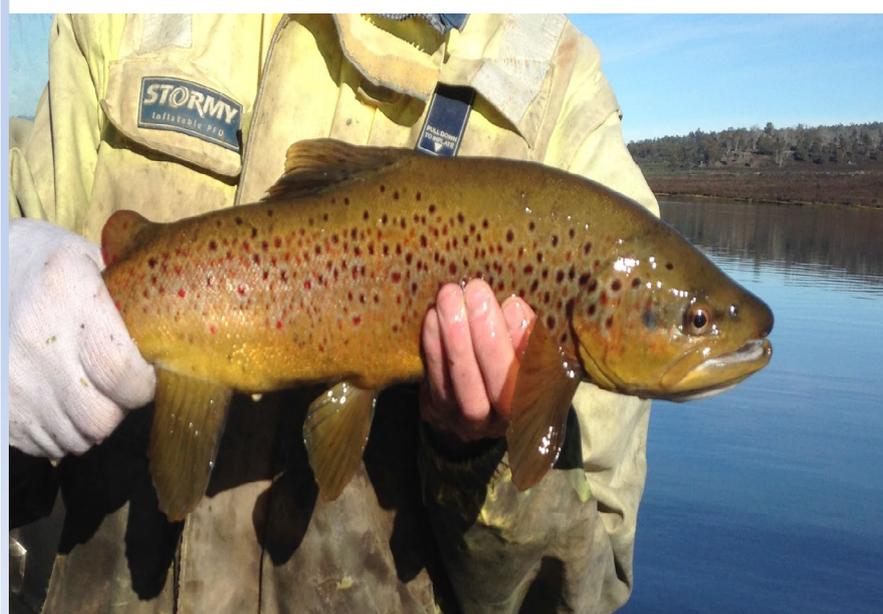


Inland Fisheries Service Report

Recreational Fisheries Report



Fisheries Performance Assessment

Technical Report

Little Pine Lagoon – April 2018

Document Information

Title:	Fisheries Performance Assessment, Technical Report, Little Pine Lagoon April 2018 (Inland Fisheries Service).	
Prepared by:	Rob Freeman	
Reviewed by:	JD,CW	
Version:	Final	13 December 2018
Approved by:	John Diggle (Director of Inland Fisheries)	

Contents

1. INTRODUCTION	1
2. FPA SURVEY METHODOLOGY	2
2.1 IN-LAKE POPULATION SURVEYS	2
2.2 ANNUAL POSTAL SURVEY	2
3. RESULTS	2
3.1 IN-LAKE POPULATION SURVEY 2018	2
3.2 CPUE	3
3.3 WEIGHT AND LENGTH INFORMATION	3
ANGLER POSTAL SURVEY	6
4. DISCUSSION	8
5. RECOMMENDATIONS	9
6. APPENDIX	10

I. Introduction

Hydro Tasmania created Little Pine Lagoon in 1954 by flooding a number of natural lagoons fed by the Little Pine River. The lagoon is 1007.07 m above sea level and at full supply is approximately 2.2 square kilometres. Water stored in the dam is diverted down Deep Creek Cut to Monpeelyata canal and then into Lake Echo for power generation. Water levels can fluctuate up to 1.22 m, however, Hydro Tasmania endeavor to maintain the level around 0.6 m below full supply, in accordance with the Memorandum of Understanding between the Inland Fisheries Service (the Service) and Hydro Tasmania.

Little Pine Lagoon is known as Tasmania's premier fly fishing water receiving upwards of 2,000 anglers per annum and is often in the top five most popular waters in the state. Of all Tasmania's trout waters, the lagoon is highly favoured by interstate and international fly fishers. Tailing fish and large hatches of mayflies are a feature of this water making it well suited to fly fishing.

Brown trout naturally recruit from the Little Pine River system and maintain a healthy and robust fishery. Rainbow trout have previously been recorded from the lagoon, likely resulting from stockings of waters in the Nineteen Lagoons area. Brook trout (9000 yearlings) were stocked in 1966 but failed to establish.

As of the 2018/19 angling season, the fishery is managed with a minimum size limit of 300 mm and a daily bag limit of 5 fish, consisting of only 2 fish over 500 mm. The fishing season opens on the first Saturday in August and closes the Sunday nearest the 30 April in the next year, with the lagoon reserved for fly fishing only.

2. FPA Survey Methodology

2.1 In-Lake Population Surveys

During 17 - 19 April 2018, 52 box traps were set each night over two nights (total of 104 box trap sets), with all areas of the lagoon covered. In total, 482 brown trout were captured with 362 brown trout weighed and measured (fork length), with the remaining 120 brown trout counted only. All fish were judged as male, female or immature, with all fish released away from the trap site after being processed.

2.2 Annual Postal Survey

Since 1986, the Service has conducted a postal survey seeking information about anglers' catches. The survey comprises a form sent to ten percent of all categories of anglers, asking set questions about their angling (catch of trout) for the past season. This information is entered into a database and information on catch per day, harvest and angling effort is extrapolated. This provides a long term overview of individual fishery performance in addition to characterising effort. In this report, only records post 2000 are analysed.

2.3 Analysis methods

Condition factor was calculated using the basic formula of $K=10^5 \times \text{weight}/\text{length}^3$. This provides a basic generalised result that can be used to compare other fish and fisheries. Condition factor categories assigned to each level of condition i.e. poor, fair, good or excellent, are reflective of an individual fish or population at a particular time within the reproductive cycle and will therefore change during this cycle e.g. high during peak spawning condition.

3. Results

3.1 In-Lake Population Survey 2018

During 17 - 19 April 2018, the Service conducted an in-lake survey at Little Pine Lagoon to examine:

- Catch Per Unit Effort (CPUE) for brown trout,
- to assess the population structure and,
- the condition of fish.

Fifty two box traps were set each night over two nights (total of 104 box trap sets), with all areas of the lagoon surveyed. In total, 482 brown trout were captured with 362 brown

trout weighed and measured for fork length, with the remaining 120 brown trout counted only.

3.2 CPUE

In total, 482 brown trout were captured from 104 box trap sets. This equates to a CPUE of 4.64 fish per trap, with the vast majority of traps catching multiple fish. Despite surveys being undertaken previously during 2000, 2003 and 2007, no directly comparable catch effort is available, as all previous surveys utilised boat based electrofishing to collect fish. However, the CPUE for past electrofishing surveys and this survey, where only box traps were used, were all relatively high. This is indicative of a high abundance of fish over all survey periods.

3.3 Weight and Length Information

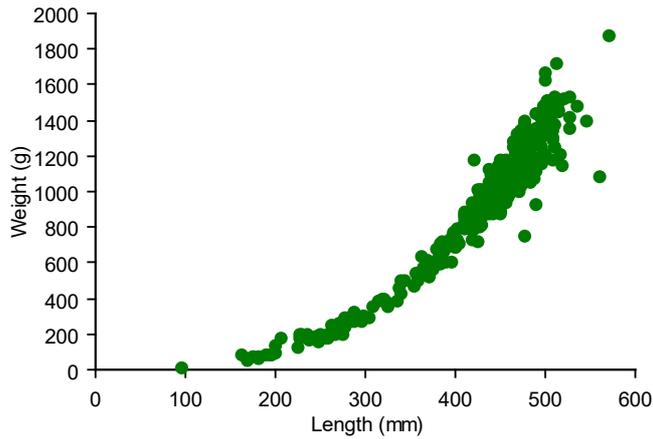
Over two nights, 482 brown trout were captured, consisting of 50% females, 36% males with the remainder being smaller immature fish. Of these fish, 362 were weighed and measured for fork length. Table 1 shows the summary statistics for these fish separated by sex. On average, male fish were significantly heavier than female fish by around 290 grams.

The average weight for all fish, including immature fish was 917 grams. The average weight for fish over 300 mm was 1,044 grams, with 85% of the catch being greater than 300 mm length (see figure 1 & 2).

Grouping	Measurement	Mean	Std Error	Minimum	Maximum
All brown trout (n=362)	Length (mm)	417	4.48	40	570
	Weight (g)	917	20.25	10	1,870
	Cond Factor (k)	1.14	0.01	0.61	2.03
Male (n=132)	Length (mm)	476	2.87	320	570
	Weight (g)	1,189	18.13	400	1,870
	Cond Factor (k)	1.10	0.01	0.61	1.34
Female (n=181)	Length (mm)	424	3.78	247	510
	Weight (g)	899	20.10	170	1,510
	Cond Factor (k)	1.14	0.01	0.69	1.59
Immature (n=49)	Length (mm)	230	9.56	40	338
	Weight (g)	197	14.77	10	460
	Cond Factor (k)	1.25	0.04	0.95	2.03

Table 1: Length, weight and condition factor for brown trout separated by sex or immature fish.

The growth of fish appears to be good with all fish showing a healthy weight for a given length. Just over ten percent of fish had grown to over 500 mm (see figure 1), with no signs of larger fish being in poor condition.



Length Distribution (100 mm ranges)

From (>=)	To (<)	Count	Percent
0.0	100.0	4	1.1
100.0	200.0	11	3.0
200.0	300.0	38	10.5
300.0	400.0	37	10.2
400.0	500.0	234	64.6
500.0	600.0	38	10.5
	Total	362	100.0

Figure 1: Length/weight regression for brown trout captured 2018 ($Y = -10.335 + 2.824 * X$; $R^2 = 0.979$)

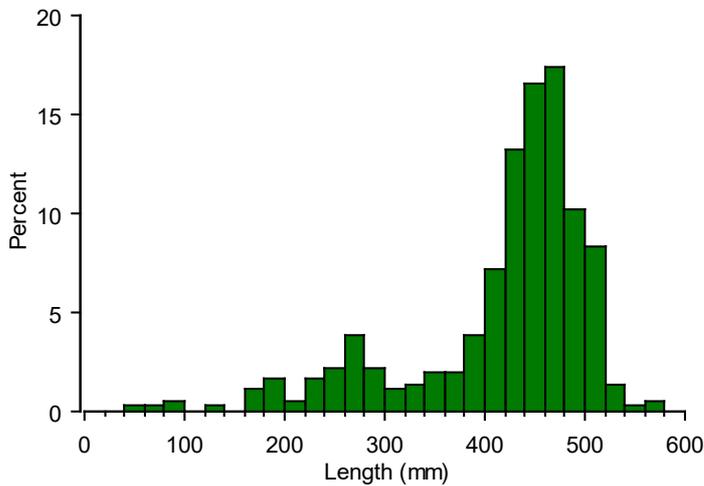


Figure 2: Length frequency for brown trout 2018.

There was good evidence to suggest the recruitment of brown trout has been solid across several years with all length classes present (see figure 2). However, recruitment resulting from 2016 spawning was not high, despite favourable conditions during winter/spring. Nonetheless, there were still reasonable numbers of fish surveyed in the 220 – 320 mm size range.

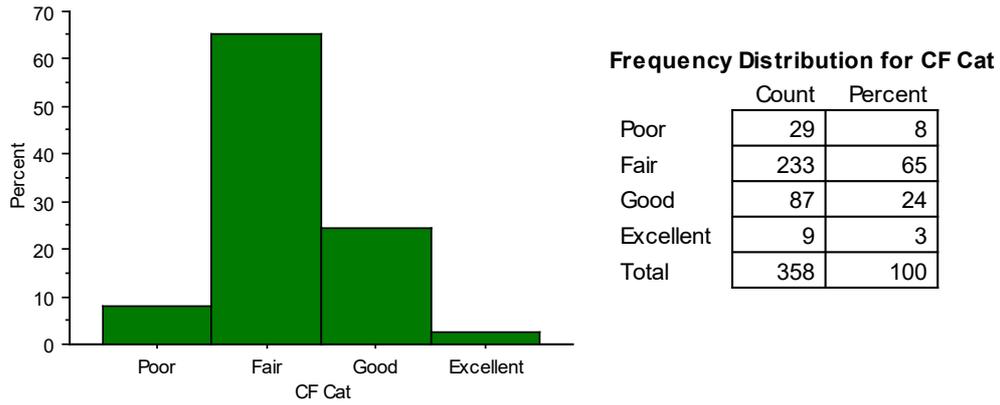


Figure 3: Condition factor categories for brown trout 2018.

In general, the overall condition of brown trout was good, with an average k-factor of 1.14. Just eight percent of fish were in poor condition with 92 percent in the fair to excellent range (see figure 3). This is typical of most lake fisheries within the State.

Angler Postal Survey

Average (mean) fishing effort in the period 2000 - 2018 was 8,032 angler days per season, with a low of 5,422 days in 2005/06 and a high of 12,280 days during 2009/10 (see figure 4). The increase in fishing effort during 2007 – 2010 is likely a consequence of drought conditions during 2007 – 2008 affecting other major fisheries, with a large influx of anglers electing to fish Little Pine Lagoon. This drought broke in 2009 and anglers continued to fish at the lagoon with higher water levels providing favourable fishing conditions. The decline in effort in recent years is a combination of; other waters such as Penstock Lagoon fishing extremely well, a decline in the catch rate during 2015-16 (see figure 7) and the reluctance of anglers to fish Little Pine Lagoon when the mayfly hatches were either poor or sporadic.

Interestingly, the daily catch rate during the 2017/18 season was the equal highest recorded, returning a result of 1.6 fish per day, the same as the 2013/14 season (see figure 7). The effect of this high catch rate was however, diminished by low fishing effort, resulting in an annual harvest below the long-term average (see figure 6). At present, there is significant room for additional anglers at this fishery with total angling effort well below the long-term average (see figure 4).

The average number of days fished by anglers within each season remained around the long term average of 4 days and had little effect on angling effort (see figure 5).

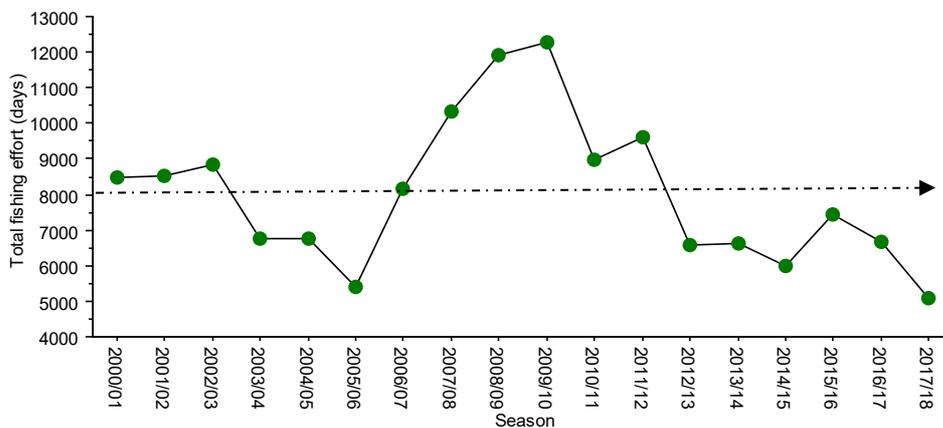


Figure 4: Total fishing effort 2000 – 2018 (dotted line indicates long-term average).

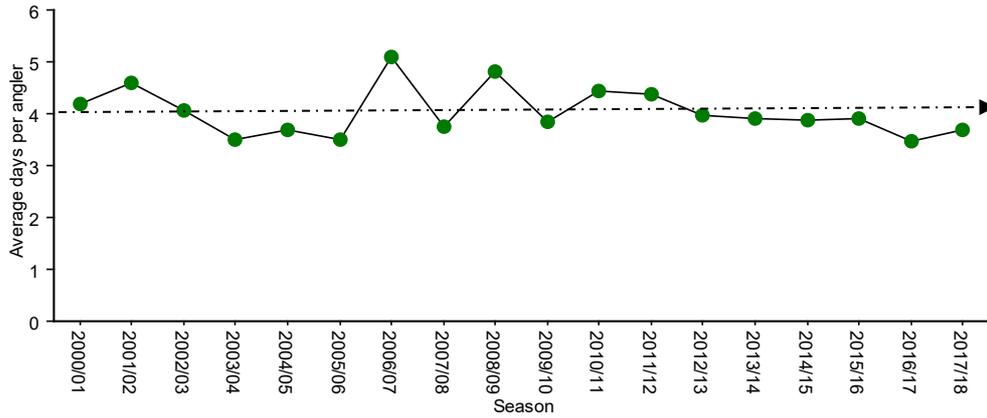


Figure 5: Number of days fished per angler for each season 2000 – 2018 (dotted line indicates long-term average).

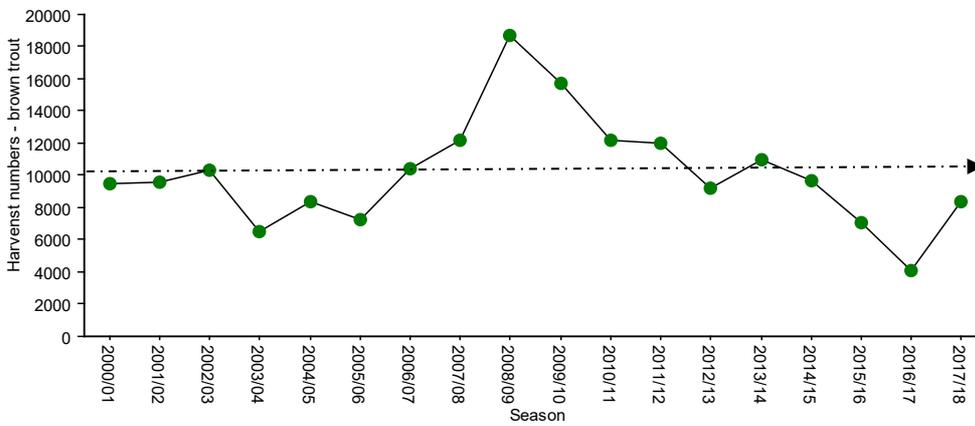


Figure 6: Estimated harvest of brown trout 2000 – 2018 (dotted line indicates long-term average).

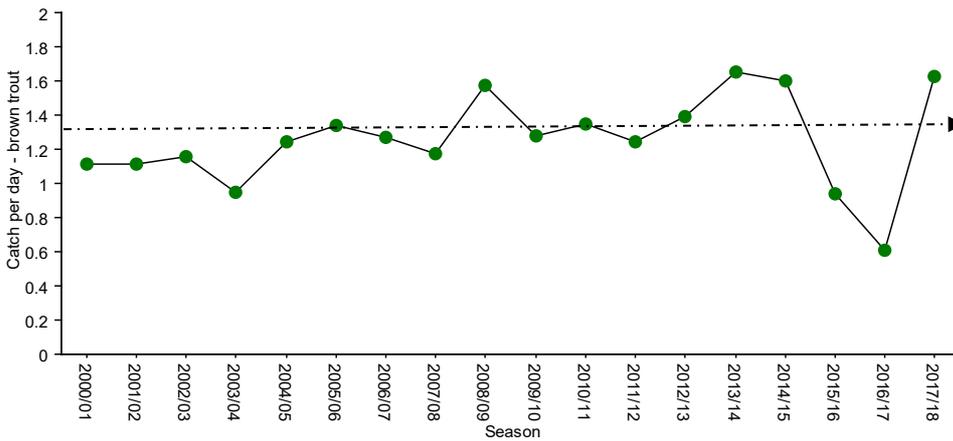


Figure 7: Daily catch rate for brown trout 2000 – 2018 (dotted line indicates long-term average).

4. Discussion

The fishery at Little Pine Lagoon appears to be robust and performing well. The lagoon contains a high abundance of brown trout across a range of size classes. There is some evidence the 2016 cohort of brown trout is not as strong as might be expected, especially given the above average rainfall during May – October 2016, the spawning/fry development period. Though, sampling bias may be influencing this result as generally, 2yo trout are not as catchable in box traps compared to larger fish (i.e. 300⁺mm) The CPUE from the in-lake survey was high and above that for similar sized waters, e.g. Penstock Lagoon (3.6 brown trout per trap). The average weight of fish was good with fish over 300 mm averaging 1,044 grams. Moreover, 85% of the catch was greater than 300 mm length. There were no signs of any growth limiting factors, with over 10 percent of the fish measuring greater than 500 mm, with very few fish in poor condition across the survey population. There is no evidence of excessive harvest with significant latent fishing effort apparent over the last six years.

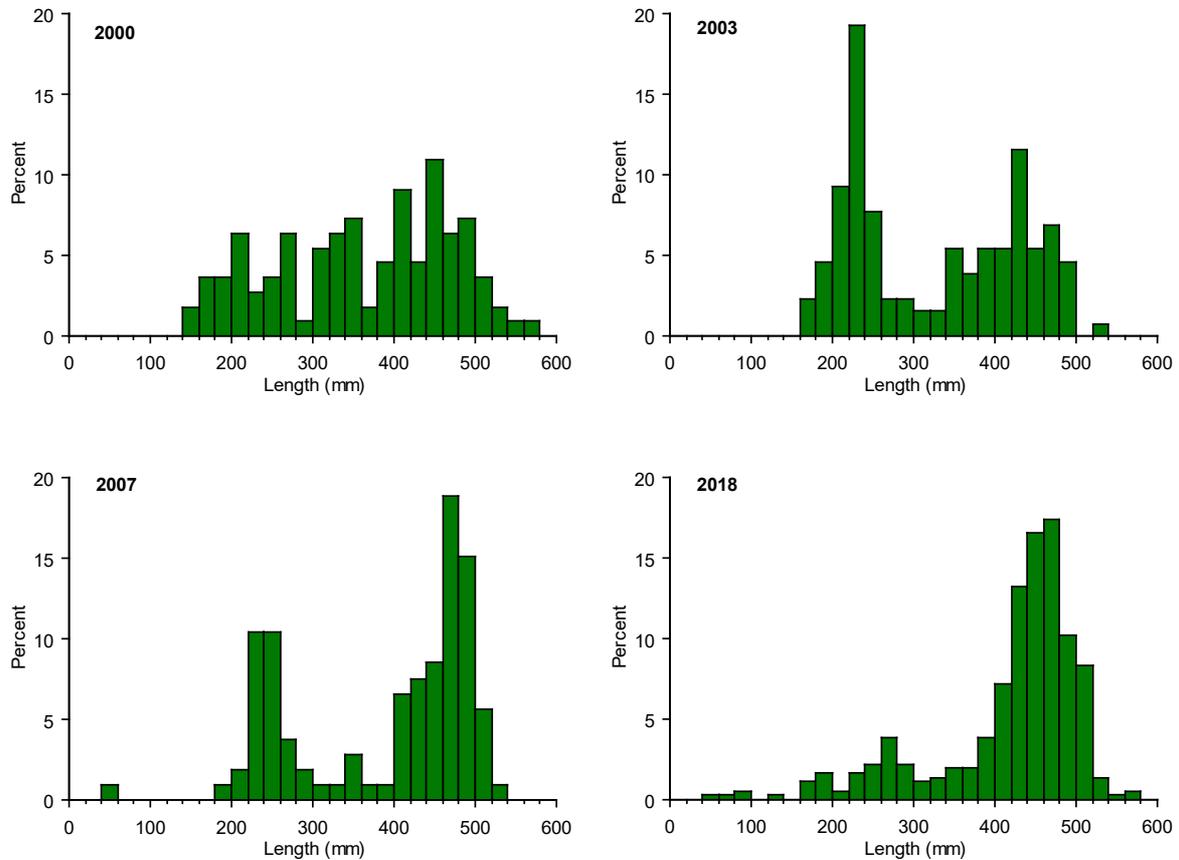
The results of this assessment are comparable to previous surveys (see appendix A – D), this is despite different sampling methods employed. All surveys suggest a high abundance of fish from most size classes however, the average length and weight of fish capture during the 2018 survey was significantly greater than for the 2000 and 2003 but similar to 2007.

In summary, at present Little Pine Lagoon has a high abundance of brown trout across a wide range of sizes. The vast majority of fish are in good condition and the growth of fish relative to most other waters is good. The annual harvest relative to fish abundance is low, and present fishery management actions are serving the fishery adequately.

5. Recommendations

- The trout fishery at Little Pine Lagoon continues to be managed by way of adjustment to bag and size limits. At present (2018/19 season), the minimum size limit is 300 mm with a daily bag limit of 5 fish consisting of only 2 fish over 500 mm length. Given there is significant latent fishing effort, there are no recommendations to alter either bag or size limits.
- Monitoring of future angling effort and harvest is achieved by angler feedback and assessment via the annual postal survey.
- Monitoring of the brown trout population is in accordance with the schedule as outlined in the Tasmanian Inland Recreational Fishery Management Plan 2018-28.
- There are no performance targets set for Little Pine Lagoon but maintenance of long term catch rates and mean fish weights are desirable.
- At present the lagoon has the capacity to sustain more fishing effort and a higher harvest and should be promoted as an alternate fishery to the heavily patronised Penstock Lagoon and Woods Lake.
- The results of this survey suggest sampling effort and the timing of the survey are optimal.

6. Appendix



Appendix A: Length frequency for brown trout Little Pine Lagoon in-lake surveys 2000 – 2018.

Descriptive Statistics

Split By: Year

	Mean	Count	Minimum	Maximum	Median	IQR
Length (mm), Total	387	708	40	572	427	173
Length (mm), 2000	360	110	146	572	376	179
Length (mm), 2003	326	130	162	528	336	197
Length (mm), 2007	388	106	50	525	436	215
Length (mm), 2018	417	362	40	570	446	73
Weight (g), Total	816	685	10	1870	920	740
Weight (g), 2000	760	91	175	1650	775	600
Weight (g), 2003	530	130	40	1420	410	780
Weight (g), 2007	871	106	120	1640	1030	1020
Weight (g), 2018	917	358	10	1870	1000	420

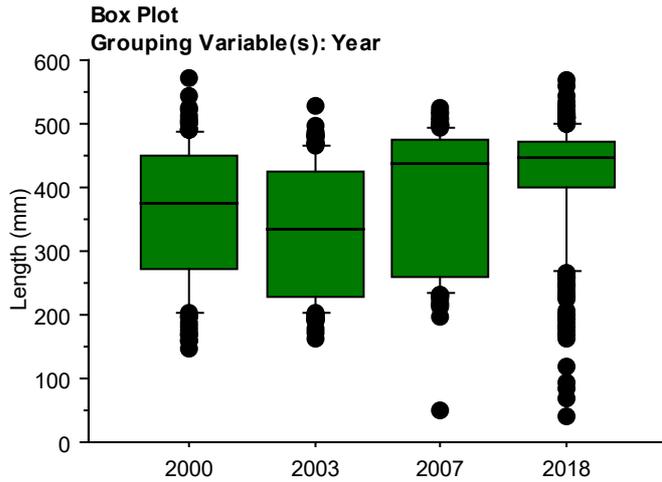
Fisher's PLSD for Weight (g)

Effect: Year

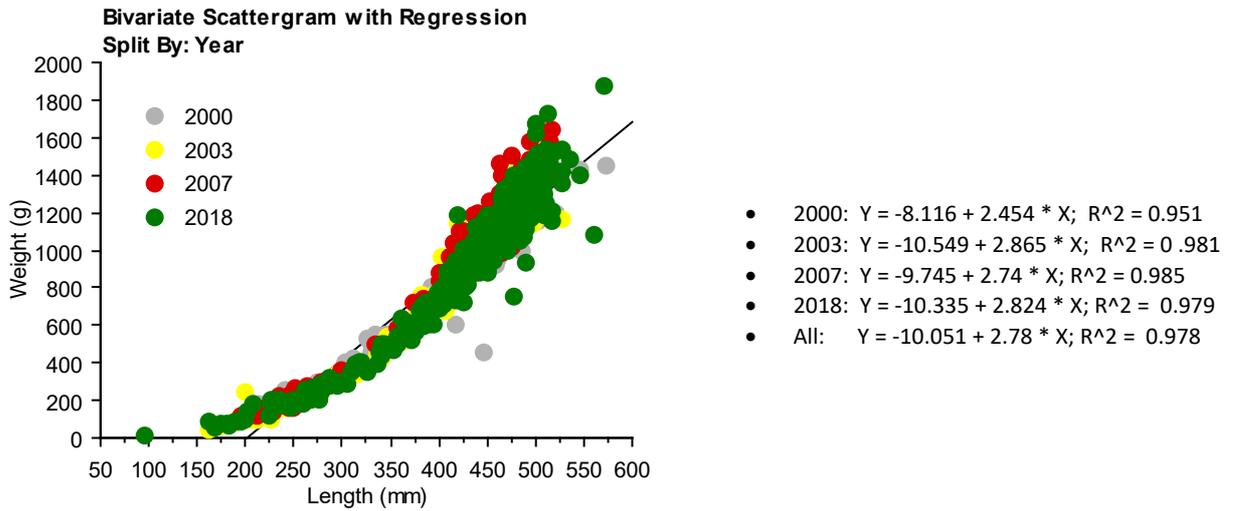
Significance Level: 5 %

	Mean Diff.	Crit. Diff.	P-Value	
2000, 2003	228.802	108.451	<.0001	S
2000, 2007	-112.561	113.394	.0517	
2000, 2018	-158.797	93.152	.0009	S
2003, 2007	-341.363	103.839	<.0001	S
2003, 2018	-387.599	81.251	<.0001	S
2007, 2018	-46.237	87.739	.3012	

Appendix B: Summary statistics for brown trout Little Pine Lagoon in-lake surveys 2000 – 2018.



Appendix C: Box plots for weight, brown trout Little Pine Lagoon in-lake surveys 2000 – 2018.



Appendix D: Length/weight relationship for brown trout Little Pine Lagoon in-lake surveys 2000 – 2018.