Lake Whitefish Re-introduction Progress Report for Mary Lake

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Mary Lake is located in Stephenson Township, in MNRF's Parry Sound District. The surface area is approximately 1060 ha. The mean depth is 25 m with a maximum depth of 56 m. Water clarity is moderate with a Secchi disk reading of 3.4 m. The water level is controlled by an MNRF dam in Port Sydney. The lake is accessed via a public boat launch on Muskoka Road 10.

The major fish species in the lake include Lake Trout (stocked on a put-grow-take basis), Northern Pike, Smallmouth Bass, Largemouth Bass, Walleye and Rainbow Smelt. Lake Whitefish and Cisco were native to the lake, but are now extirpated, possibly due to interactions with non-native Rainbow Smelt. A management review completed in 2009 recommended the re-introduction of Lake Whitefish on a trial basis (Scholten 2009). Stocking was conducted for three years, beginning in 2009 using a combination of fingerlings reared from eggs collected from Lake Simcoe as well as adults transferred from Lake of Bays (Table 1, Scholten et al. 2009, Scholten 2010, Drennan 2011).

This note summarizes observations made to date on the results of the stocking effort.

Summer Profundal Index Netting (SPIN) projects were completed on the lake annually from 2011 to 2014 by staff from the Muskoka Lakes Fisheries Assessment Unit. Lake Trout was the target species, but the gear is effective at catching Lake Whitefish. Data from these surveys are stored in the provincial FISHNET database. An additional non-standard SPIN survey was conducted by Parry Sound District staff in 2017, specifically to target whitefish. Because it was only a partial survey, data were not submitted to FISHNET but are summarized here.

2017 Netting

Nets were set on October 3rd and 12th ,2017. Nets were set non-randomly and were allocated primarily in the depth strata of 10-20 and 20-30 m, to target depths where whitefish were most likely to occur. Other aspects of the SPIN protocol were followed (Sandstrom and Lester 2009).

The fork length was measured for all captured fish. Lake Whitefish weights and fin clips were also recorded. In addition, gender, state of maturity and stomach contents were recorded for Lake Whitefish that did not survive capture. Aging structures were collected from all Lake Whitefish; pectoral rays from those that were released and otoliths from fish that did not survive capture.

A temperature profile was collected to determine thermal stratification to inform net placement. The lake was thermally stratified with the thermocline occurring from approximately 9-13 metres deep (Table 2).

A total of 19 double-gang sets were completed. Four sets were in the 6-10 m stratum, 11 were in the 10-20 m stratum, and 4 were in the 20-29 m stratum (Table 3, Figure 1).

The catch included 35 Lake Trout, 1 Rainbow Smelt, 2 Lake Whitefish, 1 Smallmouth Bass, 4 Yellow Perch, 2 Northern Pike, 1 Rock Bass and 1 Walleye (Table 4). All species caught were previously documented in the lake. Individual fish data are presented in Table 5.

Recovered Lake Whitefish

Surveys from 2011 to 2014 and 2017 yielded a total of 28 Lake Whitefish (Table 6). Each fish was assigned an origin and age based on the fin clip, size and, for some fish, an age assessed from the collected structures. Overall, 13 of the recaptured fish had been transferred from Lake of Bays and 9 were fish of Lake Simcoe origin. The origins of 6 were not determined as fin clips were not recorded; based on size, all appeared to be stocked fish. Only one Lake Simcoe origin fish was caught in 2011 because they were still too small to be fully vulnerable to the gear. Higher numbers of Lake Simcoe origin whitefish were captured in subsequent years. Age and size-at-age of Lake Whitefish is shown in Figure 2. Lake Simcoe origin fish were growing at a rate at which they would achieve a similar size as the adults

transferred from Lake of Bays. Lake Simcoe fish were beginning to mature in 2017 with one 4-year-old and two 5-year-old fish displaying developing gonads. All but one of the Lake of Bays origin fish were mature and most had developing gonads. Most fish had stomach contents. Spiny water flea occurred most commonly, followed by small fish and cladocerans.

Overall, results of the re-introduction to date show some positive signs. Stocked fish of both origins have survived, are growing at normal rates, finding a variety of food types and progressing to maturity. These are positive indicators that natural reproduction may be possible. However, if the adult fish transferred from Lake of Bays had successfully spawned, eggs had hatched and fry survived in the first year or two after being transferred, offspring would have been large enough to be catchable by 2014 or 2017. The lack of the capture of any small naturally reproduced fish is an early indication that the re-introduction will not be successful. However, Lake Whitefish can be very long-lived and are subject to wide variation in annual recruitment success, so it is premature to make a conclusion.

It is suspected that whitefish recruitment failed initially due to interactions with exotic Rainbow Smelt. Since smelt still occur in the lake it may be unlikely that reproduction will occur. However, in the time since smelt became established several additional species (Northern Pike, Walleye, Black Crappie) that depredate on smelt have been introduced. If smelt abundance is reduced sufficiently by depredation, there is hope that whitefish will start to reproduce successfully again.

In the late fall of 2017, an additional 335 adult Lake Whitefish of Lake Simcoe origin, consisting of four different year classes, were stocked. This further boost in adult biomass may improve the potential for successful Lake Whitefish reproduction in Mary Lake.

Table 1 Lake Whitefish stocking summary, Mary Lake, 2009-2011.

Strain	Development Stage	Fish Weight (g)	Stocking Year	Number Stocked	Fin Clip
Lake Simcoe	Fingerling	17	2009	2000	Left Ventral and Adipose
Lake Simcoe	Fingerling	15	2010	2000	Left Ventral
Lake Simcoe	Fingerling	14	2011	2000	Adipose
Lake of Bays	Adult		2009	141	Adipose
Lake of Bays	Adult		2010	80	Adipose
Lake of Bays	Adult		2011	45	Adipose

Table 2 Water temperature profile, Mary Lake, October 3, 2017.

Depth (m)	Temp (℃)
0	16.7
1	16.7
2	16.7
3	16.6
4	16.6
5	16.6
6	16.5
7	16.2
8	15.8
9	15.5
10	14
11	11.2
12	9
13	7.6
14	7.3
15	6.9

Table 3 Net set summary, Summer Profundal Index Netting, Mary Lake, 2017.

Effort	Date	Zone	Easting	Northing	Depth Start (M)	Depth Mid (M)	Depth End (M)	Set Time	Lift Time
1	3/10/2017	17	634929	5009512	10	16	20	9:40	11:45
2	3/10/2017	17	635218	5010583	9	21	25	10:10	12:15
3	3/10/2017	17	635874	5010458	13	14	15	10:30	12:43
4	3/10/2017	17	636309	5010110	9	14	18	10:55	13:20
5	3/10/2017	17	636123	5009513	16	17	18	11:25	13:50
6	3/10/2017	17	635616	5009726	19	20	23	11:40	14:10
7	3/10/2017	17	635125	5010100	16	19	21	12:10	14:30
8	3/10/2017	17	635589	5011080	20	24	25	12:40	14:45
9	3/10/2017	17	636701	5010089	20	22	23	13:15	13:05
10	3/10/2017	17	635796	5010157	27	27	28	13:45	13:40
11	12/10/2017	17	635740	5011626	20	25	31	10:00	12:00
12	12/10/2017	17	636077	5012590	10	19	27	10:20	12:20
13	12/10/2017	17	636650	5013079	11	22	28	10:40	12:45
14	12/10/2017	17	637064	5013376	11	15	21	10:55	13:15
15	12/10/2017	17	637316	5013889	11	14	18	11:20	13:40
16	12/10/2017	17	638188	5013895	12	15	18	11:40	14:00
17	12/10/2017	17	636095	5012391	12	25	39	12:40	14:45
18	12/10/2017	17	638504	5013567	9	18	18	13:15	15:15
19	12/10/2017	17	637591	5012044	7	11	16	13:45	15:35

Table 4 Catch summary, Summer Profundal Index Netting, Mary Lake, 2017.

Species	Number Caught
Lake Trout	35
Lake Whitefish	2
Rainbow Smelt	1
Northern Pike	2
Rock Bass	1
Smallmouth Bass	1
Yellow Perch	4
Walleye	1

Table 5 Fish sampling details, Summer Profundal Index Netting, Mary Lake, 2017.

Effort	Species	Fish #	Fork Length (mm)	Fin Clip	Fate	Sex	Gonad	Age Structure	Comments
1	81	1	557	AD	R				
1	81	2	600	AD	R				
1	81	3	645	AD	R				
1	81	4	520	LP	R				
1	81	5	510	RV	R				
1	81	6	540	LV	R				
1	81	7	435	AD	R				
2	81	8	638	AD	R	M			Ripe
2	81	9	521	RP	R	F			Pre-Spawn
3	81	10	500	LV	R	F			
3	81	11	290	RP	R				
3	81	12	498	LV	R				
3	81	13	443	AD	R				Poor condition
3	131	14	669	NC	R				
4	81	15	396	AD	R				
4	81	16	517	RP	D				
4	311	17			R				rock bass
5	81	18	443	AD	R				
5	81	19	478	AD	R				
5	81	20	520	AD					
5	81	21	495	LP	R				
5	81	22	490	AD	R				
6	81	23	523	LP?					NC? regen?
7	81	24	540	RV					partial regen
8	81	25	665	LP	R				
8	81	26	553	LV	R				
9	81	27	465	AD					
9	81	28	511	LV	D				
12	331		225		R				
12	81		265	RP	R				
12	91	1	610	AD	D	M	23	2A	rwt:2950
13	81		720	NC	R				no clip AD?
13	81		610	RV	R				
13	81		590	LV					
13	121				R				
14	81		260	RP	R				
14	331		220		R				

Effort	Species	Fish #	Fork Length (mm)	Fin Clip	Fate	Sex	Gonad	Age Structure	Comments
14	81	2	375	AD	D	M	22	2A	Poor Clip RWT:625
15	331		210		R				
15	331		210		R				
15	81	3	650	AD	R			4	
15	81	4	500	AD	R			4	poor clip
16	131		705		K				
18	91	5	405	NC	R			24	possible bad AD
19	81								escaped
19	334		295		R				
19	316		310		R				

Table 6 Individual fish characteristics for Lake Whitefish, Mary Lake, 2011-2017.

DATE CAPTURED	FISH	FLEN	RWT	SEX	GON	AGE	CLIPC	Origin	STOMACH
31-Aug-11	1	225	140	9	10	2	ADLV	L. Simcoe	large Bythotrephes bolus
31-Aug-11	2	445	1200	1	22	8	AD	L. of Bays	large mass of small Cladocerans
08-Sep-11	1	453	1350	2	22	7	AD	L. of Bays	Bythotrephes
08-Sep-11	2	473	1500	2	22	7	AD	L. of Bays	ninespine stickleback (1)
08-Sep-11	3	424	950	1	22	7	AD	L. of Bays	unidentifiable - small amount
08-Sep-11	4	485	1450	1	22	7	AD	L. of Bays	empty
08-Sep-11	5	448	1300	2	21	7	AD	L. of Bays	UFR
08-Sep-11	6	436	1150	2	21	8	AD	L. of Bays	empty
08-Sep-11	7	510	2000	2	22	14	AD	L. of Bays	several sculpins; a few Bytho
05-Sep-12	8	237	146	2	10	2	LV	L. Simcoe	one sculpin
05-Sep-12	9	482	1420	2	22	8	AD	L. of Bays	several caddis, 1 sculpin, Bytho
05-Sep-12	10	510					AD	L. of Bays	
05-Sep-12	11	490				9	AD	L. of Bays	
05-Sep-12	12	295				3			
05-Sep-12	13	300				3			
05-Sep-12	14	240				2			
13-Jun-13	15	393	773	1	22	4	ADLV	L. Simcoe	a few Bytho spines
13-Jun-13	16	500				9			
13-Jun-13	17	285				3	LV	L. Simcoe	
02-Aug-13	18	289	302	2	10	4	ADLV	L. Simcoe	small Bytho bolus
28-Aug-13	19	487	1133	2	10	9	AD	L. of Bays	empty
09-Sep-14	20	362	575	2	22	5	ADLV	L. Simcoe	Bythotrephes
09-Sep-14	21	315	385	2		3	AD	L. Simcoe	Bythotrephes
09-Sep-14	22	348	525	1	22	5	ADLV	L. Simcoe	Cladocerans
09-Sep-14	23	292	302	9	10	3	AD	L. Simcoe	empty
10-Sep-14	24	442	1428	1	22		NC		Bythotrephes
12-Oct-17	1	610	2950	1	23		AD	L. of Bays	
12-Oct-17	5	405		9			NC		



Figure 1 Net set locations, Summer Profundal Index Netting, Mary Lake, 2017.

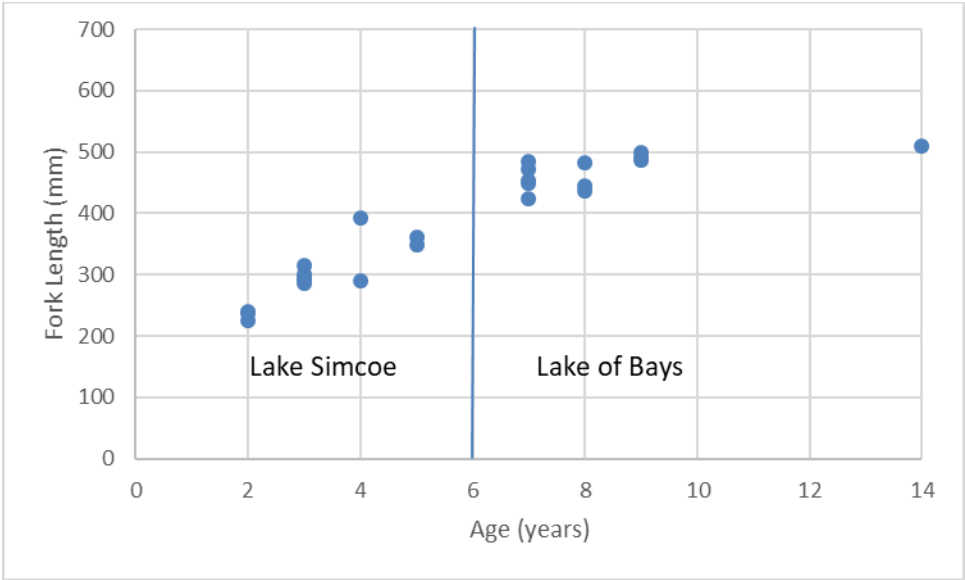


Figure 2 Size-at-age of recaptured Lake Whitefish, by origin of stocked fish, Mary Lake, 2011-2017.

References

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