

# Fisheries Performance Assessment Program

**Introduction**

Tooms Lake is an artificial impoundment situated 36 km north east of Oatlands. The water covers an area of 6.6 square kilometres, with a full supply level of 464m above sea level. Tooms Lake is subject to annual drawdowns with the water frequently being moderately turbid. According to early reports, brown trout were well established by 1904 and there have been many liberations of brown trout since. Liberations of rainbow trout were first recorded around 1908 and there have been regular releases but these have been in more recent times only. Most trout average around 1 – 1.5 kg with bigger fish of 2.0-2.5 kg captured.

During February 2003, the Service undertook an intensive survey within Tooms Lake. The purpose of the survey was to gain information on catch per unit effort and the age structure of the brown trout population. Until this time, no full assessment of the trout population within Tooms Lake has occurred. Analysis of a range of fishery performance indicators in conjunction with the results of this survey are reported below.

**In-Lake Surveys**

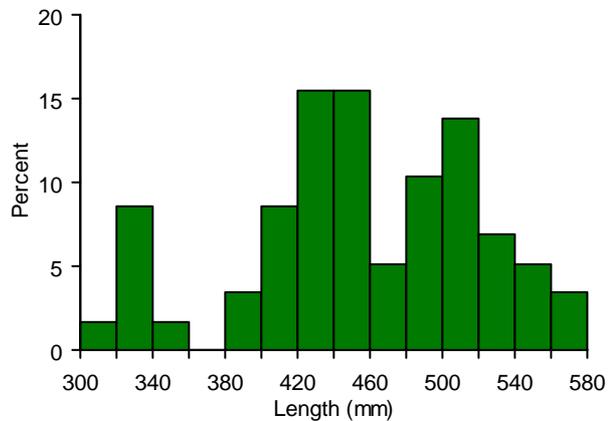
A total of 68 brown trout (30 females, 16 males & 22 indeterminate sex) between 305 - 570 mm were captured. Two rainbow trout were also captured. Only brown trout are reported. The average weight and length of brown trout was 1 185 g and 457 mm respectively (see table 1) with an average condition factor of 1.23 k. which is significantly higher than most Tasmanian lake fisheries. The maximum weight recorded for an individual fish was 1 900 g.

	Mean	Count	Minimum	Maximum
Length, Total	457.07	68	305.00	570.00
Length, F	469.73	30	337.00	570.00
Length, I	438.50	22	305.00	555.00
Length, M	458.88	16	316.00	562.00
Weight, Total	1185.00	68	400.00	1900.00
Weight, F	1235.33	30	480.00	1860.00
Weight, I	1098.18	22	400.00	1760.00
Weight, M	1210.00	16	420.00	1900.00
CF, Total	1.23	68	0.93	2.56
CF, F	1.18	30	0.93	1.93
CF, I	1.29	22	1.03	2.56
CF, M	1.24	16	0.93	2.38

**Figure 1.** Length, weight and condition factor (CF) for brown trout – Tooms Lake 2003. (M= male, F= female and I= indeterminate sex).

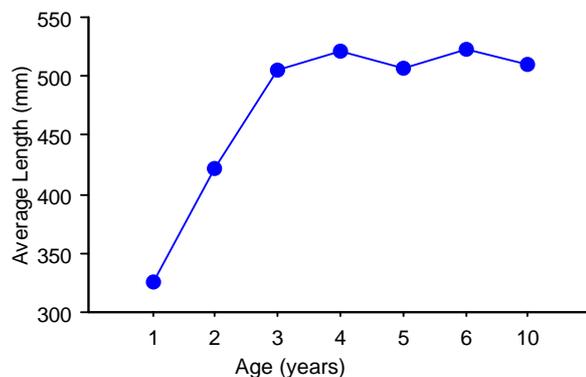
A high proportion (48%) of brown trout showed no sign of gonad development despite many of the fish being above a length where most fish would normally have reached sexual maturity (320 – 360 mm). An interesting point relating to these fish is they represented a significant proportion of fish in the 3 and 4 year old age classes (37 %).

A graph of length frequencies (figure 1) shows three distinct size cohorts. These consist of fish in the 300-360 mm range, which are make up of a distinct grouping. In addition to these, there are a number of fish in the 380-460 mm range and in a third cohort 460-580 mm.



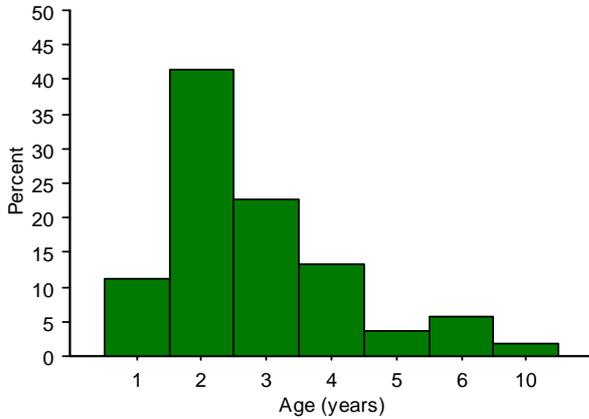
**Figure 1.** Percentage of brown trout in each length class - Tooms Lake 2003.

The ageing of fish using otoliths (ear bones) showed that 64 percent of the fish sampled were in the 2+ and 3+ year cohorts (figure 3). One plus fish represented 11 percent of the sample while 4+ and 5+ cohorts represented 13 and 4 percent respectively. The remaining 8 percent were made up of 6 year olds and a single 10 year old fish. No young of the year fish (0+) were collected.



**Figure 2.** Average length of brown trout in each year class - Tooms Lake 2003.

Growth in 1 - 4 year old fish was solid, with the average length for a 4+ year old fish being 521 mm. On average, fish of 5+ years and above showed very little growth. The maximum age for an individual fish was 10+ years with a length of 510 mm.



**Figure 3:** Percentage of brown trout in each age class – Tooms Lake 2003.

**Stocking History**

Rainbow trout stockings recommenced in June 1988 with the release of 2 000 fingerling rainbow trout. An almost immediate response occurred with the capture of rainbow trout reported in the 1988/89 season. During August 1994, 3 000 yearling rainbow trout of 150 cm were released. This release produced an increase in both the catch rate and harvest of rainbow trout in the following seasons, and when 2 000 yearlings were released in 1998 and 3 000 in both January and October 2002, the estimated harvest reached high levels.

The stocking of brown trout has been significantly reduced since the early 1980's. During the 3 year period 1980–83, an average of 95 000 brown trout fry were released into Tooms Lake per season. A reduction in numbers occurred in the 6 year period 1984-89 with a seasonal average of 41 250 fry stocked. This compares with a seasonal average of 30 000 fry released during the period 1990 – 2004.

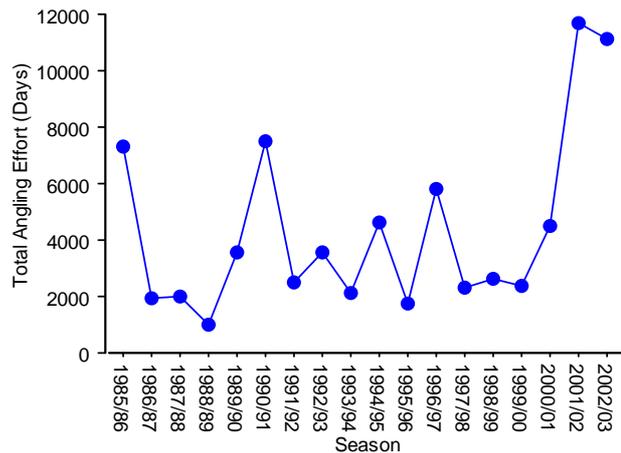
**Angler Creel Survey**

During the period August 2003 to August 2004 compliance staff interviewed 421 anglers over 10 separate days. Data for 391 anglers were used in the analysis. Of these anglers, 41% were bait fishers, 26% trollers, 15% fly fishers, 10% spin fishers with 8% of anglers using a combination of methods. A total of 352 fish were caught for a total angling effort of 1 807 hours. On average, anglers spent 4.7 hours fishing for a catch rate of

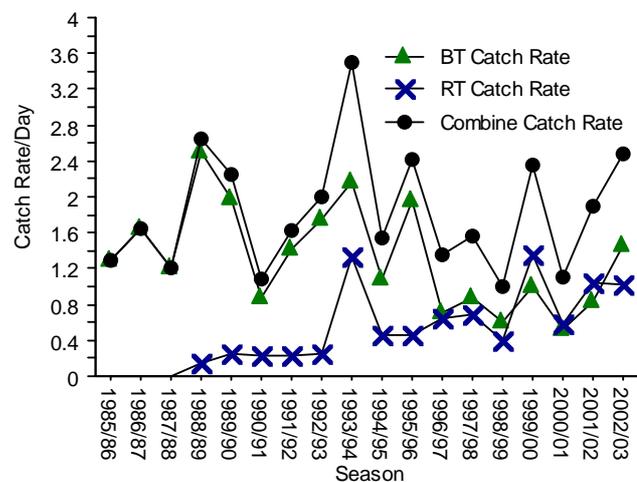
0.92 fish which factors to 1.2 fish per day (assuming a days fishing is based on six hours). Brown trout comprised 78% of the total catch. The most successful angling method was trolling followed by bait fishing.

**Angler Postal Survey**

During the 18 years the Angler Postal Survey has been operating, on average anglers spent a total of 4 358 days per annum fishing for trout at Tooms Lake. This has ranged from a low of 1 019 days during the 1988/89 season to a high of 11 686 days in the 2001/02 season. An average of 827 anglers have fished the lake each season since 1986. However, this number has increased significantly over the last three seasons (1999-2003) to around 2 100 angler per season with 2 752 anglers visiting during the 2002/03 season. This increased participation has been equally shared between both full season and short term licence holders.



**Figure 4.** Estimated number of days fished by anglers each season - Tooms Lake 2003.



**Figure 5.** Estimated daily catch rate for brown and rainbow trout - Tooms Lake 2003.

The long term catch rate for combined rainbow and brown trout is 1.8 fish per day, with highs of 3.4 and 2.5 fish per day in 1993/94 and 2002/03 respectively (figure 5). These figures appear to be independent of whether rainbow trout or brown trout were predominant in the catch.

The 18 year long term average catch rate for brown trout is 1.3 fish per day. The catch rate for brown trout has however trended downward from a high of 2.5 fish per day during 1988/89 to 0.5 fish per day during 2000/01 (figure 5). This trend has however been halted, with 1.5 brown trout per day caught during the 2002/03 season.

The catch rate for rainbow trout has trended upward steadily since the reintroduction of this species in 1988. Increases in both catch rate and harvest of rainbow trout appear to be moderately correlated with changes in the stocking regime for this species. The current catch rate for rainbow trout is around 1.0 fish per day (figure 5).

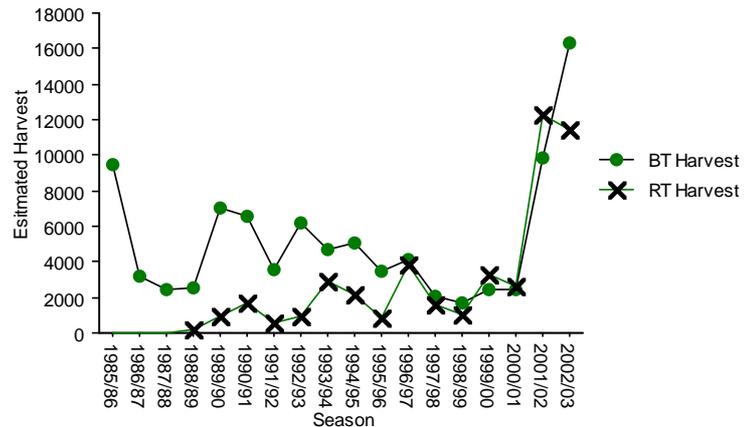
Since 1996, both brown and rainbow trout have fluctuated in their dominance within the total harvest. The 2002/03 season data indicates a harvest of approximately 60% brown trout to 40% rainbow trout.

The estimated annual harvest of brown trout has trended downward to a low of 1 644 fish in 1998/99 and 2 397 fish in 2000/01. However, there has been a strong rebound in the two years following this period, with the estimated total harvest during 2002/03 being significantly higher than all other seasons (figure 6).

Rainbow trout were reintroduced into Tooms Lake in 1988 with the release of 2 000 fingerlings. An almost immediate response was recorded with an estimated 153 rainbow trout harvested in the 1988/89 season. The estimated harvest of rainbow trout has since trended steadily upward until 2000/01 where an estimated 2 650 fish were caught. In the two seasons since this period, around 11 500 - 12 000 rainbow trout were harvested annually (figure 6).

These harvest figures correspond with a significant increase in total angling effort while the catch rate for both separate and combined species increased only moderately, with both being well within the long term average catch rate of 1.8

fish per day (0.5 rainbow per day and 1.3 brown per day).



**Figure 6.** Estimated annual harvest of brown and rainbow trout - Tooms Lake 2003.

During the period 2001 - 03 anglers who received a postal questionnaire and also fished Tooms Lake, were asked to rate their angling experience at this water. Of the 300 individuals that replied, some 77% said their angling experience at Tooms Lake was good to excellent. Fourteen percent of anglers said their experience was average, while 9% believed their angling experience was poor to terrible. Those anglers that rated their experience as good to excellent, based their opinion mainly on the size of fish and fish condition. Catch rate also rated a significant factor in angler's favourable opinion. A smaller number of anglers also rank facilities as good or better. Of those anglers that rated their experience at Tooms Lake as poor to terrible (9%), most believed that poor catch rate and fish size were the main reasons they rated it at this level.

#### **Discussion on ageing**

There are some discrepancies in the ageing of fish with the suggestion the first annual growth check was not evident on those otoliths (ear bones) examined. Consequently, this may have led to an underestimation of the age of fish by one year and subsequently overestimated length at age. For example, the mean length of 1+ old fish was 326 mm, which is well above that which might be expected for Tasmanian brown trout fisheries. Further work to validate these ages is needed. However, the current ageing data as analysed has been presented in this overview for the interest of anglers.