

What Types of Monitoring Can I Participate In?

If you have an interest in any of the following monitoring activities, please contact your regional coordinator.

Secchi

Father Pietro Angelo Secchi was an astrophysicist and the scientific advisor to the Pope in Italy. He was asked by the head of the Papal Navy to develop a way to measure transparency in the Mediterranean Sea. Secchi used white disks to measure the clarity of water in the Mediterranean in April of 1865. The Secchi disk was adopted for use by limnologists as a way to measure water clarity and to set a numerical value to water quality. Secchi disks come in various sizes and colors and even the shape may be slightly different depending on use.

A Secchi depth reading is intended to give a general picture of your lake's water clarity. The sampling is easy to do and does not require sophisticated, high-maintenance equipment nor demand a background in science, chemistry, or engineering. One Secchi reading will not tell you a great deal about your lake but Secchi disk readings taken over a period of time will tell a story about your lake – is your water clarity improving, declining, or remaining the same?

Wisconsin CLMN uses a Secchi disk that is 8 inches in diameter. The Secchi disk is black and white and weighted with a stainless steel plate. CLMN protocols must be followed closely so that the data that you collect can be compared to other lakes. The Secchi disk is lowered into the water on a marked rope until it just disappears from view, that point is marked with a clothespin at the water's surface. Volunteers then lower the disk a couple of feet further into the water. They then slowly raise the disk until they can see it again. That point is also marked with a clothespin. The average

of these two measurements is recorded. Doing the two measurements using the “clothespin method” allows the volunteer's eyes to acclimate to looking in the water and gives a more accurate reading. Measuring the water clarity or transparency of lakes over time provides a “pulse” on the health of these lakes, and is a crucial record for long-range planning.

Water Chemistry

After one year of water clarity monitoring, you may be eligible to participate in water chemistry monitoring. Chemistry volunteers, in addition to measuring water clarity and temperature, collect water samples for analysis for phosphorus and chlorophyll levels four times a year. Volunteer collected samples are sent to the [State Laboratory of Hygiene \(WSLH\)](#) for analysis. The information volunteers collect when monitoring both Secchi and water chemistry is used to determine the **trophic state** of the lake. Training and equipment for chemistry monitoring are provided by the Wisconsin DNR. Secchi volunteers who have participated in the Network for at least one sampling season and are interested in becoming a chemistry volunteer should contact their CLMN regional coordinator. The number of chemistry lakes that are added each year is limited due to the cost of equipment and the cost of sample analysis by WSLH. Because of budget limitations lakes are prioritized according to the need for information.

Temperature and Dissolved Oxygen

Water temperature impacts many organisms living in the lake. Reproduction, metabolic rate, and survival of fish and other aquatic animals; plant and algal growth and biomass; and nutrient cycling are all driven by water temperature. Long term data is needed to understand temperature trends.

DNR Fisheries Biologists and Lake Coordinators may ask you to collect a dissolved oxygen profile. Temperature and dissolved oxygen profiles are collected at three-foot intervals at the deep hole.

A Van Dorn water sample bottle is used to collect the water sample from the various depths for dissolved oxygen testing. The collection profile will be determined by your regional coordinator. Winkler titration kits are available through CLMN. This method is accurate but time consuming and demands great attention to detail.

Dissolved oxygen meters are not available through CLMN but your CLMN Coordinator may know of meters that are available to the public.

Native Aquatic Plant Monitoring

Aquatic plants are a good indicator of lake health. Over time, the type of vegetation and size of plant beds may change and/or move in response to changes in water quality, invasives, and human activity. Aquatic plant monitoring is tailored each volunteer's ability, interest, and time commitment and can vary from lake to lake. Some volunteers choose to identify and map plant beds on the lake, keeping track of beds based on whether the plants are submergent, emergent, or floating.

Other volunteers wish to have a more comprehensive list of the aquatic plants that are present on their lake. They identify, collect, and press their lake's aquatic plants and map the plants' location. All plants collected by volunteers are verified by Wisconsin DNR staff and a university plant taxonomist. Familiarizing yourself to which plants are present in your lake is a great way to monitor for the presence of **aquatic invasive species**.

Aquatic Invasive Species (AIS) Monitoring

Citizen volunteer monitoring protocols for AIS can be found at the UWEX-Lakes website.

If you think you have found an invasive, please contact your local CLMN coordinator so they can verify the specimen. Visit <http://dnr.wi.gov/lakes/clmn> to find a list of lakes known to have invasives.

Eurasian Water-milfoil (EWM) Watch

All volunteers are encouraged to monitor their lake for Eurasian water-milfoil (*Myriophyllum spicatum*). EWM is an aquatic plant that is not native to the United States and continues to populate many lakes throughout Wisconsin. This plant can dominate lake

PUBLIC PERCEPTION OF WATER QUALITY

As part of your Secchi data collection, the Network is interested in your opinion of the lake's water quality when you are sampling. Using these observations, a public opinion assessment of water clarity can be made. This information will help determine water quality standards for lakes. There is no right or wrong answer to these questions and your answer can change throughout the summer or in subsequent years. Specifically, citizen volunteers will be asked to note the algal content of the water. Is there so much algae that you want to shower after swimming? Do you not want to go swimming? In addition to the Secchi disk readings that you measure, the Network is concerned with your opinion of what constitutes good or poor water quality. The Network predicts that the public opinion question will reveal that people living in one area of the state will have similar perceptions of what they consider to be acceptable water clarity. The Network hopes to share this information with other states in anticipation of creating a regional map of public perceptions of water clarity.



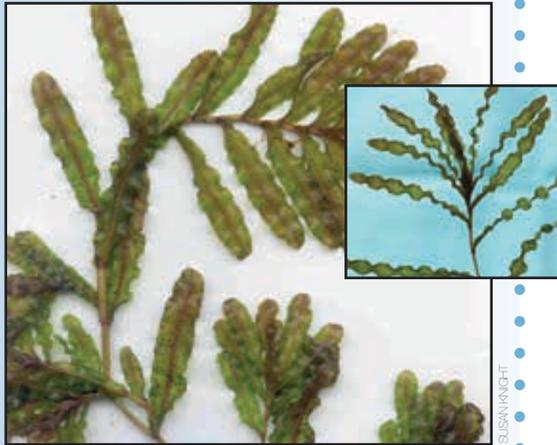
STATE LABORATORY OF HYGIENE (WSLH) • The state of Wisconsin's public health and environmental laboratory.

TROPHIC STATE • The extent to which the process of eutrophication has occurred is reflected in a lake's trophic classification or state. The three major trophic states are oligotrophic, mesotrophic, and eutrophic.

AQUATIC INVASIVE SPECIES (AIS) • Refers to species of plant or animal that are not native to a particular region into which they have moved or invaded. Zebra mussels and Eurasian water-milfoil are examples of AIS. Wisconsin has a law that prohibits someone from placing a boat in the water if aquatic plants or zebra mussels are attached to the boat.



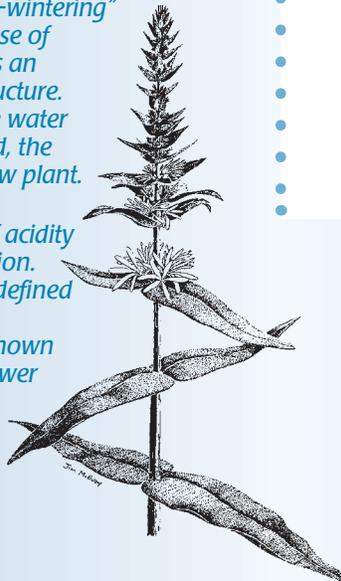
Eurasian Water-milfoil



Curly-leaf Pondweed

TURION • A specialized bud which consists of condensed leaves and stems. This structure is most often an “over-wintering” structure, but in the case of curly-leaf pondweed is an “over-summering” structure. When the appropriate water conditions are reached, the turion will sprout a new plant.

pH • The measure of acidity or alkalinity of a solution. Neutral solutions are defined as having a pH of 7.0. Solutions which are known as acidic have a pH lower than 7. Solutions which are known as basic have a pH greater than 7.



Purple Loosestrife

(D. Brenner photos provided with permission by Michigan Sea Grant www.miseagrant.umich.edu).

habitats and displace native species. Watching for this non-native plant is not difficult. It involves inspecting shorelines and water surfaces for plant fragments and checking plant beds throughout the lake a few times during the summer. Information on invasive species can be found at the Wisconsin DNR web site.

Curly-leaf Pondweed Watch

In Wisconsin, curly-leaf pondweed (*Potamogeton crispus*) usually completes its life cycle by June or July. In most lakes, the over summering bud (**turion**) breaks off from the plant, falls to the bottom of the lake, and lies submerged and dormant during the late summer months. Responding to the shortening day length and cooling water temperatures, turions put out roots in late summer or early fall. The new plant continues to grow even under the ice of winter if snow depth is not great and there is enough sunlight coming through the ice. Volunteers are asked to check plant beds on calm, clear days from ice off until mid-July.

Purple Loosestrife Watch

Purple loosestrife (*Lythrum salicaria*) is a beautiful but aggressive plant from Europe that can displace native wetland vegetation. This non-native flowering plant is often confused with native plants. Once familiar with the plant, monitoring involves watching shorelines and wetlands in July, looking for the characteristic bright magenta flowers of purple loosestrife.

Infestations can be managed by biological control efforts. Volunteers may be recruited to rear and release *Galerucella spp.* beetles that feed on purple loosestrife.





Zebra and Quagga Mussel Watch

The zebra mussel (*Dreissena polymorpha*) is a non-native species that has been introduced into Wisconsin's lakes. Once in a lake, this mussel species can spread rapidly and has the potential to alter natural lake communities. The quagga mussel (*Dreissena rostriformis bugensis*) has been found in the Great Lakes, but not in any inland lakes. Both mussels have a high rate of reproduction and are able to attach themselves to almost anything including docks, boats, rocks, sticks, plants, and even other mussels. As a result, beautiful swimming areas can become a foul smelling mess of broken and discarded shells. Volunteers complete shoreline surveys and perform brief inspections of docks, boats, and other places where zebra and quagga mussels are likely to be found.

Rusty Crayfish Watch

Rusty crayfish (*Orconectes rusticus*) are native to streams in the Ohio River basin states of Ohio, Kentucky, Illinois, Indiana, and Tennessee. These crayfish are not native to Wisconsin and were likely introduced to Wisconsin waters by anglers who used them as live bait. Rusties eat about four times the amount of food native crayfish eat and will eat small fish, insects, fish eggs, and aquatic plants. They displace native crayfish and destroy aquatic plant beds by uprooting plants. Fewer plant beds reduce the amount of cover available to fish and can result in algal blooms.

Spiny Waterflea Watch

Spiny waterfleas (*Bythotrephes* spp.) and fish hook waterfleas (*Cercopagis pengoi*) are small crustaceans distantly related to shrimp. They can move long distances by floating on water currents and can actively swim to "hunt" prey. Both species of waterflea entered the Great Lakes in ship ballast water from Europe. The spiny waterflea arrived in the 1980s, followed in the 1990s by the fish hook waterflea. One or both of the species are now found in all of the Great Lakes. Spiny waterfleas are found in some inland lakes in Wisconsin.

Both species tend to gather in masses on fishing lines and downrigger cables so anglers may be the first to discover a new infestation.



ZEBRA MUSSEL • A tiny bottom-dwelling mollusk native to Europe.



Zebra Mussel



Quagga Mussel



Rusty Crayfish

(D. Brenner and Jeff Gunderson photos provided with permission by Michigan Sea Grant www.miseagrant.umich.edu).



Spiny Waterflea



Banded Mystery Snail (left), Brown Mystery Snail which is native to Wisconsin (center), and Chinese Mystery Snail (right).

LAURA FERNANDEZ

Chinese and Banded Mystery Snail Monitoring

There are three species of mystery snails in Wisconsin. Only one of these species, the brown mystery snail (*Campeloma decisum*) is native to Wisconsin. The Chinese mystery snail (*Bellamya chinensis*) is native to Asia. The banded mystery snail (*Viviparus georgianus*) is native to southeastern United States.

Freshwater Jellyfish Watch

The freshwater jellyfish found in Wisconsin are one of several species of *Craspedacusta* native to China. Two species (*C. sowerbii* and *C. sinensis*) live in the Yangtze River. The freshwater jellyfish are not true jellyfish – they belong to the class Hydrozoa which includes the common hydra. Freshwater jellyfish were first reported in North America as early as 1884. Sightings in Wisconsin date to 1969.

Often, jellyfish will appear in a body of water in large numbers even though they were never reported there before. The following year they may be absent and may not reappear until several years later. In Wisconsin, jellyfish usually appear during dry and hot summers.



Freshwater Jellyfish

SARAH MUSTEAD

New Zealand Mud Snail Watch

New Zealand mud snails (*Potamopyrgus antipodarum*) are small (1/8 inch) snails that have brown or black cone shaped shells with five (usually but can have up to eight) whorls. They are native to New Zealand but have become an invasive species in Australia, Europe, and North America. In the United States they are a threat to trout streams. In 2013 a population was discovered in Black Earth Creek in Dane Co. in Wisconsin. New Zealand mud snails are found in all of the Great Lakes with the exception of Lake Huron.

In their native habitat, the snails pose no problem because of a trematode parasite which sterilizes many snails, keeping the population to a manageable size. However, they have become an invasive pest species elsewhere in the world in the absence of these parasites.

Although they are small, they have the ability to reproduce rapidly and mass in high densities. Mudsnails are able to withstand desiccation, a variety of temperature regimes, and are so small that they can inadvertently be moved from one water body to another by anglers, boaters, and recreational users.



New Zealand Mudsnail (see page 14)



PHOTOS: DANIEL JARFON

Volunteer Monitoring in and Around Wisconsin Waters



Welcome to the Citizen Lake Monitoring Network — a volunteer network with over 1,000 citizens collecting water quality data on Wisconsin's lakes! **We welcome you to check out these additional volunteer monitoring opportunities in and around Wisconsin waters!**



Clean Boats, Clean Waters Watercraft Inspectors

Volunteers can also help stop the spread of invasive species by organizing and conducting watercraft inspections at boat landings in their communities. Trained volunteers then educate boaters on how and where invasive species are most likely to hitch a ride into water bodies. For more information, contact Erin McFarlane, Aquatic Invasive Species Volunteer Coordinator, at (715) 346-4978 or email erin.mcfarlane@uwsp.edu.



Water Action Volunteers

Water Action Volunteers (WAV) has three levels of stream monitoring to accommodate citizens' time availability and interests; volunteers begin by learning to monitor six aspects of water quality their first year. After a monitoring season, citizens can move to the next level to monitor stream health using the same methods as DNR biologists or can conduct intensive monitoring that addresses a specific issue about local stream quality. For more information, contact Peggy Compton, WAV Coordinator, at (608) 342-1633 or email peggy.compton@ces.uwex.edu.



Project RED

Project RED (Riverine Early Detectors) allows volunteers to identify, report, and control invasive species in and along Wisconsin's rivers and streams. Volunteers are trained to monitor rivers and streams by canoe, kayak, or on foot for 16 species of concern. For more information, contact River Alliance of Wisconsin's Project RED Coordinator at (608) 257-2424 x110.



Mussel Monitoring Program of Wisconsin

Over half of Wisconsin's 51 native mussel species (also known as clams) are listed as species of greatest "conservation need"; we need information on where they currently occur. The Mussel Monitoring Program of Wisconsin would like your help in finding out what mussels occur in your area. For more information, contact program coordinator Lisie Kitchel at (608) 266-5248 or email lisie.kitchel@wisconsin.gov.



Odonata Survey

The goal of the Wisconsin Odonata Survey is to gain more knowledge about the distribution and habitat requirements of our 160+ species of dragonflies and damselflies (Order Odonata). The Odonata Survey uses volunteers to document populations of dragonflies and damselflies by identifying adults, larvae, and exuviae (cast skins left behind near shore when the larva transforms into the adult). For more information, contact program coordinator Bob DuBois at (715) 392-6976 or email robert.dubois@wisconsin.gov.



LoonWatch

LoonWatch promotes the preservation, understanding, and enjoyment of common loons and their aquatic habitats in the Lake Superior region. Volunteers record when loons arrive, if they nested, how many chicks were produced, and any potential threats to the nest site. For more information, contact the LoonWatch Coordinator at (715) 682-1220 or email loonwatch@northland.edu.





Wisconsin Bat Program

In general, bat populations are susceptible to decline because of low reproductive rates, and many species congregate at a limited number of locations during critical stages of their natural history cycle (i.e., hibernacula and maternity colonies). Volunteers can conduct acoustic surveys or can participate in bat house monitoring. For more information, contact the Wisconsin Bat Program at (608) 266-5216 or email [dnrbats@wisconsin.gov](mailto:dnr bats@wisconsin.gov).



Citizen Monitoring of Wisconsin's Freshwater Sponges

Biologists have been unable to assess the conservation status of Wisconsin sponges. Our Citizen Monitoring of Wisconsin's Freshwater Sponges project helps address this situation by engaging volunteer monitors and creating a database of probable sponge occurrences that can be further investigated. For more information, contact program coordinator Dreux J. Watermolen at (608) 266-8931 or email dreux.watermolen@Wisconsin.gov.



Wisconsin Turtle Conservation Program

The Wisconsin Turtle Conservation Program (WTCP) records turtle species' distributions using the help of Wisconsin citizens. The program is looking for volunteers to document high turtle mortality locations along roads in order to promote effective management and conservation of Wisconsin's 11 turtle species. For more information, contact the WTCP at DNRHerptiles@wisconsin.gov.



Wisconsin Frog and Toad Survey

The Wisconsin Frog and Toad Survey (WFTS) is a citizen-based monitoring program intended to determine the status, distribution, and long-term population trends of Wisconsin's frog and toad species. WFTS includes approximately 150 permanent roadside routes throughout the state where volunteers monitor frog populations through calling surveys. For more information, contact the WFTS at WFTS@wisconsin.gov.



Wisconsin Marshbird Survey

Secretive marshbirds such as rails, bitterns, coots, and grebes are among the most poorly monitored bird groups in North America. Volunteers are needed to conduct surveys of a predetermined route during in May and June to help experts learn more about species' abundance, population trends, and habitat associations. For more information on marshbird surveys or additional bird monitoring opportunities, contact survey coordinator Ryan Brady at (715) 685-2933 or email ryan.brady@wisconsin.gov.



Purple Loosestrife Biocontrol Project

There are a number of methods to control purple loosestrife; however, biocontrol may be the most viable long-term control method. The Purple Loosestrife Biocontrol Program offers cooperative support, including free equipment and starter beetles, to all Wisconsin citizens who wish to use these insects to reduce their local purple loosestrife. For more information, contact program coordinator Brock Woods at (608) 266-2554 or email brock.woods@wisconsin.gov.

For more information, please visit the Wisconsin Department of Natural Resources at:

<http://dnr.wi.gov/volunteer/>

or the Wisconsin Citizen-based Monitoring Network at:

<http://wiatri.net/cbm/>

