

Michigan's Growing Threat

Fish Farming in the Great Lakes & Tributaries

FLOW
FOR LOVE OF WATER

ISSUE BRIEF
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MICHIGAN SITS AT THE CENTER of a swirling debate over whether to open its Great Lakes waters to commercial aquaculture or fish farming. The practice involves packing thousands of fish into near-shore cages or mesh net-pens that rise above the surface, are anchored to the bottom, and accessed via pier or boat. The fish are fattened with food pellets and buoyed by antibiotics, and discharge tons of untreated waste rich in nitrogen and algae-producing phosphorous into public waters in exchange for marketable fish, private profits, and a few jobs.



Great Lakes advocates say that commercial net-pen fish farming, pictured above, does not belong in Michigan's public waters.

Numerous Great Lakes advocates, including environmental and anglers groups, tribes, scientists, legal experts, a trio of state agencies, and lawmakers in both major parties, say that net-pen aquaculture in the Great Lakes is not legally authorized and is too risky for the environment, native species, and the multibillion-dollar sport fishing economy. It is the government's perpetual duty under the common law to protect Great Lakes public trust waters for the public's current and future benefit, including for drinking, boating, fishing, swimming, sustenance, and navigation.

THIS FLOW ISSUE BRIEF summarizes the public trust legal framework in Michigan that prohibits Great Lakes fish farming, outlines the significant economic and environmental risks that aquaculture poses, highlights the Grayling fish hatchery litigation, points to the promise of closed-loop aquaculture operations not connected to public waters, and recommends actions the public can take.

IN THE GREAT LAKES, a small number of commercial fish farms have been allowed since the 1980s, but only in Canadian-held waters in Lake Huron's North Channel and Georgian Bay.¹ Michigan began to seriously consider Great Lakes fish farming in 2011 when three state agencies—the departments of Natural Resources

Michiganders Oppose Great Lakes Fish Farming

Nearly 7 in 10 Michigan voters oppose opening Michigan's Great Lakes waters to commercial net-pen fish farming, including 77 percent opposition in northern Michigan where two fish farms have been proposed, according to a statewide poll released in February 2016.² The opposition existed across geographic, political, and demographic lines, and strengthened when participants learned more about the issue.

(MDNR), Environmental Quality (MDEQ), and Agriculture and Rural Development (MDARD)—partnered with the aquaculture industry. Together they created a “road map”³ to help aquaculture operators navigate the regulatory process, consider the industry’s possible expansion into the Great Lakes, and grow the state’s current \$5 million industry into a “major part of Michigan’s agriculture sector.”

The road map paved the way for two commercial proposals in 2014 to build net-pen rainbow trout operations—each harvesting as much as one million pounds of fish a year—off Michigan’s coast in northern Lake Michigan near Escanaba and northern Lake Huron by Rogers City.⁴ Spurred by the proposals, the state agencies extensively studied the economic and environmental impacts, legal framework, and public perception of net-pen fish farming in the Great Lakes.

In the face of troubling environmental and economic findings and stiff public opposition,⁵ the agencies’ March 2016 report⁶ strongly recommended against fish farming in the open waters of the Great Lakes “at this time,” citing “significant risks to fishery management and other types of recreation and tourism,” objections from Indian tribes, lack of a multimillion-dollar state funding stream to start up and maintain a program promising modest returns, and the absence of legal authority to issue permits.

THE DEBATE CONTINUES TO BREW, though, with the aquaculture industry⁷ pressing for state permission to farm the Great Lakes and a private operator pushing to expand production 20-fold at the Grayling Fish Hatchery. Divided state lawmakers in late 2015 and early 2016 introduced bills⁸ to facilitate net-pen fish farming in the Great Lakes or, conversely, ban it altogether.

Types of Fish Farming

Aquaculture⁹ involves raising fish, plants, and other aquatic organisms under controlled conditions. The fish farming industry includes private operations that raise fish for human consumption, hatcheries that release fish into the wild, baitfish operations, and growers raising fish for aquariums. The three primary types of fish farms are:

1. **HARD CAGES OR MESH NET-PENS:** Fish are hatched in a land-based facility and then transferred to a hard cage or mesh net-pen structure in a public water body, whether lake or ocean, and fed and fattened until harvest.

2. **STREAM FLOW-THROUGH SYSTEMS:** Fish are raised in man-made “raceways” connected to public streams, which receive some or all of the operation’s waste, excess food, and pharmaceuticals.

3. **CLOSED-LOOP SYSTEMS:** Fish are raised completely isolated from public waters in ponds or tanks on land, both indoors and outdoors. The water is recirculated with pumps and the waste removed.

Public Trust Law Prohibits Great Lakes Fish Farms

The use of public waters and bottomlands of the Great Lakes, or tributary navigable waters, for the occupancy and operation of concentrated fish production raises substantial legal, environmental, aquatic-resource, and water-use impact issues, including:

1. Exclusion of public access and occupancy of bottomlands for private purposes, impairing the rights of boating, fishing, swimming, drinking water, and other forms of paramount public uses protected by public trust law;¹⁰

2. Likely impacts from wastes, including pharmaceuticals, and nutrient loading, and;

3. Escaped fish competing with wild fish for food, spreading disease, and threatening genetic diversity.

In legislative testimony¹¹ and public outreach, FLOW maintains that, by definition, concentrated fish farms occupying navigable waters of the Great Lakes are subject to public trust law and would directly violate Michigan’s public trust obligation to manage and protect these waters for the enjoyment of current and future generations. The public trust doctrine applies to all navigable waters and bottomlands of the Great Lakes up to the ordinary high-water mark, whether by common law or statute, including Michigan’s

Great Lakes Submerged Lands Act.¹² Accordingly, any decision involving enclosed, cage or net-pen concentrated fish-farming operations must be reviewed by the framework, principles, and standards set forth under public trust law.

In the United States, the doctrine also protects public waters and bottomlands, and aquatic and water-related resources and public uses, from conduct or activities *on land* or in the *tributary waters* that degrade the quality of navigable public trust waters.



The Great Lakes contain 20 percent of the world’s fresh surface water and are the economic and cultural lifeblood of Michigan’s people and businesses. Great Lakes net-pen aquaculture could threaten sport fishing in Michigan and nearly 38,000 jobs and \$4.4 billion a year in economic activity.

Commercial Fish Farming: Economic Boom or Bust?

Proponents of the commercial fish farming industry, including some Michigan lawmakers, believe that allowing net-pen fish farming in the Great Lakes could supersize the state’s \$5 million-a-year aquaculture industry into a billion-dollar enterprise within a decade, citing estimates from a 2014 Michigan Sea Grant strategic plan.¹³

Michigan Sea Grant¹⁴ predicts up to 5,000 acres of the Great Lakes and Michigan landscape would be occupied by aquaculture infrastructure, and a Michigan DNR projection foresees 250 fish-farming facilities in the Great Lakes by 2025.¹⁵ The envisioned payoff could include supplying Detroit, Chicago, Toronto, and other areas with fresh fish, increasing jobs and revenue to Michigan communities, and providing the recreational fishing industry with baitfish.

Many Great Lakes advocates, however, say that vision would jeopardize multibillion-dollar Great Lakes restoration efforts, protected public uses, and the well-documented benefits to the Pure Michigan economy already flowing from the Great Lakes—all for a small number of new jobs. Great Lakes net-pen aquaculture, for example, could threaten sport fishing in Michigan and the nearly 38,000 jobs and \$4.4 billion a year in economic activity¹⁶ it provides, since farmed fish are known to escape their cages, spread disease, and outcompete wild fish.

A study¹⁷ by the MSU Center for Economic Analysis in October 2015 confirmed that the economic return would be modest, finding that the two active proposals to place commercial net-pen fish farms in the Great Lakes near Escanaba and Rogers City would provide no more than 44 Michigan jobs with a total annual income of about \$2.5 million.

In recommending against opening the Great Lakes to net-pen aquaculture, a March 2016 report¹⁸ by the MDNR, MDEQ, and MDARD determined that Michigan lacks a funding stream for the \$3.3 million in startup costs to implement a commercial net-pen aquaculture program to protect the public’s interest in the Great Lakes, and another \$2.3 million needed annually to monitor and maintain the program and to protect the state’s resources.

Ecological Threats

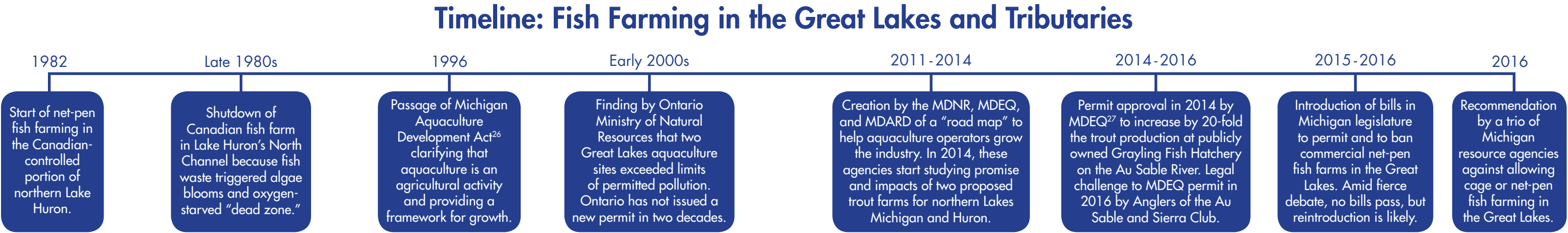
The Great Lakes belong to the public, and these majestic waters define Michigan, power the Pure Michigan economy, and provide a distinct way of life. FLOW and other Great Lakes advocates oppose¹⁹ net-pen aquaculture as it would violate public trust and environmental laws by:

- **DUMPING UNTREATED FISH WASTE DIRECTLY INTO THE GREAT LAKES** that is laden with nitrogen and phosphorous, potentially triggering toxic algae “dead zones” like the one in 2014 that shut down Toledo’s drinking water supply from Lake Erie. A typical 200,000-fish farm, for example, creates as much fecal matter as a city of 65,000 people—about the size of West Bloomfield’s population—and threatens



to make the Great Lakes “a toilet bowl,” according to a state lawmaker.

- **PROVIDING A BREEDING GROUND FOR PARASITES AND DISEASES** such as whirling disease, infectious salmon anemia, and viral hemorrhagic septicemia that can spread and mutate to wild populations, risking the health of the Great Lakes fishery and ecosystem. Disease has devastated fish farms in the United States and across the world, including in Canada, Scotland, Norway, and Chile. Managing disease often involves applying antibiotics and other pharmaceuticals that could persist in the environment and impact other fish, wildlife, and potentially humans.
- **LEADING TO ESCAPES FROM DAMAGED CAGES OR NET-PENS** due to operator error, storms, ice damage, defects in the cages, and other causes. Escaped fish compete with wild fish for food and interfere with their reproduction and genetic diversity. For example, in October 2016,²⁰ a cargo ship accidentally tore apart a fish-farm net off Denmark in the Baltic Sea, setting free the entire trout farm and its 80,000 rainbow trout. The Great Lakes host some of the world’s best fishing for steelhead, a variety of rainbow trout. The net-pen proposals before the state call for raising rainbow trout, and the seemingly inevitable escapes would put the wild steelhead population in danger.
- **INTRODUCING INVASIVE SPECIES INTO THE WILD** if non-native species are raised in the net-pens and some escape. Invasive species have significantly changed the Great Lakes by competing with native species for food and habitat. Invasives foul beaches, harm fisheries, clog water pipes, and lead to regional extinction of species.





Anglers of the Au Sable and the Sierra Club say that the ecological impacts from a proposed 20-fold expansion of trout production at the Grayling Fish Hatchery would threaten the famed, local fly-fishing economy with the loss of more than \$3 million a year in revenue and as many as 52 full-time jobs.

Plan for Grayling Hatchery Expansion Faces Lawsuit

The Anglers of the Au Sable and the Sierra Club in early 2016 filed a legal challenge to a MDEQ permit²⁸ allowing the Grayling Fish Hatchery²⁹ to boost production 20-fold and increase waste discharges into the Au Sable River, one of the Midwest’s most prized blue-ribbon trout streams.


Built in 1914, the Grayling Fish Hatchery once was owned by the state, and was defunct from the late 1960s to the early 1980s. Crawford County now owns the facility and leases it to the Harrietta Hills Trout Farm, LLC.³⁰

The Anglers of the Au Sable and the Sierra Club oppose the state-permitted transformation of a hatchery now raising about 15,000 pounds of trout a year to what would become the state’s largest fish farm, producing 300,000 pounds of fish annually. They contend that phosphorus and fish excrement leaving the flow-through operation would degrade water quality in a sensitive nine-mile section of the Au Sable known as “the Holy Waters” because of its cold, clean water and

exceptional fly fishing. They also raise concerns about the spread of disease, the use of aquaculture drugs in water treatment, and of fish escaping.

The groups claim that ecological impacts from the operation would threaten the local tourism economy that has grown up around the fly-fishing haven with the loss of more than \$3 million a year in revenue and as many as 52 full-time jobs.

The state permit concedes the likely degradation of the Au Sable River, asserting that the “lowering of water quality is necessary to support the identified important social and economic development of the area.” It requires the hatchery to self-monitor phosphorus loading as part of its daily discharge of 8.5 million gallons of fish-rearing water into the Au Sable River.

After an administrative law judge rules on the permit challenge, it will move to the DEQ director for a final decision in late 2016 or early 2017. 

Closed-loop Fish Farming on Land Holds Promise

While several lawmakers, agencies, and organizations oppose opening the Great Lakes to commercial fish farming, many support closed-loop aquaculture systems on land that are completely separated from public-trust rivers, lakes, and streams.

Contained systems on land continually recirculate and filter water in the fish tanks and offer advantages over, and address a number of key concerns regarding, open-water fish farming, including:


- No reliance on public waters;
- Capture and treatment of waste, including excess feed and chemicals;
- Disease prevention;
- Little or no chance of fish escaping into the wild;
- Tight control of the temperature, flow, and water quality to ensure optimum rearing conditions; and
- Less water use than other aquaculture systems.

Advocates contend that these closed-loop fish farm operations can be a sustainable source of nutritious local food and economic development. The trio of Michigan resource agencies—MDEQ, MDNR, and MDARD—overseeing aquaculture have expressed support for assisting the industry in the development of closed-loop, recirculating aquaculture facilities.

According to Michigan Sea Grant, the disadvantages³¹



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of closed-loop systems are high complexity, start-up costs, energy use, and failure rates. Taking up the challenge, the Michigan Office of the Great Lakes, in its 2016 statewide water strategy,³² expressed support only for closed-loop or recirculating aquaculture systems and called for the state and industry to collaborate to establish operational best practices and grow the industry. 

Great Lakes Fish Farming Legislation

Lawmakers in both political parties and chambers of the Michigan legislature have proposed bills³³ to facilitate net-pen fish farming or ban it altogether:

BILLS THAT BAN FISH FARMING

- SENATE BILL 526: Introduced in September 2015, the bill would ban aquaculture in the Great Lakes and flow-through operations in connected waters, including the Au Sable River.
- HOUSE BILL 5255: Introduced in January 2016 to ban net pens in Michigan Great Lakes waters and connecting rivers up to the first dam.

BILLS THAT PROMOTE FISH FARMING

- SENATE BILLS 681-683: Introduced in December 2015 to reform the permitting and application processes and allow net-pens in Michigan’s Great Lakes waters, limited to 10 operations in the first five years.
- HOUSE BILLS 5166-5167: Introduced in December 2015 to allow net-pens in the Great Lakes and consolidate permitting.

TAKE ACTION



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CONTACT YOUR STATE LAWMAKERS. Express your concerns today to your state representative and state senator.³⁴



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¹ Great Lakes Environmental Assessment and Mapping Project (GLEAM) at http://www.greatlakesmapping.org/great_lake_stressors/3/aquaculture

² "Poll finds overwhelming public opposition to Great Lakes fish farming proposals," Michigan Environmental Council press release, Feb 2, 2016, at <http://www.environmentalcouncil.org/newsroom/pressRelease.php?x=144>

³ See "Aquaculture in Michigan Roadmap through Regulation," prepared for the Aquaculture Industry Committee (Administered by the Michigan Department of Agriculture and Rural Development) by Originz, LLC, Summer 2012. http://www.michigan.gov/mdard/0,4610,7-125-48096_48099_48140-345145-,00.html

⁴ "Battle building over fish farming in Great Lakes," Bridge Magazine, September 10, 2015, at <http://bridgemag.com/2015/09/a-push-for-fish-farming-on-the-great-lakes/>

⁵ Commercial Net-pen Aquaculture in the Great Lakes, Public Input and Comment, January 28, 2016. https://www.michigan.gov/documents/dnr/Draft_Public_Input_on_Com_netpen_aquaculture_v_1_14_2015_clean_ts1_511797_7.pdf

⁶ "Synthesis Report Regarding Net-pen Aquaculture in the Great Lakes," March 9, 2016, and five separate reviews of the science, regulations, and economics related to opening Michigan's portion of the Great Lakes to commercial fish farming at https://www.michigan.gov/mdard/0,4610,7-125-48096_48099_71766-368088-,00.html

⁷ Michigan Aquaculture Association at <http://michiganaquaculture.org/>

⁸ Search for Michigan legislation using keyword "aquaculture" at [https://www.legislature.mi.gov/\(S\(fq0z1r5ie-2i1hkrfhq02tzkz\)\)/mileg.aspx?page=Bills](https://www.legislature.mi.gov/(S(fq0z1r5ie-2i1hkrfhq02tzkz))/mileg.aspx?page=Bills)

⁹ National Oceanic and Atmospheric Association Fisheries at http://www.nmfs.noaa.gov/aquaculture/what_is_aquaculture.html

¹⁰ Learn more about the public trust on the FLOW website at <http://flowforwater.org/public-trust-solutions/>

¹¹ See FLOW's testimony in opposition to opening the Great Lakes to commercial fish farming at <http://flowforwater.org/programs/aquaculture-in-the-great-lakes/>

¹² Michigan's Great Lakes Submerged Lands Act at [http://www.legislature.mi.gov/\(S\(fq3q1wo0nn5ppnhlpvdi-wra\)\)/mileg.aspx?page=GetObject&objectname=mc1451-1994-III-1-THE-GREAT-LAKES-325](http://www.legislature.mi.gov/(S(fq3q1wo0nn5ppnhlpvdi-wra))/mileg.aspx?page=GetObject&objectname=mc1451-1994-III-1-THE-GREAT-LAKES-325)

¹³ "A Strategic Plan for a Thriving and Sustainable Aquaculture Industry in Michigan, Final Project Report," October 2014, at <http://www.miseagrant.umich.edu/research/exploring-and-expanding-michigans-aquaculture-in-industry-integrated-assessment/>

¹⁴ Michigan Sea Grant—a collaborative effort of the University of Michigan and Michigan State University—at <http://www.miseagrant.umich.edu/>

¹⁵ "Great Lakes fish farming debate picks up speed in Michigan legislature," by Garret Ellison, MLive.com, February 2, 2016, at http://www.mlive.com/news/index.ssf/2016/02/michigan_net_pen_aquaculture.html

¹⁶ State of Michigan at http://www.michigan.gov/som/0,4669,7-192-45414_45416-383313-,00.html

¹⁷ "Expected Economic Impact of Cage Trout Aquaculture on Michigan's Great Lakes," Michigan State University Center for Economic Analysis, October 15, 2015, at https://www.michigan.gov/documents/mdard/MSU-Miller_504301_7.pdf

¹⁸ "Synthesis Report Regarding Net-pen Aquaculture in the Great Lakes," March 9, 2016, and five separate reviews of the science, regulations, and economics related to opening Michigan's portion of the Great Lakes to commercial fish farming at https://www.michigan.gov/mdard/0,4610,7-125-48096_48099_71766-368088-,00.html

¹⁹ Commercial Net-pen Aquaculture in the Great Lakes, Public Input and Comment, January 28, 2016. https://www.michigan.gov/documents/dnr/Draft_Public_Input_on_Com_netpen_aquaculture_v_1_14_2015_clean_ts1_511797_7.pdf

²⁰ "Danish anglers urged to catch 80,000 escaped trout," BBC, Oct. 12, 2016, at <http://www.bbc.com/news/world-europe-37629377>

²¹ Coldwater Fisheries at <http://www.coldwaterfisheries.com/home>

²² Grayling Fish Hatchery at <http://www.graylingfishhatchery.com/>

²³ Harrietta Hills trout farm at <http://www.harriettahills.com/>

²⁴ Aquaculture Research Corp. at <http://aquaresearchcorp.com/>

²⁵ Indian Brook Trout Farm at <http://www.indianbrooktroutfarm.com/>

²⁶ Michigan Aquaculture Development Act at [http://www.legislature.mi.gov/\(S\(2ivoh1452nuufz55an-5prb451\)\)/documents/md/pdf/md-Act-199-of-1996.pdf](http://www.legislature.mi.gov/(S(2ivoh1452nuufz55an-5prb451))/documents/md/pdf/md-Act-199-of-1996.pdf)

²⁷ MDEQ permit at http://media.mlive.com/news_impact/other/Harrietta-Grayling%20Fish%20Hatch%20Issued%20NPDES%20Permit.pdf

²⁸ Ibid.

²⁹ Grayling Fish Hatchery at <http://www.graylingfishhatchery.com/>

³⁰ Harrietta Hills Trout Farm at <http://www.harriettahills.com/>

³¹ Michigan Sea Grant at <http://www.miseagrant.umich.edu/explore/fisheries/what-is-aquaculture/>

³² Michigan Department of Environmental Quality at http://www.michigan.gov/deq/0,4561,7-135-3313_3677_76614-,00.html

³³ Search for Michigan legislation using keyword "aquaculture" at [https://www.legislature.mi.gov/\(S\(fq0z1r5ie-2i1hkrfhq02tzkz\)\)/mileg.aspx?page=Bills](https://www.legislature.mi.gov/(S(fq0z1r5ie-2i1hkrfhq02tzkz))/mileg.aspx?page=Bills)

³⁴ Search for your Michigan State Representative at <http://www.house.mi.gov/mhrpublic/>. Search for your Michigan State Senator at <http://www.senate.michigan.gov/fysbyaddress.html>

³⁵ Learn more about the public trust on the FLOW website at <http://flowforwater.org/public-trust-solutions/>



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