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Sawyer County
Aquatic Invasive Species
Strategic Plan
2015

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."

~Aldo Leopold

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The Sawyer County AIS Strategic Plan was developed under an Aquatic Invasive Species grant from the Wisconsin Department of Natural Resources.

Cover Photo

Windigo Lake taken by: Kelly Nechuta

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Glossary of Acronyms

AIS	Aquatic Invasive Species
CBCW	Clean Boats Clean Waters
CLP	Curley-leaf Pondweed
EWM	Eurasian Watermilfoil
GIS	Geographic Information System
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
LCC	Land Conservation Committee
LWCD	Land and Water Conservation Department
NPS	National Parks Service
UWEX	University of Wisconsin Extension
WAL	Wisconsin Association Lakes
WDNR	Wisconsin Department of Natural Resources
ZAC	Zoning and Conservation

AIS Goal: The goal of the Sawyer County AIS Strategic Plan is to provide a document to guide lake associations, individuals, and other organizations in their efforts to educate, control, and prevent aquatic invasive species.

Sawyer County AIS Program

Sawyer County created an Aquatic Invasive Species Program in May, 2006 with funding from a Wisconsin Department of Natural Resources Aquatic Invasive Species grant. The primary goal of the program has always been to prevent the introduction or spread of aquatic invasive species in Sawyer County waters. Objectives of the program have included education of the public about AIS issues, map and monitor aquatic invasive species in Sawyer County, ensure lake associations have assistance to properly manage AIS issues, and provide displays and materials to spread the work about AIS.

Since 2006, the AIS Coordinator, along with Sawyer County Zoning and Conservation staff have made hundreds of lake visits, presented information to many lake associations, and have assisted on many lakes throughout the county with AIS issues. As of 2014, few lakes have aquatic invasive species in Sawyer County that do not have a control plan in place.

Assistance has been given to lakes with Eurasian Watermilfoil, purple loosestrife, curly-leaf pondweed, mystery snails, flowering rush, and any other AIS or unusual native plant that caused concern. With no one specifically working on AIS in the Hayward Department of Natural Resources office, the Sawyer County program has been of real benefit.

Plan Goals and Actions:

Goal 1: Educate Sawyer County's recreational community regarding AIS problems and prevention

- Sawyer County will provide materials to lake associations, residents, business, and local groups to educate lake users about aquatic invasive species.
- A display will be kept up-to-date on aquatic invasive species for use at lake association meetings, picnics, and other events. The display will be loaned out for any event that will reach an audience to be educated on AIS.
- Identification material will be kept in the Land and Water Conservation office. Materials will be provided, to aid in identification, upon request.

Goal 2: Prevent the introduction of AIS into Sawyer County

- Sawyer County ZAC will encourage lake associations/groups to establish a Clean Boats, Clean Waters for their lakes access points.
- Sawyer County's AIS coordinator will train interested participants in Clean Boats, Clean Waters protocols to serve as landing monitors to prevent AIS from being transported to and from Sawyer County lakes.
- ZAC staff will replace AIS boat landing signs when signs are damaged or missing, or will contact the DNR about sign placement.
- ZAC will encourage Citizen Lake Monitoring Network (CLMN) programs by lake associations.

Goal 3: Monitor lakes in Sawyer County for AIS

- The AIS Coordinator will continue to survey lakes for native vs. non-native plant growth trends.
- Sawyer County ZAC staff will identify plants that are brought in to determine native or non-native.

Goal 4: Purple Loosestrife Control and Prevention

- Sawyer County currently harvests *Galarucella* beetles for redistribution to other areas of Purple Loosestrife.
- Sawyer County has experimented in beetle rearing. However due to remote locations frequent monitoring is difficult. Future plans include beetle rearing at Purple loosestrife infested sites.
- Purple Loosestrife control will also be accomplished through a cut and dabbling method.
- Educate different user groups on transportation of plants and soil

Goal 5: Eurasian Watermilfoil Control and Prevention

- Currently Sawyer County has identified eleven (11) lakes having EWM. Sawyer County's goal is to prevent future infestation by:
- Maintaining documentation, levels of infestation, and management of AIS in county
- Provide expert advice on available AIS management options and funding.
- Encourage lakes associations to implement watercraft inspection programs at boat landings.

Goal 6: Curly-leaf pondweed Control and Prevention

- Currently Sawyer County has identified eleven (10) lakes having CLP. Sawyer County's' goal is to prevent future infestation by:
- Maintaining documentation, levels of infestation, and management of AIS in county

- Provide expert advice on available AIS management options and funding.
- Encourage lakes associations to implement watercraft inspection programs at boat landings.

Goal 7: Other AIS Control and Prevention

- Currently Sawyer County has identified Rusty Crayfish, Chinese mystery snail, and Banned mystery snail in various lakes thought the county. However, currently there are few acceptable treatment methods for the aforementioned species. Therefore, education and prevention are our best tools.

Goal 8: New infestations Control and Prevention

- Sawyer County ZAC prefers a proactive approach to new AIS infestations. We work hard to keep new infestations out of Sawyer County through CBCW programs and other education outlets. However, new infestations reported to, or sighted by, Sawyer County ZAC will be dealt with rapidly. Sawyer County ZAC will ascertain proper management or eradication protocols.

Aquatic Invasive Species and Sawyer County

Aquatic invasive species (AIS) are an on-going concern throughout Wisconsin. They have been increasing at a steady rate throughout the past two decades. Aquatic Invasive Species are defined by the Wisconsin Department of Natural Resources (WNDR) as:

Plants, animals and pathogens that are "out of place". A species is regarded as invasive if it has been introduced by human action to a location, area, or region where it did not previously occur naturally (i.e., is not native), becomes capable of establishing a breeding population in the new location without further intervention by humans., and spreads widely throughout the new location.

In Sawyer County, many people appreciate the abundance of lakes, rivers, beautiful landscapes and variety of wildlife the county possesses. However, many are unaware of what aquatic invasive species are. Unfortunately, sometimes people overlook the harmful plants, animals and microscopic organisms that also exist in nature, transforming it. This puts Sawyer County's biological richness and diversity at risk.

Invasive species can create serious and often irreversible effects on our lakes. Eradication of established infestations is nearly impossible and control measures can become controversial and expensive. Although each species has unique characteristics, they all portray common harmful impacts. They are successful because they have few natural predators, and are aggressive, prolific and mature early. AIS are spread mainly through human interaction. Boaters launching, transporting via trailers and recreational equipment are the most common inlets. However, water gardeners, aquarium owners, seaplanes and natural dispersal are also guilty parties. Addressing AIS concerns on a state and local level is essential, considering the potential for them to transfer from one water body to the next is centered around people and their activities.

The following are aquatic invasive species of concern throughout Wisconsin. Refer to Appendices A&B for present Sawyer County AIS locations.

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Eurasian Watermilfoil(*Myriophyllum spicatum*)

History: Eurasian Watermilfoil is a submersed aquatic plant originating in Europe, Asia, and North Africa. It was introduced to Wisconsin in the1960's, and is the only non-native milfoil found in the state. As of April, 2008, it is currently found in 452 Wisconsin lakes and is of the greatest concern in Wisconsin.

Identifying Characteristics: Eurasian Watermilfoil has feather-like leaves, and lay flat along stem when pulled out of the water. There are usually12-21 leaflets per leaf, which are arranged in whorls (circles) of three to five around the stem. Native milfoils typically have 7-11 leaflets. It can grow in depths of 6-20 feet of water. The upper part of the plant usually resembles a red or pinkish color, although some native species of watermilfoils also have pink stems.

Life Cycle: Eurasian watermilfoil starts growing when the temperature reaches 50^{o}F, and begins growing earlier than the native watermilfoils. It produces seeds and runners, although the main method of reproduction is through vegetative fragmentation from boats and wave action. The floating fragments sprout roots, and eventually sink to the lake bed where they will root and start a new colony. Unlike other plants, Eurasian watermilfoil does not produce turions (over wintering vegetative buds).

Impacts: Eurasian watermilfoil poses a serious threat to a lake's native aquatic plant community, and to the animals that depend on the native vegetation. It forms thick Vegetative mats that spread horizontally across a lake's surface, and intertwines with native vegetation. It out competes native vegetation used by fish, waterfowl and other animals. It also hampers recreational uses like fishing, boating, and swimming. Additionally infestations and can lead to degraded water quality and algal blooms. Under significant infestations, channels are cut to allow access from the shoreline, out into deeper water.

Treatment Methods: Once Eurasian watermilfoil is well established in a lake, it is nearly impossible to eradicate. However, it is important to remember it doesn't cause severe problems in every water body it is found in. Physical, chemical, mechanical and biological measures are available to help control it. When early detection growth occurs in small areas, the best chance to inhibit growth is to hand pull it out when it is first observed. Raking shallow areas of the lake bottom also works well to reduce the spread. For larger infested areas, herbicide treatment is an option, although it can be disruptive to native vegetation and become very expensive .*A Wisconsin DNR permit is required for all chemical treatments.* Mechanical harvesting temporarily removes milfoil canopies and increases growth of native plants, however also causes a lot of fragmentation. Biological control occurs from a small native weevil that feeds on native milfoils, although it prefers Eurasian. Overtime, weevils can impact the population, but complete eradication is unlikely.

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Curly-leaf Pondweed (*Potamogeton crispus*)

History: Curly-leaf pondweed is a submersed aquatic plant originating in Eurasia, Australia and Africa. It was accidentally introduced into the United States when the common carp was brought in during the 1800's, and eventually into Wisconsin in 1905. Before the introduction of Eurasian watermilfoil, curly- leaf pondweed was considered the largest nuisance aquatic plant in the Midwest. ***Identifying Characteristics:*** Curly-leaf pondweed can be recognized by its stiff reddish-green "lasagna- like" looking leaves. They area about 3 inches long, finely toothed along the edge, and alternate along the stem. The stem of the plant is flat and reddish-brown. Like Eurasian watermilfoil, curly-leaf pondweed can grow in a variety of water depths, usually up to15 feet.

Life Cycle: Curly-leaf pondweed does reproduce and spread by seed, although vegetative buds called *turions* are the primary role. Turions are hard compacted vegetated buds that resemble small conifer cones, and are produced along the stem of the plant.

Curly-leaf pondweed is unique because it can start growing under the ice before any other plant, making it one of the first plants to emerge in the spring. A few days after ice out, it begins to grow more rapidly. In mid-summer, when most aquatic plants are still growing, curly-leaf pondweed begins to die off, dropping its turions on the lake bed to begin new plant growth. It completes its life cycle by late June or early July. It is tolerant of disturbance and can grow in most any type of water conditions.

Impacts: Because curly-leaf pondweed can grow so early, it can out-compete native plants in the spring. It forms thick mats across the surface, interfering with aquatic recreation. In the summer when curly-leaf pondweed dies off, the decaying plants release nutrients, such as phosphorus, which cause severe algal blooms and unpleasant smells along shorelines. Plant die-offs also result in a loss of dissolved oxygen, an essential component for all aquatic life forms. ***Treatment Methods:*** Like Eurasian watermilfoil, once curly-leaf pondweed is well established in a lake, it is nearly impossible to eradicate, but physical, chemical, and mechanical measures can be taken to help control it. To have the maximum benefit of control, chemical control efforts should be done in the spring or early summer, while the native plants are still dormant. *It is important to remember, a WDNR permit is required for chemical treatment*

Purple Loosestrife (*Lythrum salicaria)*

History: Purple Loosestrife is an attractive wetland plant originating from Europe. It was first introduced as a garden perennial during the1800's.The plant was first detected in Wisconsin in the early1930's,but remained uncommon until the 1970's.Currently,there area bout 24statesthat have laws prohibiting the import or distribution of purple loosestrife because of its aggressive invasive characteristics. It is now widely dispersed throughout the state, and has been recorded in 70 of Wisconsin's 72 counties.

Identifying characteristics: Purple loosestrife is a 3-9foot semi-woody plant that has a square stem with smooth, opposite leaves. It has showy purple to pink flowers with 5-6 petals that are formed into numerous long spikes that bloom from July to September. It also has a large woody taproot with fibrous rhizomes that form a dense underground mat. Its optimal habitat includes marshes, stream and lake edges, and wet meadows, although is also tolerant of moist soil and shallow water sites, such as pastures and road ditches. It has been planted in lawns and gardens, which is often how it is introduced to wetlands, lakes and rivers.

Life Cycle: Purple Loosestrife can germinate in a variety of soil types, although optimum sites for growth include moist soil with neutral to slightly acidic pH. It spreads mainly by seeds, but also by its large underground taproot. A single stalk can produce between100,000 to 300,000 seeds per year, seed survival is between60-70%, resulting in an extensive seed bank. Mature plants can release more than two million seeds in a single year! Even seeds that fall in water, can survive approximately 20 months. Plants may be quite large and several years old before they begin flowering. It is difficult to look for non-flowering plants, so the best time to spot PL is mid-summer when they are flowering.

Impacts: Purple loosestrife grows faster and taller than most native wetland plants creating a monotypic plant community. Once established on a lakeshore or adjacent wetland, it displaces native plants and reduces wildlife habitat. As native vegetation is displaced, rare plants are often the first to disappear. Thick stands of purple loosestrife can choke out recreational waterways, and eventually over run large acres of wetlands. This can result in a loss of wetland biodiversity and functionality.

Treatment Methods: Prevention is the best way to control the spread of purple loosestrife. It is important to look for pioneering or small isolated colonies and target them for control. It is easiest to spot the plant while it is flowering in mid-summer. Mechanical, chemical, and biological methods are used to control purple loosestrife. Small young plants can be hand pulled, while older and taller plants can be dug up with a shovel. It is important to try to dig up as much of the root as you can because it may re-sprout. Plants should be controlled prior to seed dispersal (usually before the first week in August), and flowers should be cut, and tightly bagged. Burning and mowing is not recommended, as the seeds can still disperse and regenerate growth. Chemically, glyphosate (Roundup/Rodeo)is the most commonly used chemical for killing loosestrife. It should be applied in late July or August and should only be sprayed on 25% of each plant's foliage to be effective. It is best used on freshly cut stems. Be aware that glyphosate is non-selective, meaning it will kill any green foliage it comes in contact with. *Any*

herbicide applied on or near surface water requires a permit from the regional DNR Aquatic Plant Coordinator. Biological control is considered the most effective and cheapest option for controlling larger-scale infestations of purple loosestrife. Biological control began in WI in 1994, with the release of *Galarucella* beetles. They eat exclusively on loosestrife stems and leaves, and also reduce the height and seed output which enables other native plants to regain control within a few years. Research has shown that these control beetles won't harm native vegetation, nor find their way to window sills and ceilings. As purple loosestrife diminishes in a wetland, the control beetles fly to a new stand to begin feeding. Biological control takes many years to develop, so combining it with some of the methods aforementioned, may produce both short and long-term control.

Zebra Mussel*(Dreissena polymorpha)*

History: Zebra mussels were accidentally introduced to North America as larvae through ballast water international shipping Eurasian ports. In1988, they were first discovered in St. Claire Lake, which is located between Ontario, Canada and Michigan. Two years later, they arrived in a Lake Michigan harbor, and by 1999had expanded to the Gulf of Mexico.
Identifying Characteristics: Zebra mussels look like a small D-shaped clam, only reaching a maximum of two inches in length (although most are smaller than an inch).They have yellowish-brown alternating light and dark stripes, hence their name. They are usually found growing in large clusters of individuals in shallow, algae-rich water.
Life Cycle: Zebra mussels reproduce sexually spring to late fall, and form microscopic larvae called veligers. A female zebra mussel can produce 30,000to 1,000,000eggs in one year. Veligers stay suspended in water for one to five weeks, where then, they begin to sink and attach to hard surfaces using their adhesive byssal threads. Docks, native mussels, wood, glass, metal, aquatic plants, and each other are some of the surfaces they attach themselves to. Once attached, they change from free-swimming larvae to anchored mussels. Young zebra mussels reach sexual maturity during their first year and are ready to carryon the cycle.
Impacts: Zebra mussels are filter feeders and can filter up to a liter of water per day. They remove plankton from the water, which is an essential food source for young fish, native mussels and other aquatic organisms. Filtered water also leads to clearer water. This can affect light sensitive fish, like walleye, and can lead to more aquatic plant growth in deeper water. This may help smaller fish survive by giving them a place to hide, but makes it harder for larger predatory fish to move around and find food. Thicker plant growth can also cause a problem for anglers and boaters. Zebra mussels also clog water intake pipes for industrial facilities and boat engines, making it very expensive to keep their pipes cleared out. They attach to piers, boatlifts and boats, causing damage and costly repair. They also attach to the shells of native mussels in great masses, eventually smothering them. Their sharp shells wash up on shore, and can cut the feet of beach walkers and swimmers.
Treatment: Currently there are few acceptable treatment methods to control zebra mussels, there fore prevention steps (covered at the end of this species section) are critical.
Water Bodies with Zebra Mussels: Fortunately, there are no zebra mussels present in Sawyer County. Nearby, they are found in Lake Superior ,Douglas County and in the St. Croix River.

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Rusty Crayfish *(Orconectes rusticus)*

History: Rusty crayfish are native to streams in the Ohio River Basin states of Ohio, Kentucky, Illinois, Indiana and Tennessee. They were likely introduced to Wisconsin waters by anglers using them as fishing bait. It is illegal to possess both live crayfish and angling equipment on any inland Wisconsin water (except the Mississippi River).It is also illegal to release crayfish into a water of the state without a permit.

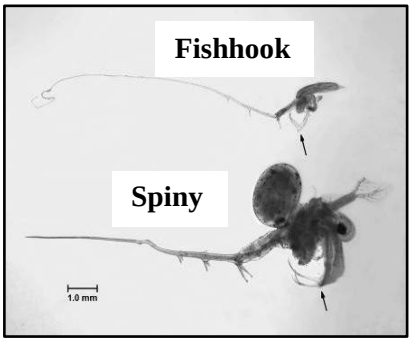
Identifying Characteristics: Adult rusty crayfisharegenerally3-5inches long (excluding claws).They are identified by their rust-colored spot each side of their body. Their claws are typically larger and smoother than many other native crayfish, and have black bands on the tips.

Life Cycle: Rusty crayfish inhabit lakes, streams and ponds. They prefer areas that have logs, rocks or other debris for cover, and bottom substrates of silt, clay, sand or rocks. They need fairly clean water, and inhabit both pool and riffle-like areas, and can be prolific, lying from 80-575 eggs.

Impacts: Adult rusty crayfish eat about four times the amount of food a native crayfish eats. It feeds on small fish, insects, fish eggs, and native crayfish eggs. They also feed on aquatic vegetation, damaging habitat for fish spawning, cover and food. If the rusty crayfish are eating Eurasian water-milfoil, they are making the problem worse by causing plant fragmentation. They are also more aggressive than native crayfish, eventually displacing them from an area.

Treatment: Currently there are few acceptable treatment methods to control rusty crayfish; therefore prevention are critical.

Spiny Waterflea *(Bythotrephes longimanus)* **Fishhook Waterflea***(Cercopagis pengoi)*



History: Both species of water fleas entered the Great Lakes through ballast ship water from Europe. The spiny waterflea arrived in the 1980's, followed by the fishhook during the 1990's.

Identifying characteristics: Both species are about ¼ to ½ inch long. Spiny water fleas are distinguished by their long tail spines, which usually have one to three barbs. Fishhook water fleas have smaller barbs on their tails and the end of the tail has a "fishhook" appearance. Both species will appear as a white slimy glob on fishing line.

Life Cycle Both species reproduce sexually and asexually in the summer. This means that no males are required; therefore each single female can start a new population herself. Eggs can be transferred to new water bodies through boating, fishing and other water recreational equipment. Resting eggs can survive long after the adults are dead, even under extreme environmental conditions.

Impacts: Spiny and fishhook waterfleas reproduce very rapidly, leading to large increased populations. They eat smaller zooplankton, including the native daphnia (native waterfleas) which are an important food source for young fish. Additionally, young fish have trouble eating these waterfleas due to their long spiny tails. Waterfleas also gather in thick globby masses on

fishing line and downrigger cables, clog eye lids of fishing rods and damage a reel's drag system, all of which can prevent fishing activity.
Treatment: Waterfleas spread to inland waters when fishing gear is contaminated with eggs. Make sure to clean all fishing equipment (waders, fishing line, bait buckets, etc.) before going to another lake.
Water Bodies with Waterfleas: There are no known infestations found in Sawyer County. However, one or both species are found in all of the Great Lakes, and in 2003, Spiny waterfleas were found in the Gile Flowage, a lake in Iron County near Lake Superior. This was the first time the invasive waterfleas have been found in an inland Wisconsin lake. More recently, in2007, spiny water fleas were also discovered in Stormy Lake, located in Vilas County.

Chinese Mystery Snail *(Cipangopaludina chinensis malleata)*

History: Chinese mystery snails are native to China and other Asian countries. They were introduced to the United States as a food source, and later were distributed through the aquarium industry.
Identifying characteristics: The easiest way to identify a Chinese mystery snail is by its shell. It is a smooth, cone shaped spiral-shaped shell with uniform light to dark olive-green coloration and 5-7 whorls. It grows upward about two inches in length.

Life Cycle: Chinese mystery snails are found in shallow, slow moving, or stagnant waters, staying partially buried in the mud. Unlike the zebra mussel, Chinese mystery snails have no free-swimming larval stage. Sexual reproduction occurs, and females give birth to crawling live young twice a year. Snails mature after one year, and can live 3to 5years.
Impacts: Chinese mystery snails eat native zooplankton, filter feed on suspended matter, and compete for space with native species. They also serve as vectors for the transmission of various parasites and diseases such as flukes ,which can infect humans. Unlike native snails, the Chinese mystery snail *will not* serve as a host for swimmers itch. Additionally, their shells clog water intake pipes, inhibiting the flow of water. They have a "trap door" called an operculum which allows them to close the opening of their shell when water conditions are unfavorable.
Treatment: Currently, there are few acceptable treatment methods to control Chinese mystery snails, therefore prevention steps are critical.

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New Zealand mud snail*(Potamopyrgus antipodarum)*

History: The New Zealand mud snail is native to New Zealand. It was accidentally introduced into the Great Lakes with imported rainbow trout in Idaho during the 1980's through ballast water.

Identifying characteristics:

Like the Chinese mystery snail, the New Zealand mud snail is characterized by its shell. The shell is cone shaped, brown to dark brown in color, grows to 3-6mm in length, and consists of 5to 6 whorls.

Life Cycle: The New Zealand mud snail can survive in most aquatic habitats, and can tolerate a range of water temperatures(except freezing), salinity and turbidity, although they prefer flowing water. They can be found on cobble substrates and pieces of wood, and rarely in sandy or silty areas. They reproduce asexually, meaning a single snail can generate an entire colony. Young are kept within the mantle cavity until maturity at 3 to 6 months old. Twice a year they give birth to between 20 and 120 live young, which are only about1mm long. In ideal conditions, New Zealand mud snails reproduce every three months and can live up to3 years. In its native habitat, several parasites keep the population in check .

Impacts: As a result of asexual reproduction, New Zealand mud snails can invade other bottom-dwelling species and eliminate algae from an entire river system. They can become as dense as one-half million per square meter! They compete with native invertebrates, mollusks, and fish for space and food and have no natural predators. When eaten by fish and birds, they shut their operculum and pass through the digestive tract unharmed. On its own, it may move as much as 60 meters in 3 months. At cool temperatures, mud snails can survive up to 25days or longer inside waders, laces and tongue of waders, live well or in cooling systems, and mud (therefore, drying gear is ineffective).Fisherman are encouraged not to use felt bottom wading boots, as they are more likely to harbor mud snails and other invasive species.

Treatment: Currently there are few acceptable treatment methods to control New Zealand mud snails, therefore prevention steps are critical.

Water Bodies with New Zealand mud snails: There are no known infestations found in Sawyer County. However, infestations have been identified, in Black Earth Creek, located in Dane County, Wisconsin and are established in Lake Superior, Erie, Ontario and most recently, Michigan.

Viral Hemorrhagic Septicemia *(VHS)*

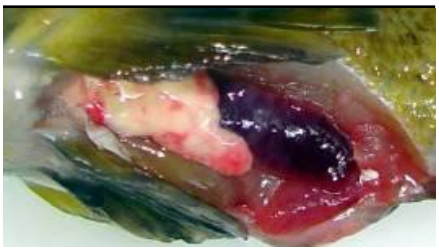
History: VHS is a deadly fish virus that is threatening Wisconsin's fish. It has mutated from the original virus that was discovered in the 1930's that infected European trout farms. More recently, it has caused large fish kills in several eastern Great Lakes in 2005 and 2006. In 2007, VHS was confirmed to be in Lake Michigan, after first being found in the Lake Winnebago system. The virus infects the internal organs and cells that line the blood vessels, causing severe hemorrhaging (bleeding); this is the main cause of death. Fish can also be infected when they eat an infected fish.

Identifying Characteristics: Fish infected with VHS may have clinical signs; bulging eyes, external and internal hemorrhaging, swollen or pale organs, or bloated abdomens. Infected fish shed the virus through their reproductive fluids and urine. The blood vessels become weak, causing hemorrhaging in the internal organs, muscles and skin. The virus grows best when the water temperature is between 37°-54° F, and most infected fish die at 37° to 41° F, but rarely die above 59° F. It can survive in water for at least 14days.Stress plays a large factor in VHS outbreaks. Stresses such as spawning hormones, lack of food, poor water quality, or excessive handling of fish, can suppress a fish's immune system, causing infected fish to become diseased. Although some infected fish may not show any signs, transporting these fish to new locations could spread the disease to unaffected waters.

Impacts: Presently, there are about 45 species of fish that are known to be susceptible to VHS. Fortunately, studies have shown it is not a threat to people who handle or eat infected fish. The virus can potentially cause massive fish population die offs, and can severely impact the billion dollar fisheries industry.

Treatment: Presently, there is no cure and VHS must be confirmed by lab tests.

Water Bodies with VHS: Currently it is not found in Sawyer County, only in the Lake Winnebago system and Lake Michigan.



<u>Symptoms of VHS:</u>

External hemorrhaging

Internal hemorrhaging

Swollen or pale organs and bulging eyes

Prevention Steps

Fortunately, not every lake in Wisconsin has an aquatic invasive species {AIS}, nor does the county itself have zebra mussels, water fleas, New Zealand mud snails or VHS. As we move our boats from water body to water body across the state, AIS hitch a ride with us, and can become established in new areas.

Although it will be impossible to prevent all AIS from entering Sawyer County and complete eradication is unlikely with those species already here, there are ways to decrease the impacts posed by AIS. It is important for everyone to follow the appropriate prevention steps to stop their spread:

1. ***Inspect*** and ***Remove*** aquatic plants, animals, and mud from boat,

Watercraft Check Points:

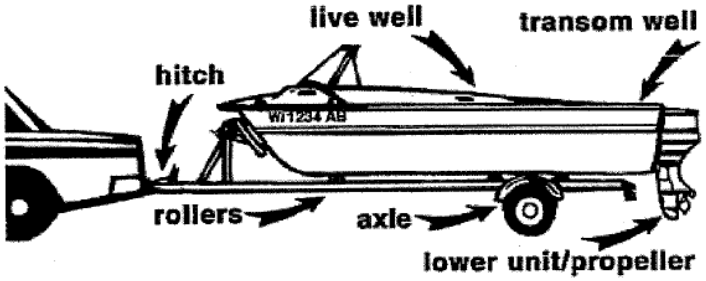
- Anchor
- Axle
- Bait bucket
- Wheels
- Live well
- Lights/wiring

Watercraft Check Points:

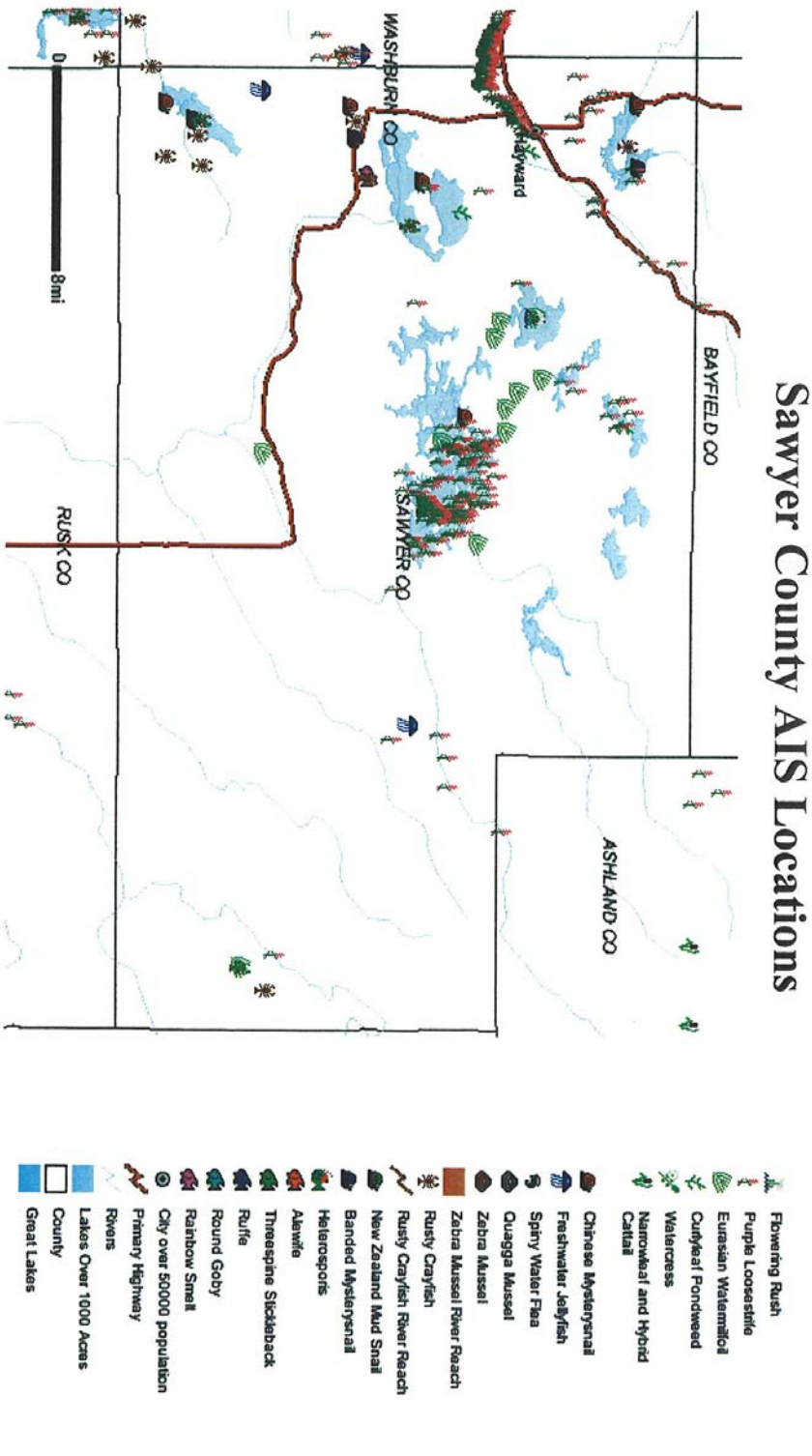
- Anchor
- Axle
- Bait bucket
- Bunks
- Bow line
- Fishing line
- Floor
- Hull
- Intake pipe
- Wheels
- Live well
- Lights/wiring
- Rollers
- Prop
- Spare tire
- Tackle
- Tow rope
- Trailer

Watercraft Check Points:

- Anchor
- Axle
- Bait bucket
- Bunks
- Bow line
- Fishing line
- Floor
- Hull
- Intake pipe
- Ladder
- Landing net
- License plate
- Motor
- Wheels
- Live well
- Lights/wiring
- Rollers
- Prop
- Spare tire
- Tackle
- Tow rope
- Trailer
- Transducer
- Transom well
- Trolling motor



Appendix 1


Sawyer County AIS Locations
BAYFIELD CO
ASHLAND CO
WASHBURN CO
SAWYER CO
RUSK CO
Hayward
0
8mi
Flowering Rush
Purple Loosestrife
Eurasian Watermilfoil
Curlyleaf Pondweed
Watercress
Narrowleaf and Hybrid Cattail
Chinese Mysterysnail
Freshwater Jellyfish
Spiny Water Flea
Quagga Mussel
Zebra Mussel
Zebra Mussel River Reach
Rusty Crayfish
Rusty Crayfish River Reach
New Zealand Mud Snail
Banded Mystersnail
Heterosporis
Alewife
Threespine Stickleback
Ruffe
Round Goby
Rainbow Smelt
City over 50000 population
Primary Highway
Rivers
Lakes Over 1000 Acres
County
Great Lakes

Appendix 2

Key

EWM: Eurasian Watermilfoil CLP: Curley-leaf Pondweed CMS: Chinese Mystery Snail

BMS: Banded Mystery Snail RC: Rusty Crayfish

Water Body	Town	Aquatic Invasive Species
Ashegon Lake	Couderay	Freshwater Jellyfish
Birch Lake	Edgewater	BMS,CMS, CLP, RC
Blueberry Lake	Hunter, Radisson	BMS,CMS, CLP, RC
Callahan Lake	Round Lake	EWM
Clear Lake	Round Lake	BMS, EWM, Freshwater Jellyfish
Connors Lake	Winter	BMS,CLP,EWM,RC
Couderay River	Sand Lake	EWM
Grindstone Lake	Bass Lake	BMS,RC
Hayward Lake	Hayward/City of Hayward	CMS, CLP, EWM, Hybrid Eurasian / Northern Water-Milfoil
Island Creek	Winter	BMS
Island Lake	Bass Lake	BMS
Knuteson Creek	Edgewater	RC
Lac Courte Oreilles	Bass Lake	CMS,CLP,RC
Lake Chetac	Edgewater	BMS, CMS, CLP, RC
Lake Chippewa	Hunter	CMS,EWM
Lake of the Pines	Winter	BMS,CMS
Little Lac Courte Oreilles	Bass Lake, Couderay	EWM
Little Round Lake	Round Lake	EWM

Little Sissabagama Lake	Sand Lake, Edgewater	Freshwater Jellyfish
Lost Land Lake	Spider Lake	BMS, CMS, Hybrid Eurasian / Northern Water-Milfoil
Mud Lake	Round Lake	EWM
Mud Lake	Round Lake	EWM
Namekagon River	Lenroot, Hayward, Bass Lake	Hybrid Eurasian / Northern Water-Milfoil
Nelson Lake	Lenroot	BMS,CMS,RC
North Fork Chief River	Hunter	EWM
Osprey Lake	Hayward	EWM, Freshwater Jellyfish, PL
Perch Lake	Spider Lake	Freshwater Jellyfish
Radisson Flowage	Winter	EWM
Round Lake	Round Lake, Hayward	BMS,EWM,,RC
Sand Lake	Sand Lake	BMS,CMS
Sissabagama Lake	Sand Lake	BMS,CMS
Smith Lake	Lenroot	BMS, CMS, Phragmites (non-native),PL
Smith Lake Creek	Lenroot, Hayward	BMS
Spider Lake	Spider Lake	CLP
Spring Lake	Bass Lake	BMS
Teal Lake	Spider Lake	CMS
Thirty-three Creek	Meteor	RC
Tiger Cat Flowage	Round Lake	BMS
Totagatic Flowage	Lenroot	CLP
West Fork Chippewa River	Hunter	EWM
Whitefish Lake	Sand Lake	BMS,CMS,CLP,EWM
Winter Lake	Winter	CLP