Lake Tides
The newsletter for people interested in Wisconsin lakes

Thinking It Through

Our History of Chemical Use on Aquatic Plants

We humans have a poor track record of thinking through all the ramifications of our great ideas and plans. We do, however, tend to be good Monday morning quarterbacks. Think of the lessons learned from the Titanic disaster, Hurricane Katrina and space shuttle foam. One area that seems ripe for not considering all the consequences from the beginning is the complex field of aquatic plant management in general, and large or whole-lake treatments with chemical or mechanical methods.

Lake management has not escaped the debate over chemical use. Small-scale chemical treatment of aquatic plants is common in Wisconsin but there seems to be a growing demand for larger scale applications. In meetings across the state, from the Eagle River Chain to the Marion Mill Pond, citizens concerned with large-scale chemical applications are gathering to express their apprehension on both sides of the issue.

In almost any country you are likely to spark a debate if you bring up the subject of impacts of chemicals on people. Ask a chemist and he might say, "Everything is made of chemicals, what's your problem?" The chemist is right! We use chemicals for everything from preserving our food (and ourselves) to keeping dandelions at bay. The widespread use of chemicals that serve all parts of our society began in earnest with the close of World War II. The benefits of new chemical compounds were numerous and amazing. These new compounds brought us high-tech materials, more farm crops per acre, less disease…better living through chemistry.

Silent Spring

The payback of chemical use seemed to far outweigh any side effects. Chemical use of all kinds increased through the 1940s, 50s

(Continued on page 2)

Sprayers, such as the one pictured here, can be used to apply chemicals to lakes.

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Wisconsin Lakes Partnership

(Chemical Use, continued)

and 60s. Then, little by little, some rather grim discoveries started coming to light. In 1962, Rachel Carson's book, Silent Spring, brought to public attention a dark side to chemical use, stimulating widespread public concern. One of the chemicals Carson wrote about was DDT.

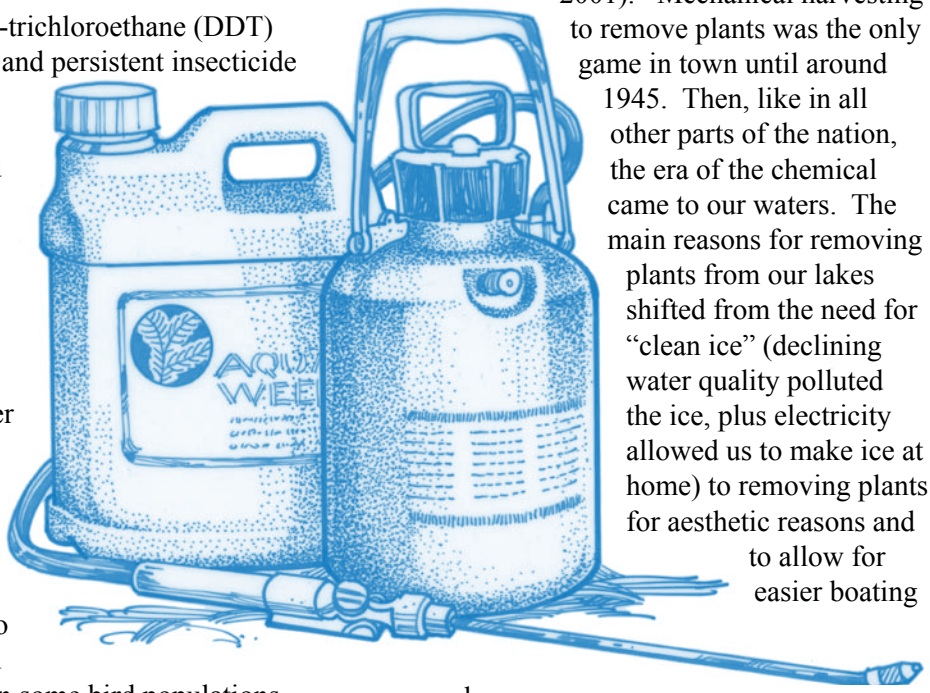
Between 1950 and 1969, over 2 million pounds of sodium arsenite were used in 167 Wisconsin lakes.

Dichloro-diphenyl-trichloroethane (DDT) was a fairly cheap and persistent insecticide that controlled vector-borne diseases and saved crops. In the 30-year period between 1945 and 1975, over 1.3 billion pounds of DDT were used domestically. Later we discovered unplanned side effects of DDT, such as eggshells of birds becoming too thin. This resulted in a huge decline in some bird populations, including the bald eagle.

The years that followed brought more bad news headlines involving chemicals. There was the Love Canal incident in 1978 when the nation was jolted as a community fought to uncover a serious public health crisis resulting from the burial of chemical wastes in their small suburban neighborhood. In 1984, a Union Carbide pesticide gas leak injured between 150,000 and 600,000 people and killed at least 15,000 in Bhopal, India. If we scan magazines and newspapers we can read of Superfund sites, cancer clusters, spills, tainted food and concern over the uses of "safe" chemicals that most of us have taken for granted. Much of this has left a portion of our world's population suspicious, afraid and nervous about accepting the tempting promises over the environmental risks of chemical use.

Plants be gone

The urge to remove aquatic plants in Wisconsin's lakes goes back a long time. Starting in the late 1800s, shoreland owners in southeastern Wisconsin became concerned about too many plants and formed organizations. Human activities increased the amount of nutrients in the lakes, which was perfect for plant growth and bad for the ice making business (*Lake Tides* Vol. 26 No. 2, 2001). Mechanical harvesting to remove plants was the only game in town until around 1945. Then, like in all other parts of the nation, the era of the chemical came to our waters. The main reasons for removing plants from our lakes shifted from the need for "clean ice" (declining water quality polluted the ice, plus electricity allowed us to make ice at home) to removing plants for aesthetic reasons and to allow for easier boating and recreation.



A lethal legacy

The main way to chemically control aquatic plants on Wisconsin lakes through the 1950s and 60s was the use of sodium arsenite (which contains inorganic arsenic that can be fatal if swallowed and is considered a cancer hazard). Between 1950 and 1969, over 2 million pounds of sodium arsenite were used in 167 Wisconsin lakes. In 640-acre Whitewater Lake in Walworth County, 55,000 pounds of sodium arsenite were used in those years. Big Cedar in Washington County took in 179,000 pounds, and 87,000 pounds were used in Nagawicka in Waukesha County (*DNR Technical Bulletin No. 57, 1972*).

Another common treatment of the day was copper sulphate. Copper can be persistent in the environment and an accumulation of copper in bottom sediments can adversely affect important food chain organisms. To avoid undue toxicity to fish it was usually mixed with half as much lime to force the

chemical to settle to the bottom. Between 1959 and 1969, over 1.5 million pounds of copper sulfate were used in our lakes to kill snails thought to cause swimmers' itch. Although the use of copper sulphate is no longer allowed for that purpose, the chemical is still used today for other purposes.

The chemicals 2,4-D and 2,4,5-T have a considerable history of aquatic use, and 2,4-D is still used. The chemical 2,4,5-T was used in Wisconsin as an aquatic herbicide under the brand name of Silvex but was discontinued in the late 1970s when it was banned in the U.S. (and many other countries) due to its carcinogenic qualities.

The Wisconsin DNR also experimented with using toxaphene (often used as a solvent) to kill fish in lakes. It was very effective but was discontinued because the toxicity lasted up to three years. The plan to rehabilitate the fisheries in the lakes failed because the fish put in after treatment kept dying until enough time had passed to reduce the toxaphene toxicity. Lion's Lake in Portage County was one lake treated with toxaphene.

With current knowledge, the idea of applying some of the chemicals used in the 50s and 60s as treatments would be unthinkable. However, not that long ago it was thought of a state-of-the-art practice.

So what should we do?

There are growing and serious concerns over aquatic plants such as Eurasian water milfoil (EWM). EWM at nuisance levels can make a lake almost unusable for fishing, swimming and boating. Chemical treatments applied by skilled, professional applicators can be an important and effective tool for plant control. Today, chemicals are required to go through rigorous toxicity tests to be initially registered and need to be re-registered every few years. These tests determine the lethal dose to assure that quantities used are below that level.

Each year in Wisconsin there is growing pressure to do large and even whole-lake treatments to limit the growth of nuisance plants such as EWM. Some citizens think we should be cautious with our chemical use until we are absolutely sure of the effects of these chemicals on all parts of the aquatic ecosystem (*Lake Tides* Vol. 30 No. 4, 2005). Others see chemical control as a fast, safe and economical way to deal with a plant that can in some cases severely limit how we can use our lakes.

With current knowledge, the idea of applying some of the chemicals used in the 50s and 60s as treatments would be unthinkable.

Silver bullet?

The nuisance levels of aquatic plants is seen as a top issue by most people living on lakes and it has been a major issue for over 100 years, but are chemicals really a "silver bullet"? There is little evidence showing that chemicals provide long-term relief from EWM growth and growing evidence that some plants may be able to build a resistance to chemicals. We need to weigh the benefits and cost of our choices in methods of manipulating lake ecosystems to make sure the decisions we make today leave options open for those that will care for our lakes in the future.

By Robert Korth, UW-Extension Lakes Specialist

What Are the Chances?

Aquatic Invasive Species

Aquatic invasive species are opportunists; they depend on human interaction to spread plant fragments, larval forms and mature adults to new habitats. Frequently, they quietly hitch a ride in transoceanic ballast waters, waiting to be expelled into the Great Lakes. Transient boaters pick up these species in bait buckets, boats and trailers, and transport them into Wisconsin's inland lakes. About 160 different aquatic invasive species have been reported in the Great Lakes, including the dreaded Eurasian water milfoil and zebra mussel. It may seem surprising that only 2.7% of Wisconsin's inland lakes are infested with Eurasian water milfoil and only 0.4% of lakes have zebra mussel infestations!*

Since 2001, Wisconsin laws prohibit launching a boat or placing a trailer or boating equipment in navigable waters with aquatic plants or zebra mussels attached.

So what are the chances your favorite waterbody will be infested with invasive species? A quick look at the information collected at boat landings by watercraft inspectors gives an insight into the number of boats launched with aquatic plants attached, which directly relates to a possible invasive species infestation. Since 2001, Wisconsin laws prohibit launching a boat or placing a trailer or boating equipment in navigable waters with aquatic plants or zebra mussels attached. Unfortunately, boaters are not always aware of this law and Eurasian water milfoil, as well as zebra mussels, are moved from one waterbody to the next on a boat or trailer.

Clean Boats, Clean Waters volunteers assist boaters with watercraft inspections at their local boat landings.

In the summer of 2005, watercraft inspectors in the form of WDNR personnel and volunteers participating in the *Clean Boats, Clean Waters* (*CBCW*) program logged 10,054 hours at boat landings and made contact with over 59,000 boaters. During the watercraft inspection process, inspectors checked boats for traveling plants, asked boaters if they used their boat within the last 5 days, and if the last waterbody was infested with any invasive species. Because some boat landings were extremely busy with boats coming and going, not all watercraft inspectors were able to collect this information. However, the data that was submitted revealed 4% of the boats came from infested waters and had plants attached, and 5.3% of the boats moved within the last five days. Does that mean for every one hundred launched boats, four will be transporting live plants from infested waters? (Standard prevention protocol recommends washing and drying boats and equipment for at least five days to prevent the spread of invasive species.)

It may be difficult to apply this statewide data at the local level, so a closer look at volunteer watercraft inspection programs will help verify the numbers. Shell Lake in Washburn County has been active in watercraft inspection for three years. In 2003, of the 1,725 boats looked at by volunteer watercraft inspectors, 190 had plants attached and nine of these boats arrived from infested waters. After three years of educating and instructing boaters how to perform watercraft inspections, the percentage of boats entering the launch area with aquatic plants dropped from 9% to 4.5%. Because of this volunteer effort at the landing, Shell Lake has decreased their chances in becoming another statistic on the infestation list.

Big Stone Lake in Oneida County is one of 24 lakes on the Three Lakes Chain. Starting in 2005, trained *CBCW* volunteers logged 272 hours at two active public boat landings. They inspected 342 boats, and over 10% had aquatic plants attached! Volunteers from Big Lake, another lake located on the Three Lakes Chain, inspected 126 boats and found 6% of those boats had plants attached.

Delta Area Lakes and the Pike Lake Chain in Bayfield County were fortunate to have 30

volunteers inspecting boats in the summer of 2005. After 341 hours of inspections, about 7% of the boats were found to be transporting aquatic plants. Long Lake in Waushara County, a new participant in the *CBCW* program, logged 43 hours in 2005. There, volunteers inspected 79 boats and found 10% carrying aquatic plants. With continued presence at the boat landings, volunteers will help boaters understand the importance of taking the prevention steps and removing aquatic plants before they launch.

These are just a few of the many local volunteer watercraft inspection programs throughout the state. While collecting and submitting watercraft inspection data helps track boater education efforts, it is the presence of someone at the boat landing that makes the difference. The watercraft inspection data confirms there are still large numbers of boats being launched with plants attached. Boaters will change their behavior if someone demonstrates how to properly check their equipment and provides encouragement to continue to perform inspections.

While the number of infested water bodies has increased over the years, there still is time to learn about aquatic invasive species, form watercraft inspection teams, and monitor for invasive species. For more *Clean Boats, Clean Waters* information, visit the website at www.uwsp.edu/cnr/uwexlakes/CBCW or contact Laura Felda-Marquardt, program coordinator, 715-365-2659.

Do not sit back and take a chance your lake will not become infested. Be proactive, perform watercraft inspections at the boat landing. You really will make a difference!

by Laura Felda-Marquardt, Invasive Species Volunteer Coordinator

**Percentages based on 15,081 inland lakes and 2005 Wisconsin infestation lists. For more details on specific water bodies infested with Eurasian water-milfoil visit website: http://dnr.wi.gov/invasives/fact/milfoil.htm and specific zebra mussel infested water bodies see website: http://dnr.wi.gov/invasives/fact/zebra.htm/.*

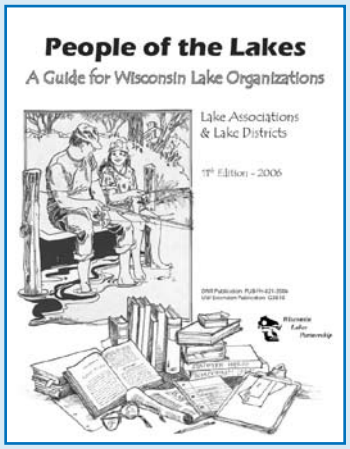
For upcoming CBCW trainings, see www.uwsp.edu/cnr/uwexlakes/CBCW

Photo provided by Laura Felda-Marquardt

Removing plants from your watercraft or trailer will help reduce the spread of aquatic invasive species.

New Edition...New Name!

People of the Lakes: A Guide for Wisconsin Lake Organizations



The 11th edition of the guide for Wisconsin lake organizations is "hot off the press." This new edition of *The Guide to Wisconsin Lake Management Law* contains information on starting and operating lake associations and lake districts. One free printed copy of this guide will be supplied to each lake organization for which we have a current address.* Additional copies of the guide can be downloaded at no charge from www.uwsp.edu/cnr/uwexlakes. Printed copies are also available for purchase on the website.

*Please check the *Lake List* at www.uwsp.edu/cnr/uwexlakes to make sure your organization's contact information is current. If your lake organization has not completed the 2006 Lake Organization Directory Update contact uwexlakes@uwsp.edu or 715-346-2116.

Hot off the Press!

Hands Across the Waters

Over 500 people gathered in Green Bay in late April for the 2006 Wisconsin Lakes Convention to discuss the issues that face our water resources today. Many of the discussions focused on the theme of civic engagement, as attendees explored ways to cultivate service, foster engagement in community and leave a legacy of positive change.

Girl Scout Troop 724 from Pewaukee received the 2006 Wisconsin Lake Stewardship Award in the Youth category. With WAL Director Peter Murray, DNR Secretary Scott Hassett, and Senator Robert Cowles looking on.

Attorney General Peg Lautenschlager joined the attendees to discuss the importance of conserving lakes and other resources, as did Wisconsin Senator Robert Cowles, DNR Secretary Scott Hassett, and former chief of the U.S. Natural Resources Conservation Service, Paul Johnson. Dr. Richard Heinzl, founder of Doctors Without Borders-Canada, provided a unique worldview of civic engagement and how people can solve huge problems by working together and using creativity. Futurist David Zach motivated participants with a humorous look at trends and how we can keep a sense of personal commitment in an age of technology. The packed agenda included over 100 speakers, with workshops, a field trip, and many concurrent sessions. Over 60 businesses and non-profit organizations exhibited their products and programs.

The Wisconsin Lakes Partnership congratulates the following winners of the 2006 Lakes Stewardship Awards:

Citizen – Kay Scharpf
Educator – John Haack
Group – Green Lake Association
Public Service – John Molinaro
Youth – Girl Scout Troop 724

Mark your calendars for the 29th annual Wisconsin Lakes Convention to be held in Green Bay, April 26-28, 2007.

2006 Wisconsin Lakes Convention Photo Contest Winners

The Fisher River
by Milton West
1st Place - Natural Features Around and In Lakes

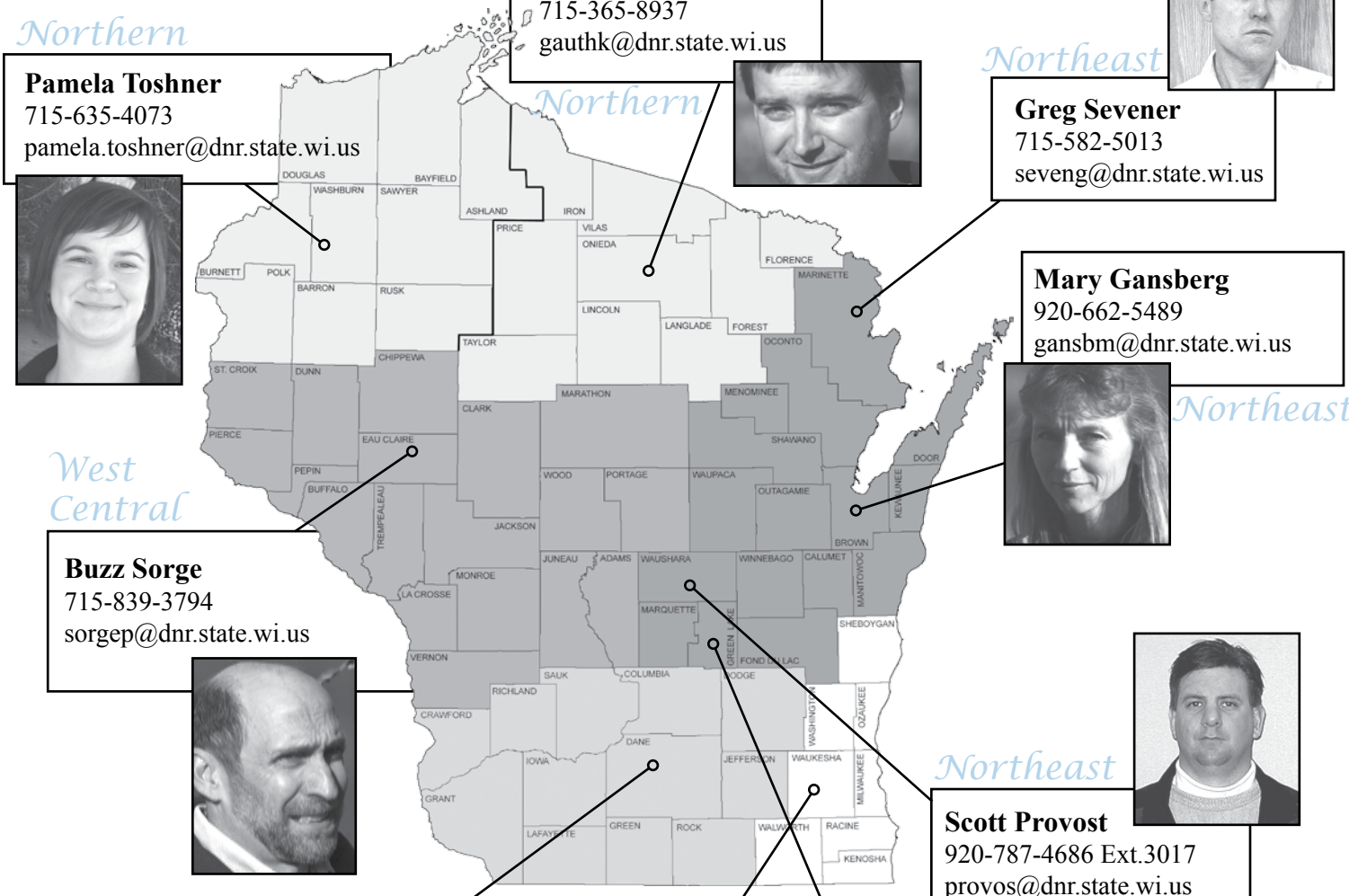
1-2-3-Go!
by Craig Libuse
1st Place - People Enjoying Lakes

Who's Who? DNR Lake Coordinators

These folks have responsibility for administering the DNR's lake programs. While exact duties vary depending on regional staffing arrangements and priorities, they can help provide assistance with:

- Lake management education, technical and information assistance
- Grants: Lake Planning, Aquatic Invasive Species, Lake Protection and Classification, and other project funding opportunities
- Citizen Lake Monitoring Network
- Aquatic Plant Management

In addition, they may be involved in River Protection Grants and Water Action Volunteer stream monitoring.



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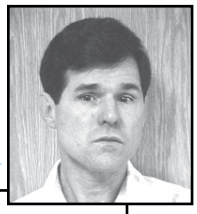

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Hard Ground, Hard Times
Manure Management in Wisconsin

Have you checked your license plate or the new Wisconsin quarter lately? Yep, we're America's dairyland (though Californians may disagree). Dairy farming defines a big piece of Wisconsin's heritage, and dairy farms have been at the core of Wisconsin culture for a long time. We're also a water rich state. Recent headlines in the papers have heated up the discussion that cows and water don't mix.

Wisconsinites have been jolted by recent news headlines revealing manure running off farmfields after a rain or snowmelt. Manure-handling has been put in the public spotlight as manure runoff into waterways has been blamed for killing fish in streams, polluting lakes and contaminating wells.

When manure is spread on farm fields, particularly in the winter months, a spring thaw or rain event can move it off the field and downstream into a nearby stream or lake. These runoff events have the potential to contribute high levels of pollutants and nutrients to the waterbody, often causing fishkills.

Between late 2004 and early 2005 there were more than 50 documented cases of manure runoff from farms of all sizes in Wisconsin. Of these, nine resulted in significant fishkills, including some high-value, cold water fisheries. Ten of them resulted in private water supply well contaminations with very serious public health implications. And at least six of them were discharges to lakes. DNR staff who monitor and track manure runoff occurrences speculate that a much greater number of these events probably occurred than were documented or reported.

One of the documented cases involved Jersey Valley Lake in Vernon County, a popular pan fishing spot for local residents. After several episodes of manure-laden water running into the lake from upslope fields, the DNR fish manager deemed the fishery to be a total loss. Another case occurred in Green Lake where an early winter thaw caused manure on frozen fields from three small farms to run downslope and on top of the ice-covered lake.

Manure runoff also occurred in Madison, where ongoing efforts to reverse (or at least decelerate) the rate of degradation of the Madison lakes from years of urban and rural runoff include a Priority Watershed Project and a ban on phosphorus-bearing lawn fertilizer. Under the phosphorus ban, DNR estimates that about 2,000 pounds of phosphorus were prevented from entering the Madison lakes in one year. Ironically, on a single day in winter during a snow melt event, one larger livestock operation discharged about 2,000 pounds of phosphorus from manure into the Madison lakes system.

What is being done?

In response to these events, a Manure Management Task Force was established by the DNR and the Department of Agriculture, Trade and Consumer Protection (DATCP). The members, who represented a diverse group of interests, were given the task of developing recommendations to limit manure runoff events and protect Wisconsin's ground and surface waters. The group developed recommendations and convened listening sessions to gather public input. Their recommendations included:

- Winter spreading plans for farmers to identify high risk fields that should not receive winter applications of manure.
- Manure hauling procedures to promote safe handling of manure.
- Emergency response plans to contain and clean up manure spills and overflows.

Liquid manure being applied to a field.

Mandatory or Voluntary?

Most of the people who attended the listening sessions supported the recommendations of the task force. However, the primary issue of contention that emerged was: Should the recommendations to reduce manure runoff be implemented by mandatory or voluntary means?

The discussion of a mandatory versus voluntary approach has been a part of agricultural water quality issues for many years. There are those who support increased environmental oversight of livestock operations and certain mandatory actions on the part of livestock producers, such as a ban on winter manure spreading. The other side of the discussion asserts that the livestock industry cannot afford burdensome regulations and that additional regulations would severely impede the maintenance and growth of one of the state's most important industries, resulting in severe economic consequences.

Next steps

In March 2006 the Manure Management Task Force delivered its recommendations and a report to the DNR and DATCP.

The two agencies will evaluate the report and develop a strategy to implement recommendations. Stay tuned!

For more information on the task force and a report of their recommendations, go to: www.manuretaskforce.wi.gov/

By Gordon Stevenson, Chief Runoff Management, Wisconsin Department of Natural Resources

2005 Worst Year

DNR staff reported that 2005 was the worst of the last 20 years for manure runoff. Why? An analysis of the runoff events revealed some common threads. Better than half of them all had the following in common:

- they occurred in February or March
- the ground was frozen or snow-covered immediately before runoff occurred
- the manure source was dairy farms
- the runoff was associated with the practice of landspreading manure
- the manure had been spread as a liquid rather than a solid

The Secchi Disk and Our Eyes

Working Together To Measure Clarity of Our Lakes

To the citizen lake monitor and professional lake manager, the Secchi disk is an indispensable tool for assessing lake clarity. The Secchi depth measurement is valuable because it is simple, low cost, relates well to our general perception of a lake's clarity, and can be compared to a large historical database. Yet we tend to interpret this measurement in a variety of ways. Sometimes we consider it a rough measurement, giving a ballpark estimate of a lake's clarity. At other times we rely on the Secchi disk as a quantitative tool to help make costly lake management decisions. So should the Secchi disk measurement be considered a ballpark tool or a highly precise instrument? The answer is that it depends on the precautions taken while making the measurement.

Secchi disk readings depend on four basic elements: sunlight, water, the Secchi disk, and our eye. While a lake's water clarity itself is the major contributor to the measurement, these four elements, the weather, and our technique can create external factors that result in variations in readings. The more important of these are:

- Whiteness (and blackness) of the disk
- Altitude of the sun
- Surface ripples and waves
- Shadow of the boat or observer
- Surface reflections off the water
- Clearness of the sky
- Observer vision characteristics (e.g., abnormalities, adaptation, sunglasses, etc.)
- Number of repeated measurements

Because of external influence, investigators consider the Secchi depth an apparent optical property of the water. An inherent property would not have external influence. This does not make the Secchi depth measurement a poor measurement. But it does bring home the point that minimizing the external factors, or making them as constant as possible, is important to make the measurement precise.

Following a well-defined measurement protocol is essential to maximizing the value of the Secchi depth measurement.

For example, taking the Secchi depth within the 10 a.m. to 4 p.m. period recommended in Wisconsin helps minimize the influence of the sun's altitude. Based on one study of the solar altitude effects, Secchi depth values would vary by about 6% due to altitude changes in mid-summer Wisconsin over the 6-hour measurement period. Over the full May-September period, the variation increases to 15% because the sun's altitude is lower at the beginning and end of the summer season. Taking measurements outside the times recommended in the protocol will tend to introduce additional variability.

Another example is the effect of waves. Most monitors have experienced the difficulty of taking Secchi depths when the lake is rough and try to take readings when the lake is calm. Waves contributed to an average 10% decrease in Secchi depth values when 5-inch waves were present in a recent study. This study and others have demonstrated that a view-scope (a tube between the eye and water to block out waves and glare) can decrease this effect of waves.

The variations caused by individual factors can exceed a 10% range. The total variation resulting from several factors can increase the variability far beyond that of just one factor. Although studies to date demonstrate potential protocol improvements, the studies are insufficient to be sure that changes would produce an overall benefit, especially in light of the large existing Secchi depth database using the current protocol. Furthermore, a protocol change that increases complexity must be weighed against the possibility of reducing the number of times that monitors truly follow the protocol. The Wisconsin Citizen Lake Monitoring Network is conducting several studies this year with a goal of reducing measurement variability,

thereby improving ability to detect "real" clarity variations of a lake over time as well as differences among lakes.

In the meantime, careful attention to following the existing protocol will keep variation to a minimum. One step all monitors could add to improve precision, or reduce variability, is to take several consecutive readings on the day of sampling and report the average. Averaging several readings is a sound method to reduce variability in measurements. In fact, following the protocol and averaging a few consecutive readings could reduce the uncertainty for a day's reported result to just a few percent.

by Larry Bresina
Crew V Lake Leader, Pipe Lake, Polk County

This article in its entirety can be found at: www.uwsp.edu/cnr/uwexlakes/editorscorner/articles under "Human Impact."

The full Secchi depth protocol for Wisconsin is at http://dnr.wi.gov/org/water/fhp/lakes/selfhelp/forvolunteers.htm.

Volunteer Lake Monitoring Update

Even when things change, they stay the same…

Things are being improved and expanded in the Self-Help Volunteer Lake Monitoring Program. One of the things that will change is the name. Welcome to the Citizen Lake Monitoring Network (CLMN)! The new name will better reflect who we are - a network of citizens helping agency staff monitor Wisconsin lakes.

Laura Herman, former DNR Self-Help Coordinator, is the new UW-Extension Citizen Lake Monitoring Network Statewide Coordinator and will oversee the education and training aspects of the network. In 2006, the CLMN will add 80 new chemistry volunteers and 100-plus new Secchi volunteers to the current 1600 volunteers. The data volunteers collect is kept in electronic format and that too, is undergoing improvements.

The DNR is developing a new and improved database called the Surface Water Integrated Monitoring System (SWIMS). Instead of having a database just for lake data, we'll be sharing a database that will hold data on rivers, streams and lakes. In addition to traditional water chemistry and clarity data, SWIMS will hold data on aquatic plants, aquatic invasive species, sediment, and more. Volunteers will benefit from the new system in a number of ways: online data entry will be improved, lab results will be available sooner, and more reports covering a wider variety of topics will be available online. Volunteers will be able to add in lake-specific information on aquatic plants, invasive species, ice on and off records, and other interesting information.

The SWIMS database should be in place during the later half of the 2006 monitoring season, or at the latest in 2007 (for volunteers' 2006 reports). Volunteers can watch for updates from Jennifer Filbert, SWIMS Coordinator, DNR, for the status and timeline of the database.

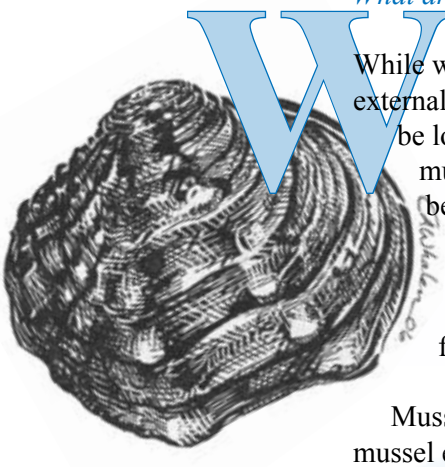
Volunteers deserve the opportunity to make the most of their monitoring capabilities and know that the data they collect is high quality and can be used by all. Tim Asplund, Statewide Aquatic Ecologist/Limnologist, DNR, will be working with protocols and expanding monitoring options. He will be developing new Quality Assurance/Quality Control practices, and working to ensure that the data volunteers collect is fully integrated into the state's lake monitoring and assessment efforts.

Wisconsin citizens have been collecting lake data for 20 years, and our network is known nationwide for its volunteers and quality data. This will never change!

If you want to learn more or become involved with the CLMN, contact Laura Herman, Citizen Lake Monitoring Network Statewide Coordinator, at 715/346-3989 or laura.herman@uwsp.edu.

Mussel Mania
Freshwater Mussels

Here's a riddle for you: They can live for decades, seldom moving from one spot. They cannot see. They make no sound, but yet they can tell us volumes about water quality. What are they?



What do these silent residents of your lake or river tell you?

While we often refer to animals with two external shells as a clam, you might actually be looking at a mussel. Freshwater mussels and freshwater clams both belong to the class bivalvia, although there are differences between the two. The largest difference is in reproduction. Mussels require a host fish to attach to, while clams do not.

Mussel reproduction starts with the male mussel expelling sperm into water. As the water moves, the sperm (with luck) end up in a female's respiratory gills, where eggs are held during breeding season. Once fertilized, the eggs stay in the gills and develop into tiny mussels called glochidia. The glochidia are expelled from the female in spring to early summer when the right host fish is nearby. (The females of some species actually "go fishing" by displaying tissue that simulates prey for the right fish!) The glochidia clamp onto the fish as a generally harmless parasite.

Although this relationship is not entirely understood, it's believed that by clamping onto the fins or gills of a fish, glochidia are provided with food and shelter until they drop off to live on their own anywhere from two to six months later. The young mussels must attach physically to a host fish in order to survive. If they do not find a suitable host fish within a few days of drifting in the water column, they die. While some mussels will attach to a wide variety of fish, a few have selected only one specific species to serve as host. The whole process seems like a gamble, doesn't it?

Adult freshwater mussels live burrowed in sand and gravel at the bottom of rivers and streams. Some are adapted to the quiet water and muddy depths of lakes, ponds, and reservoirs. Unlike most animals, which must travel in search of food, their food drifts to them, mainly tiny plants and animals called plankton that are suspended in the water. By drawing water inside their shells through a siphon, their gills filter out food and take in oxygen.

Mussels usually do not move much, but a muscular "foot" helps them burrow and allows limited travel if disturbed by floods or drought. The foot also helps anchor a mussel against strong currents and may prevent a hungry muskrat from tugging it out for dinner! A mussel's shell, however, provides its main protection from predators.

The hard, calcium-based shells of mussels consist of two halves joined by a hinge. Unique names like monkeyface, purple wartyback, and pink heelsplitter refer to the wide range of shell shape, color, size and texture found among mussel shells. The lifespan of freshwater mussels varies widely. While some species live for only 10 years, others may live for as long as 100 years.

One species that used to be found in the St. Croix River is called the elephant ear. The skipjack herring is the only host fish to this species. The skipjack used to swim up the Mississippi to the St. Croix. When the river's lock and dam system was installed, the fish could no longer navigate its way upstream. Without host fish, the elephant ear is dying out. Currently there is only one known remaining elephant ear in the St. Croix River, a male who is somewhere over 80 years old. When he is gone, this species is gone from the St. Croix forever.

In the lakes and rivers where they live, mussels' filtering ability makes them natural water purifiers. They play an important role in the aquatic food chain as a food source for wildlife such as muskrats and otters. They also can tell us something about the health of the environment on which we all depend. Because

mussels respond to changes in water quality, gradual mussel die-offs or sudden mussel kills are reliable indicators of water pollution problems and other environmental health concerns. Stable, diverse mussel populations generally indicate clean water and a healthy aquatic environment.

There are nearly 300 North American freshwater mussel species in the United States, compared to only 12 in all of Europe. Yet most of these species need protection. The American Fisheries Society believes 72% of these species are extinct, endangered, threatened or of special concern. In Wisconsin, 19 of 51 species are listed as threatened or endangered, two of them are also listed as federally endangered. No North American group of animals is in this much trouble, or declining as rapidly. Native mussels constitute the largest group of federally-listed endangered or threatened species.

Many factors affect the health of mussels and can contribute to their demise. Pollution can destroy their environment and kill them as they filter impurities. Excessive silt can cover a mussel or a mussel bed, smothering the animals. Channels and dams built for navigation and/or flood control change the nature of the river in ways that help some species of mussels but devastate other species, such as the elephant ear in the St. Croix. Exotic, introduced species such as the zebra mussel threaten native mussels by competing for food, oxygen and living space.

Freshwater mussels are one of the most diverse and important resources in Wisconsin and perhaps one of the least known. What do these silent residents of your lake or river tell you?

By Dale Cox, Interpretive Park Ranger
St. Croix National Scenic Riverway

For more information on the endangered and threatened freshwater mussels of Wisconsin, visit the WDNR at http://dnr.wi.gov/org/land/er/invertebrates/mussels/

Photo provided by Dale Cox

A park ranger teaches middle school children the importance of mussels in the St. Croix River.

Shoreland Restoration Website

The Langlade County Land Records and Regulations Department has developed a one-of-a-kind website for individuals who are interested in planting native vegetation on their shoreland property. The website gives step-by-step instructions which walk property owners through the differing stages of shoreland restoration. The property owner simply answers four questions about each area of their property they plan to restore (soil type, soil moisture, gradient of slope, and sun angle), and then the program gives information on plants that will grow there.

The website contains information on eliminating invasive weeds, soil preparation, planting tips, mulching, maintenance, greenhouse contacts, supplemental plantings, the benefits of bioengineering over rock riprap, and the rationale behind planting native species. It includes more than 340 easy to find and locally grown trees, shrubs, wildflowers, ferns, vines, grasses, sedges, and emergent and submerged aquatic vegetation that property owners can use to customize their own shoreland restoration plan.

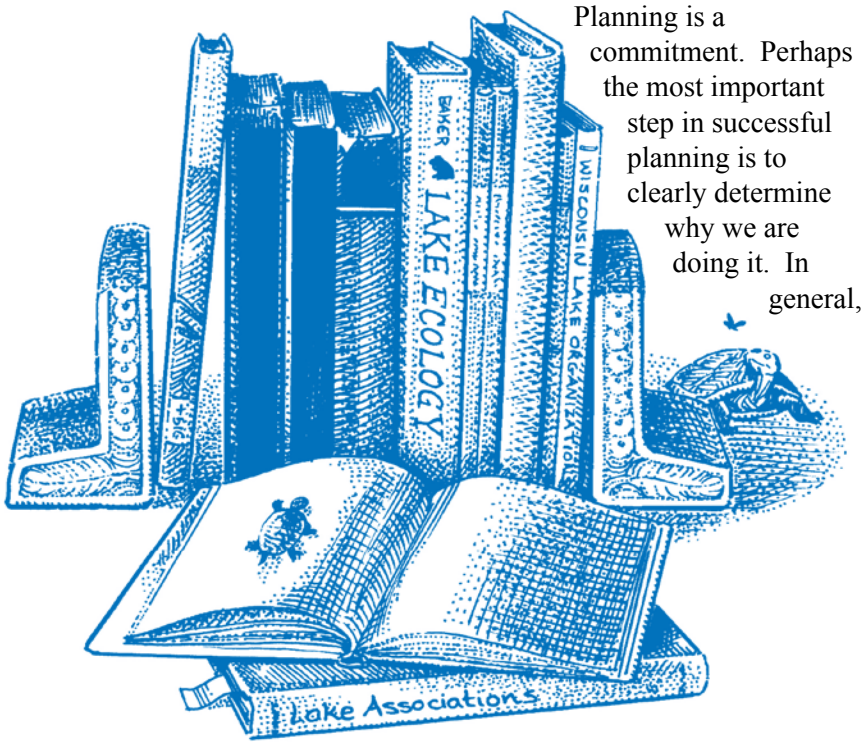
The new website works for all properties, not just those on the shorelands, thereby making it a handy tool for those property owners who do not live on a lake, but would still like to plant a native garden. To access this website, type www.co.langlade.wi.us into your search engine, click on *County Departments*, *Land Records and Regulations*, *Zoning-Shoreland*, and *Restoring Native Vegetation*.

www.co.langlade.wi.us

Lake Planning

Thinking about a lake planning project? Perhaps you recently heard someone say, "We need a lake management plan!" Responses may include: Why bother? What for? What is it? How do we do it? What will it cost? There is no question that planning has benefits, but before a lake organization embarks on a planning effort, these are important questions to answer. With a clear understanding of why we are planning and what we are planning for, the process will be much more productive. The tradition of lake planning in Wisconsin is really quite deep, going back 40 years or more, with varying but mostly positive results. Planning efforts can be frustrating though. Informed participants with clear expectations and an understanding of the process are keys to successful outcomes.

To encourage and foster our planning tradition on Wisconsin's "jewels," we will present a series in *Lake Tides* that will explore and explain the lake planning process, the step-wise building blocks and methods used to create a plan. Also addressed will be ways to get the plan approved and most importantly, implemented!



Planning is a commitment. Perhaps the most important step in successful planning is to clearly determine why we are doing it. In general, planning allows communities to control their fate. Planning can correct past problems, protect and improve on current conditions, and provide a guide to the future. It seeks to minimize conflict and undesirable conditions while proceeding to attain things that are valued by communities. Planning helps assure that money spent on projects is expended in a meaningful and effective way. It may be required for, or aid in, qualifying for grants or to get approvals and permits to conduct lake improvement activities.

What is a plan? Planning is an ongoing process, which is what this series will be about. We want the process to ultimately lead to a comprehensive lake management plan -- a guide to taking care of aspects of a lake ecosystem including water quality, fisheries and wildlife, shorelands and watersheds, recreational use and others -- as opposed to a narrow view of just one element or "problem." Ideally, in the plan these elements are considered in detail and have goals and associated strategies, priorities, schedules and budgets to guide implementation of projects to protect and improve the whole lake.

That's a tall order! To get to a comprehensive management plan will take time. There are several steps along the way but we don't have to wait until the end to take action. Each step can be designed to lead directly to taking action while continuing to build your plan. Remember, it is a process.

In future *Lake Tides*, we will describe these steps and how to achieve them while emphasizing actions that can be taken to protect lakes. The next installment will cover the first step of building a successful lake management plan. If you have specific planning topics or issues that we should discuss or if you have success stories, tips and experiences you would like to share, contact Carroll Schaal at Carroll.Schaal@dnr.state.wi.us or (608) 261-6423.

CALENDAR

Summer 2006 - Clean Boats, Clean Waters trainings. See the Winter issue of *Lake Tides*, or www.uwsp.edu/cnr/uwexlakes/CBCW

Water Action Volunteers stream monitoring trainings
June 3, 2006 - Waukesha County
June 3, 2006 - Milwaukee
June 10, 2006 - West Bend
See http://clean-water.uwex.edu/wav/events.htm for information.

June 23-28, 2006 - Natural Resources Careers Camp (ages 15-17)
Central Wisconsin Environmental Station, Amherst Junction.
See www.uwsp.edu/CNR/cwes/summer06.htm.

July 16, 2006 - Loon Population Survey. To participate or for more information, visit the Sigurd Olson Institute at www.northland.edu/Northland/Soei.

Wisconsin Association of Lakes Regional Workshops

WAL workshops create great opportunities for lake enthusiasts to learn about issues affecting Wisconsin's lakes, meet other lake enthusiasts, learn from the experience of other lake groups, and make personal contact with lake management professionals. The workshops include a blend of special guest speakers, presentations from lake experts, panel discussions, insights from local lake leaders, and hands on learning opportunities.

Registration for these events includes refreshments, luncheon, and program materials. Visit the Wisconsin Association of Lakes website for workshop agendas and registration details at www.wisconsinlakes.org, or call 800-542-5253 (in Wisconsin only) or 608-662-0923.

Northwest Wisconsin Lakes Conference
June 29-30, 2006
Telemark Resort and Conference Center, Cable

Northwoods Lakes Workshop
July 20-21, 2006
Lakeland Union High School, Minocqua

West Central Wisconsin Lakes Conference
Friday, August 11, 2006
Rice Lake Technical College

June is Invasive Species Awareness Month!

Workshops, field trips and lectures about the impacts of invasive species are scheduled throughout the state this June. A calendar of upcoming invasive species events, educational fact sheets, articles, and resources about invasive species can be found on the Wisconsin Council on Invasive Species http://invasivespecies.wi.gov/awareness.

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Reflections

If you think you're too small to have an impact, try going to sleep in a room with a mosquito.

~ Author unknown.