Summary of Activities

Date: November, 2017

To: Ian Kitch
MB Sustainable Development

From: Holly Urban, Brock Koutecky, Megan Paterson - Swan Valley Sport Fishing Technical Staff
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Subject: Whitefish Lake Walleye Recruitment Surveys 2017

Location: Whitefish Lake, Porcupine Provincial Forest, 14U 322253 5801418

Whitefish Lake is one of the most popular recreational fishing destinations for "valley" locals and visitors. SVSFE has invested time and resources over the years in angling improvements, various surveys and fish habitat rehabilitation. As popularity increases on this self sustaining fishery annually, SVSFE recognizes the need for continual management.

Research History: In order to reflect the work invested into Whitefish Lake, an overview was tabulated on the various activities known to date. This outline is brief, but validates the continued efforts by the various officials and groups over the years have helped sustain the only walleye fishery in the area that is not supplementally stocked.

North Creek (2009)

North Creek (2010)

Beaver dam removal 2015

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Research History:

Year	Researcher	Activity	Results
1952	R.K Stewart-Hay	Report on the Fishery	Found to be the most attractive lake in the Porcs. Species present: whitefish, tullibee, pike, suckers and pike-perch (walleye)
70's	Fisheries Branch	Stocking	Whitefish Lake was stocked with lake trout in 1975, 1978, and 1979. There is no evidence to indicate any of the trout survival
1980	Fisheries Branch	Stocking	Stocked with walleye (300,000 fry)
1990	Fisheries Branch	Regulation Change	Slot length limit for walleye of 45-70 cm introduced as well as a reduced creel limit from 6 to 4
2000	SVSFE	Reconstruction	SVSFE funded repairs to reconstruct the control structure at Whitefish Lake to maintain lake levels and ensure marina remains accessible by watercraft
2000	SVSFE	Reconstruction	SVSFE funds re-construction of fishing pier along Lagoon Creek marina ($40,000 project with $10,000 contributed from FEI)
2001	Fisheries Branch	Index Netting	Found the combination of reduced walleye limits and the slot limit are having a positive effect on the sustainability of walleye numbers.
2004	Fisheries Branch	Regulation Change	Creel limit for walleye lowered from 4 to 2
2005 & 2006	SVSFE & Fisheries Branch	Walleye Telemetry Study	Results indicated both North and Lagoon Creek were utilized during prime spawning periods but barriers impeded upstream movement
2006	Fisheries Branch	Index Netting	Confirmed the reduced walleye limits and the slot limit are having a positive effect on the sustainability of walleye numbers.
2008	SVSFE & Taiga	Photo Inventory of North and Lagoon Creek	Documentation of tributary status and fish barriers. Several barriers identified on both creeks with substantial overland flooding
2009	SVSFE & AAE Tech Services	Tributary Asssessment on North & Lagoon Creek	Documented spawning habitat in both creeks. Recommendations (1)removal of barriers (beaver dams) (2)conduct spring assessments to monitor success (3)conduct telemetry surveys to monitor walleye (4)conduct annual aerial surveys to document habitat changes (5)conduct index netting and (6) conduct creel surveys

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Research History:

Year	Researcher	Activity	Results
2010	SVSFE	Beaver Dam Removal	First beaver dam removal on North Creek. Dams blasted in various reaches up to Palanuk's road
2010	SVSFE & Fisheries Branch	ESTN Program (Year 1)	FEF funded End of Spring Trap Netting (ESTN) indicated a current species composition of; walleye 23%, northern pike 32%, yellow perch 1%, lake whitefish 3%, burbot 1%, white sucker 40%. Walleye sampled were an average of 532 mm (21 inches) and 1817 g (4 lbs)
2010	SVSFE	Spawn/ Recruitment Assessments	Spawn assessments suggested that 2010 North Creek blasting was successful; numerous mature walleye in creek, walleye fry present in drift nets. As for Lagoon creek, no positive results were determined, as barriers were still an issue. Seined nine locations late summer collecting four walleye
2011	SVSFE & Fisheries Branch	ESTN Program (Year 2)	2011 trap netting results were similar to the 2010 indicating a health fishery (funded by FEF). Recognized the important roles both North and Lagoon creek plan in the fishery. Objectives included (1)continual dam removal, (2)monitoring spawn success & fish populations, and (3)creating positive awareness to anglers
2011	SVSFE	Spawn/ Recruitment Assessments	Drift netting resulted in the presence of walleye fry in North Creek but not in Lagoon Creek. Seined two locations collecting 11 walleye. One additional beach seine was conducted in August during an educational presentation for young campers and technicians hauled in a full seine of YOY walleye. Recommended to continue with beaver dam removal as needed.
2012	SVSFE	Beach Seining	Seined 12 locations collecting 6 walleye (1+ or greater). Noted decrease in recruitment and recommended blasting for 2013 along with a *closure to angling during spawning period in tributaries*
2013	SVSFE	Beaver Dam Removal	Effort (# of dams/creek) unknown for blasting at this time but more effort was put into North Creek. Between 2011-2014, anglers noted angling quality was high catching "walleye in all age classes".
2013	SVSFE & Fisheries Branch	Spawn Investigation	Visited North Creek on May 29th to evaluate the success of beaver dam removal. Did a quick kick net sample and found 8 live walleye eggs ready to hatch
2014	Fisheries Branch	Regulation Change	Reworded regulation to state slot and possession limit applies to Whitefish Lake, its tributaries/creeks as anglers were keeping over their limit while fishing in these areas
2015	SVSFE & RFCPP	Beaver Dam Removal	RFCPP funded the 2015 beaver dam removals and removed ~ 30 barriers between the two tributaries (again more effort on North Creek)
2015	Fisheries Branch	Regulation Change	Extended the fishing closure in sensitive spawning area. *North Creek closed to all fishing from April 1 to and including June 1*

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Research History:

Year	Researcher	Activity	Results
2015	SVSFE	Recruitment Survey (Seining)	In 2015, four sites along the east shore were seined and collected 5 walleye ranging from 0+-2+. Suggested beaver dam removal for another consecutive year.
2015	Angler Feedback	Angling Quality	Exceptional year for angling quality. Anglers noting catches of 80+ fish/evening of various sizes
2016	SVSFE	Beaver Dam Removal	Removed nine barriers between the two tributaries (more effort on North Creek)
2016	SVSFE	Recruitment Survey (Electrofishing)	Suggested spring monitoring be completed on spawning tributaries in the spring of 2017 to (1) further assess the effectiveness of blasting (2) to geo-reference prime spawning habitat during spring flows and (3) and to ensure fish are not being trapped behind newly erected dams. Follow-up late summer assessments (seining or e-fishing) recommended to assess survival
2017	SVSFE	Beaver Dam Removal	Removed all dams marked on North Creek (10) and several big dams in upper reaches on Lagoon (~6) allowing access to reaches not available in previous years.

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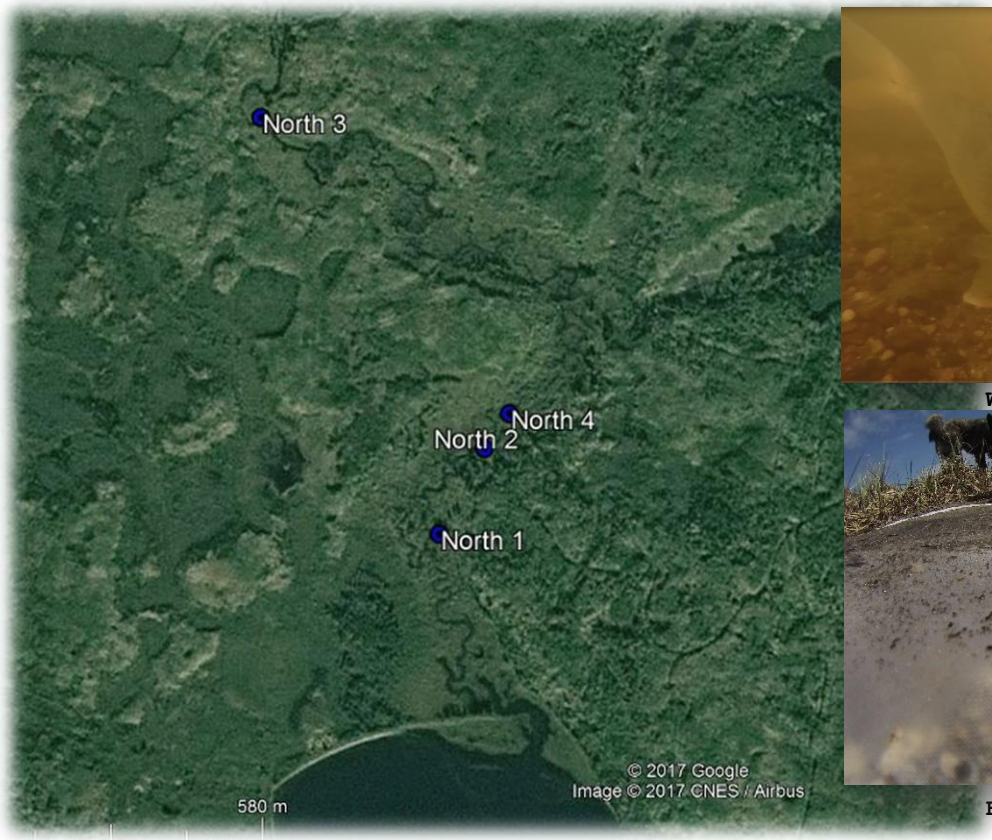
2017 Results: SVSFE paid 'due diligence' in 2017 and conducted spawn assessments on North Creek and Lagoon Creek as recommended from 2016. Three reasons stated in 2016; (1) to further assess the effectiveness of blasting (or lack thereof in non-blasting years) (2) to geo-reference prime spawning habitat during spring flows and (3) and to ensure that fish are not being trapped behind newly erected dams. In addition, recruitment surveys were replicated in September via electrofishing to follow the success of the walleye spawn to young of the year size.

Spawn Assessment on North Creek and Lagoon Creek

North Creek was assessed on May 10/17 with water temperatures at 7.8°C. Four locations were selected as prime spawning habitat and sampled via kick net for 60 seconds each (Figure). Walleye eggs were found at each site and both adult walleye and white suckers were observed in the creek. The results are as follows;

Site	Location	Habitat	Eggs Present	Comments
1	14U 321401 5803535	Gravel, Silt, Sand	200+ wall	Low vegetation, eggs not eyed
2	14U 321492 5803701	Gravel	200 wall	
3	14U 321060 5804361	Gravel, Boulder	~5 wall, ~75 whsc	Flock of pelicans/eagles at downstream pools
4	14U 321542 5803769	Gravel, Silt	~10 wall	1st active dam



North Creek 2017 kick net sites

Walleye found in creek

Eggs found in kick net

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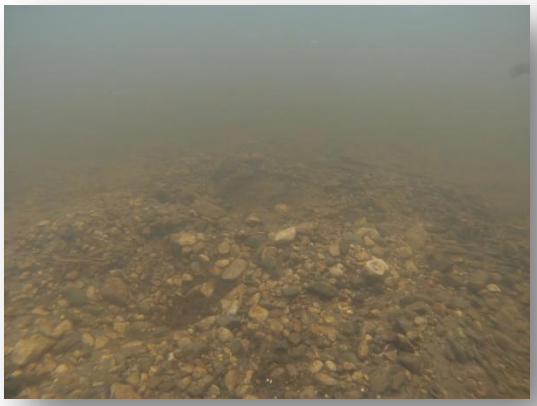
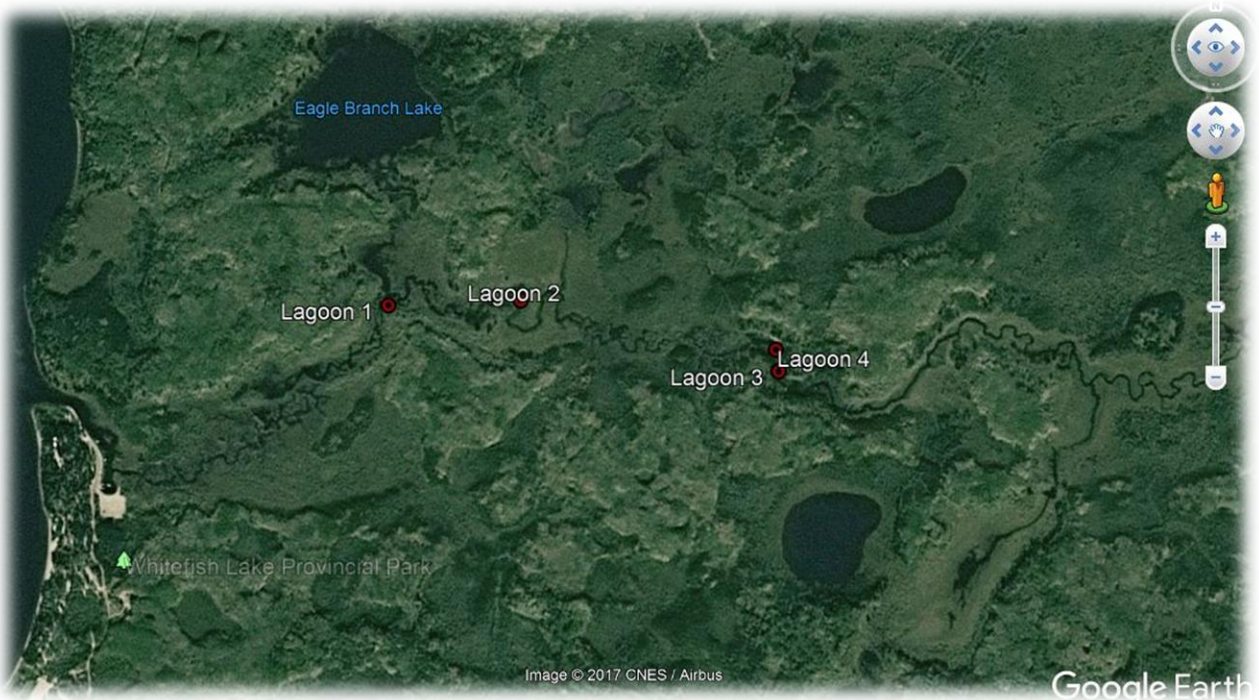
Lagoon creek was assessed on May 16/17 with water temperatures at 11.8°C. Four sites were selected and these sites were the only areas within the creek exhibiting somewhat suitable spawning areas (gravel) between the marina and site #4 (Figure). Note, there were several barriers (beaver dams) still present throughout lower reaches and water levels were significantly low for spring discharge. Sites were kick netted for 60 seconds but no eggs found at any sites (Figure).



Suitable substrate found in Lagoon Cr.

Beaver dam upstream of site #4 prior to 2017 blasting

Site	Location	Habitat	Eggs Present
1	14 U 324431 5802032	Gravel, Sand	0
2	14 U 324731 5802032	Gravel, Cobble	0
3	14 U 325307 5801851	Gravel	0
4	14 U 325303 5801900	Gravel	0



Lagoon Creek 2017 kick net sites

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Recruitment Surveys

Transects one through seven were replicated on September 5th, 2017 from the initial 2016 electrofishing survey. Young of the year walleye were the target sample but other species were documented including game fish and forage.

Whitefish Lake Electrofishing Transects		
Transect #	Waypoint	UTM (Start/End)
1	4-5	14 U 323706 5802318 14 U 323723 5802472
2	6-7	14 U 322916 5802665 14 U 322779 5802690
3	8-9	14 U 321321 5803118 14 U 321139 5803057
4	10-11	14 U 321041 5801466 14 U 321039 5801332
5	12-13	14 U 321768 5800027 14 U 321936 5800072
6	14-15	14 U 322614 5800121 14 U 322787 5800123
7	16-17	14 U 323488 5801209 14 U 323652 5801557

Electrofishing transects

The total electrofishing effort was 3,685 seconds or 1.02 hours, equating to a CPUE of 10.78 fish/hour in 2017. This effort was comparative to 2016, at 3,491 seconds or 0.96 hours although CPUE was considerably lower at 2.08 fish/hour in 2016. Walleye ranged from 101-134 mm and averaged 116 mm.

Young of the year walleye

Comparison of young of the year catches (2016 - 2017)						
Transect #	**2016**	**Effort (secs)**	**CPUE (fish/hour)**	**2017**	**Effort (secs)**	**CPUE (fish/hour)**
1		299	0		474	0.00
2		338	0	1	382	9.42
3		442	0	2	519	13.87
4		357	0	5	371	48.52
5	1	627	5.7	1	534	6.74
6	1	440	8.2		466	0.00
7		988	0	2	939	7.67
Total	**2**	**3491**	**2.06**	**11**	**3685**	**10.75**

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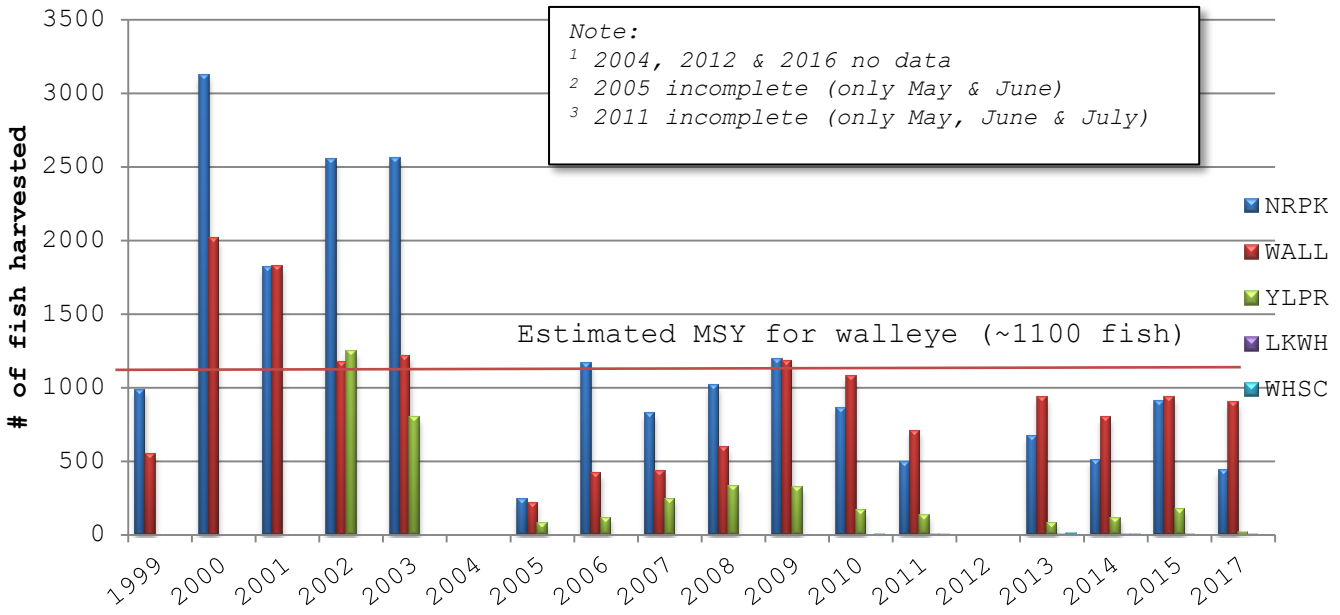
Barrel Counts

In addition to recruitment surveys, Parks Branch and SVSFE have been collecting barrel counts since 1999 to monitor the angler harvests. Some years lack data or contain partial data, due to lack of staff available to collect the information. Whitefish Lake Park staff completed barrel counts in 2017. Total harvests included 440 northern pike; 902 walleye; 15 yellow perch ; and 1 lake whitefish. The following table displays the past year's barrel counts relative to the walleye maximum sustainable yield(MSY). Note, barrel counts only collect 5-6 months worth of harvests and do not account for the closed water season and fish processed away from the filleting shack. The estimated MSY is the maximum amount of fish which can be removed on an annual basis (1 kg/lake hectare or approximately 1100 fish).

Whitefish Lake Barrel Counts



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Discussion:

North Creek has been identified as the main spawning tributary with successful movement and spawning in reaches up to 2.5 km from the mouth of the creek. Beaver dam removal has improved walleye recruitment in the past and should continue. Walleye attempt to utilize Lagoon Creek, but unfortunately barriers throughout the lower reaches impede movement to suitable habitat upstream.

In 2009, Lowden stated "with the loss of valuable spawning habitat, as a result of beaver activity, the fishery is under constant pressure". SVSFE has concentrated recent efforts on beaver dam removal from the lake moving upstream on both creeks, and removing all significant dams along the way. This has helped re-define the creek beds, once flooded and braided prior to 2010. Due to the persistent beaver activity, annual efforts only maintain the first 2.6 km on North Creek and struggle to maintain the first 2.4 km on Lagoon Creek (Figure on page 10). In 2010, dams recommended for removal along North Creek extended up 8km of the creek (Figure on page 10). There is excellent habitat within the first few kilometers of North Creek and Lagoon Creek and SVSFE does not recommend maintaining stretches beyond these points. What should be considered is removal of the extreme upper reaches' dams. This may have been the key factor to recruitment success. Releasing water held back in upper reaches may have provided sufficient discharge levels to not only attract fish but also the key requirement for fry development and growth.

To improve the effectiveness of beaver dam removal, SVSFE should work together with the local trapper to increase trapping efforts on both tributaries as beaver activity is unyielding year after year. Ensuring dams are not re-constructed during the spawn is also beneficial. Additionally, a short aerial survey or snowmobile ride would be an advantage. This would help identify any significant barriers in upper reaches causing water level issues downstream during peak spawning.

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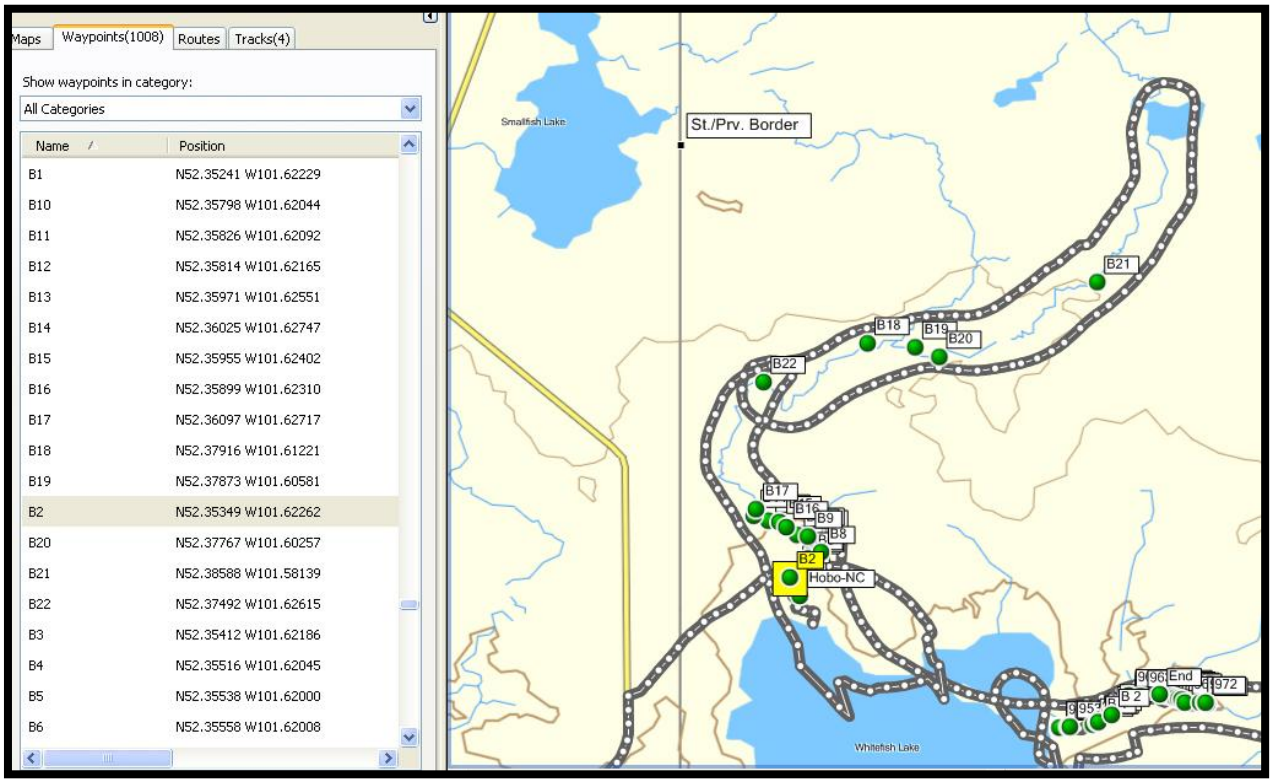
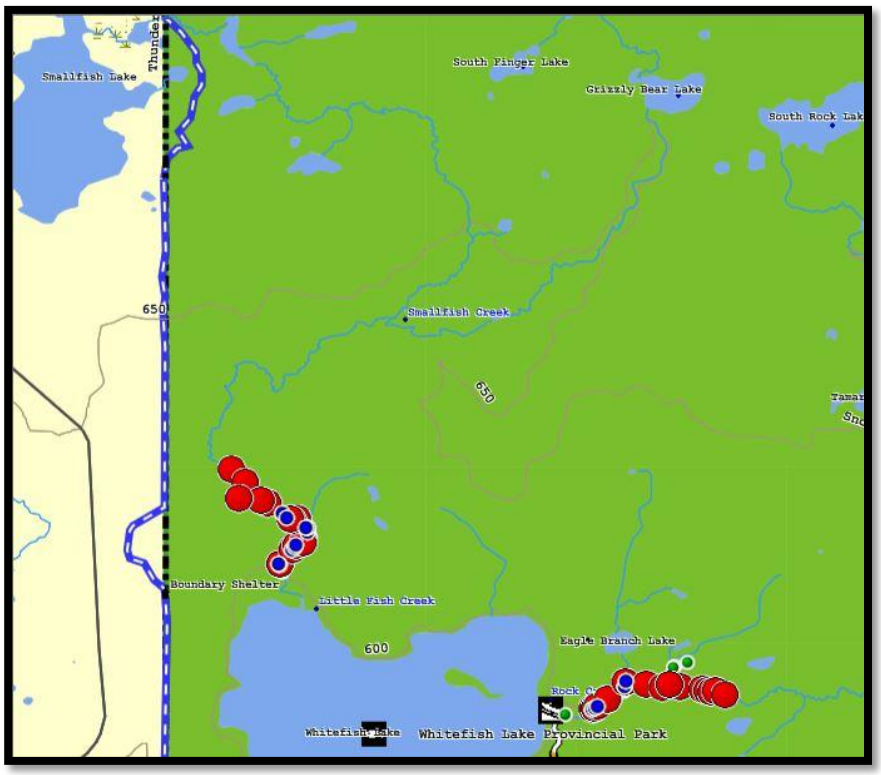


Beaver dams recommended for removal in 2010

As illustrated in the two maps, recent beaver dam removals over the years have maintained the first 2.5 km on both tributaries, but there has been no return to upper reaches on North Creek since 2010.



Beaver dams recommended for removal between 2014 - 2017

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Subject: Whitefish Lake Walleye Recruitment Surveys 2017

Discussion cont'd:

Following the first year of beaver dam removals in 2010, SVSFE technicians noted a beach seine to be "full" of walleye in August of 2011. This strong year class has been followed through reports of angling quality. In recent years, recruitment results via both beach seining and electrofishing, appear significantly low for a lake which is dependant on natural recruitment. Interestingly, this is following three consecutive years of dam blasting.

This in turn, poses inquiries to the current size structure of the walleye population. There have been a few reports of domestic fishing on the lake which can cause concern if this takes place during critical spawning periods but SVSFE has not confirmed any details on these cases. Angler harvest remain fairly consistent over the past four years (800 – 900 walleye harvested annually), below the MSY. Again, this is only considering walleye processed at the filleting shack. The threat of walleye stocks being exploited is fairly unlikely, but high fishing mortality can reduce numbers of large fish before they can be replaced. Recruitment of walleye is dependant on various abiotic and biotic factors including population structure, larval growth, availability of food, water levels and temperatures.

In 2011, SVSFE's management plan prescribed; continue beaver dam blasting as needed (approx. every 2 years), monitor recruitment & creeks (annually) and lake assessments (ever 4 - 6 years) on a rotational basis. Whitefish Lake is far over-due for an ESTN lake assessment(last completed in 2011). A lake assessment specific to walleye would fill in information gaps and help identify if there are any concerns which require action. Each symptom of population imbalance is of importance to fishery managers, who often wish to sustain adequate numbers of fish that are desirable to anglers and a healthy balance between predator and prey species (Isermann and Paukert 2010). SVSFE feels this should become a priority as proactive management is key.. The combination of habitat rehabilitation on the two primary spawning tributaries and rotational monitoring of fish stocks, is an efficient method in maintaining quality habitat for all species.

Walleye caught during the 2011 ESTN at Whitefish Lake

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Acknowledgements:
SVSFE would like to thank the Parks Branch staff and local enforcement for continued support throughout the years in providing information related to Whitefish Lake and it's users. In addition, a shout out to our board members and volunteers which have participated in various surveys (Telemetry, ESTN, Spawn & Recruitment Surveys) and numerous beaver dam removals. These activities usually involve working late hours in the dark or during the cold winter months. There are many stories to be told, but our group always has fun doing what they do best… "giving fish a helping hand"

Literature Cited:

Isermann DA, Paukert CP. 2010. Regulating harvest. Pages 185–212 in Hubert WA, Quist MC, editors. Inland fisheries management in North America. 3rd edition. Bethesda, Maryland: American Fisheries Society.

Lowden M. 2009. Fish and Habitat Survey: Whitefish Lake Tributaries. AAE Tech Services Inc.