Lake Tides
The newsletter for people interested in Wisconsin lakes

Drugs & Water Don't Mix
A Pharmaceutical Cocktail

Pharmaceuticals and personal care products (PPCPs) are showing up in the aquatic environment. We don't enjoy being the bearer of unsettling news, but here is another unintended consequence of our societal ways. If you listen to NPR or CNN, read USA Today or follow reports from the United States Geological survey (USGS) or the U.S. Environmental Protection Agency (EPA), you may be aware of the growing concern with PPCPs on aquatic ecosystems.

A Prescription Gumbo

Frogs, fish, and other aquatic critters and plants are being exposed to a cocktail of pharmaceuticals and personal care products in amounts that can disrupt their normal functions. The list of compounds being found in our steams is impressive: human and veterinary antibiotics, antidepressants, cardiovasculars, caffeine, biogenics and respiratory drugs are leading the way. These PPCPs have been found in almost every place they have been looked for. According to Herb Buxton, with USGS in Washington DC, a study "tested waters across the nation for 95 chemicals ranging from perfumes to antidepressants. Of 139 streams tested, 80% had at least one of the chemicals and 50% had seven or more." Buxton added, "Some of these chemicals can be active at very low levels, but they will most likely be found in areas with large or concentrated human or animal populations."

A Medicated Nation

An aging population and a host of new and helpful drugs that started showing up in the late 80s and 90s have caused drug sales to rocket upward. In the past 20 years we have made great strides in the medicated control of diseases like AIDs, Alzheimers, high blood pressure, high cholesterol and many more. Sales of cholesterol lowering drugs called statins were at $1.8 billion in 1991. By 2000 those sales had increased to $17.8 billion. With the introduction of a host of new anti-depression drugs in the late 80s, antidepressant prescriptions grew from 40 million in 1988 to more than 120 million in 1998. According to the National Center for Health Statistics at the Center for Disease Control, more than 61 million prescriptions for antidepressant were given by U.S. doctors in 2001. Prescription drug sales in the U.S. have increased by 16.9% to $172 billion last year, plus $18 billon in over-the-counter medicines.

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Wisconsin Lakes Partnership

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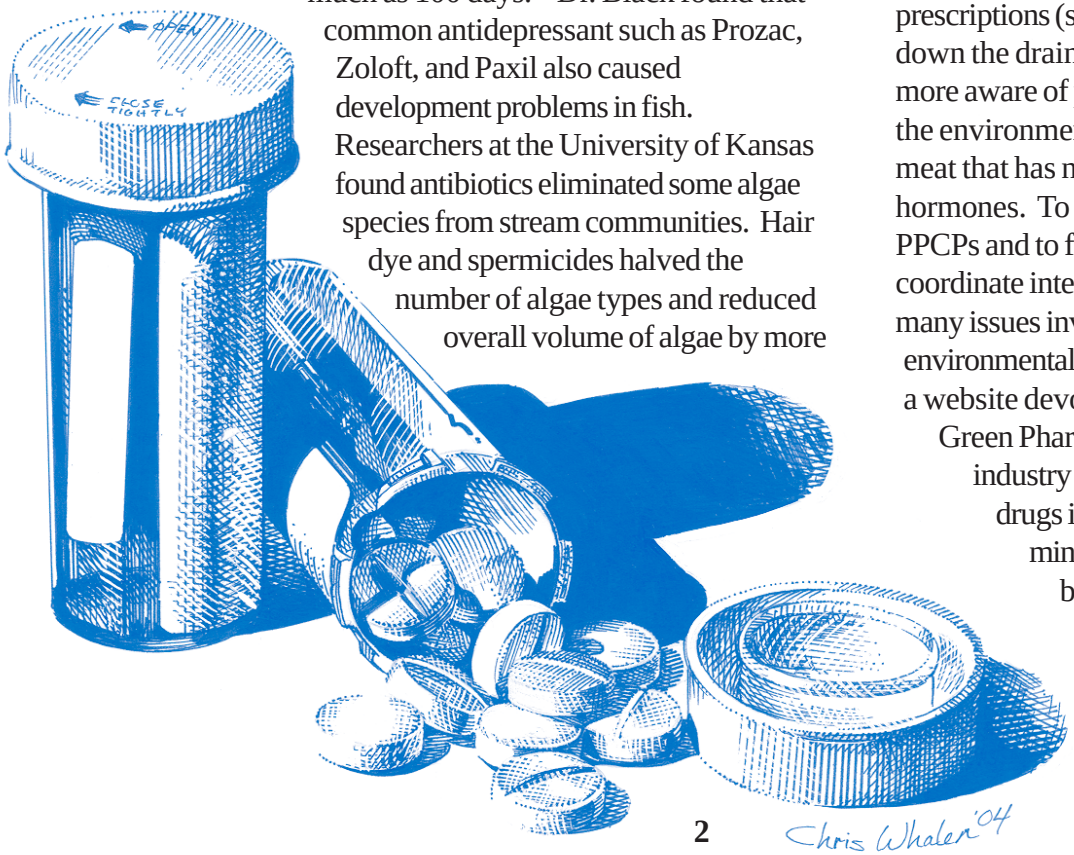
When we take medication, our bodies excrete the active chemicals with as much as 90% of the ingested drug still in a potent form. Sewage treatment plants are not designed to remove many synthetics of these chemicals in the water. Farm animals are also given drugs to make them grow faster and become more fertile. Much of this ends up in our ground and surface waters. The Union of Concerned Scientists estimates that 25 million pounds of antibiotics are fed to animals each year compared to 8 million pounds for people.

At this time researchers don't believe PPCPs are a major threat to humans but they may pose a grave threat to our aquatic ecosystems.

Fish on Prozac

Bryan Brooks, a toxicologist at Baylor University, found evidence of the antidepressants Prozac in the brains, livers and muscles of bluegills caught downstream from the Pecan Creek Water Reclamation Plant near Dallas, Texas. Marsha Black, an aquatic toxicologist at the University of Georgia in Athens, told *Lake Tides*, "with levels of antidepressants as low as 1.5 parts per billion, African frog metamorphosis was delayed from a normal of 70 days to as much as 100 days." Dr. Black found that common antidepressant such as Prozac, Zoloft, and Paxil also caused development problems in fish. Researchers at the University of Kansas found antibiotics eliminated some algae species from stream communities. Hair dye and spermicides halved the number of algae types and reduced overall volume of algae by more than three quarters. Another of the dominant concerns for scientists has to do with possible hormonal disruption in fish by natural and man-made estrogen. In addition, the release of antibiotics could lead to more drug resistant pathogens.



Doom and Gloom?

At this time researchers don't believe PPCPs are a major threat to humans but they may pose a grave threat to our aquatic ecosystems. Many of these drugs have half lives of a few weeks in the environment but the continued flood of drugs may create a concentration high enough to cause trouble. There is also concern over what all these different drugs and chemicals may do as they mix together in unknown ways. Elisabeth Harrahy, a WDNR Water Quality Standards Specialist, sees PPCPs in our environment as a significant emerging concern even though there has not been much research on the problem in Wisconsin.

What Can We Do?

Harrahy suggests that we use medication only if we need to and that we are careful with what we do with out-of-date prescriptions (such as not flushing them down the drain). As consumers we can be more aware of placing drugs and perfumes in the environment. We can ask to purchase meat that has not been subjected to growth hormones. To promote better control of PPCPs and to facilitate and partially coordinate international research on the many issues involved with them as trace environmental pollutants, the EPA maintains a website devoted to the issue, called the Green Pharmacy. The pharmaceutical industry is also looking at ways to limit drugs in the environment by minimizing waste, recycling and better controlling the process from development to production and on to their final use.

Growth in pharmaceutical drug sales has posted double digit increases each year since 1995. While pharmaceutical drugs have benefited humans and animals with healthier and longer lives, this is a story of the residue of our society and how it impacts the natural world. Sometimes our attempts to make the planet a place where humans can live better lives has unintended consequences.

For more information, visit:

www.epa.gov/esd/chemistry/pharma/about.htm

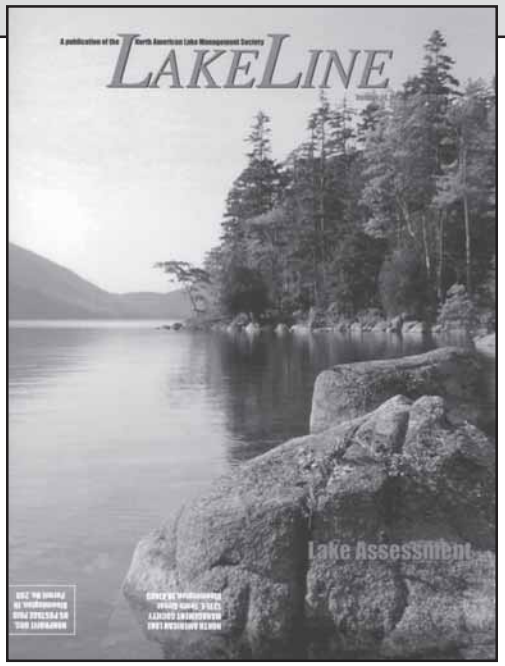
toxics.usgs.gov/regional/emc.html

Looking for a Good Magazine About Lakes?

The North American Lake Management Society (NALMS) publishes a magazine, *LakeLine*, that is a "must read" if you're interested in lakes, reservoirs and your watershed.

LakeLine features the latest in lake management techniques, and gives you a feel for issues facing the nations lakes and how our society is dealing with them. Catch up on the exchange and communication among lake management experts and practitioners, as well as lake enthusiast at an introductory subscription rate of $25/year.

For more information go to www.nalms.org/lakeline/lakeline.htm or contact NALMS at (608) 233-2836.



Best of Luck Tamara!

Tamara Dudiak, UW-Extension Lake Specialist, gave birth to a baby boy named Max on January 13th of this year. Tamara has decided to put her professional career on hold in order to spend the coming years raising a family.

For seven years we have enjoyed working with this gentle, soft-spoken woman. She edited *Lake Tides*, and coauthored numerous books including *How's The Water?* and *Wisconsin Water Law*. Her professional life has always been about helping others and many people are thankful for her balanced wisdom and assistance. Tam has left her mark on the arena of water law and lake management and has been a great asset to Wisconsin.

The UW-Extension Lakes Program at UW-Stevens Point is in the process of refilling her position. While we are a bit melancholy to see her go, we wish her well and hope her life will continue to be filled with adventures and happiness.

The Nature of Water

2004 Wisconsin Lakes Convention

Great Blue Heron & Golden Wildflowers
by Jan Okerstrom
1st Place - Natural Features Around and In Lakes
2004 Wisconsin Lakes Convention Photo Contest

It was another record-breaking attendance for the Wisconsin Lakes Convention! Over 600 people shared their knowledge, met friends new and old, gained new insights and enjoyed their time in Green Bay.

Many non-profit organizations including the Wisconsin Ground Water Association, Wisconsin Wetlands Association, 1000 Friends of Wisconsin, Gathering Waters Conservancy, and River Alliance of Wisconsin assisted the Wisconsin Lakes Partnership in planning and facilitating the day's events. Attorney General Peg Lautenschlager, in her Thursday dinner address, talked about the importance of getting involved in the politics of environmental matters.

Governor Jim Doyle, U.S. Senator Russ Feingold and Wisconsin Senator Neal Kedzie addressed the participants regarding the concerns surrounding our state and national water issues. Jim Holperin, Secretary of the Wisconsin Department of Tourism, and Scott Hassett, Secretary of the Wisconsin Department of Natural Resources, also gave informative talks about Wisconsin's lake issues. Robert Martin, ex-ombudsman with the U.S. Environmental Protection Agency, closed the convention with a discussion about rollbacks of environmental policy and elimination of the federal ombudsman position.

Mark your calendars for April 28-30, 2005.

We would like to congratulate the 2004 Wisconsin Stewardship Award winners. The following individuals and groups have made outstanding contributions of time and effort toward the preservation and protection of Wisconsin's lake ecosystems: Tom Arnison, Thomas Ward, Lake Hallie Lake Association, Lake Association of White Lake and the White Lake School District, and NES Ecological Services.

Participants said they will use the information they gained at the convention to better improve the quality of local government, publish in their lake newsletters, educate others, and begin new lake projects, among other uses. We thank all of the presenters, guests and participants of the 26th Annual Wisconsin Lakes Convention! We hope to see you all at the next convention, being planned for April 28-30, 2005.

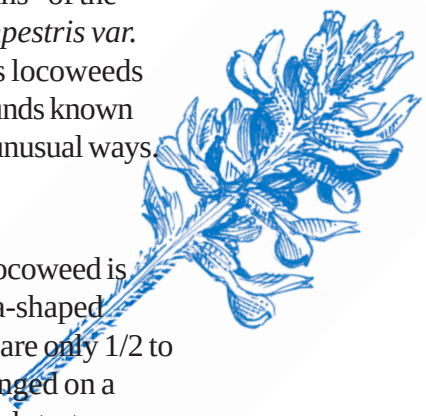
Power Walk *by Frank Koshere*
1st Place - People Enjoying Lakes
2004 Wisconsin Lakes Convention Photo Contest

Fassett's Locoweed
Pretty in Pink & Only in Wisconsin

It was a warm sunny day in late May, and I was driving along Highway 73 from Plainfield to Wautoma, a route I travel often. There is a small yellow sign there for a State Natural Area near Plainfield Lake. I had seen this sign often but had never stopped; on this day I decided to pull off the highway to see what this natural area was all about. Parking my car, I headed along a path to the small lake. I rounded a corner and there in front of me, sweeping along the shoreline, was a soft sea of pink. I looked to the left and to the right and saw pink flowers stretching along the entire north side of the lake. The band of flowers was wide - up to 20 feet in some places. As I got closer I realized the area was buzzing with busy bumblebees gathering pollen. Leaning down to take a closer look, I found pea plant-like flowers and pea plant-like leaves strung along the stem. It was a plant I had never seen before and I wondered, is this prolific flower a "good" plant or a "bad" plant? At the time, I did not realize that I was one of the few and lucky people that have ever seen this rare beauty.

Fassett's Locoweed is a member of the legume (bean) family. It is a rare plant to see and it is becoming more rare. Wisconsin is the only place in the world that it can be found. Because of its rarity, it is listed by the federal government as threatened, and by the state of Wisconsin as endangered.

The plant was first discovered in Wisconsin in 1928. Years later plants were discovered at other locations by one of Wisconsin's most famous field botanists, Norman Fassett, known to many lake folks for his Manual of Aquatic Plants. In honor of Fassett's contribution to the knowledge of the state's flora, the plant is named after him. Its Latin name, *Oxytopis campestris*, describes its features: *Oxytropis* breaks down into oxus, meaning sharp, and *tropis*, meaning keel, in reference to the beaked flower petals. *Campestris* means "of the fields or open plains." *O. campestris var. chartacea* is one of the famous locoweeds which contain alkaloid compounds known for causing cattle to behave in unusual ways.



Peas, Purple and Pink

When fully grown, Fassett's Locoweed is only 4 to 12 inches tall. Its pea-shaped flowers are purplish-pink, and are only 1/2 to 3/4 inch across. They are arranged on a spike in groups of about 15, and start flowering from the bottom of the spike. Locoweed begins flowering the second or third week of May and continues through mid-June. The flowers are frequented by bees who use their legs to pry open the flower to get the pollen that's inside. The entire plant, including the leaves, is covered with white silky hairs that help to keep the plant cool under the hot sun. The leaves are from 3 to 8 inches long, each with nine to fifteen pairs of leaflets.

It is believed that this plant only reproduces by seed. After flowering, the flowers shrivel and small yellow seedpods appear. These seedpods contain many small black seeds. The specific conditions that these seeds need for successful germination is not yet known.

Good to Grow

Fassett's Locoweed is presently found in three counties (Bayfield, Waushara, and Portage) at seven sites. It grows along the sandy and gravelly shorelines of landlocked, hard water lakes. The distribution of this plant throughout the state may be related to the glacial history of Wisconsin. Nearly all of

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When one tugs at a single thing in nature, he finds it attached to the rest of the world.
- John Muir

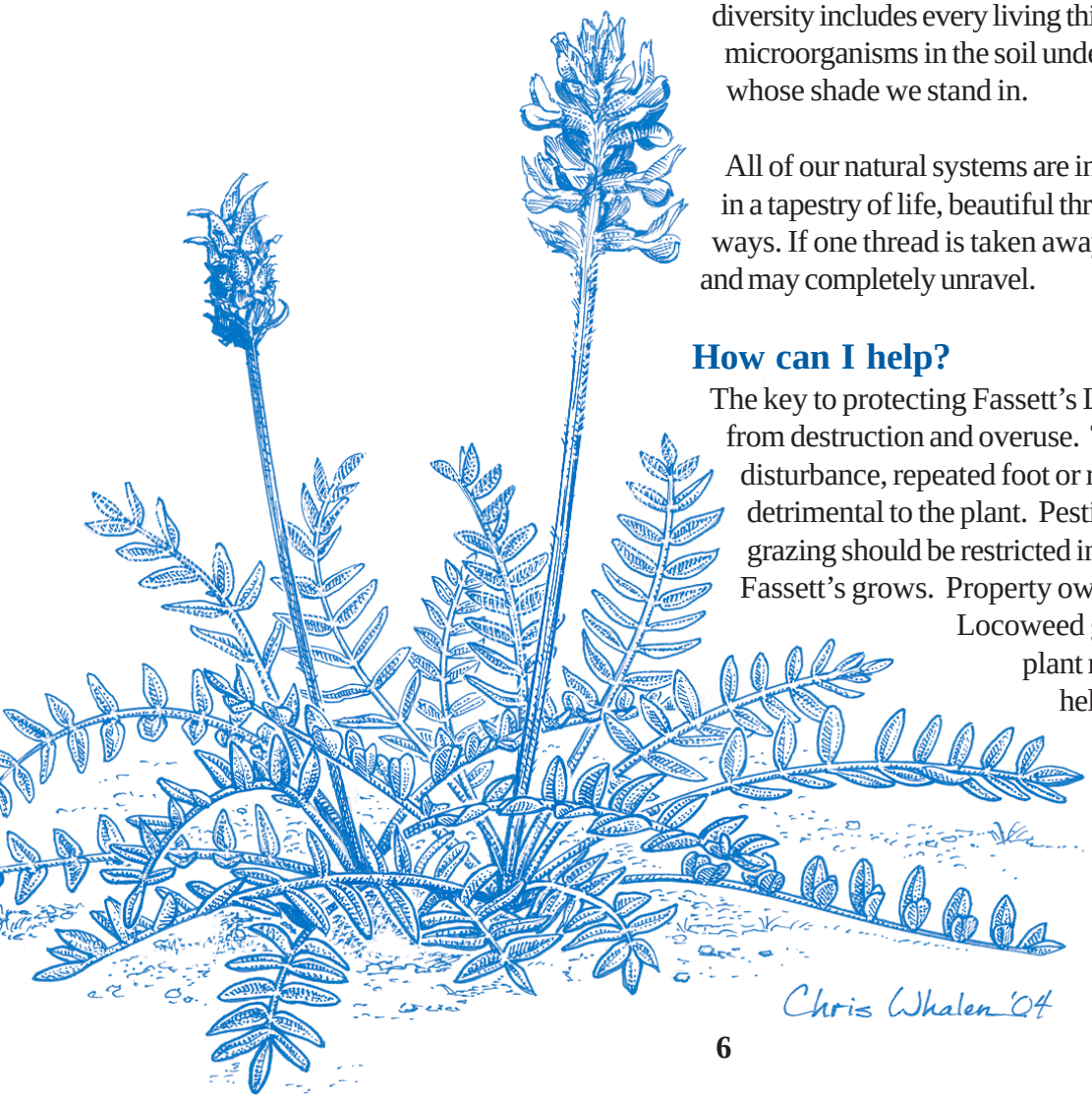
the lakes with historical populations are small, less than 36 acres in size and occur at approximately 1100 foot elevation. These lakes are generally shallow and dependent upon groundwater seepage for their water supply. One of the most important characteristics of the lakes where Fassett's Locoweed is found is their fluctuating water levels. The changing water levels help to keep shrubs and grasses from crowding out or shading out the locoweed.

This plant is rare largely because it requires a very specific habitat. Fassett's Locoweed populations are declining because of habitat loss and destruction through development of homes and high-impact shoreline activities like ATV travel, trampling, herbicides and pesticides, over irrigation, and loss of woodland. An emerging (and perhaps the greatest long-term) threat is the introduction of non-native weedy species such as spotted knapweed (*Centaurea biebersteinii*) and sweet clover (*Melilotus ssp.*), which could essentially "take over" locoweed habitat.

Why should we care?

If we believe this plant has the right to exist, it is important to protect it and all other rare and not-so rare plants. They are a part of the state's biological diversity. By definition, biological diversity is the number and abundance of species found within a common environment such as a forest, a lake, or even your backyard. This diversity includes every living thing from top to bottom…from the microorganisms in the soil under our feet to the towering trees whose shade we stand in.

All of our natural systems are interconnected and interdependent in a tapestry of life, beautiful threads woven together in unknown ways. If one thread is taken away, the entire tapestry begins to fray and may completely unravel.



How can I help?

The key to protecting Fassett's Locoweed is to protect it's habitat from destruction and overuse. Though it can tolerate some disturbance, repeated foot or recreational vehicle travel can be detrimental to the plant. Pesticide use as well as mowing and grazing should be restricted in the immediate area where Fassett's grows. Property owners on whose land Fassett's Locoweed grows can help by keeping track of plant numbers and health. They can also help manage to maintain the appropriate habitat by fencing populations or removing invading, non-native species. Most important is to learn how to identify the plant and to learn more about the plant so that in turn you may gain an appreciation for its uniqueness.

By Darcy Kind
WI Dept. of Natural Resources

Locoweed

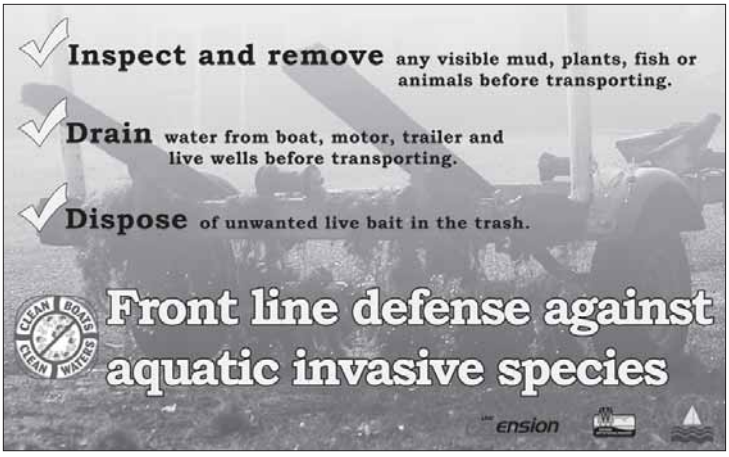
Know more!

Want to know more about Fassett's Locoweed, or think you might know of a population? Contact Darcy Kind with the DNR's Landowner Contact Program at (608)267-9789. This program, based out of the Endangered Resources Program, is currently working with private landowners to help foster appreciation for locoweed and other very rare plants throughout the state. Through the program, private landowners throughout Wisconsin are acting as guardians of rare plants and their sensitive habitats, by voluntarily agreeing to protect and monitor the plants. See the Landowner Contact Program website at: www.dnr.state.wi.us/org/land/er/landowner/.

Aquatic Invasive Species Workshops

Workshops are scheduled around the state to encourage volunteers to take a frontline defense against aquatic invasive species. Workshops are open to adults and youth and cost $25.00 (preregistration is required).

To register or learn more about the workshops, contact Laura Felda-Marquardt by e-mail, Laura.Felda@dnr.state.wi.us, or at the following telephone numbers: UW-Extension Lakes Program, (715) 346-3366, or the Rhinelander office, (715) 365-2659.



Dates and Locations

May 18, Rhinelander, 5-8 p.m., Rhinelander DNR Service Center
May 22, Fitchburg, 9 a.m. - noon, DNR Service Center, 3911 Fish Hatchery Road
May 25, Wautoma, 6-9 p.m., DNR Service Center
June 5, Eau Claire, 9 a.m. - noon, DNR Service Center, Beaver Creek Reserve
June 9, La Crosse County, 6-9 p.m., Power House Marine, La Crosse
June 15, Oconto County, 6-9 p.m., Riverview Town Hall
June 16, Portage County, 5-8 p.m., Lake Emily
June 19, Siren, 9 a.m. - noon, Burnett Government Center
June 19, Solon Springs, 6-9 p.m., Solon Springs Community Center.
June 25, Cable, 9:45-noon, Northwest Lakes Conference at Telemark Resort
July 10, Phillips, 6-9 p.m., County Normal Bldg.
July 15, Vilas County, 6-9 p.m., Lincoln Town Hall
July 17, Hayward, 9-noon, DNR Service Center,Hayward
July 24, Crandon, 9 a.m. - noon, CO Vantage Credit Union Community Room

Westfield Middle School Adopts Twin Lakes

Earlier this year, Westfield Middle School teamed up with the Twin Lakes Conservancy (Marquette County) to build a program of lake study for 7th and 8th graders. This Adopt-A-Lake (AAL) project has grown…

Quinn Shirley, middle school science teacher, and Don O'Keene, a graduate of the Lake Leaders Institute, met to discuss the goals of their Adopt-A-Lake project. With a little work, they were able to plan a program that utilized the school's Earth Sciences textbook as well as met the needs of the school's math and science curriculum and the teachers' goals for the year. They planned one-day sessions that would introduce students to important concepts within the watershed. Over 200 students will take part in the Twin Lakes Conservancy AAL project.

Adopt-A-Lake

Adopt-A-Lake is an environmental education program that provides resources and recognition to lake organizations and schools or youth groups that team up on lake stewardship efforts. Contact the UWEX-Lakes office at (715) 346-2116 or uwexlakes@uwsp.edu for more information.

Topics including topography, glaciation and stratification, and the watershed of Twin Lakes have been closely looked at by the students through hands-on presentations and activities. The recent discovery of petroforms created by ancient people has sparked the students' interest in preserving the area, being outdoors, and making a difference in their lake community.

Wisconsin River of Words

Wisconsin River of Words is an environmental art and poetry program focusing on watersheds. Students in grades K-12 are encouraged to get outdoors to learn about and enjoy their home watershed, then unleash their imaginations. Resulting poetry and artwork can be sent to the national River of Words competition, which judges in four age categories. All Wisconsin entries sent to the national competition are also judged in a Wisconsin-wide contest. The 2004 competition yielded over 20,000 entries. Wisconsin students made up 450 of these, including Joanna Foster who is a national finalist in poetry for Grades 10-12. For a list of Wisconsin River of Words poetry and art winners, go to our website at www.uwsp.edu/cnr/uwexlakes.

The Home of the Woodduck *by Mark Pontow*
2nd Place - Grades 7-9
2004 Wisconsin River of Words

The Earliest Riparians

Ancient Wisconsin Lakes Uncovered

Imagine living on a lakeshore…not because you chose to live there for economic or recreational reasons, but because that is where you were born. Visualize a waterfront community where your neighbors live together in large groups instead of homes evenly spaced around the water body. Imagine having no concept of actually "owning" property. Envision large meetings, similar to lake meetings, where the sole undertaking is to build boats. You build these boats using hand axes which you chipped from stone. Couple these images with the knowledge that your survival is vitally dependant on your natural environment and that same unpredictable setting can just as easily take it all away. The mental picture portrayed above is a likely representation of life for early Wisconsinites some 11,000 years B.P. (Before Present).

This story starts with highway construction in Door County. The Wisconsin Department of Transportation was in the process of an expansion project on State Highway 57 when six archeological sites were found in the project's right-of-way. Dr. David Overstreet, director of the Center for Archaeology Research at Marquette University in Milwaukee, and Jim Clark, a researcher there, are the principal investigators of one of the archeological sites called the Fabry Creek complex. According to Clark, "the lake waters at the time were very different. It was a time when shorelines' rise and fall was influenced by the melting and freezing of glaciers."

Since Dr. Overstreet's discovery of a Paleo-Indian site near Pleasant Prairie in Kenosha County, Wisconsin in 1987, he has been piecing together the early human history of the upper Great Lakes. Along with Overstreet and Clark, the UW-Milwaukee Archaeological Research Laboratory, Dr. Bill Mode at UW-Oshkosh, various students and other specialists have also been participating in the excavation and investigation processes. Ironically, if it were not for the State Highway 57 expansion project, there would have been no archeological excavations taking place at these sites. Tools found with mammoth bones in Southeastern Wisconsin dating between 13,000 and 14,000 years B.P. link with tools found at the Door County site and may place people in the Great Lakes area much earlier than previously believed.

Dr. Overstreet believes, "These early people developed sophisticated scavenging, hunting and boat building strategies to deal with their fluctuating environment…regardless of which (ancient) lake level you want to talk about, it would have flooded a tremendous amount of the landscape. Within 200 years, the glaciers advanced southwest across Wisconsin only to abruptly recede back beyond Michigan's Mackinaw Island, producing unpredictable environments of flooding, droughts and ice. There certainly is good evidence to indicate that these landscape-dependent people were actively involved in building canoes in order to

The lake waters at the time were very different. It was a time when shorelines' rise and fall was influenced by the melting and freezing of glaciers.

Continued on Page 10

Earliest Riparians
Continued from Page 9

traverse from one inclusive environment to another during times of flooding."

Our current issues such as ownership and riparian rights are fleeting in the contemplation of geologic time.

These Door County findings are significant because they place people in the Green Bay peninsula area as far back as 11,000 to 14,000 B.P. (actual dates are still pending). This time period correlates with Dr. Overstreet's hypothesis that indigenous people were exploiting the tundra and tundra-like environments that were exposed as the ice sheets retreated. This hypothesis implies that people were following the retreat of the glaciers. "These sites are contributing proof that people were living at the margins of the retreating ice sheets, hunting woolly mammoths and bison as they followed the advancing and retreating glaciers across the state," Overstreet said. They probably used boats to move about these ancient lakes. This idea is strengthened by discoveries of a woodworking tool (called an adze) possibly used for boat building.

At least three major lakes present in Wisconsin's glacial past were predecessors of today's inland lakes: Lake Oshkosh (slightly older than 11,000 years), Lake Algonquin (ca. 11,000 years old) and Lake Nipissing (ca. 4,000- 5,000 years old).

These lakes were also the precursors to the Great Lakes, and were carved out of the landscape by glaciers and filled with melting glacial water from the retreating ice sheets. The recent lake sediments unearthed at the site near Fabry Creek will be an indicator of which lakes were actually present. Dr. Overstreet and Clark collected radiocarbon samples from artifacts found at Fabry Creek and the data obtained should help to settle the questions pertaining to age. In addition, Dr. Mode also collected samples for pollen analysis. The results indicate that the shoreline sediments at the Fabry Creek site are probably not of Lake Nipissing age, but more likely that of Lake Algonquin or Lake Oshkosh. Further work to discover the true age is still ongoing.

Tales of early humans on our lakes are fascinating…and there may also be a lesson to learn. The first humans to live near these lakes 420 generations ago probably viewed themselves as "a part of" the natural world, not "apart from" the natural world. How will families 420 generations from now remember us?

By Andrew Walloch
UW-Stevens Point Natural Resources Student and UWEX Lakes Assistant

James A. Clark, Jr.

Dr. David Overstreet and Michael F. Kolb at Fabry Farm.

Governor Signs Bill Amending Lake District Law

It has been years since Chapter 33 (the laws governing public inland lake protection and rehabilitation districts) has been changed. At this year's Wisconsin Lakes Convention, Governor Doyle signed into law SB 440, now Wisconsin Act 275, clarifying some issues facing the state's lake management districts and amending Chapter 33. Here is a list of some of these changes:

- Removes one of the conditions that a county board needed to consider in the formation of a district. That condition was that the establishment of the district would not contribute to long-term pollution.
- Specifies that no absentee ballots or proxies are permitted at annual meetings.
- Limits the amount of special charges for services provided to members of a lake district to not more than $2.50 per $1000 of assessed valuation.
- Allows the electors and property owners at the annual meeting to consider and vote on amendments to the annual budget.
- Requires the secretary of the board of commissioners to prepare and send notices of the annual meeting, any special meeting, and meeting of the board.
- Requires specific content in the proposed annual budget to be presented for debate and adoption at a district's annual meeting.
- Adds to the duties of the board of commissioner of the lake districts the scheduling of the districts annual meeting and the preparation of the annual budget for presentation at the annual meeting.
- Requires the proposed annual budget to include a list of existing debt and expected revenue and expenditures from the previous year and estimated revenues and expenditures for the current year.

The bill (not as part of chapter 33) also allows the DNR to enter into contracts with public and private persons to create and support a statewide lake monitoring network and data base. For more details on the changes to Chapter 33 go to www.uwsp.edu/cnr/uwexlakes. Look for more details on the changes to Chapter 33 in future issues of *Lake Tides.*

CALENDAR

June 9 - Vilas County Lakes Association Meeting, Sandy Gillum, President 1875 Bald Eagle Lane, Eagle River, WI 54521 715-479-9091 ssgillum@nnex.net

June 25 - Northwest Lakes Conference, Cable. Register by June 12. www.wisconsinlakes.org or 800-542-5253 for more

July 14 - St Germain Lakes Fair. All day activities for adults and children including a silent auction, crafts, and educational workshops. Food for sale. Contact Dick Kloepfer at (715) 542-3741.

July 25 - Northeast Lakes Conference. Nicolet Area Technical College in Rhinelander.This evening workshop (4pm - 9pm) will focus on the economics of water and water quality. 800-542-5253

August 20-21 - Citizen-based Monitoring Workshop. The theme will be citizens and scientists working together to monitor Wisconsin's natural resources. www.atriweb.info/indexIE.htm or 800-542-5253

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Reflections

Water

Ripples, Dimples, Rings
Waves capped with white bubbles
Shimmering water illuminated by the sun
A mist of water hangs in the air
Covering the sand like a blanket

Sarah Casperson, Age 14
Gibraltar School, Fish Creek
2004 Wisconsin ROW
1st Place, Grades 7-9 Poetry