# Roxburgh Angler Surveys & Otolith Collection

*2024-25*

*Project - 2025-04*

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# 1. Executive Summary

*A roving creel survey was conducted on the Clutha River/Mata-Au downstream of Roxburgh Dam during March and April 2025 to assess the state of the recreational salmon fishery. The primary objectives were to estimate angler effort and catch, determine angler targets, compare findings with historical data, and collect biological samples for ongoing research.*

*The survey revealed exceptionally low levels of angler participation. Across 29 dedicated survey days, only 13 anglers were interviewed, contributing a total of just 8.3 hours of fishing effort. This represents a significant decline from previous years, such as 2013 when 21 anglers were interviewed over just seven surveys, accounting for 63.1 hours of effort.*

*The key findings from the 2025 survey were:*

- ***Zero Catch**: No fish of any species were observed or reported caught by interviewed anglers, resulting in a Catch Per Unit Effort (CPUE) of zero.*
- ***Shift in Target Species**: In a departure from historical trends, no interviewed anglers were specifically targeting salmon. Effort was instead directed towards trout (46.2%) or "any" species (53.8%).*
- ***Biological Sampling**: Efforts to obtain salmon otoliths through public campaigns and field surveys were unsuccessful due to the absence of harvested salmon. Fortunately interpersonal contact secured two sets of otoliths for future analysis.*

*The 2025 results confirm a persistent, long-term decline in the Roxburgh Dam salmon fishery. The area has transitioned from a recognised destination salmon fishery to a marginal, low-use local fishery with a focus on other species. The lack of returning salmon appears to be the primary driver of this significant reduction in angler effort and catch.*

# Introduction

Historically, studies to estimate harvest and usage of the Clutha River/Mata-Au salmon fishery have used various methods, including postal surveys (Whiting 1986), online surveys (Trotter 2022), phone surveys (Couper 2024), and combined online and phone surveys (Court and Couper 2023). Targeted angler creel surveys, the method used in this study, were also conducted in 2013, 2014, 2019, 2022, and 2023 (Court and Couper 2023; Halford 2019; Morris 2013, 2014; Trotter 2022).

The majority of these surveys have recognised the upper river around Roxburgh Dam as a known congregation point for migrating salmon and a focal point for angling activity. Targeted angler creel surveys have largely focussed on this area to provide the best chance at quantifying the angler catch component of the remnant salmon run.

Previous studies have used otolith (ear-bone) microchemistry to determine the natal origins of Clutha sea-run salmon with up to 61% estimated to be sourced from above the dam (Gabrielsson 2019).

The primary objectives of the 2025 creel survey were to:

- Estimate angler effort and catch rates in the 2 km reach immediately downstream of Roxburgh Dam.
- Determine angler target species and methods.
- Compare current fishery performance with historical data.
- Collect otolith samples from any harvested salmon to support ongoing natal origin research.

# 2. Methods

## 2.1. Survey Area

The survey was conducted on the Clutha River/Mata-Au immediately downstream of the Roxburgh Dam. The surveyed reach extended for approximately two kilometres downstream from the dam, covering both banks of the river. This area is a well-established location for shore-based salmon angling, with multiple access points available to the public via local roads and the adjacent Roxburgh Gorge Cycle Trail.

## 2.2. Survey Design

A roving access point creel survey (Pollock, Jones, and Brown 1994) was conducted during March and April 2025. This period was selected to coincide with the historical peak of the autumn salmon run as identified in previous surveys. The survey design incorporated a stratified semi-random sampling methodology to ensure representative coverage of angling activity.

- **Stratification:** The survey period was stratified by day type (weekday, weekend/public holiday) to account for different usage patterns.
- **Sampling Effort:** A minimum of six survey days were completed each month. This allocation consisted of at least three weekday surveys and three weekend surveys to capture potential differences in angling pressure between these day types.
- **Survey Timing:** Surveys were undertaken during daylight hours. Start times were varied to cover morning and evening periods when angling activity is often highest

## 2.3. Data Collection and Interview Protocol

Surveyors patrolled the study area and interviewed all accessible anglers. For consenting anglers, data were recorded directly into a designated smartphone application or onto a standardised paper field sheet.

The survey collected information on:

- **Angler Effort:** Time started fishing and duration of fishing trip so far.
- **Fishing Method:** Spin, bait, or fly fishing.
- **Target Species:** Whether the angler was fishing for trout, salmon or had no particular or "any" target
- **Catch Data:** Number and species of fish kept and released.
- **Biological Data:** For any fish available for inspection, the surveyor recorded the length and weight.
- **Angler Details:** Licence type and region of residence.

### 2.4. Biological Sampling

In addition to collecting biological data during creel surveys, Otago Fish & Game initiated a public campaign to obtain salmon heads for otolith analysis. Media requests for anglers to keep salmon heads were shared through a Facebook post (which the Central Otago District Council also shared), a mention in a weekly fishing report, the January Reel Life e-newsletter, and a press release that was picked up by the Teviot Bulletin and the Clutha Leader.

### 2.5. Data Analysis

Catch Per Unit Effort (CPUE) was calculated as the total number of fish caught divided by the total hours of fishing effort. The 'Anglers per Survey' metric was calculated by dividing the total number of anglers interviewed by the total number of surveys completed.

## 3. Results

### 3.1. Survey Effort and Angler Numbers (2025)

A total of 29 surveys were conducted in 2025. Angling pressure was exceptionally low, with anglers observed on only 8 of the 29 survey days (28%). Across the 8 successful survey days, a total of 13 anglers were interviewed. Angling pressure was almost exclusively confined to weekends and public holidays (Table 1).

*Table 1: Summary of Angler Activity by Day Type, Roxburgh Dam, 2025*

| Day Type | Number of Surveys | Number of Anglers Interviewed | Total Angler Effort (hrs) | Anglers per Survey |
|---|---|---|---|---|
| Weekday | 15 | 1 | 1.5 | 0.07 |
| Weekend & Public Holiday | 14 | 12 | 6.8 | 0.86 |
| **TOTAL** | **29** | **13** | **8.3** | **0.45** |

## 3.2. Angler Demographics and Methods (2025)

Of the 13 anglers interviewed, 6 from the Southland Region and 5 were from Otago, leaving 2 from other regions. All anglers interviewed were spin fishing. No anglers stated they were targeting salmon. The effort was split between those targeting trout specifically (46%) and those fishing for "any" species (54%).

## 3.3. Fishery Usage (2025)

The 13 interviewed anglers accounted for a total of 8.3 hours of fishing effort. During this time, the total reported catch for all species was zero. Consequently, the Catch Per Unit Effort (CPUE) for all species was zero.

## 3.4. Historical Comparison of Fishery

The 2025 results, when compared with data from previous surveys, show a long-term trend of declining angler participation and salmon catch at this location (Table 2). Total angling effort recorded in 2025 (8.3 hours) is a fraction of the 63 hours recorded in 2013 and is substantially lower than the 31 hours recorded in 2022 from a similar number of surveys.

*Table 2: Comparison of creel survey results for the Roxburgh Dam fishery across all monitored seasons.*

| Season | Surveys Completed | Angler Interviews | Total Angler Effort (hrs) | Salmon Catch (Observed/ Reported) | Trout Catch (Observed) | Anglers Targeting Salmon (%) |
|---|---|---|---|---|---|---|
| **2013** | 7 | 21 | 63.1 | 0 observed, 28 reported[1] | Not Recorded | ~100%[2] |
| **2014** | 8 | 10 | 9.3 | 0 observed, 9 reported[1] | Not Recorded | ~100%[2] |
| **2018** | 14 | 2 | Not Reported | 0 | Not Recorded | ~100%[2] |
| **2022** | 31 | 28 | 30.8 | 0 | 1 (Rainbow) | 0% |
| **2023** | 23 | 7 | 10.0 | 0 | 0 | 57% |
| **2025** | 29 | 13 | 8.3 | 0 | 0 | 0% |

[1] This number represents the self-reported total season catch of the interviewed anglers.
[2] Surveys in 2013, 2014 and 2018 did not retain or report on data on trout catch or angling.

### 3.5. Otolith Collection

Efforts to collect biological samples were largely unsuccessful. During dedicated searches of the riverbanks, Fish & Game staff did not find any salmon carcasses. No samples were provided in response to the public media campaign, and no anglers interviewed during the survey had retained any salmon. Consistent with these results, no salmon were observed by the surveyor during the survey period.

The only samples acquired were the heads from two salmon (Photo 1), which a surveyor obtained through a personal contact outside of scheduled survey hours. The salmon otoliths from these fish have been archived for future analysis.

*Photo 1: Salmon caught below the Roxburgh Dam in 2025. Photo: Nicholas Rae.*

## 4. Discussion

The 2025 creel survey indicates a significant shift in the recreational fishery downstream of the Roxburgh Dam. The key findings were low angler numbers, a complete absence of catch during the survey period, and a change in angler focus away from salmon. This continues a trend of declining participation observed over the last decade (Table 2). Whereas this area was once a well-known salmon fishery, anglers in 2025 were primarily targeting trout or "any" species, suggesting that angler perception and use of this fishery have changed.

Several factors may have influenced these results. The minimal angler activity was heavily concentrated on weekends, typical of a local, opportunistic fishery rather than a destination one. Furthermore, surveyors noted that the river was often low and clear, conditions that can make fish, but particularly salmon more cautious and fishing more challenging. While these conditions could have contributed to the zero-catch rate in 2025, the long-term decline in effort points to a more persistent change in the fishery itself. Past observations suggest that any increase in salmon catch in this accessible area is likely to generate a rapid increase in local angling effort.

The low number of returning salmon was reflected in the biological sampling efforts. Obtaining otolith samples proved difficult without a consistent fishery, and the two samples collected were acquired opportunistically. Given the low usage of the fishery and negligible harvest rates, a high level of survey effort would be required to obtain useful data and biological samples.

## 5. Conclusion

The 2025 creel survey provides further evidence of a decline of the recreational fishery immediately downstream of Roxburgh Dam. The findings of exceptionally low angler effort, zero catch, and the complete absence of anglers targeting salmon is indicative of a long-term downward trend.

The data also reveals a shift in angler expectations. This once popular salmon fishing area is now a marginal, low-use location where the remaining anglers primarily target trout or whatever is available. This change in angler behaviour and perception points directly to a collapse in the returning salmon run. Without a significant recovery of the salmon population itself, the recreational fishery in this reach will likely remain in its current, low use state.

## 6. Acknowledgments

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