

April 2011

Portage Lake Watershed Forever . . . *Submitted by: Kathy Ervin*

Since 2008, the Portage Lake Watershed Forever (PLWF) Plan has existed to protect Portage Lake and the nearly 25 square miles of the watershed. One of the objectives of the Plan has been to increase awareness and understanding about how actions on the land within the watershed can impact water quality.

When you visit the **H2OExpo** Tent in the Village Park on Saturday (August 6th) during Onekama Days you will have a chance to learn how you and your family can help. ! From 11:00 a.m. to 5:00 p.m., you will find information about everything from creating your own rain garden, to the best practices for maintaining your septic system, to how to responsibly landscape along the lakeshore. There will be demonstrations to identify invasive species and how to properly clean your boat to avoid introducing them into the water. Experts from the DNR, MSU Cooperative Extension and elsewhere will answer your questions and provide updates on the state of the fishery, Asian Carp, water quality and more. There will also be a door prize for those who register during the expo. Further, beginning at 11:00 o'clock from the Fair Grounds, bikers can "Pedal Portage" and get a taste of watershed lore (along with refreshments *en route*.)

SOOPER YOOPER - *Sooper Yooper* is a book about an environmental superhero who does everything in his power to safeguard the Great Lakes from his headquarters in Michigan's Upper Peninsula. It was written to educate and entertain kids about the importance of protecting our natural resources. The message is simple: when it comes to the environment, everyone can be a superhero!

Thanks to Mary Reed, PLWF Council Vice-Chair, Sooper Yooper is coming to Onekama Schools on May 5th with an program that includes an Art Competition designed expressly for 4th, 5th and 6th graders - but with an environmental twist. The students' art work will be displayed in the school; winners of the competition will receive prizes during the **H2OExpo**. -

Explore the Shores (a.k.a. Onekama Coastal Parks) - By the time you read this, the Onekama Coastal Parks Leadership Team (consisting of Susan Barnard, Kathy Ervin, Tom Gerhardt, Alice Hendricks, Phil Joseph, Mary Lou Millard, Jon Phillips, Margaret Panches, Mary Reed and Al Taylor) will have evaluated the six proposals received from contractors. An implementation plan will be prepared by the selected contractor in partnership with the Leadership Team and the community. The plan will include estimated costs, recommended funding sources and an approximate schedule for site development. The project has an expected completion date of October 2011.

PLWF Annual Cocktail Fundraiser - It really *is* a moveable feast! If you have penned this event in your calendar already, please note that the location has changed. If not, please note that Paul and Jane Mueller have graciously agreed to host this gala occasion on July 9th at their charming Canfield House on Portage Point Drive. It will be a fine opportunity to meet old & new friends, enjoy some wonderful hors d'oeuvres and beverages, and get up to speed on Watershed activities.

MAY 2011

Watershed Party Wrap-Up

Nearly 130 generous people gathered on the lawn of Paul & Jane Mueller's Canfield House on July 9th for a party that raised over \$10,000 for the PLWF **Annual Fund**. Thanks go to event chairs DeeDee Giles Miller,

Mike Acton, Paul Fairchild and a bevy of volunteers who, for the third year in a row, saw to the myriad details that make an event a success. Special thanks to the Muellers for their hospitality!

What's the used money for?

*The watershed has two funds established at the Manistee County Community Foundation to implement the plan. The **Annual Fund** covers immediate or anticipated needs to implementing the watershed plan. In addition to paying for printing, mailing and other day-to-day expenses, to date it has been used to support the following:*

- *Grants and Matching Funds*
- *Invasive Species Management & Control*
- *Evaluation of Portage Lake and its Immediate & Extended Watershed*
- *Detailed Aquatic Vegetation Survey*
- *Monitoring the Effect of Lake Improvement Program*
- *Water Quality Monitoring*
- *Development of a Comprehensive Lake Management Plan*
- *Public Meetings & Education Initiatives*
- *Creation of a Special Assessment District to fund cost of improvements*

Complimenting the Annual Fund is the **Endowment Fund**. This account provides long-term money to implement and update the plan. The ultimate goal is to build Endowment to a level of \$1 million through planned giving and charitable donations. At that amount, the watershed will have approxi. \$20,000 to \$30,000 annually to put the plan into action. Since its inception, and despite taking a significant hit during the recent economic downturn, the endowment has grown to nearly \$88,000. Mike Acton, along with a number of others, is currently spearheading a campaign to increase the fund.

November 2011



Watershed Updates “Explore the Shores” Project

If a picture is worth a thousand words, then the conceptual drawings of six community parks unveiled at a recent community open house are priceless. The drawings, on display at the Farr Center until the end of October, illustrate ideas proposed by the Onekama Parks Leadership Team under the guidance of consultants Beckett & Raeder. If you haven't gotten to the Farr Center, you can also see them by going to <http://www.onekama.info/watershed/> and clicking on Onekama Coastal Parks. You may recall that Portage Lake Watershed Forever (PLWF) received a grant of \$34,000 from Coastal Zone Management (via the Alliance for Economic Success) in connection with the Manistee county-wide “Explore the Shores” program. The purpose of the funding was to determine how to re-engineer parks in the Onekama community to make them accessible for people of all ages, needs and abilities to enjoy and benefit from the County's rivers, lakes and wetlands and our 25 miles of Lake Michigan shoreline. In addition to the PLWF Plan, “universal accessibility” is also an objective of the Onekama Township Parks and Recreation Plan, and the Onekama Community Master Plan. The ‘re-imagined’ parks are the Farr Center, Glen Park, Langland Park (the ‘turn-around’ on Lake Michigan), Onekama Village Park, the township's newly-acquired Wetlands, and Zosel Walk-in Park. Not unexpectedly, changes suggested for the Onekama Village Park generated the most comment as the designs call for a new play area, a splash park for kids, an impressive outdoor concert stage, rest room facilities and other upgrades. As yet, however, these are still “concepts”. Assuming that the Village and Township give us the nod, and keeping in mind that we are still functioning at the “big picture” level, the next phase of the project will be drill down to further refine designs, budget, time frames, priorities, and fund development. The Community Access Leadership Team includes Susan Barnard, Kathy Ervin, Tom Gerhardt, Alice Hendricks, Phil Joseph, Mary Lou Millard, Jon Phillips, Margaret Panches, Mary Reed and Al Taylor.

Third Annual Fund Fundraiser

Thanks to the generous support of the 130 people who attended the Portage Lake Watershed Forever's third annual Annual Fund Cocktail Party in July, and the many more who weren't able to come but who sent in donations, PLWF's annual fund grew by nearly \$15,000. The event, held under a tent on the beautifully coiffed lawn of Paul and Jane Mueller's "Canfield House", featured hors d'oeuvres from Arcadia Bluffs, scintillating conversation among many guests, and a brief presentation about the goals and objectives of the Watershed Plan.

The money raised for the annual fund is used to 'keep the wheels on the PLWF wagon' – mailings, printing, grants (such as the one given to support "Salmon in the Classroom" for Onekama 3rd graders or the contribution PLWF made to enable a study of the pros and cons of merging the Village and the Township) – and education/outreach efforts. DeeDee Miller, who chaired the party, was aided by a stalwart group of volunteers who, day in and day out, rise to any occasion and make it fun! Special thanks go to Mike Acton, who made sure we were legal, and Paul Fairchild, who again this year made sure we looked good.

INVASIVE SPECIES- Portage Lake Management Update

At the end of the third year of the management plan, Portage Lake has been successfully treated for phragmites and eurasian water milfoil. Eighty-three acres of phragmites were treated the first year; and this year, less than 10 acres required treatment. This includes stands that were identified in other areas of the township and on the Lake Michigan shoreline.

In 2009, 162 acres of eurasian water milfoil (ewm) were treated and this year we successfully treated 22 acres. Because of the clarity of our lake, the ewm is now growing in the deeper areas of the lake. Treatment of these areas will require additional permits for next year's treatment. Samples were tested this year and some of the ewm has hybridized. Because of the location of the ewm and the fact it has formed a hybrid, next year will require a special permit, and perhaps new products and techniques of administration.

There are also several other invasives such as japanese knotweed, purple loosestrife, hybrid cattails and blue lyme grass that are being monitored.

An important part of the treatment of invasives is the ongoing monitoring of the lake's water quality that is being done. Data has been gathered this year from several areas of the lake, feeder streams and storm drains. The management report for 2011 will be received soon and will be posted on the Internet on the Portage Lake Watershed Forever site.

FEBRUARY 2012

PORTAGE LAKE WATERSHED UPDATE

Submitted by: Kathy Ervin

ELECTION OF OFFICERS

Unlike most election campaigns the selection of 2012 Portage Lake Watershed Forever officers in November did not involve 18 + months, a huge war chest, or bitter personal attacks. What it did take, however, was for Mary Reed and Mike Acton to agree to serve as Co-chairs, Herb Lennon to be Vice-Chair, Frank English to remain as Treasurer, and Kathy Ervin to step in as Acting Secretary. While the cast of characters remains much the same, the change in their roles provides opportunities for broadening the base of the organization and increasing community participation.

To kick off the New Year, a PLWF Council Retreat is scheduled for January 31 at the Portage Lake Bible Camp. The goals of the 4-hour session include: reviewing the current status of the watershed plan implementation and identifying top priority projects & strategies for the coming year.

INVASIVE SPECIES COMMITTEE

Submitted by: Mary Reed

This committee of the Portage Lake Watershed and Onekama Township is very busy this winter planning for next year's Lake Management program. The biggest challenge is researching best practice methods in the treatment of eurasian watermilfoil. It has moved out into deeper areas of our lake and has also formed a hybrid variety. These two factors will require that we use different methods of application and perhaps different products and concentrations. We are working with the Michigan DEQ in designing an evaluation study. This requires a special permit and significantly more data will need to be obtained before, during and after treatment. Less than 6 acres of phragmites was treated in 2011. This is a significant decrease from the 83 acres that were treated in 2009. We will continue to monitor and spot treat in 2012. We are also carefully monitoring purple loosestrife, blue lyme grass, hybrid cattail, japanese knotweed and other invasives as they are discovered.

A TREE COMMISSION ESTABLISHED

In October of 2011 the Onekama Parks and Rec committee created a Tree Commission as a new sub-committee. The purpose of the Tree Commission (TC) is to oversee the planting, care, and removal of trees (if necessary) in all of the parks in the Onekama area. Members are Howard Hughes, Jon Phillips, Herb Lenon, Paul Mueller, Mary Reed, and Don Oswell. The TC will meet monthly and has already undertaken the remove of several diseased trees in Glen Park and has focused on the autumn olive infestation in several of the parks. They are pursuing the proper and best approach to

eradication/control of this damaging species.

The commission is also presently working to formulate a long term forestation plan for North Point Park. On Arbor Day- April 27th- approximately a thousand trees and bushes will be planted in the park. In the past, a single species of tree was planted. However this year, approximately eighteen different species of trees and shrubs will make up this annual planting. Volunteers are always needed to perform this task, so please contact a member of the commission to sign up for the Arbor Day planting. These efforts are all part of a plan to create enjoyable and interesting parks for all to use. See you on April 27!

October 2012

PORTAGE LAKE WATERSHED FOREVER (PLWF)

Because of the importance of wetlands to our environment, the Watershed Council decided at their August meeting to make wetlands a focus area for next year. The community interest and support for our project to purchase wetland property this summer demonstrates that people are aware of the value of wetlands and are interested in protecting and preserving this valuable resource. We will plan several community educational events on wetlands and how they protect the water quality of our lake and provide protection for our fish and wildlife. A committee was formed consisting of Howard Hughes (Chair), Al Taylor, Dave VanEerden, Dan Behring and DeeDee Miller. This committee will research all the wetlands in our watershed and investigate all possible options to protect and preserve these wetlands forever

INVASIVE SPECIES

Professional Lake Management treated eurasian water milfoil in Portage Lake twice this summer. Each time approximately 70 acres were treated (for a total of 140 acres). This is almost as much as the 164 acres that were treated in 2009. It is a significant increase from the 22 acres that were treated last year. We have had divers on the lake - prior to the treatments and after -to confirm the success of the three different treatment products that were used. The treatments seem successful but the warm winter, hot summer, clear water and low water levels have promoted the growth of not only the e.w.m., but ALL species of weeds in Portage Lake and other area lakes. The entire Portage Lake shoreline was surveyed and spot treated for phragmites on Sunday September 16th. Our management plan for the control of phragmites has been very successful. The lake will be surveyed again this fall and the final report for the lake from Lakeshore Environmental Inc will be available the end of October.

April 2013

LAKE SHORE CARE

Portage Lake is very important to our community. While gardening weather is a bit in the future, consider

seriously these suggestions about the **care and maintenance of property on the lake shore...** living by the

water carries a responsibility.

It is in the best interest of a lake shoreline to keep it natural. Cutting grasses and aquatic plants depletes the

natural screening of toxins that enter the water and invite unwanted waterfowl to the property.

Listed below are some reminders of how you can help keep our lake clean:

Plant low maintenance native trees/shrubs to reduce erosion and absorb runoff; prune trees - don't

remove them; keep solid surfaces to a minimum (use porous materials for walks and drives)

Redirect runoff away from the water's edge; leave grass about 3" high (it retains moisture)

Start a buffer – leave some grass uncut and unfertilized along the water's edge

Soften or naturalize your shoreline with grasses, aquatic plants, deep rooting native plants; let imported sand erode away naturally and allow native plants to establish

Consider a pipe, cantilever or floating dock; avoid treated wood

Properly maintain your septic system

Baking soda and vinegar are great cleaning products.

Those of us who do not live on the lake - we have a responsibility as well!! Consider the fertilizer you use on your lawn, and what ends up on your driveway from your automobile, snow mobile, lawn mower etc.... it could be a pollutant! We all need to take care of our valuable resource- our lake water!!

STATE OF THE LAKE

This will be our 5th year of treating invasive plant species in and around our lake. We will again be doing a

spring and fall survey to determine the success of our program and to achieve an "early detection/ rapid

response" to any new invasives. This year we will be working with a new lake manager Bre Grabill from

Professional Lake Management (PLM). We have had several years of experience with this company as our

applicator and we look forward to working with them as our lake manager. We are confident that the quality of

their work will meet our high standards.

Eurasian water milfoil remains our biggest concern. Last year we did an evaluation study using different

agents and concentrations. The success will be evaluated after the 2013 spring survey. We have had some

surprises in the past with the discovery of the deep water, hybrid milfoil. It is hard to anticipate what to expect

from last year's low water levels and high temperatures. If necessary, we will collect the final year of the SAD

with the 2013 winter taxes. Intensive water monitoring will continue to immediately identify any changes that may threaten the quality of our water.

The **Northwest Michigan Invasive Species Network** has recently been formed and we look forward to working with them. This organization covers the 4 counties of Benzie, Grand Traverse, Leelanau and Manistee and brings organizations with similar goals together in these areas. A grant was received in 2012 and the project will target phragmites, Japanese knotweed and garlic mustard on over 3000 acres of public and private land. Their focus is to map the location of these invasives and increase awareness of residents regarding their impact on our environment. Continued monitoring of currently treated areas will be ongoing in addition to identifying any new threats.
Mary Reed, Chair, Invasive Species Committee

July 2013

Invasive Species Committee Report

The first 2013 survey of the lake was conducted by Professional Lake Management on June 4th. In addition to doing the usual Aquatic Vegetation Assessment Site survey, they also used a Lowrance sonar and side imaging structure scanning depth finder. This is the same equipment that was donated by the watershed for use by volunteers throughout the summer. All the data will be sent to a bio-base technology company to be updated and compiled into precise, current maps of underwater invasive weed colonies. These will not only serve as treatment maps, but will become a permanent record to confirm effectiveness of areas treated, growth statistics, identify new areas of infestation for future treatment, and maintain a year by year effectiveness profile of Eurasian water milfoil treatment. With this new state of the art technology and the increased number of surveys that will be done by volunteers throughout the summer, we will have excellent data on the aquatic vegetation in our lake this summer. The purple loosestrife was treated using a biological control in late May and the phragmites treatment will be done in September.

Watch for the Portage Lake Newsletter that will be included in your winter tax notice for the 2014 Tentative Treatment and Survey Schedule. An extensive State of the Lake Report will be available later this summer.

DATE SET FOR ANNUAL FUNDRAISER

The Portage Lake Watershed Forever (PLWF) Annual Cocktail Party will be held on Saturday, July 27, from 5:00 until 7:00 at the Bernard Family compound on Ardmore Road on the north side of Portage Lake. This year will feature brief remarks by Portage Lake's Lake Management Environmental Scientist, Bre Grabil. As questions usually abound about the state of the lake, this event will give attendees a chance to get accurate and current information. The party, however, is

never all work and no play. Each year for the past six summers, the event has brought friends together to enjoy fine food and wine in their support of the Watershed's Annual Fund. This fund helps to defray costs associated with ongoing work of the organization. For tickets (\$60/each) or for more information, please contact Mary Reed, PLWF Chair, at 231-889-3781

What's Happening to Portage Lake?

The short answer is "lots". The longer answer can be had on Saturday, June 29th from 9:30 a.m. - 10:30 a.m. at the Farr Center in Onekama. Environmental Scientist Bre Grabil, who is responsible for management of the lake, is going to talk about "The State of the Lake". Sponsored by PLWF, the hour-long session is scheduled to accommodate busy weekend schedules, family obligations and Saturday errands. In other words, we will begin promptly and end on time. Coffee and donuts will be provided. There is no charge and everyone is invited.

INVASIVE SPECIES REPORT

An additional 10 acres of Eurasian water milfoil were found in a new area of the lake during a lake survey on July 23. It was treated on August 8 along with an estimated 1.5 acres in the channel off Easy Street. The lake was resurveyed on September 16 and another water quality sampling was done. Phragmites treatments were done in late September. The annual report from Professional Lake Management will be available by the end of the year.

In an effort to not just treat but to also prevent aquatic invasive species from entering our lake, the Portage Lake Watershed provided volunteers for the Manistee County Clean Boats Clean Water boat washing program. Their portable boat washer came to the Onekama Village Park boat launch on Sept. 7th. This was the first operation for this unit and for 4 hours, boats were cleaned and decontaminated with their hydroblaster heated power washer. The new Manistee County Aquatic Invasive Species(AIS) Program is led by Kirsten Sheffield who is the AIS coordinator. She shows boaters how to inspect their equipment, use proper cleaning techniques and distributes educational information about invasive species. The project is expanding to boat launches throughout the county to prevent the spread of invasive species. The Northwest Invasive Species Committee of the counties of Manistee, Benzie, Grand Traverse and Leelanau continues to meet and identify the highest priority areas for early treatment.

Submitted by:

Mary Reed, Chair, Invasive Species Committee

OCTOBER 2013

STATE OF THE LAKE - PORTAGE LAKE 2013

Summary of a report by Herb Lenon for Invasive Species Committee of the Portage Lake Watershed Forever

We must recognize that Portage Lake has several physical factors in its favor and only a few of detriment:

1.) It has a relatively **small watershed** relative to the surface area of the lake which is mostly forested, and thus, has less run-off and lower lake productivity. 2) The **soils** of the watershed are mostly well-drained sand or sandy loam so that, in general, surface runoff is minimized by the permeability of the soils. 3.) It has a moderately **good mean depth** (average = 19 ft.) which implies a lower fertility. 4.) It has a relatively **short water residence time** of 3.5 years due to the outlet to Lake Michigan which results in a greater flushing of the lake. 5.) The **orientation of the lake relative to the prevailing wind** has both benefit and adverse results. The strong west and east winds and wave action cause a greater movement (exchange) of water in and out of the lake through the outlet. At the same time, the heavy wave action at times causes more mixing of the nutrients into the water from the shallow bottom in the east end of the lake and increases productivity of the lake. 6.) The relatively large littoral zone (shallow area out to the edge of plant growth), approximately 55% of the lake surface, would imply a greater area of plant productivity but due to the sandy, **wave-swept bottom** of much of the littoral zone this limits plant invasion of the shallowest part of the shelf and decreases the total production somewhat. 7.) The relatively low ratio of hypolimnion-to-epilimnion (**lower water-to upper water areas**) tends toward greater productivity, especially of phytoplankton, but also aquatic macrophytes (plants). 8.) **Groundwater** is an important resource for Portage Lake and for the streams, and may be more significant to water quality of Portage Lake than runoff, due mainly to the short length and low flows of the tributaries which are primarily ground water inputs. With stratification of the lake in summer, the **dissolved oxygen** (D.O.) in the two deep basins consistently goes to very low levels, very near zero. This has been evident from the earliest historical data (1974) to the present. It continues to be a major concern for the lake, for if it does go to zero, phosphorus that is bound up in the substrate is changed in form and becomes soluble and released into the water column which increases the fertility of the lake. This would lead to greater "weed" production in the lake. Low oxygen levels (below 5 mg/L) in the hypolimnion are also a concern for the health of warm-water fishes. It is therefore important to continually monitor this D.O. level since it comes very close to 0 mg/L most years and we should do all that we can to prevent that. One of the greatest changes that has occurred in Portage Lake over the years has been in the **increased transparency** of the water- it has gone from 8-10 feet in earlier years to 20-27 feet more recently. This corresponds with the appearance of zebra mussels and then quagga mussels which efficiently filter the water. The major impact of the increased

transparency has been an expanded littoral zone - the shallower area of the lake that supports aquatic plant growth. In earlier years plants would grow out to about 12-15 feet of water. Now we have plants growing out to 20-25 feet due to greater light penetration with increased transparency of the water. This means there is less plant-free area of the lake.

Phragmites (giant common reed) was found in 2008 becoming a monoculture in the shoreline and adjacent wetlands.

The phragmites population has been significantly reduced around the lake which has helped to protect the diversity of the

shoreline marsh area. The **Eurasian water milfoil** population was initially greatly reduced and then rebounded due to miscalculations of the population and consequently, incomplete treatment, but now should come under better control. To

complicate this, it has hybridized with the native northern water milfoil and become more resistant to herbicide as a result

of hybrid vigor. **Purple loosestrife** is another invasive exotic plant of the wetlands that can quickly become a

monoculture, eliminating all diversity of the wetlands. We have been treating it along with the phragmites and will now

begin some biological control of it with beetles which looks promising and will reduce the herbicide application. In the

extensive study of 1991 by the Snell Environmental Group only 10 native aquatic plant species were identified. During our

four year study and treatment, 18-24 native species were identified along with the three exotic species. So it appears that

plant diversity has increased, and even more so with treatment of the invasive species, the desired result.

Chlorophyll-a is a parameter used to determine the eutrophic state (enrichment or age) of the lake. Our values for the

deep basins (open waters) fall mostly in the range for a mesotrophic lake (mid-range of enrichment - 2-6 ug/L). Only on a

few occasions does it move up into the eutrophic (enriched or aged) state (>6 ug/L). Hence, Portage Lake has been fairly

consistent over the years but needs to be continually monitored to prevent premature aging (enrichment).

Phosphorus loading in Portage Lake comes possibly from both the lake and from the watershed.

Internal loading is due

to wave and boat churning of sediments, especially in the east end and by anaerobic (lack of oxygen) release of

phosphorus from sediment in the deep basins. External loading from the watershed is by tributary inflows and runoff from

the land (e.g., fertilizers) along with inadequate septic systems. The current phosphorus loading to Portage Lake from

upland areas of the watershed via tributaries does not appear to be above a level which the lake can assimilate at its

existing state. However, we must realize that some proportion of the phosphorus loading is cumulative and wherever it

can be controlled it must be done to avoid the potential for future water quality problems. This is even more important if

the watershed continues to be developed. **pH** is the measure of acidity or basicity with a pH of 7.0 being neutral. Historically, Portage Lake has been primarily

consistent in the range of 7.7 - 8.9. In our studies from 2009 – 2012 the pH has ranged from 8.0 – 8.5. thus, Portage

Lake is classified as a hard water lake with a moderate calcium carbonate content. The presence of numerous flowing artesian wells around the lake indicates that carbonates are entering the lake dissolved from underlying limestone bedrock.

Closely related to pH are measurements of **alkalinity** which evaluate the buffering capacity (less change in pH) of the lake. The higher the alkalinity the greater the buffering capacity and, hence, the greater ability to accept acid inputs from acid rain or runoff without significant impact. Based on alkalinity, as with pH, Portage Lake moderately well-buffered with only minor variations occurring from time to time.

Phytoplankton, the microscopic algae in the water column, is an important component of any lake ecosystem, for it is the major base of most food chains in the lake. There are many different species possible and there are good ones and some bad ones. The blue-green algae are undesirable, capable of forming unsightly algal scums on the surface and producing microtoxins that can cause neurologic or hepatic (liver) dysfunction in animals or humans if ingested in large quantities. They tend to appear more in late summer. Nutrient levels in the lake are still low enough to prevent excessive blue-green algae blooms (scum).

Over the past four years (2009-2012) a limited number of **E. coli** samples have been taken at various sites around the lake and all have been low or below detection levels.

Although Portage Lake contains a healthy biodiversity of plants, fish, and other organisms, it does have a moderately high general productivity and nutrient level, and with continual inputs of nutrients. Thus, the system must be monitored continually to avoid impending problems in the future.

Portage Lake Watershed Forever UPDATE OF ACTIVITIES

The Watershed has been very busy this summer with efforts to increase awareness of the watershed and educate folks on ways that to preserve and protect it. Literature was placed at display booths during Onekama Days and at the Manistee County Fair, PLWF participated in the Onekama Days parade and volunteers took part in the Clean Boats Clear Water demonstration at the Village Boat Launch on September 7th.

The invasive species committee of the Watershed and Township has continued to put data into the new gps ciBioBase program throughout the summer. This equipment allows for constant monitoring of the weeds on the bottom of the lake. Maps and data are posted on the display board at the village boat launch. Call Chuck Reed if you would

like more information on the surveying done this summer (231-889-3781). A program on the State of the Lake will be presented at the October 29th PLWF annual meeting. Watch for more information on this (a summary of the state of Portage Lake is included in this newsletter).

What Can YOU Do to Protect Portage Lake?

Do not feed the ducks and geese.

Remove dog, geese and duck droppings from lawns, docks, etc.

Excess feces will increase nutrients within the lake.

Create a natural buffer close to the water's edge and remove grass/turf touching the water's edge. A natural setting consisting of native plant varieties of shrubs, flowers or trees that do not shed their foliage into the water will filter excess nutrients from entering the water and decrease erosion. Natural buffers are also an excellent way to deter geese from making a stop on your beach front. Geese do not like areas where they cannot see the predators coming towards them.

If you fertilize, make sure you are using phosphorus free fertilizer.

One pound of phosphorous may produce over 775 pounds of algae - "the slimy green stuff".

If you must fertilize, apply nitrogen fertilizer when the grass is actively growing to minimize loss of nutrients to nearby waters. Begin fertilizing in the spring when temperatures are warm and discontinue before the grass ceases to grow in the fall. Avoid application of fertilizer prior to rainy days.

Perforate lawn periodically and seed and mulch exposed soil (to prevent erosion).

Remove aquatic plants, leaves/branches and other debris that wash up along the lakeshore so less decomposition occurs in or near the lake.

Always use silt fences when building a new home or doing any yardwork that would cause erosion.

Keep all burn piles and debris piles away from lake. Do not burn near the water. The ash is concentrated nutrients!

Encourage the use of stone, brick and similar porous materials when building a landscape to minimize urban water collection.

JANUARY 2014

Invasive Species Committee Report

After 5 years of treating the invasive species in and around Portage Lake, our phragmites remains under control.

Eurasian watermilfoil continues to be a challenge as it has formed a hybrid, making it more difficult to identify and treat. Also it has moved to deeper areas of the lake due to increased water clarity caused by invasive zebra and

quagga mussels.

Extensive surveys of our lake with the latest state of the art equipment provides us a definitive baseline to monitor future weed growth and water quality. Data in the 2013 report shows clearly that 5 years of treatment has not harmed our native plants, since the agents used specifically target the milfoil while improving fish habitat.

The Invasive Species Committee is working with the Watershed and Township Board to implement a management plan for the next 5 year phase. We have started the process of renewing our Special Assessment District (SAD). This will require that the Township Board pass several resolutions and hold public meeting as was done in 2009. A tentative timeline has been developed so that the renewal of the SAD is completed in May 2014. This will give us time to obtain permits, complete an early spring survey, develop contracts for the applicators and do a community education program. The community education program will begin as soon as the Resolution of

2013 Supplement to the State of the Lake Report

By Herb Lenon (Summarized from BreAnne Grabill's PLM Report, 2013)

Management Goals for the Portage Lake Study:

1. The primary goal is to control exotic invasive plants to the maximum extent possible, and to encourage native plants throughout the lake to promote an overall healthy ecosystem for recreational use and a healthy fisheries, as well as maintaining the riparian enjoyment of the water resources and the value of their properties. Aquatic plant management should preserve species diversity and cover of native plants to provide suitable habitat for fish and other aquatic organisms, while avoiding interference with recreational uses of the lake (e.g., swimming, boating and fishing). Chara (Muskgrass) is a highly desired plant, typically low growing, keeping the water clear and slowing down the invasion of exotic weed species through competition. It should be allowed to grow throughout the lake except where it may interfere with swimming or boating. It is presently the most abundant plant species in the lake. Invasive terrestrial plants (e.g., Phragmites and Purple Loosestrife) should be controlled along the shoreline and adjacent wetlands where present. Both species can quickly take over the wetland forming monocultures, crowding out native vegetation and indigenous waterfowl habitats.
2. Water quality monitoring and vegetation surveys must be continued and is essential for preserving a high quality lake by detecting changes that may adversely affect the lake, and to target and reduce external loading of nutrients. Proper watershed management techniques should be encouraged and applied wherever possible.

3. Outreach/education of the Portage Lake residents is important and should be on-going in an attempt to communicate

lake activities and management goals. The Portage Lake website can help to keep residents informed and communicate

activities and practices concerning the watershed and lake management.

Lake Monitoring – This involves several components:

1. Complete aquatic vegetation (aquatic macrophyte) surveys of the entire lake done according to the State of Michigan

AVAS (Aquatic Vegetative Assessment Survey) Method which gives the distribution and densities of the species found.

This is performed twice each year (June and September) to identify all native species and, thus, helps to determine and

maintain the desired species diversity. At the same time exotic invasive species densities and locations are mapped for

treatment. Several post treatment surveys monitor the success of all treatments.

2. Algal (phytoplankton) population is monitored twice each year to identify phytoplankton composition and diversities

which is essential as the base of all food chains.

3. Along with phytoplankton samples, zooplankton populations were identified to determine their composition and diversity

as the second level in the food chains.

4. Lake water quality monitoring included 12 parameters being analyzed for each of the two deep basins and for

three selected shoreline sites, all done twice a year (June and September). In addition, tests for E-coli were performed at

three designated shoreline sites.

5. Tributary water quality was monitored for ten parameters twice a year (May and September) in six streams near the

outlet of each as important potential contributors to lake quality.

6. Four storm drains were monitored for ten parameters in May as important potential contributors to lake quality

Results and Conclusions:

1. Aquatic Vegetation: There were 19 native species found in the lake and this represents a very good diversity and stable

population of native plants and confirms the selectivity of the herbicides used to control the exotic invasive species. Two

exotic invasive species were found again this year, Eurasian watermilfoil (EWM) and curly leaf pondweed. 129.75 acres of

EWM was treated. The curly leaf pondweed is an aggressive plant but was not found in the September survey due largely

to natural die-off midsummer which is common for this species and this allows for the native species to increase in its

place. Starry stonewort, an invasive exotic species has not been seen yet in Portage Lake but we need to be on the watch

for it as it is in Michigan and can be very detrimental to a lake ecosystem. The most common plant species found were

chara, wild celery, sago pondweed, richardson pondweed, thinleaf pondweed, naiad, and coontail.

2. Phytoplankton: There were 13 genera of phytoplankton algae present with the most common being diatoms, which is

also the most beneficial, and thus, a good thing. The least desirable is the blue-green algae which was the least abundant

in June but became the most abundant in September. This is of some concern yet not at high enough level to be a problem

at this time but needs to be watched in the future. Blue-green algae can release toxins that may cause problems and also

form an ugly scum on the surface of the water when populations become abundant. Zebra mussels will not filter it out but do filter the green algae and this is why the bluegreens become dominant later in the season replacing the more desirable green algae.

3. Zooplankton: They were diverse and represented by three key genera. So both the phytoplankton and zooplankton populations represent a healthy water quality structure and supportive of a healthy, robust fishery.

4. Water Quality Results: a.) Temperature and oxygen profiles in the two deep basins indicated that on June 4th the lake

was already stratified with a thermocline at approximately 20 ft. The dissolved oxygen was high down to the bottom and

somewhat higher in basin 1 than basin 2. On September 16th the lake was still stratified but nearly anoxic (no oxygen) near the bottom in both basins, lower in basin 1 than 2. This is a common symptom of eutrophication and leads to elevated

internal nutrient loading with a release of phosphorus from the sediment. These results are consistent with previous years

and remains a concern to watch. b.) pH, alkalinity, conductivity were consistent with previous years.

c.) Secchi Disk values were significantly lower in the two basins than the past two to three years indicating a lowered

clarity of water, but is dependent on many variables, e.g. the person doing the reading, amount of sunlight, time of day,

wave action, time of year, plankton population, etc. They were determined this year by a different observer and in June 4th

and September 16th instead of May and August . That alone could make the difference. This is something to watch and

evaluate next year.

d.) Total Dissolved Solids (TDS) and Turbidity are parameters that are related to Secchi Disk values and they do help to

explain the Secchi Disk results this year. The TDS and Turbidity results were both significantly higher in both basins this

year which correlates well with the lower clarity of water indicated by the Secchi Disk results and may well be due to the

time of year of sampling. This is evident as well with much of the earlier results when Secchi Disk values were lower at

these same times of year. e.) Total Phosphorus (TP) values were somewhat lower in both basins than previous years

which is a good thing but needs to be monitored closely each year since the lake is phosphorus limited, which means an

increase in phosphorus will result in an increase in plant production. The shoreline sites were significantly higher than the

basins, especially in June, which might suggest runoff, stream input or the stirring up of the shallow bottom sediment and

releasing phosphorus. f.) Total Kjeldhal Nitrogen (TKN) were somewhat higher than previous years and especially in

September samples. This parameter needs to be broken down into nitrates and ammonia component values in the future

to indicate if internal loading of nitrogen is a factor. g.) Chlorophyll-a values were consistent with previous years or slightly lower and are low to moderate overall. This is an indicator of the primary production in the lake. h.) E-Coli values

5. Tributary Water Quality: Six tributaries were sampled on May 10 and September 16: Glenn, McCormick, Onekama, Schimke, Dunham, and Hansen. a.) TDS and Turbidity were significantly higher than lake values, thus, a sediment load concern somewhat. b.) TP was significantly higher than lake values in Glenn, McCormick, Hansen, and Schimke in May. Schimke and Hansen were higher in September. These streams are a concern at times. c.) TKN was higher than the lake in June but about the same in September, thus, all these streams may be a concern. d.) Conductivity was somewhat higher than the lake in both June and September. This corresponds with the TDS and turbidity results. e.) pH was consistent with the lake. f.) Flows ranged from 0.8 ft/sec (Onekama) to 2.5 ft/sec (McCormick) in May and from 0.6 ft/sec (Glenn) to 1.6 ft/sec (Schimke) in September.

6. Storm Drains: Four storm drains were sampled on May 10th during a slight rainfall. a.) Dissolved oxygen was high. b.) pH was typically lower than the lake, thus slightly more acidic. c.) Conductivity, TDS, and Turbidity were typically higher than the lake, thus, some concern. d.) TP was significantly higher than the lake and is a concern. e.) TKN was significantly higher than June in the lake and is a concern. f.) Flows were slow-to-quick and murky-to-clear.

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CITIZEN SCIENTIST

The **Portage Lake Watershed Forever (PLWWF)** continues to develop best management practices for the protection and preservation of our watershed. In our efforts to do this, we are always looking for ways that **everyone** can become more involved in protecting our lakes and streams.

Last year the PLWF purchased equipment and a program called **ciBioBase** for mapping the concentration and location of weed beds in the lake. This, along with the AVAS survey by our lake manager, identifies the variety of species in those location, providing invaluable GPS referenced data for treatment of the invasive plants and determining the effectiveness of our treatment program. This data can be collected by anyone and uploaded to servers where it is processed into various online charts and graphs.

Call Chuck Reed 231-889-3781 for more information on how you can be involved.

This year the **PLWF** is starting a **Crowd Hydrology** program with the University of Buffalo and the USGS to

gather data on our streams. The program has expanded from New York to Michigan, Wisconsin, and Iowa.

Anyone passing by can dial a number and text the height of the stream to that number. The information is then

entered into a computer program and made available online so anyone can view the data. The PLWF has placed stream measuring devices in 5 of our 22 streams that empty into Portage Lake with nearby signs explaining the program. The sites are located on the following streams:

1. Stream #4 (just past Little Eden)
2. Onekama Creek (5098 Main -Near the old Pizza Place)
3. Stream #7 (Near the Blue Slipper)
4. Schimke Creek (E side of M22 just before the Fairgrounds))
5. Hansen Creek (Onekama Marine west side).

Please watch for these signs and stop and text the data on your cell phone

Portage Lake Watershed to Host "Tuesdays With Water"

Tuesdays With Water

If you have every wondered if it's safe to drink your funky smelling well water or if treating lake water to combat invasive water plants impacts fishing, then the information

sessions being hosted by the Portage Lake Watershed Forever (PLWF) Council Tuesday nights during July and August in Onekama are just for you.

Dubbed "Tuesdays With Water", the forums aim to help people who live with, near or on Portage Lake get answers. "One of the main goals of our organization," said Mary Reed, PLWF Council Chair, "is to provide "best-practice" information so we can all make smart decisions about how to protect the health of the watershed."

Dan Behring, co-chair of the PLWF Education Committee, said that the topics range from safe landscaping practices to learning about how to keep the lake from dying. Session presenters include Gregg Goudy (Water Resources Division with Michigan's Department of Water Quality (DEQ); Tom Reichert (District 10 Health Department Environmental Health Director), and Bob Versical (Hydrogeologist, DEQ Oil & Gas Division).

Dr. Herb Lennon, a Fisheries Biologist and long-time member of the PLWF Council, and Susan Conradson, DEQ Watershed Specialist, will provide updates on the status of the watershed and its origins.

All of the meetings will be held at the Farr Center in Onekama from 5:00 - 7:00 pm, are open to the public and are free.

July 15 - Safe Yard Care

Shoreline practices, fertilizer use, spraying and removing bottomland vegetation, soil disturbance, burning practices. Presenters - Greg Goudy, Water Resources Division/DEQ; Carolyn Thayer, MI Certified Natural Shoreline Professional

July 22 - Invasive Species & Fishing

What invasives threaten fishing in the lake? What can/should be done? Plants, fish, waterfowl, mussels, and more. Presenters - Mark Tonnello, MI Fisheries; Herb Lennon, PhD Fisheries Biologist; Kristin Sheffield, Manistee County Aquatic Invasive Species/Watershed Coordinator

July 29 - How Do We Keep the Lake from Dying?

Septic design & maintenance, sediment & other pollutants (runoff), weed management, symptoms and solutions. Presenters - Tom Reichert, Environmental Health Director, District 10 Health Department; Eric Grabill, Portage Lake Lake Manager; Herb Lennon, PhD Fisheries Biologist

August 5 - Water Works

Where does the water in Portage Lake come from? Fascinating overview of the watershed. Maps, demonstrations and more. Presenters - Herb Lennon, PhD Fisheries Biologist; Bob Blackmore, Onekama Township Board; Susan Conradson, Watershed Specialist MI DEQ Water Resources Division; Bob Versical, Hydrogeologist, DEQ Oil & Gas Division

August 12 - What About Wetlands?

What are they? Where are they? Why are they important? What is being done to protect them? Presenters - To Be Announced

August 19 - '... but not a drop to drink.'

Does your water taste or smell funny? Is it safe to drink? Artesian, shallow and deep wells. Tom Reichert, Environmental Health Director, District 10 Health Department