Beaver Lake Stock Assessment 2021

In part of reporting for FES Project 20-040
SVSFE Recreational Angling Initiatives 2021

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Executive Summary

SVSFE applied to the Fish and Wildlife Enhancement Fund to investigate walleye stock on two recipient lakes of the Beautiful Lake Walleye Transfer. Featured in this report is the data from Beaver Lake.

Beaver Lake has a surface area of 21.8 hectares with 33% being littoral habitat (<3m). Results found a healthy walleye population with multiple age classes. A total of 33 walleye were sampled during the assessment and fish were in great condition and growth rates on par with other walleye lakes in the Duck Mountains. When correlating age class strengths to stocking records, plantings from 2014 and 2015 of 0+ and 1+ walleye contribute to the current walleye population. Guzzling results display potential evidence of successful natural recruitment.

Recommendations are to continue walleye stocking at the current rate of 12.5 fish/hectare on alternate years (250 fish) from the Beautiful Lake Walleye Transfer. It is also recommended to continue monitoring the response to this stocking regime. Trap netting results indicate a significant decrease in walleye CPUE. It is uncertain if this change was affected by unusual weather conditions therefore additional monitoring will help identify whether stocking rates require alternations. Future monitoring should include electrofishing surveys when the boat is available. The recently enhanced shoal was utilized by walleye in the spring of 2021, therefore annual guzzling would be an efficient and beneficial survey to monitor future successes/failures.

Angler reports are few and far between but of those who reported back, state fishing has been fair to good. With the improved habitat and monitoring the current stocking regime, it is believed the lake will offer some great opportunities for anglers. At this time, there is no reason to make any considerable changes to the management of Beaver Lake.

Table of Contents

List of Figures

List of Tables

List of Appendices

Background Information

Beaver Lake is a unique small fishery which has been actively managed over the years (Table 2). The lake has a long management history with limited success regarding different fish species introductions (Table 1). Historically, Beaver Lake was a northern pike/yellow perch fishery. The initial stocking of walleye fry occurred in 1983. Test netting two years following fry stocking indicated no survival of walleye. By 1987, the Beaver Lake Reclamations Project was initiated, and all rough fish were removed through chemical reclamation. The lake was managed as a trout fishery from 1988 to 2010 with rainbow trout as the focus species. Splake were introduced in 2000 in attempts to address the rising perch populations. The lake holds a few dozen master angler records of splake and rainbow trout, though stocking success appeared poor following 20+ years of annual plantings. Following poor angling quality and low catchments of trout in SVSFE's 2010/11 trout assessments, a new management plan was initialized. Lake managers decided to stock adult walleye and closely monitor success.

In 2011, 548 adult walleye were introduced via the Beautiful Lake Walleye Transfer. The transfer has introduced walleye of various ages annually from 2011 to 2016, followed by plantings in 2018 and 2021 (Appendix 2). In addition, mature walleye from North Steeprock Lake were transferred on Oct 22, 2013, in efforts to enhance the number of mature walleye within the population. Unfortunately, only two walleye were captured during that time. They are referred to as Waldo (FL of 503mm) and Wilma (FL of 630mm).

Monitoring has been diverse over the years, but the continued focus has been to monitor stocking success & walleye populations, evaluate walleye recruitment and improve habitat. In 2012, SVSFE initiated a condensed version of the End of Spring Trap Netting (ESTN) program which was referred to as "Mission Walleye". Results indicated high survival of walleye from the 2011 planting, with 80% of the walleye measuring between 250-301 mm. Only 16% of the larger fish >300mm which were the "average sized" stocked in 2011 were observed. Seining results indicated a variety of forage but as expected, no walleye recruitment was documented.

2013 monitoring was limited to recruitment surveys via seining. This year marked the first evidence of recruitment with one 0+ walleye caught in seine nets. At that time, it was estimated that the lake had a moderate population of walleye over 450 mm. 2013 also displayed the highest angling quality of all years, exhibited through recapture submissions. Following this it was recognized that Beaver Lake lacked suitable walleye spawning habitat and therefore funds were acquired from Recreational Fisheries Conservation Partnership Program (RFCPP) to create two artificial spawning shoals to facilitate walleye recruitment. The support from partners to undertake this project far exceeded expectations and enhanced 1050m^2 of habitat in the winter of 2014. Regrettably, the rock which was delivered to Beaver Lake for the shoal creation consisted

of a much higher percentage of large rock than requested. This resulted in two structures not exactly ideal for walleye spawning. SVSFE remained optimistic during monitoring, but lack of recruitment success in following years supported the need for future "tweaking" by adding smaller diameter rock to the shoals.

After years of heavy angling pressure, in the spring of 2014, a protected slot regulation (45-70cm) with lower limits of 2 was imposed to protect mature fish. Following the shoal creation, SVSFE replicated the "Mission Walleye" trap netting program in 2014 with the addition of a full spawn assessment. Population estimates calculated 571 individuals with minimal signs of walleye from the 2013 transfer (882 walleye stocked). It was encouraging, that 39% of walleye were found within the protected slot Walleye also displayed significant levels of growth, but again, no signs of recruitment and no indication that walleye were utilizing the shoal during spawning periods.

In 2014, the lake experienced a large increase in water levels (raising levels up 70cm) due to a beaver dam blow out on one of the connected tributaries, Keys Creek. It was believed the influx may have contributed to poor recruitment. On a positive side, the "blowout" made suitable spawning habitat available to fish. SVSFE found white suckers utilizing the creek along with other forage species. Suggestions following 2014 assessments were to continue recruitment surveys as the walleye populations continued to mature.

Annual recruitment surveys between 2012-2014 were reserved to beach seining. The newly developed spawning shoal was created along one of the most suitable beach areas. Therefore in 2015, a new collection method was introduced. Technicians developed an electrofishing survey and set one fine mesh trap net in efforts to collect young of the year (yoy) walleye. Trap netting proved to be unsuccessful at targeting yoys though a very significant catchment (n=63) of 2+, and/or 3+ walleye were captured. These fish were from previous sub-adult stocking in 2013 and 2014 and confirmed fair survival of recently stocked walleye. Electrofishing was an efficient and effective tool from 2015 to 2017 and therefore annual surveys were completed using this method.

Between 2015 and 2017, walleye populations remained fair. Walleye compositions and catch per unit effort displayed an increase in walleye abundance as a direct result from the transfer. Unfortunately, minimal recruitment success was found. 2017 marked the first evidence of natural recruitment since the shoals were created with 1 young-of-year. This 0+ walleye was located where the original yoy was caught in 2013 and along one of the newly developed shoals. Following the 2016 review, it was decided to change stocking frequencies to once every two years to help reduce age class suppression.

In 2017, an obvious trend was identified. There had been a lack of walleye within the protected slot size in recent years. This was likely a direct response to angling pressure and walleye being harvested prior to maturity. Further recommendations were to continue stocking through the transfer every two years (larger walleye when possible), monitor success through electrofishing every 5 – 6 years, and it was highly recommended to enhance the newly developed shoals with an additional layer of appropriately sized rock. In March of 2020, 70 cubic yards of 1-6” rock was added to the larger shoal located alone the east shoreline (Figure 1).

Figure 1: Recently enhanced spawning shoal

Stocking History

Table 1: Beaver Lake stocking history

Year	Species	Amount	Life Stage	Comments
1983	Walleye	200,000	Fry	Initial Stocking
1988	Brook Trout	10,000	1+	Lake reclaimed in 1987
1988	Rainbow Trout	6,000	1+	
1990	Rainbow Trout	2,000	2+	
1991	Rainbow Trout	2,000	1+	
1991	Rainbow Trout	9,000	4" trout	purchased by SVSFE
1992	Rainbow Trout	3,000	1+	
1993	Rainbow Trout	15,000	4-6 cm	purchased by SVSFE
1994	Rainbow Trout	10,000	12-15 cm	summer and fall plantings
1995	Rainbow Trout	5,000	18+	
1996	Rainbow Trout	7,300	12-15 cm	
1997	Rainbow Trout	5,000	12-15 cm	
1998	Rainbow Trout	5,000	12-15 cm	
1999	Rainbow Trout	3,000	12-15 cm	
2000	Splake	15,000	12-15 cm	Introduce of splake
2001	Splake	3,000	12-15 cm	
2002	Splake	10,000	12-15 cm	
2003	Splake	7,500	12-15 cm	
2004	Rainbow Trout	6,000	18+	
2004	Rainbow Trout	2,250	fingerlings	
2005	Splake	20,000	12-15 cm	
2006	Rainbow Trout	3,500	18+	
2007	Rainbow Trout	5,000	18+	
2008	Rainbow Trout	5,000	18+	
2008	Splake	5,000	12-15 cm	
2009	Rainbow Trout	5,000	18+	
2010	Rainbow Trout	5,000	fingerlings	
2011	Walleye	549	Adult	Beautiful Lake Transfer
2012	Walleye	90	Adult	Beautiful Lake Transfer
2013	Walleye	882	0+	Beautiful Lake Transfer
2014	Walleye	737	0+, 1+	Beautiful Lake Transfer
2015	Walleye	865	0+, 1+, 2+	Beautiful Lake Transfer
2016	Walleye	1,916	0+	Beautiful Lake Transfer
2019	Walleye	67	0+	Beautiful Lake Transfer
2021	Walleye	321	0+, 1+, 2+, 3+	Beautiful Lake Transfer

Research History

Table 2: Beaver Lake research history

Year	Researcher	Program	Results/Comments
1975	Swan River School/Fisheries	Test Netting	Caught 8 pike ranging from 0.7 to 2.4 lbs, winterkill not an issue, would benefit from walleye fingerling stocking
1985	Fisheries Branch	Test Netting	19 pike, no walleye, no evidence of walleye survival from 1983 planting
1988	Fisheries Branch	Chemical Reclamation	Funded by Fish America Foundation, Manitoba Habitat Heritage, SVSFE and MB Natural Resources. Rough fish removed and lake re-stocked with brook trout and rainbow trout
2010	SVSFE	BTIN-Brook Trout Index Netting	Year One - Stocked trout assessments to evaluate current trout populations
2011	SVSFE	BTIN-Brook Trout Index Netting	Year Two - Stocked trout assessments to evaluate current trout populations. After reviewing results, decision was made to re-introduce walleye
2011	SVSFE & Fisheries Branch	Walleye Introductions	First planting of adult walleye via Beautiful Lake Walleye Transfer (548 walleye)
2012	SVSFE	Mission Walleye - Trap netting, seining & minnow trapping	Surveys conducted to assess walleye survival and determine recruitment. Results indicated a high survival rate of stocked walleye (80%). Little evidence of recruitment and consideration for habitat improvements was noted
2013	SVSFE	Dissolved Oxygen Testing	DO results remained fair throughout the winter
2013	SVSFE	Recruitment and Forage Assessment - Seining	Results from 8 seining locations indicated dominate yellow perch forage base and found one young of the year walleye. Recommendations were to move forward with the construction of the artificial shoal
2013	Anglers	Angler Reports	High # of angler reports and tagged fish submissions indicating high angling quality. Walleye displayed exceptional growth.

2013	SVSFE	Adult Walleye Introductions	In attempts to introduce mature walleye to the population, walleye from North Steeprock Lake were transferred. Only 2 walleye were caught - Waldo (503mm) and Wilma (630mm) and transferred on Oct 22, 2013
2014	SVSFE	Creation of Spawning Shoals	SVSFE acquired funding from RFCPP (Recreational Fisheries Conservation Partnerships Program) to create two artificial shoals
2014	MB Fisheries	New Regulations	Proposed regulation changes of a 2 walleye limit and protected slot between 45cm-70cm was implemented by Fisheries Branch for the 2014 angling season to protect spawning sized fish
2014	SVSFE	Stock and Recruitment Assessment	Objective was to assess the spawn, recruitment, and walleye stocks. Various methods: kick sampling, guzzling, use of spawning mats, gill netting, seining, backpack shocking and trap netting. No evidence of walleye recruitment. Spring conditions were irregular with fluctuating water levels and temperatures. Suckers eggs found in Keys Creek. Netting indicated poor stocking success of the 2013 stock. 39% of walleye caught were in the protected slot.
2015	SVSFE	Fish Stock & Recruitment Survey	Evaluate stocking success and walleye recruitment via fall electrofishing and one fine-mesh trap net. Methods caught 102 adult walleye with only 2% in the protected slot. No natural recruitment was found. Catches did indicate a healthy young walleye population with success from the 2013 and 2014 Beautiful Lake plantings
2016	SVSFE	Fish Stock & Recruitment Survey	Evaluate stocking success and recruitment via electrofishing. Walleye populations appeared fair. Concerns on recent stocking success. Was recommended to fine tune shoals, stock walleye at a lower rate on alternate years, monitor angling pressure & continue annual surveys
2017	SVSFE	Fish Stock & Recruitment Survey	Evaluate stocking success and recruitment via electrofishing. First evidence of natural recruitment since shoals were created. One yoy caught near east shoal. Walleye population appeared healthy though not many mature walleye present. Recommended to enhance shoals, continue stocking via Beautiful Lake Walleye Transfer and monitor through replicated surveys every 5 to 6 years
2020	SVSFE	Shoal Enhancement	In March of 2020, 70 cubic yards of 1-6” rock was added to the larger shoal located alone the east shoreline.

Study Objective

Over the years various assessments and initiatives have been undertaken in attempts to understand and manage Beaver Lake to its highest potential. In the last decade walleye has become the primary focus. The original intent was to create a small self-sustaining fishery. The objective of the 2021 stock assessments was to;

1) Evaluate the current walleye population through replication of past trap netting programs (Mission Walleye)
2) Evaluate the stocking success from the Beautiful Lake plantings
3) Replicate electrofishing surveys to determine natural recruitment success and compliment the current dataset.

Study Area

Beaver Lake is located 45 km from Swan River, MB off PR366 in the Duck Mountain Provincial Park. The lake is 21.8 hectares with a maximum depth of 12.9 meters (Figure 2). Targetable fish species present are walleye and yellow perch.

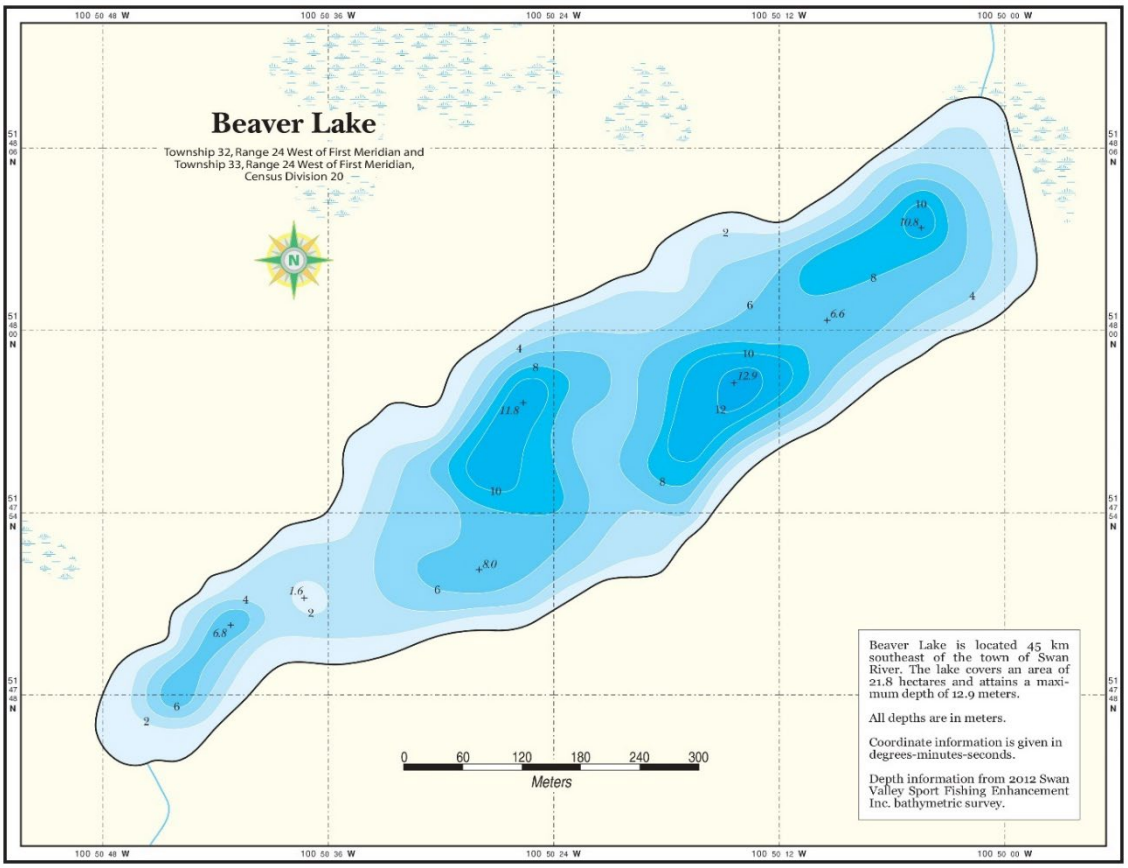


Figure 2: Beaver Lake bathymetric map

Methods

The methodology used to assess the Beaver Lake fishery was a variation of Ontario's End of Spring Trap Netting (ESTN). The program is a replication of the "Mission Walleye" program from 2012 & 2014. The assessment was designed to be achievable within a work week which consisted of six overnight sets fishing for a minimum of 21 hours (Figure 3). The netting schedule was created based ESTN's netting requirements. The nets used were customized trap nets which consisted of a 30 m lead, 4' wide trap with $1^{3/4}$" mesh. Information recorded at set time included: project code, UTM coordinates of set location, project site code, site type (general substrate, fish cover) bottom type (substrate, fish cover), net set crew, set date, set time, lead length, distance offshore, angle to shore, start depth, mid depth, gap depth, and any comments. Information recorded at net pull consisted of; net lift crew, lift date, lift time, effort status, duration of set, water temperature, cloud cover, precipitation type, wind direction & speed, general weather for set duration and surface conditions through set. As the trap was pulled, fish were placed in an onboard live-well. Game fish caught were identified by species, and sampled for fork & total length, weight, age and left pectoral fin clipped to identify recaptured fish. A subsample of white suckers were measured for length and the remaining were counted and released. Age structures taken included scales from walleye and yellow perch. Once all fish were sampled and released, traps were relocated and reset at the next assigned fishing location.

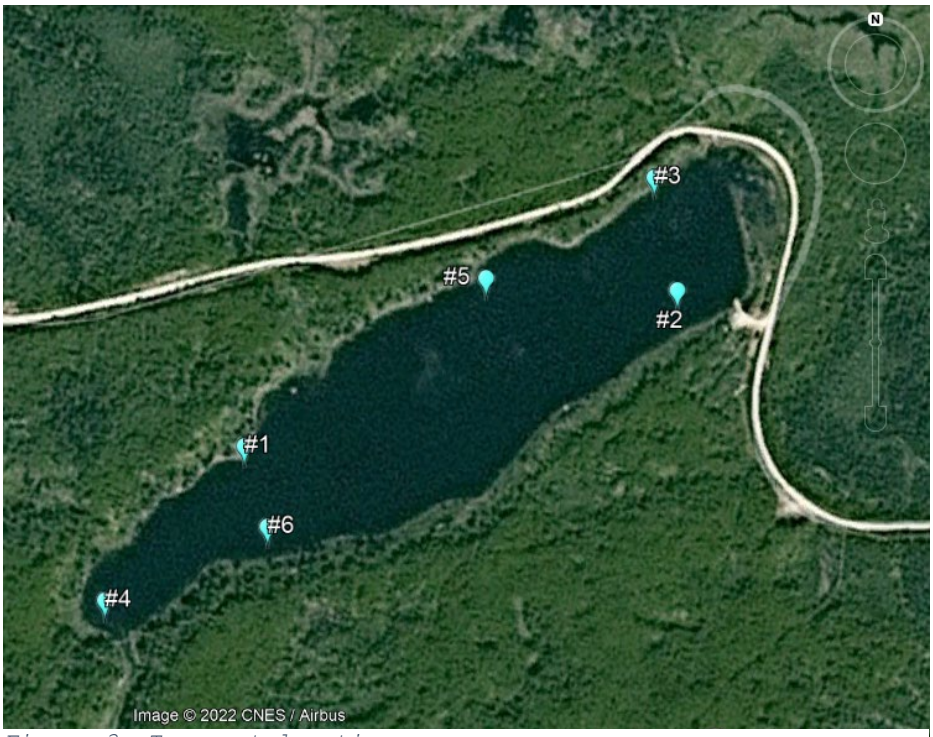


Figure 3: Trap net locations

In addition to the trap netting program, spring guzzling on the artificial shoals and complementary electrofishing were scheduled to evaluate recruitment success. Unfortunately, due to technical issues with the electrofishing boat no shoreline surveys were completed. The survey is efficient in providing quality data on mature and juvenile fish so it is regrettable it could not be completed.

Guzzling for walleye eggs was completed to evaluate usage of spawning habitat on the newly enhanced shoal. Typically guzzling is completed on the water by boat but due to the low water levels this spring, technicians were able to collect samples from wading in from shore (Figure 4). Sites were randomly chosen with a three by five-meter area sampled at each site for 5 minutes. Eggs were collected with the use of a hand pump guzzler. Data recorded at each site included percent of substrate type, percent of clean substrate, depth, number of live eggs and location. Eggs were returned to the water after counted and species identified.

Figure 4: Technician guzzling for eggs on the enhanced shoal

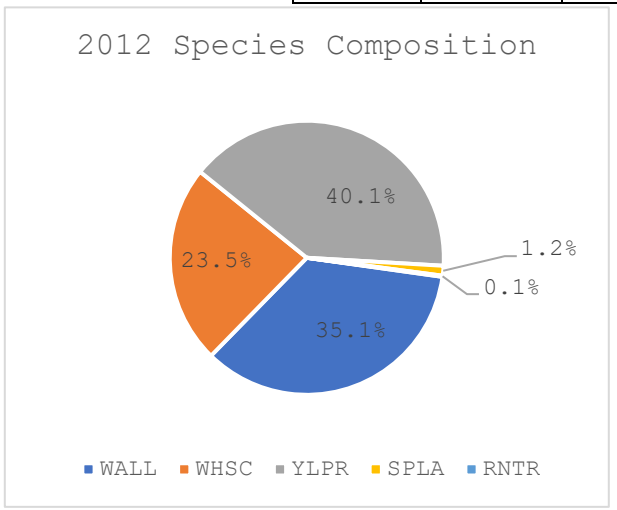
Results

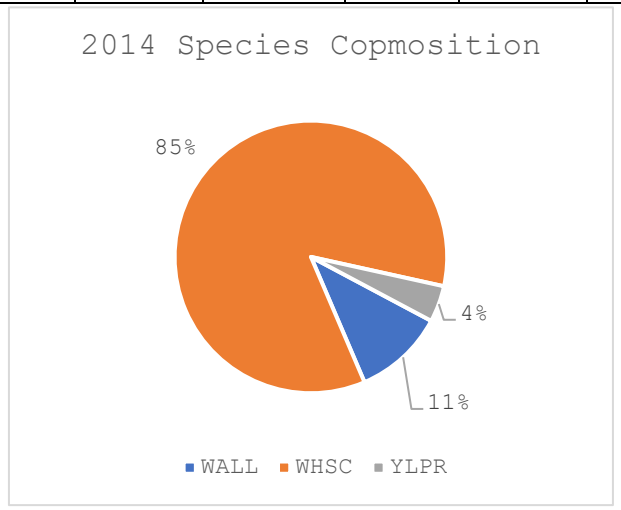
Trap Netting

Trap netting occurred between June 14th-17th, 2021. Effort equated to 136.1 fishing hours which yielded a total catch of 1507 fish. Six trap net locations were selected with two trap nets fishing at a time. Surface temperatures remained consistent throughout the assessment 18.2-18.9°C. Catch results are summarized as follows and compared to the 2012 and 2014 netting programs:

Table 3: 2021 Trap netting catch per unit effort

SAMPLE	HOURS FISHED	TOTAL FISH CAUGHT	TOTAL CPUE	WALL		WHSC		YLPR	
				TOTAL	CPUE	TOTAL	CPUE	TOTAL	CPUE
1	22.25	39	1.75	8	0.36	29	1.30	2	0.09
2	23.00	857	37.26	8	0.35	848	36.87	1	0.04
3	22.35	127	5.68	3	0.13	123	5.50	1	0.04
4	22.25	80	3.60	5	0.22	70	3.15	5	0.22
5	23.27	107	4.60	8	0.34	99	4.26	0	0.00
6	22.97	297	12.93	1	0.04	294	12.80	2	0.09
TOTAL	136.08	1507	11.07	33	0.24	1463	10.75	11	0.08





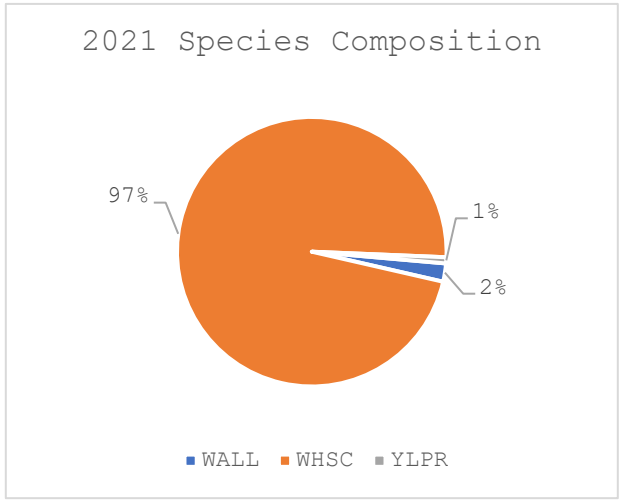


Figure 5: Species composition comparison 2012, 2014, 2021

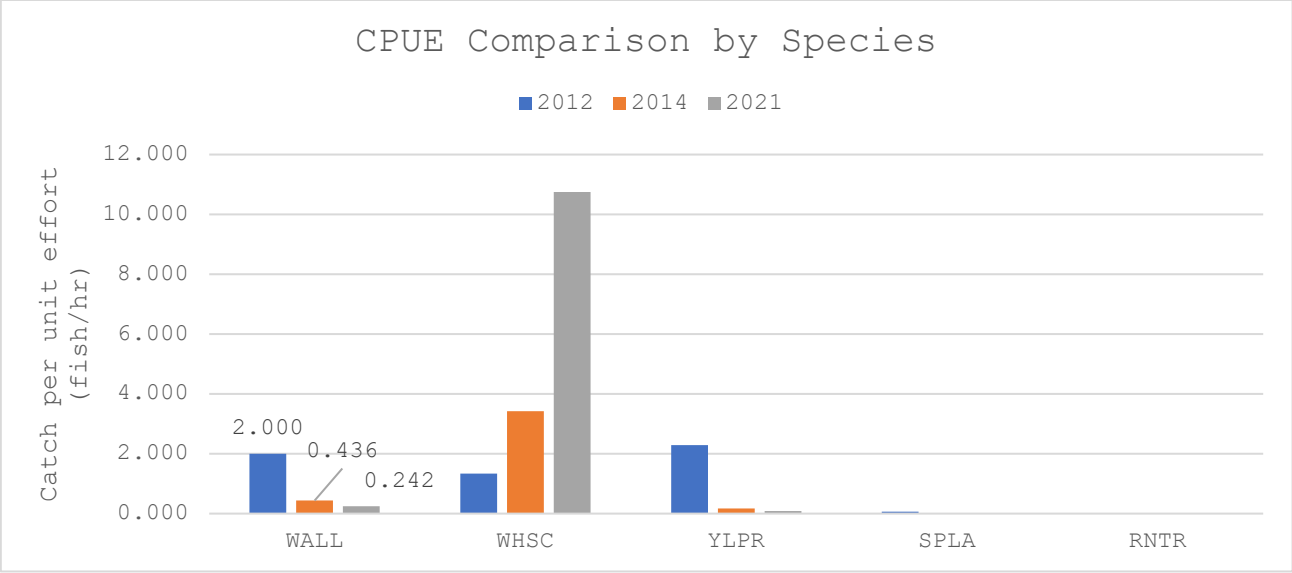


Figure 6: CPUE comparison by species – 2012, 2014, 2021

Walleye

In total, 33 walleye were sampled during the trap netting program equating to CPUE of 0.24 fish/hour. This is a significant drop from 2012 and 2014 (Figure 6). Walleye were in good health with an average condition factor of 0.99. Of the 2021 catches, length frequencies display a high occurrence of walleye between 401-450 mm (Figure 7), while age frequencies display a dominate age classes of 7+ and 6+ walleye (Figure 8). Walleye fork lengths ranged from 168 mm to 668 mm (6.6”-26.3”) and weight ranged from 50 g to 3150 g (0.1 lbs – 6.9 lbs)(Figure 9). The average walleye was 422 mm, 868g and 6 years old (Figure 10). Walleye were found at all sites and fairly distributed between sites. Five of these walleye were tagged from previous surveys.

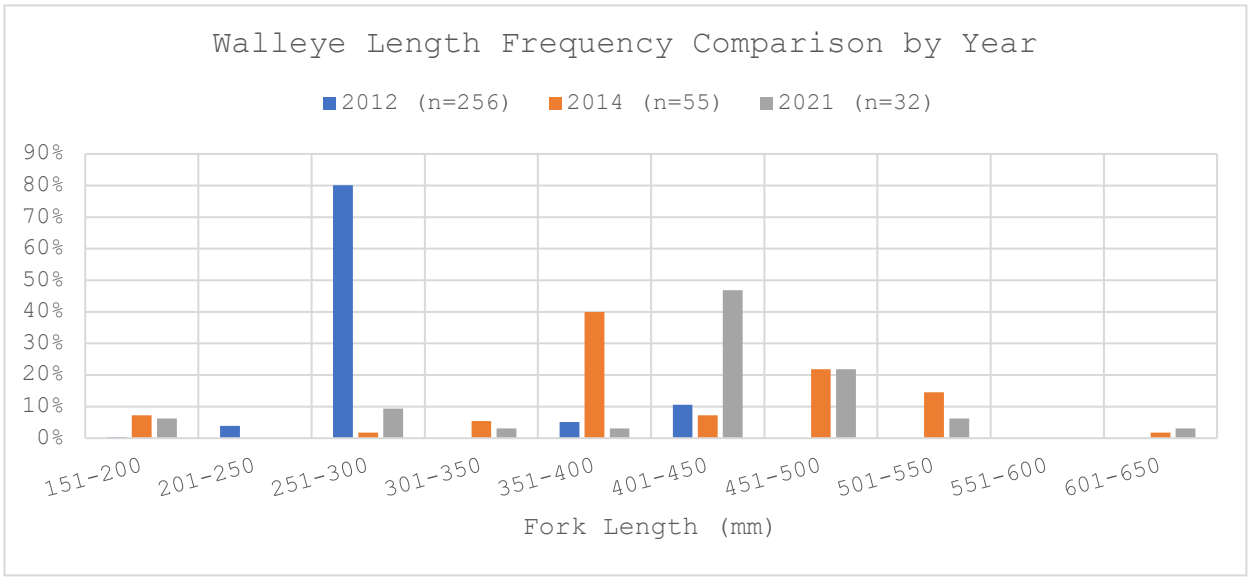


Figure 7: Walleye length frequency comparison – 2012, 2014, 2021

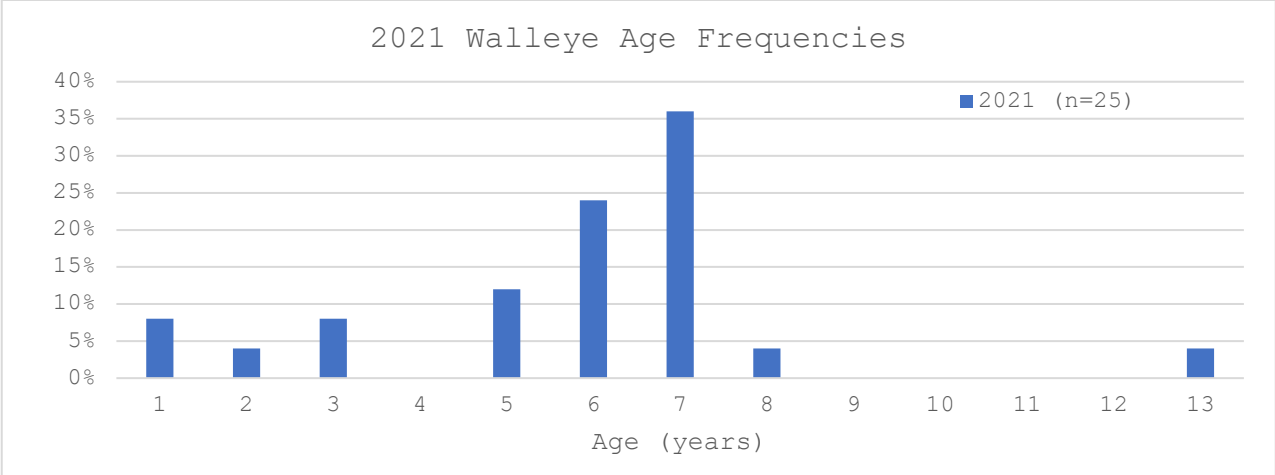


Figure 8: 2021 walleye age frequencies

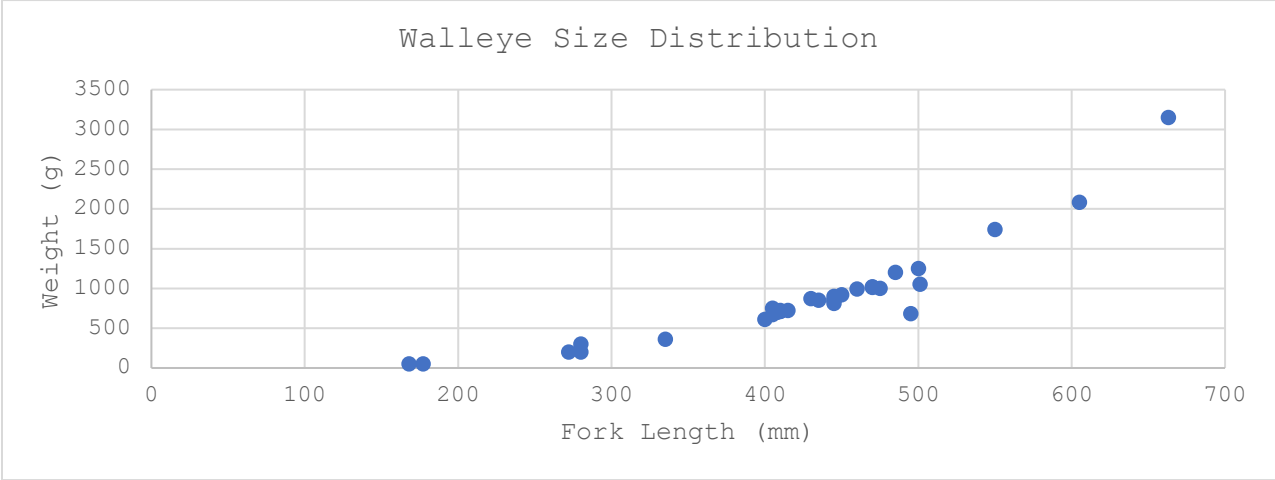


Figure 9: 2021 Walleye size distribution

Figure 10: Representative walleye caught during netting program

Yellow Perch & White Suckers

A total of 1463 white suckers were caught, equating to 10.75 fish/hour and present in all trap nets. Site #2 had a high catch with 848 suckers. These fish were merely counted and released therefore recaptures were not documented which may influence compositions. From the subsample of suckers, these fish averaged 403.6 mm in fork length with a range of 290 to 460 mm.

Yellow perch were present in all sites except for site #5. A total of 11 perch were caught equating to 0.08 fish/hour. Perch ranged from 115 mm to 264 mm with an average fork length of 234 mm. Age structures were collected for two of the larger perch and estimates concluded one perch (255 mm FL) to be seven while the larger perch (264 mm FL) was estimated at age nine (Figure 11).

Figure 11: Sample of larger yellow perch caught during netting program

Guzzling Results

Guzzling occurred on May 20th, 2021. Four sites were guzzled; three on the 2020 enhanced shoal (east shoal) and one site on south shoal. The enhanced shoal was significantly cleaner than the south shoal. Eggs were found at site #1-3 (enhanced shoal) while no eggs were found at site #4 (south shoal)(Table 4). A total of 12 live eyed walleye eggs were identified (Figure 12).

Table 4: 2021 guzzling results

BEAVER LAKE 2021 GUZZLING RESULTS

CLOUD COVER	8/8	Wind (km)	NE 20-30	Date	20-May-21
WATER TEMP (°C)	13	Time	10:40am	Crew	BK HU

5x3 SQUARE Rectangle SAMPLED PER SITE - 5 Minutes - No Flush

LOCATION	SITE	DEPTH RANGE	EFFORT (MINS/SITE)	Comments (location)	% Clean	HABITAT				EGGS	CPUE (LIVE EGGS)
						BOULDER	COBBLE	GRAVEL	SA/SI	ALIVE	(Eggs/Min)
SHOAL	1	.2-1	5	Post 3.5	100	10		90		3	0.6
SHOAL	2	.2-.8	5	Post 6	100	10		90		8	1.6
SHOAL	3	.2-.6	5	Post 9	100			100		1	0.2
SOUTH SHOAL	4	.2-.8	5	Post 2	5	90		10		0	0
		Total	**20**							**12**	**0.6**

Discussion

Over the past several years of monitoring walleye stocks in Beaver Lake, one quality remained consistent; recruitment was limited. Positive results from the 2021 guzzling and trap netting indicate recent enhancement efforts are providing some benefits to the fishery. Unfortunately, technicians were unable to replicate fall recruitment surveys with the electrofishing boat due to malfunctioning equipment. This survey would have provided further data on the walleye population and subsequent natural recruitment success.

Trap netting results found walleye in multiple age and size classes. When correlating age class strengths to stocking records, some correspondence with the walleye transfer can be identified. Age class 7+ and 6+ make up 60% of the 2021 catches. The highest age frequency (7+ walleye) can correlate with the 2015 planting of 1+ walleye or the 2014 planting of 0+ walleye. The next highest age frequency of age 6+ walleye would be related to the planting of 0+ walleye in 2015.

In 2015, 865 walleye were transferred from Beautiful Lake. These walleye were anywhere from 0+, 1+, 2+ years of age at the time of planting and 64% of these walleye were tagged. All the walleye transferred in 2015 were measured for fork length. Of these 865 walleye, it is believed 80% were 1+, slightly under 20% were 0+ and <1% were 2+. In 2014, only 25% (183/737) of walleye stocked in Beaver Lake were 0+ and the remaining were tagged and documented at an average size of 244 mm, presumably age 1+. It is believed the stronger age classes are likely the result of the combination of the 2014 & 2015 plantings. This was an average stocking rate of 800 fish/year.

There were a handful of tagged fish caught in the 2021 netting program. Each of these fish have an interesting story of their own. Recap info can be reviewed in (Appendix 1)

- Fish #4185 and fish #4191 were both tagged in the spring of 2015 caught in the experimental fine mesh trap net in search of yoy walleye. These fish would have been 0+ walleye stocked in 2014.
- Fish #5749 was tagged and transferred from Beautiful Lake in 2015. This fish would have been 1+ at the time of stocking.
- Fish #516 was originally tagged in 2016 during electrofishing surveys. This fish was 551 mm and 7 years old in 2016. It is believed this walleye was one of the original adult walleye stocked in 2011
- Fish #1297 was originally tagged in the 2012 Mission Walleye program. At that time the walleye was 428 mm. This fish was then recaptured twice in 2014 in both a trap net and a gill net and grew 100 mm and doubled in weight in the two years. It was caught again in 2021 and was the largest walleye at 663 mm and 3150 g (almost 7 lbs!). This walleye was estimated at age 13, which would put this walleye stocked in 2011 at age 3+.

Therefore, from recaptures, two fish were a result of the 2014 planting, one fish from the 2015 planting and two fish from the original stocking in 2011. Interestingly, only 12% of the 2021 catch attributes to the super stocking in 2016 of 1916 0+ walleye. This may indicate poor survival or significant angling pressure on these fish over the years. There appears to be some evidence of natural recruitment with walleye age estimates not related to Beautiful Lake transfers (walleye estimated at age 1+ & 3+ in 2021). Not too much should be drawn from these low occurrences, but these results provide some optimism.

Regarding fish abundance, trap netting results display a significant shift in composition and CPUE since 2012. Walleye and yellow perch abundance have dropped considerably while white sucker numbers have increased. Weather can greatly influence catches. Although the surveys were all conducted during early June, an unusually hot/dry spring resulted in much warmer water temperatures in 2021. Both 2012 & 2014 water temperatures remained around 14°C while temps in 2021 rose to over 18°C. This may have affected catch results. Although trap netting CPUEs display a consistent drop, past electrofishing surveys 2015-2017 had indicated the opposite. Walleye abundance had increased from 52.8 fish/hr in 2015 to 78.2 and 129.2 fish/hour in 2016 & 2017, respectively (Appendix 3). Again, it is unfortunate electrofishing surveys could not be completed in 2021. Results would have help confirm whether walleye abundance is a concern.

In efforts to understand more, a few anglers that frequent the lake were questioned on recent angling quality. With Beaver Lake off the beaten path, it is difficult to evaluate this parameter. Of those anglers that responded, they stated they were satisfied with their experience rating the quality as fair to good both during open and closed water seasons.

Considering results from the 2021 assessments there are no reasons to make any significant alterations to the current management strategy. It is recommended Beaver Lake remain a high priority recipient lake for the Beautiful Lake Walleye Transfer. Stocking rates should remain at 12.5 fish/hectare (~250 fish) and receive older walleye on years when available. Monitoring of the fishery should continue to evaluate the success of this stocking regime and rates altered if CPUEs continue to drop. Monitoring should consist of annual spring guzzling of the enhanced shoal, replication of fall electrofishing surveys when the boat is available, along with continued correspondence with anglers.

Appendices

Project Site Code	Fish #	Species	Fork Length	Total Length	Weight	Tag #	Tag Code	Age
BV-TR-15-001	BV-15-0014	WALL	300	320	240	4185	SVSFE - BLUE	
BV-TR-21-002	BV-21-0017	WALL	430	465	870	4185	SVSFE - BLUE	
		Growth	**130**	**145**	**630**			
BV-TR-15-001	BV-15-0022	WALL	295	315	245	4191	SVSFE - BLUE	
BV-TR-21-002	BV-21-0019	WALL	445	475	850	4191	SVSFE - BLUE	
		Growth	**150**	**160**	**605**			
BU-WT-15-005	BV-15-1825	WALL	322			5749	SVSFE - BLUE	
BV-TR-21-001	BV-21-0005	WALL	485	515	1200	5749	SVSFE - BLUE	
		Growth	**163**					
BV-ES-16-001	BV-16-0006	WALL	551			516	ORANGE - 4 DIGIT	7
BV-TR-21-003	BV-21-0022	WALL	605	633	2080	516	SMALL-ORANGE	
		Growth	**54**					
BV-TR-12-002	BV-12-0103	WALL	428	447	820	1297	SVSFE - BLUE	
BV-GI-14-005	BV-14-0039	WALL	528	554	1740	1297	SVSFE - BLUE	
BV-TR-14-006	BV-14-0225	WALL	525	550	1560	1297	SVSFE - BLUE	
BV-TR-21-002	BV-21-0012	WALL	663	698	3150	1297	SVSFE - BLUE	13
		Growth	**235**	**251**	**2330**			

Appendix 1: Stocking info from the Beautiful Lake Walleye Transfer

Beautiful Lake Walleye Transfer												
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2019**	**2021**	**Total by Lake**
Wellman Lake	48	522	222	153	144	360	1,005	2,680	1,402	0	0	**6,536**
Spray Lake	0	50	41	75	0	285	0	868	312	0	261	**1,892**
Verrall Lake	0	74	57	132	0	100	394	603	117	22	556	**2,055**
Child's Lake	230	0	0	0	0	368	1,000	3,086	1,103	20	26	**5,833**
Singush Lake	650	0	0	77	200	662	814	3,536	0	51	42	**6,032**
Line Lake	0	539	54	89	0	0	0	0	0	0	0	**682**
Chain Lake	0	40	0	0	0	0	0	0	0	0	0	**40**
Marge Lake	0	399	585	125	0	569	50	1,530	943	0	536	**4,737**
Vermillion Reservoir	0	20	300	200	324	200	195	363	0	0	0	**1,602**
Swan River	0	395	54	0	0	124	0	0	0	0	0	**573**
Beaver Lake	0	0	548	90	882	737	865	1,916	0	67	321	**5,426**
Cache Lake	0	0	0	0	0	0	0	602	451	0	0	**1,053**
West Blue Lake	0	50	0	0	0	0	0	0	0	0	0	**50**
Langan Lake	0	0	0	50	0	0	0	0	0	0	0	**50**
Mossberry Lake	0	0	0	0	0	0	0	0	184	0	0	**184**
TOTALS:	**928**	**2,089**	**1,861**	**991**	**1,550**	**3,405**	**4,323**	**15,184**	**4,512**	**160**	**1,742**	**36,745**
Average size:	*29cm*	*35cm*	*34.5cm*	*27.6cm*	*17.5cm*	*24.4 cm*	*32.2cm*	*17.0cm*	*24.5cm*	*15.7 cm*	*YOY=16.5cm A=41.4cm*	
Catchment Method	*ES*	*TR*	*TR*	*TR*	*TR*	*TR & ES*	*TR & ES*	*TR & ES*	*TR & ES*	*TR & ES*	*TR*	
Age Classes	*?*	*?*	*?*	*?*	*0+*	*0+, 1+*	*0+, 1+, 2+*	*0+*	*0+, 1+*	*0+*	*0+. 1+. 2+. 3+*	

Appendix 2: Composition and CPUE results from the 2015, 2016 & 2017 electrofishing surveys

Figure 1: 2015-2017 Beaver Lake Species Composition

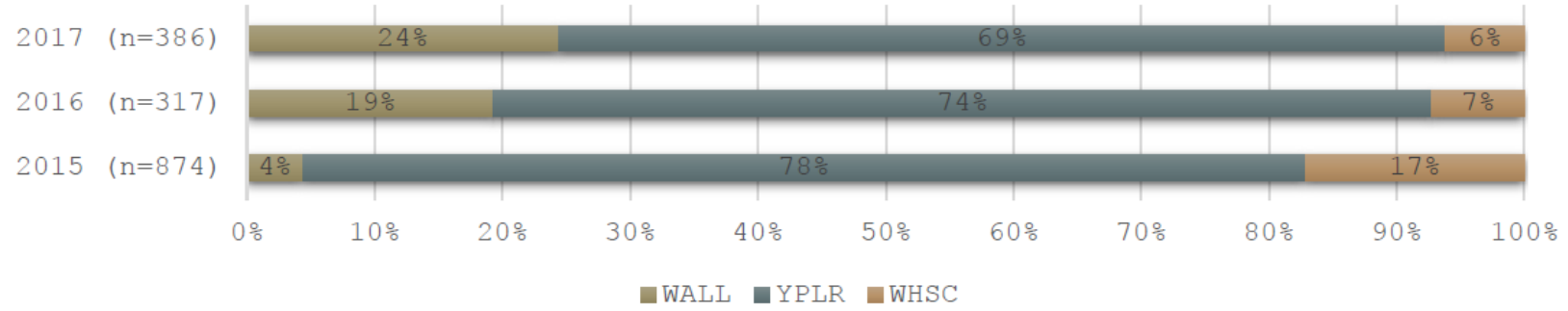


Table 2: CPUE of all species from 2015 - 2017

Catch per Unit Effort (# of fish/hour)			
	WALL	YLPR	WHSC
2015	52.8	952.8	208.3
2016	78.2	298.7	29.5
2017	129.2	368.4	33.0