Lake Tide
The newsletter for people interested in Wisconsin lakes

The Invisible Fish

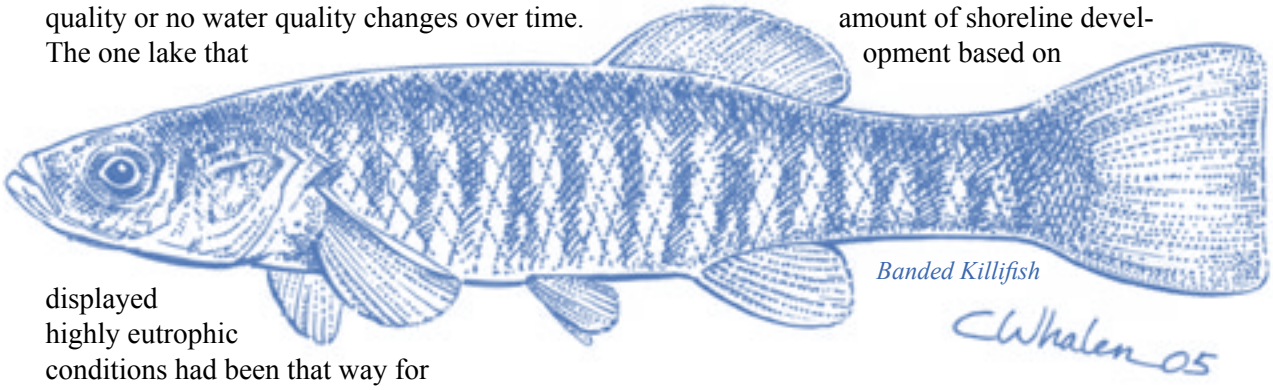
Small Fish As Bio-indicators

Many of the changes to our aquatic environment are invisible. They are caused by everyday actions, habits, traditions and routines. Resulting changes are slow, unnoticed, and unremarkable. When a change starts with the disappearance of small, overlooked creatures, it is only observed by those who are really looking.

The diversity of native fishes and the presence of environmentally-sensitive fish are good indicators of a lake's condition. Small colorful fish that live along shorelines are important members of lake food webs but are usually invisible in the management of lakes. Many of these small fishes are more sensitive to environmental changes than popular sport fish. Declines of small darters, topminnows and minnows can reveal problems in lakes before game fish growth rates and abundance are affected.

In 2004, DNR biologists sampled 13 lakes in southeast Wisconsin that had good water quality or no water quality changes over time. The one lake that displayed highly eutrophic conditions had been that way for decades. All 13 lakes were previously sampled as part of the Fish Distribution Study from 1974 to 1980. By re-sampling lakes with no water quality changes over time, the status of native species or environmentally-sensitive near-shore species may reflect other environmental factors. The 2004 lake surveys replicated the original surveys using the same sampling gear (small mesh seines), locations and sampling effort. In addition to fish sampling, piers were counted in an effort to characterize extent of shoreline development on each lake.

Results of the 2004 surveys revealed statistically significant declines in numbers of both native species and environmentally-sensitive near-shore species. The findings revealed declines for both species groupings in 11 of the 13 lakes. The lake with the poorest water quality, the only eutrophic lake of the 13, actually supported the highest numbers of both native species and environmentally sensitive species in 2004. The eutrophic lake also had the lowest amount of shoreline development based on the pier density surveys. Comparing the 2004 lake data sets alone, the numbers of native fishes and environmentally-sensitive fishes declined as pier densities increased.



Banded Killifish

What does the inverse relationship between pier densities and fish diversity mean? First of all, water quality is eliminated as a factor

(Continued on page 2)

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Wisconsin Lakes Partnership

(The Invisible Fish, cont.)

Provided by David Marshall

Can you find the least darter?

based on the types of lakes sampled and collective data results. Declines of several habitat-sensitive species suggest shoreline habitat changes. In one of the lakes, pier numbers tripled from 1950 to 1996. Shoreline development can assume many forms including piers, shoreline armoring, suburbanized landscaped shores, powerboat scour, and mechanical or chemical aquatic plant removal. Species such as least darters, pugnose shiners, blacknose shiners and banded killifish are sensitive to aquatic vegetation loss. Their declines may reflect aquatic vegetation loss from the cumulative effects from numerous types of development.

Small fish declines may reflect aquatic vegetation loss from the cumulative effects of numerous types of development.

Piers providing public and private access to public waters are the most common form of shoreline development. Piers can alter habitat by directly shading out aquatic plants underneath. Activities around piers such as motorboat mooring and scour can expand the loss of aquatic plant habitat beyond the shaded zone. Both direct shading effects and indirect effects of powerboat scour have been reported from studies conducted in the eastern U.S.

In 2004, DNR biologists monitored the shading effects at 26 piers from two of the 13 survey lakes. Sampling design included submersible light measurements, shaded and unshaded aquatic plant sampling, aquatic invertebrate sampling and minnow trap surveys. Results were consistent with previous studies that documented loss or reduction of aquatic plant habitat due to shading under piers. The study also revealed a reduction of aquatic invertebrates that coincided with reduced plant growth while juvenile sunfishes were significantly more numerous within aquatic vegetation than under piers. The near-shore fish study will continue with detailed map analysis to determine if land use changes correlate with native fish diversity.

Enjoying our time at the lake is a privilege that is filled with fun and joy but comes with some responsibilities. It is becoming more and more apparent that what we do on the lake can cause positive or negative change. These signs of change may be asking us: What price are we willing to let other species pay for our pleasure?

By Dave Marshall, WDNR Water Resources Management Specialist, Fitchburg

What's the Latest About Piers?

DNR continues to work on revising NR 326, the state's pier rules, in response to 2004 legislative changes. DNR habitat protection staff are evaluating comments from over 300 citizens and organizations, and will use them to develop a final proposal for consideration by the Natural Resources Board. The rules must be approved by the board and by lawmakers before they go into effect, not likely until late 2005.

Most piers do not need a DNR waterway permit under the new law. An updated Pier Planner brochure available from DNR explains how to design and locate a pier that meets the law, avoids needing a permit and minimizes environmental harm. Piers do not need a permit if they are no more than 6 feet wide, are only as long as you need to dock your boat or reach a water depth of 3 feet, and have no more than two boat slips for the first 50 feet of frontage and one slip for every additional 50 feet of frontage. Piers exceeding these dimensions must get a one-time, individual waterway permit and review from DNR. When the proposed permanent rules are completed, other quicker, less expensive permit options will be available for some larger piers. Until those permanent rules are in place, people with existing larger piers can continue to install them as before, while anyone seeking to install a new larger pier for the first time must seek a DNR individual permit. More information and the updated Pier Planner are available on DNR's website at http://dnr.wi.gov/org/water/fhp/waterway/piers.shtml.

Revised Shoreland Zoning Standards

The state is releasing a draft proposal that updates 35-year-old rules governing waterfront development and reflects two years of citizen advisory committee meetings, eight listening sessions and thousands of public comments.

Todd Ambs, top water official for the Department of Natural Resources, says the proposal gives landowners significantly more flexibility on their waterfront but upholds the state's Constitutional responsibility to protect the lakes and rivers that belong to all Wisconsin citizens.

The new NR 115 will give increased flexibility to landowners and better protection to public waters.

It outlines changes to Chapter NR 115 of the Wisconsin Administrative Code, which generally sets statewide minimum standards in unincorporated areas for lot sizes, how far buildings need to be set back from the water, limits on cutting trees and plants, and other rules intended to protect water quality, fish and wildlife habitat, and natural scenic beauty. The proposal represents the sixth individual draft DNR has developed in response to advisory committee and public comments.

Under this proposal, requirements for minimum lot sizes for single family homes and the building "setback" of 75 feet would remain the same. Where the current rule limits alterations, additions or major repairs to 50 percent of the structure's current equalized assessed value over the life of the structure, the proposal eliminates that 50 percent rule.

It significantly increases flexibility on repairing, rebuilding, and even expanding existing structures that are closer to the water than the current setback requirement. Property owners making major changes to a nonconforming structure would be required to take steps to mitigate or offset the impact of their actions on clean water and habitat in the portion of their property right next to the water, called the primary buffer.

When owners of nonconforming structures start a building project that requires a building permit or some other county permit, they would be required to take actions to mitigate the potential impacts of their project on the primary buffer. They would have to restore native vegetation within the 35-foot primary buffer; get their septic system inspected and upgraded if necessary; develop an erosion control plan, and control for the impact of the hard or "impervious" surfaces on their property that contribute to runoff. They may also be required to remove accessory structures within the 35-foot primary buffer that do not have an exemption.

The net result of the proposed changes to NR 115 is that over time, more primary buffers will be restored with native plants and trees that can do a better job of filtering pollution and providing habitat.

To view the draft proposal, and all of the other materials that the advisory committee and DNR have reviewed and developed since starting the revision process in fall 2002, go to DNR's Web site: http://dnr.wi.gov, and use the drop down topic menu and select "shoreland management."

Night Bowfishing
Some People Are Carping About It

'Twas the night before Independence Day and out on the water,
not a creature was stirring, not even an otter.
The fish poles were set by the screen door with care
in hopes that a lunker soon would be there.

The children were crashed on the cots in their rooms,
While they dreamt of fireworks and all the big booms.
And mom and I with sparklers, ready for the 4th,
Had just settled down from the long drive 'Up North.'

When out on the lake there arose such a roar,
I ran to the pier; I'd never heard it before.
The din of a generator was filling the night,
Joined by loud voices and a very bright light.

Does the above scenario sound familiar? A new twist on the sport of bowfishing, night bowfishing, is coming up on some people's radar screens. The question seems to be: Is it an aggravation or a great way for people to take part in a sport that can lessen the population of a nuisance fish?

In 1999 state laws changed to allow bowfishing with lights at night.

Bowfishing of rough fish (carp) during daylight hours has been legal in Wisconsin for many years. In 1999 state laws changed to allow bowfishing with lights at night. Darkness makes it easier to find, see and get close enough to carp to shoot them with a bow and arrow. Night bowfishers also feel there is less competition for space at night, compared with the more traditional daytime uses of a lake such as water skiing, swimming and angling. Nighttime harvests typically far outweigh daytime kills. On an average night a skilled bowfisher may shoot 200-300 carp. At 5-20 pounds a piece, that's a lot of carp! A buffalo fish (sometimes called carp) can weigh up to 69 pounds.

Carp are the primary target for bowfishing. In most waters, carp are considered a nuisance species that can have an adverse impact on water quality, aquatic plants and other fish species. While bowfishing certainly removes carp from a waterbody, it rarely puts much of a dent in reducing a lake's total carp population.

State law requires that any fish shot with an arrow must be taken out of the water and disposed of properly. Bowfishers arrange for carp disposal before they go out. Carp are used for gardens, composting or sometimes food.

Bowfishers formed the Wisconsin Bowfishing Association in 2000, shortly after the law allowing night bowfishing was passed. This organization supports bowfishing enthusiasts and also sponsors night bowfishing tournaments. Participation in the activity is still very small; less than 500 people have tried night bowfishing in Wisconsin.

Boats are typically used and must be wide enough to provide a stable platform. According to Matt Harris, President of the Wisconsin Bowfishing Association, bowfishers can spend anywhere from $1,000 to $50,000 on a boat outfitted with the needed equipment such as generators and lights, but generally spend between $5,000 and $12,000. A trolling motor helps them maneuver in shallow water. A new trend is the use of "airboats" (those we typically associate with the Everglades) which use motors to power propellers above water,

mounted in the stern. These boats can operate easily in shallow water, but some people are concerned about the noise they make.

The issue seems to be less the taking of carp and more the concern over the noise and lights. Some boats light the water with 250-500 watt halogen lights, which can reflect off the water. These lights are powered by generators that can be noisy and people may need to speak in a loud voice to be heard over the noise. Because sound carries so easily across the water, these noises may bother some lake residents.

Provided by Wisconsin Bowfishing Association

Two bigmouth buffaloes taken at the 2003 WBA State Tournament

Other issues are the potential disturbing of spring spawning of musky and northern and the number of bowfishers. A common way for night bowfishers to operate is in a tournament setting. During tournaments in Wisconsin, up to 50 teams have competed to see who can shoot the most carp. As many as 3000 carp have been taken in a given night.

Sometimes lake organizations see bowfishing as a great way to reduce unwanted carp and encourage bowfishing. Lake organizations on large shallow lakes with sizeable carp populations such as Beaver Dam Lake and Petenwell/Castlerock may sponsor tournaments and even pay a small "bounty" per carp.

Currently, night fishing with bow and arrow is limited to 53 lakes in Wisconsin. A new bill was recently introduced by Senators Zien, Brown, Reynolds and Grothman (Senate Bill 158) which would open up more waters of the state to bowfishing.

Conflicts can occur when public waters and private lands come together.

Conflicts can occur when public waters and private lands come together. Some property owners have complained of their peace being disturbed by night bowfishers. The Wisconsin Bowfishing Association contends they are doing a service by removing the nuisance fish and that any trouble in their sport comes from a minority of the participants. The association polices their own sport. Most bowfishers try to stay away from developed areas and may attempt to finish their hunting by a reasonable hour when most folks would still be awake and common household noises like TVs would cover some of the sounds.

Bowfishing is another example of the proliferation in quantity and variety of water recreation experiences. If this sport grows at the pace that some predict, there may be more bowfishing on more waterways. Like so many recreational lake uses, solutions to conflicts will likely involve compromises, such as time and space limits.

For more information about SB 158, contact your state legislator, or go to www.legis.state.wi.us/2005/data/SB158hst.html. For a list of which lakes can be bowfished or more information about the Wisconsin Bowfishing Association, go to www.wibfa.com.

Aeration
Destratifying the Myths

For the past few decades, aeration has been used in lakes in an attempt to cure a whole host of ailments. However, reality sometimes falls short of the expectations. Aeration can be an effective tool for some lake management objectives, but not all lakes and lake issues are the same, and neither is the use of aeration as a management technique. Once you understand your lake's symptoms you can better determine if aeration is right for your lake. Let's look at three lake management concerns where aeration is considered as a management tool.

Fish Kills

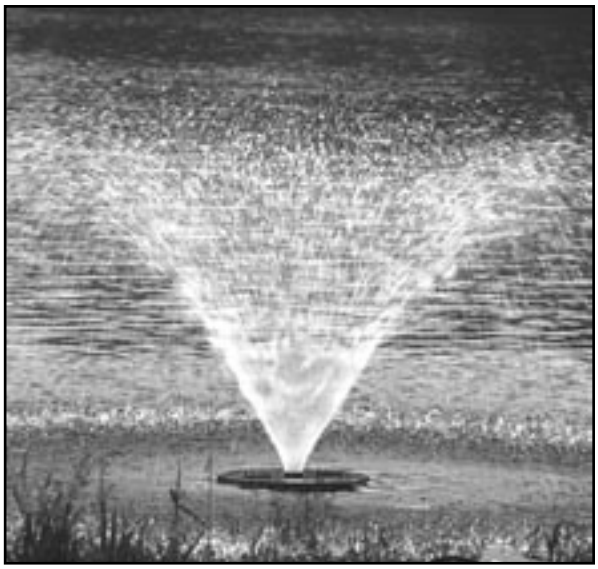
Using aeration on "freeze out" lakes can be a tool if, in fact, there are fish kills from a lack of Dissolved Oxygen (DO). Ice cover on some lakes (usually shallow and small lakes) can get so thick that the volume of water for certain fish species is too small to hold the necessary DO levels to sustain life through the winter. In those cases fish actually suffocate and in the spring, the victims can be seen floating or washed up on shore. An aerator can help increase DO levels to some degree. This is achieved by adding DO directly to the water column or by maintaining open areas in the ice where gas exchange with the atmosphere can occur, which keeps sufficient oxygen in the lake. One concern to keep in mind is the question of safety. Aeration keeps ice from freezing, so making sure the open water area is properly marked as a thin ice area is vital.

Aeration can be used to prevent a lake from stratifying, thereby eliminating an anoxic, nutrient-rich hypolimnion.

Destratification

Another way aeration can be employed is during the summer to mix water in the lake through a technique called "destratification." Air is pumped through a network of perforated pipes to generate air bubbles. The air bubbles are not necessarily needed for adding DO but they act as a mechanism to erode a layering effect in the water column caused by different water temperatures. The border between the layers is called the thermocline. As some lakes stratify, the bottom layer (hypolimnion) becomes anoxic (low DO) because it does not mix with the oxygen-rich upper layer of water (epilimnion). The hypolimnion changes to a chemically reduced state and there is much less oxygen in this bottom layer than in the upper layer. Dissolved oxygen levels can be so low that fish cannot survive for long and because of the reduced chemical state, nutrients are released from the sediments back into the water.

While some lakes stratify annually, others that are not as deep may weakly stratify temporarily, only to have a windy day mix it all up again. Lake managers call this condition polymictic. When a lake weakly stratifies and the hypolimnion begins to release nutrients, a strong wind can break the weak thermocline that separates the layers and re-circulate those nutrients back into the water column. Nutrients like phosphorus are now available and can cause algae to bloom. In these cases, aeration can be used to prevent a lake from stratifying, thereby eliminating an anoxic, nutrient-rich hypolimnion.



Does this mean that all lakes that stratify should use aeration to break up the thermocline? No… Stratifying is a perfectly normal process in deep lakes. However, some

lakes have increased nutrient loads due to human activities. The combination of excess nutrients and a polymictic lake can create a "nutrient pump" condition.

Aeration in this situation may be a management tool, but consult with your local lake coordinator and other unbiased professionals before pursuing this technique. This type of aeration has been employed in some Wisconsin lakes and has been successful. However, a project of this size takes careful planning and sampling to assure adequate aeration is occurring. It is possible to create zones of anoxic water that are continuously supplying nutrients even when the air pumps are running!

Decreasing sediments

Using aeration to decrease organic matter ("eat muck") is sometimes attempted and often unsuccessful. To date, very little research supports aeration as an effective means to decrease muck in the lake bottom. Research and anecdotal evidence shows that aeration works to break down organic matter in some cases. Wastewater treatment plants, where influent water is very rich in organic compounds, can have up to a 1000 times more Biochemical Oxygen Demand (BOD) than lakes. With that much BOD (which comes from organic matter), adding oxygen will increase bacteria which in turn break down organic matter. The wastewater industry has taken advantage of aeration to significantly reduce the organic matter in wastewater. Even with all the aerators working, treatment lagoons still accumulate sludge in the bottom.

Using aeration in a wastewater setting works, but using it in a lake to decrease organic matter (muck) doesn't always work. Research by Engstrom and Wright (2002) summarized that there is "...no evidence that aeration has enhanced the oxidation of organic matter." Despite a lack of evidence, some lakes still use aeration to attempt to reduce muck and cite an actual increase in depth near the aerators. It's important to remember that muck is very fine and can be easily re-suspended. In these situations, the question to ask is: Was the increase in depth due to oxidation (was the muck eaten by bacteria?) or did the sediments get redistributed (blown away) only to reach the bottom someplace else?

Take a look at the sources of nutrients and organic matter in your lake. Aeration can be a tool to employ on some lakes, but many things need to be considered. First define the objective and decide if it is worth the expense, then consult with many people to see if the application is right for your lake.

Aeration can be a tool to employ on some lakes, but many things need to be considered.

by Scott Provost, Water Resources Specialist, WDNR, Wautoma

Engstrom, D.R. and Wright, D.I. 2002. Sedimentological Effects of Aeration-Induced Lake Circulation. Lake and Reservoir Management 18(3): 201-214. North American Lake Management Society.

APM Online

Understanding the role of aquatic plants in the ecology of your lake is a cornerstone to developing a sound lake management plan. Aquatic plants are as central to our lakes and rivers as the trees are to the forest. Loss or major changes in the make-up of aquatic plant communities can cause an unmendable tear in the fabric of a water body's aquatic ecology. The Aquatic Plant Management (APM) guide is designed to help you navigate through the world of APM in Wisconsin, including understanding laws and permits, planning, control strategies, and where to go for assistance.

A draft of the APM guide can be downloaded at www.uwsp.edu/cnr/uwexlakes/ecology/APMguide.asp. Comments on the draft guide are welcomed.

Holey Moley!

Star-nosed Mole Lives by Lakes

On the banks of lakes, streams and ponds, and in wet meadows and marshes, lives a tiny, furry creature whose name you may have heard, but most likely have never seen. The creature is 6 to 8 inches long and weighs a mere one or two ounces. It has short, brown, dense fur and a long, scaly tail that is covered with coarse hair. It's a star-nosed mole (*Condylura cristata*), and its remarkable nose makes it very unique.

The little star-nosed mole has perhaps the best sense of touch of any mammal.

While humans use their nose primarily for the sense of smell, the star-nosed mole uses it to touch things. The little star-nosed mole has perhaps the best sense of touch of any mammal. While "star-nose" might make you think of a nose with five points, in actuality its hairless nose is ringed by 22 pink, fleshy tentacles. There are 11 of these short tentacles on each side that make up the star. Each tentacle is covered with tiny bumps called Eimer's organs. Each Eimer's organ has three types of sensors, two of which are found in the skin of other mammals. The third type of sensor is unique to the star-nosed mole. This third sensor is thought to give the mole the ability to identify objects by their microscopic texture. The star possesses over 25,000 Eimer's organs in a space less than 1 square centimeter, making it incredibly sensitive.

The tentacles at the bottom of the star have the greatest density of Eimer's organs, and are probably used to identify prey. The star-nosed mole, being a burrowing animal and a carnivore, eats worms and insects. It prefers, however, to hunt aquatic prey such as leeches or dragonfly and caddisfly larvae, among other aquatic macroinvertebrates. The mole will occasionally take crustaceans, mollusks and small fish. A star-nosed mole finds prey by feeling its surroundings with the tentacles on its nose. The tentacles move so rapidly they appear to us as a blur of motion, touching up to 12 objects in one second. When the mole encounters a possible food item, it focuses the lowest, shortest, most sensitive tentacles on the prey. Using these supersensitive organs, the mole can identify the prey in under half a second. If the encountered item promises to be a tasty treat, the mole will put its 44 sharp and pointy teeth to work.

Like many other moles, the star-nosed mole digs networks of tunnels through moist soil. Although they do spend more time on the actual surface than other moles, when they burrow the tunnels are often deep enough to be hidden from our eyes. Occasionally they

will dig close enough to the surface to cause a raised ridge to appear. When the soil from these ridges pushes out to the surface, we find "molehills." Unlike other moles, however, the star-nosed is semiaquatic, so its tunnels may open under the surface of a stream or lake. The little mole with big paddle-like front feet is a good swimmer, using its front and hind feet to move through the water with a characteristic zig-zag motion. It will even swim under the ice, as the star-nosed mole is active and foraging all winter long.

This time of year, baby moles are being born. Although not much is known about how the star-nosed mole goes courting, it does seem that males and females pair up as early as autumn and remain together throughout winter and into the mating season of March and April. (They are monogamous for this time, but may find new mates for the next breeding season.) They build a nest in a tunnel above the high water line, lining the nest with leaves and other vegetation. Between April and June, an average of five young are born in a litter. The little ones fend for themselves after three weeks, and are ready to raise their own baby moles by the following spring.

The star-nosed mole prefers to hunt aquatic prey such as leeches or dragonfly and caddisfly larvae, among other aquatic macro-invertebrates.

While this reproductive lifestyle sounds like it could lead to a lot of moles in little time, mole population is kept in check by predators. Since it spends time underwater as well as above ground, the star-nosed mole is vulnerable to many types of predators. From the air, owls hunt moles by night, and hawks search for them by day. Skunks, weasels, and fishers, as well as domestic dogs and cats, pose a threat on the ground. Underwater, the bullfrog and large-mouth bass find moles to be a good lunch. The mink, who is also semiaquatic, hunts moles both on land and in water. Besides providing a food source for many animals in wetland ecosystems, the star-nosed mole makes a good citizen by providing aeration to the roots of plants through its tunneling activities.

Next time you find that molehill in your yard, think of the little star-nosed mole, master of touch, going about his life in and around the lake. His tentacled nose might make him less than cute and cuddly, but he makes an important contribution to the overall health of his, and your, ecosystem.

By Mary Pardee, Lake Education Specialist, UW-Extension Lakes Program

Water in Our Veins: Celebrating Lake Volunteers

Over 500 people gathered in Green Bay this past April for the 2005 Wisconsin Lakes Convention to discuss the issues that face our water resources today. Many of the discussions focused on the theme of volunteerism and leadership, as citizen efforts such as water quality monitoring are becoming increasingly important to our state's natural resources.

Peter Murray, Executive Director, Wisconsin Association of Lakes, congratulates the Liberty Go-Getters 4-H Club while Jeff Bode, Wisconsin DNR, looks on.

Governor Jim Doyle joined the attendees to discuss the importance of conserving lakes and other resources, as did Attorney General Peg Lautenschlager, State Representative Scott Gunderson, and DNR Secretary Scott Hassett. Dave Jones from StormCenter Communications, Inc. showed examples of ways that the media can deliver educational information about the environment. The packed agenda included over 100 speakers, with 56 concurrent sessions to choose from and many exhibits to peruse.

The Wisconsin Lakes Partnership congratulates the following winners of the 2005 Lakes Stewardship Awards:
Lifetime Achievement – Elmer Goetsch
Public Service – Patrick "Buzz" Sorge
Individual – Sandy & Fred Anderson, and Wayne Towne
Youth – Liberty Go-Getters 4-H Club
Group – Pike Lake Chain of Lakes Association

Mark your calendars for the 28th annual Wisconsin Lakes Convention to be held in Green Bay, April 20-22, 2006.

Celebrating a Retirement

After 31 years of working for the Wisconsin University System, Sally Marchel Handrich is retiring! Sally has served as the office manager for the UWEX-Lakes office for the past two years. Before she came to us, she worked 23 years for UW-Extension in Madison and six years in another UW-Stevens Point department.

While Sally will miss working with the Lake Leaders Institute, the Wisconsin Lakes Convention, and lake organization volunteers, she has many plans. Her gardens will be featured in the Waupaca area Garden Walk & Art Stroll, scheduled for June 25. Of the 180 varieties of hosta she grows, Sally's favorite is called "guacamole."

Besides spending more time with her gardens and family, which includes two dogs and three cats, Sally has plans to travel to Pennsylvania, Arizona and Jamaica this year. We will miss her, but wish her the best of luck and lots of fun in a well-deserved retirement!

Contact information for the businesses and organizations that exhibited at the 2005 Wisconsin Lakes Convention:

A. W. Research Laboratories, Inc.
218/829-7974, www.awlab.com

Ag Systems
800/523-2350, www.agsystemsonline.com

American Excelsior Company-Earth Science Division
630/978-2867, www.curlex.com

Applied Biochemists
608/524-4014, www.appliedbiochemists.com

Aquamarine, 262/547-0211

Aquarius Systems
262/392-2162, www.aquarius-systems.com

Aquatic Biologists, Inc.
920/921-6827, www.AquaticBiologists.com

Aquatic Engineering, Inc.
608/781-8770, www.aquaticengineering.org

Aron & Associates, 262/514-3234

Ayres Associates
715/834-3161, www.AyresAssociates.com

Barr Engineering Company
952/832-2810, www.barr.com

Cedar Corporation
715/235-9081, www.cedarcorp.com

Cerexagri, Inc., 608/798-3922, www.cerexagri.com

Construction Fabrics & Materials
608/839-8031, www.cfmwi.com

Crane Landscape & Design - Environmental Concepts
262/889-8802, www.cranelandscape.com

Earth & Road Corporation
608/592-3355, www.earthandroad.com

Eco-Building & Forestry, LLC
715/344-2817, www.eco-buildingandforestry.com

Environmental Horizons, Inc.
262/598-0597, www.environmentalhorizons.com

EnviroScience, Inc.
800/940-4025, www.enviroscienceinc.com

Foth & Van Dyke and Associates, Inc.
920/497-2500, www.foth.com

Hach Environmental
616/554-1127, www.hachenvironmental.com

Hey and Associates, Inc.
262/796-0440, www.heyassoc.com

In-Situ, Inc., 800/446-7488 Ext. 651

J. F. New & Associates, Inc.
608/240-1453, www.jfnew.com

L.J. Reas Environmental Consulting Corp.
920/294-3116, www.ljreas.com

Lake Renewal Co., 715/454-6258

Laub & Horton Insurance
414/220-4828, www.thehortongroup.com

Liesch Environmental Services, Inc.
608/223-1532, www.liesch.com

Loon Watch/Sigurd Olson Environmental Institute
Northland College, 715/682-1223

Marine Biochemists
262/238-0406, www.marinebiochemists.com

Maxim Technologies
715/845-4100, www.maximusa.com

NES Ecological Services, 920/499-5789

Northern Environmental Technologies
800/498-3921, www.northernenvironmental.com

Oak Prairie Farm
800/894-3884, www.oakprairiefarm.com

Onterra, 920/338-8860

Petersen Supply
262/692-2416, www.petersenonsite.com

Professional Lake Management
800/382-4434, www.prolakemgmt.com

Renaissance Fertilizers, Inc.
800/395-4769, www.organicfertilizer.com

Ridgeview Insurance - Lake DIP, 608/655-4150

SePRO, 317/216-8360, www.sepro.com

Shore Sox Shoreline Restoration
651/353-5144, www.shoresox.com

Solar Bee/Pump Systems, Inc.
866/553-5590, www.SolarBee.com

Sweetwater Technology
218/927-2200, www.teemarkcorp.com

The Limnological Institute, 800/485-1772

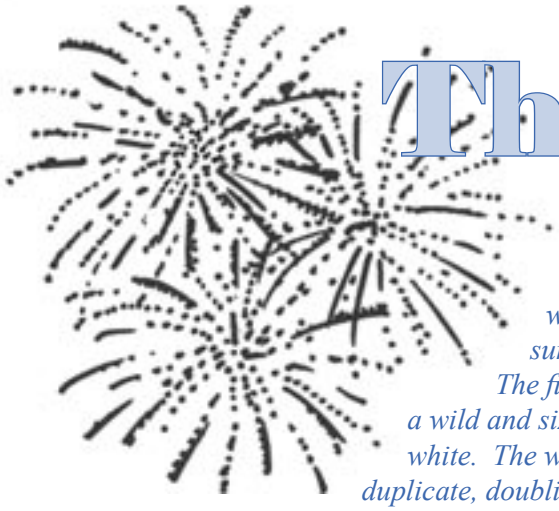
Vierbicher Associates, Inc., 608/524-6468

Volrath Sales Group, Inc., 515/251-8926

Wisconsin Aquacultural Association, 920/730-0684

Wisconsin Dept. of Natural Resources
608/261-6416, www.dnr.state.wi.us

List provided by the Wisconsin Association of Lakes



Thrills & Chills

Fireworks on our Lakes

It was a black and sultry night. Not a breath of air was stirring. The lake's surface was as flat as glass. The first starburst lit up the sky in a wild and sizzling display of crimson and white. The water mirrored an exact duplicate, doubling the visual thrill…the Independence Day celebration had begun.

How do you remember the Fourth of July at the lake? Barbeques, sparklers, boat parades around the lake? Here, at the UW-Extension Lakes office, phone calls about the Fourth of July sometimes go like this: "What can I do about my neighbor? My canvas boat awning burned off from falling hot fireworks, my beach is full of a nasty procession of scorched cardboard and plastic remains, the smoke makes us sick and I haven't seen my dog in two days! Not to mention what that noise is doing to the loons!"

Fireworks over the water seem to be a "no brainer" as far as fire safety is concerned, yet doing so can cause human explosions.

Fireworks around Independence Day are certainly an American tradition. Firing them over the water seems to be a "no brainer" as far as fire safety is concerned, yet doing so can cause human explosions. So what about fireworks around the lake?

Fireworks are big business in the USA. According to the U.S. Census Bureau, the value of fireworks imported from China in 2003 was $163.1 million, representing the bulk of fireworks imports to this country. In 2003, the U.S. consumed 220.8 million pounds of fireworks. Fireworks consist of a wide range of products with a highly variable composition. Although the available safety and environmental effect data on fireworks are often incomplete, issues with fireworks usually fall into the categories of noise, accidents, property damage and pollution.

Noise

Complaints of noise caused by fireworks are common around lakes in the beginning of July. The sounds of fireworks going off at all hours of the day and night can be more than just an annoyance. The blast can terrify pets and wild animals alike, causing them to seek a place to hide or be overcome with physical effects such as trembling. The noise from exploding fireworks can top 130 decibels (dB). According to acoustic health specialists, exposures to 105 dB for one hour can cause hearing damage. The typical lake environment has noise levels from 30 dB to 50 dB.

Accidents & Property Damage

Fireworks are dangerous. They can cause burns, loss of limbs and sometimes death. They are extremely hot -- sparklers can burn at temperatures of over 1800 degrees. On average, annually about 9,000 people are injured severely enough by fireworks to require hospital treatment. Forty-five percent of those injuries occur to children younger than 15 years old.

Annually, fireworks cause over 30,000 fires nationwide, resulting in millions of dollars of property damage. Reports of fires caused by fireworks on Wisconsin lakes are most frequent in July.

Pollution

Some researchers believe heavy metal fallout from exploding fireworks poses a threat to the environment and us. Currently toxicological studies on the effects of fireworks on the environment are limited and vary in results. The solid reaction products that give us the pretty colors and special effects include a nasty bunch of chemical additives. The unknown factor is the concentrations needed to cause a problem. Fireworks are often propelled by charges of black powder (which contain carcinogenic sulfur-coal compounds). Ammonium perchlorate, which can cause problems with the human thyroid gland, is another ingredient used in fireworks and is not a good thing to find in our water. Ammonium perchlorate has been found in ground and surface water in California, Nevada, Utah and West Virginia. White phosphorus is another toxic substance used in

fireworks. Its residue can persist in aquatic environments and has caused die-offs of fish and waterfowl.

Fireworks contain a number of other toxic metals that are used to create a range of colors. Strontium produces blazing reds; copper compounds burn blue; magnesium, titanium and aluminum create brilliant white sparks. Sodium chloride generates orange-yellow fire; boric acid burns green; potassium and rubidium compounds produce purples and burning lithium glows red. Glittering greens are produced by radioactive barium. These ingredients drift on the winds and settle into our water and soils.

During the Stockholm Water Festival in 1996, air pollutant levels were measured before and after the fireworks display. Levels of airborne arsenic were found to be twice as much as normal, while levels of mercury, cadmium, lead, copper, zinc and chromium were as high as 500 times above normal. Concern about these effects on their waters and people caused organizers to switch to a more environmentally-friendly laser light show.

Another type of pollution commonly complained about on Wisconsin lakes is the fireworks packaging materials such as cardboard, wood or plastic tubes and structural parts that drift up on shore or settle on the lake bottom.

Like so many other activities that we enjoy, watching fireworks comes at a price. Some of those costs, such as the noise and cardboard waste, are immediate and visible. Others, such as the carcinogenic chemicals let loose to contribute to the pollution of our soil, water and air, are not visible and often not thought about. Celebrating this Independence Day can be more enjoyable for everyone if we are all respectful of our neighbors and wildlife, cautious in how we use fireworks and concerned with the potential impact they may have.

For information on the regulation of fireworks in Wisconsin, see Wisconsin Statute 167.10.

Wisconsin River of Words

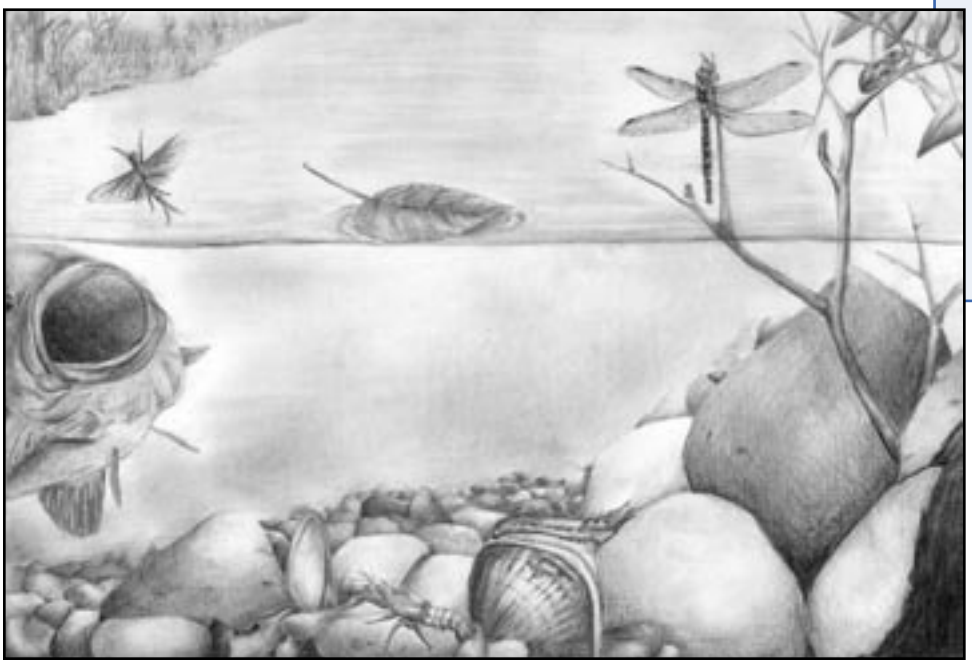
2005 – 1st place winners in the Grades 10-12 category.

To see all 2005 WROW winners, go to www.uwsp.edu/cnr/uwexlakes/row

The Yellow Dog Watershed

The Yellow Dog Plains:
One last piece
Of untouched wilderness.
River, stream, creek,
Meandering through,
All connected
Like veins
In the palm of my hand.
Pouring into one another,
Clear water
Filling lakes, seeping into wetlands.
This water, all connected,
A haven for Coaster Brook Trout
A hydration source for Moose and Deer
And the Peregrine Falcon.
Mineral rights, a mining company
Sulfuric Acid contamination
Carried along by
River, stream and creek,
All connected
Filling lakes, bird and moose.
My heart is connected too
And the water flows out
Through the corners of my eyes.

Tess Clancy, Age 16
Conserve School, Land O' Lakes



A Tranquil Moment
Kerissa Nelson, Age 17
Grantsburg High School

Self-Help Lake Monitoring

Citizens work with scientists on a regular basis to monitor the health of many of our natural resources including lakes, amphibians, birds, exotics, fish, forests, groundwater, invertebrates, mammals, rivers, streams, vegetation, watersheds, and wetlands. With training and quality assurance/quality control methods, the information that citizens gather can be used to make management decisions. As state budgets are cinched tighter, citizen participation in natural resource monitoring is becoming more necessary and important.

Self-Help Lake Monitors Celebrating 15 Years of Service

Dianne Brown, Wazeecha Lake
Bob Crane, Lake Wissota
Verene Crane, Lake Wissota
Robert Damon, Long Lake
Ariel Dickerman, Falk Lake, Gull Lake, Love Lake
Kent Dickerman, Falk Lake, Gull Lake, Love Lake
Darlene Fiske, Adelade Lake
Ken Fiske, Adelade Lake
David Grether, Loon Lake, Lower Red Lake
Jack Hafner, Hasbrook Lake
Walt Hallen, Ashippun Lake
Richard Lathrop, Devils Lake, Presque Isle Lake
Candy McMahon, Long Lake
John McMahon, Long Lake
Jim Merkowitz, High Lake
Dave Opsteen, Rose Lake
Patrick Perkins, Bass Lake
Carol Schumacher, Clark Lake
Paul Schumacher, Clark Lake
Barb Spees, Lake Huron
Marc Spees, Lake Huron
Robert Tiede, Sissabagama Lake
Robert Wiethaup, Horsehead Lake, Lake Five

Fortunately, citizen-based monitoring activity continues to gain momentum. Last year, the first annual Citizen-Based Monitoring Conference focused on how the Department of Natural Resources can better serve and support monitoring programs. To this end, a new Citizen-Based Monitoring Coordinator position was created, $100,000 in partnership program funding was awarded, a Citizen-Based Monitoring Network was established, legislation is pending which will form an advisory council, and a new website was developed to list programs, news, events and funding sources (http://atriweb.info/cbm/).

The new developments are a testimony to how strongly Wisconsin citizens care about their natural resources. The hard work and dedication of the many volunteers assist natural resource professionals in making sound management decisions. The Self-Help Lake Monitoring Program is one monitoring success story involving over 1200 volunteer monitors over an almost 20-year span. In recognizing volunteers who have dedicated years of their time to monitor our lakes, we extend a thank you to all Wisconsin citizens who take part in natural resource monitoring.

Self-Help Lake Monitors Celebrating 100 Secchi Disk Readings

Gayland Jensen, Big Butternut Lake
Merle Johnson, Horseshoe Lake
Larry Kochendorfer, Amacoy Lake
Don Krueger, Pigeon Lake
David McLaughlin, Lipsett Lake
Ron Nieman, Lake Noquebay
Roy Redlich, Broken Bow Lake
Ken Sedmak, Town Corner Lake
Bob Strobush, Apple River Flowage
Paul Volek, Montgomery Lake
Herb Jensen, Okauchee Lake
Paul Kuhn, Two Sisters Lake
Dan Mersel, Fawn, North, Spider and Clear Lake
Richard Bjodstrup, Ottawa & Pretty Lake
William Wilcox, Nelson Lake
Tom Ganfield, Whitewater Lake
Don Macintosh, Grindstone Lake
Barry Borman, Birch Island Lake
Arlene Borman, Birch Island Lake
Patricia Juday, Anderson Lake
Tom Ammend, Long Lake
Richard Jochem, Lac Sault Dore
Mary Adams, Plummer Lake
Glenn Grage, Namekagon Lake
Sandra Anderson, Whitefish Lake
Kenn Krouse, Little Newton Lake
James Jana, Fish Lake
Verlyn Benoy, Magnor Lake

CALENDAR

All of June - Invasive Species Awareness Month - For more information about invasive species month and scheduled events about invasive species, visit http://invasivespecies.wi.gov/awareness/.

June 2, 2005 - Clean Boats, Clean Waters Training - Minocqua, 6-9 p.m., Lakeland Campus. Contact Laura.Felda@dnr.state.wi.us or 715-346-3366.

June 11, 2005 - Clean Boats, Clean Waters Training - Florence, 9-12 a.m., Resource Center. Contact Laura.Felda@dnr.state.wi.us or 715-346-3366.

June 11, 2005 - Wetland Restoration Workshop - Manitowoc, 8 am - 4 pm, Woodland Dunes Nature Center. Co-sponsored by Manitowoc County Lakes Association. For information, call 608-250-9971.

June 16, 2005 - Clean Boats, Clean Waters Training - Madison, 2-5 p.m., Big Splash, Dane County. Contact Laura.Felda@dnr.state.wi.us or 715-346-3366.

June 18, 2005 - Clean Boats, Clean Waters Training - Barron, 8:30-12 noon, location TBA. Contact Laura.Felda@dnr.state.wi.us or 715-346-3366.

June 21, 2005 - Clean Boats, Clean Waters Training - Eagle River, 1-4 p.m., Big Splash, Vilas County. Contact Laura.Felda@dnr.state.wi.us or 715-346-3366.

June 23, 2005 - Clean Boats, Clean Waters Training - Cable, Northwest Wisconsin Lakes Conference Attendees only.
Contact Laura.Felda@dnr.state.wi.us or 715-346-3366.

June 23-24, 2005 - Northwest Lakes Conference -Telemark Convention Center, Cable. 7:30 a.m. to 3:45 p.m. For more information, contact the Wisconsin Association of Lakes at 800-542-5253 or 608-662-0923 or see www.wisconsinlakes.org/events/NWLC05.pdf

July 16, 2005 - Project Loonwatch Loon Population Survey - 5-10 a.m. Volunteers needed to survey the numbers of loons, loon nests and loon chicks on 258 randomly selected lakes across central and northern
Wisconsin, by canoe, kayak or on foot. For more information contact Brian Fox at FoxB01@northland.edu.

July 24-29, 2005 – Natural Resource Careers Workshop – Central Wisconsin Environmental Station, Amherst. For ages 14-17. Contact 715-824-2428 or see www.uwsp.edu/cwes.

October 21-22, 2005 - 2005 Citizen-based Monitoring Conference - Manitowish Waters. See http://atriweb.info/cbm

November 9-11, 2005 - North American Lake Management Society Annual Meeting - Madison. See http://www.nalms.org

Lake Tides -- *905032*
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Reflections

The earth laughs in flowers.
- Ralph Waldo Emerson