DockSide

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Balsam Lake Protection and Rehabilitation District Board members Howard Seim, Tom Miller, Loren Johnson, Milt Stanze, and David Wagner met with Barr Engineering staff Meg Rattei and Dr. Brian Huser, (via Skype video conference).

Board explores strategy for East

In January the Balsam Lake Protection and Rehabilitation District Board members Howard Seim, Tom Miller, Loren Johnson, Milt Stanze, and David Wagner; met with Barr Engineering Co. staff Meg Rattei and Dr. Brian Huser (via Skype video conference call from Uppsala, Sweden) in Minneapolis.

Rattei began the meeting by summarizing the work already completed by the Board with emphasis on the recent Balsam Lake Water Quality Report completed by Barr engineering (2011) which detailed the annual phosphorus loads to the lake and potential management options to improve water quality in East Balsam Lake.

Dr. Huser provided details of the recommended East Balsam Lake sediment study. He mentioned that we would take about a foot of sediment using a gravity corer so that we would not only get the surface mobile phosphorus that contributes to internal loading, but also deeper samples which give us an idea of what background levels are and how enriched the surficial sediment is. He also discussed mobile phosphorus which lives up to its name and easily moves from the sediment into the overlying lake waters when oxygen is absent at the lake bottom. Inactivation of mobile phosphorus is necessary to manage the internal loading problem in East Balsam Lake. Use of aluminum to inactivate mobile phosphorus is not only the most effective management tool, but also the most cost-effective management option. He mentioned that the data from the core samples would be used to estimate internal phosphorus loading potential and to calculate the aluminum dose required to bind and inactivate mobile phosphorus, thereby decreasing internal phosphorus loading. Rattei and Dr. Huser mentioned

Explores (Con't on page 4

Done . . .

The conservancy project, known as the the Stump Bay Property, as approved at the annual meeting in July 2011, was completed this past year. The lake district closed on the property on November 10, 2011.

The property consists of 34 undeveloped acres in Stump Bay adjacent to the districts' other property known as the Peterson property that was obtained in 2005. The lake district now own most of the northern shore of Stump Bay preventing any development on the area that the DNR considers to be the most sensitive fish spawning area in Balsam Lake.

It is a very pristine area and also protects the wildlife habitat. The conservacy committee has been working on this since 2003 with two different owners and have finally completed it. The lake district was aided by a DNR grant which covered about a third of the cost.

Conservacy Committee: Milt Stanze & Dave Wagner

Long Plan update

An advisory committee of volunteers, advisors, and the board of commissioners have been working on an update of the Balsam Lake Long Range Plan this winter. The group met twice so far to review information, identify key questions, and update goals, objectives and activities for the long range plan. The top priority goals involve education and water quality improvement and maintenance.

Plan (Con't on page 3)

Long Range Committee members are, Volunteers: Debbie Irestone, Roy Guidice, Carl Pentland, Dave Stark, Greg Moore, Ray Sloss, Advisors: Jeremy Williamson and Scott Geddes, Polk County LWRD and Alex Smith, WDNR. Commissioners: Howard Seim, Tom Miller, Carl Holmgren, Milton Stanze, David Wagner, Caroline Rediske, and Loren Johnson.

Measuring water clarity/quality

A lake's water quality can refer to water clarity—how many particles are suspended in the water and how far light can penetrate down into the water. Water clarity affects the ability of fish to find food, how deep aquatic plants can grow, dissolved oxygen content, and water temperature. Water quality can also be used to describe how well the lake can support plants, fish, and other parts of a healthy lake ecosystem. Nutrients—like phosphorus—can dramatically affect water quality and what species can survive in the lake.

Lakes can be divided into three categories (trophic states) based on a lake's water clarity and nutrient levels. These trophic states can give you an idea of what features a lake is likely to have (clear waters, supportive of many, or few aquatic plants or fish).

Water clarity can be influenced by polluted runoff from across a lake's watershed and from decisions made on the lake's shoreline. How lake front property owners take care of their shorelines can dramatically effect whether a lake will be prone to algae blooms, invasive species, and what types of fish can survive in the lake.

- Water paths and water quality
- Why is water clarity important
- What harms water quality

The path that water takes to enter a lake is very important to water quality. Water that moves through the soil and into groundwater is filtered during its passage. This filtering removes nutrients, such as phosphorus, and allows them to be reused by plants on the land. In contrast, surface runoff pathways do not allow for this removal and can move water with higher concentrations of phosphorus to the lake.

Because phosphorus is a critical nutrient for biological growth in lakes, if we increase the phosphorus concentration, we will increase the amount of algae in the lake. This leads to a greener color to the water and makes it more difficult for light to penetrate the water.

Lakes in watersheds with conditions that lead to more surface runoff, such as urban areas or areas with more agricultural activity, generally have more algae. Other factors, such as the area of the land that drains water to the lake and the depth of the lake also influence the phosphorus concentration in the lake.

In all cases, if the phosphorus moving into the lake increases, the amount of algae produced will also increase.

Water clarity is often used as a measure of a lake's productivity level and an indicator of ecosystem health. Water clarity is a measure of the amount of particles in the water, or the extent to which light can travel through the water. Water clarity affects

- the ability of fish to find food
- the depth to which aquatic plants can grow
- dissolved oxygen content
- and water temperature

There are many ways to express water clarity, including Secchi disk depth, turbidity, color, suspended solids, or light extinction. Chlorophyll, a pigment found in all plants, is often used to determine the amount of algal growth in the water and is related to water clarity as well.

Nutrients such as phosphorus and nitrogen come from sediments (eroded soil), agricultural fields, manure, pet wastes, improperly maintained septic systems, fertilizers, grass clippings, and leaves.

Phosphorus, whether from natural sources or commercial fertilizers, is plant food. Too much phosphorus in our lakes causes excessive aquatic plant growth and algae blooms (where lakes turn green).

Excess algae can cloud water which can block sunlight from penetrating through the water and make it impossible for bottom-rooted plants to grow. When algae, plants, and other organic materials decay at the bottom of lakes this depletes oxygen in the water, making it difficult for fish and other aquatic life to survive. Reduced oxygen levels also contribute to winter fish kills in shallow lakes.

Most Wisconsin lawns and soils already contain adequate—and often excessive—amounts of phosphorus.

Sediments can be eroded from construction sites, developed areas, and cropland. Sediment—soil particles that end up in the water—reduces water clarity causing the water to become cloudy or "turbid." Sunlight cannot penetrate as deeply into turbid waters, which restricts aquatic plant growth to smaller and shallower areas.

Turbid water conditions can also affect fish by damaging gills and impacting their ability to find food. Some species of fish are unable to tolerate persistent turbid water conditions, and may no longer be able to survive in the lake.

In addition to the impact the sediment particles can have themselves; sediment runoff can pick up and transport additional pollutants such as metal flakes, debris, toxins, and even more phosphorus into our lakes.

Lake-Friendly Landscapes on a Budget

The Balsam Lake Waterfront Runoff Program encourages native plantings and runoff reduction landscaping projects to protect lake water quality. However, in times of shrinking family budgets and real estate values, adding a landscaping project at your waterfront property may be the last thing you are considering. You can help protect water quality without reaching deeply into your pocket. There are many low and no cost options for reducing runoff and improving habitat next to the water. Your biggest investment is likely to be in changing your mindset rather than your bank balance.

The Basics

To reduce runoff from waterfront property, consider how water flows and where nutrients, sediment, and water flow originate. More vegetation reduces erosion and slows water flow – reducing pollutants carried to the lake.

Eliminate Nutrients – The nutrient of greatest concern in most lakes is phosphorus because it is the limiting ingredient for algae growth. The most obvious source of phosphorus is fertilizer. According to Wisconsin regulations, fertilizer with phosphorus may not be used on lawns. However, it is still a good idea to check the label. Fertilizer labels have an N-P-K value listed, and phosphorus is the second number. So, a label with 6-0-6 has 0 phosphorus. Even simpler, don't fertilize your lawn at the lake. If grass growth is poor, test your soil. If the pH is low, add lime as a soil amendment.

Divert Water

Channelized water causes erosion and carries sediment and nutrients to the lake. Simple diversions can make a big difference. Roof downspouts are frequently the source of water channels. Add flexible plastic downspout diverters to direct water to a flat, well vegetated area, or even better, to ground that slopes away from the lake.

Slow Runoff Flow

Slowing runoff flow reduces erosion and sediment carried to the lake. If slopes are gradual, water flow may slowed enough to allow water to soak into the ground. The simplest way to slow runoff flow is to allow vegetation to grow. Tall stems of grasses and other vegetation provide more resistance to flowing water. A very minor change is to set your mower blade higher, perhaps to 3 or 4 inches. To get greater water quality benefits, choose to not mow certain areas near the lake. Greatest benefits to the lake result if you choose no-mow areas where water flows, on steep slopes, and in areas closest to the water. It really is good for your lake home landscape to be more wild – both for lake water quality and for the animals that live nearby. With less time spent on lawn maintenance, perhaps there will finally be some time for fishing or taking that evening stroll.

Encourage Native Growth

If you put away your mower and allow plants to grow, you are likely to find that native flowers and grasses will sprout. This will be a great time to learn more about the local flora and see what nature

has to offer. Learn about some of the non-native invasive plants, so you are not encouraging their growth. Spotted knapweed, purple loosestrife, and Japanese knotweed are a few to look out for and remove.

Many resources are available on the lake district website blprd.com including lists

Budget(Con't on page 5)

Plan (Con't from Page 1)

Following a meeting in April, the committee and consultant, Harmony Environmental, will be ready to present a draft of the Long Range Plan to Balsam Lake owners and others. A summary of the plan will be mailed in late April along with a questionnaire for input. The full draft of the plan will be on the web site BLPRD.com. Comments can be made through the annual meeting July 21, 2012.

Thanks are due the volunteers and advisors who are working on the plan.

Volunteers: Debbie Irestone, Roy Guidice, Carl Pentland, Dave Stark, Greg Moore, Ray Sloss

Advisors: Jeremy Williamson and Scott Geddes, Polk County LWRD and Alex Smith, WDNR

Commissioners: Howard Seim, Tom Miller, Carl Holmgren, Milton Stanze, David Wagner, Caroline Rediske, and Loren Johnson

Phosphorus build up in our soils: a chronic problem

Fertilizers (both commercial and manure) and livestock feed supplements can add significantly more phosphorus to the soil than can be used by plants. This excess phosphorus can accumulate in the soils of a watershed.

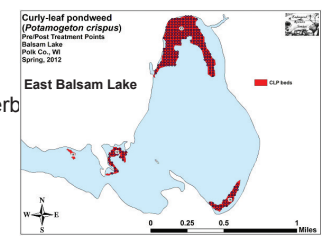
Erosion can move phosphorus laden soil particles downhill into our lakes. Rain, snowmelt, and groundwater movement can dissolve phosphorus attached to soil and carry it to our lakes.

This phosphorus build up in lake watershed soils can cause chronic problems for our lakes for years, decades, even centuries.

PUBLIC NOTICE

AQUATIC PLANT MANAGEMENT NOTICE

The Balsam Lake Protection and Rehabilitation District is applying for a permit from the Wisconsin Department of Natural Resources treat about 54 acres of Balsam Lake with an aquatic herb control the invasive plant curly leaf pondweed. This proposed treatment would occur between April 15 and June 1, 2012. The BLPRD hires a contractor to control curly leaf pondweed using the herbicide Endothall. Herbicides are used early in the season at a low dose to avoid harm to native plant species. The Aquatic Plant Management recommends treating curly pondweed in order to minimize navigation problems, prevent the spread of curly leaf pondweed, and protect native plant populations.



A map of the treatment areas and a copy of the permit application are available on our web site: blprd.com or by calling Milt Stanze at 715-557-0902.

WIDNR to limit issuing aquatic plant control permits for Balsam Lake property owners in 2012

Office of the Governor
Governor Scott Walker
115 East State Capital
Madison, WI 53702
Phone: 608-266-1212
Web: www.wisgov.state.wi.us

Secretary of Dept. of Natural Resources
Matt Frank
P.O. Box 7921
Madison, WI 53707
Phone: 608-267-7556 or
608-261-7580
Email: matt.frank@wisconsin.gov
Web: www.dnr.state.wi.us

DNR Northern Regional Director
John Gozdzialski
810 W. Maple Street
Spooner, WI 54801
Phone: 715-635-4002
Email: john.gozdzialski@wisconsin.gov
Web: www.dnr.state.wi.us

Regional Water Leader-Northern Region
Tom Jerow
107 Sutliff Avenue
Rhinelander, WI 54501
Email: tom.jerow@wisconsin.gov
Web: www.dnr.state.wi.us

Bureau Director-Watershed Management
Russell Rasmussen
P.O. Box 7921
Madison, WI 53707
Phone: 608-267-7651
Email: russell.rasmussen@wisconsin.gov
Web: www.dnr.state.wi.us

Section Chief – Lakes and Wetlands
Jeff Bode
P.O. Box 7921
Madison, WI 53707
Phone: 608-266-0502
Email: jeff.bode@wisconsin.gov
Web: www.dnr.state.wi.us

Basin Supervisor
Duane Lahti
Phone: 715-395-6911

State Assembly District 28
Eric Severson
Room 6 North / State Capitol
P.O. Box 8952
Madison, WI 53708
Phone: 608-267-2365
Email: rep.severson@legis.wisconsin.gov

State Senator – District 10
Sheila Harsdorf
Room 108 South/ State Capitol
P.O. Box 7882
Madison, WI 53707
Phone: 608-266-7745
Email: sen.harsdorf@legis.wisconsin.gov

**Let your . . . . . .
Voice be heard contact your State Representative**

Explores(Con't from page 1)

that the estimate of internal phosphorus load in the Balsam Lake Water Quality Report is based upon modeling rather than a direct measurement of the phosphorus content of the sediment. We can also use the potential internal phosphorus loading rate estimates from the sediment study to compare to modeling calculations from the Balsam Lake Water Quality Study to determine if the model results are realistic or not.

The board asked what options exist for controlling internal phosphorus loading in lakes:

Dr. Huser responded by saying a number of options exist including sediment phosphorus inactivation (using aluminum, iron plus aeration, and others like calcium or Riplox) and that aluminum was superior due to the fact that iron requires constant oxygenated conditions (which are difficult to maintain), calcium requires higher pH (around 8 or 9) to be most effective, and Riplox is only a temporary solution because it adds an alternate electron acceptor (nitrate) that limits the reduction of iron and release of phosphorus (but must be continually added to be effective). Dredging is another option that removes high sediment phosphorus but can be expensive and is destructive to the natural habitat in the lake. Aeration or hypolimnetic aeration is another option but East Balsam is a shallow lake that only stratifies occasionally so it would be difficult to implement such a system for reducing internal phosphorus loading. Trophic web manipulation (addition of picivorous fish such as bass or northern pike) to help increase the zooplankton population was also mentioned. However, if the source of the problem is not fixed (elevated nutrients), this is generally a short term fix because the implanted fish do not survive. Fishing pressure also reduces effectiveness. Barley straw was also mentioned but it is still unresolved how (or even if) barley straw works via production of algistatic chemical production during decay or enhancement of the bacterial community which can compete with algae for uptake of phosphorus. The size of East Balsam and the fact that barley straw would need to be added every year makes this option unsuitable.

The Board asked how long the alum treatment would last:

Dr. Huser responded by saying the bond between aluminum and phosphorus is considered permanent in neutral pH conditions. Hence, any phosphorus bound by the treatment would stay in the sediment and eventually be buried by new, natural sediment over time. The longevity of the treatment is then based on the amount of external phosphorus loading to the lake. But, without sedimentation rates in the lake, it is difficult to make an adequate prediction for treatment longevity. Theoretically the treatment should last indefinitely, but because humans have increased phosphorus loading to lakes, this estimate is not realistic. Based on previous cases, treatment longevity would be expected to last between 10 and 20 years. However, most of the data we have on alum treatments are for lakes where dosing was basically just a guess. Dosing has improved substantially in the past decade and is now based on the amount of phosphorus in the sediment, whereas dosing used to be based on alkalinity in the lake water or on the internal loading rate. Both methods can be wildly inaccurate. Nonetheless, the majority of treatments have shown success. Thus, a 10 to 20 year treatment longevity is a good estimate of treatment longevity for East Balsam as long as the appropriate amount of aluminum is added to the sediment.

The Board asked if copper (from copper sulfate treatments) would have an impact:

Dr. Huser responded by saying no. Copper, in general, binds strongly with organic matter and not aluminum. Furthermore, copper concentrations would be relatively low. Some copper could be attracted to the compounds formed by aluminum in the sediment, but this should not have a negative impact on treatment effectiveness.

The Board asked how aluminum (alum) is applied to lakes:

Dr. Huser stated that it is usually applied as a liquid just below the water surface via barge or boat. Tanker trucks deliver the liquid to the site and the barge/boat loads near shore and then applies the liquid to the lake. The aluminum then forms solid aluminum hydroxide which settles out of the water column down to the sediment surface.

The Board brought up using split

Explores(Con't to page 5)

Budget (Con't from page 3)

and photos of both native and invasive plants. Go to Waterfront Runoff Program then Native Plant Lists. Top Ten Native Shrubs for Wildlife includes some great choices of native shrubs for birds. Bare root shrubs are available in the spring and small potted shrubs are available throughout the growing season – both are low cost options. Call the Polk County Land and Water Resources Department at 715-485-8699 to get on their mailing list to order bare root shrubs for next spring.

Tell Your Story

We would love to hear about how you made changes on your property using your ingenuity rather than the cash in your wallet. Send your stories and photos to Clemons at harmonyenv@amerytel.net.

Free Visits

Clemons at Harmony Environmental can also set you up with a free water quality consultation for your property. Clemons will work with you to further investigate low cost options and additional lake-friendly landscaping methods.

Explores(Con't from page 4)

treatments:

Dr. Huser mentioned that splitting treatments can be useful because the binding between aluminum and phosphorus can be improved. This is because the aluminum starts to crystallize into mineral form shortly after treatment so the sooner the aluminum contacts the phosphorus, the more phosphorus will be bound by the aluminum. If a treatment is split, a smaller amount of aluminum is added relative to the available phosphorus near the surface of the sediment. Over time, mobile phosphorus a few inches down will migrate towards the surface and the binding capacity of the first treatment will be used up. This is when the second (or third, depending on the split) should be added. There is no easy way to tell when to add follow up treatments of aluminum. Degrading water quality could be a trigger or a set amount of time can be used. It's up to the District to decide.

The Board asked a few questions about the failed Wappogasset treatment:

Rattei asked Dr. Huser about the sediment work conducted on Wappogasset and said that a large amount of mobile phosphorus remained in the sediment. Dr. Huser couldn't recall specific numbers, but agreed with Rattei that a large amount of mobile P remained in the sediment that would lead to continued high phosphorus loading. Dr. Huser also brought up the dam failure in the system saying that an event like this would likely disturb the sediment greatly, possible dredging up previously buried phosphorus from deeper in the sediment, providing additional phosphorus for internal loading. After the meeting, Dr. Huser checked the Wappogassett data and found that there was enough mobile phosphorus remaining in the sediment after the alum treatment to support up to 14 mg/m2/d internal phosphorus load.

The Board asked about rerouting flows into East Balsam to increase the flushing rate and reduce the residence time in the lake to help improve water quality:

Dr. Huser asked Rattei about the residence time in the system and Rattei responded by saying the residence time calculated in the recent Barr study was about 1.3 years, significantly higher than the other parts of Balsam. Both Dr. Huser and Rattei responded by saying that increased flushing may have a beneficial impact, but would probably not solve the problem. Because the East Balsam internal loading problem would still continue, inflow concentration would have to be significantly lower in phosphorus content and contain a large this option would improve East Balsam water quality and, if so, the degree of improvement expected to occur.

The Board asked how much an alum treatment of the 600 acre East Balsam Lake would cost:

Dr. Huser said the treatment cost would depend upon the amount of alum applied which in turn will depend upon the phosphorus content of the lake sediments. However, based upon other alum treatments, Dr. Huser said a range of $500 to $2000 per acre with about an average of $1000 per acre would be a ballpark estimate. If a split dose was used for the treatment and the dose was applied in two treatments, the cost for each of the two treatments would be half of the total treatment cost. If the dose was applied in three treatments. The cost for each of the three treatments would be one third of the total treatment cost. The sediment study is necessary to determine the phosphorus content of the sediments, the alum dose required, whether a split treatment is advised, and whether the dose should be split into two or three applications if a split treatment is advised.

Barr Engineer, Meg Rattei facilitates the Skye Conference with lake district's members in an effort to address the East Balsam water quaility issue.

See our website BLPRD.com. Go to the Waterfront Runoff Program pages. To schedule a visit with our lake-friendly landscape specialist call or email Clemons at 715-268-9992 or harmonyenv@Amerytel.net.

NO OR LOW COST Lakeshore Water Quality Advice

Lawn Care

- Don't fertilize or use zero phosphorus fertilizer
- Set your mower blade to 3-4 inches.
- Mow less frequently
- Select no-mow areas

Water flow

- Add downspout diverters

Native Plants

- Allow lakefront to grow
- Identify invasive plants
- Purchase bare root shrubs

Go to BLPRD.com

- Get free info

Request a free site visit

Balsam Lake Protection & Rehabilitation District
P.O. Box 202
Balsam Lake, WI 54810

20012-13
Meeting Schedule
Polk County Business Center
Lower Level Conference Room
Third Saturday of the Month
8:30 a.m.

April 21st
May 19th
June 16th
July 21st - Annual Meeting
August 18th
September 15th
October 20th
November – No Meeting
December 15th
January - No Meeting
February 16th
March – No Meeting

Commissioners

Howard Seim, Chairman
1425 Molan Terrace
Columbia Heights, MN 55421
Home: 763-574-0480
Lake: 715-825-2302
E-mail: howardseim@aol.com
Term Expires: July 2013

Tom Miller, Vice Chairman
1466 195th Avenue
Balsam Lake, WI 54810
Home: 715-825-4157
Office: 715-485-3121
E-mail: t-miller68@hotmail.com
Term Expires: July 2012

Carl Holmgren, Secretary/Treasurer
105 Indianhead Point Road
Balsam Lake, WI 54810
Home: 715-485-9421
E-mail: holmgren@lakeland.ws
Term Expires: Annual-County Appointment

Loren Johnson
1758 190th Street
Centuria, WI 54824
Home: 715-646-2361
E-mail: landpjohnson@centurylink.net
Term Expires: July 2014

Caroline Rediske
805 Park Drive
Balsam Lake, WI 54810
Home: 715-485-3780
Office: 715-485-3229
E-mail: sewbusybl@centurytel.net
Term Expires: Annual-Village Appointment

Milt Stanze
806 Maple Leaf Court
St. Croix Falls, WI
Home: 715-483-1516
E-mail: m.stanze@yahoo.com
Term Expires: July 2012

David Wagner
962 W. Hoyt Avenue
St. Paul, MN
Home: 651-488-0784
Office: 651-266-6261
E-mail: david_wags@comcast.net
Term Expires: July 2014

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Balsam Lake Protection & Rehabilitation District
P.O. Box 202
Balsam Lake, WI 54810