

BLACK LAKE INVASIVE SPECIES INVENTORY REPORT

Created for the Black Lake Association by Huron Pines on November 28, 2017

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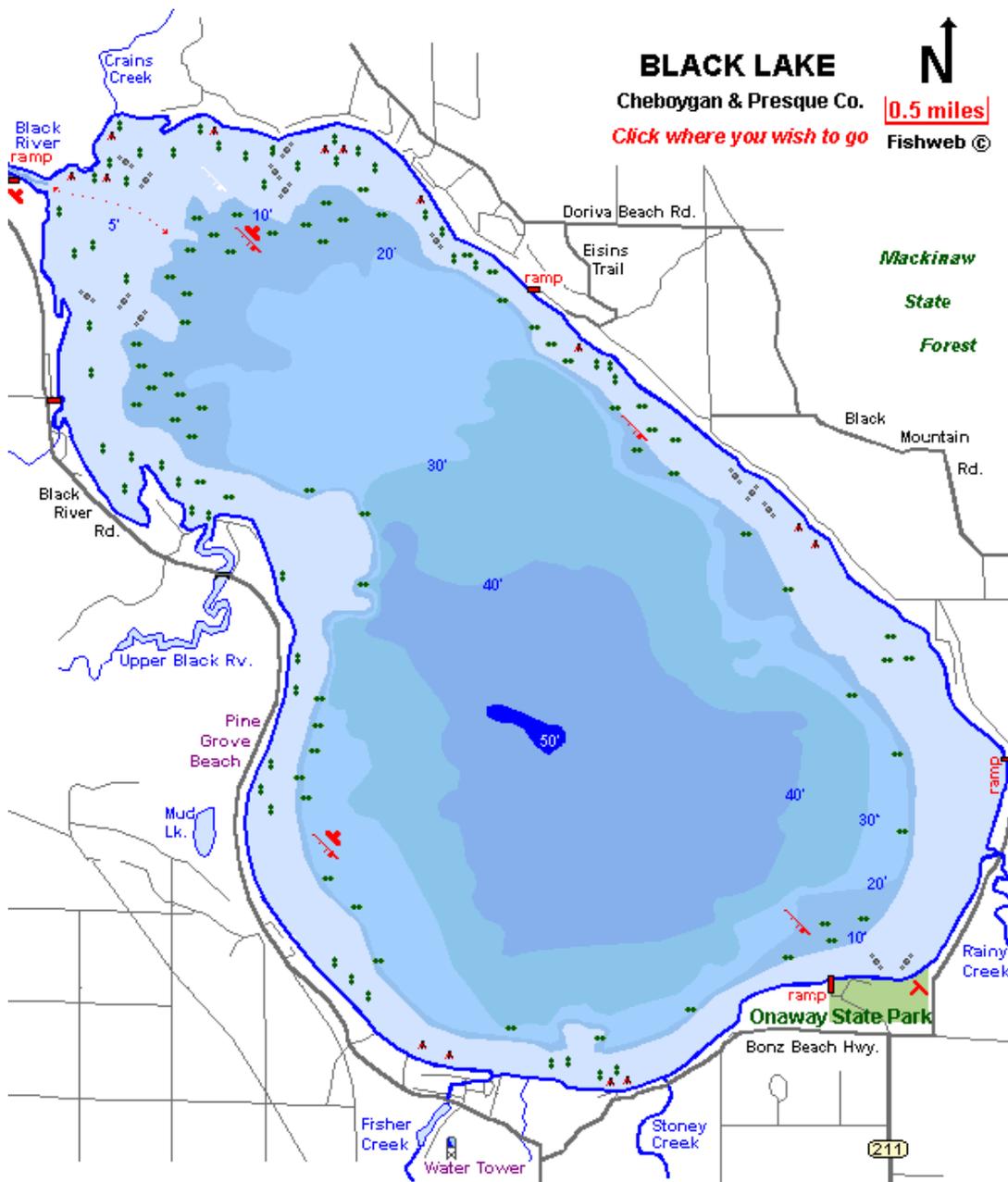


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Black Lake Overview

Black Lake is situated along the Cheboygan–Presque Isle county line in northeast lower Michigan, approximately 6 miles north of the town of Onaway. The lake is the tenth largest inland lake in Michigan by surface acreage at 10,113 acres, and has nearly 18 miles of shoreline. The Black Lake watershed encompasses more than 350,000 acres, representing 38% of the greater Cheboygan River Watershed.

Black Lake is fed by a variety of small creeks and rivers. The largest tributary is the Upper Black River, which enters the lake on the west shore. This river provides suitable spawning habitat for various species of fish that live in Black Lake, including lake sturgeon, walleye, and redhorse sucker. Other tributaries, such as Stony, Stewart, and Fisher creeks, enter the lake at the south end, and Mud Creek enters the lake on the northwest shore. Many of these tributaries are used seasonally by game fish for spawning, and spring fishing closures are in place on both the Upper Black and Rainy rivers to protect spawning fish. Little Mud Creek, Stony Creek, and parts of the Rainy and Upper Black rivers are also considered Michigan designated trout streams.

There is public access from several sites around the lake, including Onaway State Park and the Black Lake State Forest Campground. The shoreline of Black Lake is largely developed with private residences, and there is little public riparian land except at the state park, near the Upper Black River mouth, and along the northeast shore where the state forest campground is.

A late 1930s bathymetric study determined the lake to be a mesotrophic (moderately biologically productive) lake with a maximum depth of 50 ft. The lake has large areas of shallow shoals, consisting primarily of sand, that drop off sharply into deeper waters. Shoal width ranges from 330 ft wide to a quarter-mile wide based on 1939 estimates. Approximately 29% of Black Lake is less than 10 ft deep, nearly 9% is 10–20 ft deep, 17% is 20–30 ft deep, and 45% of Black Lake is water greater than 30 ft deep. Maximum depth is around 50 ft and mean depth around 23 ft. **(Black Lake bathymetric data provided by: State of Michigan Department of Natural Resources SPECIAL REPORT 56, The Fish Community and Fishery of Black Lake, Cheboygan and Presque Isle Counties, Michigan with Emphasis on Walleye, Northern Pike, and Smallmouth Bass, May 2011)*

Abstract

In response to the growing threat of invasive species outbreaks across Michigan, the Black Lake Association contracted Huron Pines to complete a full lake inventory of aquatic invasive species on Black Lake. For this survey, the entire lake was inventoried twice during the summer of 2017 at two different times to ensure that all species could be identified during their peak growth/blooming period.

The first inventory occurred on June 21 and consisted of a full inspection of the perimeter of the lake, both in the water and nearby shoreline. This inventory was completed by boat, wading where necessary to allow for closer inspection. The second inventory occurred on August 24 and utilized a transect pattern, with emphasis of the more shallow waters where submerged aquatic plants could grow. The second inventory was also completed by boat, wading where necessary to allow for closer inspection. See Figure 2.

Invasive species of concern for Black Lake and the surrounding area include: *Phragmites australis*, Eurasian watermilfoil, European frog-bit, purple loosestrife, zebra mussels, and rusty crayfish. Invasive species identified in Black Lake during the survey include phragmites australis, purple loosestrife, Morrow's honeysuckle, mute swan, zebra mussels and reed canarygrass.

Methods

In preparation for the inventory, a map of Black Lake was developed that highlighted areas of interest, such as boat launches, campgrounds, parks, marinas, and river/stream inlets and outlets. These areas were identified for closer inspection because they have higher transient user activity, and are often the source of an invasive species outbreak. Where any of these high-use sites were encountered, a more careful inspection occurred.

For purposes of the initial June inventory, a 17-foot stern-drive canoe with a 5.0 Mercury outboard motor was used to navigate the lake. The canoe was launched from Onaway State Park.

The initial perimeter inventory was done by navigating in shallow, nearshore waters, searching for both emergent and submerged invasive weeds, as well along the shoreline and the nearshore environment. When a cove or bay was encountered it would be explored, wading the nearshore lands as needed. A stop was made at the Black Lake State Forest Campground and a foot inspection occurred in the surrounding area. The campground launch was inspected and boaters were approached to gather further information about invasive species knowledge and identification. River inlets and outlets near the shoreline were also searched to a distance of approximately 100 feet when possible. Further exploration into the rivers was done using waders as necessary.

During the second survey in August that consisted of the lake transect, the nearshore environment was re-inspected as well as two long passes across the lake where the water depth was most suitable for aquatic invasive plants (Figure 2). Prior to transect inventory, the Midwest Invasives Species Information Network (MISIN) website was checked to look for any previously identified invasive species sightings. At the time of the survey, no invasive species had been recorded on MISIN for Black Lake. A different boat was also used during the transect inventory for greater efficiency. This was a 16ft flat-bottom Jon boat with a jet propulsion motor. This was used because of its greater stability in the water and ease of the crew to maneuver inside of the boat, especially when getting out for closer inspection.

For both inventories, inspection was done to identify submerged, emergent and terrestrial shoreline plants. When a submerged plant was identified it would be hauled in with a plastic rake for closer inspection and identification. When any invasive species was positively identified, it was recorded on a data sheet that captured its location via GPS, an image, and size/scope of the population. See Table 1.

To help guide identification, "A Field Identification Guide to Invasive Plants in Michigan's Natural Communities" was used. Emergent shoreline plants, such as phragmites, were inspected by dissecting the stalk, leaves and other key features of the plant.

Results

Overview - During the first inventory in June, the only invasive species discovered was a small patch of invasive phragmites along the north shore of the lake. Considering the small presence of invasives during the first inventory, the second inventory was planned for approximately a month later to allow time for further growth of all species. During the second visit in August, there were numerous sightings of purple loosestrife, reed canarygrass, invasive mute swans and native phragmites. The locations of all these species can be found on the Black Lake map (Figure 1a).

Overall, there was a total of 25 different sites that contained invasive species. The majority of these sites consisted of purple loosestrife, with only a few being either invasive phragmites, reed canarygrass or Morrow's honeysuckle. Although there was milfoil noticed in several locations, none of it was confirmed to be Eurasian watermilfoil, the invasive type. During the course of both inventories, approximately 35 linear miles were covered.

Phragmites - Black Lake has a history of invasive phragmites inventory and treatment that dates back to 2008. In 2008, the Tip of the Mitt Watershed Council (TOMWC) did an inventory and discovered one large cluster of invasive phragmites. This site was inland, situated around a road stream crossing on Black River Road, just north of Mud Lake. Based on shared historical information of both TOMWC and Huron Pines, this site has yet to be treated. In 2014, TOMWC did another survey for invasive phragmites and discovered one new site that contained invasive phragmites and one new site that contained both native and invasive phragmites. In 2015, Huron Pines treated both of these stands. In 2017, Huron Pines discovered several new stands of phragmites along the lakeshore. Only one small patch of invasive phragmites was identified, all the others were identified as native. The invasive patch is smaller than its 2015 pre-treatment extent, and we believe the mixed site is now gone or has been filled in with native phragmites. Because of the finding of invasive phragmites in 2008 inland along Black River Road, Huron Pines also went to this site and confirmed it is still present and alive.

Treatment for the site inland along Black River Road and the site along the northwest shore of the lake is scheduled for 2018. (see map below)



2018 Planned Treatment Sites

Recommendations

The first recommendation for invasive species control on Black Lake would be to deal with the invasive phragmites. Since the invasive phragmites is found growing in the water, a permit from the Department of Environmental Quality is required for chemical treatment. Additionally, permission will be required by the landowner prior to treatment, on both public or private land. It is important, however, that the native phragmites in the area be identified and not treated. The north side of the lake, where both native and invasive species are found, should be monitored each year and when an invasive patch is found it should be treated promptly to reduce the spread of this aggressive plant. ****The estimated cost for treatment of invasive phragmites on Black Lake for 2018 would be \$500. Removal success is dependent on subsequent annual treatment until eradicated, with each year's cost decreasing as the size of the outbreak decreases. Huron Pines is working to identify landowners for inland sites and will work to treat those as well in order to prevent recolonization.***

The second recommendation is to manage the purple loosestrife found in patches around most of the lake. This could be done mechanically by hand-pulling the plant through contract work, or ideally, the development of a volunteer event. Purple loosestrife was frequently found on all shorelines of the lake, but is not at unmanageable levels. Most patches were small and located on private property. If a purple loosestrife pulling event was held, landowners could easily pull out their own purple loosestrife with little effort. This would change the nearshore invasive plant situation quickly. ****Huron Pines proposes to coordinate a community wide training and inaugural lake-wide purple loosestrife pull in 2018. The cost for the training and coordination of the inaugural event would be \$500, matched with funding from our invasive species grants.***

A third recommendation is community outreach and public education, both for the general public and students. This effort can be completed in a number of way, including: notifying the public about the state-led "Clean Boats, Clean Waters" campaign, hosting a mobile boat wash station and posting informational signs at all public access sites and local businesses. Additionally, local school presentations and fields trips can occur, having the students assist with monitoring and the purple loosestrife pull. Prevention is the cheapest and most effective method to manage invasive species, and outreach and education is a great tool that reaches all user groups. ****Huron Pines proposes to host their mobile boat wash at Black Lake during the 2018 Aquatic Invasive Species Blitz. The boat wash would be operated by Huron Pines staff for 3 full days at a cost of \$500. Another option would be for Huron Pines to provide training to volunteers to operate the boat wash for 7 days for \$250.***

Invasive species of least concern include reed canarygrass and honeysuckle. Both of these species are of less concern because they are so widespread that they are mostly naturalized in northern Michigan. If they are creating a monoculture that does not allow for native plants to grow they can be chemically treated and removed. For these two species, treatment is usually decided on a case-by-case basis. The best way to keep these plants from crowding out native populations is to develop and maintain a native plant buffer, or greenbelt. Greenbelts filter and absorb potentially harmful runoff and excess nutrients, rather than flowing directly into the lake water where they cause algae blooms and unwanted aquatic plant growth.

Greenbelts are useful in reducing erosion and can be attractants to wildlife such as birds, bees, and butterflies. Native plantings also reduce the ability of invasive plants to become established by outcompeting for space. If a greenbelt is established, it should be monitored regularly for invasive species growth. If any are found to be growing, they should be removed immediately to keep the greenbelt healthy. ****Design and implementation of a greenbelt is on a case-by-case basis and would require a site visit for each inquiry. The site visit would be of no cost, and if further steps were desired, a project would be developed and expenses determined at that point.***

Last, but not least, It is important to continue to monitor the lake for invasive species, identifying and treating outbreaks quickly before they can spread. Monitoring can easily be done for a fee, by volunteers or local students. Huron Pines can provide training for anyone interested in doing volunteer monitoring. **** Huron Pines propose to do an annual monitoring visit of Black Lake, inspecting each site discovered in 2017, while looking for any new outbreaks. This annual monitoring would cost \$750. A second option would be to host a training event to prepare volunteer monitors to do this work. The cost for the training would be \$250.***

Inventoried Invasive Species Reference



Phragmites australis - Occurs in wetland areas such as streams, ponds, ditches, lakes etc. The plants range from 6-13 feet tall and grow in dense, often impenetrable stands. They reproduce extensively by seed as well as by rhizomes which can live for 3-6 years after cutting or covering, making them difficult to eradicate. They can be identified by their hairy ligules (the area where the leaf attaches to the stem), hollow ridged stems, feathery seed heads, and by their height and density. Native phragmites can be distinguished from the invasive species by its exposed and reddish lower stem, the lack of height and density, and the lack of hairy ligules. Chemical treatment in late summer or fall is the best treatment for invasive phragmites. Attempting to remove by mowing or digging will only stimulate growth.

Huron Pines recommendation for invasive phragmites: Considering that the outbreak of invasive phragmites is fairly limited, all landowners should be identified during the winter and subsequent treatment should occur at all locations during the late summer of 2018. If done by commercial contractor, special permit and applicator licenses are required. Huron Pines has all the necessary permits and is licensed and insured to do this work.



Purple loosestrife - A perennial herbaceous wetland plant that can tolerate a wide range of soil types. Its most prominent feature is its four-sided square stem and spike of purple flowers that bloom from late July through October. It can also be identified by its lance-shaped leaves, which are larger toward the base. It can reproduce by seed or vegetatively from cut pieces of its stem, meaning that mechanical control is difficult. This plant spreads vigorously and crowds out native plant species. Plants can be hand pulled as long as the entire plant is removed. The recommended treatment, if already gone to seed, is to remove the flower and seed heads (dispose of in trash bags) and then chemically treat the remaining plant. This type of treatment is best conducted after peak bloom in late August.

Huron Pines recommendation for purple loosestrife: Considering the extent of purple loosestrife around the lake, and the fact that it is growing in sensitive areas, it is recommended that a lakewide purple loosestrife pulling event be developed during the winter and initiated in summer of 2018. This requires no permit or chemicals and can be done by volunteers.



Morrow's honeysuckle - A deciduous shrub with shallow roots that grows up to 6 feet tall. It can grow in a variety of soil and moisture conditions. It is most easily identified from other shrubs by its hollow stem. Other features include oblong leaves that are slightly hairy underneath, small tubular white flowers that bloom May-June, and paired red berries. This plant is considered invasive because it forms dense thickets and decreases plant diversity. Its seeds are easily dispersed long distances by birds and can resprout from root fragments. It can also be harmful to nesting wildlife because of its hollow stems, which can collapse under the weight of growing nests, increasing juvenile bird mortality. Chemical treatment would be recommended and can be done by cutting and treating the exposed stump with a herbicide.

Huron Pines recommendation for Morrow's honeysuckle: This plant was brought into the country for erosion control and wildlife habitat. If this plant is found to be developing a monoculture, i.e., outcompeting native plant regeneration, mechanical or chemical removal is recommended.



Reed Canarygrass - This plant is considered invasive because of its thick, fibrous root system that is very difficult to eradicate and causes it to grow in dense monocultures. This is a cool-season perennial grass that grows in wet areas. It reproduces by rhizomes and by seed. It can be difficult to identify but it does have a couple of unique characteristics. The first feature is that it has a very prominent transparent 'paper-like' ligule and the second is that it has an area on the leaf blade that looks like it has been scrunched together, appearing as a 'W'. This grass has also been described as a smaller version of invasive phragmites based on its appearance. Chemical treatment in the late summer or fall would be the most effective control method.

Huron Pines recommendation for reed canarygrass: Unfortunately, this plant is naturalized across most of the United States. However, in areas where rare or endangered species are identified, areas of historic value, or where a landowner is trying to establish a native greenbelt, chemical treatment is recommended. Similar to phragmites, a permit is required.



Photo courtesy of allaboutbirds.com

Mute swan - The mute swan is native to Europe and was brought to North America in the mid 1800s to decorate ponds and lakes. They can easily be identified by their orange bills and large size. The mute swan is one of the world's most aggressive waterfowl species. It displaces many native waterfowl, including Michigan's threatened species: the common loon, trumpeter swan and black tern. They are also voracious feeders of aquatic vegetation and fish, consuming so much that little is readily available for the native species. Perhaps the largest concern for lake users is that mute swans are well known to attack people both on shore and in small watercraft, having the ability to cause substantial harm due to their large size.

Huron Pines recommendation for mute swans: Considering the potential harm to people and native plant and animal species, it is recommend to have them professionally removed. For further questions regarding removal, please contact Wildlife Disease Biologist David Marks by phone, (517) 336-1928 x25 or by email, David.R.Marks@aphis.usda.gov.



Photo Courtesy of Greatlakes.net

Zebra mussel: The Zebra mussel arrived in the Unites States through transoceanic ballast tanks. They are about an inch long with dark rings and they spread very rapidly. They are well known for attaching to any hard surface, creating large, very dense colonies. They cause much harm to native species because they consume phytoplankton, which is the basis of the aquatic food chain. This causes other species to not have a readily available food source. They also attach directly onto native mussels, effectively smothering them.

Huron Pines recommendation for zebra mussels: Considering the potential harm that zebra mussels pose to anything that comes in contact with water, it is recommended that an annual inspection occur for all submerged infrastructure, such as: water intake systems, bridges, culverts, dams, public swimming sites, boats and docks. Several local companies are currently testing chemical treatment of invasive mussels; otherwise, physical removal at important sites is the best option.

Further Invasive Species Reference

Beyond those invasive species identified and inventoried in Black Lake, there are many others already found in Michigan and the midwest that should be closely monitored for. Three species that have been all found near Black Lake include: Eurasian watermilfoil, European frog-bit, and rusty crayfish. Each of these species pose a different and unique threat, and preventing them from entering Black Lake is a top priority.

For further information, including interactive maps, please go to the Midwest Invasive Species Information Network (MISIN) <http://www.misin.msu.edu/>. MISIN is a regional effort to develop and provide an early detection and rapid response resource for invasive species in the Midwest region of the United States. The effort is led by researchers at the Michigan State University Department of Entomology Laboratory for Applied Spatial Ecology and Technical Services. The goal is to assist both experts and citizen scientists in the detection and identification of invasive species. Data collection allows for the development and implementation of effective control strategies in the region.



For more information on invasive species control efforts in the state of Michigan through the Michigan Invasive Species Coalition, visit www.michiganinvasives.org. This website lists contacts for local partnerships that often have resources to assist with invasive species education and management. The site also provides links to maps and reporting as well as updates on ongoing research and a forum to discuss invasive species issues with other landowners and experts.



This inventory was completed by Huron Pines, the coordinating organization for the Northeast Michigan Cooperative Weed Management Area and a partner in the Michigan Invasive Species Coalition. We encourage your participation in our regional partnership by signing our cooperative agreement and sharing your invasive species priorities at annual meetings. Visit www.huronpines.org/invasives to learn more.

Data Tables

Table 1: 2017 Data Recorded for Black Lake Inventory. See Table 2 for key (below)

Species	Estimated Area	Actual Area	Density	Treatment Status	Latitude	Longitude	Date	Comments	Picture ID
Invasive Phragmites	3	7000 sq ft	3	U	45.4886	-84.3152	6/21/17	Portion of plant was out of water	BLKINV 1
Purple Loosestrife	1	48 sq ft	1	U	45.43620	-84.23577	8/22/17	Beside dock on both sides	BLKINV 2
Morrow's Honeysuckle	1	300 sq ft	1	U	45.43615	-84.23548	8/22/17	Beside dock on East side	BLKINV 3
Purple Loosestrife	2	2,500 sq ft	1	U	45.43566	-84.23600	8/24/17	Along the campground	BLKINV 4
Purple Loosestrife	1	800 sq ft	1	U	45.43669	-84.23150	8/24/17		
Purple Loosestrife	2	1,000 sq ft	1	U	45.43657	-84.22989	8/24/17		
Purple Loosestrife	1	375 sq ft	1	U	45.43712	-84.22509	8/24/17		
Purple Loosestrife	1	6 sq ft	1	U	45.46439	-84.22645	8/24/17	Private residence.	
Purple Loosestrife	1	9 sq ft	1	U	45.46488	-84.22766	8/24/17	Private residence.	
Reed Canary Grass	1	250 sq ft	3	U	45.49380	-84.27539	8/24/17		
Purple Loosestrife	1	150 sq ft	1	U	45.50334	-84.30341	8/24/17		
Purple Loosestrife	1	150 sq ft	1	U	45.50331	-84.30945	8/24/17	Small clump right across from this point.	
Purple Loosestrife	1	500 sq ft	1	U	45.49985	-84.31863	8/24/17	Just a few scattered plants.	
Purple Loosestrife	2	2,000 sq ft	3	U/D	45.49867	-84.32264	8/24/17		
Purple Loosestrife	2	1,000 sq ft	1	U	45.49822	-84.32304	8/24/17		

Purple Loosestrife	1	48 sq ft	1	U	45.49777	-84.32184	8/24/17	Small patch in water	
Purple Loosestrife	2	2,000 sq ft	2	U	45.49705	-84.32133	8/24/17		
Purple Loosestrife	1	500 sq ft	2	U	45.49533	-84.32195	8/24/17		
Purple Loosestrife	1	300 sq ft	1	U	45.49039	-84.31889	8/24/17		
Purple Loosestrife	1	504 sq ft	3	U	45.47685	-84.31060	8/24/17		
Purple Loosestrife	1	600 sq ft	2	U	45.47510	-84.30899	8/24/17	Large inlet area infested with purple loosestrife.	
Purple Loosestrife	1	36 sq ft	1	U	45.43007	-84.27953	8/24/17		
Purple Loosestrife	1	16 sq ft	1	U	45.42973	-84.27326	8/24/17		
Purple Loosestrife	1	72 sq ft	1	U	45.42916	-84.27122	8/24/17		
Purple Loosestrife	1	4 sq ft	1	U	45.42811	-84.26231	8/24/17	Young loosestrife.	
Native Phragmites	2	75 sq ft	1	-	45.48492	-84.25434	8/24/17	Found on the shoreline.	
Native Phragmites					45.49874	-84.32307	8/24/17		
Native Phragmites	2	400 sq ft	2	-	45.50118	-84.30008	8/24/17	Found submerged in the lake.	
Native Phragmites	1	250 sq ft	2	-	45.50318	-84.29796	8/24/17	Found on the shoreline.	
Native Phragmites	2	300 sq ft	2	-	45.49897	-84.29796	8/24/17	Found submerged in the lake	
Native Phragmites					45.50334	-84.22766	8/24/17		

Table 2. Key for Table 1.

Estimated Area	Density	Treatment Status
0=None 1=Individual/few/several 2=<1000 sq ft 3=1000 sq ft to 0.5 acre 4=0.5 acre to 1 acre 5= > 1 acre	1=Sparse (scattered individual stems or very small stands) 2=Patchy (a mix of sparse and dense areas) 3=Dense (> 40% of area) 4=Monoculture (nearly 100% of area)	U = Untreated # = Consecutive years treated N = Nonconsecutive years treated D = Don't know

Maps

Figure 1a. Overview map of invasive species around in Black Lake



Figure 1b. Zoomed in map of invasive species found in the northwest corner of Black Lake



Figure 2. Map showing the route navigated during the two separate inventories. The red line represents the first inventory on June 21 and the blue line represents the second inventory on August 24.

