work for organizations, such as NOAA and Sea Grant, who have organizational directives to support aquaculture development. This is a possible form of bias which could have influenced the paradigms in which these members approached this report.
- Appendix A of the report provides the specific questions posed to the Panel by the Quality of Life Bureau (QOLB). The panel report extensively failed to address a majority of those specific questions. Those questions were presumably identified as critical information needed by QOLB to properly consider net penning and understand how to regulate it, if it were to become legalized. As such, the panel report failed to provide a majority of the necessary information, leaving citizens and QOLB without critical information.
- Adaptive Management, BACI approach. As discussed in our introduction, the adaptive management approach proposed in this report, is not actually true adaptive management,

and as proposed is inappropriate (reasons provided earlier). Despite proposing a BACI approach to monitoring, this approach was not elaborated upon in sufficient detail to determine monitoring details, and whether or not the monitoring would have an ability to document many of the impacts we anticipate from net penning. Further, the Panel suggests that much of the cost of this monitoring would likely need to be provided by the State of Michigan. As taxpayers and fishing license purchasers, we find spending preciously limited public funds of the DEQ and DNR for the economic benefit of a private business enterprise with certain impact to our natural resources deplorable.

- The coverage of "the Ontario Experience" was not only significantly incomplete, but lopsided and biased. For example, the Panel failed to discuss:
    - How they had a closure in the La Cloche channel, why, and how long it took to recover.
    - Ontario Ministry of the Environment reports of field sampling conducted by various net pen operations which showed consistent violation of "severe effluent limits" in "far field" areas, outside the permitted boundaries of the operations (Thornburn 2007, Errata from the Canadian Freshwater Symposium, AAC Spec. Publ. No. 12 (2007).
    - The 2009 Ontario regulatory framework for new net pen operations, and the white paper series that went along with its development (all easily accessible). This regulatory framework, along with the past surveillance, resulted in siting rules, that do not allow consideration of any new permit anywhere other than in full exposure open lake deep sites (not the type of sites the existing operations are located in currently).
    - How all existing net pens there began operation prior to the requirement for an environmental assessment, and have not been required to undergo them during permit renewals.
    - Which types of relevant information have and have not been collected by Ontario.
    - Ongoing public debate and federal policy formation to address problems Ontario continues to have with these operations. CAN Senate Committee on Fisheries and Oceans has been investigating regulatory reform on this topic since 2014.
- The Panel failed to address the impacts from expansion of "flow-through" hatcheries commensurate with net-penning to provide the juvenile fish annually raised in the net pens. The MAA strategic plan for example, has an enterprise budget scenario for net penning of rainbow trout in Michigan showing approximately half the cost of the initial start-up of net penning operations will go toward their associated land-based rearing facility, where they take purchased eggs and raise them till time of release into pens. Despite this, no real discussion of the extent or plans involved in the land-based support systems for net penning were provided.
- The Panel failed to identify, synthesize and reference certain key "white papers" on the subject of cage aquaculture. James Morris, panel member, was co-author on a NOAA technical memo synthesizing many aspects of cage aquaculture (excluding coverage of diseases and escapement), but while referenced, the summaries in it were not prominent in

the report. Also, to name a few key other papers that were excluded, Hutchings, et.al. (Environ. Rev. 20: 220–311 (2012), NRC Research Press)), did a review of the subject for the Canadian government, and published the results in peer reviewed literature. Hutchings has also been a key researcher in this field who has provided numerous key papers on the subject, none of which were identified. Additionally, Ontario produced a series of white papers on this subject, which helped inform their new regulatory process of aquaculture, and these papers were not identified in the report. Nova Scotia also undertook an extensive process of net pen review leading to their ongoing development of a new regulatory process for net penning. They also collected and summarized much pertinent information on this subject, and those are readily available as well.

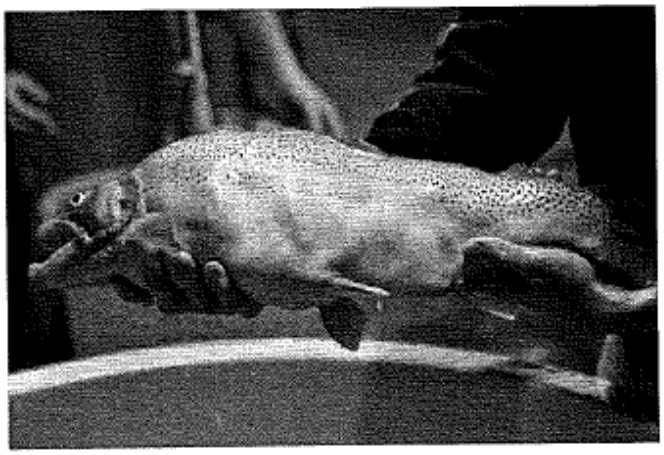
- In the findings report of a Nova Scotia panel sanctioned to report on problems with current regulation of net penning and make recommendations for necessary improvements, the following key finding was provided: *"For fin-fish and other kinds of aquaculture, the regulation of aquaculture will change in fundamental ways under the proposed framework. For example: a. The regulation of aquaculture will be functionally separated from the promotion of the aquaculture industry."* We note this here, because the QOL Bureau in Michigan has been working "in unison" to evaluate the prospect and concerns with allowing net penning to occur, including regular meetings of the DRARD, DEQ and DNR with the industry. While this may appear to be a positive manner to approach this subject, we have concerns over whether this approach serves to mute some of the unique responsibilities, missions, and mandates of the individual departments. In Nova Scotia, where governmental promotion of agriculture interests has intermingled with or influenced governmental responsibilities for environmental protection and natural resource management, it has led to widespread public mistrust of the entire government's ability to responsibly consider net penning in light of the public trust.
- The Panel routinely uses biased phrases to move through discussions of various topics of impacts created by net penning. For example, "to assure that impacts are localized", "to limit these impacts", "while minimizing escapes", "Only 3-4 catastrophic failures have occurred...". These language choices are pervasive throughout document, and illustrate the personal biases of the members. The writing was not consistently unbiased and scientific in its fact finding, but injects value-based judgments on what level of impacts should be acceptable to Michigan citizens. The Panel was not asked to give its opinion on whether impacts are okay if only localized, if "limiting" impacts is okay compared to preventing them, if minimizing escaped fish rather than preventing them is ok, or if 3-4 catastrophic events is a low number, or shockingly high since they can't be prevented from occurring. These language biases jeopardize the perceived credibility of the report, and subtly bias readers. A "short summary of the science" should be that – not an opinion based interpretation of some of the science.
- The Panel appropriately identifies escapement of fish as a serious risk to wild fisheries, such as our steelhead fishery. Yet, they only encourage the use of triploid fish (while noting that process as imperfect), and recommend the operator only use the "most reasonable" method for "reducing" the reproductive capacity of the fish. Escapement is not preventable

with these operations, it occurs ongoing and in large episodic events, and the number of escaped rainbow trout we could expect annually could outnumber the spawning steelhead rainbow trout sustaining the Little Manistee River and our entire hatchery production annually. It is unacceptable to introduce this risk into our recreational fishing economy.

- Diseases. The report goes to great length to provide information about available protocols for fish livestock health testing and management. However, while those procedures can help manage disease in the livestock fish, and help reduce risk of disease epidemic spread to wild fish, none of them prevent epidemics from occurring in wild fisheries, nor do they offer viable response plans for dealing with those outbreaks in wild fish shall they occur. While an MDARD vet may check the health of the captive fish, and prescribe anti-biotics, that does not provide any sufficient means to track health of wild fish, prevent epidemics, or even control the wild fish disease epidemics once they occur. Can we look forward to our wild fish passing normally harmless diseases to the livestock fish, those diseases being amplified and made more virulent or anti-biotic resistant, becoming epidemics, crashing wild fisheries, and then the public being asked to pay for more nets to help keep our remaining wild fish from contaminating the livestock fish? Our salmon fishery is facing collapse, are we trying now to collapse the steelhead fishery too? How about the remaining lake sturgeon? The Panel Report states, with wild fish epidemics, "their impact on ecosystem structure and function is difficult to fully determine". They provide no plans in their BACI approach to overcome this.
- Siting. The Panel suggests that siting will be very critical to determine and regulate, and we agree. Unfortunately they did not develop the thinking behind necessary criteria further, at least biological, chemical and physical. For instance, if uncontrolled phosphorus pollution and loading were to be allowed, they mention needing certain water depths and flushing rates to spread it. Ontario's experience and regulations have addressed that, and now only consider sites with full exposure in open lake settings. However, those sites are not suitable because of ice damage, accessibility, and inability to secure the nets given Great Lakes storms. Those two considerations alone eliminate feasible siting. Numerous other biological, physical, chemical as well as social considerations (public trust existing uses), will preclude any viable siting.
- Decommissioning. We agree with the panel about decommissioning needs prior to permitting, but the Panel again conditions this requirement on returning sites' structure and function back to original conditions "as close as possible". As close as possible is not adequate. The owner/operator of the business should be responsible for returning the site to original conditions or better, and for paying for all necessary monitoring it takes to accomplish that.
- Fouling Agents. No discussion was provided concerning anti-fouling chemicals commonly used by the net pen industry. These chemicals have posed severe problems when used by net pens in other parts of the world.
- The discussion of Integrated multi-trophic aquaculture as a means of potentially reducing impacts is unnecessary. The Panel discusses it, as to put forth a potential encouraging

means of minimizing impacts, but then later recognizes it's not feasible for Great Lakes waters.

- Summary recommendations provided would not suffice to regulate net pens to prevent impacts and risks.
- Regulatory Authority. Discussion of the adequacy of NPDES permits to protect the environment failed to consider the loophole that the "anti-degradation clause" permits.
- Invasive Species. The Panel mentions "we recommend that policies continue to limit aquaculture to only native and naturalized species to avoid risk of future introductions". Existing policies however, allow non-native and non-naturalized species to be raised, via the "experimental" condition in the aquaculture license. The State of Michigan currently is allowing barramundi to be raised in Michigan as an example. So their premise that current policies are restricting these species from being raised is a faulty premise.
- Nuisance and harmful algal blooms. This topic is given some coverage, and the Panel accepts that net penning has the means to cause these. More scientific exploration of this would have been desirable, as their proliferation not only poses a possibly severe impacts to aquatic life, but also tourism on our beaches, private property rights, and human health with the basic right of drinking water.
- As recreational anglers, we reject the premise presented that the main interaction with recreational fishing and net pens is generally positive, with anglers going to acts of vandalism to release livestock fish. This reference came from an Ontario official from the equivalent of the Agriculture department, not a fisheries manager. A casual comment such as this has no place in a document entitled "a short summary of the science". In Michigan, anglers depend on the long-term health and resiliency of healthy fish stocks. That included tremendous efforts to support wild fisheries, and periodically replacing hatchery stocks as there domestication level leads to poor performance in the wild. The main interaction between net pens and our recreational anglers will not be generally positive. This was a poor section of the report, poorly covered, not science, and with bias.
- The cover photo for the report shows a rainbow trout, caught by angling (fishing line attached to mouth). The commercial or wild origin of the fish is unknown, but it does depict a healthy looking rainbow trout with no fin decay or physical abnormalities typical of domesticated rainbow raised in high densities. Perhaps a better photo for the report cover would be something like found below – a transgenic rainbow trout developed for better commercial production and profit. Photo at http://www.sciencedaily.com/releases/2010/03/100310113540.htm, courtesy of the University of Rhode Island. Perhaps this photo might better reflect the dichotomy of goals between wild fishery management and commercial fish production, and the inherent threat of escapement?



Economics Papers

-The most glaring concern with the two economics papers relates to Dr. Lupi's identification of the Miller, Mann, Knudson paper's use of a price per pound of rainbow trout estimate that was roughly twice the national average. Despite, this, Miller et al were apparently not required to address this point in a revision of their report. Using an estimate that is nearly twice the national average, without providing robust justification to warrant its use, equates to allowing the economic projections of the net pens to be suspiciously doubled – creating perceived bias in the findings. Despite this issue being raised in report form, QOLB did not require the issue to be reconciled prior to release of the reports. This unreconciled estimate of the economic benefits of the net pen operations is now in use, including in presentations used by the QOLB at the public meeting, and in the media. This problem should be addressed, with required revision of the Miller et al report. Care should be given to carefully reviewing what the justification or rationale is for the valuation used. The Miller et al. report only states that they used the $2.75/lb. price as it was used by Weeks and Knudson 2014. That reference is the MAA strategic plan. When that plan was reviewed, the only mention of the $2.75/lb. estimate was found in the "enterprise budgets" section of the report. In that section, where the rainbow trout net pen scenario is provided, they only say "The sale price is $2.75 per pound." The references for that section site only a study of Nowegian salmon farms, and a shrimp aquaculture study. This hence, leaves a reader to assume that there is no justification for 2.75/lb., but its use was forwarded along by authors not pursuing the validity of their assumptions. Lupi provides comments on the details of rainbow trout pricing in Michigan, referencing prices from national statistics and price dynamics applicable to MI net pen expansion (NASS 2015, and Gvillo et al 2013), which suggest the national average of $1.63/lb. in 2013 should have been used. If the public must attempt to consider balancing the potential economic gains with the potential economic losses than the public must be informed in this regard with accurate information. Please consider having this net pen economic analysis redone and reposted with appropriate product pricing.

Regulatory & Legal

- NPDES. MITU has concerns over the adequacy of this permitting structure to ensure water quality and designated uses of waters when applied to net pen operations. First, the report highlights that net pens will qualify for technology based standards, which require use of best management practices to control discharge of pollutants from the facilities. We are both unaware of any best management practices specifically for this net penning; and also are confident that any such best management practices that were created would be insufficient to prevent its pollutants. The Panel report states that there is no way currently available to collect the wastes associated with net pens. So the only BMP's we are likely to get will be focused on feed content and feeding dynamics. Both will be insufficient to prevent nutrient pollution. Escaped fish and diseases can also be governed by this NPDES, and similarly, any BMP's created will at best, minimize those pollutants but are not able to prevent them. On this point, perhaps the greatest weakness of the NPDES permit in practice, is the use of discretion in applying the anti-degradation clause. In practice, it can be used as a loophole for unacceptable levels of pollution, by simply stating that the pollution levels are necessary in order to achieve the social or economic gains of the operation. This clause should be used to test whether the gains of the operation are greater than the possible social or economic losses from the operation – but it's commonly not. The result is a loophole which makes NPDES permitting less than a confident tool for ensuring environmental protection. Given its use recently, as applied to the Grayling fish farm, we no longer can view NPDES permitting as an existing adequate regulatory safeguard to protect citizens of Michigan from net penning.
- Aquaculture Facility Registration. This section states "Because of the potential long-term impact of escaped fish on the Great Lakes fish populations, the Model Program will need to be strictly followed." This section does not explain what the "Model Program" is, or how it's suitable as a safeguard against escapement issues. Also, in choosing wording, its pointed out that this act currently prohibits net penning in the Great Lakes – so the wording in the previously quoted sentence should be " ... the Model Program *would* need to...". Use of "will" signals a judgement from the authors that the law will be overturned.
- Aquaculture Facility Registration. As noted previously, this act has been allowing the use of non-native, non-naturalized fish species through "experimental" license status. This issue needs to be addressed.
- Public Trust Doctrine. This legal concept received no coverage in the report. It is a highly relevant legal concept that will come into play on this issue. It's a basic and foundational legal concept and mandate, the report could use some mention of it in regards to net penning.
- Ontario's "Experience". Ontario has a relatively new regulatory process for net penning. This section of this report does not reflect enough of the details of that process. For example, they have established siting rules, which would have been useful to bring forward here. Also, while they have 6 permitted operations, there was no discussion of them all having been given prior to requirements for environmental assessments. Since new

requirements have been in place, they have not issued a new permit for net penning to our knowledge. These facts paint a different picture of "Ontario's Experience". It would have also been useful to dig deeper into actual compliance reporting results, how often violations have been recorded, and how effective the current operators actually have been in addressing them. It's been hard for the public to get a true picture of how Ontario net pens have performed. Some have used the scarcity of information to falsely project a "clean record" for those net pens. This section would have been well-served to take a deeper investigative approach to bring forth a clearer picture of their true experience.

Conclusion

With growing populations, the world may indeed demand more fish protein. We understand that assumption, and the need to develop systems to accommodate it. However, there are both shortcuts to that, and proper responsible sustainable paths to it. Net penning is a shortcut, attractive to the owners of those operations who will profit from their competitive advantages. The cost of those competitive advantages will be paid by the public in terms of health risks, water quality degradation, and loss of existing high value sustainable economic uses of our waters and shoreline. The subsidies for net pens paid for by the public will put the long-term sustainable forms of fish production at great disadvantage and will set us and the world back from true solutions to our fish demand indefinitely. Allowing net pens in the Great Lakes would be bad public policy.

In Michigan, there exist so many compelling and intelligent reasons why net penning will cause damage; biological, ecological, physical, chemical, economic, social, and health. Any one of these should be enough to confirm that net penning has no place here. Taken cumulatively though, it must be apparent that there is no way through this proposition without unacceptable losses. Some grand BACI experiment with our resources, as proposed, will at best simply partially document the problems to be created and partially tell a picture of the losses we will suffer long-term. Net pens are unable to prevent or mitigate all of their damage. All over the world, where these have been allowed, there have been problems. Some states/countries simply accept the damage in trade for the gains (perhaps they did have much to lose to start); some places have struggled with existing operations, learned, and have crafted new regulatory safeguards that functionally prevent any new net pens (while wishing they could now get rid of the ones they have); other places have learned from the experience and mistakes of others and prevented net penning from starting there. Alaska for example, with their proud heritage of natural resource use, still recognized they had far too much of value to lose by allowing net pens, and banned it. Michigan receives more out-of-state anglers annually than Alaska. Michigan has not allowed net pens, and should be wise enough to learn from others' while protecting the wealth of what our waters provide for us currently.

From a fisheries perspective, net pens will create numerous types of damage to our fisheries, and pose risks to them that we are economically not equipped to absorb. If we create the vector for wild fish disease epidemics, with far reaching impacts to species like salmon or steelhead, walleye or perch we will have created an economic loss to the state which will far outstrip all economic gains from net penning. And there will be no quick fix or solution. We know with certainty and experience that

genetic introgression of heavily domesticated fish with wild fish, will decrease their fitness in the wild. How long will it take for annual escapes of domestic rainbow trout, with periodic large-scale losses, to cause our steelhead fishery to decay? Will we recognize its happening when it does? Can we afford the loss of our vibrant steelhead fishery, which is now helping to sustain Great Lakes fishing and supports year-round destination fishing in our rivers – No. Are the potential losses greater than all the cumulative gains from net penning – Yes. Can we afford the closure of marinas, restaurants, lodging and retail in "waterfront" communities all over Michigan – No. Can we afford the loss of local tax revenues when riverfront properties around Michigan decrease in value when our tremendous fisheries diminish – No.

There is no perfect analogy to this Great Lakes net penning proposition that can fully show it for what it truly represents. But, it is not much different from a proposal to allow a commercial farm to raise hundreds of thousands of domestic turkeys or deer in a netted facility, on a southern Michigan State Park land; where the animal waste would be allowed to be spread on the adjacent State Park lands (to be "assimilated"); where the smell of the waste would be viewed as only a potential nuisance (like nuisance algal blooms on beaches); where disease transmission would occur freely through the fence (flowing water is a far better transmittance factor than air, or direct contact); and where you would knowingly approve of ~9,000 animals escaping annually (3% of 300,000 animals – taken from Panel Report), with even larger occasional catastrophic escape events. This kind of a proposal would be viewed as preposterous, and consideration of it ended quickly. We encourage a similar view of net penning in the Great Lakes.

Thank you for consideration of our comments.

Respectfully & Resolutely,

Michigan Trout Unlimited

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Appendix A. Michigan Trout Unlimited's Aquaculture Policy.

MICHIGAN TROUT UNLIMITED AQUACULTURE POLICY POSITION

PURPOSE:
The purpose of this document is to state Michigan Trout Unlimited' s ("MITU") policy in regards to the growing aquaculture movement both within the waters of the State of Michigan and the Great Lakes. MITU is concerned about impacts aquaculture may have on Michigan's coldwater fisheries and their watersheds. Aquaculture occurs in three basic forms: closed pond systems, stream flow through systems, and open water net pen systems. Each comes with its own concerns and each will be discussed in sections of this policy.

MITU General Policy Concerning Aquaculture:
MITU is not opposed to aquaculture in Michigan or the Great Lakes so long as it is strictly regulated in a way that absolutely ensures no harm to Michigan's coldwater fisheries and their watersheds. This means that regulations for aquaculture must ensure that no impacts can occur from this activity, and that all risks posed are eliminated. Private operations must not be subsidized by the public by allowing negative impacts or diminishment of our natural resources or the existing uses and benefits provided by our natural resources; nor shall the risks posed by aquaculture operations put our natural resources and their uses in any jeopardy.

Requirements to Ensure No Harm:
The following will list potential harms from aquaculture and MITU's current position on standards to prevent such harm.

1. Water Temperature and Dissolved Oxygen:
High water temperature and low dissolved oxygen impacts will mainly occur from stream flow through systems where diversions of flow from coldwater streams are shunted through raceways or ponds and discharged back into the same stream. This diversion can significantly increase temperature and reduce dissolved oxygen in the water that is discharged back into the stream which will directly impact coldwater fisheries and lower their abundances or extirpate them from miles of streams. With Great Lakes net penning, waste effluent and nutrients can create biological oxygen demand in surrounding waters leading to dissolved oxygen depletion and/or anoxic conditions.
a. Regulatory Standards to Prevent Increased Water Temperature:
i. Water chillers must be made part of all flow through systems to ensure discharge water is at the same or lower temperature than intake water.

ii. Constant temperature monitors must be utilized to ensure the appropriate discharge temperature and close the system if temperatures increase above the intake temperature.

b. Regulatory Standards to Prevent decreased Dissolved Oxygen.

i. Oxygen diffusers must be made part of all flow through systems to ensure discharge water is at the same or higher dissolved oxygen levels than intake water.

ii. Constant dissolved oxygen monitors must be utilized to ensure the appropriate discharge dissolved oxygen levels and closes the system if the dissolved oxygen decreases below the intake level.

iii. Waste effluent and nutrient pollution management requirements at both flow-through and net penning operations must ensure that dissolved oxygen depletion does not occur in waters outside of the aquaculture operations.

2. Nutrient Pollution:

Nutrient pollution can be introduced into the water bodies receiving the discharges of wastewaters from flow through systems or from open water net pen systems. Phosphorus is often the limiting nutrient in aquatic systems, and very small changes in the level of it can lead to significant changes to aquatic ecosystems. Nutrients from uneaten fish food and fish excrement will be the most significant source. In flow through systems discharges with excessive nutrients can lead to increases and shifts in algal communities, algae blooms, filamentous algae, less of some pollution intolerant aquatic invertebrates (like stoneflies, mayflies and caddisflies) and even less of certain stream fish populations (some research has documented brook trout density decreases with minor nutrient pollution). In open water net pen systems nutrients and waste would accumulate on the bottom, smothering benthic life, creating anoxic areas, or helping to stimulate dangerous Microcystis algae blooms that can render water unsafe for public use (similar to the problems occurring in Lake Erie due to nutrient pollution).

a. Regulatory Standards for Nutrient Pollution:

i. Aquaculture operations must be required to take full responsibility for handling all nutrients created by their operations. Effluent nutrient levels should not exceed ambient intake levels.

ii. Aquaculture operations must collect solid waste and prevent solid waste from reaching Michigan inland lakes and streams or becoming free in the Great Lakes from open water net pens.

iii. Aquaculture operations must treat and remove all dissolved nutrients so that no nutrients are added to either Michigan inland lakes and streams or the Great Lakes.

iv. Flow- through systems must be required to take regular samples for solid waste and dissolved nutrients to ensure that neither type are discharged into Michigan's inland lakes and streams. Rigorous and robust sampling means and regimes must be prescribed by the state and conducted at the expense of the private operator.

v. Open water net pen systems must have all appropriate safeguards to ensure that no solid waste or dissolved nutrients are added to the Great Lakes from the systems, and

include monitoring systems sufficient to document such, and conducted at the expense of the private operator.

3. **Antibiotics & Growth Hormones**:
Addition of antibiotics and growth hormones to the fish food similar to other large-scale meat productions operations may be a desired practice for aquaculture operations. However, because aquaculture in pass through systems or open water net pen systems uses public waters those antibiotics and growth hormones will be released into public waters where they can affect natural bacterial communities dynamics and resistance (influencing frequency and severity of disease outbreaks), wild fish stocks health and public drinking water supplies.
a. Regulatory Standards for Antibiotics and Growth Hormones:
i. Open water net pen systems must not be allowed to release any antibiotics or growth hormones into the Great Lakes and to take all appropriate safeguards to ensure that none are released.

ii. Pass through systems must not be allowed to release any antibiotics or growth hormones into Michigan's inland lakes or streams.

iii. Requirements for regular monitoring for antibiotics and growth hormones to ensure that neither is discharged into Michigan's inland lakes and streams or Great Lakes must be in place.

iv. Examples of implementing these standards could include prohibiting any such chemicals from delivery via fish feed or water inoculation (leaving direct inoculation via injections to individual fish as a possible viable means).

4. Diseases:
Aquaculture poses two main direct vectors for disease introduction to wild fisheries. First, fish raised in a facility are often acquired from other places (spawned from brood stock kept specifically for that purpose) and may bring diseases with them (all net pen operations source fish from other facilities). Second, large and dense fish concentrations increase the probability of disease and the severity of disease outbreaks. Disease prevention regulations need to be commensurately tough compared with the cost of a collapse of the multi-billion dollar Michigan sport fishery.
a. Regulatory Standards Concerning Disease:

i. Regular and rigorous disease testing must occur for all brood stock, and of all juvenile fish sourced for the operations.

ii. Regular and rigorous disease testing must occur for all types of aquaculture operations.

iii. For all cases of disease outbreaks in any type of aquaculture operation, all fish must be immediately quarantined and destroyed, including immediate quarantine or isolation of all water leaving the aquaculture operation (flow-through or open water).

This could include shutting off water inlet and outlets at flow-through operations, or deployment of disease impermeable booms for Great Lakes operations.

iv. All aquaculture operations must be required to provide bonds to the State of Michigan sufficient to cover all costs of natural resource damages and harms to Michigan's sport fishery (including loss of use, effective response, and cost of long-term irreparable loss).

5. Escapement:

Fish escape from aquaculture facilities. Aquaculture escapement provides two categories of impacts. First, escapement can introduce new invasive and foreign species which can result in complete ecological imbalances (See Asian carp – a result of an insufficiently regulated aquaculture operation). Second, and more often under-assessed, is the introduction of domesticated gene pools from fish species that are found in nearby waters. The aquaculture industry utilizes fish purposeful genetic selection (or modification) for mass production as compared to our wild fisheries that have been honed for survival in the wild. Domesticated rainbow trout, for example, are common aquaculture species that perform well in dense populations and feed heavily in response to humans feeding them. Their genetic makeup varies widely from the wild steelhead strains in most of our coldwater tributaries. The traits selected for in domesticated rainbow trout versus wild rainbow trout or steelhead are largely mutually exclusive. Escapement dilutes wild gene pools and disrupts wild fish stocks from thriving. This fact is well studied and used in modern governmental aquaculture operations with goals of restoring wild fish stocks; as well as underpinning the MI DNR's own current procedures for steelhead production. There is scientific literature available on the impacts of marine net pen escaped Atlantic salmon on wild Atlantic salmon stocks available as well.

a. Regulatory Standards Concerning Escapement:

i. All species not currently found in the Great Lakes region must be prohibited from use in flow-through and net penning operations in Michigan. Closed system aquaculture operations must be required to maintain safeguards to escapement of such species adequate to ensure all risk of them being introduced into the wild is eliminated. We have Asian carp because of this, and other popular aquaculture species such as tilapia pose equal risk for introduction and complete ecological imbalances.

ii. All aquaculture operations with species currently found in the Great Lakes region must actively prevent escapement such that no aquaculture raised fish are allowed to escape from operations. Limited escape is not acceptable. Risk of escapement must be eliminated through regulation.

6. Interruption of Existing Uses:

Aquaculture operations may cause significant disruptions to recreational uses of our public waters. Open water net pen systems may result in interference with recreational boating and yachting, sportfishing, swimming and beach enjoyment, lakefront views, tribal fishers and state-

licensed commercial fishers, and Great Lakes shipping channels. Flow- through systems may result in interference with canoers and kayakers, sportfishing, riverfront views, and tribal fishers. Michigan's waters have myriad existing uses, including rights to those uses afforded by property rights, public trust doctrine, Treaty rights, and numerous other basic legal structures. Additionally, our waters currently provide for Michigan's tourism economy, a 4 billion dollar plus annual sport fishery economy, and an incredible portion of local and state tax base through waterfront property owners. Diminishing or jeopardizing any of those uses and benefits of our waters would be short-sighted, irresponsible, and many cases illegal.

a. Regulatory Standards to Preserve Existing Uses:

i. Aquaculture operations must not be allowed to interfere with, diminish, jeopardize or otherwise affect any other uses of Michigan's inland lakes and streams or the Great Lakes.

7. Regulatory Standards as a Whole:

MITU believes that the impacts and risks associated with aquaculture development in Michigan increase from closed-systems to flow-through systems, and again to net penning. Closed-systems, not without risks, offer the most viable and responsible means to aquaculture development in Michigan. Closed-systems may not be pursued, due to the capital investments in infrastructure involved, which implicitly make them less risky or damaging than flow-through or net penning operations. Those capital investments represent the business owner taking financial responsibility, at least in part, for the risks and impacts to public waters its business poses. The general regulatory standards MITU proposed should be uniformly applied to all aquaculture operations to ensure:

a. The prevention of impact or risks to natural resources and their associated uses and benefits;

b. The citizens of Michigan are not forced to subsidize the cost of certain kinds of aquaculture ventures by absorbing the impacts and risks they pose;

c. All three kinds of aquaculture are held to the same consistent standards, thus preventing the public subsidizing an incentive to do net penning or flow-through systems (by absorbing the avoidance of preventing impacts and risks) while simultaneously creating an economic disincentive for closed-system operations.

The above regulatory standards must be established prior to any additional aquaculture operations beginning in Michigan's inland lakes and streams or the Great Lakes. The risks posed are significant and the potential harms are devastating.

The Executive Branch of the State of Michigan and its agencies must approach aquaculture with caution and come together to ensure that Michigan's recreational traditions, incredible water resources, and the benefits they provide to this State are protected. MITU believes that if the above protections are implemented then aquaculture may be able to co-exist with Michigan's well established and valuable water uses.

November 30, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528

Dear Ms. Guyer:

RE: Aquaculture in the Great Lakes

While understanding the demand for economic growth in Michigan, especially in the agriculture sector, this is an extremely bad idea. Currently, ther are too many information gaps to insure that such operations can be managed in an environmentally safe manner.

Further, we do know and can say that there are several areas of concern insufficiently addressed. Much of our information comes from the Science Advisory Panel. These concerns include:

1. Nutrient overloading from fish fecal matter and unconsumed food.
2. Disease possibilities and their spread to other non-caged fish.
3. Antibiotics used to prevent and treat diseases entering into the water and forwarded to drinking water systems.
4. Genetic effects from escaped fish, especially in a catastrophic escape event.
5. Monitoring through ice cover during the harsh mid-western winters.

Clearly the risks outweigh the economic benefits. We strongly recommend you put this project on hold until the above issues can be resolved and /or mitigated.

By chance, if you decide to go ahead with the project, it is imperative you adhere closely and completely to the various Science Advisory Panel recommendations.

The "bottom line" should be keeping the treasured waters of Michigan "Pure."

Sincerely,

Ann Rogers

Ann Rogers, Co-chair NMEAC

Northern Michigan Environmental Action Council Post Office Box 1166, Traverse City, MI 49685-1166 231 946-6931
www.nmeac.org

Genetic contamination of wild fish stocks could result from farmed fish escaping due to human error, mechanical failure or storm and ice damage.

Displacement of other uses will result on waters occupied by aquaculture pens, including recreational and commercial fishing, and all forms of watercraft recreation.

Adequate regulatory oversight of aquaculture ventures is problematic, particularly the high quality study and review recommended by the scientific review committee. The Michigan Department of Agriculture and Rural Development is a promoter of development. The Michigan Departments of Environmental Quality and Natural Resources have missions that aim to protect resource values but have limited resources. In addition, once a capital investment is established in a venture such as the one proposed, a strong political resistance to reversing course inevitably develops, even in the face of evident problems.

Michigan regulatory agencies involved in the decision making process must keep uppermost in mind the fact that this business proposal is dependent on public trust resources. Given the modest level of job production envisioned, and the significant risk of degrading the Great Lakes ecosystem, we respectfully request that no permits for net-pen aquaculture be granted.

Sincerely,

Jean Moberly

Jean Moberly
President,
Straits Area Audubon Society

DNR-Net-Pen-Comments@michigan.gov

From: Lance Climie [redacted]
Sent: Thursday, November 12, 2015 8:53 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Comment on Aquaculture Policy

To Whom It May Concern,

The idea that commercial aquaculture could be allowed in the Great Lakes is very alarming to me. As someone who has traveled all over the State of Michigan and fished our waters for 6 decades, the idea of deliberately introducing another complicating factor to the ecosystem of the Great Lakes seems exceptionally dangerous. The risk of such ventures is not warranted. The economic value of the Great Lakes for tourism and recreation far outweighs any economic return any aquaculture may bring to our state.

I would hope that a sensible course is taken and aquaculture is not permitted in the open waters of the Great Lakes.

I would add that the development of the old hatchery in Grayling to become a "pass through" fish farm poses a dangerous threat to the waters of the Au Sable river. That decision must be overturned before this world famous fishery is damaged.

Thank You,
Lance Climie CCM
Schrems West Michigan Trout Unlimited Board of Directors
Plaster Creek Stewards
Michigan League of Conservation Voters

[redacted]

SIERRA CLUB
FOUNDED 1892

MICHIGAN CHAPTER

December 3, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528
Email: DNR-Net-Pen-Comments@michigan.gov

The Sierra Club Michigan Chapter has reviewed the reports on aquaculture and is pleased to submit the following comments which are in substantial part taken from comments submitted to you by the Michigan Environmental Council (MEC).

We also agree with MEC's position that the scientific panel's reports clearly demonstrate that net-pen commercial aquaculture in the Great Lakesis not worth the risk. 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 accidently 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.

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.

Sincerely,

Gail Philbin, Director
Sierra Club Michigan Chapter

109 East Grand River Avenue • Lansing, Michigan 48906 • (517) 484-2372 www.michigan.sierraclub.org

The Watershed Center
GRAND TRAVERSE BAY
13272 S. West Bay Shore Drive
Traverse City, MI 49684
T 231.935.1514
F 231.935.3829
www.gtbay.org

December 4, 2015

Michigan Department of Natural Resources
TTN: Hannah Guyer/Executive Office
525 W. Allegan St.
Lansing, MI 48909-7528
Submitted via email: DNR-Net-Pen-Comments@michigan.gov & guyerh@michigan.gov

Re: Comments - Commercial Net-Pen Aquaculture

Dear Ms. Guyer, or Whom it May Concern,

I am writing on behalf of The Watershed Center Grand Traverse Bay (TWC) to comment on commercial net-pen aquaculture in the Great Lakes. TWC advocates for clean water in the Grand Traverse Bay watershed. The Grand Traverse Bay region is inextricably dependent on having exceptional water quality in the Bay. Our economy and community are driven, directly and indirectly, by the Bay.

TWC opposes the introduction of net-pet aquaculture into Grand Traverse Bay because of the potential adverse effects on water quality and wild fish. There is currently no technology available to capture and treat the significant effluent associated with confined fish operations. Further, the probability that net-pen fish contract and harbor parasites and disease-causing organisms could pose series risks to wild fish. In addition, TWC is concerned that the permitting, monitoring, decommissioning, and enforcement that would be essential to prevent adverse impacts associated with net-pen aquaculture would challenge Michigan's current regulatory environment.

Whatever economic benefits net-pen aquaculture may provide for Michigan, the environmental and regulatory uncertainties pose tremendous risks. The potential benefits are not worth compromising Grand Traverse Bay's invaluable water quality and fisheries habitat.

Thank you in advance for your consideration.

Sincerely,

/s/ TJ Andrews

Tracy (TJ) Andrews
Policy Director

DNR-Net-Pen-Comments@michigan.gov

From:	Robert Evans [redacted]
Sent:	Wednesday, November 25, 2015 12:35 PM
To:	DNR-Net-Pen-Comments@michigan.gov
Cc:	Robert Evans
Subject:	comments on net-pen aquaculture proposal

Comments from the Upper Peninsula Environmental Coalition on Proposed Net-Pen Aquaculture in the Great Lakes

November 23, 2015

The Upper Peninsula Environmental Coalition (UPEC) is strongly opposed to the proposal to raise farmed fish in the Great Lakes using net-pen aquaculture. We believe that this practice would pose far too great a threat to our public waters, and also to public health.

We have reviewed the recently-released report from the scientific advisory panel that was established by MDNR, MDEQ, and MDARD. The findings from this report confirm our concerns with the proposal. Some of the concerns we have (most of which agree with the findings from the above report) are as follows.

Net-pen aquaculture in the Great Lakes has the potential to:

- add excessive amounts of phosphorus and nitrogen each year into the Great Lakes, as a result of discharge from the operations. This could have many negative impacts, including potentially triggering toxic algae outbreaks like the ones that have affected Lake Erie in recent years;

- provide a breeding ground for diseases that could spread from caged fish to wild populations, putting the Great Lakes fishery and ecosystem at risk;

- lead to escapes that can have wide-ranging negative genetic effects on native populations and erode our wild fish population's ability to adapt and survive;

- lead to introductions of non-native fish species into the Great Lakes;

- unfairly compete with environmentally friendly aquaculture systems, since these responsible, self-contained projects must capture and treat the waste they produce, rather than dumping it untreated into a public water body for free.

While the report concludes that the ultimate effects of net-pen aquaculture industry on lake ecosystems are not entirely known, the scientific panel still believes that the state must err on the side of caution – and we strongly agree. The risks are far too great for Michigan's most significant resource, our freshwater lakes.

There can be benefits from aquaculture in Michigan, if it is done differently. Michigan already has closed-loop aquaculture. These promising ventures (which can be established in vacant warehouses and other buildings) re-circulate water and capture all the waste. Completely separated from rivers and lakes, these operations can be a

sustainable source of food and economic development, while we keep the Great Lakes and inland waterways protected.

The Great Lakes belong to all of us, and private interests should not be allowed to transfer the risks of their business venture to the citizens of this state, and the future generations who will inherit our natural resources.

Thank you for the opportunity to comment.

Sincerely,

/s/ Robert A. Evans

Robert A. Evans, representing the UPEC Board of Directors

Appendix G. Example of the form letters were received from the listed individuals from the Food and Water Watch website.

Nov 14, 2015

Hannah Guyer

To whom it may concern: Guyer,

I urge you to protect the Great Lakes' ecosystem and to prohibit net pen aquaculture in their waters.

Our Great Lakes should not be opened to the same industrial factory farm model that currently pollutes our environment on land.

These systems are not contained and allow a tremendous amount of waste to flow directly into the water, potentially contributing to toxic algae blooms. Fish in these systems can spread disease quickly, and the risk of thousands of fish escaping and harming wild fish populations is a very real threat.

Factory fish farming is simply too big, too dirty and too risky for the Great Lakes. We expect our leaders to protect our public natural resources, including our Great Lakes environment, fishermen and coastal communities.

I urge you to prohibit net pen aquaculture in Michigan's Great Lakes waters.

Sincerely,

Appendix H. Individuals and organizations other than from Food and Water Watch that provided written comment (Last name, first name, and organization).

(Unknown), Anne
(Unknown), Theresa
Abbott, John
Abele, Patricia
Abercrombie, James
Acord, Verlon
Adams, Pegge
Ade, Daniel
Adkins, Thomas
Agacinski, Karen
Aguirre, Robert
Aird, Ross
Akom, Denise
Aksman, Cyrene
Alberts, Douglas
Alberts, Raechel
Aldea, Suzanne
Alexander, Heather
Allen, Amanda
Allen, Janis
Allen, Lynn
Allen, Wynona
Allman, Lecia
Almer, Tom
Alsobrooks, Diane
Alspector-Kelly, Tammy
Amar, Kat
Ames, Judi
Anbender, Irene
Anderson, Janet
Anderson, Karen
Anderson, Marilyn
Anderson, Michael
Anderson, Michelle
Anderson, Patricia
Anderson, Peter
Anderson, Robert
Anderson, Tina
Andre, Deanna
Andre, Marilu
Andreski, Joan
Andrews, Gordon G. Jr.
Andrews-Mckinney, Joyce
Angell, Donald
Anne, Abate Jo
Anne, Bowie Carol
Anne, Lowery Jo
Anne, Wagtmann Maria
Anthony, Rachael
Appelt, Tammie
Apps, Darryl
Archer, Vikki
Archibald, Cindy
Arena, Serene
Armstrong, Beth
Armstrong, Jameka
Armstrong, Sara
Arnold, O.
Arnst, Von
Arrivee, Sally
Ash, Barbara
Ash, Michelle
Ashley, Claudette
Assel, Ernest
Atkinson, Chuck
Atkinson, Dennis
Austin, Terry
B, Marc
B., Anne
Babb, Jim
Bachmann, George
Bagnall, Sally
Bahlman, Nancy
Baier, Mary Ann
Bailey, Dave
Bailey, Deborah
Bailey, Norma
Bailey, Tracy
Bails, Jean
Bails, Kirk
Baker, Janice
Baker, Nancy
Baker, Steven
Bakker, Clara
Balasko, Debbie
Baldridge, George
Balgavy, Jason
Ballard, Cynthia
Ballingall, Christina
Balogh, Beth
Balsick, John
Bambach, Barbara
Banes, Patricia
Banks, Patrick
Baran, Judith
Barber, Arleen
Barber, Susan
Barclay, Joshua
Bargman, Ben
Barnes, Brooks
Barnes, Julia
Barnes, Margaret
Baron, Avrey
Barrett, Christine
Barrett, Elizabeth
Barrios, Meyer Pamela
Barry, Debra
Bartell, Robert
Bartels, Joyce
Barton, Edward
Basta, Sue
Batzer, Stephen
Bauerle, Sharon
Bayi, Jerilynn
Beatty, Annette
Beatty, Lorne
Becker, Christine
Bedell, David
Belanger-Neddo, Catherine
Belknap, Bobby
Belrose, Bradley
Bemis, Judith
Bennett, Thomas
Benoit, Maria
Berg, K.
Berglund, Vicki
Berkey, James
Bertolino, Terry
Betts, Nanette
Betzold, Joann
Beukema, Kristi
Bierma, Daniel
Bijkerk, Inie
Birdsall, Sammie
Birely, Karen
Birmingham, Steve
Blake, Richard
Blake, Veronica
Blanc, Walter
Blanchard, Irene

Blazier, Karin
Blodgett, Linda
Blum, Shira
Bober, Rita
Bodner, Carole
Bohatch, Oksana
Boike, James
Bolleber, Luise
Booth, Richard
Borin, Victoria
Boris, Donna
Bosko, Jan
Boswell, Thomas
Bovee, Emily
Bowen, Donna
Bowers, Marsha
Bowie, Linda & Willie
Boyce, Brady
Boyer, Ralph
Boyers, Gary
Boys, Sara
Bragg, Dianne
Bragg, Kenneth
Brainerd, Kay
Bramer, Courtney
Brandmeier, John
Brazin, Elaine
Breidenstein, Beth
Brennan, Denise
Brill, Bob
Brinkle, Laurie
Brock, Catherine
Brockett, Grace
Brooks, William
Brown, Beverly
Brown, Elizabeth
Brown, Gerald
Brown, Jacqueline
Brown, Joanna
Brown, Kathleen
Brown, Louis
Brown, Ronald
Bruder, Karen
Brumleve, Charles
Brzak, Cynthia
Brzezinski, Matt
Buchanan, Saylor Carla
Budzynski, Jill
Buese, Joe
Buhse, Tim
Buntin, Sheryl
Burbeck, Martha
Burgess, Carmen
Burke, Rose
Burnell, Nathan
Burnham, Gerald
Bush, Donna
Butcher, Michael
Byars, Jackie
Byrd, Carol
Byrd, Darlene
C., P.
Cade, Colleen
Cady, Kirsten
Calati, Chuck
Calhoun, Elizabeth
Calvert, Bruce
Camero-Sulak, Adrianne
Camp, Don
Campbell, Amy
Campbell, Danyelle
Campbell, Eric
Campbell, Sarah
Candela, Theresa
Canjar, Jessica
Cannon, Bill
Cantrell, Albert&Patsy
Carantza, Tina
Carey, Strven
Carpenter, Dale
Carpenter, Steven
Carrell, James
Carrigan, Katherine
Carroll, Carole
Carroll, Nancy
Carson, Todd
Carter, Linda
Cartwright, Larry
Carty, Karen
Caskey, Kay
Castaneda, Olga
Castle, Ronald
Caulfield, Joyce
Cavanaugh, Daniel
Centers, Alana
Chagnon, Cari
Chambers, Peggy
Champagne, Christine
Charlier, Thomas
Charnetski, Mary
Chartier, Allen
Chelland, Ron
Chen, Yani
Chennault, Barbara
Christman, Mary
Christoff, Joan
Christopher, John
Chubb, Margaret
Cianfarani, Ryan
Cicholski, Laura
Cindrich, Susan
Claflin, David
Clark, Abigail
Clark, Leann
Clark, Pamela
Clary, Barbara
Clenet, Joy
Clifford, Nancy
Cline, Andi
Cline, Michael
Cloninger, Bryan
Clyne, Robert
Cober, Ron
Cole, Nancy
Coleman, Helena
Cole-Misch, Sally
Colista, Gian
Collier, Marion
Collins, Greg
Collins, Peggy
Colville, Roberta
Colwell, John
Conaway, Tara
Conklin, Lindsay
Connors, Timothy
Conti, Anthony
Cook, James
Cook-Fine, Marcy
Corrigan-Calley, Diane
Costello, Carol
Cottrell, Larsen
Couck, Lynn
Courtade, Mylene
Cowie, Virginia
Cox, Joseph
Cox, William
Coyle, Patricia
Craig, Janelle
Cramer, Carol
Cramer, Kathleen
Crancer, Connie
Crawford, Tracy
Creech, Nancy

Cremeans, Michael
Croce, Hugh
Cromley, Michael
Crooks, Patricia
Crosby, Elizabeth
Crossey, Colleen
Crouch, Mary
Cruden, Robert
Crump, Gary
Curran, Jennifer
Cushman, Anna
Cypher, Steven
Cyr, Anette
D, K
D'Alessandro, Keith
Dalinowski, Kimberly
Dalley, Vicki
Dalton, Brian
Daniel, Al
Daniels, Joanne
Dannin, Ellen
Dashner, Steve
David, Carlo L.
Davies, Miranda
Davis, John
Davis, Kathleen
Davison, Rondi
Dawe, Jennifer
Day, Stephen
Dean, K.
Debelak, Theresa
Decker, Emily
Defilippo, Terri
Degennaro, Mary
Dekorte, Robert
Delisi, Donna
Dellacorte, Maria
Dennis, John
Deplanche, Mike
Descheneau, Katie
Devane, Karen
Devoe, Carolyn
Dick, Rachel
Dickinson, Vicki
Dierkes, Don
Diment, Kim
Dimmitt, Ruth
Dineen, Charles
Dinges, Marcia
Dixon, Francine
Dobson, Melissa
Dolinka, Toby
Doolittle, Don
Doty, Carol
Doughty, Blondell
Douglass, K.A.
Doyle, Carrie
Drake, Margery
Drenten, Judy
Dudek, Gary
Duffy, Diana
Dukovich, Karen
Dulac, Janine
Dunlop, Ann
Dunn, Marilynn
Dunn, Melvin
E, Harris Marilyn
E., Boik Mark
Eacker, Glenn
Eaton, Alexandra
Ebersole, Jan
Edgren, Carl
Edison, Jeffrey
Edwards, John
Edwards, Tao
Egged, Jim
Ehrhardt, Jean
Ehrnst, Amanda
Eldridge, David&Ellen
Eliowitz, Mary
Ellis, Tammy
Ellsworth, Marcie
Ellyn, Cain Mary
Elmore, Ronald
Elster, Evelyn
Emmons, Adeline
Emmott, Tom
Engel, John
Englund, Mary
Englund, Rob
Engwall, James
Enneking, Dj
Erlewine, Phillip
Ernst, Charlene
Ernzen, Florence
Esser, Pamela
Estrada, Toni
Evans, Barbara
Evans, Margaret
Evans, Monica
Evans, Tania
Exoo, Alan
Fairchild, Felicia
Faith, Pat
Farmer, Heidi
Farrell, Wendy
Farrer, Judy
Faust, Nancy
Feichtinger, Dennis
Feldman, Agnes
Fent, Sherry
Ferrier, Daniel
Fiebernitz, Mitchell
Field, Kathleen
Field, Whitney
Findley, Marjorie
Finwall, Maggie
Fisch, Dorothy
Fisher, Lynn
Fisher, Sharon
Fisher, Stephen
Fisk, Katherine
Fitzgerald, Robin
Fletcher, Carol
Flis, Jerry
Florido, Carlos
Florkowski, Nancy
Flum, Sarah
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Foley, Patricia
Folkertsma, Casey
Follett, Sandra
Fong, Christina
Fordham, Chad
Fortune, Kelly
Fox, Robert
Fox, Robert D
Fragel, Robyn
Francis, Deborah
Francis, Donald
Francisco, Jerome
Francisco, Linda
Franulic, Sean
Frazier, Marjorie
Freas, Roy
Frederick, David
Friday-Craft, Betty
Frieden, Amy
Friedman, Michael
Friend, Joseph
Fry, William
Fugate, Karl
Fuller, Jane

Funke, Julie
Furst, Steven
Gage, Elizabeth
Gagnon-Wielart, Tiffany
Gailliard, Esperanza
Gaines, Jeff
Gallo, Patty
Galt, Sarah
Gamache, Bobbi-Jo
Gamalski, Robert
Gamboa, Miguel
Ganesh, Charanya
Gardey, Cheryl
Gardner, Pamela
Garland, Antoinette
Garlit, Donald
Garrels, Nancy
Garrett, Gary
Gaudette, Cheryl
Gedelian, Craig
Genn, Oliver
Gerber, Pam
Gerlach, Sharon
Germain, Mary
German, Bonnie
Gibbings, Jim
Gibbs, Melissa
Giebel, Cathie
Giesick, Christy
Gilbert, Dave
Gilbert, Pamela
Gilchrist, Joellem
Gilmer, Ted
Gittlen, William
Glassheim, Barbara
Gleissner, Alexander
Glenn, Julie
Glicker, Jason
Glickfield, Bette
Glygoroff, Leanne
Goecke, Sarah
Goedhart, Gayle
Goldsweig, David
Golembeski, Edmund
Gonsky, Carol
Goode, Julia
Goodspeed, Elaine
Goralski, Kathy
Gordon, Amanda
Gordon, June
Graham, Sylvia
Gram, Neil
Grant, Larry
Graube, Davids
Gravlin, Kim
Gray, Norleen
Gray, Tonya
Gray-Lion, Annelissa
Greenhoe, Todd
Greening, Gretchen
Greenwald, Patricia
Greer, Liz
Gregory, Renee
Grenadier, Carl
Griffith, David
Grimm, Barton
Grother, Susan
Grove, Marie
Groves, Sharon
Grunewald, Dennis
Guilbault, Aubrey
Gumina, Greg
Gurney, Hugh
H, Chris
H., Karr William
Haan, Doug
Habalewsky, Ruth
Hagerman, Timothy
Haines, Joel
Hair, Karla
Hakala, William
Hambrock, Geri
Hamlin, Teri
Hammer, Jeffery
Han, Richard
Hanaford, Patricia
Hanka, Ladislav
Hanks, Enrico
Hannah, James
Hanninen, Janice
Hansen, David&Sharyn
Hanser, Jackie
Hanson, Art
Hanson, Natalie
Hanus, Heidi
Hardie, D.
Harmon, Arianna
Harmon, Elaine
Harrier, Katherine
Harrison, Patrick
Hartmann, Paula
Hascall, Mary
Hausauer, Kurt
Haviland, Adam
Haworth, Patricia
Hayden, Sherry
Hayes, Laura
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Hayes, Sylvia
Haynes, Margot
Head, Jim
Heath, B
Hebert, Marilyn
Hedrick, Michael
Heether, Leonard
Hefling, Tracy
Hegstrand, Lee
Helman, Michal
Helton, Cathy
Hendrix, Jo
Henzler, Judith
Herrington, Michael
Herron, Richard
Herron, Scott
Hershman, Lesley
Hewett, Heather
Hewitt, Sharon
Higdon, Maxxcell
Hildebrant, Kathryn
Hill, Jack
Hinds-Lepsy, Kim
Hirlemann, Eloise
Hirschhorn, Susan
Hoadley, Mary
Hobbs, Deb
Hodak, Dana
Hoekje, Lee
Hoffmaster, Debra
Hofmann, Rachel
Holappa, Peggy
Holbrook, Claudine
Holcomb, Barbara
Holden, Jodi
Holmes, Katherine
Holmes, Linda
Holsinger, Sue
Hominga, Lorraine
Honey, Linda
Hood, Jerry
Hormel, Michael
Horn, Anne
Horowitz, Phyllis
Houseworth, Bradley

Houston, Roy
Howard, James
Howard, Kristen
Hoyt, Tom
Hubbard, Sarah
Hudnut, Christine
Hughes, Don
Hughes, Maureen
Hulme, William
Hummer, Karen
Humphrey, Earnest
Hundley, Ann
Hunt, Ann
Hunwick, Mishia
Hurlin, Shirley
Hutchinson, Peggy
Hutchison, Larry
Ibarlucea, America
Ingram, Laurie
Inman, Susan
Ishii, Megumi
Iskra, Matthew
Isler, Lisa
Iyer, Janine
J, Swann Kevin
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Jackson, Heather
Jackson, Jim
Jackson, Mary
Jane, Mcintee Mary
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Jellema, John
Jenkins, Lloyd
Jersett, Melissa
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Johnson, Barry
Johnson, Cheryl
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Johnston, Todd
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Jones, Ralph
Jones, Ruth
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Justen, Kathy
K, Paruchuri Rama
Kaczorowski, David
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Kalamarz, Mary Ann
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Kanistanaux, Nancy
Kappe, Ruediger
Karasek, Lois
Kardos, Ron
Katakowski, Dennis
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Katz, Jerome
Kauffmann, Leisa
Kaufman, Randy
Kayne, Nan
Kazak, Ilene
Keefer, Deborah
Keegan, Barbara
Keirnan, Sandra
Kelley, John
Kellum, Travis
Kelty, Joseph
Kendall, Karen
Kendall, Kenneth
Kendall, Sandra
Kendall-Rozman, Joan
Kerman, Michael
Kesti, Jill
Khachaturian, Joann
King, Ginny
Kinnard, Evelyn
Kinney, Ronnie
Kitchen, Karen
Kittle, Rex
Klein, Chris
Klein, Jeff
Klein, Robert
Kleinsmith, Dennis
Kler, Chloe
Klimovitz, Joseph
Kline, Samuel
Klingel, Kaaren
Klinkhamer, Luci
Klykylo, Katherine
Knight, Haven
Knoerl, Marie
Knox, Karen
Kohl, Jusy
Kohn, Beverly
Kohn, Jerry
Kolasa, Gary
Konwinski, Jarita
Koop, Susan
Korstange, John
Korthase, Anne
Koslek, Terry
Kostiuk, Wolodymyr
Kott, Cyndee
Kramer, Victoria
Krasner, Beryl
Krick, Julie
Krispien, Christina
Kristofice, Kathy
Kroske, Kelly
Krueger-Locy, Christie
Krug, Patty
Krull, William
Kuboske, Patricia
Kukla, Terry
Kustasz, Robin
Kwitt, Michael
L, Parker Ann
La, Fleur Gloria
La, Fond Nan
Labarge, Karen
Laclair, Gary
Lafond, James
Lamarr, Barbara&Theresa
Lameck, Janet
Landuyt, Renee
Lane, Lee
Lane, Roger
Langberg, Mark
Langmeyer, Delana
Laporte, Chris
Larson, Katherine
Larson, Sherry
Larson, Stephen
Laufer, Scott
Laurence, Sandra
Lauzzana, Gail
Lavaute, Judy
Lawrence, Richard
Lebert, Mary
Leclair, Jeff
Lehman-Rittinger, Ann
Leichner, Karen
Lemke, Eric
Lenhard, Tom
Lent, Patricia
Lenzen, Robert
Leonard, Henrietta
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Lesinski, Pete
Lesser, Margo
Lester,, Md Eric
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Letts, Susan
Levasseur, Luana
Leven, Marie
Levine, Vivian
Levinson, Lydia
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Ley, Barb
Ley, Cristina
Lheureux, Jole
Liff, Christine
Light, Kathryn
Linabury, Theodore
Lindberg, Kathie
Lindsay, Paricia
Lindsey, Toi
Lisowsky, Maria
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Lockhart, Theresa
Lockwood, Jeff
Lofman, Sherry
Lonewolf-Kitzul, Deborah
Longcore, Judith
Lootens, Tom
Lord, Jeanine
Lore, Lourdes
Lottridge, Kimberly
Loubert, Paul
Lowe, Judith
Lozon, Sharon
Lubbers, Kaitlyn
Ludwig, Russell
Luedtke, Kelene
Luppe, Beth
Lusk, Wm
Lyles, Lori
Lyon, Gary
M, Anita
M, Senesi Stephen
M., Van-Deventer F.
Mabie, Craig
Macbay, Annette
Macdonald, Gordon
Mackay, Jeanne
Mackres, David
Macks, Victor
Maffessoli, Maryjo
Magee, Patricia
Maguire, Patricia
Mahan, John
Makarewicz, Jamie
Maki, Mary
Malnati, Peggy
Malone, Mary
Mandel, Mark
Maraldo, Mario
Marcus, Michael
Marie, Osborne Anne
Marikovics, Martha
Markillie, Paul
Markley, Barbara
Martich, John
Martin, Laura
Martin-Herlein, Carla
Masani-Manuel, Nzingha
Mason, John
Massey, Robert
Matash, Scott
Matero, Suzan
Mathews, Betty
Mathieu, Patricia
Matthies, Andrea
Mattice, Linda
Mattison, Thomas
Mattys, Brian
Maturen, Virginia
Matuszak, Sarah
Matz, Appolonia
May, Cynthia
May, Dave
Maybouer, P
Mayes, Ava
Maynard, Lorraine
Mayor, Carol
Mayotte, Mark
Mazian, Armeney
Mazurek, Cynthia
Mccabe, Marie
Mccallum, Sarah
Mccance, Robert
Mccarthy, Lee
McComb, Sandy
Mccomber, Rod
Mccombs, Annie
Mcdaniel, Janice
Mcdavid, Carrie
Mcdonald, Daryl
Mcdougall, Carey
Mcgarry, A.C.
Mcgeehan, Carol
Mcghee, Liane
Mcgill, Linda
Mcginnis, Kelley
Mcgladdery, Martin & Sharon
Mcgregor, Debra
Mchugh, Robert
Mcintyre, Adrian
Mckendry, Margo
Mckinnon, Terri
Mclaughlin, Fredric
Mcmillan, Brandi
Mcnea, Judith
Meinhardt, Ken
Melmoth, Kathy
Melton, Elizabeth
Merriam, William
Messing, Mark
Metelko, Winnie
Meyers, Sarah
Michael, Liberato C.
Michael, Nevette
Michiya, Kelly
Mickie, John
Micklin, Philip
Middleton, Diane
Milbrodt, Bob
Millan, Italia
Miller, Angela
Miller, Betsy
Miller, Elinore
Miller, Glen
Miller, Glenn
Miller, Lesley
Miller, Maria
Millker, Eleanor
Milne, Beverley
Milose, Jessica
Miron-Alimpich, Renee
Miskovsky, Thomas
Mitts, Yolanda
Mohan, Tim
Moneoe, Richard
Money, Diane
Moody, Peggy
Moore, Debra
Moore, Gregory
Moore, Joseph
Moore, Kaylee
Moore, Lawerence
Moore, Mark
Moorman, Steven
Morang, Vicki
Morbach, Elicia

Moreau, Justin
Morello, Gary
Morgan, Deborah
Morley, Susan
Morr, Rachel
Morrison, Renee
Morway, Sheila
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Motz, Tina
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Moyer, Sharon
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Muhammad, Mary
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Mulvey, Lori
Murdock, Michael
Murphy, Judy
Murua, Honorio-Valdes
Musialowski, Monique
Mutchler, Ruth
Myers, Barry
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Nason, Laura
Nawara, James
Nearing, Sue
Nedeau, E.
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Neff, Dorothy
Nelson, Barbara
Newhouse, Jocelin
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Niebuhr, Steven
Nixon, Hal
Noda, Phyllis
Nolan, Kaiser D
Noordhoff, Tina
Norgard, Jim
Novotny, Janice
Nuccio, Margaret
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O'Donnell, Neil
Oldham, Craig
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Olson, Sheryl
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Onken, Brianna
Opalka, Sherry
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Ortiz, Julie
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Ossenheimer, Merry
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Paddock, Amoreena
Pagels, Mary
Palazzolo, Joseph
Palmer, Al
Palmgren, Tris
Palms, Jeannine
Pappas, Carole
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Parker, Marna
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Parkett, Renee
Parks, Alex
Parks, George
Parran, Christina
Parsons, Harriet
Parsons, Mary
Pasco, Vicki
Patrick, Dwyne
Patrick, William
Patton, Susan
Patzer, Phillip
Payne, Randolph
Payne, Robert
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Pearlman, Barry
Peet, Henry
Pelath, Jeff
Pelkola, Carol
Pellett, William
Peltan, Mark
Pelton, Cooper Mary
Perkins, Ronald
Perkinson, James
Pero, Beth
Pescatello, Kaye
Peters, Heidi
Peterson, Derek
Peterson, Georgie
Petty, Tom
Phillips, Maggie
Phillips, Moira
Phoenix, Skylar
Pichiotino, Nancy
Pielemeier, William
Pierce, Jovon
Pietras, Tom
Pinti, Ben
Piper, Elaine
Place, Troy
Pliska, Larry
Plumb, Brenda
Podrasky, Joseph
Polesnak, Bill
Polidori, Marguerite
Popp, Joseph
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Porter, Jeffrey
Porter, Linda
Posselt, Gita
Post, Lara
Postma, Janice
Postma, Wendi
Potoski, Jacqueline
Potter, Krystal
Pow, Kim
Powers, Cynthia
Powers, Ed
Powers, Susan
Poxson, David
Poxson, Tim
Prochowski, Richard
Pryor, Diane
Ptasznik, Ed
Purcell, Gary
Quinn, Deborah
Rabiteau, Kathleen
Raby, Christina
Rahbari, Carol
Railey, Bob
Rakowsky, Walter
Rall, Carol
Ramirez, Lydeen
Rand, Tim
Randall, Dorene
Ratatosk, Lily
Raupp, Christopher
Raymond, Mike
Reaume, James
Reed, Andrew
Reed, Carolyn

Reed, Gary
Reed, Harvey
Reichel, Tom
Reid, Kenneth
Reiher, Linda
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Remkus, Ann
Renaud, Thomas
Renshaw, Jr Robert
Reynolds, Michele
Rhizal, Ross
Richards, John
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Richardson, Suzy
Richter, Dianne
Rider, Richard
Ridley, Debbie
Riley, Chris
Ring, Terry
Rios, Dorene
Ripley, Carlotta
Riser, Gary
Rittenberg, William
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Roberts, Catherine
Robinson, Benjamin
Robinson, Irene
Robinson, Peggy
Roche, Clinton
Rodgers, Lori
Rodriguez, Matt
Rogan, Robert
Rogers, Ann
Rogers, Linda
Rolands, Joseph
Root, Christine
Root, John
Rop, Charles
Ross, Ken
Rossdo, Cindy
Roush, Sue
Rousseau, Karline
Rowe, Bill
Royer, Jeremy
Rozek, Renee
Roznick, Lisa
Rubenstein, Howard
Rudolph, Joellen
Ruedemann, Diane
Rummel, Mitzie
Rungis, Sniedze
Rupprecht, Michael
Rusanowski, Michael
Rush, Todd
Rushlow, Timothy
Rusnell, Patricia
Ryburn, Charles
Ryman, Denise
S, Hands David
Sacksteder, Carla
Salmons, William
Saltonstall, Constance
Salvner, Amanda
Salyer, Allen
Sanford, Steve
Sauntry, John
Sawyers, Michelle
Sayer, Christine
Sayles, Andy
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Scarbrough, Terry
Schaberg, Pamela
Schaffer, P
Schaller, Dawn
Schambeers, Barbara
Scharffe, Kirk
Schaut, Ruth
Scherpenisse, Carol
Schilling, Kenneth
Schindler, Arlene
Schleusener, Marion
Schlick, Haim
Schmitt, Karen
Schneider, John
Scholl, Jack
Schriner, Macie
Schroeder, Jan
Schroen, Hazel
Schrotenboer, Micah
Schultz, James
Schultz, Peggy
Schumacher, John
Scorzelli, Susan
Scott, Kathy
Scott, Paul
Scotti, Lucille
Scrivnor, Norma
Sears, Carol
Sears, Frances
Seay, Emily
Seeley, Mark
Seigneur, Judy
Seiler, Mike
Semeniuk, Betty
Senker, Etienne
Sercombe, Sarah
Sevald, Diane
Shagena, Scott
Shane, Judith
Sharon, Michael
Sharp, Sam
Shaw, T.
Sheahan, Maureen
Shear, Julie
Shehadeh, Sommer
Shelleau, Maureen
Shelton, Elizabeth
Sheltraw, Sam
Sherman-Jones, Cynthia
Sherman-Jones, John
Shock, Jasmine
Shoemaker, Lisa
Shorkey, Tim
Shoults, Bradley
Shovein, Bart
Sieracki, Tabatha
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Sikora, Gene
Sikorski, Frank
Simmer, Walter
Simms, Herman S. Jr.
Simon, James
Sims, Cindra
Sisler, Robert
Sitkoski, Selena
Skelton, Julie
Skowronski, Mark
Skufis, Paul
Skufis, Xen
Slayton, Bonnie
Slintak, Martin
Small, Tom
Smalley, Dennis
Smarjesse, Dean
Smarsch, William
Smidtz, (Unknown)
Smith, Brian M
Smith, Chris
Smith, Gerald
Smith, Gregory
Smith, Jim
Smith, Julie
Smith, Lynette

Smith, Michelle
Smith, Phillip
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Smith, Romanow Loma
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Smith, Sandra
Smith-Hoffman, Rebecca
Sneden, K
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Snyder, Carol
Solomonson, Barb
Soper, Jerry
Sotala, Leslie
Sparkes, Richard
Sparks, Steven
Spencer, Lynn
Spencer-Wood, Suzanne
Spens, Nick
Splan, Mary
Spring, Kym
Spyridakis, Kathrina
Stadel, Dallas
Stafford, Donna
Stallard, Michelle
Stanbury, Phyllis
Stanfield, Jr Wayne
Stankowski, Janet
Stankye, Karen
Starr, Susan
Staszkow, Richard
Staudacher, Daniel
Steen, Carmella
Steeno, Mary
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Steiner, Kay
Steinman, Re
Stenske, Dorothy
Stephan, Debra
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Stephenson, Valorie
Stevens, David
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Stevenson, Ruthie
Stickel, Ann
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Stinson, Loree
Stitt, Brenda
Stockdill, Nelson
Stoddart, Gail
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Stoody, Carol
Stordahl, Eric
Storrer, Patricia
Strader, Veroneze
Strawn, Michael
Streu, Debra
Stricklin, Andrew
Striegel, Gordon
Strom, Kirsten
Strong, Grace
Strotkamp, Dorothy
Stuart, Douglas
Stucki, Marcia
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Suarez, Joe
Sulier, Patricia
Sullivan, Susan
Surface, Sandy
Sutliff, Leslie
Sutton, Susan
Swain, Robert&Mary
Swanson, Mark
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Sweeny, Candace
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Szalega, Marianne
Szczepanski, Gerald
Szof, Mark
Szutz, Joe
Szwed, Steven
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Taite, Linda
Tam, Stephen
Tarlton, Amanda
Taylor, Jennifer
Tazzia, Charles
Tee, Jerry
Tee, Patricia
Ten, Brink Antoinette
Tennant, Dawna
Tetreault, Chantal
Thanasas, Patty
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Thiebaut, Dana
Thierry, John
Thomas, Abigail
Thomas, Arthur
Thomas, James
Thomas, Kane Dr
Thomas, Natalie
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Tilly, Arlene
Timm, Carol
Tindall, Christine
Tinker, Robert
Toledo, Karen
Toshalis, Barbara
Tosiello, Josephine
Trainor, Catherine
Travis, Linda
Trevorrow, Theresa
Trumbell, Elizabeth
Trumbull, Ramon
Tucholski, John
Tucich, Rudolph
Tucker, James
Turgeon, Randall
Turnbull, Karen
Twigg, Judy
Ugelow, Joanne
Updyke, Shana
Urueta, Mariah
Valdez, Amy
Valdmanis, Vivian
Valley, Daniel
Vallimont, Deborah
Valrance, James
Valrance, Nancy
Van, Andel Mary
Van, Eijnatten Maurits
Van, Loo Randy
Van, Rooyen Robin
Vandervere, Dan
Vandyken, Barbara
Vanhall, Teri
Vanhapelto, Hilkka
Vanwart, Shelly
Veenema-Birky, Jean
Velandra, Paul
Velazquez, Francisco
Verhelst, Jennifer
Vigo, Eva
Virag, Leslie
Visger, Theresa
Vogel, Kathleen
Von, Glahn Jeffrey
Vorenkamp, Jane
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Wallace, Patrice
Wallick, Eileen
Walsh, Marie
Walsh, Sally
Walter, Gail
Walters, Alta
Walters, Susan
Ward, Bissell R.
Warmbier, Bradley
Warren, David
Wassmer, Tom
Watkins, Barbara
Watkins, Jim
Watson, Barbara
Watson, David
Watson, Jamey
Waurzyniak, Thomas
Way, Lee Li
Wayda, Georgia
Weaver, Harvey
Weber, Joanne
Weeber, Mary
Weed, Wendelin
Weeden, Janice
Weitkamp, Ernst
Welch, Irene
Welch, Sandra
Wellman, Kate
Welsford, Susan
Wengert, Nancy
Wesley, Mark
Whalen, Shannon
Whaley, Barbara
Wheatley, Catherine
Whipple, Dennis
Whitaker, Kimberlee
White, Allen
White, Barbara
White, Mary
Whitman, Fran
Whitt, Heather
Widick, Barbara
Widigan, Sharon
Wiesner, Kris
Wilbourn, Pam
Willer, James
Williams, Helen
Williams, Marijean
Williams, Matt
Williams, Tsatsos Claire
Williamson, Jim
Williamson, Linda
Williamson, Richard
Willingham, Andre
Wilson, Marilyn
Witkowski, Mark
Witt, Michael
Wittebols, James
Wolf, Debra
Wolfe, Margaret
Wolfe, Shirley & Arthur
Wolk, Mik
Wolschlager, Linda
Wood, Dawn
Wood, Roderick
Wood, Suzanne
Woodbury, Mark
Woodworth, Linda
Woolworth, Chuck
Worden, Bonnie
Worley, Joseph
Woznicki-Likavec, Marie
Wright, James&Diana
Wright, Jan
Wyman, Susan
Young, Brenda
Yuncker, Michele
Zajac, Andrea
Zalba, James
Zalenski, Lisa
Zalewski, Jon
Zamarron, Stephen
Zarnoch, Walter
Zelenak, Suzette
Zhang, Victoria
Ziarno, Raymond
Zielinski, Betsy
Zimmer, Zimmer Valerie
Zimny, Gloria
Zinsmaster, Kathryn
Zitta, Mary Ann
Zoldowski, Gary
Zoldowski, Joan
Zolkosky, Pamela
Zorn, Connie
Zucker, Cathy
Zwald, Phil
Zwarka, Jan
Zwiernik, Susan

Appendix I. Letters submitted by individuals in opposition to commercial net-pen aquaculture in the Great Lakes.

The Aquaculture Industry in Michigan has expressed an interest in Net Pen Aquaculture in Michigan waters of the Great Lakes. As aquaculture cage-culture expands world wide the same problems and concerns seem to follow.

Escapement of pen raised fish can cause many problems

1). Risk of feral stock establishment in the wild.
2). Risk of competition with wild fish for mates, space, and prey.
3). Risks associated with genetic interaction.
4). Risk of pathogen transmission
a) epidemiological out breaks from sea lice have been reported in Ireland, Scotland, Norway and Canada
b) highly contagious disease such as (ISA) Infectious salmon anemia
(IHN) infectious hematopoietic necrosis, in world fish stocks have been linked to aquaculture in Norway, Canada, and the US (Idaho)
Whirling disease has been linked to the dispersal of cultured salmonids is heavily implicated spreading whirling to wild andromous species.
5). The use of drugs and vaccines to treat cage culture fish spreading out of the culture area outside the scope of the culture area.
6). Dealing with escapement
In the US only Maine and Washington States have escapement regulations. In Canada only British Columbia has regulations.

Currently there are 9 freshwater cage-cultures in the Canadian waters of the North Channel and Georgian Bay in northern Lake Huron. Ontario produces about 7.05 million lbs. of rainbow trout. This level of production has prevailed since 1996. These net pens are on Crown Land (public trust responsibilities) at the time of this report by Jim Johnson (MDNR) 2009. No Certificate of approval has been granted for cage-culture operations in Lake Huron because standards are not available and the industry does not treat effluent from cage-culture operations.

Environment scientist presented data that each cage-culture operation deposits 15 to 25 kg./m2/yr of solid waste under the pens in these deposition areas, the biota is considerably altered with species diversity lowered and species composition made up of highly pollution-tolerant organisms. The settle able solids are rich in phosphorus. Only 15% of the phosphorous was found in the water column and 85% was in deposits beneath the pens. Carbon deposition under the cages was 25 g/m2/day and threshold set by Ontario Ministry of Environment is 1g/m2/day, but what level of degradation is "acceptable" is lacking.

There is concern over the effect of escaped fish on genetic and ecology of Lake Huron ecosystem. We have had escapements of 250,000 rainbow trout in past years which are a great concern.

In all the sites available in Michigan waters of the Great Lakes there will be conflicts with sport fishing, boaters and commercial fisherman.

Since the Bottom Lands over which these cage-culture would be located over are held In trust for the citizens of the State of Michigan by the MDNR. What will be the benefit for usage of these bottom lands if it falls in the category of monies collected for mining, oil and gas wells, and sales of timber from the state forests, which goes into the Natural Resources Trust Fund? In addition, to posting a security bond of cash (monetary) or insurance bond for damage to the bottom land from manure and food deposition and degradation, the damage of the ecosystem of the Great Lake waters of the State of Michigan, from escapement, disease transfer to native species, causes loss of valuable habitat.

In conclusion, I support aquaculture in a closed system.

Kenneth E. Merckel D.D.S.

Sport Fishing Advisor Lake Huron

[redacted]
Subject: Fwd: Net Pens
Date: November 18, 2015 at 6:15 PM
[redacted]

1st

[redacted]
Sent: 11/17/2015 1:02:50 P.M. Eastern Standard Time
Subj: Fwd: Net Pens

[redacted]
Subject: Net Pens

Greeting everyone,

This is my first attempt to do anything like this, i.e. send messages to a group that will eventually amount to pages of text. Let me remind you all about some of my deficiencies. My ability to use my computer is limited in the number of functions that I can undertake. Some of you will remember that I got my first computer in 1983 when I retired from the Michigan DNR. Being of sound mind, at that time, I traded it for fishing tackle. Helen and I acquired our next computer when we were both about the age of 80. Another excuse, I dictate all my messages to the person residing within my computer (Dragon Speaking Naturally). I have named him Dr. Watson and he does a very good job in translating my voice messages to a written text. However he sometimes makes some massive mistakes and since I have such a difficulty in

some massive mistakes and since I have such a difficulty in reading what I have dictated you may see some occasions when my text includes some totally unrelated phrases. With that I will end my excuses

I am totally opposed to the proposed development of fish rearing pens in the Great Lakes as proposed by several documents that have appeared recently. Sea Grant working with the Michigan aqua culture Association produced a document earlier this summer entitled a strategic plan for the development of Michigan aquaculture. It is about 110 pages long and copies are limited. I got my copy as an attachment from Frank Crist. Perhaps that is a source that some of the rest of you could use. In my opinion it should not be described as a strategic plan. I would describe it as a promotional document. Again in my opinion it is deceitful. Deceitful in that it omits many of the negative aspects of developing aquaculture in the Great Lakes. It omits many readily available negative facts about the only example that we have for comparison that being the net pens currently in the North Channel area of Lake Huron in the province of Ontario. There are dozens of other places that I find objectionable statements. My intent is to share these concerns, express my opinions and describe what I believe is wrong with the whole idea. Having said this much, I don't want to make any of my emails so lengthy as they will sometimes be passed over because they take too long.

In this message I want to make only one point. There is a public meeting to be held on November 19. I believe that it is at Treetops Resort immediately east of Gaylord. The meeting is a public review of what our state agencies have to say and provides an opportunity for public input. I hope that many of you can make that meeting I plan to be there if I can arrange transportation and I have registered as a person wishing to deliver comments.

As more informative emails from me arrive, I hope you will feel free to share them to colleagues and any other interested

people

Best regards to all of you,
Howard Tanner

[redacted]
Subject: Fwd: Net Pens
Date: November 17, 2015 at 1:02 PM

1 rec

[redacted]

Sent: 11/13/2015 12:01:39 P.M. Eastern Standard Time
Subject: Net Pens

Greeting everyone,

This is my first attempt to do anything like this, i.e. send messages to a group that will eventually amount to pages of text. Let me remind you all about some of my deficiencies. My ability to use my computer is limited in the number of functions that I can undertake. Some of you will remember that I got my first computer in 1983 when I retired from the Michigan DNR. Being of sound mind, at that time, I traded it for fishing tackle. Helen and I acquired our next computer when we were both about the age of 80. Another excuse, I dictate all my messages to the person residing within my computer (Dragon Speaking Naturally). I have named him Dr. Watson and he does a very good job in translating my voice messages to a written text. However he sometimes makes some massive mistakes and since I have such a difficulty in reading what I have dictated you may see some occasions when my text includes some totally unrelated phrases. With that I will end my excuses

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As more informative emails from me arrive, I hope you will feel free to share them to colleagues and any other interested people

Best regards to all of you,
Howard Tanner

[redacted]
Subject: Net Pens #3
Date: November 18, 2015 at 1:55 PM
[redacted]

3 rd

Monday, November 16

I will make this my text with an old adage – – "*Smart people learn by their mistakes, really smart people learn by the mistakes of others*"!

One of my main concerns with existing and proposed net pen operations in our Great Lakes is the track record of how, cage or pen culture, in any form using fish or any animals capable of surviving in the the wild.

I will start with a review of experiences from least germane to our current situation, moving through the list to those more applicable, ending up with the experiences of pen culture in the North Channel of Lake Huron.

There are many similarities in the experiences of raising mammals either for hunting preserves or for food that are at least remotely related to the net and culture of fish. In North America, for one reason or another, elk, deer, wild boar, and pigs have been raised chiefly for private hunting preserves. As a result we have at least 1 million wild pigs in Texas, several thousand in Michigan, wild boar, rooting up our forest floor vegetation in the upper Peninsula of Michigan.

CWD or Chronic Wasting Disease was first spread from penned, infected, deer in Colorado. In less than 30 years it has been spread through deer and elk populations from Saskatchewan to Texas and from Colorado to New York. This year three infected deer were detected in Michigan. There is only one way this disease could have been spread so rapidly and so far – – it was the interexchange for trade or sale of animals by enterprises raising wild animals in pens.
Yes, these were mammals, but the lesson is the same. Animals will escape and disease will be spread when pen reared animals escape and carry with them diseases.

Fish diseases have been spread in several places in North America by disease and escaping fish from private aquaculture. Whirling disease has decimated the trout populations of the famous Madison River.

And mentioned several times the five species of Asian carp originally escaped from aquaculture operations in Arkansas in Michigan a long time ago but within my memory experienced the spread of bacterial gill disease originating from state hatcheries, and then more recently in the late 1960s we experienced the whirling disease in the Tobacco River near Clare Michigan. We responded by poisoning 7 to 9 miles of that river eliminating all fish populations. Our efforts appear to have been successful.

Turning to the pen culture of fish in more distant locations. In Norway, Atlantic salmon were reared in pens in saltwater. The amount of Atlantic salmon on the market grew tenfold in a few short years. Then a deadly disease developed in the pens producing a complete collapse of the pen reared salmon industry. However the real tragedy, and the one that is growing in the North Channel, threaten us like a dagger pointed in our direction is that this disease spread to wild populations of Atlantic salmon and those populations have been decimated. Remember the Atlantic salmon is the most prized species of fish in the world. It is known as Salmo salar or the Leaper. Worldwide their populations continue to decline. So what was the solution of the companies operating in the pens in Norway waters? They moved most of their industry to protected areas along the shoreline in the country of Chile and the Pacific Ocean. There the industry grew to a billion-dollar industry and then collapsed. It has currently been restructured and its future is open to question – – as an aside I viewed three net pens sites in Chile while on tour. They were ugly but located in remote areas essentially unpopulated by people and other activities. At two of the locations I saw seals swimming near the net pens. To me they appeared fat and happy presumably feeding on the unwary pen reared fish escaping.

Turning now to the net pens in the North Channel of Lake Huron. Those pens have been there for at least a decade and it is documented that rainbow trout have escaped many times, almost consistently. One escape incident more than 200,000 rainbow escaped.
Why didn't Sea Grant tell us this in their so-called strategic plan document?
Why didn't they tell us that these net pens have been in violation of water quality standards established by the province of Ontario? This one I must label as hearsay, but I believe it to be true. I have been told that there is evidence that tourism in that area has declined with boarded up motels

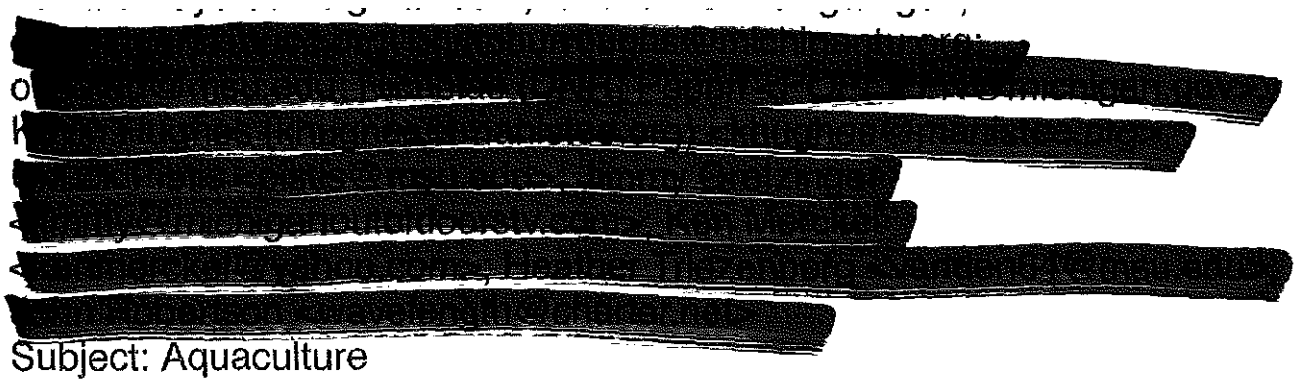
evidence that tourism in that area has declined with boarded up motels and other relics catering to visiting tourists. If this is true, why didn't Sea Grant tell us about this in their promotional document.

Here are my closing comments.
Aquaculture – as it exists in the net pens of the North Channel of Lake Huron, stare at us like a dagger pointed at our throat.
Now the authors of this proposal would have us authorize net culture in Michigan's portion of the Great Lakes to an industry growing to a value of $1 billion a year. Are we nuts? This proposal must be defeated – – smart people learn by their mistakes, really smart people learn by the mistakes of others

End of my third message – – Howard

Sent from my Verizon Wireless 4G LTE smartphone

4 7A



Subject: Aquaculture

This will be my fourth message on the subject of net pens in the Great Lakes good afternoon everyone it's Monday afternoon this message will chiefly be on the subject of phosphates.

This afternoon I will take as my starting point some memories of long long ago. As I write I am 92 years old and talking about my research experiences as a graduate student at Michigan State University. Both my Masters degree research and my PhD research were on the subject of adding nutrients to natural lake systems for the purpose of stimulating fish production and fish growth! I worked on seven lakes, I winter killed one of them and I produced offensive mats of filamentous algae on two more. I am happy and proud to report that that in my recommendations in my last chapter I made a statement to the effect no one under any circumstances should deliberately add nutrients including phosphates to natural aquatic systems!

In that promotional document which C Grant chose to label as a strategic plan, pardon me while I wiped the froth away from my mouth, it is well established that phosphates are the limiting factor throughout the waters and soils of the great lakes watershed fish culture and net pens releases, without treatment, fish feces and other waste products. Research studies published in a review journal states that the amount of phosphates discharged from a single minute pen operation are the equivalent of the phosphates from a well-run sewage treatment plant serving the community of 10,000 people!! According to the – – when I will now call that accursed promotional document put forward by Sea Grant – – which postulates that we could have been aquaculture industry worth billions of dollars by 2025. I don't know how many net pin operations that would take but let's just make a guess and say 100 discharging phosphates to the equivalent of sewage treatment plant serving 1 million people!

sewage treatment plant serving 1 million people?
We the people of Michigan are the stewards of the Great Lakes our history includes our struggles to reduce phosphates beginning in the late 1950s Michigan people led the nation to ban phosphates and detergents phosphates and lawn fertilizer and spent millions of dollars to upgrade the efficiency of our sewage treatment plants and our industrial discharges. The Department of natural resources spent three years and a lot of money to reduce the phosphate discharges from the Platte River hatchery that effort was successful in reducing the discharges of phosphates by more than 90%. Now comes forth that federal agency known as C Grant promoting net pen fish culture in the Great Lakes that without any semblance of treatment will discharge phosphates equipment to the ways of 1 million people.
The predictable results will be that there will be considerable more amount of filamentous algae deposited in stinking decaying mats on the nearby beaches. There will be a general increase in the concentration of phosphates throughout the system. Producing more filamentous algae particularly in Lake Erie where it recently has produced sufficient filamentous algae that in turn produces toxic compounds forcing the closure of the intakes for drinking water for the cities of Toledo and Cleveland. Again the authors of this document clearly have that information and jet chose never to mention it. Remember also that about 5 million people or half the population of Lake Michigan takes their drinking water from Great Lakes sources. How come they never mentioned that? I'm going to close with some speculation. This aquaculture proposal starts on the assumption that they can take waters owned by the public and convert them to private profit motivated production of fish. The second assumption is that it's okay to discharge him treated fish feces in other ways in the waters of the Great Lakes. Let's strip this down to the fact that they would conduct operations that would discharge untreated animal wastes, yes Fisher animals, into the Great Lakes I wonder how far that assumption could be carried? Hypothetically let's assume that I own a big factory – – the truck picks up 100 pigs every Monday morning from my establishment one of my most difficult problems and most expensive problems is the proper disposal of animal feces. If their assumption is to be accepted I think I can make money by locating my pig factory where I can discharge into the Great Lakes – – seems fair – – about a chicken factory we could locate that on charity island and solve the difficult waste problem by just discharging it in the Great Lakes and so on and so on and so on.
I'm going to end this – I haven't stated all of the arguments but the

I'm going to end this – – I haven't stated all of the arguments but the reasons why Penn culture in the Great Lakes must be rejected we the people will not allow it – – not ever!!
That ends my fourth in a series of opposition statements to greatly expand culture I hope to see many of you at dealer on the 19th – – Howard

DNR-Net-Pen-Comments@michigan.gov

From: Jan Murphy [redacted]
Sent: Friday, December 04, 2015 8:37 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish farms

To whom it may concern:

I have lived in Michigan my entire life. and am still surprised at some of the really stupid actions that have been taken by the DNR. The idea of actually allowing fish farms on the Great Lakes, though, with the outrageous pollution that will be a given with such operations, is almost off the "bonehead scale".

I am old enough to remember the damage that the sea lamprey did to our Great Lakes fisheries. We were lucky to recover as well as we did, and to turn around and risk the health of our waters with something as short-sighted as fish farms seems extremely foolish. We are likely to be dealing with the fallout from fish waste long after these "entrepreneurs" have moved on to something else.

Putting aside the intrinsic value of pure water, especially in light of the "megadroughts" that NOAA and other agencies are predicting, is nothing other than foolish.

Please do the right thing and reject this proposal.

Very truly yours,

Janis Murphy
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Kim Thoma[redacted]
Sent: Friday, December 04, 2015 5:56 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Commercial Net Pens

Dear Sir,
I'm writing about the commercial net pen proposal on rainbow trout in Lakes Michigan and Huron. Please count this household against this unwarranted commercial venture. There's just too much at stake to allow this proposal to go any further than it has. One mistake and the lakes will be damaged for years to come. As practicing conservationists, hunters and anglers, we have to be able to see to it that ALL protections are taken when it comes to the lakes and rivers for all generations to come. This venture is just way too risky to even be considered any further.
Please, don't allow this proposal!!
Sincerely,
John and Kim Thomas
[redacted]

Sent from my iPhone

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Walter Bock [redacted]
Sent: Friday, December 04, 2015 4:35 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen Aquaculture in Great Lakes Areas That Are Under the Jurisdiction

To Whom it May Concern;

Allowing large scale net pen aquaculture in the Great Lakes should not be authorized as the lake ecosystem as it is now configured does not lend itself to proper or safe management. The siting and management of such facilities would be extremely problematic and prone to failure. While I do see the future need for additional protein in the world's food chain the better option would be on land recirculation systems where any and all pollution loading would be controlled and treated.

Thank you for allowing me this opportunity to comment on this very important issue concerning the future of the Great Lakes.

Wally Bock
"Conservation is a state of harmony between men and land" Aldo Leopold

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From:	Ann George[redacted]
Sent:	Thursday, December 03, 2015 9:05 PM
To:	DNR-Net-Pen-Comments@michigan.gov
Subject:	Net Pen Aquaculture
Attachments:	My Comments on Net Pen Aquaculture to the State of MichiganAC.doc

Attached please accept my comments on the proposed net pen aquaculture businesses in the Great Lakes.
Gary Marek

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Thursday, December 03, 2015 4:50 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net-Pen Aquaculture

December 3, 2015

TO: DNR/DEQ/MDARD Net Pen Aquaculture Group

DNR-Net-Pen-Comments@Michigan.gov

FR: Ann George

RE: Great Lakes Net-Pen Aquaculture Proposals

When I first heard of the plan to allow net-pen aquaculture in the Great Lakes, I was dumbfounded. I found it hard to believe that the agencies charged with conserving and protecting our environment in Michigan would have anything to do with such a troubled industry. Then I read the reports prepared for the Quality of Life Group and was further astounded. It would appear that none of the analyses takes into account the overwhelming evidence of disease, escapes, environmental degradation and economic loss from Europe, Canada, or South America. None of the reports even attempts to calculate a ***net*** economic or environmental benefit (or loss) from net-pen aquaculture. No mention is made of any of the documented negative effects from the Ontario operation in the North Channel of Georgian Bay, even though this is the only truly comparative example. No alternatives are considered, such as land-based recirculating aquaculture systems (RAS), even though the world-wide industry is heading in that direction. The current proposals are grossly inadequate -- and just plain wrong-- on many levels:

- The waters of the Great Lakes that Michigan shares are held in **public trust**. To allow private companies to exploit and profit from this public resource would be an egregious abuse and abandonment of responsibility by the very state agencies charged with its preservation and protection.
- Around the world, net-pen aquaculture has been shown to be a boom and bust industry, leaving **environmental and economic damage** in its wake.
- Michigan has **a multi-billion dollar fishing industry** dependent on the health of our waters, not to mention our **tourist industry**.
- **Recirculating aquaculture systems work**. They use less water, offer greater control of growing conditions, have less climate-related risk and fewer disease problems, are expandable, can be situated close to markets, can be integrated into a growing system which incorporates plants and/or other organisms -- to name only a few of the potential benefits.
- **The aquaculture industry is heading toward RAS systems**, having realized the returns are there in the long run. The initial investment is greater, but so are the benefits. RAS-raised Atlantic salmon and rainbow trout are being profitably brought to market by

[redacted]

Sustainable Blue, a company in Nova Scotia, to name just one example. There are several large-scale examples of companies growing other species here in the United States.

- * Developed properly, **Michigan could become a leader in freshwater RAS aquaculture.**

We humans have a well-documented history of destroying the environment, extirpating species, and endangering human health. Net-pen aquaculture has been shown to have numerous adverse environmental effects, but it's too late (for instance) for the Atlantic salmon rivers of the Bay of Fundy or the coastal rivers of Maine. Have we in Michigan really learned nothing from the examples world-wide? In my mind, **there is no justification for experimenting with net-pen aquaculture in the Great Lakes**, fully 20% of the world's fresh water, especially given the analyses made public so far.

I urge you to start over and take **all potential effects (positive and negative)** into account. A good article to start with might be *Searching for Solutions in Aquaculture: Charting a Sustainable Course,* by Dane Klinger and Rosamond Naylor, appearing in the **Annual Review of Environment and Resources (2012)**. Then go on to analyze the most recent research and fully consider the potential for harm inherent to net-pen aquaculture. I am confident you will find that recirculating aquaculture systems have many more benefits and far fewer drawbacks, and would be a good fit for our state economy.

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Thursday, December 03, 2015 8:10 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Great Lakes net pen aquaculture

Dear MDNR, MDEQ, and MDARD Panel Members,

I'm writing to provide commentary on proposal to allow net pen aquaculture (a.k.a. "fish farming") in the Great Lakes. I've been following this issue from articles in my local paper (the Petoskey News-Review) and my local public radio station (CMU public Radio). I have a degree in fisheries management from the University of Wisconsin-Stevens Point and have spent a good portion of my career working in water resource management.

Even in the vast and resilient oceans, fish farming has been shown to be detrimental. Sustainable seafood guidelines advise against most types of net pen aquaculture due to the harm posed to marine life. I shudder to think what the consequences could be in in a much more sensitive freshwater ecosystem like the Great Lakes. Furthermore, the waters of the Great Lakes are a treasured public resource held in trust by the State for use by everyone. I do not want even a small portion of my Great Lakes dedicated to a private fish farming enterprise.

I strongly urge you to prohibit fish farming in the Great Lakes.

Sincerely,

Doug Fuller
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: elizabeth benyi [redacted]
Sent: Wednesday, December 02, 2015 8:41 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish Farming Pens

Fish farming should NEVER be allowed in the Great Lakes. It is highly contaminating to the water and kills native species. There have been many credible scientific studies done on the hazards of farmed fish both to the consumer and to the environment. We have the most pristine and largest fresh water bodies in the world. We need to protect those resources no matter what. In the next ten years most wars will be fought over fresh water and not oil.

Please stop this

Elizabeth Benyi
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: John Knoppe[redacted]
Sent: Sunday, November 29, 2015 1:07 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: aquaculture in the great lakes

This is to express strong opposition to the proposal to set up "fish farms" in the Great Lakes and to request that you deny any such proposals.

In addition to the sound environmental reasons provided at the public hearing, I ask you to consider that such proposals are at the expense of our public heritage and public ownership for the benefit of special interests. We are asked to give up ownership so a few can profit and degrade our ecosystem. This is dead wrong.

Thank you for your consideration,

John W Knoppe
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Deb Hansen [redacted]
Sent: Saturday, November 28, 2015 8:38 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net-Pen Aquaculture in the Great Lakes

Please include my comments in your assessment of this issue. Thank you.

It's my understanding that the State of Michigan has received proposals to establish privately owned net-pen operations in public waters of the Great Lakes near Escanaba and Rogers City.

I do not support this proposal. There are better ways to undertake aquaculture away from the Great Lakes. Our responsibility is to ensure that we invest in improving the health of these waters as sources of life for natural fisheries not to allow private interests to exploit them.

I understand from reports on the subject that net-pen operations in public waters of the Great Lakes is not economically justifiable and poses far too great of risk to them and to public health. It is your responsibility to put the public interest before private gain.

Documented dangers include:

* Adding tons of phosphorus and nitrogen each year. This is unacceptable.

* Creating a potential breeding ground for diseases that could spread from caged fish to wild populations -- a superior food source to farmed fish.

* Escapes such as what happened with Asian carp can have unintended and undesirable consequences.

* Putting environmentally-friendly aquaculture systems at a disadvantage.

I agree with the assessment of the scientific panel still believes that the State "must err on the side of caution." Protecting these waters is a sacred trust. We must not gamble with the health one of the fundamental sources of life itself for 44 jobs.

[redacted]

Michigan already has closed-loop aquaculture. Separated from rivers and lakes, these operations do not endanger the Great Lakes and inland waterways.

We do not own the Great Lakes, but we are responsible for their care. It is a profound responsibility as we will learn in the years ahead.

I encourage you not to approve this business venture.

Respectfully,

Rev Debra Hansen

[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Dan Sernick[redacted]
Sent: Friday, November 27, 2015 9:06 PM
To: Armas Soorus
Cc: DNR-Net-Pen-Comments@michigan.gov
Subject: Re: Fish Net Pen Farming in Great Lakes

Well said. I second.
Dan Sernick

On Nov 27, 2015 6:12 PM, "Armas"[redacted] wrote:

I am speaking out as firmly opposed to fish net pen farming in the Great Lakes.

The Asian Carp in the Mississippi watershed is a prime example of how fish farming cannot be adequately controlled and causes great environmental damage at the profit of a few special interests. We are already facing this threat in the Great Lakes through the Chicago River and it demonstrates how commercial interests conflict with the interests of environmental and recreational groups and can have far ranging impact. The Great Lakes are a public resource that should not be contaminated further by Fish Net Pen Farming.

Further, I do not think open water net pen aquaculture has a place on the great lakes because:

Fish invariably and routinely escape from aquaculture net pens and cages and not infrequent accidents release them in large numbers. These escapes have documented negative genetic effects on native or wild populations of the same and closely related species. If the escapees are of a non-native species, they may found (and have founded) viable populations and become pernicious invaders themselves. Escapees also transmit disease to and compete with all susceptible aquatic species.

The crowded conditions in net pens and cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aqua culturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.

Aquaculture uses hormones to promote faster growing and larger crops. Unknown portions or metabolites of these chemical compounds are passed on through excrement to have still poorly understood effects on other aquatic populations and on the public water supplies.

Net pen and cage operations in the US waters of the Great Lakes would discharge very significant amounts of untreated animal excrement, dead animals, uneaten food, food additives, hormones, medications, pesticides and chemicals used to maintain the pens directly into the water. Volumes depend on pen size and numbers, as well as the fish species farmed, but their volumes are the equivalent to the effluent releases of small to medium sized cities. However, open water fish farmers do not treat that waste like our municipalities must!

In the Great Lakes, where there are no tides to help disperse wastes, cage and net pens will concentrate effluent, stifle existing bottom life, and facilitate condition conductive to algal blooms, including blooms of poisonous species like Microcystis that cut off the public water of Cleveland a summer ago.

Nutrient effluent from open water fish farms reduces dissolved oxygen and exacerbates conditions leading to dead zones, even as Great Lakes state and federal agencies, farmers, municipal sewage plants and others undertake costly efforts seeking to reduce anoxia in parts of the Great Lakes, including parts of Lake Michigan.

Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas, and the like. The much from near shore fish farms has itself prevented the use of beaches for other activities. I don't want to be swimming in excrement.

Over their lifetime, farmed fish require a greater weight of fish protein in their food than they contribute to the human food supply. Indeed, one sixth of the total fish harvest worldwide is used to make aquaculture fish food. Harvesting of forage species to feed aquaculture is devastating these species worldwide.

Aquaculture operations typically exploit nearby sources of fish protein to produce the less expensive feed needed to stay viable and Michigan's studies already suggest the likelihood of instate fish meal mills. However, the Lake Michigan - Huron complex is not an ocean with a vast forage base that can be exploited in support of aquaculture. Indeed, the amount of forage in these lakes has become a limiting factor for commercial and recreational fisheries and is currently near historic lows. The forage base cannot sustain fishing in support of aquaculture.

Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes, Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice.

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Charlie Weave[redacted]
Sent: Friday, November 27, 2015 7:34 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Aquaculture in the Great Lakes

I believe this to be a poorly designed project for the following reasons:

1. Nutrient overloading from fish fecal matter and unconsumed food.
2. Disease possibilities and their spread to other wild fish.
3. Antibiotics used to prevent and treat diseases entering into the water and forwarded to drinking water systems.
4. Genetic effects from escaped fish, especially in a catastrophic escape event.
5. Monitoring through ice cover during the harsh mid-western winters.

Clearly the risks outweigh the economic benefits. I strongly recommend you put this project on hold until the above issues can be resolved and /or mitigated.

If you do decide to go ahead with the project, it is imperative you adhere closely and completely to the various Science Advisory Panel recommendations.

Thank you for considering this.

Charles Weaver

[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Armas[redacted]
Sent: Friday, November 27, 2015 6:12 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish Net Pen Farming in Great Lakes

I am speaking out as firmly opposed to fish net pen farming in the Great Lakes.

The Asian Carp in the Mississippi watershed is a prime example of how fish farming cannot be adequately controlled and causes great environmental damage at the profit of a few special interests. We are already facing this threat in the Great Lakes through the Chicago River and it demonstrates how commercial interests conflict with the interests of environmental and recreational groups and can have far ranging impact. The Great Lakes are a public resource that should not be contaminated further by Fish Net Pen Farming.

Further, I do not think open water net pen aquaculture has a place on the great lakes because:

Fish invariably and routinely escape from aquaculture net pens and cages and not infrequent accidents release them in large numbers. These escapes have documented negative genetic effects on native or wild populations of the same and closely related species. If the escapees are of a non-native species, they may found (and have founded) viable populations and become pernicious invaders themselves. Escapees also transmit disease to and compete with all susceptible aquatic species.

The crowded conditions in net pens and cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aqua culturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.

Aquaculture uses hormones to promote faster growing and larger crops. Unknown portions or metabolites of these chemical compounds are passed on through excrement to have still poorly understood effects on other aquatic populations and on the public water supplies.

Net pen and cage operations in the US waters of the Great Lakes would discharge very significant amounts of untreated animal excrement, dead animals, uneaten food, food additives, hormones, medications, pesticides and chemicals used to maintain the pens directly into the water. Volumes depend on pen size and numbers, as well as the fish species farmed, but their volumes are the equivalent to the effluent releases of small to medium sized cities. However, open water fish farmers do not treat that waste like our municipalities must!

In the Great Lakes, where there are no tides to help disperse wastes, cage and net pens will concentrate effluent, stifle existing bottom life, and facilitate condition conductive to algal blooms, including blooms of poisonous species like Microcystis that cut off the public water of Cleveland a summer ago.

Nutrient effluent from open water fish farms reduces dissolved oxygen and exacerbates conditions leading to dead zones, even as Great Lakes state and federal agencies, farmers, municipal sewage plants and others undertake costly efforts seeking to reduce anoxia in parts of the Great Lakes, including parts of Lake Michigan.

Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas,

and the like. The much from near shore fish farms has itself prevented the use of beaches for other activities. I don't want to be swimming in excrement.

Over their lifetime, farmed fish require a greater weight of fish protein in their food than they contribute to the human food supply. Indeed, one sixth of the total fish harvest worldwide is used to make aquaculture fish food. Harvesting of forage species to feed aquaculture is devastating these species worldwide.

Aquaculture operations typically exploit nearby sources of fish protein to produce the less expensive feed needed to stay viable and Michigan's studies already suggest the likelihood of instate fish meal mills. However, the Lake Michigan - Huron complex is not an ocean with a vast forage base that can be exploited in support of aquaculture. Indeed, the amount of forage in these lakes has become a limiting factor for commercial and recreational fisheries and is currently near historic lows. The forage base cannot sustain fishing in support of aquaculture.

Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes, Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice.

DNR-Net-Pen-Comments@michigan.gov

From: rivdrifter[redacted]
Sent: Friday, November 27, 2015 4:41 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net pens

We don't want net pen in our great Lakes hasn't government hurt our lakes enough by allowing all the foreign invades that are here already enough already do your job protect our natural resources stop the exploitation of our great lakes

Sent from my Verizon Wireless 4G LTE smartphone

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Judy Passon [redacted]
Sent: Wednesday, November 25, 2015 2:57 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish Farming

Please do not allow fish farming in the Great Lakes. It would add too much pollution and risk the introduction of invasive species to the ecosystem. There would be no advantage to citizens of Michigan, but it would endanger the state's most valuable resource!
Judy Passon
Michigan resident

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Benjamin Brady [redacted]
Sent: Wednesday, November 25, 2015 11:18 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Save the tributary rivers!

Good morning,

As part of the Ojibwa tribe I plead for this not to take place. Fish invariably and routinely escape from aquaculture net pens and cages and not infrequent accidents release them in large numbers. These escapes have documented negative genetic effects on native or wild populations of the same and closely related species. If the escapees are of a non native species, they may found (and have founded) viable populations and become pernicious invaders themselves. Escapees also transmit disease to and compete with all susceptible aquatic species.

Please no fish pens.

Thank you,

Benjamin Brady

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Edson Murray [redacted]
Sent: Wednesday, November 25, 2015 11:01 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish farms

PLEASE do not allow FISH FARMS in any of the Great Lakes.

Edson W Murray
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Dan DeVisser[redacted]
Sent: Monday, November 23, 2015 9:55 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Please protect our Great Lakes

Please say no to the proposed net pens. I love our fishery that has been carefully planned for throughout the years. I fish on Lake Michigan for game fish, this fishery is under extreme stress already because of invasive species and possible climate changes. I feel it would be detrimental to add net pens. I am extremely worried about adding the additional fish waste and also to chance of cross breeding that could happen as well as unforeseen problems that could happen do to the added pens.

Dan DeVisser
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Jim and Wendy Johnson [redacted]
Sent: Saturday, November 21, 2015 10:54 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Comments from James Johnson
Attachments: Johnson Cage Aqua Nov 19.docx

Categories: From Meeting, Print

Attached is a text version of my oral comments delivered at the November 19 meeting at Treetops Resort Conference Center. This version is a bit more lengthy and includes some thoughts that I did not feel there was time for me to bring up at the meeting.

Thank you for the opportunity to weigh in regarding this important issue.

James E. Johnson
Great Lakes Fishery Research Biologist, retired
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Kala Snyder [redacted]
Sent: Friday, November 20, 2015 3:05 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen Aquaculture

Categories: Print

To Whom it May Concern:

I am a proud Michigander who would like to thank you for all your work supporting our amazing state's natural resources. Our waters, forests, parks, and every God-given beauty make our state well-beyond matchable by any other.

The introduction of fish farming to the Great Lakes concerns me; the most important risk being contamination of our waters and wild aquatic species (by types of fish raised, given medications, fish food, colorants, etc.). These farm-factors will impact surrounding habitats and their species more than we can project. Additionally, I most certainly DO NOT agree with any GMO fish, let alone it being allowed in our majestic lakes. Fish were made perfect long before humans intervened in any way.

My husband, and I agree, thought allowing fish farms that only raise native species is not too extreme of a requirement. Restrictions on mass medicating and fish being fed colorants and growth-stimulants are imperative, as well. This would still allow the introduction of a local industry in fish farming, but would decrease the daily negative impacts of pen aquaculture. It would also prevent enormous negative consequences on our local species due to an escape from the farm.

I urge you to protect the Great Lakes' ecosystem, even if it means turning down a business and potential jobs. Polluting our waters, soils, and communities, even possibilities of such activities, should not be promoted by our DNR. Only businesses willing to effectively enhance Michigan should be allowed to work near our precious water systems. I do expect our leaders to protect our public natural resources, including our Great Lakes environment, fishermen, and coastal communities.

Thank you for considering our views as you debate this topic, and for all your servitude to all living creatures.

God bless you each and every day,
Kala Snyder
Christian, wife, mother, nurse, conservation advocate

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: jim keller [redacted]
Sent: Friday, November 20, 2015 1:06 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: open water net pen aquaculture

below are just some of the reasons I object to open water net pen aquaculture in ANY Michigan waters, especially the Great Lakes.

In the Great Lakes, where there are no tides to help disperse wastes, cage and net pens will concentrate effluent, stifle existing bottom life, and facilitate conditions conducive to algal blooms, including blooms of poisonous species like Microcystis that cut off the public water supply of Cleveland a summer ago.

Nutrient effluent from open water fish farms reduces dissolved oxygen and exacerbates conditions leading to dead zones, even as Great Lakes state and federal agencies, farmers, municipal sewage plants and others undertake costly efforts seeking to reduce anoxia in parts of the Great Lakes, including parts of Lake Michigan.

Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas, and the like. The muck from near shore fish farms has itself prevented the use of beaches for other activities.

Over their lifetime, farmed fish require a greater weight of fish protein in their food than they contribute to the human food supply. Indeed, one sixth of the total fish harvest worldwide is used to make aquaculture fish food. Harvesting of forage species to feed aquaculture fish is devastating these species worldwide.

Aquaculture operations typically exploit nearby sources of fish protein to produce the less expensive feed needed to stay viable and Michigan's studies already suggest the likelihood of in-state fish meal mills. However, the Lake MI - Huron complex is not an ocean with a vast forage base that can be exploited in support of aquaculture. Indeed, the amount of forage in these lakes has become a limiting factor for commercial and recreational fisheries and is currently near historic lows. The forage base cannot sustain fishing in support of aquaculture.

Regards

Jim Keller

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Hugh Melling [redacted]
Sent: Friday, November 20, 2015 9:09 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: opinion regarding aquaculture

Thank you for allowing me to express my opinion regarding net pen fish raising operations in the Great Lakes.

I feel that net pen aquaculture should not be allowed in the Great Lakes. Putting this great natural resource at risk for the personal profit of private individuals is not in the best interest of the state of Michigan or the people of Michigan.

Thank you and best regards

Hugh Melling
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Lynn Chastain[redacted]
Sent: Friday, November 20, 2015 8:52 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net-pens

I say absolutely not.!! We don't need this in our Great Lakes. How much more damage can our lakes take? Leave our lakes alone.
Our lakes are busy enough with big freighters coming through dumping their ballast waters with contaminates, pleasure boats racing around, fishing charters and oil companies running oil lines under our 'clear, beautiful, pure water'.
Don't let this Net-Pen idea take hold. As long as we have developers, people who don't care, as they have not lived on the Great Lakes all their life nor do they truly care about the quality of our lakes, they only care about the 'mighty dollar' going into their pocket, tell them 'NO'!
Enough is enough.
Regards,
L.C.

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Jessica Bell [redacted]
Sent: Thursday, November 19, 2015 9:02 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net pens, my opinion

Rec'd OK

To Whom It May Concern:

I do not want my email on this publicly published and I am generally not prone to putting myself "out there", but I thought I would put in my two cents regarding net pens in the Great Lakes. I am not well read on this particular company's pitch to put in the nets, but I have done some reading on general net pen usage elsewhere.

There is a lot of information out there regarding the use of antibiotics in net pens. The overuse of antibiotics in our food supply, be it poultry, beef, pork or fish and the subsequent consuming by humans is becoming a huge health issue. Just look at this week's headline health news regarding this issue. It's a major contributor to antibiotic resistant bacterial infections in kids and adults (see this week's release from USDA http://blogs.usda.gov/2015/11/18/alternatives-to-antibiotics-to-keep-food-animals-healthy/). Large quantities of penicillin being dumped into a mostly recreational body of water doesn't sound like a good idea. The waste byproducts resulting from net pens can cause major environmental issues in both plants and aquatic species if not handled very precisely. The problems are well documented in ocean net penning. I'm sure you can imagine the negative impact in a much smaller and more shallow body of water (ie. Great Lakes) in comparison to something as large and deep as the Atlantic and Pacific oceans which can absorb much more.

I would suggest that the DNR really digs into researching this before agreeing to even a test run. Do not accept paid scientific consultants offered up by the people who have a direct interest in making this happen. The public needs to be informed of all findings via popular news media sources to reach a broad Michigan audience before a decision is made. I, for one, have zero interest in one of our state's most important and beautiful natural resources getting nastied up just so some company can make a ton of money at everyone else's expense. The economic benefit to the residing county and state is tiny compared to what they reap from both resident and out of state tourism. In this instance diversification of the DNR's income portfolio will eventually backfire ending in tourism, water quality and possibly native species suffering.

I live 15-30 minutes from many beautiful, pristine places. I take my kids to all the beaches in the area throughout the summer. I would not, however, take my kids to swim anywhere near a net pen and most of my friends in this area would say the same thing. I'm sure it doesn't matter as much to people who do not use the beaches or lakes, or who do not live near the water. We that do care very much!

Jessica Bell

PS. Although the publication below is a rather long and old study-from 2001-and in regards to salmon net pens, but I think there's some good points made regarding both the benefits and detriments of net pens. It covers my concerns and many others I didn't mention.

http://www.westcoast.fisheries.noaa.gov/publications/aquaculture/noaa_memo_net_pen_salmon_farming_sept2001.pdf

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Daniel Swab [redacted]
Sent: Thursday, November 19, 2015 8:53 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen in Great Lakes is a Bad Idea!

Categories: Print

Reasons to be against Great Lakes fish farms:

1. Fish raised in net pens concentrate fish waste below them and have created "dead zones" in some ocean "fish farms."

2. Changes in the water chemistry near fish pens due to added nutrients from fish waste to and (likely) antibiotics given to the fish to keep them health will adversely affect other water species and potentially harm human who may consume the water.

3. Fish pens will keep the public fro using the same waters which belong to all Michigan citizens.

4. Fish pens are not needed. Ponds or tanks could easily be constructed on land to raise the fish.

5. The possibility of the fish escaping and co-mingling with native fish could upset native fish populations.

6. There is the potential to spread disease to other organisms and great lakes fish if the penned up fish were to become diseased.

Please do not allow Great Lake fish farms!

Dan Swab
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: JW[redacted]
Sent: Thursday, November 19, 2015 7:55 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: net pens

We are definitely opposed to any commercial type net pens in the great lakes. Go back in time and look at the contamination the salmon fish hatcheries caused to many of the inland lakes such as Platte Lake in Benzie County. It took years for things to be resolved from the contamination it caused. To allow this direct contamination would be a disaster for the great lakes and could cause irreversible contamination. Accidents will happen no matter what safe guards are put into place. There are other options that should be explored.

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Thursday, November 19, 2015 2:27 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: fish farms

As a member of Trout Unlimited I mplore the DNR to oppose the introduction of fish farming into Lake Michigan.The lake's coldwater species are currently in decline already.Introducing fish farms into the equation can only exacerbate that situation as they have wherever they've been allowed.

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Bruce Noble[redacted]
Sent: Thursday, November 19, 2015 10:37 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Aquaculture

Hello, I would like to say I am against Aquaculture or large fish farm operations in the State of Michigan. Aquaculture produce large amounts of organic waste. Current water laws do not adequately regulate effluent discharge into sensitive water ways such as cold water trout streams. The proposed industrial fish farm in Grayling, MI has great potential and will have a determinatly effect on the Au Sable river. Overall Michigan does not have a specific set of laws or regulations on how to properly Michigan waterways from Aquaculture. By not allowing large industrial fish farms to operate in Michigan, will protect our waters for future generations.
Sincerely,
Mr. Bruce Noble, CPG, CHMM
[redacted]

Sent from my iPad

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Wednesday, November 18, 2015 11:36 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Written Comment

MITU:

I am unable to attend the 11/19/15 Gaylord meeting on Great Lakes Aquaculture, but I wish to state my opposition to the request to raising fish in net pens in the Great Lakes and connecting waters and I support Senate Bill 526 which would ban this practice.

Jim Mirro
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: bfritzphoto[redacted]
Sent: Wednesday, November 18, 2015 6:24 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Don't Do It

TU has a litany of reasons, bona fide reasons, not to do this. I don't even look for farmed salmon after everything I've read.

Don't destroy the Great lakes with this pipe dream.

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From:	Greg Potter [redacted]
Sent:	Wednesday, November 18, 2015 6:17 PM
To:	DNR-Net-Pen-Comments@michigan.gov
Cc:	Greg Potter
Subject:	Public comment on Net Pen Aquaculture in Michigan waters of the Great Lakes
Categories:	Print

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office

Michigan Department of Natural Resources

ATTN: Hannah Guyer

Below and attached are my comments on Net Pen Aquaculture in Michigan waters of the Great Lakes, please include them in the public comments.

In Michigan our Lakes and streams are held in a public trust. State and federal agencies are supposed to protect and manage them for us but they are owned collectively by every Michigan citizen.

There are currently proposals from a couple Canadian companies to establish high concentration fish farms that would raise domesticated rainbow trout in Michigan waters of the Great Lakes. There is a third company that wants to expand the Grayling Fish Hatchery on the Au Sable River to also raise high concentrations of rainbow trout in a flow through system.

Establishing net pen aquaculture and expanding commercial flow through systems in our public waters will reverse fishery and water management policy in our state by 50 years. When we managed our waters as commercial fisheries and used our lakes and streams as garbage disposals they were a mess. Only after we began managing our waters as recreational fisheries and quit releasing raw waste into them did they improve.

We do not allow other businesses to dump raw sewage into our public waters. Every other business is required to properly dispose of their waste and treat their sewage. How can we justify asking other industries and enterprises to properly handle their waste or obtain release permits so we can meet TMDLs for pollutants like phosphorous, then allow aquaculture to release raw waste, possible pathogens including questionable genetics from escapes directly into our public waters.

The science of nutrition management should be pretty clear and easily calculated on a

production unit basis. The trick is adjusting it to unique local conditions developing maximum permissible limits on each site, along with a requirement to vacate sites if limits are reached, accurately project growth or failure within the sector and design a build out model that reflects these changes, and develop cumulative limits on a watershed basis. Having experience with the managing agencies I am not confident they have the capacity to develop, monitor and enforce regulations that would adequately protect our waters.

We have enough problems with land based concentrated animal feeding operations (CAFO) and their associated manure management systems. Why would we allow aquatic CAFOs to be placed in our lakes and streams? This is the foundation of my biggest concern, when agricultural practices become generally accepted the Right to Farm Act, if applied to the aquaculture industry, would allow these operators and those that follow to continue using damaging practices regardless of their effect on the local ecosystem and the cumulative effect on our environment.

The recent statement by MDARD that aquaculture is an important industry to Michigan is at best a stretch. Many of the producers licensed by MDARD are either out of production or never were in production of at least some of their listed species. I have spoken with aquaculture producers and their suppliers in Michigan and they tell me processing, low cost foreign competition and too small of an appropriate local market are all barriers to the industry's growth and sustainability. The last thing we want is an industry with a high probability to pollute operating in our lakes and streams without a strong business model in place before launching.

At present the largest sector of aquaculture in Michigan by sales is the ornamental fish business. Over thirty years experience as an owner of a pet, aquarium and water garden business leads me to the following conclusions. The industry has a long history of fighting any and all regulations even when those restriction could help stabilize and sustain the industry. Currently there are few rules on the industry and those that do exist are poorly understood and communicated to the producers, wholesalers and retail businesses and their customers, and those rule are not commonly being enforced. That sector of the aquaculture industry could be used as a model of what we might expect from the net pen /flow through sectors

At one time I thought aquaculture might make sense but at present the risks and costs far out weight the small chance of reward.

In my opinion,

Greg Potter

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Ted Bernhard [redacted]
Sent: Wednesday, November 18, 2015 4:07 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Pens for fish farms

Please do not permit open water net pens for raising fish in any of the Great Lakes for the following reasons:

Concentrations of fish will become places for various fish diseases that will be treated by the owners with antibiotics and pesticides that will spread through the water and expose native fish to these chemicals.

Aquaculture industry uses hormones to promote rapid growth for faster harvest and larger fish. these hormones would enter the water supply with effects that are not well understood by science.

These pens would produce large amounts of untreated fish excrement which would have only negative effects on the creatures living in the lakes and also the water supply for humans.

The pens not only would deplete the immediate water of oxygen but would also lead to massive algal blooms some of which may be poisonous.

Fish can escape from these pens and mix with native fish having only undesirable outcomes such as transmitting diseases and negatively effecting the genetics of wild fish.

Fish farms interfere with other uses of the water such as recreational and commercial boating, recreational fishing, use of beaches and swimming.

The farmed fish would be given feed produced from smaller forage fish which are already experiencing low populations for a variety of reasons.

Please consider this request and not permit such pens in the Great Lakes.

Sincerely,
Theodore Bernhard

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: John Adams [redacted]
Sent: Wednesday, November 18, 2015 1:17 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Bad Idea

Hello,

I would strongly urge the state of MI to not have net pens in Lake Michigan. I live in IL but fish both in WI and MI. Please protect our Lake.

Thank you,

JA

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Wojcik, Lawrence A. [redacted]
Sent: Wednesday, November 18, 2015 12:08 PM
To: DNR-Net-Pen-Comments@michigan.gov

I am writing to oppose fish farms in the Great Lakes. The Great Lakes are a treasured resource and I am very concerned that fish farms will create a danger to quality of the Great Lakes water. Thank you

Lawrence Wojcik
Partner
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: DANIEL [redacted]
Sent: Wednesday, November 18, 2015 11:29 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish farms

Just what we need....high concentrations of fish manure and a select few profiting from a Michigan natural resource. Oh, wait....and we want the state to enforce keeping the public away from our operations in public waters!
Sent from my iPhone

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Tim Regan [redacted]
Sent: Wednesday, November 18, 2015 8:25 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Opposed

I am writing to express my opposition to any aquaculture program in Lake Michigan.
I enjoy fishing the Wisconsin and Illinois portions of Lake Michigan for salmon, smallmouth, musky and carp and feel that aquaculture in the lake could cause serious problems.
Sincerely,
Tim Regan
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Rebecca Gril[redacted]
Sent: Wednesday, November 18, 2015 7:26 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Do Not Permit Open Fish Pens in Lake Michigan

As a resource specialist in Northeastern Illinois, I have studied the alarmingly rapid destruction of entire classes of native fish by invasive species. Introduction of farmed fish not only brings potential new invaders, but also pollution in the form of nutrients and waste, sediment and chemicals.

More than 6 million people in our area rely on Lake Michigan water for drinking, cleaning and recreation. Please do not open another doorway to damage of this national resource of clean fresh water.

I will be contacting our Senate and Congressional representatives regarding this matter.

Sincerely,

Rebecca Grill
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Scott Reynolds [redacted]
Sent: Wednesday, November 18, 2015 7:02 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net-Pen Aquaculture Comments

Categories: Print

To whom it may concern:
Fish invariably and routinely escape from aquaculture net pens and cages and not infrequent accidents release them in large numbers. These escapes have documented negative genetic effects on native or wild populations of the same and closely related species. If the escapees are of a non native species, they may found (and have founded) viable populations and become pernicious invaders themselves. Escapees also transmit disease to and compete with all susceptible aquatic species.

The crowded conditions in net pens and cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aquaculturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.

Aquaculture uses hormones to promote faster growing and larger crops. Unknown portions or metabolites of these chemical compounds are passed on through excrement to have still poorly understood effects on other aquatic populations and on public water supplies.

Net pen and cage operations in the US waters of the Great Lakes would discharge very significant amounts of untreated animal excrement, dead animals, uneaten food, food additives, hormones, medications, pesticides and chemicals used to maintain the pens directly into the water. Volumes depend on pen size and numbers, as well as the fish species farmed, but these volumes are the equivalent to the effluent releases of small to medium sized cities. However, open water fish farmers do not treat that waste like our municipalities must!

In the Great Lakes, where there are no tides to help disperse wastes, cage and net pens will concentrate effluent, stifle existing bottom life, and facilitate conditions conducive to algal blooms, including blooms of poisonous species like Microcystis that cut off the public water supply of Cleveland a summer ago.

Nutrient effluent from open water fish farms reduces dissolved oxygen and exacerbates conditions leading to dead zones, even as Great Lakes state and federal agencies, farmers, municipal sewage plants and others undertake costly efforts seeking to reduce anoxia in parts of the Great Lakes, including parts of Lake Michigan.

Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas, and the like. The muck from near shore fish farms has itself prevented the use of beaches for other activities.

[redacted]

Over their lifetime, farmed fish require a greater weight of fish protein in their food than they contribute to the human food supply. Indeed, one sixth of the total fish harvest worldwide is used to make aquaculture fish food. Harvesting of forage species to feed aquaculture fish is devastating these species worldwide.

Aquaculture operations typically exploit nearby sources of fish protein to produce the less expensive feed needed to stay viable and Michigan's studies already suggest the likelihood of in-state fish meal mills. However, the Lake MI - Huron complex is not an ocean with a vast forage base that can be exploited in support of aquaculture. Indeed, the amount of forage in these lakes has become a limiting factor for commercial and recreational fisheries and is currently near historic lows. The forage base cannot sustain fishing in support of aquaculture.

Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes. Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice.

Scott Reynolds
[redacted]

Sent from my iPad

Inspiration appears when we're willing to consider that what we believe might not be true.

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Steven R. Bodenstab [redacted]
Sent: Wednesday, November 18, 2015 2:06 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Do Not Allow Open Water Net Pen Aquaculture in the Great Lakes

Gentlemen:

I wish to register my strong opposition to open water net pen aquaculture in the Great Lakes; particularly in Lake Michigan. Among the reasons that it is bad policy and should not be permitted are:

1. Fish invariably and routinely escape from aquaculture net pens and cages and not infrequent accidents release them in large numbers. These escapes have documented negative genetic effects on native or wild populations of the same and closely related species. If the escapees are of a non native species, they may found (and have founded) viable populations and become pernicious invaders themselves. Escapees also transmit disease to and compete with all susceptible aquatic species.
2. The crowded conditions in net pens and cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aquaculturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.
3. Aquaculture uses hormones to promote faster growing and larger crops. Unknown portions or metabolites of these chemical compounds are passed on through excrement to have still poorly understood effects on other aquatic populations and on public water supplies.
4. Net pen and cage operations in the US waters of the Great Lakes would discharge very significant amounts of untreated animal excrement, dead animals, uneaten food, food additives, hormones, medications, pesticides and chemicals used to maintain the pens directly into the water. Volumes depend on pen size and numbers, as well as the fish species farmed, but these volumes are the equivalent to the effluent releases of small to medium sized cities. However, open water fish farmers do not treat that waste like our municipalities must!
5. In the Great Lakes, where there are no tides to help disperse wastes, cage and net pens will concentrate effluent, stifle existing bottom life, and facilitate conditions conducive to algal blooms, including blooms of poisonous species like Microcystis that cut off the public water supply of Cleveland a summer ago.
6. Nutrient effluent from open water fish farms reduces dissolved oxygen and exacerbates conditions leading to dead zones, even as Great Lakes state and federal agencies, farmers, municipal sewage plants and others undertake costly efforts seeking to reduce anoxia in parts of the Great Lakes, including parts of Lake Michigan.
7. Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas, and the like. The muck from near shore fish farms has itself prevented the use of beaches for other activities.
8. Over their lifetime, farmed fish require a greater weight of fish protein in their food than they contribute to the human food supply. Indeed, one sixth of the total fish harvest worldwide is

[redacted]

used to make aquaculture fish food. Harvesting of forage species to feed aquaculture fish is devastating these species worldwide.

9. Aquaculture operations typically exploit nearby sources of fish protein to produce the less expensive feed needed to stay viable and Michigan's studies already suggest the likelihood of in-state fish meal mills. However, the Lake MI - Huron complex is not an ocean with a vast forage base that can be exploited in support of aquaculture. Indeed, the amount of forage in these lakes has become a limiting factor for commercial and recreational fisheries and is currently near historic lows. The forage base cannot sustain fishing in support of aquaculture.
10. Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes. Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice.

Please do not allow open water net pen aquaculture in Lake Michigan or any of the Great Lakes. Thank you.

Yours Truly,
Steven R. Bodenstab

[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Bruce Tompkin [redacted]
Sent: Tuesday, November 17, 2015 9:02 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Farm Fishing in Lake Michigan

Pen-comments,
I can't believe you are even considering the idea of approving commercial fish farming in Lake Michigan. The lake is a long bowl with minimal structure. There is no tide. I've always considered the lake to be a large bathtub that is dependent upon wind and other natural forces to create water movement. While water is added through rivers, rain and snow and loses water through usage by the surrounding cities and evaporation, what forces exist to remove solids and chemicals created by fish farming? Will the excess of soluble nutrients lead to algal blooms, bad tasting water or toxic compounds.
All solid waste produced from such operations would settle to the bottom. Over time it will accumulate, undergo anaerobic digestion and create dead zones. Such anaerobic areas could increase the prevalence of Clostridium botulinum type E and other pathogens of wildlife and humans. Michigan has had a number die-offs of birds from type E botulism in decaying alewives. The pathogen already exists. All it needs is decaying organic material.
Short term profits by a currently non-existing industry in Lake Michigan should not drive this decision. The long term accumulation of nutrients will have a very negative impact on the existing ecology. Furthermore, if problems do develop, how many decades must pass for the lakes to heal themselves? How long would it take to flush Lake Michigan arid rid itself of an excess of nutrients and dead zones.
I am less familiar with Lake Huron but would expect a similar impact.
In addition, this topic deserves input from the millions of consumers of drinking water that surround the lake. It is a decision that will impact several states and the province of Ontario.
Last year many of us participated in a survey/vote to select management choices and bring about a better balance between forage fish and the trout/salmon population. This is clear evidence that Lake Michigan is not as big as we thought and we can influence the balance of nature in Lakes Michigan and Huron. Too many planted trout/salmon can be the wrong thing. Introducing captive fish that can escape by way of accidents, mismanagement (I worked in the food industry for 40 years and can tell you stories about that) and through unexpected strong forces of nature is just what I would expect from a Chicago politician or from a state that is in dire need of additional revenue.
Please, bring in unbiased scientists ASAP to help provide guidance in arriving at a decision.
Sincerely,
R B Tompkin
[redacted]

Bruce

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Sam Gomberg [redacted]
Sent: Tuesday, November 17, 2015 9:01 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Do not allow fish farms in the Great Lakes

This should be a no-brainer. With all of the troubles that the great lakes and its tributary waters have had with invasive species and pollution, why would you consider allowing fish farms in the Great Lakes. The economic benefits are small and far outweighed by the potential environmental disaster that these farms can bring to the great lakes.

I, as a citizen who lives along Lake Michigan, as a fisherman who values our native species, and as an environmentally conscious person who recognizes the risks that this can pose to our native ecosystems, implore you to deny any request to establish fish farms in one of our nation's most precious water resources.

Sincerely

Sam Gomberg

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: PETER Hillmann [redacted]
Sent: Tuesday, November 17, 2015 8:49 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Please Stop this Insanity

What's happening here ? Where's the leadership that has worked so hard and been so successful in restoring Michigan's Water Resources to become the envy of the Eastern Half of United States. Where are You ? Do You see what these Idiots are trying to Do? Where are You.

Peter Hillmann

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Tuesday, November 17, 2015 6:46 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish pens

I live in Illinois, not Michigan, but the waters of lake Michigan don't know the difference. I am against the proposed "fish farms" as outlined above. All one has to do is realize what these enclosures have produced in other areas of the US/World. There is nothing new here. These already exist and the problems they generate already exist. The mass feedings, the introduction of growth steroids and other chemicals, untreated waste, escaped fish, non-native introductions, disease.....the list goes on and on. The native fisheries of Lake Michigan are already suffering and this proposal would only add to that crisis. I'm sure a few people will make a decent profit for awhile, create all the problems associated with these "nets" and leave a huge mess that will need to be cleaned up.....once again by those who actually care about the native fishery of Lake Michigan. I would like the State to think about the future of the natural resources instead of a salesman approach promising dollars for once.

Brad Laaker
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Jeff Shillington [redacted]
Sent: Tuesday, November 17, 2015 6:22 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Trout Farming?

Allowing this practice would be detrimental to native fish populations. I sincerely urge you not to move this proposal forward.
Kind regards,
Jeff Shillington

Sent from my iPhone

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Chuck Ellis [redacted]
Sent: Tuesday, November 17, 2015 5:54 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net pen fish farms

Trout Unlimited has brought to my attention that net pen fish farms are being considered for the Great Lakes. I am weighing in as one opposed to this potential aquaculture venture. We have incredible water and fish resources here in Michigan. The risk of aquaculture pollution, fish escape and damage to the wild and native fishes via genetic mixing is not worth it. We as Michiganders enjoy the clean waters, beauty, sport and economic gains of our Lakes and rivers. I am asking you to oppose the large scale aquaculture business ventures being considered by our state government.
Sincerely,
Charles Ellis
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Tuesday, November 17, 2015 4:53 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: No Net Pens

Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes. Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice.

In Solidarity,
Martin Turek

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Mike Schmitz [redacted]
Sent: Tuesday, November 17, 2015 4:50 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen Fish Farming

I am writing to express my opposition to allowing net pen fish farming in the great lakes or anywhere in Michigan. The science is clear that this practice is extremely harmful to the resource and will only cause damage to our greatest natural resource, the Great Lakes. We have enough issues with invasive species that have already established themselves and those that are knocking on the door (Asian carp). We don't need to add this to our list of problems. Allowing net pen farming would have serious long term consequences both financially and ecologically. Do the right thing and do not allow this to happen

Respectfully,

Mike Schmitz
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Bob Schroyer [redacted]
Sent: Tuesday, November 17, 2015 3:42 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish Farms in the Michigan waters - Concerns & Comments

Categories: Print

There are many things about this idea of fish farming in cages in Lake Michigan, but here are my primary concerns.

1) The crowded conditions in net pens/cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aquaculturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.

2) Aquaculture uses hormones to promote faster growing and larger crops. Unknown portions or metabolites of these chemical compounds are passed on through excrement to have still poorly understood effects on other aquatic populations and on public water supplies.

3) Net pens/cage operations in the US waters of the Great Lakes would discharge very significant amounts of untreated animal excrement, dead animals, uneaten food, food additives, hormones, medications, pesticides and chemicals used to maintain the pens directly into the water. Volumes depend on pen size and numbers, as well as the fish species farmed, but these volumes are the equivalent to the effluent releases of small to medium sized cities. However, open water fish farmers do not treat that waste like our municipalities must!

I do not want to risk the long term pollution of our Great Lakes for the short term profits of an industry that inherently creates significant pollution as byproduct.

Thank you for considering my input.

Bob Schroyer
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Tuesday, November 17, 2015 3:24 PM
To: DNR-Net-Pen-Comments@michigan.gov

To Whom it may concern,

Please keep Lake Michigan beautiful! The risks and actual pollution from open pen aquaculture are too great. As a sportsman who travels to your state to enjoy the outdoors(fishing), I can only say that it would be a shame to damage the incredible natural resource that the Great Lakes are. Thank you and I appreciate the opportunity to comment on this decision.

Scott Lawryn
[redacted]

Sent from Windows Mail

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Guyer, Hannah (DNR)
Sent: Tuesday, November 17, 2015 3:03 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: FW: Fish farming in the Great Lakes

[redacted]
Sent: Friday, November 13, 2015 4:18 PM
To: Guyer, Hannah (DNR)
Subject: Fish farming in the Great Lakes

Though the Canadian are doing this, it doesn't mean it makes good science for the Great Lakes. They want to bury radioactive waste near lake Huron. Do not let money or business groups persuade you. Let caution be your guide and spirit. The Lakes have suffered enough.

Stan Blood
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Bill Dallman[redacted]
Sent: Tuesday, November 17, 2015 2:59 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Against Fishing Farming in Lake Michigan

To Whom It May Concern,

Please do not allow fishing farming in Lake Michigan.

Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas, and the like. The muck from near shore fish farms has itself prevented the use of beaches for other activities.

Thank you for your consideration.

Very respectfully,

Bill Dallman
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Ron Fial[redacted]
Sent: Tuesday, November 17, 2015 2:24 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Aquaculture

No fish farms in the Great Lakes!!!!!

Sent from my iPhone

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Tuesday, November 17, 2015 2:22 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Aquaculture

Categories: Print

Michigan DNR,

Fish invariably and routinely escape from aquaculture net pens and cages and not infrequent accidents release them in large numbers. These escapes have documented negative genetic effects on native or wild populations of the same and closely related species. If the escapees are of a non native species, they may found (and have founded) viable populations and become pernicious invaders themselves. Escapees also transmit disease to and compete with all susceptible aquatic species.

The crowded conditions in net pens and cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aquaculturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.

Aquaculture uses hormones to promote faster growing and larger crops. Unknown portions or metabolites of these chemical compounds are passed on through excrement to have still poorly understood effects on other aquatic populations and on public water supplies.

Net pen and cage operations in the US waters of the Great Lakes would discharge very significant amounts of untreated animal excrement, dead animals, uneaten food, food additives, hormones, medications, pesticides and chemicals used to maintain the pens directly into the water. Volumes depend on pen size and numbers, as well as the fish species farmed, but these volumes are the equivalent to the effluent releases of small to medium sized cities. However, open water fish farmers do not treat that waste like our municipalities must!

In the Great Lakes, where there are no tides to help disperse wastes, cage and net pens will concentrate effluent, stifle existing bottom life, and facilitate conditions conducive to algal blooms, including blooms of poisonous species like Microcystis that cut off the public water supply of Cleveland a summer ago.

Nutrient effluent from open water fish farms reduces dissolved oxygen and exacerbates conditions leading to dead zones, even as Great Lakes state and federal agencies, farmers, municipal sewage plants and others undertake costly efforts seeking to reduce anoxia in parts of the Great Lakes, including parts of Lake Michigan.

Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas, and the like. The muck from near shore fish farms has itself prevented the use of beaches for other activities.

Over their lifetime, farmed fish require a greater weight of fish protein in their food than they contribute to the human food supply. Indeed, one sixth of the total fish harvest worldwide is used to make aquaculture fish food. Harvesting of forage species to feed aquaculture fish is devastating these species worldwide.

Aquaculture operations typically exploit nearby sources of fish protein to produce the less expensive feed needed to stay viable and Michigan's studies already suggest the likelihood of in-state fish meal mills. However, the Lake MI - Huron complex is not an ocean with a vast forage base that can be exploited in support of aquaculture. Indeed, the amount of

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forage in these lakes has become a limiting factor for commercial and recreational fisheries and is currently near historic lows. The forage base cannot sustain fishing in support of aquaculture.

Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes. Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice.

Stan Kotecki

Stan Kotecki

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Cody Rhoder[redacted]
Sent: Tuesday, November 17, 2015 2:20 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: DNR Net Pen comments

Categories: Print

Fish invariably and routinely escape from aquaculture net pens and cages and not infrequent accidents release them in large numbers. These escapes have documented negative genetic effects on native or wild populations of the same and closely related species. If the escapees are of a non native species, they may found (and have founded) viable populations and become pernicious invaders themselves. Escapees also transmit disease to and compete with all susceptible aquatic species.

The crowded conditions in net pens and cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aquaculturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.

Aquaculture uses hormones to promote faster growing and larger crops. Unknown portions or metabolites of these chemical compounds are passed on through excrement to have still poorly understood effects on other aquatic populations and on public water supplies.

Net pen and cage operations in the US waters of the Great Lakes would discharge very significant amounts of untreated animal excrement, dead animals, uneaten food, food additives, hormones, medications, pesticides and chemicals used to maintain the pens directly into the water. Volumes depend on pen size and numbers, as well as the fish species farmed, but these volumes are the equivalent to the effluent releases of small to medium sized cities. However, open water fish farmers do not treat that waste like our municipalities must!

In the Great Lakes, where there are no tides to help disperse wastes, cage and net pens will concentrate effluent, stifle existing bottom life, and facilitate conditions conducive to algal blooms, including blooms of poisonous species like Microcystis that cut off the public water supply of Cleveland a summer ago.

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Fish farms can definitely interfere with other beneficial uses of near shore areas, limiting recreational and commercial boating and paddling of all types, recreational fishing, use of adjacent beaches, swimming, appreciation of lake vistas, and the like. The muck from near shore fish farms has itself prevented the use of beaches for other activities.

Over their lifetime, farmed fish require a greater weight of fish protein in their food than they contribute to the human food supply. Indeed, one sixth of the total fish harvest worldwide is used to make aquaculture fish food. Harvesting of forage species to feed aquaculture fish is devastating these species worldwide.

[redacted]

Aquaculture operations typically exploit nearby sources of fish protein to produce the less expensive feed needed to stay viable and Michigan's studies already suggest the likelihood of in-state fish meal mills. However, the Lake MI - Huron complex is not an ocean with a vast forage base that can be exploited in support of aquaculture. Indeed, the amount of forage in these lakes has become a limiting factor for commercial and recreational fisheries and is currently near historic lows. The forage base cannot sustain fishing in support of aquaculture.

Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes. Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice.

--

Cody M. Rhoden
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Steve Kaiser [redacted]
Sent: Tuesday, November 17, 2015 2:16 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Objection to fish farming in the Great Lakes

The Great Lakes are too valuable a resource to damage with fishing farming.

The crowded conditions in net pens and cages make them breeding grounds for fish disease and parasites that spread to nearby free ranging fish. Aquaculturists routinely lace their feed with antibiotics and pesticides just to keep their fish alive, while subjecting native and wild aquatic populations outside the cages to increased detrimental exposure, greater incidence of disease outbreak and greater severity of outbreaks. Moreover, this preemptive dosing with antibiotics accelerates declines in drug effectiveness and drug resistant maladies, while pesticides lead to unknown impacts on other aquatic animals.

--
Steve Kaiser
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Tuesday, November 17, 2015 2:14 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Great Lakes Aquaculture

This is an uncommonly bad idea for a variety of reasons which I'm sure you are aware of .Please don't screw with the wonderful recreational fishery in Michigan.Believe me this will come back to bite you .
Frank J Harford M D

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Hildreth, Christopher [redacted]
Sent: Tuesday, November 17, 2015 2:13 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen Aquaculture

Hello. I'm aware and concerned about the current deliberations around fish farming in Lake Michigan. Though I respect and indeed support the effort to stimulate job creation and diversify the state's economic base, I think this concept poses far more risks and cost than benefit. Recreational fishing and tourism produce multiples of the small economic impact that might be expected from net pen aquaculture in the Great Lakes. Studies suggest that the combination of production cost and environmental costs of open water aquaculture actually make it an unprofitable choice. Accordingly, I urge you to consider this proposal from a holistic perspective. Thank you.

Chris Hildreth

[redacted]

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[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Tuesday, November 17, 2015 10:06 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Comment on Net Pen Aquaculture

Having experienced the Bacterial Kidney Disease (BKD) induced die off and subsequent collapse of the Chinook fishery on Lake Michigan in the late 80s, I have witnessed first hand what happens when disease strikes fish communities. Plunging angler effort and a recovery that took nearly a decade back then. BKD may not be at the top of the list of diseases emanating from open water Net Pen Aquaculture, but many other diseases are. The point would be the same result, a devastating blow to Michigan's Great Lakes fishery.

Escapement is inevitable, it happens around the world all the time. We only have to think about the threat of Asian Carp now knocking on our door that escaped Aquaculture farms in some southern States to remind us. Escapement from net pens has become a serious problem in aquaculture facilities, leading to aquatic invasive species issues, as well as the genetic diluting of same specie wild fish stocks.

Fish waste creating pollution in public waters is another concern. Once again we can look no further then are own Platte Lake State hatchery system pollution of Platte lake in the 70s. That being a flow through system and now corrected to very low levels at a high cost is an example of havoc that may be caused by concentrated fish in culture.

Closed Aquaculture systems and Flow through systems have merit, providing strict guidelines for flow through systems are mandated.

Open water net pen Aquaculture is very risky ,has no place using public bottom land and water for what appears at best, economically questionable business ventures.

Open water Net Pen Aquaculture is not a good idea in any jurisdiction in any Great Lakes waters.

Captain Denny Grinold
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Wayne Andersen [redacted]
Sent: Tuesday, November 17, 2015 9:42 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: No Net Pens

Please do not allow net pens in the Great Lakes. Far too much risk to the fishery.
Wayne Andersen

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Holton, Jennifer (MDARD)
Sent: Monday, November 16, 2015 10:18 AM
To: DNR-Net-Pen-Comments@michigan.gov
Cc: Benner, Thomas (MDARD)
Subject: FW: Michigan Department of Agriculture & Rural Development Feedback Form (ContentID - 344492)

For the public input comments.

-----Original Message-----
From: MDA-Info
Sent: Sunday, November 15, 2015 10:12 PM
To: Holton, Jennifer (MDARD)
Subject: FW: Michigan Department of Agriculture & Rural Development Feedback Form (ContentID - 344492)

Referral from MDA-Info; no contact available for reply.

/tom

-----Original Message-----
From: DoNotReply@michigan.gov [mailto:DoNotReply@michigan.gov]
Sent: Sunday, November 15, 2015 11:26 AM
To: MDA-Info <MDA-Info@michigan.gov>
Subject: Michigan Department of Agriculture & Rural Development Feedback Form (ContentID - 344492)

name: Randy Nichols
phone:
email:
subjecttype: General Question
message: Net pen fish farming is a bad idea. Please do not do it.

DNR-Net-Pen-Comments@michigan.gov

From: Keith Konvalinka [redacted]
Sent: Monday, November 16, 2015 9:11 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen Farming

I oppose Net Pen Farming in the Great Lakes. Pollution, disease, genetic contamination of and threats to wild stock are too great a risk to our unique fishery. Please ban this practice in the Waters of the Great Lakes.

Keith
Sent from my freakin' iPad Mini4

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Bill Grau [redacted]
Sent: Sunday, November 15, 2015 6:53 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: comment on aqua farming in great lakes

Please do not approve the proposed net farming in the Great Lakes.
There is enough pressure on the Great Lakes as it is from pollution, invasive species and other threats.

I have lived in Michigan for 63 years and appreciate the unique natural resources we have here not to mention the economic benefit to Michigan's economy and all the recreational opportunities we have.
Thanks for listening,
Bill Grau
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Fritz [redacted]
Sent: Friday, November 13, 2015 12:40 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Great Lakes Fish Farming

I am 100% opposed to allowing net-pen fish farming in the Great Lakes. The risk of disease, genetic pollution from escaped fish and water quality degradation is way to high.

Fritz Grebe
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Mark Olson [redacted]
Sent: Friday, November 13, 2015 11:27 AM
To: DNR-Net-Pen-Comments@michigan.gov

Comment on Commercial "Pen" style fish farming in the great lakes.

Having worked with surface water personnel for 20+ years as an Environmental Manager for industry, I remember the great furor regarding unhealthy BOD levels which my plant might cause since it was situated along the banks of the Bear River in Petoskey, Michigan. To set aside those standards for the sake of commerce after all the hard work that has been done in the attempt to maintain high water quality in the great lakes watershed would be a travesty.

I am well aware of the commercial allure of such a program; however it is my belief that at this time: insufficient study has taken place, and also insufficient safeguards required, for this to be a worthy program. I believe that such a commercial venture would exhibit all the same problems and documented ill effects and accidents that land based "CAFO" operation represents with even greater likelihood of detrimental effects to the environment.

It is my opinion that this practice would be very hazardous to the water quality of the greats lakes watershed due to the high concentration of fecal matter (both local and downstream) which results from such a high population concentration in such a limited area.

At this time I am vehemently opposed to any pen type fish farming in the great lakes.

Kindest Regards
Mark W. Olson

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Greg Jazdzyk[redacted]
Sent: Friday, November 13, 2015 9:55 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen Discussion

I just want to add my voice to the discussion stating that I believe that the net pen commercial fish farming idea is a bad idea. Our great lakes are already under significant stress from invasive species, lack of forage base, and pollution. I would ask why add another stressor to a system that is of such high value to the people and businesses of Michigan.

--
Greg Jazdzyk
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Karen Cortis[redacted]
Sent: Friday, November 13, 2015 9:51 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: STOP THE FARMING

Dear Sirs,

Fish farming in our great lakes, or anywhere for that matter is not safe. It can cause irrepairable damage to our fish and waterways.
Stop the farm fishing!

Toward Healing The Planet, One Person At A Time

Karen Cortis
[redacted]

**"Someone is sitting in the shade today
because someone planted a tree a long time ago."**

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Matthew Koekkoek [redacted]
Sent: Friday, November 13, 2015 9:14 AM
To: DNR-Net-Pen-Comments@michigan.gov
Cc: [redacted]
Subject: Net-pen aquaculture

Categories: Print

To whom it may concern:

I would like to communicate my concerns regarding the proposal and possible approval of net-pen aquaculture in the Great lakes, specifically in Lake Michigan and Lake Huron. MITU has reviewed the science behind net pen fish farming, and has concluded that it cannot be done today without causing damage to our fisheries and putting them at severe risk. With all the possible impacts that aquaculture can have, the risks posed by its expansion in Michigan are real and numerous. How these will be regulated will be critical, and is yet to be determined. On inland waters, permitting and regulations are following traditional lines, considering the new requests in piecemeal fashion, within regulatory silos, rather than holistically or comprehensively. Nutrient pollution limits are set by MDEQ without the ability to require detailed waste removal plans prior to permit authorization; potential disease spread falls under MDARD not under the permitting for the operation overseen by the MDEQ (or regulated by theDepartment of Natural Resources – who will be forced to deal with the impacts it will have on our wild fisheries). Escapement concerns are not easily captured or regulated under existing permitting; and interruptions of existing uses are not commonly regulated at all, but left up to any lawsuits that might follow. On the last point, the Clean Water Act does have a provision for "anti-degradation", wherein if a proposed permitted operation is going to cause water quality degradation, the societal benefits of the operation are supposed to be balanced along with the costs posed by it. Assessing accurate socio-economic costs and benefits and risk assessment are complicated endeavors, limited by our basic understandings of these today (and the MDEQ doesn't collect permit fees commensurate with them being able to acquire it properly).

My personal stance in conjunction with MITU, views the possible introduction of net-pen fish farms into Great Lakes waters as one of the largest threats facing our coldwater fisheries today. I advocate strongly against Great Lakes net penning and ask that further research be conducted and thought be given to existing research on the harmful effects that penning will have on our freshwater fisheries.

Thank you for your time and consideration.

Matt Koekkoek
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Matthew Warner [redacted]
Sent: Friday, November 13, 2015 9:14 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: NO to the Nets

This idea sounds dangerous to the waters I love to fish.

Matt Warner/Administrator

[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Watty [redacted]
Sent: Thursday, November 12, 2015 9:36 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Great Lakes Net Pen Farming

Although I am a free market guy, love eating fresh fish and would love to increase Michigan's tax base, I must voice my disapproval of the pens. Our King (Coho) populations are diminishing because the Alewives are declining because they are being out-competed by zebra and quagga mussels for the same nutrients in the lake. Farm/pen fishing will not help that problem and might hurt other species as well.

If the State could find a solution to rid our waters of the Zebras and gobies, I might be in favor of a limited testing of farm pens. W. Bernard

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Mossner, Tim [redacted]
Sent: Thursday, November 12, 2015 8:25 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Salmon pens in the Great Lakes

Dear Sir or Madam,

Please consider this my opposition to pen raised salmon in any of the Great Lakes. Pig farms and chicken farms are expected and regulated enough to keep their waste contained and when accidents occur where the waste enters ditches and creeks, the companies are fined and expected to clean up the accident. With pen raised salmon the waste is dumped into the Great Lakes and concentrated where the pens are kept. Who is responsible for the damage? Likely "dead zones" would occur as in Chesapeake Bay and other areas where pen raised salmon are raised.

Look at Chesapeake Bay. It is well documented that great damage has occurred to Chesapeake Bay from pollution. Animal waste likely from chicken farm waste has been theorized as the culprit but has been hard to prove and therefore stop. The same thing likely would happen with pen raised salmon in that environmental problems would be determined well ***AFTER*** the problem occurred.

It is also proven that the nutritional value of pen raised salmon is virtually zero. Once again we are tricking people into thinking that this is a good thing. Why would we risk producing these fish with no nutritional value in public waters?

Please keep our Great Lakes clean and accessible.

Tim Mossner, life-long Michigan resident
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: mark desanto [redacted]
Sent: Thursday, November 12, 2015 7:55 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish net pen aqua farming

Raising fish in pens has proven in past to introduce too much nutrient , fish waste and disease into the surrounding water, raising fish in a confined area is asking for the same problem that bulk feeding of deer caused, raising fish in a confined pond is safer, it does not spread anything out side of the contained pond. Raising fish in net pens in an open body of water will cause problems with disease, and waste by products. please do not allow this to take place in the great lakes, the facts show it causes many problems

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Thursday, November 12, 2015 6:51 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: net pen aquaculture

As a long time michigan fisherman and Trout Unlimited member, I am very much against fish farming in the great lakes. We have a wonderful resource in this state that has enough challenges without adding more!

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Thursday, November 12, 2015 5:12 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: net pen fish farming

Many well informed people will argue against this activity in the Great Lakes. Please listen to them. Their reasoning will be based on the common good now and into the future. They will not be motivated by personal gain, and they will know what they are talking about.
Charles R. Fisher, [redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: John Reinartz [redacted]
Sent: Thursday, November 12, 2015 5:00 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: No Net Pen Fish Farms

I am deeply upset that there is consideration for this activity in Lake Michigan. I do not support this and hope that it is not permitted!

John Reinartz

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Denny Douglas [redacted]
Sent: Thursday, November 12, 2015 4:44 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Aquaculture hearing/Meeting

The purpose of this message is to state my opposition to the open pen type form of aquaculture on our Great Lakes. There is a smart old adage that says "don't sh-- where you eat." These pens would force the fish to do just that. How could pollution and disease be prevented with this type of operation?
Dry land CAFO's are at least amenable to controls, I just can't see that with fish pens.The Great Lakes belong to the people, they are not the property of any individual or company who wants to start a water based CAFO.
Fish hatcheries have already been identified as sources of pollution and steps have been taken to control them. Don't see how controls could be applied to a fish pen. Beside the pollution, the ability to create "Frankenfish" would be extremely tempting. It has already been done to a small degree and expanding aquaculture in this direction would be horrible.
Weather permitting, I plan to attend the meeting on the 19th.

Denny Douglas
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Ladislav Hanka [redacted]
Sent: Thursday, November 12, 2015 4:04 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net Pen trhoughts

Categories: Print

Dear Sirs,

with regard to your soliciting comments on the allowance of pen-held aquaculture in the Great Lakes please register my protest as an informed and interested party.

I was a fisheries biologist some time ago and have an MS degree in Zoology from Colorado State University. I am also a fly-fisherman and TU member who grew up in Michigan and still lives here at the age of 62. I am an interested party to this matter and knowledgable.

The idea of further degrading the precious genetic stocks of the Great Lakes with promiscuous introductions of exotic strains of domesticated and transgenic food fish greatly horrifies me.

The damage already done to Great Lakes fisheries is outrageous. The loss of nearly half the native Corregonids, most native genetic variants of Salmonids, the complete Blue Pike fishery, most breeding populations of Sturgeon in most watersheds as well as American Eels, should be enough damage to demonstrate the vulnerability of the Great Lakes to overfishing and ill-considered ecological impacts. Now we have a continual influx of invasive species on top of the short-sighted introductions of non-native game fish. When will the evidence be overwhelming enough to over-rule uninformed economic interests?

Ignorance is perhaps an excuse of sorts for past transgressions - an attempt to "improve" a sport fishery or overcome the collapse of the commercial fishery after Alewives and Sea Lamprey were allowed entry, but of course today the science is far more astute, peer reviewed and well evidenced with far superior statistics and experimental design being brought to bear. Resource management is today informed by actual science which has in many instances come of age and stands as the equal of any academic research-based discipline, if you'll but listen. The old agricultural and forestry models of maximal sustainable (monetized/economic) yield and such voodoo models of presumptive management are being supplanted by informed husbandry. We could join the intelligent world of 21st century best management practices and have a far better basis of understanding than has ever before been the case. We know just how labile and unstable an ecosystem we have here.

There is no honest science that could justify allowing aquaculture into the great Lakes - only the most myopic and short-sighted of self-serving economic arguments. Quite to the contrary however, there is every bit of needed evidence available (and no need for further

study) to ban all exotics and begin an active program of their eradication, while erecting effective regimes to protect the Great Lakes from further introductions.

Further aquaculture, especially of domestic cultivars and transgenic fish, must never be allowed to happen.

L R Hanka

Ladislav Hanka [redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Donald Goodman [redacted]
Sent: Thursday, November 12, 2015 3:59 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: penned fish

When my great- great-grandfather, John Holt, arrived in the frontier of Wisconsin to preach in Methodist churches in 1848 there were an estimated 5 billion (Yes Billion) passenger pigeons alive in the states of Michigan and Wisconsin. When he died early in the 1900's every single one was gone. Yes, you can wipe out entire populations of wildlife or even plant life through stupidity. Through stupidity our own generation has pretty well destroyed the Orange Roughy fish population: it was not ignorance because we should have done the research; it was stupidity.

There is no possible way to confine the diseases that absolutely WILL be generated within the confines of a fish pen; they will spread to the wild. Good Lord, have you never heard of Asian Carp? They WILL get away! Arguments claiming you cannot PROVE that disaster will happen remind me of the tobacco companies in the 1970's claiming that cigarettes were safe. Yeah, just like fish pens. Safe...

Donald J. Goodman

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Jeffrey Hohman [redacted]
Sent: Thursday, November 12, 2015 3:58 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Please Don't Do It - We Are Smarter Than This - We Have The History

As a worried Michigan resident, I feel it is my duty to write this letter to you voicing my concerns about us even considering using net pen farming in our Great Lakes. As you know, the Great Lakes are a spectacular natural resource and they need to be protected. Too many times in our recent history we have already had negative impacts on this world class fishery we have. Net pens are not new. We have the history of fish pens in oceans which are much larger than our lakes. We know for a fact that fish pens will impact the wild and resident populations of fish we already have. Please do not do this. I for one, will make every attempt I can to block the usage of them. Please hear our voice. Thanks for your consideration.

Jeffrey D Hohman
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Chris Moshier[redacted]
Sent: Thursday, November 12, 2015 3:18 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Net-Pen fish farming(opposed)

To whom it may concern,
I am unilaterally opposed to any future net-pen fish farming in Lake Huron or Michigan. I believe the possible nutrient pollution and disease outbreak in wild fish populations is too great a risk. Our fresh water resource is too important and fragile to risk on such commercial endeavors given the present science.

Sincerely,
Chris Moshier

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Thursday, November 12, 2015 3:13 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish Farming

Please do not allow net pens in the Great Lakes. I know we have to support business but that will be a major pollutant with the high phosphate discharge along with other nutrients, possible antibiotics, and other chemicals.

There can be other ways onshore to do this so that the fishery discharges can be monitored properly. The Great Lakes are too important to be experimenting with and so much depends on them being safeguarded.

Thank you.

Dale M. Borske

[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Guyer, Hannah (DNR)
Sent: Thursday, November 12, 2015 1:39 PM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: FW: Net Pen Aquaculture

From: Denny Douglas [redacted]
Sent: Wednesday, November 11, 2015 9:30 AM
To: Guyer, Hannah (DNR)
Subject: Net Pen Aquaculture

I am opposed to polluting our Great Lakes and the net pen form of aquaculture is the worst form of aquaculture. I don't see how any effective pollution control would be possible. A great old bit of wisdom applies here..."Don't sh-- where you eat!" Fish raised in net pens would be forced to do so. Net pens would become cesspools of disease that would spread throughout the lakes.
We are already aware of the dangers that CAFO's present on land. Establishing such things in our Great Lakes would be totally irresponsible. How could the detrimental effects be controlled?

Denny Douglas
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: marilyn [redacted]
Sent: Thursday, November 12, 2015 9:47 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Fish Farm Farce

ATTN: Hannah Guyer

With horror I read about the proposed fish farm at the old Grayling Fish Hatchery and possible expansion to Lake Michigan. I know conservation means **WISE** use of our resources but the idea of allowing the high concentration of fish waste in one of our state's premier fisheries does **not** constitute wise use in any way. This proposal would only financially benefit a few in that business and cause irreparable harm to a river I and my family have enjoyed since my childhood. You are charged with the responsibility of ensuring the health of Michigan's water resources. Great strides have been made over the past few years in educating the public about maintaining our clean water status. I hope you bear this in mind and not allow the fish farms to gain a foothold in our state. I depend upon you to protect our waters for future generations to come.

Marilyn Case
[redacted]

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]
Sent: Tuesday, November 10, 2015 10:03 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Say NO to Commercial Net Pens on the Great Lakes

Dear Sir,

I Vote NO to commercial net pens in the great lake or any other Michigan water.

Thank You.

Capt. John VanDusen
[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: Dick Stafford[redacted]
Sent: Tuesday, November 10, 2015 5:01 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Say NO to Commercial Net Pens on the Great Lakes

As a formercharter boat owner and operator of 30 years and past President of the Michigan Charterboat Association, I am opposed to pen nets for the sake of commercial fish farming. Living in Escanaba, Michigan where fish farming is proposed, commercial fish farming would be devastating to the ecco system in our area. I will work with all my ability to keep these out of the Great Lakes.

Sent from my iPhone

[redacted]

DNR-Net-Pen-Comments@michigan.gov

From: [redacted]

Sent: Sunday, November 15, 2015 8:33 AM
To: DNR-Net-Pen-Comments@michigan.gov
Subject: Keep factory fish farms out of our Great Lakes!

Nov 15, 2015

Hannah Guyer

To whom it may concern: Guyer,

I'm sorry to say that I am extremely disappointed in the DNR of this state. There are so many issues that are poorly managed and based on very bad descions with no research backing them. This is yet another case. After living alongside Michigan in Ontario for my entire life, and now residing IN Michigan, I have been exposed to more truths and have become even more upset with the mismanagement and biased opinons on how to handle wildlife and environment situations. Take for instance, the declining deer population in Michigan. The past few winters have decimated herds in the U.P. and yet hunters are still encouraged and allowed to kill whatever deer are left. It's sickening to see young people killing young deer and hovering over their kills on Facebook just like those gruesome trophy hunters do. It's all about the money and the greed and the 'showing off' and no concern is put on the animal's well-being. So, with this said, and all things you haven't considered about consequences, I urge you to protect the Great Lakes' ecosystem and to prohibit net pen aquaculture in their waters.

Our Great Lakes should not be opened to the same industrial factory farm model that currently pollutes our environment on land.

These systems are not contained and allow a tremendous amount of waste to flow directly into the water, potentially contributing to toxic algae blooms. Fish in these systems can spread disease quickly, and the risk of thousands of fish escaping and harming wild fish populations is a very real threat.

Factory fish farming is simply too big, too dirty and too risky for the Great Lakes. We expect our leaders to protect our public natural resources, including our Great Lakes environment, fishermen and coastal communities.

I urge you to prohibit net pen aquaculture in Michigan's Great Lakes waters.

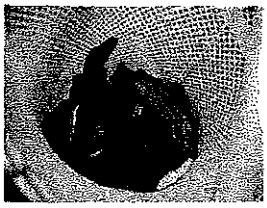
Sincerely,

Maureen Shelleau

[redacted]

Letter: Fish farms a setback to water management

Battle Creek Enquirer 2:36 p.m. EST November 11, 2015



(Photo: Getty Images, AFP/Getty Images)

In Michigan our lakes and streams are held in a public trust. State and federal agencies protect and manage them for us, but they are owned collectively by every Michigan citizen.

There are currently proposals from a small number of companies that would establish high concentration fish farms to raise domesticated rainbow trout in large nets in Michigan waters of the Great Lakes and expand the Grayling Fish Hatchery on the Au Sable River.

If allowed, these fish farms would set back the fishery and water management policy in our state by 50 years. When we managed our waters as commercial fisheries and used our lakes and streams as garbage disposals, they were a mess. Only after we began managing our waters as recreational fisheries and quit allowing raw waste to be flushed into our lakes and streams did they improve.

We do not allow other businesses to dump raw sewage into our public waters. Every other business is required to properly dispose of their waste and treat their sewage.

We have enough problems keeping manure and antibiotics from land-based concentrated animal feeding operations out of our water. Why would we even consider allowing them to be placed directly into our lakes and streams?

Michigan's lakes and streams and the world class recreational fisheries they support belong to you. The agencies that watch over them for you would like to hear your opinion on how you want them managed.

Your public comments can be made via email at DNR-Net-Pen-Comments@michigan.gov (mailto:DNR-Net-Pen-Comments@michigan.gov) or via regular mail at:

Michigan Department of Natural Resources

ATTN: Hannah Guyer/Executive Office

525 West Allegan St.

P.O. Box 30028

Lansing, MI 48909-7528

Comments will be accepted through Dec. 4, 2015. All submitted comments will be made publicly available following the close of the comment/review period.

JUDY AND BILL BUTLER [redacted]

Greg Potter

Marshall

Read or Share this story: http://bcene.ws/1iUMb2W

12/2/15: FLY FISHERMEN AND WOMEN COME FROM AROUND THE WORLD TO FISH THE GLORIOUS AU SABLE RIVER. PLEASE DO NOT PERMIT ANYTHING NEGATIVE, SUCH AS POORLY DESIGNED OR POORLY OPERATED FISH FARMS, HAPPEN TO OUR WONDERFUL AU SABLE.

JUDY AND BILL BUTLER

Appendix J. Letters in support of commercial net-pen aquaculture in the Great Lakes.

November 19, 2015 || QOL Public Comment Aquaculture – Gaylord || Kent Herrick, President ARC

In 2008, the Food & Agriculture Organization of the United Nations (FAO), made a claim that the world would need to increase agricultural output 50% by 2030 and to double by 2050. However, over 70% of water usage is in agriculture and by 2025 two-thirds of the global population is expected to be water stressed, thus meeting these goals with our available fresh water will be a huge challenge. Surrounded by the Great Lakes, with over 80% of North America's surface fresh water and 20% of the World's, Michigan is a natural place to assume a significant expansion of agricultural output in a relatively short period of time.

Reflecting on this challenge, the Herrick Foundation began asking scientists, agriculture experts, and regulators: "Can we double the agricultural output of Michigan, without damaging our waters?" Answers revealed gaps in our knowledge and experience that would likely impact the sustainability of a large increase. After decades of progress cleaning up the damage from our industrial heritage, it would be a tragedy if we damaged the Great Lakes in a desperate attempt to feed a starving world.

With that context, the Herrick Foundation began a strategic plan to invest in filling the science gaps and to further develop techniques and technologies which can help us achieve a diverse approach to doubling of agricultural output, while sustainably managing the Great Lakes. We have provided grants worth several million dollars towards this objective, and over the past 7 years, we have quietly been behind Michigan leadership in several agricultural and environmental advances.

Aquaculture is one of those promising fields; however, with limited local experience to draw from, we felt it necessary to take a more direct, hands-on approach to advance this sector. We established Aquaculture Research Corporation (ARC) as a non-profit research and education organization, dedicated to the development of a large scale aquaculture industry in the Great Lakes Region. We have been involved with recirculating, flow-thru, and open water systems, culturing several species worldwide, in order to understand how a Michigan industry might develop. Many of the findings are documented on our website and we encourage you to visit for more information: www.aquaresearchcorp.com

As I stated in the June 2015 public input to the Science Advisory Panel:

... *Project Rainbow is a targeted investment in research* that will improve design for sustainability and work towards achieving trust in responsible aquaculture development.

Building on extensive experience of regulators, researchers, and operators in the Ontario waters of Lake Huron, *Project Rainbow is designed to extensively engage and inform stakeholders, while developing a model for commercial fish production in the Michigan waters of the Great Lakes that is environmentally, socially, and economically responsible* ...

Although no permits have been applied for, we submitted a concept proposal in October 2014 and encouraged the formation of a Science Advisory Panel to advise regulatory agencies on key issues. While waiting for engagement from the QOL, we sponsored a panel discussion in St. Ignace that brought experienced stakeholders in Ontario together with interested parties in Michigan. The completion of the Science Advisory Panel summary of the science, provides further information to stakeholders, and we believe validates our assumptions on the value and the efficacy of conducting a pilot project in Michigan.

Since the QOL has chosen to engage with angler groups, more than with us in the last year, it is not surprising that the Economic analysis does not represent the project details. Perhaps this meeting will be our only opportunity to explain the proposal and now that you have the Science summary, it should be much more understandable.

Essentially, ARC committed to funding the legal contracts, permit process, and capital equipment to establish a pilot site, which in turn would be leased to an experienced Canadian operator to stock, grow, and harvest fish. The pilot site would be established under regulations similar to Canada, but consistent with Michigan statutes. This starting point for adaptive management (AM) would take advantage of the 30+ years of Ontario evolution and the current healthy status of existing farms. A separate entity would be formed to control the detailed BACI analysis. Guided by a panel of Michigan and Canadian experts, research specialists would be contracted for the relevant studies at multiple locations and would add a substantial body of new knowledge to our understanding of the Great Lakes.

The operating farm would cost around $1m to construct and would be cash flow positive in 12-18 months. The BACI design studies would require a 10 year commitment and are currently estimated at $2m. Additional commitments to provide improvements at Rockport State Park, constructing a RAS based hatchery at Oden, and other contingencies are estimated at $3.5m. Related work we have sponsored in native fish restoration and improved science coordination for $2.5m, brings a 10 year budget commitment of $10m towards the Herrick Foundation Great Lakes aquaculture initiative. Additional grants are still active in RAS improvements, but all of those activities are currently outside of the state, in regions where aquaculture industry is firmly established. We attempted to entice a world leader in RAS development to Michigan with a grant of $4.5m, but that proposal was declined.

It is not the intent of Project Rainbow to burden the government with a costly scientific study or to create any kind of subsidy towards a commercial use of public waters. As proposed by the Science Panel and consistent with Project Rainbow, the cost of the BACI study may be 2-3x the capital to establish a farm. This would be fully funded under our proposal and based on proper siting experience in Ontario, the farm should provide a net benefit to the fisheries in the area. The Science Panel Report suggests that this is a reasonable assumption and that careful monitoring and regulations can respond if the impact is negative.

We agree with the statement on page 25: "Throughout this process, we believe that if your goal is to preserve ecosystem structure, function, and nutrient status, managers and regulators must err on the side of caution, if commercial aquaculture develops in the Great Lakes." In order to understand in an ecosystem that is "undergoing rapid ecological change owing to invasive species and shifts in nutrient loading and hatchery-driven abundance of top predators" (pg 3), then BACI design is important to grow our understanding of the Great Lakes and to make appropriate adjustments to our management practices. Even without the involvement of aquaculture, this level of study, across borders and with committed funding over a long period can help "focus on cross-scale phenomena that tease apart fast-acting processes from those that act at scales of a decade or longer" (pg 4).

Through Project Rainbow, we are committed to providing this 10 year cycle of funding, that we believe will improve the understanding of our natural fisheries, while taking a small step towards building a fledgling aquaculture industry.

Parting thoughts:

Summary of the Science – Science Advisory Panel, October 2015

(Page 7) "We recommend that if aquaculture permits are granted, operators begin with pilot projects with monoculture at a commercial scale to develop data on ecological and economic outcomes, quantifying these impacts with an adaptive management plus BACI design."

www.Aquaculturereserchcorp.com/about

Growing Michigan aquaculture will provide fresh, affordable, and healthy local seafood, increase the economic potential of the Great Lakes, and demonstrate to the world a balanced regulatory approach that provides productive and sustainable use of our fresh waters.

While net pen sites are a concern for concentrated disease risk, the example from Ontario operators is that this is a low and manageable risk through current practices. Acting as a fish aggregating device (FAD), the sites could certainly amplify risks among farmed and wild species, however, the FAD could also be beneficial as a sentinel to rapidly identify and manage novel wild disease as it occurs. The Lake Huron experience with known diseases has been that the farm is more likely infected by the wild, thus the sentinel role is a reasonable consideration for diseases not yet known.

Fish Poop – waste or nutrient?

The Science Panel report strikes the right tone in assessing the specific role of fish poop as a nutrient. Issues remain with understanding the full impact of the Phosphorous contribution, but at least they recognize that a positive contribution may be seen in the right local setting. One critical error in the their reflections was to give credence to the MDNR (Gary Whelan) estimate of 250 farms by 2025, which as Dr. Weeks pointed out was not even remotely contemplated in the Sea Grant Integrated Assessment. Since Dr. Whelan was in those integrated assessment discussions, and fully knew the intent of including the impact of open water aquaculture, we feel that these figures have been deliberately exaggerated to stir up concerns by anglers and environmentalists that a massive pen culture is being planned. Nothing could be further from the truth, as all parties that have seriously considered net pens acknowledge: (pg 25) "...the potential for finding specific, low impact, high yield locations may be challenging, even in the size of the Great Lakes." A $1billion industry was never expected to be grown exclusively by net pens and this siting limitation was recognized as keeping their contribution to a small component. With this correction in mind, the full potential of net pens should not be anticipated as a major impact on the overall Phosphorous budget and its competing uses in the Great Lakes.

Comments by Tanner, Thomassey, DeClerk, Ernst, as well as, recent articles by Trout Unlimited, MUCC, and MEC, have all attempted to draw comparisons of fish poop to human or animal sewage. Several of these statements have been made by trained biologists and therefore add a level of credibility to the claims. As noted in the Science report and emphasized by Dr. Weeks, the constituency of fish poop is nothing like terrestrial sewage and many of the figures published by environmental groups are completely wrong. We strongly encourage the QOL to emphasize the actual science of fish waste and to recognize that the misinformation by these intelligent biologists is nothing but propaganda to generate opposition by the general public.

We are concerned that the Science Panel did not fully understand the impact of "flushing" on the waste management around the cage sites. It has been our understanding from Canadian researchers that the flushing is targeted not for disbursing wastes, but is instead for maintaining sufficiently high dissolved oxygen levels that allows the waste to act more as a nutrient to the local food web. Directly below the nets, in about a 1m boundary, waste will accumulate that may become anoxic due to the heaviest loadings. However, with good flushing, fresh waters in higher dissolved oxygen will maintain the surrounding area as a higher productive environment for the natural benthic, prey, and predators in an impact area not larger than the 100m noted. In sites where the nets have more movement, even the waste below the nets does not accumulate as the environment assimilates the nutrient potential effectively. It is in the specific differences between marine and freshwater organisms that net pens have been effective in Lake Huron without the tides – freshwater "flushing" is needed for oxygen transport, NOT waste transport.

Economic Analysis

With three reports published, the analysis was scattered, information was missing, and it is not clear what the QOL was trying to accomplish with the Economic analysis. Consequently, anyone can take selected "facts" established in one or another report and write their own narrative to the Economic conclusions. Our narrative assumes that the Sea Grant Integrated Assessment has already established the potential of aquaculture in Michigan and so focuses on three other themes in the reports:

- Counting all the economic value Michigan derives from the Great Lakes, makes it appear that these billions of dollars in annual activity will be at risk by a pilot cage farm. One of our prime motivations for this project was a different assumption, that many of these activities are already at risk, as noted in the Science report due to the rapidly changing ecosystem. The Scientific understanding generated by this pilot project may be necessary to improve the management of this environment that the State is actively engaged. Therefore, the risk to our existing water economy should be viewed as the potential to LOSE current values if we do nothing – the economic impact of the Lake Huron salmon fishery collapse would serve as a good model and this could be projected to Lake Michigan's decline. Furthermore, figures for the current full fishing impact likely includes inland lake fishing and river sheds that would be highly unlikely to be impacted by net pens in the Great Lakes. The decline in Salmon tag purchases, before the last MDNR license change, would serve as a more valid proxy for the value of impacts on open water angling.

- The revenue/return models for a pilot farm have many assumptions that we would be glad to help correct. However, we are not sure the relevancy of this analysis to the broader QOL consideration. As noted in our statement at the public meeting, if Rockport were chosen as a potential site, we expect a net benefit to the State as we would need to build facilities anticipated in the park's Phase II plan, but currently unfunded. The value of these permanent facilities would likely be higher than the investment in the actual docks and nets to grow fish. Studies required for the BACI design, would also provide an impact on the local economy as scientists perform frequent field work throughout the year, for at least 10 years.

- Costs to the State for deep participation in adaptive management and BACI design do not appear to be estimated, just implied by the Science report. We would be glad to discuss further with the QOL, as noted above, their economic impact has not been considered in any of the analysis.

Legal Analysis

We are not certain that your interpretation of the Michigan Aquaculture Development Act (MADA), as not applying to net pens in the Great Lakes, is correct. Without understanding the arguments for this conclusion, we cannot comment directly on the assessment, but can only imagine that it is possible to overcome several of the obvious roadblocks. As correctly raised by Olson comments, Public Trust Doctrine will play a key role in establishing a right to utilize the public waters of the State. We have assumed that PTD will arise in the Bottomland Conveyance process and if successful the private right will become narrowly defined. Marina docks, often taxed as private property for "dockominium"

developments, will be an interesting comparison for establishing private rights in public waters and how this may extend to the interpretation of the MADA.

We would also encourage the QOL to share the assessment of the MDNR's use of net pens in the Great Lakes. We have assumed that they hold less than 20,000lbs of cold water species and therefore have not had to apply to MDEQ for an NPDES permit. However, the bottomlands conveyance should still be applicable for anchoring the nets, perhaps this is why Merkel's comments on problems with containing the pens were prevalent? Canadian operators use very heavy concrete anchors and have not had difficulties with relative movement. The failure mode has typically been in surface joints, but unique advances in construction, submersible techniques, and wave reduction barriers have reduced these concerns. In addition, we believe MDNR has only applied net pens in non-treaty waters and do not know if their interpretations over the private/public ownership of the fish inside the nets would be different if they were within the 1836 Treaty waters. If MDNR has interpreted for the Treaty waters, then have they operated in the Thunder Bay Marine Sanctuary and encountered Federal barriers to impacting bottomlands, even if they are free from wrecks? A public explanation and full disclosure of the MDNR's experience with operating net pens would be a positive contribution to the discussion.

As Olson suggested, it would be nice if QOL were proactive to interpreting whether an application might be successful under Public Trust Doctrine. However, since the burden is upon the applicant to prove the suitability of the proposal, we are not sure if the QOL can express an interpretation without a formal permit application. We suggest the QOL provide some further legal clarity to the public around how it would interpret this question and under what circumstances. Perhaps the MDNR's current use of net pens could provide a clear test case for assessment of the Public Trust Doctrine.

<u>Recirculating Aquaculture Systems (RAS) and net pen assumptions</u>

Several comments have consistently promulgated that RAS technology should be the solely supported technology for moving aquaculture forward. As likely the most involved in RAS technology in the state, ARC has a strong understanding of where RAS technology is, as well as, deeply developed concepts for how we can achieve its widespread adoption. We would be pleased to talk with the QOL in more depth on this subject.

First, while disease and escape concerns can certainly be better managed than in net pens; RAS is not a zero waste or zero risk technique. In fact, the concentration and containment of waste is actually a greater concern with RAS and large scale installations have raised some significant operating concerns. Animal welfare is also an increasing concern with several environmental groups and organic standards in EU and Canada are being challenged for RAS, in ways that actually favor net pen and flow thru systems. The dream of placing large RAS systems in repurposed urban buildings demonstrates a lack of understanding that the building cost is less than 10% of the RAS capital cost and that the repurposed building would likely add significant capital cost to constructing the culture facility and result in higher operating costs on an ongoing basis.

The Science Panel repeated a common misunderstanding that the superior economic returns of net pen operations is related to freely releasing waste into the environment. The superior returns are actually related to superior "resiliency" to variable operating conditions. More like the natural environment, upsets among any of a number of variables, are readily absorbed in the system and the fish return to

normal health and feeding very quickly. However, in a RAS system, operations run much tighter among fewer biological systems interacting, thus an upset can quickly cascade into a significant loss of control and quickly impact the economics of the farm. With a net pen operation, in an upset, feed cost can be reduced and possibly some labor (the two largest cost inputs). However, with a RAS upset, feed cost can be reduced, unfortunately electricity, labor, oxygen, and fuel will likely remain at the same cost regardless of production reduction (variable costs for nets are effectively high fixed costs for RAS). Flow-thru systems act with a level of resiliency between these two types of systems and as greater control is taken over the waste of a flow-thru and/or larger size using semi-recirculating practice, then the flow-thru responds much more like the full RAS.

In addition, as our study of the existing Lake Huron farms has shown, the waste from these farms has acted as a nutrient and enhanced the food web for native species, much like the Integrated Multi-Trohpic Aquaculture approach being promoted in the Marine environment. In Ontario's case, the benefit has been to local anglers and charter captains, with the farmer chiefly benefiting in terms of their feed limits being expanded as more nutrients are assimilated. For RAS a key improvement to their economics will be in capturing the value of the waste, however, without consistent production of fish, the waste market cannot be developed and currently is only a compliance cost. Some projections indicate that the waste can eventually be more valuable than the fish fillet, in Great Lakes nets, that value today is being enjoyed by anglers.

Esteemed Commentators response:

Howard Tanner: As the father of the Great Lakes Salmon fishery, through his unconventional insight to fight invasive species with a more valuable invasive species, his opinions carry strong support. However, we feel it is necessary to point out several errors in his statements. Norwegian licenses are not costing $20-$30m and a full discussion of this subject has been shared with Ed Eisch on why the Norwegian "perpetual" license is not as valid of a model for Michigan as the Canadian "annual" license system. Idaho farms have been closing production and selling scarce water rights to other industries in the area and have focused their fish production on developing South American production. As noted earlier in the waste discussion, Dr. Tanner unfortunately has equated fish waste with waste from Chicken or Pigs, which is categorically wrong. We do agree with Dr. Tanner, to "Go Where it Will Grow", which the success of the Ontario farms in creating a new market for 2-3lb trout fillets that sell competitively to Salmon, has shown what is possible in Lake Huron.

Jim Johnson: Johnson's experience and insight into the Great Lakes is tremendous, however, he is wrong on equating the net pen strategy as "dilution is the solution" and has misunderstood the flushing mechanism around the farms. See earlier comments on Science Panel's error in their use of this term, but the Ontario farms are an operating demonstration of nutrient assimilation as an enhancement to the environment. Johnson is also misinformed (as was the Science Panel) in assuming the development of 250 open water farms, however, his insights into projecting the full impact of the $1billion/yr goal onto a whole supply chain is a valid exercise, regardless of grow out systems. The $1b Scenario is dependent on positive Social Acceptance, so any concerns upstream of the investment growth should be addressed in a systematic fashion. The QOL endorsing the goal of the Integrated Assessment is not sufficient for progress and the best minds in Michigan need to come together to address potential consequences of a large scale industry besides just the question of open water net pens. Johnson's

example of hatchery expansion impact is an excellent thought exercise, as described in the Integrated Assessment as a "Moonshot". For equivalence, imagine MDNR currently stocks 20m-40m fingerlings/year, the entire Rainbow Trout industry in the US uses around 50m fingerlings/yr, the $1b goal, if produced solely in Rainbow Trout would require over 610m fingerlings/year! That impact is much broader than the open water aquaculture analysis and should be a cautionary tale to accepting simplifications like the claim to 250 open water Rainbow Trout farms.

Great Lakes Aquaculture Public Meeting Statement

Treetops Resort

November 19, 2015

Hello, I'm Gary Boersen and I've been involved in the writing of several of the recent documents concerning aquaculture development in Michigan. I believe that we should seriously consider expanding aquaculture in Michigan as long as is carried out in an environmentally sound and sustainable manner.

I started working for the Michigan Department of Natural Resources in June, 1974 in the Water Quality Studies Unit. I collected surface water samples around the State, because at that time we had very little idea of what water quality was like in the State. From there I moved into conducting Point Source Studies of municipal and industrial discharges into waters of the State. There isn't a county in the State where I haven't collected water samples. I retired in 2003 from the Department of Agriculture working in the Siting of Animal Livestock facilities.

My comments here aren't going to dwell on specifics, but on some of the big issues I've observed over the past 40 years and how it's so important to keep the big picture in mind as the thought process on aquaculture development proceeds. I think the statement "think globally, act locally" is important to keep in mind.

The issue of aquaculture development in Michigan is a very important topic and deserves serious consideration. As I worked on the development of the Michigan Aquaculture Strategy I was struck by the incredible challenges facing the world from the projected population growth in the next 50 years. The demand for increased food production, in particular protein, is significant as the world's population and its protein intake increases. The 3 billion people of Southeast Asia currently consume about 20 grams protein per day while a western style diet can go up to 200 grams protein per day.

Today most of the seafood consumed in the United States originates from overseas sources and is primarily farmed raised shrimp, salmon and tilapia. Wild caught seafood (exceptions exist like wild Alaskan salmon, which can be prohibitively expensive) is often from over harvested fish stocks, is caught illegally and perhaps even caught under slave labor conditions (NYT July 27, 2015). Concerns also exist with this farmed seafood over how safe it is from a public health perspective. Much is also raised in what we could consider totally unsustainable conditions. For example, many overseas operations are built in highly sensitive natural areas such as mangrove swamps that have high biological diversity and provide protection during storm events. If you currently consume seafood products then you are having an impact, although you may not see it.

I probably fish 30 days a year. Half of those are probably on Saginaw Bay, but that also includes a week on Little Bay Noc for the walleye opener, so I am keenly aware of the importance of these fisheries. In the past I've fished for walleyes on the Detroit River and I'm totally amazed at how the river front has changed. All the places I used to do industrial surveys on, Pennwalt, BASF North and South no longer exist and have been replaced by nice water front parks. The rusting hulk of McLouth Steel still looms along the river bank. Other places I conducted wastewater surveys on in Flint, Saginaw and Kalamazoo are concrete slabs. Sometimes I'm amazed that anyone in Michigan still has a job. Michigan's air and

water have improved immensely over the past 50 years. Some of this improvement is due to many closures of these old and outdated facilities many of which have never been replaced.

The Michigan Department of Health and Human Services has issued fish advisories for mercury on virtually all of Michigan's waters and yet mercury has never been discharged from a point source into most of these waters. The biggest source of this mercury is atmospheric and coal fired plants are the biggest source of mercury. Today you go into a Walmart and it's tough to find much made in the U.S. A majority is from Southeast Asia. What's the major source of energy in Asia? Its coal.

My point is that we may believe we are living an environmentally sound life, but we are not. We are living very unsustainably. I don't live sustainably driving to Saginaw Bay with a round trip of 240 miles to hopefully catch a limit of walleyes and figuring expenses probably end up costing between $25-$50 a pound. Overall we in the United States have exported many of our environmental issues to other countries to pollute their air and water and destroy their natural resources.

No one is even remotely suggesting that fish farming in Michigan be done in an unsustainable manner. Existing permit requirements and the anitdegradation procedure provides plenty of structure for making an informed decision on the siting of open water aquaculture in Michigan. For us as a society to truly live in a sustainable fashion, our impacts on others must be kept in mind. If fish farming in Michigan can be done in a sustainable manner there is no reason why it should not be considered. Let's not have an emotional knee jerk reaction of "no way in my backyard". Open water aquaculture provides a great opportunity for Michigan by being able to provide locally sourced, safe and sustainable seafood. I believe that we can operate fish farms in Michigan in a sustainable manner.

Thank you.

Gary Boersen
7965 N. Scott Rd.
St. Johns, MI 48879
boerseng@mutualdata.com

Delta County Economic Development Alliance

December 1, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 W. Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528

Hello,

The Delta County Economic Development Alliance is a private, not for profit 501(c)(3) located in Escanaba, Michigan. Our function is to lead the promotion of economic development of Delta County through the retention, expansion, and attraction of business and industry.

In the U.P. we understand the dynamics of balancing economic development with protection of our natural resources. In 2012 we started our efforts to develop Aquaculture as a new industry in our community. Our core values are Environmental Responsibility and Accountability, Product Quality and Safety, Respect for others, Integrity, Research, Objectivity, and Economic Development. Our vision is to develop a community-supported fishery that enhances our wild commercial industry with healthy, Michigan farm raised fish.

We've partnered with Coldwater Fisheries, a major player in the North American trout industry that is interested in expanding their markets to Wisconsin and Chicago. This family owned agriculture business was established in 1988 and except broodstock is a fully integrated fish farm from hatchery to grow-out to processing. They produce on average 4-6 million pounds of rainbow trout per year. Their net pen farms expand Nova Scotia, Newfoundland, Prince Edward Island, and Ontario. They employ 100-120 people.

We remain supportive of the work the Quality of Life departments and the independent science panel have done to date. We support adaptive farming practices and regulation to ensure this is done right. Most importantly, we support rigorous environmental control and scientific analysis to determine the impact net pens would have on Lake Michigan. No one cares more about protecting the great lakes resource than us. We want to again express our sincere willingness to work with the Quality of Life Departments on this process. We've assembled a team that has the farm expertise and private financial capital to execute a controlled pilot and are here to help.

Our pilot project will create 8 direct jobs. It will fit into an established Native American commercial fishing industry, supply chain, and skilled employees. We celebrate each and

every job created in our area, as they are vital to maintain the local economy and help us diversity from the vulnerable paper industry.

We ask that you keep in mind this is a controlled pilot effort, to be monitored by the State and more intensely by the local Yoopers. We have tremendous local support from our elected officials, tourism organizations along with others. We remain committed to conducting a science based controlled pilot project to really understand the impact of raising healthy Michigan fish to feed Michigan people can provide.

Sincerely yours,

Vicki Schwab

Vicki Schwab
Executive Director
Delta County EDA
230 Ludington Street
Escanaba, MI 49829
906-212-5408

November 18, 2015

Michigan Department of Natural Resources
Attn: Hannah Guyer/Executive Office
525 West Allegan Street
PO Box 30028
Lansing, MI 48909-528

Dear Quality of Life Departments,

My name is Robert Devine and I am the President and Owner of Coldwater Fisheries. I'm a farmer. I farmed beef cattle for 20 years and now have farmed Rainbow Trout for the past 22 years. Farmers have always operated on proven science, no "Political" Science when it comes to protecting the environment that a Farmers Livestock lives in which will be sold for human consumption.

Coldwater Fisheries is a family owned aquaculture business established in 1988. We have a total integrated fish farming operation except for broodstock – from hatchery to grow-out to processing. We produce an average of 4-6 million pounds of rainbow trout in the 2-4 pound range per year. We employ 100-120 people across Nova Scotia, Newfoundland, Prince Edward Island, and Ontario. We supply large retail chains including Costco & Sysco. We continually strive to be the best in customer satisfaction and produce the highest quality products on the market.

We are interested in expanding operations in the U.S. especially Chicago and Milwaukee markets. We want to help and bring our expertise to Michigan and grow Michigan food for Michigan people. We continue to believe the best way to study the science and impact on the Great Lakes is to conduct a controlled pilot project and we are willing to work with you and provide our expertise and financial resources to do this.

While this list is not inclusive, there are some points I ask you to consider as you determine your recommendations:

- Net Pen farming is not new to the Great Lakes it's been happening since the 1980's and Trout farms in Ontario are regulated by 26 different federal, provincial, and municipal authorities to ensure that they maintain the highest standard of environmental responsibility. Farms are zoned and managed by Best Practices. Over 20 years of testing by authorities has resulted in, NOT ONE REQUIRED CHANGE of our farming practices for any reason.
- Fish Farms support the Commercial and Sports fishing Industries. Our farms must

enhance the environment for all wildlife. It has been proven that the best location to place nets or cast a line is in the vicinity of a farm. Governments license the taking of wildlife through quota systems in order to preserve the species for future taking. Farmers want all their livestock to be harvested.

- Net pen Farming has the smallest footprint of all the farming sectors. The land required is the smallest per tone of all farming sectors.
- The years of work done by Canadian Department of Oceans and Fisheries on the effects of net pen farming on wildlife has proven evidence of better conditions in wild fish near cage sites. Phosphorus dissolved material is quickly diluted and dispersed into surrounding water. Particulate material deposition is more localized.
- Every effort is made to locate pens in areas that maximize the health of all fish, wild and farmed, as well as maximize the effect of the farm impact for the benefit of the Resort Industry, Tourism, Residential as well as Commercial Fishing. Areas where there is already an impact from Human activity are not conducive to fish farming because of previous negative impact on the water quality
- The construction, location, and fish density of the net pen design is done in a way to minimize any environmental impact to the area. There is a very thorough process that goes into siting a pen, and proper zoning and permitting takes place. There are profile and visual requirements managed by the Canadian Coast Guard. The net pens can't be huge, or blaze orange – they have to blend in with the natural environment. The goal is for them to be no more obtrusive than a navigational buoy. Just like proper zoning is needed in land for farms, the same thing is done for farms in the water.
- Rainbow Trout is already a species in the Great Lakes. We purchase our disease free certified eggs from Trout Lodge in WA. They are Rainbow Trout triploids - all females. The fingerlings aren't introduced in the water until they reach the right size. Typically, fingerlings are introduced into the cages in May or June and by Christmas the fish have reached one pound. The goal is to market fish that are 2.5 pounds in size.
- The trout are constantly monitored and tested for disease. Coldwater Fisheries has not administered one antibiotic in the past 5 years. If needed antibiotics would be administered under veterinary prescription and supervision. Diseases usually transfer from wild fish to farm fish. There have not been any documented cases in Canada of farm fish transferring disease to wild fish.
- Feed and feeding techniques are very important elements of Net Pen Aquaculture. Feed suppliers are highly regulated and experienced in manufacturing pet food and feeds for livestock and poultry. Fish feed is composed primarily of fishmeal (herring or anchovy), fish oil, soybean meal, and a healthy diet of vitamins,

minerals and beta-carotene. This diet closely approximates the diet of wild salmonids to ensure that the outcome is a fillet with fresh, bright color and excellent quality characteristics. To ensure maximum freshness, the fish are harvested to order and immediately chilled to the core. The fish are processed within hours and shipped out the same day.

- Advances in feed technology and feeding techniques ensure that the correct amount of feed is given for the number of fish in the pen and that the feed is formulated to so that the fish absorbs the maximum amount. Feed that is not eaten is money wasted by the farmer.
- Every effort is made to minimize escaping. The trout are contained in nets. Nets and infrastructure are monitored regularly and before and after major storms. The consequences are loss of the fish, sports fisherman could catch the trout, or the fish could die.

I would like an opportunity to address the concerns that interested parties have and welcome you to visit our Coldwater Fisheries facilities. We welcome the opportunity to work with you on a controlled pilot project in order continue the improvement of the industry.

Sincerely,

Robert Devine

Robert Devine
President and CEO
Coldwater Fisheries
54 Vankoughnet St
Little Current, Ontario P0P 1K0, Canada

Public Comment Net-Pen Aquaculture the Great Lakes

1 – Thank MDARD and the science review panel for their time and work on this very important topic, and in developing a science based document evaluating the sustainability of net-pen aquaculture in the Great Lakes.

2 – As an Aquaculturist and Michigan resident I support aquaculture in Michigan and net-pen aquaculture in the Great Lakes.

Responsible and Sustainable Eco-friendly Aquaculture (BEST MANAGEMENT PRACTICES)

BMP's for water quality regulations and limitation, to insure no detrimental effect on water quality

Native species to insure exotic species are not introduced to the ecosystem

BMP's to prevent disease in the aquaculture system and therefore disease transmission to wild stocks; including controlling stocking densities, feeding rates, maximum harvest biomass per area, handling of fish and water temperatures, and stocking size.

BMP's for site location taking into account, wave action, storm protection, currents, and other water user, managing risk of escapement.

BMP's for mesh sizes, net monitoring, and net types to manage risk of escapement.

Transparency through reporting, demonstrations, presentation, publications, audits and third party monitoring and reporting. To insure all interested stakeholders are informed.

Process and product certifications to guarantee quality seafood is being produced at Michigan aquaculture facilities.

Partnering with local extension and universities to insure technology transfer and aqua-farms are using correctly the newest technology available.

Commitment to local communities and governments. Opportunities for development in rural areas – case in point Canada salmon net-pen industry has revitalized many rural communities across Canada in a sustainable eco-friendly manner.

Carbon foot printing – ***Beef 40 kilo CO2 / kilo of edible beef, Fish 3 kilos CO2 / kilo of edible fish.***

Food Conversion Rates - ***Beef 10 kilo feed / kilo of live beef, Fish 1.2 kilos feed / kilo of fish produced.***

Land Use - ***Beef 1 acre / kilo of live beef, Fish 1 acre / 1000 kilo of fish produced.***

Environmental policies included carbon emissions reduction policies, green supply-chain policies and energy and water-efficiency strategies. Social policies included diversity and equal-opportunity targets, work-life balance, health and safety improvement, and favoring internal promotion. Policies related to community included corporate citizenship commitments, business ethics, and human-rights criteria. Finally, other policies we accounted for related to customers, product risk and customer health and safety.

Low Carbon footprint

Food product	kg CO_2 /kg edible product
Beef	16-40
Milk	0.8-1.4
Pork	3-6
Chicken	1.5-7
Salmon	1.8-3.3

Low Feed conversions which results in low phosphorus impact on environment and efficient use of proteins.

FCR

Beef 12

Pork 3

Chicken 2

Fish (salmon) 1.2

Supportive of aquaculture and done right can be a fantastic industry for Michigan.

Healthy source of proteins and omega 3 oils

Submitted by Louis Hamper
8759 Hebert Drive
Greenville Michigan 48838
lwhamper@hotmail.com
(616) 232-7130

December 3, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
DNR-Net-Pen-Comments@michigan.gov
525 W. Allegan St. P.O. Box 30028
Lansing, MI 48909-7528
Subject: Aquaculture Net Pen Project

I am writing in support of the proposed commercial net-pen aquaculture project in Delta County.

The thorough review and excellent website documentation has been a great help to analyze and assess the multiple factors which impact the decision for approval. I commend each of the agencies, The Michigan Departments of Agriculture and Rural Development, Natural Resources, and Environmental Quality for their work. And I thank the science advisory panel members, the Small Business Development Center and Michigan State University for their work and contributions to the reviews.

As an avid sailor in the North Channel for many years, I have personally observed the net pen operations in the North Channel, operated by Coldwater Fisheries, and consumed their products. There is no negative impact from these operations. The benefits are enormous, providing healthy and tasty fish for consumption, which is a large attraction for the many visitors to the area. Many sailing friends and I are annual regular customers of particular restaurants which feature North Channel fish and Manitoulin Island local produce on their menus.

With the recently published diet guidelines in the USA to reduce and avoid red meat products, the growth potential for commercial net-pen aquaculture in Lake Michigan and Huron is compelling. Delta County is fortunate to have the locations where net-pen aquaculture meet the requirements for a healthy fishery that enhances our wild commercial fishery industry.

Delta County is ready to move forward with the pilot project. The local skilled fishermen and fish processing equipment, the excellent airport commercial service by Delta Airlines, twice a day to the Detroit area market, and good road transportation services to Wisconsin and Chicago, will enhance the existing Native American fishing supply chain, with a predictable and consistent quality product.

This pilot project needs approval as soon as possible, to improve our Michigan opportunities to help feed the Midwest population, with a healthier diet, employing Michigan workers, and supporting the central Upper Peninsula communities.

Sincerely,

Marilyn Kinsey
630 Lake Shore Dr, Escanaba, MI 49829-3602

MICHIGAN AQUACULTURE ASSOCIATION

November 18, 2015

Demand for access to fresh, healthy and affordable seafood continues to provide a strong impetus for the aquaculture industry to develop a balanced approach and show the world that Michigan can have aquaculture standards and practices that bring access to fresh, healthy, affordable seafood without hurting the environment.

The Michigan Aquaculture Association has worked to ensure that aquaculture projects in Michigan continue to move forward to meet the growing need for sustainable seafood, while working with producers and agencies to ensure that our production practices are in sync with the need to conserve and wisely use our precious resources. There are a number of production methods embraced by our Strategic Plan which also calls for more land-based farms and enhanced R&D in the area of recirculating aquaculture systems, however net culture in Michigan's Great Lakes waters is seen as a necessary element to produce a successful aquaculture in Michigan.

The report produced by the GOL Science Review Panel provides a basic outline for the successful introduction of net pen fish culture to Michigan's Great Lakes waters. Acceptance of an Adaptive Management approach and the BACI Method will allow for a safe and reasonable introduction of commercial scale net pen fish farming in Michigan's Great Lakes waters, while developing the scientific knowledge that is necessary to intelligently and responsibly expand and manage aquaculture within the Great Lakes ecosystem.

Some interest groups have come forward already with negative rhetoric based on a fear of the unknown and for control based on status quo. Some of these groups have already engaged in a misguided legislative effort to ban nearly all aquaculture existing in Michigan today and to prevent growth in this sector. We believe that this extreme approach is not responsible and is contrary to everything that we stand for as citizens of Michigan. We believe that there is another path available. We hope that the Michigan Aquaculture Association can develop cooperation with the Tribal Community, Michigan's Commercial Fishermen, Michigan's Sport Fishermen and Michigan's Conservation Community to build a responsible aquaculture industry that will help revitalize Michigan's working waterfronts and waterfront communities. Aquaculture is an economic opportunity that Michigan is uniquely positioned for. Our abundant freshwater can mean job opportunities for Michigan's hardworking families as well as vital working waterfronts that can diversify and coexist with recreation, tourism and other waterfront uses. Aquaculture is an opportunity to assure a supply of fresh, healthy and affordable seafood for Michigan and our region in a world of increasing uncertainty for seafood supply.

The focus of these reports is specifically Michigan's Great Lakes waters, but it is important to consider the ecology of the world at large and acknowledge that accepted estimates project world population to reach over 9 billion people by the year 2050. Aquaculture has been identified and acknowledged by many national and world organizations as a key component of feeding this population. Without significant growth in aquaculture, pressure on the world's wild fish stocks will continue to increase and by most estimates, push these stocks over the edge. Part of the question that the people of Michigan must answer is: "what is the cost to world ecology if we choose not to use Michigan's water resources to produce fish to feed a hungry world population?"

It is widely acknowledged that aquaculture must grow. The responsible approach is to develop a properly regulated, sustainable and economically viable aquaculture industry in Michigan, and not to allow the loud rhetoric of fear to prevail.

Respectfully,

Dan Vogler, President

December 2, 2015

State of Michigan: Public Comment on Commercial Netpen Aquaculture

Comments by: Chris Weeks
Aquaculture Extension Specialist
Michigan State University, North central Regional Aquaculture Center

I wish to thank Michigan Departments of Agriculture and Rural Development, Natural Resources, and Environmental Quality for the opportunity to comment on potential netpen aquaculture in Michigan waters of the Great Lakes. It is obvious upon review of the commissioned reports that considerable effort, knowledge and forethought went into their compositions.

General Comments

Netpen aquaculture began in the Great Lakes about 1982 in Georgian Bay of Lake Huron, and today 6 Ontario licensed and 3 tribal facilities produce and harvest about 17.5 million lbs of rainbow trout annually. Average production from licensed facilities is approximately 1.1 million pounds, a good proportion of which is imported into the US. One can currently purchase fresh farmed Ontario rainbow trout between $6.99-$9.99 per pound at Meijer's and Kroger stores across Michigan (Figure 1).

Figure 1. Canadian farmed raised rainbow trout fillets for sale at Meijer's grocery store, South Pennsylvania St., Lansing, Michigan (photo taken 10/29/15).

USDA dietary guidelines recommend that Americans should eat at least 26 lbs of seafood per year to maintain good health, yet actual per capita consumption is approximately 14.6 lbs. The average licensed facility in Ontario could provide 21,200 people their recommended amount of seafood every year. Farmed rainbow trout is high in omega 3 fatty acids and is listed as a Best Choice in the Monterey Bay Seafood Watch program. Whitefish is another good possibility for Michigan aquaculture, and development with this species could support existing commercial fisheries.

Statements in any of the reports suggesting the Michigan Aquaculture Plan calls for 250 netpen facilities by 2025 is concerning. As PI on the Integrated Assessment project that produced the Plan, I can verify neither the Plan nor the Integrated Assessment Final Report provide a basis for this projection. It appears this estimate might have been extrapolated from a hypothetical illustration of how Michigan aquaculture could grow (Figure 7 in Colyn et al. 2014), suggesting trout and whitefish could combine for $300 million farm gate, of a target $1.0 billion dollar revenue for Michigan aquaculture. This is a hypothetical number arbitrarily assigned by a consultant, to provide graphical representation of potential value across species, from both land based and open water systems. Moreover, the $1 billion mark was established through a scenario forecast exercise under a stipulation of no constraints. It is not a projection, nor does the hypothetical trout-whitefish value distinguish between current or future land based systems. It should also be noted that Figure 7 (of Colyn et al.) also shows a $400 million farm gate for marine shrimp in indoor systems. This is a worthy challenge itself since indoor systems have not shown to be profitable on large commercial scale in US processed seafood markets.

As another general comment it is important to understand that Aquaculture is a farming activity. And like terrestrial farming, nutrient output to the environment is a management priority. Projections of global needs for food production require that we manage our resources today, sustainably, to the best of our ability. Sustainability means being environmentally conserving, socially and culturally serving, and economically viable. Through proper siting and utilization of established best management practices, open water aquaculture has shown to meet these criteria in many other parts of the world including the Great Lakes.

Economic Reports

Report: Overview of Natural Resource Values Potentially at Risk from Consequences of Net-Pen Aquaculture

Comment: Based on the title of this document Dr. Lupi examined values at potential risk from netpen aquaculture. Potential benefits were not explored. A risk to benefit analysis that included potential benefits from netpen production would have provided important additional information.

Dr. Lupi did a good job attempting to quantify values for services provided by the Great Lakes, but, admittedly, his analysis was inconclusive (page 1, first paragraph): "studies support the fact that there are significant economic values for these natural resources, even though the amount those values would be affected, if any, is not known at this time."

Tourism (pg 2): risks are described in the following sentence: "boating, beach uses, and fishing can be affected by water quality, including problems related to nutrient enrichment such as algal growth and turbidity, and problems resulting from invasive species and diseases."

Comment: With very few exceptions (e.g. small aquaponics facilities), every operating aquaculture facility in the state of Michigan discharges effluents into tributaries that flow into the Great Lakes. In

2014, The State of Michigan stocked over 20 million fish from gametes collected from the wild. This equated to more than 325 tons of fish stocked, nine different species, in 370 stocking trips to 732 stocking sites, traveling more than 100,000 miles from several different hatcheries.

In comparison, Ontario netpen operations typically stock a single cohort of certified specific pathogen-free fish, raise these fish to harvest, and truck them to a slaughter facility. Both public and private hatcheries are held to the same regulatory standards for health and invasive species. It seems reasonable then that netpen aquaculture could have greater control in risk management than public aquaculture facilities in terms of disease and invasive species introduction. In addition, an assessment examining risks to tourism should also assess whether tourism could be positively affected.

Charter fishing (pg 4): "Fishing on charter boats is also an important activity in the Great Lakes, with charter trips averaging about 17,000 per year from 1990 to 2009, with a declining trend over time (O'Keefe and Miller 2011)."

Comment: The severity of the declining trend for Lake Huron salmon charter fishing is not described in the report and is provided in Figure 2 below:

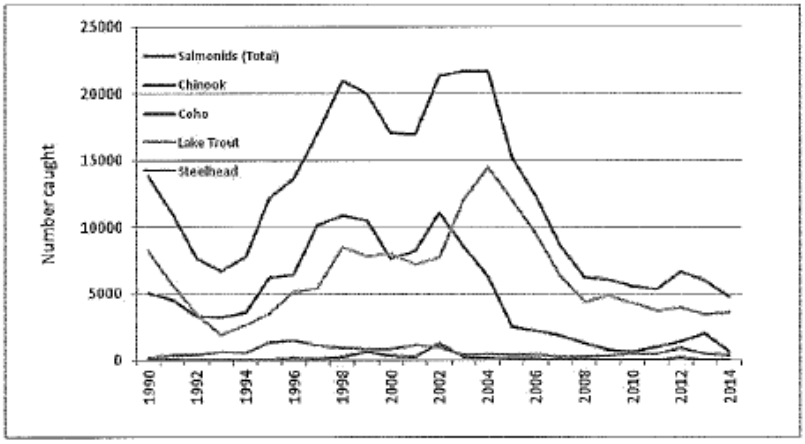


Figure 2. Charter boat salmonid harvest in Lake Huron 1990 – 2014.

According to a NOAA Report (Price and Morris 2013): studies have shown that "... excess food and waste released from fish cages may be a food source for wild fishes, especially benthic feeders. Cages may also provide shelter and foraging habitat for fish. These characteristics may be considered a benefit to the local and regional environment because of increased production of local fish and potential benefits to the benthic environment." Based on the status of the Lake Huron fishery, and changing dynamics impacting prey availability within Great Lakes, this would appear to be an important area for research. Also, according to the Science Report (page 20, 3rd paragraph) interaction between anglers and aquaculture operations in Canadian waters is generally seen as a positive for both the aquaculture industry and the recreational angler.

An interesting point brought forward by Dr. Lupi is that the price analysis used a cost of $2.75 which falls between NASS database averages of $1.63 (national) and $3.39 Michigan (Lupi Report pg 8 bullet 2), adding "It is unclear how a price of $2.75 can be achieved with a larger scale of production in Michigan." It should be noted that netpen fish culture has been shown to be economically sound across the world for many years. Netpen aquaculture opponents are stating Michigan aquaculture should expand through indoor recirculating aquaculture systems (RAS). RAS facilities require 2 -3 times initial capital costs to construct, and have substantially higher fixed costs to operate than netpen systems. This is an extremely important point to address in future consideration and discussions.

Report: Expected Economic Impact of Cage Trout Aquaculture on Michigan's Great Lakes

Comment: Human health benefits from seafood and USDA Dietary Guidelines for Americans are missing from current analyses. From Figure 1 it is clear than Canadian farmed rainbow trout is a cost effective product readily available in Michigan grocery stores. Increased production in Michigan would help keep the cost of this fresh healthy product low for consumers.

The reference of Weeks and Knudson (2014) should be replaced with Colyn et al. (2014).

Report: Aquaculture – Industry Report (SBDC)

Comment: Authors noted they were unable to find estimates of market size for individual species of fish and seafood and therefore used data from the 2013 USDA Aquaculture Census.

Authors do not account for current trends (Figures 3 and 4):

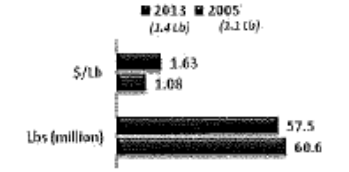


Figure 3. Volume (lbs) and price ($/lb) for US-grown rainbow trout in 2005 and 2013. Average weight at harvest in parentheses. Source: 2013 USDA Aquaculture Census.

Between 2005 and 2013 the volume of rainbow trout production in the US declined by 5% while value increased by 50%.

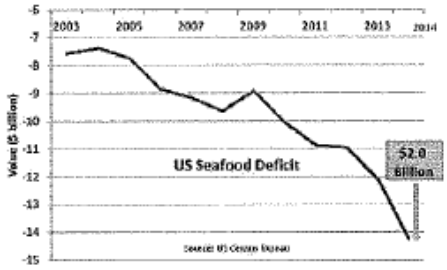


Figure 4. US Seafood Deficit

The US seafood deficit increased by $2 billion in 2014, the greatest 1-yr increase ever recorded.

Legal Report

Report: A Regulatory Analysis of Proposed Commercial Net Pen Aquaculture in the Great Lakes

Legal Report pg 5, 1st para: "The NPDES Program protects the surface waters of the state by assuring that discharges of domestic and industrial wastewater comply with state and federal regulations. NPDES permits are required under Section 402 of the Federal Clean Water Act and under Part 31, Water Resources Protection, of the NREPA."

Legal Report pg 5, 3rd para: "In 2004, the USEPA established technology-based effluent limitations guidelines (ELG) applicable to the CAAP industry. CAAP facilities subject to this rule are flow through, recirculating, and net-pen systems that directly discharge wastewater and produce at least 100,000 pounds of fish per year. The ELGs require best management practices and recordkeeping activities to control the discharge of pollutants in the wastewater from these facilities. This rule is implemented in the NPDES permit. "

Also from NREPA Sec. 32503:
"(1) Except as otherwise provided in this section, the department, after finding that the public trust in the waters will not be impaired or substantially affected, may enter into agreements pertaining to waters over and the filling in of submerged patented lands, or to lease or deed unpatented lands, after approval of the state administrative board."

Comment: NREPA and the Clean Water Act are part of a comprehensive and effective regulatory framework already established in Michigan. Current state and federal laws and regulations allow for public use of resources including fish production, fisheries, marinas, and other uses under permitting and monitoring. Existing regulations for water monitoring requirements from Ontario, Maine and Washington provide excellent benchmarks for incorporation into the Michigan framework.

Science Report

Report: Great Lakes Net-Pen Commercial Aquaculture: A Short Summary of the Science

General comment: The science report is thorough and recommends a cautious approach to netpen aquaculture development through adaptive management principles. Some caution may be warranted in setting requirements unnecessarily high as to remove economic incentive, which is a principle component of sustainability. While a conservative approach is warranted, enforcement of a program such as BACI should take under consideration existing models in Ontario, Maine and Washington State.

Invasive species
Applicability of the reference to Asian carp (Science Report pg 18 2nd para) is questionable and not explained. Risk of invasive species through netpen production is limited primarily to accidental movement through gear and water (Science Report pg 18 3rd para): "Possibilities exist for non-native species introduction and spread from activities such as the transport of fry from hatcheries and routine movement of fish and gear among farm sites (e.g., net fouling). Biosecurity plans could include requirements for cleaning gear, inspections of farm sites, and other precautions similar to those in place

for zebra mussels." As previously mentioned, both public and private hatcheries are held to the same regulatory standards for fish health and invasive species.

Escapes

Comment: Escapes are a concern as noted; however, risk is reduced and minimized through established and adopted best management practices, stock and site selection, and technology.

Disease

Comment: Michigan State University has one of the best aquatic diagnostic programs for fresh water species in the country, and the state of Michigan has exceptional expertise in fish production and aquatic diseases across public agencies, the work force and academic institutions. Lake Superior State is geographically well located and positioned for support and training for diagnostics, monitoring, research and development. Regulations and management practices require fish health inspections and certified specific pathogen-free stocks only, and commercial aquaculture is held to the same standards as the state of Michigan aquaculture program. Additionally, Ontario producers have been operating since the early 1980s. If disease has shown to be a problem with netpen operations to date, management agencies should have been informed. Risk of disease transfer from wild to aquaculture fish are minimized using established best management practices.

Nutrients

Comment: Netpen fish production is a farming activity and results in nutrient inputs to the water. An Ontario study by Naylor et al. (1999), characterized chemical composition of waste produced by rainbow trout fed commercial diets (Table 2 from Naylor et al). Essentially fish waste can be compared to a dilute fertilizer, and differs from human and terrestrial animal waste because it is absent of harmful bacteria such as E. Coli and salmonella.

The Science Report describes permitting requirements and standards for allowable total maximum daily loads (TMDLs) established by law. For a commercial fish producer, wasted feed is lost revenue. Best management practices and feed manufacturers strive to minimize nutrient discharge while maximizing feeding efficiency.

Regulations

Per the Science Report (pg 20 2nd full para):

> "Current state and federal regulations, as well as the provisions of the 2012 GLWQA, provide regulators with both the mandate and tools for appropriate regulation."

Table 1 – Table 2 from Naylor et al. (1999) providing chemical composition of manure from rainbow tout farms.

TABLE 2.-Chemical composition of manure from Ontario rainbow trout farms (this study) compared with values reported in previous studies. Data are presented as ranges or means on a dry-weight basis.

Element	This study[a] (mean ± SD)	Mudrak (1981) A[b]	Mudrak (1981) B[c]	Mudrak (1981) C[d]	Willet and Jakobsen (1986)[e]	Olson (1992)[f]	Bergheim et al. (1993)[g]	Westerman et al. (1993) A[h]	Westerman et al. (1993) B[i]	Axler et al. (1997)[j]
Elements measured as percent										
N	2.83 ± 0.66	4.85	2.17	1.41	3.3	3.15-5.49	4.8	2.95-16.11	1.78-15.31	2.44-3.60
P	2.54 ± 1.20	1.79	2.99	1.49	1.03	1.34-3.51	2.22	0.88-6.60	0.35-1.85	0.94-3.80
K	0.10 ± 0.05	0.15	0.46	0.71	0.03	0.29-0.43	0.047	0.05-0.96	0.29-0.88	
Cu	6.99 ± 2.71						6.1	1.18-4.43	0.34-2.70	
Mg	0.53 ± 0.39						0.31	0.18-0.44	0.35-0.60	
C					25			11.2-48.5	9.3-70.6	19.0-44.5
Na							0.20	0.023-0.351	0.035-0.052	
S							0.52			
Cl								0.006-0.0109	0.002-0.015	
Elements measured as mg/kg										
Cu	33.4 ± 12.5	49				47	40	0	0-60	
Fe	1,942 ± 1,123						769			
Mn	487.8 ± 408.2						150			
Zn	604.9 ± 207.1	342				450	458	130-590	160-500	
As	2.20 ± 1.16									
Cd	1.13 ± 0.77	7.6				<2	0.20			
Co	1.82 ± 1.29						0.59			
Cr	3.86 ± 3.92	91				13	2.6			
Hg	0.05 ± 0.05						<0.03			
Ni	4.94 ± 4.57	60				7	1.0			
Pb	5.54 ± 7.71	92				5	0.92			
Se	0.50 ± 0.31									
B							10			
Mo							0.41			

[a] Samples of settleable solid wastes were collected from gravitational settling units at 12 commerical trout farms. Mean composite data are presented on a dry-weight basis.
[b] Concrete settling chamber, < 18-d old.
[c] Earthen pond; sludge from top 7.5 cm of sediment, <6 months old.
[d] Earthen pond; sludge between 25 and 30 cm deep in sediment, >6 months old.
[e] Concrete-lined ponds, unknown age.
[f] Three fish farms using concrete settling basins, unknown age.
[g] Settled solids from seawater tanks stocked with Arctic char Salvelinus alpinus.
[h] Trout manure samples from raceway settling sections, less than 2 weeks old.
[i] Trout manure samples from settling basins, 1-9 months old.
[j] Trout manure samples settled in raceways, less than 2 weeks old.

Opportunity

With rising global demand for seafood, aquaculture will become increasingly more important in the future. However, aquaculture expansion must be environmentally conserving, socially and culturally serving, and economically viable. A major question at hand then is whether netpen aquaculture in the Great Lakes can be considered sustainable. Based on what we know of past experiences, and the assessments commissioned by the State of Michigan, I believe it can. Moreover, such an endeavor could prove beneficial to local fisheries in the process.

From an ecological standpoint, 1-2 pilot commercial scale netpen systems provide the ability to assess impacts (positive and negative), on local biodiversity. Socially and economically, they would yield important information regarding private, public and tribal partnership opportunities, human health

benefits and seafood value chain development. Both the science and regulation reports indicate regulations are in place to minimize potential risks, limit nutrient discharges, and ensure no long term negative impacts will be allowed.

Finally, use of public resources for aquaculture appears to be a critical issue. Dr Lupi, in his report, identified a number of potential user conflicts. For this discussion it might be helpful to visualize the general scope of one of the proposed pilot netpen facilities. Figure 5 shows superimposed satellite photos at similar scale for a 500,000 lb Ontario production facility in comparison to the size of a marina located in St. Joseph, Michigan. Both netpens and marinas add material into the water. Marinas play an important role in recreational activity in Michigan and the state's economy. Through netpen aquaculture, an opportunity is presented to assess the overall intrinsic value of Michigan farmed raised seafood across a wide range of avenues, while we continue to explore ways to achieve economic viability of indoor systems in mainstream processed seafood markets.

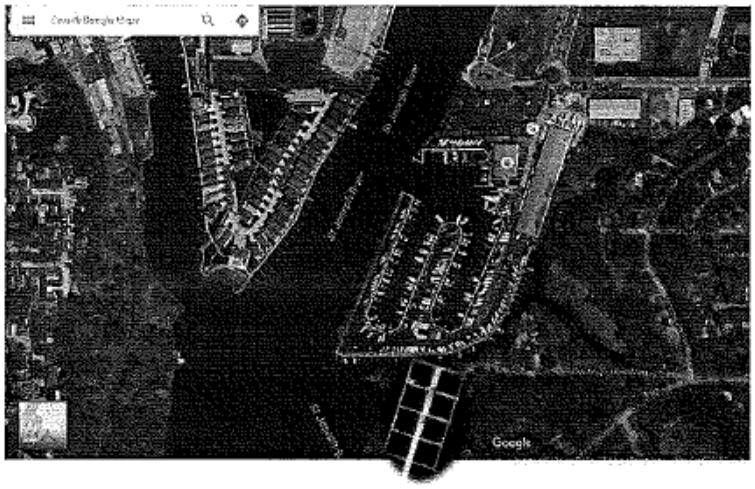


Figure 5. Size comparison of a 500,000 lb netpen facility to a marina located in St. Joseph, Michigan. Figures were taken independently from Google Maps at similar scale and superimposed for size comparison only.

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Originz, LLC statement and supporting information to the Michigan QOL Agencies regarding Net Pen Aquaculture. *At Gaylord on November 19, 2015 and in writing on November 20, 2015.*

Background & Introduction:
Good afternoon, I'm Joe Colyn of Originz, LLC – a Michigan-based consultancy where for the 15 years we've helped clients develop "food systems for a healthier world". For the past 5-6 years we've been engaged in supporting the opportunity to develop a sustainable and thriving aquaculture in Michigan and the Great Lakes region. Thanks for the opportunity to be heard.

I will address five aspects of the net pen and broader aquaculture opportunity: Abundance, Zoning, Adaptive Management, Moving towards the billion dollar opportunity, and challenge the entire stakeholder community to learn from those that currently do best practice with net pen technology.

Abundance:
I live here in Michigan and believe that we can do our part and more to feed the world and leave a healthier world as we do it. In Michigan we are serious about growing our agriculture and natural resource economy without damaging our environment. In that context we need to explore how to better manage our open water for the benefit of society. Historically we think of Michigan as two peninsulas – but that's only 60% of the story of the state's resources. Fully ***40% of the area within Michigan's state borders is on the open water of the four upper Great Lakes***. Here in the Midwest we enjoy bountiful land based agriculture, and as terrestrial beings mankind logically feels more at home securing most of our food from our land base. But in order to meet the ever-growing demand for high quality food, and seafood as part of the solution, we need a balanced approach that puts fresh, affordable, and healthy food on the table. Aquaculture can help feed a growing US and world population. And we ***need to begin to develop further for food production some of the 40% of our state that is covered with water.*** Those open water resources are 3-dimensional – presenting an opportunity beyond what we can likely even imagine today. Six quadrillion gallons of water in the Great Lakes – enough to satisfy our recreational, drinking, industrial, agricultural, fishery, shipping, AND aquaculture needs.

We need to recognize that regulatory agencies have a responsibility to uphold the law and that established organizations in society with vested interests may have a high bias to supporting the status quo or legacy practices and use of resources. Yet the betterment of society has always relied on a look forward based on opportunity. In Michigan we have abundant natural

resources, talent in engineering, design, bio-systems, and other fields. What possibility does that present for a better future? Many, I suggest. Lets tap that abundance.

Zoning (the context for Siting):
As we determine how best to meet this demand for seafood it seems logical that we explore options where water is most abundant – and in this region that must include the open waters of the Great Lakes. Limiting the use of those waters for shipping and recreational uses may not represent the best stewardship of that part of the creation. In our land-base economy we assign various use to land from fence-row to fence-row – be that farming, residential, commercial, highways and byways, or as nature preserves and parks. ***Should we think more creatively and extensively about zoning and use of the open water resources? I think so. In a way that does not compromise water quality as a source of life. The SAP report touches briefly on the subject of zoning. The economic reports not so much. It should be explored further from an economic perspective in the broader context of benefit to society – and to that end we need to engage a process, one we can't do on our own. Lets learn how others do this in Ontario, in Turkey. We can do this and do it well.*** *(Note: I posit that this CAN be done without compromising the Public Trust Doctrine. Just as the public right to land under navigable waters are upheld even while very small portions of those bottomland are permitted by to private commercial or other entities to place marina structures, etc, so it could be argued, that the historical public trust right to fishing today also grant commercial enterprise rights 'very small portions of those bottomland' for the anchoring of trap-nets and other devised that don't compromise the public good or trust. Likewise net pen siting – and we have suitable Bottomland Conveyance Permitting process – can be done, again on 'very small portions of bottomland' that will not compromise the public trust. In fact it can be argued that producing healthy, fresh, affordable food meets the public trust expectation– just as a commercial dock or marina situated on/above bottomlands does.)*

Adaptive Management – in the best interest of the public:
As the SAP concludes its reflection on the opportunity for net pen aquaculture in the Great Lakes it states, "***siting of aquaculture net pens can become quantifiably defensible and in the public's best interest.***" I agree. Lets collectively put an adaptive management plan in motion that pursues the public best interest. Indeed an adaptive management approach is the right way forward. It's how society and stewardship of the earth's resources can best be advanced. That collective approach should be lead by those in the sector that are willing to invest developing the opportunity – foundations and the like, in partnership with a "yes we can" state agency attitude. Lets demonstrate in the next 2-3 years that aquaculture can show relentless positive action in action on behalf or the citizens if the state that want jobs on our working waterfronts that provide fresh, affordable, healthy and local seafood to our tables.
I am pleased to see ***that the SAP Report favors, If I read between the lines, an Adaptive Management Strategy rather than adhering to the Precautionary Principle (PP). The PP is arguably totally risk averse, and by its very nature could constrain innovation that could***

deliver a preferred solution and a desired future. The AM approach recognizes that there are risks in all human activity, and that by applying sound science and good intuition we can advance to a better future together. We have some amazing human, technical, funding and other resources in Michigan that can be applied in an AM approach and I look forward to a the creative, sustainable and beneficial solutions that can be developed for aquaculture. But ***we have to start now, and I urge our regulators and state agency partners to rather wholeheartedly engage the process.***

Building a Billion Dollar Sector – Moving Forward One Dollar at a Time

The Michigan aquaculture strategic plan posits the opportunity to develop a billion dollar sector in the Great Lakes region as one of four scenarios that might play out in the future. The four scenarios arose out of an engaging dialog with a wide range of sector stakeholders. ***A plan is not a prediction, nor is a scenario a forecast of an outcome. Rather they are tools to guide us and cause us to ask better questions and make better decisions as we learn along the way creating a thriving and sustainable sector. I trust that today is part of that learning our way forward. Lets not close doors before we know what's behind them.***

Miss-calculations proffered by some that a Billion Dollar sector would be built entirely on the net pen systems are indeed that – misinformation. A thriving and sustainable sector would by its very nature have to be diverse, with a number of different production system element – some we know today, including net pens and other know system and some of creative solutions not yet discovered.

We should, in fact we must, be asking "what if" questions as we go forward. What if the underutilized water and sewer infrastructure of our cities and waterfront communities could be leveraged for fish production? What if fish swimming freely in a net pen are the healthiest form of seafood we can produce? What if our charter boat fishery thrives because we revive an ecosystem around our net pens that allow the recreational fishery to grow and expand? What if RAS systems for fingerling are the perfect compliment to open water finishing of market ready food fish? ***All these questions support being proactive in taking an Adaptive Management approach to net pen aquaculture– to answer the questions of supporters and naysayer alike.*** Argument that an Active Adaptive Management approach is not appropriate because there are too many risks and too many unknown elements are unfounded. The SAP report rightly reference that we can, indeed should, build on the prior learning in Ontario and other parts of the world – both to avoid mistakes and to improve the system for our situation.

And speaking of tools, the Global Aquaculture Alliance rightly challenges us too look beyond just food production. If you look at the (global) aquaculture toolbox, it's not only being used to ***restore fisheries, it's also being used to restore ecosystems***. Conservation and restoration aquaculture is an important area that is completely neglected as a part of our field of

aquaculture[1]. We've done amazing cleanup to eliminate industrial pollutants – and we need to be diligent about caring for our water bodies as the living ecosystems that they should and can be. Farming fish in a depleted ecosystem can be a part of a restorative process, just like cover crops and animal impact can restore damaged soils. *(Note: Allan Savory has done more for the restoration of desert by taking a what seems at first to be a counterintuitive approach to the problem. See this video it's worth the 22-minute watch, an example of Active Adaptive Management – he addresses desertification on land. I argue we have the water-based equivalent in the oligotrophic volumes of the Great Lakes – a lifeless place begging restoration. https://www.ted.com/talks/allan_savory_how_to_green_the_world_s_deserts_and_reverse_climate_change?language=en)* Fish waste is not a pollutant that sits idly on the bottomlands forever – it's the substrate for the restoration of a healthy living ecosystem in a body of water ***What might we learn by collectively taking an Adaptive Management approach to developing aquaculture? This must not be an RAS vs. Net Pen or Land-base vs. Open Water discussion – it must be an and/both discovery process, applying the best of what we already know, acknowledging that our approach to date has been imperfect, assume that there are things that we don't know that we don't know, and ready to apply what we will learn.*** Again, an Active Adaptive Management process approach is right.

So lets move forward, and let our learning along the way guide us to our preferred future where healthy affordable seafood from local source contribute jobs to our economy while caring for our ecosystem. We have an ethical and moral responsibility to grow our own seafood in this country[2]. Its doable. Lets lead here in Michigan!

Ontario and beyond – Go and See and Learn:

Finally, in June I suggested that the SAP and state decision makers should be visiting Ontario to learn from the 30-year experience across that dotted line in Lake Huron. I'm glad to hear that the SAP engaged our neighbors. And I do know of several department conversations with the Ontario and Canadian ministries. I applaud this engagement. I'll reiterate that, *"seeing is believing"* – a visit to the Ontario farms should still be considered. ***My offer stands, I'd be glad to help organize a visit to Ontario.*** And extend that invitation to other stakeholders that could benefit from being informed with first-hand exposure to net pen operators who practice fish farming as stewards of the ecosystem within which they operate for the benefit of Ontario – and Michigan – citizens.

And while there I suggest visiting with the First Nations operators. They operate under the radar in many ways, and I'm somewhat jealous of them because they have what I call "small government'. But that does not mean they are not good stewards of the creation. They are realizing the aquaculture opportunity and as the SAP report shows, have grown their part of the Ontario rainbow trout industry to be larger than the provincially regulated operators by

[1] http://advocate.gaalliance.org/aquaculture-exchange-barry-costa-pierce-unc/
[2] http://advocate.gaalliance.org/aquaculture-exchange-barry-costa-pierce-unc/

applying best management practices. The First Nations people have long, indeed for millennia, been stewards of the natural resources upon which their communities depend. In fact the ***Aboriginal Aquaculture Association in Canada has developed a set of principles[3] that are simple, concise and a model that we can learn from. Why would we not consider direct learning from the growing $50 Million sector in Ontario that could be replicated here? And maybe aquaculture can be an even bigger contributor to our Michigan society's wellbeing!***

I applaud the QOL agencies for holding this public hearing in Gaylord, government represents the people and needs to be engaged where the people are. That's why Originz, LLC hosted the August 24, 2015 "Freshwater Net Aquaculture in the Great Lakes: a Dialog" public in St Ignace – the net pen opportunity and the broader aquaculture opportunity is going to be realized in and around the working waterfront communities of our state. The Canadian Aquaculture Industry Association recently produced a video https://www.youtube.com/watch?v=2YDw67unVx0 that has leaders of working waterfront communities talking about how aquaculture can compliment the capture fishery and other seasonal work with year-round work. Michigan's has many working waterfront communities that could realize similar opportunity. A strong Michigan needs a healthy Detroit, a thriving Grand Rapids, tourist town like Saugatuck. It also needs vital Naubenway, Escanaba, Alpena, and Port Rogers where aquaculture can make a small but vital difference.

Thanks for the opportunity to contribute to advancing Michigan as a leader in sustainable seafood production that puts healthy, fresh and affordable food on our tables.

Joe Colyn – Originz, LLC

For Reference – perspectives on the opportunity for aquaculture:

The Michigan Opportunity Video series: www.originz.com/aquaculture

On how America needs to rethink our seafood supply and aquaculture's role. Aquaculture and the capture fishery can be complimentary sectors in meeting demand, and provide ecological services too: http://advocate.gaalliance.org/aquaculture-exchange-barry-costa-pierce-une/

On how aquaculture can compliment the capture fishery and benefit rural communities: https://www.youtube.com/watch?v=2YDw67unVx0

Telling the Story of Aquaculture: http://www.seafoodsource.com/news/aquaculture/aquaculture-has-a-story-and-no-one-to-tell-it?utm_source=Informz&utm_medium=Email&utm_campaign=eNewsletter

[3] http://www.aboriginalaquaculture.com/aboriginal-certification/

DNR-Net-Pen-Comments@michigan.gov

From: John B. Dietrich <jdietrich@pem-digesters.com>

Sent: Thursday, December 03, 2015 12:10 PM
To: DNR-Net-Pen-Comments@michigan.gov; Pete Dietrich - GMAIL
Subject: Commercial Net-Pen Aquaculture: Comments

Commercial Net-Pen Aquaculture: Comments

The Vision for the mitigation of waste for the wood waste to synthetic fuel plant.

1. PEM is a Wisconsin based engineering and manufacturer of state of the art anaerobic digesters.
2. We have been retained by the developer of wood waste to synthetic fuel projects to mitigate waste from these plants including process waste heat.
3. PEM basic business project mission is to

a. Mitigate waste and turn the waste into benefit for the business
b. Add additional employment to the project through the use of viable waste mitigation business options

1. We are currently researching the use of fish farming for the project based on Dr. Christopher Weeks document titled "A Strategic Plan For a Thriving and Sustainable Aquaculture Industry in Michigan"

a. This well thought out document is the basis for our research to use fish farming options in conjunction with the wood waste to synthetic fuel plant.
b. We believe that with the fish farming there exists the opportunity to significantly to add to the employment base of the original project. This employment would be based on the actual fishing aquiculture plus the related fish processing.

We are greatly disturbed by the overall negativity of the Michigan legislators that oppose this economic opportunity for the State of Michigan.

1. The negative statement that Senator Rick Jones made "A typical 200,000 fish operation creates as much waste as a city of 60.000 people, which would make the Great Lakes a giant toilet bowl." It is this type of error that does not have to enter into the discussions? We contend that how is a 3 to 5 pound fish able to generate 3.3 gallons or 27 pounds of liquid waste when a person generates 20 gallons of liquid waste per day. These types of half-truths should not be published.
2. The major concern of the legislators, trade groups and special interest groups is the fish manure pollution. PEM is of the opinion that manure handling techniques from other intensive animal agriculture methods could be adapted to the mitigation of the fish manure. The captured fish manure then could be processed with an anaerobic digester to produce a pathogen free high quality liquid fertilizer.

We are in the early stages of our research and are using the above path as the road map for our research. Weather the fish aquiculture system is land based or water based it is too early to make the determination. We would ask your committee to reject the negative comments on fish aquaculture and let the principles of free enterprise create the jobs that are desperately needed in Michigan.

Respectively yours:

John Dietrich, Pabst Engineering & Manufacturing, Inc., Onalaska, WI 54650

Soy Aquaculture Alliance

8425 Keystone Crossing, Suite 200
Indianapolis, IN 46240

t : (888) 326-4458
w : SoyAquaAlliance.com

December 4, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 West Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528
DNR-Net-Pen-Comments@michigan.gov

Re: Proposals for Net Pen Aquaculture in the Great Lakes

Dear Ms. Guyer,

We are writing to offer our support for expansion of aquaculture in the Great Lakes. The Soy Aquaculture Alliance (SAA) is committed to the development of a vibrant and successful domestic aquaculture industry.

The Earth's oceans are not able to meet the growing worldwide demand for seafood and aquaculture is critical to our nation's food supply. Over 50% of today's existing supply of seafood is farmed. Both the Food and Agriculture Organization of the United Nations, and our own Departments of Commerce and Agriculture recognize that our nation's seafood production will need to drastically increase over the next 20 years and that aquaculture must play a major role in meeting that need.

Recent studies published by U.S. researchers as well as by international, non-governmental organizations report that aquaculture, when conducted properly, is by far the most sustainable way to produce animal protein for human consumption. With rising global demand for seafood, aquaculture will become increasingly more important in the future. However, aquaculture expansion must be environmentally conserving, socially serving, and economically viable. Based on the assessments commissioned the State of Michigands6xytz, we believe, that through an adaptive management process as described in the Science Report, the opportunity exists to explore how the Great Lakes could be managed effectively in a way that allows for some capacity of net pen aquaculture to develop.

The development of net pen aquaculture in the Great Lakes has the opportunity to benefit the local economy and local agriculture in the production of sustainable feed ingredients such as soy protein produced in the United States, including in the State of Michigan. Michigan currently produces 200 million acres of soybean which are the second largest agricultural crop in the State. The Soy Aquaculture Alliance has invested in several years of research into rainbow trout (Oncorhynchus mykiss) nutrition and has seen great advances in this area thanks to valuable research and scientific knowledge from U.S. institutions.

We look forward to seeing the opportunity for U.S. aquaculture to grow and expand, including in the Great Lakes.

Sincerely,

Bridget C Owen

Bridget Owen
Executive Director, Soy Aquaculture Alliance

Appendix K. Other letters on commercial net-pen aquaculture in the Great Lakes.

December 10, 2015

Michigan Department of Natural Resources
ATTN: Hannah Guyer/Executive Office
525 W. Allegan St.
P.O. Box 30028
Lansing, MI 48909-7528

Dear Ms. Guyer:

I am writing as Chair of the Great Lakes Fishery Commission (Commission) to express the views of the Commission about net-pen aquaculture in the Great Lakes. The Commission is a binational organization established by treaty between Canada and the United States in 1955. The Commission's duties include control of the invasive sea lamprey, research, communicating with governments, and facilitation of coordinated fishery management in the Great Lakes through *A Joint Strategic Plan for Management of Great Lakes Fisheries* (Joint Strategic Plan), to which the Michigan Department of Natural Resources (MDNR) is signatory.

The Commission discussed net-pen aquaculture in the Great Lakes at its most recent meeting on December 3-4, 2015. The Commission, as a science-based organization, recognizes that there is limited scientific data available on which to make policy decisions. As a result, the Commission is not writing to express an opinion either for or against net-pen aquaculture. But the Commission does support the careful approach that Michigan is taking to the issue. In particular, the Commission endorses the recommendations of the science panel in its report, *Great Lakes Net-Pen Aquaculture; A Short Summary of the Science*. In particular, the Commission appreciates the recommendation to deliberate with the Precautionary Principle in mind, and to make any decisions in the context of an active adaptive management approach to learning. Because effective techniques do not exist to eliminate effluents from net-pens to the Great Lakes, the Commission urges Michigan's Quality of Life Group to carefully consider the role of aquaculture as a source of nutrient loading, relative to other sources that influence the nutrient loading targets recommended by the two federal governments in the amended Great Lakes Water Quality Agreement of 2012. The Commission also agrees with the report finding that siting is incredibly important to determining the success of net pens in the Great Lakes. Consequently, the Commission supports development of a multi-faceted, stakeholder-shared spatial decision support tool. Lastly, as the facilitator of the Joint Strategic Plan process, the Commission recommends that MDNR continue to seek the input and recommendations of its partners around the lakes to ensure that there is consensus about actions related to net-pen aquaculture from fishery management agencies.

GREAT LAKES FISHERY COMMISSION
2100 Commonwealth Blvd, Suite 100 • Ann Arbor, Michigan 48105-1574 • 734-662-3209 • www.glfc.int

Thank you for the opportunity to provide comment to Michigan as it deliberates about a course of action. The Commission appreciates the many ecological, social, and economic considerations that affect any decision and urges Michigan to continue to follow the Precautionary Principle and active adaptive management in any decision, as well as early and open consultation with its Joint Strategic Plan partners.

Sincerely,

Robert Hecky, Chair

cc: Mr. Bob Lambe, Executive Secretary
Mr. Todd Kalish, CGLFA
Mr. Steve LaPan, CLC

Committee of Advisors
to the
Great Lakes Fishery Commission

A RESOLUTION CALLING FOR MULTI-JURISDICTIONAL CONSIDERATION AND REGULATION OF NET PEN AQUACULTURE IN THE GREAT LAKES

WHEREAS, interest in the concept of net pen aquaculture as an activity of economic benefit to states and provinces in the Great Lakes system has arisen in recent years;

WHEREAS, private funded efforts have already established or are in the planning process of establishing net pen aquaculture sites in both Canadian and U.S waters of the Great Lakes;

WHEREAS, increased aquaculture activity within the U.S. waters of the Great Lakes has the potential to provide substantial economic benefit to the communities of the Great Lakes watershed;

WHEREAS, net pen aquaculture in both North America and the rest of the world has shown a need for extensive regulation to prevent serious disease out breaks among fish raised within said net pens, as well as wild fish that share the watershed with net pen raised fish;

WHEREAS, waste by product removal has proven to be a serious concern with net pen aquaculture operations throughout the world;

WHEREAS, the issue of fugitive fish escapement from net pens has become a serious problem in other aquaculture facilities throughout the world, leading to aquatic invasive species issues, as well as the genetic diluting of same specie wild fish stocks;

WHEREAS, the Province of Ontario has instituted comprehensive regulations pertaining to the establishment and operation of net pen aquaculture in the Canadian waters of the Great Lakes; and

WHEREAS, the State of Michigan has initiated due diligence as to the economic, cultural and environmental consequences of net pen aquaculture in the Michigan waters of the Great Lakes.

BE IT RESOLVED, the U.S. and Canadian Advisors to the Great Lakes Fishery Commission call on Great Lakes Fishery Commission to encourage all Great Lakes jurisdictions to thoroughly investigate the impacts of net pen aquaculture—through a comprehensive regulatory, social (including public meetings with stakeholders, citizens, and tribes and First Nations), economic, and scientific assessment—and prior to any approval of said operations, institute appropriate legislation and regulations to protect the Great Lakes from the consequences of unregulated net pen aquaculture.

BE IT FURTHER RESOLVED, that the Commissioners request that Council of Great Lakes Fishery Agencies adhere to provisions of A Joint Strategic Plan for Management of Great Lakes Fisheries that require signatory agencies to discuss and seek consensus on any fishery activity that has the potential to affect another jurisdiction.

The Committee of Advisors consists of both U.S. and Canadian representatives, from First Nation, commercial, recreational, academic, agency, and public fishery interests in the Great Lakes Basin. Advisors provide advice to the Great Lakes Fishery Commission; U.S. advisors are nominated by the State Governors, and appointed by the commission. Canadian advisors are nominated by the Ontario Minister of Natural Resources and appointed by the Minister of Fisheries and Oceans Canada.

BE IT FINALLY RESOLVED, that the Commissioners support the establishment of a scientific committee under appropriate auspices to monitor basin-wide issues relating to net pen aquaculture and to resolve potential multi-jurisdictional issues regarding the same.

Passed unanimously by U.S. and Canadian Committee of Advisors
June 10, 2015

The Committee of Advisors consists of both U.S. and Canadian representatives, from First Nation, commercial, recreational, academic, agency, and public fishery interests in the Great Lakes Basin. Advisors provide advice to the Great Lakes Fishery Commission; U.S. advisors are nominated by the State Governors, and appointed by the commission. Canadian advisors are nominated by the Ontario Minister of Natural Resources and appointed by the Minister of Fisheries and Oceans Canada.