Fish Community Assessment of Prospect Lake

File Report

Meghan Powell

Ministry of Natural Resources

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Prospect Lake (Figure 1) is a small (69 ha) and moderately deep (20 m) lake located within Draper Township. Access to this lake can be found by taking Highway 118 east from Highway 11 to Prospect Lake Rd and then taking the first left onto Big Island Rd and following it along the perimeter of the lake to the public boat launch.

In the past a variety of different species have been stocked into Prospect Lake. Smallmouth bass (*Micropterus dolomieui*) were introduced in the 1940's through to the late 1950's. During the 1960's brook trout (*Salvelinus fontinalis)* and rainbow trout (*Salmo gairdneri)* were introduced and during the 1970's lake trout (*Salvelinus namaycush)* were introduced in hopes of sustaining a natural population.

A lake survey was conducted during 1971 and fish species found within the lake were white sucker (*Catostomus commersoni),* a strong population of yellow perch (*Perca flavescens*) and cisco (*Coregonus artedii*). Other reported fish species found in the lake during that time were rainbow trout and smallmouth bass. In 1981 another lake survey was conducted to examine the biological properties of Prospect Lake and draw conclusions as to the lake's ability to support a lake trout population. It was concluded that the lake had poor chemical, biological and physical properties for lake trout. It was recommended after this survey that this lake be managed as a smallmouth bass, walleye (*Sander vitreus)* fishery and the stocking of lake trout be discontinued. In 1987, 198 adult walleye that had an average weight of 710 g were stocked into the lake.

An assessment was conducted in June 2010 to determine the status of the walleye introduction; specifically whether a self-sustaining population had become established and the overall current status of the fish community.

METHODS

Aspects of the End of Spring Trap Netting (ESTN, Skinner and Ball 2004) and Fall Walleye Index Netting (FWIN, Morgan 2002) protocols were used to sample the available habitats.

The ESTN gear consisted of two trap nets made with polypropylene mesh and a mesh size of 6.4 cm. Leader of the trap nets are 46 m in length and the wings of the trap net are 8 ft 4 in long and 6 ft high. The gap opening into the house is 20 in and the house and crib are both 6 ft 2 in long by 6 ft high in size.

The FWIN gear consisted of one monofilament gillnet which was 1.8 m deep and 61 m long consisting of 8 mesh sizes. The mesh sizes were 25, 38, 51, 64, 76, 102, 127 and 152 mm stretched measurement and were randomly arranged. The FWIN net was set to sample the deeper waters not sampled by the trap nets.

Both FWIN and NSCIN nets were set perpendicular to shore for an overnight set period. All captured sport fish were sampled for length, weight and age structures were taken. Fork lengths were sampled on all other fish species that were caught. A temperature profile was also conducted to determine suitable habitats for FWIN net placement.

RESULTS

Netting was conducted between June 8 and June 10, 2010. Weather conditions were generally cloudy with some precipitation. The surface water temperature was 19.5°C and the thermocline was forming between 3 and 8 m deep (Table 1).

Table 1 Temperature profile, Prospect Lake, June 8, 2010.

Depth (m)	Temperature (°C)
0.5	19.5
1.0	19.5
2.0	19.5
3.0	17.7
4.0	14.0
5.0	12.3
6.0	11.0
7.0	9.3
8.0	7.2
9.0	6.4
10.0	6.1
11.0	5.9
12.0	5.8
13.0	5.7
14.0	5.6
15.0	5.4
16.0	5.2
17.0	5.1

Details on net set data can be found in the following Table 2. A total of four ESTN and two FWIN net sets were completed. The ESTN net sets were all successful in producing a catch. Within the four sets, 25 smallmouth bass, 3 largemouth bass (*Micropterus salmoides*), 11 white sucker, 73 rock bass (*Ambloplites rupestris*) and 1 pumpkinseed (*Lepomis gibbosus*) were caught, but no walleye were present.

Table 2 Net set summary, Prospect Lake, 2010.

Sample No.	Gear Type	UTM	Set Date	Set Time	Lift Date	Lift Time	Duration (hrs)	Min Depth	Mid Depth (m)	Gap Depth (m)	Max Depth	Effort Status	Water Temp (°C)
1	Trap Net	17- 646957 4983319	08-Jun-10	15:30	09-Jun-10	11:15	19.8	0	1.8	2.8		3	19
2	Trap Net	17- 647168 4984034	08-Jun-10	16:00	09-Jun-10	12:00	20	0	2.8	3.2		1	19
3	Trap Net	17- 646987 4984114	09-Jun-10	13:00	10-Jun-10	11:20	22.2	0	2.1	3.3		1	18
4	Trap Net	17- 646749 4983804	09-Jun-10	14:20	10-Jun-10	12:50	22.5	0	1.8	2.8		1	18
1	FWIN Net	17- 646791 4983387	09-Jun-10	11:00	09-Jun-10	14:30	3.5	3.2			7.5	1	19
2	FWIN Net	17- 646791 4983387	09-Jun-10	14:30	10-Jun-10	10:30	20	4			8.5	1	19

The first FWIN set was a daytime set of 3.5 hr duration. It was unsuccessful in producing any fish but the second set was successful in catching 10 cisco and 2 white sucker. The total catch of fish sampled from both the FWIN and ESTN samples is illustrated below in Table 3.

Table 3 Catch summary Prospect Lake, 2010.

Sample No.	Gear Type	Smallmouth Bass	Largemouth Bass	White Sucker	Rock Bass	Pumpkin Seed	Cisco
1	Trap Net	0	1	1	6	1	0
2	Trap Net	8	0	1	52	0	0
3	Trap Net	7	0	7	8	0	0
4	Trap Net	10	2	1	8	0	0
1	FWIN Net	0	0	0	0	0	0
2	FWIN Net	0	0	3	0	0	10

The fork length of all species ranged from 100 to 529 mm. The summary of all fish data that was collected can be found in Table 4.

DISCUSSION

Trap nets were used to target the shallow water species of Prospect Lake, and also the fish that preferred warmer water temperatures. These nets proved to be more successful in producing a catch due to the dominance of bass and sucker species found within the lake. By conducting a temperature profile, we were able to determine where the thermocline was located (between 3 to 8 m). Cisco were known to be present within the lake, and they are known to prefer deep water in or below the thermocline. By using the FWIN net, we were able to target the deeper water

species to determine whether there was still a cisco population present and to possibly catch any walleye that were feeding on them during the sampling period.

Table 4 Fork length distribution, by species, for all gears, Prospect Lake, 2010.

Fork Length (mm)	Smallmouth Bass	Largemouth Bass	White Sucker	Rock Bass	Pumpkin Seed	Cisco
100-109			1			
110-119				4		1
120-129				10		
130-139				2		
140-149				12		
150-159				11		
160-169			1	15		1
170-179				13		1
180-189				2	1	3
190-199	1			1		4
200-209	1			1		
210-219	2		1			
220-229	1			1		
230-239	2			1		
240-249	1					
250-259	2					
260-269	1					
270-279	1		1			
290-299	1					
310-319	1		2			
360-369	2		1			
400-409			1			
410-419			1			
420-429			2			
430-439	2					
440-449	2	1	1			
450-459	2					
470-479	2					
500-509	1					
510-519		1				
520-529		1	1			
Total	**25**	**3**	**13**	**73**	**1**	**10**

Since 1987 there had been no surveys conducted on Prospect Lake to monitor the walleye population that was introduced. Based on the results of this survey, a self sustaining walleye population does not seem to have been established. The walleye introduction may have been unsuccessful due to a number of reasons. Competition for food with the three species of bass could have been a factor. Other reasons may be that there is not suitable spawning habitat available for the walleye to spawn or the fry that were produced were predated by the resident species; the later seems most likely.

The catch of largemouth bass was the first documentation of that species in the lake. The timing and source of their introduction is not known, but they were probably stocked intentionally, albeit without authorization.

Northern pike (*Esox lucius*) have been reported by local fishermen to be present in Prospect Lake. ESTN and FWIN efforts were unable to produce physical evidence of this but a number of different fishermen have reported their presence. Pike can be a fierce predator to walleye (OMNR, 2002). Having a number present can also be the cause of the failure of the walleye introduction by predation, as well as competition.

RECOMMENDATIONS

Future stocking of Prospect Lake is being considered in response to the failure of fish stocking efforts in the past. Fish species that are in consideration of being stocked are walleye, splake *(Salvelinus fontinalis x S. namaycush)* or black crappie (*Pomoxis nigromaculatus)*.

Walleye have been considered because of the stocking that was done in 1987. The results of this assessment show that the lake is not suited to supporting a self-sustaining population. Since adults were introduced and didn't reproduce, introducing younger walleye will most likely fail due to the bass and other predators present. Stocking of fingerlings of sufficient size may by-pass the predation bottleneck allowing creation of a put-grow-take walleye fishery.

Splake are being considered because of the past brook trout and lake trout stocking and availability of some cold water habitat. Splake are widely used in Ontario as a put-grow-and-take angling opportunities in waters that are unsuitable for lake trout or brook trout (OMNR 2002). Complications that may arise by stocking splake are that generally they shouldn't be stocked in lakes containing bass or cisco, which are present within Prospect Lake. Because of these resident competitors, they may fail to survive well within the lake. Many other lakes stocked with splake in the area seem to be experiencing poor survival. It is probably not advisable to stock additional lakes until the reasons for this can be determined. If splake are stocked, future netting efforts should be conducted to determine if the stocking efforts were successful.

Black crappie are also being considered to be stocked because of the suitable habitat that Prospect Lake offers. Crappie tend to spawn in deeper waters and spawn earlier than bass. They build their nests in colonies and construct them in water depth that range from 0.25 to 6 m in depth and prefer substrate of sand, mud or gravel. A potential drawback of introducing crappie into the fishery that they can compete for food with largemouth bass and predate young bass as well as other panfish species (Kerr and Grant 2000). The potential benefits are that they would likely reproduced successfully, eliminating the need for further stocking, are active through the

winter and would add a new dimension to angling in the lake, would probably have lower levels of mercury contamination than large or smallmouth bass and may reduce the abundance of less desirable rock bass.

In conclusion, the walleye introduction to Prospect Lake was not successful, presumably due to a combination of limited habitat and predation from several species of bass and cisco. Further stocking of walleye, other than perhaps advanced fingerlings on a put-grow—take basis should not be done. The stocking of splake was being considered but appears unlikely to have a reasonable chance of success given that a third species of bass and possibly northern pike are now present. Stocking of black crappie is likely to be successful. Consultation with stakeholders must be done if crappie stocking is considered due to the irreversible nature of it and possible impacts on the other bass species

REFERENCES

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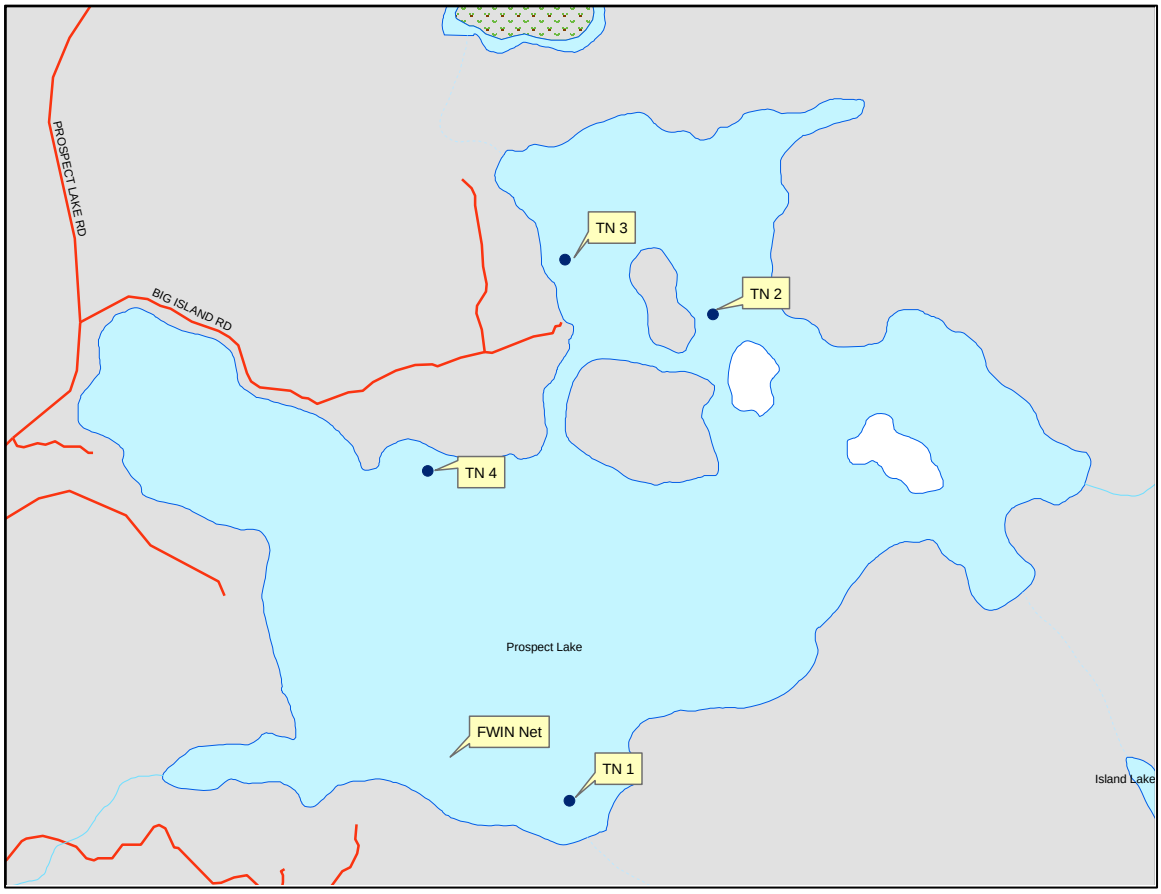


Figure 1 Map of Prospect Lake showing net set locations, 2010.