• Growing demand for seafood.
  – Health benefits.
  – Still expensive, secondary food choice.
• Tremendous growth potential to supply high quality, healthy and fresh seafood that is produced using environmentally sustainable methods.
• National policy to support aquaculture.
• So U.S. aquaculture is growing, right?

2005 Census of Aquaculture: Segments of U.S. aquaculture

- Catfish
- Trout
- Other foodfish
- Mollusks
- Crustaceans
- Other fish
- Sport or game
- Ornamental fish
- Baitfish
- Other

$0 $100 $200 $300 $400 $500
million $ (U.S.)
"Stagnation in EU production of farmed fish over the last decade has been the result of years of inertia, difficulties with competing and confusing EU legislation…"
"…and a lack of respect for the needs and ability of small companies to absorb the costs and impacts of multi layered bureaucracy and red tape."

- Census of Aquaculture (2005)
- 44% of farms sell less than $25,000/year
- 69% of farms sell less than $750,000/year
- 90% of farms sell less than $500,000/year
  - Small Business Administration definition for a small aquaculture business ≤ $0.75 million
• In FY 2011, estimated that the public spent 9.14 billion hours responding to Federal information collections.
• U.S. population is 314 million.
• 29 hours per man, woman, child, infant.
Federal government regulations cost an estimated $1.75 trillion, equal to 14% of U.S. national income.

Small businesses face an annual regulatory cost of $10,585 per employee, 36% higher than for large firms.

Each agency must propose or adopt a regulation only upon reasoned determination that its benefits justify the costs...

“Regulations shall be adopted through a process that involves public participation.”
Aquaculture in Michigan Roadmap through Regulation

Taking Aquaculture in Michigan (AIM) to the future: a "Roadmap" for the aquaculture sector to understand the underlying regulatory framework for operation expansion and new farm enterprise development.

Prepared for the Aquaculture Industry Committee by: Origniz, LLC
Project Co-Principal: Joan Carney of Great Lakes
Summer 2013

Wisconsin Walleye Initiative
Regulatory Review & Recommendations Study
November 15, 2013

A report to the Wisconsin Legislature as required by 2013 Wisconsin Act 20

Wisconsin regulatory agencies (DNR and DIFC) have been and will continue to work with the aquaculture industry on legislation and agency rule procedures to reduce barriers to private firm formation within Wisconsin. These changes will support the growth of aquaculture in general, which will enable the private fish farm to play a significant role in supplying greater numbers of large-holding walleye to the future.
Benefits of Regulations

- Some degree of government oversight is necessary: rule of law, political & economic stability, environment, safety, etc.
- Regulations typically increase costs.
- Major federal rules – costs & benefits are evaluated. Some benefits hard to quantify, social costs of carbon.

Impact of Regulations on U.S. Aquaculture

- Global economy – costs of doing business in U.S. are higher due to regulations that do not apply to overseas competitors.
  - Food Safety, Environmental Sustainability

  ![Aquaculture Economics & Management](image)

- Encourage research on effects of regulations on U.S. aquaculture: $, jobs.

Effect of Regulatory Burden on Costs

To lower production costs, yields must go up.

- Higher yields require higher stocking & feeding.
- Higher feeding rates increase waste production.

Waste Treatment Costs go up.

- Requires
  - Greater electric costs.
  - More water quality monitoring.
  - More plankton control costs.
Effect of Regulatory Burden on Costs

- Increased Record-keeping
  - More accounting & legal fees.
  - More office supplies.
  - More insurance, worker's compensation.
  - Bird control costs.
  - Monitoring effluents.

- Requires additional manager-level personnel

European Paradox:
Europe sets higher standards for its producers than it requires for its markets. We produce at one standard but we consume at another.

(European Parliament Hearing, Committee on Fisheries, March 2008)

Basa/tra/swai are priced much lower in U.S. markets than are domestic fish.

Vietnamese farmers obtain very high yields, that result in lower costs.
Major reason for the high yields is the amount of water exchanged from the Mekong River.


**Antibiotics (n = 36)**

- Gentamycin
- Kanamycin
- Neomycin
- Streptomycin
- Aminoglycosides
- Ampicillin
- Penicillin
- Erythromycin
- Furanadone
- Furaloidone
- Nitrofurantoin
- Nitrofurazone
- Ofloxacin
- Enrofloxacin
- Flumequine
- Norfloxacin
- Ofloxacin
- Chloramphenicol
- Ciprofloxacin
- Enrofloxacin
- Oxytetracycline
- Chloramphenicol
- Colistin
- Florenicol
- Metronidazole
- Risperidon
- Trimethoprim

**Pesticides (n = 29)**

- Acriflavine
- Copper sulfate
- Formin acetate
- Methylresorcinol
- Methylene blue
- Nystatin
- Trifluralin
- 2,4-D
- Dazaxone
- Deltamethrin
- Chlordane
- Diazinon
- Dichlorvos
- Dibenzofuran
- Malathion
- Malathion
- Monocrotophos
- Paraquat
- Simazine
- Carbaryl
- Parathion
- Lindane
- Cyanophos-methyl
- Chlorpyrifos
- DDT
- Dieldrin
- Endosulfan
- Endosulfan
- Oxyzimidazole
- Saponin (seed cake)
“FDA’s testing is so limited, they often do no tests for drugs that are illegal to use in US in aquaculture, but are permitted in Vietnam or China....”

- FDA currently inspects less than 2% of imported seafood.
- Transfers catfish inspection from FDA to USDA.
“Imported meat, poultry, and egg products must meet all safety standards applicable to similar products produced in the United States”

And now, catfish …

Impact of Regulations

• Cumulative burden – multiple agencies.
• Barrier to new farms: requires time, makes financing more difficult.
• Barrier to expansion; may keep farms small, unable to obtain economies of scale.
• Need for streamlining the regulatory process (e.g., Norway).
• Seek global parity in food safety and environmental sustainability.

Some Regulatory Issues

• Lacey Act
• Wildlife Diseases & USFWS
• Aquatic Invasive Species & Fish Transportation
• National Aquatic Animal Health Plan
• Critical Habitat for Endangered Species and Additional Listings
• Numeric Nutrient Criteria
**The Lacey Act**

- **1900**, amended several times.
- Applies to all wild animals (including fish), even if “bred, hatched or born in captivity”.
- Can be triggered by violation of federal law or regulation, or when a state or federal law or regulation is violated during interstate commerce.

**Example** - A load of live fish going from Wisconsin to Minnesota accidentally contains a fish that is legal in Wisconsin but prohibited in Minnesota. 
- State law, max. 90 days and/or $1,000 fine.
- However, if the Lacey Act is invoked - up to a year in federal prison and up to $100,000 fine.
- If a false labeling charge is added (for not declaring the fish in the list of shipment contents) - additional up to 5 years and/or $250,000.

**U.S. Fish and Wildlife Service**

- Seeking authority to expedite injurious species listing under the Lacey Act.
- Categorical exclusion from having to consider the environmental impacts.
- Would also exempt the Service from having to consider economic impacts (e.g., for species in trade or being raised commercially).
Listed by Congress, not USFWS, because of economic value.
Economic impact of $135 million.

Proposed legislation would give Interior (USFWS) control over interstate fish disease regulations.
SEC. 10. PREVENTION OF WILDLIFE PATHOGENS AND PARASITES.
"IN GENERAL.—The Secretary* shall have the primary authority to prevent, and the primary responsibility for preventing, the importation of, and interstate commerce in, wildlife pathogens and harmful parasites...."
*Secretary of the Interior

• Devastating global fungal disease of amphibians.
• Potential means of movement include moist soil, bird feathers, waterfowl feet, crayfish.

Waterfowl: Potential Environmental Reservoirs of the Chytrid Fungus *Batrachochytrium dendrobatidis*

As Gomez, *Pascal Van Ranst*, Frank Keesing, Tom Holmes, Wil Van Den Besselaar, Frederick Hendrix, *As Martel*
• Would represent new authority assumed by USFWS to regulate diseases using the Lacey Act (back-door approach, by regulating animals that carry diseases).
• Would require testing of amphibians; any in interstate trade would need to be certified as Bd-free (2-year history required!).
• An uncertified accidental tadpole in a load of fish crossing a state line would violate the Lacey Act…

Aquaculture Risk Reduction Act

• To amend the Lacey Act to exempt animals accidently included in shipments of aquatic species produced in commercial aquaculture.

UNITED STATES ASSOCIATION OF REPTILE KEEPERS, INC Lawsuit

“Currently this provision of law, among other things, bars import, export, transportation, sale, and receipt of fish, wildlife, and plants acquired, transported, or sold in violation of United States law, treaty or regulation, tribal law, or the laws of any state or foreign nation. 16 U.S.C. § 3372(a)(1), (2). Importantly, however, the Lacey Act no longer prohibits interstate shipments, sales, or export of wildlife determined by the Secretary to be “injurious” under the Act’s Title 18 provisions.”
Aquatic Invasive Species & Fish Transportation

• eDNA – DNA that can be extracted from environmental samples (soil, water, air).
• Within cells or dissolved.
• Complex mixture of DNA from many different organisms, may be degraded.

Concerns with proposed use of eDNA for regulatory purposes

• Validity of tests unknown.
• Quality of labs unknown.
• Sources of DNA other than live fish.
• Unknown how long eDNA can persist.

ECAL Report February 2013
Fisheries Gear

• Vessel hulls have considerable amounts of adhering DNA, which can persist for days and is not removed by overland transport.
  – Adhering DNA also does not appear to be completely or quickly washed off of boats moving through the water.
• Nets appear to be sources of very large amounts of eDNA but require confirmation...
Invasive Species Advisory Committee (ISAC)

ISAC is a group of non-federal experts and stakeholders mandated to provide advice to the National Invasive Species Council (NISC) on invasive species-related issues.

Advisory Committee Recommendations:

2. Independent performance testing of laboratories.
3. Develop validation & accreditation programs for eDNA methods and labs.

NAAHP

- National Aquatic Animal Health Plan.
- Currently, state fish health regulations vary widely. A national plan would encourage states to adopt more uniform requirements and regulations.
- Will likely increase costs for testing, implementing quality control documentation.
Critical Habitat for Endangered Species

- Designate as critical habitat for the Neosho mucket:
  - 484 river miles in Arkansas, Kansas, Missouri, and Oklahoma.

- Designate as critical habitat for the rabbitsfoot:
  - 1,655 river miles in Alabama, Arkansas, Kentucky, Illinois, Indiana, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, and Tennessee.

Endangered Species Act Protection - Proposed Rule

- Requires USFWS to make decisions on listing over 700 species as endangered by 2018.

CBD/WEG-USFWS Settlement

- Center for Biological Diversity and Wild Earth Guardians sued U.S. Fish and Wildlife Service.
- Will need to consider critical habitat for each new species listed.
Are Cattle Egrets Really Endangered?

• “Endangered” in Ohio!
• Native of Africa, first appeared in U.S. in 1953.
• Globally abundant and widespread species.

Numeric Nutrient Criteria

• Under Clean Water Act, states are responsible for establishing water quality standards.
• Set limits for nitrogen and phosphorus concentrations in surface waters to prevent eutrophication.
• Complex process given variability among water resources.

States can set own numeric criteria

Nutrient Reduction Strategy Framework for Ohio Waters

<table>
<thead>
<tr>
<th>Aquatic Life Use and Eutrophication Score</th>
<th>TP (mg/L)</th>
<th>DIN (mg/L)</th>
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</thead>
<tbody>
<tr>
<td>Exceptional warmwater habitat</td>
<td>60</td>
<td>3,000</td>
</tr>
<tr>
<td>Warmwater habitat and GHI score &gt; 54</td>
<td>160</td>
<td>3,000</td>
</tr>
<tr>
<td>All other aquatic life uses and GHI score</td>
<td>300</td>
<td>1,000</td>
</tr>
</tbody>
</table>
• Send in comments on proposed rules, stating how they will affect your farm
  – Opportunity for public comment.
  – But burden of considering impacts of proposed rules is on you, not the government.
• Be an active member of farmer associations.

Examples:
• National Aquaculture Association
• U.S. Trout Farmers Association
• American Farm Bureau
• Work with:
  – National Association of State Aquaculture Coordinators