






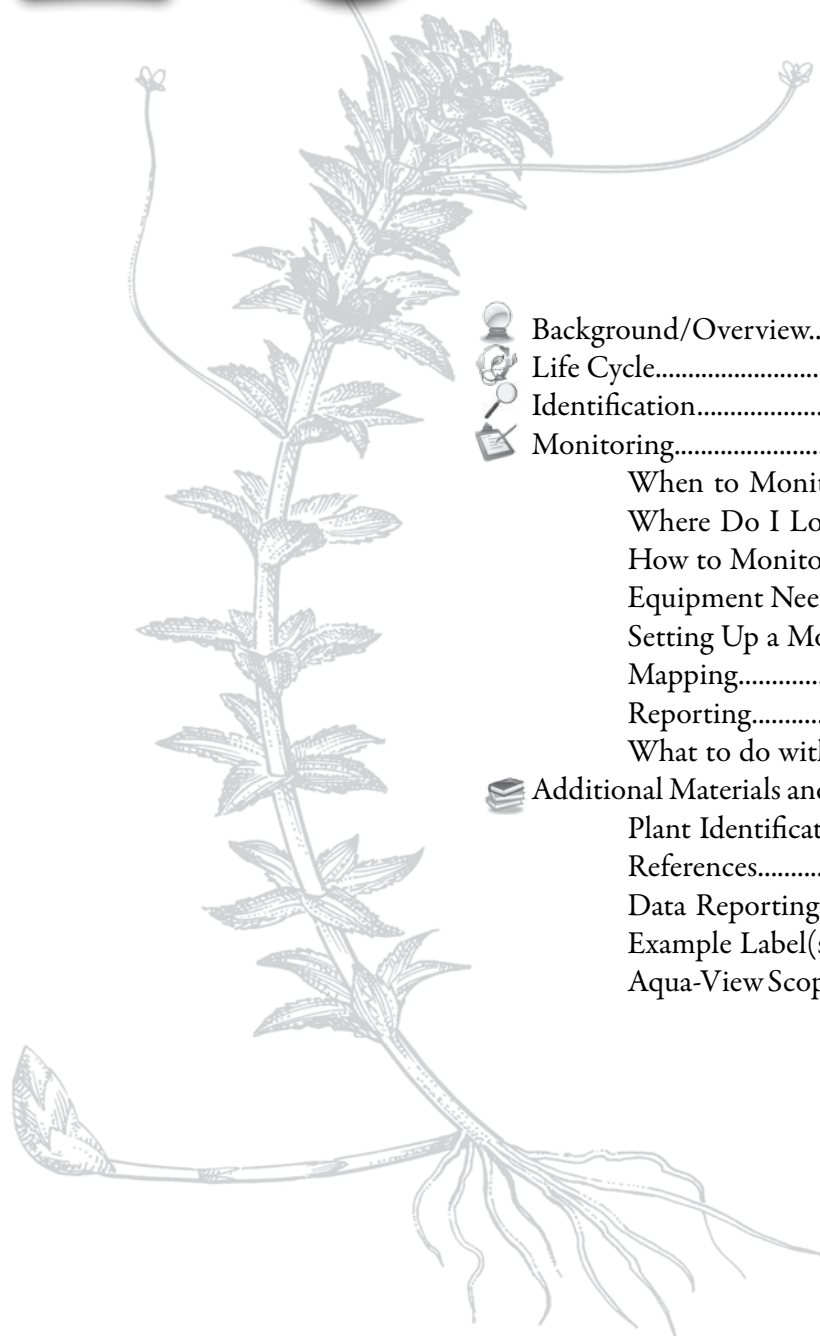
# 10

## HYDRILLA

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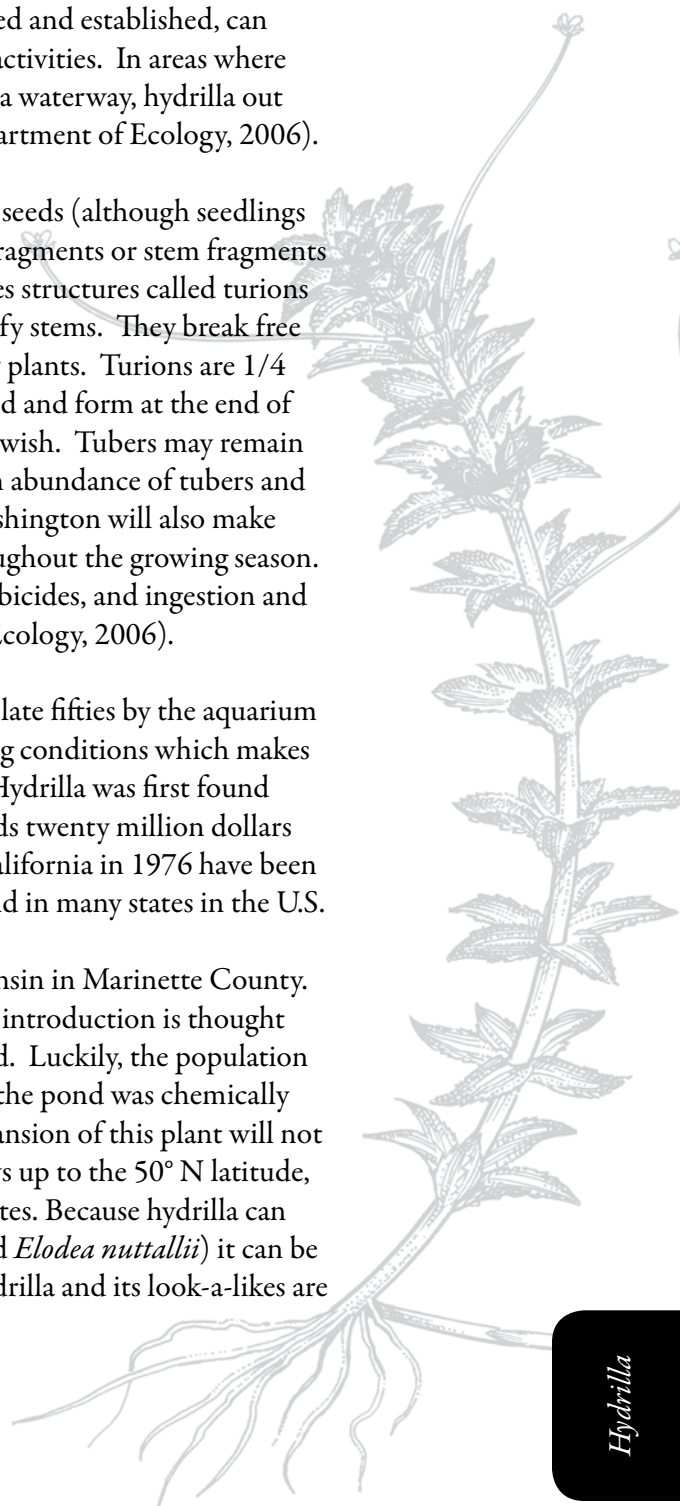
## BACKGROUND/OVERVIEW

Hydrilla is a submerged aquatic plant native to Asia and northern Australia and is considered to be the most problematic aquatic plant in the United States. In areas of North America where hydrilla has been introduced it has formed dense canopies that shade out native vegetation and destroy fish and wildlife habitat. The hydrilla canopy has detrimental impacts on fisheries as well as recreation and creates harsh conditions for other species by decreasing oxygen under the canopy mats and increasing water temperature and pH. The plant can grow several inches a day and once introduced and established, can easily spread to other waterbodies through boating and fishing activities. In areas where hydrilla, Eurasian water-milfoil and Brazilian elodea co-exist in a waterway, hydrilla out competes the other two noxious weeds (Washington State Department of Ecology, 2006).

Hydrilla has very effective methods of reproducing. It produces seeds (although seedlings are rarely seen in nature) and can sprout new plants from root fragments or stem fragments containing as few as two whorls of leaves. Hydrilla also produces structures called turions and tubers. Turions are compact “buds” produced along the leafy stems. They break free of the parent plant and drift or settle to the bottom to start new plants. Turions are 1/4 inch long, dark green, and appear spiny. Tubers are underground and form at the end of roots. They are small, potato-like, and are usually white or yellowish. Tubers may remain dormant for several years in the sediment. Hydrilla produces an abundance of tubers and turions in the fall. The hydrilla variety found in the state of Washington will also make tubers in the spring and will produce nondormant turions throughout the growing season. Hydrilla tubers and turions can withstand ice cover, drying, herbicides, and ingestion and regurgitation by waterfowl (Washington State Department of Ecology, 2006).

Hydrilla was first introduced to the United States in the mid to late fifties by the aquarium trade. This hardy, tolerant plant does well in a variety of growing conditions which makes it a perfect plant to sell in the nursery and aquarium industry. Hydrilla was first found in a waterway in south Florida in 1960. Currently Florida spends twenty million dollars annually on hydrilla control. Introduction to small ponds in California in 1976 have been traced to a contaminant of waterlily shipments. Today, it is found in many states in the U.S.

In 2007, hydrilla was discovered in a man-made pond in Wisconsin in Marinette County. It is the only known occurrence of the plant in Wisconsin. The introduction is thought to have been by nursery stock that was introduced into the pond. Luckily, the population was caught early and it is believed to have been eradicated after the pond was chemically treated, drained and allowed to freeze over the winter. The expansion of this plant will not be restricted by the Wisconsin climate. In Russia the plant grows up to the 50° N latitude, which is equivalent to the border of Canada and the United States. Because hydrilla can be easily confused with our native elodea (*Elodea canadensis* and *Elodea nuttallii*) it can be easily overlooked. Volunteers trained in the identification of hydrilla and its look-a-likes are essential to prevent the spread of this non-native plant.



Hydrilla

Hydrilla continues to be sold through aquarium supply dealers and over the internet even though the plant is on the U.S. Federal Noxious Weed List. Commercially, it is often named “anacharis.”

Eradication of established populations of hydrilla is very difficult and may be impossible.



## LIFE CYCLE

Hydrilla is a submersed perennial that looks a great deal like our native elodea. This close resemblance makes monitoring for hydrilla difficult. Another factor that makes identification difficult is that hydrilla can be either monoecious (both male and female flowers on the same plant) or dioecious (male and female flowers on different plants). Each has unique growth characteristics. The monoecious plants tend to be more delicate and grow laterally and spread, carpeting the bottom before lifting to the surface. In the U.S., monoecious plants tend to be north of the Carolinas. It is believed that the Wisconsin plant is the monoecious form. In the monoecious form, female flowers are solitary and white and float on the surface with threadlike stalks. Male flowers are tiny, greenish and attached to leaf axils toward the stem tips. Flowers are not always found on the plant.

Hydrilla forms a dense canopy, 80% of the biomass of the plant is in the upper two feet of the water column. While it does provide structure and food for insects and other macroinvertebrates, it also creates vast monotypic stands and can out-compete native aquatic plants.

Hydrilla grows rooted to the bottom, submersed in either still or flowing water. Sometimes fragments will break loose and the plant will survive in a free floating stage. The depth of growth depends on substrate and water clarity, but it can grow in a few inches of water or in water more than twenty feet deep. Stem lengths of up to 30 feet have been found in Florida. It will grow in low or high nutrient conditions.

Hydrilla has great reproductive potential. The plant spreads readily through fragmentation but it also reproduces by growth of turions and subterranean tubers. The tubers can remain viable for more than four years. Southern U.S. populations overwinter as perennials while northern U.S. populations overwinter and re-grow from tubers. Research suggests that the monoecious strain is better adapted to the temperate climate because it can form tubers quickly during short photoperiods (Spencer and Anderson, 1986; Van, 1989) and also during long photoperiods (Van, 1989).

New plants can sprout from stem fragments. Langeland and Suttin (1980) found that more than 50% of fragments with three whorls of leaves can sprout and grow a new plant which in turn can start a new population. In fact almost 50% of hydrilla fragments that have a single whorl of leaves can sprout and grow a new plant. This means that small amounts of hydrilla on boat trailers, bait buckets, draglines, and from aquariums can grow into new plants, spreading the plant from place to place.



## IDENTIFICATION

In your packet you will find a fact sheet called “Have you seen this plant” (DNR PUB WT-884) as well as an identification card on hydrilla and egeria (*Brazilian elodea*) as well as a drawing of hydrilla, elodea and egeria.

Hydrilla (*Hydrilla verticillata*, pronounced hi-DRILL-ah ver-TI-si-LAH-ta) closely resembles our native elodea species (*Elodea canadensis* and *Elodea nuttallii*) and Brazilian elodea (*Egeria densa*) which is native to South America.

*Refer to the pictures below as well as reference materials in your packet to see the characteristics listed below:*

### HYDRILLA (*HYDRILLA VERTICILLATA*) CHARACTERISTICS

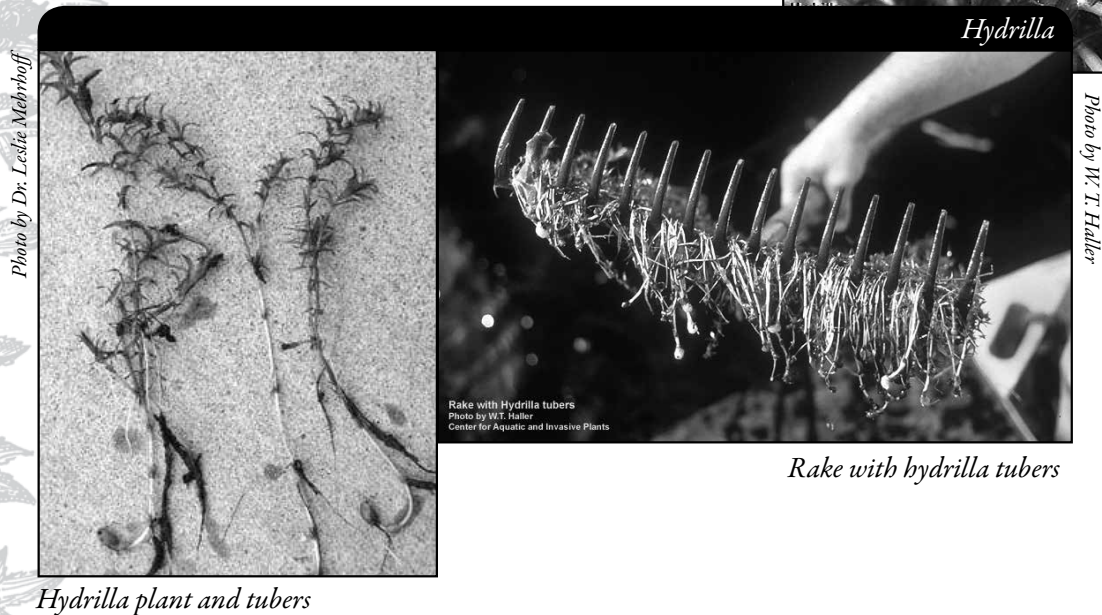
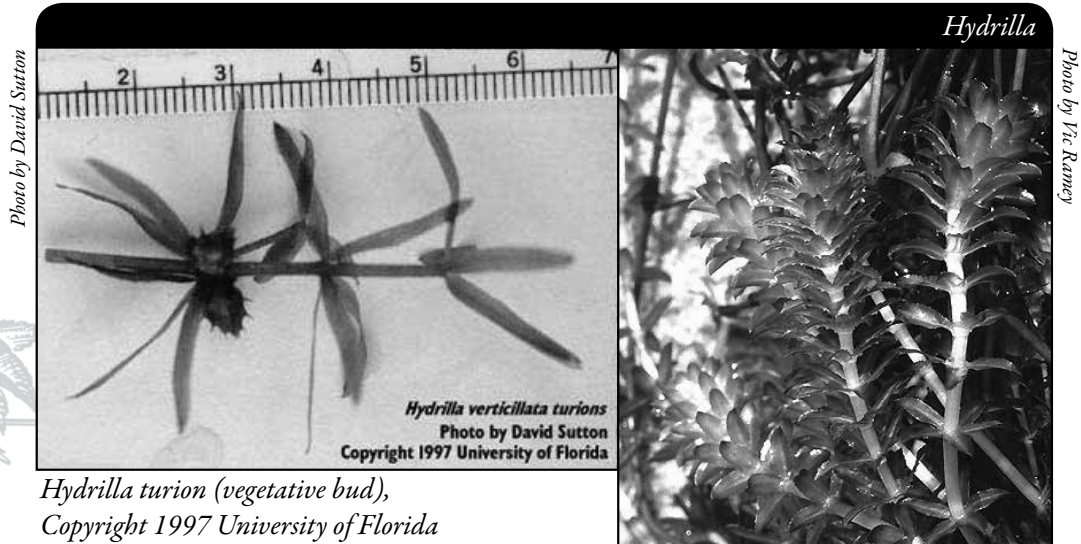
- Submersed stems are slender ( $\frac{1}{32}$  inch thick) and can be up to 30 feet in length.
- Small green leaves ( $\frac{1}{2}$  to  $\frac{3}{4}$  inches long) with pointed tips.
- Leaves are normally arranged in whorls of 4 to 8. Leaves have been found in whorls with as few as 3 and as many as 12 leaves. If the plant is growing very quickly, there may be significant distances between whorls – this allows it to reach the surface of the water more quickly.
- Leaves are attached directly to the stem.
- Toothed margins of leaves usually visible without magnification – (on some plants this is only obvious on the lower parts of the plant).
- Leaf axils (junction of the leaf stalk and stem) have pairs of minute scales (squamulae intravaginales) up to 0.5 mm long, fringed with finger-like orange brown hairs. These are visible with magnification on some mature leaves and branch points.
- Midrib (on the back of leaf) is often red.
- Often there are one or more sharp teeth along the midrib of the leaf, making the plant feel rough.
- Female flowers are solitary, tiny and white. They float on the surface on long (up to 4 inch) threadlike stalks. The stalks are attached at leaf axils near the stem tips.
- Male flowers are tiny and green. They are closely attached to leaf axils toward the stem tips until they break loose and rise to the surface where they float free. The male flowers fertilize the female flowers by bumping into them.
- Adventitious roots develop only at nodes with dormant axillary buds or branches.
- Plants often produce a mat of creeping above and below ground stolons that develop subterranean turions at the tips (referred to as tubers). Tubers are tough, whitish to brown-black, plump, ovoid, 4-15 mm long, and remain attached until parent stolon decomposes.

Photo by Michigan Sea Grant



Hydrilla

- Plant produces turions. Turions are compact buds produced in the leaf axils. The turions are dark green, cylindrical, up to ¼ inch round (see photo below), and appear shiny. Turions survive near freezing temperatures. Suddenly removing dense canopies of hydrilla by mechanical harvesting or herbicide treatment may stimulate turion germination.
- The monoecious form of hydrilla has a complete die-back in winter.
- The monoecious form that grows north of the Carolinas has a growth habit similar to native elodea. It tends to grow carpet-like, along the bottom of the lake.



#### **ELODEA CANADENSIS (NATIVE) CHARACTERISTICS**

*This is an aquatic plant native to Wisconsin that can easily be confused with hydrilla.*

- Submersed stems are slender and up to three feet in length.
- Small, dark green, lance-shaped leaves (6-17 mm long, 1-5 mm wide)
- Leaves usually peppered with large dark cells (visible with low magnification)
- Leaves are most often arranged in whorls of three. Occasionally you will find leaves in whorls of two near the base of the plant. On occasion you may find leaves in whorls of four. Leaves tend to be more crowded toward the stem tip.
- Leaves are attached directly to the stem

- Leaf margins not visibly saw-toothed
- Midrib (on the back of the leaf) is green.
- Midrib does not have spines (hydrilla has spines)
- Male and female flowers are on separate plants. Female flowers have three small white petals with a waxy surface. Flowers are raised to the surface of the water on a long, slender stalk
- Adventitious roots develop only at nodes with dormant axillary buds or branches
- Roots in substrate are more wiry than those of hydrilla or Brazilian elodea
- Reproduces by stolons, stem fragments and terminal turions (turions produced at the end of the growing stem)
- Does not produce tubers (underground vegetative structures)
- Overwinters as an evergreen plant.



#### **ELODEA NUTTALLII (NATIVE) CHARACTERISTICS**

*This is an aquatic plant native to Wisconsin that can easily be confused with hydrilla. One needs to look closely at Elodea nuttallii to distinguish it from Elodea canadensis. E. nuttallii is more delicate in structure with finer stems and narrower leaves.*

- Submersed stems are slender and up to three feet in length
- Small, pale to dark green, lance-shaped leaves (6-13 mm long and less than 1.5 mm wide); leaf tip is tapered to a slender point
- Leaves are most often arranged in whorls of three. Occasionally you will find leaves in whorls of two near the base of the plant. On occasion you may find leaves in whorls of four. Leaves tend to be more evenly spread out on the plant as compared to *E. canadensis*
- Leaves not densely overlapping toward stem tip as seen in *Elodea canadensis*
- Leaves are attached directly to the stem
- Leaves very finely toothed along the edges, but evident only with magnification

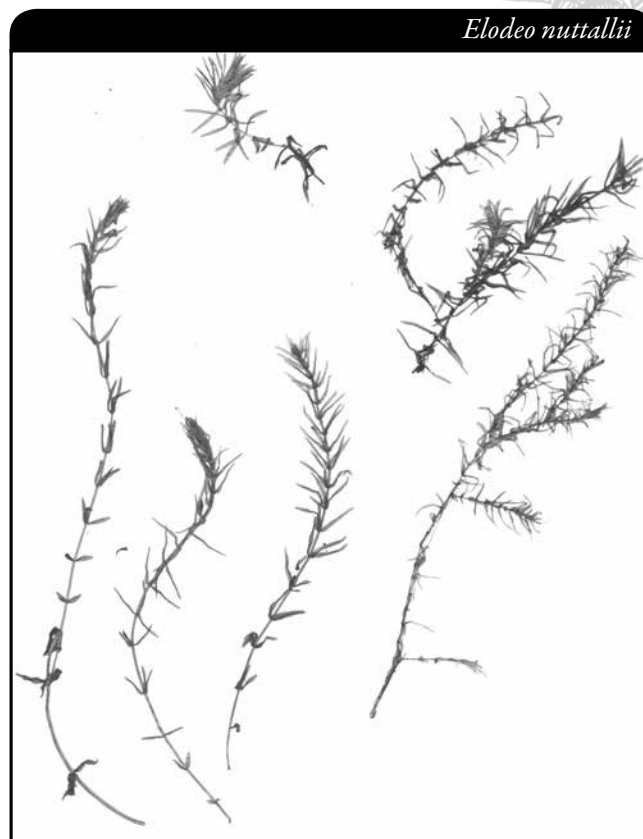


Photo by Alison Mikulyuk

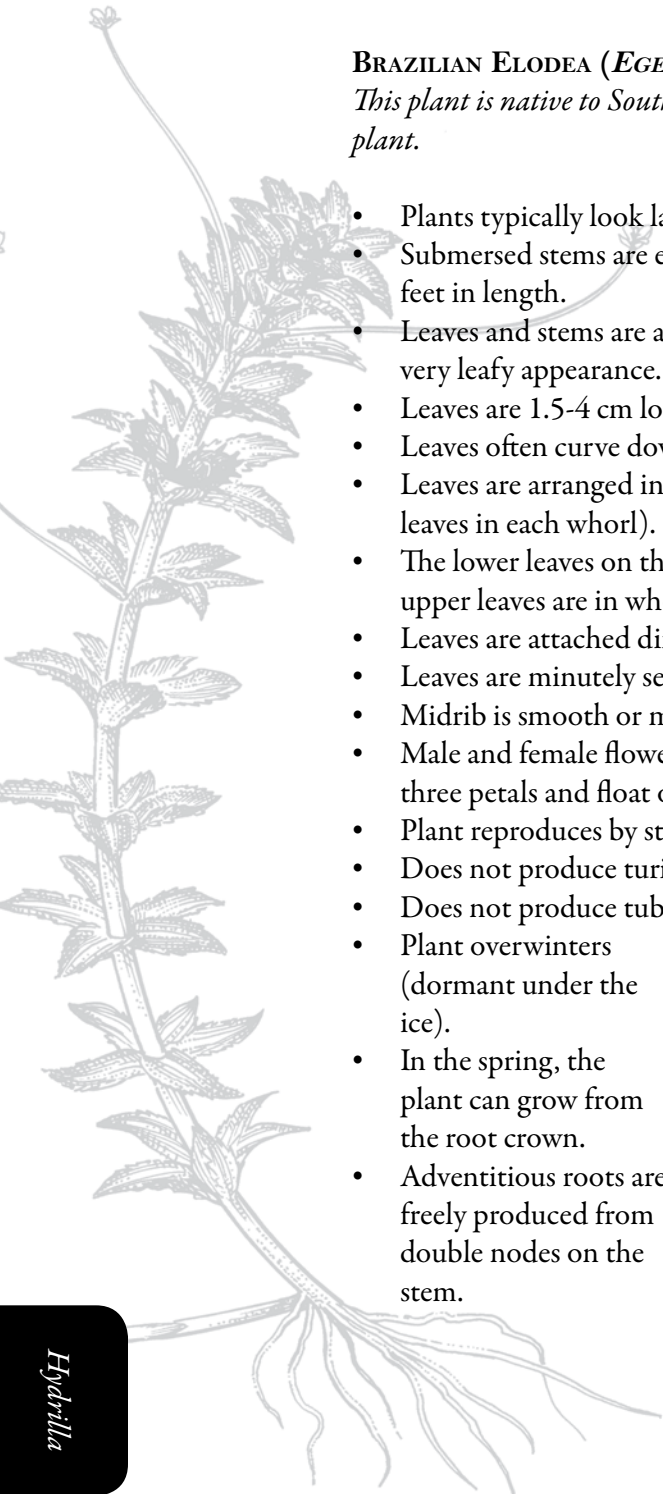
Hydrilla

- Midrib (on the back of the leaf) is green
- Midrib does not have spines (hydrilla has spines)
- Male and female flowers are on separate plants. Female flowers have three small white petals with a waxy surface. Flowers are raised to the surface of the water on a long, slender stalk. Male flowers more common in *E. nuttallii* and in *E. canadensis*
- Adventitious roots develop only at nodes with dormant axillary buds or branches
- Roots in substrate are more wiry than those of hydrilla or Brazilian elodea
- Reproduces by stolons, stem fragments and terminal turions (turions produced at the end of the growing stem)
- Does not produce tubers (underground vegetative structures)
- Overwinters as an evergreen plant

#### **BRAZILIAN ELODEA (*EGERIA Densa*) (NON-NATIVE) CHARACTERISTICS**

*This plant is native to South America and was brought to the United States as an aquarium plant.*

- Plants typically look larger and leafier than hydrilla or common elodea.
- Submersed stems are erect, cylindrical, and frequently branched. Stems can reach 15 feet in length.
- Leaves and stems are a bright green. Short internodes between leaves give the plant a very leafy appearance.
- Leaves are 1.5-4 cm long, up to 5 mm wide.
- Leaves often curve downwards.
- Leaves are arranged in whorls of four to six leaves (some references say three to eight leaves in each whorl).
- The lower leaves on the plant are often opposite or in whorls of 3, while the middle and upper leaves are in whorls of 4 to 6.
- Leaves are attached directly to the stem.
- Leaves are minutely serrated.
- Midrib is smooth or minutely toothed.
- Male and female flowers are on separate plants. The 18-25 mm white flowers have three petals and float or rise above the surface of the water on thread like stems.
- Plant reproduces by stolons and stem fragments
- Does not produce turions.
- Does not produce tubers.
- Plant overwinters (dormant under the ice).
- In the spring, the plant can grow from the root crown.
- Adventitious roots are freely produced from double nodes on the stem.



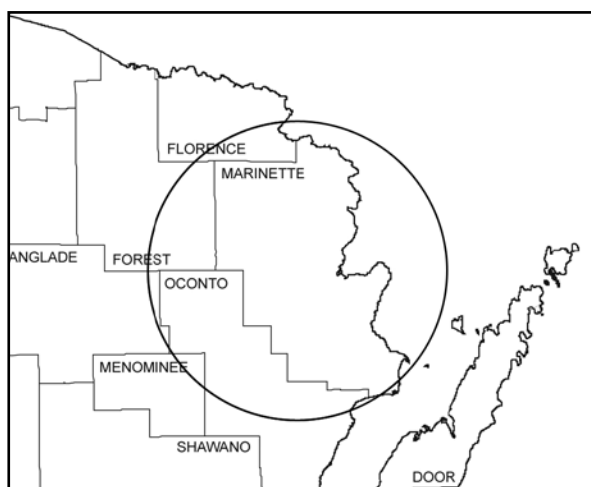
## MONITORING

There is only one known established population of hydrilla in Wisconsin. Eradication efforts are underway on this population and appear likely. The focus of monitoring in Wisconsin is prevention monitoring.

## PREVENTION MONITORING

Citizen lake monitors are going to play a huge role in keeping Wisconsin free of hydrilla. Since there is only one known established population, it is important to educate as many people as possible about hydrilla and how to identify it. We have learned from Eurasian water-milfoil, curly-leaf pondweed and other aquatic invasives and need to be pro-active. We are asking volunteers to learn about hydrilla and regularly monitor their lake for it. It is important to know which lakes are being monitored, even if no hydrilla is found.

Volunteer monitors are welcome throughout the state, but monitors are especially needed in a target area that includes every lake within a 32-mile radius of the pond in Marinette County where hydrilla was found. Lake managers are attempting to eradicate hydrilla from this pond and keep it from spreading to other waterbodies. Tubers and turions are a major mode of reproduction and were present in the pond before the infestation was discovered. Turions and tubers can be moved by both wildlife and recreational users. Chemical treatment will not destroy the turions or tubers.



*Lakes within this target area are in particular need of hydrilla watch volunteers.*



Hydrilla



## HYDRILLA MONITORING

### WHEN TO MONITOR

#### PREVENTION MONITORING

Volunteers should try to monitor once a month from ice-off to mid-September. It is important to find hydrilla early so there may be adequate time to plan and implement a first response yet that season. Hydrilla can thrive in lower light conditions – that means it can expand quicker than most other species. Looking early in the season is helpful. Given the lag time from discovery to a first response, monthly monitoring is very prudent.

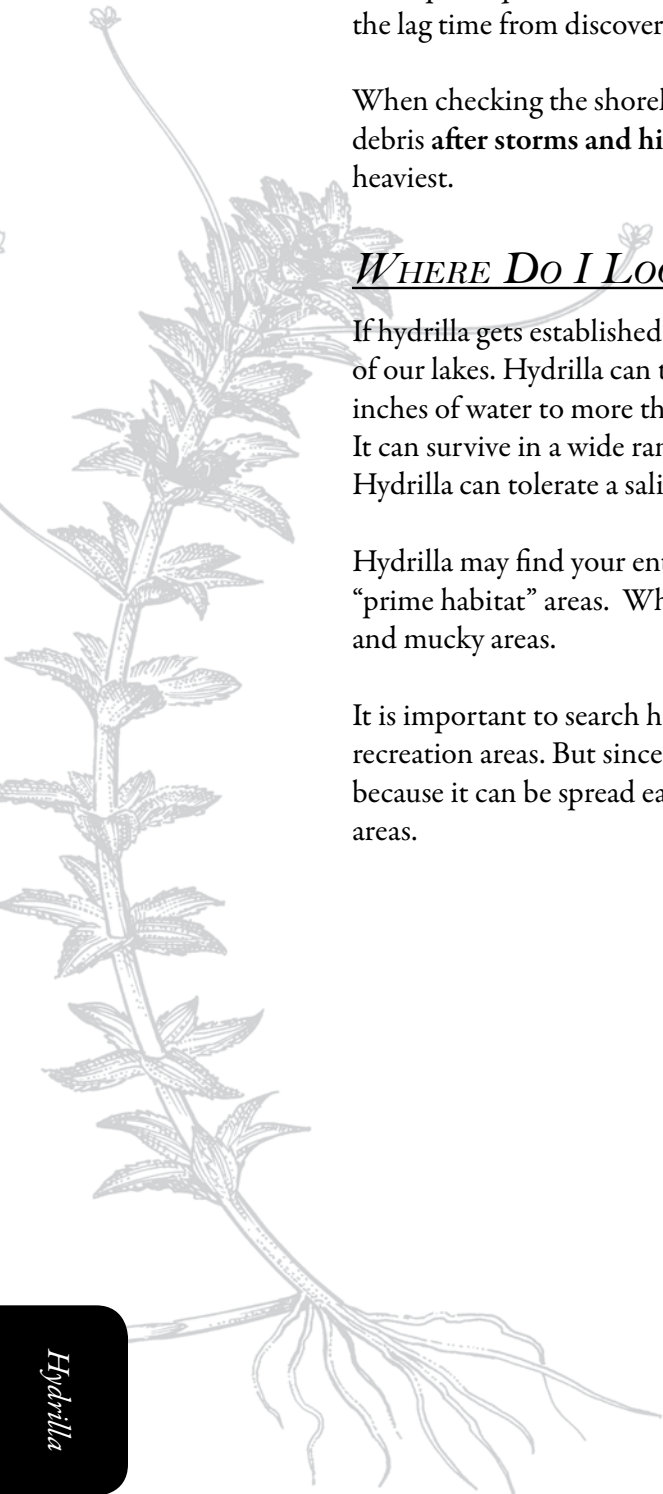
When checking the shorelines, it is especially important to check piles of plants and debris **after storms and high boat traffic times**, as this is when plant fragments will be the heaviest.

### WHERE DO I LOOK FOR HYDRILLA?

If hydrilla gets established in Wisconsin, it probably has the capability to survive in all of our lakes. Hydrilla can tolerate a wide range of conditions and can grow in a couple of inches of water to more than 20 feet. It can tolerate eutrophic or oligotrophic conditions. It can survive in a wide range of pH, although it does best when the pH is around 7. Hydrilla can tolerate a salinity of 7%.

Hydrilla may find your entire lake suitable for growth – do not rely on monitoring just the “prime habitat” areas. When looking for rooted plants, check for hydrilla in both sandy and mucky areas.

It is important to search high traffic areas – boat ramps, near resorts, and popular recreation areas. But since hydrilla can thrive in so many different habitat types, and because it can be spread easily by waterfowl, please don't limit watch efforts to high traffic areas.



Hydrilla

## HOW TO MONITOR

### PREVENTION MONITORING

#### Shorelines

When looking for plant fragments, go to areas where you have seen piles of plants and debris, especially after storms and high traffic times – this is when plant fragments will be the heaviest. Check beach areas, inlets, boat launches, high use area and the perimeter of the lake.

#### Deeper Water Areas

Once you have monitored a variety of near shore areas, go out in your boat and begin to search for and collect plants in 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 seeing plants in the water. 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 so you may need to adjust the depth of monitoring.

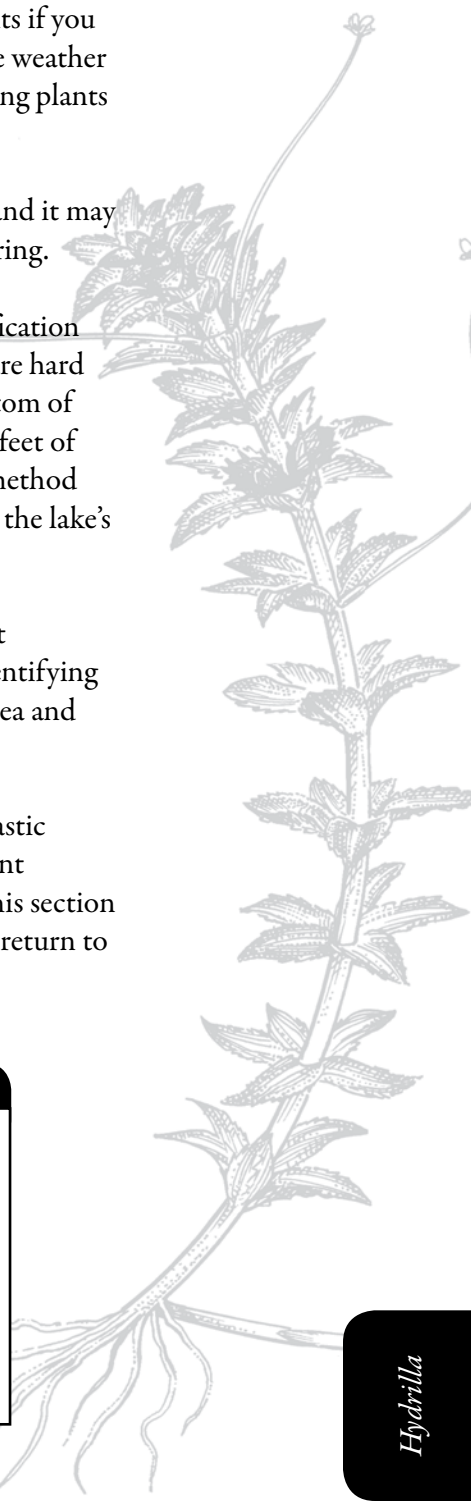
Since hydrilla looks so similar to elodea it probably isn't feasible to rely on identification without having the plant in hand. Use a long-handled rake to collect plants that are hard to reach or difficult to identify. In deeper areas, you can lower the rake to the bottom of the lake and drag the rake along. Pull the rope so that the rake pulls along 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 your lake has large mats of elodea plants, be sure to check these mats and collect samples to look at. Count the number of leaves in the whorl and look at other identifying characteristics. It is important that we look carefully at plants we assume are elodea and make sure they are not hydrilla.

If there is any doubt about a plant that you are looking at, collect a sample in a plastic ziplock bag and take it to your local CLMN contact or Aquatic Plant Management Specialist for identification (see 'What to do with Suspect Plants' at the end of this section for more information). Make sure to mark the location on a map so that you can return to the same area if necessary.



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.



*Hydrilla*

## 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.

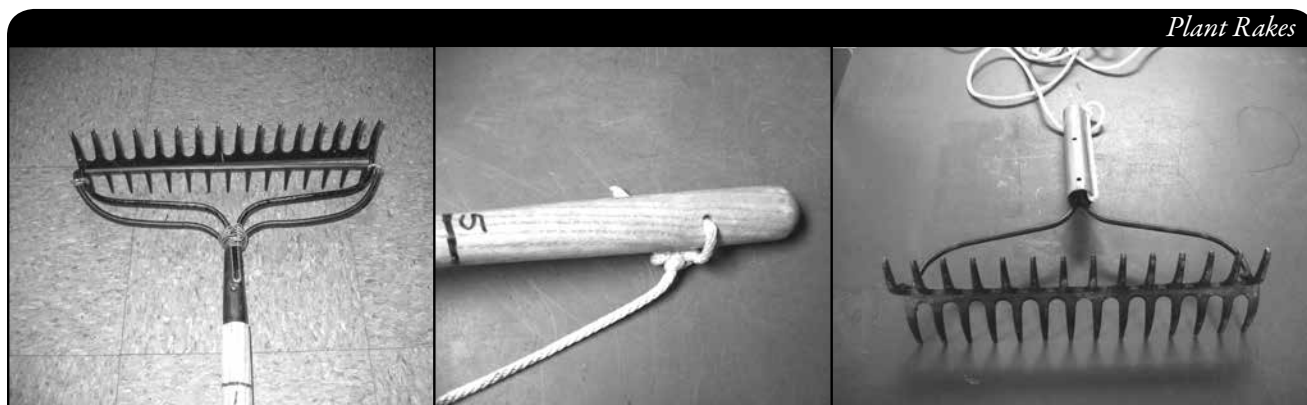
## EQUIPMENT NEEDED

- ☐ 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 hydrilla 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.
- ☐ 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.



*Plant Rakes*

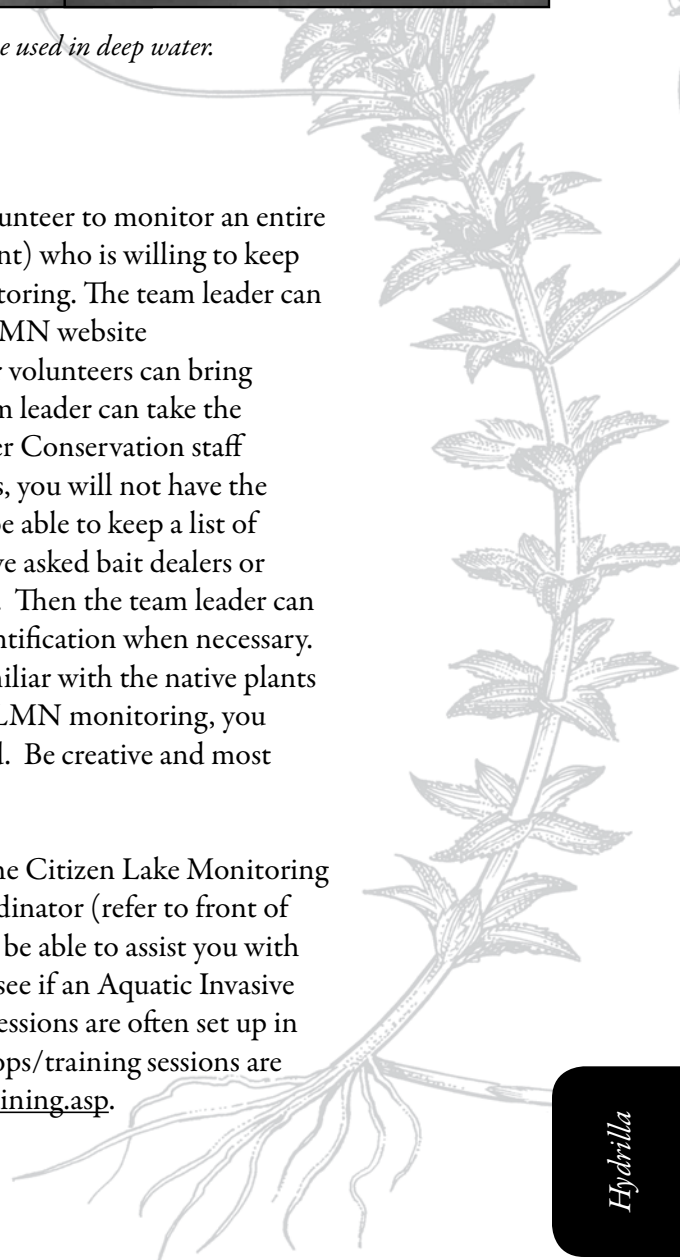
*Photos by Sandy Wickman*

*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 hydrilla. 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/training sessions are also listed at <http://www.uwsp.edu/cnr/uwexlakes/CLMN/training.asp>.



*Hydrilla*

## 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.

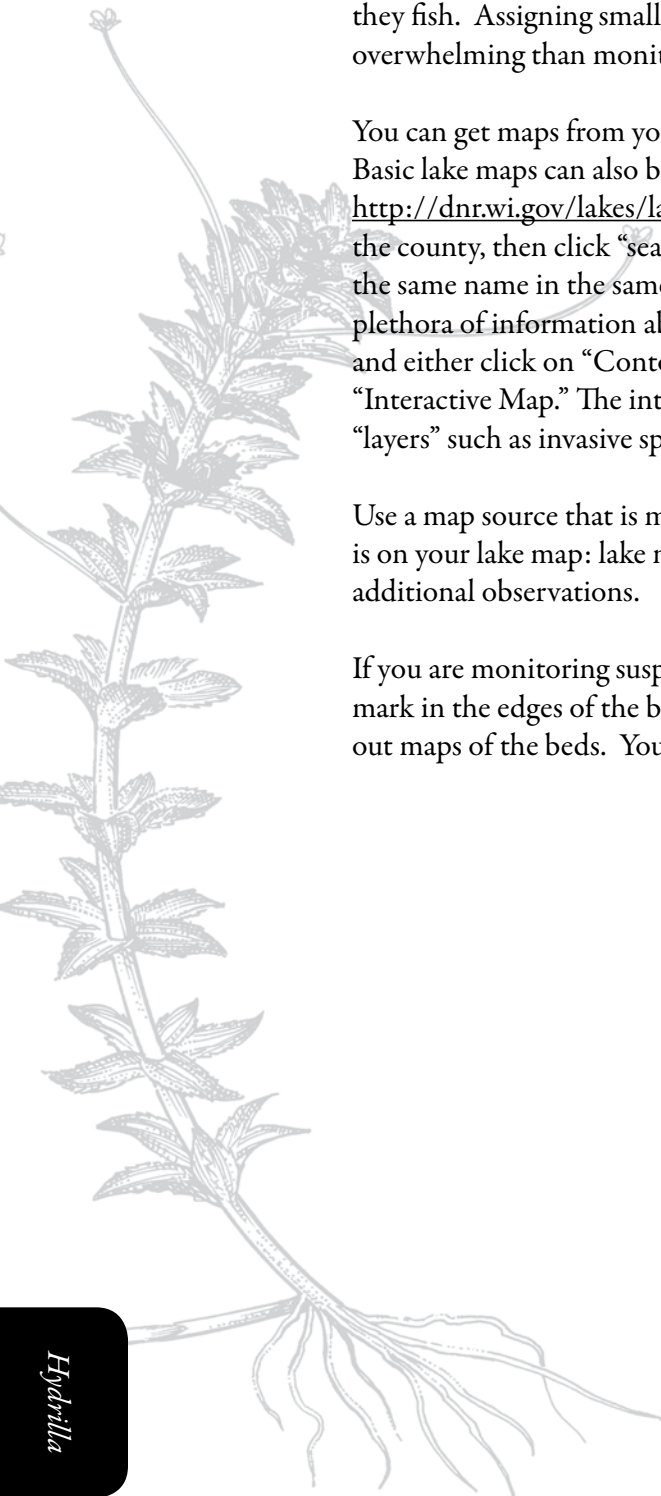
If you have a team of monitors, a map will also assist your team in deciding who will monitor where. Once you have your “team” together, print out a map so that you can mark which areas each volunteer is monitoring. Your team leader should keep the master copy of the map. It may be easiest to have volunteers 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 web site:

<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 suspect beds of hydrilla 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.



Hydrilla

## 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.

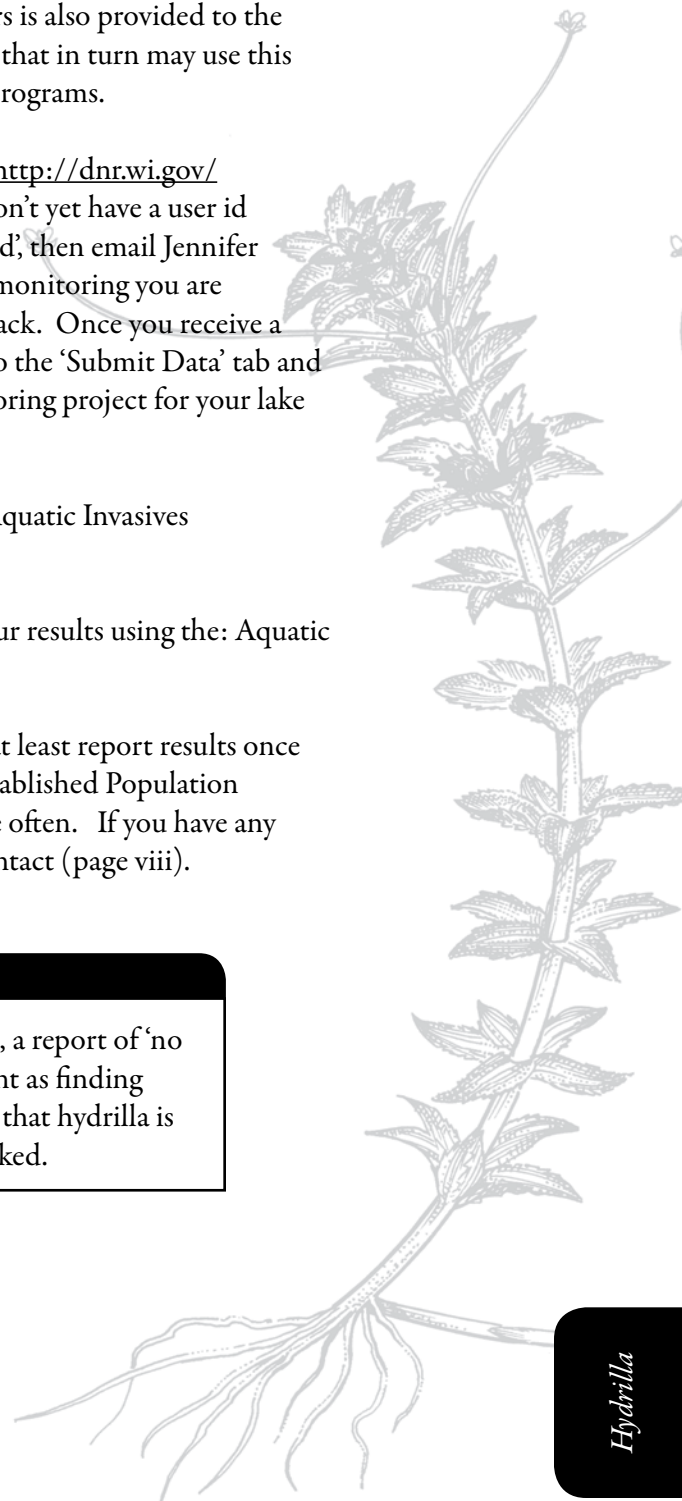
You can enter your monitoring results on the CLMN website: <http://dnr.wi.gov/lakes/CLMN> (click “Enter Data” on the left side bar). If you don’t yet have a user id and password, click ‘Request a Wisconsin User ID and Password’, then email Jennifer at [jennifer.filbert@wisconsin.gov](mailto:jennifer.filbert@wisconsin.gov) 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 hydrilla for the first time on your lake, report your results using the: Aquatic Invasive Plant Incident Report, Form 3200-125.

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 hydrilla’ at a location is just as important as finding hydrilla. One cannot confidently state that hydrilla is not present in an area if no one has looked.



*Hydrilla*

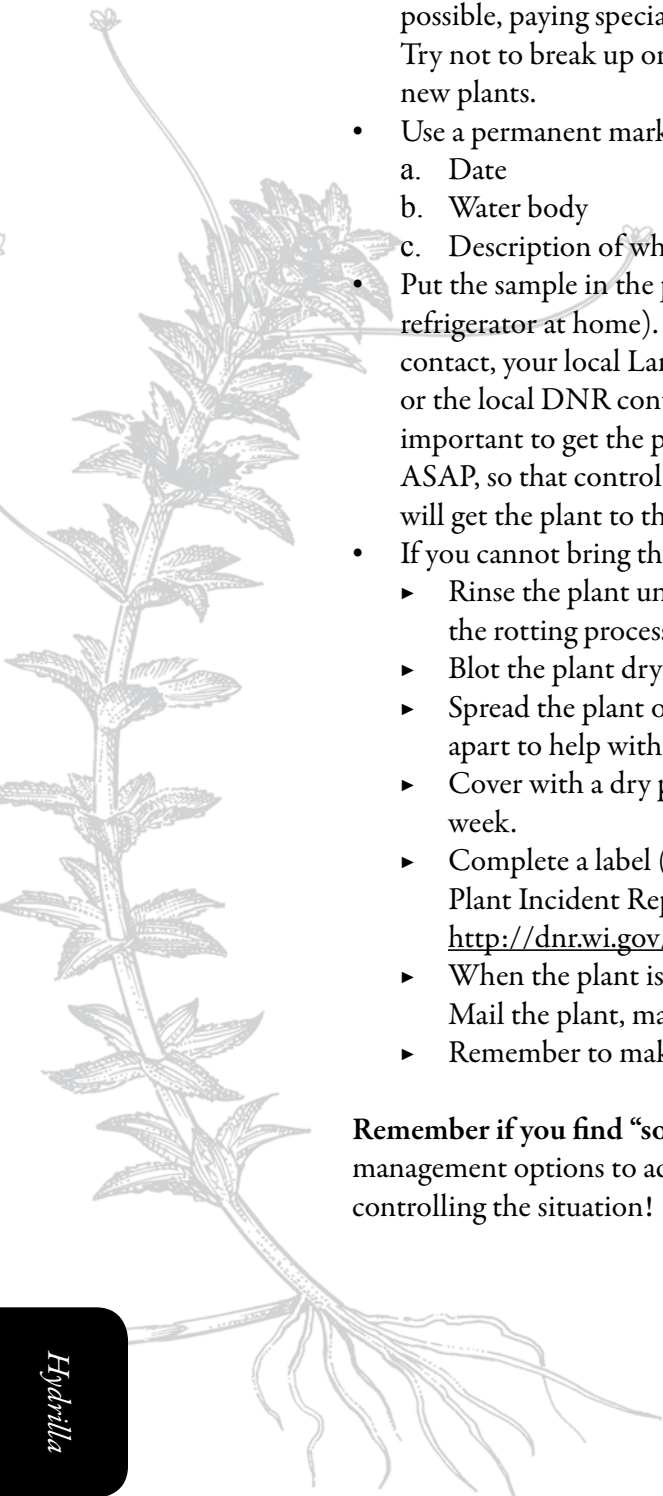
## WHAT TO DO WITH SUSPECT PLANTS

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 hydrilla in a lake, 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 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!**



*Hydrilla*



## *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 hydrilla.



*Photo by Wilfredo Robles, Mississippi State University*



*Hydrilla*



*Hydrilla*



## *ADDITIONAL MATERIALS AND SUPPORTING DOCUMENTATION*

### *PLANT IDENTIFICATION AND INFORMATION 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*



*Hydrilla*

## PLANT IDENTIFICATION AND INFORMATION SOURCES

UWEX – Lakes

<http://www.uwsp.edu/cnr/uwexlakes/CBCW/Pubs/HydrillaFactsheet09.pdf>

Wisconsin Department of Natural Resources

<http://dnr.wi.gov/invasives/fact/hydrilla.htm>

Michigan Sea Grant

<http://www.miseagrant.umich.edu/photos/ais/index.html>

Langeland, K.A. 1996. *Hydrilla verticillata* (L.F.) Royle (Hydrocharitaceae), “The Perfect Aquatic Weed”. *Castanea* 61:293-304. <http://www.se-eppc.org/manual/HYVE.html>

Center for Aquatic and Invasive Plants, University of Florida, IFAS,

<http://aquat1.ifas.ufl.edu/>

## REFERENCES

Non-Native Freshwater Plants, Washington State Department of Ecology. 2006

<http://www.ecy.wa.gov/programs/wq/plants/weeds/>

*Competitive Interactions between hydrilla (Hydrilla verticillata) and Vallisneria (Vallisneria americana) as Influenced by Insect Herbivory*<sup>\*1</sup> T. K. Van, G. S. Wheeler and T. D. Center, USDA/ARS Aquatic Plant Research Unit, 3205 College Avenue, Ft. Lauderdale, Florida, 33314 [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6WBP-45JK142-1V&\\_user=10&\\_rdoc=1&\\_fmt=&\\_orig=search&\\_sort=d&view=c&\\_version=1&\\_urlVersion=0&\\_userid=10&md5=5ff75ca909b6d2df8fc8a92bdf86459b](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6WBP-45JK142-1V&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_version=1&_urlVersion=0&_userid=10&md5=5ff75ca909b6d2df8fc8a92bdf86459b)

Langeland, K. A. & D. L. Sutton, 1980. *Regrowth of Hydrilla from axillary buds*. *Journal of Aquatic Plant Managemet*. 18: 27–29.

Spencer and Anderson 1986

<http://www.springerlink.com/content/u31un285q3436570/>

## 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
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...

All Beaches and Boat Landings?
Frequently   Some of the Time   Not Often/Never
Perimeter of whole lake?
Frequently   Some of the Time   Not Often/Never
Docks or piers?
Frequently   Some of the Time   Not Often/Never

### Did you...

Walk along the shoreline?
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
Use rake to extract plant samples?
Frequently   Some of the Time   Not Often/Never
Check underwater solid surfaces (boat hulls, dock legs, rocks)?
Frequently   Some of the Time   Not Often/Never

Other: \_\_\_\_\_

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>



# **Aquatic Invasives Surveillance Monitoring** **Multiple Locations, One Date** Form 3200-130 (R 2/10)

This monitoring is designed to help you detect new invasive species on your lake, so you can then alert the DNR and so 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 prevention 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. 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, ss. 19.32 - 19.39, Wis. Stats.

## **Data Collectors**

Primary Data Collector Name

Phone Number

Email

Additional Data Collectors

## **Date and Time**

Date

Start Time

End Time

		Record one of the following:					Did you monitor?	Y=Yes	N=No	N/A = Didn't Look For	Did you find?
		Boat Landing (if you only monitor at boat landings)?	All Beaches and Boat Landings?	Perimeter of Whole lake?	Docks or piers?	Walk along the shoreline?					
Waterbody	County										
	Township										

## **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
-----------------	------------	----------

**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, %
---------------------	-------------------	-----------------------	-------------------	-------------------------------

**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?:  
☐ 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#:**

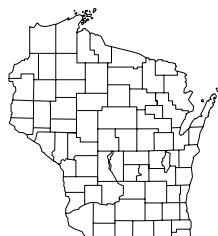
**County:**

**Collected by:**

**Date:**

**Depth:**

**Location and Habitat:**



**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:**



*Hydrilla*



## 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)

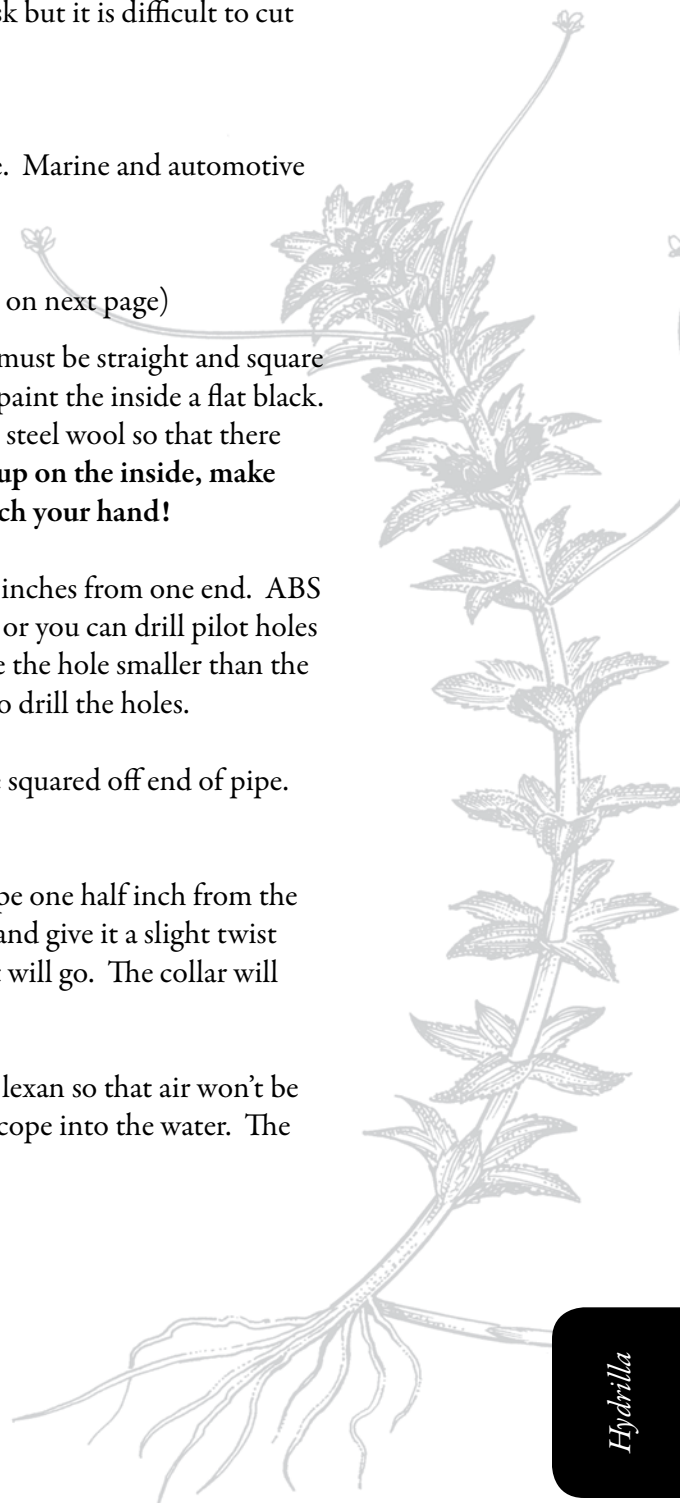
Cut a 3 foot section of 4" diameter ABS or PVC pipe. The cut must be straight and square to the pipe. If you can't find pipe with a black interior, you can paint the inside a flat black. If the pipe is shiny on the inside, rough it up using sandpaper or steel wool so that there won't be any glare inside 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.



*Hydrilla*

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

