

EURASIAN WATER-MILFOIL

2

MONITORING PROTOCOL



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BACKGROUND/OVERVIEW

Eurasian water-milfoil (EWM) is a submerged aquatic plant that poses a serious threat to a lake's native aquatic plants and the animals that depend on these diverse ecosystems. Since it is not native to Wisconsin or the United States, it has very few natural predators. EWM can form thick underwater stands of tangled stems and vast mats of vegetation at the water's surface. It can crowd out native plants and become so thick that the larger fish cannot swim through the tangled mats. When EWM mats get well established, channels are needed to allow access from the shoreline out into deeper water areas. EWM is now one of the most troublesome submerged aquatic plants in Wisconsin.

There are 11 native water-milfoil species in North America. Of these 11 native species, seven are native to Wisconsin. The native water-milfoils are not as aggressive as the exotic water-milfoil and they have natural predators. Some Wisconsin species of water-milfoil are quite rare and are on the Wisconsin Threatened and Endangered species list.

EWM is native to Europe, Asia and northern Africa. It may have been brought in to the United States via aquaculture and the aquarium trade. The first authenticated record of EWM in the United States was in 1942 in a Washington D.C. pond. In 2007 it was found in 48 of the 50 states. EWM was first documented in Wisconsin in the 1960's. The list of waterbodies in Wisconsin where EWM has been verified can be found at <http://dnr.wi.gov/lakes/invasives/>.

Volunteers play an integral part in learning to recognize the plant and checking local lakes for the presence of EWM. Early identification of the plant makes control much easier, and can help prevent the spread into other waterbodies. If you detect the invasives early enough, you may be able to prevent them from spreading throughout your lake system. It is cheaper to control small patches of invasives than to control invasives that have taken over an entire lake system. Once invasives are established in a lake, they are nearly impossible to eradicate.



LIFE CYCLE

EWM is an evergreen plant. The plant remains alive over the winter and starts growing when water temperatures reach 50° F (Bode, J. et al. 1992). EWM begins growing earlier in the season than the native water-milfoils. This makes early spring chemical treatment an option for control of EWM as it is more selective for EWM than late spring or summer treatments. In spring and summer, EWM can grow up to two inches a day. If EWM plant growth reaches the surface of the lake, the plant will continue to grow and can form a canopy over the surface of the lake often making the area nearly impassable with a motor boat. This canopy can also shade out native plants. Excessive growth affects recreational use by interfering with swimming, fishing, and boating and reducing the aesthetics of the lake. EWM grows in water depths ranging from less than one-foot to over 20-feet. Thick beds can form in water depths from 3 to 20 feet deep (Smith, C and J. Barko, 1990), but most commonly reach nuisance levels in water depths of 6-15 feet. EWM is tolerant of

disturbance and can grow in most water conditions. One way to protect your lake from EWM or other invasives is to maintain native aquatic plant beds.

EWM produces seeds and runners, but the main method of spread is through plant fragmentation (vegetative propagation) by boats and wave action. In the late summer and early fall, auto fragmentation may occur. Auto fragmentation is when the plant “breaks itself into smaller pieces”. Plant cells at leaf nodes and side-branch connections become weak, die and break off. These newly formed fragments float to new locations where they fall to the substrate, root and establish new beds of EWM.



IDENTIFICATION

In your packet is a card with a picture of EWM (*Myriophyllum spicatum*, pronounced MIR-ee-ah-FILL-um spi-KAY-tum) on one side and northern water-milfoil (*Myriophyllum sibiricum*, pronounced MIR-ee-ah-FILL-um si-BIR-I-cum) on the other side. Northern water-milfoil is the Wisconsin native that is sometimes confused with EWM. In your packet, you will also find a laminated example of EWM, as well as a fact sheet on water-milfoil turions (overwintering buds). Several of the native water-milfoil species produce turions. EWM does not produce turions, so if you see turions in the fall, or turion leaves in the spring, you do not have EWM.

EWM has been known to hybridize with northern water-milfoil. The hybrids cannot be distinguished by visual characteristics, but rather have to be identified through DNA analysis. If you suspect that you have the hybrid, please contact your local Aquatic Plant Management staff <http://dnr.wi.gov/lakes/contacts> for assistance.

Refer to pictures on next page, as well as reference materials in your packet, to see the characteristics listed below:

EURASIAN WATER-MILFOIL (EWM) CHARACTERISTICS:

- Delicate feather-like leaves
- Leaves are arranged in whorls (circles), 3 to 5 leaves around the stem
- Usually 12-21 leaflet pairs per leaf
- Lower leaflets pairs are about the same length as upper leaflet pairs
- Leaves are fairly limp when pulled out of the water
- In the summer, the plants can be 20 feet tall
- In the summer, the distance between the leaf whorls can be several inches
- Upper part of the plant stem often has a pink or reddish color. (Some native species of water-milfoils may also have pink stems.)
- EWM does not produce turions (overwintering buds)
- Adventitious roots (roots growing along the stem) develop on EWM in late summer to early fall

NORTHERN WATER-MILFOIL CHARACTERISTICS:

This is the native water-milfoil that is most often confused with EWM.

- Rigid feather-like leaves
- Leaves are arranged in whorls (circles), 4-6 leaves around the stem

- Usually 7-10 leaflet pairs per leaf
- Lower leaflet pairs are longer than upper ones, creating a Christmas tree shape
- Leaves are usually stiff when pulled out of the water
- In the summer, the plants can reach 10-12 feet in height
- In the summer, the distance between the leaf whorls is quite short
- Stems are often whitish or whitish-green in color
- Most native water-milfoils produce turions (overwintering buds), EWM does not
- Adventitious roots (roots growing along the stem) develop on Northern water-milfoil in late summer to early fall

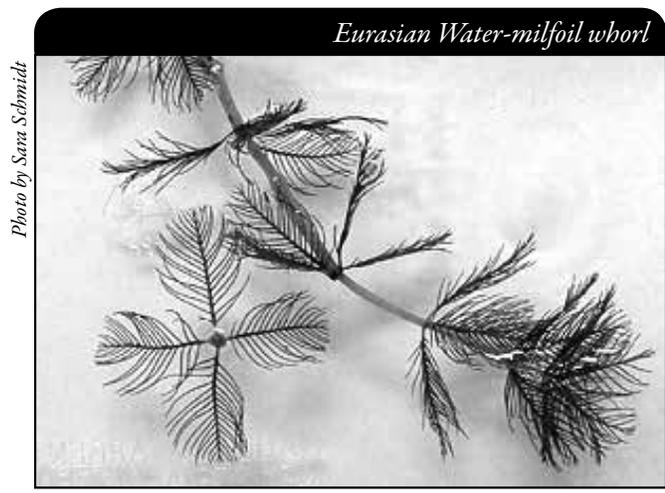


Photo by Sara Schmidt

Eurasian Water-milfoil whorl

EWM whorl showing four leaves with leaflets. On each leaf, lower leaflet pairs are about the same length as upper leaflet pairs.

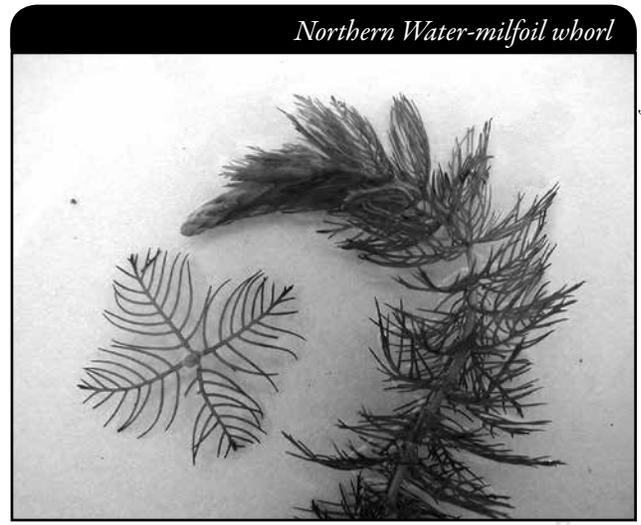


Photo by Sara Schmidt

Northern Water-milfoil whorl

Northern water-milfoil whorl showing four leaves with leaflets. On each leaf, lower leaflet pairs are longer than upper leaflet pairs, creating a Christmas tree shape.

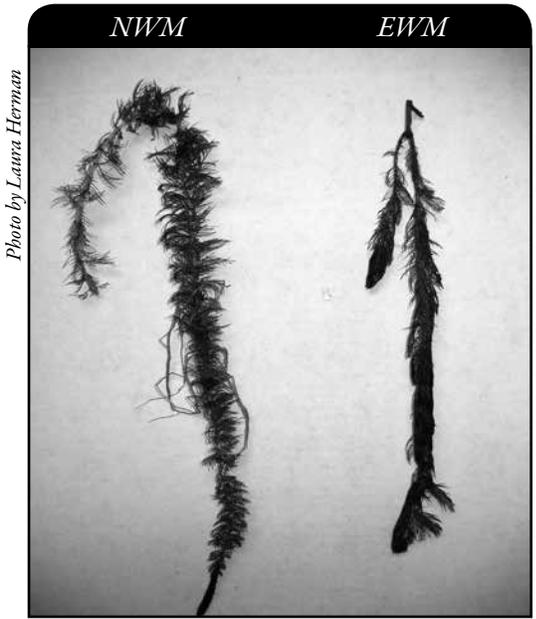


Photo by Laura Herman

NWM

EWM

Northern water-milfoil on the left. EWM on the right. Northern water-milfoil leaves are stiff when pulled out of water. EWM leaves are limp when pulled out of water.

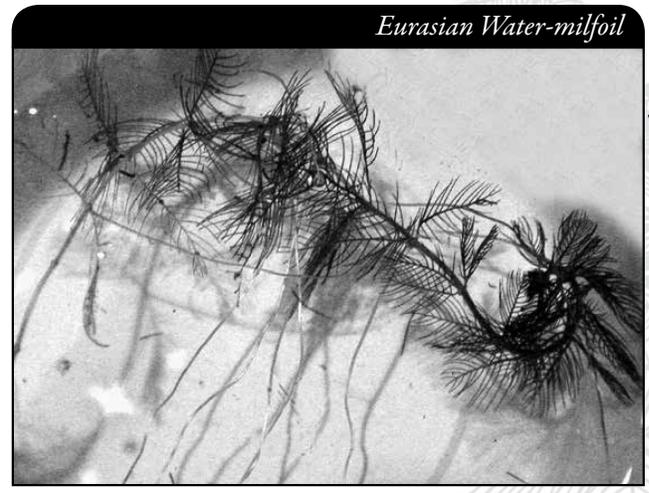


Photo by Ted Ritter

Eurasian Water-milfoil

EWM often develops adventitious roots along its stem.

Shown below are turions on whorled water-milfoil and northern water-milfoil.
EWM **does not** form turions.

Eurasian
Water-milfoil

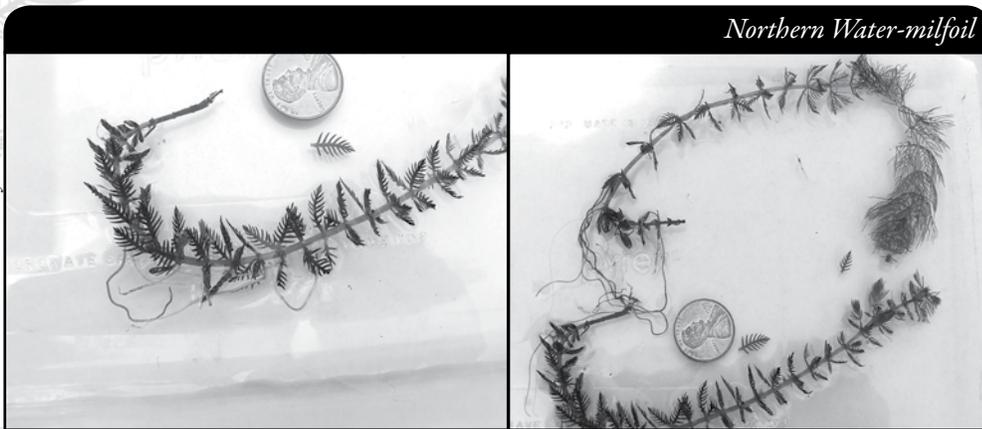
Photo by Susan Knight



Photo by Laura Herman

Several native species of water-milfoil form turions (winter buds).

Photos by Laura Herman



Northern water-milfoil turion leaves.

In the spring the winter turion will “expand” revealing the turion leaves. New summer leaves will start growing from the top of the turion. The summer leaves have a different look than the winter turion leaves. EWM does not produce turions.



EWM MONITORING

TYPES OF MONITORING

There are two types of monitoring for EWM - Prevention Monitoring and Established Population Monitoring.

PREVENTION MONITORING

If a lake is not known to have EWM, citizen lake monitors can play a very important role by regularly monitoring the lake for EWM and reporting if EWM is found or that nothing has been found. The “negative” information is important as it lets the lake managers know when EWM is not in a lake so they can better focus their work efforts. If EWM is found at an early stage, there may be hope of knocking it back. Several lakes that found EWM at an early stage have been able to keep it “in check” with minimal cost and efforts.

ESTABLISHED POPULATION MONITORING

If a lake is already known to have EWM, citizen lake monitors can help track its spread. If treatment options are being used to control EWM, citizen lake monitors can track the effectiveness of the management options by monitoring the spread or decline of EWM.

Even if your lake group is controlling EWM, you still want to monitor for EWM. You want to know if they have spread to any new locations, so that you can begin control of these new beds ASAP. The earlier you find a new invasive, the easier it will be to control.

WHEN TO MONITOR

PREVENTION MONITORING

Volunteers should try to monitor once a month from ice-off to mid-September, as EWM begins growing early and keeps growing late into the fall. The first half of the summer is especially important to keep up steady (monthly) monitoring because EWM biomass is at its greatest during this time of the season, and if EWM is found early enough, there may be adequate time to plan and implement a first response yet that season. If a previously undiscovered bed is found later in the season, it can be planned into management for the following season. Given the lag time from discovery to a first response, monthly monitoring is very prudent. In drought years you will want to start monitoring earlier because spring drought conditions can cause high EWM growth early in the growing season.

When checking the shorelines, it is especially important to check piles of plants and debris **after storms and high boat traffic times**, as this is when plant fragments will be the heaviest.

ESTABLISHED POPULATION MONITORING

If you or your lake group have found new beds of EWM, volunteers will probably want to monitor more carefully and more often than once a month. If treatment options are being used, it is very helpful to have volunteers monitor before and after treatment, especially around the treatment beds. In cases where treatment is occurring, more monitoring is better, especially if the plant may still be in an expanding stage within the lake. This allows the lake community to see if management options are working to meet their goals. The more involved lake residents are in monitoring, the more likely they will understand the process and support actions they see as reasonable and worthwhile.

Regular monitoring of a lake with EWM allows you to locate new beds so they can be treated (by hand-pulling, chemical treatments, or other means) while the beds are still small. Since chemical treatment is usually conducted in the spring, and since EWM starts growing in cool water, beds need to be located early. An aquatic plant management plan (often required as a part of a permit for chemical treatment) may prescribe a monitoring schedule. For example, you may be requested to follow the Pre- and Post-Treatment Evaluation of Aquatic Plant Community, DNR, 2008 (<http://dnr.wi.gov/org/water/fhp/lakes/PrePostEvaluation.pdf>).

WHERE DO I LOOK FOR EWM?

If EWM gets established, it probably has the capability to survive in all lakes in Wisconsin. It can tolerate a wide range of conditions. EWM can grow in water depths ranging from less than 1-foot to over 20-feet. In Wisconsin, EWM gets the most dense in water depths of 6-15 feet, but can reach nuisance levels in as little as 2 feet. EWM can grow in the clearest of lakes to some of the most turbid lakes, but it does best in moderate to fertile lakes. EWM can grow in rocky areas, sandy areas, and mucky areas, but does best in areas with silt. EWM even has the ability to survive in wetland areas, although it will not grow to be dense in these areas. Please remember, EWM will grow throughout the entire lake where water depths are less than 20 feet, so do not just rely on monitoring “prime habitat” areas.

PREVENTION MONITORING

When looking for floating plant fragments, think about your lake. Which way does the wind blow from and where does the wind blow the plants and floating debris? Go to areas where you have seen the piles of plants and debris, especially after storms and high boat traffic times, as this is when plant fragments will be the heaviest. Check **beach areas, inlets, boat launches, high use areas and the perimeter of the lake**. In mid-summer, EWM may start to break up into smaller pieces and these pieces often wash up along shorelines. These smaller fragments may establish new populations.

When looking for rooted plants, look for EWM in both sandy and mucky areas.

ESTABLISHED POPULATION MONITORING

If EWM has been verified in your lake, you will probably want to monitor the existing beds as well as checking the rest of the lake to locate any new beds (especially if the plant may still be in an expanding stage within the lake). In cases where treatment is occurring, you will probably want to monitor in and around the treatment beds, as well as new areas around the lake to locate new plants if they have spread.



Photo by Robert Korth

HOW TO MONITOR

PREVENTION MONITORING

Shorelines

Even before looking for beds of EWM, you will want to look for floating plant fragments. Look in shallow water areas and in piles of washed up plant fragments along the shoreline to see if you can find any EWM plant fragments. It is especially important to visit these areas after storms and high boat traffic times, as this is when plant fragments will be the heaviest. If you find any EWM fragments, you know the invasive is in your lake.

Shallow-water Areas

Boat or walk around the shoreline of your lake and look for EWM in the shallow water areas.

Deeper-water Areas

Once you have monitored a variety of near shore areas, go out in your boat and begin to collect plants in the deeper water areas. It will be easiest to see the plants if you are wearing polarized sunglasses and/or using an Aqua-View Scope. Make sure the weather will allow for successful and safe sampling. Clear, calm weather is the best for sampling. Sunny skies make it easier to see into the water.

Later in the season there tends to be more suspended algae in the water column and it may be more difficult to see the plants, thus you may need to adjust your monitoring depth.

Use a long-handled rake to collect plants that are hard to reach or difficult to identify. In deeper areas, you can lower the rake to the bottom of the lake and drag the rake along. Pull the rope so that the rake pulls across several feet of the lake bed. This makes for relatively easy monitoring of deep water areas. This method will also help you pull up roots and collect plants that are not readily visible from the lake's surface. Be sure to monitor over sand as well as muck areas.

If you find beds of EWM, you may want to determine how dense the beds are. This information will be very useful when determining the proper control method for your invasive.



Please do not throw plants that you collect back into the lake. Instead, dispose of them on shore or take them for mulch or compost for your garden. If you toss back plants, you may inadvertently spread plants to different locations on the lake. Since it's sometimes difficult to know which plants are native and which are non-native, it is best not to throw any plants back into the lake.



ESTABLISHED POPULATION MONITORING

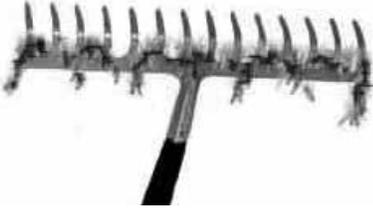
In cases where treatment is occurring, more monitoring is better, especially if the plant may still be in an expanding stage within the lake. This allows the lake community to see if management options are working to meet their goals. The more involved lake residents are in monitoring, the more likely they will understand the process and support actions they see as reasonable and worthwhile.

Look for EWM plants in and around existing beds using polarized sunglasses and/or an Aqua-View Scope. Make sure the weather will allow for successful and safe sampling. Clear, calm weather is the best for sampling. Sunny skies make it easier to see into the water.

Use a rake to pull up and record the plant density of EWM beds. In deeper areas, you can lower the rake to the bottom of the lake and drag the rake along. Pull the rope so that the rake pulls across several feet of the lake bed. This makes for relatively easy monitoring of deep water areas. This method will also help you pull up roots and collect plants that are not readily visible from the lake's surface.

On the Plant Bed Density Report Form (3200-132) (found at the end of this section and at <http://dnr.wi.gov/lakes/monitoring/forms.aspx>) use the following numbers to denote the plant density for each invasive aquatic plant bed found:

Rake fullness ratings are given from 1-3. Conditions of the ratings are described below:

RATING	COVERAGE	DESCRIPTION
1		A few plants on rake head
2		Rake head is about ½ full Can easily see top of rake head
3		Overflowing Cannot see top of rake head



Please do not throw plants that you collect back into the water. Instead, dispose of them in the trash or take them for mulch or compost for your garden.

OTHER INFORMATION YOU MAY WANT TO COLLECT

Sample Location

Record the sample GPS position.

Depth

Measure depth at each sampling site regardless of whether vegetation is present. A variety of options exist for taking depth measurements, including SONAR guns, depth finders that attach to the boat, or an anchor attached to a line with depth increments.

Dominant Sediment Type

Record sediment type (based on how the rake feels when in contact with the bottom) at each site where plants are sampled as: (a) mucky, (b) sandy, or (c) rocky.

If you are checking the rest of the lake to locate potential new beds of EWM, follow the instructions in the Prevention Monitoring section above.

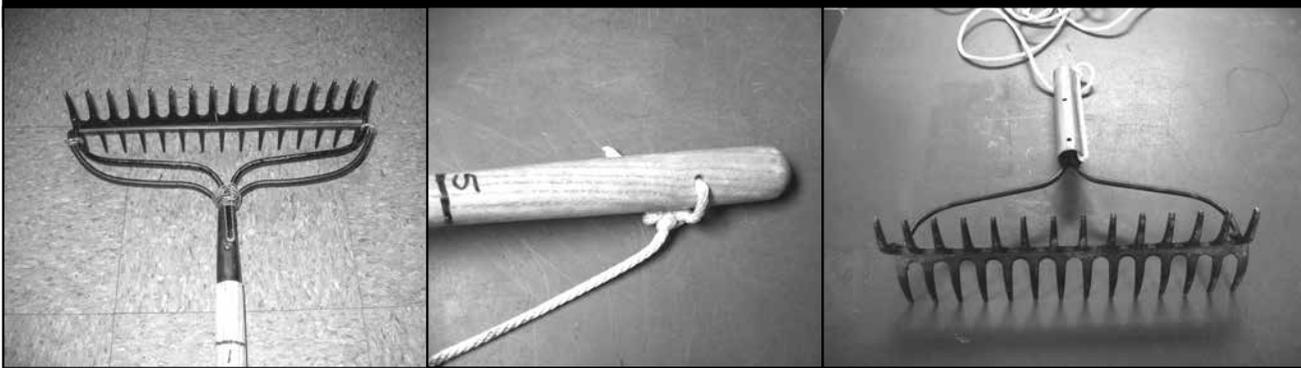
EQUIPMENT NEEDED

- Boat (canoe, kayak, fishing boat, paddle boat, etc.)
- Personal Floatation Device (PFD)
- Long handled rake with attached rope (see description and pictures on the next page)
- Lake map for marking suspect EWM beds and keeping track of where you have been.
- Pencil for marking on map
- Clip board or other hard surface for writing
- Ziploc bags
- Waterproof sharpie pen (to write on Ziploc bags)
- Cooler to keep plants in
- GPS unit (optional)
- Polarized sunglasses (optional)
- Aqua-View Scope (optional). To build your own Aqua-View Scope, see construction directions at the end of this section (page 43-44).
- A copy of appropriate report form(s) (found at the end of this section and at <http://dnr.wi.gov/lakes/monitoring/forms.aspx>) depending on the type of monitoring you are doing:
 - ▶ Aquatic Invasives Surveillance Monitoring Report, Form 3200-133
 - ▶ Aquatic Invasive Plant Incident Report Form, 3200-125
 - ▶ Plant Bed Density Reporting Form, 3200-132



PLANT RAKES

Since it is sometimes difficult to identify plants under water, volunteers use rakes to sample plants. When the rake is thrown into the water, it settles to the bottom of the lake. When the rake is hauled back into the boat, aquatic plants come with it making for easier identification. A thatching rake can be used, or you can make a “2-headed” garden rake by purchasing 2 garden rakes (try looking at garage sales). Disconnect the head from one rake and wire or weld the rake heads together (teeth facing out). To monitor in deeper water, drill a hole in the end of the handle and tie a rope to it. With the two heads, no matter which way the rake falls to the lake bed, the teeth will catch the roots of the plants making plant collection a lot easier. If you need to make the rake heavier, you can use cable ties to attach duck decoy weights, a small brick or other weights. Some volunteers do not like to deal with a rake handle in deeper water, so they cut off the rake handle and attach the rope directly to the rake heads. If you use this type of rake, it is essential that you weigh the rake by using the decoy weights, a small brick, hand weights, etc. No matter which rake is used, please be sure to tie the loose end of the rope to the boat. This way you will not lose your sampling rake.



A rope is tied to the handle of this “2-headed” garden rake, so it can be used in deep water.

SETTING UP A MONITORING TEAM

Often it is easier to “divide” up the work than to rely on one volunteer to monitor an entire lake for invasives. Designate a team leader (and maybe an assistant) who is willing to keep track of what areas are being monitored and who is doing monitoring. The team leader can also be the person who enters the monitoring results on the CLMN website <http://dnr.wi.gov/lakes/CLMN> and the person to whom other volunteers can bring suspect species. If assistance in identification is needed, the team leader can take the species to DNR, UW-Extension, or the County Land and Water Conservation staff for vouchering. By having the team leader take in suspect plants, you will not have the confusion of every team member taking in plants and you will be able to keep a list of what plants have been taken in and identified. Some groups have asked bait dealers or other businesses to “hold” suspect plants bought in by residents. Then the team leader can collect the plants from the bait dealers and take them in for identification when necessary. By the end of the summer, your team leader should be quite familiar with the native plants in your lake. If you are mapping native plants as part of your CLMN monitoring, you will probably not have to submit all your plants to be vouchered. Be creative and most importantly, do not burn out your team leaders!

Consider having a mini-plant training session for your team. The Citizen Lake Monitoring Network Coordinator or the Aquatic Plant Management Coordinator (refer to front of manual and <http://dnr.wi.gov/lakes/contacts>) in your area may be able to assist you with a training session. If not, contact your local CLMN contact to see if an Aquatic Invasive Species training session will be scheduled for your area. These sessions are often set up in conjunction with local lake fairs and conventions. AIS workshops and training sessions are also listed at <http://www.uwsp.edu/cnr/uwexlakes/CLMN/training.asp>.

MAPPING

A map is a very quick and reliable way to assure that everyone knows the place you are talking about when you describe a certain point on your lake. A map will assist you in locating plant communities, recreational and habitat use areas, and more. At the end of the season, you can map all of the sites visited.

If you have a team of monitors, a map will also assist your team in deciding who will monitor where. Once you have your “team” together, print out a map so that you can mark which areas each volunteer is monitoring. Your team leader should keep the master copy of the map. It may be easiest to have volunteers monitor the areas by their homes or where they fish. Assigning smaller (1/2 or 1 mile) stretches of shoreline per volunteer will be less overwhelming than monitoring larger areas of the lake.

You can get maps from your local DNR office, Fishing Hot Spots, fishing map books, etc. Basic lake maps can also be generated through the DNR Surface Water Viewer: <http://dnr.wi.gov/lakes/lakepages/search.aspx>. Type in the name of the lake and choose the county, then click “search.” Click on the lake name (if there are two or more lakes with the same name in the same county, select the lake you are after). This site will give you a plethora of information about your lake, but to find a map, scroll down to the map section and either click on “Contour (Bathymetric) Map” for a printable version, or click on “Interactive Map.” The interactive map (in the Surface Water Viewer) allows you to add in “layers” such as invasive species or monitoring sites.

Use a map source that is most convenient for you. Make sure the following information is on your lake map: lake name, county, sites monitored, date(s), volunteer(s), and any additional observations.

If you are monitoring existing beds of EWM and you have a GPS unit, you may want to mark in the edges of the beds, and then load this data into a mapping program and print out maps of the beds. You may also want to mark other locations monitored.

REPORTING

What would all the work that goes into gathering accurate information be worth if others could not read, review and act on it? Reporting is one of the most important parts of monitoring for invasive species. Knowing where species are not, as well as where they are, is extremely important in being able to track and understand their spread. Knowing how often monitors are looking for species and what they are finding is very important information.

The DNR, lake managers, researchers, and others use the information that is reported through the Citizen Lake Monitoring Network to study lakes and better understand aquatic invasive species. The information reported by volunteers is also provided to the state legislature, federal, tribal and local agencies/organizations that in turn may use this data to help determine funding for invasive species grants and programs.

You can enter your monitoring results on the CLMN website:

<http://dnr.wi.gov/lakes/CLMN> (click “Enter Data” on the left side bar). If you don’t yet have a user id and password, click ‘Request a Wisconsin User ID and Password’, then email Jennifer at jennifer.filbert@wisconsin.gov with your User ID and what monitoring you are involved in. Jennifer will set up your accounts and email you back. Once you receive a confirmation email, you can log in. Once you’re logged in, go to the ‘Submit Data’ tab and click “Add New” to start entering data. Choose the AIS monitoring project for your lake in the *Project* drop down box.

- For prevention monitoring, report your results using the: Aquatic Invasives Surveillance Monitoring Report, Form 3200-133.
- If you find EWM for the first time on your lake, report your results using the: Aquatic Invasive Plant Incident Report, Form 3200-125.
- For established population monitoring, report your results using the Plant Bed Density Report, Form 3200-132. At this time, there is no computer data entry option for this form. Online data forms will be created as time allows. The data collected with this form will be very useful in tracking the spread of EWM throughout the lake if EWM does spread and is necessary in tracking success of your management option. Keep hard copies for your reference and/or submit them to your local DNR Aquatic Plant Management Coordinator.

You can report your results as often as you wish, but be sure to at least report results once a year, at the end of the monitoring season. If you are doing Established Population Monitoring, you will probably want to report your results more often. If you have any questions about reporting, contact your local DNR CLMN contact (page viii).



Remember, for prevention monitoring, a report of ‘no EWM’ at a location is just as important as finding EWM. One cannot confidently state that EWM is not present in an area if no one has looked.

WHAT TO DO WITH SUSPECT PLANTS

Note the “suspect” plant’s location on your map, making sure you can find the spot(s) again. Fill out the Aquatic Invasive Plant Incident Report (Form 3200-125) (found at the end of this section, and at <http://dnr.wi.gov/lakes/monitoring/forms.aspx/>, and deliver it with the suspect plant to your team leader or local DNR CLMN contact. Suspect plants need to go to a herbarium for vouchering. DNR staff can transport plants to the herbarium for the lake group.

To collect a specimen of the plant:

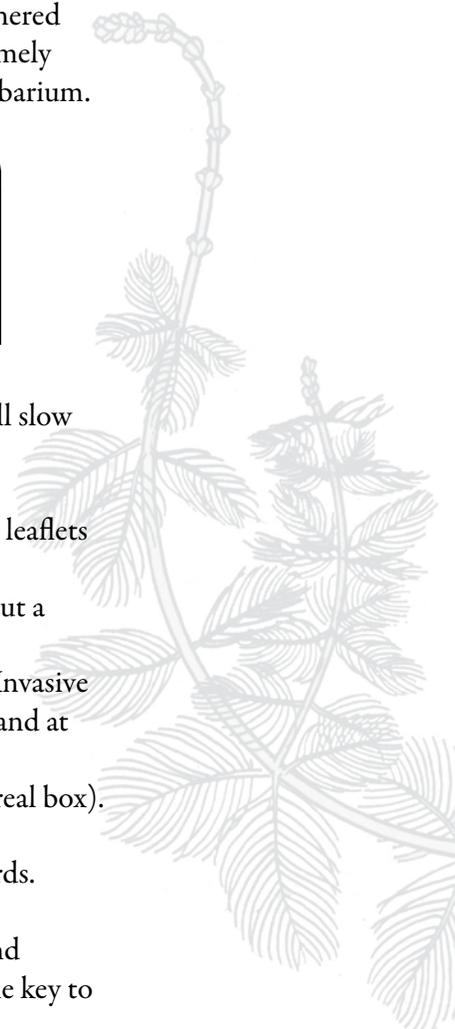
- Gently pull the plant from the lake bottom. Be sure to collect as much of the plant as possible, paying special attention to getting the leafy and flowering portion, if present. Try not to break up or rip the plant as the pieces of the plant can float away and start new plants.
- Use a permanent marker and record the following information on a plastic bag:
 - a. Date
 - b. Water body
 - c. Description of where the sample was found.
- Put the sample in the plastic bag and keep it in a cool place (a cooler in your car or refrigerator at home). Take the specimen to your team leader, your local CLMN contact, your local Land and Water Conservation Department, UW-Extension office or the local DNR contact for identification. If you found EWM in a lake where it has not been verified before, it is important to get the plants verified and vouchered (usually by an herbarium botanist) ASAP, so that control can take place in a timely manner. Your local CLMN contact will get the plant to the DNR or local herbarium.



If your lake has been verified to have EWM, samples do not need to go to the DNR for vouchering – you can just take the plants to your team leader.

- If you cannot bring the plant in to your team leader or other contact:
 - ▶ Rinse the plant under running tap water or in a large pan of water. This will slow the rotting process.
 - ▶ Blot the plant dry with a paper towel.
 - ▶ Spread the plant out on a dry paper towel or newspaper. Try to spread the leaflets apart to help with identification.
 - ▶ Cover with a dry paper towel and press in a catalog or phone book for about a week.
 - ▶ Complete a label (see example at the end of this section) and the Aquatic Invasive Plant Incident Report (Form 3200-125) (found at the end of this section and at <http://dnr.wi.gov/lakes/monitoring/forms.aspx/>).
 - ▶ When the plant is dry, place it between sheets of thin cardboard (like a cereal box). Mail the plant, map and the reporting form to your local CLMN contact.
 - ▶ Remember to make a copy of your map and reporting forms for your records.

Remember if you find “something,” don’t give up; there are a variety of control and management options to address invasive species on your lake. Early detection is the key to controlling the situation!





PREVENTION STARTS WITH US

Whether you are out monitoring, or just boating for fun, be sure to remove all aquatic plants from boating equipment, including your trailer, boat, motor/propeller and anchor before launching and after leaving the water. By removing aquatic plants from boating equipment and encouraging others to do the same, you can help protect Wisconsin lakes from Eurasian water-milfoil.

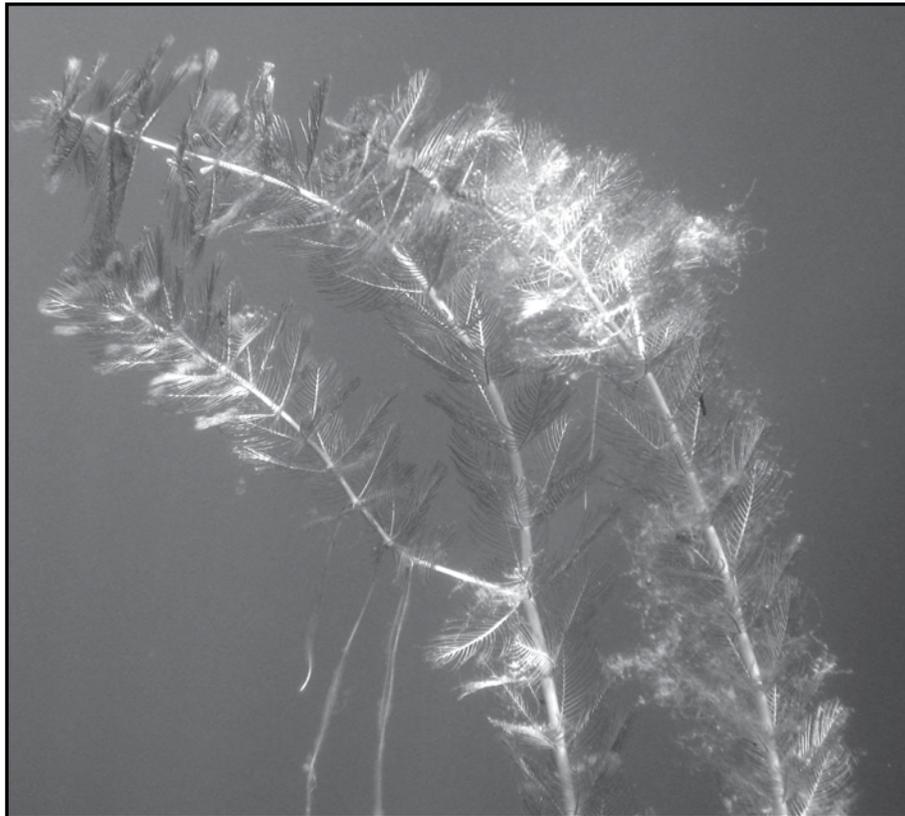


Photo by Tiffany Lyden

*Eurasian
Water-milfoil*



ADDITIONAL MATERIALS AND SUPPORTING DOCUMENTATION

PLANT IDENTIFICATION SOURCES

REFERENCES

REPORTING FORMS

AQUATIC INVASIVES SURVEILLANCE MONITORING REPORT

- **SINGLE LOCATION, MULTIPLE DATES**

- **MULTIPLE LOCATIONS, ONE DATE**

AQUATIC INVASIVE PLANT INCIDENT REPORT

PLANT BED DENSITY REPORT

PLANT LABELS

AQUA-VIEW SCOPE CONSTRUCTION DIRECTIONS



PLANT IDENTIFICATION SOURCES

Through the Looking Glass. 1997. Susan Borman, Robert Korth, Jo Temte. Wisconsin Lakes Partnership. DNR publication # FH-207-97.

Common Aquatic Plants of Wisconsin list prepared by Stan Nichols, Wisconsin Geological and Natural History Survey, Madison, WI. (This is not a true key, but it is easy for all to use.)

Aquatic and Wetland Plants of Northeastern North America. Garrett E. Crow and C. Barre Hellquist. University of Wisconsin Press.

A Manual of Aquatic Plants. 1957. Norman C. Fassett. University of Wisconsin Press.

Aquatic Plants of Illinois. 1966. Glen S. Winterringer and Alvin C. Lopinot. Department of Registration and Education, Illinois State Museum Division and the Department of Conservation, Division of Fisheries.

Michigan Flora. 1985. Edward G. Voss. University of Michigan Press.

REFERENCES

Smith, C.S. and J.W. Barko. 1990. *Ecology of Eurasian watermilfoil*. J. Aquat. Plant Manage. 28:55-64.

Bode, J. et al. 1992. *Eurasian Water Milfoil in Wisconsin: A Report to the Legislature*.

DNR. 2008. *Pre and Post Treatment Evaluation of Aquatic Plant Community*.

**Aquatic Invasives Surveillance Monitoring
 End of Season Report**

Form 3200-133 (02/10)
 Previously Form 3200-124

This monitoring is designed to help detect new invasive species on your lake, so DNR can be alerted and lake residents and/or professionals can respond appropriately. The purpose of the DNR collecting this data is to let us know what methods trained citizens and professionals use when actively looking for aquatic invasive species. You are often the ones to alert us of new invasives in our waters. Remember for surveillance monitoring, a report of "no invasive" at a location is just as important as finding an invasive. One cannot confidently state that the invasive is not present in an area if no one has looked and reported their findings. Knowing where invasives are not, as well as where they are, is extremely important in being able to track and understand their spread. Knowing how often monitors are looking for species and what they are finding is very important information.

Notice: Information on this voluntary form is collected under ss. 33.02 and 281.11, Wis. Stats. Personally identifiable information collected on this form will be incorporated into the DNR Surface Water Integrated Monitoring System (SWIMS) Database. It is not intended to be used for any other purposes, but may be made available to requesters under Wisconsin's Open Records laws, ss. 19.32 - 19.39, Wis. Stats.

Data Collectors

Primary Data Collector Name	Phone Number	Email
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Additional Data Collector Names

Total Paid Hours Spent (# people x # hours each)	Total Volunteer Hours Spent (# people x # hours each)
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Monitoring Location

Waterbody Name	Township Name	County	Boat Landing (if you only monitor at a boat landing)
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Dates Monitored

Start Date (when you first monitored this season)	End Date (when you last monitored this season)
---	--

Did at least some data collectors monitor in... May? June? July? August? (circle all that apply)

Did you monitor...

Did you...

All Beaches and Boat Landings? Frequently Some of the Time Not Often/Never	Walk along the shoreline? Frequently Some of the Time Not Often/Never
Perimeter of whole lake? Frequently Some of the Time Not Often/Never	Observe entire shallow water area (up to 3 feet deep)? Frequently Some of the Time Not Often/Never
Docks or piers? Frequently Some of the Time Not Often/Never	Use rake to extract plant samples? Frequently Some of the Time Not Often/Never
Other: _____	Check underwater solid surfaces (boat hulls, dock legs, rocks)? Frequently Some of the Time Not Often/Never
	Other: _____

Did you find...(even if not a new finding for the lake or stream)

Banded Mystery Snail? Yes No Did not look for	Hydrilla? Yes No Did not look for
Chinese Mystery Snail? Yes No Did not look for	Purple Loosestrife? Yes No Did not look for
Curly-Leaf Pondweed? Yes No Did not look for	Rusty Crayfish? Yes No Did not look for
Eurasian Water Milfoil? Yes No Did not look for	Spiny Waterfleas? Yes No Did not look for
Fishhook Waterfleas? Yes No Did not look for	Zebra Mussels? Yes No Did not look for
Freshwater Jellyfish? Yes No Did not look for	Other?: _____

If you find an aquatic invasive

If you find an aquatic invasive and it is not listed at <http://dnr.wi.gov/lakes/AIS> fill out an incident report for the species. Then bring the form, a voucher specimen if possible, and a map showing where you found it to your regional DNR Citizen Lake Monitoring Coordinator as soon as possible (to facilitate control if control is an option).

If you don't find an aquatic invasive

If you submit your data online, that is all you need to do. Otherwise, please mail a copy to your regional DNR Citizen Lake Monitoring Coordinator. <http://dnr.wi.gov/lakes/contacts>

The purpose of this form is to notify DNR of a new species of AIS in a waterbody. Only use if you found an aquatic invasive plant on a lake where it hasn't been found previously.

To find where aquatic invasives have already been found, visit: <http://dnr.wi.gov/lakes/ais>.

Notice: Information on this voluntary form is collected under ss. 33.02 and 281.11, Wis. Stats. Personally identifiable information collected on this form will be incorporated into the DNR Surface Water Integrated Monitoring System (SWIMS) Database. It is not intended to be used for any other purposes, but may be made available to requesters under Wisconsin's Open Records laws, ss. 19.32 - 19.39, Wis. Stats.

Primary Data Collector

Name	Phone Number	Email
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Monitoring Location

Waterbody Name	Township Name	County
----------------	---------------	--------

Boat Landing (if you only monitor at a boat landing)

Date and Time of Monitoring or Discovery

Monitoring Date	Start Time	End Time
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Information on the Aquatic Invasive Plant Found (Fill out one form for each species found.)

Which aquatic invasive plant did you find?: Curly-leaf Pondweed Eurasian Water-milfoil Purple Loosestrife
 Brittle Naiad Hydrilla Brazilian Waterweed Yellow Floating Heart

Where did you find the invasive plant?

Latitude: _____ Longitude: _____

Approximately how large an area do the plants occupy?

A Few Plants One or a few beds Many beds A Whole Bay or Portion of Lake
 Widespread, covering most shallow areas of lake Don't know (e.g. didn't check the whole lake)

Was the plant floating or rooted? Floating Rooted

Estimated percent cover in the area where the invasive was found (optional)

Substrate cobble, %	Substrate muck, %	Substrate boulders, %	Substrate sand, %	Bottom covered with plants, %
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Voucher Sample

Did you collect a sample of the plant (a voucher specimen) and bring it to your local DNR office? If so, which office?

Rhinelander Spooner Green Bay Oshkosh Did not take plant sample to a DNR office
 Fitchburg Waukesha Eau Claire Superior Other Office _____

Please collect up to 5-10 intact specimens. Try to get the root system, all leaves as well as seed heads and flowers when present. Place in ziplock bag with no water. Place on ice and transport to refrigerator. Bring samples, a copy of this form, along with a map showing where you found the suspect plants to your regional AIS or Citizen Lake Monitoring Coordinator at the DNR.

For DNR AIS Coordinator to fill out

AIS Coordinator(s) or qualified field staff who verified the occurrence: _____

Statewide taxonomic expert who verified the occurrence: _____

(for list see <http://dnr.wi.gov/invasives/aquatic/whattodo/staff/AisVerificationExperts.pdf>)

Was the specimen confirmed as the species indicated above? Yes No If no, what was it?

Herbarium where specimen is housed: _____ Herbarium Specimen ID: _____

Have you entered the results of the voucher in SWIMS? Yes No

AIS Coordinator: Please enter the incident report in SWIMS under the Incident Report project for the county the AIS was found in. Then, keep the paper copy for your records.

Use this form when you have verified that your lake has Eurasian Water-Milfoil or Curly-leaf Pondweed and you want to assess the densities of the bed(s). Please use one form per plant bed raked.

Personally identifiable information collected on this form will be incorporated into the DNR aquatic invasive species database. It is not intended to be used for any other purposes, but may be made available to requesters under Wisconsin's Open Records laws, s. 19.32 - 19.39, Wis. Stats.

Primary Data Collector				
Name		Phone Number	Email	
Monitoring Location				
Waterbody Name		Township Name	County	Station Name
Latitude of approx. center of plant bed			Longitude of approx. center of plant bed	
Method of obtaining Latitude and Longitude: <input type="checkbox"/> GPS <input type="checkbox"/> Online Surface Water Data Viewer <input type="checkbox"/> Other Mapping Software <input type="checkbox"/> Other _____				
Date and Time of Monitoring				
Monitoring Date	Start Time	End Time		
Estimated percent cover in the sample area (Optional)				
Substrate cobble, %	Substrate muck, %	Substrate boulders, %	Substrate sand, %	Bottom covered with plants, %
Monitoring Results				
Which aquatic invasive plant are you monitoring the density of?: <input type="checkbox"/> Curly-leaf Pondweed <input type="checkbox"/> Eurasian Water-milfoil <input type="checkbox"/> Other _____				
Plant Density Rating <input type="checkbox"/> 1-A few plants on rake head <input type="checkbox"/> 2-Rake Head is about 1/2 full <input type="checkbox"/> 3-Overflowing				
Depth to lake bottom at edge of plant bed closest to shore (min depth)		feet/meters (circle one)		
Depth to lake bottom at edge of plant bed furthest shore (max depth)		feet/meters (circle one)		
Estimated Height of Plants (use marked-off rake handle to determine) <input type="checkbox"/> 0.5 - 1 foot <input type="checkbox"/> 1 - 2 feet <input type="checkbox"/> >2 feet				
If monitoring Eurasian Water-Milfoil, did you notice any holes or damage to the stems that could possibly be weevil damage ? <input type="checkbox"/> Yes <input type="checkbox"/> No				

PLANT LABELS



Project Name: Citizen Lake Monitoring Network

(Scientific Name & authority)

Common Name:
Lake Name:
Water Body ID code#:
County:
Collected by:
Date:
Depth:
Location and Habitat:



Project Name: Citizen Lake Monitoring Network

(Scientific Name & authority)

Common Name:
Lake Name:
Water Body ID code#:
County:
Collected by:
Date:
Depth:
Location and Habitat:



Project Name: Citizen Lake Monitoring Network

(Scientific Name & authority)

Common Name:
Lake Name:
Water Body ID code#:
County:
Collected by:
Date:
Depth:
Location and Habitat:



Eurasian
Water-milfoil



AQUA-VIEW SCOPE CONSTRUCTION DIRECTIONS

- 1 - 3 foot section of 4" diameter plastic pipe. We use ABS pipe because it is black and because it is lighter than PVC pipe. If you are unable to find ABS pipe, PVC pipe will work just fine. Your hardware store may have a short piece of pipe they will sell you. We bought a 10-foot piece of pipe and cut it.
- 1 or 2 - 5 ½" pull handles (we used one, it was easier to hold and guide)
- Screws if not supplied with handle
- 1 - 4" ABS coupler
- 1 - 4 3/8" diameter lexan disk – Lexan is non-breakable plexiglass that we had cut at our local glass repair shop. You can use plexiglass for the disk but it is difficult to cut the plexiglass in a circle.
- Clear silicone rubber sealant
- Drill and screw driver
- Weatherstripping for around the top of the aqua-view scope. Marine and automotive weatherstrip tape works well.

HOW TO MAKE AN AQUA-VIEW SCOPE (picture on next page)

Cut a 3 foot section of 4" diameter ABS or PVC pipe. The cut must be straight and square to the pipe. If you can't find pipe with a black interior, you can paint the inside a flat black. If the pipe is shiny on the inside, rough it up using sandpaper or steel wool so that there won't be any glare inside the tube. **If you are going to rough it up on the inside, make sure to do that before you attach the screws so you don't scratch your hand!**

Attach one or two handles on either side of the pipe about four inches from one end. ABS pipe is fairly soft, you can use a screw driver to put the screws in or you can drill pilot holes and put the screws in. If you are using a drill, make sure to make the hole smaller than the screw so the screw will hold. If using PVC pipe, you will need to drill the holes.

Run a bead of clear silicone rubber sealant on the bottom of the squared off end of pipe. Place the lexan disk on the bead of sealant.

Smear a small amount of silicon sealant on the outside of the pipe one half inch from the end of the pipe with the lexan. Slide the coupling over the end and give it a slight twist to distribute the sealant evenly. Slide the coupling on as far as it will go. The collar will extend out beyond the lexan disk protecting it from scratching.

Drill two small (1/4") holes in the side of the collar close to the lexan so that air won't be trapped in the open end of the coupler when you put the view scope into the water. The holes should be drilled on opposite sides of the pipe.

Weatherstripping is placed around the top of the open end of the scope (the side you look into). Weatherstripping has a sticky side that sticks to the plastic and the foam makes it a little more comfortable for your face to rest against.

Aqua-view scope instructions adapted from those designed by Jeff Schloss, coordinator of New Hampshire Lakes Lay Monitoring Program (603) 862-3848.

AQUA-VIEW SCOPE DRAWING

