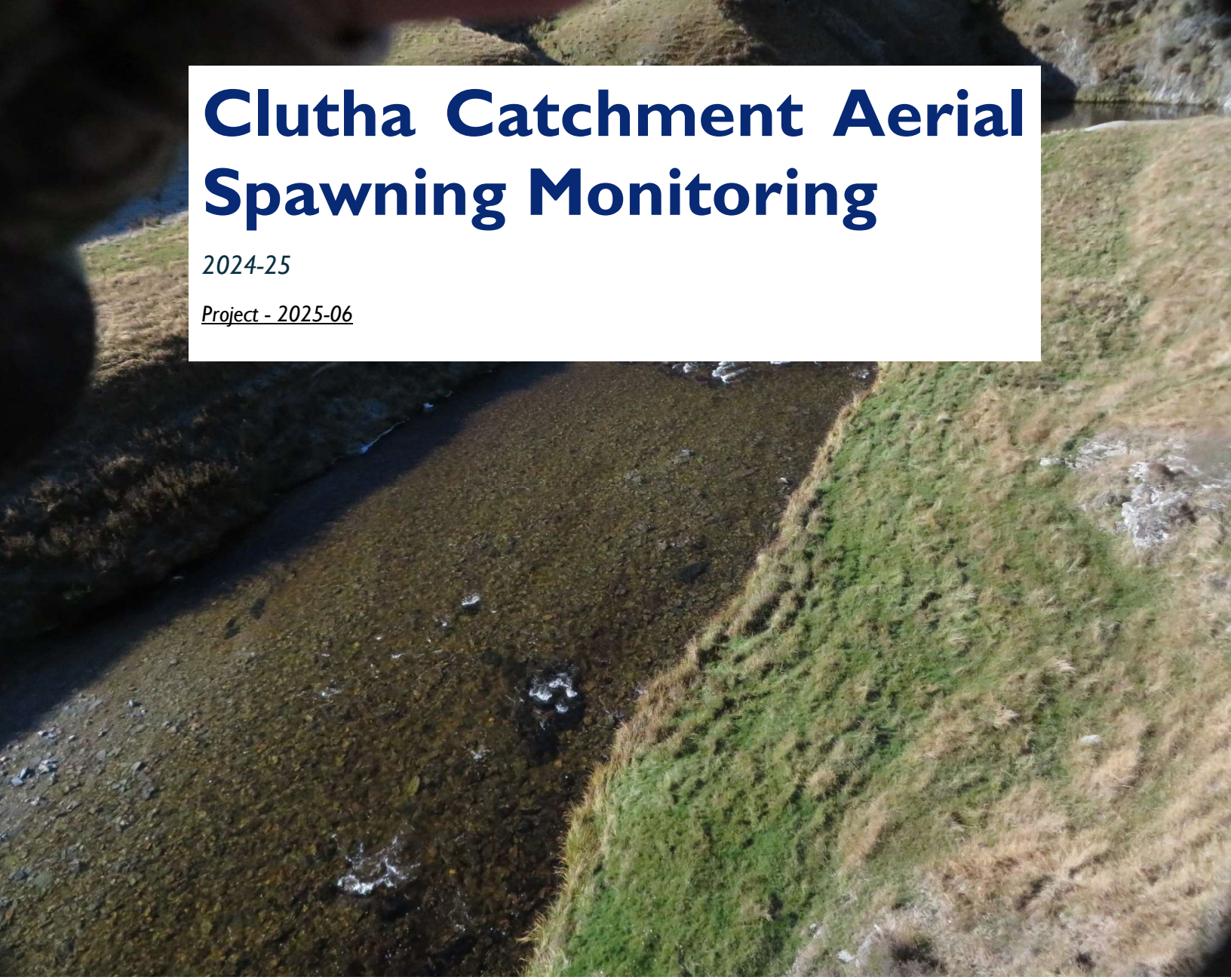

Clutha Catchment Aerial Spawning Monitoring

2024-25

Project - 2025-06

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1. Executive Summary

In May and June 2025, Otago Fish & Game conducted aerial surveys to assess salmon and trout spawning in the Lower Clutha/Mata-Au catchment. The surveys covered the main stem of the Clutha River/Mata-Au and key tributaries: the Pomahaka River, Leithen Burn, Benger burn and Sandy Creek.

The principal finding is a continuation of the significant long-term decline of the Clutha salmon spawning population. The 2025 surveys recorded only ten salmon redds and no live salmon across the entire catchment. These results represent a critical decline from historical data from the 1990s, when annual counts frequently exceeded 200 redds.

In contrast, the trout population appears to be more resilient, though variable with the 2025 Clutha survey recording 85 trout redds.

The consistency of the data over many years provides strong evidence of a substantial decline in the Clutha salmon run.

Photo 1: Winter Conditions on the Pomahaka, 18/06/25.

Introduction

The Clutha River/Mata-Au supports a regionally significant fishery for both salmon and trout (Otago Fish & Game 2015). Long-term monitoring of spawning activity is crucial for managing this resource, particularly given persistent concerns over the decline of the salmon population. Aerial surveys provide the only effective method for assessing spawning activity by counting live fish and their nests (redds).

This report presents the findings of aerial surveys conducted in May and June 2025 in the Lower Clutha catchment, including the main stem and the key tributaries of the Pomahaka River, Leithen Burn, Benger Burn and Sandy Creek. Results were compared with historical survey data to analyse long-term trends and discuss the implications for fisheries management. This work was funded by and produced for the Mata Au Trust.

2. Methodology

2.1. Data Collection:

Aerial surveys were conducted to count adult salmon and trout and their spawning redds in the traditional spawning areas of the Lower Clutha/Mata-Au catchment.

Surveys were timed to coincide with the estimated peak spawning periods for each target species. Salmon surveys were flown on 5 & 6 May 2025, and trout surveys were flown on 18 & 24 June 2025. The trout counted were presumed to be predominantly brown trout (*Salmo trutta*) as they generally spawn before rainbow trout (*Oncorhynchus mykiss*). As redds from the earlier salmon survey were mostly still visible during the later trout survey, all visible redds were counted on each occasion.

All surveys were conducted from a Guimbal Cabri G2 helicopter. The aircraft was flown with the surveyor's door removed to improve vision and photography. Flight altitude and speed were varied to match river conditions and ensure accurate species identification. The location of every fish and redd sighted was recorded as a timestamp which was matched to a continuous GPS tracklog, allowing for position recording. All flights were scheduled between 10:00 and 14:00 to optimise light conditions and minimise water surface glare.

The specific survey reaches and dates are detailed in Table 1.

Table 1: Survey locations, dates and target species.

Waterway	Reach	Target Species	Date	Distance surveyed (km)
Clutha River	Roxburgh Dam to Balclutha	Salmon	06/05/2025	130.4
	Roxburgh Dam to Koua-Matau Split	Trout	24/06/2025	131.9
Pomahaka River	Black Jacks Creek to Greenvale Road	Trout	18/06/2025	63.5
	Black Jacks Creek to Leithen Mouth	Salmon	05/05/2025	51.7
Leithen Burn	Mouth to main split at Leithen Bush	Salmon	05/05/2025	10.0
		Trout	18/06/2025	10.0
Benger Burn	Mouth to Moa Flat	Salmon	06/05/2025	3.0
Sandy Creek	Mouth upstream	Trout	18/06/2025	0.8

2.2. Limitations:

The accuracy of aerial surveys for population monitoring is subject to several known limitations:

- **Environmental Conditions**: Survey visibility can be limited by factors such as river flow, water clarity, and weather. Conditions like fog, surface glare, or turbid water can obscure fish and redds, potentially leading to undercounts.
- **Survey Timing**: The timing of a survey relative to the peak of a spawning run can significantly influence the results. As run timing can vary annually, a survey may miss the peak, leading to a count that is not representative of the total spawning population.
- **Species Identification:** While efforts are made to distinguish between species, there is potential for misidentification. This is particularly true for redds when no live fish are present, and it can be difficult to differentiate between brown and rainbow trout redds in areas where both may be spawning.

2.3. Data Analysis

GPS tracklog data were processed using GIS software to map the spatial distribution of all sighted fish and redds and to allow batching into varying lengths of river. The 2025 count data were compiled and compared with historical survey results to identify and analyse long-term population trends.

3. Results

3.1. 2025 Spawning Results

Table 2: Total fish and redd Counts broken down by species for surveyed waterways in 2025

Waterway	Date	Salmon		Trout	
		Live Fish	Redds	Live Fish	Redds
Clutha River	06/05/2025	0	9	63	6
	24/06/2025	0	0	23[(1)]	84
Pomahaka River	05/05/2025	0	1	104	4
	18/06/2025	0	0	144	36
Leithen Burn	05/05/2025	0	0	15	3
	18/06/2025	0	0	7	20
Benger Burn	06/05/2025	0	0	0	0
Sandy Creek	18/06/2025	0	0	0	0

In the Clutha River, a peak of nine salmon redds was observed. For trout, the peak count was 63 live fish and 84 redds Table 2.

In the Pomahaka River, a single salmon redd was recorded. The peak trout counts were 144 live fish and 36 redds, while in the Leithen Burn, no salmon were observed. The peak counts for trout were 15 live fish and 23 redds.

No adult fish or evidence of spawning were seen in the Benger Burn or Sandy Creek.

Conditions

Observational conditions were generally good across most surveys. However, the second survey of the Clutha River on 24 June was affected by poor visibility. Higher, turbid flows, combined with low fog and surface steam, meant the survey was flown higher and faster than the other flights. These conditions hampered the observation of live fish, meaning the count was primarily focussed on recording redds. It is likely the resulting redd count is an underestimate, as deeper redds, which are not uncommon in the Clutha, would not have been visible.

The Benger Burn had very low flows, which were likely insufficient to allow passage for adult trout or salmon. Photographic examples of the viewing conditions are provided below in Photos 2–5.

[1] Lower water clarity meant the flight was done higher and faster, making this an underestimate.

Photo 2: Example of Pomahaka water quality – 5/5/25. Suspected salmon redd

Photo 3: Clutha water Clarity – 6/5/25. Suspected salmon redd

Photo 4: Pomahaka 18/06/25 water clarity. Could see everything except the deepest pools.

Photo 5: Reduced clarity in the Clutha/ Balclutha area 25/6/25. Note algae buildup and 4 trout redds clearly visible

3.2. Spatial Distribution 2025

Figures 1-3 show the spatial distribution of redds and fish across the surveys broken down by 10km sections for the Clutha and Pomahaka and 2km sections for the Leithen Burn. Due to limited data, salmon data were omitted from the Pomahaka and Leithen charts.

In the Clutha River/Mata-Au, salmon redds were found intermittently, with the highest concentration (four redds) around and upstream of Roxburgh township. No live salmon were observed. Trout were widely distributed, with the highest number of live fish (14 of 63 total) seen around Roxburgh. The highest concentrations of trout redds were observed around Beaumont and Balclutha.

In the Pomahaka River only one salmon redd and no live salmon was observed. The one redd was seen just above Hukarere Station. The highest numbers of live trout were observed in the upper reaches between Hukarere Station and Aitcheson Runs. Redd distribution was more uniform, with the highest counts (eight redds per 10km section) in three separate sections upstream of Leithen Burn confluence.

In the Leithen Burn, no salmon or salmon redds were observed. Live trout were most numerous in the lower reaches, with the majority observed in the first 4 km upstream of the Pomahaka confluence. In contrast, redds were most concentrated in the middle reaches, particularly in the 4–6 km section around the Leithen Road Bridge, which contained eight of the 20 redds counted.

No trout or redds were observed in the Benger Burn or Sandy Creek during the surveys.

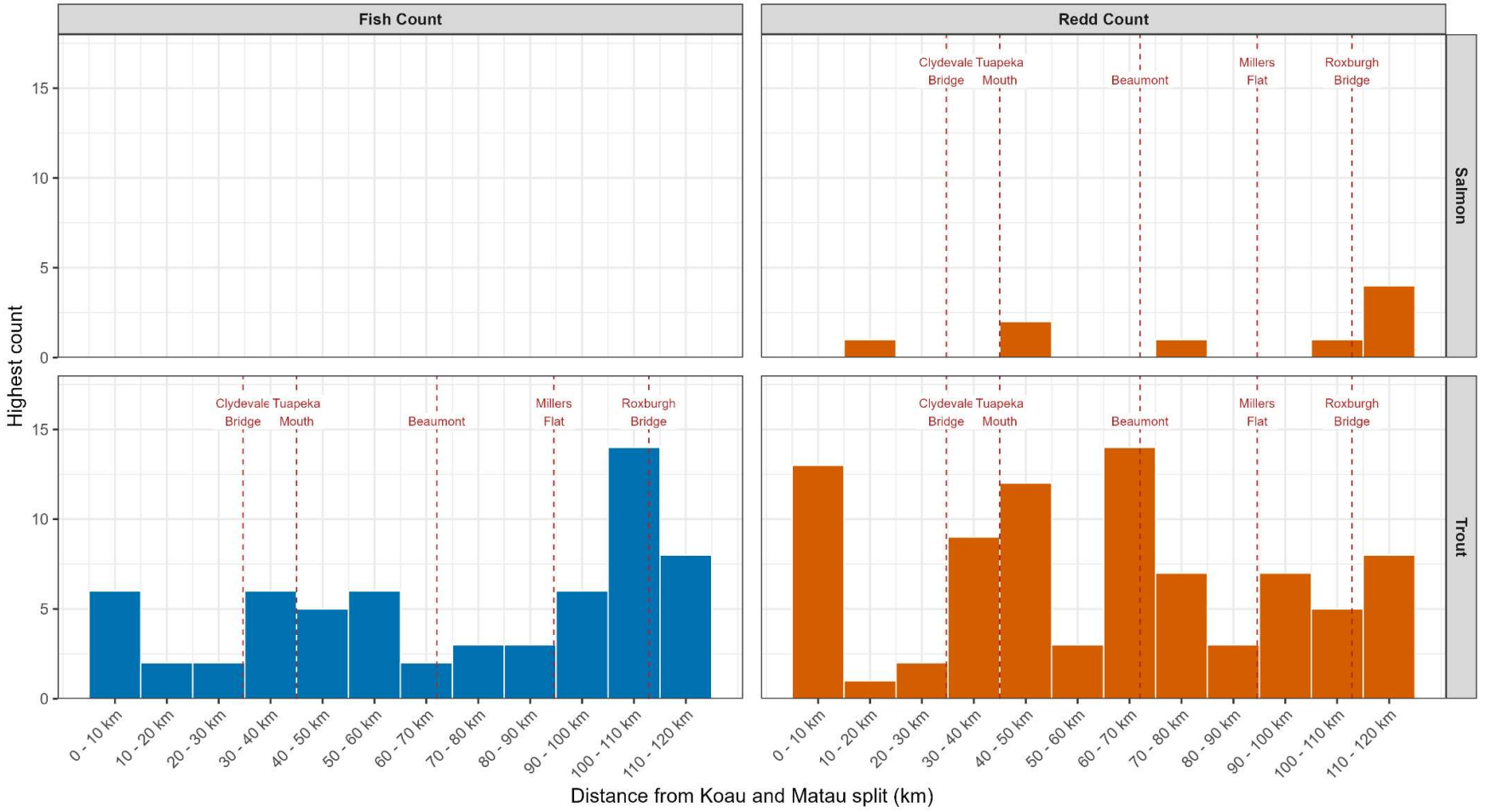

Figure 1: Fish and redd distribution in the Clutha / Mata-Au River for 2025. Counts aggregated by 10km sections and species.

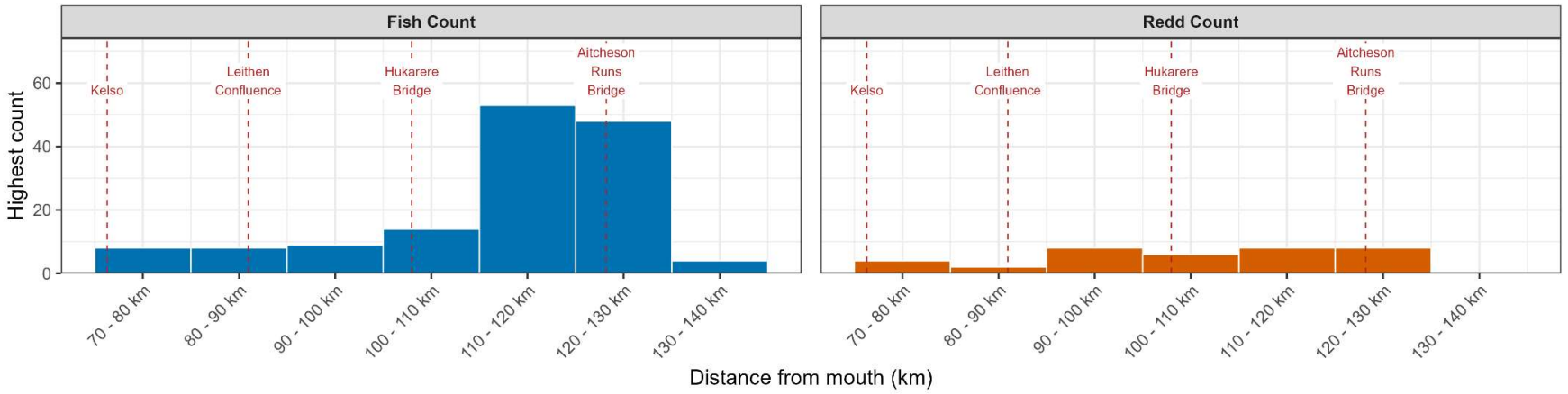

Figure 2: Trout and redd distribution in the Pomahaka River for 2025. Counts aggregated by 10km sections

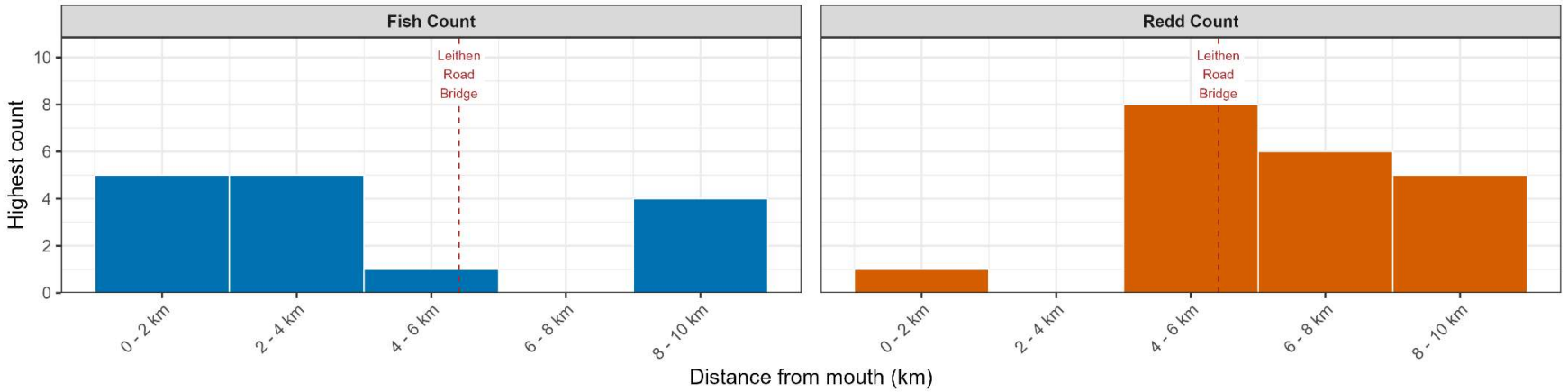

Figure 3: Trout and redd distribution in the Leithen Burn for 2025. Counts aggregated by 2km sections

3.3. Historical Comparison and Trends

The historical data for the main stem of the Clutha River/Mata-Au, collected since 1995, illustrate the long-term population trends for both salmon and trout (Figure 4). Spawning records were pulled from the Fish & Game database, historical paper records and Dungey (2020). While the data contains caveats including different survey timings, observers and water clarities and in some years only the most prolific section being surveyed, it provides and overall picture of trends in the spawning runs.

The data reveal a significant decline in the Clutha River salmon spawning population. The seasonal highest counts in the late 1990s typically exceeded 200 live fish and 250 redds within the main stem. Since 2010, however, the spawning population has collapsed to a state of sustained low abundance. The 2025 results, with zero live salmon and nine redds observed in the Clutha, are consistent with this recent trend. This count represents less than 2% of the peak abundance recorded in the 1990s, underscoring the critical state of the population.

In contrast, the trout population in the Clutha River is historically variable, demonstrating a pattern of peaks and troughs. While historical peak counts of live fish were much higher than the 63 fish observed in 2025, the population has shown significant fluctuations over time. Notably, the low number of live fish seen in 2025 contrasts with the spawning activity indicated by the redd count. The 2025 count of 85 trout redds in the Clutha is the highest recorded in the main stem since 2012 and suggests a more positive outcome for the 2025 spawning season than the live fish count alone would indicate.

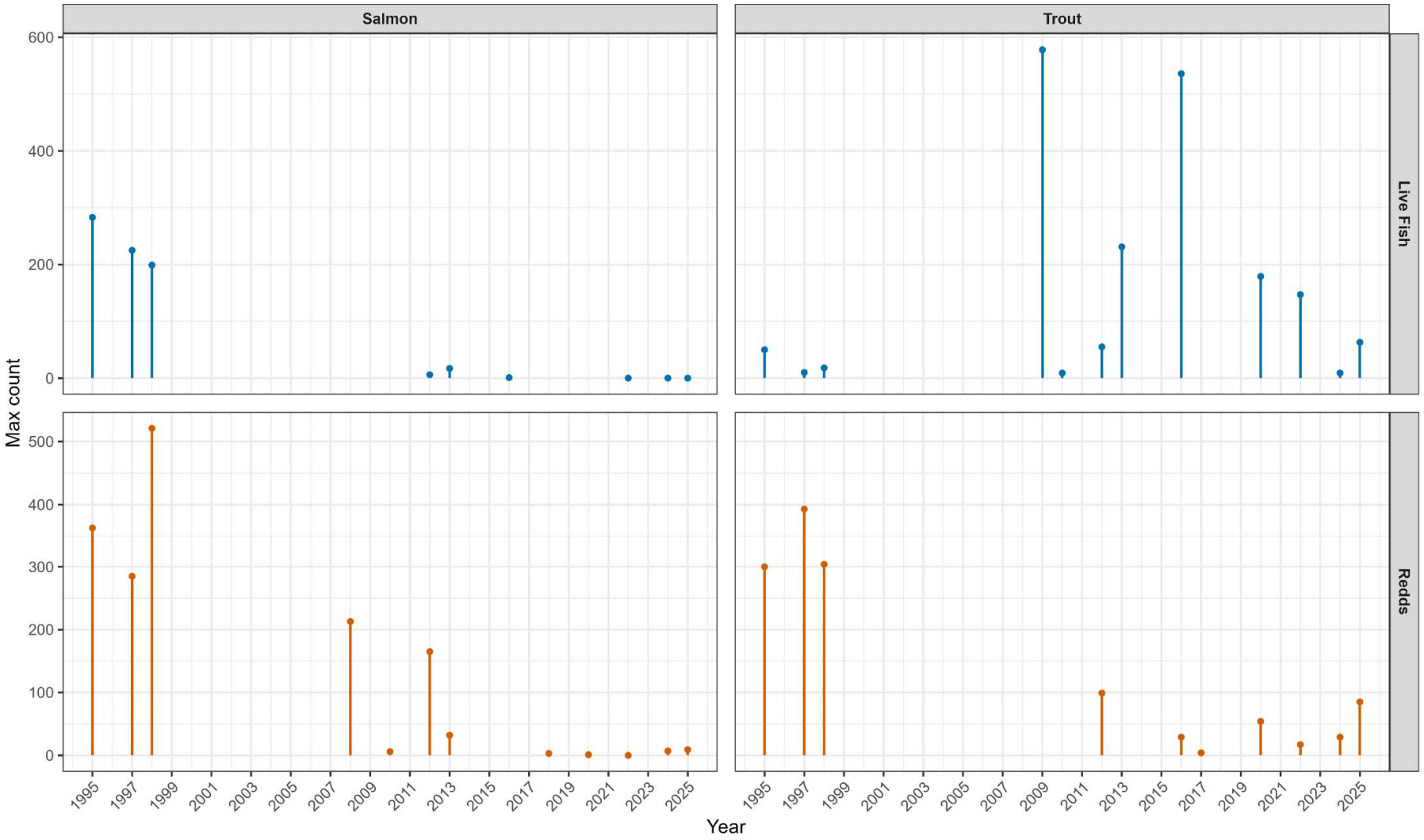

Figure 4: Salmon and trout, live fish and redd counts for the Clutha River. Where multiple counts were conducted, the max of each count has been used.

4. Discussion

The results from the 2025 aerial surveys, when viewed alongside historical data, confirm the critical state of the Clutha/Mata-Au salmon population. This trend becomes even more pronounced when contrasted with anecdotal records of Clutha salmon runs of 20,000–30,000 fish in the mid-20th century (Jellyman 1989). The disparity between these historical estimates and the ten redds recorded in 2025 highlights a dramatic, long-term reduction in the fishery.

In contrast, the trout population appears more resilient, though it exhibits significant variability. While the 2025 live fish counts were lower than some historical peaks, the high number of redds observed is a positive indicator of recent spawning success. This suggests that while the population fluctuates, its spawning activity remains robust.

While the long-term trend is clear, interpreting low-density counts from any single survey requires caution due to the known limitations of aerial observation. This was highlighted in the Pomahaka River, where a single potential salmon redd was recorded, yet recent eDNA sampling found no trace of salmon in that waterway (Couper 2025). This discrepancy could be due to either misidentification of the redd or limitations of the eDNA sampling protocol, such as the timing or location of water samples. Despite limitations, the extent of the decline gives confidence that in the data, showing a steep decline over time.

When taken in the context of other similarly declining salmon fisheries of the East coast of the South Island, the Clutha's sustained decline suggests systemic issues, potentially including poor marine survival, in-river habitat degradation, and impediments to passage and spawning posed by the catchment's hydroelectric dams.

5. Acknowledgements

Sincere thanks are extended to Ross Dungey of Ross Dungey Consulting Ltd for establishing this survey's recent methodology, training Fish & Game staff, and contributing years of foundational data.

We are grateful to pilots Andy, Tommy, and David at HeliOtago. Their skill and professionalism were essential for the safe and effective collection of data.

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