

Summary of Activities

Date: November, 2018

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MB Sustainable Development
Cc: Lloyd Rowe, Jonathan Stephens
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Subject: East Blue Lake Trout Maintenance - White Sucker Removal 2018

Location: East Blue Lake, Duck Mountain Provincial Forest, 14U 367303 5717799

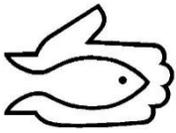
Background Information:

East Blue Lake was once an amazing rainbow trout fishery. In recent years, studies on East Blue Lake identified white sucker populations as having negative effects on rainbow trout growth and survival. Historic data suggests white suckers were non-existent prior to the rising water levels in 2010 and the recent influx has caused a direct increase in interspecific competition. These benthivores can play an important role in the ecology of both fish and benthic communities in lake and streams (Saint-Jacques, 2000). Unfortunately, white suckers can also be "extremely flexible in their use of resources" (Saint-Jacques, 2000) and have been reported to affect the yield of many species, including rainbow trout (Barton 1980). White suckers' tolerance of a wide range of environmental and chemical conditions, and their ability to exhibit thermoregulatory behaviour, are thought to largely explain their distribution and competitiveness (Stewart 1926; Spoor and Schloemer 1938; Verdon and Magnin 1977; Kavaliers 1982; Marrin 1983; Trippel and Harvey 1987; Logan et al. 1991). Several studies identified white sucker removal programs can benefit a trout fishery.

The "East Blue sucker removal program" was initiated in 2016 to (1) further quantify white-sucker invasion, (2) remove as many white-suckers as possible and (3) develop an effective yet long term management program for rainbow trout in East Blue Lake. The program was conducted by SVSFE, Intermountain Sport Fishing Enhancement Inc. and Manitoba Sustainable Development - Fisheries Branch.



Figure 1: A rainbow trout after sampling before returning to the water



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Background Information cont'd:

Between May 30th and June 7th in both 2016 and 2017, team members successfully removed an approximate 6 tonnes of white suckers which equated to 6,206 individual fish. While in 2016, the suckers were mostly live transferred to Sinclair Lake, in 2017 it was arranged that a mink farmer picked up the suckers for feed purposes. The initial stages of the removal expressed that a significant white sucker population was residing in the lake. Catch per unit efforts (CPUEs) did decrease near the end of each program but simply not enough to justify discontinuation of the project for 2018. Suggestions from 2016 & 2017 are as follows:

- 1) Timing - replicate program with the same dates & net locations
- 2) Repurpose - find a recipient/market for the fish instead of relocation
- 3) Target - reach a CPUE of 2 white suckers/hour of trap netting

Evaluating number of fish caught by hours of trap netting is represented as catch per unit effort (CPUE) or # of fish caught per hour. CPUE is much more reliable for reflecting changes in population density within a lake (Schneider, 1998b) than differences in density between lakes. By comparing annual CPUE, managers can rate the success or failure of the program over time.

2018 Results

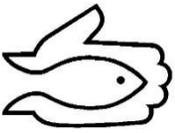
Between May 28th and June 1st, trap nets were set in the locations proven productive in the past 2 years of the program. It is important to note that although the dates of the project replicated dates from 2016/2017, the water temperatures were higher in 2018 compared to previous years. In 2016/2017 the water temperature ranged from 8-16.8°C with an average of 13.3°C. In 2018 the water ranged from 15.6-16.8°C with an average of 16.2°C.

In total, 246 white suckers were captured and repurposed to the public during the 2018 removal. A random sub-sample of white suckers were collected to determine biomass removal estimates. The average sucker weighs 902 grams (2 lbs) which equates 221.81 kg biomass removed (Table 1)

Table 1: Total fish removed during the 2018 White Sucker Removal

2018 Recipient	# Fish Removed	Biomass (g)	Biomass (kg)
Public	246	221810	221.81

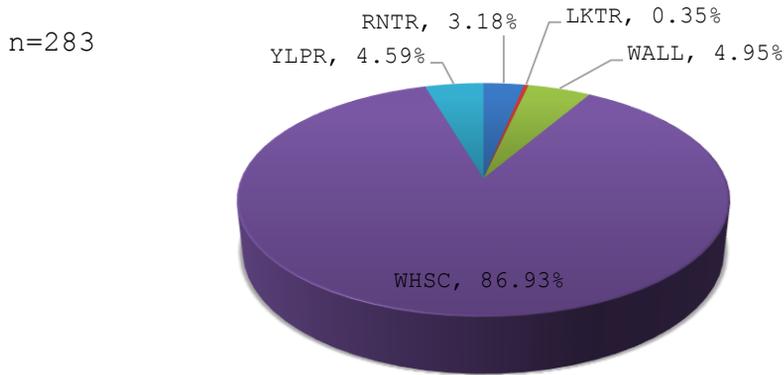
Rainbow trout, lake trout and walleye that were captured during the removal were measured, aged, and released to gain a better understanding of growth and stocking success.



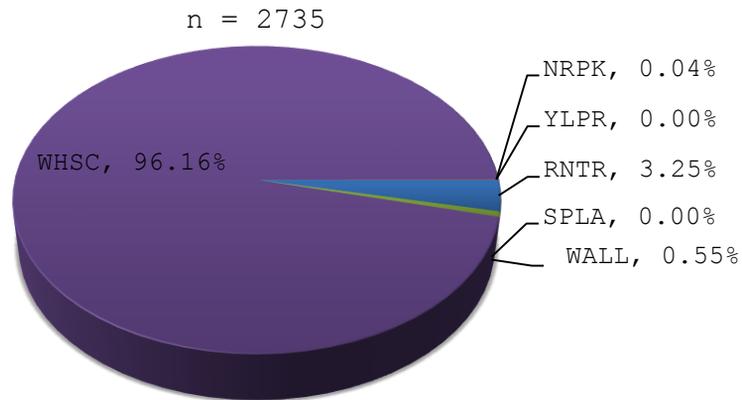
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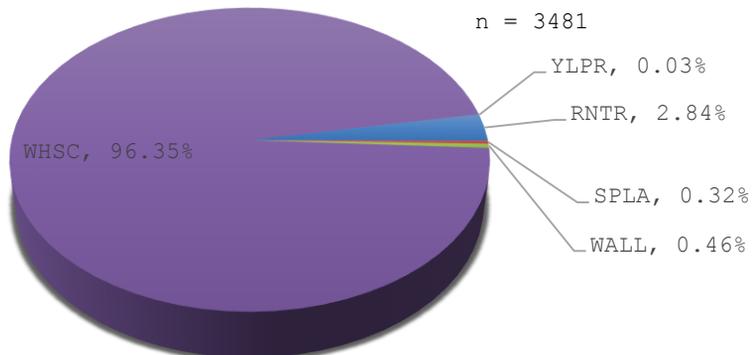
2018 EAST BLUE LAKE Trap Netting - Species Composition

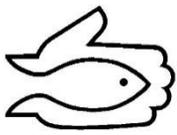


2017 EAST BLUE LAKE Trap Netting - Species Composition



2016 EAST BLUE LAKE Trap Netting - Species Composition





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Results cont'd:

White sucker still maintains a high composition in the population at 86%, even considering the lower catch in 2018 than previous years. There was no presence of splake or northern pike in trap nets this year. This year was the first instance of a lake trout in this program (Figures 2 -4).

Table 2: Catch per unit effort comparison of white suckers between 2016-2018

East Blue Lake White Sucker Removal			
Year	Effort (hours)	Total Caught	CPUE (fish/hour)
2016	355.58	3354	9.43
2017	404.57	2630	6.50
2018	266.55	246	0.92

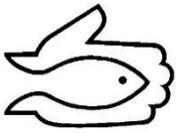
White sucker catch per unit effort dropped from 6.5 in 2017 to 0.92 in 2018 (Table 2). Catch per unit effort for rainbow trout also decreased. Walleye and yellow perch CPUE increased marginally (Table 3).

Table 3: Catch per unit effort comparison of all species between 2016 & 2017

Year	Effort (hours)	WHSC CPUE	RNTR CPUE	SPLA CPUE	WALL CPUE	YLPR CPUE	NRPK CPUE
2016	355.6	9.43	0.28	0.03	0.04	0.0	1.00
2017	404.6	6.50	0.22	0	0.04	0	0
2018	266.6	0.92	0.03	0	0.05	0.05	0



Figure 4 & 5: A lake trout and walleye captured and sampled on East Blue Lake in 2018



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Results cont'd:

Walleye: A total of fourteen walleye were sampled in 2018 with an average fork length of 623 mm. Ages varied from 2 - 16 years old (Figure 6) and all fish appeared to be in healthy condition. The variety in ages from data collected since 2016 would indicate a small population with evidence of recruitment.

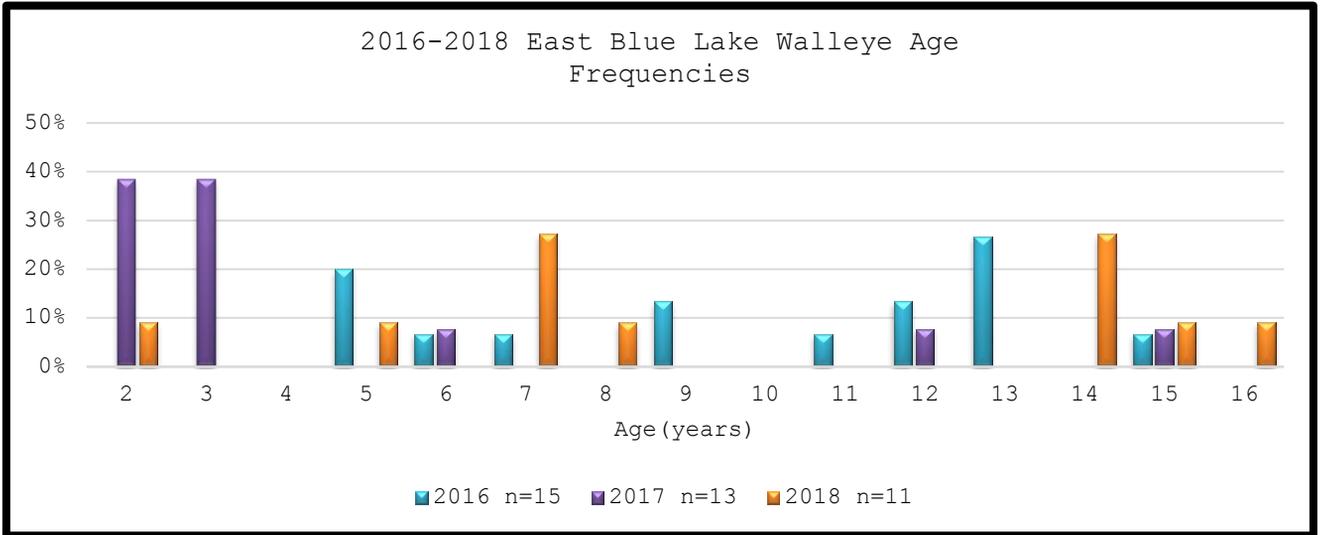


Figure 6: 2016-2018 walleye age frequencies

Rainbow trout: A total of nine fish were collected and sampled. There was one recapture from 2018 and one from 2016. The average fork length was 509 mm and 55% were master angler sized (n = 5 @ 508mm+) as pictured in Figure 7. Master angler(MA) submissions for rainbow trout have steadily increased since 2016 (Figure 8). The strongest fork length frequency for 2018 was 500-551 mm at 56%. Years previous, the largest frequency was the 451-500 mm at 26-35% (Figure 9). In 2018, aging analysis indicated the strongest year class at age 4. Since 2016, the age frequencies have been strongest at ages 4 & 5 consistently(Figure 10). On average, 4 year old rainbows had a fork length of 505 mm and at age 5, a fork length of 517 mm.



Figure 7: A photo of an MA rainbow trout

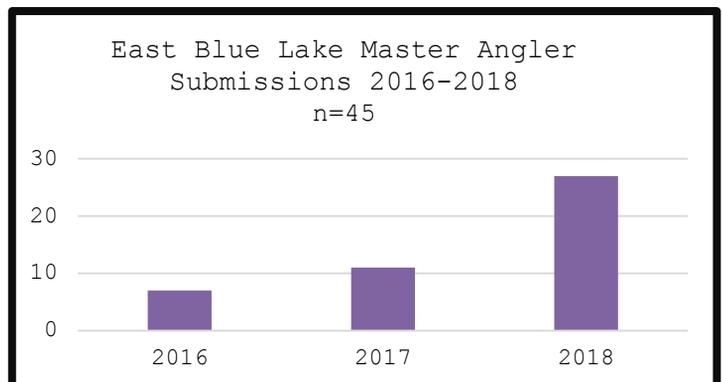
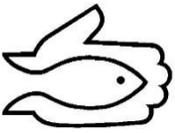


Figure 8: 2016-2018 Master Angler Submissions 5



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Results cont'd:

2016-2018 Rainbow Trout Age Frequencies

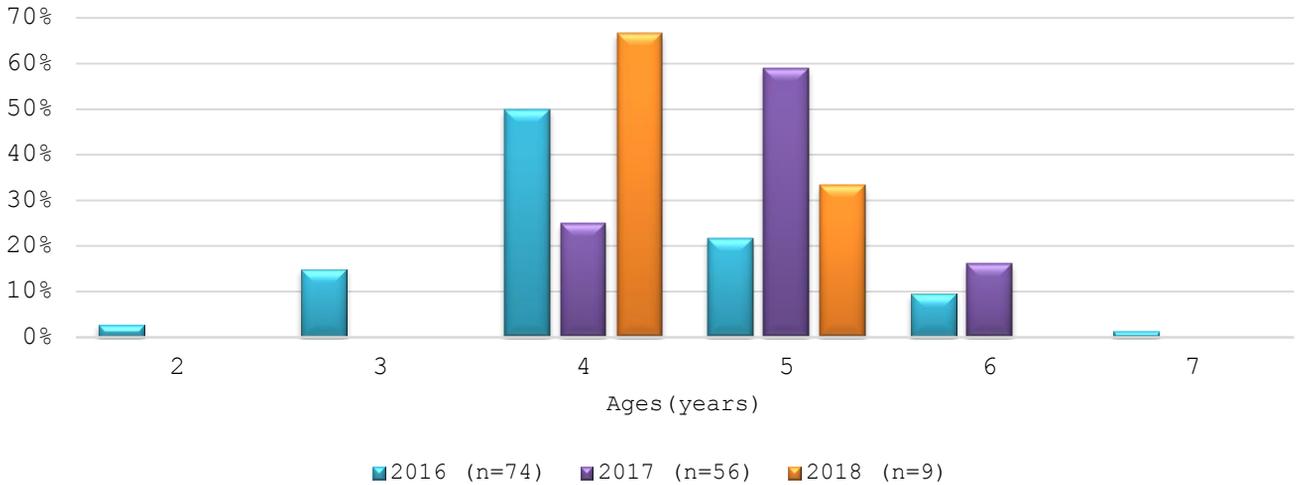


Figure 9: 2016/2018 rainbow trout age frequency

2016-2018 East Blue Lake Rainbow Trout Length Frequencies

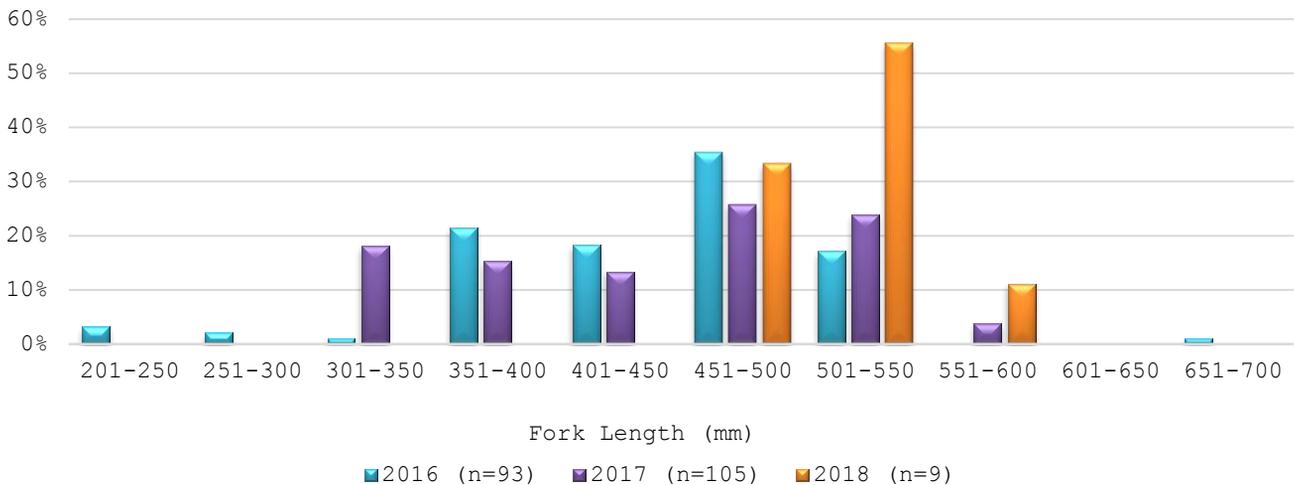
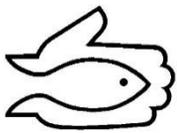


Figure 10: 2016/2018 rainbow trout fork length frequency



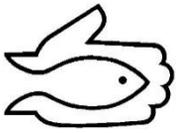
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Rainbow Trout cont'd: Following the trend of last year, the stocking of either 12-15cm rainbows in the fall of 2014 or 18+cm rainbows in the spring of 2015, have resulted in strong age class contributing to 67% of the trout aged in 2018(n=9). Generally trout stocked in the spring are 18+cm (1+ years old) and trout stocked in the fall are 12-15cm (0+ years old). This is the case for rainbows stocked from 2011-2018.

Table 4: 2011 - 2018 Stocking records for East Blue Lake

Rainbow Trout Stocking Condition & Rate Comparison by Year					
Year	Time of Year	# Fish/Kg	# Fish Stocked	Total Stocked/Year	# Fish Stocked/ha
2011	spring	?	8,300	48,300	472.60
	fall	?	6,000		
	fall	?	34,000		
2012	fall	97.3	12,000	19,500	190.80
	fall	85	7,500		
2013	spring	28.8	5,000	30,000	293.54
	fall	120	25,000		
2014	spring	36	6,000	31,000	303.33
	fall	117	15,000		
	fall	89	10,000		
2015	spring	13	1,400	15,400	150.68
	spring	20	4,600		
	spring	20.5	2,400		
	spring	20.5	7,000		
2016	spring	12	4,540	19,460	190.41
	spring	12	1,620		
	spring	12	2,500		
	spring	12	5,400		
	spring	12	5,400		
2017	spring	24	13,000	14,000	136.99
	spring	27	1,000		
2018	spring	21	4,000	24,900	243.64
	spring	20	7,200		
	spring	20	7,200		
	spring	18	6,500		



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Discussion:

White Sucker Removal Program

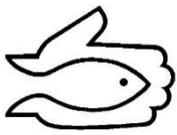
Since 2016, the species composition has remained above 80% in favor of white suckers, decreasing with each year. Consecutive years of the removal program have removed over 6 tonnes of white sucker biomass from the lake. The long-term management of this fishery is still being 'ironed out' at this time. Goals from 2017 included reaching a CPUE of 2 fish/hour. This year's CPUE of 0.92 surpassed the project target but sources of error caused the significant decrease. Unfortunately, the catches for 2018 were exceptionally low compared to previous years which ended the program earlier than anticipated therefore decreasing effort. Other factors resulting in low catches were water temperature and net avoidance. The water was warmer by an average 3 degrees in 2018, which could affect the white sucker behavior targeted by the trap nets (ie spawning on gravel near shore). Net avoidance was also a key feature noted in 2018. White suckers were observed swimming along the leads of the trap nets, into traps and back out.

Moving forward, listed are some current recommendations for the removal program:

- 1) Continue the white sucker removal program into 2019. A consecutive year of white sucker CPUE below 2 fish/hour would confirm target goals without the doubt of environmental disturbances.
- 2) Water temperatures (instead of dates) will have to be more closely monitored to replicate the success of 2016/2017 removals.
- 3) Incorporating the Smith-Root electrofishing boat (owned by DFO) again will be of utmost importance to compensate for the occurrence of net avoidance. Implementation of this boat was proven successful in 2016 for the congregated white suckers nearshore in the spring. SVSFE has requested use of the boat for the 2019 field season. Open communication, scheduling and maintenance with all interested parties in the electrofishing boat is vital.
- 4) Although sourcing removed suckers to the public was sufficient for 2018, large quantities of suckers may still remain in the waterbody and will have to be repurposed. Contacting the mink farmer from Minnedosa and other interested parties should be set in place prior to the program start.

Rainbow Trout Stocking

The rainbow trout stocking rate suggestions for East Blue Lake have been studied since the early 80's. Hudy 1980, found "regardless of strain, spring stocking was superior to fall stocking in survival to the creel". A creel census by Valiant & T. Smith in 1983 found that spring stocking lead substantial rainbow trout predation by birds. Registered Master Angler Award analysis in 2015 indicated angling success in the years where 1+ rainbows were stocked in the spring. The most current practice is spring stocking of 18+ cm rainbows, preferably scattered to the deeper waters of the lake.



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Rainbow Trout Stocking cont'd

It was also advised from the 2015 summary exclusively spring stocking success would be apparent in master angler submissions/angler surveys between 2018 & 2020. Since the removal program began and the change to spring stocking only, Master Angler Award submissions have tripled. This change correlates to the beginning of the removal program, which has freed up forage for steady and consistent rainbow trout growth, and also the standardization for the stocking on East Blue Lake.

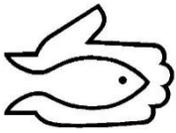
In regards to stocking practices, it is recommended to continue with spring scatter stocking of 18+cm rainbow trout. Rates fluctuate each year depending on available trout, but numbers should remain close to 10,000 trout annually plus compensation for fish mortality due to bird predation. Throughout the following years, angler catches will indicate the effects of this stocking practice and provide insight on the debate of spring versus fall stocking. In regards to the rainbow trout monitoring, it is recommended to continue studying the stocking success of the rainbow trout during the white sucker removal. Multiple years of age and length data will confirm the success of the current stocking practices. Marking fish by means of a simple fin clip will suffice to identify yearly recaptures when identifying strong age classes.

Acknowledgements:

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, Fisheries & Wildlife Enhancement Fund, Manitoba Sustainable Development staff - Fisheries and Parks Branch, the Whiteshell Fish Hatchery, East Blue Lakes Resort, cottage owners and the anglers.



Figure 11 & 12: A 4 year old rainbow trout and multiple freshly stocked 1+ rainbow trout



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