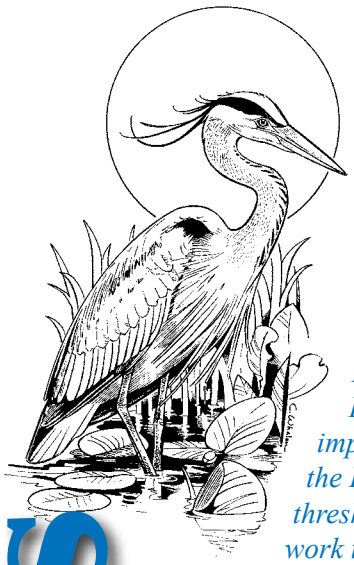
Lake Tides
The newsletter for people interested in Wisconsin lakes



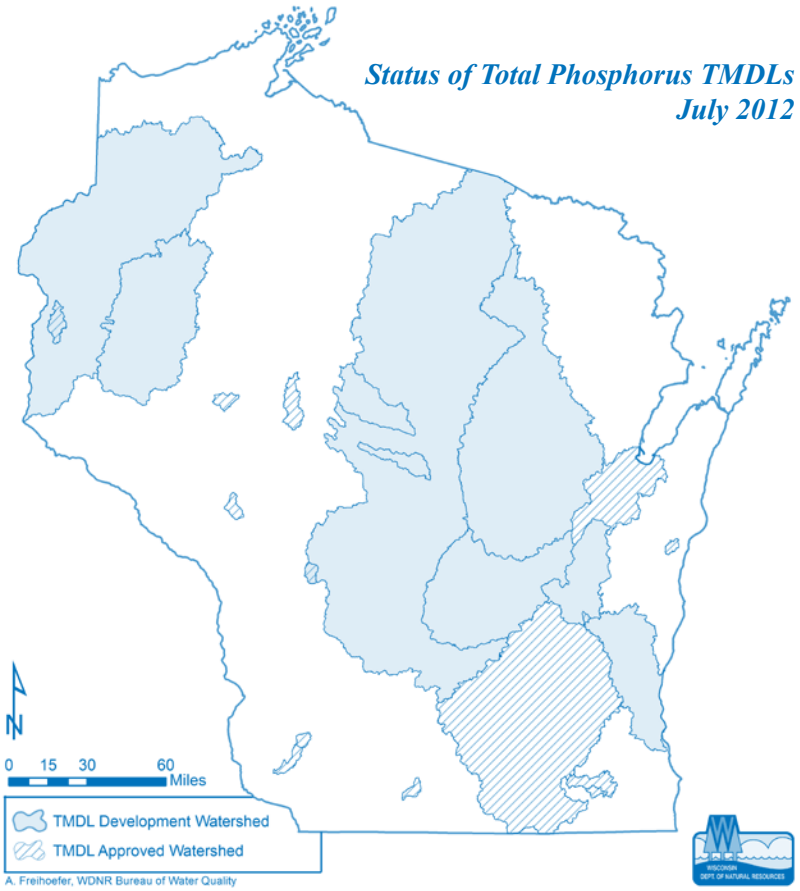
Major WI TMDLs Get EPA's A-OK

Local Groups Begin Developing Innovative Water Quality Solutions

Efforts to restore water quality in two major Wisconsin basins were recently given Environmental Protection Agency (EPA) approval to move from planning into implementation. The total maximum daily load (TMDL) plans for the Rock River Basin and the Lower Fox River Basin were approved in 2011 and 2012, respectively. These plans set threshold amounts of phosphorus and sediment pollution that the DNR and local partners must work to stay under in order to meet water quality standards. Now comes the more challenging work of actually reducing pollution flows into these waterways.

To develop a TMDL plan, researchers analyzed the different sources of sediment and phosphorus. Point sources include wastewater treatment plants, industrial facilities, urban areas with stormwater permits, non-metallic mines and construction sites that have DNR runoff permits, and confined animal feeding operations. They also look at nonpoint sources, including agriculture lands, smaller urban areas, and background sources of phosphorus and sediment.

The Rock River TMDL addresses a 3,750 square mile basin in Dodge, Jefferson, Rock, Dane, Columbia, Fond du Lac, Washington, Walworth, Waukesha, Green and Green Lake Counties. The basin includes 3,900 miles of river and over 440 lakes and impoundments. Government agencies and volunteer groups have been tracking and reporting water quality issues in this region for many years; the TMDL plan utilizes water quality and pollution data to identify methods for reigning in phosphorus and sediment in order to attain healthy rivers and lakes.



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Volume 37, No. 3 Summer/Fall 2012
Wisconsin Lakes Partnership

(WI TMDLs, continued)

The Lower Fox River Basin runs from the outlet of Lake Winnebago into Green Bay and encompasses 641 square miles in Brown, Calumet, Outagamie and Winnebago counties. Because of the relationship between the river and Lake Michigan's waters in Green Bay, the Lower Fox Basin TMDL also includes over 20 square miles of the south end of the bay itself.

Wisconsin DNR

The Lower Fox River in Green Bay.

In the Rock River Basin, nearly two-thirds of the phosphorus currently entering the water originates from agriculture, while almost a third comes from wastewater treatment facilities. For the Lower Fox River, about 50% of the phosphorus source is agriculture, while industrial point sources account for over 20% of the loading. Almost 16% of the phosphorus comes from wastewater treatment plants. Knowing the amount of nutrients and sediments originating from these key sources is crucial for determining how to best dial back the pollution load coming into each basin.

Knowing the amount of nutrients and sediments originating from these key sources is crucial for determining how to best dial back the pollution load coming into each basin.

The implementation phase of these TMDLs will involve detailed planning and local action to reduce loads. For municipal and industrial wastewater facilities, the most straightforward means to reduce phosphorus is to enhance the treatment plants to filter out pollutants. Unfortunately, this is often the most expensive option because it potentially involves either modernizing existing water treatment infrastructure or using complex chemical methods for removing phosphorus from the wastewater stream. The Madison Metropolitan Sewerage District (MMSD) developed a range of scenarios for meeting the higher standards at the Nine Springs Wastewater Treatment Plant. They estimated the capital costs alone for these scenarios ranged between $60 million and $142 million. These costs would be passed down to residences and businesses that rely on municipal water and sewer.

Collaborating for Cost Efficiency

In an effort to make meeting pollution targets more cost effective for everyone, communities in the Rock River Basin in Dane County are creating an innovative framework that would allow for wastewater treatment plants to receive credit for limiting nutrients and sediment from nonpoint sources such as farm fields. The Yahara Watershed Improvement Network (Yahara WINs) is one of the first partnerships in Wisconsin to try and utilize an "adaptive management" approach to implement a TMDL plan. Watershed adaptive management options were made possible in 2010 through updates to DNR rules: NR 216 and 217 (see "Major Victory for Water Quality Statewide" in the Fall 2010 edition of *Lake Tides*). The Metropolitan Madison Sewerage District is a key player in the Yahara WINs strategy because, like Brookfield, they currently face an expensive prospect of reducing pollution discharged into the upper stretches of the Rock River Basin. By focusing instead on nonpoint sources, members of the Yahara WINs effort believe that they can reach the same water quality goals at about one-quarter of the price.

An additional partner in the Yahara WINs includes the Clean Lakes Alliance, a not-for-profit organization formed in 2009 devoted to the water quality of area lakes, streams, and wetlands in the Yahara River Watershed. The Alliance has supported the creation of a Yahara Pride Farm Conservation Board comprised of five farmers, one independent crop consultant, one agribusiness representative and four members of the Clean Lakes Alliance Community Board of Directors. The Yahara Pride Conservation Board is dedicated to enhancing conservation practices that can reduce runoff from agricultural land to feeding tributaries in the Yahara Watershed.

(Continued on page 4)

Now How Did That Get In the Water?

An Update on Pharmaceuticals and Other Human Products in Lakes and Groundwater

By Paul McGinley, Water Quality Specialist, UW-Extension Center for Watershed Science and Education

Several years ago, *Lake Tides* discussed recent observations of low levels of some pharmaceuticals and personal care products (PPCPs) in our waters (*Spring 2004, Vol. 29, No. 2*). This topic continues to interest many of us, so we thought it was time to take another look at it and try to summarize what's been learned.

First, this is a very brief summary of a large and complex topic. A recent effort to compile all the scientific literature related to the pharmaceuticals and other compounds in the environment found almost 15,000 reports and scientific papers published worldwide (US EPA PPCPs Bibliographic Citation Database, Synopsis on web site from June 28, 2012). The summary here was based on only a portion of these articles.

PPCPs Still Present

Researchers continue to find trace levels of these compounds in rivers, lakes and groundwater. Of course, that's not surprising. We consume a variety of pharmaceuticals and use many other products that contain chemicals. When we consume them, only a portion is completely metabolized, and the remainder ends up in our wastewater. In addition, disposal of unused pharmaceuticals down the drain and the presence of these compounds in foods and personal care products also contributes to their occurrence in the wastewater. It is no coincidence then that the list of compounds that have been detected in wastewater includes many of the most abundant pharmaceuticals (e.g., acetaminophen and ibuprofen), artificial sweeteners (e.g., acesulfame), and antibacterials (e.g., triclosan).

Meds Go With the Flow

The presence of pharmaceuticals in our aquatic environment provides a real example of how water moves through our watersheds, entering as precipitation, moving as groundwater, and finally draining to lakes and streams. Contaminants added to this moving water then travel along with the water. These pharmaceuticals provide an interesting way to trace where this water has been. For example, the presence of caffeine, ibuprofen, and artificial sweeteners at trace levels in water have been used as an indication that the water has been influenced by drainage from a septic system. Most wastewater treatment systems, whether they are household septic systems or large municipal wastewater treatment plants, were not designed to remove these compounds either. They do remove some, but the removal appears to vary quite a bit between compounds, reflecting the extent to which a specific compound is susceptible to microbial degradation or is likely to stick to solid surfaces in the treatment system or soil beneath a septic drainfield.

The good news is that when these compounds are found in water they have typically been at concentrations below the levels where they would pose an immediate risk to human health or be toxic to aquatic organisms and plants.

Unknown Consequences

Some of the most complex questions regarding the possible impact of these compounds on

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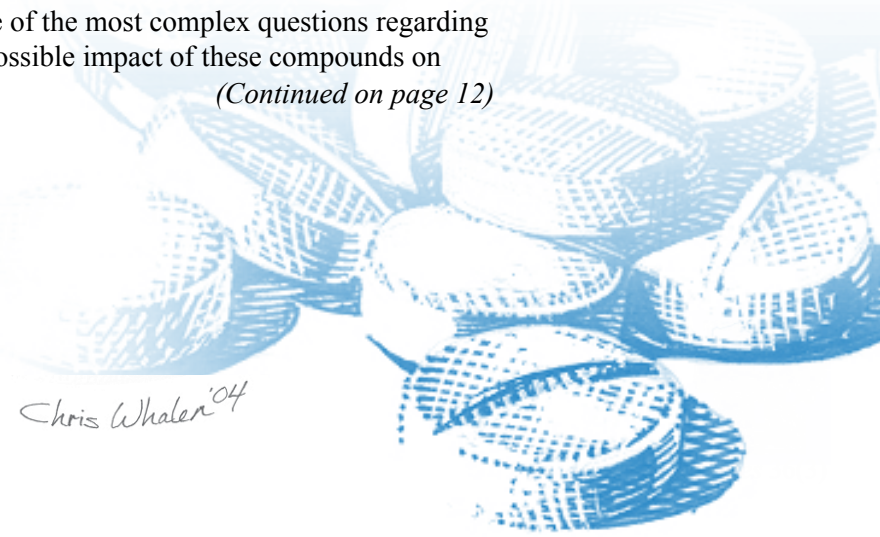


Innovative collaborations between clean water advocates, utilities, and agricultural operations are likely to grow as more and more lakes and watersheds complete the planning process for their TMDL and move into implementation.

Working with Dane County and the MMSD, Yahara WINS has identified a four-year, $3 million pilot project in Dorn Creek, located in the Six Mile Creek watershed northwest of Lake Mendota. The goals of the pilot project include evaluating the cost, performance, and ability to implement phosphorus control practices, to evaluate the actual water quality impacts associated with implementing the practices, and to gauge the level of community support for future, full-scale projects. The Yahara Pride Conservation Board would provide guidance and assistance in implementing pollution prevention techniques on farmland in the pilot project area.

Another partner in the Yahara WINs effort is the Sand County Foundation, a Wisconsin-based non-profit working to advance the use of ethical and scientifically sound land management practices and partnerships for the benefit of people and the ecological landscape. Sand County Foundation is sponsoring a broader effort to look at new types of agricultural incentives for achieving conservation goals. Drawing from an Aldo Leopold quote, "The only progress that counts is on the actual landscape of the Back Forty," the Foundation maintains an informative web page at the-back-40.com which summarizes progress made in achieving meaningful conservation.

Research done in the [Red Cedar] basin as part of the TMDL process found that agricultural runoff from cropland, pastureland, and barnyards is the source of nearly 80% of this key lake pollutant.

These innovative collaborations between clean water advocates, utilities, and agricultural operations are likely to grow as more and more lakes and watersheds complete the planning process for their TMDL and move into implementation. Recently, the DNR submitted TMDL reports for Tainter Lake and Lake Menomin in the Red Cedar Basin. These two lakes are among the most impaired in Wisconsin with respect to phosphorus, and in order to reach water quality goals, the DNR believes phosphorus inputs will need to be reduced by nearly two-thirds. Research done in the basin as part of the TMDL process found that agricultural runoff from cropland, pastureland, and barnyards is the source of nearly 80% of this key lake pollutant.

Leaders in the Red Cedar Basin are already beginning the conversations with agricultural producers to find ways to reduce the excessive nutrient runoff into the river that flows to Tainter and Menomin. This past spring, UW-Stout hosted the first annual Red Cedar River conference titled "The Red Cedar: Land, Water and People Coming Together." Conference organizers worked hard to bring agricultural interests into the event and bring them on board with the effort to manage polluted runoff. As in the Rock River Basin, stakeholders in the Red Cedar are forging partnerships and seeking collaborative solutions to water quality problems. River Country Resource Conservation and Development recently hired Karl Hakanson to help coordinate basin efforts, and plans are underway for next spring's follow-up conference.

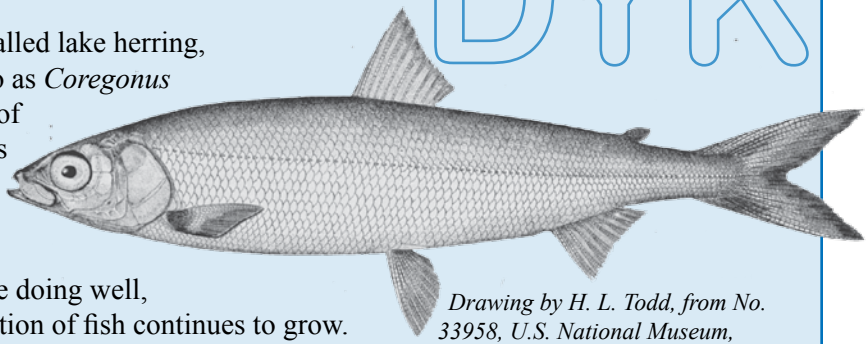
It's far too early to judge the effectiveness of these new strategies for addressing lake and river pollution, but the challenge of cleaning up impaired waterways is great enough to warrant a wide range of approaches. In a perfect world, all sources of phosphorus and sediment into our waters would be held accountable and given sufficient incentive to voluntarily reduce their pollution. Since the expense of reducing phosphorus from wastewater treatment plants is so high, we can expect more and more suggestions for steering spending to more cost effective measures outside the sewer stream. A key unanswered question is whether those measures will be truly permanent or if they will fade away over time.

Learn more about Wisconsin's TMDLs at http://dnr.wi.gov/topic/TMDLs/.

R. Korth

Did you know about cisco?

DYK



Drawing by H. L. Todd, from No. 33958, U.S. National Museum, collected at Nearfield Bay, Wisconsin, by J. W. Milner

The cisco is a fish of many names – sometimes called lake herring, other times a tulibee, and scientifically referred to as *Coregonus artedi*. The cisco is currently found in about 170 of Wisconsin's larger and deeper lakes, as it depends on cold, oxygen-rich water. Researchers at Minnesota Sea Grant have been tracking cisco populations in Lake Superior and recently found that the state's 25 commercial cisco harvesters are doing well, generating a $10 million fishery while the population of fish continues to grow. Egg roe from cisco is marketed as far as Scandinavia and is often labeled as "Bluefin caviar."

Cisco is a versatile fish for using in the kitchen – it can be fresh, smoked, and frozen. Recipes call for steaming, frying, broiling, boiling, microwaving, or baking. Some commercially harvested cisco is ground and mixed with other ingredients to form fish balls marketed as *gefilte* fish. Gefilte is a popular holiday food among Jewish communities.

Many Wisconsin inland lakes are at risk of losing their cisco due to eutrophication (a process where excess nutrients stimulate excess plant growth) and warmer weather, both of which limit the volume of cold, oxygen-rich water available to fish in the summertime. "By 2100, 30 to 70 percent of cisco populations could be extirpated in Wisconsin due to climate change," says Sapna Sharma, a researcher at the UW–Madison Center for Limnology and the lead author of a recent study that predicts the decline of the cisco according to a number of possible future climate scenarios. "Cisco are much more at risk due to climate change rather than interactions with exotic species."

You can learn more about Sharma's research on cisco through her web page: https://sites.google.com/site/sapnasharma23/publications. The Minnesota Sea Grant published a fact sheet on cisco available online at http://www.seagrant.umn.edu/downloads/factsheet_cisco.pdf.

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.*

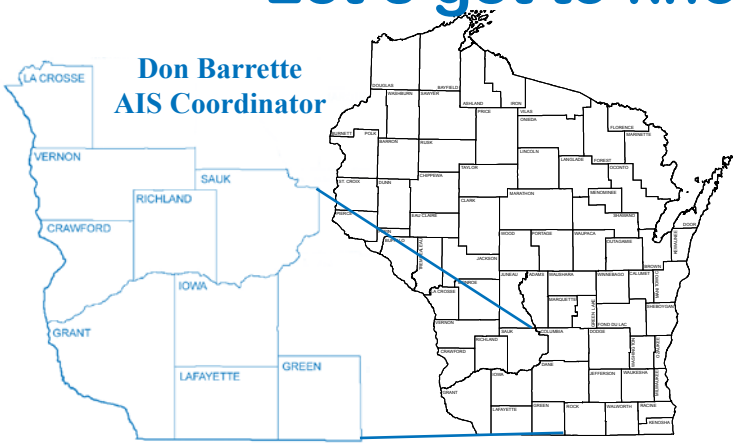
Q: Are bylaws needed for operating lake districts in Wisconsin?

A: No. Typically, bylaws are not needed by lake districts to guide their rules for procedures. The laws governing the formation and operation of lake districts can be found in Chapter 33 of the Wisconsin State Statutes. Those legal questions that lake districts may have which are not addressed in Chapter 33 are often covered under the same body of municipal laws that govern Wisconsin towns and counties. For some special circumstances, bylaws are sometimes used to clarify a specific set of actions that are unique to a certain lake district, such as: lake districts having multiple lakes may use bylaws to add representation requirements for the elected members of the board of commissioners; clarifying the composition of a nominating committee to make commissioner nominations; or the creation of committees to look into assorted lake management activities like aquatic plant management or a fishery. Standard operating procedures can fill the role of bylaws in these kinds of special circumstances as well.

For more information on lake districts, see *People of the Lakes: A Guide for Wisconsin Lake Organizations*, www.uwsp.edu/cnr/uwexlakes/districts.

Meet Wisconsin's AIS Staff

Let's get to know….Don Barrette!



Don Barrette
AIS Coordinator

Don is the Aquatic Invasive Species Coordinator with Southwest Badger Resource Conservation and Development, covering nine counties in the southwest part of the state – Crawford, Grant, Green, Iowa, LaCrosse, Lafayette, Richland, Sauk, and Vernon counties. He attended UW-Madison, where he earned a Bachelor's degree and Master's degree in Zoology. Before joining the Southwest Badger team in June 2011, Don worked for the Wisconsin Department of Natural Resources (WDNR) as a Fish Health Biologist and a Water Resources Management Specialist. He is currently working to build awareness and deliver information about aquatic invasive species (AIS) including Japanese hops and Japanese knotweed.

First and foremost I am an ecologist. I look at the big picture. If enough small things are changed, then the large picture gets changed as well.

What's new with invasive species in the counties you serve?

We are currently working on phase two of an invasive species management project in Richland County. We are working to manage Japanese knotweed on Willow Creek, a class one trout stream. Phase one was completed last month (mapping), thanks to the help of many partners. Future plans include a rapid response grant submission, some cutting and herbicide, and follow-up treatments.

Trout Unlimited chapter members Jerry Sapp and John Bacon, a local canoe/kayak club president Dean Jewel, WDNR forester Mike Finlay, River Alliance AIS member Matt Krueger, Friends of Badfish Creek member Lynn Deibel, and Richland County Conservationist Cathy Cooper have all been instrumental partners in Richland County.

In your opinion, what is currently the most prominent AIS issue in these three counties?

Plants tend to be the biggest issue in our region. Since the Mississippi River contains an inordinate amount of AIS, we can include fish in that problem group as well - specifically, the three species of Asian Carp in the news. The plants that I am talking about are not the normal aquatic plants that you may think of like Eurasian water-milfoil or curly leaf pondweed, but rather plants like Japanese hops and Japanese knotweed. These two species are major concerns because of the lack of knowledge regarding their existence and control.

Why is AIS prevention important to you?

First and foremost I am an ecologist. I look at the big picture. If enough small things are changed, then the large picture gets changed as well. Ecologically speaking, everything that is considered native is dependent upon other native species for their existence. If we change one small area in that chain, it changes the nature of our ecosystem and the complexity. Example: Climate change on a small level, if given enough time, can change the species that inhabit a certain area. I enjoy trout fishing (I know brown and rainbow trout are not native nonetheless), and, if the climate in this area continues on its current pace, small mouth bass may replace trout inhabitants in certain areas because water temperatures will not be cool enough to support trout habitat. These small changes with AIS also work the same way when changing the larger function of the ecosystem.

How do you think preventing the introduction and spread of AIS should be addressed?

I feel laws are weak in accordance with offenders. We also need to have regional consistency. Laws in the Midwest should be fairly consistent in terms of what's illegal to possess or not. Minnesota and Wisconsin are on the same page, but we are not on the same

page with Illinois and Iowa. Minnesota and Wisconsin have very strict Asian Carp laws that the other two do not. Again, make the laws consistent and enforceable throughout a region or, better yet, nationwide. Final note - enforce current AIS laws. It seems that some people are unaware of the new AIS laws. In this case, make them take a test showing their knowledge of AIS laws to get a fishing license or a boat registration. The WDNR could offer a reduced rate for licensing to those who pass the test as a courtesy for being responsible and knowledgeable. If a person who has passed a test is caught breaking one of the laws that they knew about, then the penalties could be extreme with good reason.

R. Korth

Miller Bluff is in the Driftless Area along the Wisconsin River.

What is your favorite part of being an AIS Coordinator?

Working outdoors in the Driftless Area. I grew up in this area, have lived in many places in the US, and I have always found my way back to southwest Wisconsin. Why? Because it is one of the most beautiful areas in the country and deserves to be protected. I also get to meet a lot of like-minded people who are also concerned about protecting the environment. With many of us, it is not about the money we make; moreover, it is a passion for the outdoors and all of the activities associated with it.

If you live in one of the nine counties Don covers and would like to get involved in AIS prevention (or just have some AIS questions), please contact him at: don.barrette@swbadger.org or 608-348-7114.

To find out who is working on AIS issues in your area, go to: http://dnr.wi.gov/lakes/invasives/topics.aspx.

35th Wisconsin Lakes Partnership Convention

Call for Presenters
Due Sept. 21, 2012

2013 will mark the 35th Wisconsin Lakes Partnership Convention. Through the years, partnerships have been forged and lifelong friendships have been made all in the effort to protect and enjoy Wisconsin's valuable water resources. We realize that we're all in this together and invite lake organization members, resource professionals, researchers, students, and other lake enthusiast to submit proposals for educational presentations and workshops for the 2013 Wisconsin Lakes Partnership Convention.

Presentation topics include:
Cultural/Historical/Archeological Aspects of Lakes
Endangered Resources
Aquatic Invasive Species
Scientific Lake Research
People, Policy, & Politics
Lake Habitat & Biology
Lake Recreation
Native Plants & Animals
Water Quality & Groundwater
Watersheds
Economics & Water
Governance of Water

Presentations that offer empowering messages and knowledge-to-action results, specifically showcasing local lakes, are encouraged.

Submission guidelines and an application form can be found on the UWEX-Lakes web site at www4.uwsp.edu/cnr/uwexlakes/convention. If you would like an application form in hard copy, contact 715-346-2116 or email uwexlakes@uwsp.edu

Deadline for submittal: September 21, 2012

The "Moo"st Interesting Frog: the American Bullfrog

By: Kim Shankland, student, UWEX Lakes

In the warm and humid summer months, there is nothing better than sitting out by the water and listening to a symphonic chorus of bullfrogs singing in their resonant, baritone voices. Maybe you remember the hours of fun these water-loving creatures provided as you romped about as a kid, catching them to have frog races on the dock. Some of you may even prefer them on your dinner plate, battered and fried! No matter what your relationship with the American bullfrog, you are sure to have a story…next time you tell it, you might want to add some of these interesting facts.

Hearing is one of the most essential senses to the bullfrog, as the males need it in order to sense female reciprocation or aggressive calls.

Music to Our Ears

The most common musical song that is emitted from the bullfrog, usually at night, resembles the sound of mooing from a cow, thereby giving the "bull" frog its name. With its constant "jug-o-rum" bellow, the bullfrog protects its territory and attracts mates with its resounding call. Hearing is one of the most essential senses to the bullfrog, as the males need it in order to sense female reciprocation or aggressive calls.

The American bullfrog has many different calls!

Advertisement call – This is what you typically hear during breeding season in June and July and is described as a loud low-pitched, two-part drone or bellow.

Alarm call – This is a fast squeak made just before it jumps into the water to escape danger (primarily heard from juveniles).

Encounter call and territorial sounds – Made by male bullfrogs when another male is too close for comfort; this is a short, sharp call. Bullfrogs also make a chirping and grinding or rasping sound when they interact with each other.

Release call – You might hear this low growling sound like a creaking door if you are handling a bullfrog that wants to be released!

Size 'em Up

The American bullfrog is the largest of all North American frogs. Females are typically larger than the males…sometimes up to eight inches in length! You can easily tell the difference between male and female adult bullfrogs by their tympanum, or the external ear of the frog. It is a round circle located on each side of the head near the eye. By comparing the tympanum to the size of the bullfrog's eye, you can simply distinguish one from the other. If it's male, the tympanum is larger than the eye, and females have tympanum that are the same size or smaller than the eye.

Frog Business

Females are most attracted to males whose territory provides the most food. Bullfrogs mate through external fertilization which takes place in late spring or early summer, with the females producing up to 20,000 eggs in one clutch. The eggs hatch in three to five days, with metamorphosis times ranging from a few months to three years, depending on the geographic climate. North American bullfrogs are unique, as they may remain at the tadpole stage for up to two years. With a longer tadpole stage, a larger frog emerges after metamorphosis. This usually means that there is a better chance for survival.

The bullfrog is very territorial and aggressive. It is known to protect its territory through calls, chases, jump attacks, and even wrestling. In

Who's Larry? Well, he's a frog who can give you a quick and fun summary of what kind of shoreline he likes and how to keep him coming back to your lakefront property year after year. Check out his video! It's linked from the UWEX Lakes main page at www4.uwsp.edu/cnr/uwexlakes.

1913, stomach content studies of the bullfrog suggested that this creature preys on any animal it can overpower and stuff down its throat. Its diet is unique and includes rodents, small turtles, snakes, birds, insects, fish, and even their own fellow bullfrogs. When attacking, these cannibalistic creatures lunge forward with their mouth open and extend their fleshy tongue upon the prey. Their jaws move forward and bite, while their tongue retracts back into the mouth with the prey attached. If the prey is not completely inside the frog's mouth, they are stuffed in with the frog's strong forearms.

In Fellsmere, Florida, there is an annual frog-eating festival intended to satisfy the "recreational needs of children in Fellsmere." The festival sold 4,000 pounds of frog legs in 2012. Though many frog lovers may shudder at the idea of this festival, it has raised hundreds of thousands of dollars that have been donated to the city's recreational needs and also to volunteer organizations who work the festival.

Watch out for humans!

Humans are one of the bullfrog's predators, as they are traditionally hunted through "frogging" adventures for their rear legs, resembling small chicken drumsticks when fried. During frogging, the hunter waits for the frog to make a noise, shines a light on it to inhibit movement, gigs it (thrusts it with a spear), and brings it into the boat. Breaking the skin in some states is illegal, so grasping gigs or hand capture are used. Even Wisconsin has an open season on frogs from May 1-Dec 31 (except for bullfrogs in Jefferson County, which has no open season). They cannot be taken with firearms or airguns. More info. at dnr.wi.gov/files/pdf/pubs/er/ER0102.pdf.

Frog legs are a delicacy, tempting the taste buds of the refined palate to the average Joe who is craving anything that tastes like chicken. Europeans consumed 120 million frogs per year in the 1990s, and the Californian gold-miners nearly drove the California red-legged frog to extinction in the 19th century. Due to this type of human behavior, there is a depletion of wild populations of frogs.

The North American bullfrog is also used for dissection in classrooms across the country, accumulating infamous, freeing discharges by passionate students who want to simply "save the frogs." Their cry of freedom is echoed across the world from others who agree with that sentiment.

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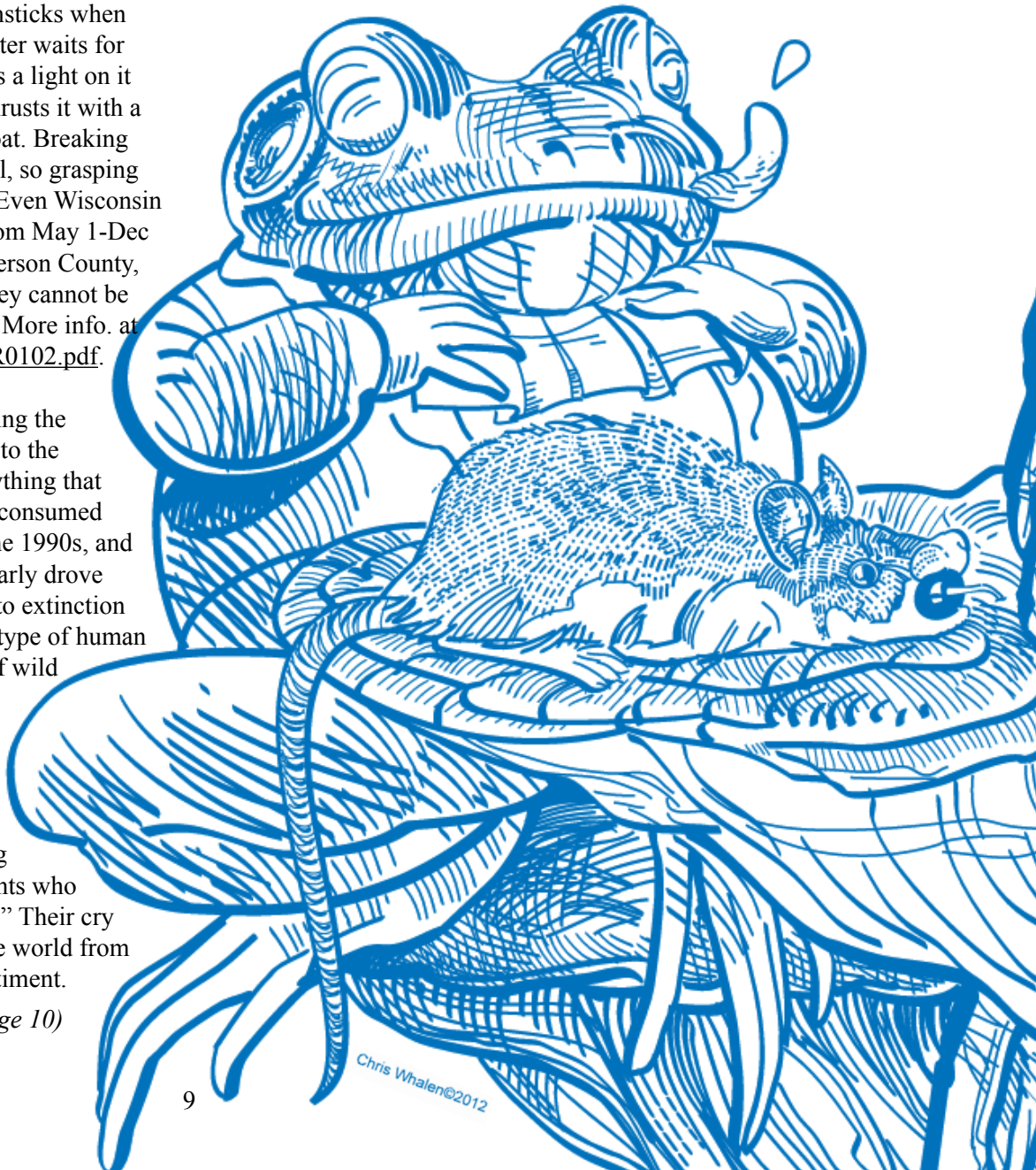

The Traveling Frog

Though native to North America, the bullfrog is exported and imported to many different countries as a food source. Due to the large number of bullfrog exports, many escape and, being very adaptable, create new homes wherever they end up. These bullfrogs can become invasive and harm native frog species by competing with them for food, consuming them, and spreading chytridiomycosis.

Chytridiomycosis is a potentially lethal skin disease that is caused by the chytrid fungus. This disease has likely caused the extinction of over 100 amphibian species since the 1970s. Because of unregulated pet and food trades, this disease can spread to native populations from infected frogs who escape captivity or are intentionally set free, or if the water from their holding tank is released into the environment. The chytrid fungus is lethal to the bullfrog, as it brings epidermal changes and behavioral changes to the host. Disease-ridden frogs die within 21 days after infection, but larvae are less susceptible to the fungus due to their lack of keratin. Each year, over 5 million bullfrogs get imported into San Francisco, Los Angeles and New York City, and a recent study demonstrated that 62% of these frogs are infected with the chytrid fungus.

The bullfrog may spur some controversy on its flavorsome appendages, but its unique qualities make lake lovers swoon with its musical majesty. The memories and stories we share about the beloved bullfrog are always special, no matter if they are in our hearts or in our stomachs.

FUN FACT

The Newar community in the Bagmati River Valley of Nepal worship the frog on the full-moon day of Shrawan (July) during the rainy season. The locals bring flowers, sandalwood paste, dry and boiled rice, and the soup of nine varieties of legume seeds as an offering to the frogs. This religious rite is called Byan Janakegu (feeding rice to the frog) in the local dialect.

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CLMN Superstars

Wisconsin is fortunate to have many talented and knowledgeable people acting as Citizen Water Quality Scientists on their lakes. We would like to highlight some of the accomplishments of the volunteers in the Citizen Lake Monitoring Network (CLMN).Want to see a CLMN volunteer acknowledged in Lake Tides? *Please send information to Laura Herman, CLMN Statewide Coordinator at Laura.Herman@uwsp.edu.*

The Town of Plum Lake in Vilas County is home to 37 lakes. The Town Lakes Committee was formed in 2005 and is committed to preserving the water quality in those lakes and educating the public about invasive species as well as native aquatic plant communities.

Bill Sloey has been the Lake Monitoring Coordinator since the beginning. He works closely with Chris and Jan Wise and Ted Ritter, Invasive Species Coordinator for Vilas County. Together they have trained more than one hundred local residents how to monitor their lakes for AIS. Bill has educated hundreds more through his appearances at local lake association picnics and meetings. Volunteers have learned to collect baseline native aquatic plants, crayfish, snails, and AIS survey data from 29 of the 35 lakes in Plum Lake Township. Some of these lakes are undeveloped – baseline data would likely not have been collected on them without this group. Each year, Bill authors a report to the people of the Town of Plum Lake that summarizes the past field season's efforts. In 2011, twenty volunteers spent a total of 124 hours searching the township's lakes for invasive species.

The Plum Lake monitoring volunteers have spent hundreds of hours collecting native plant information, walking the shoreline looking for invasive species, collecting water clarity and water chemistry data, and participating in the Clean Boats, Clean Waters Watercraft Inspection Program.

DNR Staff Take on New Roles

Brenda Nordin
DNR Lakes Coordinator, brenda.nordin@wisconsin.gov, 920-662-5141

I started working for the Department of Natural Resources' (DNR) lake program in 2007 as the Aquatic Invasive Species Coordinator/Specialist, and then worked briefly as a Water Regulation and Zoning Specialist. I am back in the lake program as the Lake Biologist for Shawano, Menominee, Marinette, and Oconto counties. My new duties will consist of aquatic plant management, aquatic invasive species management, lake grants, and water quality. I am now the CLMN contact for Shawano, Menominee, Marinette, Oconto, Waupaca, Outagamie, Brown, Door, Kewaunee, Waushara, Winnebago, Calumet, Manitowoc, Marquette, Green Lake, and Fond du Lac counties. I look forward to working with everyone again!

Alex Smith
DNR Lakes Coordinator, Alex.Smith@Wisconsin.gov, 715-635-4124

I am the new DNR Lakes Coordinator/Biologist covering Polk, Barron, Rusk, and Sawyer counties. I started on May 21, 2012 and am stationed at the Spooner Service Center. I have been with the DNR as a limited term employee (LTE) since 2007 working with lake associations, grants, aquatic invasive species, lake monitoring, and critical habitat evaluation. My experience includes spearheading critical habitat designations through positive professional relationships with DNR staff, lake organizations, and the public. Many folks in the lakes community have recognized me as an exceptional public servant. In 2011, I received the DNR water resources employee of the year award for regional staff. I have a Bachelor of Science degree from UW-Stevens Point with a major in watershed hydrology and management. I live on a small lake near Spooner with my wife Amber, young son Adrian, and two dogs Joey and Gus. In my free time, I enjoy boating, fishing, hunting, gardening, and traveling.

Rachel Sabre
Water Resources Biologist, rachel.sabre@wisconsin.gov, 262-574-2133

provided by Rachel Sabre

I am very excited for the opportunity to join the team as a Water Resources Management Specialist here in the Southwest District. I received a BS in conservation and environmental science from UW-Milwaukee in 2001 and then joined the DNR as an LTE in May of 2002 in the invasive species program. I spent almost 4 years as an LTE in various water programs, until I became a permanent employee with the water regulation and zoning program where I have worked until now. I enjoyed my time working on some very exciting projects that included rehabilitation of waterways and remediation of contaminated sediments. During my time at the DNR, I have gotten married to the love of my life, Joe, and we have had two beautiful children, Shane (3) and Skylar (9 months) whom have brought tremendous joy to our lives. We love to spend our time with our extended family hiking, kayaking, camping, and fishing up north at the family cabin! One of the greatest parts about working for the DNR has been my work with the volunteers due to their passion and dedication to protect and understand the lakes and streams of this state.

Unfortunately, we know much less about whether these compounds could pose long-term risks to ecosystems by altering biochemical functions within some organisms.

humans and ecosystems remain unanswered. The good news is that when these compounds are found in water, they have typically been at concentrations below the levels where they would pose an immediate risk to human health or be toxic to aquatic organisms and plants. That's certainly better than finding them at high concentrations, but unfortunately, we know much less about whether these compounds could pose long-term risks to ecosystems by altering biochemical functions within some organisms. Many of the pharmaceutical compounds are designed to interact with biological molecules. They may penetrate cell membranes and interact with enzymes or other biological molecules in different ways. Because of their structure, they may have the potential to alter a variety of processes in cells.

Potential Effects on Aquatic Life

The actions of these compounds might not only affect aquatic life the way we might anticipate. The side effects humans experience may also have an impact on plants and animals in the water. For example, aquatic bacteria may be affected by antibiotic concentrations similar to those found in wastewater (Brosche and Backhaus, 2010), although the dilution that occurs after wastewater is added to streams generally reduces those concentrations to levels which did not have an inhibiting effect. Interestingly, blue-green algae (sometimes called "cyanobacteria") are similar to some bacteria and may also be susceptible to antibiotics (Pomati 2004). Other organisms may be susceptible to low levels of these compounds as well. Researchers found that zebra mussels accumulate low concentrations of ibuprofen and exhibited related enzyme changes (Contardo-Jara et al., 2011). An example of more complex interactions is the beta-blockers that are widely prescribed pharmaceuticals used for heart conditions. In humans, one of their effects is to block molecules that might lead to an increase in heart rate. In fish, this could have undesired effects on cardiac function but also alter gill blood flow and affect vision (Owen et al., 2007).

Did You Know…?

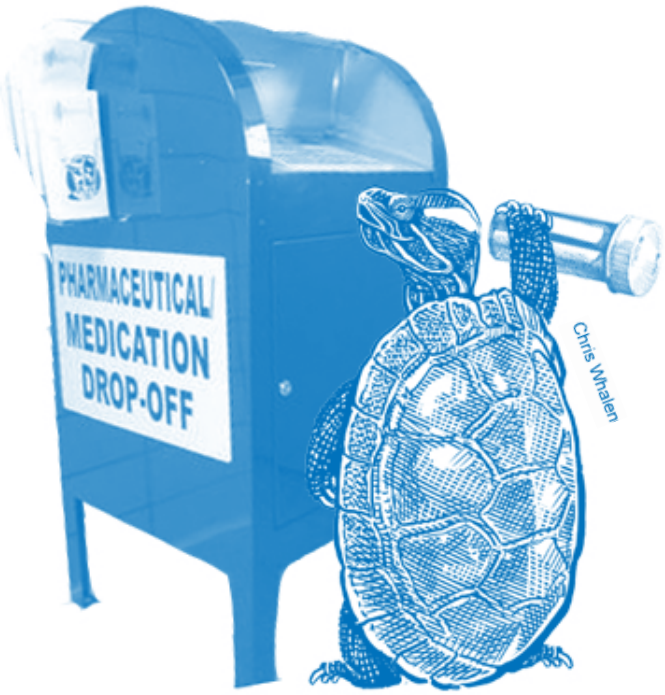
You can find a list of permanent medicine disposal locations on the UW-Extension Solid and Hazardous Waste Education Center's website. Just search online for "SHWEC Medicine Collections".

Responsible Actions & Treatment

So where does this leave us? It appears that there is enough evidence of these compounds getting into our water to encourage us to reduce that amount. It makes sense to dispose of unused prescriptions drugs without dumping them down the drain. Of course, we will still have unmetabolized compounds in our wastewater, so we should also encourage the development of treatment technologies that address these compounds just like we address other pollutants in wastewater. For households around lakes, we still need to know more about how these compounds move from septic systems and what that might mean for the lake. Studies near septic systems show that some of the compounds travel away from septic systems slowly because they are reacting with subsurface solids, and others can biologically decompose under the right conditions (Carrara et al., 2008; Conn et al., 2006). Additional research exploring the movement of these compounds will be helped by the availability of technology that permits more routine measurement of some of these compounds in groundwater and surface water.

What Can You Do?

You can help minimize the amount of pharmaceuticals in our state's water by properly disposing of your unused medication.



In 1990, Wisconsin Clean Sweep was a program established by the Department of Trade and Consumer Protection (DATCP) to help municipalities collect unwanted pesticides, and in 2007, this program expanded to include pharmaceutical collection. Go to this web site (http://datcp.wi.gov/environment/clean_sweep/) to get the 2012 Clean Sweep schedule. Don't see your county or community listed? Not every municipality uses Clean Sweep funds, so just contact your local police department...many of these departments have permanent drop boxes for old or unwanted prescription drugs.

Learn more about what's being done to develop sustainable strategies for reducing pharmaceutical waste in Wisconsin and the Great Lakes region here: http://fyi.uwex.edu/pharma/.

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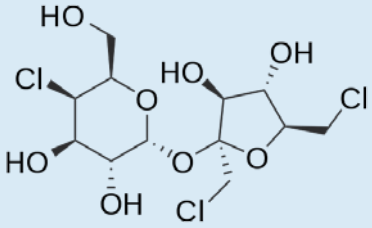
Owen, S.F., E. Giltrow, D.B. Huggett, T.H. Hutchinson, J. Saye, M.J. Winter, J.P. Sumpter. 2007. Comparative physiology, pharmacology and toxicology of b-blockers: Mammals versus fish. Aquatic Toxicology 82:145-162.

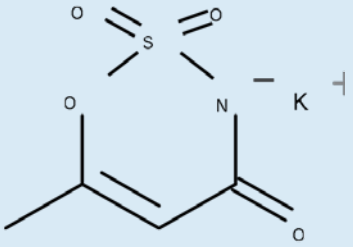
Useful Contaminants (a "sweet" idea…)?

One interesting result of finding these chemicals in water is that they may provide useful clues to the origin and pathways of water. For example, the artificial sweeteners acesulfame and sucralose (Splenda) have been used in the U.S. since the late 1990s. These compounds are hundreds of times sweeter than sugar, yet they are not metabolized as they pass through our body. As a result, these are low calorie, sugar substitutes. These sweeteners also are slow to disappear in groundwater, and that combined with advances in chemical measurement technology, allows these compounds to serve as tracers of septic system contaminated groundwater. Researchers at the University of Wisconsin-Stevens Point recently used the presence of sweeteners to determine if nitrate contaminated groundwater has been coming from nearby septic systems.

The sucralose molecule



The acesulfame molecule



Dealing with Drought?

The 2012 drought is taking its toll on the land and on lakes. In addition to the lack of rain, the hot weather and clear days have impacted lake ecology in many ways - many of them not good. By early July, there had already been numerous lakes with fish kills. Northern pike are among the most vulnerable, as they are sensitive to warmer water temperatures. There are a number of resources available to help people understand and cope with this hot summer; check out these websites for more information:

http://dnr.wi.gov/emergency/drought/

http://fyi.uwex.edu/drought2012/

Wisconsin Farm Bureau Federation

"We Love the Lake"

By Carla R. Anderson, Lake Tides *reader*
Dedicated to: Caleb J. Faizi

We love our summers at the lake,
The sun, the sand, make no mistake.

Black-eyed Susans drink morning dew,
They softly whisper, "Come pick a few!"

Monarchs munch on milkweed plants,
While bugs and beetles do their dance.

Daddy Long-legs do explore,
See how many? Wait! There's more!

A Sandhill Crane on stilted legs,
A Mallard duck broods on her eggs.

While Turkey vultures soar above,
Hear the cooing call of the Mourning Dove?

Gray squirrels scamper near the shore,
Hunting for acorns they will store.

A dragonfly hovers like a whirly-bird
Above our heads not a hair is stirred.

Bees are buzzing, making honey,
We spy a soft and frisky bunny.

See dazzling diamonds—lake's sky-blue glass,
Like unclaimed jewels? Can't let it pass!

Our feet are dangling from the pier,
Toes nibbled by minnows without a fear.

The cool, lake liquid on suntanned skin,
Feels so refreshing we all jump in!

Bending branches in the breeze
Becoming " crocodiles" in the trees!

The smell of pine is so divine,
We swim 'til dusk, it feels so fine.

Mosquitoes are zapped by a bumpy, black toad,
While a red-headed woodpecker taps out "Morse code."

Smokey campfires late at night,
S'mores galore—here, take a bite!

A gooey, chewy, marshmallowy sweet,
With creamy, smooth, chocolate—wow! What a treat!

These sights and sounds, smells, tastes and touch,
Are why we love the lake so much!

Provided by Carla Anderson

Caleb loves to fish!

Provided by Carla Anderson

Cody, Diane, Luke and Caleb enjoying S'mores by the fire.

2011-2012 Invader Crusaders

Congratulations to the "Invader Crusader" award recipients from 2011 and 2012! We would like to join the Wisconsin Governor's Council on Invasive Species to celebrate these volunteers and professionals:

2011

Volunteer Individual – Aquatic – Carol AveLallemant
Volunteer Individual – Land – Jack Rasmussen
Volunteer Pair – Lee and Mary Krueger
Professional – Government Agency – Milwaukee County Parks Department / UW- Extension Natural Areas
Professional Individual – Brian Swingle
Nonprofit Individual – Paul Skawinski
Professional Research and Education – Individual
Mark Renz
Professional Organization – Wild Rivers Invasive Species Coalition

2012

Professional Individual – Academic / Research
Phil Pellitteri
Volunteer Group
Youth Environmental Projects of Sauk County
Volunteer Pair – Martha and John Lunz
Professional Individual – Nonprofit
Jerry Ziegler
Volunteer Individual – Eric Tarman-Ramcheck
Professional Individual - Government
Ted Ritter

To read more about these award recipients, go to http://invasivespecies.wi.gov and click on "Awareness Month," then "Awards."

CALENDAR

August 31, 2012: Shawano Lake Fair, Shawano, WI
Open to the public from 9:00 am to Noon at the Shawano golf course. For more info: Brenda Nordin at Brenda.Nordin@uwsp.edu or Jon Motquin at John.Motquin@co.shawano.wi.us

September 8, 2012: Celebrate Amherst River Fest, Amherst, WI
A new addition to this annual celebration will focus on the water resources in Portage County and the Amherst area. Water related events include workshops on aquatic plants and healthy shorelines, informational booths and displays on different water topics, and a variety of kid's activities will take place from 10am-3pm. The festival runs from 10am-10pm.
For more information: Lori Britz, 715-824-3424 or jacksonandlouies@wi-net.com

September 10-13, 2012: Phenology 2012 Conference, UW-Milwaukee, WI
This international conference on phenology will bring together experts from around the world in all sub-fields of phenology and related disciplines. The overall theme of the conference is "Future Climate and the Living Earth."
For more information: www4.uwm.edu/letsci/conferences/phenology2012/index.cfm

September 22, 2012: Citizen Volunteer Planting Day, Executive Residence, Madison, WI
A group of Wisconsin Lake Leader graduates has been planning a shoreland restoration project at the Governor's Residence for several years and is now to the implementation phase. This project is part of a statewide initiative to show how shorelands planted in native vegetation can improve water quality and wildlife habitat. Sign up early to secure a volunteer spot!
For more information and to sign up to volunteer: www.wisconsinlakes.org/

October 29-31, 2012: 2012 Upper Midwest Invasive Species Conference, LaCrosse, WI
For more information: http://sewisc.org/sewisc-events

November 7-9, 2012: 2012 NALMS International Symposium, Madison, WI
The 32nd International Symposium of the North American Lake Management Society (NALMS) will be held at the Monona Terrace in Madison. The theme of this year's Symposium is Lakes in the Landscape: Values > Visions > Actions. For more information: www.nalms.org click on "Conferences," then choose "2012 NALMS Symposium."

Lake Tides -- *905032*
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Reflections

No one can see their reflection in running water. It is only in still water that we can see.

~ Taoist Proverb