Lower Clutha salmon harvest monitoring

2024-25

Project - 2025-05

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1. Executive Summary

The Mata Au Trust commissioned Otago Fish & Game to run a survey to estimate angler effort and salmon harvest in the lower Clutha River for the 2025 fishing season. The study combined a large-scale email survey of local licence holders with targeted telephone follow-ups to provide a statistically robust overview of salmon fishing activity and catch.

The key findings show a fishery with substantial angling effort but minimal salmon harvest. Anglers spent an estimated 2,290 (± 600) days fishing for salmon. From this effort, the total estimated catch was just 76 (± 28) salmon, with 40 (± 26) of these being kept. The data describes a fishery with very low catch rates (approximately 30 days per salmon), and small fish (1.4–3.2 kg) rather than the large, sea-run salmon of the past.

The survey results confirm that the Clutha salmon fishery is in a depleted state, operating at a fraction of its historical capacity. This conclusion is strongly supported by other work streams, including recent surveys suggesting a remnant population of fewer than 50 spawning salmon. This quantitative assessment was mirrored in angler feedback, which expressed widespread disappointment over the decline of a fishery many remember as exceptional.

2. Introduction

Quantifying the harvest and angler effort within the Clutha River/Mata-Au salmon fishery is essential for assessing the population's health and informing sustainable management.

Studies to estimate harvest and usage of the Clutha salmon fishery, particularly the salmon fishery have varied over time consisting of postal surveys (Whiting 1986), online surveys (Trotter 2022), phone surveys (Couper 2024), combined online and phone surveys (Court and Couper 2023).

This report presents the results of a comprehensive 2025 survey designed to provide a robust contemporary estimate of the fishery's performance and angler experience.

3. Methods

3.1. Survey Area Definition

The study area was defined to capture the majority of salmon angling activity. Analysis of the National Angling Survey (Stoffels 2023) showed that all recent salmon angling effort came from Otago Region licence holders living within a 65-minute drive of the river. Travel time was defined as the driving time to the nearest of four key locations: Balclutha, Clydevale, Beaumont, or Roxburgh, sourced via the ggmaps package in software R and the Google Maps API. The resulting study area is shown in Figure 1.

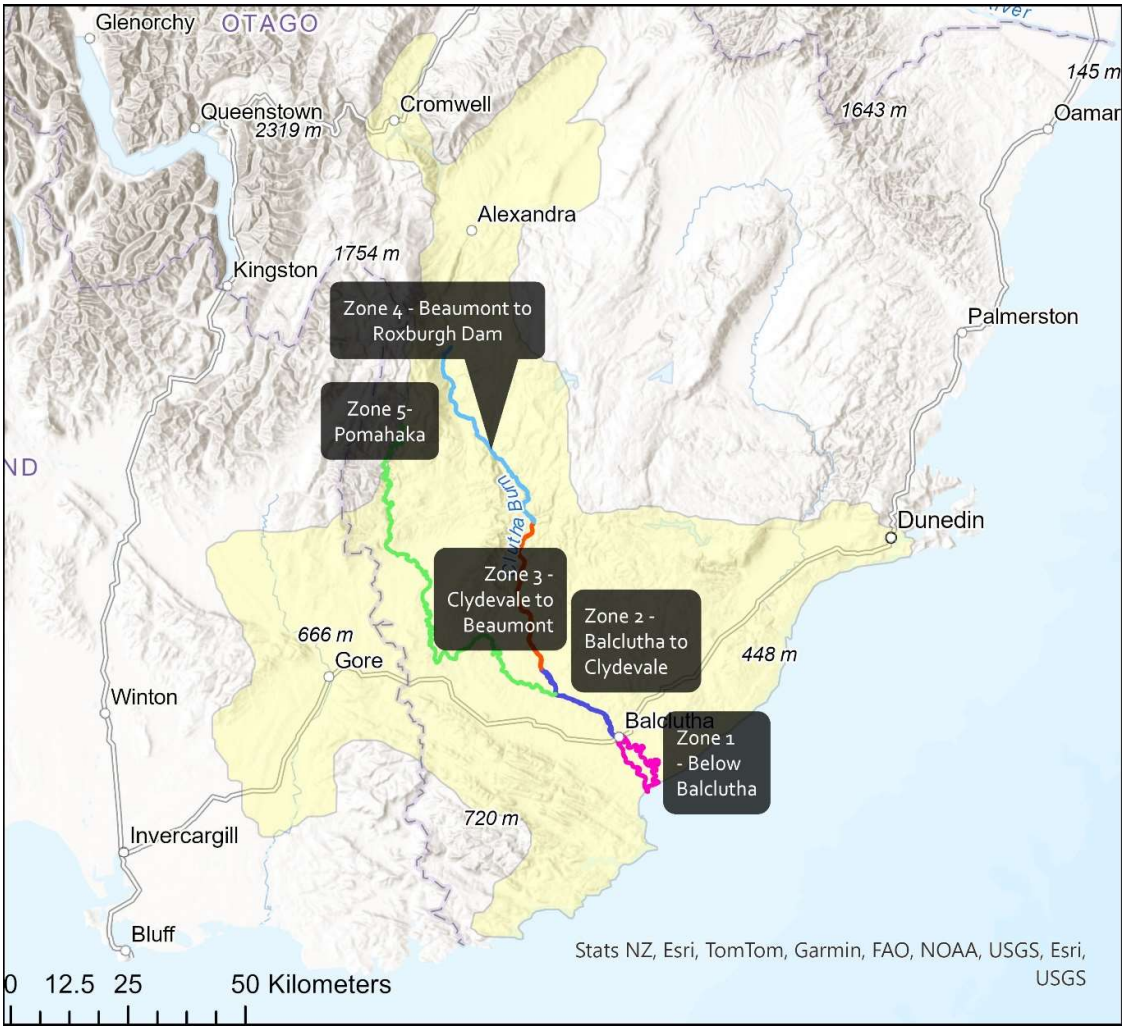

Figure 1: Map showing the five river zones and an approximation of the 65-minute travel-time catchment area used for the survey sample.

3.2. Survey Design

Our survey was timed to follow the Central South Island and North Canterbury surveys of Canterbury sea-run salmon endorsement holders, which prevented Otago anglers holding this endorsement from being surveyed twice.

The survey began with an email sent to all Otago licence holders who lived within the defined study area (Figure 1) and did not hold a Canterbury sea-run salmon endorsement. A reminder email was sent one week later to increase the response rate. Email surveys were sent to a total of 5155 Otago licence holders. For reporting, the fishery was divided into five zones: the Pomahaka River and the four sections of the Clutha River between the major bridges (Figure 1).

Telephone surveys were conducted with a sample of non-respondents. This follow-up was stratified by whether an angler was an 'identified salmon angler', defined as someone with a previous record of catching salmon on the Clutha. A higher proportion of these identified anglers was surveyed to increase the precision of harvest estimates for this key group. We also telephoned a sample of successful anglers to confirm species identification.

Table 1 details the final survey strata, sample sizes, and scaling factors.

Table 1: Strata Breakdown with totals.

Strata	Description	Number Surveyed	Database Total	Scaling Factor
1	Email respondents	946	946	1.0
2	Phone Calls - Email non-respondents	1,503	5237	4.1
3	Phone Calls - Identified salmon anglers (excluding 10 who responded to the email survey)	9	16	1.78
4	Canterbury Salmon Endorsement Volunteer returns (anglers who reported fishing the Clutha).	7	12	1.71
	Total	2,465	6,199	

The Canterbury survey of salmon endorsement holders found 12 anglers that fished the Clutha in their initial voluntary card return however no further Clutha anglers were identified in their follow up phone surveys.

Email respondents and those that were surveyed by phone were all asked how many days they fished each zone and how many salmon they kept or released. Successful anglers were asked for the location, month, and weight of their catch, and whether fish heads had been kept for sample retrieval.

3.3. Data Analysis

The data were analysed using the survey package in R. This method allowed for the incorporation of a Finite Population Correction (FPC) and the estimation of catch and activity parameters with their associated uncertainty. Email responses were treated as a census of that group (a certainty stratum), so these results were not extrapolated to non-respondents.

4. Results

4.1. Fishery-Wide Effort, Catch, and Angler Numbers (2025)

During the 2025 season, an estimated 233 (± 36) anglers fished for salmon in the lower Clutha catchment, spending a total of 2,080 (± 490) days on the water. The majority of this effort (1,740 days) occurred on the Clutha mainstem. This figure is within the confidence limits of the 2021/22 National Angling Survey estimate of 2,740 (± 2,040) salmon angling days for the Clutha River (Stoffels 2023).

The total estimated salmon catch for the season was 72 (± 23) fish. Of this total, an estimated 37 (± 22) were kept and 33 (± 10) were released. These results are summarised in Table 2.

Table 2: Estimated salmon angler usage, catch, and harvest in the Clutha River Fishery for the 2025 season. Values given as the estimate ± 95% confidence interval.

	Estimate	
Angler Days	2,080	± 490
Number of Anglers	233	± 36
Salmon Caught	72	± 23
Salmon Kept	37	± 22
Salmon Released	33	± 10

4.2. Catch and Effort by Zone (2025)

Angling effort and catch were unevenly distributed across the fishery (Table 3). Zone 1 (Clutha Below Balclutha) accounted for the most angling effort (42% of the total) and the highest total catch.

While the lowest reaches of the river experienced the most angling activity, the upper river sections were more productive for anglers. Zone 3 (Clydevale to Beaumont) and Zone 4 (Beaumont to Roxburgh Dam) had the highest productivity, with approximately one salmon caught for every 12 and 14 days of effort, respectively (Table 3). In contrast, the lower river (Zone 1) required an average of 35 days of effort per salmon caught. The Pomahaka River

(Zone 5) and the section between Balclutha and Clydevale (Zone 2) had the lowest overall catches.

Table 3: Estimated angler effort (days) and salmon catch by survey zone for the 2025 season. Values are the estimate ± 95% confidence interval.

Zone	Description	Days Fished		Salmon Caught		Days per Salmon
1	Clutha Below Balclutha	880	± 330	25	± 10	35
2	Clutha Balclutha to Clydevale	390	± 220	8[1]		**49**
3	Clutha Clydevale to Beaumont	210	± 160	17	± 17	12
4	Clutha Beaumont to Roxburgh Dam	260	± 70	18	± 12	14
5	Pomahaka River	340	± 230	4[1]		**85**
Clutha subtotal		1,740	± 430	68	± 23	26
Grand Total including Pomahaka		**2,080**	**± 490**	**72**	**± 28**	**29**

4.3. Historical Comparison of Fishery Performance

To place the current results in context, the 2025 harvest estimate was compared with available historical data from 1973 to the present (Figure 2). Historic data was largely sourced from Pack and Jellyman (1988), while more recent data was found in Couper 2024; Court and Couper 2023 and Trotter 2012 and 2022.

The long-term data reveals a significant decline in the Clutha salmon harvest over the last 50 years. The fishery appears to have peaked in the mid-1980s, with estimated harvests reaching a high of 1,600 fish in the 1985 season. Following this period, the harvest declined substantially. Since 2010, estimates have ranged between 15 and 80 fish per season. The 2025 harvest estimate of 37 (± 22) fish is in line with this more recent period of low harvest.

[1] No confidence intervals able to be calculated due only online respondents providing data. These data are likely to be underestimates.

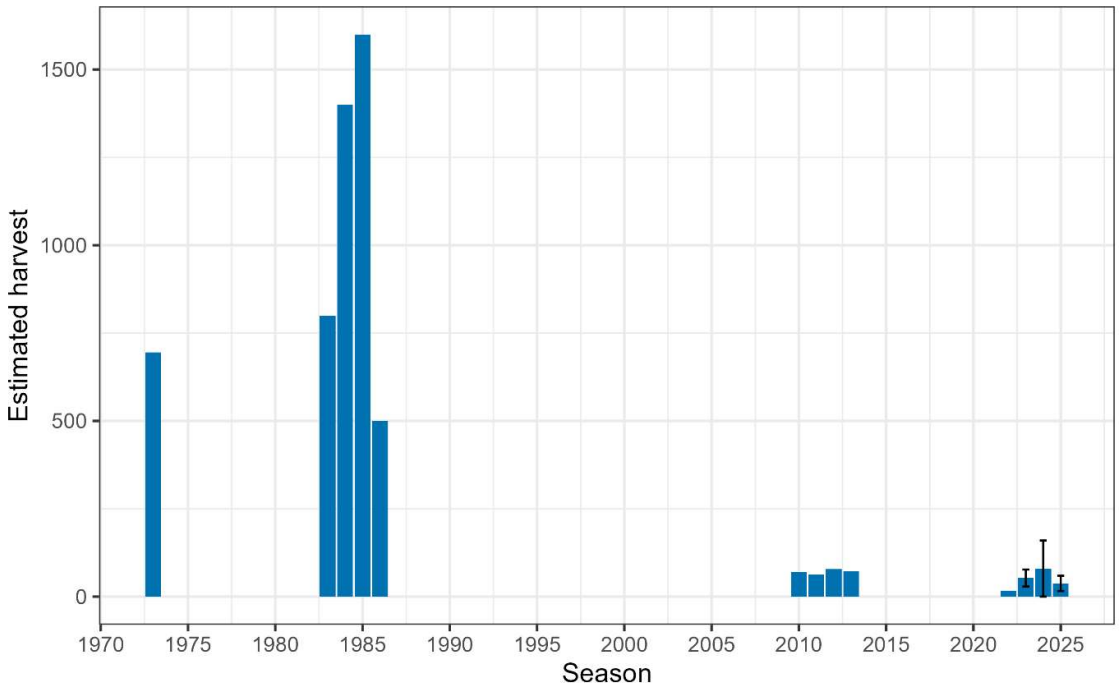

Figure 2: Estimated salmon harvest (number of fish kept) in the Clutha River Fishery from 1973 to 2025. Error bars represent 95% confidence intervals where available.

4.4. Fish Size and Timing

Detailed information on the size and capture month of individual salmon was limited, as few survey respondents provided these optional details. From the small sample available (n=7), catches were reported in November, February, and April. For the five fish where a weight was recorded, sizes ranged from approximately 3 lb (1.4 kg) to 7 lb (3.2 kg). Due to the very small sample size, these results can only give an indication of Clutha salmon life histories.

4.5. Angler Feedback

Of the online respondents, 178 provided comments. These were anonymised and summarised using a large language model (Google 2025) to identify key themes and reduce the potential effects of researcher biases.

The feedback revealed widespread disappointment regarding the state of the fishery. The dominant sentiment was that the salmon population is critically low, contrasting with a fondly remembered, thriving fishery in past decades. Many anglers reported they no longer fish for salmon in the Clutha River because they believe it is not worthwhile.

Perceived Causes for Decline: Anglers attributed the decline to several factors:

- **Dam Operations:** A primary concern was the cessation of salmon smolt releases by the dam operator (Contact Energy) and the need to enforce resource consent conditions.

- **Lack of Fish Passage:** The absence of fish passage at the dams was frequently cited as preventing natural migration to headwater spawning grounds.
- **Habitat and Environmental Issues:** Predation by seals, invasive plants limiting river access, and concerns over water quality were also common themes.

Angler Suggestions: The most frequent suggestions for restoring the fishery were:

- **Install Fish Passage:** This was the most common recommendation.
- **Resume Stocking:** Many called for re-establishing a hatchery at Roxburgh and resuming stocking programmes.
- **Improve Habitat:** This included predator control and invasive plant management.

Other Comments: A smaller number of respondents noted they now target trout instead of salmon, cited personal reasons for not fishing, or requested more information about the fishery.

5. Discussion

The 2025 survey confirms that the Clutha River salmon fishery currently provides a very limited recreational harvest. The estimated 37 kept fish represents a continuation of the low returns seen in recent decades and contrasts sharply with the fishery's past performance. This decline is even more pronounced when compared with anecdotal records from the mid-20th century, which suggest salmon runs once numbered in the tens of thousands (Jellyman 1989). A harvest based on even a fraction of such a run would have been orders of magnitude greater than recent estimates.

The small size of the salmon reported also suggests a change in the fishery. The reported fish weights ranged from approximately 3–7 lb (1.4–3.2 kg). These are not the large, >10 lb fish characteristic of a destination sea-run salmon fishery. This may explain the high release rate (46%) observed in the survey, as anglers may not consider these smaller fish are desirable to keep.

The origin of these smaller fish is uncertain. The smaller end of the catch range may indicate that some of the catches were lake-resident fish that have moved downstream from Lake Roxburgh or above. The larger fish, around 7 lb, are consistent with a life history previously common on the Clutha (Pack and Jellyman, 1988), where fish rear in freshwater for multiple years and spend only a short time at sea. The small size also raises questions around species identification, particularly for released fish. When salmon are small and the fishery also contains large silver sea-run brown trout, the potential for misidentification increases. Although staff telephoned successful anglers to confirm species, it is possible that a portion of the reported salmon catch, particularly among released fish, may have been trout.

The certainty of this study's findings should be considered alongside two study limitations that introduce opposing uncertainties. Firstly, potential species misidentification would lead to an *overestimation* of the salmon harvest. Secondly, the survey's geographic scope, which was based

on the home location of known salmon anglers, may have missed a small number of anglers who travelled from outside the area, leading to a potential *underestimation* of effort and harvest. The net effect of these two uncertainties is unknown and expected to be small, but provides important context for the final estimates.

The key findings of this survey are consistent with other recent research. The estimated angling effort on the Clutha mainstem (1,920 days) aligns well with the 2021/22 National Angling Survey (NAS) figure of 2,740 (± 2,040) days for the same area, which suggests the methods are robust.

Feedback from staff follow-up calls provides further context in angling activity. It suggests that unlike in other East Coast fisheries where methods are highly salmon-specific, many anglers on the Clutha are engaged in general fishing for other species while hoping to catch salmon opportunistically.

The extremely low harvest documented in our survey is supported by recent creel reports (Couper 2025b) and, critically, by spawning surveys that indicate a remnant population, with only 10 salmon redds observed in the catchment, meaning there are likely fewer than 50 spawning adults (Couper 2025a). This combination of work streams and reports suggest that while general angling effort remains high (Couper 2024; Stoffels 2023), the targeted salmon fishery and the population itself are at a critically low point.

This situation is reflected in the feedback from anglers, which was characterised by widespread disappointment and frustration. While many anglers have strong views on the causes of the decline and potential solutions, the overarching sentiment is one of loss for a fishery that many remember as being exceptional.

6. Conclusion

The 2025 angler survey provides a clear measure of the Clutha River salmon fishery, confirming it currently provides a limited recreational opportunity and is operating at a fraction of its historical capacity. The low harvest estimate, combined with the small size of the fish caught, indicates the fishery is essentially a remnant population, not the robust and popular salmon fishery of the past.

These survey findings align with other recent data, including spawning surveys, to provide a consistent picture of the current low salmon population. The 2025 Mata Aa work programme suggests the current population is not robust enough to support a healthy targeted recreational fishery, contrasting clear desire from licence holders to see the fishery restored.

7. Acknowledgments

We thank the 2,465 Otago licence holders who participated in this study. We are particularly grateful to the members, parents, and coaches of the Dunedin Thunder U18 ice hockey team for their essential assistance in conducting the phone surveys. This research was made possible by funding from the Mata Au Trust and Contact Energy.

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