Ross Impoundment
T17N, R01W, Sec. 12
Tobacco and Cedar River Watersheds, Last Surveyed 2018

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Environment

Ross Lake is a 294-acre impoundment of the Cedar and Tobacco Rivers about 6 miles south of Gladwin in the Village of Beaverton (T17N, R01W, Sec. 12; Figure 1). The Impoundment has public access from a Township Park with a gravel launch, parking, beach and picnic area located off M-18. Fishing and moderate boating and jet skiing activity occurs during the summer months.

The topography surrounding Ross Lake is generally flat. Soils are mostly sand and clay, with the dominant vegetation being shrubs, birch and poplar. The glaciation transitions from outwash plains to Lake Plain in in the Ross Impoundment watershed. Land-use is predominantly agricultural in nature. The lake is within the Cedar River/Tobacco River watershed. The Cedar, North Br. Tobacco, Middle Br. Tobacco, South Br. Tobacco Rivers, and several small drains are the inlets to Ross Lake. The outlet is the Tobacco River which drains into the Tittabawassee River to the Saginaw River, and eventually to Saginaw Bay.

Ross Impoundment has several embayments and is irregularly shaped. The lake has a maximum depth of 19 ft., the head height at the dam. Much of the lake is less than 15-ft. deep. Submergent vegetation has not been a problem due to the impoundment's high turbidity. The drop-offs are gradual except in the old river channels. The bottom of the shoals is sand, clay and pulpy peat. The bottom in the deeper areas is pulpy peat.

Limnological parameters were measured in August 2018 and included temperature, dissolved oxygen (DO), and pH (Table 1). The impoundment temperature, DO, and pH profile showed no thermocline or variation. Critical DO concentrations for fish (< 3 ppm) were not observed and the water was well oxygenated throughout the water column. The water is quite turbid in Ross Impoundment and the Secchi depth was 1.8 feet. Alkalinity was measured as 182 ppm. Parameters such as total phosphorous, chlorophyll a, and Secchi depth can be used to calculate a Carlson's Trophic State Index. Ross Impoundment `s index was 56.1 which placed it in the category of eutrophic. The description of a eutrophic lake is one that has decreased transparency, anoxic hypolimnion, macrophyte problems, warm water fisheries, and is mostly supportive of all swimmable/aesthetic uses. There are a fair number of residences around the impoundment (16.3 dwellings per mile of shoreline) and many of these have docks. There were a fair number of submerged trees providing fish habitat.

History

History of Beaverton Dam
Ross Impoundment dam was built in 1919 by the Ross brothers and was fully operational by 2021. The dam was sold in 1927 to Consumers Power and was operated for hydropower until the mid-1960's. In 1967, Consumers sold the dam to the City of Beaverton and from 1967 to 1984 the city used the dam only as a lake level control structure. Ross Impoundment was occasionally drawn down during

this time-frame for various reasons. In 1984, the present turbine was installed, and Catalyst Energy Development Corporation operated the dam for hydroelectric power under a lease agreement from the City of Beaverton. During this time there were problems with the water volume released through the dam, and residents noticed intermittent downstream flow issues from 1985 to 1986, but these events were infrequent and of short duration. In 1987, dry weather decreased the stream discharge even further, the frequency of water stoppages increased, and more complaints arose. In 1988, record droughts decreased the discharges further. The turbine operation was computer controlled, and major fluctuations of the river discharge occurred frequently on some days. The computer adjustments were under the control of Alward Electric, Plumbing and Heating, Inc. of Gladwin. This was in violation of the Federal Energy Regulatory Commission (FERC) license. A FERC inspection in 1989 revealed several violations and outlined corrections. Data thereafter became sketchy, but complaints appear to have stopped. The inspection also highlighted a need to improve recreational access to the tailwater area of the facility. Most of these problems didn't have direct impact to the impoundment except in the establishment of a set range of water levels.

Although management records are scant, records do indicate that Bluegills, Largemouth Bass, Yellow Perch, and some Walleye fry were stocked from 1937- 1944. The first survey on record was in 1951. Game fish captured in this survey included Northern Pike, Largemouth Bass, Smallmouth Bass, Bluegill, Pumpkinseed Sunfish, Yellow Perch, Rock Bass, and Black Crappie. Forage fish included Bluntnose Minnow, Mimic Shiners, Blackchin Shiners, Spotfin shiners, Rosyface Shiners, Banded Killifish, and Johnny Darters. Rough fish included White Suckers, Redhorse, Northern Hogsuckers, and Carp.

The lake was treated with rotenone in 1967 to remove rough fish, but re-establishment occurred in a short time. A follow up survey was conducted in 1971. This survey deployed only gill nets. Species noted in this survey included walleye, bullheads, and Golden Shiners as well as species collected in 1951 already listed above. Rough fish abundance appeared to be high. In 1976 a more thorough chemical treatment was carried out which included the South Branch Tobacco River downstream of Clare and the Cedar River downstream from Gladwin. An excellent, if not total kill, was realized in the treated waters. However, due to its size and complexity it was impractical to treat the entire watershed. Channel Catfish, Steelhead, Largemouth Bass, Black and White Crappies, Brown Trout and Bluegill were subsequently stocked. An electrofishing survey in 1977 revealed that numerous young of the year carp were still present. Recommendations were made for a follow-up antimycin partial treatment for 1978, but no documentation exists for whether that was ever done.

A netting survey was conducted in 1981 to assess the fish population following the 1976 treatment. The analysis showed that carp and bullhead levels had returned to pre-treatment levels. Black and White Crappies, Channel Catfish, and Northern Pike were fairly abundant and of decent sizes. The panfish and rest of the gamefish populations appeared poor. In 1987, a prescription was written to address the problem of low populations of predator species, and overabundance of rough fish. The actions to be implemented included initiating the stocking of 2000 Northern Muskellunge fingerlings annually and the stocking of 300 adult White Bass for three consecutive years. Muskellunge were stocked as early as 1984. Another prescription in 1989 added Walleyes to the stocking request. Walleye fingerling rearing and stocking became more feasible. The first Walleye fingerlings were stocked in 1989. The lake has been managed with Walleye and Muskellunge ever since. The 1987 netting survey revealed a similar species complex. Four White Bass and one Walleye were netted and

rough fish numbers remained high. Golden Shiners, Common Shiners, and Creek Chub were the forage species noted. Sizes and numbers of panfish appeared improved. Eighty-one percent of the Bluegills were of catchable size and predator numbers were still low. Growth of panfish was only slightly below State average. A subsequent night electrofishing survey showed improved Largemouth Bass growth as well. Other predators including two Walleyes, one Pike, and six Smallmouth Bass were also captured.

In 1991, a night electrofishing survey was conducted to assess the Walleye stocking program. No young of the year were observed, and not enough of the other species were collected to perform a growth analysis.

In 1995 a netting survey was conducted to again evaluate the status of the fish community and the Walleye and Northern Muskellunge stocking programs. Only two Walleyes, and 10 Northern Muskellunge were captured during the survey. Management recommendations called for a continuation of the program, and possibly increasing walleye stocking rates.

In 2000, another electrofishing survey was conducted to assess the stocking programs. Ten young of year Walleye and five young of year Northern Muskellunge were captured. The survey also noted one adult Walleye, and two adult Northern Muskellunge as being visually observed. This was the best documentation of Walleye survival to date, but this is still considered a poor year class relative to many Walleye Fall Indices.

Current Status

Ross Impoundment was surveyed using a variety of gear types set forth in the Status and Trends protocol. Efforts included seining, night electrofishing, trap netting, fyke netting, gill netting, and limnological surveys (Figure 1). The netting and electrofishing surveys were conducted from 6/11/2018 through 6/14/2018, and the limnological survey was conducted on 08/22/2018. The water temperature was 68 ºF during netting. Each gear type was subject to certain biases and these must be considered when reviewing the survey catch. Trap and fyke nets were used to sample fish moving through the littoral zone. Gill nets sample fishes that occupy offshore waters and are particularly effective at capturing Yellow Perch and Northern Pike. Seine hauls are designed to net fish in the shallows and nursery areas and target young fish and some minnow species. Electrofishing is designed to catch fish moving into the shallows at night, and typically samples both small and large fish. Some electrofishing was done in the daytime due to the turbidity. Collectively, the catch from all these gears allow for reasonable interpretation of the fish community.

A total of 785 fish representing 24 species were collected from survey efforts. Black Crappie were the most abundant species, comprising 20% of the total catch by number and 9% by weight (Table 2). Other fish species collected in appreciable numbers included Pumpkinseed Sunfish, Brown Bullhead, Bluegill, Common Shiner, and Golden Redhorse. In lesser abundance were gamefish including Rock Bass, Largemouth Bass, White Crappie, Yellow Perch, and Northern Pike. Rough fish and minnows were also captured in low numbers.

A total of 154 Black Crappie averaging 8.6 inches comprised 19.6 % of the total survey catch (Table 2). Black Crappie ranged from 0 to 12 inches with 68% of the fish meeting or exceeding the acceptable harvest size of 7 inches. Growth data indicated Black Crappie in Ross Impoundment are

growing above the State average with a mean growth index of +0.2 (Table 3). Age distributions indicate sufficient recruitment to the fishery with good representation of fish ages 1 to 9. Ross Impoundment is also one of the few impoundments to still have a White Crappie population. Nine were caught averaging 6.9 inches.

A total of 62 Pumpkinseed Sunfish averaging 4.8 inches comprised 7.9% of the total survey catch (Table 2). Pumpkinseed ranged from 1 to 8 inches with 16 % of the fish meeting or exceeding the acceptable harvest size of 6 inches. Age-growth data indicated Pumpkinseed Sunfish were growing 1.0 inch above State average (Table 3). Age distribution indicated sufficient recruitment with good representation of Pumpkinseed Sunfish aged 1 through 7.

Only 34 Bluegill were captured which was very different from many area inland lakes where Bluegill usually are the most common species captured. Bluegill ranged from 1 to 6 inches and averaged 3.6 inches. Only 9% of the Bluegill caught met or exceeded the acceptable harvest size of 6-inches. Most of the Bluegill were age 1 and 2. Bluegill had a mean growth index of +0.1 and were growing above State average although the sample size was low.

Fourteen Rock Bass averaging 6.1 inches comprised 1.8% of the total survey catch (Table 2). Rock Bass ranged from 4 to 7 inches. Fifty percent of the fish met or exceeded the acceptable harvest size of 6 inches. Rock Bass were not aged.

Twenty-seven Yellow Perch averaging 8.1 inches comprised 3.4% of the total survey catch (Table 2). Yellow Perch ranged from 5 to 12 inches. Seventy percent of the fish met or exceeded the acceptable harvest size of 7 inches. Yellow Perch were not aged.

Both Largemouth and Smallmouth Bass were found in relatively low numbers representing only 1.0% and 1.4 % of the catch by number, respectively (Table 2). Smallmouth averaged 12.0 inches and ranged from 4 to 19 inches. Largemouth Bass averaged 5.4 inches and ranged from 0 to 16 inches. Insufficient numbers were captured to analyze growth.

Twenty-six Northern Pike were captured representing 3.3% of the survey catch (Table 2). Northern Pike ranged from 19-40 inches and averaged 27.1 inches. Fifty-eight percent of the Northern Pike met or exceeded the minimum harvest size of 24 inches. Northern Pike were represented by 6 age classes (2-8). Age-growth data indicated that Northern Pike were growing 0.5 inch above State average (Table 3) which is rare in shallow impoundments or lakes. Age distribution indicated sufficient recruitment with good representation of ages 2 through 8.

Twenty Channel Catfish were captured representing 2.5% of the survey catch (Table 2). Channel Catfish ranged from 12-32 inches and averaged 25.8 inches.

Non-game fish including minnows were diverse and numbers do not appear to be a problem.

Due to the flooded and shallow nature of the impoundment and habitat present, Ross Impoundment is home to a lot of turtles. During the survey 2 Snapping Turtles (10-16 inches), 12 Softshell Turtles (6-13 inches), 2 Map Turtles (8 inches), and 1 Painted Turtle (7 inch) were incidentally captured.

Analysis and Discussion

Bluegill are often abundant in southern Michigan lakes, and play a key role in establishing community structure and overall sportfishing quality (Schneider 1981). This however is not the case for Ross Impoundment. Inadequate numbers of Bluegill were captured for detailed size structure analysis and the calculation of a Schneider Index. The dominant panfish species was Black Crappie. All species aged exhibited above average growth and appeared to reach larger sizes which are acceptable for anglers.

Predators including Northern Pike, Largemouth Bass, Smallmouth Bass, and Channel Catfish are thriving and appear to be providing enough predation to help balance and maintain the fish community. Walleye and Muskellunge which were stocked for many years are not represented at all. Rough fish (such as carp, catfish, bullheads and suckers) do not appear overabundant or stunted.

Management Direction

Overall, the fish community and recreational fishery of Ross Impoundment is adequate. There is ample opportunity to catch Black Crappie, Pumpkinseed Sunfish, Rock Bass, Channel Catfish, and the occasional Bass or Northern Pike. These together with the non-game fish species like suckers and bullhead provide diverse fishing opportunities. The location of this impoundment in the Village of Beaverton and the developed park and access site make Ross Lake a perfect spot for a family fishing trip.

Long-time stocking programs for Northern Muskellunge and Walleye are not producing the desired results or any fishery. Recommendations are to discontinue these plants. Native predators are occupying the same niche.

References

Fuller, L.M., and Minnerick, R.J., 2008. State and regional water-quality characteristics and trophic conditions of Michigan's inland lakes, 2001-2005: U.S. Geological Survey Scientific Investigations Report 2008-5188, 58 p.

Schneider, J. C. 1981. Fish communities in warmwater lakes. Michigan Department of Natural Resources, Fisheries Research Report 1890, Ann Arbor.

Figure 1. Map of Ross Impoundment (Gladwin County) with locations of various survey gear deployments in 2018.

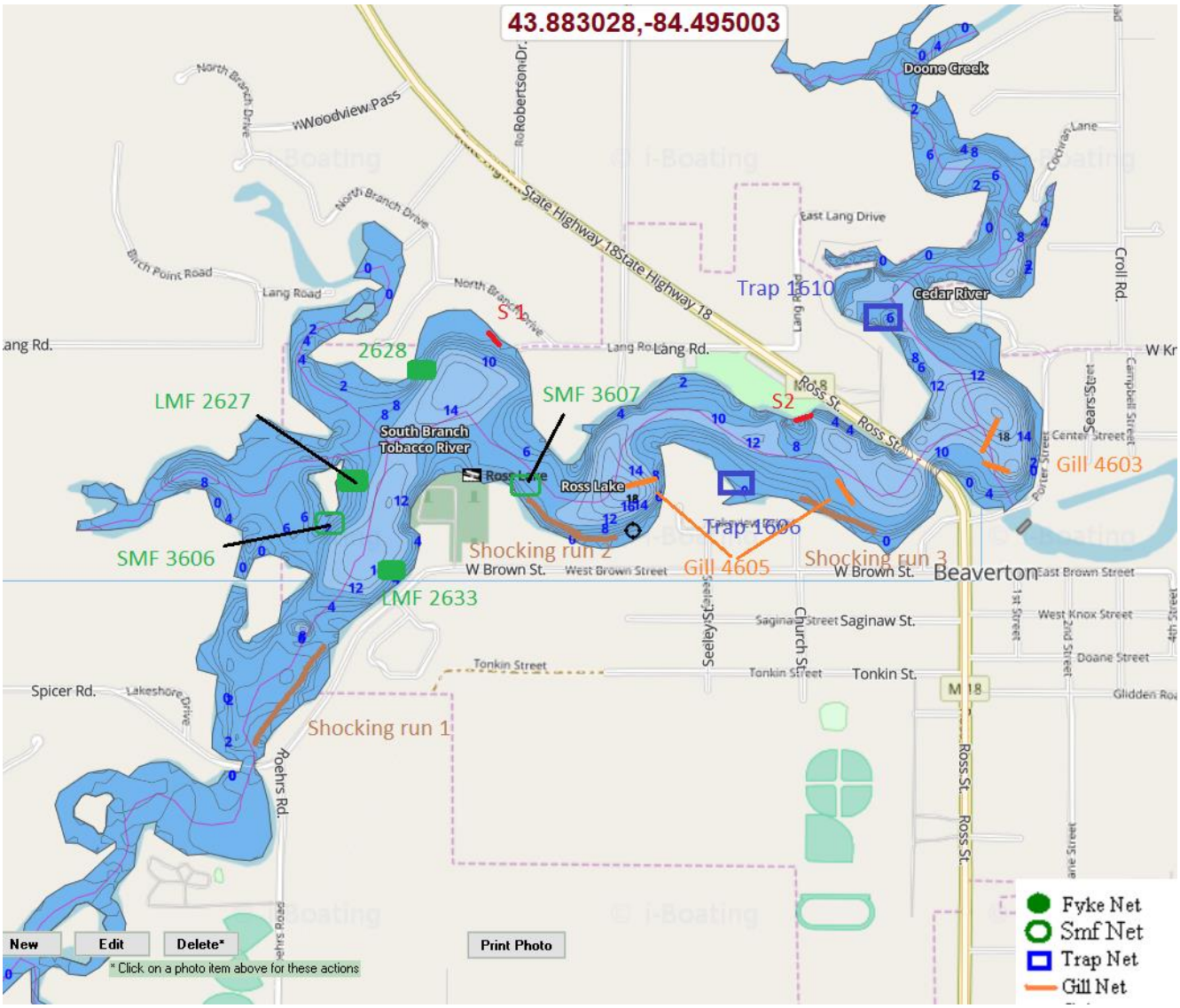

Table 1. Limnological Parameters of Ross Impoundment, August 2018.

Depth (ft)	Temperature (°F)	Oxygen (ppm)	pH
1	70.70	7.01	8.45
2	70.68	7.09	8.21
3	70.70	7.01	8.10
4	70.68	7.00	8.08
5	70.68	7.03	8.07
6	70.68	7.06	8.06
7	70.66	6.92	8.05
8	70.62	6.92	8.03
9	70.55	6.86	8.02
10	70.55	6.81	8.02
11	70.48	6.78	8.00
11.8	70.44	6.81	8.00

Table 2. Summary of fish species number, length, and weight data for fish captured during 2018 survey of Ross Impoundment.

Species	Number	Percent by number	Weight (lb.)	Percent by weight	Length range (in.)*	Average length (in.)	Percent legal size**
Black Crappie	154	19.6	78.3	9.2	0-12	8.6	68
Black Bullhead	1	0.1	0.1	0.0	6-6	6.5	0
Bluegill	34	4.3	1.8	0.2	1-6	3.6	9
Bluntnose Minnow	12	1.5	0.1	0.0	2-2	2.5	100
Brown Bullhead	110	14.0	79.0	9.3	4-17	11.0	88
Blackside Darter	4	0.5	0.0	0.0	0-1	0.8	100
Common Carp	14	1.8	148.7	17.5	18-34	28.0	100
Channel Catfish	20	2.5	130.5	15.4	12-32	25.8	100
Common Shiner	48	6.1	3.6	0.4	3-6	5.4	100
White Sucker	67	8.5	125.3	14.8	4-19	16.5	100
Golden Redhorse	75	9.6	100.7	11.9	5-18	15.3	100
Golden Shiner	31	3.9	2.7	0.3	2-7	6.2	100
Green Sunfish	2	0.3	0.1	0.0	3-3	3.5	0
Johnny Darter	2	0.3	0.0	0.0	0-0	0.5	100
Largemouth Bass	8	1.0	3.7	0.4	0-16	5.4	13
Northern Pike	26	3.3	137.5	16.2	19-40	27.1	58
Pumpkinseed	62	7.9	7.0	0.8	1-8	4.8	16
Rock Bass	14	1.8	2.5	0.3	4-7	6.1	50
Smallmouth Bass	11	1.4	15.2	1.8	4-19	12.0	36
Spottail Shiner	45	5.7	0.2	0.0	1-3	2.3	100
Tadpole Madtom	3	0.4	0.1	0.0	3-3	3.5	100
White Crappie	9	1.1	1.2	0.1	6-7	6.9	44
Yellow Perch	27	3.4	7.4	0.9	5-12	8.1	70
Yellow Bullhead	6	0.8	3.3	0.4	8-11	10.3	100
All species totals:	785	100	848.8	100			

* Note some fish may be measured to 0.1 inch, others to inch group.
** Percent legal or acceptable size for angling.

Table 3. Weighted mean length and age composition data for selected game fishes captured during 2018 Ross Impoundment survey.

Species / Age	No. aged	Length range (in.)	State avg. length (in.)	Weighted mean len. (in.)	Weighted age freq.	Mean growth index*
Black Crappie						+0.2
Age I:	6	3.50-5.50	4.8	5.21	10.14%	
Age II:	13	5.50-7.20	6.5	5.96	15.07%	
Age III:	12	7.60-8.60	7.9	7.95	8.12%	
Age IV:	9	8.90-9.90	8.9	9.43	6.52%	
Age V:	3	9.90-10.40	9.7	10.20	4.93%	
Age VI:	13	10.20-12.90	10.4	10.97	30.58%	
Age VII:	6	11.00-12.00	11.1	11.31	17.03%	
Age VIII:	6	11.10-14.10	11.6	11.60	6.16%	
Age IX:	2	12.00-12.60		12.30	1.45%	
Bluegill						+0.1
Age I:	15	1.50-2.40	2.4	2.08	47.06%	
Age II:	11	3.40-5.60	4.2	4.40	32.35%	
Age III:	5	5.30-6.30	5.3	5.74	14.71%	
Age IV:	2	6.00-6.40	6.2	6.20	5.88%	
Age VI:	1	8.50-8.50	7.4		0.00%	
Largemouth Bass						--
Age I:	2	4.10-4.80	5.4	4.45	50.00%	
Age VI:	1	13.40-13.40	15.0	13.40	25.00%	
Age VII:	1	16.10-16.10	16.7	16.10	25.00%	
Northern Pike						+0.5
Age II:	5	19.10-21.40	19.0	20.40	19.23%	
Age III:	3	19.70-22.80	21.8	21.43	11.54%	
Age IV:	1	23.60-23.60	24.2	23.60	3.85%	
Age V:	7	22.20-29.70	26.1	25.40	25.64%	
Age VII:	7	26.40-35.50	30.0	30.69	28.21%	
Age VIII:	3	38.60-40.20		39.50	11.54%	
Pumpkinseed						+1
Age I:	2	1.80-2.40	2.4	2.25	6.67%	
Age II:	18	3.60-4.80	4.2	4.35	76.67%	
Age III:	5	6.50-7.40	5.2	7.04	8.33%	
Age IV:	1	7.60-7.60	5.8	7.60	1.67%	
Age V:	4	7.70-8.30	6.3	7.97	5.56%	
Age VII:	1	8.80-8.80	7.2	8.80	1.11%	
Smallmouth Bass						--
Age I:	1	5.50-5.50	5.5		0.00%	
Age II:	3	6.10-6.90	8.8	6.57	30.00%	
Age III:	3	11.30-13.80	11.1	12.47	30.00%	
Age VI:	2	16.70-17.10	15.5	16.90	20.00%	
Age VIII:	2	17.90-19.90	17.4	18.90	20.00%	

*****Mean growth index is the average deviation from the state average length at age and requires a minimum of 5 samples in an age group.