

Aquatic Invasive Species Monitoring in Streams: Guidelines for Wisconsin Department of Natural Resources Stream Biologists

State of Wisconsin

Department of Natural Resources

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DRAFT

Table of Contents

Introduction	3
Objectives	3
Monitoring Design	3
General Sampling Procedures.....	3
Equipment.....	3
Sampling Methods	4
Sample Handling and Preservation.....	6
Notification	6
Quality Assurance	6
Data Management.....	7
Programmatic Evaluation.....	7
References	7
Appendix A Target Species Codes.....	8
Appendix B Aquatic Invasive Species Monitoring Data Form (Form 3600-532A)	9

DRAFT

Introduction

Wisconsin Department of Natural Resources stream biologists conduct routine assessments to evaluate stream health during Long-Term Trend Water Quality Monitoring, intensive watershed assessments, and Natural Community Stratified Random Monitoring. During these assessments, biologists can also document aquatic invasive species (AIS) occurrences, especially during the stream habitat assessments of Biotic Index surveys (such as fish or macroinvertebrates).

A team of DNR stream biologists, aquatic invasive species (AIS) specialists, and external partners identified target species (Appendix A) and protocols to be used by stream biologists. Species targeted for monitoring might cause harm to stream health and/or warrant a response. Protocols involve collecting presence/absence data and some estimate of abundance. Regional AIS staff will assist follow-up.

Objectives

Data derived from AIS occurrences are needed to:

- 1) Establish baseline data on the statewide AIS distribution in streams.
- 2) Early detection of pioneer populations to enable early response efforts.
- 3) Identify priority locations for AIS monitoring.

Monitoring Design

General Sampling Procedures

Target species identification, time of year, reporting, specimen collection, and follow-up are included with AIS monitoring. In general:

1. Biologists should become familiar with the target species.
2. Collect AIS monitoring data anytime. Habitat assessments are especially convenient times to collect AIS data.
3. Complete the Aquatic Invasive Species Monitoring Data Form 3600-532Ai (Appendix B).
4. Collect specimens and/or photo of observed species.
5. Notify appropriate DNR AIS contact.
6. AIS contact will provide initial identification of specimen.
7. AIS contact will have data entered into the Surface Water Integrated Monitoring System (SWIMS).
8. AIS contact will submit voucher specimens.
9. Central office staff will verify the record in SWIMS following identification confirmation.
10. Following AIS identification confirmation and vouchering, AIS contact will implement the [communication protocol](#) to initiate follow-up activities, if needed.

Equipment

Equipment is needed for identification, documentation, preservation, and vouchering.

A Field Guide to Wisconsin Streams (Miller et al. 2014) and the laminated handout, Invasive Plants to be on the Lookout for in Wisconsin Streams, are useful identification guides. Each biologist received a copy of A Field Guide to Wisconsin Streams and the laminated handout.

Since SWIMS station ID will be recorded on the datasheet, further location information is not mandatory. However, a geographic positioning system (GPS) unit can be used to record the exact location within the stream where a SWIMS station does not already exist.

Ziploc bags or sample jars are needed for specimen preservation. Labels are used to properly identify the collection site. Cameras can be used for photo documentation.

Ethanol and a plant press are used for vouchering.

Sampling Design

DNR Biologists will attempt to collect presence/absence and abundance information of AIS at all Wadeable Trend Reference Streams, Targeted Watershed streams, and all other routine stream monitoring activities that will allow the adequate collection of AIS presence/absence and abundance data consistent with the general methods below.

In addition, DNR biologists will attempt to collect focused presence/absence and abundance information of AIS at all Stratified Random Natural Community Stream sites. The focused method includes four areas of directed monitoring to focus attention. These include access points and the distinct habitat features of riffle, runs, and pools.

Sample period

May through September

General Sample Methods

The following methods will be used at all sites stream biologists visit with the exception of Random Stratified Natural Community Model sampling Sites. During the course of normal stream monitoring activities, stream biologist will observe if any target AIS species exist along the riparian corridor or within the stream.

1. During Routine Sampling efforts if target species are observed:
 - Collect up to 5 specimens, if possible. Beware of private property and trespassing laws when identifying or collecting riparian species for vouchering.
 - Collect photographs that illustrate species and general area/habitat, if possible.
 - Beware of private property and trespassing laws when identifying, collecting, or photographing riparian species for vouchering.
2. Complete field data sheet (Form 3600-532A) (Appendix B) including:
 - Identify species.
 - Identify site- Was it an access point, target, or incidental
 - Identify Habitat Type
 - Provide geographic coordinates, if possible.
 - Land use – natural, agriculture, or urban.

- Estimate area - 0.001 acre: 1 plant; 0.01 acre: living room; 0.2 acre: baseball diamond without field; 1 acre: football field.
- Estimate density - 1: A few individuals (1-25); 2: Many small, scattered populations (25 – 500); 3: Dense population (> 500).
- Identify if samples were collected.
- Identify if photos were collected.
- If it is not possible to obtain this information, supply as much information as possible in the comments.
- If no species were observed, then the box on the data sheet should be checked. Absence data is needed to address the objectives.

All equipment should be disinfected following the Boat and Gear Disinfection Protocol [Manual Code 9183.1](#).

Focused Sample Methods

The following method will be used at all Stratified Random Natural Community sites. At each of the four target areas (Access Location and at a riffle, run, and pool), examine the banks and stream bed for and sample the areas per the specified guidelines below:

1. 1 minute examining the right bank for riparian invasive plants.
2. 1 minute examining the left bank for riparian invasive plants.
3. 1 minute examining the stream bed for invasive aquatic plants/algae and invertebrates.
4. If target species are observed:
 - Collect up to 5 specimens, if possible. Beware of private property and trespassing laws when identifying or collecting riparian species for vouchering.
 - Collect photographs that illustrate species and general area/habitat, if possible.
 - Beware of private property and trespassing laws when identifying, collecting, or photographing riparian species for vouchering.
5. Complete field data sheet (3600-532Ai) including:
 - Site name - access site (A), 3 target sites (T) and incidental occurrences sites (I).
 - Land use – natural, agriculture, or urban.
 - Geographic coordinates, if possible.
 - Species name, area, and density
 - Estimate area - 0.001 acre: 1 plant 0.01 acre: living room 0.2 acre: baseball diamond without field 1 acre: football field
 - Estimate density - 1: A few individuals (1-25); 2: Many small, scattered populations (25 – 500); 3: Dense population (> 500)
 - Samples collected.
 - Photos collected.
 - No AIS were observed.
 - If it is not possible to obtain this information, supply as much information as possible in the comments.
6. Also record data for incidental AIS occurrences observed between the four target sites.

7. Depending on AIS observed, the total estimated time on each Stratified Random site is 15-20 minutes.

All equipment should be disinfected following the Boat and Gear Decontamination Protocol [Manual Code 9183.1](#).

Sample Handling and Preservation

There are different criteria for handling and preserving plant and animal specimens. In the field, plants should be placed in a Ziploc bag with water. Upon return to the office, the plants can be refrigerated for two weeks. Plants should be pressed following standard vouchersing protocols (see pages 25-28 in Hauxwell et al. 2010). Invertebrates can be placed in a Ziploc bag or sample bottle. Following collection, invertebrates should be preserved in at least four parts 75% ethanol. If needed, the DNR AIS contact can help with voucher preparation.

Specimen labels should include: **species code, waterbody name, SWIMS station ID or WBIC or lat/long, collector's name, and date**. Species code can be found in Appendix A.

Photos should be named **species code_SWIMS station ID or WBIC and lat/long_collector_date** (e.g. CLP_94800 44.64654 -89.146883_12311968). Photos should be attached to the fieldwork event in SWIMS.

The DNR AIS contact will send vouchers to the appropriate taxonomic expert for verification.

Notification

Following fieldwork, biologists should notify their regional DNR AIS contact identified on the back of the data form. The AIS contact can help with specimen preservation and verification. Following specimen verification, the DNR AIS contact can also initiate the AIS communication protocol to notify the appropriate stakeholders to initiate follow-up, if needed:

<http://dnr.wi.gov/lakes/invasives/AISDiscoveryCommunicationProtocol.pdf>.

Quality Assurance

Regional AIS staff will host annual AIS identification and disinfection trainings to ensure consistent identification efforts in data collection. The AIS staff hosting the training might differ from the AIS contact.

Vouchered specimens and photographs will be submitted to the AIS contact for verification of specimen identification. The AIS contact will submit the specimen to the appropriate taxonomic expert. The taxonomic expert will provide identification results to the AIS contact and central office staff. DNR central office staff will update the SWIMS fieldwork event once verification reports are received from the designated expert.

If no specimens were collected, AIS contact will initiate reconnaissance with external partners to collect voucher specimens.

It is understood that records indicating species were not observed doesn't guarantee that species were not present – they just weren't detected.

Data Management

Data will be entered into the Streams/Rivers AIS Early Detection Monitoring project in SWIMS. Biologists will provide completed datasheets to their DNR AIS contact to enter into SWIMS. A scan of the data sheet, photos, and taxonomic verification should be attached to the SWIMS fieldwork event. Data entered into SWIMS should be proofed by another staff person for additional quality assurance.

Programmatic Evaluation

A meeting will be held in fall/winter with monitoring staff to review protocols and identify issues to improve following year.

References

- Hauxwell, J., S. Knight, K. Wagner, A. Mikulyuk, M. Nault, M. Porzky and S. Chase. 2010. Recommended baseline monitoring of aquatic plants in Wisconsin: sampling design, field and laboratory procedures, data entry and analysis, and applications. Wisconsin Department of Natural Resources Bureau of Science Services, PUB-SS-1068 2010. Madison, Wisconsin, USA.
<http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/ecology/Aquatic%20Plants/PI-Protocol-2010.pdf>
- Miller, M., K. Songer, and R. Dolen. 2014. Field guide to Wisconsin streams: plants, fishes, invertebrates, amphibians, and reptiles. The University of Wisconsin Press. Madison, Wisconsin, USA.

Appendix A Target Species Codes

Common Name	Latin Name	Species Code
Aquatic Plants		
European Frog-bit	<i>Hydrocharis morus-ranae</i>	EFB
Yellow Floating Heart	<i>Nymphoides peltata</i>	YFH
Water Chestnut	<i>Trapa natans</i>	WC
Brazilian waterweed	<i>Egeria densa</i>	BWW
Hydrilla	<i>Hydrilla verticillata</i>	HYD
Curly-leaf pondweed	<i>Potamogeton crispus</i>	CLP
Fanwort	<i>Camboba caroliniana</i>	FW
Parrot feather	<i>Myriophyllum aquaticum</i>	PF
Eurasian water milfoil	<i>Myriophyllum spicatum</i>	EWM
Water hyacinth	<i>Eichhornia crassipes</i> and <i>E. azurea</i>	WH
Water lettuce	<i>Pistia stratiotes</i>	WL
Didymo	<i>Didymosphenia geminata</i>	DIDY
Wetland Plants		
Flowering rush	<i>Butomus umbellatus</i>	FR
Phragmites	<i>Phragmites australis</i>	PHRG
Japanese knotweed	<i>Polygonum cuspidatum</i>	JK
Giant knotweed	<i>Polygonum sachalinense</i>	GK
Purple loosestrife	<i>Lythrum salicaria</i>	PL
Japanese hop	<i>Humulus japonicus</i>	JH
Yellow iris	<i>Iris pseudoacorus</i>	YI
Invertebrates		
Zebra mussels	<i>Dreissena polymorpha</i>	ZM
Quagga mussels	<i>Dreissena bugensis</i>	QM
Asian clam	<i>Corbicula fluminea</i>	AC
Faucet snails	<i>Bithynia tentaculata</i>	FS
Chinese mystery snails	<i>Cipangopalundina chinensis</i>	CMS
Banded mystery snails	<i>Viviparus georgianus</i>	BMS
New Zealand mudsnail	<i>Potamopyrgus antipodarum</i>	NZMS
Red swamp crayfish	<i>Procambarus clarkii</i>	RSC
Rusty crayfish	<i>Orconectes rusticus</i>	RC

Appendix B Aquatic Invasive Species Monitoring Data Form (Form 3600-532A)

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Instructions: Bold fields must be completed.

Location Name	WBIC	SWIMS Station ID	NC Type	County	Date	Collector(s)	Contact info

Step 1: Circle species that you looked for - review the laminated picture field guide and *A Field Guide to Wisconsin Streams**.

AQUATIC PLANTS/ALGAE	Hydrilla	Water hyacinth	RIPARIAN PLANTS	Yellow flag iris	INVERTEBRATES	Faucet snails
European frogbit	Curly leaf pondweed	Water lettuce	Flowering rush	Japanese knotweed	Zebra/quagga mussels	Chinese mystery snails
Yellow floating heart	Fanwort	Eurasian water milfoil	Phragmites	Japanese hop	Asian clam	Banded mystery snails
Brazilian waterweed	Parrot feather	Didymo	Purple loosestrife		New Zealand mudsnails	Rusty/red swamp crayfish

STEP 2: Record the sample site, habitat, and land use. If possible, record latitude and longitude (in decimal degrees). If AIS are observe, record species name, area, and density. If possible, collect up to 5 specimens of each AIS and take photos. Include internal and external labels with **species code, waterbody name, SWIMS station ID or WBIC or lat/long, collector’s name, and date**. If needed, preserve specimens with adequate ethanol and identify ethanol type on label.

Site*	Habitat Type†	Land Use‡	Latitude	Longitude	Species 1 name, area [§] , density	Species 2 name, area [§] , density	Species 3 name, area [§] , density	Sample(s) collected (list/NA)?	Photo(s) collected? (list/NA)?	No AIS observed	Comments

*A – access, T – target, I - incidental

†Riffle, Run, Pool, Riparian

‡Natural, Agriculture, Urban

§Area estimates: only one plant (.0001 ac), my living room (12’x16’ or .004 ac); a baseball diamond (90’ X 90’ or 0.2 ac); or a football field (300’x 160’ or 1.1acre)] If linear use appropriate conversion of miles to acres (# of miles X 3.62 (if only on one side of the stream/road divide by 2).

||Density ratings: 1 - a few individuals (1-25), 2 - many small, scattered populations (25 – 500), 3 - dense population (> 500)

Step 3: Please indicate how closely you looked for invasive species.

Very

Somewhat

Not at all

Step 4: Notify the appropriate DNR AIS Contact and deliver specimen, if collected (see Report Invasive Species below).

----- Steps below are for more advanced reporting -----

Step 5: Enter data into SWIMS. Work with appropriate DNR AIS specialist on data entry, if needed. If a photo is taken, attach it to the SWIMS record.

Step 6: Data was entered into SWIMS on _____ by _____

Step 7: Data entered in SWIMS was proofed on _____ by _____

Report Invasive Species

Contact your local DNR Aquatic Invasive Species Contact and deliver this report form, specimens, and digital photo (id available). Please do this as soon as possible – no later than 4 days after you discover the plant. For more information visit: <http://dnr.wi.gov/topic/Invasives/report.html>.

- Milwaukee Area – Heidi Bunk, 262-574-2130, heidi.bunk@wi.gov
- Green Bay Area – Brenda Nordin, 920-662-5141, brenda.nordin@wi.gov
- Green Bay Area – Mary Gansberg, 920-662-5489, mary.gansberg@wisconsin.gov
- Oshkosh Area – Ted Johnson, 920-424-104, tedm.johnson@wisconsin.gov
- Madison Area – Susan Graham, 608-275-3329, susan.graham@wi.gov
- Rhinelander Area – Kevin Gauthier, 715-356-5211 ext. 214, kevingauthiersr@wi.gov
- Park Falls Area – Jim Kreitlow, 715-365-8947, james.kreitlow@wi.gov
- Spooner Area – Craig Roesler, 715-635-4076, craig.roesler@wi.gov
- Eau Claire Area – Jodi Lepsch, 715-838-8385, jodi.lepsch@wi.gov

Notes:

*Miller, M., Songer, K., and Dolen, R. 2014. Field Guide to Wisconsin Streams. University of Wisconsin Press. Madison, Wisconsin. (<http://uwpress.wisc.edu/books/4887.htm>)