Risk Mitigation Strategies for the Bait Industry: AIS-HACCP and the Verification Program

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INVASION OF THE FLYING FISH

HELLO GIANT SALVINIA. GOODBYE FISHING HOLE.

Once giant salvinia invades, it chokes lakes and ruins fishing, boating and water recreation. When introduced, it can double in size every seven days and completely cover the lake.

Giant salvinia travels to different Texas lakes attached to boats and trailers. It can survive for days out of water, so clean even the smallest pieces off your boat, trailer and gear.

Because if giant salvinia is allowed to take over Texas lakes, it won’t be our Texas anymore.

Learn to identify and report harmful invasive species. www.texasinvasives.org
Minnesota has 10,000 lakes

The official number of lakes in Minnesota: 11,842

Wisconsin?
15,074

Michigan?
10,759 natural lakes over 5 acres
Invasive species cost the United States more than $120 billion in damages every year.
However, according to the Office of Technology Assessment (OTA, 1993), reported costs were estimated at $1.1 billion/year

($97 billion averaged over 85 years 79 species)

Actual Range of damage caused by AIS in US: $1.1 - $100 billion
To date there have been no AIS established in the Great Lakes as a result of commercial aquaculture
The spread of invasive species is inevitable
Zebra and Quagga Mussel Sightings Distribution
Dreissena polymorpha and D. rostriformis bugensis

Map produced by the U.S. Geological Survey, Nonindigenous Aquatic Species Database, July 8, 2016.
Aquatic Invaders in the Marketplace

Many of the aquatic plants and animals that are bought, sold and traded in the U.S. are invasive—if introduced into new waterways, they can outnumber the native species wreaking havoc on ecosystems and economies.
Aquatic farming—raising aquatic plants and animals for harvest—is a rapidly growing global industry. The 'farms' range from large aquaculture facilities to small home aquaponic tanks to waterways stocked by individuals for private consumption. And the species are just as diverse. In the U.S. alone, more than 100 different aquatic plants and animals are raised on aquaculture farms. This diversity, coupled with a lack of federal regulation, makos aquatic farming a common pathway for aquatic invaders. Unauthorized introductions and accidental escapes have helped plants, fish, mollusks, viruses, parasites and other pests spread to new habitats.

**Case in point: Snakeheads**

Several species of **snakeheads** (*Channaidae*) native to Africa and Asia have spread to the U.S. over the years, in part from efforts to turn them into a local food source. These air-breathing fish have no predators in U.S. waters and can live on land for several days as long as they remain wet. These characteristics allow them to outcompete native fish for food and make it easier for them to invade nearby waterways. Because the snakehead family is federally listed as an injurious species, it is illegal to carry any of its 20 species across state or federal boundaries.

**Case in point: Asian clam**

**Asian clam** (*Corbicula fluminea*) was brought to the U.S. in 1938, likely by immigrants interested in establishing it as a food item. In addition to competing with native species, Asian clams clog water intake equipment, creating problems for agricultural irrigation, drinking water suppliers and power plants that use water for cooling. Some estimates suggest that this species costs the country billions of dollars in economic damages each year.
Industry has a seat at the table when it comes to setting policy on AIS issues
Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
Executive Order 13112 (1999)
Interagency National Invasive Species Council

NISC Co-Chairs
- Secretary of Agriculture
- Secretary of Commerce
- Secretary of Interior

NISC Members
- Secretary of Defense
- Secretary of Health and Human Services
- Secretary of Homeland Security
- Secretary of State
- Admin. of National Aeronautics and Space Administration
- Admin. of U.S. Agency for International Development
- Admin. Of U.S. Environmental Protection Agency
- Admin. Of U.S. Agency for International Development
- Admin. Of U.S. Agency for International Development
- Admin. Of U.S. Agency for International Development

NISC Staff
- Executive Director
- Assistant Director Domestic
- Assistant Director International
- Program Staff & Other staff
- Non-federal Invasive Species Advisory Committee (ISAC)

Each NISC Member has a Policy Liaison

USDA Policy Liaison
DOC Policy Liaison
DOI Policy Liaison
Aquaculture and baitfish industry sectors are taking steps towards AIS prevention

- OR -

Aquaculture and baitfish industry sectors are taking steps towards AIS regulatory impacts
Trends in Commercial Aquaculture and Baitfish Sectors

• Seeking recognition for AIS prevention
  – Best Management Practices
  – Biosecurity Plans
  – Certifications
  – AIS HACCP
Hazard Analysis and Critical Control Point

Based on the principles of Seafood HACCP (National Seafood HACCP Alliance 1997) to ensure safe processing and importing of fish and fishery products.
• Objectives:

1) identify and concentrate on critical process control points to ensure environmental safety

2) minimize risks associated with aquaculture and baitfish activities

3) stress communication between regulators and industry
Critical Control Point

• A step at which control can be applied and is essential to prevent or eliminate the hazard or reduce it to an acceptable level.
• 2001: developed for commercial aquaculture and baitfish sectors

• Adopted by USFWS who developed a version AIS-HACCP training for their use

• 2009: AIS HACCP became an international standard ASTM E2590

• According to USFWS website over 181 AIS HACCP plans developed across 30 states
More Industry Involvement?

• Building partnerships to combat AIS and increase safe seafood supply
• Increase and improve surveillance, compliance and reporting
• Help to make laws effective and fair
• Reduce complexity and redundancy
• Protect US commerce and create more jobs
Adding Verification to AIS HACCP?

State of Michigan Comprehensive Aquatic Invasive Species State Management Plan 2015-2016 (GLRI)

“Towards AIS Free Certification in Aquaculture and Baitfish Industries”
Michigan State University (Weeks), Michigan Sea Grant (Kinnunen), University of Minnesota (Phelps)

1) Review Task Force Group
2) AIS Management in GL Aquaculture and Baitfish Report
3) Feasibility Study
4) Risk Assessment
5) Case Study
6) Stakeholder Input
Feasibility Study - Model Programs

• AIS HACCP
• Arkansas Certified Bait
• Michigan Agriculture Environmental Assurance Program (MAEAP)
## Cost estimates per facility for AIS HACCP verification

<table>
<thead>
<tr>
<th>Item</th>
<th>Low</th>
<th>Median</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training instruction</td>
<td>280</td>
<td>495</td>
<td>710</td>
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<tr>
<td>Training materials</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Plan development support</td>
<td>240</td>
<td>660</td>
<td>1,080</td>
</tr>
<tr>
<td>Site inspection</td>
<td>480</td>
<td>580</td>
<td>680</td>
</tr>
<tr>
<td>Verification process</td>
<td>1,350</td>
<td>1,575</td>
<td>1,800</td>
</tr>
<tr>
<td>Estimated total cost per facility</td>
<td>$2,360</td>
<td>$3,330</td>
<td>$4,300</td>
</tr>
<tr>
<td>Estimated re-verification cost per facility</td>
<td>$450</td>
<td>$525</td>
<td>$600</td>
</tr>
</tbody>
</table>
Verification Body

• Representation:
  − 1 state natural resources or environmental quality department
  − 1 state agriculture department
  − 1 university or Sea Grant Extension
Training

• Online module

• Hands on
  – Biosecurity for aquaculture facilities
  – AIS HACCP
  – AIS regulations (binder)
  – AIS identification (region specific)
  – Verification requirements
  – AIS HACCP plan review and record keeping
Training – Regulations (MI)

• Fish Disease Control FO 245.16
  – List of allowable species for importation, stocking, or baitfish
  – Seasonal and site specific fish health testing requirements

• NREPA (Act 451 of 1994) Subpart IV minnows
  – List of minnows and bait species/activities

• NREPA Part 413 Transgenic, non-native organisms
  – Prohibited species list
  – Restricted species list

• NREPA Subpart V Licenses and permits

• Michigan Aquaculture Development Act (1990 of 1996)
  – List of species and activities
Training – AIS Identification

• Interactive
  − Slides and samples
  − Topical issues and concerns

Regulations?
  possession
  Incidental/prohibited/restricted

Seasonal / life cycle characteristics
# RECORD KEEPING FORM

<table>
<thead>
<tr>
<th>Lot ID #</th>
<th>Location</th>
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<table>
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<tr>
<th>CCP</th>
<th>Procedure Flow Step</th>
<th>Pass/Fail</th>
<th>Issue (If Fail)</th>
<th>Corrective Action</th>
<th>Initial &amp; Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Observe targeted baitfish for external signs of disease and presence of AIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Observe targeted baitfish in seine/trap for disease and presence of AIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Disinfect gear if baitfish appear diseased</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>If baitfish appear normal – take fish to truck in buckets containing well water</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Transfer fish to quarantine for short term storage (if necessary)</td>
<td></td>
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<tr>
<td>6</td>
<td>Transfer fish to ponds for long term storage (disease test if necessary)</td>
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<tr>
<td>7</td>
<td>Transfer of baitfish from pond to holding facility</td>
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<tr>
<td>8</td>
<td>Truck fish from holding facility to retail outlets in well water</td>
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</tr>
</tbody>
</table>

Reviewed by: ___________________________  Date: ___________________________
## RECORD KEEPING FORM

**Wholesaler**

Lot ID #: ____________________  Location: ____________________

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<tr>
<th>CCP</th>
<th>Procedure Flow Step</th>
<th>Pass/Fail</th>
<th>Issue (if Fail)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Receiving</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
<td>Hold in quarantine (holding facility)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Transfer fish from holding facility to truck &amp; transport to retail outlets in well water</td>
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</tr>
</tbody>
</table>

Reviewed by: ____________________  Date: ____________________
Q6 Could incorporating voluntary 3rd party verification into AIS HACCP help reduce risk of movement or introduction of AIS?

NCR Industry (targeted)

- Yes, adding verification to AIS HACCP could help considerably if...
- No, adding verification to AIS HACCP would likely not help reduce...
- Perhaps, combining AIS HACCP with verification might help reduce AIS...
- Other (please specify)

Answered: 11  Skipped: 0

Great Lakes Panel ANS

- Yes, adding verification to AIS HACCP could help considerably if...
- Perhaps, combining AIS HACCP with verification might help reduce AIS...
- Unknown

Answered: 15  Skipped: 1
NCR Industry (targeted)

Q8 Would you consider participating in a voluntary AIS HACCP verification program for your business?

Answered: 10  Skipped: 1

Willing to pay for initial verification
< $1,000  86%
$2,000-3,000  14%

Willing to pay for re-verification
< $100/yr  86%
$200-300/yr  14%
**Baitfish Harvesters (post workshop)**

Q8 Would you consider participating in a voluntary AIS HACCP verification program for your business?

- **Willing to pay for initial verification**
  - < $1,000: 100%

- **Willing to pay for re-verification**
  - < $100/yr: 50%
  - $100-200/yr: 50%
Conclusions

• The majority of stakeholders polled believe adding verification to AIS HACCP might or could reduce the movement of AIS

• Industry concerns between overburdening regulatory constraints and implementation of a verification program
  • Voluntary vs mandatory
  • Additional costs

• Implementation of such a program would likely have to originate in a single state
  • Legislation
  • Support in effort and funding
Questions or Comments?

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