

**Fish Species Inventory of Inland Waters of
Pictured Rocks National Lakeshore, Michigan**

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Abstract

The US Fish and Wildlife Service (USFWS), Ashland Fishery Resources Office, conducted fish surveys of inland waters at Pictured Rocks National Lakeshore, targeting species likely to occur in the park but not yet confirmed. Using gill nets, Windermere nets, and backpack electrofishing equipment, USFWS captured 595 fish representing 21 species. The western blacknose dace (*Rhinichthys atratulus*) is the only new species confirmed during this survey. The researcher provided recommendations for further intensive sampling of targeted species and routine monitoring for new species.

Introduction

Published literature (Becker 1983) suggests that Pictured Rocks National Lakeshore (PIRO), Michigan, is within the geographic range of the following fish species: brassy minnow (*Hybognathus hankinsoni*), silver lamprey (*Ichthyomyzon unicuspis*), yellow bullhead (*Ictalurus natalis*), silver redhorse (*Moxostoma anisurum*), shorthead redhorse (*Moxostoma macrolepidotum*), mimic shiner (*Notropis volucellus*) and pearl dace (*Semotilus margarita*), but none of them have been documented in former surveys. (All Latin names are according to Becker 1983.) To determine whether these or other unverified species exist in waters of PIRO, the National Park Service (NPS) contracted the Ashland Fishery Resources Office (FRO) of the U.S. Fish and Wildlife Service (USFWS) to survey the inland waters to verify the presence of these and any other previously unrecorded species.

Methods

Ashland FRO utilized a variety of fish capture techniques including gill net, trap and windermere nets and backpack electrofishing to seek these species at PIRO. The equipment was the same as that employed in the 2003 survey work done at PIRO (Newman 2003).

Sampling efforts were concentrated within habitats judged most likely to produce the species sought and within those small or isolated habitats that have received little or no attention in previous surveys. These included:

Streams:

- Chapel, Spray, and Sable Creeks (upstream from waterfalls)
- 2 unnamed tributaries east of Sand Point (when flowing)

Lakes:

- Trappers, Chapel, Hyde, and Grand Sable Lakes

Unnamed ponds:

- 4 connected ponds in section 19 at Sand Point.
- 1 pond in section 21 near Chapel Lake
- 1 pond in section 16 near Sullivan Creek

Ashland FRO conducted field sampling from August 9 to 19, 2004. Universal Transect Mercator coordinates for all collection locations were recorded along with gear type, effort, and catch. Total body lengths were recorded for the first 50 fish of each species captured at each location. All fish captured in the survey were identified to species either in the field or in the laboratory. Specimens requiring species confirmation in the lab were preserved in NOTOXhisto_{tm} and brought to the Ashland FRO before disposal. The identification of a specimen of western blacknose dace (*Rhinichthys atratulus*) was confirmed by Professor Gerald Smith of The University of Michigan, Ann Arbor.

Results, discussion and conclusions

A total of 595 fish comprising 21 species were captured in the survey (Table 1). (See Appendix 1 for complete data on species caught, length classes, locations, dates, and gear types.) Only one species, western blacknose dace, had not been reported from PIRO previously. None of the other unverified species targeted in the project (brassy minnow, silver lamprey, yellow bullhead, silver redhorse, shorthead redhorse, mimic shiner and pearl dace) were captured.

Table 1. Latin and common names of fish and numbers of individuals caught during surveys at Pictured Rocks National Lakeshore, 2004.

Latin Name	Common Name	Number Caught
<i>Ambloplites rupestris</i>	Rockbass	49
<i>Catostomus commersoni</i>	White sucker	1
<i>Chrosomus eos</i>	Northern redbelly dace	123
<i>Cottus bairdi</i>	Mottled sculpin	19
<i>Esox lucius</i>	Northern pike	4
<i>Etheostoma exile</i>	Iowa darter	8
<i>Eucalia inconstans</i>	Brook stickleback	48
<i>Notropis cornutus</i>	Common shiner	1
<i>Notropis heterolepis</i>	Blacknose shiner	22
<i>Notropis hudsonius</i>	Spottail shiner	1
<i>Oncorhynchus mykiss</i>	Rainbow trout (Steelhead)	19
<i>Oncorhynchus kisutch</i>	Coho salmon	1
<i>Osmerus mordax</i>	Rainbow smelt	2
<i>Perca flavescens</i>	Yellow perch	62
<i>Percina caprodes</i>	Log perch	4
<i>Rhinichthys atratulus</i>	Western blacknose dace	37
<i>Rhinichthys cataractae</i>	Longnose dace	17
<i>Salvelinus fontinalis</i>	Brook trout	53
<i>Salvelinus namaycush</i>	Lake trout (Hatchery)	1
<i>Semotilus atromaculatus</i>	Creek chub	67
<i>Umbra limi</i>	Central mudminnow	56

In my opinion, Chapel/Little Chapel Lakes and their tributaries have not been sampled adequately. Data provided by Michigan Department of Natural Resources (MiDNR) and PIRO in the past have stated that the rocky cascade waterfall at the mouth of the Chapel Creek was an impassable barrier. Because of that, it was not sampled in any of the studies previous to this one. Sampling conducted in Chapel Creek during this survey was less comprehensive than in the other major stream systems at PIRO, and may not have provided adequate data for this stream.

Given the possible exception noted above, it is my professional opinion that it is unlikely that populations of any other unreported, native species exist in inland waters at PIRO. Brassy minnow, yellow bullhead, mimic shiner and pearl dace (the species whose geographic ranges include PIRO) are probably not present in PIRO waters. Silver redhorse and shorthead redhorse have not been found to date and I am confident that they

do not spawn or utilize streams at PIRO, however, they could occur on an occasional or transient basis within the ¼ mile park boundary of Lake Superior.

Sampling completed in this and other studies in the park have not used the equipment best suited for collecting silver lamprey. The backpack electrofishing units used in this study are highly effective for capturing fish and will capture some ammocete stage and adult lamprey (we did capture sea lamprey) but they are not as effective as the specialized backpack units used by USFWS sea lamprey survey teams. PIRO streams have been surveyed periodically by sea lamprey control teams for many years. A summary report (Moore and Braem 1965) of the species composition of fish captured in those surveys is attached (note the reports of sea lamprey - *Petromyzon marinus* and American brook lamprey - *Lampetra lomotiei*). I conclude that the combination of the sea lamprey surveys and surveys conducted during this project would probably have captured silver lamprey if they were present.

A number of exotic species are present in PIRO, including sea lamprey, rainbow trout or steelhead (*Oncorhynchus mykiss*), coho, and pink salmon (*Oncorhynchus gorbuscha*). Salmonids are common in PIRO streams with anadromous habitat downstream from barrier waterfalls. A particularly interesting population exists in Section 34 Creek which flows into Chapel Lake and was the site of an unsuccessful 1987 attempt to reintroduce grayling (*Thymallus arcticus*). There is adequate anadromous fish habitat in both Section 34 Creek (downstream from Chapel Falls) and Chapel Creek between Chapel Lake and Lake Superior, however, a bedrock cascade waterfall at the mouth of the stream forms a barrier to fish migration (Figure 1). No salmonids were captured in the stream from Chapel Lake to Lake Superior, but a number of young-of-the-year and yearling rainbow trout were found in Section 34 Creek between Chapel Lake and Chapel Falls. If the barrier at the mouth of Chapel Creek rarely or never allows fish from Lake Superior to enter, rainbow trout found upstream from Chapel Lake may be part of a land-locked, reproducing population.

Monitoring of fish populations in Lake Superior and its tributary streams at PIRO have shown that splake (a fertile hybrid produced by crossing lake trout with brook trout) occur in most streams with anadromous habitat and are common in the nearshore waters of Lake Superior. Concerns regarding the possibility of splake reproducing or backcrossing with wild, native stocks of either parent species led to a cooperative study (Ashland FRO, PIRO, MiDNR, and U.S. Geological Survey) of the genetics of splake that were captured in the Lake Superior nearshore waters at PIRO. Initial results of that study indicate that 5 of 16 specimens tested were probably backcrosses (Wendy Lee Stott, USGS, Ann Arbor, MI, pers. comm.). It could not be determined if those backcrosses had occurred as a result of reproduction in the wild or as an accidental product of the hatchery system.



Mouth of Chapel Creek, Pictured Rocks National Lakeshore, showing author and bedrock cascade waterfall that is a barrier to fish migration. Photo by USFWS.

Recommendations

- Unless PIRO has a compelling interest or need for information regarding the possibility of silver lamprey presence, I would not recommend additional survey work. If needed however, this species should be targeted with intensive sampling and specialized equipment.
- Unless PIRO has a compelling interest or need for information regarding the occurrence of transient species occasionally passing through Lake Superior waters within PIRO's $\frac{1}{4}$ mile boundary, I would not recommend further field surveys, particularly because the lake is surveyed by other agencies that monitor fisheries and exotic species. I recommend that PIRO maintain contact with state and federal agencies that conduct fish surveys in Lake Superior to keep current with their findings (e.g., exotic three spine stickleback was documented in Munising Bay by Ashland FRO Aquatic Nuisance Species field biologists).
- I recommend that tributaries open to anadromous fish passage and colonization from Lake Superior by both native and exotic species be surveyed at intervals of 3 or 4 years. The introduction of new fish species to Lake Superior is becoming more common; several of these are established in Lake Superior but not yet found

at PIRO. Streams with available anadromous habitat can be easily and quickly colonized by these exotics.

- Because inland lakes and streams are less likely to be colonized by new species through dumping of bait buckets or intentional transfers, I recommend that inland and landlocked waters be surveyed at 10 year intervals.
- I recommend further field surveys in the Chapel Lake/Creek system to seek unrecorded species and to determine the status of the rainbow trout population(s) in Section 34 Creek and in Chapel Creek upstream from Chapel Lake. A modest survey effort during the period from late May through June should resolve these issues.
- I recommend further collection of splake at PIRO. Annual tissue samples from creel surveys in Munising Bay and PIRO streams may clarify the extent of back crossing and elucidate whether this is occurring in the wild or in hatchery production. The goal is the possibility of finding genetic contamination of brook and/or lake trout stocks.

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Literature Cited

- Becker, G. C. 1983. Fishes of Wisconsin. University of Wisconsin Press. Madison, WI.
- Moore, H. H. and R. A. Braem. 1965. Distribution of Fishes in U.S. Streams Tributary to Lake Superior. USFWS Spec. Sci. Rept.- Fisheries No. 516. Washington, D.C.
- Newman, L. E. 2003. Inventory of nearshore fish and mud puppy (Amphibian) in Lake Superior, Pictured Rocks National Lakeshore. National Park Service, Great Lakes inventory and Monitoring Network, Ashland, WI. 54806. GLKN/2003/04.

Appendix 1. Locations sampled, effort and catch, PRNL, inland lakes and streams, 2004. All windermere and experimental (expn.) gill net sets were overnight (approximately 24 hours). BPEF = backpack electrofishing unit.

Location description	Date	GPS coordinates	Gear/effort	Species	Length class (mm)/N
Chapel Ck. Mosquito trail	8/10/2004	N 46 31 225 W 86 27 981	BPEF 35 minutes	Mottled sculpin/15	40-60mm/1 61-80mm/10 81-100 mm/4
				Brook stickleback/2	61-80 mm/2
Chapel Ck. at trail head road	8/10/2004	N 46 31 139 W 86 27 761	BPEF 35 minutes	Brook trout / 6	100-120mm/3 120-140 mm/1 140-160 mm/2
Marsh Trail Ponds at Sand Point	8/11/2004	N 46 26 949 W 86 36 234	Windermere nets/3	Northern redbelly dace/122 (62 not measured)	40-60mm/35 61-80mm/24 81-100mm/1
				Brook stickleback/37	20-40mm/19 41-60mm/18
				Central mud minnow/31	20-40mm/3 41-60mm/10 61-80mm/7 80-100 mm/10 100-120mm/1
Legion Lake	8/12/2004	N 46 31 537 W 86 21 603	Windermere net/1 1 expn. gill net (no fish)	Central mud minnow/22	40-60mm/2 61-80 mm/17 81-100 mm/2 101-120mm/1
Sable Creek, Hwy 58 to Sable Lake	8/14/2004	N 46 39 245 W 86 01 612	BPEF 60 minutes	Creek chub/44	41-60mm/14 61-80 mm/17 81-100 mm/3 101-120mm/3 121-140mm/5 141-160mm/2
				Long nose dace/13	41-60mm/3 61-80 mm/4 81-100 mm/6
				Rock bass/2	61-80 mm/1 121-140mm/1
				Mottled sculpin/3	61-80 mm/3
				Common shiner/1	61-80 mm/1

Fish of Inland Waters at Pictured Rocks

Location description	Date	GPS coordinates	Gear/effort	Species	Length class (mm)/N
Sable Creek, Hwy 58 to Sable Lake	4/29/04	N 46 39 245 W 86 01 612	BPEF 60 minutes	Lake trout/1	80-100mm/1
				Long-nose dace/4	not measured
				Creek chub/11	not measured
Trappers Lake	8/13/2004	N 46 35 172 W 86 19 019	Windermere net/1 (no fish) 1 expn. gill net	Yellow perch/60	40-60mm/0 61-80 mm/1 81-100 mm/1 101-120mm/0 121-140mm/1 141-160mm/2 161-180mm/15 181-200mm/12 201-220mm/12 221-240mm/14 241-260mm/1 261-281mm/1
				Rock bass/8	81-100 mm/2 101-120mm/5 121-140mm/0 141-160mm/1
Section 34 tributary (above falls)	8/14/2004	N 46 31 720 W 86 26 379	BPEF 35 minutes	Brook trout/11	61-80 mm/1 81-100 mm/0 101-120mm/1 121-140mm/6 141-160mm/2 161-180mm/0 181-200mm/0 201-220mm/1
				Central mud minnow/1	61-80 mm/1
				Northern redbelly dace/1	41-60mm/1

Fish of Inland Waters at Pictured Rocks

Location description	Date	GPS coordinates	Gear/effort	Species	Length class (mm)/N
Section 34 tributary (below falls)	8/14/2004	N 46 31 770 W 86 26 770	BPEF 30 minutes	Brook trout /2	61-80 mm/2
				Rainbow trout/19	41-60mm/14 61-80 mm/3 81-100 mm/0 101-120mm/0 121-140mm/1 141-160mm/1
				Log perch/2	81-100 mm/2
				Iowa darter/1	41-60mm/1
Chapel Creek mouth upstream	8/22/2004	N 46 32 777 W 86 26 456	BPEF 50 minutes	Blacknose shiner/9	21-40mm/4 41-60mm/5
				Central mud minnow/1	81-100 mm/1
				Western blacknose dace/34	21-40mm/3 41-60mm/14 61-80 mm/9 81-100 mm/7 101-120mm/1
				Blacknose shiner/8	not measured
				Log perch/2	61-80mm/1 81-100mm/1
				White sucker/1	61-80mm/1
				Creek chub/12	21-40mm/0 41-60mm/1 61-80 mm/0 81-100 mm/3 101-120mm/3 121-140mm/4 141-160mm/1
Un-named pond near 12 mile campground	8/15/2004	N 46 38 676 W 86 10 974	Windermere nets /3	Brook stickleback/1	21-40mm/1
				Iowa darter/7	21-40mm/2 41-60mm/5

Fish of Inland Waters at Pictured Rocks

Location description	Date	GPS coordinates	Gear/effort	Species	Length class (mm)/N
Hyde Lake	8/15/2004	N 46 34 049 W 86 16 712	Windermere nets /3	Brook trout /3	61-80 mm/1 121-140mm/1 161-180mm/1
				Brook stickleback/5	41-60mm/5
				Mottled sculpin/1	81-100 mm/1
Spray Creek	8/16/2004	N 46 32 061 W 86 23 824	BPEF 5 3 minutes	Brook trout/17	61-80 mm/6 81-100 mm/1 101-120mm/0 121-140mm/3 141-160mm/3 161-180mm/3 181-200mm/1
Bill's Creek mouth in Little Beaver Lake	8/16/2004	N 46 33 471 W 86 21 737	BPEF 5 minutes	Blacknose shiner/3	00-20mm/2 41-60mm/1
				Spot tail shiner/1	41-60mm/1
Bill's Creek up from Little Beaver Lake	8/16/2004	N 46 33 423 W 86 21 740	BPEF 25 minutes	Brook trout/ 9	61-80 mm/8 81-100 mm/1
				Coho salmon/1	61-80 mm/1
Un-named pond off Beaver Lake Rd.	8/16/2004	N 46 32 390 W 86 21 447	BPEF 15 minutes	Western blacknose dace/3	61-80 mm/2 81-100 mm/1
				Brook stickleback/3	41-60mm/3
				Central mud minnow/1	61-80 mm/1
Un-named tributary East of Sand Point	8/17/2004	N 46 27 949 W 86 34 939	BPEF 15 minutes	Brook trout/ 5	61-80 mm/1 101-120mm/1 121-140mm/2 141-160mm/1
Little Chapel Lake	8/10/2004	N 46 32 564 W 86 26 746	1 expn. gill net	Northern pike/4	500-600mm/3 600-100mm/1
			Windermere nets /2	Black nose shiner/2	21-40mm/1 41-60mm/1

Fish of Inland Waters at Pictured Rocks

Location description	Date	GPS coordinates	Gear/effort	Species	Length class (mm)/N
Un-named tributary near Sand Point	8/17/2004	N 46 27 705 W 86 35 122	BPEF 10 minutes	No Fish	
Un-named pond near Sand Point	8/17/2004	N 46 27 128 W 86 35 754	BPEF 10 minutes	No Fish	
Grand Sable Lake	8/14/2004	N 46 26 949 W 86 36 234	Windermere nets/3	Rock bass/39	41-60mm/3 61-80mm/19 81-100 mm/12 101-120mm/4 121-140mm/1
			Expn. Gill net/1	Yellow perch/2	141-160mm/2
				Rainbow smelt/2	181-200mm/2