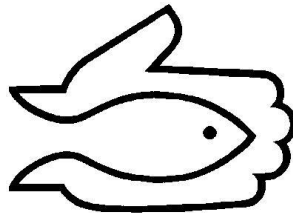


# 2017 Two Mile Lake Stillwater Stocked Trout Littoral Sampling (SSTLS)

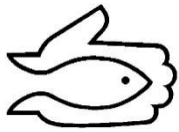


Swan Valley Sport Fishing Enhancement Inc.



Written by: Brock Koutecky  
Reviewed by: Holly Urban & Megan Paterson  
November 2017

Submitted to:  
Manitoba Sustainable Development  
SVSFE Board of Directors



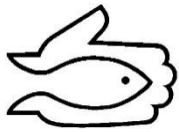
# Executive Summary

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A fish inventory and trout stocking success assessment was completed on Two Mile Lake in 2017. The fish inventory utilized the Stillwater Stocked Trout Littoral Sampling (SSTLS) which was created by SVSFE in early 2017 as a non-lethal assessment protocol to monitor stocked trout fisheries in the Parkland region. Trout stocking success was determined through age, growth, and abundance data acquired through SSTLS. A summary and recommendations are as follows;

Rainbow trout stocking success was found at variable rates. It was determined success is largely influenced by the current ecological complexities of the lake. This includes loss of stock from predation of birds, fish, and other mammals along with intraspecific and interspecific competition with perch, suckers, and stocked trout. Based on trout abundance, correlation with stocking records, and literature review we recommend the following stocking plan. Rainbow trout should be stocked twice annually; once in the spring and once in the fall. Spring stocking of yearling trout (18+) should be stocked with 7,500 fish annually (Minimum 5,000 and Maximum 10,000). This equates to 160 fish/hectare or 65 fish/acre. Fall stocking of fingerling rainbow trout should be stocked with 12,500 fish each fall (minimum 10,000 and maximum 15,000). This equates to 265 fish/hectare or 100 fish/acre. Under no circumstances should smaller fingerlings (<4") be stocked into Two Mile Lake. Also, in terms of stocking method it is highly recommended that scatter stocking in both spring and fall over deep water be priority. These high rates are designed to incorporate loss of stock of yearling trout to bird predation over the summer months, and also loss of stock of fingerling trout to starvation over the winter months. Of course, there is no guarantee that stocking at these suggested rates are going to "turn the lake around", however based on the available information it is believed that this program will result in increased rainbow trout angling success.

Brook trout were found in low numbers which were a direct result of low stocking densities in recent years. At this time, it is recommended that brook trout stocking be ceased to avoid further complicating the system with multiple species of trout and increased competition. Brook trout were found in attractive sizes and healthy condition. Perhaps, managing Two Mile Lake for brook trout as opposed to rainbows would result in increased stocking success and therefore angling quality. Unfortunately, at this time there is not enough evidence to support this notion. If managers choose to accommodate a brook trout fishery in Two Mile Lake's management plan, it is recommended the species be stocked at 50%-75% the rate of rainbow trout (above), and rainbow trout stocking be ceased.



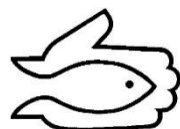
# Executive Summary

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Splake were also found in low numbers which is a direct result of low stocking rates in recent years (most recently stocked in fall 2010). Splake were found at large sizes and impressive condition. Splake were first stocked in 2006 as an effort to reduce perch populations, and therefore increase stocking success of rainbow trout. From this initiative, splake stocking was successful and resulted in increased angling quality and harvest of splake, particularly through the ice. Stocking success was verified from SVSFE 2010-2011 BTIN results along with qualitative information from the angling community. Splake rearing at the hatchery was discontinued in 2010, and the lake has not been stocked with them since. Because this species was successful in the lake, SVSFE has encouraged the re-stocking of the species in recent years, however stock has not been available. Each year since 2010, a request has been submitted to the Whiteshell Fish Hatchery for splake destined for the Duck Mountains, but it is unknown how long it will be before they are available. Future stocking rates are as follows and have been adapted from "Splake - an Annotated Bibliography (Kerr, 2000), in conjunction with Two Mile Lake stocking rates (2006, 2008, 2010). First of all, once splake stocking occurs it is recommended rainbow trout stocking decrease to 5,000 yearlings each spring and 10,000 fingerlings each fall. Both Fraser (1988), and Liskauskas & Quinn (1991) recommend that splake should not be stocked annually, and that stocking should occur every 2 years at relatively low rates. Stocking frequency should occur once every two years, at a rate of 100 fish/hectare or 40 fish/acre. This equates to 4,500 fish biennially (minimum 3000 and maximum 6000), spring or fall, whichever is available. This stocking rate simply mirrors what has worked in the past, and is the best recommendation based on available information.

**Brown Trout:** In late 2016, it was recommended that brown trout be stocked with hopes that the species would compete better with resident perch populations. This recommendation was based simply on the fact that brown trout have shown success being stocked on top of perch populations in the Province of Saskatchewan. On the other hand, there have been instances where brown trout have been stocked for similar reasons in Alberta which have been deemed unsuccessful. For the primary reason of splake being available in the near future\*, it is recommended that brown trout stocking idea be halted at this time.

A small white sucker population (n=2) was found during 2017 assessments. Both individuals were removed from the waterbody. This was the first instance of white sucker in the lake since the most recent reclamation in 1987. At this point in time we can assume the population will grow over time due to suckers aggressive and opportunistic nature. This occurrence should not be overlooked. It is believed that the suckers entered the lake from the Ketchum Creek system. Since pike are believed to have entered the lake via this same system in the late 1980's, it should be of top priority that the integrity of the water control structure from Ketchum Lake to Two Mile Lake be investigated and improved if necessary. Follow up assessments (SSTLS) should be conducted in 4-6 years.



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# 1.0 Historical Data

Below is a summarized timeline of Two Mile Lake's stocking, assessments, and management objectives since 1961. An in depth summary of the lake's history can be found in PRJ. 15-036 - IFAMM: Two Mile Lake Historical Literature Review, 2016 Assessments and Management Options.

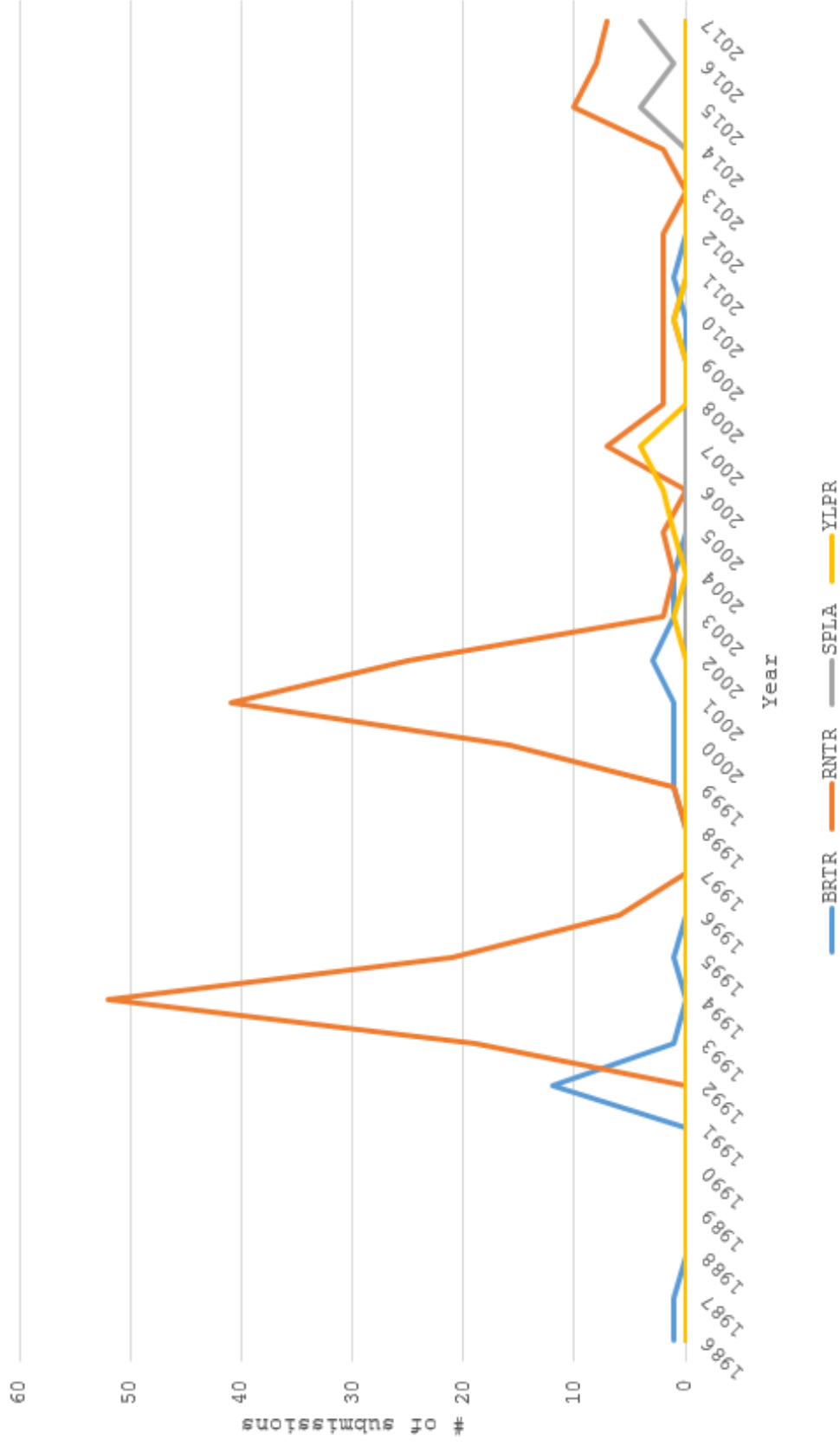
## Summarization of Historical Information:

Year	Researcher	Activity	Results
1961	MB Fisheries	Reclamation	Poisoned using 18.1 gallons of toxaphene. Species present in lake prior to the poisoning unknown
1962	MB Fisheries	Initial Stocking	Brook trout - 70,000 fingerlings
1963	MB Fisheries	Stocking	Brook trout - 3,000 (1+), and 20,000 (0+)
1963	MB Fisheries	Test Netting	2 sets of 75 yard nets of 1.5" mesh size. South end set yielded 40 brook trout, north end set yielded 11 brook trout
1964	MB Fisheries	Stocking	Brook trout - 2,000 (1+), and 15,000 (fingerlings)
1964	R. Andrews	Test Netting	Brook trout (n=399). Growth rates significant. Trout stomach contents found primarily invertebrates
1965	Conservation Officers	Creel Survey	Creel success of 0.36 fish/angling hours. Lake popularity growing
1965	MB Fisheries	Stocking	Forage stocking - fathead minnow, stickleback, dace - 30,000
1965-67	MB Fisheries	Stocking	Brook trout - 6,000 (1+)
1967	Andrews, Dennehy	Comprehensive Study	Summary "the lake attracts anglers and provides high quality angling to justify stocking program"
1968	MB Fisheries	Stocking	Brook trout - 2,000 (1+)
1968	MB Fisheries	Test Netting	4 - 25 yard sets (3 hours) - 3 Brook trout
1969-70	MB Fisheries	Stocking	Brook trout - 8,000 (1+)
1970	MB Fisheries	Test Netting	50 yards each - 1.5", 2", 3", 3.75" - 12 Brook trout
1971-78	MB Fisheries	Stocking	Brook trout - 41,700 (1+)
1978	Brunen, Bilenduke	Test Netting	7 standard gangs - 320 brook trout (5 large), 8 white suckers
1979-83	MB Fisheries	Stocking	Brook trout - 15,492 (2+), 14,270 (1+), cutthroat trout - 11,000 (1+), rainbow trout - 2,762 (0+)
Unknown	Whyte, Duane	Verbal Reports	Late 70's-80's "extremely popular winter fishery, lake littered in ice shacks"
1983	Valiant, Smith	Creel Census	Two Mile stocking should consist of 0+ splake or brook trout in combination with small numbers of 2+ rainbows
1983	MB Fisheries	Report	"Pike present in Two-Mile, came up Shell River System"
1985	MB Fisheries	Test Netting	"Pike, perch, suckers, walleye (from Black Beaver Lake), and brook trout - trout stocking to be discontinued
1985-87	MB Fisheries	Construction	Control structures built on two connected tributaries - Ketchum Lake outflow and from Black Beaver Lake inflow
1987	MB Fisheries	Reclamation	Two mile reclaimed using rotenone (unknown volume)
1988-93	MB Fisheries	Initial Stocking	Brook trout - 49,100 (1+), 10,000 (fingerlings)
1991	SVSFE	Initial Stocking	Rainbow Trout - 5,500 (12-15cm)
1993	MB Fly Fishers Assoc.	Regulation Proposal	Due to heavy harvest and populatity during winter - MFFA proposed winter closure. Proposal declined
1994-98	MB Fisheries	Stocking	Brook trout - 85,640 (18+cm), 111,400 (12-15cm), 25,000 (eggs)
1998	Yake	Test Netting	2 overnight gangs - 20 smaller brook trout (~150-200mm). Suggested stocking rainbow trout
1998	MB Fisheries	Stocking	Rainbow Trout - 15,840 (fingerlings)
1999-02	MB Fisheries	Stocking	Brook trout - 2,000 (18+cm), 54,000 (12-15cm), Rainbow Trout 500 (18+cm), 12,000 (fingerlings), 10,000 (12-15cm)
2002	MB Fisheries	Report	Yellow perch confirmed in Two Mile Lake - source unknown
2003-4	MB Fisheries	Stocking	Brook trout - 1,000 (18+cm), 2,700 (fingerling), Rainbow Trout 12,000 (fingerlings), 10,000 (12-15cm)
2004	Keewatin College	Stomach Study	Using 3" and 3.75" gills (n=15 RNTR, 14 YLPR). Result - YPLR actively feeding on 12-15cm RNTR, RNTR feeding on invertebrates
2005	MB Fisheries	Stocking	Rainbow Trout 10,000 (12-15cm)
2006	Kitch	History and Analysis	"Perch population has exploded and trout fishey has collapsed" - Recommended stocking splake to control perch populations
2006-9	MB Fisheries	Initial Stocking	Splake - 8,175 (12-15cm), rainbow trout - 28,770 (18+cm), 10,000 (12-15cm), 25 (adults)
2010	SVSFE	BTIN	32 sets at 30 minutes each yielded 124 RNTR, 128 SPLA, 4 BRTR, and 31 YLPR
2010	MB Fisheries	Stocking	Splake - 6,000 (18+cm), rainbow trout - 5,000 (18+cm), 5,000 (fingerling)
2011	SVSFE	BTIN	22 sets at an average of 13 minutes each yielded 16 RNTR, 274 SPLA, 1 BRTR, and 75 YLPR
2010	SVSFE	Winter Test Netting	16 sets at an average of 1 hour each yielded 17 RNTR, 85 SPLA, and 41 YLPR
2011-17	MB Fisheries	Stocking	Rainbow Trout - 20,600 (18+cm), 47,000 (12-15cm), Brook Trout 4,000 (12-15cm), Albino 1,000 (18+cm)
2015	MB Fisheries	Regulations	New regulation in Duck Mountain Stocked Trout Waters - All trout smaller than 35cm must be released except those caught in streams
2015-17	SVSFE	Angler Surveys	Rated angling quality at an average 2.14/10 (7 participants)
2016	SVSFE	Perch Removal	June - Electrofishing (2.32hrs) Removed 2,550 YLPR. August - Trap Netting (137.5 hours) Removed 1,055 YLPR
2017	SVSFE	SSTLS	WITHIN THIS DOCUMENT

**Citations:** Andrews 1964, Andrews & Dennehy 1969, Brunen & Bilenduke 1978, Kitch 2006, UCN 2004, Whyte 2016, Yake 1998, WRSD 2017, Unknown 1980, Urban 2011, Paterson 2016, Koutecky 2017

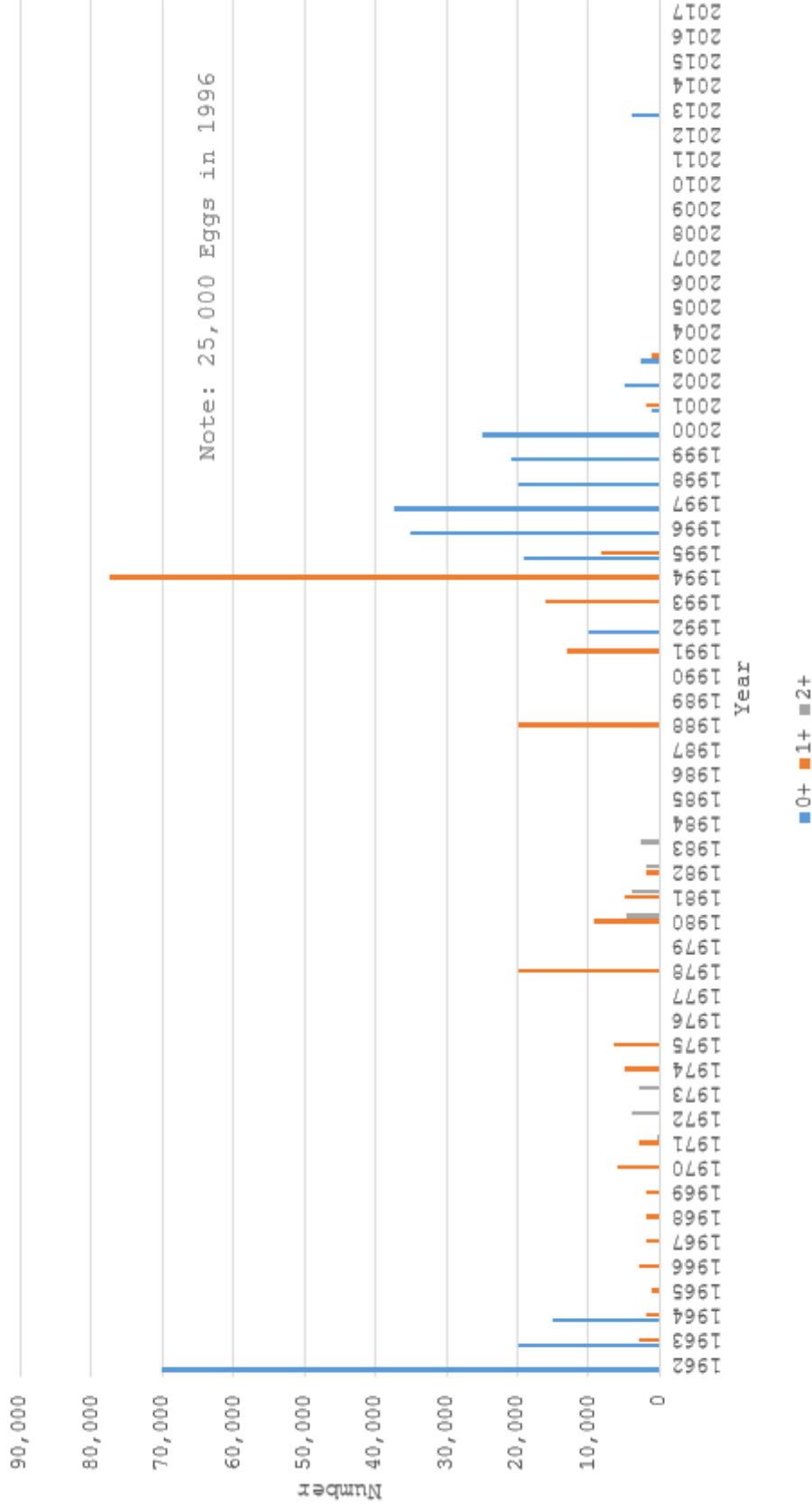
# 1.0 Historical Data

Figure 1: Two Mile Lake Master Angler Submissions 1986-2017



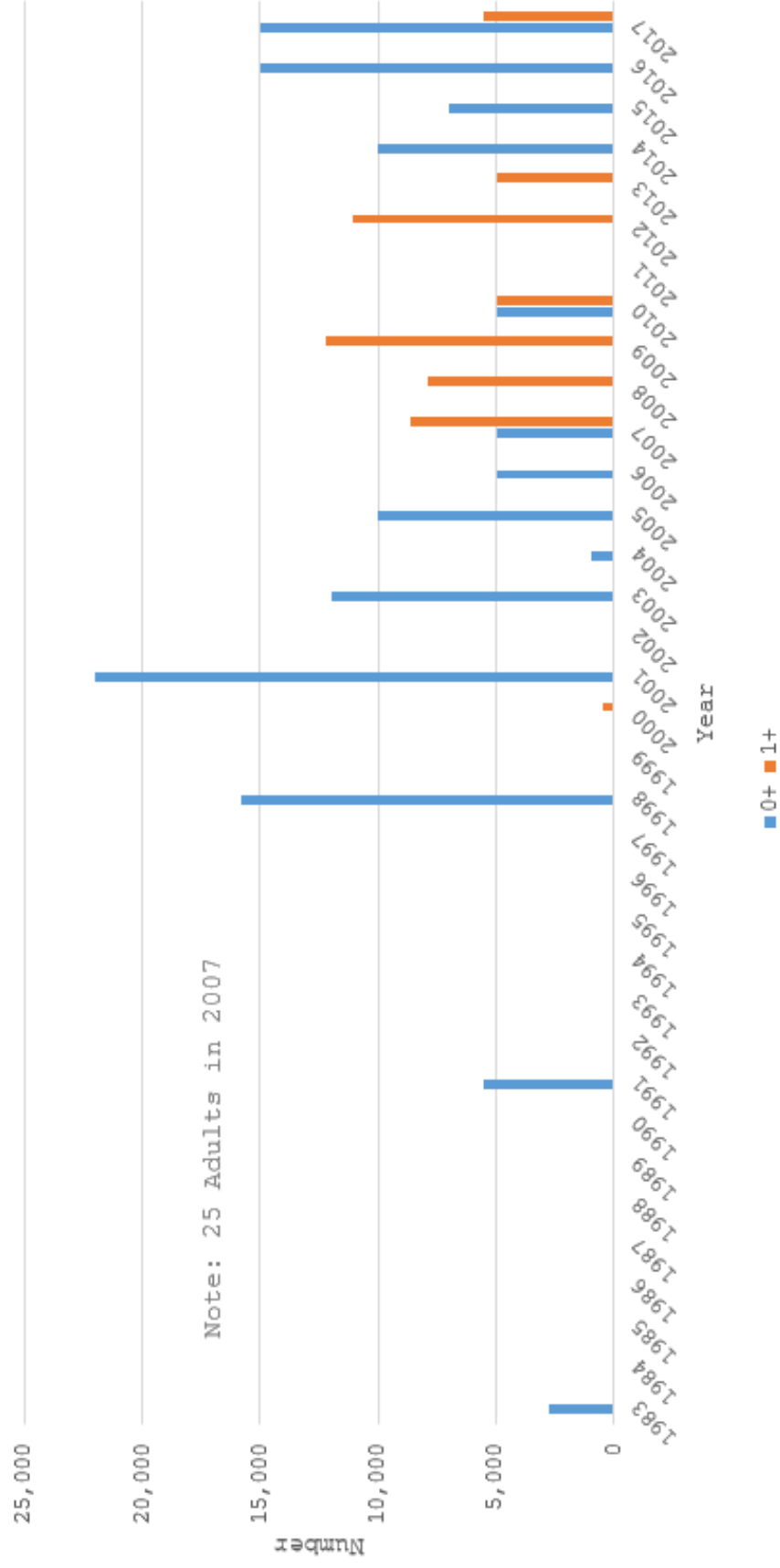
# 1.0 Historical Data

Figure 2: Brook Trout Stocking Records 1962-2017



# 1.0 Historical Data

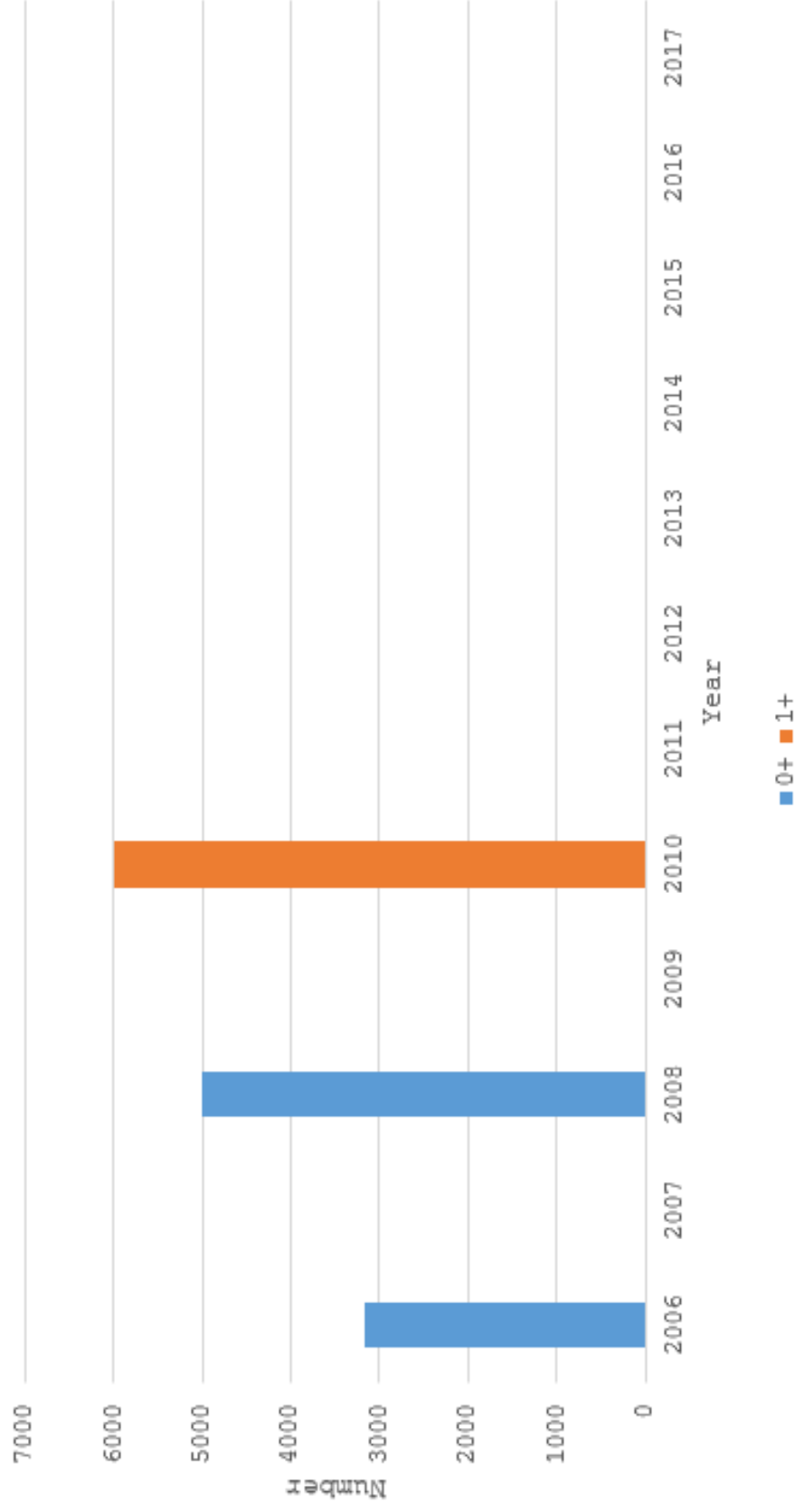
Figure 3: Rainbow Trout Stocking Records 1983-2017





# 1.0 Historical Data

Figure 4: Splake Stocking Records 2006–2017



# 1.0 Historical Data

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## Summarization of Historical Information:

(1) Two Mile Lake has been managed as a put-and-take trout fishery since 1962. Primarily, the species managed for was brook trout until 1998 when rainbow trout became the primary species stocked. Two Mile Lake has been chemically reclaimed twice (1961, 1987). In both cases, reclamation was deemed successful in removing unwanted species and therefore increasing trout stocking success.

(2) Brook Trout stocking was considered successful with the exception of the mid 1980's (walleye, pike, perch, and sucker encroachment). In 2000, the primary salmonid stocking switched to rainbow trout. Although very few brook trout masters were submitted in this time (1962-2000), there is ample evidence the lake provided a very popular put-and-take brook trout fishery.

(3) Rainbow trout stocking was also considered very successful. Specifically, two stockings occurred in 1993 and again in 1998. From these two stockings there is significant evidence of stocking success (176 master submissions) which equates to 77% of total submissions today (2017). Since 2002, trout stocking rates remained consistent, however angling quality declined. This closely correlated with the presence of yellow perch. This was verified from the Keewatin Community College stomach content study, master angler submissions, and general fishing reports.

(4) As an effort to battle yellow perch invasions, splake, the aggressive hybrid of brook trout and lake trout were stocked in 2006. Splake were stocked three times; 2006, 2008, and 2010. Today (2017), there is still evidence of a remnant splake population. Splake were initially stocked in 2006 with the intention of reducing the perch population, and in turn increasing stocking success of rainbow trout. Fisheries Branch and SVSFE encouraged anglers to release splake for management purposes (perch reduction). This didn't happen, either out of species misidentification, angler non-compliance, or lack of education directed to the angling community. Unexpectedly, the lake became a popular splake angling destination, especially in winter. In summary, the stocking was justifiable; not for the reasons intended, but because the species adapted and grew so well that it produced a popular angling opportunity. Splake stocking ceased in 2010.

# 1.0 Historical Data

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## Summarization of Historical Information Continued

(5) SVSFE stocked trout assessments (2010 and 2011 BTIN) found that stocking yearling (1+) rainbow trout was showing variable success. Assessments found much higher stocking success of fingerling (0+) and yearling (1+) splake when comparing to rainbow trout stocking rates. Also, yellow perch were not appearing in the large sizes found in previous years suggesting overpopulation and stunting in the system. Finally, as a result of high trout mortality rates, BTIN was suggested to not continue as assessment method in the future.

(6) In 2016 the idea of perch removal or "trout maintenance" became a topic of discussion. In spring 2.32 hrs of electrofishing, and in fall 137.5 hrs trap netting successfully captured and removed 2550, and 1055 yellow perch respectively. Following removals, SVSFE concluded that manual removals of perch is time consuming and expensive, therefore removal efforts should be discontinued for the time being and alternative efforts should be considered in order to improve trout stocking success.

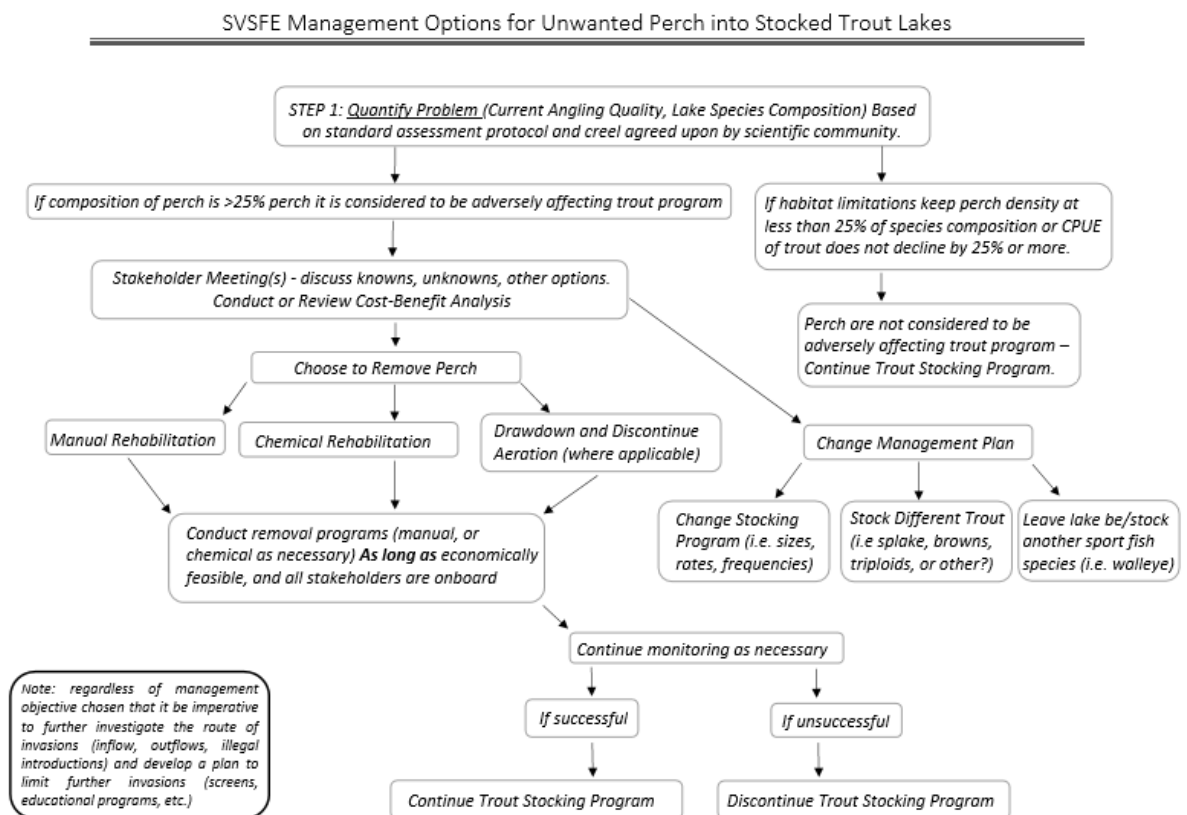
7) Following 2016 removal efforts, SVSFE technical staff began researching different approaches for battling this ongoing perch problem. During the search, a document entitled "Fisheries Management Branch Response to Unwanted Perch Populations in Stocked-Trout Lakes in Alberta" (FMB, 2008) was located. From this document, technical staff then utilized this thought process to develop a flow chart which lays out the different management options (page 12). First of all, and perhaps the most effective option is chemical reclamation. Unfortunately, this is not an option. Chemical reclamation is not only very expensive but also Park's Branch will not allow it. As we know, ceasing aeration is also not an option as the lake is not aerated. The manual removal option is plausible, however efforts are extremely unlikely to remove all individuals, and are only temporary because the juveniles that remain will display compensatory increases in recruitment, survival and growth. Therefore, mechanical removal programs should be comprehensive and long-term (Jolley et al, 2008). Before committing to an expensive and long-term removal program, SVSFE then decided to further investigate different stocking and regulation options.

8) Changing regulations to a "trophy trout" style was discussed. This option would protect large trout and a tackle restrictions would be imposed. One could argue that having a protected population of large trout in the system could assist in controlling the perch population through preying on juvenile perch. Exploring this option would require further public consultation. This option was tabled and did not enter the public consultation phase, as SVSFE and regional fisheries staff didn't necessarily like the option; (1) the regulation change would not guarantee to increase stocking success and lake popularity, and (2) Two Mile Lake has been a "put-and-take" since the 1960's, and the change would likely receive negative feedback from the public.

# 1.0 Historical Data

## Summarization of Historical Information Continued:

9) Increasing stocking success can be achieved through a list of controllable factors including; species, strain, size of stocking, frequency of stocking, rate of stocking, time of stocking, and also method of stocking. Further investigation of these options then became priority. Following the 2016 literature review, the plan became to discuss stocking different species the lake. The first option, was to look into potential sources for splake stock. Splake have been proven to be successful in Two Mile Lake, even through stocking at low stocking densities and at small sizes (12-15cm). Saskatchewan has seen success in stocking brown trout, tiger trout, or splake on top of perch populations (Prestie, 2016). SVSFE angler surveys show year after year that rainbow trout are the most sought after species in the Duck Mountains and surrounding area (Paterson, 2017). Developing an effective rainbow stocking strategy for Two Mile Lake and potential other options became the objective of this assessment.



Literature Cited: Fisheries Management Branch Response to Unwanted Occurrences of Perch in Stocked-Trout Lakes in Alberta, 2008

## 2.0 Study Rationale

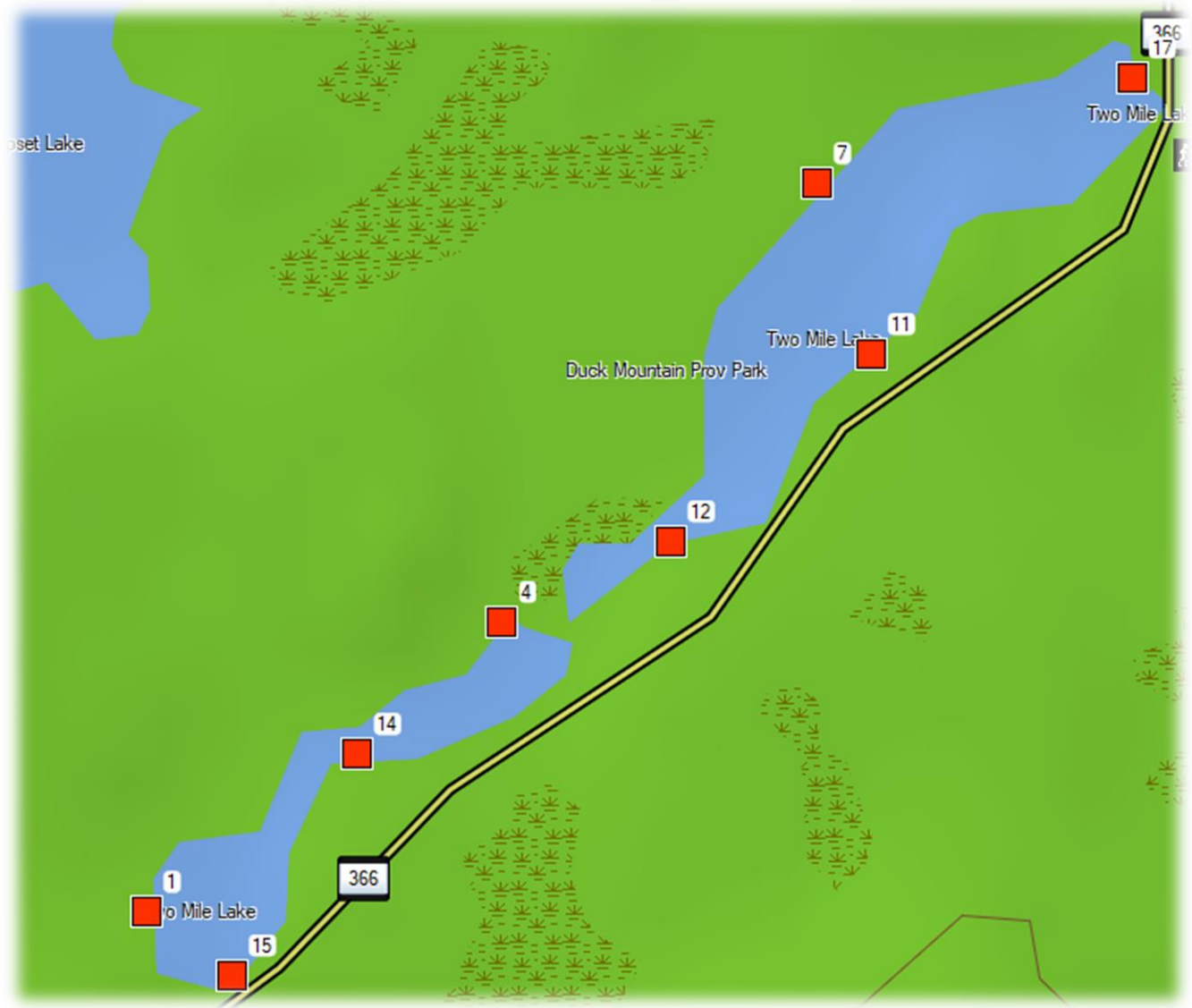
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In March of 2017, SVSFE representatives (Holly Urban, Brock Koutecky, and Megan Paterson), FLIPPR representatives (Ken Kansas and Ray Frey), and Regional Fisheries Staff (Ian Kitch, Bruno Bruderlin, and Jonathan Stephens) met in Russell, Manitoba to discuss the current status and future management of a handful of Parkland trout fisheries experiencing detrimental non-salmonid encroachments. Following the meeting, the attendees decided that a standard non-lethal trout assessment program be created. This replicable program would utilize both trap netting and/or electrofishing to assess stocked trout lakes in the Parkland area. Following the meeting, Brock Koutecky drafted the assessment program which would later be entitled "Stillwater Stocked Trout Littoral Sampling (SSTLS)". This program, where efforts were based primarily on shoreline distance and lake surface size, would be utilized during the 2017 to assess a handful of stocked trout waterbodies. The methodology of SSTLS can be viewed in the protocol document; Swan Valley Sport Fishing Enhancement: Stillwater Stocked Trout Littoral Sampling - Version 2.0 (Draft), or a short summary of the protocol on page 16 of this report. The program was designed to monitor trout stocking success by estimating relative abundance of a specific fish community, as well as provide other biological measures to help managers quantify trout stocking success and monitor trend analysis over time. In 2017, the specific objectives for Two Mile Lake were as follows;

- (1) Establish a current database/fish inventory of Two Mile Lake by creating and utilizing a replicable protocol which can be used for assessment measures in future years (SSTLS)
- (2) Determine fish community compositions, CPUE, age and growth, and other biological measures to help managers quantify trout stocking success
- (3) Summarize methodology and seasonal variation of catch data for future research or manual removal programs
- (4) Remove all non-salmonid catch from the lake while conducting assessments
- (5) Develop recommendations that will assist in future management, use, and development of Two Mile Lake.

## 3.0 Effort Map

Figure 6: Trap Netting Sites and Summary



Site #	UTM	Trap Type	Spring Pull Date	Water Temp (°C)	Effort (hrs)	Fall Pull Date	Water Temp (°C)	Effort (hrs)
15	14U 367251 5736946	Black	30-May-17	12.2	22.42	26-Sep-17	10.5	23.92
11	14U 368407 5737977	Green	30-May-17	12.2	23.48	26-Sep-17	11.7	23.95
17	14U 368982 5738512	Black	31-May-17	12.3	22.45	27-Sep-17	11.4	23.75
4	14U 367777 5737578	Green	31-May-17	13	23.07	27-Sep-17	11.04	24.3
1	14U 367139 5736977	Green	1-Jun-17	14.8	24.63	28-Sep-17	10.78	22
7	14U 368379 5738352	Black	1-Jun-17	13.8	24.37	28-Sep-17	11.38	22
12	14U 368074 5737691	Green	2-Jun-17	13.3	23.77	29-Sep-17	10	22.12
14	14U 367518 5737332	Black	2-Jun-17	12.6	23.75	29-Sep-17	10	22.35

## 3.0 Effort Map

Figure 7: Electrofishing Transects and Summary



Site #	Date (Day)	Water Temp (°C)	Effort (Seconds)	Date (Night)	Water Temp (°C)	Effort (Seconds)
1	26-Sep-17	10.01	400	5-Oct-17	9.8	401
2	26-Sep-17	10.01	400	5-Oct-17	9.8	400
3	26-Sep-17	10.01	400	5-Oct-17	9.8	407
4	26-Sep-17	10.01	400	5-Oct-17	9.8	407
5	26-Sep-17	10.01	400	5-Oct-17	9.8	412
6	26-Sep-17	10.01	400	5-Oct-17	9.8	403
7	26-Sep-17	10.01	400	5-Oct-17	9.8	408
8	26-Sep-17	10.01	400	5-Oct-17	9.8	401





## 4.0 Methodology

Stillwater Stocked Trout Littoral Sampling (SSTLS) was designed to efficiently assess a stocked trout water body in a workweek with a minimum of 3 technicians (maximum 5-6 including volunteers). The size of the waterbody (ha) and shoreline perimeter distance (m) are the two primary factors in determining effort requirements. The program was proposed to facilitate a sampling period when all targetable species are utilizing littoral habitats at some stage over the sampling variation.

Season	Target (°C)	Acceptable (°C)
Spring	4°-10°	4°-20°
Fall	16°-10°	20°-4°

For medium sized stocked trout water bodies (16ha-200ha), electrofishing and trap-netting requirements are based on lake shoreline distance (including island shoreline). The minimum requirements for each water body will receive a trap-net and one - 400 second, or 100m electrofishing transect for each 1000m of available shoreline. The target requirement for each trap net and 400 second, (or 100m) transect will require one of each for every 500m of available shoreline. The program guidelines were compiled and referred to a variety of electrofishing and trap netting protocols used throughout Canada and the United States. Two Mile Lake effort requirements below:

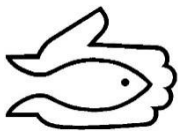
Lake Name	Lake Size	Shoreline (m)	Island Shoreline	Total Shoreline	Minimum # of Transects &	Target # of Transect and	# of Transects and Traps
Two Mile Lake	43.62ha	5,885m	0m	5,885m	6	12	8

**Trap Netting:** Netting efforts were initially conducted in the spring, and then replicated in the fall. A total of 8 nets sets were completed each season. With four nets using standard Lake Superior ESTN nets, and four sets using small-mesh custom Lake Superior type trap nets to facilitate the catch of small bodied fish. Net set specifics have been adapted from NSCIN, and also ESTN (Ontario). Type of net for each site was selected based on gap depth also was pre-determined prior to field activities. An overview of netting efforts can be viewed on page 14.

**Electrofishing:** The initial intention was to conduct electrofishing surveys in both spring and fall, however, due to unforeseen issues with the electro-fisher only fall sampling was conducted. A total of 8 non-random transects at 400 seconds were completed during daylight hours, the same transects were then replicated after sundown a week later. An overview of the electrofishing efforts can be viewed on page 15.

For more information on requirements, guidelines, and specifics; please refer to Swan Valley Sport Fishing Enhancement: Stillwater Stocked Trout Littoral Sampling - Version 2.0 (pages 2-11)

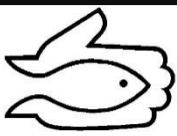




# 5.0 Results

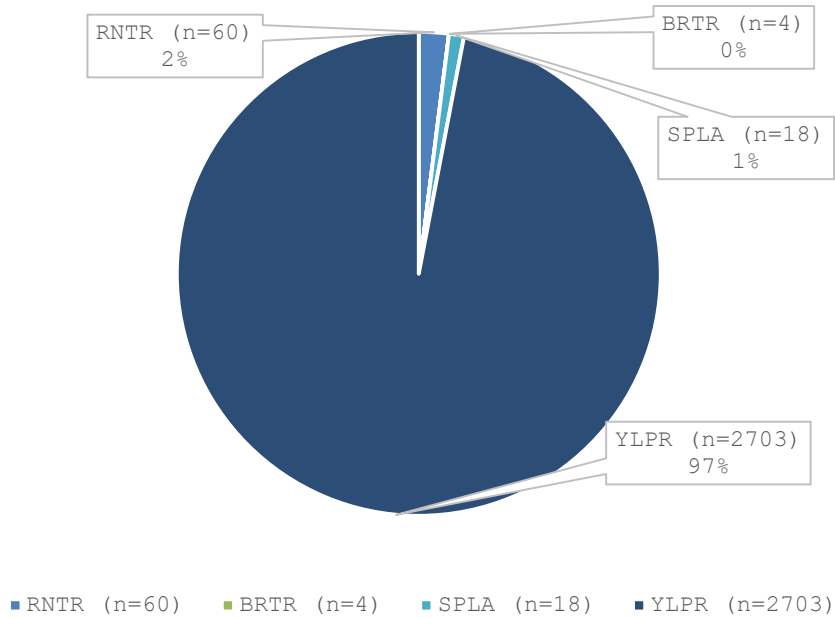
Table 1: Catch Summary

METHOD	EFFORT	SITE/METHOD/CODE	SITE #	RNTR	CPUE RNTR	BRTR	CPUE BRTR	SPLA	CPUE SPLA	YLPR	CPUE YLPR	TOTAL FISH
TN-SPRING	22.42	TM-TM-17-001	15	17	0.758	0	0.000	2	0.089	4	0.178	23
TN-SPRING	23.48	TM-TM-17-002	11	2	0.085	1	0.043	1	0.043	150	6.388	154
TN-SPRING	22.45	TM-TM-17-003	17	2	0.089	1	0.045	11	0.490	45	2.004	59
TN-SPRING	23.07	TM-TM-17-004	4	10	0.434	0	0.000	0	0.000	652	28.266	662
TN-SPRING	24.37	TM-TM-17-005	7	16	0.657	2	0.082	4	0.164	4	0.164	26
TN-SPRING	24.63	TM-TM-17-006	1	4	0.162	0	0.000	0	0.000	1200	48.714	1204
TN-SPRING	23.75	TM-TM-17-007	14	9	0.379	0	0.000	0	0.000	35	1.474	44
TN-SPRING	23.77	TM-TM-17-008	12	0	0.000	0	0.000	0	0.000	613	25.792	613
TN-FALL	23.92	TM-TM-17-009	15	1	0.042	1	0.042	0	0.000	16	0.669	18
TN-FALL	23.95	TM-TM-17-010	11	4	0.167	1	0.042	1	0.042	26	1.086	32
TN-FALL	23.75	TM-TM-17-011	17	6	0.253	2	0.084	3	0.126	1	0.042	12
TN-FALL	24.30	TM-TM-17-012	4	5	0.206	4	0.165	0	0.000	70	2.881	79
TN-FALL	22.00	TM-TM-17-013	1	5	0.227	0	0.000	0	0.000	105	4.773	110
TN-FALL	22.00	TM-TM-17-014	7	4	0.182	3	0.136	8	0.364	2	0.091	17
TN-FALL	22.12	TM-TM-17-015	12	1	0.045	5	0.226	1	0.045	198	8.953	205
TN-FALL	22.35	TM-TM-17-016	14	1	0.045	2	0.089	3	0.134	9	0.403	15
D-EFISHING	0.11	TM-TM-17-017	1	7	63.000	0	0.000	0	0.000	20	180.000	27
D-EFISHING	0.11	TM-TM-17-018	2	10	90.000	0	0.000	0	0.000	0	0.000	10
D-EFISHING	0.11	TM-TM-17-019	3	1	9.000	0	0.000	0	0.000	3	27.000	4
D-EFISHING	0.11	TM-TM-17-020	4	0	0.000	0	0.000	0	0.000	13	117.000	13
D-EFISHING	0.11	TM-TM-17-021	5	2	18.000	0	0.000	0	0.000	13	117.000	15
D-EFISHING	0.11	TM-TM-17-022	6	0	0.000	0	0.000	0	0.000	16	144.000	16
D-EFISHING	0.11	TM-TM-17-023	7	5	45.000	0	0.000	0	0.000	9	81.000	14
D-EFISHING	0.11	TM-TM-17-024	8	2	18.000	0	0.000	0	0.000	16	144.000	18
N-EFISHING	0.11	TM-TM-17-025	1	16	143.641	0	0.000	0	0.000	6	53.865	22
N-EFISHING	0.11	TM-TM-17-026	2	1	9.000	0	0.000	0	0.000	11	99.000	12
N-EFISHING	0.11	TM-TM-17-027	3	15	132.678	0	0.000	0	0.000	28	247.666	43
N-EFISHING	0.11	TM-TM-17-028	4	11	97.297	0	0.000	0	0.000	62	548.403	73
N-EFISHING	0.11	TM-TM-17-029	5	25	218.447	0	0.000	0	0.000	53	463.107	78
N-EFISHING	0.11	TM-TM-17-030	6	15	133.995	0	0.000	0	0.000	54	482.382	69
N-EFISHING	0.11	TM-TM-17-031	7	12	105.882	0	0.000	0	0.000	15	132.353	27
N-EFISHING	0.11	TM-TM-17-032	8	9	80.798	0	0.000	0	0.000	24	215.461	33
Totals:	374.11			218		22		34		3473		3747

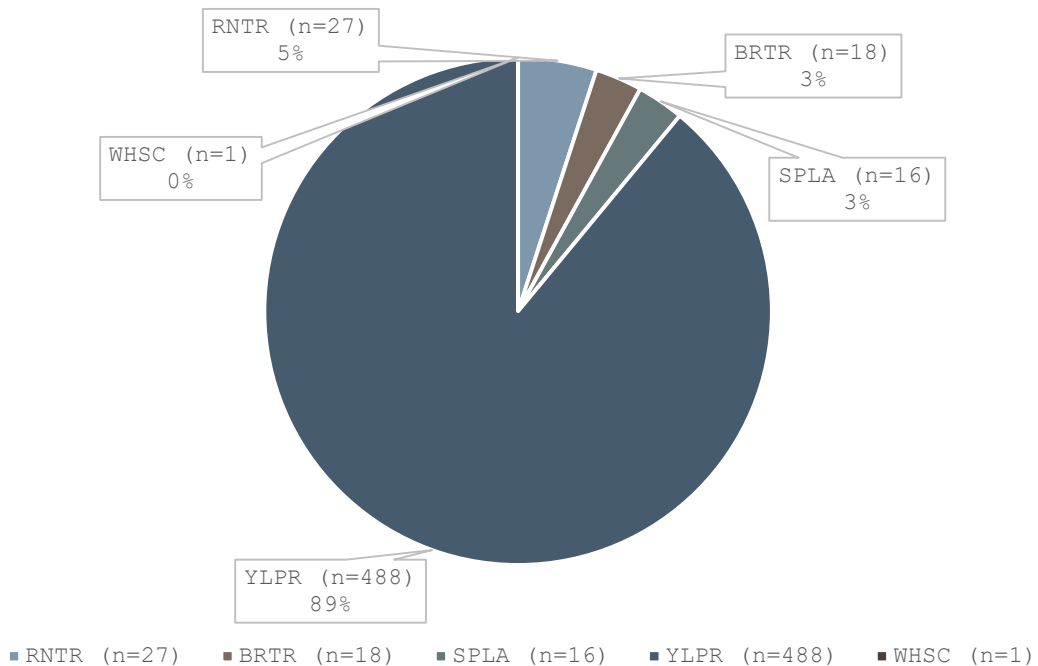


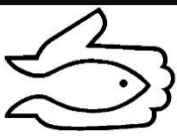
## 5.0 Results

**Figure 8: Spring Trap Netting Composition**



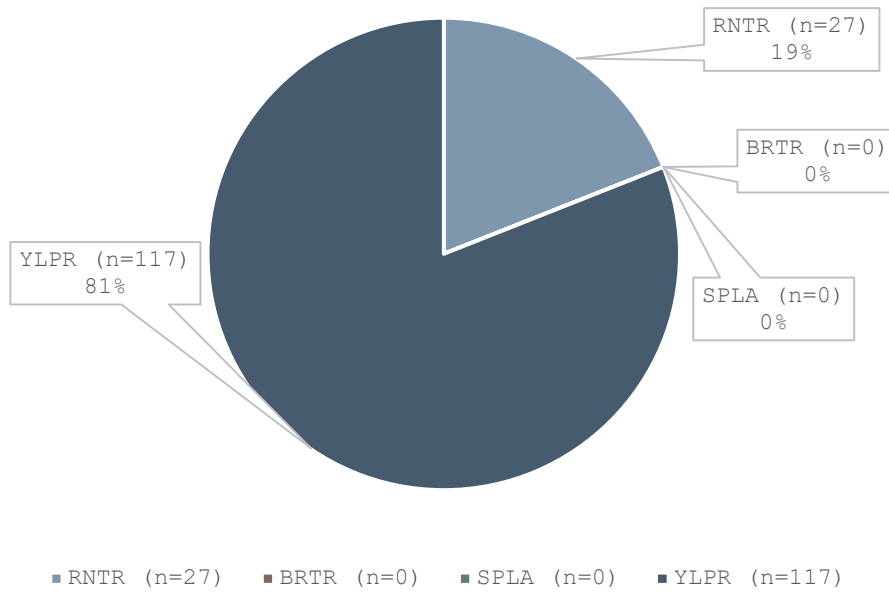
**Figure 9: Fall Trap Netting Composition**



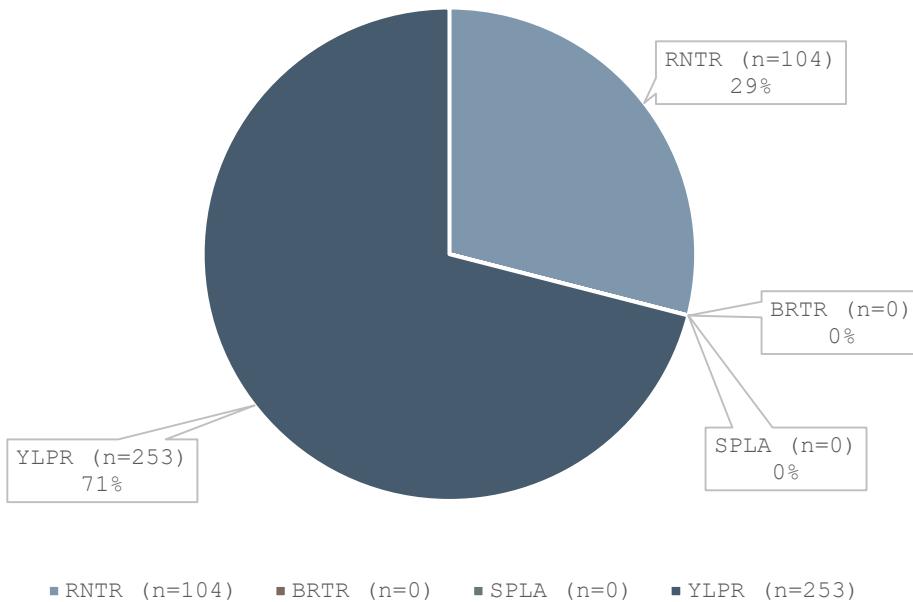


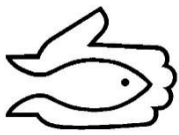
## 5.0 Results

**Figure 10: Day Time Electrofishing (Fall)**



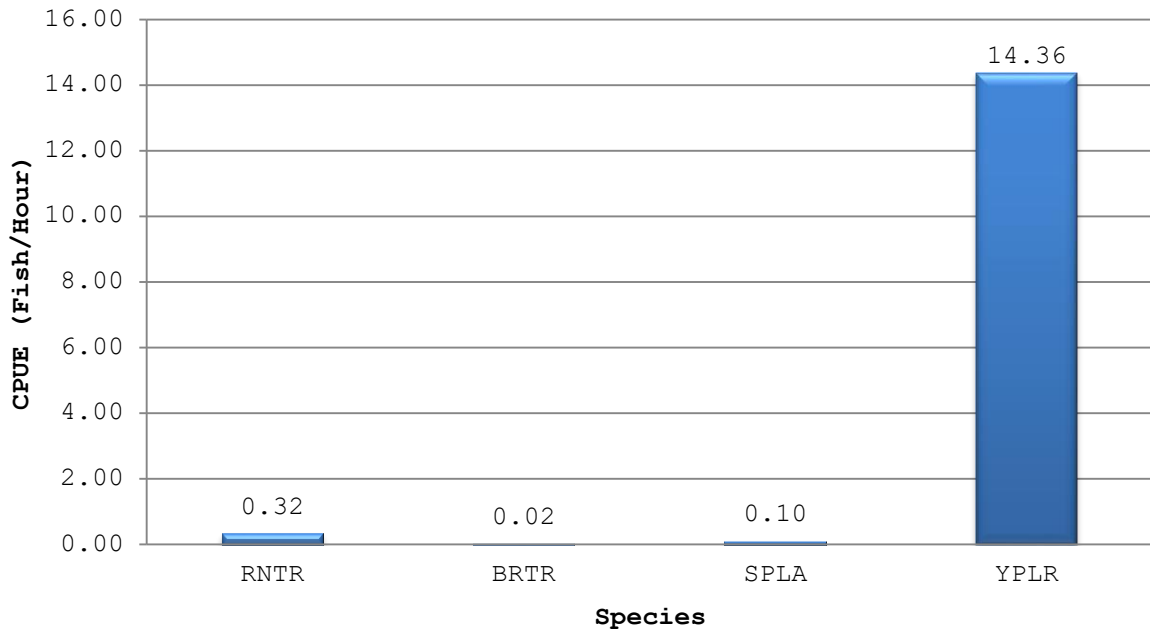
**Figure 11: Night Time Electrofishing (Fall)**



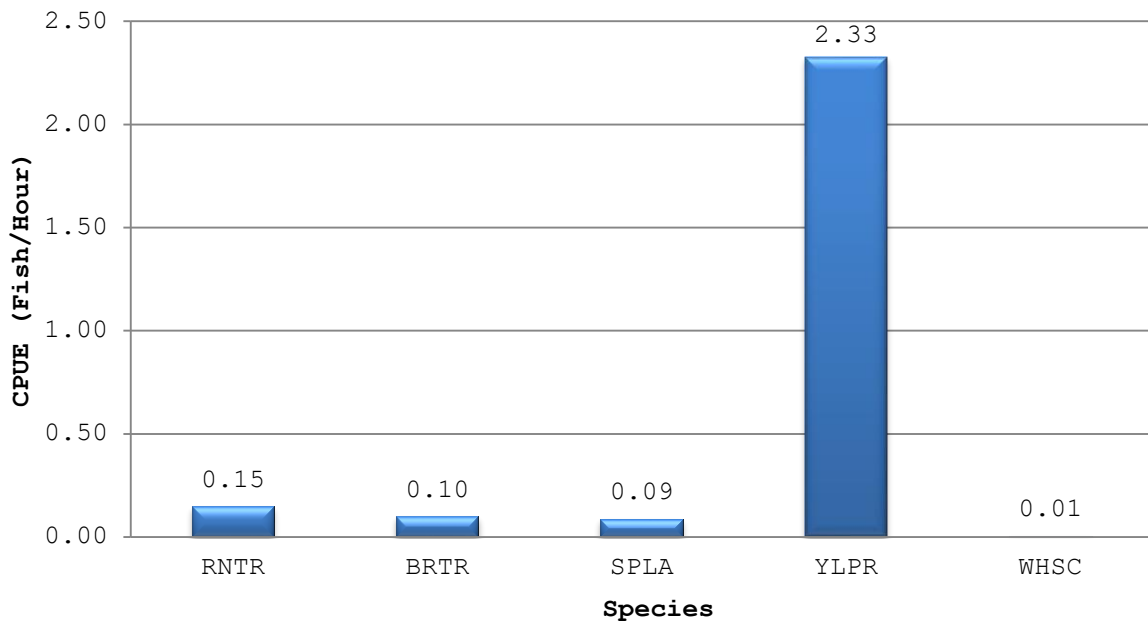


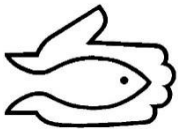
## 5.0 Results

**Figure 12: Spring Trap Netting CPUE**



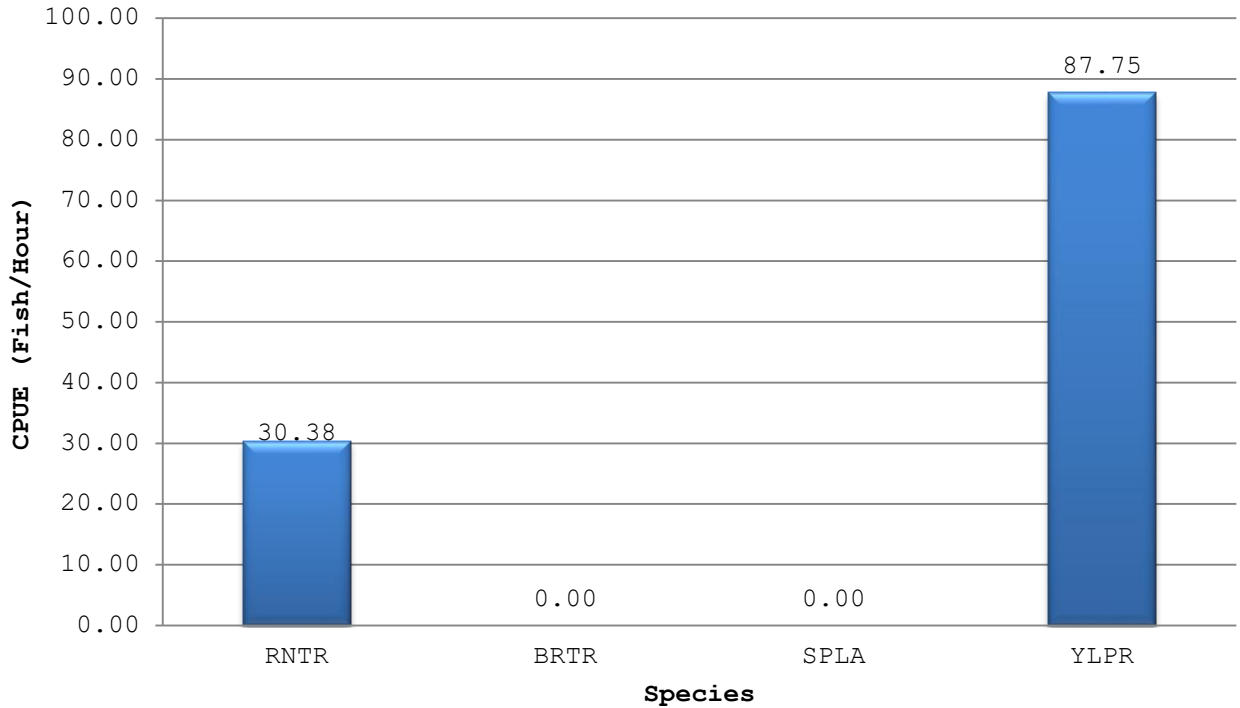
**Figure 13: Fall Trap Netting CPUE**



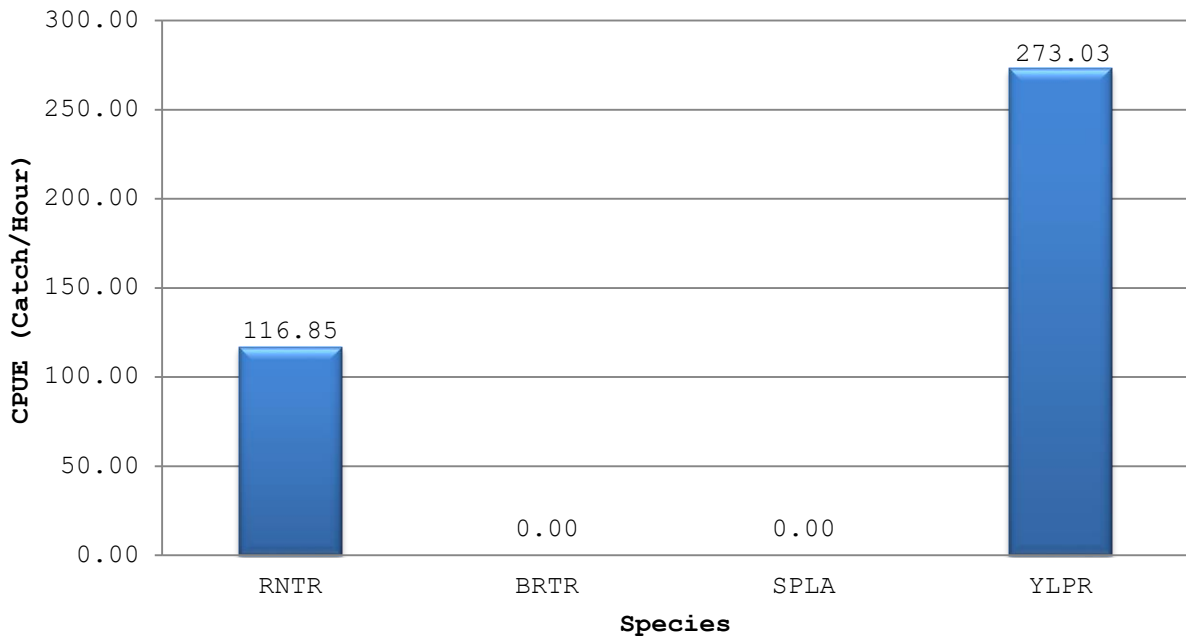


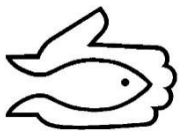
## 5.0 Results

**Figure 14: Day Time Electrofishing CPUE (Fall)**



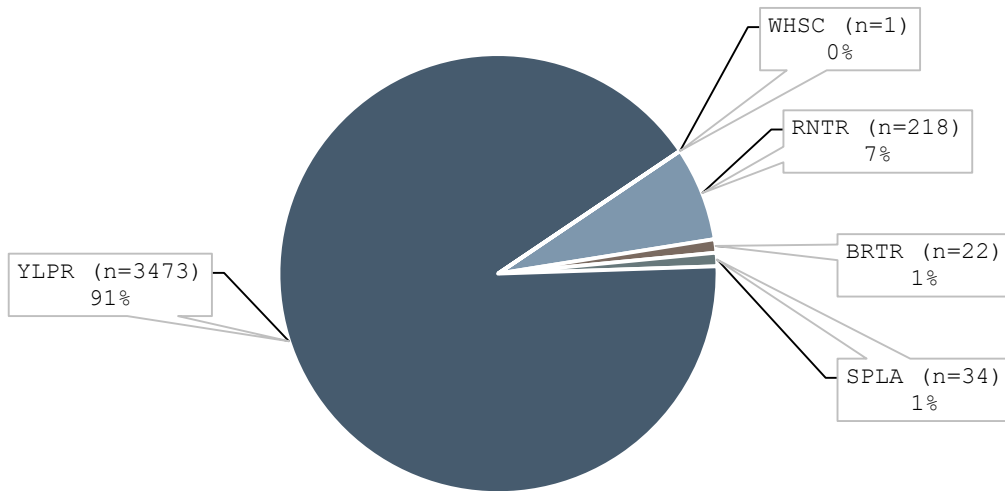
**Figure 15: Night Time Electrofishing (Fall)**



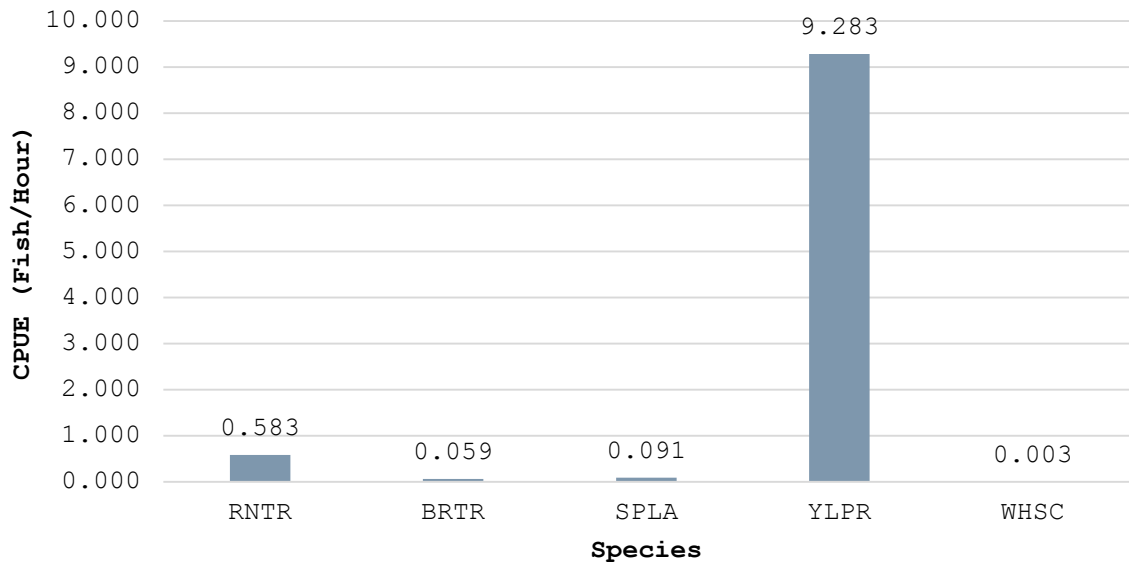


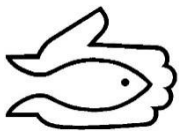
## 5.0 Results

**Figure 16: 2017 Two Mile Lake Overall Species Composition**



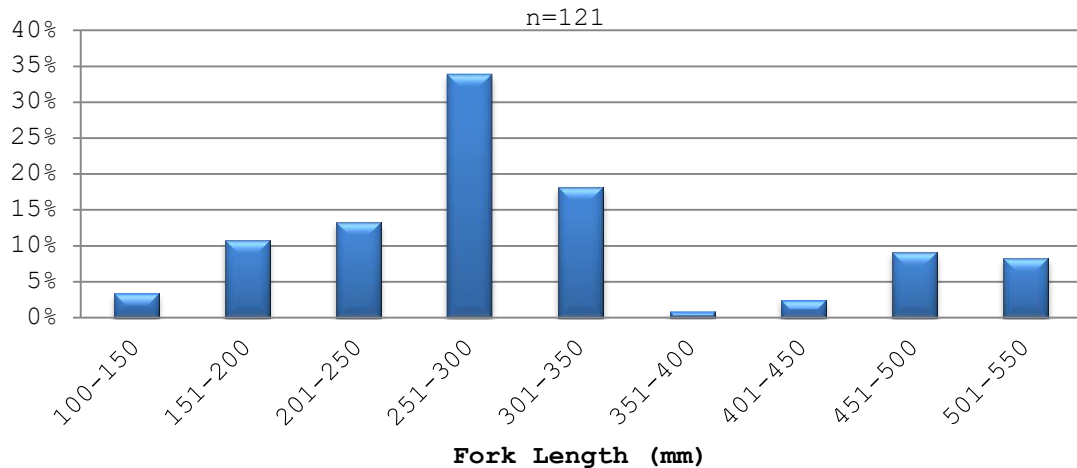
**Figure 17: Overall CPUE**



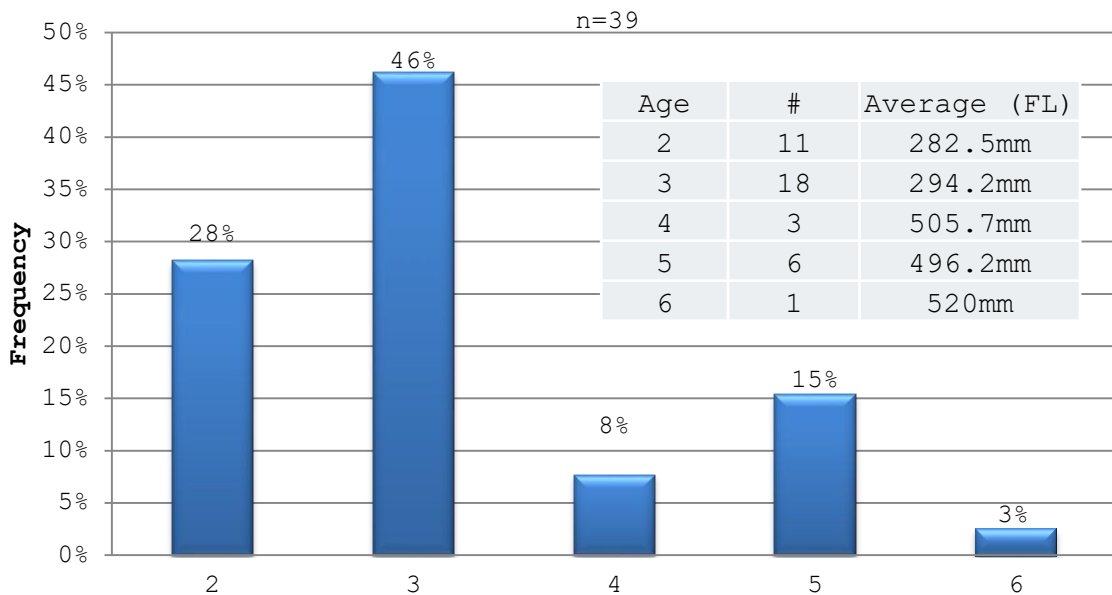


# 5.0 Results

**Figure 18: 2017 Two Mile Lake - Rainbow Trout Length Frequencies**



**Figure 19: Rainbow Trout Age Frequencies**



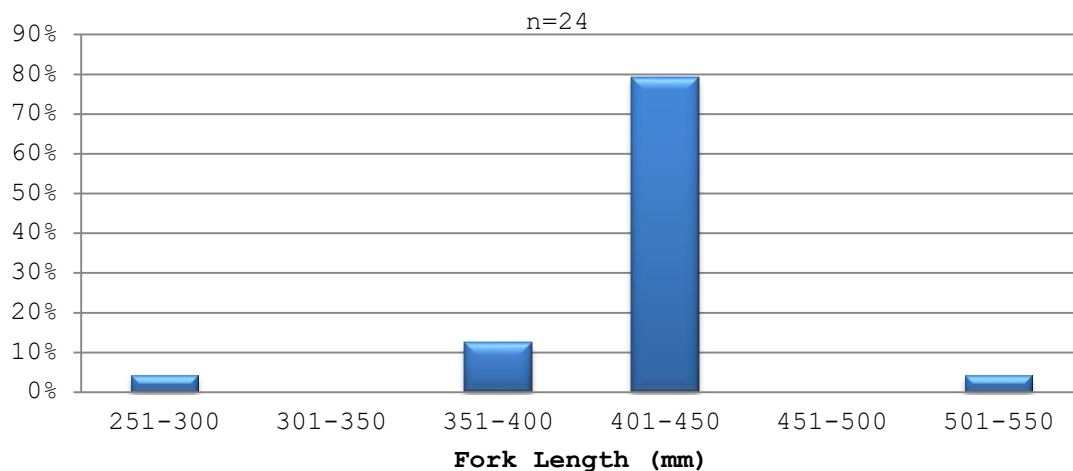
**Table 2: Two Mile Lake Rainbow Trout Stocking Records (2008-2016)**

Year	2010		2012	2013		2014	2015	2016
Date	20-May	4-Oct	30-May	17-Jun	2-Oct	10-Sep	21-Sep	19-Sep
Rate	5,000	5,000	11,100	2,500	5,000	10,000	7,000	15,000
Age	1+	0+	1+	1+	0+	0+	0+	0+
2017 Age	8+	7+	6+	5+	4+	3+	2+	1+

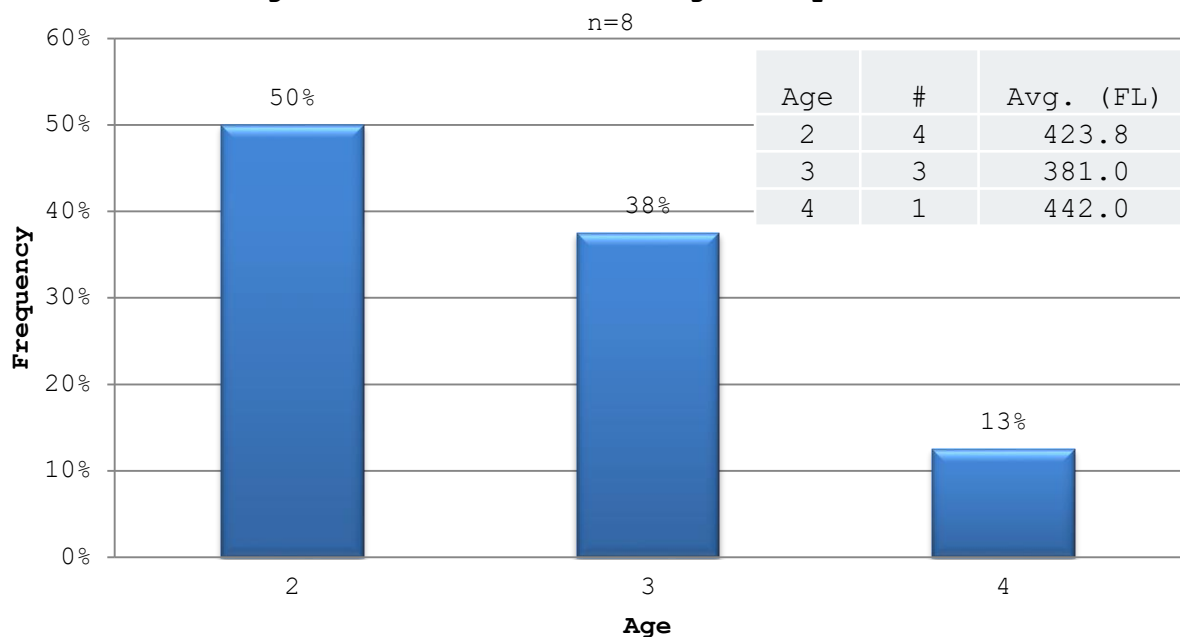


## 5.0 Results

**Figure 20: 2017 Two Mile Lake - Brook Trout Length Frequencies**



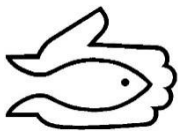
**Figure 21: Brook Trout Age Frequencies**



**Table 3: Two Mile Lake Brook Trout Stocking Records 2008-Present**

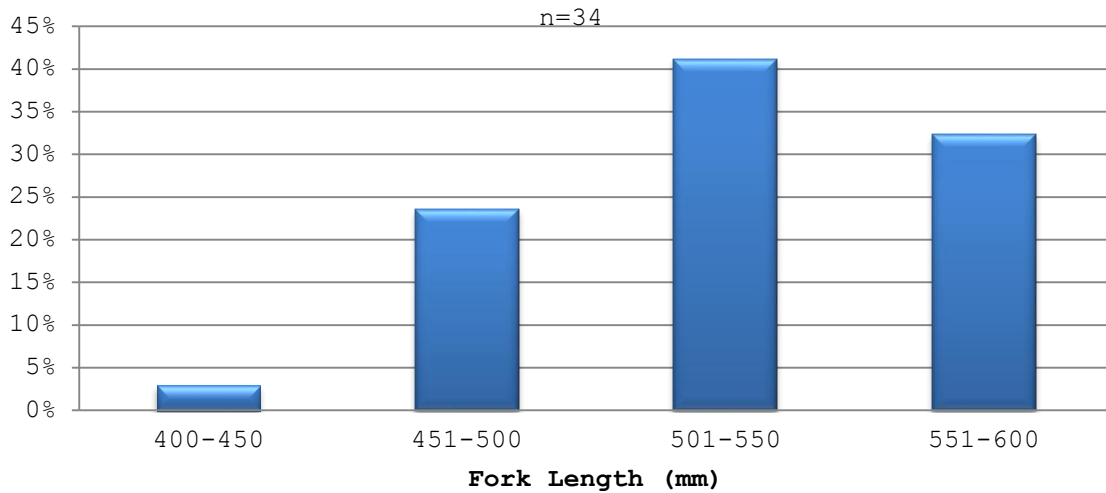
Year	2013
Date	October 9th
Rate	4,000
Age	0+
2017 Age	4+



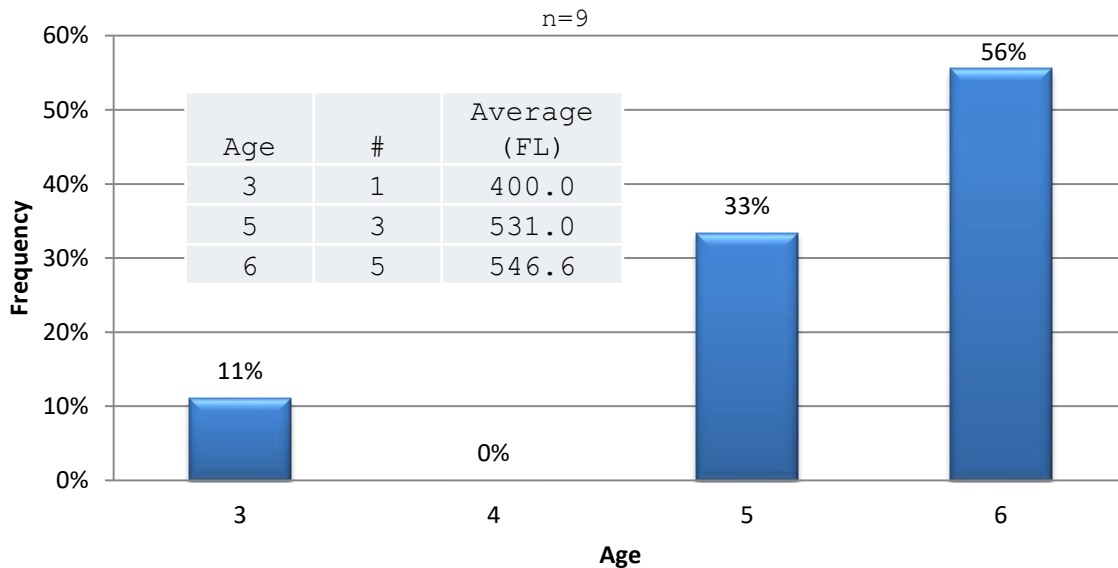


# 5.0 Results

**Figure 22: 2017 Two Mile Lake - Splake Length Frequencies**

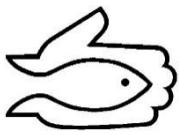


**Figure 23: Splake Age Frequencies**



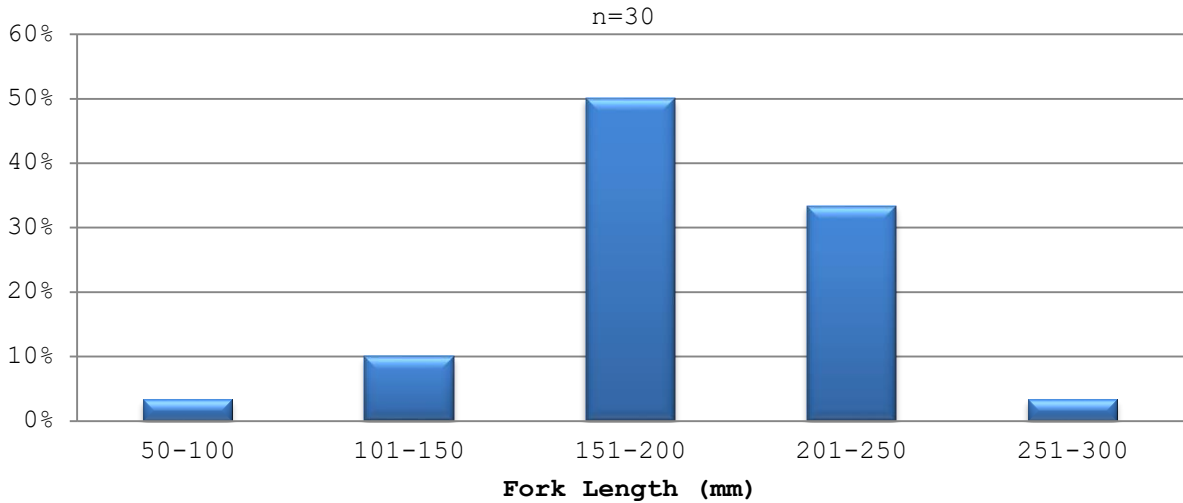
**Table 4: Two Mile Lake Splake Stocking Records 2006-Present**

Year	2006	2008	2010
Date	19-Sep	29-Sep	21-Sep
Rate	3,175	5,000	6,000
Age	0+	0+	1+
2017 Age	11+	9+	8+

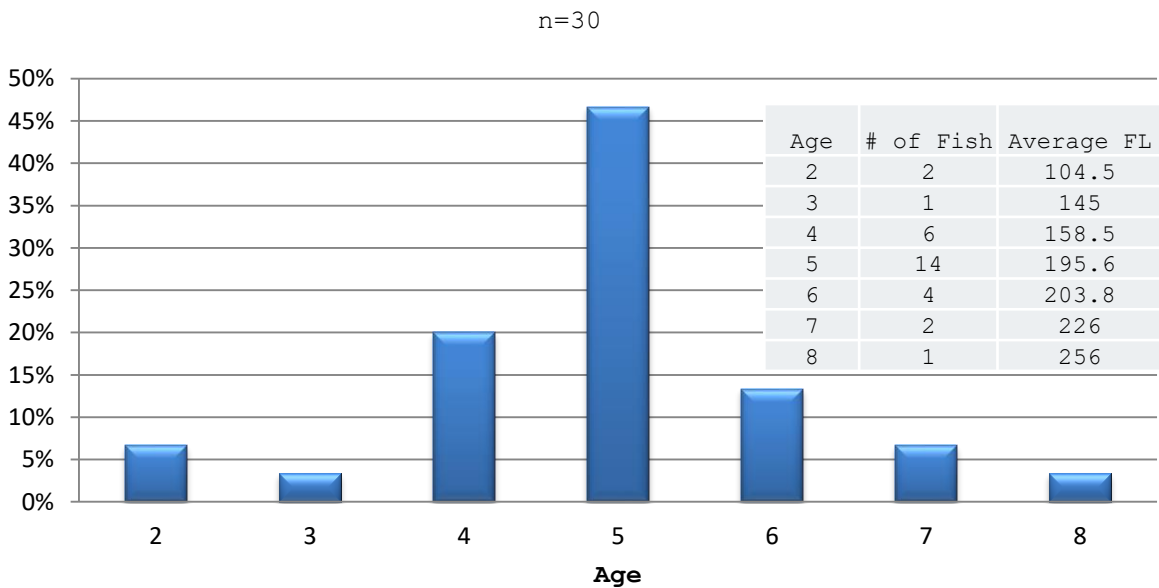


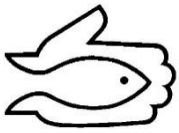
## 5.0 Results

**Figure 24: 2017 Two Mile Lake - Yellow Perch  
Length Frequencies**



**Figure 25: 2017 Two Mile Lake - Yellow Perch  
Age Frequencies**





## 6.0 Discussion

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### **Catch & Method Comparison:**

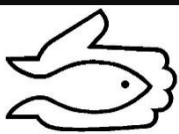
**Rainbow Trout:** In terms of trap netting, rainbow catch was twice as high in the spring (0.32 fish/hour) when comparing to the fall (0.15 fish/hour). When referring to electrofishing; rainbow catch was almost quadruped (116.85 fish/hours) at night when compared to the day (30.38 fish/hour). Unfortunately, electrofishing during the spring was not conducted due to unforeseen issues with the electro-fisher.

**Brook Trout & Splake:** Trap netting brook trout was higher in the fall (0.10 fish/hour), when comparing to the spring (0.02 fish/hour). Splake catch remained consistent over both seasons (0.09 and 0.10 fish/hour) respectively. Electrofishing efforts did not yield any splake or brook trout.

**Yellow Perch:** Spring trap netting was the most effective method of catching yellow perch. Spring traps yielded a catch of 14.36 fish/hour while the fall resulted in 2.33 fish/hour. In terms of electrofishing, night catch was significantly higher 273.03 fish/hour when compared to during the day 87.75 fish per/hour.

**Summary:** With the understanding of general fish behavior there were no surprises in catch results. Low catches of both splake and brook trout are a direct result of low stocking records over the past years. The reason for discussing these catch results are for potential maintenance and monitoring purposes. Regarding yellow perch, it is suggested that if a comprehensive removal program ever be initiated; that spring trap netting (fine mesh) would be the most effective. Arguably, spring electrofishing would produce significant results as well. This can also be verified from 2016 MCWS spring electrofishing results. The fine mesh trap nets were extremely effective in the spring, with the best sites having high fish cover in terms of thick vegetation and woody debris. The best sites were sites 1, 4, and 12. If future information or stocking success of rainbows become necessary, electrofishing after sundown produces much higher catch rates than during the day.

**Stock Analysis:** Two Mile Lake has been managed as a rainbow trout fishery since the late 1990's, and at this point in time rainbow trout stocking remains part of the management plan. We have found through our angler surveys that year after year, rainbow trout are the most sought after species in the Duck Mountains and surrounding area (Paterson, 2016). At this point focus will shift to a rainbow stocking strategy.



## 6.0 Discussion

Again, the objective of this assessment was to gather a greater understanding of the state of Two Mile Lake, with focus on correlating strong age classes of trout to stocking records. Therefore we intended to pattern these correlations and suggest future stocking recommendations based on the findings. Due to discrepancies with trout ages, the only members of the dataset used were the structures that achieved full confidence from our aging consultant.

### Rainbow Trout:

**Growth:** In terms of rainbows, we first notice that growth is significant, especially when comparing to 2010 BTIN rainbow trout ages; it appears that length at age has increased since this time (Table 5). In addition, rainbows generally appeared healthy and in good condition.

Table 5: Rainbow Trout Growth Comparison (FL-mm)

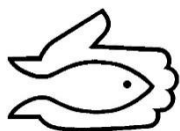
Age	2	3	4	5	6
Avg (FL) 2010	204.25	292.5	310.6	378.6	n/a
Avg (FL) 2017	282.5	294.2	505.7	496.2	520

In terms of strong age class correlation, it was noted through field observations an abundance of rainbows at approximately 10-12". Following age analysis, we were then able to directly correlate these fish to a stocking of 10,000 12-15cm (0+) rainbows in the September of 2014. This equates to a stocking rate of 212 fish per hectare.

**Stocking Considerations:** The Following is a list of recommended rainbow trout stocking rates from different jurisdictions:

1) Minnesota DNR - In North-Central soft-water Lakes (similar in nature to Two Mile Lake) - the states stocks medium fingerlings at 175 fish/acre for moderate angling pressure lakes annually. For yearling trout - or as we use in Manitoba (18+cm) they suggest 85 fish/acre for moderate angling pressure lakes annually (Johnson, 1978). This equates to 20,366 (12-15cm) or 9,892 (18+) for Two Mile Lake

2) When referencing the creel census of Two Mile Lake in 1983 by Hugh Valiant; he states that stocking of fingerling rainbows is a waste of money; however, fall stocking should be investigated as a means of reducing bird predation. Rainbow trout are more suseptable to bird predation than splake or brook trout. He suggests that in order to provide a reasonable angling quality at a reasonable cost, the lake should be stocked with either 0+ splake or 0+ brook trout in combination with a low levels of 2+ rainbow stocking (Valient, 1983). Of course, this was recommended prior to the prevalent yellow perch populations found today. In order to achieve a high angling quality this could be achieved by stocking 650 0+ splake, or 350 1+ brook trout, or 225 2+ rainbows/ha. This equates to 30,615 0+ splake, or 16,485 1+ brook trout, or 10,597 2+ rainbows annually.



## 6.0 Discussion

3) Bidgood, 1975 had a recommended rainbow stocking rates for Alberta potholes. His recommendation was 500 (0+) per acre. This equates to 58,000 (12-15) annually for Two Mile Lake.

4) Hopelain, 2000 had created stocking rates for California stocked trout lakes. For small fingerling rainbows (>75 per lb) the suggestion was for 50-100 fish per acre. This equates to 5,819 - 11,638 (12-15cm) rainbow trout for Two Mile Lake

5) The Ohio Department of Natural Resources used 25 fish per hectare in lakes >33ha (Ohio DNR, undated). In Two Mile Lake, this equates to 1,177 fish per year. They do not reference fish size.

6) The province of Quebec stocks 200 fingerlings per hectare in lakes with moderate levels of competition (Quebec, 1988). This equates 9,420 (12-15cm) for Two Mile Lake.

7) Wyoming Department of Fish and Game use 150-300 "catchable" trout per surface acre (Eiserman, 1966). In Two Mile Lake this equates to 17,457 - 58,190 rainbow trout.

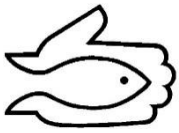
8) Saskatchewan: The province of Saskatchewan is experimenting with stocking larger trout in lakes experiencing perch problems. "In a couple lakes with perch we are planning on stocking larger trout (8-10 inches compared to 2-3 inches) at a reduced stocking rate (1/2 to 2/3 the regular rate) with the hope that the larger stocked trout will better compete with the perch" (Prestie, 2016). This was the first year this was tried and only in one lake so far, so we do not have any results yet (Prestie, 2016).

The Whiteshell Hatchery receives rainbow trout eggs in each March. The following fall rainbows are stocked as fingerlings, which are usually 12-15cm by that time. A portion of stock is also kept over winter and stocked the following spring as yearlings (which are usually 18+cm by that time).

As we can see, rates vary significantly from jurisdiction to jurisdiction. In Two Mile, the stocking rate ranges vary each year (Table 6);

Table 6: Two Mile Lake Rainbow Trout Stocking Records & Rates (2008-2016)

Year	2008	2009		2010		2012	2013		2014	2015	2016
Date	9-Jun	11-Jun	8-Jul	20-May	4-Oct	30-May	17-Jun	2-Oct	10-Sep	21-Sep	19-Sep
Rate	7,900	6,200	6,000	5,000	5,000	11,100	2,500	5,000	10,000	7,000	15,000
Age	1+	1+	1+	1+	0+	1+	1+	0+	0+	0+	0+
Rate (fish/ha)	167.7	131.6	127.4	106.2	106.2	235.7	53.1	106.2	232.3	148.7	318.47



## 6.0 Discussion

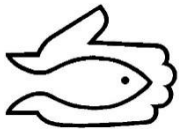
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In general, and multiple authors state that stocking of rainbow trout in the fall generally survive poorly. This is based on the fact that they do not disperse as readily, and that overwinter mortality is extensive (Needham, 1959). On the other hand, Matkowski (1982) stated that predation by birds and fish appear to be the two major sources of loss of stocked trout in study lakes (Matkowski, 1982). Matkowski, found that an adult loon in a particular Duck Mountain trout takes will eat three stocked trout per day. An interesting pilot study conducted in Perch Lake by Matkowski in 1982 is as follows. In early May, the lake was stocked with 321 brook trout, 321 splake, and 330 rainbow trout. Matkowski observed predatory birds over the course of the summer, noting significant loss of stock from loons in particular. In the fall, the lake was pulse netted as an effort to quantify survival rates and loss of stock over the summer. Catch yielded 135 brook trout, 171 splake, and 29 rainbows. This equated to a survival rate of 42%, 53%, and 8% respectively. Significantly fewer yearling rainbows survived the summer compared to the other two species and it seems likely that because the rainbows occupy shallower, warmer water than the splake or brook trout do, they are more susceptible to bird predation (Valient, 1983).

Fingerling stocked trout in the fall are subject to only a short period of bird predation before freeze up and fish surviving to the following spring are apparently not as seriously reduced by avian or mammal predators (Johnson, 1978). In 2017, predatory birds were often documented on the lake. There was no resident family of loons noted in 2017, however visiting birds on occasion can be assumed. Over the year, we noted four resident osprey and one single resident kingfisher. In the fall, a flock of approximately six cormorants were present at the lake during the trap netting and electrofishing assessments.

Rainbow trout stocking has occurred throughout the year but there is considerable evidence to suggest that plantings in the spring and summer are most successful (Kerr, 2000). When it comes to rainbow trout stocking where levels of competition are present; stocking larger is better. Stringer (1980) generalized survival rates for stocked rainbow trout as follows: yearlings (40-60%), fall fingerlings (10-30%), and fry (2-6%).

Mueller and Rockett (1961) suggested planted rainbow trout needed to be at least four inches long (e.g. 40/lb) to escape predation from yellow perch. Rainbow trout predation from yellow perch was found to be significantly less when released over deep (12-18m) water sites ((Mueller & Rockett 1961).



## 6.0 Discussion

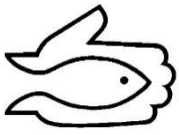
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In 2017, white suckers were found for the first time in the lake since the most recent reclamation (1987). Although the population at this point in time is very low; it can be assumed that over time the population will increase. Several studies have demonstrated a negative relationship between white suckers and rainbow trout (Kerr, 2000). Alexander (1975) found that survival of stocked rainbow trout was reduced with the introduction of white sucker in Paine Lake, Alberta. This was attributed to a reduction in the benthos population. In Paine Lake, Barton noted that trout catch rate increased from 0.11 to 0.94 fish/hour when stocking rates increased from 1028-2475 fish/ha.

As seen above, stocking rates vary considerably among different jurisdictions according to the stocking objective, age/size of fish, and amount the fishing pressure of the waterbody. There are a number of studies that suggest slow growth and reduced condition can be attributed to over-stocking. Overall, it is better to understock than to overstock (Brown and Thorenson, 1958).

In terms of stocking frequency, the best approach depends on the stocking objective. For projects designed to provide an immediate (i.e. put and take) angling opportunity, it may be prudent to stock catchable sized fish several times during the season (Kerr, 2000). In situations where establishing a longer-term (i.e. put-and-delayed-take fishery) goal, annual or alternate year stocking is probably more appropriate (Kerr, 2000). Two Mile Lake is a put-grow-delayed-take fishery. Raising rainbows to catchable sizes does not currently occur in Manitoba's Provincial Hatchery.

At this point in time, one can confidently state Two Mile Lake is a complicated system in the fact that the lake hosts multiple trout species, a prevalent yellow perch population, a small sucker population, and a variety of fish eating avian species that further complicate trout stocking success. A chemical reclamation of the lake would without a doubt increase stocking success, however this is not an option at this time. Manual perch removals are worth consideration but a few things should be considered; specifically long term commitments. As stated above; efforts are extremely unlikely to remove all individuals, and are only temporary because the juveniles that remain will display compensatory increases in recruitment, survival and growth. Therefore, mechanical removal programs should be comprehensive and long-term (Jolley et al, 2008).



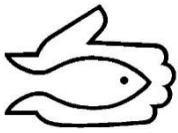
## 6.0 Discussion

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There are multiple options for stocking rainbows to consider. This refers to size, frequency, rate, and method. Regarding stocking size and frequency, of course stocking fish at a harvestable size would result in increased return to the anglers. In Manitoba, we currently have access to 0+ (12-15cm) for fall stocking and 1+ (18+cm) available for spring stocking. Stocking rates are perhaps the most difficult to recommend. As we know, this complicated system has an abundance of competition and predators. Therefore, determining a balanced approach should consider; initial loss of stock to avian and fish predation, and mortalities associated with interspecific & intraspecific competition (including over stocking). Due to the complexity of these relationships, we can simply suggest rates, sizes, and frequencies that are based on success rates from past years, in correspondence with stocking recommendations from other jurisdictions. Based on the available information, stocking program success varies significantly and are largely customized based on lake type, ecological complexity, and angling pressure. In terms of stocking method, there are two possible methods. Spot stocking by truck, or scatter stocking by boat.

**Recommendations:** Rainbow trout should be stocked twice annually; once in the spring and once in the fall. Spring stocking of yearling trout (18+) should be stocked with 5,000 to 10,000 fish annually. Fall stocking of fingerling rainbow trout should be stocked at 10,000 - 15,000 fish annually. Under no circumstances should smaller fingerlings (<4") be stocked into Two Mile Lake. Also, in terms of stocking method it is highly recommended that scatter stocking in both spring and fall over deep water be priority.



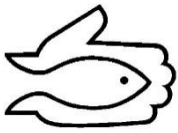


## 6.0 Discussion

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**Brook Trout:** Brook trout catch was low, which directly correlates with low stocking densities (1 planting of 4,000 12-15cm in October 2014). Growth does not make sense when comparing to stocking records. There are two potential answers for the length frequencies found. (1) there have been undocumented stockings of brook trout in the past several years, or (2) there is evidence of successful natural recruitment into the adult population. There are also discrepancies with regards to age at growth. A number of larger mature brook trout with a mean fork length of 423.8mm were aged a 2+ years at full confidence from the ager. The only hypothesis for the brook trout catch is that 23/24 brook trout captured came from the 2014 stocking (age 4+), and the one small brook trout (FL 280mm) came from an undocumented stocking or was naturally recruited. Regardless, the size and condition of the brook trout is worthy of discussion. Much like rainbow trout, stocking brook trout into waters containing other dietary competitors including yellow perch may limit the survival and growth (Hartleb & Moring 1994). Fraser (1978) found that brook trout could not compete successfully with yellow perch for food, and that survival of stocked brook trout was maximized in waters with the least complexity of fish. On the other hand, a handful of studies were unable to demonstrate a relationship between white sucker abundance and growth and survival of stocked brook trout; noting a niche shift when living amongst suckers (Kerr, 2000). In summary, brook trout stocking is showing variable success in Two Mile Lake, even at low stocking rates.

**Recommendations:** At this time, it is recommended that brook trout stocking be ceased to avoid further complicating the system with multiple species of trout and increased competition. If managers choose to accommodate a brook trout fishery in Two Mile Lake's management plan, it is recommended the species be stocked at 50%-75% the rate of rainbow trout (above), and rainbow trout stocking be ceased.

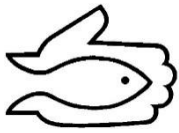


## 6.0 Discussion

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**Splake:** Splake were also found in low numbers (n=34) which is directly associated to low stocking densities over the past 10 years. The most recent stocking occurred in September of 2010 with 6,000 18+cm splake. The species were found in very good condition and relatively large sizes. Surprisingly, in terms of age and growth analysis multiple age classes were found. The three potential reasons for this occurrence (1) inaccurate age analysis, (2) undocumented stockings in the past few years (unlikely), or (3) the hybrid has shown successful natural recruitment. First generation (F1) are known to have established a self-sustaining population in Agnes Lake, Alberta (Spangler, 1978). Regardless of these findings, there is a remnant population of large splake in Two Mile Lake. Splake stocking was successful a decade or so ago, and a request has recently been submitted to Jeff Long with the Whiteshell Fish Hatchery for splake destined for the Duck Mountains. It is unknown how long it will be until splake will be available at this time. Splake have successfully been used as a predator to reduce stunted perch populations (Rumsey and Lamarre 1994). However, there have also been multiple instances where splake stocking on top of perch populations was unsuccessful do to high mortalities associated with interspecific competition.

**Recommendations:** Future stocking rates are as follows and have been adapted from "Splake - an Annotated Bibliography (Kerr, 2000), in conjunction with Two Mile Lake stocking rates (2006, 2008, 2010). First of all, once splake stocking occurs it is recommended rainbow trout stocking decrease to 5,000 yearlings each spring and 10,000 fingerlings each fall. Both Fraser (1988), and Liskauskas & Quinn (1991) recommend that splake should not be stocked annually, and that stocking should occur every 2-3 years at relatively low rates. Stocking frequency should occur once every two years, at a rate of 60-130 fish/hectare. This equates to 3,000-6,000 fish biennially, spring or fall, whichever is available.



## 6.0 Discussion

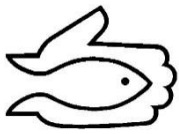
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**Yellow Perch:** Yellow perch still exist in very high numbers and it is without a doubt that they are having a detrimental effort on stocked trout success. Over the years, the size of perch has been reduced. Age analysis from 2017 suggest the population has stunted. In the first few years after the introduction to a waterbody perch sometimes produce attractive sized fish. As the perch population expands rapidly they compete with trout and each other for food, negatively affecting the growth of both species (FMB AB, 2008). Once over-populated, they remain in this ecological stage; i.e. abundant and very small sized fish (FMB AB, 2008). This appears to be occurring in Two Mile Lake at this present time. Also, the perch still have high infestation rates of the black spot and yellow grub parasite(s). In 2017, 3,276 (255.54kg) individuals were removed from the waterbody.

**White Sucker:** In 2017 was the first confirmed presence of white sucker since 1987. It becomes apparent that the species has made it's way back into the lake since the most recent reclamation, and likely entered the lake through the Ketchum Creek system. As we know, white suckers are extremely aggressive and opportunistic; therefore we can confidently say that over time the population will grow and further complicate stocking success. In the past, northern pike have entered the lake form the same system (Ketchum Creek).

**Recommendations:** We believe that the suckers entered the lake from to Ketchum Creek system. Since pike are believed to have entered the lake via this same system in the late 1980's, it should be of top priority that the integrity of the water control structure from Ketchum Lake to Two Mile Lake be investigated and improved if necessary.

Furthermore, follow up assessments (SSTLS) should be conducted in 4-6 years to monitor encroachment of non-trout species and the success of adapted stocking rates.



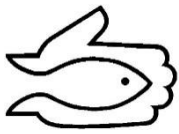
## 7.0 Acknowledgements

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We are excited to report the work and results from Two Mile Lake in 2017, however, our team does not do this alone. We rely on partnerships and support through several entities. First and foremost, recognition of the Fisheries and Wildlife Enhancement Fund (FWEF) is imperative. They funded IFAMM 2017 (Integrated Fisheries Assessments, Maintenance and Monitoring) and granted dollars to facilitate not only this particular project, but various other important projects over the years. The stamp is a constant reminder that a portion of angling licenses goes towards creating, protecting, and enhancing fisheries for future generations. The work completed under the Two Mile Lake Project would not be possible without the initiatives of the fund.

We would also like to thank our directors for their understanding and lead on creating partnerships to enhance and sustain local fisheries. Without our group's conviction and support to break boundaries, this type of support would not be achievable. A huge thank you to Fisheries Branch Staff, especially our mentor, Ian Kitch, for your endless support, guidance, and the use of your gear. Also, a huge thank you to the other government departments, for your generous support. Projects like this could not be completed without continued partnerships, financial support and assistance from the various organizations/individuals who continually back up SVSFE; in this project - Intermountain Sport Fishing Enhancement Inc, Parks Branch, the Whiteshell Fish Hatchery, East Blue Lakes Resort, cottage owners and the anglers. We thank you all.

Goals are only achievable by working with individuals who are passionate about fishing and who have the drive to do meaningful work. These partnerships are truly the key to success. We, as SVSFE technicians are extremely grateful for the encouragement received from the organization and look forward to building this partnership in the years to come.



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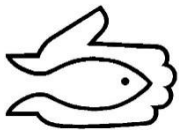
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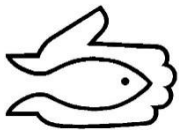
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