

Tank Lake

Luce County, T49N, R12W, Sec 36
North Two Hearted River watershed, last surveyed 2008

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Environment

Tank Lake is located in northwest Luce County, about three miles west of the Pretty Lakes Quiet Area. It encompasses about 36 acres, with a maximum depth of about 50 ft (Figure 1). Deeper contours form a deep central bowl with relatively steep sides. Shoal areas are located along the northwest shoreline and in the east bays, comprising about 60% of the surface acreage. Some downed woody structure lies along the south shoreline, with extensive emergent reed colonies along the north shoreline. There are submerged plant colonies, mostly lake pondweeds, in the shallower bay areas. The shoreline is mostly sand and softer sand/muck substrate. Even so, wading anglers can generally wade out far enough to cast over the sharp drop-off. The most eastern bay is separated from the lake, which probably reduces the actual lake size to 33-34 acres instead of the calculated 36.

Water chemistry had not changed appreciably in the last sixty years, with the exception of a potentially larger oxygen deficit (anoxic) zone at the bottom (Figure 2). The 1949 data did not include samples from 5, 10 or 25 ft depths, so those data were extrapolated for Figure 2 in order to present a clearer graphic comparison with the 2008 data. Dissolved oxygen in August, 2008 extended down into 30 ft and 47F water. In contrast, dissolved oxygen in July, 1949 extended down to 40 ft and 45F. However, anoxic zones generally continue to grow larger throughout the summer, until the lake undergoes complete mixing in the fall as temperatures become uniform from surface to bottom. For that reason, the apparent decrease in oxygenated water may be the result of sampling in two different months rather than an actual change in dissolved oxygen. Conductivity was very low in 2008, while alkalinity was not detectable (Table 1). Such low numbers imply low fertility and productivity, somewhat verified by a chlorophyll a reading of 5.8 mg/m³.

Tank Lake lies adjacent to relatively flat sandy jack pine plains. The immediate locale has a somewhat richer, more nutritious soil type supporting maple-beech hardwoods, while the actual shoreline bluff supports mature white pine and hemlock stands. The two-track access road is quite overgrown and contains sharp corners that make hauling large trailered boats very difficult for both the towing vehicle and the boat trailer. In addition, exposed white pine roots make the road adjacent to the shoreline very rough. The result is minimal vehicle traffic through the area and few engine-powered fishing boats. Although the site is sometimes filled with day-use activity and campers, because of its relative isolation Tank Lake receives limited use through most of each summer.

There is one leased cabin on the north side of the lake, along the two-track "circle drive." Although that portion of the lake perimeter is privately owned, the landowner participates in the Commercial Forest Act which allows public hunting and fishing access. There are also two unofficial camp sites along the two track access road, located on the 10 ft bluff overlooking the lake. There is no improved boat launch, just an alley cleared through the trees extending from the two-track road down to the shoreline. Anglers and boaters should plan to use carry-in boats, float tubes, or use a 4WD vehicle to launch small trailerable boats across the relatively soft sand substrate.

History

The Tank Lake water level has generally remained stable over the last sixty years. However, the farthest easterly bay was connected to the main basin in 1949, but has not had a water connection for many years. While the lake was estimated at 36 acres when mapped, loss of that bay and some shoreline around the lake has probably reduced its size to 33-34 acres. Fisheries Division has been actively managing this lake for over 75 years. Despite its location so far from good roads or Newberry, anglers continue to target its good splake fishery. Its fertility, depth, and vegetative shelter have given Tank Lake the ability to produce good numbers and sizes of trout species.

Brook trout were stocked during 1934, 1935, & 1936. At that time, management direction changed and both bluegills and largemouth bass were stocked during 1937, 1938, & 1939. By 1949, anglers reported that the previously existing brook trout fishery had been excellent, but now complained that the lake was full of stunted yellow perch. This scenario was to be repeated until present day.

In an attempt to change management direction again, the lake was reclaimed with rotenone during 1950, and Fisheries Division began to stock rainbow trout in 1951. For better shoreline habitat, 31 groups of fish shelters were placed in 1957, just deeper than 10 ft contour around the lake perimeter.

Management direction was switched again in 1966, from rainbow trout to splake yearlings. Even so, by 1973 there were plans drawn for either an antimycin partial or another rotenone complete lake chemical treatment to reduce the number of yellow perch. The rotenone treatment occurred in 1974. In 1978, another netting survey was conducted, with results showing the fish population was 79% perch. That result precipitated another rotenone treatment in 1979. By 1983, however, a cursory survey again found yellow perch in the lake. A more intensive 1984 survey found splake, perch, rock bass, pumpkinseed, white sucker, and common shiner, resulting in yet another rotenone treatment.

During 1990, a gill net survey found both large and small splake, but no other species were noted. In 1995, a netting survey found many of the recently stocked splake but only a few of age 2. No other species or ages were noted. A 2000 netting survey found 71% perch, a white sucker, and 25 splake which were almost entirely from the recent spring stocking. As a result, another rotenone treatment was conducted in 2002. A post-treatment survey indicated that yellow perch comprised about 96% of the fish killed, and no splake were observed.

Current Status

The 2008 netting survey (Figure 3) found an entirely different fish community. Species present were brook stickleback, fathead minnow, northern redbelly dace, and splake. Fathead minnows comprised 3.6% of the catch biomass, while splake comprised 96% (Table 2). Splake were also growing quite well with a growth index of -0.2 in slower than state average (Table 3). Four year classes were captured with sizes up to 18 in, and with 46% legal at 10 in or larger. The length frequencies for splake showed good numbers per inch group up to 15 in (Table 4). That size range implied either that the lake was lightly fished or that anglers were targeting trophy sized specimens. In general, the splake were doing well, with the other three species likely providing piscivory forage.

Analysis and Discussion

As stated in the Current Status section, the 2008 netting survey found an entirely different fish community. The 2002 lake reclamation effort appeared to have been very successful, with no ecological competition, such as yellow perch or sunfish, evident in the community (Table 2). Splake in Tank Lake are doing very well, with good survival and growth. The key consideration for future management will be the longevity of this most recent treatment.

Past management history of this lake is very informative. Yellow perch have many times in the past increased in number such that they present a survival challenge for young splake. This lake is land-locked, however, and it seems that the only way for perch to arrive is in angler minnow buckets. In some cases, however, an incomplete fish kill may allow perch to become reestablished. Each rotenone treatment required 360 gallons, which is very expensive at current prices. In addition, public support for complete chemical reclamations is waning. Future management might very well require a change in direction from the use of rotenone.

Tank Lake is currently managed as a Designated Trout Lake, regulated under Type B which allows all types of bait. Changing the regulation to Type A, to eliminate minnow use (and accidental yellow perch stocking), would potentially provide a buffer against another perch infestation. At this time, however, the splake are doing very well.

Management Direction

Tank Lake fish community appears to have stabilized into a truncated structure consisting of splake and minnow species. However, the lake's past management history requires that Fisheries Division continue to keep a careful watch to maintain that community structure. The lake's isolation makes it difficult to estimate amount of angling hours generated during normal summers versus summers of perch inundation. For that reason, no recent cost-benefit ratios have been estimated for reclamation projects. It is unknown what treatment periodicity can be justified for rotenone treatments. Future treatments, however, may also be economically unfeasible due to changes in funding protocols.

An alternative action to control perch introduction would be to change the fishing regulation from Type B to A, which outlaws the use of minnows as bait. Since the 2008 survey found no perch, the change could be made immediately in order to preserve the existing fish community. That change would go against local precedent, however, as no other lake managed for splake is regulated as Type A. Even so, past history shows that Tank Lake management has periodically struggled against perch contamination. The probability is high that perch will again be introduced into the lake; a change to Type A regulations will help reduce the likelihood of that happening.

The annual stocking program of 2,000 splake yearlings should be continued.

References

Historical files are stored at Newberry Operations Service Center, 5100 S M-123, Newberry, MI 49868

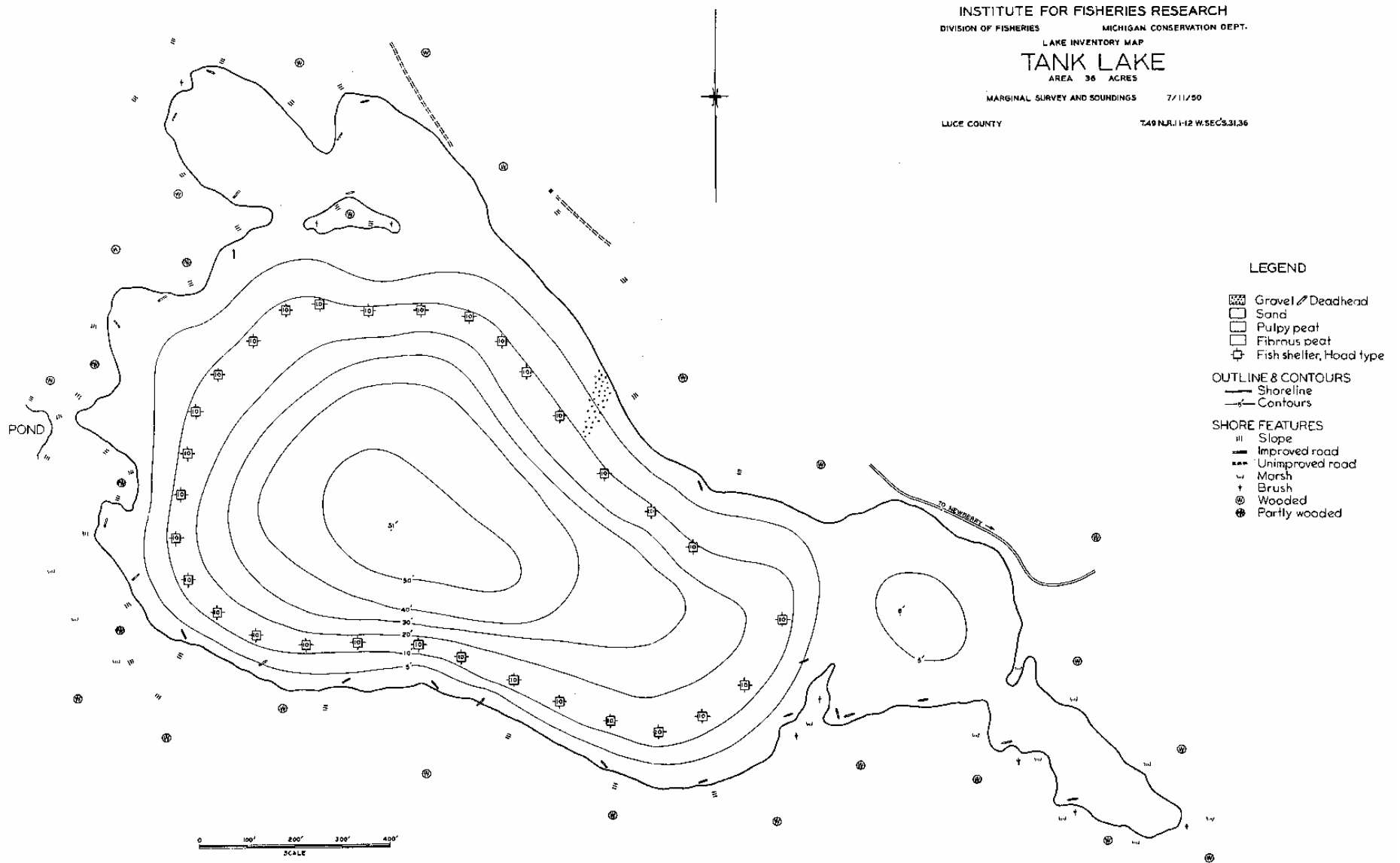


Figure 1. Contour map of Tank Lake, Luce County

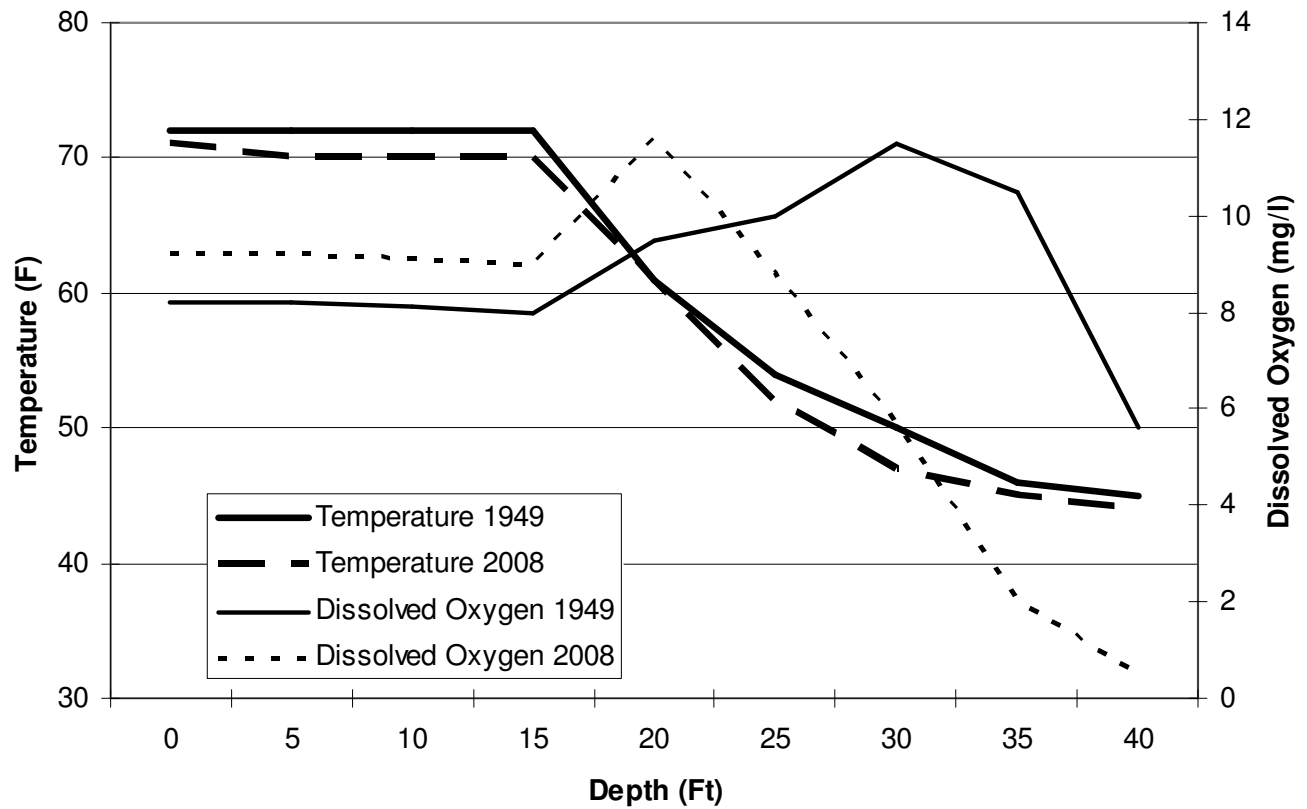


Figure 2. Comparison of temperature (F) and dissolved oxygen (mg/l) in Tank Lake, Luce County from July 19, 1949 and August 27, 2008. The 1949 data was taken only from depths of 0, 15, 20, 30, 35, and 40 ft depths. Extrapolations were made for the missing depths in order to provide a clearer comparison.



Figure 3. Netting locations in Tank Lake, Luce County during the May 27-30, 2008 survey, using fyke (F), mini-fyke (MF), and gill (G) nets, and seines (S).

Table 1. Limnological vertical profile for Tank Lake, Luce County, on August 27, 2008.

Depth (ft)	Temperature (F)	Dissolved oxygen mg/l	pH	Conductivity μ mhos/ml	Alkalinity mg/l CaCO ₃
0	71	9.2	7.1	18	ND*
5	70	9.2	7.1	18	
10	70	9.1	7.1	18	
15	70	9.0	7.1	18	
17	69	9.8	7.0	18	
18	67	10.8	6.9	18	
19	63	11.7	6.9	18	
20	61	11.6	6.9	19	
25	52	8.8	6.5	20	
30	47	5.7	6.1	23	
35	45	2.0	6.0	25	
40	44	0.5	5.9	26	

* Not detected
 Bottom is 51 ft.

Table 2. Number, weight, and length by species for Tank Lake, Luce County netting survey May 27-30, 2008 using fyke, mini-fyke, trap, and gill nets, and seines.

Species	Number	Percent by Number	Weight (lb)	Percent by Weight	Length Range (in)	Average Length (in)*	Percent Legal Size**
Brook stickleback	87	13.1	0.0	0.0	1 - 2	1.6	100
Fathead minnow	405	61.1	2.2	3.6	1 - 2	2.2	100
Northern redbelly dace	19	2.9	0.0	0.0	1 - 2	1.7	100
Splake	131	19.8	58.3	96.4	6 - 18	10.7	46

* Some fish may be measured to 0.1 in, others to inch group: e.g., “5” = 5.0 – 5.9 in, “12” = 12.0 to 12.9 in, etc.

** Percent legal or acceptable size for angling harvest

Table 3. Weighted mean length and age for splake hybrid from Tank Lake, Luce County, from a netting survey on May 27-30, 2008, using fyke, mini-fyke, trap, and gill nets, and seines. Numbers of each age are in parentheses.

Species	Age											Mean growth index (in.) ¹
	I	II	III	IV	V	VI	VII	VIII	IX	X	X1	
Splake hybrid	8.7 (29)	12.7 (24)	14.4 (15)	16.3 (1)								-0.2

¹ Mean growth index is the deviation from state average length in inches.

Table 4. Length frequencies of four species captured in Tank Lake, Luce County during the May 27-30, 2008 netting survey using fyke, mini-fyke, trap, and gill nets, and seines.

Species	Size (inch-group)	Number Caught	Lbs. Caught
Brook Stickleback	1	78	
	2	9	
	Average length 1.6 in	Sample totals	87
Fathead minnow	1	132	0.19
	2	273	1.96
	Average length 2.2 in	Sample totals	405
Northern redbelly dace	1	15	0.02
	2	4	0.02
	Average length 1.7 in	Sample totals	19
Splake hybrid	6	1	0.07
	7	7	0.77
	8	47	7.77
	9	16	3.84
	10	6	2.03
	11	3	1.38
	12	15	9.13
	13	23	18.15
	14	10	10.02
	15	1	1.26
	16	1	1.55
18	1	2.28	
Average length 10.7 in	Sample totals	131	58.25