

UPPER SUGAR RIVER WATERSHED ASSOCIATION Aquatic Invasive Species Strategic Plan 2019-2023



**Written by Wade Moder, Upper Sugar River
Watershed Association**

**Funded by a grant from the
Wisconsin Department of Natural Resources**

UPPER SUGAR RIVER WATERSHED ASSOCIATION

Aquatic Invasive Species (AIS) Strategic Plan

Table of Contents

- I. Introduction
 - a. Purpose
 - b. Scope
 - c. Goals

- II. Background Information
 - a. Summary of Upper Sugar River Watershed and unique plant communities/species threatened by AIS
 - b. Overview of existing AIS in the watershed
 - c. Summary of threats and impacts posed by AIS in Upper Sugar River corridor
 - d. Proposed AIS management strategies

- III. Fact Sheets
 - a. AIS of concern (high priority)
 - b. AIS of concern (low priority)
 - c. AIS to watch for (not yet present in the watershed)

- IV. Closing Comments

ACKNOWLEDGEMENTS:

Principal Authors:

Wade Moder, Upper Sugar River Watershed Association
Megan Phillips, past Upper Sugar River Watershed Association Director

Geographic Information Systems Specialist:

Wade Moder, Upper Sugar River Watershed Association

Advisors/Plant Specialists:

Jeanne Scherer, WDNR
Laura MacFarland, River Alliance of Wisconsin
Patricia Cicero, Jefferson County Land and Water Conservation Department
Cindy Ramseyer, Blue Mounds Area Project
Joyce Powers, Botanist and USRWA member
Carol Warden, University of Wisconsin/WDNR
Megan Phillips, Former Upper Sugar River Watershed Association Director

Monitoring Volunteers/Trainees:

Marty Cieslik
Toni Dallwig
Alicia Engel
Kirsten Engel
Steve Gavin
Shane Herkert
Erich Hughes
Bill Keen
Lisa Keen
Julie Kisely
Michael Long
Gaila Olsen
Jon Radloff
Justin Sabol
Rodd Wangen

This project was funded by the Wisconsin Department of Natural Resources.

INTRODUCTION:

In August 2011, the Upper Sugar River Watershed Association (USRWA) was awarded an Aquatic Invasive Species (AIS) Education, Prevention and Planning grant from the Wisconsin Department of Natural Resources (WDNR) to do a variety of education and volunteer promotion efforts to locate and map exotic species in the watershed, raise awareness and reduce new introduction and spread of AIS in the basin. That grant also funded the creation of the 2014-2018 AIS Strategic Plan for the watershed, which has provided direction for the Association to prioritize AIS projects in the watershed. USRWA reapplied for another AIS Education, Prevention and Planning grant and was awarded funding in 2014 to execute portions of the strategic plan and update the plan. This version of the strategic plan is a result of that effort.

Due to its proximity to other waterbodies and its popularity among paddlers and anglers, the Sugar River and its tributaries are at risk for invasion by non-native species. In order to protect the Upper Sugar River's numerous high quality trout streams and wetland areas as well as preserve the biological integrity of the river corridor, populations of aquatic invasive species must be reported and contained (and potentially eradicated) if possible. Prior to the onset of this project, Project RED volunteers had already identified four aquatic invasive species within the watershed, including Purple loosestrife (*Lythrum salicaria*), Curly-leaf pondweed (*Potamogeton crispus*), Eurasian watermilfoil (*Myriophyllum spicatum*), and Japanese knotweed (*Polygonum cuspidatum*). At the time that this grant application was submitted, there was not an active management strategy for AIS within the Upper Sugar River basin.

a. Purpose:

The primary purpose of this AIS strategic plan is to coordinate residents and natural resource managers within the Upper Sugar River Basin to monitor and prevent and/or control the spread of AIS. It is our aim that this plan will give local stakeholders the knowledge and ability to manage AIS and preserve the natural biodiversity of the Upper Sugar River and minimize negative impacts of AIS.

b. Scope:

The geographical scope that this plan encompasses is the 170 square mile Upper Sugar River Watershed. The watershed includes 115 miles of streams, some of which are classified as Class II trout waters. The entirety of the Sugar River main stem is classified as at least Exceptional Resource Waters (ERW), with some sections being deemed Outstanding Resource Waters (ORW). The plan also encompasses the sloughs, impoundments and wetland habitats along the Sugar River.

c. Goals:

Prevention: Implement procedures to halt the introduction of new aquatic invasive species to the Upper Sugar River and its tributaries and impoundments.

Detection: Monitor the river and its tributaries and impoundments regularly for target AIS species and report any new findings immediately.

Rapid Response: Prevent the establishment and minimize the potential impact of AIS infestations by responding effectively to the detection of new populations.

Control: Reduce the economic and ecological damage caused by AIS by containing their populations and promoting the restoration of native plant communities within the river basin.

BACKGROUND INFORMATION:

The Upper Sugar River Watershed (USRW) drains 170 square miles in southwestern Dane County. The headwaters of the Sugar River flow from north of Mt. Horeb down to Lake Belle View in Belleville, Wisconsin. This entire length of the river is classified as an Exceptional Resource Water (ERW). It is home to various fisheries, native plant communities, wildlife and recreational opportunities. The river sees significant public use by both paddlers and wading trout anglers, especially at Mt. Vernon Creek and the West Branch. This water body has public access points at least every ten miles as well as a plan for future handicap access at Lake Belle View, thereby meeting the NR1.91(4) requirements. Access points of special interest include Donald Park (Deer Creek, Fryes Feeder), Mt. Vernon Creek State Fishery Area, and Belleville Community Park. With Dane County's recent purchase of the Bruce Company property along Highway 69 we can expect to see several more public access points by the end of 2014.

The Upper Sugar River Watershed encompasses portions of several municipalities including the Village of Mt. Horeb, City of Verona, City of Madison, Town of Verona, Village of Belleville and the City of Fitchburg. Verona and Madison are some of the most rapidly growing municipalities in the state of Wisconsin. Their accelerated urban growth has the potential to put pressure on surface and groundwater resources within the Upper Sugar River Watershed, and also draws more users to the river which may facilitate the spread of AIS.

a. Summary of watershed and unique features threatened by AIS

Class I & II trout streams

The USRW boasts 115 miles of stream within its boundaries, many of which are classified as Class I and II trout waters. Trout streams in Wisconsin are divided into three classes. Class I streams are of the highest quality and have naturally reproducing trout populations, good surrounding land management, and minimal pollution inputs. Class II streams are of moderate quality. They have some naturally reproducing populations of trout but do not fully utilize the stream's space and resources, so they often require supplementary fish stocking. Class III streams lack naturally reproducing trout populations, have poor habitat and require annual stocking to support angling (Hastings and Hewitt 2008).

Class I and II trout streams in the USRW include:

Mt. Vernon Creek Fishery Area: This area includes eight miles of fishable waters, four of which are Class I, and the remaining four are Class II trout streams.

Fryes Feeder: This Class II stream is one of two tributaries that form Mt. Vernon Creek. It originates in the agricultural and wooded landscapes of Springdale Township. This is a classic spring tributary, characterized by a narrow channel with overhanging vegetation, cold, clear water, natural meanders and rocky substrate.

West Branch Sugar River: This Class II trout stream has been the focus of intensive habitat restoration in the early 2000's. Thirteen miles from Highway 92 upstream to Lewis Road

received removal of nuisance trees such as box elder, channel narrowing, and placement of LUNKERS (little underwater neighborhood keepers encompassing rheotactic salmonids).

Primrose Branch: This Class II tributary to the West Branch of the Sugar River is fed by numerous springs and contains brook trout as well as brown trout in its lower reaches. This stream is small and shallow and has experienced channel straightening below CTH U in past years.

Badger Mill Creek: This Class II trout stream used to be classified as an Impaired Water of the state. It is considered a warmwater sport fishery and recent electro-shocking surveys have found brown trout, suckers, bluegill, and other species within the lower reaches of the creek. The Madison Metropolitan Sewerage District discharges treated effluent to this stream, which sustains its baseflow. Since the diversion of wastewater to this stream populations of coldwater pollution intolerant species such as brook stickleback and mottled sculpin have declined.

Deer Creek: This coldwater stream flows partially through Donald Park and is a second tributary to Mt. Vernon Creek. It is classified as a Class II trout stream. This creek drains about 5 square miles and has a steep gradient of approximately 42 feet per mile. The high gradient of the creek coupled with its steep hillside slopes causes this stream to be very flashy during major precipitation events. Brook trout are prolific in this water body, and reaside dace (a rare species) have been found here as well. Dane County holds several temporary easement areas along the banks of Deer Creek.

Flynn Creek: This creek runs for 4.6 miles before draining into the West Branch of the Sugar River. It drains approximately 5 square miles, most of which is dominated by agricultural lands. Several springs feed this creek and allow it to maintain a cold enough water temperature to be classified as a Class II Trout Stream. Flynn Creek supports a population of both brown trout (non-native) and brook trout (native). The enrollment of adjacent lands in conservation programs such as the Conservation Reserve Program (CRP) has reduced sediment loading into the stream and improved instream habitat for fish and other aquatic life.

Lakes & impoundments

The USRW has two non-flowing surface waters of interest; Morse Pond and Lake Belle View. Morse Pond is a small shallow pot-hole pond just west of Madison. The pond contains a large bed on the native plant *Nelumbo lutea*, which is a lotus not common to the area. Lake Belle View recently underwent a whole-lake restoration which entailed dredging the lake and constructing an earthen berm to separate the lake from the Sugar River. The river had been bringing tremendous amounts of sediment into the lake, resulting in elevated concentrations of phosphorus in the lake (phosphorus binds to soil particles and moves with the sediment downstream). Montgomery & Associates: Resource Solutions estimated that the annual phosphorus loading into the lake prior to restoration was almost 60,000 pounds/year. To gain insight into how this matches up with other lakes in the region, the consulting firm prepared a chart comparing the phosphorus levels to Cox Hollow Lake, Twin Valley Lake, and White Mound Lake, all of which had phosphorus loading values of less than 5,000 pounds/year. Since the dredging and construction of the berm, water quality within the lake has improved. The establishment of a warm water sport fishery is underway, with desirable fish species being electro-shocked and then transferred from the Sugar River to the lake.

Wetland areas


The USRW boasts several diverse wetland habitats. The Sugar River Wetlands State Natural Area is accessible via the Military Ridge Bike Trail or Country View Road in Verona. This area features a diverse wetland community including sedge meadow, calcareous fen, emergent aquatic, shrub-carr, and wet-mesic prairie. This extensive wetland also is home to numerous rare plant and animal species and contains the most diverse fishery in southern Wisconsin. The fen flora is diverse with many calcium-loving plants including Kalm's lobelia, grass-of-parnassus, and shrubby cinquefoil. The carbonate-rich groundwater that percolates up from the underlying bedrock provides high quality water to the surrounding wetlands and river. Intergrading with the fen is a wet-mesic prairie dominated by tall grasses including big blue-stem, Canada blue-joint grass, prairie cord grass, and Canada wild rye. The forb component is diverse with azure aster, shooting star, prairie blazing-star, prairie phlox, and culver's root. Also present is a southern sedge meadow with tussock sedge and a shrub-carr community dominated by tall shrubs such as red-osier dogwood, meadowsweet, and willows. Within these communities are a number of rare plants including the state threatened prairie parsley (*Polytaenia nuttallii*) and two special concern species, bluets (*Houstonia caerulea*) and glade mallow (*Napaea dioica*). Short-eared owls (*Asio flammeus*) frequent this area in winter and northern harriers (*Circus cyaneus*) nest within adjacent wetlands. The area is part of a larger grassland habitat restoration complex along the Sugar River, which seeks to establish landscape management areas for the benefit of declining grassland birds and animals, vegetation communities, and invertebrates that depend upon native vegetation.

There is also a floodplain forest wetland area surrounding Lake Belle View at the terminus of the watershed, which is comprised of silver maple, ash, elm and cottonwood. Recent restoration efforts in Belleville have separated the river channel from the lake via an earthen berm. There has been some concern that invasive species such as Purple loosestrife (*Lythrum salicaria*) that is currently present on the river channel side may eventually jump the berm during flood season and infest the lake. Dense stands of cattails populate this wetland area. Bald eagles, green herons, and American coots are often spotted in this area.

b. Overview of existing AIS within the watershed

Through invasive species inventories taken in 2013, 2014 and 2015, volunteers have identified five major AIS of concern within the Upper Sugar River Watershed boundary. The pictures and information enclosed in the boxes on the following pages are screen shots taken from USRWA's interactive web mapping application (www.usrwa.org, scroll to bottom of page). When enabled, the AIS layer of this mapping application allows users to hover over a marked infestation (designated with a color-coded flag) and click to learn more about the species, how to identify it, and when to be watching for it in the river corridor. River-goers can submit additional infestations by simply marking the location of their finding with a GPS and sending the coordinates to USRWA's geographic information systems (GIS) technician. Additional layers of the mapping application include feature points (dams, cattle fences, put-ins and take-outs for canoeing and kayaking), and water quality monitoring stations.

CURLY-LEAF PONDWEED (*POTAMOGETON CRISPUS*)



Curly Pondweed (*Potamogeton crispus* L.)
Latitude: 42.9042
Longitude: -89.51649

Distinguishing features: Has curly reddish-green leaves with wavy edges. Spreads via winter buds.
When to look: New plants form under ice during winter, and emerge in spring. Plants usually die back in mid-July and collect on lake bottoms.

Where to look: Submerged in nutrient-rich lakes and waterways; generally grows in shallow water (3-10 feet).
Look-alikes: There are numerous native pondweeds in Wisconsin, including Richardson's pondweed (right). Curly-leaf pondweed, however, is unique in its life cycle – emerging in early spring and dying off in mid-July.






Photo credit: Laura MacFarland

PURPLE LOOSESTRIFE (*LYTHRUM SALICARIA*)



Purple Loosestrife (*Lythrum salicaria* L.)
Latitude: 42.95858
Longitude: -89.55879

Distinguishing features: Dense, bushy perennial herb that grows from 3-7 feet tall. Purple to magenta flowers with 5-6 petals clustered in long spikes.
When to look: Blooms from July to September. Dead stems stand through the winter.

Where to look: Marshes, stream margins, meadows and prairies. Found in 70 of Wisconsin's 72 counties.
Look-alikes: Blue vervain (bottom right) and wing-angled loosestrife are commonly mistaken, as they are also found in wet areas and have pink-purple spiky flowers.






Photo credit: Christina Anderson

EURASIAN WATERMILFOIL (*MYRIOPHYLLUM SPICATUM*)



Eurasian Watermilfoil (*Myriophyllum spicatum* L.)
Latitude: 42.89393
Longitude: -89.52731

Distinguishing features: Forms dense mats near water surface, which get caught in boat motors and spread via fragmentation.

When to look: Rapid growth in early spring, flowers in mid-summer.

Where to look: Submerged in nutrient-rich lakes and waterways; stems branch near water surface, and small reddish flowers appear above water.

Look-alikes: There are seven native milfoils in Wisconsin. Generally, native milfoil species are stiff out of water (not limp), and have 10 or less leaflet pairs per leaf (EWM leaf has at least 12 leaflet pairs; as seen in the photo right; compared to native milfoil).

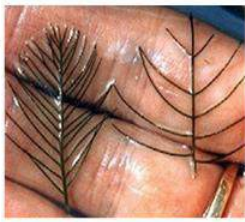




Photo credit: Paul Skawinski

Photo credit: Vilas Co. Land & Conservation Dept.



JAPANESE KNOTWEED (*FALLOPIA JAPONICA*)

Japanese Knotweed (*Fallopia japonica*)
Latitude: 42.89020
Longitude: -89.5367



Distinguishing features: Herbaceous perennial plant with hollow stems and lacy greenish-white flowers. Grows in large clones from 5-10 feet tall. Reproduces primarily via rhizomes.

When to look: Emerges in early spring, flowers in late summer, and dies in fall/winter but remains upright until new growth the following spring.

Where to look: Stream banks, lakeshores, wetlands, grasslands and woodlands.

Look-alikes: Giant knotweed, also an invasive species, is similar but has larger leaves (pictured right, up to 12"; vs. 4-9" for Japanese knotweed)





Photo credit: Laura MacFarland

Photo credit: WI-DNR/Emmet Judziewicz



PHRAGMITES (PHRAGMITES AUSTRALIS)



Phragmites (*Phragmites australis*)
Latitude: 42°59'4.18"N
Longitude: 89°31'33.38"W

Overview: Tall, robust perennial grass that is semi-aquatic but can also be established in dry areas. Grows to 3-20 feet tall and canes remain through winter.

Distribution: Phragmites has been reported in most Wisconsin counties with the exception of some in the northern half of the state. It can be found in all U.S. states except Alaska, but is not considered invasive in all states.

Description: Leaves are smooth and narrow are 6-24" long with a blue-green color. Height of overall plant is 3-20 feet tall and many times Phragmites can be identified by its height alone. Colonies are very dense and include both the live stems and the standing dead stem from the previous year's growth. Seed growth on top of the plant can appear almost fluffy like wheat towards the end of summer and into fall.

How it spreads: Seed dispersal and fragments from cut plants can be transported and established elsewhere. Once established, growth spreads horizontally below ground through a thick, deep network of roots and rhizomes. Phragmites can spread as much as 10 feet in a growing season if conditions are right.



c. Summary of threats and impacts posed by AIS

Invasive species are successful at entering disturbed environments and outcompeting native species, thereby reducing biodiversity at the site of the infestation. Invasive species often have characteristics such as rapid growth rates, the ability to tolerate a wide range of environmental parameters such as alkalinity, temperature, and moisture, and lack natural predators. They may also disrupt the provision of ecosystem services such as erosion control, filtration of nutrients and pesticides, and flood mitigation. These services are invaluable to preserving the integrity of the ecosystem as a whole.

Submerged aquatic plants such as Curly-leaf pondweed and Eurasian watermilfoil can crowd out native benthic vegetation as well as impair water body navigability if the plants become too dense and break the surface of the water. Curly-leaf pondweed reproduces via turions, which means that if a part of the plant breaks off and floats downstream, it can easily reestablish itself. For species of this reproductive strategy, once the plant is found in one part of a river, there is a danger that it will become ubiquitous throughout the downstream river system.

Grass species such as *Phragmites australis* and reed canary grass (*Phalaris arundinacea*) can degrade habitat for native turtle species such as blanding's and painted turtles as well as amphibians. The presence of *Phragmites* has reduced ideal nesting habitat for many turtle species because the plants' growth alters the microenvironment of turtle nests during incubation, particularly affecting nest temperature, which is the most important factor for embryo development (Bolton et. al 2010).

Japanese knotweed can endure extreme flooding events, and also is able to colonize rapidly when an area is disturbed. The plant's coarse rhizomes do not provide the same type of bank stabilization that the finer roots of trees and grasses offer, therefore increasing the likelihood of

erosion on streambanks that are dense with knotweed infestations (Missouri Conservation Dept.).

Wetland invaders like Purple loosestrife have significant impact on wildlife habitat. Hundreds of species of species of plants, birds, mammals, reptiles, insects and fish depends on viable wetland habitats for their survival. Purple loosestrife has the ability to choke out native species, thereby reducing biodiversity and essential habitat and food providing plants (44 species of grasses, sedges, and flowering plants to be precise). Purple loosestrife has been associated with the decline of waterfowl and other wildlife habitat, namely the black tern, canvasback duck, and bog turtle (National Wildlife Refuge Association).

d. Proposed AIS management practices

The guiding document by which species will be considered restricted or prohibited is the state's NR40 publication, or Wisconsin's "Invasive Species Identification, Classification, and Control" rule.

Past and current management practices

Monitoring

Controlling the spread of AIS in the watershed was a major component of a grant received through the WDNR in early 2014. In 2014 and 2015, USRWA volunteers and staff implemented a Project RED (Riverine Early Detectors) program to monitor five streams in the watershed at nine sites all together. Surface waters that were monitored included West Branch Sugar River, Fryes Feeder, Primrose Branch, Sugar River, Badger Mill Creek, and Lake Belle View. USRWA already had volunteers performing water quality monitoring at all these sites except Lake Belle View prior to the project, which made adding additional protocol seamless. Included in this effort was kick-net sampling for the presence of New Zealand mudsnails. Due to USRWA's involvement in the Water Action Volunteers program administered through the UW-Extension and Wisconsin Dept. of Natural Resources, the organization already owns the gear needed for this type of sampling.

Condensed Data Results - Project RED in Upper Sugar River Watershed								
Date	Volunteers	Site	Stream	Applicable SWIMS ID(s)	Invasives Present	Density	Sampled for NZM	High Priority/ Watch Lists
6/11/2014	Bill & Lisa Keen	Upstream of Highway 69	Badger Mill Creek	10011966	Wild Parsnip, reed canary grass	WP- Low, RCG- Medium		No
6/11/2014	Bill & Lisa Keen	Valley Road, Riverside Road	Sugar River	10009476, 133548	Wild Parsnip, reed canary grass	WP- High, RCG- High		No
8/14/2014	Bill & Lisa Keen	Upstream of Highway 69	Badger Mill Creek	10011966	Wild Parsnip, reed canary grass	WP- Low, RCG- Medium	Yes	No
8/14/2014	Bill & Lisa Keen	Valley Road, Riverside Road	Sugar River	10009476, 133548	Wild Parsnip, reed canary grass, buckthorn	WP- High, RCG- High, Buck- Medium	Yes	No
6/17/2015	Bill & Lisa Keen	Upstream of Highway 69	Badger Mill Creek	10011966	Wild Parsnip, reed canary grass	WP- Medium, RCG- Medium		No
6/17/2015	Bill & Lisa Keen	Valley Road, Riverside Road	Sugar River	10009476, 133548	Wild Parsnip, reed canary grass, buckthorn	WP- High, RCG- High, Buck- Medium		No
9/23/2015	Bill & Lisa Keen	Upstream of Highway 69	Badger Mill Creek	10011966	Wild Parsnip, reed canary grass	WP- Medium, RCG- Medium	Yes	No
9/23/2015	Bill & Lisa Keen	Valley Road, Riverside Road	Sugar River	10009476, 133548	Wild Parsnip, reed canary grass, buckthorn	WP- High, RCG- High, Buck- Medium	Yes	No
6/11/2014	Bill Keen/Wade Moder	Belleville Community Park	Lake Belle View	10021226	Purple loosestrife, reed canary grass	PLS- High, RCG- Low/Medium		PLS
8/14/2014	Bill Keen/Wade Moder	Belleville Community Park	Lake Belle View	10021226	Purple loosestrife, reed canary grass, garlic mustard	PLS- High, RCG- Low/Medium		PLS
6/26/2014	Toni Dalwig/Wade Moder	County Highway S, Domini Rd	Sugar River	10013311, 10034152	Wild Parsnip, reed canary grass	WP- High, RCG- Very Low		No
9/28/2014	Toni Dalwig/Wade Moder	County Highway S, Domini Rd	Sugar River	10013311, 10034153	Wild Parsnip, reed canary grass	WP- High, RCG- Very Low	Yes (CTH S only)	No
5/18/2015	Toni Dalwig/Wade Moder	County Highway S, Domini Rd	Sugar River	10013311, 10034154	Wild Parsnip, reed canary grass	WP- High, RCG- Very Low		No
8/18/2015	Toni Dalwig/Wade Moder	County Highway S, Domini Rd	Sugar River	10013311, 10034155	Wild Parsnip, reed canary grass	WP- High, RCG- Very Low	Yes (CTH S only)	No
7/17/2014	Steve Gavin/Rodd Wangen	County Highway U	West Branch Sugar River	10013308	Wild Parsnip	WP- Medium/High		No
7/17/2014	Steve Gavin/Rodd Wangen	County Highway U	Primrose Branch	10009633	Wild Parsnip	WP- Medium/High		No
7/17/2014	Steve Gavin/Rodd Wangen	Upstream of Highway 92	Fryes Feeder	10009643	Wild Parsnip, reed canary grass	WP- Low/Medium, RCG, Medium/High		No
8/26/2014	Steve Gavin/Rodd Wangen	County Highway U	West Branch Sugar River	10013308	Wild Parsnip	WP- High	Yes	No
8/26/2014	Steve Gavin/Rodd Wangen	County Highway U	Primrose Branch	10009633	Wild Parsnip	WP- Medium/High	Yes	No
8/26/2014	Steve Gavin/Rodd Wangen	Upstream of Highway 92	Fryes Feeder	10009643	Wild Parsnip, reed canary grass	WP- Low/Medium, RCG, Medium/High	Yes	No

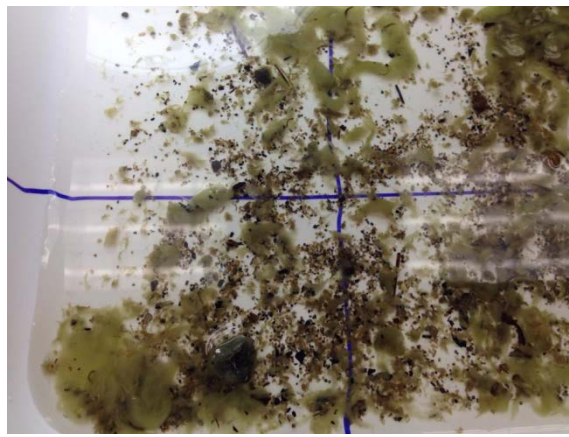


Figure 1: Kick net samples were collected and processed by trained USRWA volunteers at seven sites in 2014 and 2015

Phragmites australis control

USRWA worked in conjunction with the Ice Age Trail Alliance in the fall of 2013 and continued in 2014 to control *Phragmites australis* at a half-acre site located between the Ice Age Trail and the Badger Mill Creek in the City of Verona. Previous efforts by Ice Age Trail Alliance volunteers entailed utilizing the "cut and bundle" method. This method involves tying bundles of *Phragmites* at the base with a biodegradable twine, cutting the bundle of stalks at the base, and then treating the remaining stalks with "Habitat" herbicide. The upper portion of the *Phragmites* bundle was transported to a nearby dumping site off of the trail. USRWA volunteers joined Ice Age Trail Alliance volunteers in the next phase of the control plan; the "glove of death" technique. Volunteers wore long rubber gloves with a cotton glove worn over top of the rubber one. Dabbing the cotton glove with "Habitat" herbicide and moving the glove upward from the base of the plant causes the plant to incorporate the herbicide and translocate it to the plant's root system. Because *Phragmites* reproduces via rhizomes, this method will be effective even if volunteers failed to treat every individual plant at the infested site.

After the first volunteer workday of the fall season, volunteers re-visited the site to rake up the remaining stalks to expose the mineral soil for subsequent re-seeding with native vegetation. Dead stalks were hauled to the same site where plant matter from the "cut and bundle" phase was disposed of.

In 2013, grant funds from USRWA's Aquatic Invasive Species Planning/Education/Prevention grant were coupled with funds from the New Century School's Wisconsin Environmental Education Board grant to purchase \$300.00 worth of native seed (specific species listed below).

JFNew - RM - WI 6140 Cottonwood Drive Ste A Fitchburg, WI 53719 Ph. (608) 848-1789 Fx. (608) 848-3013	Ship To JFNew - RM - WI Attn: Dan Salas 6140 Cottonwood Drive Ste A Fitchburg, WI 53719 Ph. (608) 848-1789
---	--

Quote Number	Quote Date	Salesperson	Ship Via	Estimated Ship Date	Terms	PO Number
QO6041707	10/9/2013	MOBRIEN	UPS Ground	10/16/2013	NET 30	
Project No	Project Name					
SADGERMILLCREEK	Seed Mix					
Stock Number	Scientific Name	Common Name	Quantity Ordered	Units	Extended Price	Line Total
CC-AVESAT-SP	Avena sativa	oats	100	seed	0.07	7.00
WG-CXLACU-SP	Carex lacustris	common lake sedge	0.25	seed	75.00	18.75
WG-CXSTRI-SP	Carex stricta	common tussock sedge	0.25	seed	125.00	31.25
WG-CXVULP-SL	Carex vulpinoidea	brown fox sedge	4	seed	15.00	60.00
DG-ELYRIP-SP	Elymus riparius	riverbank wild rye	16	seed	3.00	48.00
WG-GLYSTR-SL	Glyceria striata	fowl manna grass	1	seed	25.00	25.00
PF-HELGRO-SP	Helianthus grosseserratus	sawtooth sunflower	0.5	seed	35.00	17.50
WG-LEEORY-SL	Leersia oryzoides	rice cut grass	2	seed	18.00	36.00
CC-LOLMUL-SP	Lolium multiflorum	annual rye grass	25	seed	0.13	3.25
WF-RUDLAC-SP	Rudbeckia laciniata	wild golden glow	1	seed	18.00	18.00
WG-SCICYP-SL	Scirpus cyperinus	wool grass	2	seed	12.50	25.00
WG-SPAPEC-SP	Spartina pectinata	prairie cord grass	4	seed	15.00	60.00
WF-THADAD-SL	Thalictrum dasycarpum	purple meadow rue	0.5	seed	45.00	22.50

The **Purple loosestrife** infestation at the Lake Belle View wetlands area is of highest priority due to its proximity to the newly restored lake. All that separates the AIS infestation from the lake is an earthen berm. There has been some concern that the plant may "jump" the berm during a flood event or be transported by animal activity.

In 2014, USRWA partnered with Wisconsin Department of Natural Resources to raise and release biocontrol "Cella" beetles as a part of the WDNR/University of Wisconsin Extension Purple Loosestrife Biocontrol Program. Eight purple loosestrife plants were harvested from Lake Belle View just after the ice thawed, and Cella beetles procured from Brock Woods at WDNR were placed on the plants with netting around them. After two months, the Cella beetles had multiplied ten-fold and were ready to be released at Lake Belle View in late July.



Figure 2: Eight purple loosestrife plants from Lake Belle View in Belleville, WI were harvested and put in separate pots with enclosed netting in order to raise "Cella" beetles. These beetles help to biologically control the invasive purple loosestrife.

Biocontrol beetles have been used as a method for controlling Purple loosestrife in Wisconsin since 1994, and it has been clearly demonstrated that the beetles exhibit detrimental effects on the invasive species, leaving its native neighbors unharmed. The "Cella" beetles reduce Purple loosestrife's height and flowering ability, thereby allowing native vegetation to compete successfully (Wisconsin Dept. of Natural Resources: Purple Loosestrife Biocontrol Program).

Future management practices

Japanese knotweed infestations can be reduced via several non-chemical methods including mowing, pulling, burning, mulching, or covering with a tarp. However, these tactics alone will not effectively eradicate infestations and may still allow for spread of the species. To successfully control stands of Japanese knotweed it is recommended that managers cut the plant twice during the spring when the plants reach three feet in height, and a third time when the plant is flowering. When the fall re-growth reaches three feet in height, apply a diluted glyphosate solution (4-8%). Glyphosate is not selective for Japanese knotweed specifically; therefore applicators should be careful to avoid broadcasting the substance onto neighboring native plants.

Submerged species like **Eurasian watermilfoil (EWM)** and **Curly-leaf pondweed (CLP)** can be controlled via mechanical methods such as pulling and/or hand-raking, or by applying chemicals such as fluridone on an annual basis. Mechanical control can be time consuming and the application of chemicals to aquatic environments can be controversial, and have negative effects on other wildlife within the water body.

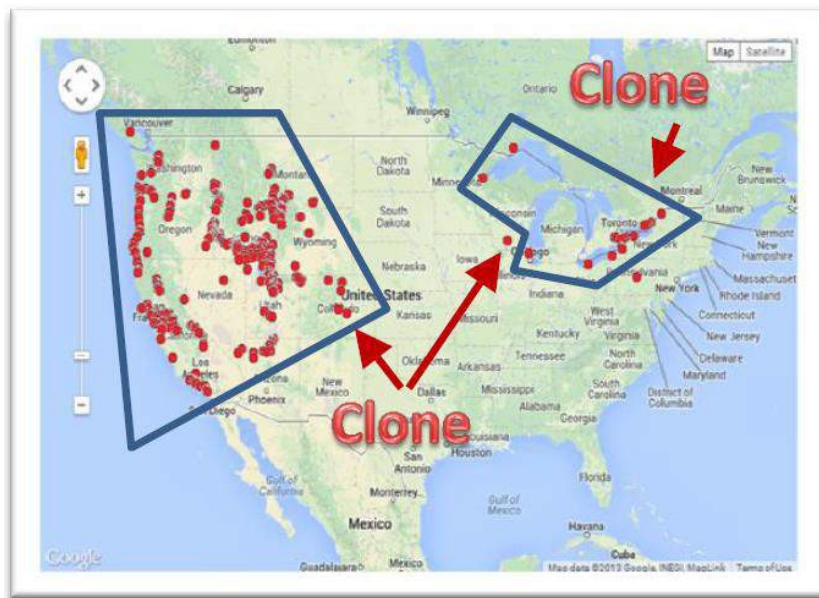
A more promising option for **Eurasian watermilfoil** may be biocontrol insects such as the native milfoil weevil (*Euchrychiopsis lecontei*). Experimental tests in freshwater tanks found that weevils were able to reduce Eurasian watermilfoil biomass by 50%, and nearly 100% of the plants showed damage as a result of weevil herbivory (University of Florida Center for Aquatic and Invasive Plants). This weevil species prefers feeding on EWM above other plant species, therefore it does not exhibit a negative impact on the native northern watermilfoil populations. Adult weevils lay their eggs on the meristem of the EWM plant.

The weevil larvae then feed on the meristem and bore down through the stem, feeding on the cortex and pupate of the plant (Sheldon and O'Bryan, 1996). The damage imposed by the weevil larvae suppresses the growth of the plant, reduces root biomass, and diminishes the plant's carbohydrate reserves, causing the plant to sink toward the bottom of the water body (Creed et. al, 1992). The native milfoil weevil may be one option for controlling EWM in Lake Belle View, however would not be a viable control option for the river itself or its tributaries. Weevils have been shown to be more effective at controlling EWM in lakes and ponds than in flowing water systems.

Curly-leaf pondweed may also be controlled via hand raking or pulling, and also via chemical treatment methods. This species begins growing early in the season, therefore mechanical and chemical treatment efforts should be made in the spring or early summer months. Because curly-leaf pondweed spreads via turions, any mechanical removal efforts must be careful to remove all of the plant matter. At this point in time the curly-leaf pondweed infestation in the Upper Sugar River is not so robust that it would warrant chemical application. USRWA volunteers would likely undertake mechanical removal efforts and encourage others to note the presence of the plant and provide instructions for proper removal.

Future prevention strategies

New Zealand mudsnails were recently detected in the neighboring Black Earth Creek watershed in samples taken in October of 2013. The species has been confirmed at South Valley Road and was also suspected at Highway 14 and Town Road near Black Earth. This discovery marks the first finding of New Zealand mudsnails in the Midwestern region of the country. The snails found at the Black Earth Creek site were analyzed at the University of Wisconsin – Steven's Point laboratory and were found to be members of "Clone 1," which is the clone that has been found in the western states and also recently in Pennsylvania. "Clone 2" has been present in the Great Lakes area for years but has not been actively spreading.



*Distribution of Clones 1 and 2 in the United States
Source: WI Dept. of Natural Resources*

USRWA staff and Board members attended a public meeting hosted by the Department of Natural Resources on December 12, 2013 in Cross Plains to learn more about the ecology of the species and how to prevent its spread into uninfected waters. At this point, there is not a known infestation of New Zealand mudsnails in the Sugar River or any of its tributaries. However, there is concern that the species could easily move into and become established in the Upper Sugar River Watershed without adequate prevention strategies.

Because New Zealand mudsnails are clonal, only one snail is needed to start a new population. The females are born with developing embryos inside of them, and they can have up to 230 offspring each year (Hoddle, 2013). USRWA took steps to quarantine the Black Earth Creek population by educating anglers and boaters about the species through wader wash stations that were built and stationed at key access points. Four wash stations in total were built thanks to volunteer time and tools, complete with three-sided boot brushes, a long handled brush, and an aluminum sign geared towards hikers and anglers. These stations were placed in Donald County Park near popular recreational areas, which later inspired the building of two additional stations that were also placed in the watershed. After spending time maintaining these wash stations, significant use was noticed at all four stations, and only one of the long handled brushes has gone missing in two years (as of 2015).



Figure 3: Wader wash station installed by USRWA volunteer Bill Keen near Deer Creek in Mt. Vernon, WI

The Department of Natural Resources recommends the following gear sanitation procedures for anglers, boaters, and volunteer stream monitors:

BEFORE leaving the water:

- **INSPECT** equipment and **REMOVE** plants and animals (required by law)

- **DRAIN** all water from equipment (required by law)
- **SCRUB** equipment with a stiff brush, including crevices, to remove all mud and snails
- **RINSE** equipment with tap water

BEFORE entering another stream, switch to a completely new set of gear OR

- **FREEZE** for 8 hours, or
- **WASH** with 212°F water (steam clean), or
- **SOAK** in 2% Virkon for 20 minutes, then rinse

Rapid detection & rapid response plan

USRWA staff and volunteer monitors will continue to monitor the watershed for aquatic invasive species infestations using Project RED protocols. New infestations and/or updated data will be reflected on the www.usrwa.org interactive web mapping application, as well as reported to Department of Natural Resources biologists.

USRWA will continue to rotate monitoring efforts on tributaries, the main stem, and Lake Belle View in years 2014-2018. A monitoring schedule is outlined below:

Should USRWA’s volunteer and staff monitors discover a new infestation of high priority AIS or a species from our watch list (listed in the table below), the organization may pursue funding to control it via the Department of Natural Resource’s Rapid Detection and Response grant program. In order to be eligible to utilize Department of Natural Resources funding, the infestation must be a pioneer population in the early stages of colonization or re-colonization. A pioneer population is defined as an infestation that has been present for less than 5 years, AND is less than 5 acres in size, or takes up less than 5% of the wetland/lake/streambank area.

Infestations that would prompt USRWA action:

<u>Species</u>	<u>Category</u>
Phragmites	Highest priority
Japanese knotweed	Highest priority
Purple loosestrife	Highest priority
Hybrid cattail	Highest priority
Giant hogweed	Not yet present
New Zealand mudsnail	Not yet present
Japanese hops	Not yet present
Western mosquitofish	Not yet present

If the infestation does not meet the aforementioned requirements yet still warrants enough concern by USRWA staff, Board of Directors and local natural resource managers, USRWA may use its own funds to control the population, or seek alternate funding from its various partner organizations or utilize other grant programs.

AQUATIC INVASIVE SPECIES FACT SHEETS:

Highest priority (already present in the watershed)

Phragmites
Japanese knotweed
Purple loosestrife
Hybrid cattail

Lowest priority (already present in the watershed)

Eurasian watermilfoil
Curlyleaf pondweed
Rusty crayfish

Not yet present (watch list)

Giant hogweed
New Zealand mud snail
Japanese hops
Western mosquitofish (present in Lower Sugar River, not Upper section)

Phragmites

(*Phragmites australis*)

Other common names: common reed, common reed grass, ditch reed, giant reed

Other scientific names: *Phragmites communis*, *Arundo phragmites*, *Arundo australis*

Overview: Tall, robust perennial grass that is semi-aquatic but can also be established in dry areas. Grows to 3-20 feet tall and canes remain through winter.

Distribution: Phragmites has been reported in most Wisconsin counties with the exception of some in the northern half of the state. It can be found in all U.S. states except Alaska, but is not considered invasive in all states.

Description: Leaves are smooth and narrow are 6-24" long with a blue-green color. Height of overall plant is 3-20 feet tall and many times Phragmites can be identified by its height alone. Colonies are very dense and include both the live stems and the standing dead stem from the previous year's growth. Seed growth on top of the plant can appear almost fluffy like wheat towards the end of summer and into fall.

Don't confuse it with: Native phragmites (*Phragmites americanus*).

How it spreads: Seed dispersal and fragments from cut plants can be transported and established elsewhere. Once established, growth spreads horizontally below ground through a thick, deep network of roots and rhizomes. Phragmites can spread as much as 10 feet in a growing season if conditions are right.

Impact: Phragmites can invade most habitats, but are most commonly known for taking over shorelines and marsh communities.

Control: Phragmites cannot withstand heavy grazing, so mowing or burning can be used as an effective management method, especially after a chemical treatment. Imazapyr or glyphosate can be applied to the leaves or cut stems in late summer or fall. Herbicides near water may require a permit.

WDNR classification: Restricted in all of Wisconsin.

Photo: Elizabeth J. Czarapata, WDNR



Japanese knotweed

(Polygonum cuspidatum)

Other common names: Japanese bamboo, Mexican bamboo, fleece flower

Other scientific names: Fallopija japonica; Polygonum reynoutria;
Reynoutria japonica

Overview: Perennial that likes to establish itself along stream banks.

Distribution: Present in most of Wisconsin, all surrounding states and in 40 of the lower 48 United States.

Description: Leaves are simple and alternate, typically 3-4" wide and 4-6" long. Leaves are shaped like a spade when full grown, and more like a heart on younger parts of the plant. Can grow to 10 feet tall. Creamy white, tiny flowers that bloom from in August through September.

Don't confuse it with: Giant knotweed (*Polygonum sachalinense*; invasive). Giant knotweed and Japanese knotweed have been known to hybridize, but Japanese knotweed leaf base is squared while giant knotweed has a heart-shaped leaf base.

How it spreads: Once established, seeds or even a small piece of stalk or root can create an infestation downstream.

Impact: Japanese knotweed along stream banks can lead to increased bank erosion, sedimentation and flooding. It also offers little for birds and fauna.

Control: Young adults can be hand pulled by the root crown, making sure to remove as many rhizomes as possible to prevent future reproduction. In small populations, persistent cutting can also be effective.

Best chemical results are seen when plants are cut below the second joint to the ground and treated. Roundup, Garlon and Crossbow have all proven effective during the time when plant is actively growing.

WDNR classification: Restricted

Photo: Elizabeth J. Czarapata, WDNR



® Photo by
Elizabeth J. Czarapata

Purple loosestrife

(Lythrum salicaria)

Other common names: spiked loosestrife

Other scientific names: *L. salicaria* var. *tomentosum*; *L. salicaria* var. *vulgare*

Overview: Wetland perennial that prefers moist soils and can withstand shallow flooding. Tolerates up to 50% shade and can grow to 3-7 feet tall. A mature plant can produce millions of seeds each year.

Distribution: Purple loosestrife can be found throughout all of Wisconsin and 43 of the 48 lower United States.

Description: Simple leaves that are lance-shaped and usually opposite, but sometimes whorled. Flowers bloom from July to September or October and contain 5-6 petals that are a pink-rose color. Greenish-purple stems generally square shaped.

Don't confuse it with: Garden loosestrife (*Lythrum vulgaris*, invasive). Has many of the same qualities as Purple loosestrife, but garden loosestrife has paired lower leaves and alternate upper leaves along with yellow flowers.

How it spreads: Originally and currently used as a landscaping plant, purple loosestrife spreads naturally through vegetative spread or through seed. Animals and humans can be factors in spreading seeds.

Impact: Purple loosestrife out-competes native wetland plants and serves as a negative impact on tad-poles and birds, especially those who depend on native grasses for nesting.

Control: Can be pulled or dug out making sure to remove all root fragments. Mowing is not recommended. A permit may be needed for chemical treatment, but triclopyr amine has proven effective. The *Galerucella* beetle has also served as a successful biological control against purple loosestrife.

WDNR classification: *Restricted*

Photo: *Elizabeth J. Czarapata, WDNR*



Hybrid cattail

(Typha x glauca)

Other common names: White cattail

Overview: Cattail hybrid is a perennial and present where freshwater is available. Cattail hybrid is a mix between the narrow-leaved cattail and the common cattail.

Distribution: Cattail hybrid is present in about half of counties in Wisconsin, including Dane. It has been reported in nearly every U.S. state east of the Mississippi River and is present in 36 of the lower 48 states.

Description: Leaves are erect, flat blades that are 0.3-0.8" wide with about 15 leaves per shoot. Numerous flowers at the top of the stem make up a large sausage shaped section that is larger than other cattail varieties. Plant reaches 5-10' tall.

Don't confuse it with: Narrow-leaved cattail (*Typha angustifolia*), invasive. Common cattail, broad-leafed (*Typha latifolia*), native. The clear distinguishing difference between the narrow-leaved, common and hybrid cattails is the staminate at the top of the stem. Common cattail is has a much thicker staminate compared to the hybrid and common, and the hybrid staminate is considerably longer than the common. As the name suggests, Narrow-leaved cattails have thinner leaves and common cattails have broader leaves, while the hybrid is typically in the middle (0.3-0.8" wide).

How it spreads: Cattail hybrid spreads vegetatively through underground rhizomes.

Impact: Amongst other native plants, cattail hybrid can serve as a source of food and shelter for some animals. However, as cattail hybrid becomes a dense populations it out-competes and shades out native plants, creating a mono-culture in wetland areas.

Control: Cut both live and dead stems in mid to late summer or early fall. If manipulating the water level is possible, maintain a water level 3 inches above the cut stems during the entire growing season. Imazypr can be used as a foliar spray for a chemical remedy.

WDNR classification: Restricted in all of Wisconsin.

Photo: Elizabeth J. Czarapata, WDNR



Eurasian watermilfoil

(Myriophyllum spicatum)

Other common names: European watermilfoil, spike water-milfoil

Other scientific names: *Myriophyllum spicatum* var. *muricatum*

Distribution: Eurasian watermilfoil can be found throughout all of Wisconsin and its surrounding states, and has reportedly been found in 42 of the lower 48 United States and Canada.

Description: Slender, aquatic plant with greyish-green leaflets about ½-2" long giving a feathery appearance. Leaves are divided into 14 or more leaflets pairs arranged opposite from each other. Each stem contains 3-6 leaves, arranged in a whorl.

Don't confuse it with: Northern watermilfoil (*Myriophyllum sibiricum*), native. The main difference apart from Eurasian watermilfoil is Northern watermilfoil typically has fewer than 12 leaflet pairs coming off a given leaf.

How it spreads: Motorboat traffic plays a major role in introducing Eurasian watermilfoil to new waterbodies.

Impact: Eurasian watermilfoil can form thick, large mats of vegetation on the surface of waterbodies, preventing light from reaching further down and depleting oxygen levels. Eurasian watermilfoil can out compete native plants and have been found carrying other invasive species like zebra and quagga mussels.

How to control: Eurasian watermilfoil can be removed mechanically using large harvesting equipment or hand rakes. It's recommended to remove all fragments of the plant and do multiple harvests, however, a single harvest in early summer can also be effective. Chemical treatment can also be performed with one treatment of fluridone during early growth, providing season long control.

Current WDNR classification: *Restricted*

Photo: *River Alliance of Wisconsin*



Curly-leaf pondweed

(Potamogeton crispus)

Other common names: curled pondweed, crisped pondweed

Overview: Curly-leaf pondweed is a perennial aquatic herb that lives in submerged water. Can be tolerant of low light and low water temperatures, enabling it to out-compete many of the natives.

Distribution: Curly-leaf pondweed can be found throughout Wisconsin and in 46 of the 48 lower U.S. states.

Description: Leaves are submerged and alternate, and are translucent with no stalk. The edges are wavy with fine teeth and 3 main veins.

Don't confuse it with: Numerous other *Potamogeton* species are native to Wisconsin. Curly-leaf pondweed is distinctive in its wavy leaf edges and fine teeth, a combination most submerged aquatic plants do not have in Wisconsin. Curly-leaf pondweed also has a uniquely long life cycle, generally coming up in spring and dying back in mid-summer.

How it spreads: Curly-leaf pondweed primarily spreads by unintentional transfer by humans to a lake or river network. This can be done simply by transferring the tip of a stem or plant fragments which commonly attach to boats and trailers.

Impact: Curly-leaf pondweed can actually provide some benefits to fish and waterfowl in small quantities, but often its growth becomes excessive causing dense mats. Its tolerance for low light and low water temperatures give it the upper hand against many natives.

Control: Curly-leaf pondweed begins growth early, so raking, cutting and harvesting should take place in spring or early summer. Chemical treatments are effective using diquat, endothall and fluridone.

WDNR classification: *Restricted in Wisconsin.*

Photo: UW-Extension, Adams County



Rusty crayfish

(*Orconectes rusticus*)

Overview: Rusty crayfish are crustaceans that are native to the Ohio River Basin. It's assumed the Rusty crayfish was transported to Wisconsin and other states via bait buckets.

Distribution: Rusty crayfish have been fully introduced to Wisconsin and can now be found in several Midwest and eastern states, as well as New Mexico and Ontario.

Description: Including claws, rusty crayfish can be up to 5" in length. Their distinctive marks are the black bands on the tips of their claws, but they also (but not always) have rusty spots on each side of their hard outer body covering, or carapace. Claws range in color from grayish-green to reddish-brown and are relatively smooth.

Don't confuse it with: There are many species of native crayfish in Wisconsin. Rusty crayfish has numerous marks that are unique including the rust-colored spots on either side of their carapace.

How it spreads: Once established, rusty crayfish dominate native crayfish by taking over their habitat and natural forage.

Impact: Beyond displacing native crayfish, the presence of rusty crayfish reduces plant abundance and diversity. This eliminates key habitat for other aquatic animals and their spawning areas. Rusty crayfish also have few predators in Wisconsin due to their aggressive nature.

How to control: Intensive harvest will not eliminate crayfish, but will reduce the population and their impact. Most important, preventing the introduction of rusty crayfish is the best way to control them. No chemicals are currently available that only kill rusty crayfish.

Current WDNR classification: Restricted in Wisconsin



Giant hogweed

(Heracleum mantegazzianum)

Other common names: giant cow parsley, cartwheel-flower

Overview: Giant hogweed can reach heights of 8-20 feet during flowering and can be a biennial or perennial based on conditions. As a biennial, giant hogweed will reach maturity in its second year and disperse its seed.

Distribution: Has been reported in WI in Iron, Waupaca and Manitowoc counties.

Description: Leaves are 1-5 feet wide, palmate, deeply lobed and pointed with coarse white hairs on the underside. Leaf stalks also have a uniquely uneven purple spots (mottling). Large, white flowers with five petals bloom from May to July. Flat, oval shaped seeds are housed in a 2-winged mericarp.

Don't confuse it with: American cow parsnip (*Heracleum lanatum*), native. Leaves on the American cow parsnip have pinately divided leaves, not palmately divided. American cow parsnip is also smaller as it only grows to 3-7 feet tall.

How it spreads: Giant hogweed has a germination percentage of more than 50% and any given plant will produce approximately 20,000 seeds. Can find habitat in many different conditions including roadsides, shaded areas, stream banks. When along stream banks, seeds are quickly dispersed downstream leading to more spreading.

Impact: Giant hogweed is particularly invasive due to its size and ability to spread, creating a monoculture in areas where giant hogweed is established. Because of its phototoxicity, it can cause allergic reactions on humans when giant hogweed sap contacts bare skin.

How to control: Smaller populations or first-year plants can be dug out by hand using a sharp shovel, making sure to avoid contact with its phototoxic sap. Glyphosate can also be an effective foliar or cut stem chemical treatment.

Current WDNR classification: Prohibited in WI.
Photo: Donna Ellis, WDNR.



New Zealand mudsnail

(Potamopyrgus antipodarum)

Overview: New Zealand mudsnails are very small but very destructive in their non-native habitat. It was first discovered in the United State in 1987 and has since spread throughout the Western and Great Lakes states. It primarily feeds on phytoplankton and zooplankton.

Distribution: Recently New Zealand mudsnails were recently found in the Black Earth area of Wisconsin and it's unclear how rapidly populations are expanding. Populations have already been discovered in tributaries off the Great Lakes and in the western United States.

Description: NZ mudsnails are less than a quarter of an inch in length and their shell color can range from gray to shades of brown. Its shell is elongated with deep grooves and about 7-8 whorls with right-handed coiling (dextral).

How it spreads: Unfortunately, New Zealand mudsnails can grow accustomed to an array of environmental conditions within freshwater systems. Additionally, they have the ability to reproduce asexually, meaning it only takes one snail to create a new population.

Impact: Though its impact has not yet been realized in Wisconsin, New Zealand mudsnails will compete directly with other native grazers and limit the available food sources. Additionally, with densities of over 500,000 mudsnails per square meter, the potential for clogged pipes at water facilities is increased and possible altering of primary production in streams.

How to control: At this time, there are no real methods of removal that don't also involve adversely affecting other plants and animals in the same body of water. Chemical treatments have been tested on a small scale, but nothing has been successful at a large scale. Taking proper precautions when entering a body of water is currently the best form of control to prevent the spread of New Zealand mudsnails.

Current WDNR classification: *Prohibited in WI.*
Photo: River Alliance of Wisconsin



Japanese hops

(Humulus japonicus)

Other scientific names: Humulus scandens

Overview: Herbaceous, shallow-rooted vine plant that invades flood plains, stream banks, roadsides or areas with bare soil. Prefers sunny, moist areas. Grows as an annual or perennial plant, depending on climate.

Distribution: Japanese hops can be found mostly in southwestern Wisconsin (including Dane County) and in surrounding states, and has reportedly been found in 32 of the lower 48 United States and Canada. Japanese hops have currently not spread west of the Great Plains.

Description: Leaves are opposite, 2-5" long with serrated edges divided into 5 or more lobes. Petioles (stalk of a leaf, attaching the blade to the stem) are as long or longer than the length of its leaves. Vines grow up to 35 feet long.

Don't confuse it with: Common hop (*Humulus lupulus*), native. The leaves of common hops only have 3 lobes compared to 5 or more lobes on Japanese hops. Native hops also have much shorter petioles compared to the length of its leaves.

How it spreads: Seeds are primarily spread by flowing water, in addition to animals and wind. Mowing or bailing machinery can also cause spreading.

Impact: Vines climb rapidly on trees and other vegetation creating a dense mat that blocks light and sometimes causing vegetation to break or fall. In more established areas, Japanese hops has been known to cause hay fever and other allergies.

Current WDNR classification: Restricted in Grant and Crawford counties, prohibited in the rest of the state.

Photo: WDNR



Western mosquitofish

(Gambusia affinis)

Overview: The Western mosquitofish is a small live-bearing fish that feeds mostly on plankton near the top of the water column. They are known for their high feeding capacity; adults are able to consume up to 42-167% of their body weight each day (Nico et. al, 2012). This feature of the Western mosquitofish may allow the species to outcompete native fish species for prey.

Distribution: Western mosquitofish have been stocked in many Midwestern states including Iowa, Illinois, Minnesota, Ohio, Indiana and Wisconsin. Surveys of backwater slough habitats found this species near Brodhead, Wisconsin in the Lower Sugar River Watershed.

Description: Western mosquitofish are dull gray or brown in color with a rounded tail fin and no bars or bands on the side of its body. The fish's mouth is pointed upwards (mosquitofish feed near the top of the water column). The fish's body is about 6.5 cm long. (Nico, et. al, 2012).

Don't confuse it with: The Eastern mosquitofish (*Gambusia hoolbrooki*), which is pictured below.

How it spreads: Was originally introduced to control mosquito larvae. Now the most likely ways that the species is spread includes bait bucket introductions, aquarium escape and release, and escape from private ponds.

Impact: The three species most affected by mosquitofish are the blackstripe topminnow, banded killifish, and state-endangered starhead topminnow (found in backwater slough habitats along the Sugar River).

How to control: Netting and electroshocking ineffective. Rotenone and other chemicals have been used with varying degrees of success.

Current WDNR classification:
Prohibited in Wisconsin.
Photos: USGS



Left: Western mosquitofish
Right: Eastern mosquitofish

CLOSING COMMENTS:

For some aquatic invasive species that are well established and abundant, eradication is a ship that has already sailed. For example, reed canary grass is so prolific along the stream banks of the Upper Sugar River that we would not even know where to begin tackling it. And if we chose to do so, we'd have to get some native grasses with deep roots in place in a hurry to prevent stream bank erosion and slumping. However, for aquatic invasive species that are in the early stages of colonization, eradication and/or control is feasible. It is important to note that we cannot merely attack a stand of Japanese knotweed with chemical treatment and presume that it will disappear. We need to be frequently checking in on the status of our control efforts and be adaptable if what we have tried isn't effective.

Managing aquatic invasive species is a continuous process that includes prevention, monitoring, early detection, and control. There is no "one size fits all" solution, and we must be willing to be creative and attempt various approaches. We also must be meticulous, because leaving a few *Phragmites australis* stalks behind during a control effort could result in many more plants popping up in the near future (due to its rhizome reproduction strategy). This work can seem daunting and in some cases requires numerous man hours in the field, which is why we need to celebrate our successes. There are many examples of local people working together to preserve the biological integrity of the places that they live, work, and recreate in throughout the state. Let us learn from what has worked well, and discard the strategies that did not provide desirable results.

We need to invest now to reduce the loss of valuable wildlife habitat, native plant diversity, and loss of production on working farmland due to invasive species. As I write this, my colleagues at the Wisconsin Department of Natural Resources, the University of Wisconsin- Extension and the River Alliance are preparing to host a public meeting to educate the community about the New Zealand mudsnail, a non-native snail that was recently found in Black Earth Creek, not far from the headwaters of the Sugar River. This snail has the potential to wreak havoc on streams by competing for food and habitat with native snails and altering primary production of streams, which has implications for fish and macroinvertebrates (River Alliance of Wisconsin). Adopting the goals and management strategies put forth in this plan will help to halt the spread of aquatic invasive species in the Upper Sugar River Watershed and prevent new species from infesting our waters.

BIBLIOGRAPHY:

Bolton, Ryan M., and Ronald J. Brooks. "Impact of the Seasonal Invasion of Phragmites Australis (Common Reed) on Turtle Reproductive Success." *Chelonian Conservation and Biology* 9.2 (2010): 238-43. Print.

Hoddle, Mark S. "Center for Invasive Species Research." : *New Zealand Mud Snail*. UC-Riverside, 11 Jan. 2013. Web. 16 Jan. 2014.
<http://cistr.ucr.edu/new_zealand_mud_snail.html>.

Creed, R. P., S. P. Sheldon, and D. M. Cheek. 1992. The effect of herbivore feeding on the buoyancy of Eurasian watermilfoil. *Journal of Aquatic Plant Management* 30: 75-76.

Lower Wisconsin River Basin AIS Strategic Plan. Eastern and western mosquitofish factsheet.

Missouri Conservation Department: Japanese Knotweed
http://mdc.mo.gov/sites/default/files/resources/2011/06/japaneseknotweedsheet_06-30-11.pdf

Accessed November 17, 2013.

National Wildlife Refuge Association: Purple Loosestrife
<http://refugeassociation.org/advocacy/refuge-issues/invasive-species/purple-loosestrife/>

Accessed November 18, 2013.

Nico, L., P. Fuller, G. Jacobs, M. Cannister, J. Larson, A. Fusaro, and M. Neilson. 2014. *Gambusia affinis*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.
<http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=846> Revision Date: 10/2/2012

River Alliance: New Zealand Mudsnails
<http://www.wisconsinrivers.org/our-work/aquatic-invasive-species/new-zealand-mudsnails>

Accessed December 11, 2013.

Sheldon, S.P., and L. M. O'Bryan. 1996a. Life history of the weevil *Euhrychiopsis lecontei*, a potential biological control agent of Eurasian watermilfoil. *Entomological News* 107: 16-22. University of Florida Center for Aquatic and Invasive Plants: Biological Control Insects for Eurasian Watermilfoil.

<http://plants.ifas.ufl.edu/node/279>

Accessed November 21, 2013.

Wisconsin Dept. of Natural Resources: Upper Sugar River (SP15)
<http://dnr.wi.gov/water/watersheddetail.aspx?code=sp15&name=upper%20sugar%20river>

Accessed November 18, 2013.

Wisconsin Dept. of Natural Resources: Purple Loosestrife Biocontrol Program
<http://dnr.wi.gov/topic/Invasives/documents/2012PurpleLoosestrife.pdf>

Accessed November 18, 2013.