Section Break (Next Page)

Inland Fisheries Service Report

Recreational Fisheries Report

Fisheries Performance Assessment¶

Technical Report¶

South Riana Lake – August 2025¶

Inland Fisheries Service

Tasmanian Government

Prepared by: Rob Freeman
Approved by: Dr Ryan Wilkinson
Version number: Final
Date: 27 October 2025

Contents

1. Introduction

South Riana Lake (410628E 5434658N GDA94) is managed by Tasmania Irrigation and was commissioned during 2015 following the construction of a dam on an unnamed tributary of the Blythe River at South Riana. Local inflows supply water to fill the 4,000 ML lake with additional water pumped from the Blythe River to supply irrigation water for the Dial Blythe Irrigation Scheme.

The lake floods a series of pre-existing small to medium sized farm dams that were known to hold brown trout and the inflowing streams are known to contain a small population of brown trout and the freshwater lobster Astacopsis gouldi.

Since 2015 (excluding 2022), the lake has been stocked annually with brown trout. In 2018, a fishery assessment was conducted with 400 adult brown trout released into the lake to support a capture-mark-recapture estimate, with all fish being adipose fin clipped.

2. FPA Survey Methodology

2.1. In-Lake Population Survey

To prepare for a capture-mark-recapture population estimate, 324 adult brown trout sourced from the Liawenee Canal spawning trap and 276 from the Tumbledown Creek trap (Arthurs Lake) were adipose fin clipped and transferred to South Riana Lake (June 2025). The Liawenee Canal fish weighed an average of 795 g and Tumbledown Creek averaged 426 g.

During 25-27 August 2025, the Inland Fisheries Service (IFS) undertook a trapping survey within South Riana Lake. The purpose of the survey was to gain information on:

- catch per unit effort,
- the length structure of the brown trout population,
- the condition of fish,
- examine natural recruitment and stocking success, and
- establish an estimate of the brown trout population size.

A total of 30 box traps were set each night over two nights (total 60 box traps sets), with trap sets of two and three traps deployed around the perimeter of the lake (Figure 1).

From the 60 sets, 46 brown trout were captured. All fish were weighed and measured for length. Brown trout were examined for the presence of an adipose fin clip. Traps were checked and cleared after the first night and retrieved after the second. At the time, the lake level was approximately 0.7 m below full supply, with low in-flows.

To account for the small sample size to estimate the population, we used the Chapman estimator: $N=(M+1)(C+1)/(R+1)$, where M is the number of marked individuals, C is the total number captured, and R is the number of marked individuals recaptured.

Figure 1: Box trap sets, South Riana Lake: 25-27 August 2025.

2.2. Condition Factor

Condition factor for all fish was calculated using the basic formula of $K=10^5 \times \text{weight/length}^3$. This provides a generalised result that can be used to compare other fish and fisheries. These results, however, may not always align with anglers' perceptions.

2.3. Annual Postal Survey

Since 1986, the IFS has conducted an annual postal survey seeking information about anglers' catches. The survey comprises a form sent to between 4,000–5,000 anglers of all licence categories, asking set questions about their angling (catch of trout) for the past season. This information is used to estimate catch per day, harvest and angling effort and provides a long-term overview of individual fishery performance, in addition to characterising fishing effort. Beginning in 2024-25, the survey was distributed by email, with responses digitally entered by participants. A comparison of postal and email returns for all waters are examined in a separate report but show similar results.

2.4. Angler Creel Data

Each season, IFS officers collect fishing effort data from anglers interviewed across a range of waters. This information is entered directly into a dedicated Angler Creel data collection app, capturing details such as location, date, species, number of fish caught, and fishing

method. The data are stored in an electronic database and used to assess trout catch rates at individual waters. Once analysed, catch rates are reported as the number of fish caught per day, regardless of whether the angler had fished for three or more hours or was still fishing at the time of interview. All fish (kept or released) are analysed, including zero catches. However, for this report, only records from anglers who fished for three or more hours were examined. To calculate daily catch rates, a full day of fishing is defined as six hours.

2.5. Angler Diary

An angler fishing diary app is available to anglers to record their catch of freshwater fish. The app records location, fishing from a boat or shore, fishing method, species and number caught, weight, length, sex, fish kept/released and fishing effort. In this report, only records from anglers that fished for three or more hours were examined. For calculating daily catch rates, a full days fishing is deemed to be equal to six hours.

2.6. Stocking Database

The IFS keeps electronic records of fish stocking within public waters dating back to 1980. These records include information on location, date of stocking, species, age, origin, stock type and genotype, in addition to length/weight data and comments e.g. denoting marked/tagged fish. This information provides an historical record of supplementary recruitment into individual waters. In this report, records post 2014 are analysed.

3. Survey Results 2025

3.1. Length, Weight, and Condition Factor

Over 25-27 August 2025, 46 brown trout (24 females, 22 males, no juveniles) with lengths ranging between 315 mm – 560 mm were captured (Table 1). The average weight and length for male and female fish combined was, 1,165 g and 487 mm, respectively.

Table 1: Summary of length, weight and condition factor for brown trout, by sex.

Category	Length Mean	Length Min	Length Max	Weight Mean	Weight Min	Weight Max	CF Mean	CF Min	CF Max
Female (n=24)	485	353	560	1157	480	1700	1.0	0.9	1.1
Male (n=22)	488	315	546	1174	360	1480	1.0	0.7	1.2
Combined (n=46)	487	315	560	1165	360	1700	1.0	0.7	1.2

Three adipose fin-clipped fish from the 2018 and 2025 releases were recaptured. The weight of the 2018 clipped fish was generally high, but the rate of growth was slow. When initially released, this group of fish averaged 850 grams and 417 mm (fork length) (Figure 2).

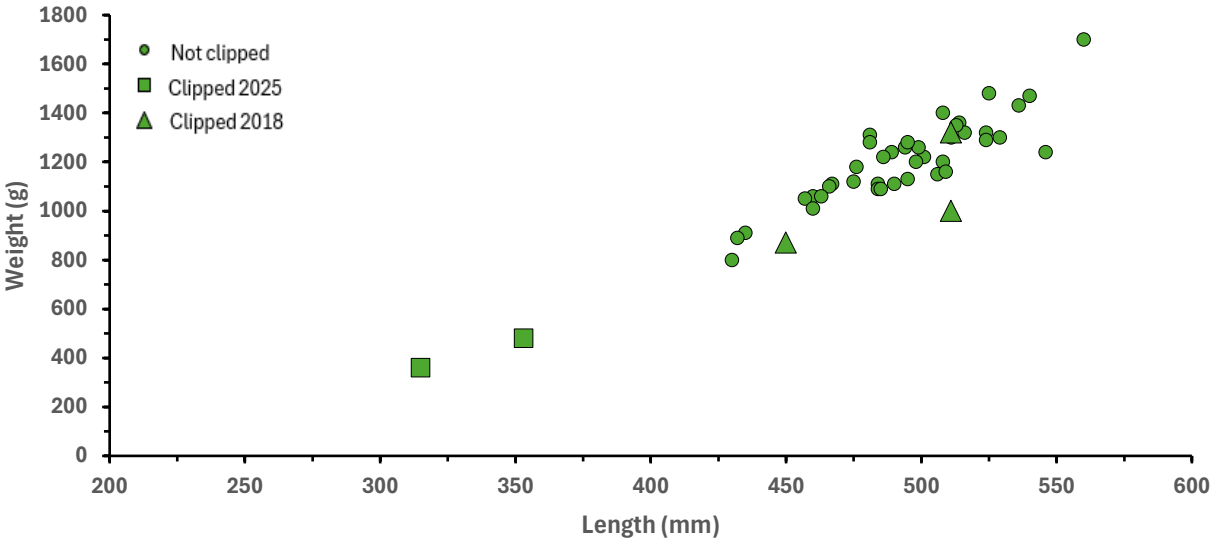


Figure 2: Length vs Weight scatterplot, showing adipose clipped brown trout 2018 and 2025, and unclipped fish captured during the 2025 survey.

Of the 46 brown trout captured, 24 were classified as being in poor condition and 22 in fair condition (Figure 3). While longer/older fish generally display lower condition factor compared to smaller/younger fish, some longer/older fish were in very poor condition.

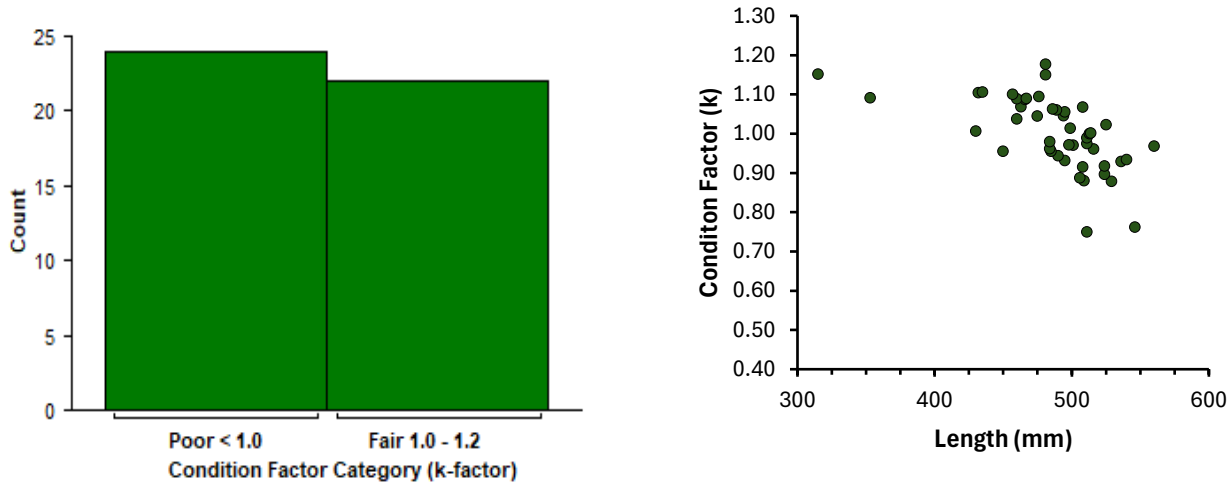


Figure 3: Condition factor category (left) and condition factor by length (right), for brown trout, South Riana Lake, 2025.

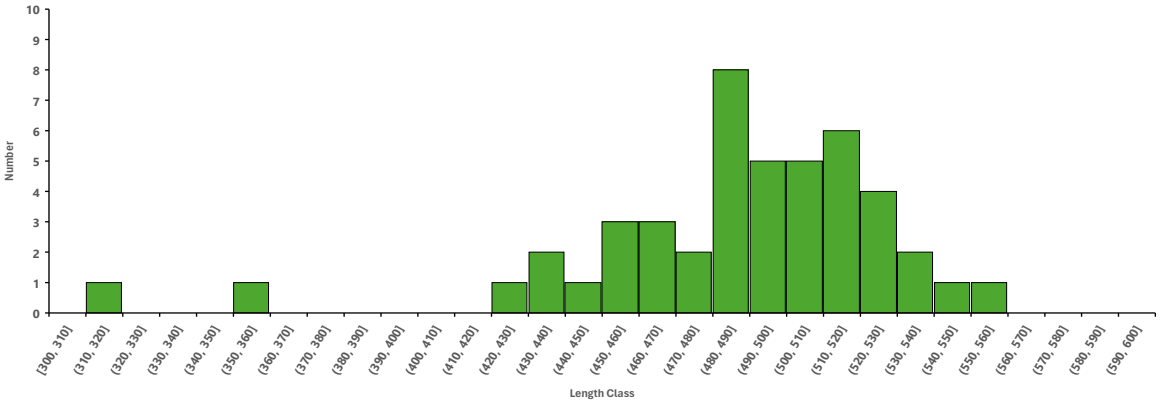


Figure 4: Length frequency for brown trout, South Riana Lake, 2025.

Figure 4 shows the length frequency data of the 46 brown trout captured. This included two 2025 adipose fin clipped fish measuring 315 and 353 mm. There was no evidence of any fish smaller than these, indicating no recruitment from 2023 and possibly 2024. A total of 140,000 brown trout fry were stocked into South Riana Lake during 2019, 2020 and 2021 however, the influence of these stockings is unclear as 1,400 adult brown trout were released during 2023-24, confounding any clear length cohorts that might be define the past fry stocking.

3.2. CPUE

Catch per unit effort (CPUE) from setting of 30 box traps over two night (total 60 box trap sets) was 0.77 brown trout per trap (total 46 fish).

4. Population Estimate

A total of 600 adipose fin clipped brown trout were transferred into South Riana Lake during June 2025 to support a capture-mark-recapture population estimate. During the recapture phase, 46 brown trout were captured, two of which were clipped (4.3 per cent). Based on this data, the estimated population was 9,416 brown trout, with a standard error of 4,544 (Table 2). The estimated bias level was <4.0, (0.5) indicating a high level of bias, reflecting the influence of the low sample size and low number of tag returns. Due to this influence, Chapman's estimation calculation was used.

Table 2: Capture-Mark-Recapture population estimate using Chapman's estimation calculation, South Riana Lake, 2025.

Parameter	Result
Total fin clipped fish released (M)	600
Total captures (C)	46
Total marked recaptures (R)	2
Population estimate: MC/R = N	9,416
Standard error	4,544
Lower and Upper 95% CI limits	510 – 18,321
Estimate bias level: MC/4N =	0.50 (>4 acceptable bias)

5. Survey Comparison 2018 and 2025

5.1. Length, Weight, and Condition Factor

A comparison of the 2018 and 2025 survey results for length versus weight, reveals a similar growth pattern. However, in 2018, several larger brown trout were present that influenced the upper bounds of the weight distribution (Figure 5). These fish were likely residents of the two farm dams inundated in 2015, which made their way into the Lake.

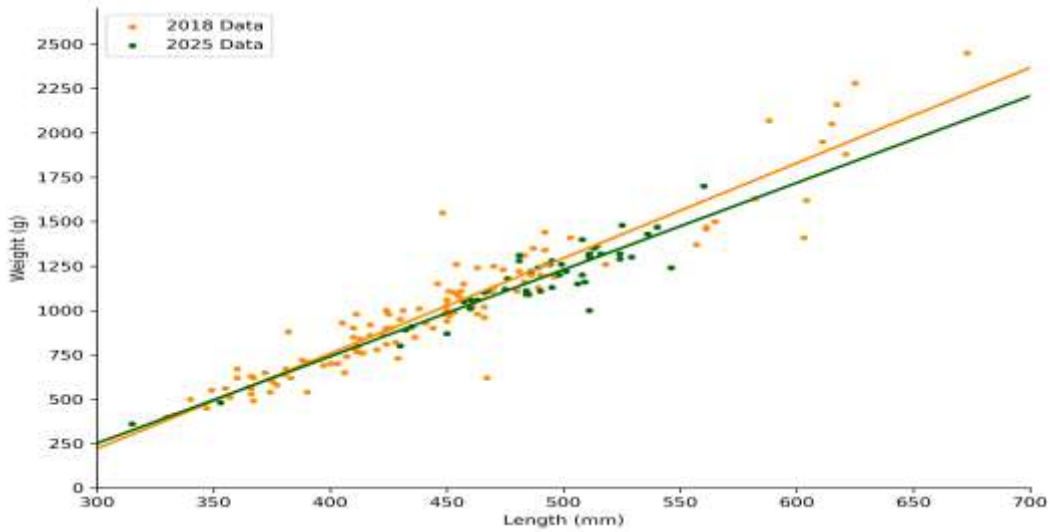
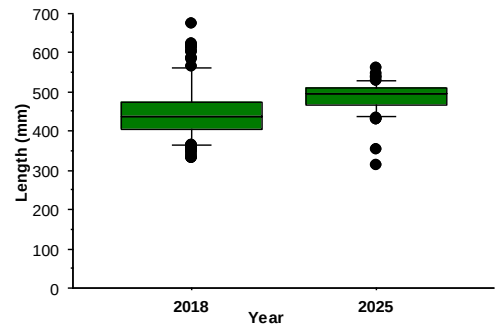
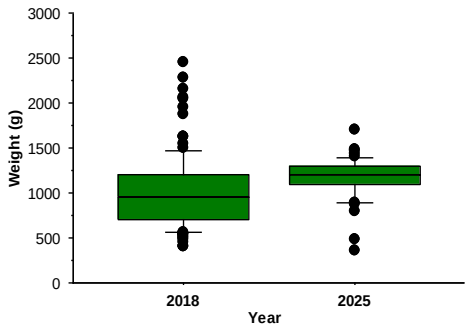
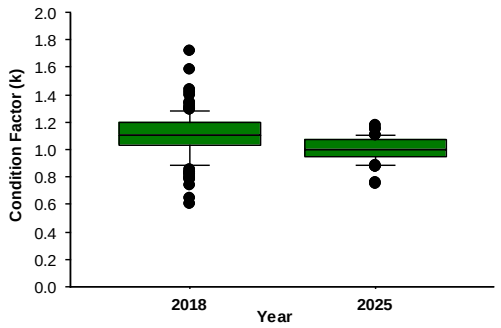


Figure 5: Length versus weight comparison from the 2018 and 2025 surveys for brown trout, South Riana Lake, 2025.







Statistic	2018 (n=115)	2025 (n=46)
Mean length (mm)	446	487
Min length (mm)	330	315
Max length (mm)	673	560
Mean weight (g)	1006	1165
Min weight (g)	400	360
Max weight (g)	2450	1700
Mean condition factor (k)	1.10	1.00
Min condition factor (k)	0.74	0.75
Max condition factor (k)	1.58	1.18

Figure 6: Box plots and associated summary statistics, comparing the 2018 and 2025 survey results for length, weight and condition factor of brown trout, South Riana Lake, 2025.

The 2018 length and weight data reflect a broad size range of fish, with several cohorts present (Figure 6), including several large fish up to 673 mm length. In contrast, the 2025 sample was dominated by fish assumed to be four and five year-olds, mostly within the 420 mm – 520 mm length range, with the maximum length at 560 mm. This led to a higher average length and weight in the 2018 fish. The fish sampled in the 2025 survey were also generally in poorer condition.

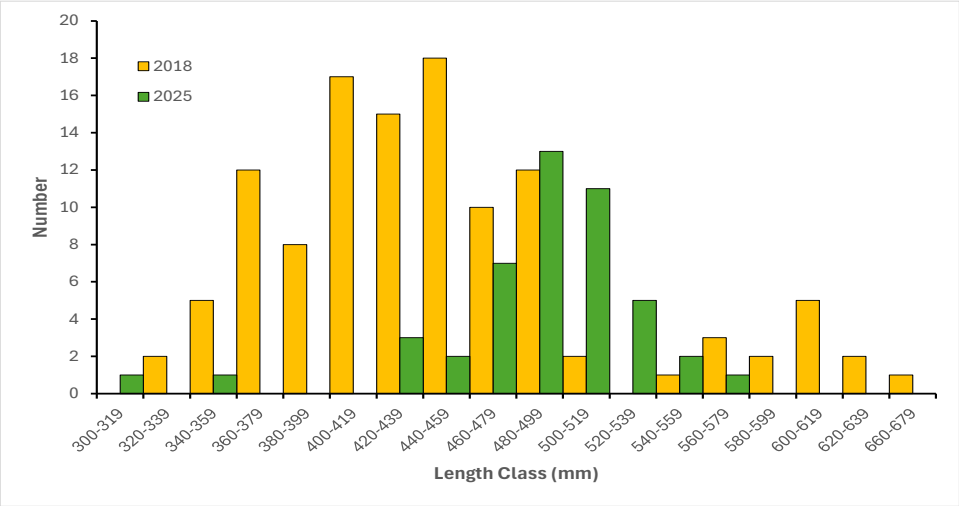


Figure 7: Number of brown trout in each 20 mm length class from the 2018 and 2025 surveys for brown trout, South Riana Lake, 2025.

The 2018 results indicate a group of fish measuring 540 mm – 678 mm, representing the initial resident population prior to flooding and transfer of larger fish from upstream farm dams (Figure 7). Currently, very few fish are reaching this size. The 2018 data also show evidence of successful fry stockings from 2015, with strong numbers in the 340 mm – 420 mm range. However, the fry stockings from 2019 to 2021 are obscured in the 2025 results by the presence of adult fish released during 2023 and 2024. Additionally, no evidence of natural recruitment was observed over the past two years, with no fish under 300 mm captured.

5.2. Population Estimate and CPUE

The CPUE from the 2018 survey was 2.13 brown trout per trap compared to 0.77 for the current survey, representing a 64 per cent decrease. Similarly, a comparison of the 2018 and 2025 population estimates, 23,000 and 9,416 respectively, represented a 59 per cent decrease. Together these results imply a substantial decrease in the number of fish between surveys.

6. Angler Postal Survey 2015-2025

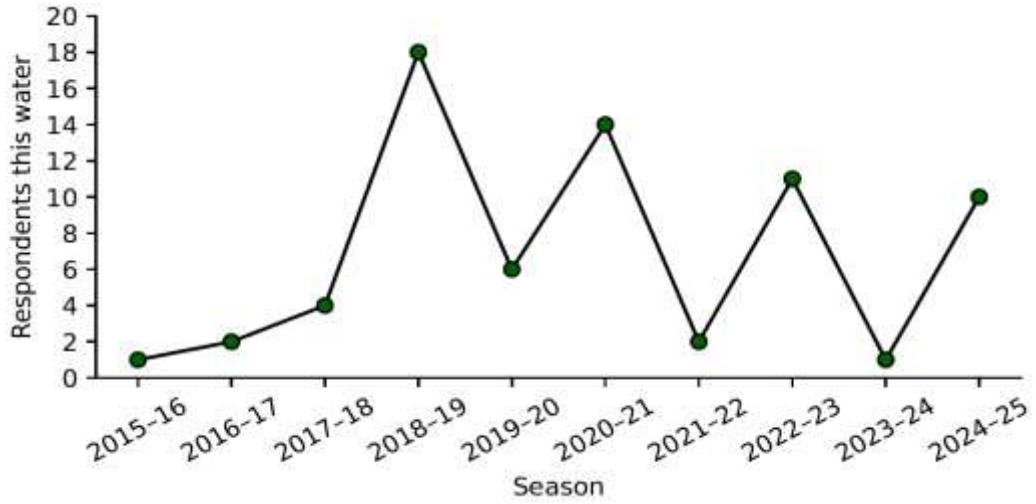


Figure 8: Number of APS respondents that fished South Riana Lake 2015-2025.

The APS results for South Riana Lake are influenced by the variability in respondent numbers, with some years such as 2016–17, 2021–22, and 2023–24 having only two responses (Figure 8). Consequently, individual responses may disproportionately influence the overall estimates.

Since the 2015–16 season, around one per cent of all licensed anglers (average 256 anglers) fished at South Riana Lake each season. This number varied from a high of 514 anglers during 2018-19 to a low of 48 anglers during 2023-24.

The average number of days fished by all anglers per season (fishing effort), was 1,707. The maximum effort occurred during 2018-19 reaching close to 7,000 angler-days**,** while in 2023-24 this was a low of 76 days (Figure 9).

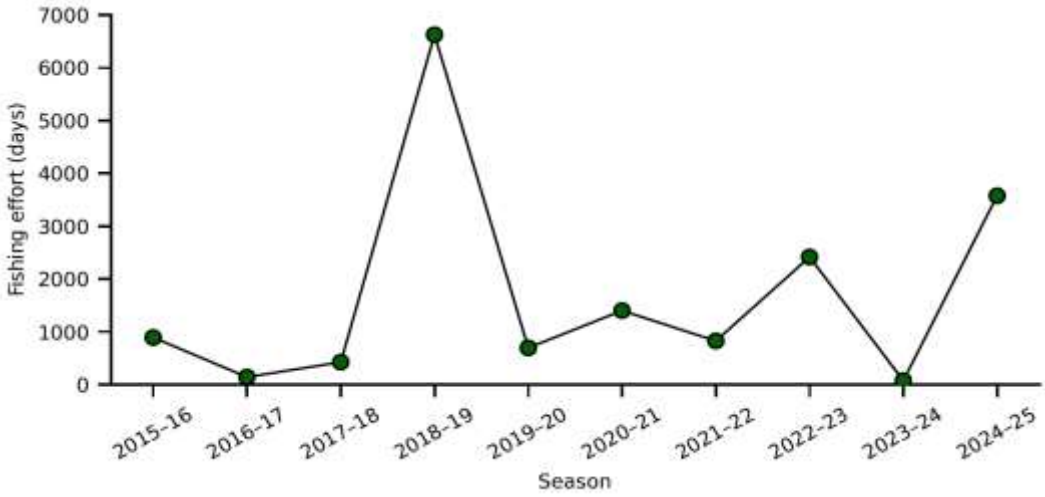


Figure 9: Total estimated fishing effort for each season, South Riana Lake 2015-2025.

The average daily catch rate for brown trout was 0.69, peaking at 1.99 in 2022–23. No catches were recorded in 2016-17 and 2023-24, primarily due to low survey respondent numbers (Figures 8 and 10). The catch rate during the 2024-25 season was 0.34 and well below the long-term average but an improvement on the previous season.

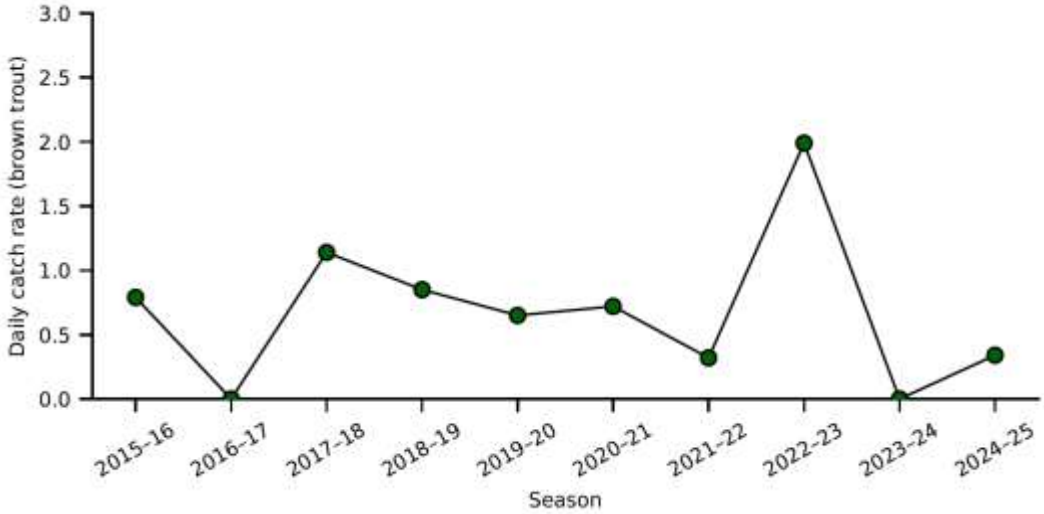


Figure 10: Catch per day of brown trout for each season, South Riana Lake 2015 – 2025.

The estimated average seasonal harvest of brown trout during 2015-25 was 1,457, with a high of 5,636 in 2018-19, with no catches reported for 2016-17 and 2023-24 (Figure 11).

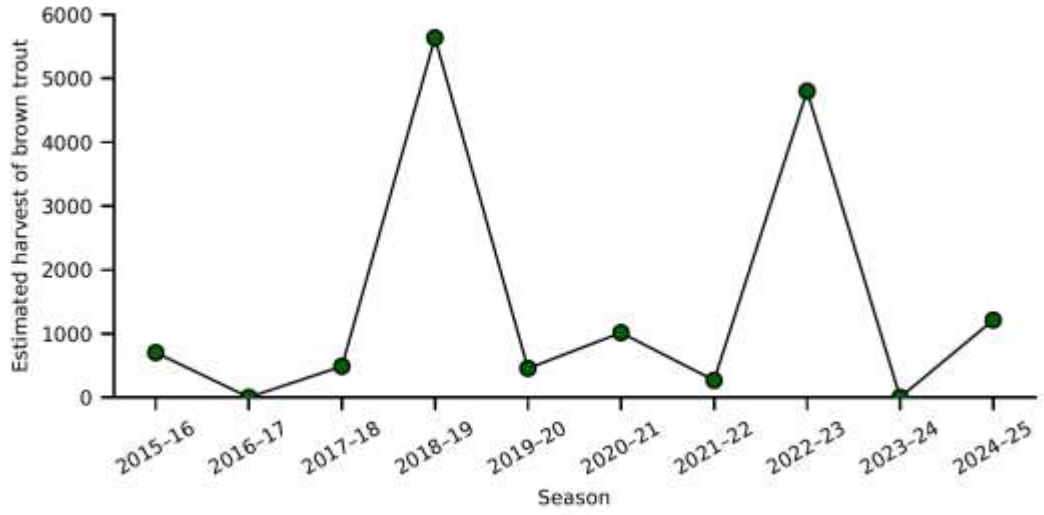


Figure 11: Estimated annual harvest of brown, South Riana Lake 2015 – 2025.

7. Creel Interview Summary 2024-25

During the 2024–25 season, 95 anglers were interviewed about their fishing activity at South Riana Lake. Only those anglers who fished for three or more hours were included in the

analysis, resulting in 13 valid records. These anglers fished a total of 46 hours, catching 11 brown trout. Assuming six hours equals a full day of fishing, the daily catch rate for brown trout was 1.4. All anglers were shore based with eight fishing with artificial lure and five with bait. They released 45 per cent of their catch.

Across the five seasons (2020-2025), using records equal to or greater than three hours fishing, the daily catch rate for brown trout declined from around 2.5 fish during 2020-22, to 1.0 during 2023-24 (Figure 12). The average daily catch over the five season period (2020-25) was 1.8.

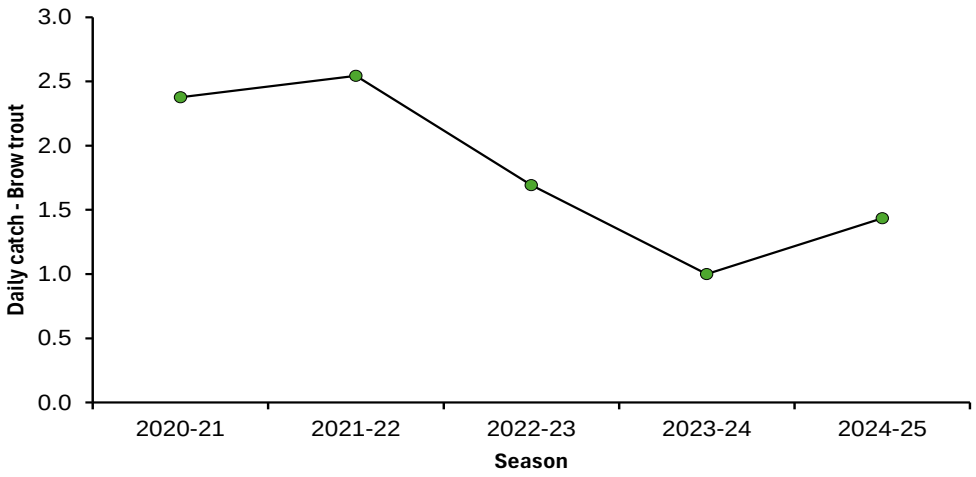


Figure 12: Catch per day for brown from the Angler Creel App, South Riana Lake, 2020-25.

8. Angler Diary Summary 2024-25

During the period 3 August 2024 to 29 September 2025, there were 34 valid records entered by anglers into the Angler Diary App for South Riana Lake (including both zero-catch and multiple-catch entries). Of these records, 29 met the criteria of fishing for three or more hours. These 29 records were attributed to 22 individual trips, with an average trip being 4.7 hours. The total number of brown trout captured was 23. Total fishing effort was 153.3 hours. Based on the assumption that a full day's fishing is six hours, this is equal to 25.6 days. The average daily catch of brown trout reported from the Angler Diary, for anglers fishing three or more hours was 0.90 brown trout per day. The reported catch and release rate was 39 per cent. Twenty-one per cent of anglers reported using a watercraft (e.g. kayak) while fishing, with the remainder fishing from the shore. Fishing methods, expressed as percentages, were 41 per cent lure, 50 per cent bait, and nine per cent fly.

9. Stocking

Since 2015, stocking at South Riana Lake has consisted of a mix of adult, yearling and fry sized brown trout (Appendix A). The 2018 survey confirmed the presence of both resident fish and stocked fish that were from the release of yearlings and fry (2015-2016). However,

since 2023 slightly lower catch rates and the influence of local anglers resulted in a switch to the exclusive release of adult brown trout. The last stocking of fry was during 2019, but their presence in the 2025 survey was masked by recent adult transfers. At present, according to stocking records, there should be a large percentage of four and five year old brown trout within the catch, resulting from previous fry and adult stockings converging.

10. Discussion

The repeat survey using box traps provided an opportunity to compare the current results with those from 2018, when similar methods and effort were applied. This comparison offers a valuable insight into changes in the brown trout population within South Riana Lake over time.

CPUE and the decline in population estimates between 2018 and 2025 suggests brown trout numbers are lower than anticipated. However, the capture-mark-recapture analysis was likely influenced by limited sample size and low tag recaptures, which introduces uncertainty into the estimates. Angler catch rates, as reported through APS and diary programs, also reflect this trend, showing lower success compared to most previous years. The creel data from 2024–25 indicate a higher daily catch rate of 1.4 fish, although the catch rate had generally decreased compared to earlier seasonal results.

Growth data reveal that brown trout can reach large sizes, up to 580 mm, but overall growth rates appear slow. Furthermore, fish exceeding 500 mm are often in poor to very poor condition, which may reflect lower productivity of the system. The absence of natural recruitment over the past two to three years raises concerns about population sustainability without regular stocking.

Past observations suggest that fry stocking can maintain catch rates and meet angler satisfaction levels, highlighting the importance of a planned stocking regime as a key management tool.

Finally, while box traps provided useful data, their efficiency was limited by the shortage of suitable sites due to deep nearshore water. Alternative methods, such as boat-based electrofishing, may offer improved sampling coverage and reliability for future surveys.

11. Recommendations

- The ratio of fin-clipped to non-fin-clipped brown trout in anglers' catches will be monitored over the next one to two seasons using the Compliance Creel app. This will provide a measure of total mortality overtime and track the general condition of fish.
- Stocking with the use of fry and adult fish for South Riana Lake will be reviewed as part of the annual stocking plan, with consideration of the desired catch rate for brown trout.
- Develop broad fishery management objectives for South Riana Lake in consultation with anglers, addressing priorities such as catch rates, fish condition, and long-term population sustainability.

12. Appendix

Appendix A: Brown trout stockings South Riana Lake, 2015 – 2025.

Year	Number	Stage	Minimum age at 2025
2015	35,000	Fry	10
2016	1,300	Yearlings	10
2017	3,000	Fingerlings	9
2017	35,000	Fry	8
2018	45,000	Fry	7
2018	400	Adults	10
2019	70,000	Fry	6
2019	392	Adults	9
2020	35,000	Fry	5
2021	35,000	Fry	4
2022	Nil	Nil	-
2023	350	Adults	5
2024	800	Adults	4
2025	600	Adults	3

Inland Fisheries Service

Phone:
1300 463 474

Email:
infish@ifs.tas.gov.au

www.ifs.tas.gov.au