

# **Project 1122 – Creel Surveys of Lake Hāwea**

## **Executive Summary**

Thirty-six randomised creel surveys were undertaken on Lake Hāwea over the months of September to May during the 2022 – 2023 fishing season to gather angler and fisheries information. One hundred and ninety-six anglers were interviewed totalling 304.25 hours of angling effort for a catch of 105 fish, which equates to one fish for approximately 2.9 hours fishing. Trolling, both deep and shallow, was the most popular method accounting for 65.6% of the overall angling effort and 74.3% of the total catch.

Spinning from the shore was popular, at 26%, with 10.5% of the total catch. Fly fishing wasn't popular on this lake, 7.1% of the angling effort, however fly anglers made up 13.3% of the total catch. Six bait anglers made up the remainder of the anglers, with two fish caught. Rainbow trout dominated the catches of most anglers, followed by salmon and brown trout. Salmon catches were highest during December, with no salmon caught after mid-February.

## **1. Introduction**

Lake Hāwea is located in the Otago region of New Zealand, at an altitude of 348 meters. Covering an area of 141 km<sup>2</sup> and reaching 392m deep, it is New Zealand's ninth largest lake. The lake holds populations of brown and rainbow trout and landlocked chinook salmon and is highly valued nationally and internationally for its sports fishing opportunities.

Creel surveys were undertaken on Lake Hāwea from 2014-2018 and summarised (Halford, 2018).

This report summarises the Lake Hāwea Creel survey results for the 2022 – 2023 season starting in September 2022 and finishing at the end of May 2023.

## **2. Survey Methodology**

The survey was a randomised creel survey with a frequency of at least two surveys per week and two weekend days per month, with randomised starting times. The survey methodology meets the requirements of a randomised stratified roving creel survey (Pollock, et al. 1994).

Two weekdays and two weekend days were selected each month and morning and evening starting times were randomly selected.

Creel survey start times were either 0900 hours or 1200 hours.

A full schedule of survey days and start times was compiled. Surveys had to be completed within the four- or five-hour survey period. Volunteers were often used to support staff on the boat.

Creel survey sheets and a questionnaire were developed to document all the relevant information (Appendix 1).

Surveys were conducted using the Otago Fish and Game boat (OFG7), a 5.5-meter Kiwi Kraft with a 115hp four stroke Suzuki. Surveys circumnavigated the lake from a selected boat ramp. The direction of the trip was randomly selected. In windy conditions, the surveys were shore based, due to difficulty in approaching other vessels and safely mooring alongside. Staff would drive to popular land-based fishing areas and conduct angler surveys from the vehicle. Similarly, if boat trailers were not present at the two boat ramps (campground and the Neck) then the boat OFG7 was not launched, as no boats were present on the water.

On the lake all anglers were approached. Extra care and consideration was given when approaching shore anglers with the boat to ensure that they were not overly interrupted. This was achieved by beaching the boat a fair distance from their fishing position around the shoreline.

Some boat angler interviews were conducted while anglers continued to fish with the Fish & Game boat pulling alongside. Fenders were deployed from the Fish & Game boat, and boats were approached on our starboard side onto their port side to mitigate damage to either vessel.

Anglers were asked about their angling activity for the day along with a standard set of creel questions (Appendix 2). In addition, anglers were asked about their years of experience on the lake and how many days a year did they commonly fish the lake. Their fishing location was recorded (Appendix 1).

All fish harvested were weighed and measured (Appendix 3) and data collected was entered onto an excel data base where it has been analysed for reporting.

### **3. Results and Discussion**

A total of 196 angler interviews were obtained from 36 sampling periods. There were six survey days during the duration of the creel programme for the 2022 – 2023 season were no anglers interviewed.

Most of the survey effort was in the lower third of the lake where our monitoring effort was focused, this was where most anglers were located.

The Neck and the Western shoreline between the campground and the Neck were the most popular angling areas where fish were commonly caught. Some angling effort was focussed off the mouths of Timaru and Dingle Burn stream mouths when weather conditions allowed.

The total catch from the 196 anglers was 105 fish for an overall 304.25 hours of angling effort. Anglers returned 55 fish which was 52.4% of the total catch.

148 (75.5%) anglers caught no fish during survey periods. Twenty-three anglers had caught one fish when interviewed, 14 anglers caught two fish each, four anglers caught three fish. Seven anglers had caught over three fish, including two anglers who had caught ten fish each by deep trolling.

#### 4. Catch Rate

The Total Catch Rate (TCR) is calculated from the number of fish caught over the length of angling time. 304.25 divided by 105 fish = one fish for 2.9 hours angling effort or (.35) as fish per hour caught. This catch rate was more than double the previous season on Lake Wānaka, which was one fish for 7.31 hours angling effort.

Of the 105 fish caught 15 were brown trout, 65 were rainbow trout, and 25 salmon were recorded. The harvest rate (HR) is calculated from fish kept divided by total angling effort and shown as fish per hour.

Table 1. Total catch rates (TCR), return rates and harvest rate (HR) for each species.

Season	Species	Fish caught (TCR)	Fish released (TCR) and % returned	Fish kept and (HR)
Sept 2022-May 2023 (inc)	Brown	15 (0.05)	12 (0.04) 80%	3 (0.009)
Sept 2022-May 2023 (inc)	Rainbow	65 (0.21)	31 (0.10) 47.7%	34 (0.11)
Sept 2022-May 2023 (inc)	Salmon	25 (0.08)	12 (0.04) 48%	13 (0.04)

During the 1998-2001 seasons Scott & Wright (2007), recorded (TCR) for brown trout at 0.14, 0.14 and 0.10, respectively. For rainbow trout it was 0.10, 0.16 and 0.08 and for landlocked salmon TCR was 0.04, 0.01, and 0.04 for the respective years.

#### 5. Catch Rate by Method

Table 2. Fish Caught and Catch Rate (CR) by method as fish per hour.

Year	Fish caught Fly and (CR)	Fish caught Spin (CR)	Fish caught Surface Trolling (CR)	Fish caught Deep Trolling (CR)
Sept 2022-May 2023 (inc)	14 (0.05)	11 (0.04)	3 (0.01)	75 (0.25)

Deep trolling including down rigger, lead line and paravane was the most productive method accounting for 75 fish, and 71.4% of the total catch. Fly fishing was next then spinning and surface trolling. Only two fish were caught by bait anglers in the 2022 – 2023 season.

Table 3. Total Angling effort for each Method

Year	Angler Numbers and (%) Time Fly fishing	Angler Numbers and (%) Time Spinning	Angler Numbers and (%) Time Surface Trolling	Angler Numbers and (%) Time Deep Trolling
Sept 2022-May 2023 (inc)	13 (7.1%)	60 (26%)	26 (16%)	92 (49.6%)

Over the 2022-2023 season trolling was the most popular method (Table 3) and most productive (table 2) with deep trolling the standout. Scott & Wright (2007) reported similar findings with trolling being the most popular method and between 57-68% of the angling effort for the three survey years from 1998 - 2001.

Fly fishing was only encountered in shallower areas of the Neck, and only made up 7.1% of angler effort.

Spinning around the shoreline was mostly concentrated near the dam and campground area at the bottom of the lake, and at the Neck. Spin angling was more popular early in the season.

Bait anglers made up the remaining 1.3% of the total angling effort percentages for the 2022 – 2023 season.

## 6. Catch Details

Table 4. Provides the average length, weight and condition factor of each trout species recorded.

Year	Average Length (mm)			Average weight (Grams)			Average condition factor		
	Brown	Rainbow	Salmon	Brown	Rainbow	Salmon	Brown	Rainbow	Salmon
Sept 2022 -May 2023 (inc)	458	401.9	378	1290	920	764	47.9	51.9	50.3

In the 2022 – 2023 season 15 rainbow trout were weighed and measured. Three brown trout were measured two were weighed, as one of the fish had been gutted. Ten salmon were measured, however five could not be weighed as they too had been gutted.

## 7. Summary

This was the first season out of three for surveying anglers on Lake Hāwea.

Half of the surveys were conducted by vehicle, and half by boat. This was either from adverse weather conditions making boating undesirable, or due to an absence of boat trailers at either of the two boat ramps.

Anglers overall seemed satisfied with angling on the lake, even though only 25% of anglers had caught fish when interviewed. Many anglers, however, had had told us of recent success on the lake during the interviews. A selection of anglers having poor results often were using poor techniques or fishing in unproductive areas, so staff would often redirect them to try and increase their angling success.

Catch rates varied over the season. Most noticeable was the catch rate of salmon, with nearly all salmon caught during the surveys occurring in November and December. During mid-January to mid-March, trout catch rates plummeted, with successful anglers using downriggers and fishing in depths of up to 40 meters.

As this was the first year of this set of Creel Surveys, there is currently not enough data to see any recent trends in the fishery. The next few seasons of monitoring the angling on Lake Hāwea will provide valuable current fisheries information over the next two angling seasons.

## **8. References**

Halford, C. 2018. *Summer season angler surveys and compliance monitoring on Lakes Hawea, Wanaka, and Wakatipu*. Otago Fish and Game Council report

Pollock, K.H., Jones, C.M. and Brown, T.L. 1994. *Angler survey methods and their applications in fisheries management*. American Fisheries Society Special Publication 25.

Scott, D., Wright, M. 2007 *Thirty Years of Creel Surveys*. Otago Fish and Game Council.

## **Recommendation**

**The report be received.**

Ben Sowry  
June 2023

Appendix 1.

<b>WATER : LAKE HAWEA</b>			<b>DATE:</b>			<b>RANGERS:</b>							
ANGLER DATA						SPORTS FISH DATA						Experience	
ZONE	LICENCE NUMBER	LICENCE CATEGORY	HOMETOWN	HOURS FISHED	METHOD	FISH KEPT			FISH RETURNED			# Seasons	Days / season
						B	RB	S	B	RB	S		
AS: Adult Season		AD: Adult Day		FA: Family Adult		FJ: Family Junior		FC: Family child		JS: Junior season			
CF: Child Free		LA: Local Area		LS: Loyal Senior		SB: Short Break		LB: Long break		NR: Non-Resident			

Appendix 2.

## Lake Hāwea Survey - Angler Questionnaire

- 1. How many hours have you fished today?**
- 2. What fishing method are you using?**
- 3. Have you caught any fish today?**
- 4. Is this your first fishing trip on Lake Hāwea?**
- 5. Or how many seasons have you fished Lake Hāwea?**
- 6. How many days per season do you fish this lake?**

Appendix 3.

# Lake Hāwea Fish Data Sheet

DATE	Brown		Rainbow		Salmon	
	Length	Weight	Length	Weight	Length	Weight