

Michigan Aquaculture Expansion:

a growing fish concern



Michigan Trout Unlimited

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Michigan Aquaculture Expansion

- Has been relatively small-scale to date
- Permit issued to expand Grayling Hatchery from about 15,000 lbs/year to 300,000 lbs/year.
- MDARD MOU with Chinese province involving aquaculture
- 2 GL net penning proposals to DEQ from Canadian Companies:
 - 1 in Bay De Noc, 1 in Alpena
 - 3 million lbs/year each
 - Domesticated Rainbow trout
 - DEQ/DARD “reviewing/evaluating” these proposals now.



Types of Aquaculture Systems

- Closed systems. Ponds or tanks, isolated from public waters.
- Flow Through systems. Use public waters as source of water inputs and outputs from the hatcheries.
- Net Penning. Juvenile fish are placed in net pens, and raised to harvest. Complete immersion of system in public waters.
- RISKS INCREASE WITH CONNECTEDNESS TO PUBLIC WATERS.

RISKS OF AQUACULTURE

- Water Temperature & Dissolved Oxygen
- Nutrient Pollution (solid and dissolved wastes)
- Antibiotics & Growth Hormones
- Fish Disease
- Escapement (invasives & domestic gene pollution)
- Impacts to Existing Uses

RISKS OF AQUACULTURE

- Water Temperature & Dissolved Oxygen
 - Pertinent to Flow-Through systems
 - Stream flow diverted from rivers thru the hatcheries can become warmed, and the fish in the hatchery can respire the dissolved oxygen.
 - Discharge of warmer water and/or lower dissolved oxygen levels can affect the suitability of the downstream portion of the river for coldwater fish populations.
 - Require use of aeration & chillers to ensure discharge water is equal to or colder & higher in temp/DO than the intake water.
 - Charge permitting fees appropriate for the collection of quality baseline data for these variables by state.



RISKS OF AQUACULTURE

- Nutrient Pollution (solid and dissolved wastes)
 - Fish Food, eaten and uneaten, becomes both solid nutrient waste and dissolved nutrient waste.
 - **Solids:**
 - currently, operators not required to submit solid waste management plan during permitting, for consideration in permitting. Only have to submit it after permit is issued. This needs to be corrected.
 - Good Food conversion efficiency ratio, 2:1 food to finished product. This means that approximately, every pound of fish raised will result in a pound of waste. This would be ~3 million pounds of waste under each net pen annually, and ~300,000 lbs of waste at the Grayling Hatchery on the Au Sable.
 - Will these be collected? How? Create anoxic areas of public waters? Create noxious algal blooms? Promote microcystis algal blooms and toxins rendering water unsafe to the public?



RISKS OF AQUACULTURE

- Nutrient Pollution (solid and dissolved wastes)
 - **Dissolved:**
 - Nutrients also dissolved in water discharge. Phosphorus limited in natural waters, additions lead to significant changes in aquatic ecology.
 - MSU research (J.Stevenson) shows significant shifts occur with relative small increases in dissolved phosphorus. Different species establish, and can drive out pollution intolerant species (algae, insects, and fish).
 - NPDES permit required, but no set standards for how much nutrient pollution is permitted. DEQ permits nutrient pollution, question is how much – not clearly defined for permitting. Needs to be fixed.
 - Should require operators to pay for adequate water treatment systems to not discharge nutrients. State Platte R. hatchery required by lawsuit to meet this benchmark, but state not requiring private operators to meet same standard.



RISKS OF AQUACULTURE

- Antibiotics & Growth Hormones
 - Antibiotics used to protect fish from diseases outbreaks. Can be in food, or injected.
 - Wild fish in same public waters will not have benefit of antibiotics for the diseases promoted by the hatchery operations.
 - Use of these can lead to increase resistance in fish diseases in wild, with greater severity of outbreaks and losses to wild fish.
 - Growth Hormones used to increase production and profit.
 - These will be released into public waters, impact wild fisheries, and also pose exposure to humans via contact with the public waters, and through municipal water intakes.

RISKS OF AQUACULTURE

- Fish Disease
 - Diseases brought in with the fish from their sources. Juvenile fish raised are normally bought from somewhere else. These can bring in diseases to Michigan waters. Rigorous diseases testing and certification rules need to be required and monitored. (MI Aquaculture industry has already been complaining about this in press during March 2015).
 - Raising fish in large concentrations, high densities, promotes disease outbreaks. In Flow-throughs and netpens, this will introduce these outbreaks to wild fisheries. Use of anti-biotics can lead to more resistant and severe disease outbreaks for wild fish.



RISKS OF AQUACULTURE

- Escapement (invasives & domestic gene pollution)
 - Fish escape from hatcheries. Closed systems are best, but still prone to birds transferring, or flood waters. (Ontario net pen estimate 100,000 – 200,000 rainbows escape annually).
 - Need to ban the production of any non-native species, including an native species claiming to be “triploid” or “infertile”. We have grass carp and asian carp thanks to aquaculture operators.
 - Species like rainbow trout, used in aquaculture, are from incredibly domesticated stocks, manipulated for success in hatcheries – not the wild. They escape, and create genetic dilution/pollution of wild fish populations – like our steelhead.

RISKS OF AQUACULTURE

- Impacts to Existing Uses
 - Public trust uses of public waters and natural resources will be impacted and put in jeopardy.
 - Swimming and boating
 - Fishing and fisheries
 - Tribal fishing rights
 - Riparain property owner rights and values, local tax base
 - GL shipping
 - Municipal water intakes
 - This will put a lot of existing uses and economic benefits in jeopardy for a small number of new possible jobs. This must be balanced, and the risks not put on the public for added profitability of the aquaculture owners.



Permitting Deficiencies

- Current permitting framework is piecemeal and inadequate to properly regulate all of the risks that aquaculture poses to Michigan.
- DEQ plays lead role in using NPDES permit to regulate nutrients and some other water quality variables.
- DARD advocates for this business sector's expansion, inadequately regulating disease prevention and response, escapement, antibiotic use, etc.
- DNR appears to be kept on the periphery of permitting, with no clear authority – but the responsibility to ensure natural resource health and productivity (suffer the consequences of these).
- We need a new framework specifically created for these, in which NPDES can be nested, but not used exclusively.



Policy Needs

- Aquaculture specific permitting framework
- Regulations commensurate with risk and costs of loss from risk (closed systems would have less regulations – incentives for this style of aquaculture).
- Full costs of aquaculture needs to be placed on the owners/operators, and not subsidized by the public via risks to public waters and natural resources.
- DNR needs permitting authority, as these place our natural resources in jeopardy, in sometimes non-fixable ways.

Policy Needs

- Water Temperature and Dissolved Oxygen of discharged water need to be equal to or colder/higher than the diverted input flow water. Require use of aeration and chillers when necessary to ensure no degradation to water temp and DO.
- Need standards and means for baseline water temperature and dissolved oxygen levels to be gathered, for flow-through systems.
- Need to require solid waste management plan as part of permit, and as condition of permit, with set requirements for the management of solid waste. Require all solids to be collected effectively (with documented % effectiveness) and disposed of off site.
- Need to clearly define standards and limits for dissolved nutrient discharges, set below levels of impact (define those clearly via research), and adhere to them. Use State's Platte R. Hatchery water treatment as a standard for private operators.
- Need to restrict the use of growth hormones in aquaculture to closed systems only.



Policy Needs

- Need to restrict the use of antibiotics in aquaculture to closed systems, until clear standards and protocols are developed for flow-through and netpen systems, that address impacts to wild fisheries and human health.
- Need to develop and require a rigorous set of disease testing and certification protocols for fish brought into michigan for production here. The requirements here should be commensurate with the risk of losses from diseases outbreaks. Closed systems would have the most streamlined requirements.
- Need to establish legislation banning production of any species not currently found in Michigan, or that are here but known to be invasive and undesirable.
- Need to require escapement prevention plans as condition of permit, and require ongoing monitoring to evaluate. Could require finclipping, or genetic testing to help detect. Develop standards, and require them as condition of permit, and effectiveness as grounds for permit nullification.



Policy Needs

- Need to develop careful sighting rules for the placement of net pens on great lakes waters. Need to consider property rights, tourism, and citizens public trust use rights in sighting. This will be just like land use planning for municipalities.
- Need to require bonding of these operations, so they are not allowed to create immense or irreparable harm to Michigan's waters and assets, then fold up and leave its citizens to pay for the costs. This is a high risk for low economic return scenario for Michigan. These risks need to be explicitly managed (prevention and response).