



2022 Perch Lake Stock Assessment

In part of reporting for FWEF Project 22-010 SVSFE
Initiatives and Monitoring of Recreational Fisheries in
the Swan Valley Area

Author: Brock Koutecky

November 2022

Swan Valley Sport Fishing
Enhancement Inc.

Executive Summary

A fish stock assessment was conducted on Perch Lake by Swan Valley Sport Fishing Enhancement (SVSFE), with assistance from Intermountain Sport Fishing Enhancement (ISFE) in June of 2022. Perch Lake has been an underachieving stocked trout lake for some time and efforts in 2022 included a fish stock assessment and historical review. The objective is to ascertain a refined stocking strategy with hopes to increase angling quality in Perch Lake for the licensed anglers of Manitoba. The research was funded by the Fish and Wildlife Enhancement Fund.

Methods included short set gill netting and overnight trap-netting as the exclusive systems for fish capture. Late fall electrofishing was planned however did not work out. Regardless, it was agreed that the information found during June netting was sufficient and the waterbody probably did not require any additional fish sampling in late fall.

The assessment aimed to provide updated population information to evaluate the success of the trout stocking regime. Information on length and age were collected from brown trout and a subsample of yellow perch. Surprisingly, no smallmouth bass were caught or observed over the course of the assessment. In addition, a review of the historical files was completed and summarized, including stocking records and Master Angler submissions.

In summary, the current stocking regime for Perch Lake is regular brown trout plantings with the odd planting of brood stock brown trout. The assessment indicated success from the regular fingerling plantings, and a correlation between Master Angler brown trout submissions and brood plantings. The current stocking regime would not be considered unsuccessful, however there does seem to be some room for improvement.

When considering another species, the "Perch Lake Experiment" conducted by Shelly Matkowski in 1982 found splake to do quite well in Perch Lake. The species appeared to have better stocking success than rainbow and brook trout. Matkowski hypothesised this was do to splake's habitat preferences and general behavior which would make the species less susceptible from predatory birds. This was interesting, additionally on multiple occasions splake have done very well when stocked upon prevalent perch populations in the Duck Mountains. Splake, not only do well in these situations, but they also grow fast, are generally easy to catch (in comparison to browns) and are long lived. As a catch and release fishery, this waterbody may have the potential to produce trophy splake successfully. Recommendation is not to change the Perch Lake management plan, but to stock splake and tiger trout one time at a rate of 1000 fish (500 of each) experimentally. A spring planting of 18+cm fish would be best, and monitoring through angler reports is the recommended method for monitoring success.

Table of Contents

Executive Summary.....	2
List of Tables.....	4
List of Figures.....	4
List of Appendices.....	4
Background Information.....	5
Objectives.....	8
Study Area.....	9
Methods.....	11
Results.....	12
Catch Summary.....	12
Discussion.....	17
Netting Program.....	17
Winterkill.....	17
Brown Trout.....	17
Smallmouth Bass.....	18
Yellow Perch.....	18
Future Management Considerations.....	18
Appendices.....	20
References.....	23

List of Tables

Table 1: Net summary.....	12
Table 2: 2022 DO Results.....	16

List of Figures

Figure 1: Brown Trout Master Angler Submissions.....	7
Figure 2: Smallmouth Bass Master Angler Submissions.....	7
Figure 3: Study Area.....	9
Figure 4: Perch Lake Bathymetry.....	10
Figure 5: Netting Effort Map.....	12
Figure 6: Brown Trout Size Distribution.....	13
Figure 7: Brown Trout Age Frequencies.....	13
Figure 8: Brown Trout Age Distribution.....	14
Figure 9: Yellow Perch Length Frequencies.....	15
Figure 10: Yellow Perch Size Distribution.....	15

List of Appendices

Appendix 1: Perch Lake Brown Trout 1.....	20
Appendix 2: Perch Lake Brown Trout 2.....	20
Appendix 3: Perch Lake Yellow Perch 1.....	21
Appendix 4: Perch Lake Yellow Perch 2.....	21
Appendix 5: Perch Lake Yellow Perch 3.....	22

Background Information

Perch Lake is a headwater lake connected to Marge Lake and therefore the Shell River system. Interestingly, the waterbody has never seemed to home any large bodied native species aside from yellow perch despite this connectivity. Additionally, with the limited database it appears winterkill is not a common occurrence. Naturally, this makes the waterbody an excellent option for stocked trout introductions, and has been managed as such dating back to the 1960's.

As an effort to eradicate perch populations and increase trout stocking success, Perch Lake was chemically reclaimed in 1962. Shortly thereafter, the waterbody was closed to the public as an angling lake. For about two decades the waterbody was used to raise brood stock for the provincial stocking program (Brook Trout, and Rainbow Trout). It appears the program was somewhat successful until the lake was re-opened to the public in the early 1980's.

In 1982, a Masters student, Shelley Matkowski, who had been studying stocked trout predation by piscivorous birds in the Duck Mountains began what she termed "The Perch Lake Experiment". In May 1982 Perch Lake was continuously netted for fourteen days until 6 consecutive days of no capture to remove any resident trout from the waterbody. Through these netting efforts a total of 57 brook trout were removed (316-388mm), all of which were believed to have been planted in 1978. During the removal efforts, rainbow trout (n=330), brook trout (n=321), and splake (n=321) were stocked into Perch Lake at age 1+. Matkowski spent morning and evening half days observing birds at the waterbody from May to late August. Loons and herons both frequented Perch Lake in the summer of 1982, but none as resident, indicating that the purpose of visits were primarily to hunt. On multiple occasions, Matkowski observed predatory birds fishing. She also noted the preferred prey item was stocked trout in comparison to yellow perch. This suggests by 1982 yellow perch had naturally re-colonized the waterbody after the 1962 reclamation. In general, Matkowski concluded through daily observations that predation of stocked trout was significant. Intensive netting in Perch Lake in the fall of 1982 and spring of 1983 resulted in unequal recoveries of the three species. Of the original numbers stocked, only 12% (n=41) of the rainbow trout were caught while 43% (n=138) of brook trout and 54% (n=173) of splake were caught. Matkowski claims that over the course of the study angling harvest and predation from other fishes was negligible. The unequal recoveries were hypothesized to be subject to stocked trout behavior and habitat preferences. Rainbow trout commonly surface feed and exist in littoral habitats and would be more susceptible to bird predation. On the other hand, brook trout and splake prefer deeper habitats and would be harder for loons to capture.

In late June 1983 smallmouth bass were introduced to Perch Lake from Wisconsin as an effort to increase angling opportunities in the Duck Mountains. The waterbody then became managed as a Catch and Release bass/stocked trout fishery. Unsurprisingly, the smallmouth naturalized the waterbody and trout stocking continued. To this day, Perch Lake is managed as a Catch and release brown trout/smallmouth bass fishery.

Shortly following the smallmouth bass planting, brook trout were planted (1983). The first planting of brown trout occurred in 1990 and have been stocked regularly since. Records from 1990-present are as follows:

*Table 1: Historical Stocking
Records (1990-Present)*

Year	Species	Size	Frequency
1990	BNTR	2+	2,000
1990	BNTR	8+	59
1991	BNTR	2+	2,000
1992	BNTR	1+	1,000
1994	BNTR	12-15cm	1,500
1996	BNTR	Adult	150
1996	BNTR	12-15cm	2,000
1997	BNTR	12-15cm	1,000
1998	BNTR	12-15cm	2,000
2001	BNTR	12-15cm	1,500
2002	BNTR	12-15cm	1,000
2003	BNTR	Fingerling	1,000
2004	BNTR	Adult	300
2004	BNTR	12-15cm	1,000
2005	BNTR	12-15cm	1,000
2006	BNTR	18+	1,000
2007	BNTR	12-15cm	1,000
2008	BNTR	12-15cm	1,000
2009	BNTR	18+	1,000
2011	BNTR	18+	1,000
2014	BNTR	12-15cm	1,000
2015	BNTR	Adult	30
2015	BNTR	12-15cm	1,000
2016	BNTR	12-15cm	500
2018	BNTR	12-15cm	1,000
2019	BNTR	Adult	30
2020	BNTR	12-15cm	1,000

In 2013, SVSFE technicians assessed the Perch Lake fish community with the objective to investigate a potential winterkill as fishing quality had reportedly diminished considerably. On September 13th SVSFE set 8 different nets of varying mesh sizes. Net types consisted of monofilament gangs of 1.5"-4", and monofilament BTIN 2.5" nets (3-panels). Each net was set 4 times at varying durations between 31 and 55 minutes. Catch consisted of 12 smallmouth bass ranging from 235-380mm total length. No brown trout or yellow perch were captured in the assessment.

Perch Lake is one of only a few "Catch and Release" fisheries in Manitoba. These types of waterbodies usually produce fish of trophy sizes eligible for awards from the Manitoba Master Angler Program. Below are figures representing Master Angler Submissions of both brown trout (BNTR) and smallmouth bass (SMBS) from 1990-Present.

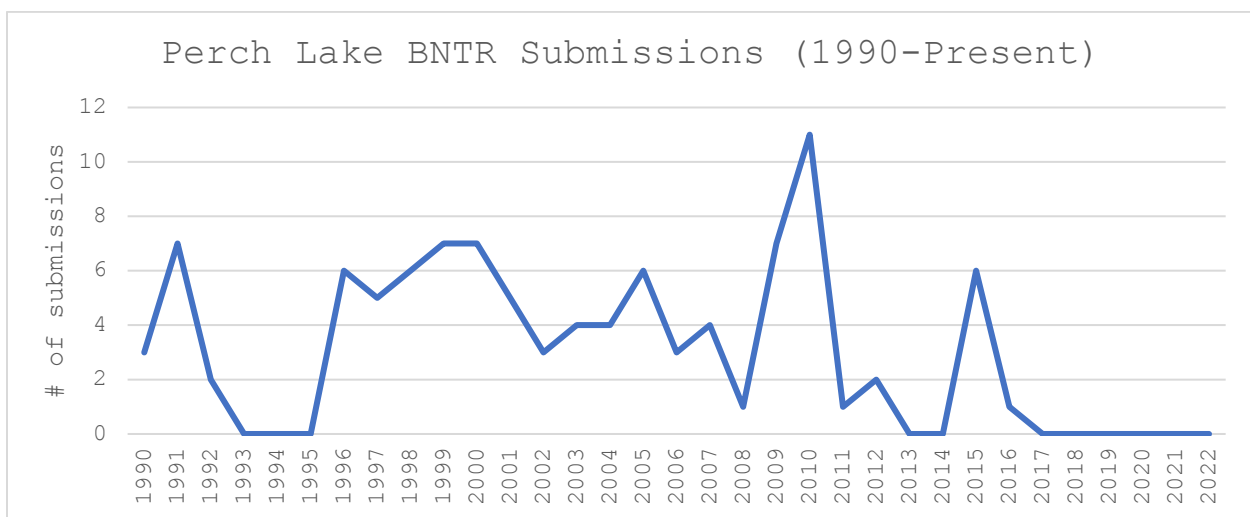


Figure 1: Brown Trout Master Angler Submissions

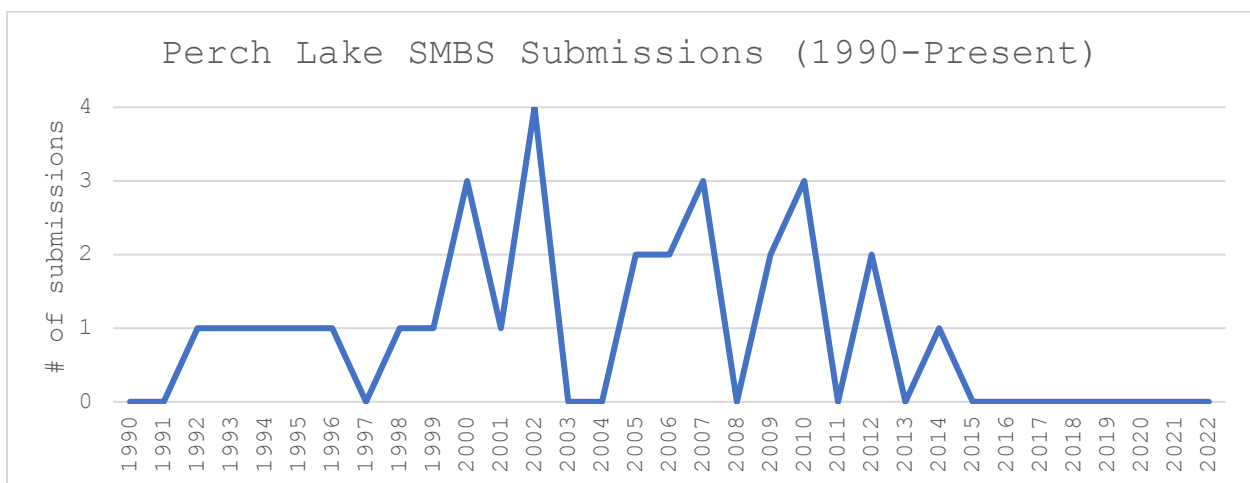


Figure 2: Smallmouth Bass Master Angler Submissions

Objectives

In 2022, a gill/trap netting survey to assess the fish community and population dynamics of Perch Lake fishes. Up-to-date information on Perch Lake became of question as the fishery appeared to be struggling in recent years. Objectives were as follows:

- 1) Gather information on relative abundance of stocked trout, smallmouth bass, and yellow perch amongst other biological measures through non-lethal netting protocols.
- 2) Develop considerations that will assist in the future management, use, and development of Perch Lake.
- 3) Develop a data report and summary for FWEF, Fisheries Branch, the SVSFE Board of Directors while publishing findings online as an angler resource.

Study Area

Perch Lake is located 77 km from Swan River, MB off PR #366 in the Duck Mountain Provincial Park. The waterbody has a small craft boat launch, a fishing pier, and the only Catch-and-Release fishery in the Duck Mountain Provincial Park.

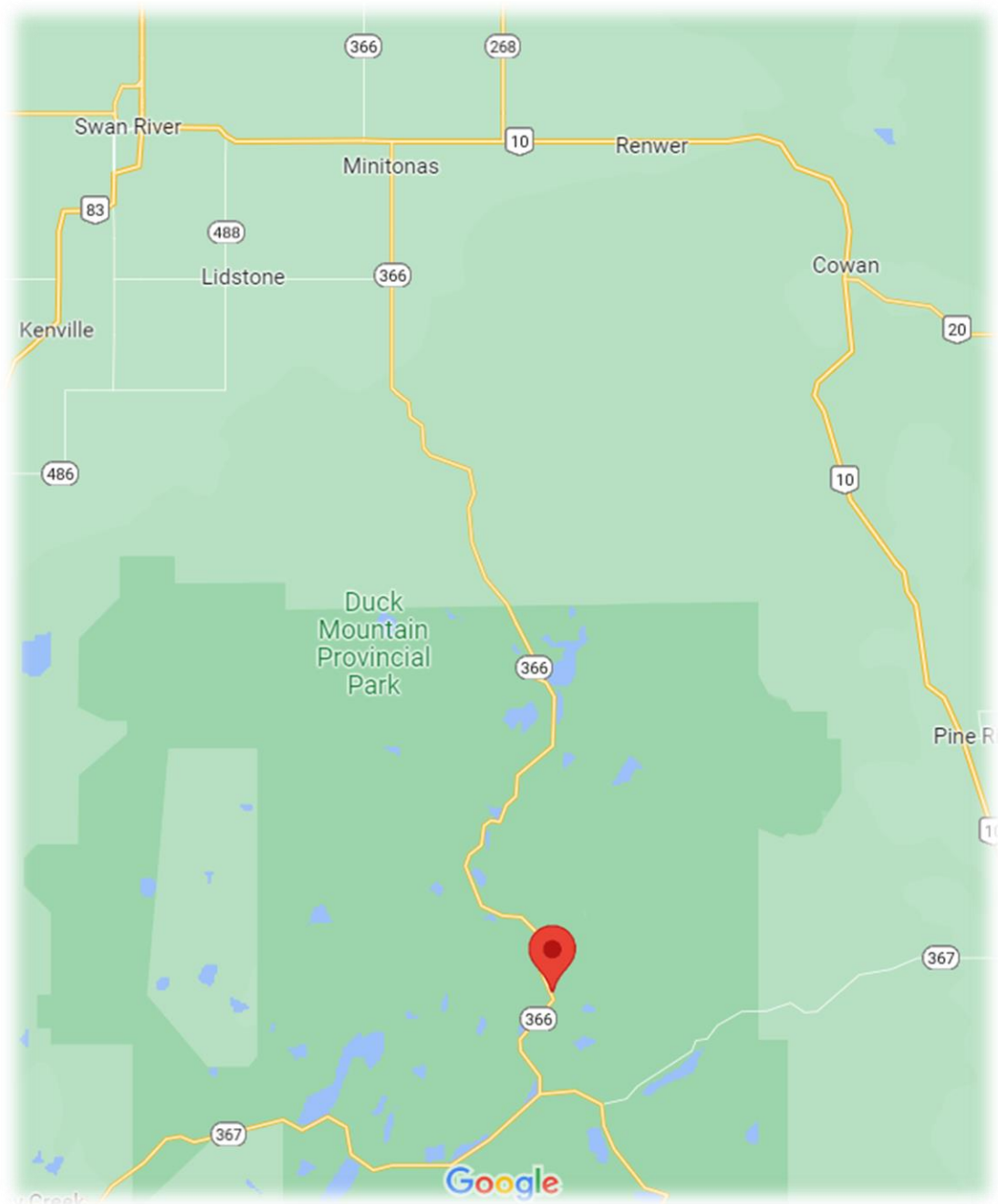


Figure 3: Study Area

Perch lake is 5.9 hectares with a maximum depth of 25.4 meters and a mean depth of 7.9 meters. Targetable fish species present include brown trout, smallmouth bass, and yellow perch.

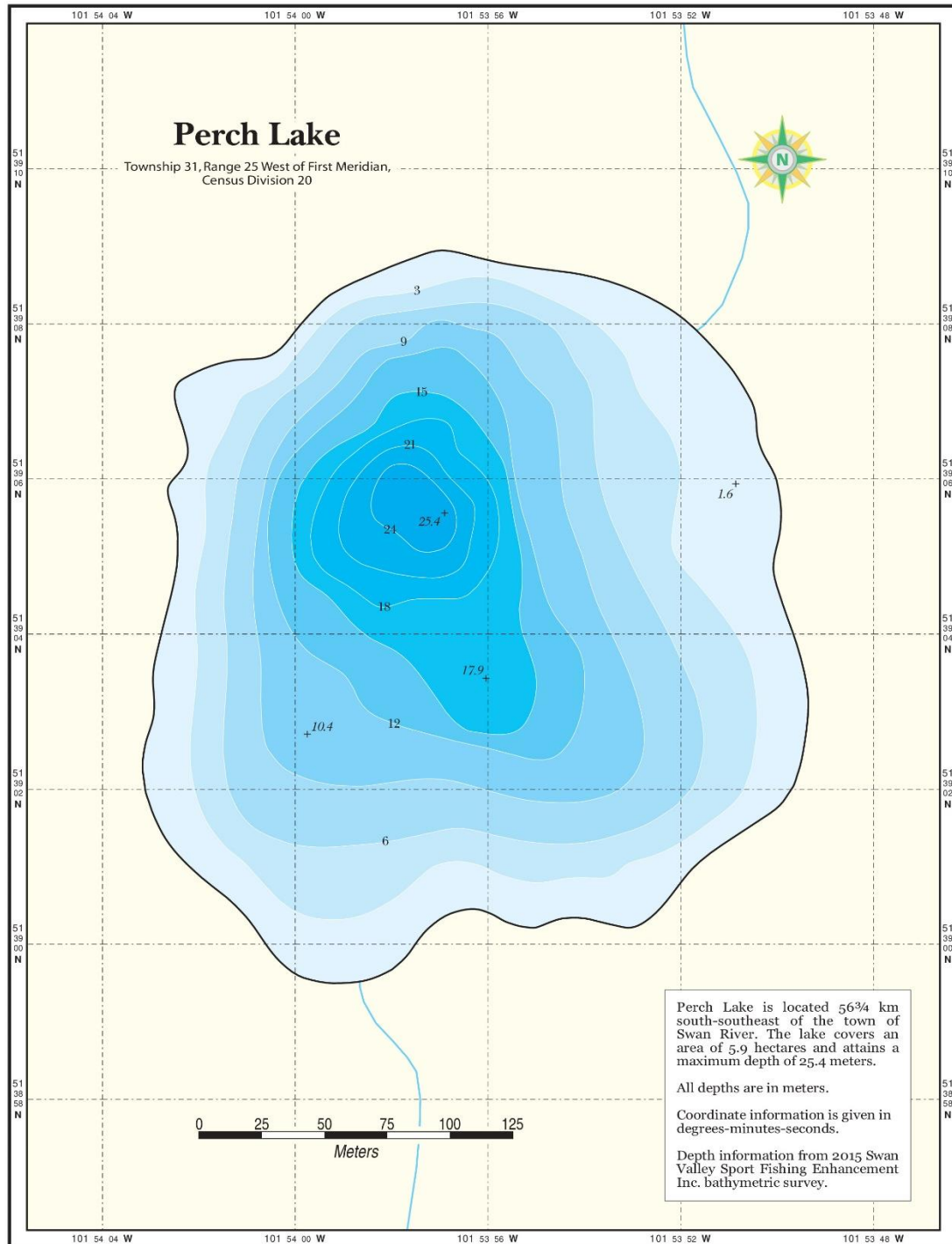


Figure 4: Perch Lake Bathymetry

Methods

Netting assessments were conducted from June 13th-15th 2022. Surface water temperature ranged from 15-17 °C.

Overnight trap netting was limited to just three viable locations due to the lakes lack of littoral zone. Two standard End of Spring Trap Netting (ESTN) nets were set in two different locations (Net 2,3), while one custom fine mesh ESTN trap net was set in one location (Net 1). The standard net fished for a total of 45.47 hours and the custom fine mesh net fished for a total of 22.83 hours.

Short set gill netting was conducted on June 14th and 15th, 2022. Three different nets were used including a monofilament random gang net with 15m of each mesh size (2", 2.5", 3", 3.5", 4"), assembled in random order. The others were monofilament SLIN (Spring Littoral Index Netting) nets consisting of 6 panels (15m each) of 2.5" and 2" mesh. Nets 1,3, and 5 were SLIN 2.5", nets 2 and 4 were SLIN 2", and nets 6,7,8, and 9 used the random monofilament gang. Net set duration ranged from 30 - 60 minutes with the total gill netting effort equating 315 minutes or 5.25 hours.

Captured fish were immediately placed in an onboard livewell for the sampling process. Captured brown trout were measured fork length, total length and weighed. Scales were taken for age estimates and left pectoral fins were clipped to mark for recapture information. Dead brown trout (n=2) were sampled for sex/maturity, stomach contents, and otoliths were taken for age estimates. A subsample (n=150) of yellow perch were measured for fork length and another subsample (n=14) were weighed prior to release. No other species were captured or observed during the assessment.

Littoral observations were also completed between net pulls and during calm periods. This also included a complete shoreline cruise on the morning of June 13th. Interestingly, no clean redds or evidence of spawning bass was observed during the 3 days on the water.

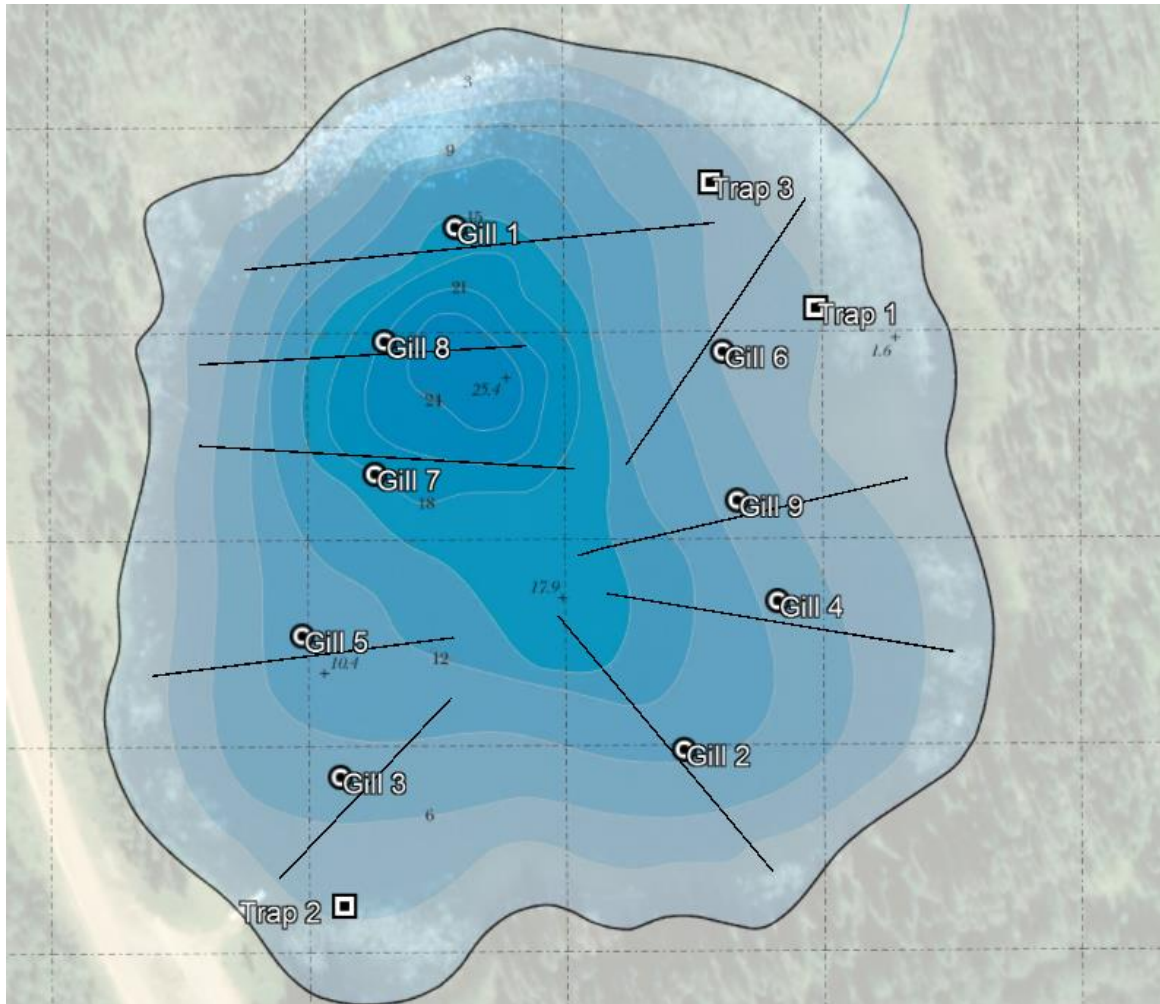


Figure 5: Netting Effort Map

Results

Catch Summary

In total 406 fish were captured during the assessments. Nine brown trout and 7 yellow perch were captured through gill netting efforts. Trap netting efforts yielded 390 yellow perch.

NET	Trap 1	Trap 2	Trap 3	Gill 1	Gill 2	Gill 3	Gill 4	Gill 5	Gill 6	Gill 7	Gill 8	Gill 9
BNTR	0	0	0	1	4	1	1	1	0	1	0	0
YLPR	363	13	14	1	3	2	2	0	0	0	0	0

Table 1: Net Catch Summary

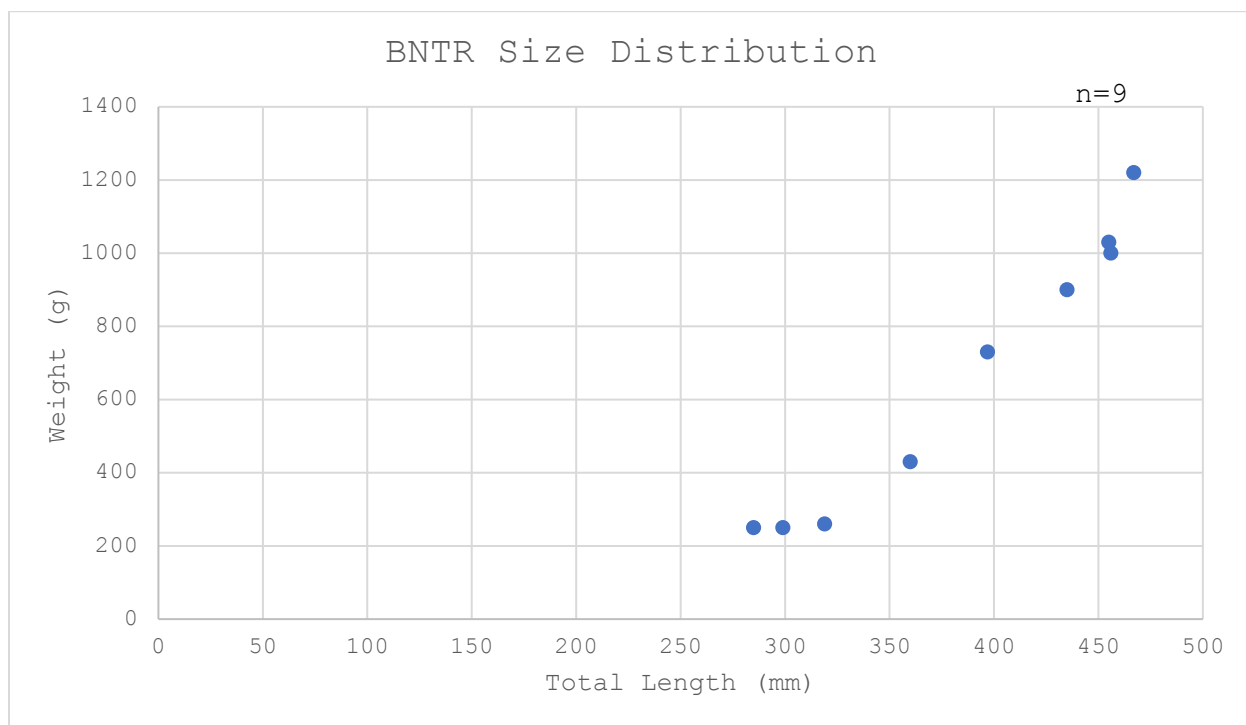


Figure 6: Brown Trout Size Distribution

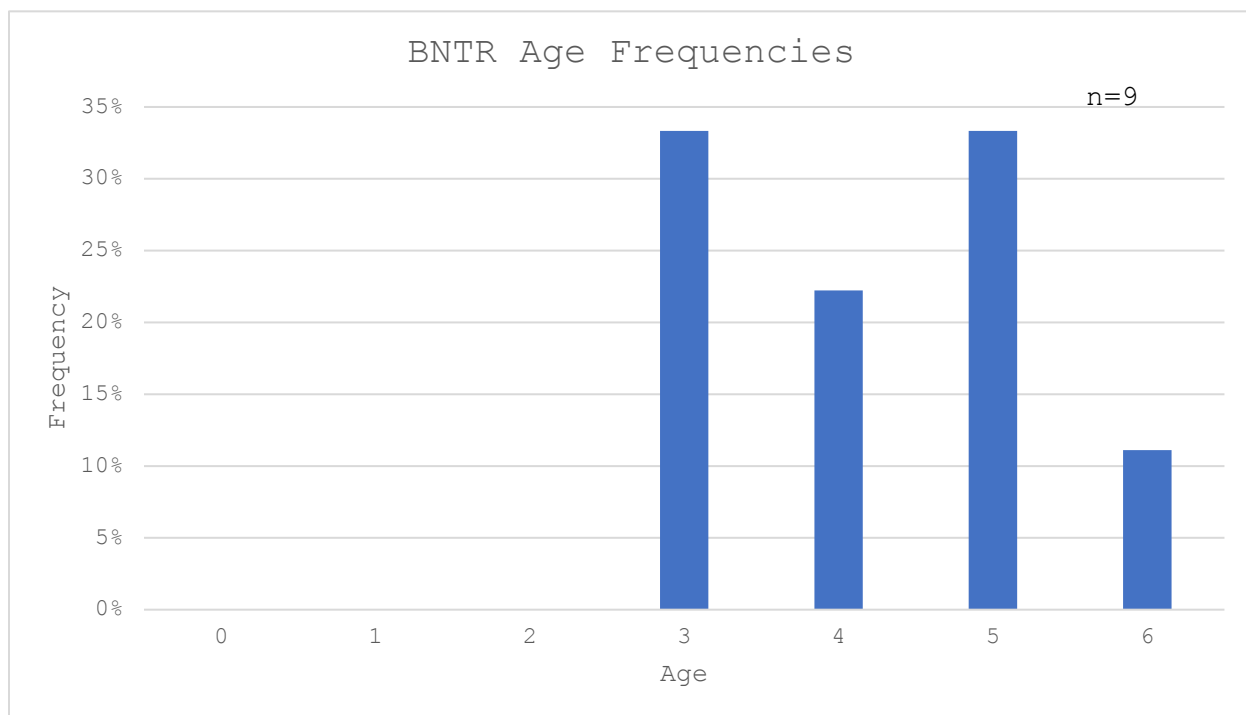


Figure 7: Brown Trout Age Frequencies

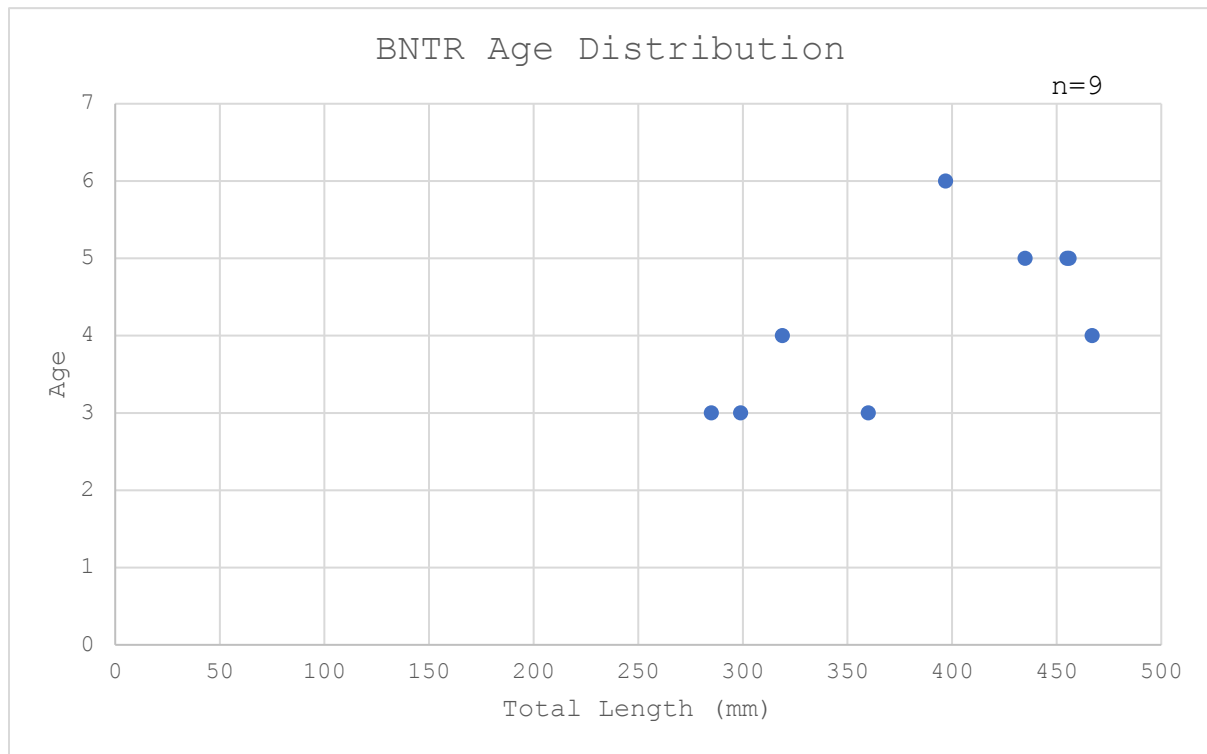


Figure 8: Brown Trout Age Distribution

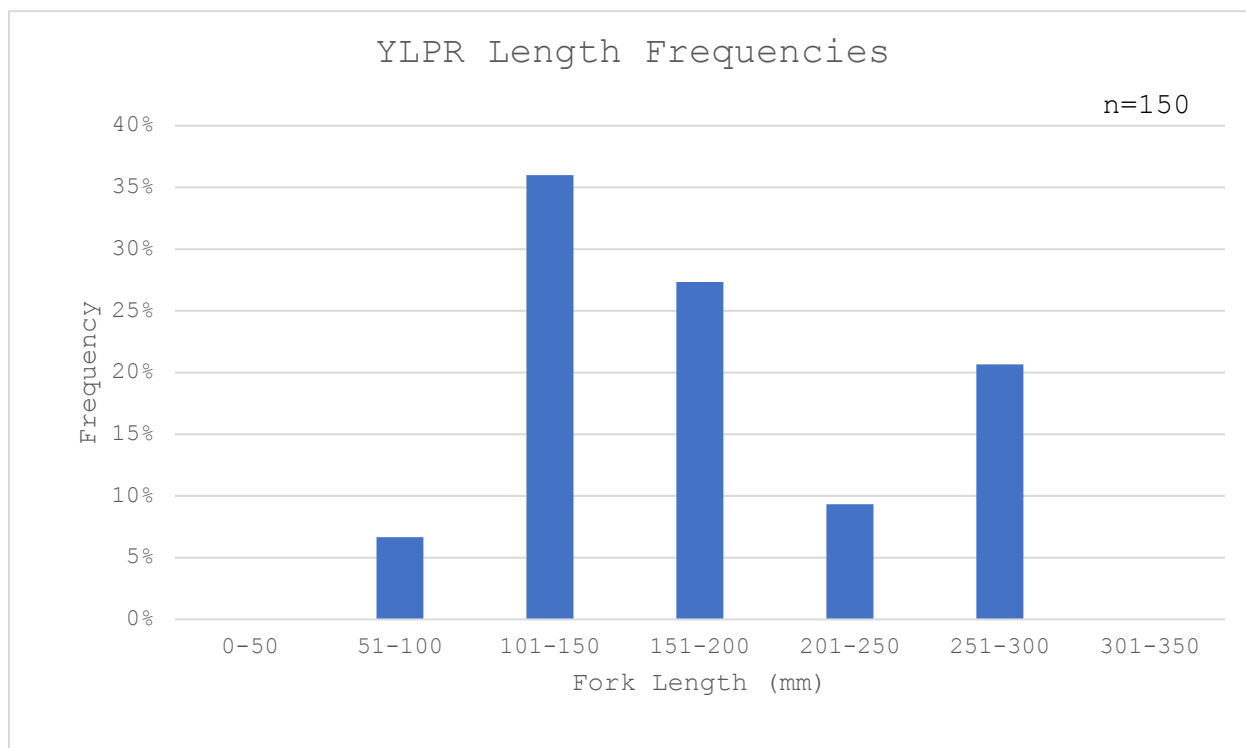


Figure 9: Yellow Perch Length Frequencies

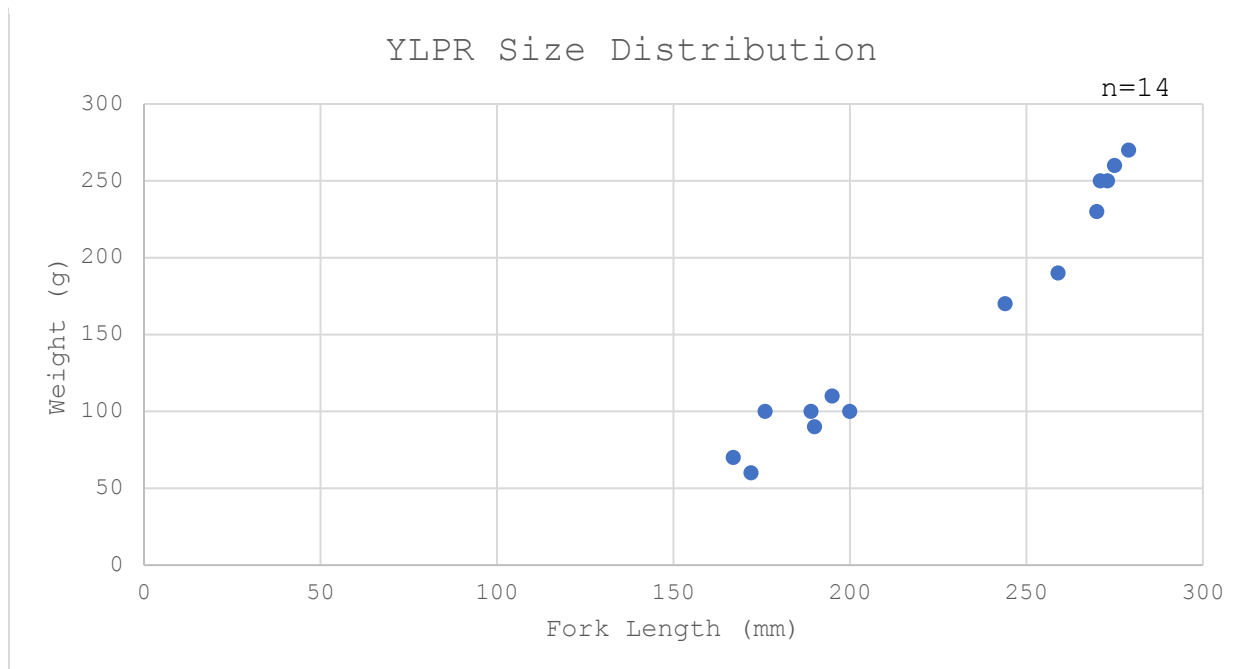


Figure 10: Yellow Perch Size Distribution

Table 2: 2022 Dissolved Oxygen Results

Dissolved Oxygen Monitoring						
Waterbody	Perch Lake					
Date (Y M D)	2022-04-28					
Time	Afternoon		Afternoon		Afternoon	
Station (#)	1		2		3	
Coordinate	368607 5723989		368664 5723899		368579 5723870	
Total Ice Thickness (cm)	70		78		72	
Opaque Ice Thickness(cm)	40		42		36	
Average Snow Depth(cm)	15		18		12	
Snow Cover (%)	100		100		100	
Maximum Water Depth (m)	24m		9		6	
Oxygen Profile						
	mg/L	°C / % sat	mg/L	°C / % sat	mg/L	°C / % sat
Surface (just under ice)	6.3	1.4	6.21	0.7	6.51	0.6
1.0 m depth	4.77	3	6.15	0.9	6.38	0.8
2.0 m depth	3.7	3.8	4.2	2.8	4.78	2.6
3.0 m depth	2	3.8	3.04	3.5	3.11	3.5
4.0 m depth	1.98	3.8	2.38	3.6	2.06	3.7
5.0 m depth	1.98	3.8	1.83	3.8	2.36	3.6
6.0 m depth	2.07	3.8	1.8	3.8	2.04	3.7
7.0 m depth	1.99	3.8	1.79	3.8		
8.0 m depth	1.98	3.8	1.86	3.8		
9.0 m depth	1.97	3.8				
10 m depth	1.97	3.8				
11 m depth	1.97	3.9				
12 m depth	1.96	4				
13 m depth	1.97	4.1				
14 m depth	1.97	4.1				

Discussion

Netting Program

The data from the netting survey provided valuable information on the fish community of Perch Lake. As stated above, an electrofishing survey was planned but was not completed. Electrofishing in late fall has been successful in capturing browns and smallmouth in nearby waterbodies in the past, and likely would have collected relevant data here. Regardless, between the netting efforts and littoral observations the data collected provides a useful snapshot of the state of the fishery. As we know, smallmouth bass are extremely resilient creatures, and it cannot be concluded the species no longer exists in the fishery. However, it is very interesting that no evidence of bass was found nor were any captured despite using the same nets used in 2013. In future, if SVSFE and/or Fisheries Branch are using the electrofishing boat in the area it would be valuable to stop in at Perch Lake for a shoreline transect to further monitor the questionable bass population.

Winterkill

Within the provincial files (both Swan River, and Dauphin) there is no data on late winter dissolved oxygen (DO) testing, only one DO profile from summer of 1978. However, winter DO testing had to have been completed at some point. In the lake summary and history sheet from September 1980, it states "winterkill not a problem". How many times it has been tested is unknown. The winter of 2021/22 created arguably as good of conditions as possible to initiate a winterkill in the Duck Mountains. An early freeze and way above average snow accumulation led to the decision it would be valuable to check the Perch Lake DOs. On April 28th, 2022 dissolved oxygen was monitored and found to be no issue (Table 2). The primary question here, is after nearly 4 decades of an established bass fishery that no bass were captured in the netting assessment. Again, this does not mean that bass are no longer present in Perch Lake, however the result is suspect. The size and depth of Perch Lake makes it one that could be susceptible to periodic winterkills. Perhaps, in the last 5 years or so late winter DO levels reached threshold levels that perch could tolerate but smallmouth bass could not. Unlikely, but worth mentioning considering the netting results from 2022.

Brown Trout

When correlating brown trout stocking records to catch data and master angler submissions a few observations can be made. First, there appears to be success from the 12-15cm plantings (2015, 2016, 2018, 2020) despite the prevalent and competitive perch population. Growth appears to be about average for brown trout stocked in the Duck Mountains. One interesting, but not surprising correlation is the increase of Master Angler submissions immediately following brood stock plantings. This is to be expected, however noteworthy. Perch Lake is a popular Duck Mountain

Lake because of its accessibility and size. The waterbody is fishable with small craft regardless of wind and weather and as a result attracts many anglers especially within the fly-fishing community. Browns are a longer-lived stocked trout species in comparison to the others, and it is questionable why there are so few Master Angler submissions considering the Catch-and-Release regulation.

Smallmouth Bass

Historically, the bass fishery of Perch Lake was a popular one. While conducting the historical analysis for this report several anglers were called for some perspective. In general, the consensus was although the smallmouth seldom reached trophy sizes, they were always abundant and fun to catch. Spring bed fishing was popular in the past, with bass spawning along the west shore primarily and sporadic activity along the north and south shores. Interestingly, despite no evidence of bass in 2022, there was also nothing resembling an active redd in the rockier areas of the lake. Again, it is very odd that bass numbers appear to be absent, but it is unlikely they have been completely eradicated from the system. This should be something to be monitored in future, as supplementing a bass population would likely be very difficult this day and age. Perhaps a remnant population will naturally re-establish in coming years.

Yellow Perch

The yellow perch fishery of Perch Lake is a popular one. Unfortunately, the fish are infested with the blackspot (neascus) parasite, and as a result one can assume nominal harvest occurs. It was estimated that from the fish sampled neascus was present in 90% of the sample. The yellow grub parasite was not noted in the waterbody. Fish infected with blackspot are still edible, however not usually harvested by the angling community. Perch fishing with kids is a popular family outing throughout the summer months. Arguably Two Mile Lake, Spray Lake, and Perch Lake are the most popular shore fishing perch lakes in the Duck Mountains.

Future Management Considerations

As explained above, the waterbody is easily accessible, protected from bad weather, and has multiple shore fishing options. From an ecological perspective, the lack of large bodied native species and good winter dissolved oxygen levels makes the waterbody an ideal stocked trout waterbody - which it has been since the 1960's. The waterbody is managed as a Catch-and-Release Lake, which generally promotes proper fish handling, trophy fish, and high-quality angling. It is arguable and likely that the size of the waterbody is the reason trophy fish are so seldom registered. Regardless, it is believed there is some room for improvement here.

When correlating master angler submissions, general angling reports, and personal experience to the stocking records, there is a very clear correlation between the popularity of the fishery and brood stock brown

plantings. For this reason, it is recommended to continue when brood browns are available.

Based on available information, there are some considerations when considering experimenting with alternative trout species. Rainbows, for example did not do well as a stocked fish dating back to Makowski's research. Matkowski hypothesised that stocking was so unsuccessful due to rainbow behavior and their susceptibility to predatory birds. Without a doubt, this would have influenced stocking success, however it is important to note that competition between resident perch is also a significant factor. Rainbows and perch share very similar dietary regimes, and in a waterbody the size of Perch Lake one can assume these two species would be competing for limited resources.

Brook trout, on the other hand have a generally short life expectancy. For this reason, it is likely that brook trout would either stunt or expire of old age before reaching trophy status in Perch Lake. Makowski's research included fish removals prior to the "Perch Lake Experiment". Matkowski netted out the fishery in the spring of 1982 as an effort to eradicate the resident brook trout population. Over those netting efforts she removed a total of 57 brook trout (316-388mm) from the waterbody. Those fish were stocked in 1978 at age 1+ suggesting the fish would be 5+ and nearing the end of their lives and measuring 12.5"-15" in 1982.

Splake on the other hand stock well on top of prevalent perch populations, are long lived, are much easier to catch than brown trout, and did exceptionally well in comparison to the other species in Makowski's experiment. At current, there is no C&R splake waterbodies in the province. Arguably, tiger trout would do well in Perch Lake as well for similar reasons. For these reasons an experimental stocking of splake and/or tiger trout in Perch Lake may be worthwhile. At this point a new management plan focused on splake and tiger trout is not the recommendation. From an experimental perspective it would be interesting to monitor the success of 500 18+ splake and 500 18+ tiger trout planted in the spring of 2023. Fisheries can continue to monitor the success of splake and tiger plantings and alter the management plan based on those findings.

Appendices



Appendix 1: Perch Lake Brown Trout 1



Appendix 2: Perch Lake Brown Trout 2



Appendix 3: Perch Lake Yellow Perch 1



Appendix 4: Perch Lake Yellow Perch 2



Appendix 5: Perch Lake Yellow Perch 3

References

- Cross, R.G. 1990 Angler Success Perch Lake - some salient data for Perch Lake. Manitoba inter-departmental memo. December 18 1990. Acquired from Perch Lake File - Dauphin, Manitoba
- Edwards, G.A. 1978 Perch Lake file - Investigation of some Duck Mountain Lakes. Manitoba inter-departmental memo. June 22, 1978. Acquired from Childs Lake File - Swan River, Manitoba
- Hicks, F. 1999. Manual of instructions - Spring littoral index netting (SLIN). Ontario Ministry of Natural Resources, Algonquin Fisheries Assessment Unit. Whitney, Ontario
- Kansas, K. 2009 Non-lethal sampling protocol. Fisheries Branch, Eastern Region. Acquired from Government Office, Lac Du Bonnet, Manitoba.
- Kerr S.J. and T.A. Lasenby. 2000. Rainbow Trout Stocking In Inland Lakes and Streams. An Annotated Bibliography and Literature Review. Fisheries Section Fish and Wildlife Branch. Ontario Ministry of Natural Resources. Pg 7
- Kerr S.J. 2000. Brook trout stocking: An annotated Bibliography and Literature Review with an emphasis on Ontario waters. Fish and Wildlife Branch. Ontario Ministry of Natural Resources.
- Kerr S.J. 2000. F1 Splake: An annotated Bibliography and Literature Review. Fish and Wildlife Branch. Ontario Ministry of Natural Resources.
- Lasenby, T. A. and S. J. Kerr. 2001. Brown trout stocking: An annotated bibliography and literature review. Fish and Wildlife Branch, Ontario Ministry of Natural Resources. Peterborough, Ontario. 187 p. + appendices.
- Manitoba Fisheries Branch. 1980 Perch Lake - some salient data and history for Perch Lake. September 8th, 1980. Acquired from Perch Lake File - Swan River, Manitoba
- Matkowski, S. 1982. Angler harvest and other cause of mortality of stocked salmonids in lake in the Duck Mountain Provincial Park, Manitoba. A thesis presented to the University of Manitoba. Winnipeg, Manitoba.
- WRSD, 2022. Western region stocking database. Manitoba Sustainable Development - Fisheries Branch
- Yake, B. 1999 Perch Lake - Smallmouth Bass Transfer to Williams Lake. August 11, 1990. Acquired from Perch Lake File - Swan River, Manitoba