






# CURLY-LEAF PONDWEED

# 3

## MONITORING PROTOCOL



	Background/Overview.....	47
	Life Cycle.....	47
	Identification.....	48
	Monitoring.....	50
	Types of Monitoring.....	50
	When to Monitor.....	50
	Where do I Look for Curly-leaf Pondweed?.....	51
	How to Monitor.....	52
	Equipment Needed.....	54
	Setting Up a Monitoring Team.....	55
	Mapping.....	56
	Reporting.....	57
	What to do with Suspect Plants.....	58
	Additional Materials and Supporting Documentation.....	61
	Plant Identification Sources.....	62
	References.....	62
	Data Reporting Forms.....	63
	Example Label(s).....	71
	Aqua-View Scope Construction Directions.....	73





## BACKGROUND/OVERVIEW

Curly-leaf pondweed is a non-native submerged aquatic plant. Its unique ability to thrive in cool water allows it to out-compete other aquatic plants. Curly-leaf pondweed can grow under the ice while most plants are dormant, but then dies back in mid-July when other plants are just reaching peak growth. This mid-summer die-off can cause dense mats of dying vegetation on the lake surface. When the plants die, nutrients such as phosphorus are released into the water, fueling algal blooms.

Curly-leaf pondweed is one of 80 pondweed species found throughout the world. It is native to the fresh waters of Eurasia, Africa and Australia. This aquatic plant was accidentally introduced into the United States when the common carp was brought in during the mid 1800's. It is thought to have made its way to Wisconsin in 1905 along with fish imported from Europe. DNR staff have just recently begun tracking lakes with curly-leaf pondweed, so there is not yet a complete listing of waterbodies in Wisconsin with curly-leaf pondweed. The information currently available on waterbodies known to have curly-leaf pondweed can be found at <http://dnr.wi.gov/lakes/AIS/index.asp?folder=CLMN>. **We need your help to determine which additional lakes have curly-leaf pondweed.**

Volunteers play an integral part in learning to recognize the plant and checking local lakes for the presence of curly-leaf pondweed. 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

Curly-leaf pondweed has a unique life cycle. Unlike most of our native aquatic plants that come out of dormancy in spring and reach their maximum growth in late summer or early fall, curly-leaf pondweed normally begins growing in the fall. Depending upon snow cover and winter severity, curly-leaf pondweed may be dormant or actively growing under the ice. Curly-leaf pondweed has a large growth spurt from ice out to early spring.

Its natural inclination for low water temperatures helps it avoid competition with other plant species. Its fast, early spring growth allows the stems to reach the water's surface before any other plant. By late spring, a dense canopy of curly-leaf can form, blocking sun light from reaching other plants.

Curly-leaf pondweed plants usually complete their life cycle in June or July. When they die back, they can form dense mats of dying vegetation on the surface. If you notice that plants on your lake are dying back in June or early July, you will want to check to see if it is curly-leaf pondweed.

Turions and seeds are formed on the plants before they die. A turion is a dormant shoot segment (vegetative bud) that can form most anywhere on the plant. It is a hard structure that looks a little bit like a burr or pinecone. Although the plants also produce seeds, the turions are probably the most reliable form of reproduction. The turion falls to the bottom of the lake as the plant dies and begins to decay. Most of the turions begin to sprout in fall, responding either to the shortening day length or to water temperature. However, some turions will actually sprout in the spring and some will lie dormant in the sediment until environmental conditions are favorable to sprouting (turions can remain dormant for years).

For the plants that sprout in the fall, the initial growth form is a winter foliage that stays green (sometimes dormant or sometimes actively growing) even under the ice. The curly-leaf pondweed foliage in winter to early spring are quite narrow and lack the wavy edges. A few days after ice off, curly-leaf pondweed begins to grow more rapidly and attain its spring foliage (lasagna noodle wavy edges with the crispy appearance). Those turions that sprout in the spring also have the narrow “non-wavy” leaves when the plant first sprouts, then the wavy leaves develop as the plant grows.

Curly-leaf pondweed is tolerant of disturbance and can grow in most water conditions. One way to protect your lake from curly-leaf pondweed and other invasives is to protect and maintain native aquatic plant beds.

The turions are sometimes carried in muck attached to an anchor or dropped in the bottom of your boat. These turions can sprout and grow new curly-leaf pondweed colonies. 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 curly-leaf pondweed and other invasives.



## IDENTIFICATION

In your packet you will find a laminated example of curly-leaf pondweed (*Potamogeton crispus*, pronounced POT-a-mo-JEE-ton CRISP-us).

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

### **CURLY-LEAF PONDWEED CHARACTERISTICS:**

- Alternate leaves that are minutely toothed (you may need a magnifying glass to see the teeth).
- Leaf edges are wavy and have a crispy appearance – hence the name. The leaves are often described as mini “lasagna noodle” looking leaves.
- Most leaves have a prominent red-tinged mid-vein.
- The stem is slightly flattened.
- No floating leaves. (Some native pondweeds produce specialized floating leaves that are thicker than submerged leaves and often have a waxy feel.)

- A short flower stalk may rise above the water's surface in spring, though the rest of the plant is submersed.
- Turions are produced and drop to the lake bottom when the plants decay in late summer. Turions are vegetative reproductive buds that are very rigid and resemble small pinecones.
- In winter and very early spring, the leaves on the plant are quite narrow and lack the wavy edges.

Curly-leaf pondweed can be confused with Claspingleaf pondweed (*Potamogeton richardsonii*). Claspingleaf pondweed does not have toothed leaf edges nor does it produce turions.

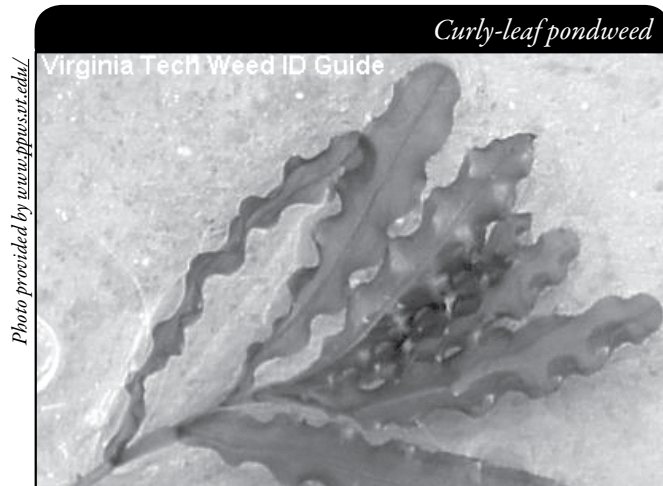


Photo provided by [www.ppvs.vt.edu/](http://www.ppvs.vt.edu/)

Curly-leaf pondweed leaves are often light green and fairly transparent.



Photo by Susan Knight

Note the "lasagna-like" wavy leaves of curly-leaf pondweed.

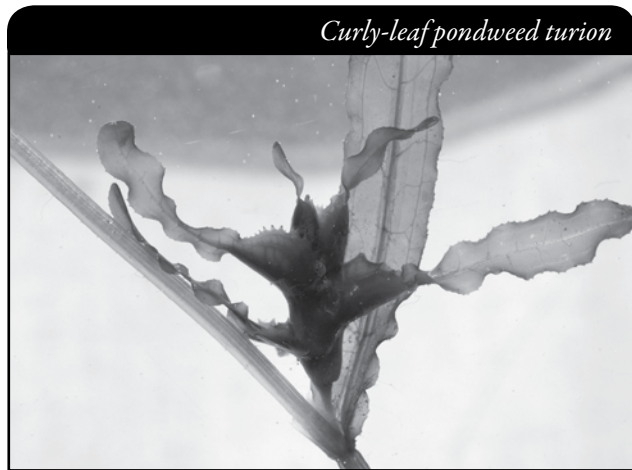


Photo by Frank Koschore

Curly-leaf pondweed turion with leaves still attached. The leaves will eventually rot and fall off of the turion.

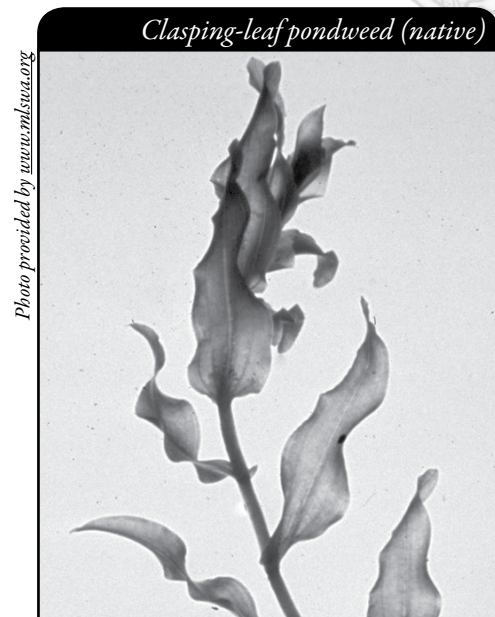


Photo provided by [www.mksusa.org](http://www.mksusa.org)

*Potamogeton richardsonii* (Claspingleaf pondweed)



# CURLY-LEAF PONDWEED MONITORING

## TYPES OF MONITORING

There are two types of monitoring for curly-leaf pondweed - Prevention Monitoring and Established Population Monitoring.

### **PREVENTION MONITORING**

If a lake is not known to have curly-leaf pondweed, citizen lake monitors can play a very important role by regularly monitoring the lake for curly-leaf pondweed and reporting if curly-leaf pondweed is found or that nothing has been found. The “negative” information is important as it lets the lake managers know when curly-leaf pondweed is not in a lake so they can better focus their work efforts. If curly-leaf pondweed is found at an early stage, there may be hope of knocking it back. With the turions remaining viable for several years, multiple years of control are necessary – but with each control year, the treatment area and density should decrease. Several lakes that found curly-leaf pondweed 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 curly-leaf pondweed, citizen lake monitors can help track its spread. If treatment options are being used to control curly-leaf pondweed, citizen lake monitors can track the effectiveness of the management options by monitoring the spread or decline of curly-leaf pondweed. With the turions remaining viable for several years, multiple years of control are necessary – but with each control year, the treatment area and density should decrease.

Even if your lake group is controlling curly-leaf pondweed, you still want to monitor for curly-leaf pondweed. 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 twice a month in May and June when curly-leaf pondweed is at its peak density. With this early season monitoring, it might be easier to see and identify. If you notice plants that suddenly disappear in late June or early July, it may be curly-leaf pondweed. Since curly-leaf pondweed is normally only dense for a few months, most groups monitor every 2-3 weeks. Some groups also check for curly-leaf pondweed in the late fall, as the new plants will be growing at this time and the native pondweeds are dying back. If curly-leaf pondweed plants are found in fall, a response could be planned into management for the following spring, if needed. This will increase the chances for control of curly-leaf pondweed. 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 curly-leaf pondweed, volunteers will probably want to monitor more carefully and more often. 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.

Since curly-leaf pondweed comes from the over-summering turions, additional monitoring should take place in late fall or early the next season. Regular monitoring of a lake with curly-leaf pondweed 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. If curly-leaf pondweed plants are found in fall, beds can be treated as early in the spring as possible. This will increase the chances for control. 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 required 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 CURLY-LEAF PONDWEED?

Curly-leaf pondweed can survive in a wide range of lake conditions. It grows in water depths of less than 1-foot to water depths of about 15-feet. In Wisconsin, curly-leaf pondweed becomes the most dense in water depths of 3-10 feet, but can reach nuisance levels in as little as 1-foot to as deep as 15-feet. Curly-leaf pondweed does best in moderate to fertile lakes and does well in turbid water conditions. Curly-leaf pondweed is often associated with degraded water quality. Curly-leaf pondweed can live in sandy soils, but prefers soft substrates. Please remember, curly-leaf pondweed will grow throughout the entire lake where water depths are less than 15 feet, so do not just rely on monitoring “prime habitat” areas.

## PREVENTION MONITORING

Even before looking for beds of curly-leaf pondweed, you will want to look for floating plants. Think about your lake. What is the direction of the prevailing winds and where are plants and floating debris likely to be? Go to the areas where you have seen the piles of plants and debris. Look in these piles to see if you can find any curly-leaf pondweed plant fragments. It is especially important to visit these areas **after storms and high boat traffic times**, as this is when the plant fragments will be the heaviest. Check **beach areas, inlets, boat launches, high use areas and the perimeter of the lake**.

When looking for rooted plants, look for curly-leaf pondweed in both sandy and mucky areas. Curly-leaf pondweed will grow in a variety of sediment conditions, but will do the best in areas with a mucky bottom.

## ESTABLISHED POPULATION MONITORING

If curly-leaf pondweed 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.

## *HOW TO MONITOR*

### PREVENTION MONITORING

#### Shorelines

When looking 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 curly-leaf pondweed 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 curly-leaf pondweed fragments, you know the invasive is in your lake.

#### Shallow-water Areas

Boat or walk around the shoreline of your lake and look for curly-leaf pondweed 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.

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 curly-leaf pondweed, 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 curly-leaf pondweed 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 curly-leaf pondweed 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 <http://dnr.wi.gov/lakes/forms/>, 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 1/2 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.

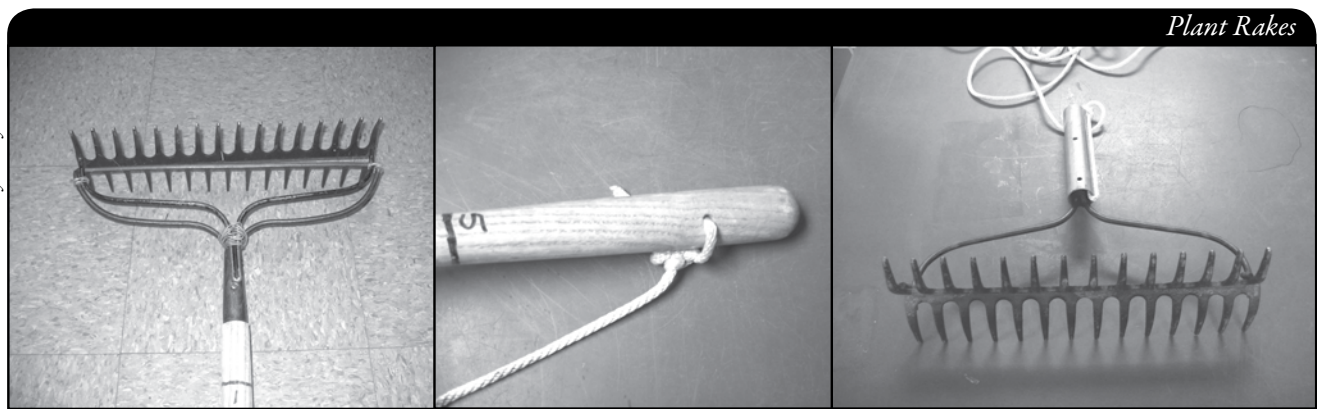
If you are checking the rest of the lake to locate potential new beds of curly-leaf pondweed, follow the instructions in the Prevention Monitoring section above.

## 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 curly-leaf pondweed 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/forms>) 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 front of manual and <http://dnr.wi.gov/lakes/contacts> for 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://dnrmapping.wisconsin.gov/imf/imf.jsp?site=SurfaceWaterViewer>. When using the surface water viewer to generate a basic lake map, the easiest way to get where you want to go is by using the “Zoom To” button.



For example, say you want a basic lake map of Bearskin Lake in Oneida County. Use the drop down button at the left of the screen (it will say city or village) click on the down arrow and click on ‘County’. Then go to the drop down arrow in the next line and click on Oneida. Then click on [Go!]. The Oneida County map will appear on the right. If you move your cursor/mouse on the map and left click, the map will zoom to the area under the cursor. Keep zooming in until you have the lake you want (you can zoom out if you overshoot your target lake). Once you have your lake in the box, click on the print button near the top of your screen and then click on ok. To see what you will be printing, click on [open map]. Once you try this a few times, it will get easier. Also, via the Layers tab, you can select what you want to show.

You might want to consider obtaining a surveyed contour or bathymetric map of your lake. The DNR has many of these maps on their website at <http://dnr.wi.wi.gov/lakes/maps>.



For example, if you want to print out a bathymetric map for Bearskin Lake, Oneida County, click on the down arrow key next to Counties. Select Oneida County. Then page down to Bearskin Lake. Left click on Bearskin Lake. Click on “For a More Detailed Lake Map”. Now just follow the directions. To print this to a letter size paper, right click on the map and “save picture as” a file on your computer. Start Microsoft Word (or other word processing program), then click on the tabs: “File” “Page Setup” “Paper Size” “Landscape” “ok” and “insert” “picture” “from file” and pick the lake map file and then print it.

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 curly-leaf pondweed 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](mailto: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* dropdown box.

- For prevention monitoring, report your results using the: Aquatic Invasives Surveillance Monitoring Report, Form 3200-133.
- If you find curly-leaf pondweed 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 curly-leaf pondweed throughout the lake if curly-leaf pondweed 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 curly-leaf pondweed' at a location is just as important as finding curly-leaf pondweed. One cannot confidently state that curly-leaf pondweed 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/forms/>), 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 curly-leaf pondweed 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 curly-leaf pondweed, samples do not need to go to the DNR for vouchering – you can just take the plants to your team leader.

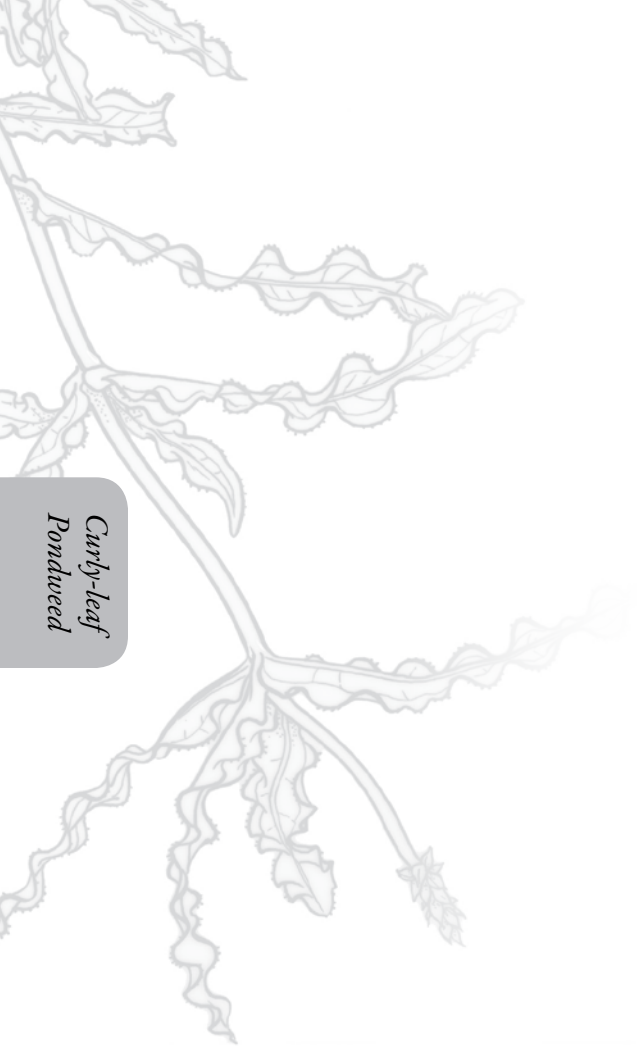
- If you cannot bring the plant in to your team leader or other contact:
  - ▶ Rinse the plant under running tap water or in a large pan of water. This will slow the rotting process.
  - ▶ Blot the plant dry with a paper towel.
  - ▶ Spread the plant out on a dry paper towel or newspaper. Try to spread 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/forms/>).
  - ▶ 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 Curly-leaf Pondweed.



*Curly-leaf  
Pondweed*





## *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*

*Curly-leaf  
Pondweed*





## 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

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

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
-----------------------------	--------------	-------

Additional Data Collector Names

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

**Monitoring Location**

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

**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 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
------	--------------	-------

**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
-----------------	------------	----------

**Information on the Aquatic Invasive Plant Found (Fill out one form for each species found.)**

Which aquatic invasive plant did you find?:

<input type="checkbox"/> Curly-leaf Pondweed	<input type="checkbox"/> Eurasian Water-milfoil	<input type="checkbox"/> Purple Loosestrife
<input type="checkbox"/> Brittle Naiad	<input type="checkbox"/> Hydrilla	<input type="checkbox"/> Brazilian Waterweed
<input type="checkbox"/> Yellow Floating Heart		

Where did you find the invasive plant?

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

Approximately how large an area do the plants occupy?

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

Was the plant floating or rooted?

<input type="checkbox"/> Floating	<input type="checkbox"/> 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, %
---------------------	-------------------	-----------------------	-------------------	-------------------------------

**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?

<input type="checkbox"/> Rhinelander	<input type="checkbox"/> Spooner	<input type="checkbox"/> Green Bay	<input type="checkbox"/> Oshkosh	<input type="checkbox"/> Did not take plant sample to a DNR office
<input type="checkbox"/> Fitchburg	<input type="checkbox"/> Waukesha	<input type="checkbox"/> Eau Claire	<input type="checkbox"/> Superior	<input type="checkbox"/> 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:     GPS     Online Surface Water Data Viewer  
 Other Mapping Software     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?:  
 Curly-leaf Pondweed     Eurasian Water-milfoil     Other \_\_\_\_\_

Plant Density Rating  
 1-A few plants on rake head     2-Rake Head is about 1/2 full     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)  
 0.5 - 1 foot     1 - 2 feet     >2 feet

If monitoring Eurasian Water-Milfoil, did you notice any holes or damage to the stems that could possibly be weevil damage ?  
 Yes     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:**



*Curly-leaf  
Pondweed*



**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:**





## 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.

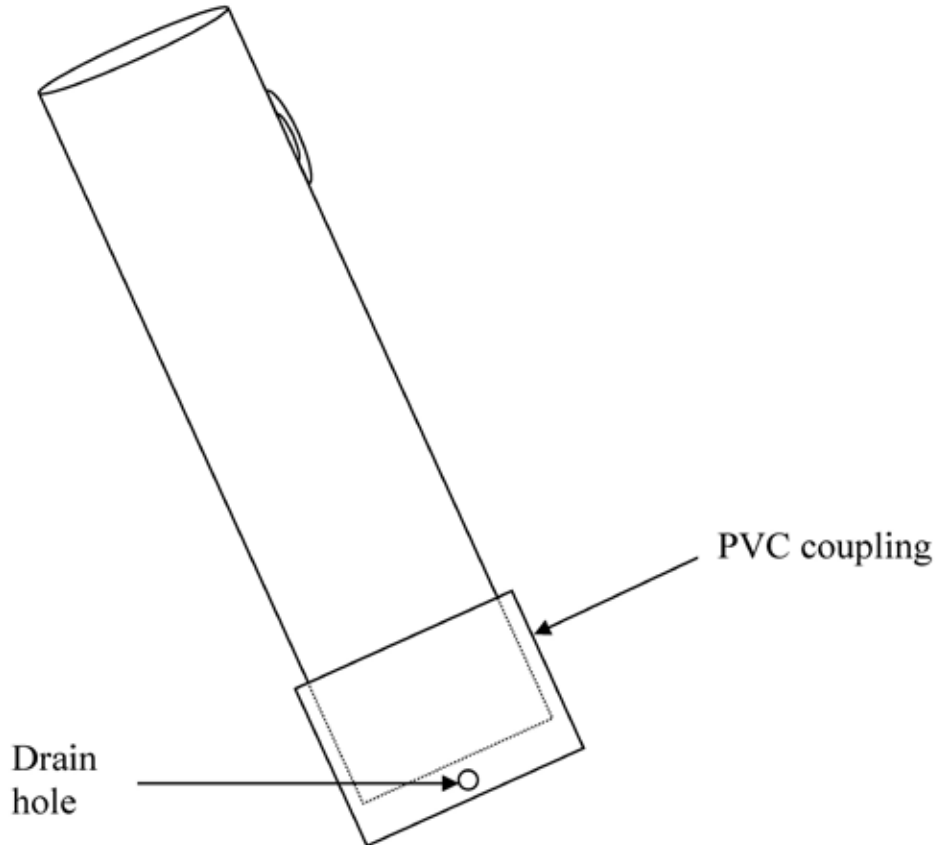
Smear a small amount of silicon sealant on the outside of the pipe one half inch from the end of the pipe with the lexan. Slide the coupling over the end and give it a slight twist to distribute the sealant evenly. Slide the coupling on as far as it will go. The collar will extend out beyond the lexan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



*Curly-leaf  
Pondweed*