FRIENDS OF THE MUKWONAGO RIVER

A Letter from the President

The Mukwonago River watershed has held its own since our last newsletter. Landowners patiently work on their private lands. Local land trusts have continued to find and preserve land in their boundary areas, and to enhance the properties they acquire.

The lake districts in the watershed move forward to deal with their dams, purple loosestrife, and other aquatic invaders, newly on the scene and old ones. People continue to find good recreational activities in the watershed, and the water quality and health of the watershed seem to hold steady. The Village of Mukwonago is working to meet the phosphorous standards as required by the state for their water treatment plant. Our fish biologists and mussel experts are monitoring the aquatic species, for diversity, health, and consistency over time.

Wisconsin DNR has not yet finalized the master planning process for the Mukwonago River Unit of the Southern Kettle Moraine, but we assume it will happen soon.

And it has been an election season that brings changes in policy that are inherent and that we can either love or despise, but mostly have to ride with the waves. Thus far, the watershed has not sustained any known problems, and there are many folks watching out for changes.

You can join us to preserve the value in the watershed by either becoming official citizen monitors, which we need more of, or as individuals caring for and monitoring your own piece with an eye to the watershed's health.

Friends of the Mukwonago River salutes you, supports you and hopes you continue to support our efforts to protect and preserve this amazing resource. We need each other to be the eyes and ears of the watershed to ensure its health.

Thank you for all your good work. We appreciate it. Please remember Friends as you work on your charitable giving goals each year. It is your membership and contribution that allows the Friends organization to protect this pristine environ. We are all tasked with preserving this great place and together with all our partners, we can sustain the value of the watershed for posterity.

Thank you,

Ezra Meyer

Ezra Meyer, President

2015-2016
NEWSLETTER

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OUR MISSION

To protect the Mukwonago River and its associated watershed ecosystems by way of education, advocacy, and promotion of sound land use throughout the watershed.

Mukwonago River Protection and Restoration Projects

Funded by the Southeastern Wisconsin Fox River Commission

Alan Barrows, Sr. Conservation Specialist, Waukesha County Dept. of Parks and Land Use, Land Resources Division

Shoreline & Riparian Buffer Restoration on Roxy Pond

The project is being completed with funding in part from the Southeaster Wisconsin Fox River Commission (SEWFRC) to stabilize and restore an eroding shoreline. Roxy Pond is an impoundment that is a tributary to the Mukwonago River, and along the water's edge, a cut bank has formed from wave action and a lack of vegetative cover and mature trees were falling into Roxy Pond. The project goals' included increasing light penetration and to revegetate the shoreline. The first step was to remove invasive and noxious woody species along the shore. A few white pines were removed to provide space for naturally reproducing white and red oak trees. The second step was to install 500 feet of coir biodegradable logs at the toe of the bank. The area immediately behind the coir logs was planted with Wisconsin native plants, and the riparian buffer area was seeded with a native mesic seed mix. Lastly, biodegradable erosion control blankets were installed on the slope above the coir logs.

Groundwater Protection and Erosion Control Project

The project includes the control of invasive and non-native vegetation along a wooded navigable tributary to Jericho Creek. Targeted species for control include buckthorn, honeysuckle and reed canary grass. The re-establishment of native herbaceous ground cover through the riparian area, which is mapped as Primary Environmental Corridor, will help to prevent soil erosion and encourage groundwater recharge. The project includes the construction of two rain gardens to infiltrate runoff back into the ground and re-seeding nearly 10 acres of reclaimed woods with native ground cover.

Phantom Woods Road Filter Strip

In 2010, as part of the Town of Mukwonago's project to upgrade Phantom Woods Road, SEWFRC provided cost-share funding to construct a Wisconsin native vegetation filter strip to treat runoff prior to entering the Phantom Lakes. The project also included installing biodegradable coir logs along the lakeshore to prevent erosion.

Rainbow Springs Culvert Removals

In 2013, SEWFRC provided cost-share funding to assist in removal of seven culverts along the Mukwonago River at the former Rainbow Springs Golf Course. The goals of the project were to improve navigability, provide riverbank stabilization, enhance wildlife and fisheries habitat and protect and enhance water quality. A variety of partnerships were formed among government agencies, nonprofit groups and educational institutions to work toward the project goals.

Indianhead Park Shoreline Restoration

Years of fishing and swimming at the park caused severe erosion to a long stretch of the shoreline and de-

PROJECTS continued on next page

Culvert removal at Rainbow Springs

Buckthorn removal

Mukwonago River Mussel Study

By Todd Levine

On the banks of the river, there is a pile of shells. The outsides are crusty brown and unimpressive. But the insides range from milky white to pearly salmon to royal purple. This part is the nacre, and it has been a prized material for a long time. It is what brought many vast populations of these animals to ruin, especially when they were harvested for material to be used as pearl buttons in the United States where large proportion of the global diversity of these animals exists.

While they don't seem all that interesting beyond their attractive shells, their unremarkable bodies belie a complex lifecycle that has also compromised their survival as we have dramatically altered our rivers. These mussels are unique among mussels and clams (collectively bivalves) that live in freshwaters, because they have a secret to moving upstream. When they are very small, the size of a grain of sand, they attach themselves to fish and hitch a ride. Once they arrive at a new habitat, they hop off and start a new life.

I have been studying this lifecycle for more than 10 years, and when I moved to Wisconsin, one of the outstanding DNR employees, Lisie Kitchel, invited me to check out the mussels of the Mukwonago River. It is a unique resource in southeastern Wisconsin, with more species (about 15) than in many other locations, including one that is listed as endangered by the State of Wisconsin. Over the past two and a half years, my students and I have explored the mussel community in the Mukwonago.

Matt Baumann, Erin Cox and Lynne Noel, among numerous volunteers, have collaborated with me to survey the mussels from the Fox River to the Phantom Lake Dam. We see the numbers of individuals and species increasing as we move upstream from the Fox with the greatest numbers just below the dam. There are mussels upstream of the dam, but to my knowledge their populations are smaller and seem to be scattered.

Mussels grow a special lure to invite attacks by their host fish. The mother displays the lure and a fish attacks it, becoming infested with her offspring. We don't know as much about this interaction as we need to conduct effective conservation. So, my research team is trying to learn about the behaviors of mussels displaying lures and how different fish react to them. So far, we have discovered that some mussels only display their lures at certain times of the day and night and that although many individuals have lures each year, there are strong differences in whether and when these lures are displayed. So far, we have been working with the common species, the plain pocketbook or Lampsilis cardium. Over the next few years, we hope to learn more about how fishes respond to differences in the coloration of the lures and to find out when the rainbow mussel, Villosa iris, displays its lure, which mimics a crayfish.

PROJECTS continued from page 2

graded the habitat and spawning grounds for a number of aquatic species. In 2008, a 500-foot section of shoreline at Indianhead Park was restored. Coir fiber logs were installed along the shoreline. The fiber logs were planted with native plant plugs. The native plants extensive root systems spread down through the fiber logs and into the soil and the river bottom. The vegetation provides habitat and a food source for both aquatic and terrestrial animals. Because this section of the river is so popular for recreational use, river access was kept intact by providing several access points where the toe at the shoreline was reinforced with fieldstone boulders.

Future projects include:

- Shoreline restoration on We Energies' property
- Mukwonago Park shoreline restoration

The Commission has recently agreed to help fund the County's aquatic invasive species program for 2017 through 2019, as well as committing funds for the 2017 Fox River Summit.

Wisconsin Wildlife Collector Report

By Todd Levine

During late summer and autumn of 2014, we conducted research activities with the mussel community of the Mukwonago River. We conducted two, reach-level surveys containing three quadrats each, consistent with the protocols designed and used by the Wisconsin DNR to assess the mussel community (Figure 1).

During these surveys, we collected mussels in mesh bags from a subset of ¼ m quadrats, identified them and immediately returned them to the river. Below are the aggregate community data that we collected during 2014 (Table 1).

In addition, we observed the lure display behaviors of a total of 41 L. cardium in situ over

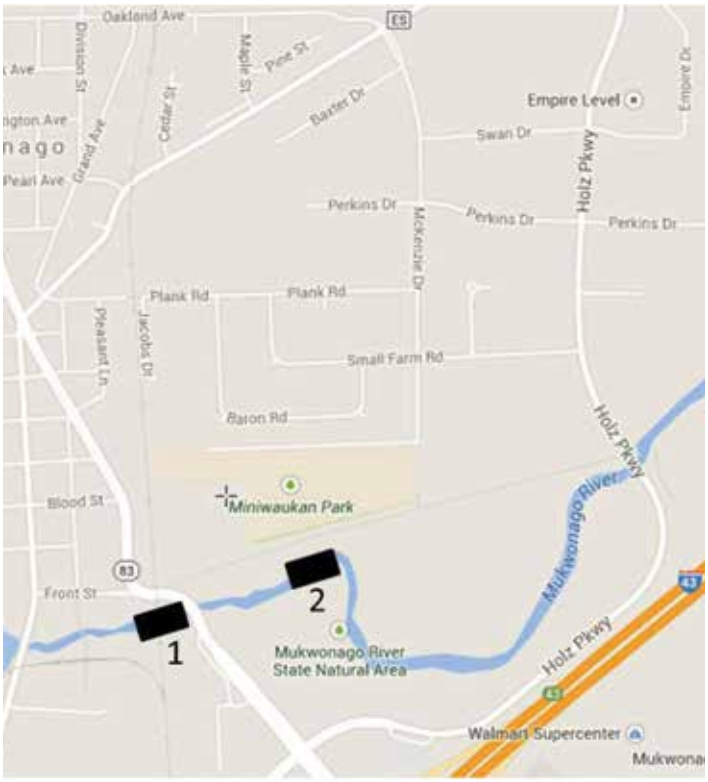


Figure 1. Mussel community survey locations in the Mukwonago River. Phantom Lake is directly to the west of the mapped area.

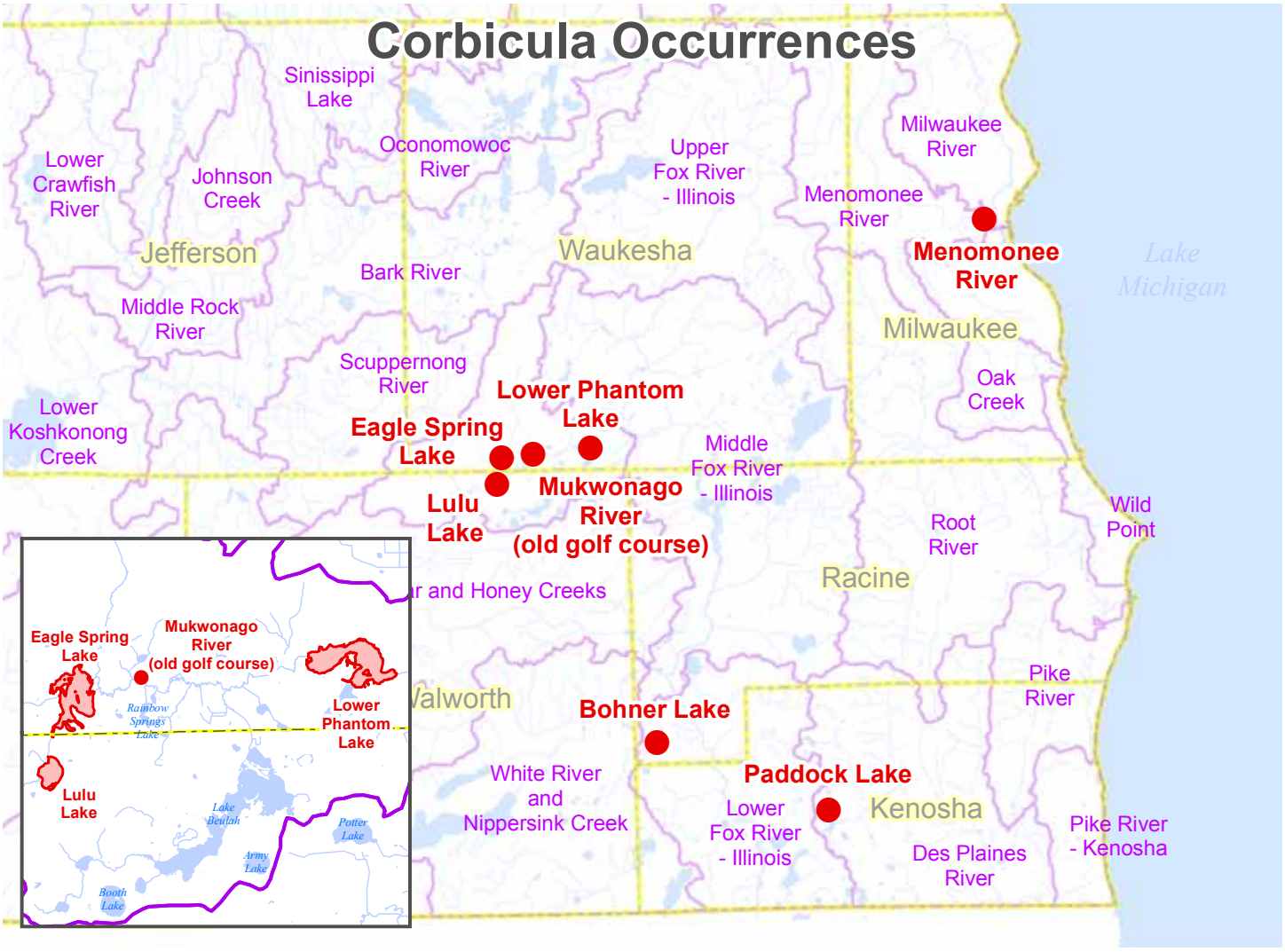
Lampsilis cardium

nine days in August and September, including one overnight observation. All of these mussels were located immediately downstream of the Highway 83 bridge. We were able to locate 19 of these mussels again in October and tagged them using cyanoacrylate glue and Floy™ tags (A0001 – A0019). We collected a total of four gravid, female Lampsilis cardium from the river to observe under laboratory conditions. These have been preserved and are currently being stored for morphological observation.

Permanent disposition in an appropriate collection will occur after the present study is complete and all relevant data collected.

	Alive	Dead	Total
Elliptio dilatata	96	97	193
Pleurobema sintoxia	80	38	118
Venustaconcha ellipsiformis	78	17	95
Strophitus undulatus	22	6	28
Lampsilis cardium	20	3	23
Villosa iris	20	2	22
Dreissena polymorpha	5	12	17
Lampsilis siliquoidea	5	0	5
Pyganodon grandis	3	1	4
Lasmagona complanata	3	0	3
Fusconaia flava	3	0	3
Fingernail clams	0	3	3
Toxolasma parvus	0	2	2
Actinonaias ligamentina	0	1	1

Table 1 (at right). Aggregate mussel community data from the Mukwonago River for the two sampled reaches.



Tips on Buckthorn

By Barb Holtz, Pam Meyer and Jacki Lewis

CHOOSE A GENERAL STRATEGY

CUT & STUMP TREAT The traditional recommendation. Cut the buckthorn, and paint or spray the stump with either half-strength RoundUp or a basal bark mix. This method looks the neatest, although live buckthorn can be heavy and will need to be burned or piled for later.

BASAL BARK TREAT & CUT Our preferred method if it is safe to leave the dead buckthorn standing for a while. Treat the buckthorn with a basal bark mix, let the tree die, and then remove it. If the buckthorn has been standing dead for at least a few months, it is very easy to cut, the wood becomes very lightweight, and the thorns break off before they can stab you. As a rule of thumb, treated buckthorn will fall over in a year or more. Cutting the dead tree before it falls will disturb the soil less, leaving less opportunity for other invasives to take root.

"SPRITZ" METHOD Conservancy gurus Tom & Kathy Brock have developed the "spritz" method for small, isolated buckthorn shoots. For small buckthorn less than 3 inches tall in a single shoot, the top two leaves can be spritzed with the basal bark mix, and the whole shoot will die. This is typically done with a kitchen sprayer.

FOLIAR SPRAY A thick patch of low buckthorn, such an area that was mowed within the last year, can be treated with a foliar (leaves) spray. This is risky because the broad spray can kill desirable plants. The best time is fall when the buckthorn leaves are still green, but most native plants have already died back and newly fallen leaves will protect the ground plants. Some experts recommend a mix of RoundUp (per label) or triclopyr in water (2 to 4 oz per gallon of water) with surfactant, but Jacki's results have generally been mediocre.

BURN Burns, such as a prairie burn through the woods, will definitely help, but are not enough to substitute for chemical treatment. A burn kills the top growth of buckthorn up to about 1 inch in diameter, but does not kill the roots. Volunteer to help others burn to gain some experience before trying it yourself.

DON'T WANT TO USE CHEMICALS?

We understand not wanting to use chemicals. Choose your chemicals carefully to be effective, to break down in the soil quickly, and use just barely enough to get the job done. Select chemicals, including triclopyr and diCamba, break down fairly quickly in the soil. Treating just the bark or a stump keeps the chemical to a very small area, and it works

CUT-STUMP TREATMENT

Anytime you cut a live tree or shrub that you are trying to eradicate, treat the fresh-cut stump! The cheapest way is to spray or paint the stump with half-strength RoundUp. The concentrate of RoundUp is 50% glyphosate, which can be mixed 50-50 with water for a 25% concentration. You have to treat the stump while it is fresh, within the first 2 to 3 minutes, for the glyphosate to get absorbed into the roots.

Stay fairly close to the recommended mix and concentration of any chemical. If you mix it too weak, you won't have enough of the active ingredient. However, if you mix it too strong, the chemical may not flow well in the plant to get down to the roots or wherever it needs to be.

If resprouts radiate outward from the stump, a quick conical spray of basal bark mix, centered on the stump, will get spray near the base all the little side shoots as well as the stump.

BASAL BARK TREATMENT

It's simple! Simply paint or spray a basal bark mix, typically triclopyr in oil, onto the trunk of the buckthorn. The oil helps the triclopyr soak through the bark to go into the roots.

The buckthorn will show signs of dying within 2 to 4 weeks during the growing season, with brown leaves hanging on the tree. Basal bark treatment can be done anytime during the year, though fall is best; spring is the least effective. Fall is when the trees and bushes are really pumping nutrients (including herbicide) down into the roots rather than up into the leaves (spring). Buckthorn stands out in fall because its leaves stay green while native trees and shrubs have shed their leaves. In addition, the native understory is going dormant. Winter also works really well and has the advantage that you can burn the brush piles while there is snow on the ground.

Well soak the basal bark, to the point where it is starting to run down the tree (but not enough to run off onto other things). It helps to master the art of the "dribble" by adjusting the sprayer to shoot a small stream rather than a fine mist.

We typically spray a band on the trunk about 2 inches wide (high) for every 1 inches of diameter of the trunk. We most often spray the band about a foot off the ground, but for trees 3-inch diameter or larger, add a light spray close to the ground and on any exposed roots will help prevent re-sprouts. For stems or trunks less than 1-inch diameter, you don't need to get all the way around the trunk. The oil mix will soak around from just one side. If you can use your foot to bend small buckthorn over, a couple drops on the stem will run around the stem for a very sure kill.

BASAL BARK TIPS:

Basal bark the large berry-producing trees first, so you stop production of more seeds that will sprout later.

For each specific area or unit, plan on repeat visits because no matter how thorough you are, you will miss a few. Basal bark as many as you can on your first pass through the area. Two to three weeks later, you will see brown leaves on the buckthorn that you treated and will be able to easily see the green ones that you missed. You will miss a few, but each time you return you will see significant progress. If you start this process on the first cool days in August, you will have time for several passes into early November. By late fall, the natives go dormant and the leaves from the oaks and hickories will provide a protective layer on the ground, so this is an ideal time to go back to spray the little shoots.

Also, remember that basal barking works in the winter as well, though you need to learn how to tell buckthorn by its twigs without leaves. Trees that you killed by basal barking in the early to mid-fall will hang onto their brown leaves, whereas the buckthorn that were still live will have dropped their leaves.

BURN PILES

It is worth the extra effort to immediately stack or pile downed trees and branches into a burn pile. A good burn pile has the branches lying mostly parallel to each other to concentrate the heat, so cut the major branches apart. This is also where working with dead buckthorn is much easier than live, because the dead ones break apart and crush down. Honeysuckle cut into 1- to 3-foot lengths on the bottom of the pile makes good kindling for starting the pile. Burn the piles fairly soon to avoid critters nesting in the piles, and to allow the burn scar to be re-used for the next load of cut buckthorn.

Check your local burn ordinances to find out the requirements for burning in your municipality.

SUPPORT:

Last but not least, find friends who are doing similar projects that you can work with occasionally. We share tips and learnings, work together when we need help, and have others who can appreciate what we're each doing

WDNR Forest Weed Grant Update

Friends of the Mukwonago River (FoMR) is pleased to announce that the Wisconsin Department of Natural Resources accepted its second proposal for a Private Forest Weed Management grant. Under the first grant, nine local landowners successfully removed terrestrial invasives from more than 17 acres. The latest round will provide assistance to 10 landowners working over 25 acres. These grants provide a $375 per acre reimbursement to the landowner, which only helps defray the actual costs to perform the work. The two grants are valued at $10,000 each from WDNR funds and require a minimum 25% cost-share contribution from FoMR and the landowner participants.

For 16 years, Friends has worked to preserve and protect the Mukwonago River and the surrounding watershed, a river system that is widely recognized as having some of the highest levels of plant and animal diversity in all of Southeastern Wisconsin, including nearly 80 state-listed threatened and endangered species.

FoMR is broadening its focus on invasive species as a primary ecological concern within the watershed with these Wisconsin DNR Private Forest Grant Program — Weed Management Area grants. This grant will complement the DNR Aquatic Invasive Species Control grant that Friends is currently fulfilling. That grant provides two years of funding for aquatic invasive species monitoring, control and education, focusing on Asian Clam, corbicula fluminea. On the other hand, the Private Forest Grant Program is focused on terrestrial invasive species. Together, these grants will allow Friends to take a comprehensive approach to invasive species education, control and monitoring.

The FoMR grant was used in part to expand upon our very successful "Got Buckthorn?" workshop. In addition to making it possible for Friends to offer additional workshops that focus on other terrestrial invasive species and control methods for them, we also offered workshops on woodland and prairie restoration methods and moved some of our education offerings into the field and offered hands-on workshops so attendees could try basal barking, cutting and burn- control methods while working with experts to provide detailed instruction, tips and hints on how to make invasive species control and native species propagation work for individual landowners and their unique situations.

FoMR is broadening its focus on invasive species as a primary ecological concern within the watershed with these grants.

Other aspects of the grant application are focused on developing a template for landowners to use to develop a land management plan for their property, watershed-wide invasive species monitoring, the development of a tool loan program so that landowners can

Savanna Oak Restoration & Evolution

Mess of buckthorn, March 2012

Mechanical clearing in progress, Nov. 2012

easily access the tools they need for invasive removal and working with local and county officials to ease the regulatory process for landowners seeking to undertake invasive removal on their land.

Friends' used a specific methodology to document the work our landowners did under the grant on their properties. Each landowner filled out our application and rubric which established these inventory items:

- Landowner information, location, contact info, coordinates
- Plant species of concern, abundance, distribution
- Maps or location information for targeted species
- Method of inventory (meander, high-use areas, drive-by, etc.)

Friends evaluated each application and assessed each a point value based on the rubric to determine which properties best met our criteria for creating corridors and enhanced areas with invasives removed in the watershed. We were able to meet our other criteria to help the most landowners and the most acres controlled within the grant dollars. We determined how many acres each would receive based on our assessment of the best value for the grant dollars. We were successful in awarding grants to every landowner who applied. We visited each property to verify the inventory and acres, and required before and after photographs to show the levels of success. Each landowner was expected to share his/her property and its results in an onsite workshop to demonstrate to others what they had done and its success, and we had many of these demonstrations as part of our outreach. Happily, we had highly motivated landowners who have been and will continue to enhance their properties and remove further invasives.

We then required each landowner to provide a management plan for the acres under the grant per the control requirements:

- Landowner information, location, contact info, coordinates
- Plant species of concern, abundance, distribution
- Plant species controlled
- Acres treated
- Type of control method(s)
- Type of herbicide(s) and rate
- Time(s) of year of control
- Level of success

Each landowner provided a management plan describing what they intended to do with what means and methods. Since most of these landowners had been controlling invasives for many years on different parts of their properties, they often chose to use a different method on the grant acres: a contract forest mower; prescribed burns; basal bark herbicide with Garlon 4, stump treatment with Garlon 4 and/or leaf treatment with Garlon 4; native seed purchase and distribution on cleared areas; or all methods, depending on their goals. Some landowners are using the funding to purchase required equipment and tools such as chain saws, forestry blades, or water pump systems to manage controlled burns. Since these highly motivated folks worked almost two years using many of the tools and methods at their disposal, it is difficult to describe which had what success, but the end results are spectacular.

Friends would like to thank all the entities that have supported our efforts to bring this grant to our community and who will be key to our success in continuing to preserve the Mukwonago River watershed.

Regrowth in summer, August 2015

Regrowth in fall, November 2015

Pio Scholars Mussel Field Survey
of the Mukwonago River

By Matt Baumann

Mussels are a frequent part of many freshwater ecosystems. They siphon minerals out of the water column making them readily available to plants, fish, and other invertebrates to consume. Mussels also increase diversity of insects and overall biomass via bioturbation. Finally, mussels play an important cultural role for different communities around the world such as the cultured pearl industry in China. Globally, nearly 70% of known species are considered to be extinct, endangered, threatened, or vulnerable.

In North America we have one of the largest species richness of mussels. In Wisconsin alone, there are 51 native species of mussels. Of those 51 species, over half are either endangered, threatened, or listed as a species of concern. These mussels belong to the superfamily Unionoidea, which are known as parasitic pearly mussels, meaning they have an obligatory parasitic stage of life. One of the ways these mussels parasitize the host is by using a lure display, which is an extension of the mantle tissue used to attract the fish and ultimately inject their glochidia into the host to grow. In southeastern Wisconsin a common species that uses this means of reproduction is Lampsilis cardium. L. cardium occurs frequently in the Mukwonago River and this species has been observed to display two distinct lure pigment patterns. The goal of this research is to determine if the two lures co-occur, if the density is equal between the two, and which habitats they prefer.

We conducted two types of surveys, consistent with the DNR's sampling protocol, were carried out to collect data to describe the distribution of each lure morph in the Mukwonago River. The first was a Catch per Unit Effort (CPUE.) This was done locating 35 equidistant sites on the river and collecting as many mussels as we could in two people-hours (with 2 people searching, we needed to search for 1 hour). We then identified all the mussels found to get an idea of species diversity, and more specifically if there were any trends in the location of L. cardium. We sampled a total of 12,309 mussels with a total of 463 L. cardium, of which there were 283 males and 179 females. There were 139 spotted lures and 27 striped lures.

The second survey we did was quadrat sampling. This was done by randomly choosing 10 new, equidistant sites between the previous sites in the river. At each site three $25m^2$ grids were set up in a random order, with one on the left bank, one on the right, and one in the center channel. Inside those grids we sampled five randomly placed ¼ m^2 quadrats that did not contain L. cardium, looking for habitat data, mussel data, and well as some water chemistry. After those five were searched, we searched the entire grid for any L. cardium and added a new quadrat around them to gather the same data. This sampling should give us a better idea of what specific habitat conditions the different mussel species prefer to live in, or if they are just randomly distributed. Specifically, we are looking for the substrate they prefer, if the live near vegetation, the depth, distance from the bank, and what other mussels live near them, if any.

Of the 15 known species of mussel present in the Mukwonago River, it seems the species richness is much higher upstream and declines as you move closer to the Fox.

We do not yet have any formal results backed by data, we have seen a few trends though and look forward to analyzing the data. We noticed that, in general, the spotted lure morph occurs more frequently than the striped, but they seem to occur in the same habitats. We have also noticed that the invasive Zebra mussel occurs much more frequently near the dam and the population declines the closer you get to the Fox River. Finally, of the 15 known species of mussel present in the Mukwonago River it seems the species richness is much higher upstream and declines as you move closer to the Fox. Additionally, there are some species that occur only downstream, but it seems that L. cardium occurs throughout the entire river

Employing a Wiggly Workforce

For Purple Loosestrife control on Phantom Lake

By Natalie L. Dorrler, Invasive Species Coordinator, Friends of the Mukwonago River

The Friends of the Mukwonago River is incredibly proud of our partnership with Phantom Lakes Management District as we joined forces to combat invasive Purple Loosestrife plants. You should be proud too! We commend the board of directors and the property owners of Phantom Lakes for your continued support of invasive species control efforts. Phantom Lake can consider yourselves a model for invasive species removal among other lake management districts.

An invasive species (or non-native species) is any plant or animal that successfully establishes itself in an area. Invasive species is any species that does not naturally occurring in a given location, often reproduce quickly, have an abundant food source, and lack natural predators. While any ecosystem requires balance, when a non-native species is allowed to establish in an environment, they often out-compete native species and over utilize the available resources. This negatively effects the natural balance of the ecosystem.

The initiative used to control Purple Loosestrife is one of biocontrol, which employs a small beetle to eat the plant. The technique has proven to be largely successful statewide by the Department of Natural Resources for nearly two decades. This beetle, which feeds exclusively on Purple Loosestrife, is reared in simulated wetland environments and then released into natural areas with established Purple Loosestrife populations to do their work.

Again, we greatly commend your commitment to our natural resources and the continued education of invasive species management in our watershed. We look forward to continuing to work with you on this initiative in the upcoming years!

While it can be difficult to identify in the fall and winter, if you are out and about and see purple loosestrife, please note locations of the plant and report the information to Friends of the Mukwonago River to assist with the continued inventory and management of Purple Loosestrife on Phantom Lake!

Learn about Mukwonago River watershed invasive species management at www.mukwonagoriver.org
For more about on statewide Loosestrife biocontrol, visit http://dnr.wi.gov/topic/invasives/loosestrife.html

Community Paddles & Hikes

A list of selected paddles and hikes that explore the Mukwonago River Watershed

HIKE CROOKED CREEK NATURE PRESERVE

Directions: Turn west onto Bluff road at the intersection of Nature Road/Bluff road. Travel .6 miles to the preserve access point, which is on the north (right) side of the road and marked by a sign. There is a narrow pull-off alongside the road for parking.

With dramatic topography and overlooks, Crooked Creek Preserve is a stunning place to visit featuring dozens of springs that provide an estimated 70% of the water flowing into the Mukwonago River system. An approximate 1.5-mile hike should provide good birdwatching with many waterfowl species making use of the two impoundments on the preserve.

PADDLE MUKWONAGO RIVER

Directions: From the main entrance to the Mukwonago River Unit of the Kettle Moraine State Forest (former Rainbow Springs). The parking lot is on County Highway LO approximately a mile east of County Highway E.

Seven culverts were removed in 2013 and the river has returned to its original path. Increases in populations of important river flora and fauna have already been observed now that the river has been allowed to flow naturally. The paddle will end at Beulah Road, although you can go on to County Highway I certain times of year before the wild rice takes over. Use caution paddling beyond Beulah/Marsh Road.

HIKE PICKEREL LAKE FEN

Among the most rare wetland type in North America, fens rely on natural springs and require very specific conditions. Pickerel Lake Fen is biologically diverse and supports a number of rare or endangered species. Oak openings are being restored, an ecosystem characterized by large bur and white oaks with a prairie-like understory of grasses and wildflowers.

HIKE MEYER NATURE PRESERVE

Directions: The preserve is located at S104-W38319 Highway 67, about 2.5 miles southwest of Eagle. The entry drive is one mile southwest of the intersection of Highway 67 and Highway LO.

A picturesque combination of woodlands, restored prairies and wetlands, this 625-acre preserve is a primary headwaters for the Mukwonago River. There are 3 miles of hiking trails on the preserve to explore.

PADDLE LAKE BEULAH TRIBUTARY

Directions: From County Highway J (west of Double D's bar). Vehicle access limited. The unnamed tributary that flows over Lake Beulah dam on the north end under County Highway J. Vehicle access limited.

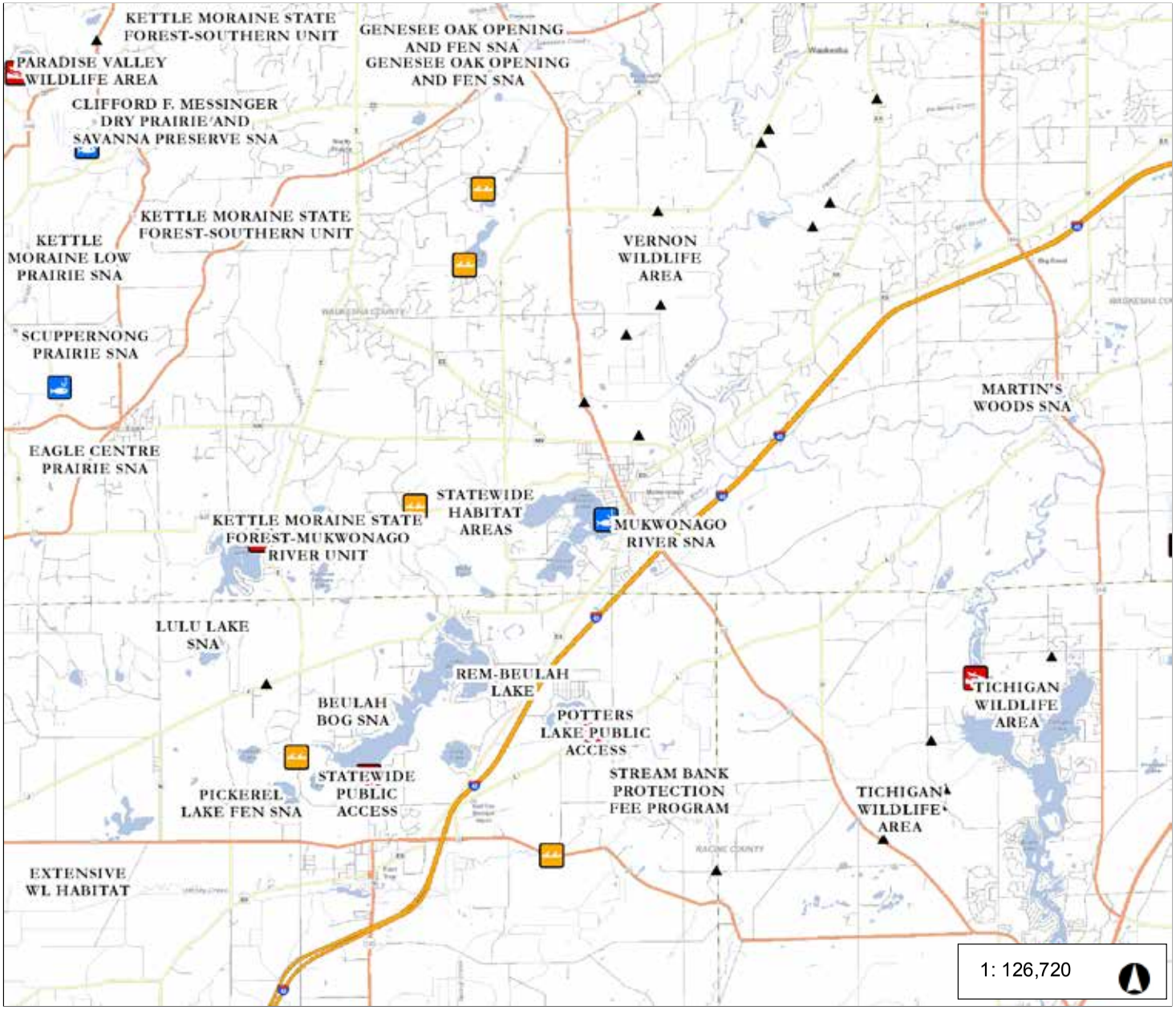
Flowing through lush wetlands and sandy bottomed, this little visited tributary offers a beautiful paddle route through an ecologically significant area of the watershed that supports abundant mussel populations. Paddlers have a choice of routes at the Mukwonago River fork: Paddle upriver to Beulah Road or extend the trip downriver to Highway I.

PADDLE EAGLE SPRINGS LAKE TO LULU LAKE

Directions: WDNR Eagle Spring Boat Launch, Wambold Road off County Highway E.

The classic Mukwonago River paddle. Boat rentals available at Eagle Springs Pub. Lulu Lake is a 95-acre kettle lake with excellent water quality and surrounding fens, bogs, sedge meadows, prairie remnants and oak openings.

Mukwonago River Boat Access Map



Map Legend

- State Natural Area Labels
- Federal Property Labels
- Shorefishing Site
- Boat Access Site
  - CARRY-IN
  - RAMP
  - UNKNOWN
- DNR Parking Areas -100 - 500
- Major Roads
  - Interstates
  - US Highways
  - State Highways
- County
- City, Town & Village
- County Boundary
- Open Water
- Rivers and Streams

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

THANK YOU!

Thank you to all our members, donors, volunteers and partners who made this past year a success. You helped preserve the health of the Mukwonago River watershed and educate others about its importance. We appreciate all you do and thank you for your support!

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Jane Zeman

Thank you Board and Staff

Friends would like to take this opportunity to thank the three staff people who made significant contributions to the organization during their tenure. Thank you to Cynthia Holt, Eric Howden and Natalie Dorrler. We appreciate all the effort and good you each accomplished for Friends and wish you well on your next and future assignments. Friends grew stronger under each of you.

We would also like to thank the board members who have retired from the board, but were significant players while they were here. Thank you Ed Olson, Gina Howden, and Dick Jenks for the incredible help and experience you provided. Keep doing your good work and know that Friends is stronger because of your participation.

We Welcome Your Support

Your generosity is critical to protecting this pristine resource

The Mukwonago River watershed is one of four "Last Great Places" in Wisconsin. Because of its high-quality waters and diverse wetlands, it was selected in the early 2000s as one of three focal sites of the Global Wetland Network. The Mukwonago River is home to over 50 species of fish, several species of rare freshwater mussels, an incredible diversity of wetlands, and some of the best water quality in Southeastern Wisconsin.

The mission of the Friends of the Mukwonago River is to protect this natural treasure, including its associated tributaries, lakes, wetlands and buffer zones, through education, advocacy and promotion of sound land use throughout the watershed. Friends works collaboratively with many other public and private organizations that have also recognized the importance of preserving the ecosystem.

The need for the preservation of this resource gem is clear and compelling. The 18 miles and 74 square miles of the watershed include seven major lakes, seven minor lakes and numerous tributaries, sustained by natural springs, seepage from wetlands and moraines and runoff from surrounding farms and developed lands. We have four program areas we have focused on for over 15 years:

Conservation initiatives

Utilize scientific concepts, scientists and technology to analyze and protect the valuable resources in our watershed. This watershed is studied by citizens and scientists alike as we continue to monitor its health and preserve its pristine qualities.

Watershed protection

Projects with local citizens which demonstrate and educate about the watershed and the needs to protect and preserve its habitat, animals and resources. We work with our Education Consortium to educate youth and adults about the benefits of the watershed.

Policy for protection, preservation and restoration

With our partners we support legislative protections for our waters, work with local governments to educate our constituents of its value, and teach and use best practices for watershed wide protection.

Promotion of sound land use

We work with local municipalities, developers, landowners and stakeholders to ensure that planning and zoning efforts include river and watershed protection.

These programs areas are of concern to the management districts of our major lakes, since these influences can positively or negatively impact the system. We hope to continue our partnership with riparian residents to protect our shared, valuable resource. We will further the work we can do together to implement the recommendations of the Mukwonago River Watershed Protection Plan.

FRIENDS OF THE MUKWONAGO RIVER

PO Box 21
Eagle, WI 53119

Become a Friend of the Mukwonago River

Your support is critical to protecting this pristine resource!

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Address _____
STREET CITY STATE ZIP

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MEMBERSHIP LEVELS (PLEASE CHOOSE ONE)

☐ SENIOR/STUDENT $10 ☐ FRIEND $25 ☐ ORGANIZATION $40 ☐ CORPORATE $50

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Mail donations to Friends of the Mukwonago River, PO Box 21, Eagle, WI 53119