Lake Roland & Lake Gerald ("Twin Lakes") Status of the Fishery Report
Houghton County, T. 52N., R.36W., Sec. 22 & 13
Misery River watershed, last surveyed May 2019

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Environment

Lake Roland and Lake Gerald are commonly known as Houghton County's "Twin Lakes". These two lakes are connected by a small channel that is navigable by boat, and the channel is freely open to fish passage. A third lake, Little Lake Gerald, rests in the midway channel that connects the larger Lake Roland and Lake Gerald. Collectively, these lakes provide 552 acres of lentic water (Roland 292 acres, Gerald 260 acres) in the southern portion of the Keweenaw Peninsula in Michigan's Upper Peninsula

Formed at the headwater of the Misery River, these lakes catch and drain the surface precipitation of the west slope of the Keweenaw Spine. The Keweenaw Spine is a geologic fault formed by the merging of two tectonic plates which created a volcanic uplift. The Keweenaw Spine ranges from Copper Harbor (to the north), extending southwesterly into northern Wisconsin. Soils here are primarily sand from an ancient seabed. The volcanic rock and quartz sandstone are very low in primary nutrients. As a headwater system in a watershed with infertile soils, the lakes were classified as oligotrophic. The lakes once had sparse vegetation and clear-colorless water that results from being surrounded by a landscape that has historically had low levels of basic food-web nutrients

Both lakes Roland and Gerald have a mix of shallow and deep-water areas. Little Lake Gerald is shallow, averaging 5-10 feet deep, and for the purpose of this report will be regarded as a simple channel that connects both lakes and while offering minimal sportfishing value, Little Gerald hosts wildlife occupations of beaver, muskrat, Great Blue Herons, and American Bald Eagle. Roland has a maximum depth of 40 feet and 6 miles of shoreline. Gerald has a maximum depth of 40 feet and 7.8 miles of shoreline. Three streams flow into the Twin Lakes system, and the waters discharge at the south end of Lake Roland into the headwaters of the Misery River. Shoal substrates and riparian soils are primarily sand, with very little gravel present. The State of Michigan Twin Lakes State Park, and State Park campground that consists of 62 campsites, is located on the southwest shore of Lake Roland.

The bathymetry of these two lakes is dishpan in shape and during the summer drought periods the lake's water level can fluctuate 1-3 feet annually, reducing access to the water from shore or from landowner docks. In the spring the snowmelt and rain can flood the lakes which inundates the lakeshores and riparian residences. A concrete adjustable water-level control structure is present at the outlet of Lake Roland. This water control structure is owned by the County of Houghton and through the establishment of a legal lake level elevation. The lake levels are managed to minimize spring flooding or summer low-water periods.

The Twin Lakes chain, with it's clear water and sandy beaches, became popular for recreational cabin development in the late 1940's, mid-1960's, and 1980's. Many of the cabins were built piecemeal as property owners saved money and would add amenities to their cabins as they could afford. Bathrooms were a family necessity for these camps, and some home-made systems comprised of

rudimentary plumbing and a 55-gallon sunken barrel would provide the septic tank for resident's needs. The abundance of cabins that were constructed during positive economic times, combined with the sandy porous riparian soils, allowed for nutrification of the lakes. By the 2000's, aquatic vegetation growth became dense, algae blooms were a regular summer occurrence, fish kills were commonly reported, and the survival of stocked trout diminished.

History

Twin Lakes have been noted as supporting an attractive panfish sport fishery since John Lowe's first survey in 1925 (J. Lowe was a university professor at Northern Michigan College in Marquette). Beginning in 1983, these lakes were managed as a two-story fishery supported by Rainbow Trout and panfish populations (Bluegill, Black Crappie, Yellow Perch, Largemouth Bass), with Rainbow Trout stocking occurring annually during spring. Fisheries Division stocked Walleye in these lakes in 1950, and a low level of natural reproduction allowed this species to persist in both lakes. Splake have also been stocked on a periodic basis.

In the 1980's, Rainbow Trout were the sportfish that were the primary focus of management efforts for these lakes. The fish assemblage of the Twin Lakes waters includes Yellow Perch, and Yellow Perch and Rainbow Trout less than 12 inches compete for zooplankton resources, especially during the winter when invertebrates are not available. To successfully sustain a quality Rainbow Trout fishery, Yellow Perch populations need to be maintained at a low density to ensure adequate zooplankton resources are available to sustain the Rainbow Trout. One management tool for managing Rainbow Trout is stocking Walleye into the lake, with the goal that the introduced Walleye will reduce Yellow Perch abundance through predation. To keep Yellow Perch abundances low in both lakes, Walleye numbers were supplemented with spring fingerling stocking in 2001 and 2003. These allocations, while being successful at reducing Yellow Perch numbers, did not however contribute to a quality Walleye sport fishery (Figure 1.) As a side consequence of the Walleye program, the numbers of Bluegill and Black Crappie improved following the cessation of Walleye stocking (Figure 2).

White Suckers, Rock Bass, and Brown Bullheads (commonly referred to as rough fish) are periodically abundant in these lakes. During the early 2000's, these fish species comprised 70-85% of the total biomass. Netting efforts to manually remove White Suckers were implemented in 2002 and 2003 whereby 3,600 pounds were taken out of these two lakes. Although rough fish are abundant at times, they do not seem to be negatively affecting panfish populations. This aligns with research findings that indicated Bluegill growth over time was not strongly correlated with White Sucker manipulations in study lakes (Zorn et al. 2020).

There have been numerous fisheries surveys on conducted in these lakes between the period of 1937 – 2019. A short chronological synopsis of survey results shows robust panfish assemblages in the early years, with Walleye (from stocking) showing up in late 1950's and early 1960's, and with Rainbow Trout providing a fishery in the 1970's to the early 2000's. Successes from trout stocking efforts tapered off through the 2000's where few Rainbow Trout or Splake were caught by 2007, and there was no improvement in coldwater species management through 2019.

For the survey specific summaries below, fish age summaries are compared (positive or negative) to the State growth average mean rates. The following acronyms describe the fish species caught: (fish acronyms; Smallmouth Bass =SMB, Yellow Perch =YEP , Rock Bass =RKB , Common White Sucker

= CWS, Rainbow Trout = RBT, Lake Trout = LAT, Brook Trout = BKT, Splake = SPL, Brown Trout = BNT, Walleye = WAE);

1937 - Surveys conducted on both lakes.
Roland: SMB, YEP, and CWS abundant; LMB, PSF, CMM, and BRB common; BLG, BCR, and Yellow Bullhead occasional. Fishing reports: Fair for bass. Lots of YEP, but all small.

Gerald: SMB abundant; PSF, BLG, RKB, and CWS common; LMB, BCR, YEP, and Yellow Bullhead occasional; CMM and BRB rare. Fishing reports: good fishing for bass. Many YEP present but seldom

1948 - Roland: Brief gill net survey finds numerous large YEP and BRB, 1 SMB, and 1 BLG.
Fishing reports: Fair for YEP and LMB. Numerous "jumbo" YEP caught in recent years.

Gerald: Fishing reports: Good fishing for YEP, BCR, and SMB.

1960 - Gill net surveys conducted on both lakes
Roland: Several WAE (12-17") and YEP (6-11") captured. BRB and LNS common. Few SMB, PSF, RKB, CWS, and BCR found.

Gerald: Numerous YEP (6-10") and 2 WAE (14-17") collected. CWS, BRB, and LNS common. Few SMB, RKB, and PSF found.

1970 - Fyke net and trap net surveys (August) conducted on both lakes
Roland: WAE (15-17") and SMB (7-14") comprise 8.7% and 4.8% of biomass, respectively. Panfish (YEP, BCR, and PSF) make up only 2.4% of biomass. CWS, BRB, LNS, and RKB comprise 84.1% of biomass.

Gerald: WAE (14-24") and SMB (8-14") comprise 11.3% and 1.0% of biomass, respectively. Panfish (BCR, PSF, YEP, and BLG) make up 3.5% of biomass. CWS, LNS, RKB, and bullheads comprise 84.2% of biomass.

1982 - Fyke net surveys (July) conducted on both lakes
Roland: SMB (3-13") and TMU (14-29") comprise 5.4% and 9.1% of biomass, respectively. Panfish (YEP, BCR, BLG, and PSF) make up 16.9% of biomass. CWS, RKB, and bullheads comprise 68.4% of biomass. No WAE or RBT found. Only 7% of panfish of harvestable size.

Gerald: 23 SMB (3-17") and 3 TMU (21-31") found. Only 6% of panfish of harvestable size. About 95% of sample made up of rough fish or undersized gamefish. No WAE or RBT found.
Mean growth indices: SMB = -1.5, PSF = -0.9, YEP = -1.3, and BLG = -0.9

1992 - Roland: 12,220 yearling RBT (22/acre) stocked
Fyke net and gill net survey (Sept): Seventeen RBT (11-21") found. Thirteen WAE (10-23"), 25 SMB (5-12"), and 4 LMB (6-11") captured. Predators comprise 10.0% of biomass. PSF and BLG common, YEP and BCR rare. About 42% of BLG and PSF harvestable. Panfish and rough fish (CWS, RKB, and BRB) comprise 9.6% and 72.3% of biomass, respectively.

Mean growth indices: BLG = +1.3, WAE = +1.4 (age 1 only), and SMB = -1.6
Fishing reports: Park personnel report very good fishing for RBT.

2000 - Fyke net surveys (May) conducted on both lakes.
Roland: Fourteen RBT (7-16") found. One WAE (27"), 37 SMB (7-16"), 15 LMB (6-11"), and 1 NOP (33") captured. Predators make up 3.6% of total biomass. PSF abundant, BLG common, YEP and BCR
rare. Percentage harvestable varies from 64% for BLG to 93% for PSF. Panfish and rough fish (RKB, CWS, and BRB) comprise 16.9% and 79.1% of biomass, respectively.
Mean growth indices: LMB = -0.4 and SMB = -0.3, 13,340 yearling RBT (24/acre) stocked.

Gerald: Four RBT (9-17") found. Eight WAE (16-21"), 25 SMB (6-16"), and 16 LMB (5-8") captured. Predators make up 2.9% of total biomass. PSF abundant, BLG common, YEP and BCR rare. Percentage harvestable varies from 36% for BCR to 98% for PSF. Panfish and rough fish (RKB, CWS, and BRB) comprise 13.1% and 83.5% of biomass, respectively.
Mean growth indices: LMB = -0.4 and SMB = -0.7.

2007 - Roland: Twenty three BCR (3-13"), 153 BLG (1-9"), 46 PSD (2-9"), 22 SMB (1-19"), 15 SPL (7-16"), 41 YEP (1-12"), 23 LMB (1-20"), 9 LAT (15-25"), 10 RBT (17-20"),
Gerald: Sixty five BCR (9-14"), 128 BLG (1-10"), 4 LAT (19-23"), 9 LMB (1-12"). 30 PSD (1-9"), 8 RBT (15-24"), 4 SPL (7-9"), 3 WAE (18-26"), 113 YEP (1-9")

2019 - Roland: Fifty seven BCR (5-13"), 339 BLG (1-9"), 40 PSD (4-9"), 3 LAT (19 - 25"), 9 LMB (8-13"), 0 WAE.
Gerald: Ninety four BCR (3-13"), 319 BLG (3-9"), 24 PSD (4-9"), 4 SMB (11-14"), 1 WAE (26"), 32 YEP (4-11").

Current Status

During the period of May 6-8, 2019, six large mesh fyke nets and two experimental mesh gill nets were used to assess the fish community in lakes Roland and Gerald. Water temperatures ranged from 42? to 45? during the survey period. This time-period of netting was selected because Rainbow Trout spawn in the spring and occupy near-shore waters during this time of the year. One of the survey goals was to assess the yearly carry-over of Rainbow Trout that were stocked in the past years.

Catch results from the netting effort showed a diverse fish community with thirteen species of fish occupying these lakes. While the management goal for these lakes was to sustain a Rainbow Trout sport fishery, only one Rainbow Trout was caught in the 2019 survey. Yellow Perch were abundant in both lakes, with an average length of 8.5 inches in Lake Roland, and 7.4 inches in Lake Gerald. Panfish numbers were abundant for Bluegill, Black Crappie, Pumpkinseed sunfish, and Rock Bass. Size classes of panfish were good enough to attract regular angler interest and were more impressive than many other surrounding inland lakes. Rough fish were not present to any large degree whereby they dominated the fish assemblage. Anecdotal reports from anglers that fish the lakes regularly indicate very few Rainbow Trout being caught in the last 5 years.

Analysis and Discussion

It is apparent from talking with Twin Lakes State Park staff, local anglers, and conservation officers, that the annual stocking of Rainbow Trout is not contributing to the quality of the sport fishery in Twin Lakes. The 2019 survey substantiates those reports. The November stocking of adult Lake Trout does provide for a winter ice fishery, however of the 185 adult Lake Trout that were stocked on November 1, 2018, only six were caught in the 2019 netting survey. These two lakes support an abundant panfish fishery, with fish being represented in attractive sizes. With the proximity of these lakes to numerous local towns, villages, cities, and with 62 campsites at Twin Lakes State Park, these lakes provide a quality panfish fishing resource to the public.

The limnological status of this lake system has changed over the past 60-years from a clear-water oligotrophic system to mesotrophic and possibly transitioning to eutrophic. There are limited resources from the township, the health department, or the residents to reduce effluent loading to the lake or to pursue grant funding for assistance. While current fishing opportunities are good for panfish, it is possible that winter-kill conditions caused by nutrient loading could arise in future years.

Management Direction

Management efforts should focus on managing for a warmwater panfish fishery, with a cessation of all future trout stocking. At the time of the writing of this report (summer 2022) there was a large die-off of the adult Lake Trout that were stocked in November 2021. The deceased Lake Trout became a public nuisance on the lake chain with fish washing up on landowner beaches and in popular swimming areas. It appears that the increased nutrification of the lake chain has reduced the capacity of the system to support trout any longer.

The local Township and Health Department should work with local officials to explore nutrient reduction to the lake such as promoting stormwater and septic tank stewardship, and reductions of lawn fertilizers.

There have been requests to resume Walleye stocking, however past Walleye introductions into these lakes did not produce a viable population or a sport fishery. The cessation of Walleye stocking in 2004 may have resulted in the boost of Bluegill and Crappie numbers which has created and will continue to provide a quality panfish sport fishery for the lakes.

References

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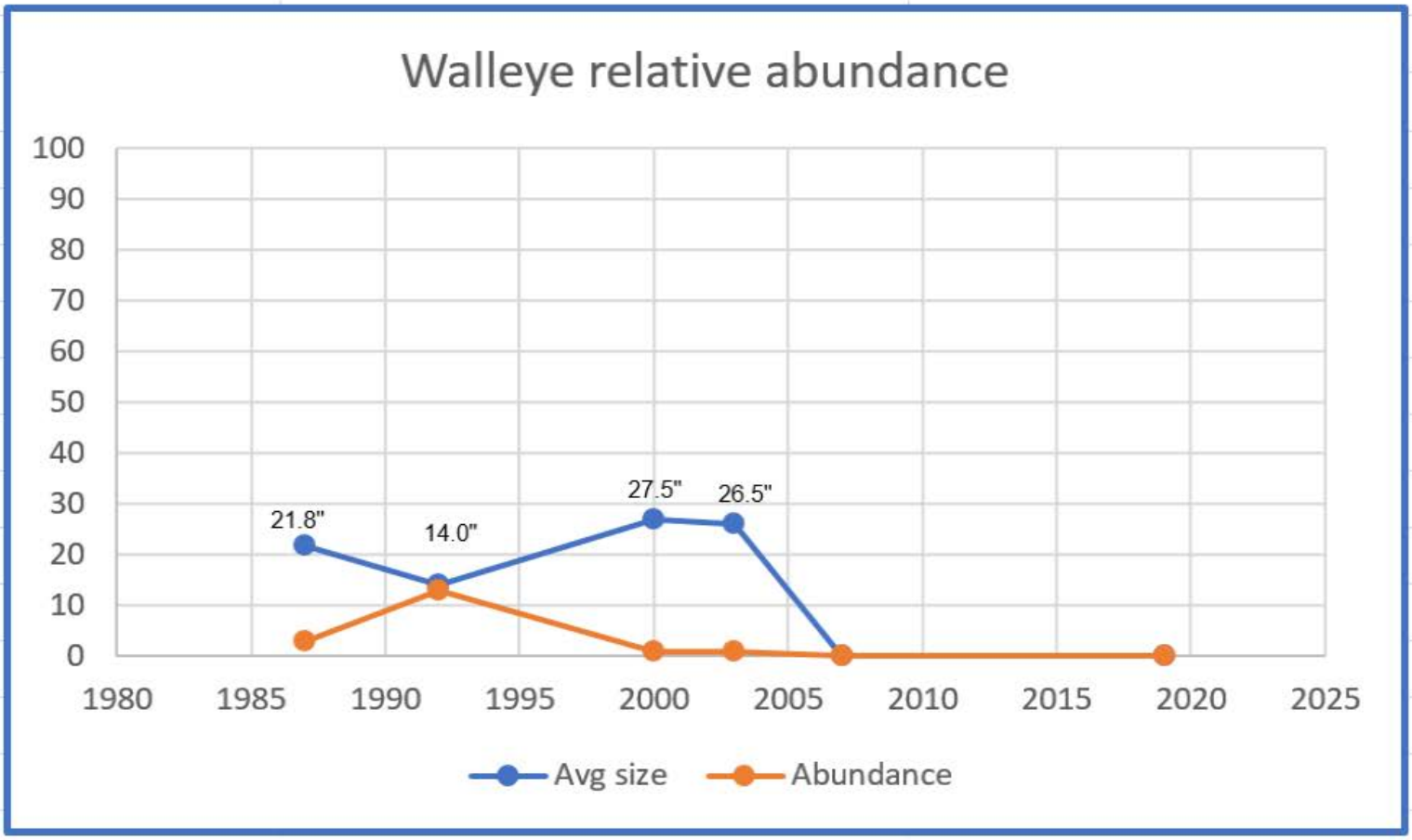
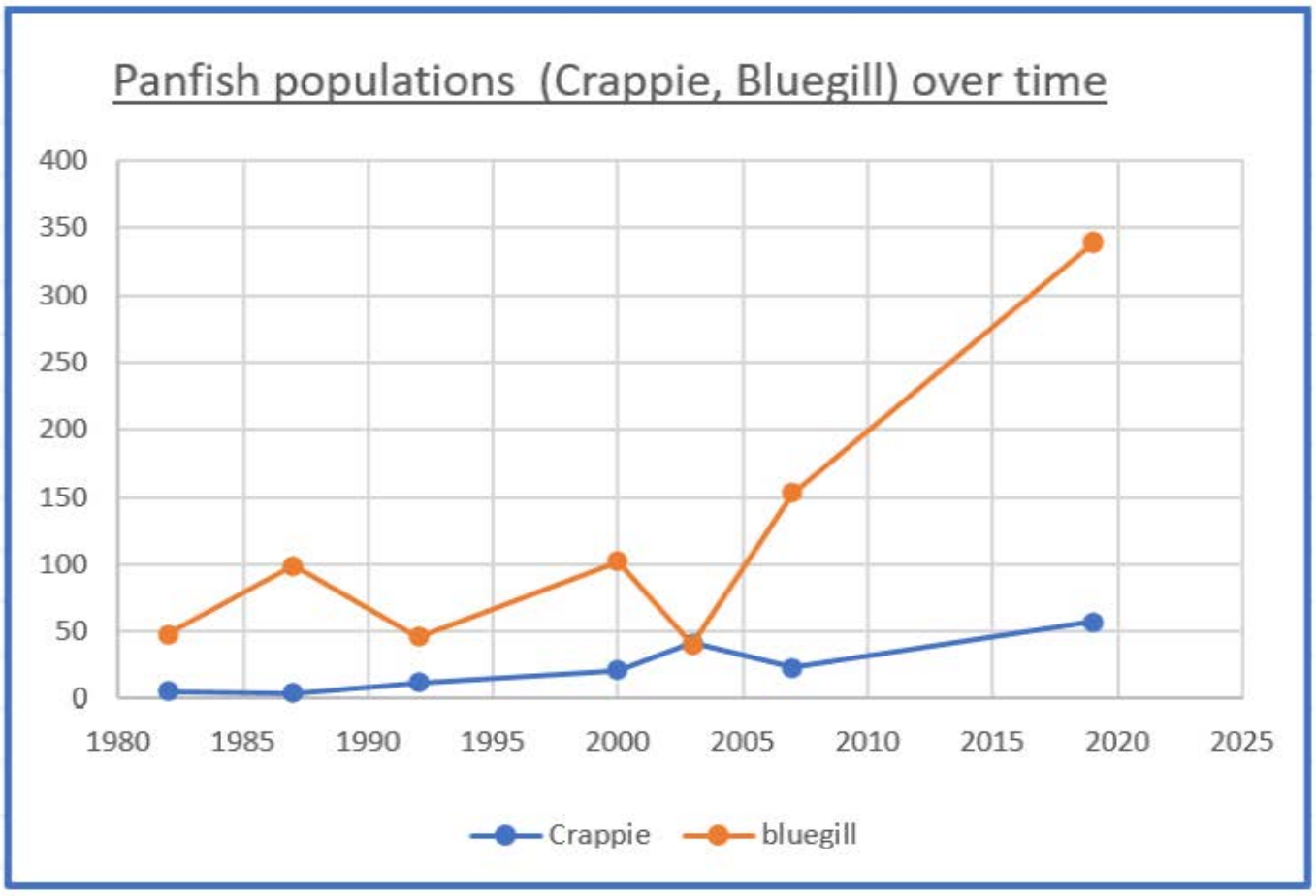

Walleye relative abundance
100
90
80
70
60
50
40
30
20
10
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
21.8"
14.0"
27.5"
26.5"
Avg size
Abundance


Panfish populations (Crappie, Bluegill) over time
400
350
300
250
200
150
100
50
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Crappie
bluegill

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