Taylor County Aquatic Invasive Species Plan

A guide for proactive AIS management in Taylor County

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Myriophyllum sibericum, northern watermilfoil, native milfoil, Chelsea Lake, 2015.

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In partnership with
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Introduction

Taylor County has 27 public access lakes with boat launches or easily accessible roadside/carry-in access. Others exist but are longer walk ins or accessible by navigable waters. Many streams and marshes also exist, which are equally susceptible to harm from invasive species. Because user groups and species of primary concern may differ, it is important to involve a diverse group of partners.

Take action today to avoid AIS problems tomorrow.

Fourteen lakes in Taylor County are listed as having formal, established lake associations or lake districts to help with management of the lakes (Appendix C). Since the majority of lakes don't have formal organizations AIS detection and management can be a challenge. Lake districts and lake associations can help to monitor the lakes, disseminate information quickly and efficiently, and create a collaborative effort through hosting meetings and workshops.

Since 2015, Taylor County Land Conservation Department (LCD) has collaborated with Marathon and Wood County Land Conservation Departments and Golden Sands Resource Conservation & Development Council, Inc. (RC&D) to acquire grant funding from the Department of Natural Resources (DNR) to support a Regional AIS program. Since 2016, this collaboration has grown to include Portage, Waushara, Waupaca, Green Lake and Marquette County Land Conservation Departments.

The Regional Aquatic Invasive Species (AIS) Program, has gathered information about the status of AIS infestations in Taylor County, volunteer activity levels, training and education needs, and other information regarding AIS in Taylor County. The AIS Program has increased AIS awareness through classroom presentations, youth and public event displays and lake group presentations. The Medford Library, UW Extension and 4-H members have partnered with purple loosestrife beetle rearing to increase awareness and management of purple loosestrife

The purpose of this AIS plan is to identify short-term and long-term goals toward establishing a coordinated, county-wide approach to protecting Taylor County's lakes, rivers and wetlands.

This AIS plan is meant to be a dynamic document, to be updated and changed as new goals and challenges are identified.

Proactive Management Steps

It is in the best interest of any citizen organization or community to initiate actions today in order to avoid AIS problems tomorrow. Take a proactive management approach to lake protection. Proactive management activities need not be costly, but they can make a world of difference. Taylor County is in a perfect position to be proactive, as of 2017 only three lakes and five rivers were known to have Eurasian watermilfoil (EWM) and/or curly leaf pondweed (CLP).

As the old saying goes—an ounce of prevention is worth a pound of cure. The same is true for preventing an invasion of AIS in your favorite lake. If efforts are kept at a "prevention" level, the

costs to your group (in time, money, and frustration) will be far lower than the costs involved with dealing with AIS at a “management” level.

Step 1: Gather Information about Aquatic Invasive Species and Native Species

Prior to 2012, individual lakes may have known about the aquatic invasive species within their own waters, but not much was known about AIS distribution in Taylor County. In response to this, visual AIS surveys were completed in 2015 and 2016 by Golden Sands RC&D staff. These visual surveys were conducted from kayaks or boats. Aquatic invasive plant locations were recorded with GPS and maps were created with the assistance of county staff. Surveys covered the littoral zone and the shoreline for the following species:

> Eurasian watermilfoil (*Myriophyllum spicatum*)
> Curly-leaf pondweed (*Potamogeton crispus*)
> Zebra mussels (*Dreissena polymorpha*)
> Rusty crayfish (*Orconectes rusticus*)
> Banded mystery snail (*Viviparus georgianus*)
> Chinese mystery snail (*Bellamya chinensis*)
> Japanese knotweed (*Polygonum cuspidatum*)
> Purple loosestrife (*Lythrum salicaria*)
> Flowering rush (*Butomus umbellatus*)
> Yellow Iris (*Iris pseudacorus)*
> Common reed (*Phragmites australis*)
>Brittle naiad (*Najas minor*)
>Yellow Floating Heart (*Nymphoides peltata*)

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Golden Sands staff surveying for AIS, South Harper Lake 2015.

All new AIS detected had voucher specimens collected, verified and recorded with the Wisconsin Department of Natural Resources (WDNR). Appropriate management bodies were notified, including WDNR, Taylor County, and any existing Lake Associations / Districts.

Native aquatic plant species were also recorded for each lake during the invasive species surveys. Species of special concern were observed in six lakes. Those observations include 1-*Potamogeton vaseyi*, 4-*Ceratophyllum echinatum*, 2-*Myrophyllum farwellii*, and 1-*Eleocharis robbinsii*.

No new invasive aquatic plants were detected. Curly leaf pondweed (CLP) was known to exist in Spirit Lake and Half Moon Lake while Eurasian watermilfoil (EWM) and CLP were known to exist in Chequamegon Waters. Both plants were observed during the AIS surveys. Spirit Lake CLP populations were mapped, however Chequamegon Waters EWM and CLP were not due to its large acreage. Half Moon Lake was not surveyed since it is listed as not having public access.

New AIS populations were observed in twenty-one lakes. It should be noted that sixteen of those were Chinese mystery snails, which are extremely wide spread throughout Wisconsin. Other

populations include, in descending order: seven lakes with aquatic forget-me-not, six lakes with narrow leaf cattail, four lakes with purple loosestrife, one Japanese knotweed and one yellow iris.

> Early detection of these invasive species is essential to minimize effort and cost associated with management. Well established populations of Eurasian watermilfoil or zebra mussels may never be eradicated, even with years of effort. It is impossible to overemphasize the importance of monitoring for aquatic invasive species, whether on a citizen level or local government level.

Eurasian watermilfoil, EWM (*Myriophyllum spicatum*)

Introduced to Wisconsin in the 1960s as an aquarium plant, this species has quickly spread around the lakes and streams of the state. Small fragments of the plant can produce adventitious roots, creating new plants wherever the wind or currents take them. The fragments can be caused by boats, paddles, fish, waves, or other sources of disturbance. EWM tends to grow earlier in the year than most native plant species, and tends to shade out the native species. In addition to reducing biodiversity in the ecosystem, EWM also reduces the recreational value of the water body by reducing water flow, increasing temperature, and encouraging stunted fish populations (Newroth 1985; Engel 1995).

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Eurasian watermilfoil

Containment and possible control is much more likely, and less expensive, if the population is caught early. Hand-removal with a small garden rake, or via snorkeling and hand-pulling by the roots, can be very effective on small populations of EWM. This is why early detection is so crucial for inexpensive management. If the population is allowed to expand for several seasons before it is detected, management options are reduced, and costs rise sharply.

Deeper or more advanced populations may need scuba divers or the DASH system (Diver Assisted Suction Harvesting). DASH uses a water pump suction device mounted on a boat to transport harvested plants from the diver to a collection basin above water. The process saves time and effort of the diver having to periodically transport removed plants to the lake surface for disposal.

For larger populations, chemical herbicide applications are typically used. 2,4-D formulations are most common, which are most effective in spring or early summer, when the plant is actively growing. As 2,4-D is a systemic herbicide, it requires the plant to be actively growing in order to absorb enough of the chemical to destroy the plant.

Biological control is an emerging option that may hold some promise for naturally controlling EWM without chemicals. *Euhrychiopsis* weevils are aquatic insects that are native to many Wisconsin lakes, and feed on native northern watermilfoil (*Myriophyllum sibiricum*). The adult

weevils feed on the leaves and stems of the plant, while the larvae bore into the stem and feed on the vascular tissues within. These activities often stress the plants enough to kill them, or at least prevent flowering. More research is needed on this topic before it will be employed on a widespread basis.

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Eurasian watermilfoil vs Northern watermilfoil whorl (left) whorl (right)

There are seven native watermilfoils in Wisconsin, and at least three of those occur in Green Lake County lakes (*Myriophyllum sibiricum*, *M. verticillatum*, *M. tenellum*). Only two of those are likely to be confused with EWM.

Northern watermilfoil (*Myriophyllum sibiricum*) typically has whitish stems, whorled leaves with 11 or fewer pairs of leaflets, and a fairly rigid growth form. EWM has pinkish stems, whorled leaves with 12 or more pairs of leaflets, and a very limp growth form. Whorled watermilfoil (*Myriophyllum verticillatum*) typically has dark green to brown stems, tightly-packed whorls of leaves, and highly divided floral bracts above the water late in the season.

Curly-leaf pondweed (*Potamogeton crispus*)

Curly-leaf pondweed (CLP) arrived in Wisconsin as early as the late 1800s, brought here as an aquarium plant, and possibly introduced accidentally during stocking of the common carp (*Cyprinus carpio*). CLP is still occasionally sold by some internet-based aquarium supply stores.

CLP has an atypical life cycle, growing to peak biomass in mid-June. At this time, most of the plants die back to the rhizome, and the nutrients contained in these plant tissues are released into the water column. This nutrient release often results in an algae bloom, sometimes containing blue-green algae (cyanobacteria) like *Microcystis*. Blue-green algae release a neurotoxin that can harm humans and pets that come in contact with the water.

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Curly-leaf pondweed

CLP spreads by rhizomes, seeds, and turions, which makes it very difficult to control. Turions are known to remain viable for more than five years, so herbicide applications need to be re-applied for at least five consecutive years to deplete the storage of turions in the substrate. (Johnson et al. 2012). Harvesting of CLP can be done in May, before turion production occurs. This can remove the biomass of the CLP and possibly prevent turion and seed accumulation for that season.

There are over thirty species of pondweeds (*Potamogeton* spp.) in Wisconsin, and two of them are commonly confused with CLP. Clasping-leaf pondweed (*Potamogeton richardsonii*) has wavy leaves with a smooth margin. Fern pondweed (*Potamogeton robbinsii*) may have very fine

serrations on the leaf margins, but the leaves are typically straight, and the plant tends to be dark green to brown. CLP has very wavy leaves with serrations on the margins.

Zebra mussels (*Dreissena polymorpha*)

Zebra mussels are small mollusks that are native to the Black and Caspian Seas of western Asia. They are filter-feeders, straining tiny plankton out of the water column, and therefore remove the base of the aquatic food web. Large zooplankton and small fishes depend on this same food source, so Dreissenid mussels like zebra mussels and the related quagga mussel (*Dreissena rostriformis*) can have detrimental effects on fish populations and sizes in affected lakes.

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Zebra mussel shell (actual size)

Control of zebra mussels is very difficult and expensive. Power plants and other near-shore businesses often pipe water out of large lakes and rivers to cool their machinery, and these pipes can quickly become clogged with zebra mussels, causing reduced flow and reduced cooling ability. These businesses often inject low doses of chlorine into the pipes to kill the mussels, or they shut off the pumps and send divers into the pipes to manually scrape the walls clean. There is currently no good option to remove zebra mussels on a large scale. A biological control option using a bacterium has been researched, evaluated, and tested in several lakes in Minnesota. This type of control could become an option in the future if it continues to be deemed safe and effective.

Zebra mussels and quagga mussels are usually less than one inch long, with white and black striping across the shell. Zebra mussels tend to be D-shaped, while quaggas are more rounded on both the dorsal and ventral sides. A simple test to differentiate the two species is to stand the entire closed shell on its side—if it can remain standing, it is a zebra mussel. If it falls over, it is a quagga mussel.

Rusty crayfish (*Orconectes rusticus*)

Native to the Ohio River Basin, rusty crayfish were probably introduced here as fishing bait. Rusty crayfish prefer well-oxygenated, flowing water with a rocky substrate for shelter. They are omnivorous, feeding on everything from fish eggs to invertebrates to aquatic plants. When native crayfish are present in the same ecosystem, rusty crayfish will often kill them or simply push them out of the prime habitats, making the native crayfish more susceptible to predation, or less likely to have adequate resources for survival. Rusty crayfish are easily recognized by the rust-colored spot on each side of their carapace (“shell”).

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The rusty colored spot gives the crayfish its name

Trapping rusty crayfish can have a localized reduction effect, but nearby rusty crayfish populations in the same body of water are likely to immigrate to the trapping area soon after efforts cease. Natural predation of rusty crayfish occurs by otters, shorebirds, turtles, large fish,

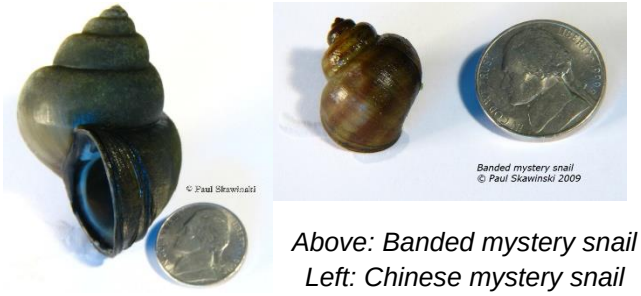
raccoons, and other creatures. Despite substantial natural predation, the rusty crayfish's high reproductive rate and tendency to hide under large rocks enable it to easily establish large populations in many waters.

Chinese mystery snail (*Bellamya chinensis*) and Banded mystery snail (*Viviparus georgianus*)

Chinese mystery snails were brought to the United States in the late 1800s as a food source in Asian food markets. Both snails have also been sold as algae-eating pets for water gardens, aquaria, and backyard ponds. A likely method of introduction to the natural environment is through this ornamental trade vector.

Little research has been done on the impact of these snails. Both banded and Chinese mystery snails are known to compete with native snail populations for resources, and may cause decreases in native snail diversity or abundance. Large die-offs have been observed, which can cause foul-smelling messes along shorelines. Both snails are possible vectors of various parasites and viruses (Harried et al. 2015; David et al. 2017).

Control of mystery snails is currently limited to manual removal with small hand tools. Mystery snails have a tough operculum at the opening of the shell, which is able to create a watertight seal. If a chemical pesticide is applied, the mystery snails can close up their shells and wait for the toxic substance to dissipate. Most native snails do not have this ability, and will be subjected to the chemical.



Above: Banded mystery snail
Left: Chinese mystery snail

Chinese mystery snails can grow up to nearly 7cm tall (2.9 inches), which is larger than any of our native snail species. They are typically dark brown, and may have several vertical ridges on the shell near the opening.

Banded mystery snails are commonly about 2cm long, with dark brown bands running horizontally along the shell.

Unlike most snails, which lay gelatinous egg masses on rocks, logs, or vegetation, mystery snails give birth to live young with complete shells.

Japanese knotweed (*Polygonum cuspidatum*)

Japanese knotweed has been planted as an ornamental shrub for decades, due to its tendency to grow in thick, straight rows about 10ft high. The plants light up with bright white flowers in the mid-summer, which originate from the base of each heart-shaped leaf. It can grow in dry sites, but does exceptionally well in moist soils like riverbanks or roadside ditches. Although sold as Japanese bamboo or Mexican bamboo in garden centers,

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Japanese knotweed leaves and flowers

Japanese knotweed is actually a member of the *Polygonaceae* family, totally unrelated to the true bamboos. A similar species, giant knotweed (*Polygonum sachalinense*), is also invasive and present in Wisconsin.

Controlling Japanese knotweed is very difficult once it is established. The rhizome network is very deep and very extensive. Foliar herbicide applications can be effective, but typically require multiple applications to have any measurable effect on the colony. Cutting the stem near to the ground and pouring herbicide into the hollow stem has proved to be effective. The herbicide will be continuously absorbed by the plant over a short period of time, taken up into the root systems. This can be very effective at killing the plant, sometimes with just one or two applications. Cutting back re-growth is vital to management after herbicide treatments, so as to minimize energy acquired by the roots. Since Japanese knotweed often occurs near water, care should be taken to ensure that the herbicide is safe for use in aquatic habitats. Certain herbicides can be toxic to amphibians, and should be avoided.

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Purple loosestrife

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife was imported to the United States as an ornamental species, and continued to be sold until recently. It is a wetland perennial with woody stems, and commonly reaches a height of 6 feet or more. Leaves are generally opposite, but may be in whorls of threes on older plants. Stems are typically square, but may be six-sided on older plants.

The Purple Loosestrife Biocontrol Program has been very successful in Wisconsin. This program utilizes volunteers to raise *Galerucella* beetles, which feed on the foliage of purple loosestrife. These beetles often stress the plant enough to stunt them, or even prevent flowering. These beetles are native to the same area of Eurasia as purple loosestrife, and were imported here as a natural predator. Testing results suggest that other plant species will not be affected by the Galerucella beetles. The goal of this program is to allow purple loosestrife to live not invasively, but harmoniously with the other native plants that also have their natural predators present.

Herbicide application can be effective to manage purple loosestrife. Systemic herbicides work best, as they affect the shoots as well as the roots. Applying herbicide in late summer to fall allows the herbicide to be carried down into the roots along with the general downward flow of nutrients for underground storage.

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Galerucella beetle on purple loosestrife

Flowering Rush (*Butomus umbellatus*)

Flowering rush came to the United States from Europe as an ornamental plant for gardens. It has since spread to shorelines and water bodies, able to become invasive in both places, due to its emergent and submersed forms. Flowering rush can form dense stands, crowding out native plants, and interfering with water uses.

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Flowering rush in bloom

It is most easy to identify when in bloom; however, only plants growing in shallow water or along the shoreline produce flowers. Its flower stalks protrude in an umbel formation from a single point on the end of the stem. Each individual flower has three pinkish colored petals and three sepals. When not in bloom, its green stems are easily mistaken for other emergent plants; however, flowering rush stems are triangular in the cross section. The leaves can grow to be about three feet high on shorelines, twisting at the tip on some plants. Submergent plants have no flowering stalks, and long thin leaves.

Their strong, robust root systems can produce new plants when fragmented. The plants spread primarily by their rhizomes, and can be further spread by boaters, or any animals that fragment these rhizomes. Reproductive structures called bulbils form on the roots and inflorescence, and break off to form new plants. Changing water levels can also influence the spread of submergent or emergent flowering rush.

Control methods of flowering rush have proven difficult to implement. The plants can grow in varying water levels, and have strong root systems that grow from fragments, making it difficult to use consistent methods of removal. Flowering rush has also proven to be resistant to herbicides, prompting scientific studies using multiple herbicides, but these methods are still in experimental stages.

Yellow Iris (*Iris pseudacorus*)

Native to Europe and the Mediterranean region, yellow iris came to the U.S. in the 1950s as an ornamental plant.
They now grow along stream banks, wetlands, lake shorelines, and other wet areas. Yellow iris grows to 5 feet tall, with long, flat narrow leaves that overlap at the base, forming a slightly fanned shape. They have bright yellow flowers that bloom from May to June in Wisconsin, making for easy identification. When not in flower, yellow iris resembles the native blue-flag iris, as well as

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Yellow Iris has a showy, yellow flower

cattails. Yellow iris has numerous thick rhizomes. The sap of the plant is toxic, and can cause skin reactions, and stomach trouble if touched or ingested.

Yellow iris leaves fan out from the base

Yellow iris is harmful, as it displaces native vegetation and reduces habitat needed by waterfowl and fish. It can clog small streams and irrigation systems, and it can dominate shallow wetlands, wet pastures and ditches. Mats formed by the rhizomes can prevent the germination and seedling growth of other plant species.

Mechanical removal of the plants via cutting below the water line to inhibit oxygen intake, thus essentially drowning the plant can be successful, but will most likely have to be repeated. Digging the plants out by the roots can be successful, but it is very labor-intensive; the rhizomes are also able to re-sprout from the fragments, so the plants may survive if any fragments are left behind.

Chemical treatment with herbicide can be effective; however it is necessary to use an herbicide labeled for use in aquatic habitats.

Common Reed (*Phragmites australis*)

Common reed was imported to the United States from Europe. Common reed, commonly called phragmites, is a tall perennial grass that can reach heights of over 15 feet. Its robust, fluffy seed heads normally lean off to one side. It is present in every U.S state, and spreads by both seed dispersal and its underground rhizomatous root system.

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Leaves grow to be up to 2 inches wide

It's incredibly strong, deep roots are the primary way this plant spreads, and adds to the difficulty of its removal. Manual removal is labor-intensive because of the root depth and intricate branching. If even a fragment of the root is left behind, it can re-sprout. Chemical spraying has proven a viable option for removal, but requires repeated treatments. Prescribed burning of the plants also can work, but must be repeated. There is both an invasive and a native common reed in the United States. While invasive common reed is normally more robust than the native, they can easily be mistaken for each other, so any suspected common reed should be verified by an expert. Another grass that could also be mistaken for common reed is reed canary grass. Reed canary grass looks like a smaller version of common reed, but only grows from 3-7 feet tall, and has leaves that grow to half the width of common reed.

Common reed has been spreading across Wisconsin from east to west, and is easily spread in road corridors, as mowing it causes fragments to spread and subsequently re-sprout. Water in ditches can also carry the seeds of these hearty plants. Phragmites has been used for bioremediation, roof thatching, and duck blinds. Some plants are not entirely dead when utilized, thus furthering the spread of the invasive plant to other areas.

Brittle naiad (*Najas minor*)

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Brittle naiad, also known as brittle water nymph or minor naiad, is native to Europe. Brittle naiad was first reported in the U.S. in 1934. It is thought to have been intentionally introduced from an aquarium release but was also favored as waterfowl food. From there it has made its way west to Wisconsin where it was found in Storrs Lake, Rock Co. in 2007. More recently it was found in Lake Puckaway, Marquette/Green Lake Co. in 2013 and Buffalo Lake, Marquette Co. in 2014.

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Recurved leaves with notable teeth.

Brittle naiad is an annual plant that branches often and has recurved leaves with noticeable teeth. Seeds are formed where the leaves join the stem. The plant breaks apart easily allowing it to spread readily. Seeds and fragments can be transported by boats, trailers, waterfowl and animals.

Brittle naiad is difficult to control once it is established. Manual removal of this plant can be difficult because it easily fragments. Any leftover fragments could potentially produce new plants, especially if they contain fruits. Mechanical harvesters have been used to remove brittle naiad biomass, but will likely spread the plant further via fragmentation. Successful chemical control has been achieved with herbicides. These herbicides can have negative impacts on many native aquatic plant species, so proper timing and dosage is crucial. A successful biological control agent is not known at this time.

Yellow floating heart (*Nymphoides peltata*)

Yellow floating heart, also known as fringed water lily, is native to Europe and Asia. Since 2006 populations in seven locations throughout Wisconsin have been found. In 2013 yellow floating heart was found in Gordon Lake, Forest County. Although the plant population was well established, manual hand removal was successful and no plants have been observed since.

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Yellow floating heart can spread by fragments, rhizomes, and seeds. The seeds are formed in pods formed following flowering. It is a popular water garden plant but prohibited in many states including Wisconsin. Plants can be spread by boats and people transplanting them.

Chemical applications and mechanical harvesting can be successful. Smaller, early populations can be hand pulled using caution to remove as much of the roots as possible to avoid new growth. Either control plan should include monitoring for missed plants.

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Seed pods of yellow floating heart

Narrow leaf cattail (*Typha angustifolia*)

Narrow leaf cattail, arrow shows the gap between the female flower and missing male flower.

Narrow leaf cattail is a tall emergent plant that can grow in wetlands and moist ditches. Like the native broad leaf cattail, narrow leaf produces the familiar looking flowers in early summer. The commonly seen brown "corndog" looking section is actually the female portion of the flower. There is also an upper section. This is the male portion of the flower. The male portion is visible early in the summer but disintegrates and falls off the stem later in the season. These flowers help distinguish the two species. The narrow leaf cattail has a gap between the two flower portions that may range from a half inch to several inches. Native broad leaf cattail doesn't typically have a gap between the flowers. Hybrids between the two are common.

All cattails spread by tiny seeds and by rhizomes. The rhizomes, stalks and leafs can be beneficial food, habitat and material for some animals. However, narrow leaf cattail and the hybrid can spread quickly and out compete other important native plant species. The dense stands of non-native cattails also decrease open areas used by waterfowl and other animals.

Chemical applications, burning, mechanical and manual management can be successful. "Drowning" is a technique where all visible stems are cut beneath the water level in late summer. Doing this stops oxygen from getting to the root system. Smaller, early populations can be hand pulled using caution to remove as much of the roots as possible to avoid new growth. Any control plan should include monitoring for missed plants.

AIS presence for Taylor County lakes

Every lake has physical, chemical, and biological characteristics that make it a unique ecosystem. All lakes are different, so it is very important to understand what is "normal" for a particular lake under everyday circumstances.

AIS management is only one component of holistic lake management. Updated background data about the lake ecosystem, such as water chemistry, water clarity, and aquatic plant surveys would be helpful to lake groups and DNR lake managers.

Why is a lake inventory important for proactive AIS management?

1. A lake inventory tells you what is "normal" for a given lake system, and makes it easier to detect changes, such as new AIS infestations, early. The earlier the detection and response, the better your chances of controlling the problem. Treatments for pioneer populations are much more likely to have a successful outcome than if the population is well-established.

2. In order to receive approval to treat a lake chemically, an aquatic plant management plan (APM plan) is normally required. If a baseline aquatic plant inventory has already been completed as part of a lake inventory, management options to control invasive species may move forward more quickly. Consult the "Guide to an Aquatic Plant Management Plan" for complete information about Wisconsin's APM plan requirements. http://www.uwsp.edu/cnr/uwexlakes/ecology/APMguide.asp

The following aquatic invasive species have been confirmed in Taylor County, as of May 2017:

Anderson Lake	*2165700*	*Narrow-leaf cattail (Typha angustifolia)*
Bear Creek	*2163900*	*Narrow-leaf cattail (Typha angustifolia)*
Big Rib River	*1451800*	*Eurasian Water-Milfoil, Rusty Crayfish*
Black River	*1676700*	*Banded Mystery Snail, Rusty Crayfish*
Camp Eight Flowage	*1466600*	*Chinese Mystery Snail*

Chelsea Lake	*2200400*	*Narrow-leaf cattail (Typha angustifolia)*
Chequamegon Waters Flowage	*2160700*	*Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Narrow-leaf cattail (Typha angustifolia), Rusty Crayfish*
Clear Lake	*1763900*	*Chinese Mystery Snail*
Deer Creek	*1433400*	*Eurasian Water-Milfoil*
Esadore Lake	*1764000*	*Chinese Mystery Snail*
Fisher River	*2181500*	*Rusty Crayfish*
Half Moon Lake	*2200000*	*Curly-Leaf Pondweed*
Horseshoe Lake	*2195400*	*Chinese Mystery Snail*
Hulls Lake	*1762700*	*Chinese Mystery Snail*
Kathryn Lake	*2166100*	*Chinese Mystery Snail*
Little Black River	*1765300*	*Rusty Crayfish*
Little Chelsea Lake	*2200500*	*Chinese Mystery Snail*
Medford Flowage	*1766600*	*Banded Mystery Snail, Chinese Mystery Snail, Purple Loosestrife, Rusty Crayfish, Yellow Iris*
Mondeaux Flowage	*2193300*	*Chinese Mystery Snail*
North Spirit Lake	*1515200*	*Chinese Mystery Snail, Rusty Crayfish*

North Twin Lake	*2194600*	*Japanese Knotweed*
Pine Creek	*1758900*	*Eurasian Water-Milfoil, Rusty Crayfish*
Rib Lake	*1469100*	*Aquatic forget-me-not (Myosotis scorpioides), Chinese Mystery Snail, Purple Loosestrife*
Richter Lake	*1760000*	*Rusty Crayfish*
Sackett Lake	*1764500*	*Chinese Mystery Snail, Purple Loosestrife*
Sailor Creek	*2164700*	*Chinese Mystery Snail, Narrow-leaf cattail (Typha angustifolia)*
Salem Lake	*2165100*	*Chinese Mystery Snail, Narrow-leaf cattail (Typha angustifolia)*
Shearer Lake	*2197600*	*Chinese Mystery Snail*
Silvernagle Creek	*1467400*	*Rusty Crayfish*
South Fork Eau Claire River	*2137000*	*Rusty Crayfish*
South Fork Yellow River	*2164600*	*Narrow-leaf cattail (Typha angustifolia), Rusty Crayfish*
South Harper Lake	*2204100*	*Chinese Mystery Snail*
Spirit Lake	*1513000*	*Chinese Mystery Snail, Curly-Leaf Pondweed, Rusty Crayfish*
Trappers Creek	*1758400*	*Curly-Leaf Pondweed, Rusty Crayfish*
Unnamed	*1466400*	*Chinese Mystery Snail*
Unnamed	*5008508*	*Chinese Mystery Snail*

Washington Creek	*1763200*	*Chinese Mystery Snail, Purple Loosestrife*
Wellington Lake	*1467800*	*Chinese Mystery Snail*
West Branch Big Eau Pleine River	*1432700*	*Eurasian Water-Milfoil*
Wood Lake	*1467100*	*Chinese Mystery Snail*
Yellow River	*2154500*	*Narrow-leaf cattail (Typha angustifolia), Rusty Crayfish*

Recommended Actions

1. **Continue to support AIS monitoring county-wide, and complete AIS surveys for any lakes that have not yet had AIS surveys completed or for new AIS occurrences.**
   a. Use CLMN-AIS monitoring protocol.
2. **Continue to update official AIS occurrences and monitoring effort records for all lakes and streams within Taylor County**
3. **Continue to encourage volunteer activities and update official AIS records**
   a. Clean Boats, Clean Waters
   b. Citizen Lake Monitoring Network
4. **Continue to network with the Taylor County lakes to implement any AIS-related elements outlined in each lake plan.**
5. **Assist Taylor Co in creating a county-wide waterway association as described in their Land and Water Resource Management Plan (LWRM).**
6. **Expand AIS monitoring and volunteer assistance to streams, rivers and wetlands.**

Step 2: Protect and Restore Native Vegetation

Terrestrial and emergent vegetation that grows along the banks of a water body is also known as the “shoreline buffer”. In many ways, this buffer indirectly helps to prevent invasive plant establishment in a lake:

1) The buffer protects the lake by reducing soil erosion and diverting nutrients that would otherwise enter the lake and provide fuel for nuisance-level aquatic plant growth.

2) A healthy shoreline buffer also provides biologically diverse and healthy habitats that are important to wildlife, including the native *Euhrychiopsis* weevils that are used for biological control of Eurasian watermilfoil.

3) Dense vegetative cover occupies areas that would otherwise be open and available to colonization by invasive species, and provides a degree of privacy to shoreline property owners.

Native vegetation is the lake's "immune system"

Shoreland, emergent and submersed plants all play an important role towards the health of a waterbody/wetland. They can reduce wave action and runoff thus reducing erosion. Reduced sediments from runoff and erosion as well the plants' ability to use nutrients in the water can improve water clarity. Healthy plant communities also benefit wildlife and keep space limited for non-native species to invade.

Taylor County shoreland regulations meet State minimums/maximums. These regulations require a 35-foot shoreline buffer zone above the ordinary high water mark, running parallel with the shore. Taylor County regulations allow for a 35 foot wide viewing corridor per 100 foot of shoreline frontage. Within the viewing corridor only pruning and trimming to provide a view of the water are allowed. Taylor County is proactive in managing any exotic or invasive species. Invasive species that are removed can replaced by replanting in the same area as soon as practical as stated in the shoreland zoning ordinance 31.07(d).

The shoreline buffer serves as the lake's "immune system", fending off new invaders. Encouraging landowners to follow this ordinance, or even go beyond the requirement, would be beneficial to the health of Taylor County's lakes.

Local government can protect shoreline buffers through policy and education. Taylor County Zoning can protect lake health with strong enforcement of shoreland zoning ordinances. In Taylor County, the shoreland zoning ordinance is routinely enforced, and with enforcement comes education. The county LCD also provides technical assistance with shoreland restoration or enhancement, and can assist landowners in locating cost-sharing options.

Starting in 2015, the Wisconsin Department of Natural Resources implemented its Healthy Lakes Initiative which provides technical assistance and information as well as potential funding for rain gardens, shoreline projects, fish sticks, and other related projects. It is meant to be a tiered approach focusing on various areas including nearshore water, shoreline, and land adjacent to the shoreline.

Tom Littwin, Waushara Co. LCD)

Shoreline in need of restoration

Tom Littwin, Waushara Co. LCD)

Same location after restoration

Use of newsletters, informational packets, news articles, videos, and previously completed restoration sights can be valuable tools to introduce the concept of shoreland restoration to landowners in Taylor County. These tools can help to illustrate what a healthy shoreline looks like, why it's beneficial to their property and the lake, and how a restoration project can be utilized to produce a healthy shoreline.

Educational campaigns can also play a role in promoting healthy shoreline buffers. It would be in the best interest of the County to provide a packet of information to new lakeshore property owners regarding aquatic invasive species and the importance of healthy shoreline buffers. The costs associated with producing this type of informational packet may be eligible for grant funding from the WDNR's Lakes Grant Program. Some lakes, for example, the Lake Helen Protection & Rehabilitation District in Portage County have created and distributed these packets for landowners on their lake. It is an easy way to ensure that new landowners are informed of pertinent regulations and ways to protect their lakeshore investment.

Native Aquatic Vegetation

Sometimes lakes plant native aquatic vegetation (Big Green Lake, Buffalo Lake and Lake Puckaway in Green Lake and Marquette Counties). The goal of these plantings is to increase diversity, create habitat, stabilize shorelines and bottom sediments, and utilize areas otherwise open for invasives. Although aquatic plants are commonly thought of as "weeds", a healthy and diverse population of native aquatic plants is a *vital* component in the prevention of aquatic invasive species. Research has shown that the abundance of EWM in a lake is inversely related to cumulative native plant cover (Madsen, 1998). For this reason, it is important to maintain healthy and diverse stands of vegetation. A thriving native plant population will compete for nutrients and living space, making it difficult for invasive species to become established. Benefits to maintaining native plant populations include:

- Improved value to desirable wildlife species and health of the sport fishery
- Protection against bank erosion and stabilization of bottom sediments

- Decreased likelihood of algae blooms resulting in increased water clarity

Recommended Actions

Volunteers and lake organizations are essential for early detection of AIS and maintenance of healthy lake

1. **County-wide promotion of native vegetation**
   a. Enforce shoreland zoning ordinances
   b. Annual review of shoreland zoning ordinances
   c. Annual review of funding for cost-sharing incentive programs
   d. Create or expand county ordinances to also address native *aquatic* vegetation
      1. Develop mechanism for enforcement of the new ordinance
   e. Create and distribute informational packets to new lakeshore property owners
   g. Promote native vegetation in news articles, citizen organization newsletters, and press releases

Step 3: Conduct AIS Monitoring

With the growing concern over the spread of aquatic invasive species to Wisconsin's inland lakes, many concerned citizens are looking for ways to get involved. AIS monitoring and volunteer boat inspection programs are opportunities to take a front-line defense against the spread of AIS.

Professional monitoring may occur on lakes however volunteer monitors are extremely beneficial to the lakes of the county. These volunteers are often lake residents, or just interested citizens of the county. **Free** training workshops are available to train volunteers on protocols of the Clean Boats, Clean Waters program, and also the Citizen Lake Monitoring Network program. Golden Sands RC&D can provide these trainings by request. These trainings ensure consistent monitoring and recording of events statewide.

Clean Boats, Clean Waters

Clean Boats, Clean Waters (CBCW) is a watercraft inspection volunteer training program sponsored by DNR, UW-Extension, and Wisconsin Lakes. Upon completion of the three-hour workshop, CBCW participants are equipped with the tools, knowledge, and confidence needed to educate lake users and perform watercraft inspections at boat landings, potentially preventing a new infestation from coming into their lake. An additional benefit of the CBCW program is that the data collected by volunteers is used to support requests for more funding and legislative support for AIS issues.

Citizen Lake Monitoring Network

The Citizen Lake Monitoring Network is a well-established program designed to involve citizens in collection of pertinent lake management data. The program includes the collection of water chemistry, aquatic invasive species, native plants, and water clarity data.

Recent research has developed solid correlations between Secchi readings and many other water quality parameters. Therefore, this one inexpensive, easy-to-operate sampling tool can tell our lake managers a great deal about a lake's condition. To have Secchi monitors on every lake in Wisconsin would be a terrific advantage for managing our state's lakes.

A Secchi disc, which is lowered into the water to measure water clarity

A component of the CLMN program trains volunteers to monitor for eleven aquatic invasive species. The data collected by volunteers in the CLMN-AIS program is used to support requests for more funding and legislative support for AIS issues. Citizens can monitor for any or all of the species included in the program. Monitoring means early detection of new AIS infestations, and can result in huge savings in treatment expenses and a reduction of impacts to the lake. Ideally, every lake would have trained AIS monitors.

The Taylor County Land Conservation (LCD) Department is also a valuable group that could serve as monitors. LCD staff works throughout the county, frequently at waterfront locations and at stream locations. The Taylor County LCD manages lands adjacent to Chelsea, Diamond, Sackett, Shearer, Spruce, Wellington and Wood Lakes, Miller Dam (Chequamegon Waters) and Camp Eight Flowage. LCD staff should be trained to identify and report new AIS sightings, and they could provide valuable assistance with early detection. Annual "refresher" training on AIS is recommended for LCD Department staff each year.

Recommended Actions

1. **Promote CLMN-AIS monitoring activity on all Taylor County lakes**
   a. Promote the CLMN-AIS monitoring program county-wide, with frequent news articles to promote awareness of the program and the importance of it.
   b. Offer CLMN-AIS training workshops county-wide through the Regional AIS Program.

2. **Promote CLMN-Secchi and CLMN-Chemistry monitoring activity on all Taylor County lakes**
   a. Promote the CLMN-Secchi and CLMN-Chemistry monitoring programs county-wide, with news articles to promote awareness of the program and the importance of it.
   b. Offer CLMN-Secchi and CLMN-Chemistry training workshops county-wide through the Regional AIS Program with assistance from CLMN personal.

3. **Encourage watercraft inspections on all Taylor County lakes**
   a. Promote the Clean Boats, Clean Waters program county-wide, with frequent news articles to promote awareness of the program and the importance of it.
   b. Offer CBCW training workshops county-wide through Regional AIS Program.

4. **Train County staff to identify and report AIS sightings**

Step 4: Spread the Word about AIS

Increasing public awareness of AIS is an important strategy in minimizing their spread. To facilitate proactive efforts from the general public regarding AIS prevention, people need to be made aware of the problems that AIS can cause.

Youth involvement in AIS management

Students and youth organizations can get involved in AIS issues through purple loosestrife beetle rearing programs for biological control. This program includes an instructional manual for utilizing the beetle-rearing project as an educational tool. Interested individuals can contact Taylor County LCD, UW Extension Office or Golden Sands RC&D for information.

Since 2015, Golden Sands RC&D has partnered with local schools in Taylor County schools to add a lesson on invasive species to the curriculum. The potential for interest in other invasive species-related projects should be initiated at local schools. This will continue into 2018.

To Report an Infestation

1) **Collect a sample, if possible**
   a. Roots, stems, flowers
   b. Place in plastic bag with water
   c. Keep it in the freezer

2) **Contact DNR**
   Kevin Gauthier, Water Resource Management Specialist
   715-356-5211

How else can youth get involved? Kids have a great time at volunteer EWM “pulling parties”, performing watercraft inspections at boat landings, helping with purple loosestrife rearing projects, removing buckthorn or participating in the CLMN-AIS monitoring program. These are all great ways for lake groups to include youth in their AIS activities. Medford school has participated in buckthorn removal along the city River Walk for several years.

Medford 5th grade volunteers removing buckthorn along the river walk.

Citizen Involvement

Attending workshops and conferences on lake issues and AIS issues is a great way for lake residents to learn about protecting the health of their lake. Citizens county-wide are encouraged to attend events like this. Some lakes host annual Lake Fairs, and the Wisconsin Lakes hosts an annual statewide Lakes Convention, which provides valuable training for both citizens and professionals.

Samples are discussed and identified.

Outreach materials

Other methods of public education and outreach include the distribution of AIS materials such as pamphlets, videos, brochures, and “watchcards” developed by DNR, Golden Sands RC&D and UW-Extension. These can be ordered free or at a minimal cost through Golden Sands RC&D or at: http://dnr.wi.gov/invasives/aquatic/pdfs/PubCatalogue.pdf

These publications can be distributed through local bait shops, dive shops, boat rental and sales shops, local chambers of commerce, resorts, restaurants, and other local businesses.

News articles in local papers can also be very effective ways to reach lake users. Articles can discuss specific AIS species, laws and ordinances, or volunteer programs. Some counties have also printed AIS placemats or bar coasters to distribute to restaurants near water bodies.

Signs at the boat landings can be another tool for education and outreach. The DNR had posted all public landings in the state with “Exotic Species Advisory” signs (if the lake had confirmed AIS), or with “Prevent the Spread” signs (if the lake had no confirmed AIS). New AIS signs were developed by the state and have been posted at all Taylor County public boat landings. They replaced three old signs with one comprehensive sign. If any signs are damaged or missing, this should be reported to DNR, Taylor County LCD or Golden Sands RC&D immediately.

"Prevent the Spread" sign

"Stop and Remove" sign

"Exotic Species Advisory" sign

The three previous DNR boat landing signs relating to AIS have been replaced with one comprehensive sign.

Dan Dufek

Some citizen groups have created additional boat landing signage to reinforce the AIS message to lake users. These projects are eligible for funding assistance from the DNR AIS Grants Program.

A common method for aquatic invasive species to be introduced to water bodies is through water gardening and aquarium practices. Many of the plants that are desirable for water gardens and aquaria are fast growers, can tolerate a wide range of conditions, and are extremely strong competitors. These are exactly the characteristics that describe an invasive species. If these plants are released, they can quickly destroy the balance of our native ecosystems. A possible solution to this important issue would be to work with distributors of water garden plants, and encourage them to insert a "Do not release to waterways" plastic stake into each pot. These stakes could also have a website printed on them for the consumer to visit if they wish to learn more about AIS and the dangers of releasing non-native species. WDNR has some of these stakes available at no cost. Water hyacinth and non-native water lilies are examples of water garden plants that have been found in state waters in recent years.

Recommended Actions

1. **Promote beetle-rearing projects for biological control of purple loosestrife**
   a. Continue to promote to schools/libraries/4-H/boy and girl scouts

b. Promote to citizen groups, volunteers, and other youth groups
c. Target lakes and wetlands with reported purple loosestrife infestations

2. **Promote lake fairs, workshops, and conferences to lakeshore residents county-wide**
   a. Newsletter notices and press releases
   b. Email notices
   c. Website – Taylor County, Golden Sands RC&D or UW Extension Lakes

3. **Print AIS information for distribution in restaurants that are near lakes**

   a. AIS newsletter/brochures
   b. AIS coasters or placemats

4. **Submit news articles**
   a. New AIS species to watch for (flowering rush, EWM, CLP, water hyacinth, other)
   b. AIS prevention
   c. Updates in AIS laws and upcoming events
   d. Volunteer programs available

5. **Offer to assist local schools with AIS-related curriculum projects**

   a. AIS lessons/presentations
   b. AIS specimens and materials for biology or environmental classes with AIS sections.

6. **Maintain AIS signage at boat landings**
   a. Include reporting procedures for damaged boat landing signs in AIS training to county staff.
   b. Update AIS signs as needed. Incorporate walk in access/wading AIS signs where appropriate.

7. **Staff AIS education table/booth/display at public outreach events**

   a. Taylor County Fair
   b. Specialized events (Westboro Fish & Wildlife Club fishing contest, tournaments)
   c. Taylor Co Youth Expo

8. **Encourage water garden suppliers to insert "Do not release to waterways" stakes into pots containing a known AIS**

Step 5: Distribute the Workload

Managing invasive species, even on a proactive level, can be a tremendous workload. By distributing the workload and allocating tasks per individual interest, a great deal can be accomplished.

In Taylor County, various tasks are being accomplished by the County LCD and individuals. The Regional AIS Program's role has been to collect information about those activities, to coordinate them, and fill in the gaps. Since the AIS workload is not expected to disappear, this program should be considered a permanent need, and funding secured to keep the position filled.

Recommended Actions

1. **Secure funding to continue the Regional AIS Program in Taylor County**
    a. Taylor County
    b. Lake associations and districts
    c. Local, Regional, and State Grants
    d. Citizens

Step 6: Involve Local Government

Local town or county governments can be wonderful resources to tap into for AIS matters. Below are a few creative ways that local government actions have been beneficial in community AIS efforts.

Town Government
Grant sponsorship—many town governments in Wisconsin have recognized an increasing need and inherent responsibility to support local lake and stream management efforts. Town governments can take an active role in the sponsorship of state lake grants. Lake or stream associations can work directly with their town boards to support grant applications on AIS-focused projects or other lake management projects. To learn more about the state lake grant programs, visit http://www.dnr.wi.gov/lakes/grants .

County Government
Community AIS partnerships—County governments can offer a unique community support system pertaining to AIS efforts. Counties can coordinate and encourage townships to work together in unified lake protection efforts. One method of accomplishing this is by supporting an AIS program to coordinate AIS activities within the county.

Law Enforcement—local Conservation Wardens, Water Guards, and boat patrols are an important resource for volunteers regarding the "Illegal to Transport" law. This law makes it illegal for anyone to transport aquatic vegetation or animals like zebra mussels on a watercraft or associated equipment. CBCW volunteers active in the county may need to submit violation report forms to the local law enforcement for follow up. Good cooperation between local law enforcement and CBCW volunteers is important.

Grant sponsorship—County government can take an active role in the sponsorship of state-administered AIS grants. Counties can help local lake associations seek grants for many types of lake protection projects, including projects focused on AIS issues. County governments can also

initiate AIS projects to be completed by County personnel. The AIS program can be funded through the AIS grant program with the DNR to accomplish such projects as AIS partnership coordination, volunteer monitoring support, educational campaigns, and more.

Conservation departments—the actions of Land Conservation Departments (LCDs) are directed by elected county board supervisors. LCD personnel are natural resource management professionals and are often well-versed in many aspects of AIS matters. The LCD is a natural home for county-wide lake protection and AIS initiatives, such as supporting an AIS program, enforcing and promoting shoreline buffers, and assisting with shoreland restoration or enhancement projects.

Recommended Actions

1. **DNR Water Guard, Conservation Warden, and local boat patrol support of AIS program boat inspectors and volunteer boat inspectors**
2. **Local Police and Sherriff's Department support**
3. **County LCD continue AIS involvement through support of AIS program**
4. **Create county AIS ordinances**

Step 7: Plug in to the Lakes Community Network

Wisconsin is proud of its lake-rich heritage, and is host to hundreds of lake organizations. It is important for lake groups and lake managers to stay well connected with the "lakes community" and to stay up-to-date on local and state lake stewardship issues.

Below are suggestions on networking within the lakes community.

Statewide Lake Organizations
Wisconsin Lakes (formerly Wisconsin Association of Lakes) is a non-profit statewide lake group working to protect Wisconsin's lakes through public policy, education, and local lake group assistance. Through Wisconsin Lakes, the lakes community can stay updated on current public policies that may ultimately affect the health of lakes throughout Wisconsin. They can also attend annual regional workshops that target key lake issues, and gain the support they need for individual lake group projects. For more information about Wisconsin Lakes, log onto their website at http://www.wisconsinlakes.org.

Lake managers with the DNR and UW-Extension come together at monthly Lake Team meetings to keep up-to-date with emerging lake issues, policies, and science. County AIS Coordinators have been invited to join this circle to stay in tune with DNR and UW-Extension initiatives. This is a highly recommended network for Taylor County's AIS program staff to stay in touch with.

DNR and UW-Extension AIS staff have begun holding semi-annual meetings for county AIS Coordinators, to update coordinators with regard to state initiatives, new available resources, policy changes, and to give coordinators around the state a chance to network. This is another highly recommended network for the Taylor County AIS program staff to stay in touch with.

Creative Kids

"Milfoil Masters" was a creative school project that kids from Minocqua-Hazelhurst-Lake Tomahawk Middle School came up with. Working off of a $25,000 start-up grant, their idea evolved into the Clean Boats, Clean Waters program, which is now the statewide protocol for slowing the spread of AIS.

Statewide Lakes Convention

The Wisconsin Lakes Convention is an outstanding educational event that has brought hundreds of lake groups, state leaders, and natural resource professionals together in a celebration of Wisconsin's lakes. The convention is an excellent opportunity for learning, sharing, and discussing issues important to lake management. For more information about the annual Wisconsin Lakes Convention, log onto the UW-Extension Lakes Program website at http://www.uwsp.edu/cnr/uwexlakes. This convention is a highly recommended opportunity for the Taylor County AIS Coordinator and representatives of the County LCD or individual lake groups.

County-wide Citizen Organizations

County-wide citizen organizations provide an excellent opportunity to stay connected with the local lakes community, and share resources between citizen organizations in the county. Membership in a county-wide citizen organization offers a collective voice for advocating for regulatory changes, influencing public policy discussions, and discussions regarding the future growth of the community. County-wide Lakes Associations are great examples of this. Creation of a Taylor County Lakes Association would be a very useful and proactive step towards education and prevention of AIS.

Individual Citizen Organizations

Citizen groups range from informal social groups to formalized lake associations or districts. An organized, functional citizen group can make a big difference in lake health protection. Citizen groups can be twice as effective when networking with other lake organizations who have struggled with similar issues—lack of funding, lack of volunteer interest or commitment, or lack of information, to give a few examples. Training opportunities like the Lake Leaders Institute,http://www.uwsp.edu/cnrap/UWEXLakes/Pages/programs/lakeleaders/default.aspx , is another great way for individuals to improve their knowledge, interactions, and involvement with their lakes and other lake residence. Only a portion of Taylor County's lakes have formal organizations. More lakes need to be encouraged to form DNR approved associations or districts.

Recommended Actions

1. **Keep AIS program staff networked with the "lakes community"**

a. Wisconsin Lakes
b. Statewide Lake Team
c. AIS Coordinators' meetings

2. Promote attendance at the Wisconsin Lakes Convention

a. AIS program staff
b. Local governments
c. Lake groups or other citizen groups

3. 100% inclusive county lakes network, with a contact person to disseminate news and information through, even on lakes/streams without organized citizen groups

Step 8: Be Creative!

Just as each lake is unique, so are the individuals that make up lake organizations. There is no "one size fits all" management criteria made to fit all lake or county situations.

The important similarity between lakes is that they all need a plan of action that is conducive to a healthy lake ecosystem and is realistic in time, money, and commitment. Consider using several of the proactive management steps for the best results.

This plan's proactive management steps are ideas to help spur thoughts that fit Taylor County's lake management situation, but sitting down with lake residents to brainstorm ideas can be very valuable. The important thing is that the County and the residents DO talk about it. Wisconsin waterways will always be vulnerable to invasions of aquatic invasive plants and animals. Proactive management is the best way of avoiding future AIS infestations.

Implementation Schedule: Recommended Actions					
Proactive Step	**Recommended Action**	**Who**	**How**	**When**	**Progress**
1) Gather info about AIS	Continue AIS monitoring county-wide, assist lakes without recent AIS surveys	AIS program with support of LCD	Letters, emails, phone calls	ongoing	√+
	Update official AIS records in SWIMS	AIS Program	Confirm reports with vouchers, enter into WDNR's SWIMS database	ongoing	√+
	Update AIS volunteer activity record	AIS Program	Confirm activity from database, create table in SWIMS	ongoing	√+
2) Protect and Restore Native Vegetation	Enforce shoreline zoning ordinances	Zoning	Established process	ongoing	√+
	Annual review of zoning ordinances	Zoning	Established process	ongoing	√+
	Annual review of cost-sharing funding	LCD	Established review process	annually	√+
	Create/expand county ordinances to address native aquatic vegetation	Zoning/LCD	Through ordinance process	2018+	
	Create/distrib. Info to property owners	LCD, citizen groups	Emails, mailings, hand-deliver to lake residents (citizen groups)	2018+	
	Promote native veg. in articles and press rel.	AIS Program	Write and submit press releases	ongoing	√+
3) Conduct AIS Monitoring	CLMN-AIS monitoring activity on ALL lakes	Citizen groups	AIS Program will train volunteers	ongoing	IP
	CLMN-Secchi monitoring activity on ALL lakes	Citizen groups	UWSP-CLMN will train volunteers	2018+	IP
	Watercraft inspectors at landings	AIS Program, citizen groups	AIS Program will train volunteers and hire inspectors	ongoing	IP
	Train County staff to identify and report AIS sightings	AIS Program	AIS Program will train county staff	annually	√+
4) Spread the word about AIS	Promote beetle-rearing projects for biological control of purple loosestrife	LCD., AIS Program	Contact schools and groups, and offer supplies, training, and rearing facility.	ongoing	√+
	Promote lake fairs, workshops, and conferences to County lakeshore residents	AIS Program, LCD	Emails through network maintained by county or RC&D website	ongoing	√+

	Print AIS placemats or coasters	AIS Program, Citizen groups	AIS Program can assist with text/photos	2018+	√+
	News articles	LCD, AIS Program	Write and distribute press releases	ongoing	√+
	Assist local schools with AIS-related curriculum	AIS Program	Take AIS lesson plan into classrooms upon request, assist with projects as requested	ongoing	√+
	Maintain AIS signage at boat landings & walk in access points	AIS Program	Keep record of boat landing signage, train others to collect signage info	ongoing	√+
	Work with water garden suppliers & pet stores	AIS Program	Offer AIS posters, stakes to suppliers	ongoing	IP
	Staff AIS education table at public outreach venues	AIS Program	Staff table and offer information to public	ongoing	√+
5) Distribute the workload	Secure funding to continue the AIS Program in Taylor County	AIS Program	Apply for DNR grant to continue program, engage other partners	ongoing	√+
6) Involve local government	Water Guard and local Warden support of AIS program boat inspectors and volunteers	AIS Program	Coordinate with DNR Water Guards and Conservation Wardens to enforce AIS violations	ongoing	√+
	County LCD continue AIS involvement through support of AIS Program	LCD	Continue to place AIS in high priority, and provide County match on AIS grant	ongoing	√+
7) Plug into the lakes community network	Keep AIS Program staff networked with the lakes community	AIS Program	Attend WI Lakes Convention, Lake Team meetings, and AIS Coordinator meetings	ongoing	√+
	Promote attendance at the Wisconsin Lakes Convention	AIS Program	Email notices to contacts and word of mouth	ongoing	√+
	100% inclusive county lakes network	AIS Program, LCD	Send emails through distribution list & work to create county lakes assoc.	ongoing	√+

Symbol Key

√ Complete √**+** Complete and ongoing **IP** In Progress **LCD** Land Conservation Department

Appendix A – Contacts List

County

Ben Stanfley, County Conservation Engineer
Taylor County Land Conservation Dept.
925 Donald Street, Room 104, Medford, WI 54451
(715) 748-1469 Ben.Stanfley@co.taylor.wi.us

Kyle Noonan, Administrator
Taylor County Zoning Department
224 South Second Street, Medford, WI 54451
(715) 748-1415 Kyle.Noonan@co.taylor.wi.us

Region

Amy Thorstenson, Executive Director
Golden Sands Resource Conservation & Development Council, Inc
1100 Main Street, Suite 150, Stevens Point, WI 54481
(715) 346-1264 Amy.Thorstenson@goldensandsrcd.org

Chris Hamerla, Regional AIS Coordinator
Golden Sands Resource Conservation & Development Council, Inc
1100 Main Street, Suite 150, Stevens Point, WI 54481
(715) 343-6278 Chris.Hamerla@goldensandsrcd.org

State

Kevin Gauthier, DNR Lakes Biologist/Water Resources Management Specialist
Wisconsin Department of Natural Resources
8770 HWY J, Woodruff, WI 54568
(715) 356-5211 Kevin.GauthierSr@wisconsin.gov

Scott Provost, DNR Lakes Biologist/Water Resources Management Specialist
Wisconsin Department of Natural Resources
472 Griffith Ave., Wisconsin Rapids , WI 54494
(715) 421-7881 Scott.Provost@wisconsin.gov

University of Wisconsin Extension – Lakes Program
College of Natural Resources, University of WI – Stevens Point
800 Reserve St., Stevens Point, WI 54481
715-346-2116 http://www.uwsp.edu/cnr/uwexlakes

Paul Skawinski
Citizen Lake Monitoring Network Coordinator, Stevens Point, WI 54481
715-346-4853 Paul.Skawinski@uwsp.edu

Erin McFarlane
Clean Boats, Clean Waters Volunteer Coordinator, Stevens Point, WI 54481
715-346-4978 Erin.McFarlane@uwsp.edu

Wisconsin Lakes
One Point Place, Suite 101, Madison, WI 53719
608-662-0923 or toll-free (WI only) 800-542-5253 http://www.wisconsinlakes.org

Appendix B – Aquatic Plant Management Laws & Regulations

Regulated and Unregulated Aquatic Plant Management Activities in Waters of Wisconsin

Activities	**Water Bodies**					
	Wetlands (non-navigable)[1]	Streams	Flowages	Lakes <10 acres entirely confined on one property	Lakes	Fish farms w/controllable outflows(s. 95.96)
Manual removal of native plants	No Permit	109 Permit required	109 Permit required if > 30ft wide	No Permit	109 Permit required if > 30ft wide	No Permit
Manual removal of exotic plants*	No Permit*	No Permit*	No Permit*	No Permit*	No Permit*	No Permit*
Mechanical harvesting	No Permit	109 Permit required	109 Permit required	No Permit	109 Permit required	No Permit
Chemical control	107 Permit required	107 Permit required	107 Permit required	107 Permit required	107 Permit required	No Permit
Biological control[2]	Stocking permit required	Stocking permit required	Stocking permit required	Stocking permit required	Stocking permit required	No Permit
Burning	No Permit	Permit required	Permit required	Permit required	Permit required	No Permit
Purple loosestrife control[3]	107 Permit required	107 Permit required	107 Permit required	107 Permit required	107 Permit required	No Permit
Native planting/stocking	No Permit	No Permit	No Permit	No Permit	Approval of Project	No Permit
Non-native planting/stocking	109 Permit required	109 Permit required	109 Permit required	109 Permit required	109 Permit required	No Permit
Incidental or scientific removal	No Permit	No Permit	No Permit	No Permit	No Permit	No Permit

- All activities must be conducted in an environmentally sound manner.
- All activities on privately owned land or land adjacent to privately owned lakefront property, or lakes confined on the property of one person must have the permission of that property owner.
- * As long as native plants are not removed during the process.

[1]Confirm with DNR Water Management Specialist that wetland is non-navigable to be exempt of permit.

[2]Use stocking permit for Eurasian watermilfoil weevils, form 9400-60, pursuant to s. 29.753 and NR 19.05.

[3]Must be a state cooperator if using purple loosestrife beetles for biocontrol.

Exerpted from “Aquatic Invasive Species: A Guide to Proactive and Reactive Management”, Carolyn Scholl, Vilas County LWCD, May 2006

Appendix C – List of Lake Associations and Districts

This list was generated from information on the UW Extension Lakes webpage, in the Taylor Co Land and Water Resource Plan and the AIS Coordinator’s personal contact with various groups. Note that the ten listed groups cover fourteen lakes.

- Diamond Lake Association
- Hammel Lake District 1 (covers Mud [Martin], Clear and Esadore Lakes. Formerly Esadore Lake Association – 2017)
- Harper Lake Association (covers North and South Harper Lakes)
- Hulls Lake Association
- Kathryn Lake Association
- Miller Dam Association
- Mondeaux Lake Association
- Rib Lake Protection & Rehabilitation District
- Richter Lake Association
- Spirit Lake Association (covers North and South Spirit Lakes)

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