

STATE OF THE LAKES

This is the first in a series of articles that will examine the state of Wisconsin's lakes. We will investigate how the Badger State's lakes and programs compare statewide and nationally. We will also look at how Wisconsin links into the Environmental Protection Agency's (EPA) Clean Lakes Program.

START WITH THE EASY STUFF...

Lake Tides wanted to commence this series by determining how many "lakes" there are in the United States. Easy task? NOT!! We ended up writing an entire article on what a lake is.

The EPA Clean Lakes Program:

Widespread public support for preserving and protecting our nation's lakes gave rise to the Clean Lakes Program in 1972. Initiated under Section 314 of the Federal Water Pollution Control Act, the Clean Lakes Program set goals for defining the cause and extent of pollution problems in the lakes of each state.

States are required to file a **305B report** with EPA every two years. This narrative describes the overall water quality programs and the condition of a state's lakes, reservoirs, streams, wetlands and estuaries. The carrot used by the EPA to encourage states to file this report is funding for lake diagnostic and restoration projects. The Clean Lakes Program funded nearly \$1.4 billion in projects between 1976 and 1991. Although EPA requires each state to report on its water, it does not require any standard procedure for determining water quality. Each state uses its own criteria to assess the condition of its water, and there may be prodigious variations in accuracy.

What is a Lake?

Comparing numbers of lakes in different states is tricky business because each state has a different definition of what constitutes a lake. Some states may include border waters like the Great Lakes; others, such as Oklahoma, define lakes as waterbodies (commonly reservoirs) containing more than one **acre-foot** of water (a volume that it would take to cover one acre to a depth of one foot) rather than surface area.

To try and standardize the means of counting the number of lakes in a state, the EPA has resorted to a uniform computerized method. They use a computerized map of water called the **Reach File 3**. The scale of this map (1:100,000) doesn't include the small lakes and there may be inconsistencies in the way various cartographers drew the maps in different parts of the country. Sometimes the maps count sewage treatment lagoons and other inappropriate waterbodies. Nevertheless, the Reach File 3 provides a way to compare numbers of lakes between states consistently, if inaccurately.

Wisconsin counts all waterbodies down to and including one acre. In the 1960s and 1970s the Wisconsin Conservation Department (now the DNR) did a county by county inventory and classification of every named and unnamed lake and river in the state. These booklets, called Surface Water Resources, are still the most complete, and in many cases, the only source of valuable information on some of our lakes.

Impoundments are waterbodies with dams. Wisconsin defines an **impoundment** as a waterbody where more than 50% of the maximum depth is behind a dam and created by the dam structure itself. In Wisconsin, impoundments like Lake Wisconsin or Post Lake are counted as lakes and river miles.

A lake is a still water body which:

Is navigable in fact under WI law; Is navigable in fact under WI law;

➡ Has an ordinary high water mark;

Has a bed denoting "reasonably permanent" surface water as displayed by one or more of the following:

• presence of open water, especially in summer.

• lack of vegetation, which may denote the extended presence of water;

• presence of obligate hydrophyte plants, particularly species such as sagittaria, which demonstrate relative permanancy of water;

• any other physical or biological indicator of water frequently being present.

So, How Many Lakes are There?

After considerable research, the best we could come up with was an educated guess of about 200,000 lakes in the continental United States.

• Wisconsin's borders encompass about 1.1 million acres of water, excluding the Mississippi River and the Great Lakes.

• There are 2,987 lakes greater than 6 acres in size in Illinois. Of these, 1,116 are publicly owned. An old assessment counted every lake and farm pond in the state from topographic maps and came up with about 87,000 lakes and ponds.

• There are no naturally-occurring lakes in Texas—all lakes are either impoundments on rivers or ponds of which the Reach File 3 counts 25,994.

• The maps haven't been completed yet for Alaska or Florida, but Alaska claims over 3 million lakes with 94 greater than 10 square miles in size. Florida counts 7,700 lakes over 10 acres in size.

by Robert Korth, UWEX and Susan Graham, WDNR





AQUATIC PLANTS: Through the Looking Glass

by Susan Borman, WDNR-Western District Aquatic Botanist

As winter envelops our lakes and ponds, an icy ceiling is constructed between the life of the aquatic world and our own. For years it was assumed that aquatic plants were dormant during the winter months, but research has shown a number of plants continue to grow under the ice. These winter-hardy plants add oxygen to the water and structure to the winter fish habitat.

The winter hardiness of Wisconsin's aquatic plants has a lot to do with their success or failure to grow the following spring. It is an important competitive adaptation we often overlook during mid-summer plant surveys when we are sorting through the contributing factors that make one plant species more successful than another. Plants that don't have an effective strategy for winter survival are not likely to become dominant members of the aquascape. Through the looking glass of Wisconsin's ice-covered lakes you will find a variety of strategies aquatic plants have developed for getting through the winter.

Put on a heavy coat and sleep through it. The bushy pondweeds (*Najas* spp.) and horned pondweed (*Zannichellia palustris*) are true annual plants in the Wisconsin aquascape. They produce seeds with heavy coats to withstand the rigors of winter and then they completely die back, depending on the viability of their seeds to produce new plants the next spring. The winter survival strategy of these annuals includes producing large numbers of seeds to compensate for losses giving the advantage of new genetic combinations to enhance survival in the next season.

Make special provisions. Many of Wisconsin's aquatic plants produce specialized over-wintering structures that they use to reproduce. These vegetative structures are called **propagules** and include winter buds, bulb-like offshoots called turions, hardy rhizomes and tubers. These propagules lack the genetic diversity of seeds, but they are larger with more stored carbohydrates and nutrients to support rapid growth in the spring. If you take a close look at the narrow-leaved pondweeds (*Potamogeton* spp.), native watermilfoils (*Myriophyllum* spp.) and bladderworts (*Utricularia* spp.) in the fall, you will find these specialized turions or winter buds on many branches. The tubers of wild celery (*Vallisneria americana*) are another good example of an overwintering structure high in stored energy.

Tough it out. A number of Wisconsin's aquatic plants have adaptations to tolerate cool temperatures and low light so the entire plant can survive under the ice. A check through an ice fishing hole may reveal growing green shoots of a number of plants including common waterweed (*Elodea canadensis*), coontail (*Ceratophyllum demersum*), curlyleaf pondweed (*Potamogeton crispus*), largeleaf pondweed (*Potamogeton amplifolius*) and fern pondweed (*Potamogeton robbinsii*).

The growth of these winter-hardy species is dependent on light penetration through ice and snow cover. On clear winter days with minimal snow cover these plants can achieve about 10-20 percent of their summer photosynthetic rates. This winter growth can put them at a competitive advantage when spring arrives and other aquatic plants are just breaking dormancy to sprout from seeds, turions or rhizomes.

The most thoroughly winter-adapted of these plants is curlyleaf pondweed. It is native to cold water streams of Europe and actually has a growth cycle that is designed for dormancy during the heat of summer rather than the cold of winter. Curlyleaf pondweed forms mature turions by mid-July and the summer shoots begin to decay. As water temperatures cool in the fall, the curlyleaf turions sprout green winter shoots. These are different in appearance from the summer shoots: the leaf-margin is quite smooth and the leaves are more translucent. Look for these bright green shoots during winter lake outings.

Whether they over-winter with durable seeds, geminate from winter buds, or tough it out intact, the aquatic plants we see in the summer have an effective strategy to survive the winter. The importance of this plant community during winter and spring has often been overlooked and has an important role to play in providing fish habitat as well as influencing the overall dynamics of the aquatic ecosystem.



CALENDAR

4th International Zebra Mussel Conference '94 — Madison, WI March 7-10, 1994, Holiday Inn West For more information, contact Clifford Kraft (414-465-2795), UW Sea Grant-Green Bay

Wisconsin Lakes Convention — Oshkosh, WI, March 25-26, 1994 Registration materials and agenda will be mailed in February and included in next issue of <u>Lake Tides</u>.

Ecosystem Management Strategies for the Lake Superior Region — Duluth, MN, May 17-19, 1994

A bi-national conference and workshop to bring issues, concerns, and opportunities into ecological focus. Sponsored by the University of Minnesota Duluth Continuing Education and Extension (phone 906-932-1330 for more information).

Elodea

(Elodea canadensis, Elodea Nuttallii)

Elodea, or **common waterweed**, is a native North American aquatic plant species found throughout the United States. In Europe it is considered an aggressive exotic invader and is regarded as a nuisance.

The success of elodea in temperate climates is due in part to its effective cool weather survival and strong disease resistance. It has a competitive advantage in eutrophic, turbid waters because it can tolerate low light conditions and can reproduce rapidly from plant fragments.

Description: Elodea is a submergent aquatic, which means it normally grows totally below the surface although sometimes the plant may grow so densely that it sticks out of the water. Its branching stems often form a tangled mass. The leaves are whorled around the stem, usually with 3 in a cluster, but occasionally with only a pair.

The two elodea species native in Wisconsin can be differentiated by the leaf size and flower structure, however the size and shape of elodea's leaves may vary depending on growing conditions. Elodea has both pistillate (female) and staminate (male) flowers, but examination of the male flowers is the best way to tell them apart. There is a catch... Good luck finding male flowers, the plant doesn't bloom that often. Elodea canadensis is by far the more common of the two species.

Special Adaptations: A tolerance for cool water and low light conditions allows elodea to over-winter as an entire plant, continuing photosynthesis at a reduced rate under the ice. These adaptations for winter survival give elodea an advantage over other plants that must sprout from seeds, winter buds called turions, or tubers when spring re-

turns. Elodea reproduces predominately through stem fragments; seed production rarely occurs.

Habitat: Elodea can grow in water ranging from less than a foot to over 30 feet deep. It is most abundant on fine sediments enriched with organic matter but can tolerate a broad spectrum of sediment types. It is common in alkaline, nutrient-rich water.

Significance in Aquatic Community: The adaptability of elodea to a wide range of environmental conditions makes it an important component of many aquatic plant communities. It offers valuable shelter and grazing opportunities for fish, although very dense stands of elodea can lead to fish stunting. It also provides food for muskrats and waterfowl. They can eat the plant itself or feed on a wide variety of invertebrates that use the plant as habitat.

Living With Elodea: Elodea has a variety of water quality and biologic values for the aquatic community. Management should be limited to thinning very dense stands. Carefully planned harvesting (including fragment removal) can increase the fishery and wildlife value of these elodea beds while relieving nuisance levels that hinder boating and recreational use.

by Susan Borman, Wisconsin DNR Aquatic District Botanist, Western District



Elodea Canadensis has an average leaf width of about 2 mm. and the male flower has a long stalk with a spathe that is approximately 12 mm. long.

Elodea Muttallii has an average leaf width of about 1.3 mm long and the male flower is not stalked with a spathe that is only about 2 mm. long.

Staminate flower

Watkins

Pistillate flower

Life on the Edge: Land Use and Water Quality

The 1994 Lakes Convention

March 25-26, 1994, Oshkosh Hilton and Convention Center

It's time to mark your new calendar for the 1994 Wisconsin Lakes Convention! This year we will be meeting in <u>Oshkosh</u> for a stimulating gathering of lake leaders and concerned citizens from throughout Wisconsin and the Midwest. Schedules are being completed, exhibitors have been invited, and the Wisconsin Association of Lakes has plans for raffles and another exciting silent auction.

Pre-conference seminars on Friday morning will include the Wisconsin Association of Lakes Annual Meeting, Lakes 101 for firsttime Convention attendees, and the Self-Help Monitoring Update. The Convention will commence Friday afternoon with keynote speakers and a session on "Land Use and Water Quality—Wisconsin State Agencies Roles" with speakers from the departments of Industry, Labor and Human Relations; Agriculture, Trade and Consumer Protection; Natural Resources; and Transportation.

The "stream" concept, introduced last year, will be continued with seven streams identified for Saturday morning workshops. Three workshops in each stream will round out the agenda to provide important information to returning Convention attendees as well as first-timers.

Registration materials and agendas will be mailed in February to previous Convention attendees. Registration forms will also be included in the next issue of Lake Tides—to be mailed February 1. Rooms have been blocked at the Oshkosh Hilton (Phone 414-231-5000) until March 1 and at the Pioneer Inn just down the street (414-426-2115) until March 10. Ask for Wisconsin Lakes Convention rates, and make your reservations early. Convention rates will be extended for those who wish to arrive early or stay longer.

Wisconsin Lake Stewardship Nominations Due February 15

Is there someone on your lake—or perhaps a group—that deserves special recognition for their dedication to the lake? Here's your chance to let others know about these special people.

Nominations are being accepted for the Wisconsin Lake Stewardship Awards. These awards will be presented on Saturday, March 26 1994 at the Wisconsin Lakes Convention luncheon. You are encouraged to nominate an individual or group that has shown special commitment to the quality of their lake or to the quality of life around their lake. Lakeshore property groups, fishing clubs, gardening groups, other service clubs, or outstanding individuals are eligible. Groups and individuals are judged separately with one award presented in each category.

The deadline for submitting nominations is February 15. Send your letter of nomination to Dorothy Snyder, College of Natural Resources, University of Wisconsin, Stevens Point WI 54481 [715\346-2116]. Help the committee select a deserving person or group by submitting a nomination today!



TO HILL AND BACK

by Celeste Moen, Wisconsin DNR-Madison

Well, the Wisconsin Legislature has wrapped up its most recent session. Several bills and joint resolutions affect lake lovers and shoreline property owners. Here's an update on what's happening on the Hill.

Some good news for lake and water lovers statewide—a resolution to designate the first week of May as Water Quality Awareness Week (AJR 17). It's encouraging to see official recognition of the importance of Wisconsin's water resources.

A bill (**AB 865**) developed by the Legislative Council Special Committee on the Use of Public Waters (what a mouthful!) makes several changes in laws relating to pier placement, local boating regulations, public access, and recreational boating aids. This widespread bill will affect many lake users.

Good news for property owners with wetlands! **AB 617** would permit wetland owners to place perpetual conservation easements on their property in return for a low, fixed property tax on the restricted property. This would include buffer lands (those not mapped as wetlands but within 300 feet of eligible wetlands).

Anglers and boaters... there's quite a bit happening on the Hill affecting you. Senate Bill 382, passed on a voice vote, would repeal the current law that prohibits returning rough fish (smelt, carp, alewife, suckers, etc.) caught by net or setline to the water. If you have a pond on your land and you stock it with fish for your own use, you will be exempt from law governing sport fish under **AB 634**.

For boaters, **AB 512** would modify statutes affecting water skiing, intoxicated boating, and local boating regulations. This bill passed the Joint Finance Committee with an amendment which expands local authority to adopt boating ordinances for the purpose of "protecting the natural and scenic resources of the state." This change would reinforce local authority to regulate boating on environmental grounds.

And finally, Eurasian watermilfoil has its turn in the spotlight with a bill that requires the DNR to design rules to remove and destroy this exotic using environmentally sound methods (**AB 228**). Under the Substitute Amendment to this bill, the DNR would issue aquatic plant management and aquatic plant dealer permits.

Remember, unless noted, these are only bills and won't become law until voted on. If these issues are important to you, contact your legislators.





One of our readers saw the article **Investigating** Sanitary Powers in the last issue of Lake Tides and volunteered to write this follow-up.

Sanitary surveys are an invaluable planning tool that can be used by lake districts or sanitary districts when addressing wastewater treatment issues.

Lake communities are frequently made up of recreational cabins and summer homes intermingled with permanent residences and small commercial establishments. Lake properties often consist of small lots, areas of high density housing, and older structures. Wastewater treatment for lake communities is commonly provided by private onsite septic tank systems which may be old, poorly sited or undersized for their current use. The pressure of modern development can tax many of these systems to the point of failure.

Failures of septic systems can create health concerns and have adverse environmental impacts on groundwater and lake quality. As a result, planning for sewers is often initiated. Although septic system failure is a possibility, the necessity of sewers should be questioned: sewers are expensive and may increase the potential for construction on previously unbuildable lots.

Sanitary surveys can pinpoint the severity and extent of problem areas and should be used as an essential planning tool rather than a means to justify sewers. A good survey will provide the information needed for effective planning and answer these questions:

• Are the failures random or concentrated in specific areas or soil types?

- Do suitable areas exist onsite for upgraded systems or are offsite options required?
- Would it be more cost effective to provide cluster systems for the problem areas or to sewer the entire lake shore?
- Could alternative wastewater collection and treatment technologies be used?

A good sanitary survey should also provide the following:

- An accurate plot plan
- Soils information
- Compliance status of the system
- Functional status of the system
- Current and expected use of the system
- Available options for upgrading onsite

Sanitary surveys are normally conducted in two stages: a desk-top survey and a field verification survey. The desk-top survey evaluates available resource materials to identify areas where it might not be appropriate to use septic tank systems. The targeted areas are then field verified through a detailed onsite evaluation of the septic tank system and the lot on which it is located.

If you are interested in conducting a sanitary survey, choose a company with experience in onsite system siting, design and installation. They should also have a working knowledge of alternative wastewater treatment technologies. Base your selection on the firm's past experience with similar projects, their technical expertise and qualifications of personnel.

Informed decisions and selection of appropriate solutions cannot be assured if the true extent of a problem is not known. Sanitary surveys can provide the necessary answers.

Rick Apfel is an engineer whose firm assists folks with development and design of sanitary systems.



On Ice Skates and Snow Shovels

by Dorothy Snyder

As I watch the snowflakes of our first "real" winter storm drift down around me, I am reminded of the fall chores that didn't get finished (those last leaves on the lawn will make a good mulch, right?). And why didn't we move the snow shovels to the front of the shed instead of back behind the rototiller? Maybe hibernation isn't such a bad idea. But as I watch these delicate flakes gliding through the crisp air, a sense of stillness and awe surround me. The cleanness of that first blanketing of snow and the silence as it covers the landscape evoke memories of childhood and simpler times. Back then, thoughts of school closings and ice-skating across the frozen lake were foremost in my mind. But now it seems that my thoughts run toward all the work involved with these long winter months. Maybe it's time to go back to those childhood musings... now what did I do with my ice skates?





Published Quarterly Editor: Robert Korth Production Editor: Dorothy Snyder Contributing Editors: Mike Dresen, Lowell Klessig DNR Coordinator: Celeste Moen Photography: Robert Korth

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Season's Greetings from the Lake Tides staff!

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Lake Tides #8517 College of Natural Resources University of Wisconsin Stevens Point WI 54481 715/346-2116

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