

Inland Fisheries Service

RECREATIONAL FISHERIES REPORT



Fisheries Performance Assessment

Technical Report

Bradys Chain of Lakes – September 2021

Inland Fisheries Service *Fisheries Performance Assessment* Technical Report – Bradys Chain of Lakes 2021

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I. INTRODUCTION

The Bradys Chain of Lakes (referred to as the Bradys system in this report), consists of Bradys Lake, Lake Binney and Tungatinah Lagoon. These three lakes were created during 1952-56 as water storages to run the nearby Tungatinah power station on the Nive River. Water is conveyed from Bronte Lagoon to Bradys Lake via Woodward's Canal. Lake levels fluctuate regularly and water flows in the spawning grounds are highly variable. The impacts of this on the fishery are not fully understood however, recruitment of trout is likely to be highly variable.

The Bradys system, in conjunction with Bronte Lagoon, provide a fishery of State significance with Bronte Lagoon, Bradys Lake and Lake Binney, all listed within the top ten most popular fisheries in Tasmania.

Until the late 1990's, these waters sustained a satisfactory population of brown trout. Rainbow trout represented a small but noteworthy population, with around one rainbow caught for every five-brown trout.

During the period 2000–03, marked declines in the catch rate of brown trout were apparent, with catches falling as low as 0.34 fish per angler per day. This was below what was acceptable for a popular and productive fishery. In response, the Service conducted a survey during 2003 of both Bradys Lake and Lake Binney. Following the results of this survey, the Service began to increase the stocking rate for both brown and rainbow trout and took the opportunity to release adult brown trout collected from the spawning run at Liawenee, ex brood stock Atlantic salmon from commercial hatcheries, domestic rainbow trout and brook trout. Furthermore, with the commissioning of the Service's trout hatchery at New Norfolk during 2007, the first large stocking of 20-gram brown trout fingerlings occurred. These 20-gram fingerlings failed to show in the fishery, indicating poor survival. Consequently, this program was discontinued in favour of the transfer of adult brown trout (more recently from the Lake King William spawning trap).

An in-lake survey was conducted by the Service from 13-16 September 2021, following on from an earlier 2019 survey where fin clipped and tagged brown trout were released. This enabled the Service to gather data on a range of fishery attributes and compare it to the results found during the 2021 in-lake survey.

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2. FPA SURVEY METHODOLOGY

2.1. IN-LAKE POPULATION SURVEYS

During the winter of 2019, 3 548 adult brown trout were collected from the River Derwent fish trap at Lake King William and individually t-bar tagged and released into the Bradys system. Of these, 3 409 were released into Bradys Lake and 139 released into Lake Binney. In addition, 2,750 adult brown trout from the River Derwent trap were adipose fin clipped and released into Lake Binney with a further 750 adipose fin clipped and released into Tungatinah Lagoon. In the same year, these trout formed the basis of a Capture Mark Recapture (CMR) population estimate, in addition to providing information about the movement of fish within the system. The results of this survey gave a population estimate for the Bradys System of 25 149, of which 11 569 inhabited Bradys Lake. Analysis of the movement of tagged and fin clipped fish provided evidence of downstream movement of fish from Bradys Lake into both Lake Binney and Tungatinah Lagoon. Since this time, no tagged or clipped fish have been released into the system.

From 13-16 September 2021, 240 box traps were set throughout the three waters (Appendix 1). At Bradys Lake, 40 traps were set each night for three nights for a total of 120 box trap sets. At Lake Binney, 40 traps were set each night for two nights for a total of 80 box trap sets and 40 box traps were set at Tungatinah Lagoon for one night. All sets were placed around the perimeter of the lakes and there were no deep-water sets. Soak times were between 20 – 24 hours. A set of traps on the southern end of the island at Bradys Lake was moved after the second night, as no fish had been trapped there. These were placed along the shack shore to the south of the island (see Appendix A).

During the survey lake levels were at maximum capacity. The presence of platypus made it difficult to set traps in long strings.

All trout captured were recorded as male, female, or immature and were weighed and measured (fork length). Fish were released away from the trap site after processing without being marked.

2.2. ANNUAL POSTAL SURVEY

Since 1986, the Inland Fisheries Service (IFS) has conducted a postal survey seeking information about anglers' catches. The survey comprises a form sent to around 4,000 anglers of all licence categories asking set questions about their angling (catch of trout) for the past season. Information on catch per day, harvest and angling effort is collated and analysed. This provides a long-term overview of individual fishery performance in addition to characterising fishing effort. Only records post 1999 were used.

2.3. STOCKING DATABASE

The IFS keeps electronic records of fish stocking within public waters dating back to 1980. These records set out information on location, date of stocking, species, age, origin, stock type and genotype, in addition to some length/weight data and comments e.g. denoting tagged fish. This information provides an historical record of supplementary recruitment into individual waters.

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Prior to 2003, there was no stocking of the Bradys system. Natural recruitment maintained the trout population since its impoundment. However, during the late 1990's and early 2000's, falling catch rates of brown trout were apparent (see figure 8). This situation initiated a stocking program utilising wild strain brown trout fry, fingerlings and adult transfers collected from various sources (see appendix B). Also, during the period 2004 - 2010, Atlantic salmon, brook trout and larger domestic rainbow trout were released to generate interest and supplement the daily catch rate. This was done at a time when extreme drought was impacting other waters and resulted in a shift of angling effort to the Bradys system. While these circumstances resulted in increased participation, with an almost doubling of angling effort (see figure 7), it also resulted in an increased harvest of brown trout and likely further depleted the population.

Since 2010, there has been a commitment to stock only wild brown trout and where feasible, wild stock rainbow trout. The use of brown trout fingerlings became the main source of restock and in the seven-year period 2008 – 14, over 750 000 (mostly fingerlings) were released into the system. This stocking strategy failed to produce any notable increase in the catch rate and consequently, it was discontinued in favour of the more reliable strategy of translocating adult brown trout collected from the spawning runs at yingina / Great Lake, Arthurs Lake and later, Lake King William. The use of Lake King William fish has now been adopted as the primary method of restock, however it is difficult to draw any link between stocking events and a sustained increase in the daily catch rate, as recorded from the APS (see Appendix B and Figure 8). This was made more difficult by a high water event at Lake King William in 2020 which prevented any fish from being captured for transfer to the Bradys system.

In response to the high water event, the Service transferred 1,044 Great Lake brown trout and stocked a further 4,507 triploid rainbow trout from Millybrook Hatchery into Bradys Lake (see appendix B). No other lakes in the system received fish in 2020.

2.4. ANALYSIS METHODS

Condition factor was calculated using the basic formula of $K=10^5 \times \text{weight}/\text{length}^3$. This provides a 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. The shortcomings of condition factor are acknowledged but are used for relative comparisons only. Categories are indicative and may not necessarily reflect the perception of anglers in general.

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3. RESULTS

3.1. IN-LAKE POPULATION SURVEY – BROWN TROUT

During 13-16 September 2021, the Service conducted an in-lake survey within the Bradys System to examine:

- CPUE for brown trout and rainbow trout,
- examine the length and weight of all trout,
- the condition of all trout,
- assess the structure of the brown trout population, and
- assess the growth and potential survival of tagged and fin clipped fish released during 2019.

CPUE

Two hundred and forty box traps were set over three nights with 193 brown trout and 2 rainbow trout captured. This equates to a CPUE of 0.8 brown trout per trap. Previous surveys during 2003 and 2011, indicated the number of fish within the system was relatively low. However, no directly comparable catch effort data is available, as these surveys utilised a range of methods such as boat-based electrofishing, fyke netting and gill netting to collect fish rather than box traps. The 2019 survey that employed the same capture methods, resulted in the capture of 314 brown trout and 3 rainbow trout captured across the system for the same survey effort. This equates to a CPUE of 1.31 brown trout per trap.

In 2021, the split of catches between waters expressed as fish per trap i.e. CPUE, was; Bradys Lake 0.88, Lake Binney 0.73 and Tungatinah Lagoon 0.73. This compares to the 2019 survey CPUE results of; Bradys Lake 1.0, Lake Binney 1.39 and Tungatinah Lagoon 2.08.

Weight and Length Information

All 193 brown trout captured were weighed, measured and sex determined. Eleven fish were too small to obtain an accurate weight measurement. For these fish, only a length measurement was taken. Seven of the captured fish were tagged and three had adipose fin clips from the 2019 survey.

Table 1 shows the summary statistics for all brown trout separated by sex, with 109 females, 54 males and 19 immature fish. The mean weight for all fish combined was 641 g with an average length of 375 mm. The average condition factor was 1.04 k, with a minimum of 0.81 k and a maximum of 1.31 k. On average, male fish weighed 128 g more than female fish, with both sexes having the same condition factor of 1.04 k.

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Table 1: Length, weight and condition factor for resident brown trout separated by sex and immature fish 2021.

Grouping	Measurement	Mean	Minimum	Maximum
Total for all fish (including immature fish) (length n=193) (weight n=181) (CF n=181)	Length (mm)	375	70	535
	Weight (g)	641	130	1,460
	Cond Factor (k)	1.04	0.81	1.31
Male (n=54)	Length (mm)	415	353	520
	Weight (g)	754	460	1,460
	Cond Factor (k)	1.04	0.84	1.26
Female (n=109)	Length (mm)	388	312	535
	Weight (g)	626	300	1,390
	Cond Factor (k)	1.04	0.81	1.29
Immature (length n=30) (weight n=19) (CF n=19)	Length (mm)	252	70	408
	Weight (g)	407	130	560
	Cond Factor (k)	1.09	0.96	1.31

The length/weight plot (see Figure 1) shows the growth rate is consistent throughout the system. Of the five fish 500 mm or longer, three were from Bradys Lake, with one each from Tungatinah Lagoon and Lake Binney. Thirteen fish under 300 mm were captured in Bradys Lake with only one captured in Lake Binney. The smallest fish measured in Tungatinah Lagoon was 335mm.

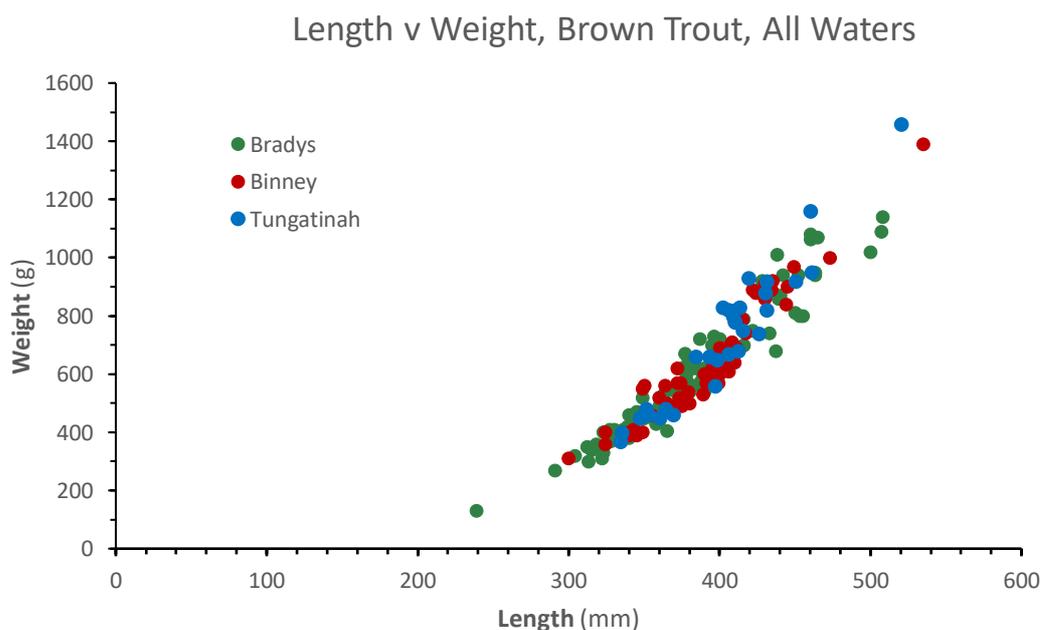


Figure 1: Length/weight scatterplot for all brown trout captured, separated by each water, (Bradys Lake, Lake Binney and Tungatinah Lagoon).

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Table 2 shows the length, weight and condition factor for all brown trout separated by each water in the Bradys system. The lowest average length and weight for trout across the system was from Bradys Lake. This is due to the higher number of smaller fish captured in this lake (see Figure 1). The condition factor of fish in both Bradys Lake and Lake Binney was 1.04 k. On average, Tungatinah Lagoon had a higher condition factor of 1.07 k, with fish being longer and heavier than the rest of the system.

Table 2: Length, weight and condition factor for all brown trout separated by water 2021.

Grouping	Measurement	Mean
Bradys Lake (length n= 106) (weight n=96)	Length (mm)	359
	Weight (g)	616
	Cond Factor (k)	1.04
Lake Binney (length n=58) (length n=57)	Length (mm)	388
	Weight (g)	642
	Cond Factor (k)	1.04
Tungatinah Lagoon (length n= 29) (weight n=29)	Length (mm)	403
	Weight (g)	725
	Cond Factor (k)	1.07

Figure 2 shows the large variation in fish size at Bradys Lake compared to Lake Binney and Tungatinah Lagoon. The lake had more outliers (smaller fish) bringing down the average length, while Lake Binney had less variation in fish length (see figure 2). Tungatinah Lagoon had the highest average length of fish due to less numbers of smaller fish.

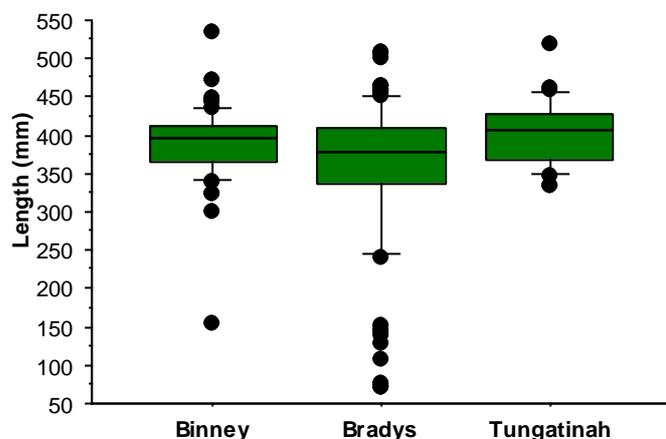


Figure 2: Box plot length comparison of fish between lakes in the Bradys system 2021.

Figure 3 shows the length frequency for all brown trout captured and measured during the survey. There is a significant group of fish in the 330-370 mm range and a second grouping in the 380-410 mm range. It is

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not possible to differentiate these as year groups because the growth of fish is relatively slow; furthermore, the Bradys system has since 2013 been supplemented with significant numbers of adult brown trout transferred from different localities. There are, however, signs of recruitment of juvenile brown trout with 7 percent of fish less than 300 mm. When separating this data by individual waters (see figures 4-6), it is evident that Bradys Lake contained the most juveniles, with 13 percent of the fish under 300 mm. In comparison, Lake Binney had 3 percent and Tungatinah Lagoon had no fish under 300 mm.

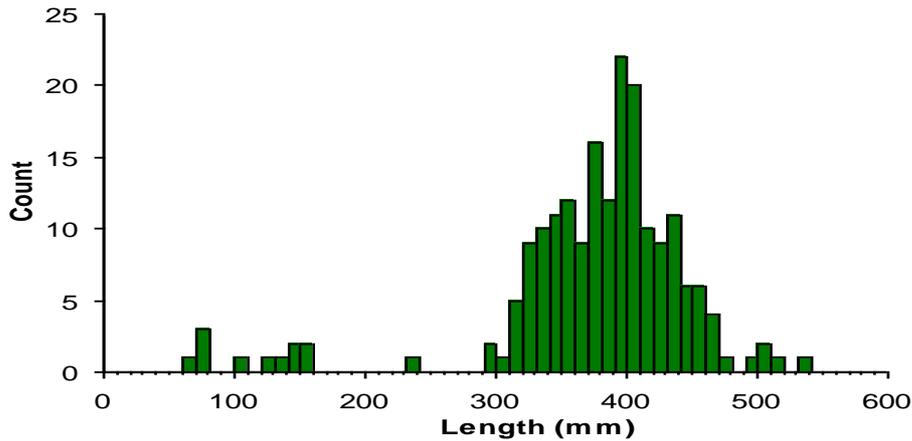


Figure 3: Length frequency for all brown trout captured (Bradys Lake, Lake Binney & Tungatinah Lagoon).

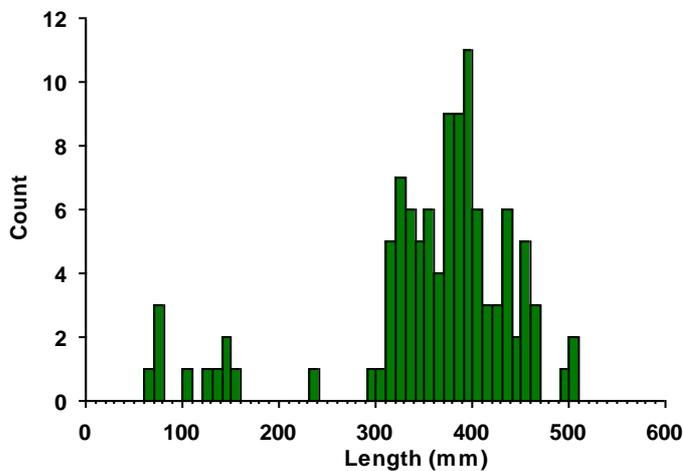


Figure 4: Length frequency for all brown trout captured in Bradys Lake.

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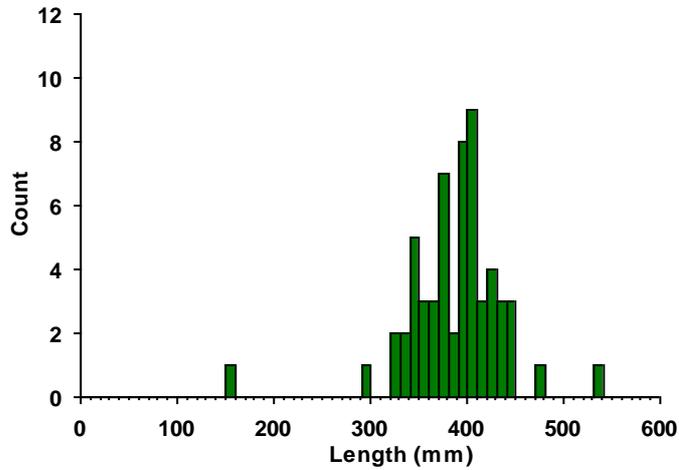


Figure 5: Length frequency for all brown trout captured in Lake Binney.

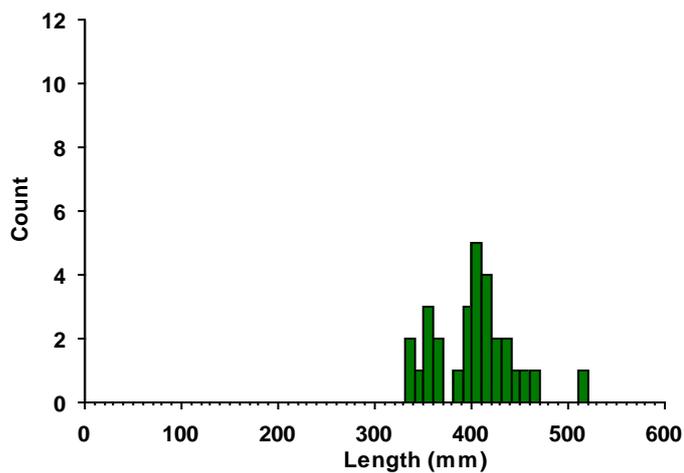


Figure 6: Length frequency for all brown trout captured in Tungatinah Lagoon.

Condition Factor

The average condition factor (k-factor) across the system was 1.04 k, with a minimum of 0.81 k and a maximum of 1.31 k (see Table 1). This result is lower than most comparable lake populations and similar to the 1.02 k average condition factor result from the 2019 FPA survey. Forty percent of fish had a k-factor below 1 k with 9 percent of fish below 0.9 k, indicating poor condition (see Figure 5). Just over 4 percent of fish were in good condition (>1.2 k). No fish had a condition factor greater than 1.4 k. This result is similar to the adult brown trout transferred from Lake King William during 2021 (see Table 3).

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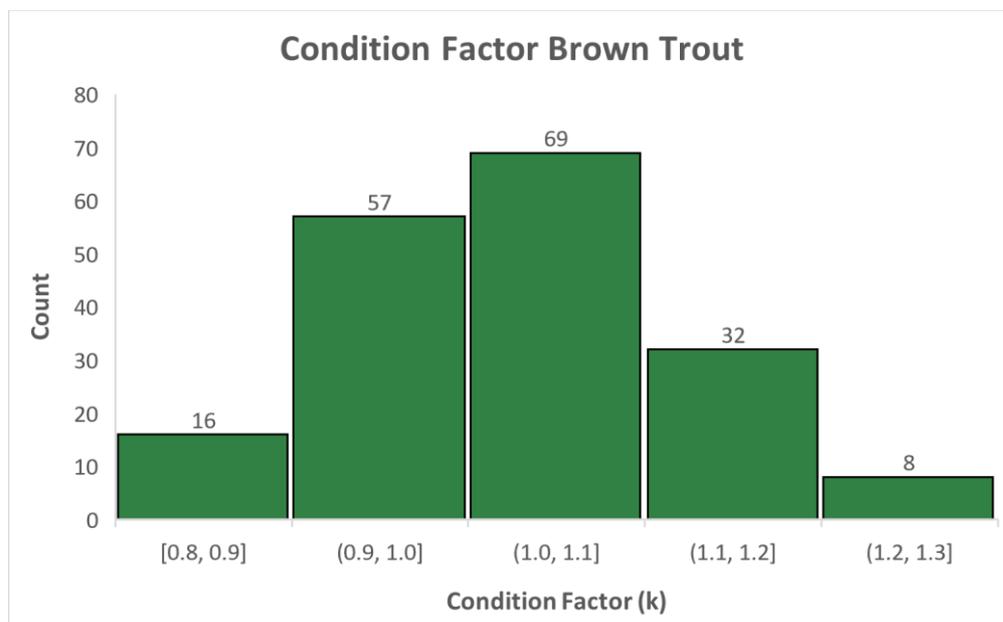


Figure 5: Condition factor (k-factor) for resident brown trout 2021.

Table 3: Length, weight and condition factor for Lake King William 2021.

Grouping	Measurement	Mean	Minimum	Maximum
All trout (n=348)	Length (mm)	364	0	456
	Weight (g)	528	0	990
	Cond Factor (k)	1.09	0.88	1.45
Male (n=144)	Length (mm)	374	260	456
	Weight (g)	561	180	990
	Cond Factor (k)	1.06	0.89	1.26
Female (n=204)	Length (mm)	357	283	424
	Weight (g)	505	270	760
	Cond Factor (k)	1.11	0.88	1.45

Generally, the condition of fish declined with length (age), although this is intrinsically related to the calculation of condition factor (see Figure 6). The condition of fish was not affected by their location within the system, with fish from all three waters displaying a similar spread of condition factor values.

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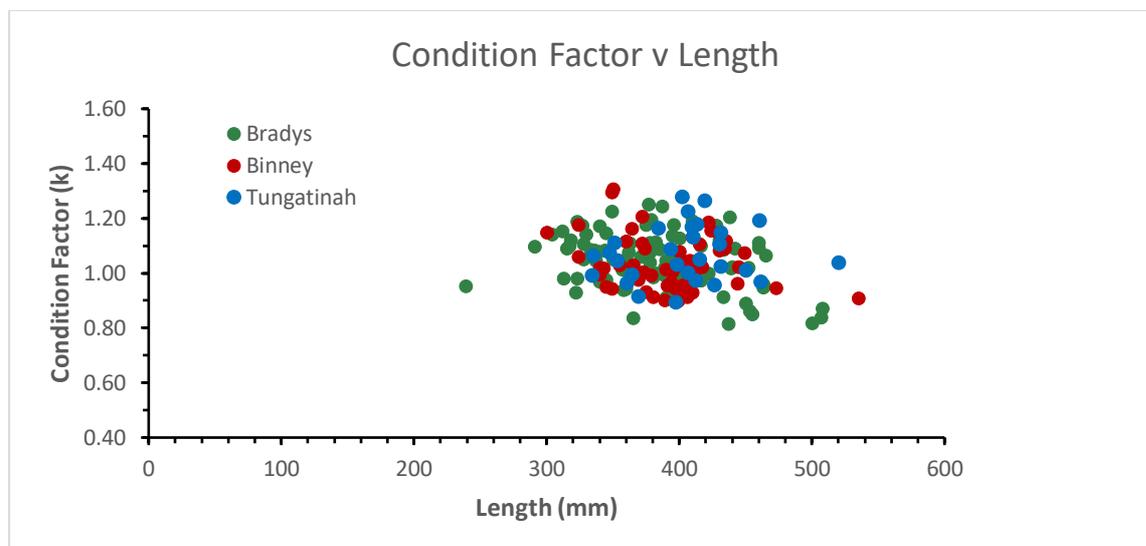


Figure 6: Condition factor compared to length of for all brown trout 2021, separated by water.

3.2. IN-LAKE POPULATION SURVEY – RAINBOW TROUT

Only two rainbow trout were captured during the survey. One, 118 mm juvenile from Bradys Lake that was too small to weigh or determine sex. This fish may be a sign of natural recruitment within the Bradys system or, a fish that has dropped down from Bronte Lagoon or Dee Lagoon. The second fish was captured from Lake Binney. It was 372 mm long and weighed 500 g. The sex of the fish was indeterminate, likely due to it being a triploid from the stocking during 2020.

3.3. TAGGED AND FIN-CLIPPED BROWN TROUT RECAPTURES

Out of 193 fish captured, seven were tagged and three were fin clipped. Three tagged fish were captured in Bradys Lake, two in Lake Binney and two in Tungatinah Lagoon. A single fin clipped fish (initially stocked into Lake Binney) was captured in each of the lakes.

Having stocked 3,409 tagged fish into Bradys Lake and a combined 3,500 fin clipped fish into Lake Binney and Tungatinah Lagoon in 2019, the seven tagged and three fin clipped fish recaptured in this survey represents a considerable decline in the number of these fish. During 2019, tagged and fin clipped fish combined represented 28 percent of the total catch of brown trout. During this survey, they represented 5 percent. Indicating a 140 percent decline over the previous two year period.

On average, recaptured tagged fish put on 166 g each, equivalent to a 25 percent increase (see Table 4). This is despite one fish (tag #850) having lost 70 g. This fish was originally the longest and heaviest of the seven but is now the fifth heaviest.

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Table 4: Length and weight data for recaptured tagged fish compared to the 2019 result.

Tag Number	2019 Length (mm)	2019 Weight (g)	2021 Length (mm)	2021 Weight (g)	Recapture Lake
2611	355	490	389	600	Bradys Lake
2421	352	530	398	660	Bradys Lake
850	419	750	437	680	Bradys Lake
435	368	560	430	910	Lake Binney
2922	372	660	444	840	Lake Binney
52	320	390	415	750	Tungatinah Lagoon
1244	391	720	431	820	Tungatinah Lagoon

4. ANGLER POSTAL SURVEY

4.1. BRADYS LAKE

The 2020-21 angling season saw an increase in angling effort at Bradys Lake (see Figure 7) with participation numbers at their highest since the 2014-2015 season.

During the 2004-05 fishing season, the IFS began stocking the system with adult brown trout sourced from the spawning run at yingina / Great Lake. This action, along with the periodic release of larger rainbow trout and Atlantic salmon and the stocking of brown trout fingerlings, saw fishing effort almost double from around 5,000 days to 10,000 days during 2005–2011. Post 2010-11, fishing effort returned to around the long-term average of 6,960.

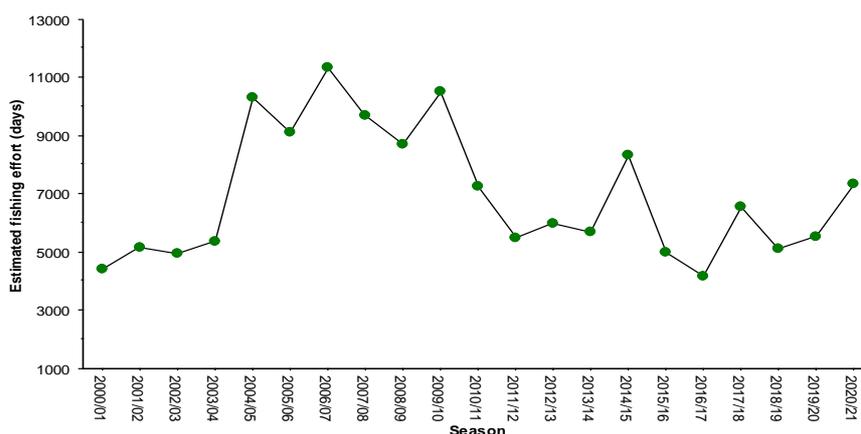


Figure 7: Estimated fishing effort, Bradys Lake, 2000 - 2021.

The combined catch rate for brown and rainbow trout in Bradys Lake in the 2020-21 season was the lowest since 2013-14 at 0.49 fish per day. This result consisted of 0.35 brown trout and 0.14 rainbow trout per day (see figure 8). Bradys Lake had the lowest overall catch rate in the system.

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As seen in figure 9, the estimated harvest of brown trout in Bradys Lake during the 2020-21 season was 2,605, down by 1,047 on the long-term average. This is likely due to the lower numbers of brown trout stocked into the lake during 2020 (n=1,044), irrespective of an increase in fishing effort.

During 2020-21, the rainbow trout harvest was the second highest recorded since 2011-12 and is indicative of the number of rainbow trout stocked during 2020.

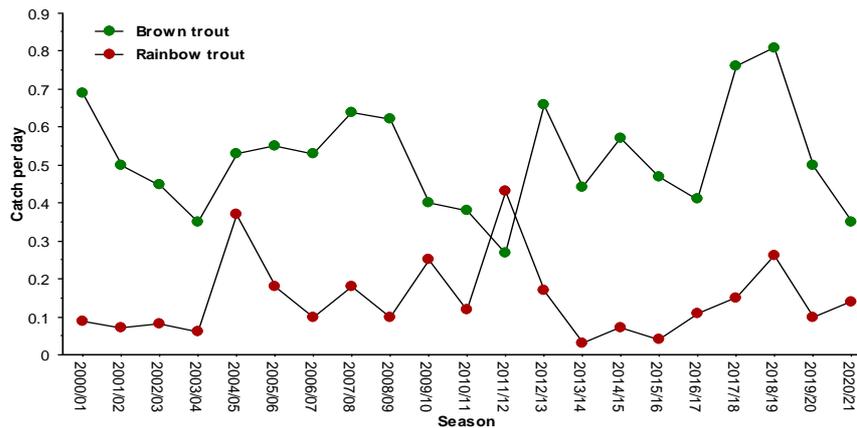


Figure 8: Daily catch rate for brown & rainbow trout, Bradys Lake 2000-2021.

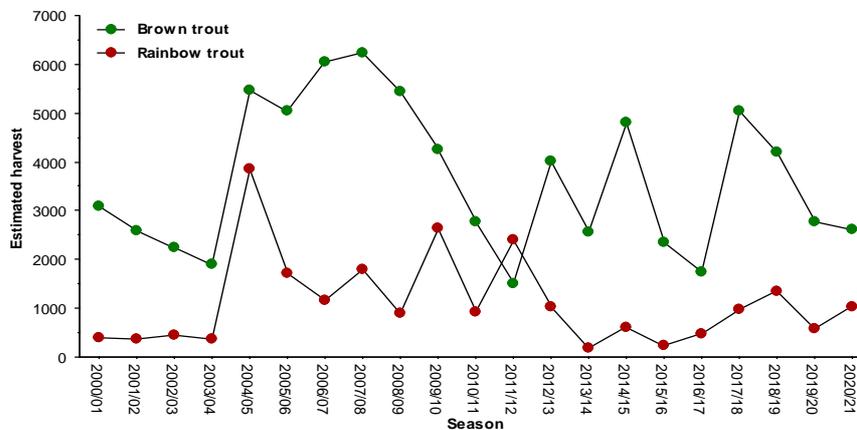


Figure 9: Estimated harvest of brown & rainbow trout, Bradys Lake 2000-2021.

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4.2. LAKE BINNEY

During 2020-21, the fishing effort for Lake Binney was the highest on record at 6,619 (figure 10). This is nearly double the long-term average of 3,323 angler days since the 2000-01 season.

Catch rates for brown trout in Lake Binney (figure 11) fell to 0.77 fish per day, which is slightly below the long-term average since 2000-01. This may be attributed to the low numbers of brown trout stocked into the system during 2020. Rainbow trout catch rates increased to 0.25 fish per day, the highest since 2011-12 and nearly double that of Bradys Lake, providing evidence that rainbow trout move down the system over time.

Regardless of the lower catch of brown trout, the combine catch rate for brown and rainbow trout was 1.02 k that is the highest in the system.

The estimated harvest of brown trout for Lake Binney fell from a high of 6,937 fish during the 2019-20 season to 5,118 during 2020-21, but was still more than double the long term average of 2,545 (see figure 12). The number of rainbow trout harvested was estimated at 1,716, the highest since 2004-05. In total, an estimated 6,834 trout were harvested from Lake Binney last season even though the catch rate for brown trout declined. This increase in angling effort can be attributed to an increase in the catch rate of rainbow trout following a stocking of over 4,500 yearling rainbow trout during 2020.

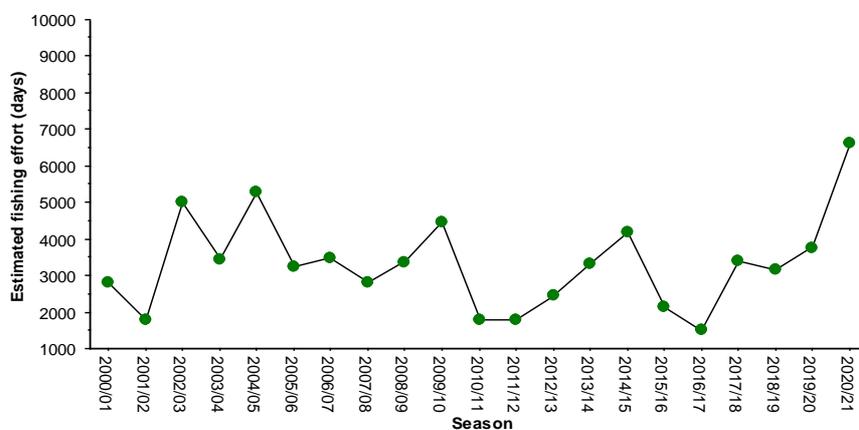


Figure 10: Estimated fishing effort, Lake Binney, 2000 – 2021.

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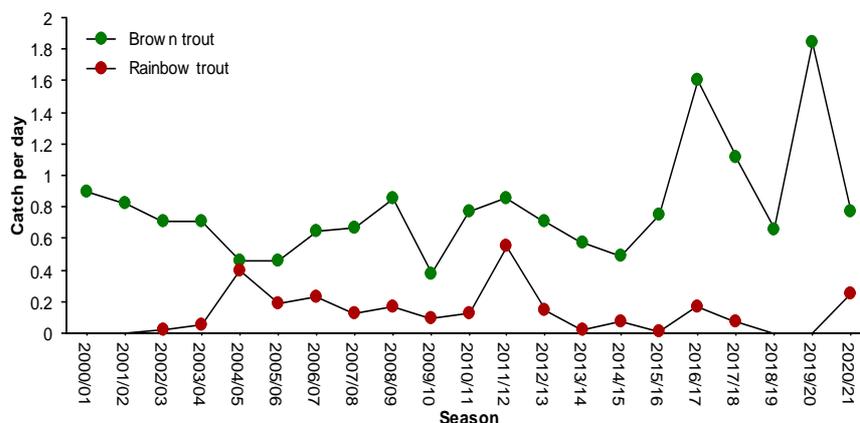


Figure 11: Daily catch rate for brown & rainbow trout, Lake Binney 2000 - 2021.

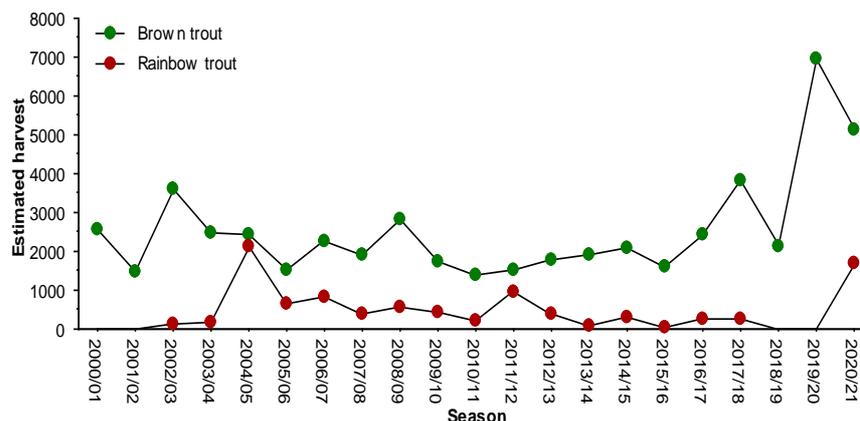


Figure 12: Estimated harvest of brown & rainbow trout, Lake Binney 2000 – 2021.

4.3. TUNGATINAH LAGOON

Angling effort at Tungatinah Lagoon during 2020-21 was less than either Bradys Lake or Lake Binney, reflecting the relatively smaller size of that water. There was a peak in effort during the 2004-05 season with a decline in the period 2012 to 2014 and low effort during 2014 to 2019 (see Figure 13). The long-term average angling effort at Tungatinah Lagoon was 1,817 days, with the 2020-21 estimate being significantly higher at 3,922 angling days.

The daily catch rate for brown trout for 2020-21 was 0.57 (see Figure 14) and is around the long-term average of 0.56. The daily catch rate for rainbow trout during 2020-21 was very low at 0.04. This is well down on the long-term average of 0.09, which was likely influenced by the stocking of larger domestic rainbow trout during the 2004-2011 to generate interest and supplement the daily catch rate. No rainbow trout were stocked into the system between 2011 and 2020, with lower catch rates and associated harvests reflecting this management strategy.

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An increase in angling effort has led to a greater harvest of fish during 2020-21 with an estimated 2,451 fish taken (figure 15). This is the second highest harvest of trout in the lagoon since 2000-01 and comprises of 2,267 brown trout and 184 rainbow trout.

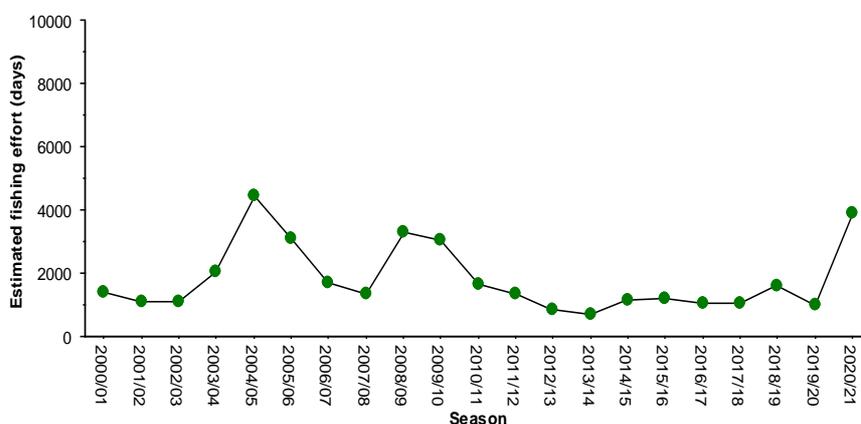


Figure 13: Estimated fishing effort, Tungatimah Lagoon, 2000 – 2021.

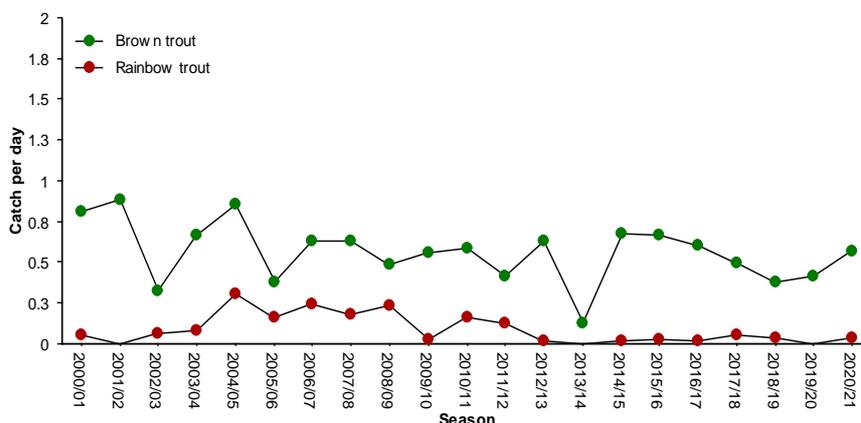


Figure 14: Daily catch rate for brown & rainbow trout, Tungatimah Lagoon 2000 - 2021.

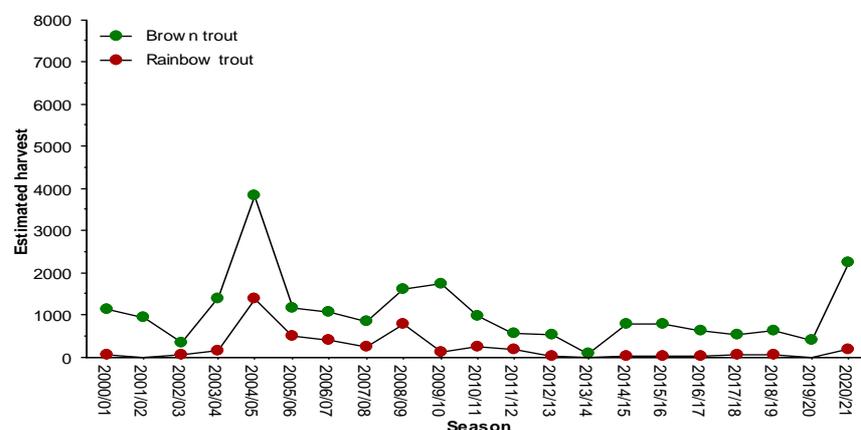


Figure 15: Estimated harvest of brown & rainbow trout, Tungatimah Lagoon 2000 – 2021.

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5. ADDITIONAL DATA OR INFORMATION

5.1. BY-CATCH

Across the three lakes during the entire survey period, 97 short finned eels, 54 redbfin perch and four tench were captured. There was a range of lengths within each species. The largest redbfin perch captured was from Bradys Lake, measuring 375 mm and weighing 750 g; with the largest tench captured from the same water, measuring 483 mm and weighing 1,560 g.

Twelve spotted galaxias and one climbing galaxias were captured across all three lakes.

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6. DISCUSSION

The CPUE results from the survey indicate the Bradys system in general, contains a low density of brown trout. The 2019 survey found a CPUE of 1.31 that has fallen to 0.8. This is supported by the relatively low daily catch rate for brown trout from the system of 0.56 as reported by anglers and is below the target (0.8) as set in the *Tasmanian Inland Recreational Fishery Management Plan 2018-28* (TIRFMP). These numbers would have been affected by to some degree by the lower number of brown trout stocked into the system during 2020.

Only two rainbow trout were captured during the survey, representing one percent of the total catch of all trout. The catch rate for rainbow trout from the APS for the system during 2020-21 was also low at 0.14 fish per day, well below the target set in the TIRFMP of 0.3 fish. Irrespective of the low catch rate, the stocking of 4,507 diploid rainbow trout in 2020 was likely the major contributing factor increasing angling effort across the system from 10,314 angler days during the 2019-20 season, to 17,896 during 2020-21 season. Historically, this has been the case with increased angling effort and catch rates occurring during periods of committed stocking using yearling rainbow trout. This was clearly evident during the period 2004 to 2005 with around 4,500 yearling rainbow trout stocked into the Bradys system each year, resulting in a significant increase in the catch rate across all three lakes. Yearling rainbow trout have also been shown to increase the catch rate at other fisheries e.g., Tooms Lake and Lake Leake. An annual program to reinstate the stocking of yearling rainbow would maintain or increase angling effort and increase the overall catch rate for trout in the system.

The average weight of brown trout over 300 mm was 646 grams. This is less than the target weight as set in the TIRFMP of 750 g, but more than the revised target weight in *the Fisheries Performance Assessment Technical Report Bradys Chain of Lakes – July 2019* of 550 g. The revised target of 550 g is more realistic if Lake King William adult transfers are continually used.

Many of the fish trapped were the same size as those transferred from Lake King William during 2021. As the transfers were not clipped or tagged, or easily differentiated in length, there was no way of determining what percentage may have been resident fish. It was therefore not possible to make assumptions on total population numbers, but CPUE results indicate a decrease of around 48 percent over the past two years.

Throughout the survey, most areas trapped held fish, indicating sampling effort was generally unbiased. Of note, one third of the fish trapped were males. The survey sample size, along with the timing of fish being relocated from Lake King William may have contributed to this bias. Interestingly, the 2019 survey results also found that one third of the fish trapped were males. There may be a female bias in the Lake King William spawning run that is contributing to this.

The size structure for brown trout provides evidence of limited natural recruitment, with 7.3 percent of fish being less than 300 mm. A significant finding from the analysis of length data for each water, highlighted the importance of Bradys Lake as a potential nurse area for young fish, with very few young fish evident in Lake Binney and none in Tungatinah Lagoon. The reasons for this are likely to reflect the dispersal of juvenile fish from Bronte Lagoon and Dee Lagoon and increasing predation by redfin perch. This predation is limiting downstream dispersal of juvenile trout from Bradys Lake into Lake Binney and Tungatinah Lagoon. The

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Whitewater inflow at Bradys Lake provides the best habitat for spawning trout within the Bradys system and is likely to be responsible for significant natural recruitment into Bradys Lake.

A comparison of the length and weight data from captured fish and the 2019 and 2021 transfers from Lake King William, indicates similar growth rates throughout the Bradys system to those found in Lake King William. The length and weight data from tagged fish recaptured, demonstrates the smaller Lake King William fish can gain weight and grow a modest amount. However, larger/older fish, as demonstrated by the capture of tagged fish IFS 850, can lose weight and condition, indicating the stocking of larger fish (e.g. from Great Lake) may not be as effective as using smaller fish.

Contrary to the findings in 2019, when downstream dispersal of tagged fish was evident, an equal distribution of tagged fish was found in this survey. This suggests brown trout will move into areas that provide the environmental conditions they require.

The low number of tagged and fin clipped fish recaptured, along with a low CPUE, suggests the abundance of brown trout within the system is low. Considering the high stocking rates over recent years and relatively low harvest estimates, the CPUE should potentially be greater. Newly stocked fish may not be able to find suitable habitat or might be displacing resident fish, causing some brown trout to disperse out of the system, either upstream into other waters or downstream into the Tungatinah power station intake, or both. The movement of brown trout within the Bradys system therefore needs to be examined further to establish if fish are being lost out of the system following stocking events.

If 7,000 brown trout are stocked annually into the system and the catch rate remains low, the same catch rate may be able to be achieved by using fewer transferred fish. There is need to monitor this situation and further examine the relationship between stocking numbers and maintaining and/or increased catch rates.

It is likely the revised average target weight for fish of 550 g is achievable while using Lake King William fish and it is apparent these transferred fish offer the best option for restock in terms of potential growth.

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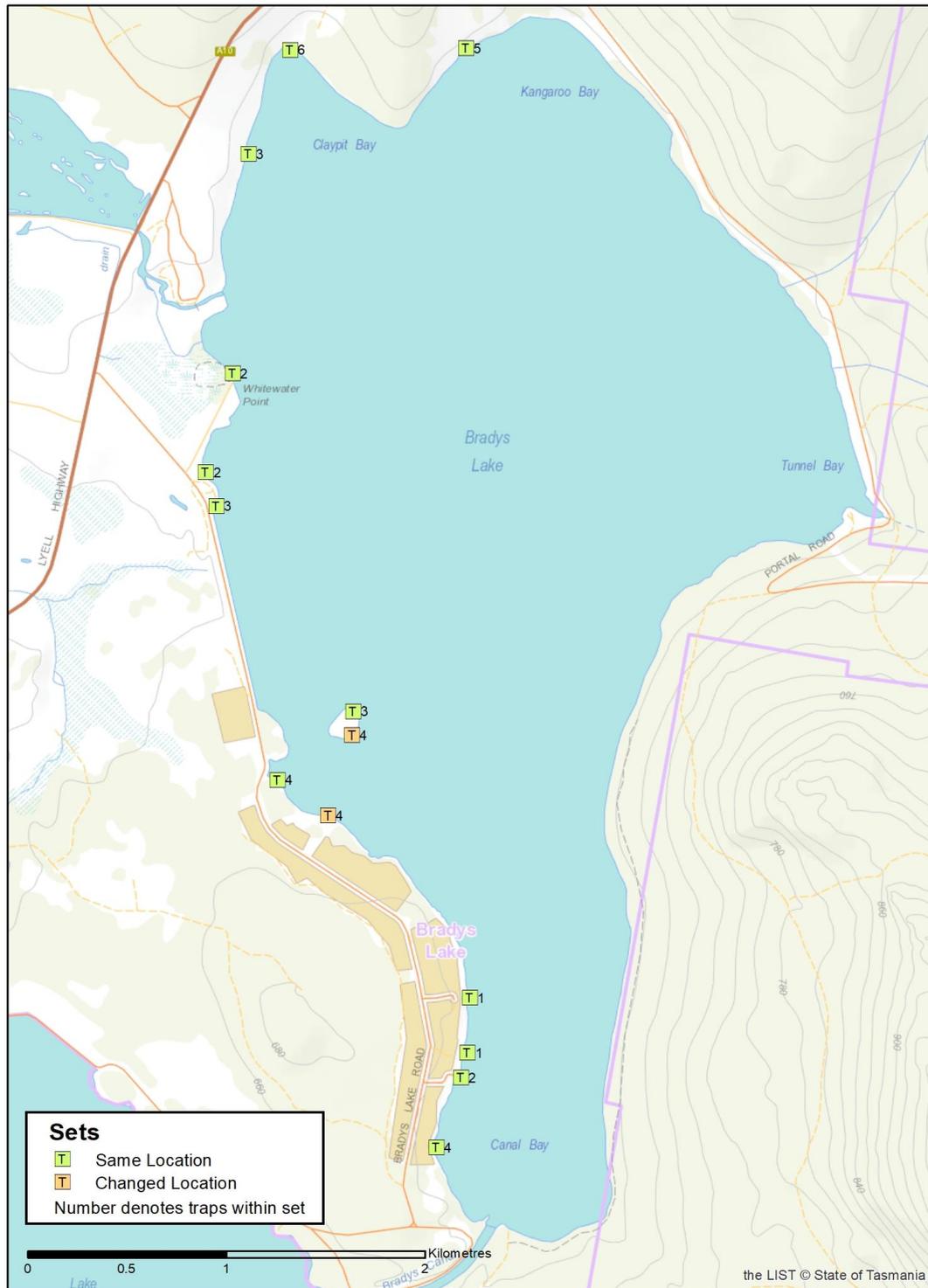
7. RECOMMENDATIONS

- The Bradys system of lakes continues to be stocked with adult brown trout, collected from Lake King William, with a target number of 5,000 fish per annum (to be stocked into Bradys Lake).
- The number of adult brown trout transferred and the contribution they make in maintaining or increasing the daily catch rate is assessed annually via lakeside creel surveys, the angler creel app and the APS. This information will be fed into the annual stocking plan process to determine ongoing stocking rates.
- 5,000 triploid yearling rainbow trout are stocked annually into Bradys Lake to complement the catch rate for brown trout.
- Monitoring of future angling effort and harvest is achieved by angler feedback, creel census and assessment via the annual postal survey (or similar).
- Bag and size limits for each water remain unchanged (5 fish per day and 300 mm minimum length).
- Remove the target weight for fish in the system and set a target catch rate of 1-1.2 fish per day.
- Investigate the feasibility of implementing a redfin perch control program for the system.
- Monitoring of the brown trout population under the Tasmanian Inland Recreational Fishery Management Plan FPA schedule, has now been completed. However, it would be advantageous to monitor CPUE every five years to examine the influence of continued stocking and the adjustment of stocking rates into the future.

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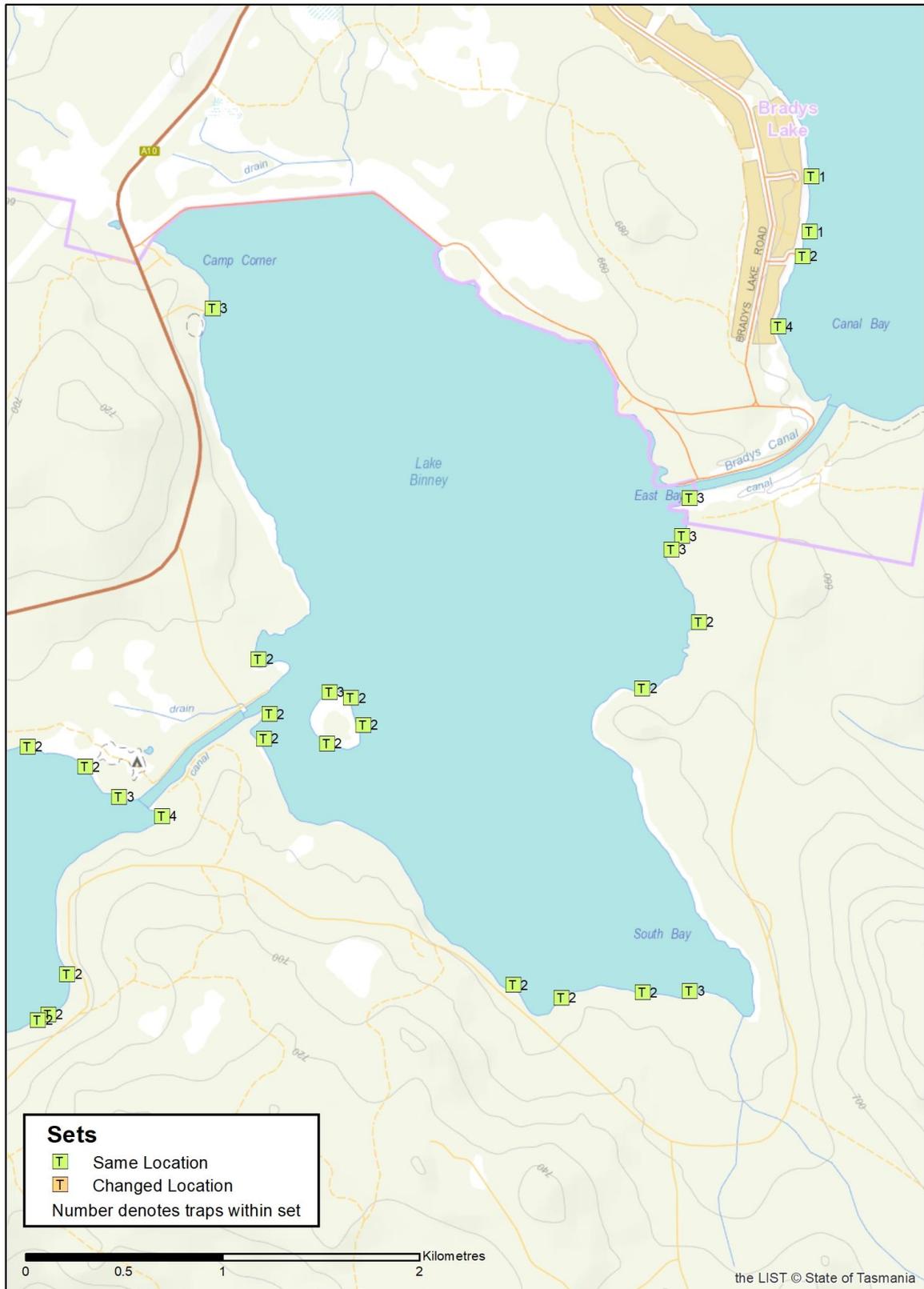
Appendix A

Bradys Lake Box Trap Locations



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Lake Binney Box Trap Locations



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Tungatnah Lagoon Box Trap Locations



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Appendix B: Stocking records for the Bradys system

Water	Date	Species	Age	Number	Source	Type	Weight (g)
Bradys Lake	7/04/2003	brown trout	Adult	190	Laughing Jack salvage	Wild	600
Bradys Lake	9/05/2003	brook trout	Yearling	1 000	Petuna	Domestic	375
Bradys Lake	27/05/2003	brown trout	Adult	887	Liawenee	Wild	1000
Bradys Lake	28/05/2003	brook trout	Yearling	2 000	Petuna	Domestic	400
Bradys Lake	10/11/2003	brown trout	Fry	50 000	Salmon Ponds	Wild	
Bradys Lake	23/04/2004	brook trout	Yearling	6 450	Petuna	Domestic	310
Bradys Lake	27/04/2004	brown trout	Adult	5 000	Liawenee	Wild	1100
Bradys Lake	18/11/2004	brook trout	Adult	60	Petuna	Domestic	1500
Bradys Lake	18/11/2004	rainbow trout	Yearling	4 800	Springfield	Domestic	150
Bradys Lake	18/11/2004	rainbow trout	Adult	40	Petuna	Domestic	3000
Bradys Lake	18/01/2005	rainbow trout	Fingerling	400	Petuna	Domestic	25
Bradys Lake	27/01/2005	brown trout	Fingerling	15 000	Saltas	Wild	8
Bradys Lake	23/02/2005	Atlantic salmon	Adult	720	Saltas	Domestic	3000
Bradys Lake	29/04/2005	brook trout	Yearling	7 000	Petuna	Domestic	350
Bradys Lake	25/05/2005	brown trout	Adult	5 000	Liawenee	Wild	1000
Bradys Lake	7/06/2005	Atlantic salmon	Adult	150	Saltas	Domestic	7000
Bradys Lake	7/07/2005	brown trout	Adult	100	Crescent	Wild	3500
Bradys Lake	14/07/2005	brook trout	Yearling	3 000	Petuna	Domestic	220
Bradys Lake	23/08/2005	rainbow trout	Yearling	4 500	Tassal	Domestic	200
Bradys Lake	6/12/2005	rainbow trout	Fingerling	20 000	Petuna	Domestic	20
Bradys Lake	15/12/2005	Atlantic salmon	Adult	120	Saltas	Domestic	2700
Bradys Lake	21/12/2005	brown trout	Adult	250	Salmon Ponds	Wild	600
Bradys Lake	21/12/2005	brown trout	Yearling	2 500	Salmon Ponds	Wild	55
Bradys Lake	9/02/2006	rainbow trout	Fingerling	16 000	Petuna	Domestic	25
Bradys Lake	28/03/2006	brook trout	Mixed	1 700	Petuna	Domestic	350
Bradys Lake	6/04/2006	brown trout	Fingerling	3 000	Salmon Ponds	Wild	15
Bradys Lake	7/04/2006	Atlantic salmon	Adult	200	Saltas	Domestic	4000
Bradys Lake	27/04/2006	brook trout	Yearling	1 700	Petuna	Domestic	350
Bradys Lake	15/05/2006	brown trout	Adult	58	Crescent	Wild	3000
Bradys Lake	15/05/2006	rainbow trout	Adult	35	Crescent	Domestic	3000
Bradys Lake	23/05/2006	brown trout	Adult	1 800	Liawenee	Wild	1250
Bradys Lake	11/09/2006	brown trout	Fingerling	15 000	Salmon Ponds	Wild	20
Bradys Lake	27/11/2006	brown trout	Fingerling	400	Salmon Ponds	Wild	25
Bradys Lake	8/12/2006	brook trout	Fingerling	10 000	Petuna	Domestic	25
Bradys Lake	12/12/2006	Atlantic salmon	Adult	120	Saltas	Domestic	4500
Bradys Lake	12/12/2006	Atlantic salmon	Yearling	200	Saltas	Domestic	250
Bradys Lake	15/12/2006	rainbow trout	Fingerling	6 500	Petuna	Domestic	25
Bradys Lake	20/12/2006	rainbow trout	Fry	10 000	Salmon Ponds	Wild	1
Bradys Lake	21/12/2006	rainbow trout	Fingerling	30 000	Petuna	Domestic	25
Bradys Lake	8/01/2007	Atlantic salmon	Adult	170	Saltas	Domestic	2500

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Bradys Lake	27/02/2007	brown trout	Adult	105	Laughing Jack salvage	Wild	350
Bradys Lake	26/04/2007	brown trout	Yearling	200	Laughing Jack salvage	Wild	200
Bradys Lake	1/06/2007	brown trout	Adult	1 000	Liawenee	Wild	1137
Bradys Lake	6/06/2007	brown trout	Adult	600	Liawenee	Wild	1137
Bradys Lake	20/06/2007	brook trout	Yearling	6 000	Petuna	Domestic	350
Bradys Lake	29/06/2007	Atlantic salmon	Adult	40	Tassal	Domestic	8000
Bradys Lake	11/10/2007	rainbow trout	Adult	510	Springfield	Domestic	3800
Bradys Lake	14/12/2007	Atlantic salmon	Adult	108	Saltas	Domestic	3500
Bradys Lake	23/01/2008	rainbow trout	Fingerling	22 000	Petuna	Domestic	25
Bradys Lake	28/03/2008	brown trout	Adult	12	Tarraleah Canal	Wild	750
Bradys Lake	30/04/2008	brown trout	Adult	76	Laughing Jack salvage	Wild	600
Bradys Lake	8/05/2008	brown trout	Adult	1 300	Liawenee	Wild	1200
Bradys Lake	22/05/2008	brown trout	Adult	1 000	Liawenee	Wild	1200
Bradys Lake	22/05/2008	brown trout	Adult	750	Liawenee	Wild	1200
Bradys Lake	28/05/2008	Atlantic salmon	Adult	850	Saltas	Domestic	1500
Bradys Lake	29/05/2008	brown trout	Fingerling	20 000	New Norfolk	Wild	20
Bradys Lake	28/11/2008	Atlantic salmon	Adult	80	Saltas	Domestic	3000
Bradys Lake	28/11/2008	rainbow trout	Adult	100	Salmon Ponds	Domestic	4000
Bradys Lake	11/03/2009	brook trout	Fingerling	16 500	Mountain Stream	Domestic	30
Bradys Lake	23/04/2009	brown trout	Fingerling	30 000	New Norfolk	Wild	25
Bradys Lake	25/05/2009	brown trout	Adult	3 000	Liawenee	Wild	12000
Bradys Lake	22/06/2009	Atlantic salmon	Adult	600	Saltas	Domestic	25000
Bradys Lake	22/10/2009	Atlantic salmon	Adult	300	Petuna	Domestic	25000
Bradys Lake	22/10/2009	rainbow trout	Adult	50	Petuna	Domestic	3500
Bradys Lake	17/12/2009	Atlantic salmon	Adult	550	Saltas	Domestic	4000
Bradys Lake	1/02/2010	brown trout	Fingerling	30 000	New Norfolk	Wild	20
Bradys Lake	16/03/2010	Atlantic salmon	Adult	288	Tassal	Domestic	25000
Bradys Lake	20/04/2010	brown trout	Adult	2 100	Liawenee	Wild	1000
Bradys Lake	3/05/2010	brown trout	Adult	900	Liawenee	Wild	1000
Bradys Lake	3/07/2010	brown trout	Adult	30	Liawenee	Wild	800
Bradys Lake	3/07/2010	rainbow trout	Adult	80	Liawenee	Wild	1000
Bradys Lake	23/07/2010	rainbow trout	Fingerling	10 000	New Norfolk	Wild	20
Bradys Lake	3/08/2010	rainbow trout	Fingerling	20 000	New Norfolk	Wild	20
Bradys Lake	10/09/2010	Atlantic salmon	Adult	370	Petuna	Domestic	2000
Bradys Lake	5/01/2011	brown trout	Fingerling	15 000	New Norfolk	Wild	20
Bradys Lake	28/01/2011	brown trout	Fingerling	8 000	New Norfolk	Wild	20
Bradys Lake	1/04/2011	rainbow trout	Adult	300	Salmon Ponds	Wild	450
Bradys Lake	11/05/2011	brown trout	Adult	106	Laughing Jack salvage	Wild	600
Bradys Lake	30/06/2011	brown trout	Adult	450	Hydro Creek	Wild	700
Bradys Lake	4/07/2011	brown trout	Adult	360	Hydro Creek	Wild	700
Bradys Lake	20/07/2011	brown trout	Adult	450	Liawenee	Wild	1000
Bradys Lake	20/07/2011	rainbow trout	Fingerling	23 000	New Norfolk	Wild	25

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Bradys Lake	20/07/2011	rainbow trout	Fingerling	10 000	New Norfolk	Wild	20
Bradys Lake	26/07/2011	brown trout	Adult	460	Hydro Creek	Wild	800
Bradys Lake	11/08/2011	brown trout	Adult	175	Liawenee	Wild	1000
Bradys Lake	6/09/2011	rainbow trout	Adult	1 200	Springfield	Domestic	2000
Bradys Lake	10/01/2012	brown trout	Fingerling	8 500	New Norfolk	Wild	20
Bradys Lake	1/02/2012	brown trout	Fingerling	21 500	New Norfolk	Wild	20
Bradys Lake	20/03/2012	brown trout	Fingerling	15 000	New Norfolk	Wild	25
Bradys Lake	11/05/2012	brown trout	Adult	300	Liawenee	Wild	1000
Bradys Lake	15/05/2012	brown trout	Adult	120	Liawenee	Wild	1000
Bradys Lake	23/05/2012	brown trout	Adult	1 500	Liawenee	Wild	1000
Bradys Lake	31/05/2012	brown trout	Adult	300	Liawenee	Wild	1000
Bradys Lake	14/06/2012	brown trout	Adult	300	Liawenee	Wild	1000
Bradys Lake	3/07/2012	brown trout	Adult	236	Liawenee	Wild	1000
Bradys Lake	12/07/2012	brown trout	Adult	80	Liawenee	Wild	1000
Bradys Lake	15/11/2012	brown trout	Fry	85 000	IFS New Norfolk	Wild	6
Bradys Lake	5/12/2012	brown trout	Fry	20 000	IFS New Norfolk	Wild	3
Bradys Lake	1/05/2013	brown trout	Adult	1 200	Liawenee	Wild	900
Bradys Lake	10/05/2013	brown trout	Adult	1 200	Liawenee	Wild	900
Bradys Lake	30/05/2013	brown trout	Adult	1 200	Liawenee	Wild	700
Bradys Lake	4/06/2013	brown trout	Adult	1 200	Liawenee	Wild	700
Bradys Lake	14/06/2013	brown trout	Adult	200	Liawenee	Wild	700
Bradys Lake	9/10/2013	brown trout	Fry	100 000	IFS New Norfolk	Wild	2
Bradys Lake	28/11/2013	brown trout	Fry	25 000	IFS New Norfolk	Wild	4
Bradys Lake	17/12/2013	brown trout	Fry	15 000	IFS New Norfolk	Wild	5
Bradys Lake	17/12/2013	brown trout	Fry	12 500	IFS New Norfolk	Wild	5
Bradys Lake	20/12/2013	brown trout	Fry	15 240	IFS New Norfolk	Wild	4
Bradys Lake	7/05/2014	brown trout	Adult	450	Liawenee	Wild	750
Bradys Lake	8/05/2014	brown trout	Adult	900	Liawenee	Wild	750
Bradys Lake	22/05/2014	brown trout	Adult	4 000	Liawenee	Wild	750
Bradys Lake	27/05/2014	brown trout	Adult	600	Liawenee	Wild	750
Bradys Lake	4/06/2014	brown trout	Adult	550	Scotch Bobs Creek	Wild	520
Bradys Lake	4/06/2014	brown trout	Adult	200	Hydro Creek	Wild	360
Bradys Lake	5/06/2014	brown trout	Adult	350	Liawenee	Wild	750
Bradys Lake	10/06/2014	brown trout	Adult	590	Tumbledown Creek	Wild	600
Bradys Lake	10/06/2014	brown trout	Adult	160	Scotch Bobs Creek	Wild	520
Bradys Lake	11/06/2014	brown trout	Adult	130	Scotch Bobs Creek	Wild	520
Bradys Lake	11/06/2014	brown trout	Adult	120	Liawenee	Wild	750
Bradys Lake	30/06/2014	brown trout	Adult	1 200	Tumbledown Creek	Wild	600
Bradys Lake	30/06/2014	brown trout	Adult	600	Hydro Creek	Wild	360
Bradys Lake	15/10/2014	brown trout	Fry	60 000	IFS New Norfolk	Wild	3
Bradys Lake	15/11/2014	brown trout	Fry	15 000	IFS New Norfolk	Wild	5
Bradys Lake	16/11/2014	brown trout	Fry	15 000	IFS New Norfolk	Wild	5

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Bradys Lake	27/11/2014	brown trout	Fry	50 000	IFS New Norfolk	Wild	3
Bradys Lake	27/11/2014	brown trout	Fry	100 000	IFS New Norfolk	Wild	5
Bradys Lake	19/12/2014	brown trout	Fry	22 000	IFS New Norfolk	Wild	5
Bradys Lake	15/04/2015	brown trout	Adult	2 000	Liawenee	Wild	900
Bradys Lake	22/04/2015	brown trout	Adult	1 000	Liawenee	Wild	900
Bradys Lake	28/04/2015	brown trout	Adult	250	Liawenee	Wild	900
Bradys Lake	29/04/2015	brown trout	Adult	650	Liawenee	Wild	900
Bradys Lake	4/05/2015	brown trout	Adult	1 500	Liawenee	Wild	900
Bradys Lake	1/04/2016	brown trout	Adult	60	Liawenee	Wild	12000
Bradys Lake	11/04/2016	brown trout	Adult	287	Liawenee	Wild	12000
Bradys Lake	29/04/2016	brown trout	Adult	465	Liawenee	Wild	1000
Bradys Lake	5/05/2016	brown trout	Adult	500	Liawenee	Wild	1000
Bradys Lake	26/05/2016	brown trout	Adult	320	Liawenee	Wild	2000
Bradys Lake	31/05/2016	brown trout	Adult	133	Liawenee	Wild	3000
Bradys Lake	21/06/2017	brown trout	Adult	205	King William	Wild	500
Bradys Lake	27/06/2017	brown trout	Adult	436	King William	Wild	500
Bradys Lake	12/07/2017	brown trout	Adult	300	King William	Wild	370
Bradys Lake	18/07/2017	brown trout	Adult	80	Scotch Bobs Creek	Wild	790
Bradys Lake	18/07/2017	brown trout	Adult	220	Tumbledown Creek	Wild	745
Bradys Lake	25/07/2017	brown trout	Adult	280	King William	Wild	370
Bradys Lake	29/07/2017	brown trout	Adult	260	King William	Wild	370
Bradys Lake	4/08/2017	brown trout	Adult	275	King William	Wild	370
Bradys Lake	16/08/2017	brown trout	Adult	310	King William	Wild	370
Bradys Lake	25/04/2018	brown trout	Adult	170	King William	Wild	465
Bradys Lake	26/04/2018	brown trout	Adult	1 150	Liawenee	Wild	950
Bradys Lake	26/04/2018	brown trout	Adult	64	King William	Wild	465
Bradys Lake	2/05/2018	brown trout	Adult	30	King William	Wild	465
Bradys Lake	9/05/2018	brown trout	Adult	205	King William	Wild	465
Bradys Lake	11/05/2018	brown trout	Adult	105	King William	Wild	465
Bradys Lake	11/05/2018	brown trout	Adult	120	Liawenee	Wild	950
Bradys Lake	13/05/2018	brown trout	Adult	150	King William	Wild	465
Bradys Lake	13/05/2018	brown trout	Adult	151	Liawenee	Wild	950
Bradys Lake	16/05/2018	brown trout	Adult	261	King William	Wild	465
Bradys Lake	18/05/2018	brown trout	Adult	251	King William	Wild	465
Bradys Lake	24/05/2018	brown trout	Adult	318	King William	Wild	465
Bradys Lake	31/05/2018	brown trout	Adult	500	King William	Wild	420
Bradys Lake	5/06/2018	brown trout	Adult	586	King William	Wild	420
Bradys Lake	15/06/2018	brown trout	Adult	2 013	King William	Wild	420
Bradys Lake	19/06/2018	brown trout	Adult	561	King William	Wild	465
Bradys Lake	29/06/2018	brown trout	Adult	471	King William	Wild	465
Bradys Lake	7/07/2018	brown trout	Adult	210	King William	Wild	465
Bradys Lake	9/07/2018	brown trout	Adult	230	King William	Wild	465

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Bradys Lake	10/07/2018	brown trout	Adult	149	King William	Wild	465
Bradys Lake	11/07/2018	brown trout	Adult	79	King William	Wild	465
Bradys Lake	7/05/2019	brown trout	Adult	250	King William	Wild	500
Bradys Lake	14/05/2019	brown trout	Adult	750	King William	Wild	500
Bradys Lake	16/05/2019	brown trout	Adult	309	King William	Wild	500
Bradys Lake	7/06/2019	brown trout	Adult	2 100	King William	Wild	500
Bradys Lake	15/05/2020	brown trout	Adult	100	Liawenee	Wild	800
Bradys Lake	15/05/2020	brown trout	Adult	124	Sandbanks	Wild	800
Bradys Lake	19/05/2020	brown trout	Adult	240	Liawenee	Wild	800
Bradys Lake	22/05/2020	brown trout	Adult	480	Liawenee	Wild	800
Bradys Lake	27/05/2020	brown trout	Adult	100	Liawenee	Wild	800
Bradys Lake	27/07/2020	rainbow trout	Adult	4507	Millybrook	Wild	350
Bradys Lake	21/04/2021	brown trout	Adult	166	King William	Wild	500
Bradys Lake	28/04/2021	brown trout	Adult	82	King William	Wild	500
Bradys Lake	13/05/2021	brown trout	Adult	155	King William	Wild	500
Bradys Lake	17/05/2021	brown trout	Adult	126	King William	Wild	500
Bradys Lake	21/05/2021	brown trout	Adult	265	King William	Wild	500
Bradys Lake	24/05/2021	brown trout	Adult	136	King William	Wild	500
Bradys Lake	27/05/2021	brown trout	Adult	400	King William	Wild	500
Bradys Lake	31/05/2021	brown trout	Adult	400	King William	Wild	500
Bradys Lake	07/06/2021	brown trout	Adult	400	King William	Wild	500
Bradys Lake	10/06/2021	brown trout	Adult	800	King William	Wild	500
Bradys Lake	13/06/2021	brown trout	Adult	800	King William	Wild	500
Bradys Lake	15/06/2021	brown trout	Adult	692	King William	Wild	500
Bradys Lake	18/06/2021	brown trout	Adult	263	King William	Wild	500
Bradys Lake	21/06/2021	brown trout	Adult	168	King William	Wild	500
Bradys Lake	28/06/2021	brown trout	Adult	12	King William	Wild	500
Lake Binney	22/5/2003	brown trout	Adult	500	Liawenee	Wild	1000
Lake Binney	28/1/2011	brown trout	Fingerling	7 000	New Norfolk	Wild	18
Lake Binney	22/5/2018	brown trout	Adult	936	King William	Wild	465
Lake Binney	31/5/2018	brown trout	Adult	500	King William	Wild	420
Lake Binney	2/7/2018	brown trout	Adult	244	King William	Wild	465
Lake Binney	4/7/2018	brown trout	Adult	232	King William	Wild	465
Lake Binney	6/7/2018	brown trout	Adult	336	King William	Wild	465
Lake Binney	28/4/2019	brown trout	Adult	139	King William	Wild	500
Lake Binney	16/5/2019	brown trout	Adult	250	King William	Wild	500
Lake Binney	21/5/2019	brown trout	Adult	1 978	King William	Wild	500
Lake Binney	7/6/2019	brown trout	Adult	250	King William	Wild	500
Lake Binney	12/6/2019	brown trout	Adult	272	King William	Wild	500
Tungatinah Lagoon	23/5/2003	brown trout	Adult	500	Liawenee	Wild	1000
Tungatinah Lagoon	12/6/2019	brown trout	Adult	750	King William	Wild	500

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