Lake Tides
The newsletter for people interested in Wisconsin lakes

Water Levels Got You Down?

What's up (or down) with those water levels the last few years? In many areas all across Wisconsin, it seems that lake levels get lower by the day. Are low levels occurring in your backyard? Just like there are many types of lakes, there are many reasons why this happens. Let's explore those reasons and see if this is always a bad thing for our lakes.

Depending on the type of lake, you may be noticing a drop in water levels. If you live near a lake where water levels are controlled by a structure such as a dam, you may not be noticing such a drastic drop as someone located on a natural glacial kettle lake. Seepage lakes, on the other hand, typically have water levels that are controlled by the elevation of the groundwater table. Because of this they are usually more susceptible to water level fluctuations.

So if groundwater plays a big role in water levels on lakes and baseflow to streams, what controls groundwater levels? Groundwater levels (the amount of groundwater in aquifers) are a reflection of the amount of water percolating into aquifers from the soil (groundwater recharge) minus the amount of groundwater discharging from aquifers to surface waters and wells. An easy way to look at it is by comparing it to a bank account, where:

Credit	–	Debit	=	***Net Savings***
Rain/ Snowmelt	–	Runoff/ Use by Plants	=	***Groundwater Recharge***

Groundwater is a product of rain and snowmelt, which is your annual credit. This credit, in terms of precipitation, equals about 31 inches per year. The

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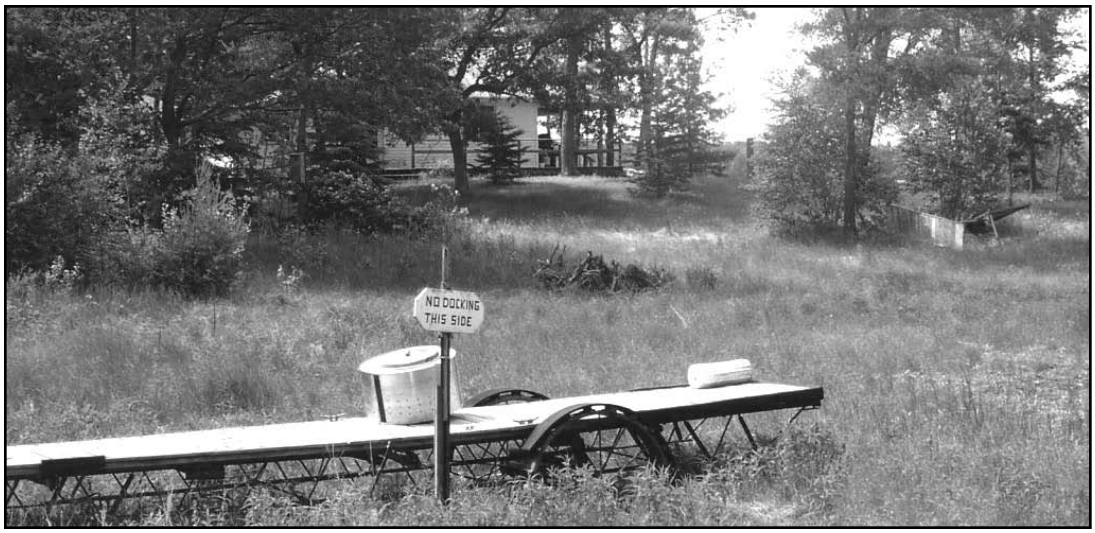

Provided by Tim Asplund

Four years ago a pontoon boat was docked alongside this pier in Long Lake near Plainfield, Wisconsin. Water level in some lakes can fluctuate several feet.

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Since the early 1990s, we have been on a decline that is nearing the previous late 1950s to mid-60s levels.

rain or snowmelt that becomes runoff or is intercepted by plants, is your debit. This makes up the majority of your account, about 21 inches per year. Your net savings is groundwater recharge. Typically, in the central part of the state the net savings is about 10 inches per year. That is your profit to spend (wisely or foolishly). If you spend too much you run into the red; conversely, if you spend wisely you run into the black. If a reduction in recharge continues, or too much money is spent, you may start to see the impacts in low water levels. Sometimes this is natural, such as a drought; other times it may be influenced by our choices in land uses.

Factors like persistent drought are basically beyond our control and have been occurring for millennia. This flow of ups and downs is natural, and will continue to occur. Unfortunately, there is not a predictable cycle and these ups and downs can range over many years. While it might be a very short time for Mother Nature, for us it can be a good portion of our "riparian life." For example, we can look at groundwater monitoring well records across the state and see that low water levels have happened before. We can see that in the late 1950s to mid-60s we experienced comparable or lower levels than we have now. Conversely, the high peak seemed to occur in the early 1990s, which coincides fairly well with precipitation trends. Since then, we have been on a decline that is nearing the previous late 1950s to mid-60s levels.

While low water levels may seem disturbing to us, fluctuations are a natural occurrence.

Development along lakes has also increased since the 1960s. Many people may not recall such low levels simply because they were not on the water then. In some lakes, stumps from young trees can be found well below the Ordinary High Water Mark (OHWM) which suggests extended low water periods. These periods were low enough and lasted long enough for small trees to invade and grow before drowning out as water levels returned closer to the OHWM. Again, these cycles may occur over a relatively short period of time for the natural world but can be a long time for us.

As development pressures of our groundwater resources continue, we see that perhaps we are running a little closer to the red at times. As we have filled wetlands, created large roof tops, and paved riparian areas and shorelines, we have increased runoff (a debit) and decreased our recharge rates (savings). As we literally tap into our groundwater bank accounts to remove water for municipal and high capacity wells, we remove even more water that is not returned as recharge, but lost as runoff and evaporation (debits). In fact, water table elevations have decreased by several feet in large urban areas and the recharge rates in heavily irrigated lands can be reduced by nearly half (about 5 inches per year). Combine this human influence with natural drought conditions and the natural low may become even lower.

But are low water levels all that bad for lakes? The natural flux has been happening for millennia and we know that many species of plants and animals have evolved to adapt to changing water levels. In fact, some high value plants such as bulrushes are dependent on this flux. As water levels decrease, emergent species of plants along the shore expand toward the lake. When water levels

Are low water levels bad for lakes?

The short answer is no. As water levels decrease, very beneficial plants are stimulated to grow along the shore. In fact, one of our rarest shoreline plants, Fassett's Locoweed, requires big fluctuations of water levels to grow. This plant is found on six lakes on the planet and all of these lakes are subject to wide fluctuation in water levels. All of these native plants benefit a lake in one way or another, making it important to protect these plants. That is why manual removal of aquatic plants is confined to a path 30 feet wide. Anything more than that, or by any other mechanical or chemical means, needs a permit from the DNR. It should also be noted that in most cases the plants that are expanding across the lake bed are actually public property, no different than the trees in a federal, state or county forest.

Fassett's Locoweed

return, this expansion of plants becomes habitat for fish and wildlife, removes nutrients from water, and helps increase water clarity. Think of the process as the lake healing itself. Without this normal water level flux, the species that make a lake ecosystem what it is can not survive.

There is an inherent rise and fall to lake levels. The natural low level phase should be welcomed with an understanding that this is a time of healing and rebirth for a lake. We have learned to tap into our groundwater accounts, which is necessary to some degree. However, we can exacerbate low level conditions through our land use practices that limit groundwater recharge and by overspending in lean times. Will lake levels come back? Most likely, but Mother Nature determines that. We can help her out by being frugal when we need to be.

By Scott Provost, Water Resources Management Specialist, Northeast Region, Wisconsin Department of Natural Resources

2007 AGENTS OF CHANGE

Wisconsin Lakes Convention
April 26-28, 2007

Call for Presenters

The Wisconsin Lakes Partnership is inviting lake organizations, resource professionals, researchers and students to submit proposals for educational presentations, field trips and hands-on workshops for the 2007 Wisconsin Lakes Convention. Our lakes need citizens to step forward as agents of change as pollution, global warming, invasive species and other tribulations take their toll. The convention will focus on ways citizens can be a force for positive changes that will result in clean, healthy lakes. Sessions will also feature topics such as lake science and management, public policy, lake organization information, wildlife, shoreland issues, fisheries, grant programs and aquatic plants. Presentations that highlight local lake management experiences are encouraged.

Submission guidelines and an application form can be found on the UWEX-Lakes website at www.uwsp.edu/cnr/uwexlakes. Click on Convention. If you would like an application form in hard copy, contact us at 715/346-2116.

The deadline to submit a proposal is October 20, 2006.

Northwoods Reflections

As a member of Anvil Lake Association, Past President of Vilas County Lakes Association and a board member of the Wisconsin Association of Lakes, Sandy Gillum reflects on Northern lakes in this excerpt of her speech at the Northwoods Lakes Workshop on July 1, 2006.

In many ways the Northwoods lake country is unique in Wisconsin and perhaps in the world. Not only does the Northwoods hold the largest number of lakes in Wisconsin, but also one of the largest concentrations of freshwater lakes in the world. What a remarkable asset to protect and conserve!

People often say they are going "up north" or "to THE lake." The meaning of those expressions is often quite different for different folks. During my years of involvement with Wisconsin lakes I have heard "up north" and "THE lake" described in many ways: peace, quiet, beauty, dark skies, northern lights, clear water, cool nights, loon calls, sunsets, swimming, teaching grandchildren to fish, canoeing, kayaking, ducklings and swans, fly fishing, and water skiing. Some of these words likely draw a mental picture for you and are likely drawn from a personal experience…unique to you.

We have the potential to change these northern waters forever - to love them to death, or protect them in perpetuity.

Lakes are unique too. Lakes are ecosystems and ecosystems are communities and communities have parts that fit and work together in exquisitely intricate ways. When lake systems are healthy, their parts work together in concert, rather like a symphonic orchestra or an articulated animal. Parts…pH, dissolved oxygen, temperature, thermocline, water clarity, phosphorus, chlorophyll, algae, aquatic plants, shoreline plants, vegetated shoreland buffers, run-off loads, sedimentation, aquatic invertebrates, minnows, mussels, fish, turtles, wildlife habitat, coarse woody habitat, piers, boats, anglers, quiet water sports, motorized water activities…yes, all these parts and more. Humans have impacts on each and every one of these parts. Sometimes we see and understand the "wake" we leave; many times we don't comprehend the "splash" we make, or we may be just learning about the "tide" of difference we are making. We have the potential to change these northern waters forever - to love them to death, or protect them in perpetuity.

Recent studies have provided perspectives on our lakes:

- Lakes with higher secchi depth readings are preferred by shoreland buyers and they are willing to pay more for this opportunity;
- Peace and quiet is the #1 reason to be at a lake;
- Shoreline development is depleting habitat for frogs and some migratory birds;
- Near shore changes have decreased habitat for fish and loons and turtles;
- Loss of coarse woody habitat diminishes fisheries;
- Phosphorus laden run-off increases aquatic plant growth;
- Wise land planning and appropriate zoning protect lakes from degradation;
- Tourism in lake country pumps billions into Wisconsin's economy and creates jobs in local communities;
- Without tourism dollars, taxpayers would need to pay more for equivalent services;
- And shorelands around degraded lakes are selling at lower prices, in some areas, and shifting some of the tax burden to off-water properties.

The quality of lakes in the future is at stake. Wise thoughts and creative plans are only

that. It is execution that makes a difference. Timely information and education about this natural resource is paramount to sound decision making to preserve robust, living lake ecosystems. The quality of lake resources has and will be challenged here again and again. Stewardship begins at home. Evaluate how you manage your shoreland, how you care for your septic system, how you control run off, how you use a lake. What do you want the future of your lake to be? How does your neighbor view your shoreland and lake use? Isn't example a good teacher?

Think beyond the shore! Think ground water sources. Think surface waters. Think watershed. Think user groups. Think wildlife. Think decades. Lake stewardship is eco-ethics in action. For what we want for tomorrow, must be understood and initiated today. Good stewardship is the gift to future generations.

Stewardship begins at home.

Silver Beach Elk

About 10,000 years ago, a massive bull elk roamed the area that is now Barnes in Bayfield County. Weighing in at about 1,000 pounds, the elk had vast antlers which impressed potential mates. He used his antlers to spar with other bulls and show his dominance, mark his territory in the vegetation, and defend himself against predators. But his antlers could not defend him against a fluted spearhead…

This elk's story ended thousands of years ago. Or did it? In July of 2005, a swimmer stepped on what he thought was wood on the bottom of Middle Eau Claire Lake. It turned out to be a pair of elk antlers. Further exploration turned up about half of an elk skeleton, along with a fluted point.

The DNR wildlife biologist for the region, Matt McKay, verified the bones were that of a large elk. Prehistoric elk were larger by a few hundred pounds than our modern elk. Dr. Jean Hudson, an archaeologist with UW-Milwaukee, is currently researching the bones and the archaeological site, now recognized as "Silver Beach Elk."

According to a June 1, 2006 article in the *Sawyer County Record*, Dr. Hudson's first radiocarbon tests to date the bones obtained inconclusive results, showing them to be only about 500 years old. However, because Dr. Hudson found butchering marks on the elk bones, she believes the bones may be older. Butchering marks are characteristic scrape marks left on bones when primitive hunters used stone tools to strip the meat off the carcass. These marks would be consistent for bones from a time period about 10,000 years ago. Further tests will be conducted to determine age, as modern materials may have contaminated the bones as they rested at the lake bottom.

The fluted spearhead (sometimes called a Clovis point) almost always dates back about 10,000 years. Not only is the spearhead exciting because of its location to the elk bones, but also it is unusual for such a point to be found this far north. What can this spearhead tell us about life at the end of the last ice age?

The Barnes Area Historical Association (BAHA) plans to display the elk bones and antlers at their museum. The climate-controlled display unit needed to properly conserve the priceless artifacts will cost upwards of a half-million dollars. Despite this hefty pricetag, the community is optimistic that they can continue this elk's story for all to enjoy.

For more information, see the BAHA website at www.barnes-wi.com/page.cfm/250.

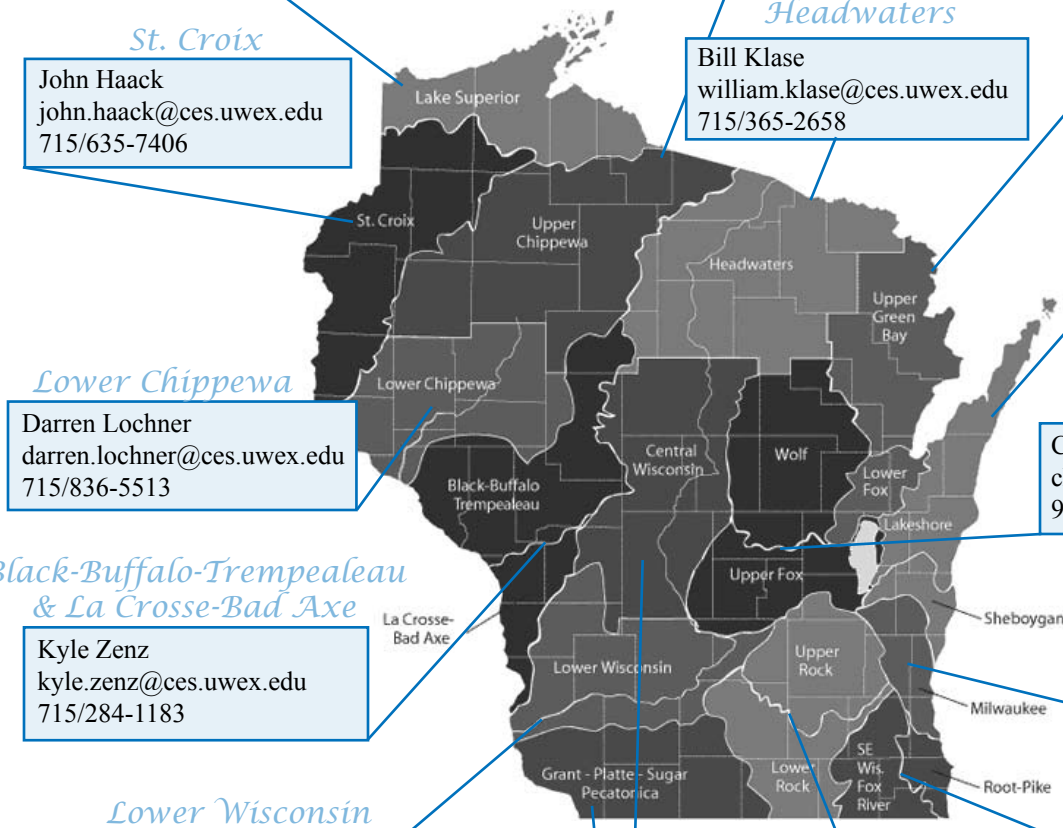
Who's Who?

Wisconsin's Basin Educators

A team of fifteen Basin Educators work in our Great Lakes and major river basins to promote understanding and stewardship of Wisconsin's natural resources at the watershed and landscape scale. They provide expertise in:

- Natural resources issues
- Group process and facilitation
- Organizational capacity building
- Educational program design/implementation
- Adult education principles

For more information on Wisconsin's Basin Education Initiative and those involved, go to http://basineducation.uwex.edu/ or contact Director Ken Genskow at kgenskow@wisc.edu or 608/262-8756.



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Green Lawn...Green Lake?

Phosphorus Bans Gain Momentum

Remember the debates and subsequent actions to ban phosphates in laundry detergents in the late 1960s and early 1970s? Fresh attention is being given to phosphorus, this time in lawn fertilizers. As debates rage in many states, some Wisconsin communities have passed local ordinances limiting the use of phosphorus-containing lawn fertilizers.

Why focus on phosphorus?

Phosphorus is the primary nutrient that fertilizes most lakes in Wisconsin. Too much phosphorus in lakes contributes to excess aquatic plant growth and algae blooms. While lawn fertilizer is certainly not the only source of phosphorus to lakes, some people feel it is an easily preventable one.

When phosphorus fertilizer is applied to lawns that already have high levels of phosphorus in the soil, much of it gets carried by rainwater into lakes, streams, and wetlands. Soil tests in Madison and the Twin Cities Metropolitan area have shown that many lawns already have very high levels of phosphorus and do not need any additional phosphorus fertilizer.

Local actions

In an effort to reduce the amount of phosphorus entering waterbodies, several communities have enacted local ordinances to ban the use or sale of lawn fertilizers containing phosphorus. The City of Madison and Dane County have had such a ban in place since January 2005. Some communities, such as the Village of Pewaukee in Waukesha County, do not entirely prohibit phosphorus, but restrict the concentration to three percent. Several other communities in Waukesha County have some type of local phosphorus ordinance in place, including the City of Pewaukee, City of Delafield, Town of Delafield, and the Village of Lac La Belle. The Village of Twin Lakes in Kenosha County and the Town of Delavan in Walworth County prohibit the application of phosphorus fertilizers, and Polk County prohibits use within the shoreland zone.

On a larger scale, Minnesota prohibits the application of phosphorus-containing lawn fertilizers statewide, unless a soil test confirms the need for additional phosphorus. Many local ordinances provide similar exceptions for soil test results, in addition to exceptions for new lawns and golf courses.

Several communities have enacted local ordinances to ban the use or sale of lawn fertilizers containing phosphorus.

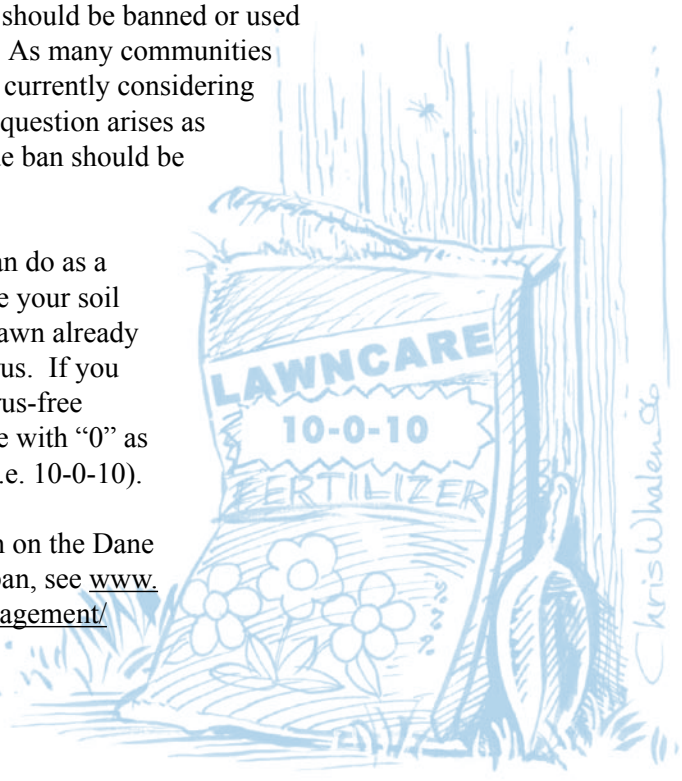
Court challenge

Recently, the City of Madison and Dane County successfully defended a lawsuit challenging their phosphorus ban. A federal court upheld the ban, determining it did not violate the rights of the fertilizer industry.

Debates continue as to whether phosphorus-containing fertilizers should be banned or used more conservatively. As many communities across Wisconsin are currently considering local ordinances, the question arises as to whether a statewide ban should be enacted.

The best thing you can do as a homeowner is to have your soil tested to see if your lawn already has enough phosphorus. If you want to use phosphorus-free fertilizer, look for one with "0" as the middle number (i.e. 10-0-10).

For more information on the Dane County phosphorus ban, see www.danewaters.com/management/phosphorus.aspx.



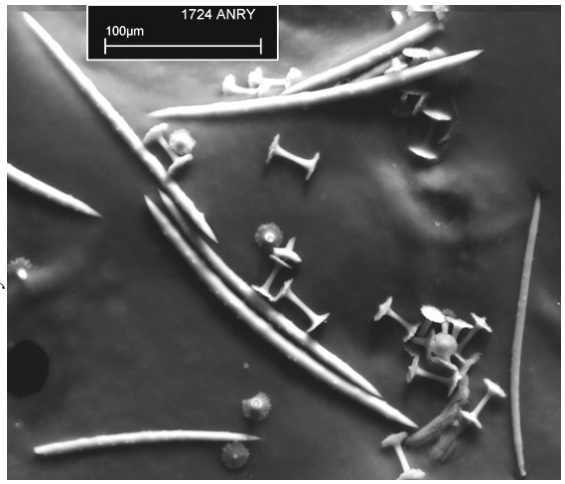
An Unexpected Encounter

Wisconsin's Freshwater Sponges

I had just returned from Hawaii with a new found love of snorkeling when I inadvertently discovered one of Wisconsin's little known aquatic treasures. As I swam through the shallows, they reached up from the bottom; lime green, fingerlike projections protruding from a sunken log. They were reminiscent of what I had seen along the Pacific's coral reefs, but on a smaller scale. I was captivated by my discovery of freshwater sponges in one of our northern Wisconsin flowages. That was the 1980s and I knew little about sponges. I certainly didn't realize that nearly 20 years later my colleagues and I would be using modern technologies and citizen monitoring to better understand these fascinating animals with the aim of conserving a part of Wisconsin's biological heritage.

Sponges in Wisconsin lakes?

Yes, about 15 species occur here. Yet, biologists, anglers, and other lake-goers often overlook these animals because of their inconspicuous coloration, small size, cryptic nature, sessile lifestyles, and inaccessible taxonomy. We just generally don't encounter these critters unless we're really looking for them.



Provided by Milwaukee Public Museum

Photograph 1. Sponges have an inorganic skeleton composed of microscopic mineral structures called spicules. Biologists rely on the varying sizes and shapes of these to identify each species.

Worldwide, scientists have described approximately 5,000 species of sponges, with fewer than 300 being found in fresh waters. About 27 freshwater species occur in North America, but scientists have spent little time working with these animals. Most states can not even produce a list of species occurring within their borders. In fact, even though some of the most important research on freshwater sponges occurred in Wisconsin (scientists have investigated Wisconsin sponges periodically since the 1890s), when my colleagues and I undertook work on the state's Comprehensive Wildlife Conservation Plan, we were unable to assess the conservation status of Wisconsin sponges.

Our lack of knowledge is unfortunate, as sponges may contribute considerably to the biomass (amount of living matter), nutrient cycling, and primary and secondary productivity of some aquatic ecosystems. Sponges also provide a substrate and refuge for other small animals and are fed upon by some larger ones.

Do they look like my bathroom sponge?

Well, not really. Freshwater sponges occur as small to medium encrustations attached to submerged rocks, logs, and twigs. They vary from marble-sized to elongated masses, and may occur as a thin, flat, encrusting film or as a convoluted layer an inch or more thick. Biologists believe sponge age, water currents, wave actions, substrate characteristics, availability of light, and the amount of minerals dissolved in the water all interact to affect the way they grow. Some freshwater sponges contain symbiotic algal cells, which color them green. Others are brown, tan, gray, or even pinkish. Unfortunately, color and shape are not particularly helpful in identifying sponges to the species level.

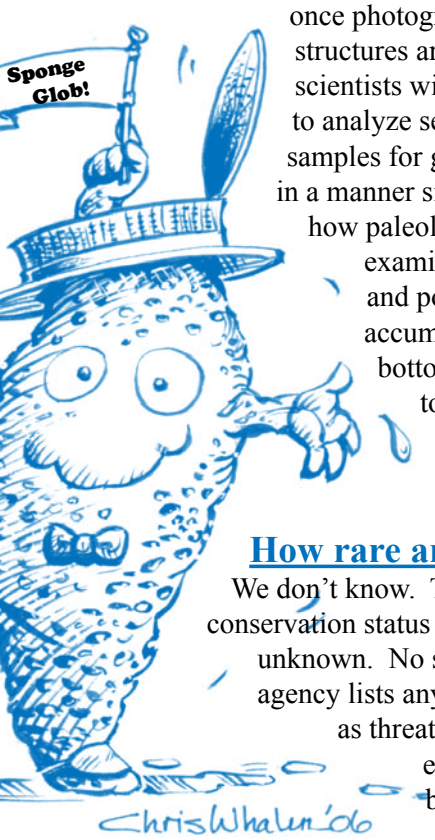
Instead, biologists rely on minute skeletal structures to identify each species. Sponges have an inorganic skeleton composed of microscopic mineral structures called spicules (see photograph 1). A special kind of protein, called spongin, holds the spicules together forming a rigid framework that provides the basic structure. The spicules are quite diverse in their size, shape, and number of prongs, and in their methods of formation. Some are needlelike and others dumbbell and star-shaped. They can be smooth or spined.

Most range in length from less than 30 micrometers (a micrometer is one millionth of a meter) to as much as 450 micrometers. Much of this variability is species-specific (i.e. each species has its own sizes and shapes). Scientists at the Milwaukee Public Museum are using scanning electronic microscopy to examine these features. We hope to develop a modern atlas of sponge morphology that biologists can use to identify Wisconsin species.

Can we find them in our lake?

You probably can, if you look carefully. Wisconsin's sponges exhibit an annual life history in which they die back in the winter and begin a new growth cycle in spring, so it's best to look in late summer and early fall.

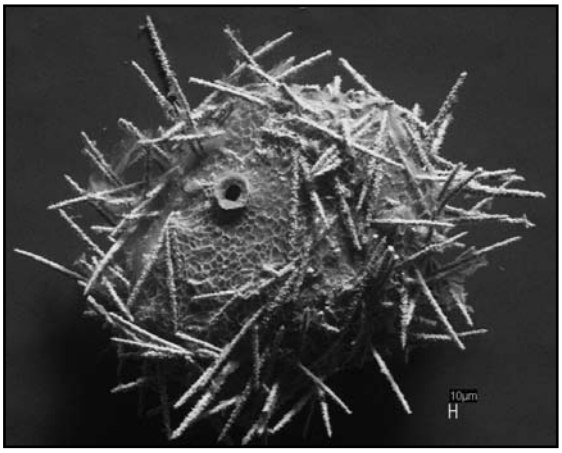
The sponge's life cycle is tied to its reproduction and involves formation of internally produced spore-like units called gemmules. These gemmules remain dormant over the winter and develop into adult sponges the following summer. Specialized spicules form a protective coat around the gemmules (see photograph 2). As with the skeletal spicules, we're using scanning electron microscopy to examine sponge gemmules. We're hoping that once photographs of these structures are available, scientists will be able to analyze sediment samples for gemmules in a manner similar to how paleolimnologists examine diatoms and pollens that accumulate in lake-bottom sediments to understand changes in a lake over time.



How rare are they?

We don't know. Their conservation status remains unknown. No state or federal agency lists any sponge as threatened or endangered, but two of our species have been reported from the state only one time and more than half of Wisconsin's counties have never been surveyed for sponges. Only one recent survey has determined if sponges continue to persist at localities where they were previously reported. From that study, we know that at least one species has declined in its distribution in the state over the past 70 years.

Provided by Milwaukee Public Museum



Photograph 2. Specialized spicules form a protective coat around the gemmules, internally produced spore-like reproductive units that overwinter and develop into adult sponges the following summer.

Current conservation threats to sponges remain unclear. Nonpoint source water pollution, particularly sedimentation, could be adversely impacting sponge populations in some waters. The associated nutrient loading may or may not adversely impact sponge populations. Paradoxically, recent field investigations have suggested that waters infested with the exotic zebra mussel are conducive to sponge growth. In these cases, sponge growth may be enhanced by increased water clarity due to the filtration activities of the zebra mussels and suspended bacteria locally associated with mussel fecal deposits may nourish the sponges. Some recent research suggests alteration of the littoral area (e.g., removal of coarse woody habitat) may affect sponge distribution.

You can help us learn more about Wisconsin sponges. We are developing a reporting mechanism that citizens can use to submit observations of sponges in their local lakes as a way of helping biologists prioritize future survey efforts. As part of this effort, we hope to develop by next spring a guide that will enable people to recognize this fascinating component of Wisconsin's wildlife. We'll let readers know when the guide is available. In the meantime, get out and look for these critters in your local waterways. Who knows, before too long, you too may be enthralled with one of Wisconsin's lesser known wonders.

By Dreux J. Watermolen, Section Chief, Science Information Services, Wisconsin Department of Natural Resources

Planning with Purpose

"Scope It Out!"

In the last issue of Lake Tides, we began a series on lake management planning with a general introduction explaining why planning is important. This is the second installment of the series.

The first step in creating a lake management plan is called "scoping." Scoping involves bringing the pieces of the puzzle together and getting organized: organizing thoughts, issues, people, and a process for addressing common concerns. The importance of preparing a "blueprint for planning" is often underestimated. Good preparation will lead to a good lake management plan.

Planning for our lakes will protect them for future generations.

Good preparation will lead to a good lake management plan.

Planning with purpose begins with thinking hard about why a lake plan is needed, who needs to be involved, what information will be collected and communicated, and how decisions will be made. A fairly detailed strategy for creating a lake management plan should be laid out, including what you're going to do, the timeline and budget.

Why is a lake plan needed?

A plan will help you meet your goals. Goals should be based on needs and should state the desired end in broad terms, while being focused enough to understand the actions needed to achieve the goals. Goals need to be practical and outline reasonable expectations, appropriate for the lake.

Who should be involved?

Identify all the stakeholders and consider how they will participate. The types of issues you are concerned with will play a role in determining who needs to be involved. Successful lake management efforts require cooperation among local government, lake organizations, state government, and sometimes federal agencies, as well as businesses, sportsmen, and organized lake users. Responsibility for lake management does not lie solely with any one organization.

What information is needed?

Define the problem or problems to be addressed. Effective solutions can not be developed without a clear picture of the problems. Plans can address a single issue, or multiple issues. Plans can focus on current concerns, or forecast possible future issues. A clear goal statement will help identify the information necessary for preparing the plan. In turn, knowing what information you need will help you identify the cost likely to be incurred. While all lake plans need some basic natural resource information, additional data may also be required to address specific issues.

How much will it cost?

Costs can vary but could include costs of mailings, scientific research, community surveys, room rental and similar programming expenses. Depending on the estimated costs associated with your plan, your organization could consider applying for one or more of the many grants available to assist lake organizations and governmental units in lake management planning. A small-scale ($3,000 maximum) lake planning grant is a good place to start and can be used to develop a scope of study and possibly complete the initial resource appraisal. From there a series of $10,000 grants (up to $100,000 total) can be phased to complete and maintain your plan.

How will the planning process be managed?

A planning advisory committee is often formed of a diverse cross-section of your lake neighborhood, including businesses, lake users, agency staff, and local government people. This committee can be broken into subcommittees assigned to specific tasks. The size of the group will often be in direct proportion to the size of the lake community. Collect facts on which to base your decisions. Schedule convenient times and locations for meetings, and prepare a calendar of milestones for each step in the planning process to help keep the effort on track. Keep in mind that the process will require persistence and compromise.

Project scoping goes hand in hand with the first phase of a lake management plan, which is a resource appraisal. The appraisal will include a characterization of the lake's natural resource condition, a description of the perceived problems or management needs and a listing of management goals. The appraisal determines the level of detail and the type of plan to seek in subsequent phases.

Types of lake management plans

Lake plans can be categorized generally into three types: single purpose plans, current issue plans and comprehensive plans.

Single purpose plans address one issue of concern to a community. These may include aquatic plant management plans, recreational boating plans, and public access plans. Frequently, such plans will help a community to access grant funds or respond to a specific legal requirement.

Current issue plans focus on issues of immediate concern to a community. These issues may span a range of topics, including stormwater management, yard care and shoreland management, and fisheries management, for example. These plans have the advantage of being readily implemented once agreement on proposed action has been achieved.

Comprehensive lake management plans cover a 10 to 20-year time frame, deal with multiple issues of concern, and include forecasting the future condition of the lake to help identify likely future concerns that may not presently exist. Comprehensive plans generally include a water quality modeling component linked to land use and will incorporate single purpose or current issue plans as elements or subchapters, with each element often having been a phase in the plan development.

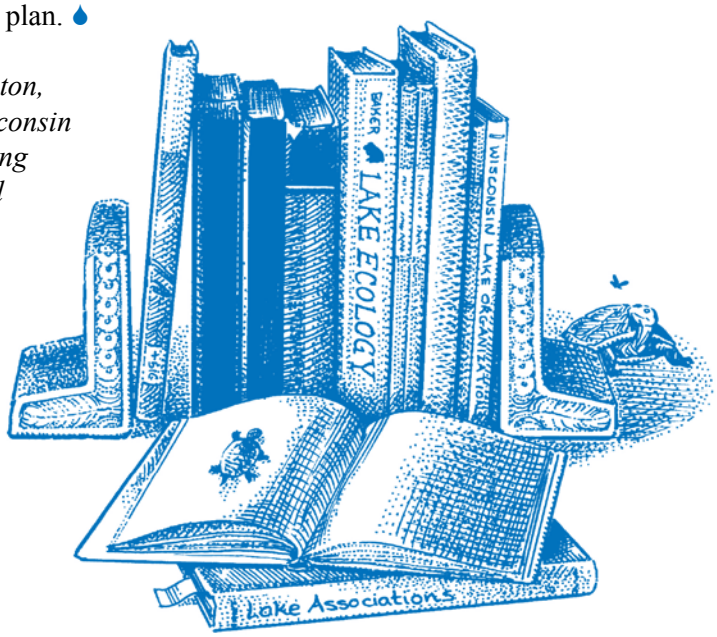
No one type of plan will meet the needs of every community.

The type of plan and how far you go will depend upon the goals established for the planning process. The costs associated with each type of plan increase proportionate to the amount of information needed and the complexity of the issues being covered. Not every lake will require costly or sophisticated plans, and no one type of plan will meet the needs of every community. It is for this reason that the scoping exercise is a critical element of the planning process.

Embarking upon the development of a lake plan is an exciting time; however, it is just a beginning. Even after the plan is complete, you will just be at the starting point for action. Your plan is a living document. It will help you build consensus among stakeholders while conserving the lake as well as your finances by providing concrete direction. Knowing the goals will allow you to effectively contract for lake services and communicate your community's "vision" to others.

In the next issue of *Lake Tides*, we will look at ways and means of obtaining assistance in developing your plan.

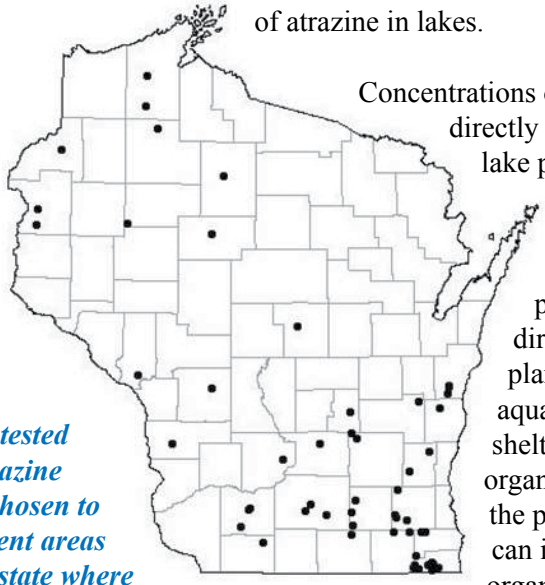
by Jeffrey Thornton, Southestern Wisconsin Regional Planning Commission and Carroll Schaal, Wisconsin Department of Natural Resources



Volunteer Monitoring of Atrazine in Wisconsin Lakes

What is atrazine?

Atrazine is a common pesticide or weed-killer that is used almost everywhere in the United States, mainly on cornfields before the crops are planted. In Wisconsin, atrazine is applied to almost four million acres of farmland each year. Because of its frequency of use, it should come as no surprise that atrazine is also one of the most commonly detected pesticides in Wisconsin rivers, streams, and groundwater. However, little is known about the occurrence and persistence of atrazine in lakes.



Lakes tested for atrazine were chosen to represent areas of the state where both commercial forest land and more traditional row crop agriculture are prevalent.

Concentrations of atrazine can directly and indirectly affect lake plants and animals. As a chemical designed to inhibit photosynthesis in plants, atrazine may directly affect aquatic plants. Because aquatic plants provide shelter to many other organisms, changes in the plant community can indirectly affect organisms living in the mud or the plankton living in the water column. Studies have shown that low levels of atrazine can decrease zooplankton diversity, change the ratios of male organisms to females in zooplankton populations, or change the ratio of predators to their prey. Changes in the types of organisms normally present in a lake on a seasonal basis have also been noticed. Once in a lake, atrazine may hang around for a very long time. Baseline data is needed to assess potential problems and understand the movement and fate of atrazine and similar pesticides in lake environments.

In lakes that stratify, the levels of atrazine at the surface are usually lower than the levels found in bottom water. There seems to be two main reasons for this phenomenon: atrazine can break down in the presence of sunlight and atrazine can accumulate in lake sediment where it is released to the water column under low oxygen conditions common in late summer.

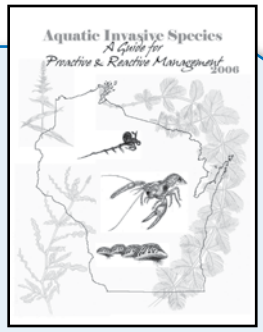
Atrazine lake survey

In 2005, the Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP) and the Wisconsin Department of Natural Resources (DNR) combined their efforts to survey atrazine levels in lakes across the state. DATCP funded the survey and DNR provided the help of volunteers through the Citizen Lake Monitoring Network. Lakes tested for atrazine were chosen to represent areas of the state where both commercial forest land and more traditional row crop agriculture are prevalent. Lake monitoring volunteers collected water samples from 53 lakes during a short period in late summer.

Aquatic Invasive Species

A Guide for Proactive and Reactive Management

A new publication is available for people looking for information on contending with invasive species in a lake. While it was written for Vilas County, most information is applicable statewide. It can be found online at www.uwsp.edu/cnr/uwexlakes/ecology.



Preliminary findings

The intensity of land use surrounding the lakes varied from less than 15% to over 75% agriculture. Data were analyzed for significant differences in the mean atrazine concentration of the lakes under five different agricultural land use settings. Atrazine was detected in over 90% of the lakes. In contrast, during a statewide groundwater survey by DATCP in 2001, atrazine or atrazine breakdown products were found in less than 12% of the 336 private wells they sampled.

While most lakes had some level of atrazine, differences in concentrations were found between lakes surrounded by varying degrees of agricultural land use. Lakes where atrazine was low or absent were primarily located in forested areas, whereas lakes higher in atrazine were found where agriculture comprised over 75% of the surrounding land area. Atrazine concentrations ranged from below the detection limit of the test (0.10 ug/L) to 0.40 ug/L. To put these numbers in perspective, the drinking water standard for atrazine is 3.0 ug/L and the preventive action limit is 0.30 ug/L (Wisconsin Administrative Code NR 140). The United States Environmental Protection Agency (EPA) also recently published a draft water quality criteria of 12.0 ug/L for atrazine which is supposed to protect aquatic organisms from exposure to the chemical. However, some studies suggest that these numbers are higher than concentrations that can cause both direct and indirect affects on plants and animals living in the lake, including amphibians. Also, atrazine rarely occurs alone but is found in complex chemical mixtures. Criteria are based on individual compounds in water; sediment levels are not even considered.

What's next?

The test used for this survey is simple and low cost and can easily be incorporated into any lake monitoring project. It can provide an indication of the potential affects of agriculture on lakes. The results of this survey suggest that low levels of atrazine are everywhere. Concentrations around 0.10 ug/L can be considered background for Wisconsin lakes. Where agriculture exceeds 15% of the land surrounding a lake, particularly if within 300 feet, atrazine will likely be found at higher than these background levels and may also be accumulating in sediments. In such cases, testing water from above and below the zone of light penetration and testing lake sediment might be considered. Atrazine testing of lakes and sediment should be encouraged because so little is known about the fate of atrazine in lakes.

Thank you, volunteers!

In this small survey, we sampled only 53 of the 15,000 lakes that exist in Wisconsin. However, without volunteers, lake surveys such as this are virtually impossible. A small research crew can not sample this many widely-spaced lakes in the time necessary for such a project. Due to Wisconsin volunteers, some important baseline lake data on one of the most commonly used pesticides was collected and we have a beginning to a better understanding of the effects of atrazine on lake ecosystems.

By Paula Allen, Pg.D., PG, Formerly with Department of Agriculture, Trade and Consumer Protection

Nominate a Local Lake Steward

Do you know an outstanding person or group who dedicates time and talent to our state's water resources? We encourage you to nominate them for the prestigious Wisconsin Lake Stewardship Award. The categories are:

- Individual citizen
- Organized group
- Youth group
- Public official or employee
- Business

The nomination deadline is March 16, 2007. Recipients and all nominees will be recognized at the Wisconsin Lakes Convention, April 26-28. An online nomination form is available at www.uwsp.edu/uwexlakes/conventions. For more information call the Wisconsin Association of Lakes at 608/662-0923.

Collecting Credible Data

A common concern with anyone collecting data, whether it is a seasoned researcher or a volunteer citizen, is making sure the data that is collected is accurate.

At the recently held National Volunteer Monitoring Conference, expert researchers stressed the importance of collecting consistent information. In order to accurately compare historical water clarity readings and readings from lake to lake, volunteers should consistently use the same method.

The Wisconsin Citizen Lake Monitoring Network (CLMN) outlines specific methods for taking secchi disk readings in the volunteer monitoring manual, including:

- Always take secchi disk readings on the shady side of the boat
- Take your readings without wearing sunglasses (different sunglasses, especially polarized lenses, will change how far down a person can see a secchi disk in the water)
- Use the "clothespin method" to mark the rope when the secchi disk disappears from view as it is lowered down, and then reappears as it is raised back up. Average the two readings.

Volunteer groups in some states take 3-4 secchi readings in succession and report the average. This provides even more credible data.

The CLMN will be launching a Quality Assurance/Quality Control study where volunteers will take secchi readings following the current protocol and also following other protocols. The study will help quantify factors that truly affect readings and determine potential sources of error.

If you would like to be involved in the study, or would like to learn more about the CLMN, contact Laura Herman, Lake Monitoring Network Educator, at 715-365-8998 or laura.herman@uwsp.edu.

Attention Lake Organizations!

Did you recently change officers? Please send us the new officer contact information to update the *Lake List*, your online directory of lake organizations. If you publish a newsletter, please add us to the mailing list! Email uwexlakes@uwsp.edu or send information to:

UWEX-Lakes Program
UWSP College of Natural Resources
800 Reserve Street
Stevens Point, WI

The *Lake List* is a searchable, online directory of Wisconsin's lake organizations and the businesses who serve them.

www.uwsp.edu/cnr/uwexlakes/lakelist

Q&A Lake Districts

We often get phone calls and emails from Lake Tides *readers with a variety of questions about lake districts. Do you have a question about lake districts that you would like to see answered in* Lake Tides? *Send it to uwexlakes@uwsp.edu so we can include it in a future issue.*

Q: What is a Special Meeting and how is it different from the Annual Meeting?

A: Like the Annual Meeting, a Special Meeting is a meeting of the electors (resident voters) and property owners of a Lake District. Special Meetings are usually called when there is additional business to conduct that could not be accomplished at the Annual Meeting.

A Special Meeting may be called at any time by a majority of the board of commissioners, or by request from 10% of the eligible voting members of the district.

Special Meetings are similar to Annual Meetings, with the following notable exceptions:

- the annual budget may not be approved at a Special Meeting (but the budget can be amended, as long as it does not impact the tax levy approved at the Annual Meeting).
- dissolution of a lake district may not be considered.
- the meeting can not consider any matter resolved during another Special Meeting that has been held since the previous Annual Meeting.

Notice and voting requirements are the same for Annual and Special Meetings.

CALENDAR

August 18-19, 2006 – Hear the Currents: Connecting with our Rivers. Lac Courte Oreilles College, Hayward. For information, visit http://basineducation.uwex.edu/ (Click on Events) or contact Kris Tiles at 715/762-0036 or kris.tiles@ces.uwex.edu.

September 7-9, 2006 – The Changing Landscapes of Minnesota's Waters. Duluth Entertainment and Convention Center, Duluth, MN. For information, see www.mnwaters.org.

September 27-30, 2006 – Forestry in the Headwaters: Protecting Water Through Excellent Forestry. Forest Guild Annual Meeting and Conference. Boulder Junction. For information, see www.forestguild.org.

October 10-14, 2006 – North American Association for Environmental Education 2006 Conference. Gathering at the Headwaters: Building EE in Society. Crowne Plaza Saint Paul Riverfront Hotel, St. Paul, MN. For information, see www.naaee.org.

October 26-28, 2006 – Wisconsin Association for Environmental Education (WAEE) Fall Conference. The Great Lakes: Where Woods Meets Waters. Wisconsin Maritime Museum and the Inn on Maritime Bay, Manitowoc. For information, see www.uwsp.edu/cnr/waee or contact Carol Weston at waee@uwsp.edu or 715/346-2796.

November 8-10, 2006 – North American Lakes Management Society (NALMS) 2006 International Symposium. Making Connections: People, Lakes, Watersheds. Crowne Plaza and Historic Union Station, Indianapolis, IN. For information, see www.nalms.org.

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Reflections

When the well's dry, we know the worth of water.

- Benjamin Franklin