Interstate Aquatic Invasive Species Prevention, Early Detection, and Response: Aquatic Plant Pathway Risk Assessment

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Risk Assessment Framework

- Adapted from NISC and ANSTF: *Training and Implementation Guide for Pathway Definition, Risk Analysis and Risk Prioritization*
- Qualitative assessment with numerical rankings based on expert judgement, available information and associated uncertainty
- Taxonomic scope
  - Plants and algae that are obligate aquatic (i.e., require standing water for growth) or obligate wetland (per U.S. Army Corps of Engineers National Wetland Plant List designation)
  - **Capable of surviving in the Great Lakes**
- Geographic scope
  - The Great Lakes and the **eight Great Lakes states up to the state boundaries**
  - *Later expanded to include Ontario and Quebec*

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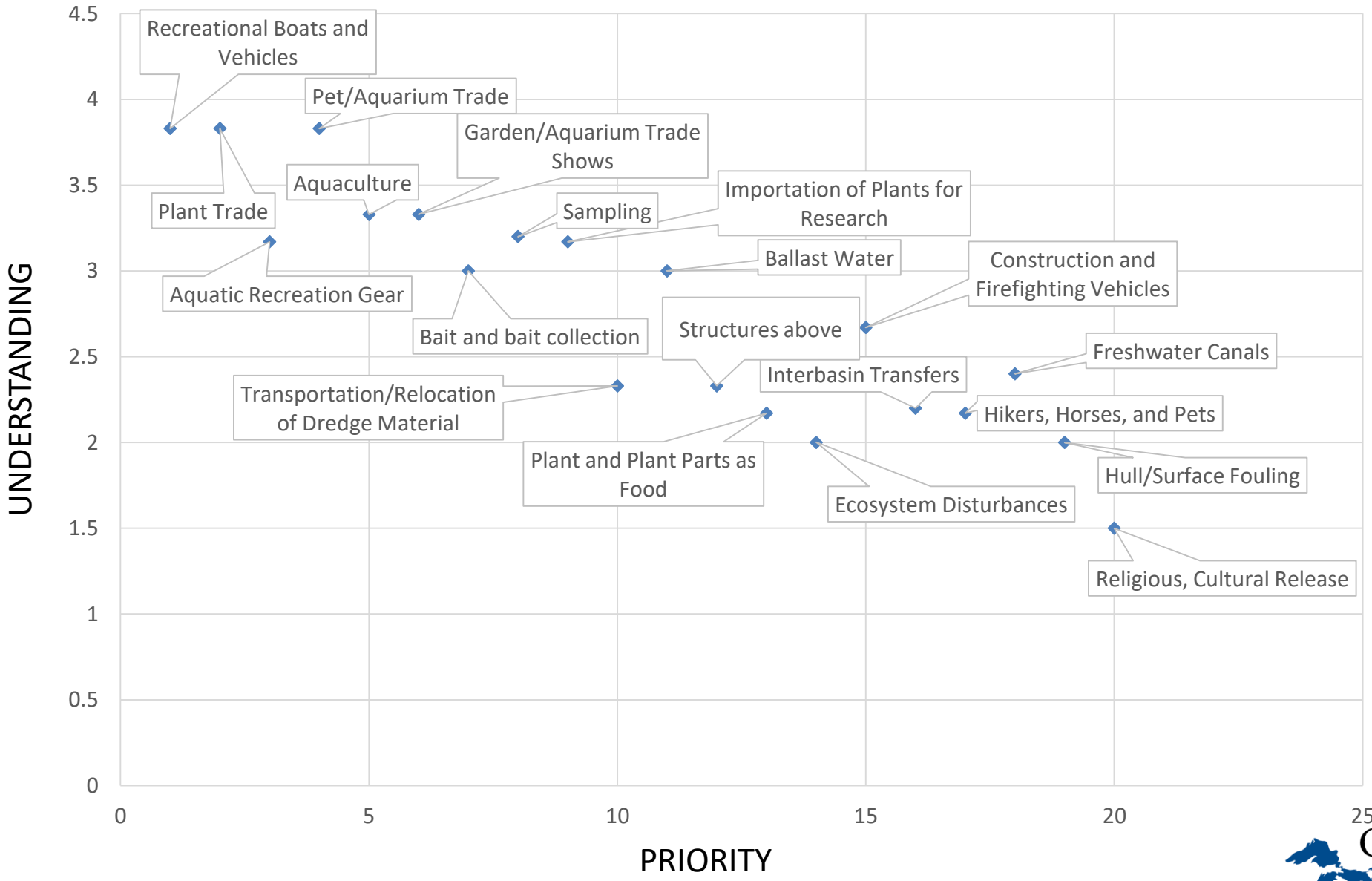
PHASE I: MULTIPLE PATHWAY TRIAGE

PATHWAY PRIORITIZATION VS. LEVEL OF UNDERSTANDING



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Priority Pathways

1. Recreational Boats and Vehicles
2. Pet/Aquarium Trade
3. Aquatic Recreation Gear
4. Fish Hauling, Movement, and Stocking
5. Sampling and Management Equipment
6. Plant Trade
7. Aquaculture of Fish/Aquatic Animals
8. Bait, Bait Collection, and Use

PHASE II: PATHWAY DEFINITION

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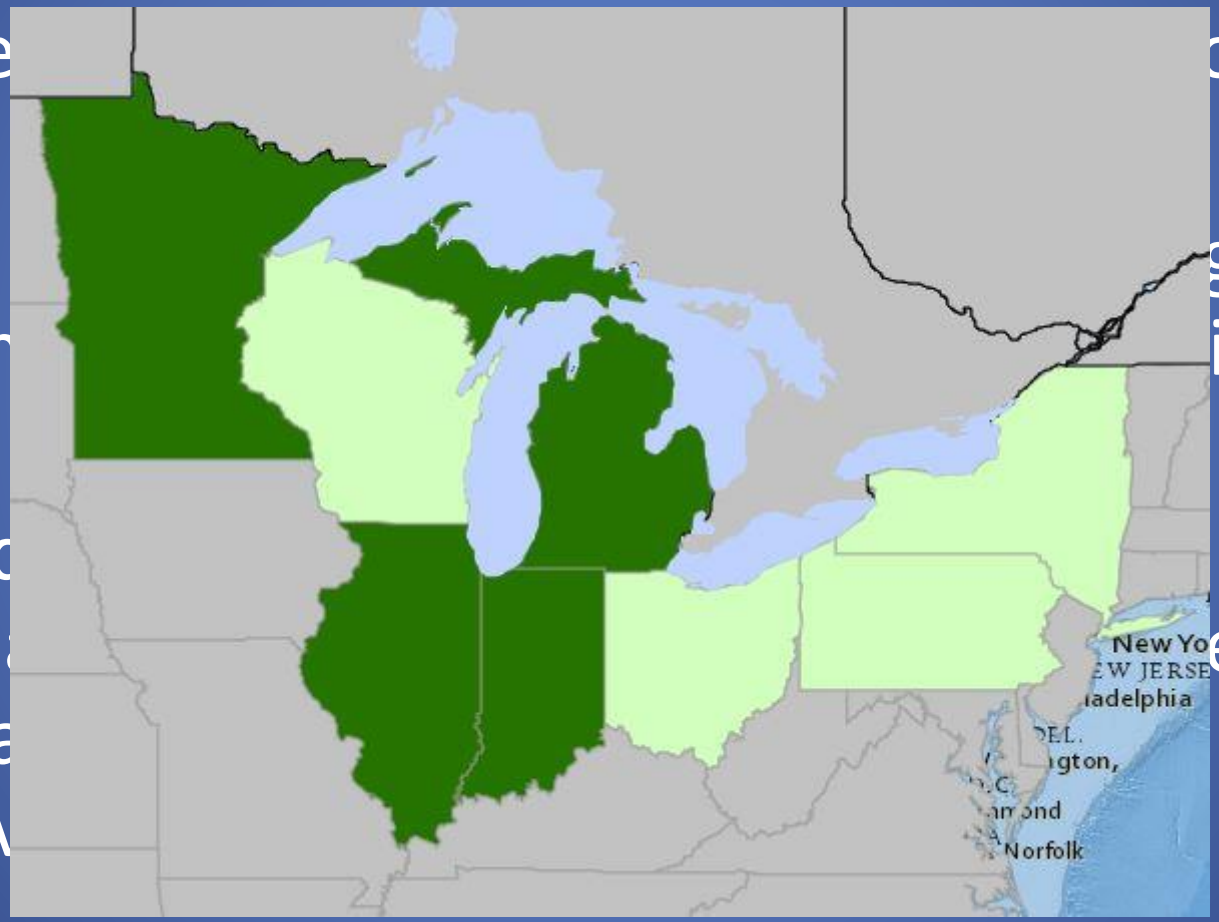
Defining Pathways

- Scope was de… …or each pathway and
- Jurisdictional … …g Phase I and further expan… …ionnaires and emails
- A color-codec… … developed for each of the pa… …e relative level of effort of ea… … non-native/invasiv…



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PHASE III: PATHWAY RISK ANALYSIS

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Four Part Questionnaire

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- Part IV: one question intended to capture the expert's individual overall perception of risk posed by a pathway

Question 1 (Number of species): What is the level of risk of many different non-native/invasive aquatic plant species being moved by this pathway in a single event?

Frame of Reference:
Level 0 – No aquatic plant species can move through this pathway
Level 5 – A variety of species can move through this pathway

Level	Level Descriptor	Level Determination (i.e., 0, 1, 2, 3, 4, or 5) (Assign a whole number):
Level 0	No Risk	**Rationale**
Level 1	Extremely Low Level of Risk	
Level 2	Moderately Low Level of Risk	
Level 3	Medium Level of Risk	
Level 4	Moderately High Level of Risk	
Level 5	Extremely High Level of Risk	

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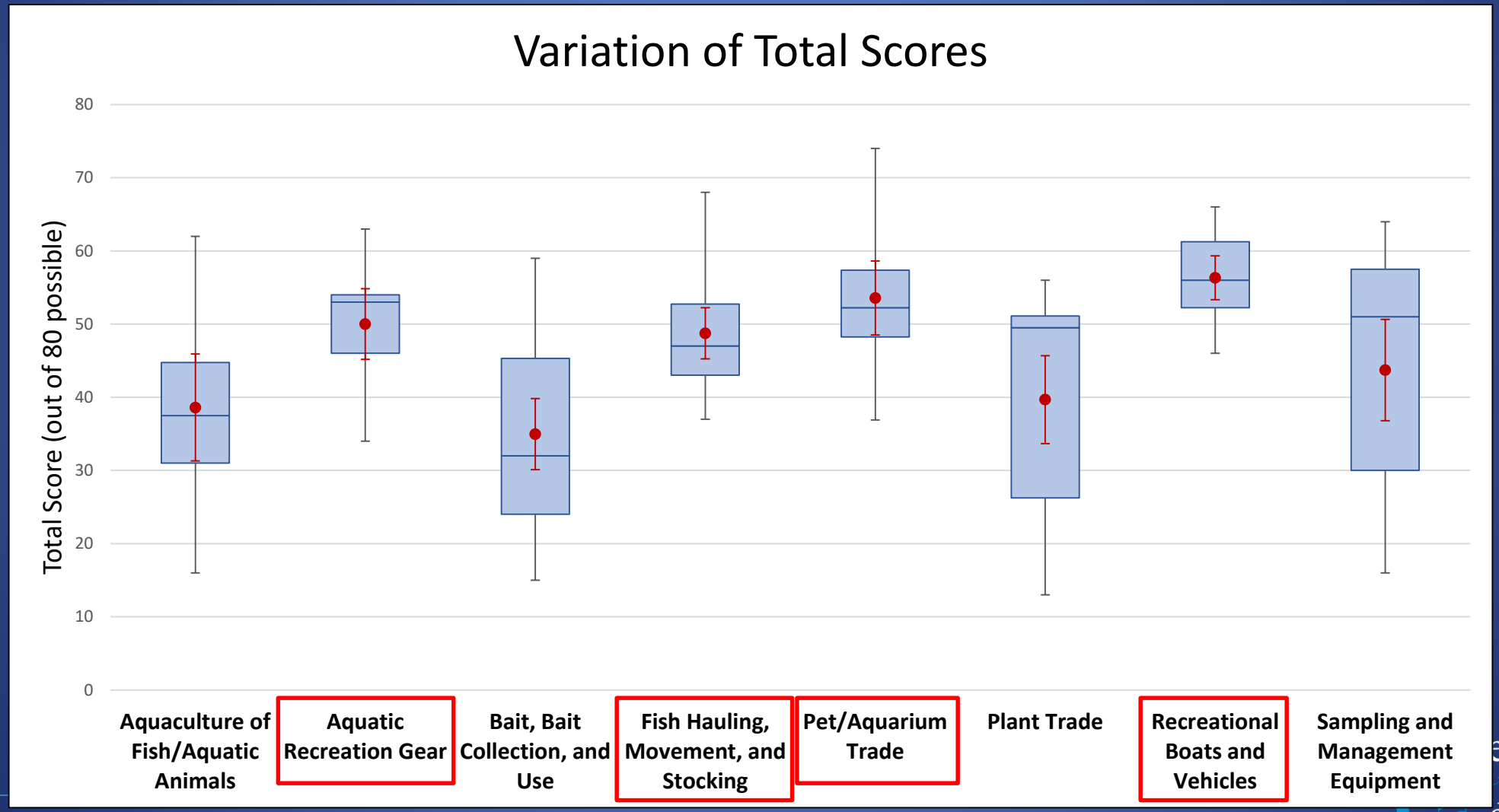
Questionnaire Distribution and Response

- A list of experts for each of the eight priority pathways based on information included in the Phase I pathway triage form and feedback from the project team
- 204 questionnaires were distributed
  - The total number of unique experts contacted was 122
- The overall response rate to the questionnaire was 28%, and the response rates for each pathway were below 40%

RESULTS

- RISK PERCEPTIONS
- SPECIFIC RISKS
- KNOWLEDGE GAPS
- REGULATORY ROAD BLOCKS
- OPPORTUNITIES FOR RISK MITIGATION

Analysis: Variation of Total Scores



Overarching Knowledge Gaps

- What species are moving through which pathways?
- How are specific pathways interconnected?
- Better understanding of plant biology
- Better identification skills in non-botanists

Overarching Themes

- Invasive plant species are difficult to manage because they can be difficult to detect during early invasion
- Enforcing regulations and bringing violations to court are a key component of effective management
- Climate change will shift the AIS of concern, and pathway management should include horizon scanning for species in the pathway that may become viable in the future

Themes and Knowledge Gaps:
1. Recreational Boats and Vehicles

- The species most likely to be moved in this pathway are species that are already present in the Great Lakes region, indicating that the primary concern is secondary spread, rather than new introductions
- A lack of authority to enact and enforce boating regulations (e.g., watercraft inspection stations, draining requirements, etc.) in some jurisdictions results in inconsistent regional policy
- Targeted outreach materials and campaigns can influence changes in boater behavior to take specific mitigation measures to reduce movement of AIS between water bodies

Themes and Knowledge Gaps:
2. Pet/Aquarium Trade

- The rise of e-commerce has made it increasingly easier to purchase a wide variety of aquatic plant species and have them delivered directly to a customer's doorstep, including species that may be prohibited in the customer's jurisdiction but unregulated in the seller's location
- There many novel and undescribed species in this pathway with unknown risks, making it difficult to conduct species risk assessments and ensure that the riskiest species are prohibited from trade
- In states and provinces where the sale, transportation, and/or possession of prohibited aquatic plant species is not banned, the pet and aquarium trade may be largely unregulated

Themes and Knowledge Gaps:
3. Aquatic Recreation Gear

- This pathway is riskiest for aquatic plant species that do not require a high propagule pressure, as gear is unlikely to move a large quantity of fragments or propagules
- Survival rates of aquatic plants on different types of recreation gear and connectivity of water bodies were identified as two areas where more research is necessary in order to fully understand the risk of this pathway
- The extent to which the public decontaminates gear and how well, how usage changes with seasonality, and frequency of use may be largely unknown for the majority of user groups

Themes and Knowledge Gaps:
4. Fish Hauling, Movement, and Stocking

- Managing risk may be difficult if the act of stocking a public waterbody is regulated differently from the act of stocking a private waterbody and a lack of regulatory authority to permit activities in private or artificial water bodies may be difficult and time consuming to address through the legislative process, particularly if a state does not have an overarching policy regarding the transportation of fish
- A lack of extensive knowledge of fish hauling, movement, and stocking as a pathway for aquatic plants is a challenge. Without datasets showing surveillance of the pathway, it is extremely difficult to know what aquatic plants may be moving through the pathway, if any are
- Development of specific best management practices and/or standard operating procedures for industry can be best informed through further research about this pathway

Themes and Knowledge Gaps:
5. Sampling and Management Equipment

- If aquatic plant species are moved in this pathway, it would likely be on a local level (rather than regional or national) and unlikely to introduce species that are not yet present in the Great Lakes region
- • While most jurisdictions employ robust in-house permitting programs, the permits required for individuals or entities outside of government agencies may not provide the same level of protection. Closing the gap between the permits required for agency activities and those required for external personnel activities, as well as the decontamination requirements of those permits, may greatly reduce the potential risk of this pathway
- • Several experts proposed a general survey to assess the level of awareness of the risk of this pathway and the proportion of users who effectively and consistently use mitigation measures across federal, state/provincial, tribal, and academic researchers

Themes and Knowledge Gaps:
6. Plant Trade

- A lack of awareness of trade shows and swap meet events and a missing connection with the hobbyist community was identified by managers as a barrier to effective risk mitigation
- E-commerce can range from large scale plant growing facilities to hobbyists selling a few individuals, making it difficult to ensure that everyone selling and shipping aquatic vegetation is aware of and adheres to each jurisdiction's laws and regulations
- Insufficient funding and staffing may be barriers to expanding management activities relating to inspection and compliance

Themes and Knowledge Gaps:
7. Aquaculture of Fish/Aquatic Animals

- Permitting language that is focused on aquaculture practices may not fully address the direct or indirect risks of introducing invasive species and may restrict the types of enforcement activities that regulating agencies may undertake
- When inspections of aquaculture facilities do occur, ensuring compliance with regulations remains difficult as inspectors may not be able to accurately identify mislabeled or prohibited species, and aquatic plants are frequently not the subject of inspection
- Wild-caught species that are transported to an aquaculture facility are at a higher risk of contamination with unwanted aquatic plants than species that are reared from egg entirely in aquaculture facilities

Themes and Knowledge Gaps:
8. Bait, Bait Collection, and Use

- Studying the movement of non-native aquatic plant species in bodies of water where bait collection occurs but where there are no trailered boat launches may further define the frequency and risk of moving aquatic plants through this pathway
- Studies that specifically target the presence or absence of aquatic vegetation in retail tanks, bait bags, and loads in transit, and identify what (if any) plants are moved through the pathway could inform the development of screenings specifically for aquatic plant matter in this pathway
- Existing compliance monitoring activities could be enhanced to include recording observations of aquatic plant matter during bait-related inspections

Thank You!!!!!

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