THE FISHES OF PIGS EYE LAKE

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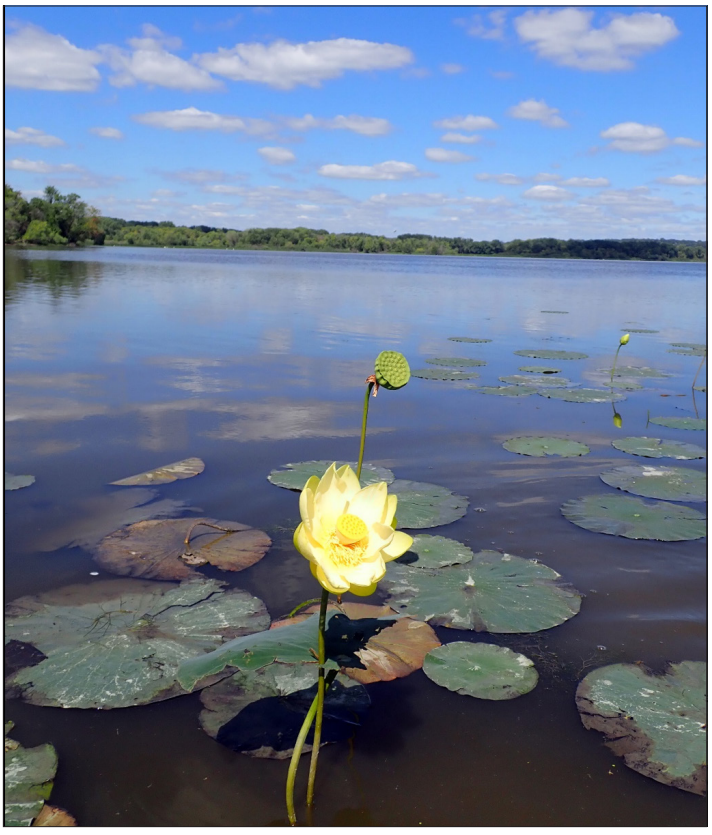
SUMMARY

Pigs Eye Lake is a 629-acre shallow backwater in upper Pool 2 of the Mississippi River downstream of St. Paul, Minnesota. In 2022, artificial islands were constructed in the lake (Figure 1) to reduce wind fetch that has caused chronic and severe turbidity from the resuspension of bottom sediments and erosion of the shoreline (Pigs Eye Lake Master Plan Amendment Draft 2020). There have been very few fish surveys in the study area. The Minnesota Department of Natural Resources (MDNR) conducted the most recent fish survey of the lake in 1999 and the Minnesota Pollution Control Agency (MPCA) surveyed one site in the lower one-mile reach of Battle Creek in 2000 (Figure 3). Fish surveys prior to construction would have been beneficial to assess the efficacy of the project with follow-up monitoring, but MDNR did not schedule a survey beforehand. In 1987, the author was a biologist with the US Fish and Wildlife Service and conducted monitoring surveys following island construction in Weaver Bottoms, a backwater in Pool 5 of the Mississippi River south of Wabasha, MN. He realized the value of having fish survey data from both before and after construction. He learned of the Pigs Eye Lake project in 2019 and decided to conduct fish surveys on a volunteer basis beginning in September 2019 and again from June through September 2020. Multiple sampling gears were deployed, collecting 54 species in 14 families, including one state-threatened species (Black Buffalo *Ictiobus niger*) and one special concern species (Yellow Bass *Morone mississippiensis*) (MDNR 2020).



Pigs Eye Lake Lotus Lily.

Photos by Jennifer Kruckenberg unless otherwise indicated.

PIGS EYE LAKE HISTORY

Pigs Eye Lake is named after Pierre "Pigs Eye" Parrant, who had a defective eye described as having a "sinister white ring around the pupil, giving it a kind of piggish expression." He is believed to be the first European settler to live in what is now St. Paul, where he operated a saloon in Fountain Cave in the late 1830s selling bootleg whiskey to early St. Paul residents and soldiers stationed at Fort Snelling (Wikipedia contributors 2019; Minnesota Fun Facts 2020). Pigs Eye Lake was called Grand Marais (the Great Marsh) by early

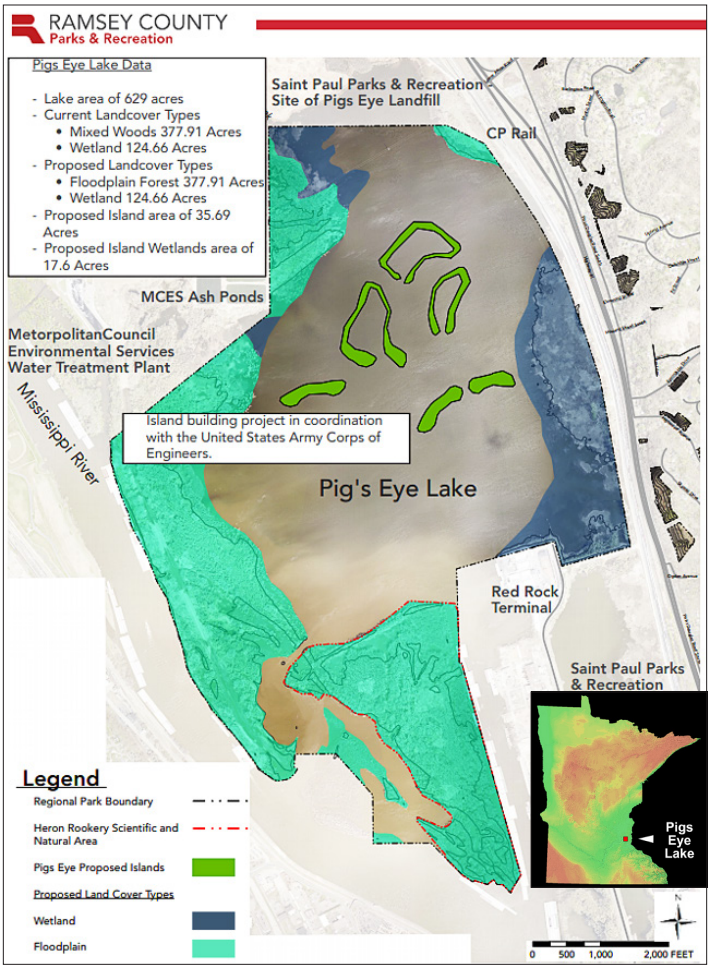


Figure 1. Proposed layout of island construction that began in 2022 and the lake's location in Minnesota (inset).

French fur traders. Battle Creek is named after the Battle of Kaposia between the Dakota and Ojibwe in 1842 (Upham 1969; History of Maplewood 2020). A topographical map of Pigs Eye Lake in 1896 (TopoView 2020) depicts a much smaller lake with an extensive marsh fringe (Figure 2). The accuracy of this map is unknown, but it is georeferenced and importable as a KMZ file to Google Earth Pro. The open water surface area was about 288 acres, which is less than half the size of the lake today. In 1930, the construction of US Lock and Dam 2 on the Mississippi River at Hastings, MN, raised the river level several meters and is responsible for Pigs Eye Lake's current size and depth (Wikipedia contributors 2020).

The Mississippi River, Pigs Eye Lake, and the shared floodplain have incurred multiple and major environmental impacts. The side channels shown on the 1896 map from the Mississippi River that enter and exit Pigs Eye Lake no longer exist. With the rapid development of the Minneapolis-St. Paul urban area in the late 19th and early 20th centuries, the river from the Twin Cities to Hastings became one of the most polluted reaches, with 65 million gallons of raw sewage discharged daily (Anfinson 2003). In 1926, the US Bureau of Fisheries surveyed almost 100 miles of the Mississippi River from St. Paul to Red Wing, MN. Dissolved oxygen levels were less than 1 mg/l and only three fish were found (Rogacki 2017). In the 1960s, the Army Corps of Engineers dredged a channel out of the lake's southwest corner to the Mississippi River and another south to the river for barge traffic. Dredge spoils were used to develop an industrial park along the east bank of the channel (Wikipedia contributors 2020). Battle Creek was re-routed west into an artificial channel through the site of the 236-acre Pigs Eye Dump that operated from 1956 to 1972. The area was then used to dispose of sludge ash from wastewater treatment until 1985 (Metropolitan Council 2023; Starbuck 2013). Following the Clean Water Act of 1972 and improved treatment of waste water, the Mississippi River at St. Paul exhibited a rebirth in the mid-1980s when massive mayfly hatches returned after a decades-long absence (Sector 1987).

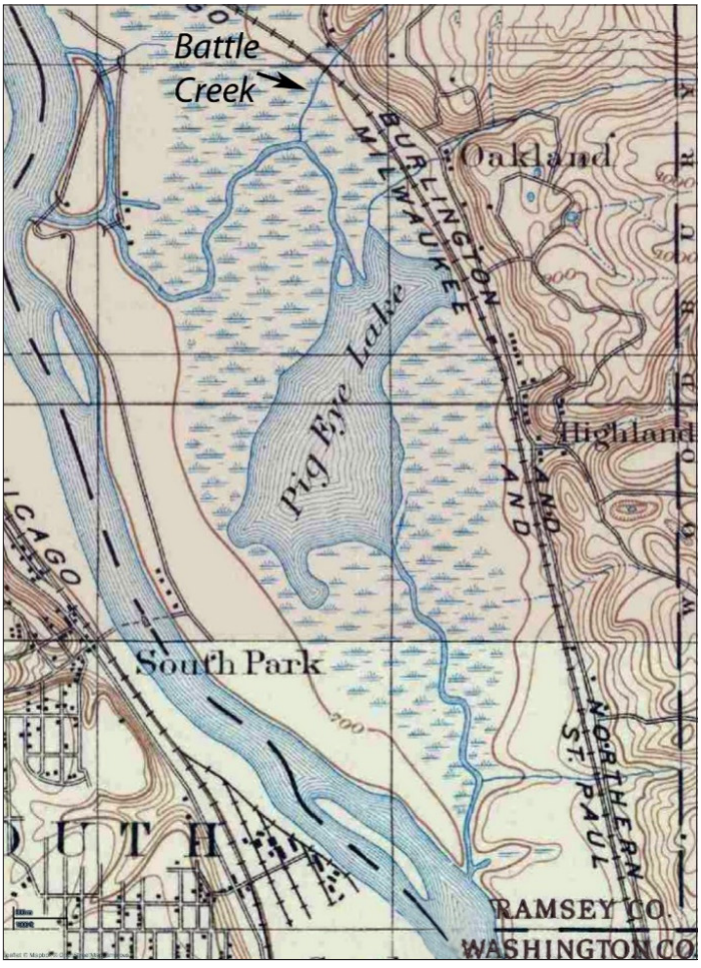


Figure 2. A modified 1896 US Geological Survey (USGS) topographical map of Pigs Eye Lake and the historical stream course of Battle Creek.

PIGS EYE LAKE HABITATS

Four habitat types were sampled in the Pigs Eye Lake study area: (1) the shallow main basin of Pigs Eye Lake, (2) a deep bay off the southwest corner of the lake (AKA Hog Lake), (3) Battle Creek, and (4) a stream tributary entering the lake in the northeast corner (Figure 3). The latter two are channelized streams but have not been recently maintained.

The main basin of Pigs Eye Lake had a maximum depth of about 1.5 m for most of the 2020 field season. Nearshore areas were less than a foot deep. The substrate was predominately silt throughout the lake, but there were pockets of sand at the mouth of Battle Creek

Figure 3. Top: The four habitat types in the Pigs Eye Lake study area. Bottom: Battle Creek at MPCA station 00UM071.

and along the south shore of the heron rookery island. The Central Pacific railroad grade along the northeast shore was the source of a narrow band of gravel and cobble. Floating and submergent aquatic vegetation was restricted to one Lotus Lily bed and Sago Pondweed. The latter was sparsely distributed throughout the lake with one exception in the southwest corner, where it was very dense and filled in the slightly deeper water beyond the Lotus bed.

Hog Lake has the deepest habitat in the study area. A sonar depth of 6.4 m was found on a trawling transect in 2020. However, a dissolved oxygen profile in the most recent (i.e., 1999) MDNR lake survey reported a depth of 8.3 m. The channel connecting Pigs Eye to Hog Lake and most of the lake itself was deeply incised with a hard substrate, likely of clay. The shallow shoreline substrate at the head of the lake was deep silt. The lake's outlet had filled in with sediment and had no connection with Mississippi River during summer flows. Floating aquatic vegetation included very small beds of Smartweed, Lotus Lily, and Yellow Water Lily. Submergent aquatic vegetation included sparse Sago Pondweed, Wild Celery, and Coontail. One active beaver lodge and remnants of others provided habitat for bass, crappie, sunfish, and likely other species.

Battle Creek between the Canadian Pacific railroad and Pigs Eye Lake is about one mile in length. For most of this reach, the stream has very few meanders or riffles and is generally a continuous sand glide with some slightly deeper runs. There are two short reaches of toe wood (MDNR 2010) where the current slows, forming pools that provide excellent fish habitat with woody cover and structure. The stream's edges are lined with aquatic vegetation (Figure 3), which is probably Longleaf Pondweed (Jay Hatch, personal communication). The stream banks have been stabilized with a mixture of limestone, cobble, and small boulders and show very little erosion, with the restored terrestrial vegetation anchoring the soil in place. Where the current slows, the stream turns east to its mouth and the channel widens to a long, sandy run. There are, however, a few pools in this reach that are too deep to wade.

The stream tributary that flows into the northeast corner of Pigs Eye Lake is a straight-line ditch for most of its length impinged against the Canadian Pacific railroad grade. It is a cold, groundwater-fed stream. The channel is a shallow, sandy glide with a few pools formed from woody debris and one scour pool from a culvert downstream of the railroad. Where the stream turns west, the depth increases and small beaver dams impound the channel.

Secchi disk and Secchi tube water transparencies were measured in Pigs Eye and Hog lakes with only the tube used in Battle Creek. Battle Creek was greater than 100 cm, with just one exception following a rain event (25 cm). The main basin of Pigs Eye Lake was

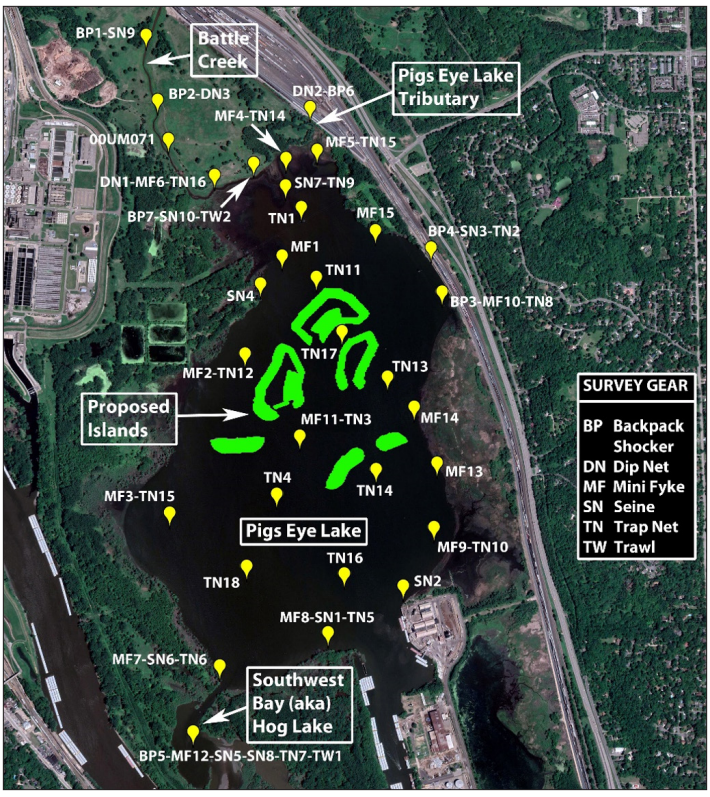


Figure 4. Fish survey stations by sampling gear.

Figure 5. Top: trawling lower Battle Creek. Middle: seining Pigs Eye Lake. Bottom: pulling trap net at entrance to bay.

Figure 6. Some large fishes from Pigs Eye Lake.

always extremely turbid, ranging from 20–31 cm (disk) and 9–14 cm (tube). Only one tube reading (95 cm) was taken near the north end where Battle Creek enters the lake. This clearer water zone extended well southward of station TN1 (i.e., powerline tower). Hog Lake ranged from 56–64 cm (disk) and 25–26 cm (tube).

PIGS EYE LAKE SURVEY STATIONS AND SAMPLING GEAR

Depending on the habitat, survey stations were sampled with multiple types of sampling gear (Figure 4). Gear types included a 12-volt backpack electroshocker (seven stations), three-quarter-inch mesh trap nets (18 stations, single sets), three-eighth-inch mesh minnow seines (10 stations), one-eighth-inch mesh mini-fyke nets (15 stations, single sets), dip nets (three stations), and Missouri trawl (two stations). One-quarter-inch mesh double-funnel minnow traps were used near trap net stations, but these typically produced very low catches. Seining at stations 1–4 and 6 was repeated at least once in 2020. Trawl station 1 was also sampled multiple times and consisted of four transects in Hog Lake and one transect through the channel from Pigs Eye Lake.

Multiple sampling gears were used in the study area (Figure 5). The backpack shocker, seine, and dip net were used in streams and near-shore (wadable) areas of lakes. The dip net was used to rake submergent vegetation or scoop terrestrial vegetation overhanging from stream banks. This gear was also used as a kick net in riffles, root wads, and undercut banks. A trawl was used only in two habitats that were too deep to wade. It was deployed from the bow of the boat. Nearshore areas were too shallow to set trap and mini-fyke nets for most of the 2020 field season. Attempts at sets were made when the water levels briefly rose, but Snapping Turtles damaged the nets and injured or consumed the catch. However, both sampling gears performed very well in deeper water throughout the main basin despite the lack of cover and structure.

All species were identified and tallied from trap and mini-fyke net catches, and fish with total lengths 9 cm and larger were measured. Sampling of the MPCA station survey in Battle Creek (00UM071) followed the same Index of Biotic Integrity (IBI) protocols used by MPCA in 2000. The remaining gear types were used to record only species presence at stations, but were also used to record high and low abundance (i.e., high: estimated catch greater than 50 and low: one to three specimens). Station location, fish species present, and comments were compiled in a database.

THE FISHES OF PIGS EYE LAKE

The 2019 and 2020 fish surveys found 54 species in 14 families (Figure 6, Appendix I), which is an incredible diversity for what appears to be extremely poor habitat and water quality. However, 13 species were extremely rare, having met all of the following criteria: (1) comprised a total catch of one to three specimens during the entire study, (2) found only once or twice, and (3) were restricted to a single habitat type.

The author's assumption before beginning this study was that the fish community would be dominated by an abundance of Common Carp *Cyprinus carpio* and Black Bullheads *Ameiurus melas*. Both are extremely tolerant species that thrive under the worst environmental conditions. The survey results revealed otherwise, with only 21 adult Common Carp and one Black Bullhead captured. Young of the year (YOY) Common Carp were common in June and July but were very rare by August. The presence of Burbot *Lota lota* was unexpected because the species typically inhabits coolwater to coldwater lakes and streams of excellent water quality. There were also several game fish species of harvestable size present that could support recreational angling (Figure 6).

The distribution and diversity of species in the four habitat types varied greatly (Appendix 1). The very poor environmental conditions in Pigs Eye Lake cannot be ignored, but the lake had the greatest number of species (45) of the four habitat types. Hog Lake was second at 34 species, followed by Battle Creek (28), and the stream tributary to Pigs Eye Lake (12). Eight species were found in all four habitats, 11 species in three, 16 in two, and 18 in one. The occurrences of Burbot and Iowa Darters *Etheostoma exile* in Pigs Eye Lake were very unusual; however, both species were restricted to cold, groundwater-fed microhabitats adjacent to the Canadian Pacific railroad.

The composition of fish communities in habitat types typically changes throughout the year (Schmidt 1988, 2013). Adult fish briefly utilize spawning habitats in the spring and early summer, and YOY remain in nursery areas into late summer and early fall. Thirteen species were sampled only during one month from June through September, while 16 species were present every month of the survey.

The minnow seine sampled the most species at 39, followed by the backpack shocker (33), mini-fyke net (27), trap nets (21), trawl (20), and dip net (19). Total catch data were recorded from mini-fyke and trap nets. The mini-fykes were most effective at capturing Emerald Shiner *Notropis atherinoides* (340), followed by Bigmouth Buffalo *Ictiobus cyprinellus* (87), Bluegill *Lepomis macrochirus* (72), Gizzard Shad *Dorosoma cepedianum* (56), and Yellow Perch *Perca flavescens* (52). The trap nets were effective on Bluegill (144), Gizzard Shad (75), Silver Redhorse *Moxostoma anisurum* (29), Black Crappie *Pomoxis nigromaculatus* (25), and Freshwater Drum *Aplodinotus grunniens* (20).

Specimens of most species sampled have been cataloged in the Etnier Ichthyological Collection at the University of Tennessee in Knoxville, where a staff ichthyologist verified identification. The collection database is available online and can be accessed at https://tennfish.utk.edu/catalog.php.

Additional species have been reported in Pigs Eye Lake from other sources. In the early 1990s, Jack Enblom (MDNR Major River Surveys Project Leader, retired) had a discussion with a commercial operator who annually seined Pigs Eye Lake in the spring while the water level was still high. He mentioned at least once his crew seined several juvenile Paddlefish *Polyodon spatula,* all about 70 cm long. Incidental catches of Paddlefish captured with very large commercial seines represent the bulk of known distribution records for this species in Minnesota (Schmidt 1995). More recently, Joel Stiras (MDNR Fisheries Specialist in St. Paul) has been conducting research on movements of several species throughout Mississippi River Pool 2. Fish are captured, implanted with radio transmitters, and released. Monitoring buoys with acoustic receivers detected Paddlefish in Pigs Eye Lake eight times from 2017–2020. In 2018, two Paddlefish were captured and implanted with transmitters in Pigs Eye Lake. Lake Surgeon *Acipenser fulvescens* were detected there three times from 2019–2020. In 2019, one Lake Sturgeon was captured in the lake and added to the study. The MDNR lists Paddlefish as threatened and Lake Sturgeon as special concern (MDNR 2020).

Last, but not least, empty mussel shells were collected throughout the field season and forwarded to Bernard Sietman (MDNR malacologist in Lake City) for identification. Relic shells preserve a historical record of species which once occurred in Pigs Eye Lake, and fresh and recent shells reveal the present community. Bernard's species list includes 17 species (Appendix 2); however, this list includes relic shells of eight species considered rare or extirpated in Pool 2. Bernard defined relic as, "Very old shells often lacking periostracum (outer layer), flaking or fragmented shell. Sometimes, if they are buried, the periostracum is intact but it is faded and discolored. Sometimes these are referred to as subfossil shells which isn't really an accurate term." The MNDR lists four of the eight species as threatened and one as special concern (MDNR 2020). There have been restoration efforts in Mississippi River Pool 2 for all five species.

RECOMMENDATIONS

The Pigs Eye Lake complex provides important spawning and rearing habitats for many species. A long-term monitoring program should be implemented to assess how effectively the proposed islands reduce turbidity and soil erosion and how the fish community responds to these conditions. The MPCA's Citizens Lake Monitoring Program oversees a network of volunteers, who measure water transparencies in Minnesota lakes, and perhaps someone can be recruited for Pigs Eye Lake. Fish surveys should be conducted every five to 10 years. However, the monitoring could be scaled back to the one electrofishing survey in Battle Creek at MPCA station 00UM071 and to the MDNR historical trap netting stations in Pigs Eye Lake. It may be impossible to develop proven and reliable Index of Biological Integrity (IBI) matrices for lakes and streams located so close to the Mississippi River. Instead, a much simpler but coarser filter to assess both habitats would be tracking trends in species diversity (both richness and evenness) and the abundance of extremely tolerant fishes. The list of tolerant species includes Black Bullhead, White Sucker *Catostomus commersonii*, Common Carp, Fathead Minnow *Pimephales promelas*, and, if the species is found in future surveys, Creek Chub *Semotilus atromaculatus*. A desired trend would be higher species richness, increasing index of evenness (e.g., Shannon-Wiener index) (Wikipedia contributors 2021), and low abundance of tolerant species. A negative trend would be a reduction of species diversity and an increase in tolerant species. The concept of evenness has been applied regionally as a fish IBI metric in Minnesota streams (Goldstein et al. 2021).

Aquatic macroinvertebrates are also environmental indicators of recovery, such as the return of mayfly hatches in the Mississippi River during the mid-1980s (Sector 1987). Conversely, the presence and abundance of tolerant species would indicate a negative trend. The MPCA has developed an Invertebrate Community Index (ICI) for streams and the ICI metric lists could serve as a guide to the "good and bad" species. Again, scoring habitats in the study area would present challenges. However, monitoring surveys of the aquatic macroinvertebrate community that coincide with fish community surveys could be one more resource to use in revealing general trends occurring in the ecology of Pigs Eye Lake.

ACKNOWLEDGEMENTS

First and foremost, I must thank Jennifer Kruckenberg (Figure 7). She not only provided the excellent photos used in this report, but also volunteered many days assisting with the surveys. Without her help, it would have been impossible to use most of the sampling gear and there would be very few results to report. Maggie

Figure 7. Jennifer Kruckenberg with a couple of "friends" on Pigs Eye Lake. (Photo by Konrad Schmidt)

Barnick (City of St. Paul) assisted with the Battle Creek survey, and her supervisor, Adam Robbins, helped with locating access to Battle Creek. Scott Mackenthum, (MDNR Hutchinson Area Fisheries Supervisor) loaned the trap nets used in the survey. Without them, this report would have been titled "The *Little Fishes* of Pigs Eye Lake." Joel Stiras (MDNR East Metro Area Fisheries Specialist) provided the historical trap netting data and a summary of Paddlefish and Lake Sturgeon movements in Pigs Eye Lake. Aaron McFarlane (US Army Corp of Engineers) answered many questions about island building and provided the GIS data for the proposed islands used in Figure 4. Bernard Sietman (MDNR Malacologist) identified mussel shells and provided all the information in Appendix 2. Bruce Bauer (UTEIC Ichthyologist in Knoxville, Tennessee) verified my field identifications and Jennifer Parris Brummett (UTEIC Collection Manager) cataloged specimens into the collection. Robert Jenkins (Roanoke College Ichthyologist, now deceased) followed up with final determinations of several troubling YOY redhorse specimens. And Jay Hatch (University of Minnesota) and John Olson (Iowa Department of Natural Resources, retired) reviewed and edited this report.

ADDENDUM

On May 12, 2021, Bernard Sietman and Zeb Secrist (MDNR Center for Aquatic Mollusk Programs) used their electroshocking boat (Figure 8) to conduct fish surveys in Pigs Eye and Hog lakes (KPS21-006-010). The cumulative catch tallied from five transects (Figure 9) was 25 species in nine families. There were no new species added to the 2020 fish survey results (Schmidt 2021b), but one Yellow Bass, a special concern species, was collected off the north shore of the MDNR Pigs Eye Island Heron Rookery Scientific and Natural Area. In 2020, one specimen was also collected off the Canadian Pacific rail grade along the east shore. These are a very significant range extensions north of their currently known distribution in Minnesota. This was the final survey done in Pigs Eye Lake before construction of artificial islands began in 2022.

Figure 8. 2021 Pigs Eye Lake fish survey using a boat shocker.

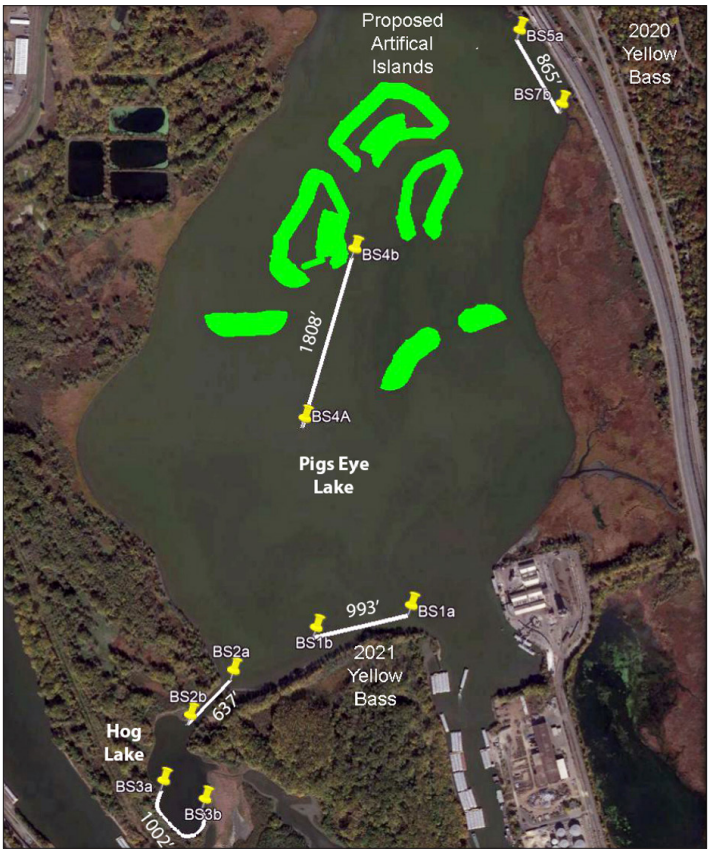


Figure 9. 2021 Pigs Eye Lake boat shocking stations.

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Appendix 1. Species distribution and frequency in Pigs Eye Lake habitats.

Common Name	Scientific Name	Pigs Eye Lake	Hog Lake	Pigs Eye Tributary	Battle Creek	Frequency Total
Gar Family - Lepisosteidae						
Shortnose Gar	*Lepisosteus platostomus*	1				**1**
Bowfin Family - Amiidae						
Emerald Bowfin	*Amia ocellicauda*	5	3			**8**
Thread Herring Family - Dorosomatidae						
Gizzard Shad	*Dorosoma cepedianum*	12	2			**14**
Minnow Family - Leuciscidae						
Central Stoneroller	*Campostoma anomalum*				2	**2**
Spotfin Shiner	*Cyprinella spiloptera*	6	1	1	4	**12**
Common Shiner	*Luxilus cornutus*				2	**2**
Hornyhead Chub	*Nocomis biguttatus*				1	**1**
Golden Shiner	*Notemigonus crysoleucas*	4	2	1	2	**9**
Emerald Shiner	*Notropis atherinoides*	15	4		5	**24**
Spottail Shiner	*Hudsonius hudsonius*	8	3		1	**12**
Weed Shiner	*Alburnops texanus*	2	3			**5**
Channel Shiner	*Paranotropis wickliffi*	2				**2**
Bluntnose Minnow	*Pimephales notatus*				2	**2**
Fathead Minnow	*Pimephales promelas*	8	2	2	3	**15**
Bullhead Minnow	*Pimephales vigilax*	8	3			**11**
Carp Family - Cyprinidae						
Common Carp	*Cyprinus carpio*	21	2	2	6	**31**
Sucker Family - Catostomidae						
River Carpsucker	*Carpiodes carpio*	1	1			**2**
Quillback	*Carpiodes cyprinus*	8	3			**11**
Carpsucker (YOY)	*Carpiodes* sp.	1				**1**
White Sucker	*Catostomus commersonii*	7	1	2	6	**16**
Smallmouth Buffalo	*Ictiobus bubalus*	2				**2**
Bigmouth Buffalo	*Ictiobus cyprinellus*	13	3	1		**17**

Common Name	Scientific Name	Pigs Eye Lake	Hog Lake	Pigs Eye Tributary	Battle Creek	Frequency Total
Black Buffalo	*Ictiobus niger*	1				**1**
Silver Redhorse	*Moxostoma anisurum*	8	2			**10**
Golden Redhorse	*Moxostoma erythrurum*	2				**2**
Shorthead Redhorse	*Moxostoma macrolepidotum*	3	1		3	**7**
Northern Hog Sucker	*Hypentelium nigricans*	1	1			**2**
Redhorse (YOY)	*Moxostoma* sp.					
North American Catfish Family - Ictaluridae						
Black Bullhead	*Ameiurus melas*	1				**1**
Yellow Bullhead	*Ameiurus natalis*				7	**7**
Channel Catfish	*Ictalurus punctatus*	6				**6**
Tadpole Madtom	*Noturus gyrinus*	3			8	**11**
Flathead Catfish	*Pylodictis olivaris*		1			**1**
Pike Family - Esocidae						
Northern Pike	*Esox lucius*	8	1	3	6	**18**
Central Mudminnow	*Umbra limi*			1	5	**6**
Trout-perch Family - Percopsidae						
Trout-perch	*Percopsis omiscomaycus*		2			**2**
Cod Family - Gadidae						
Burbot	*Lota lota*	1			4	**5**
Stickleback Family - Gasterosteidae						
Brook Stickleback	*Culaea inconstans*				1	**1**
Temperate Bass Family - Moronidae						
White Bass	*Morone chrysops*	6	1			**7**
Yellow Bass	*Morone mississippiensis*	2				**2**
Sunfish Family - Centrarchidae						
Green Sunfish	*Lepomis cyanellus*	6	5		6	**17**
Pumpkinseed	*Lepomis gibbosus*	4	4		9	**17**
Orangespotted Sunfish	*Lepomis humilis*	5	1			**6**
Bluegill	*Lepomis macrochirus*	17	4	1	12	**34**
Sunfish (YOY)	*Lepomis* sp.	1				**1**
Hybrid Sunfish	*Lepomis* sp. x *Lepomis* sp.	1	1		1	**3**
Smallmouth Bass	*Micropterus dolomieu*	1				**1**
Largemouth Bass	*Micropterus nigricans*	9	4	2	10	**25**
White Crappie	*Pomoxis annularis*	8	4	1		**13**
Black Crappie	*Pomoxis nigromaculatus*	12	4		2	**18**
Perch Family - Percidae						
Iowa Darter	*Etheostoma exile*	3			8	**11**
Johnny Darter	*Etheostoma nigrum*	2	4			**6**
Yellow Perch	*Perca flavescens*	19	4	3	13	**39**
Logperch	*Percina caprodes*	9	4		4	**17**
Slenderhead Darter	*Percina phoxocephala*	1				**1**
River Darter	*Percina shumardi*	2	3			**5**
Sauger	*Sander canadensis*	2	1			**3**
Walleye	*Sander vitreus*	4	3		4	**11**
Drum Family - Sciaenidae						
Freshwater Drum	*Aplodinotus grunniens*	9	1		1	**11**
Species Total:	**54**	**45**	**34**	**12**	**28**	

Appendix 2. Pigs Eye Lake mussel species identified from empty shells. Identification, shell condition, status, and comments provided by Bernard Sietman (MDNR malacologist). Location coordinates of relic shells are 44.90757/-93.02692 and fresh and recent 44.90619/-93.03336.

Common Name	Scientific Name	Condition	Pool 2 Status	Comments
Mucket	*Actinonaias ligamentina*	Relic	Rare	State threatened. Translocated to Upper Pool 2
Threeridge	*Amblema plicata*	Recent	Common	Young
Asian Clam	*Corbicula fluminea*	Weathered	Exotic	
Wartyback	*Cyclonaias* (formerly *Quadrula*) *nodulata*	Recent	Common	State threatened. Young
Pimpleback	*Cyclonaias* (formerly *Quadrula*) *pustulosa*	Relic	Common	
Butterfly	*Ellipsaria lineolata*	Relic	Very Rare	State threatened. Adults translocated to Upper Pool 2
Elephant Ear	*Elliptio crassidens*	Relic	Extirpated	State endangered
Spike	*Eurynia* (formerly *Elliptio*) *dilatata*	Relic	Very Rare	State threatened. Adults translocated to Upper Pool 2
Wabash Pigtoe	*Fusconaia flava*	Recent	Common	Young
Fragile Papershell	*Leptodea fragilis*	Recent	Common	Young
Threehorn Wartyback	*Obliquaria reflexa*	Recent	Common	Young
Hickorynut	*Obovaria olivaria*	Relic	Extirpated	Present in Pool 3
Round Pigtoe	*Pleurobema sintoxia*	Relic	Very Rare	State special concern. Adults translocated to Upper Pool 2
Giant Floater	*Pyganodon grandis*	Fresh	Common	
Ebonyshell	*Reginaia* (formerly *Fusconaia*) *ebenus*	Relic	Extirpated	State endangered
Monkeyface	*Theliderma* (formerly *Quadrula*) *metanevra*	Relic	Very Rare	State threatened. Reintroduced in 2002.
Deertoe	*Truncilla truncata*	Recent	Common	Young