Finding and stopping the next invaders

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Aquatic Invasive Species Monitoring Coordinator

Wisconsin Lakes Partnership Convention
Thursday, April 19, 2018
Background

- Citizen scientist
- Staff
- Partners
Background

- GLRI Partnership in 2010 for prevention, education, and monitoring.
5-Year Lake Project

Objective
1. Rate of AIS spread
2. Baseline data
3. Early detection
Early Detection Methods

Any new species found will be counted as a “detect.”

Vegetation – Visual Meander Survey

Each Boat Launch
30 minute snorkel

= sampling site:
10 minute snorkel
veliger tows at 3 of the 5 sites

= deep hole:
3 spiny waterflea tows
Water quality (Secchi depth
DO/Temp Profile, chlorophyll) if needed for suitability models
Early Detection Lakes
2011 - 2015
5-Year Results

- Logistic regression
- No change in the rate of spread (p<0.001)
5-Year Results

- No change for species – all $p<0.001$
Early Detection Methods on Stream

- Target sites (2 min each)
- Visual survey
Stream Pilot Results

- Riparian more frequent with high land use and high recreation
- In-stream no relationship
Early Detection in Wetlands
Early Detection on Roadsides
Count of prohibited species within 15 miles
- 1 - 11
- 12 - 21
- 22 - 36
- 37 - 55
- 56 - 77

Unverified archive records
- Bohemian Knotweed
- Common Reed
- Japanese Knotweed
- Reed Mannagrass

Lakes and AIS Mapping Tool records
- Invasive Invertebrates
  - Asiatlic Clam (Corbicula fluminea)
    - Verified (Asiatlic Clam)
      - Verified Asiatic Clam Points
      - Verified Asiatic Clam Lines
      - Verified Asiatic Clam Areas
  - Observed (Asiatic Clam)
    - Observed Asiatic Clam Points
    - Observed Asiatic Clam Lines
    - Observed Asiatic Clam Areas
  - No Longer Observed (Asiatic Clam)
    - No Longer Observed Asiatic Clam Points
    - No Longer Observed Asiatic Clam Lines
    - No Longer Observed Asiatic Clam Areas
Invasive species rule – NR 40

The invasive species rule (Wis. Adm. Code ch. NR 40) makes it illegal to possess, transport, transfer, or introduce certain invasive species in Wisconsin without a permit. Everyone is responsible to comply with these regulations. What you need to do as an individual, business, or organization may vary depending on your type of work and activities. The regulated species list and the details of the rule are shown in the tabs below.

View the full text of the invasive species rule [exit DNR].

What the rule does

View a quick summary [pdf] of the invasive species rule.

The invasive species rule creates a comprehensive, science-based system with criteria to classify invasive species into two categories: "prohibited" and "restricted." With certain exceptions, the transport, possession, transfer and introduction of Prohibited species is banned. Restricted species are also subject to a ban on transport, transfer and introduction, but possession is allowed, with the exception of fish and crayfish. The department may issue permits for research or public display of any listed invasive species. For species other than invasive fish and crayfish, permits may also be issued for other purposes. The rule also defines the terminology used.
### Aquatic Invasive Species Identification Guide

**SUBMERGED AQUATIC**

<table>
<thead>
<tr>
<th>Species - Code</th>
<th>Scientific Name</th>
<th>Identification</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>European frog-bit - EFB</td>
<td>Hydrocharis morsus-ranae</td>
<td>Leaves are usually heart-shaped with long stalks (3.2-6 cm (0.5-3 in) in diameter), smooth margins, ovaries purple, teeth lamellate, leaving is not visible.</td>
<td>N/A</td>
</tr>
<tr>
<td>Yellow floating heart - YFH</td>
<td>Nymphoides peltata</td>
<td>Leaves floating, heart-shaped with slightly wavy margins, 3-15 cm (1.2-6 in) in diameter, usually arranged near the stem base and occasionally arranged near the top, frequently have purple spots.</td>
<td>N/A</td>
</tr>
<tr>
<td>Brazilian waterweed - BWB</td>
<td>Elodea densa</td>
<td>Leaves long-linear.</td>
<td>N/A</td>
</tr>
<tr>
<td>Water lettuce - WL</td>
<td>Pistia stratiotes</td>
<td>Leaves Free-floating, thick green, leaves rounded, circular or elliptical.</td>
<td>N/A</td>
</tr>
<tr>
<td>Parrot feather - PF</td>
<td>Myriophyllum aquaticum</td>
<td>Leaves: Feathery, emergent leaves are bright blue-green, stiff and 2-5 cm (0.8-2 in) long, arranged in whorls of 4-6 leaves, and divided into 8-10 leaflets per leaf. Water lettuce leaves are often dialect, but they present, they are 3-5 cm (0.5-2 in) long, and are divided into 2-4 leaflets per leaf.</td>
<td>Documented in Pool 3 of the Mississippi River in 2012</td>
</tr>
<tr>
<td>Eurasian watermilfoil - EMW</td>
<td>Myriophyllum verticillatum</td>
<td>Leaves: Heart-shaped leaves with 12 or more leaflets typically arranged in whorls of 4 leaves around the stem, leaves 2-5 mm when pulled out of water, color of leaves is red (0.4-1.2 cm) upon stem.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Emergent AQUATIC**

<table>
<thead>
<tr>
<th>Species - Code</th>
<th>Scientific Name</th>
<th>Identification</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water hyacinth WH</td>
<td>Eichhornia crassipes</td>
<td>Leaves Free-floating, thick green, leaves rounded, circular or elliptical.</td>
<td>N/A</td>
</tr>
<tr>
<td>Water lily - WL</td>
<td>Nymphaea odorata</td>
<td>Leaves: Free-floating, thick green, leaves rounded, circular or elliptical.</td>
<td>N/A</td>
</tr>
<tr>
<td>Floating heart - FH</td>
<td>Victoria amazonica</td>
<td>Leaves: Free-floating, thick green, leaves rounded, circular or elliptical.</td>
<td>N/A</td>
</tr>
<tr>
<td>Water lettuce - WL</td>
<td>Pistia stratiotes</td>
<td>Leaves: Free-floating, thick green, leaves rounded, circular or elliptical.</td>
<td>N/A</td>
</tr>
<tr>
<td>Water hyacinth WH</td>
<td>Eichhornia crassipes</td>
<td>Leaves: Free-floating, thick green, leaves rounded, circular or elliptical.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Suitability Models

- Zebra mussel
- Round goby
- Rusty crayfish
- Eurasian watermifoil
- Starry stonewort
US Fish and Wildlife Service Risk Assessment Mapping Program

Climate Matching
eDNA

- New Zealand mudsnails
- Round goby
- Zebra mussels
- Asiatic clam
Report invasive species

We are working to keep invasive species out of Wisconsin. Early reports of new populations allow us to respond rapidly and control invasives before they spread into new areas. Select from the tabs below to report invasive species you have found.

Aquatic, Shoreline and Wetland  Terrestrial  NR40 species

Aquatic, Shoreline and Wetland

Check to see if the suspected invasive species has been previously reported on that waterbody or wetland. Search by waterbody or by species. Or, for a mapping tool and instructions, click here. If the invasive species is not known to occur in the waterbody or wetland where you found it, report it to your Regional DNR Aquatic Invasive Species Coordinator by following the steps below. Report every suspected wetland invasive species not associated with a waterbody, except reed canary grass (unless the latter is a new, small stand adjacent to an un-infested, natural wetland).

If it’s a new plant or animal other than a fish
If it’s a new fish
If it’s already known to be in the waterbody or wetland

If it is a plant:

- Take a digital photo(s) of the plant in the setting where it was found. Using a camera or smartphone, try to capture details such as flowers, leaf shape, leaf and stem arrangement, and fruits. Include a common object in the photo such as a dollar bill, coin or pencil for a size scale, or stand next to tall plants.
- If possible, collect 5 – 10 intact specimens to ensure precise identification. Try to get the root system and all leaves, as well as seed heads and flowers when present. Place in a ziplock bag with a damp paper towel. Place on ice and store in a refrigerator as soon as possible.
Suspected New AIS Discoveries – Communication Protocol

Internal document

This document is to be used when a suspected aquatic or wetland invasive species (AIS) is discovered in a Wisconsin waterbody (lake, river, or wetland) that it has not been previously reported in. See the Where to Find Invasive Species document or the Report Invasive Species page to determine if the suspected AIS you discovered has been previously reported in the waterbody or location in a riparian site or wetland. Use the following guidance if this is a new discovery.

The Statewide AIS Monitoring Lead generates a biweekly list of new AIS reports from SWIMS and distributes reports to regional field supervisors, regional DNR AIS Coordinators, and groups E, F, and H each month.

- Initial observer:
     a. For occurrences that are part of planned monitoring effort (i.e. CLMN, early detection, DNR field work, etc.): notify the local DNR AIS Coordinator and enter monitoring data into SWIMS. No incident report is needed.
     b. For individuals without access to SWIMS: submit an incident report.
  2. Submit a specimen: Follow the directions on the Report Invasive Species website to submit a specimen to the local DNR AIS Coordinator.

This document may be updated at any time. Make sure to use the most recent version for up-to-date information.
Last edited: 1/25/2018
Regional DNR AIS Coordinator works with taxonomic experts (Group B) to obtain verification, following the Early Detection Monitoring Verification Process and the AIS Status Guidance.

**Verification**

- Native or already listed in SWIMS for that waterbody or location in a riparian site or wetland
  - Native or already listed: Regional DNR AIS Coordinator notifies observer.

- Not NR-40 regulated
  - NR-40 review
    - Not invasive
    - Invasive
      - NR-40 regulated species (Prohibited or Restricted):
        - Regional DNR AIS Coordinator creates ROI, assigns status, and attaches photos and other supporting documents for the occurrence. ‘Verified’ and ‘observed’ statuses are visible on the website within 24 hours.

**Communication**

- Prohibited
  - High-profile finding (e.g., new infestation regionally or in a critical waterbody)
  - Relevant contacts work together to identify members for management team as appropriate.

- Restricted
  - Restricted species established in Wisconsin but new to waterbody
  - Regional DNR AIS Coordinator notifies initial observer and local stakeholders (group D).

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*The regional DNR AIS Coordinator may (with Supervisor approval) appoint another person to act as a regional coordinator or to complete individual tasks. However, it is the responsibility of the Regional DNR AIS Coordinator to ensure that assigned steps in the communication protocol are complete.*

This document may be updated at any time. Make sure to use the most recent version for up-to-date information.

Last edited: 1/25/2018
Early Detection Monitoring Verification Process

Prior to 2017, WDNR collected and submitted specimens to the herbariums and zoological museums for verification and vouchering. The number of samples submitted for verification/vouchering was not sustainable for the herbariums/museums. Likewise, no funding was provided for this extra workload. In addition, most DNR employees can identify common invasive species. Therefore, we will reduce reliance on herbariums and museums for verifying our invasive species records with photographs or physical specimens. Regional employees have been trained and tested to be verifiers. Voucher specimens will be submitted when prohibited, high profile species (i.e. Eurasian water milfoil or zebra mussel populations in the north, or populations requesting a WI Administrative Code NR 107 Aquatic Plant Management permit), or county records are reported. This draft document outlines the verification process that will be used.

1. **Become familiar.** Field staff should become familiar with the target species by reviewing the attached Early Detection Target Species and AIS Identification Guide and the links in the target species summary sheet.

2. **Check.** Collectors should check what records are known in their work area and whether further verification is needed.

3. **Fieldwork.** Staff and volunteers will conduct monitoring and complete lake, streams, wetland early detection forms, Citizen Lake Monitoring Network, Water Action Volunteers, AIS Bridge Snapshot Day, Project RED, or plant and animal incident reports.

4. **Report.** New discoveries will be reported as soon as possible.

5. **Collect.** Collect 3 specimens of all NR40 Prohibited occurrences, high profile species for your area (i.e. Eurasian water milfoil or zebra mussel populations in the north, or populations requesting a WI Administrative Code NR 107 Aquatic Plant Management permit), unusual specimens (i.e. suspected hybrid milfoil, unusual leaf count, unusual size, etc.), first occurrence in a county, or unknown specimens. Be sure that specimens contain all the identifying characteristics that are highlighted in the AIS Identification Guide (i.e. the root system, leaves, flowers, and seeds if a plant or the entire animal). Place aquatic plants in a bag with damp paper towel. Preserve animal specimens by either freezing or refrigerating in water or by using ethanol.

[Continued on next page]
Following Verification

- Spatial and tabular records
- Sample from least to most known AIS

Data & Maps

- Lakes and aquatic invasive species mapping tool
- Lakes and Rivers with Aquatic Invasives
- Sign Installation
- Species Locations
- Watercraft Inspection Data

dnr.wi.gov search “AIS efforts”
Aquatic Invasive Species

Lakes, Rivers, and Wetlands with Aquatic Invasive Species

Aquatic invasive species are not a new phenomenon. They have been observed in Wisconsin for a number of years. The Wisconsin Department of Natural Resources (DNR) has a specific program to monitor and manage these species. This information is provided as a point of reference and is not necessarily exhaustive so it is important to report occurrences. To report new discoveries visit: http://dnr.wi.gov/topic/Invasives/report.html. See the Aquatic Invasive Species Guidance for information on how statuses are assigned. Personally identifiable information on data collection forms may be provided to requesters to the extent required by Wisconsin’s Open Records Law [ss. 19.31-19.39, Wis. Stats.].

To Excel

<table>
<thead>
<tr>
<th>Waterbody Name</th>
<th>Waterbody ID Code (WBIC)</th>
<th>Invasive Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams County (28)</td>
<td></td>
<td>Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Watermilfoil, Purple Loosestrife, Rusty Crayfish, Water Hyacinth</td>
</tr>
<tr>
<td>Arkdale Lake</td>
<td>1374300</td>
<td>Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Watermilfoil, Purple Loosestrife, Rusty Crayfish, Water Hyacinth</td>
</tr>
<tr>
<td>Big Roche A Cri Creek</td>
<td>1374100</td>
<td>Japanese Knotweed, Rusty Crayfish, Water Hyacinth, Zebra Mussel</td>
</tr>
<tr>
<td>Big Roche a Cri</td>
<td>1374800</td>
<td>Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Watermilfoil, Purple Loosestrife, Rusty Crayfish, Water Hyacinth</td>
</tr>
</tbody>
</table>
### Asiatic Clam (Corbicula)

**Select Another Location:**
Select a Statewide location.

**Total Locations:** 22

**Total Lakes:**

- **Verified and Voucher:**
  - **Bohners Lake:** Status: Verified and Voucher, Waterbody ID Code (WBIC): 750800, County: Racine.
  - **Browns Lake:** Status: Verified and Voucher, Waterbody ID Code (WBIC): 750300, County: Racine.
  - **Eagle Spring Lake:** Status: Verified and Voucher, Waterbody ID Code (WBIC): 768600, County: Walworth, Waukesha.
  - **Fox River - CTH E:** Status: Verified and Voucher, Waterbody ID Code (WBIC): 742500, County: Waukesha.
  - **Lake Andrea:** Status: Verified and Voucher, Waterbody ID Code (WBIC): 733850, County: Kenosha.

**Disclaimer:** Aquatic invasive species status is based on AIS Status Guidance. In general, “verified” populations are established and have been verified by a taxonomic expert. Populations with the “observed” status have not been verified by a taxonomic expert or do not have established populations. Populations with the “no longer observed” status include populations where a reproducing population did not establish. Our inventories are not necessarily exhaustive so it is important to report occurrences. To report new discoveries visit: [http://dnr.wi.gov/topic/invasives/report.html](http://dnr.wi.gov/topic/invasives/report.html). See the Aquatic Invasive Species Guidance for information on how statuses are assigned. Personally identifiable information on data collection forms may be provided to requesters to the extent required by Wisconsin’s Open Records Law [ss. 19.31-19.39, Wis. Stats].
THE INVASIVE SPECIES RESPONSE PROCESS OVERVIEW & CHECKLIST

**Early Detection & Reporting** (p. 6)
- Report new populations of suspected invasive species on the DNR website at [http://dnr.wi.gov/topic/Invasives/report.html](http://dnr.wi.gov/topic/Invasives/report.html) or by contacting the Invasive Species Program Specialist at invasive.species@wisconsin.gov.
- Document possible invasives with photographs when possible

**Verification** (p. 7)
- Interview the reporter to validate the detection
- Get verification of identification by a recognized expert, accredited lab, or herbarium
- Voucher a specimen, when appropriate
- Conduct a site visit to verify location and population size
- For Prohibited species, obtain a definitive confirmation of identification via a second expert and/or biological analysis

**Communication** (p. 9)
- Notify appropriate resource managers at the local, regional, state, and national levels
- Notify local stakeholders and consider a local or statewide press release
- Select members for management team and identify a lead coordinator
- Establish an internal communications plan
- Begin planning external communications

**Assessment** (p. 12)
- Delimit the population and determine demographics of population
- Determine appropriate timeline based on level of threat
- Compile a knowledge base – literature reviews and species expert interviews
- Prevent the spread – identify dispersal vectors/pathways and restrict where feasible
- Begin marshalling resources – estimate needs and identify potential sources

**Planning** (p. 14)
- Decide on a reasonable and feasible control action (containment, eradication, partial or temporary suppression, or no action)
- Determine which management actions to undertake for selected control
- Secure permits, if needed

**Implementation** (p. 17)
- Lead coordinator facilitates implementation of response plan
- Continue public outreach efforts
SMALL-SCALE HERBICIDE TREATMENTS FOR CONTROL OF INVASIVE AQUATIC PLANTS

The Wisconsin Department of Natural Resources and U.S. Army Corps of Engineers have been evaluating small-scale herbicide treatments for managing invasive aquatic plants. Monitoring of 2,4-D applications for control of Eurasian watermilfoil (EWM) and endotherm for curly-leaf pondweed (CLP) are ongoing, and preliminary information is already available regarding large-scale applications. This fact sheet summarizes what researchers have learned so far from monitoring herbicide concentrations following small-scale treatments.

Concentration and exposure times of 2,4-D required for effective EWM control have been studied in the laboratory.

2,4-D Concentration/Exposure Time

Granular and liquid formulations dissipate similarly when applied at a small-scale.

Observed [2,4-D] vs. Hours After Treatment
Liquid vs. Granular Small Scale Treatments ≤ 10 Acres

This graph shows the concentrations of granular and liquid 2,4-D detected in the water column after small-scale treatments with application rates of 2-4 ppm.
- Initial concentrations (1-6 HAT) were higher with liquid formulations, however, both formulations dissipated quickly from the treatment area.
- Under most conditions, concentrations of 2,4-D were below detectable limits by 24 HAT.
- Attaining target concentrations and maintaining exposure times required for control is more difficult to achieve in small-scale treatments.
- Dissipation is affected by multiple factors such as treatment size and location, wind, and water flow.

Treatment of many small-scale areas on a lake may result in cumulative lake-wide effects due to rapid dissipation.
Starry Stonewort (*Nitellopsis obtusa*)

Starry stonewort, a submerged annual macroalga, belonging to the order Charales (includes all Chara and Stonewort species), is known to cause nuisance conditions in MI, NY and IN. It can outcompete other vegetation and forms monotypic stands that can reduce fish spawning habitat.

Current control methods have not been shown to have a measurable impact on starry stonewort. Special care should be taken to reduce the spread of starry stonewort within and amongst waterbodies, and to educate the public about presence if it is found.
AQUATIC INVASION PATHWAYS:

PATHWAY: CANALS, DAMS AND DIVERSIONS

PATHWAY: MARITIME COMMERCE

PATHWAY: STATE AND FEDERAL AGENCY ACTIVITIES

PATHWAY: ROADSIDE MAINTENANCE AND TRANSPORTATION CORRIDORS

NEW

PATHWAY: RECREATIONAL ACTIVITIES AND SERVICE PROVIDERS

PATHWAY: NON-RECREATIONAL FISHING AND AQUACULTURE

PATHWAY: ORGANISMS IN TRADE
AQUATIC INVASION PATHWAYS:

- Pathway: Maritime Commerce
- Pathway: Canals, Dams and Diversions
- Pathway: Recreational Activities and Service Providers
- Pathway: Non-Recreational Fishing and Aquaculture
- Pathway: Organisms in Trade
- Pathway: State and Federal Agency Activities
- Pathway: Roadside Maintenance and Transportation Corridors

• Research
• Species?
• Efforts?
• Gaps
• Strategy
• Close

NEW
Background

- Citizen scientist
- Staff
- Partners
LIFE IS EASIER WHEN YOU’VE GOT A POSSE.