

**Agenda For The Meeting of Otago Fish & Game Council  
On Thursday 20<sup>th</sup> July 2023  
At Clutha District Council Rooms, 1 Suffolk Street, Tapanui  
Starting 12.00 noon with a light lunch**

**14.0 Items To Be Received or Noted**

<b>14.1</b>	<b>Summary of Fishing Competitions for the 2022/23 Season</b>	<b>2</b>
<b>14.2</b>	<b>Project 1122 – Creel Surveys of Lake Hawea</b>	<b>5</b>
<b>14.3</b>	<b>Report on Takitakitoa Wetland Restoration Project to ORC Plus Small Dam Inspection Report</b>	<b>13</b>
<b>14.4</b>	<b>Poolburn Dam Creel Surveys/Spawning Surveys/Rock Marking</b>	<b>23</b>
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## **14.1 Summary of Fishing Competitions for the 2022/23 season**

### **Introduction**

Fishing competitions are approved annually in line with the Sports Fish and Game Management Plan (SFGMP) for the Otago Region and subject to conditions defined in the Freshwater Fisheries Regulations 1983.

This report summarises competition activity for the 2022/23 work year (Project 1351 in the workplan) and provides details (appendix 1) of the larger commercial type competitions that are requested to pay a \$40.00 administration fee and levies.

### **Overview**

There were five main competitions which attracted levies in the Otago region during the 2022/23 season.

These publicly notified events focus on family participation, and junior anglers are always well catered for with prizes and giveaways.

Our approval conditions generally allow 1 fish of each species per contestant to be weighed and measured at each event. Fish numbers presented to the weigh in can vary significantly between seasons mostly due to the weather conditions. On Lakes Hāwea and Wakatipu small salmon can be caught in abundance with many released.

### **Freshwater Fisheries Regulations 1983 Section 57F Rental**

Where a Fish and Game Council approves a fishing competition under this Part and an entrance fee is charged by the holder, the holder shall be liable to pay to the Council a rental of \$40, plus \$5 for each participant aged 16 years or over and \$2 for each participant aged under 16 years.

With all the major competitions we have only been requesting 50% of the levy acknowledging that these competitions are community based, provide angling opportunities with family involvement, and that profits support local communities. Levy income can vary depending on the grade of entries such as adults versus juniors.

Levy income can be used to assist with the purchase of fishing equipment and merchandise to support events run by schools and TAKF programmes. We provide the major competitions with a rod and reel set for a junior prize.

The table in Appendix 1. provides a full list of the major competitions and supporting information for the 2022/23 season noting that profits are derived from a range of sources including entry fees, donations, sponsorship, fundraising and BBQ's.

In house angling and hunting club competitions for club trophies feature regularly and some TAKF programmes incorporate a competition component. We are aware of most events and in some cases provide financial assistance through our grants budget. Staff attend competitions when they can especially the major events where the ongoing collection of fisheries information is important.

Staff attended events in Glenorchy, Hāwea and two in Cromwell, to undertake the measuring and weighing of fish.

### **Collection of Fisheries Information**

Catch information is collected from major competitions and downloaded on a data base. We have a good range of fisheries information from Lakes Dunstan, Hāwea and Wakatipu with over 40 years of data from the Glenorchy competition held annually at the head of Lake Wakatipu. Surprisingly, there is still little interest from the community for a large competition on Lake Wānaka.

### **Summary**

Fishing competitions provide a range of fishing opportunities and enjoyment for clubs, organisations, families, and individuals. Major competitions that attract levies are well organised and support requirements under Otago's SFGMP. Staff attendance at events is always well received by organisers and the fisheries information collected is proving very useful for monitoring population trends and fishery health.

Competitions early in a new season provide incentives for purchasing a new season licence.

### **Recommendation**

**The Report be received.**

Ben Sowry  
Fish and Game Officer  
June 2023

Appendix 1. Major fishing completions which attracted an application fee and levies for the 2022/23 season

Date	Event and duration (years)	Organiser	Lake	No of entries	Fish measured and weighed	Application fee \$40, and levies	Distribution of Profits
1 <sup>st</sup> October 2022	Glenorchy Fishing Competition (41)	Glenorchy Playgroup	Wakatipu	223	102	\$514.50	\$5487.79 income raised for the establishment of the Glenorchy Early childhood education center.
13 <sup>th</sup> Nov 2022	Lake Dunstan Fishing Competition (28)	Rotary of Cromwell	Dunstan	116	53	\$241.00	\$558 profit to the Cromwell College Breakfast Club.
2 <sup>nd</sup> January 2023	Lake Dunstan Fishing Competition (12)	Cromwell Town and Country Club	Dunstan	164	78	\$342.00	All profits went into prizes
11 <sup>th</sup> February 2023	Lake Hāwea Family Fishing Classic (26)	Family Fishing Classic Committee	Hāwea	350	217	\$642.00	\$8,000 profit has not yet been distributed to local community groups
25 <sup>th</sup> March 2023	Clubs NZ Fishing Competition	Cromwell Town and Country Club	Dunstan/ Clutha	119	46	\$327.00	\$0 surplus after outgoings

## **14.2 Creel Survey Summary 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 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

## 14.3 Takitakitoa Wetland Restoration Project Update

### ORC Reporting

21/06/2023

Otago Regional Council  
Private bag 1954  
Dunedin

Dear Sir/Madam

### Re Consent reporting associated with Takitakitoa Wetland Restoration Project

The information below is presented to satisfy the conditions of consent **RM14.043.03** granted to Otago Fish & Game Council to restore and enhance the Takitakitoa Wetland.

Note: access to the wetland for monitoring purposes was difficult at times due to the ongoing logging operation by City Forests.

**Both Condition 4 and 5** of the consent are being answered under each subheading

#### 1. Water Levels

Staff gauges above and below the bund wall are being used to monitor water levels in the wetland (Figure.1)

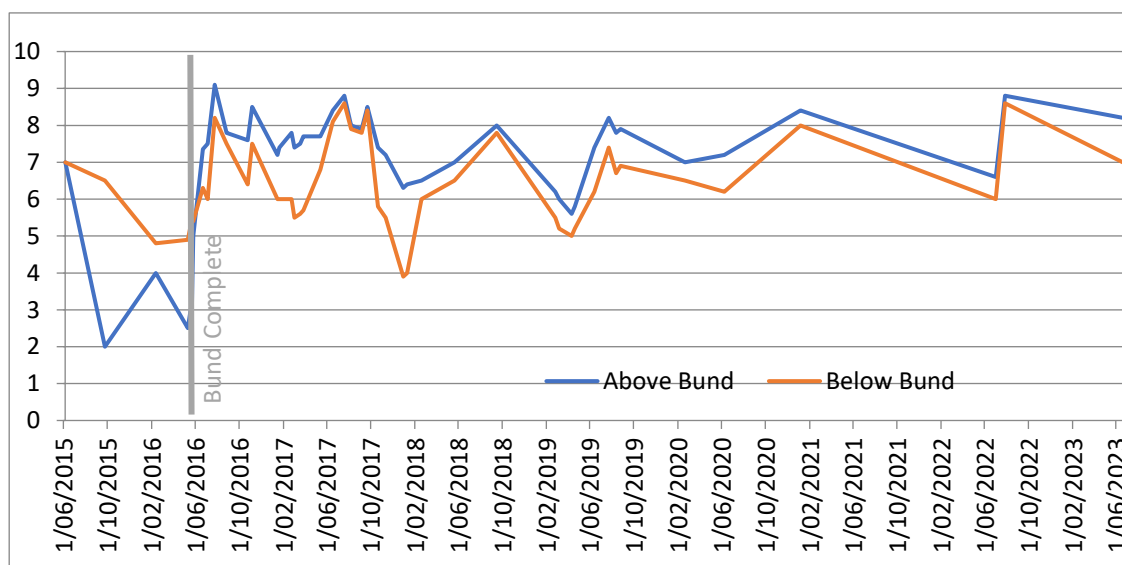


Figure.1 Water levels above and below the bund wall (units in decimetres)

The bund, and the blocking of the deep drains which dissected the upper part of the wetland has resulted in much improved hydrological regime. Water levels are higher than the lower part of the wetland and are much more consistent.

Manually read staff gauges are the most cost effective and efficient way to measure water levels in the wetland so this monitoring will continue at least quarterly (or better) for the next twelve months.

### 2. Flow through fish pass

The fish pass was modified in late February 2022 to give better water flows for fish migration. The ladder can be adjusted to keep constant water flow throughout the migrating season. Mussel rope was also added to assist climbing fish.

Fish Pass Check	Flowing?	Depth	Dam WL	Video
24/10/2016	yes	+35mm	7.6	
3/03/2017	Yes	+30mm	7.4	
19/03/2017	yes	+30mm	7.4	Yes
08/03/2019	No	0mm	6.0	
10/04/2019	No	0mm	5.6	
08/06/2020	Yes	+5mm	7.2	
06/01/2021	yes	+20mm	8.4	
02/07/2022	No	0mm	6.6	
20/06/2023	Yes	+30mm	7.9	



*Fish Pass (photo taken on 20/06/2023)*

### 3. Eel abundance

One fyke net (baited with a trout head) was set on the 06/04/2023 upstream of the bund which is shown in red (figure 2). The next day the net was checked, 3 eels were caught, 2 longfin and 1 shortfin (photo 1)



*Figure 2*



*Photo 1*



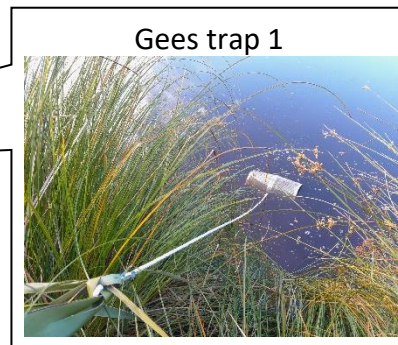
#### **4. Inanga abundance above the dam**

Inanga were in very low abundance in the upper part of the wetland before it was enhanced. Electric Fishing surveys in Surprise Stream (near the maximum upstream extent of the wetland) recorded a single fish, and even then, it was not captured.

Two minnow traps (baited with vegemite) were set on the 06/04/2023, one on the upstream side of the bund wall (Figure 3) & one in Surprise Stream just downstream of the western culvert (Figure 4). The traps were checked the next day, trap 1 was empty and trap 2 had 1 adult Inanga (photo 2).



*Figure 3.*



*Figure 4.*



*Photo 2.*

## **5. Vegetation Changes**

Seven monitoring sites have been established and from these the vegetation is photographed annually. This photo monitoring is going to continue annually. No alteration to the methodology is proposed. A photo monitoring summary attached to this report.

City Forests has continued to harvest pine trees on the Eastern boundary of Takitakitoa wetland.

## **6. Effectiveness of plant pest control**

- Crack Willow control – ongoing monitoring.
- Broom, Gorse and Blackberry - has been sprayed where possible along roadsides and bund wall and follow up knapsack spraying will be conducted again in Jan - Feb 2023.
- Glyceria – there is still ongoing monitoring and spraying on the true left and true right of the lower part of Surprise Stream.

## **7. Gamebird Harvest**

The monitoring method for gamebird harvest is simply to record the opening day harvest from each allocated mai-mai of which there are five. **Note:** in 2016 only mai-mai 5 had any water near it as the impoundment had not filled at that point in time.

Opening day results	Mai-mai #1	Mai-mai #2	Mai-mai #3	Mai-mai #4	Mai-mai #5
7 <sup>th</sup> May 2016					11 Mallards
6 <sup>th</sup> May 2017	1 Mallard 5 Parries 2 Shoveler	16 Mallards 12 Parries 2 Shoveler	7 Mallards 12 parries 1 Shoveler	25 Mallards 5 Parries	33 Mallards 2 Swans 6 Parries
5 <sup>th</sup> May 2018	6 Parries 1 Mallard	6 Swans 20 Parries 12 Mallards	3 Mallards	1 Parries	115 Parries
4 <sup>th</sup> May 2019	1 Mallard 6 Parries 2 Shoveler	25 Mallard 5 Parries	0 birds shot	2 Parries	34 Mallard 46 Parries 2 Shoveler 2 Swan
23 <sup>rd</sup> May 2020	5 Parries	1 Mallard	Not shot	Not shot	2 Mallard 6 Parries
1 <sup>st</sup> May 2021	3 Parries	Not shot	0 birds shot	10 Mallard	25 Mallard 2 Parries
7 <sup>th</sup> May 2022	6 Parries 13 Mallards	1 Mallard	Not shot	0 birds shot	Not Shot
6 <sup>th</sup> May 2023	4 Parries 1 Shoveler	0 birds shot	0 birds shot	2 Mallards 1 Parry 1 Shoveler	5 Parries



No changes to this monitoring approach are proposed. There is not a better-known monitoring tool for harvest and the results can depend a lot on the conditions, and the ability of the hunter.

### **8. Shoveler abundance**

Takitakitoa is counted as part of the “National Shoveler Survey” conducted in the first week of August 2022 - there were 145 noted in this survey. It was also noted the birds seem to congregate in the area just above the bund wall, this is probably due to a large area of open water and is the most undisturbed corner of the wetland.

### **9. Paradise Shelduck abundance**

Paradise shelduck accumulate together in the last week of January to moult flight feathers. 47 known sites have been recorded in Otago with the nearest to Takitakitoa being Lake Waiholo. Bird numbers at the wetland in January were low with only 11 being counted.

### **10. Abundance of native avifauna**

A combination of observations and counts have been used to note changes in abundance of all avifauna present in the wetland. The table below shows the relative changes over time.

\*Denotes ‘gamebirds’ as defined by the Wildlife Act 1953

<b>Species</b>	<b>Pre bunding</b>	<b>Post Bunding</b>	<b>June - 2023</b>
Pukeko*	Rare	Common	8 seen
Mallard*	Occasional	Common	Large numbers
Black Swan*	Not recorded	Occasional	6+ they come and go
Grey Teal	Rare	Abundant	550+
Scaup	Not Recorded	Occasional	10 sighted at the bund wall
P. Shelduck*	Rare	Common	Not many seen this season
Shoveller*	Rare	Common	22 counted
Harrier Hawk	Rare	Common	Seen occasionally
Fernbird	Common	Common	Still present
Bittern	Not Recorded	Not Recorded	Unseen
Pied Stilt	Not recorded	Occasional	Not seen this inspection but seen prior
Royal Spoonbill	Not Recorded	Rare	Not seen this inspection but seen over summer
Canada Goose	Not recorded	Rare	8 noted
Spurwing Plover	Not recorded	Rare	
Fantail	Not recorded	Common	Seen occasionally
Welcome swallow	Not recorded	Common	15 birds seen. Nests in Maimai's

It will be noted that there has been a significant improvement the diversity of species and their relative abundance (shaded green) since the wetland has been restored.

Ongoing monitoring will most likely involve annual (or better) checking to see if there are any changes to the post bunding abundance above and recording numbers where possible.

Takitakitoa was not recognised for its gamebird values under the Regional Plan at the time of consenting but policy 10.4.2(c) of the plan allows for those values (A8) to be enhanced. It is our view, based on the monitoring above, that F&G has been successful with this project in achieving a regionally significant habitat for waterfowl (Ref A8 under wetlands in RWP).

### **11. Biodiversity plantings**

Last year 700 native shrubs were planted in the margins of the wetland and a further 500 + are proposed to be planted this spring.

### **12. Small Dam Inspection Report**

An updated Small Dam Inspection Report is attached to satisfy **Condition 6**.

Please let me know if any further reporting is required to satisfy these consent conditions.

Thank you

Steven Dixon  
**Fish & Game Officer**  
**June 2023**

## SMALL DAM INSPECTION REPORT

**File Number:** 8                      **Date of Inspection:** 20/06/2023  
**Consent Number:** RM14.043.03  
**Owner:** Otago Fish & Game Council  
**Location:** Takitakitoa – Lower Taieri  
**Inspector:** Steven Dixon  
**Date constructed:** Feb 2016  
**Engineered by:** Southroads Ltd  
**Last inspected:** June 2023  
**Next inspection:** June 2024

### **1. EARTH DAM - *Dam size and material – Inspect for undercutting, erosion, depressions around reservoir***

**Dam height:** 1m                                      **Reservoir:** ~32ha  
**Top width:** 15m                                      **Crest length:** 350m  
**Material:** Marine clay core with soil topping

*U/S slope – Examine for signs of erosion, beaching, or slumping.*

**Vegetation:** Ungrazed fescue grass, Flax, Carex, Toi-toi

**Condition:** Very good

**Comments:** Looking good, plantings well established

*Crest – Examine for cracks & shape deformation.*

**Condition:** Good

**Comments:** Crest covered in grass and native plants (Flax, Carex Toi-toi)

There is a small depression at the western end of the bund just before the culvert (Figure 1) that needs attention. It is planned to fill in depression with soil and compact January 2024.



**Figure 1.**



**Photo taken 28/07/2022**

***D/S slope – Inspect for seepage around d/s slope, d/s toe, abutments, near spillway & around outlets***

**Vegetation:** Grass, Flax, Carex Toi-toi and Kanuka

**Condition:** Good

**Seepage:** No seepage detected

**Comments:** A small amount of black berry and Broom was noticed on the D/S side of the dam and was sprayed in February.

**2. OUTLETS – Check for seepage & subsidence. Check when outlets last flushed**

***(a) Pipe***

**Location:** 5m plastic culvert each end of the bund wall with wingwall housing both ends

**Condition:** very good

**Type:** Ribbed polypipe

**Size:** 600mm diameter

**Comments:** Wing walls look solid, neither of the pipes were blocked.

***(b) Fish ladder (western culvert) – check for obstruction and flow***

**Condition:** Good

**Flow:** Approx 30mm of flow down the fish pass.

**Comments:** The fish pass was adjusted to have water flowing in March/April.

***(c) Spillway – Check spillway is clear of any obstacles which may impede flow. Inspect for erosion damage, scoured areas, cracks, displacement.***

**Location:** Eastern end of bund

**Condition:** Good

**Type:** 70m low point in bund wall

**Capacity:** Unlimited – 70m wide

**Comments:** In sound condition. Overflow was utilised once on 28/07/2022 (photo below)



### **3. ABUTMENTS – *Check for seepage, erosion, scour***

**Comments:** all good

### **4. RESERVOIR**

**Use:** Wetland

**Level:** 7.9 on staff guage at time of inspection

**Source of supply:** Natural stream/ rainfed

**Drainage:** via culverts with boards in wingwalls

**Condition:** Very good

### **5. CONDITION D/S OF DAM**

**Channel:** Open to Taieri river

**Vegetation:** Wetland type vegetation

**Habitation:** Wetland

**Structures:** Nil

**Tributary to:** Taieri River

**Comments:** The small amount of Glyceria that had sprouted up on the true right of Surprise Stream just downstream of the culvert was sprayed in February.



## 6. PHOTOGRAPH

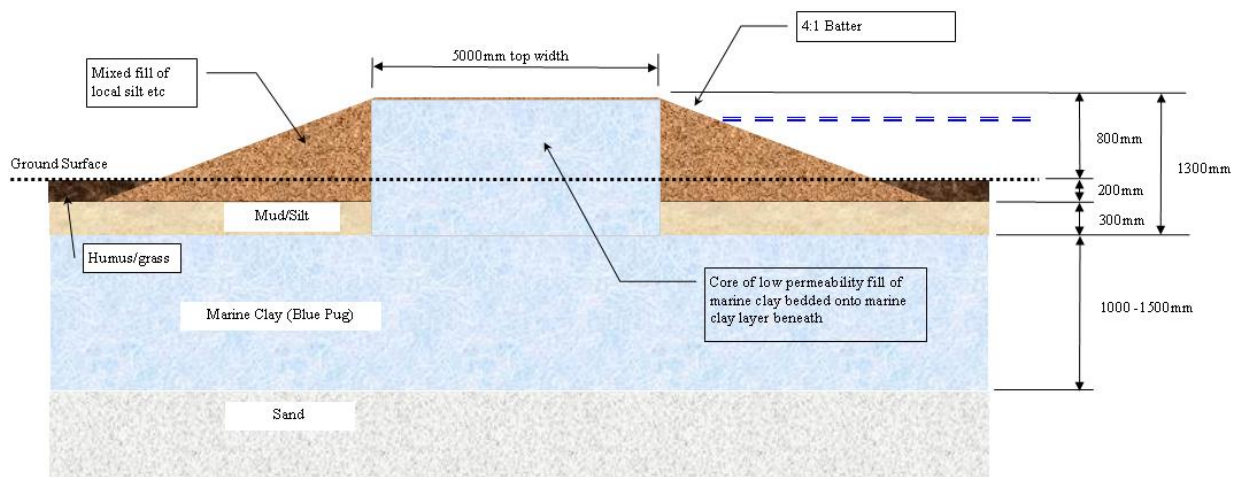


Bund wall and eastern culvert – June 2023

## 7. BUND WALL CROSS SECTION

### Takitakitoa Wetland bund wall cross section

—As built Feb 2016



## 14.4 Poolburn Dam - Creel Surveys/Spawning Surveys/Rock Marking

### 2022/23 Season



#### Summary

Results from creel and spawning surveys conducted over 2022/23 season were combined with a literature review to build a greater understanding of the Poolburn fishery.

Recent creel survey results indicate that the fishery is in good health. The present average length of Poolburn trout is significantly higher than surveys conducted from 1973-1981 and survey results from 1994 – 2006 seasons.

Spawning surveys have identified that spawning and recruitment habitat is limited to two tributaries within the Poolburn system, Cranky Woman Creek (also known as Drunken Woman Creek) and Poolburn Creek (also known as Long Valley Creek). This year's survey has shown good numbers of spawning fish.

Twelve rocks that were a hinderance to boating and fishing were marked with red buoys. This was a joint project supported by the ORC Harbour Master.

#### Introduction

The Poolburn Dam was originally constructed in 1931 to irrigate the Ida Valley and is administered by the Ida Valley Irrigation Company (Wright 2000). At full capacity it inundates

over 300 hectares. Reservoir water levels vary depending on tributary flows, precipitation levels and irrigation needs. The dam dried up in 1950 and overflowed in the summer of 1956/57 (Hughes 1992). The Poolburn Reservoir is commonly high in spring after replenishment from tributaries and precipitation during winter, then drawn down for irrigation over summer. The reservoir is set in a high tussock country basin and produces large colourful brown trout. These fish are known for their excellent table qualities (F&G 2003, Wright 2000).

Although three Central Otago Reservoirs (Poolburn Dam, Manorburn Dam, and Lake Onslow) are in a similar geographic area with comparable land use, they have developed into uniquely different fisheries. The Poolburn Dam yields large brown trout while Lake Onslow produces large numbers of small to medium sized brown trout and the Manorburn Dam is an entirely rainbow trout fishery with an average size of 35cm (Turner 2003, Wright 2000).

Both browns and rainbows were released into the Poolburn and Manorburn dams, however the Poolburn is now exclusively a brown trout fishery and Manorburn only contains rainbows. There are several possible factors (or a combination of factors) which may explain the failure of rainbow trout to establish in the Poolburn fishery.

Rainbow and brown trout were released in to the Poolburn in 1952 and again in 1955, but rainbows have not been recorded since 1966 (Hughes 1992). This would suggest that the stock of rainbow trout were unable to locate or utilise suitable spawning habitat.

Spawning surveys have identified that frozen conditions and low levels of tributary streams can hamper spawning runs in the Poolburn and Manorburn systems (Trotter 2004, Cunningham 1962). The flow of Cranky Woman Creek is augmented by the diversion of the Totorā Creek catchment during the brown trout spawning period (late autumn – winter). The timing of this flushing event enables brown trout to enter and spawn in a stream that could otherwise be very low or even frozen. This may have allowed browns to capture a competitive recruitment advantage. Rainbows tend to spawn after browns, during late winter and early spring and by this time the augmentation has usually stopped. During years of limited precipitation, and/or frozen conditions the rainbows may have not been able to access or utilise spawning streams. Lake edge spawning would be unlikely, due to unsuitable substrate and lack of current. (Trotter 2006)

The shallow waters of the Poolburn Dam may be better suited to brown trout and their territorial nature, which may have allowed the browns to gain a competitive feeding advantage over rainbows.

Alternatively, the failure of brown trout to establish in the Manorburn Dam may have been caused by frozen conditions hampering spawning. It is also possible, that the limited spawning habitat in the Manorburn system led to superimposition of brown redds by rainbows and ultimately the demise of brown trout (Scott and Irvine 2000).



## **Recent Surveys**

In order to assess the present health of the Poolburn fishery, Otago Fish & Game staff and volunteer rangers conducted a creel survey during the 2022/23 season and spawning surveys in May of this year. The results of these surveys were compared to previous records.

## **Spawning Surveys**

### ***Surveys Prior to 2004***

The Poolburn Dam has only three inflowing tributaries, Cranky Woman Creek, Little Maori Creek and Poolburn Creek (Wright 2000). Past surveys have identified that most spawning occurs in Cranky Woman Creek and Poolburn Creek. The limited length of Cranky Women Creek results in considerable superimposition of redds, reducing recruitment output (Wright 2000). The channelisation of the lower Poolburn Creek greatly reduced the recruitment potential of this stream (Wright 2000). Previous electric fishing studies have shown that Little Maori Creek has a resident population of stunted trout, which may make a minimal recruitment contribution to the Poolburn Dam (Wright 2000).

### ***2004 Spawning Survey***

Surveys were undertaken in May and June of 2004. No lake edge spawning was identified. The Cranky Woman Creek was the only inflowing tributary experiencing a reasonable flow of water; the other streams were very low or frozen. The only significant spawning was the lower reaches of the Cranky Woman Creek. A relatively large number (80+) of 1.5-2kg brown trout were spawning over a small area (200-300m). This small stream has good gravels, runs, riffles and pools with undercut banks thus ensuring spawning and juvenile rearing habitat. Very limited spawning was identified in Poolburn Creek. Only one fish and one redd were seen in the lower 1.5 kilometers of this stream. The lake was very low at the time of inspection and the flow in Poolburn Creek was minimal. Most of the substrate was smothered in silt.

### ***2005 Spawning Surveys***

In August 2005, approximately 40 redds were observed in Cranky Woman Creek. However, many of these redds were superimposed. Four redds were found in Poolburn Creek, which was flowing at a minimal level. Maori Creek was also very low. At this time the lake level was nearly full.

### ***2006 Spawning Surveys (29/04/2006)***

Twelve redds and 60 trout were counted in Cranky Woman Creek and 65 trout and three redds were seen in Poolburn Creek. The average size of the trout seen was between 1.5-2.0kg. Both streams were residing after very heavy rain fall. The health of Poolburn Creek appeared to be slowly improving. This stream is gradually regaining a meandering pattern and the recent rains have flushed a lot of silt out of the system, exposing some gravel in localised areas. During a Canada goose trend count in July of 2006, it was noted that the Poolburn Creek was entirely frozen over.

### **2011 Spawning Survey (24/06/2011)**

*Cranky Woman Creek* – nineteen redds and 8 trout were counted. The day was overcast, and the water was clear. Poolburn Dam was full of water backing up the creek approx. 150m from the lake edge.

*Poolburn Creek* – there were no redds or trout observed.

### **2012 Spawning Survey (30/05/2012)**

*Cranky Woman Creek* – there were thirty-eight redds and 63 trout counted. The day was overcast, and the water was clear. Average fish size 2kg+. Evidence of superimposition.

*Poolburn Creek* – Seventy-two redds and 59+ trout counted. The water level was high with an average flow.

### **2013 Spawning Survey (17/05/2013)**

*Cranky Woman Creek* – there was prolific active spawning with fifty-five redds and 222 trout counted. There was some evidence of superimposition with free eggs visible. Count observations were limited by dense overhanging vegetation high up the catchment.

*Poolburn Creek* – was not surveyed.

### **2015 Spawning Survey (22/05/2015)**

*Cranky Woman Creek* – nine redds and 2 trout were counted. The day was foggy with no sun and the water was clear.

*Poolburn Creek* – twenty-four redds and 3 fish were counted. When conducting this survey, a digger was discovered working in the creek approx. 3km up from the confluence with the dam.

### **2022 Spawning Survey (12/05/2022)**

*Cranky Woman Creek* – there was no signs of spawning as the water level in the stream was too low for trout migration. There was a dead trout approx. 2.5kg in the shallows of the creek, presumably a victim of running out of water when swimming up to spawn. There were a good number of large trout in pools at the confluence with Poolburn Dam.

*Poolburn Creek* – thirteen redds and 21 fish were counted during the survey. This Creek is a channelised ditch in its entire length. It does however support some good gravel for spawning. I am unsure whether it would support good juvenile rearing habitat though.

### **2023 Spawning Survey (31/05/2023)**

*Cranky Woman Creek* – seventeen redds and 67 trout counted. Creek running higher than last year's survey. Extra water may have allowed for trout to push higher up as there were multiple channels through the tussocks not just main stem. A lot of fish hiding under banks and tussocks only visible when disturbed.

Pool below culvert was holding school of large brown trout looking post spawn (poor condition and showing likely spawning injuries).

Every piece of suitable gravel in creek seemed to have a redd on with often 3-4 fish located over or near each redd.

Four dead trout seen throughout this survey unable to determine cause of death not uncommon with large quantity of fish in small area.

Spawning survey finished when unable to see into creek due to overgrown tussocks.

*Poolburn Creek* – fifty-nine redds and 77 trout counted. Much better spawning habitat when compared to Cranky Women Creek (much more suitable gravel, flow, runs and cover)

Creek appears higher in water level and flow than last survey (2022).

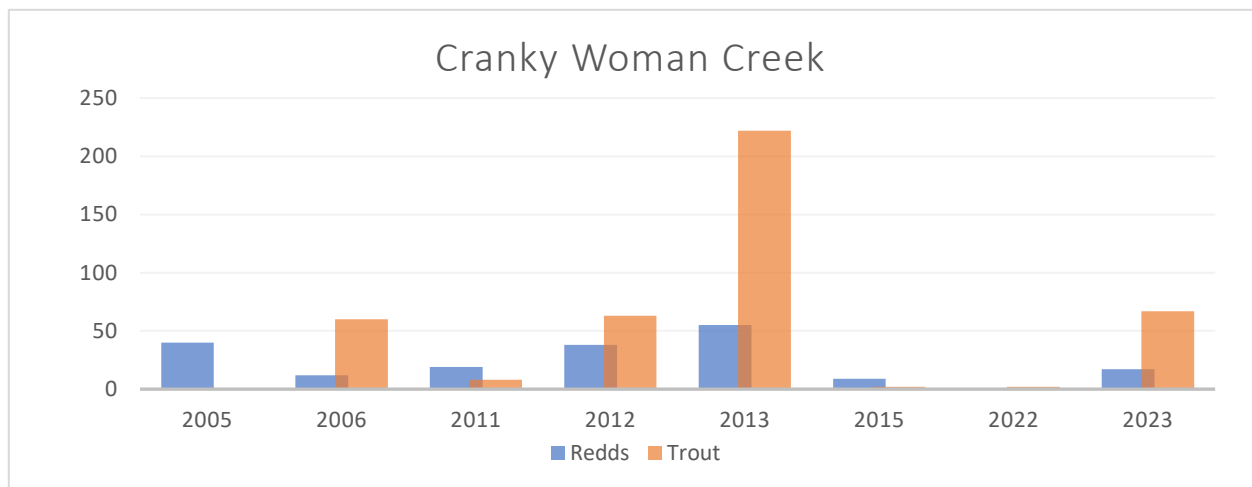
Most suitable runs/ tail end of pools had 1-3 redds present.

Fish made use of the under-cut banks often only been seen by their tail or when spooked.

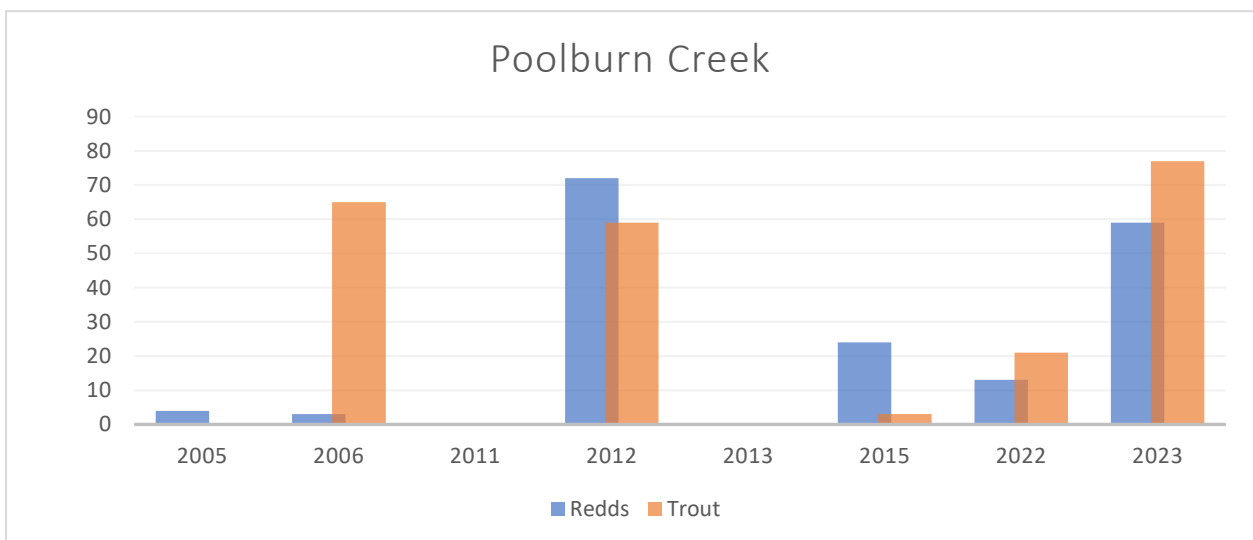
Three dead trout seen over the survey.

Some deep dark pools unable to be seen into.

Lack of trout and redds at top end of the survey where creek is straightened significantly.



Number of trout and redds counted in Cranky Woman Creek from 2005 - 2023



Number of trout and redds counted in Poolburn Creek from 2005 - 2023

## Creel Surveys

### ***Past Creel Surveys (1973 – 1994)***

Creel surveys were undertaken during, 1973/74, 1975-77, 1978-81 and 1993/94. A significant increase in angling pressure was recorded between the 1978-1981 timeframe and 1993/94. This coincides with an average increase in fish length from 387mm to 524mm which placed the Poolburn Dam in the trophy fishery category (Wright 2000).

### ***2005/06 Season***

Between 1 October 2005 and 31 May 2006, 13 standard creel surveys were undertaken, and one survey was cancelled due to exceptionally heavy rain and flooding. Anglers were encountered on 12 of the survey days with a total of fifty-three anglers interviewed. The average fish length for this season was 517mm.

There were an additional 17 angler interviews completed on opening day (1 October), and volunteer ranger, Bill Wells accounted for an impressive 128 angler interviews, during 13 personal fishing trips to the dam. (Trotter 2006)

### ***2011 – 2015 seasons (opening day surveys)***

The following table shows the results of the Poolburn Dam opening day angler surveys taken from a 2016 Council Report by C Halford. (At the top of the table is a comparison to the 2022 season)

Season	Total Fish Kept	Average Length mm	Average Weight kg
<b>2022</b>	11	607	2.333
<b>2015</b>	32	431	0.860
<b>2014</b>	23	551	1.430
<b>2013</b>	21	491	1.415
<b>2012</b>	10	510	1.643
<b>2011</b>	29	532	1.617

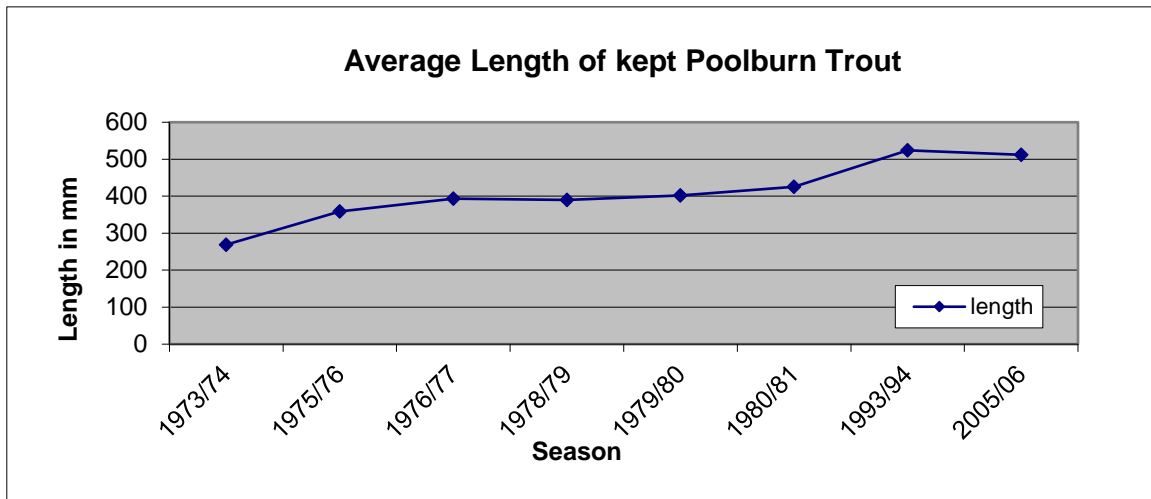
### ***2022/23 Season***

#### Method

The lake creel survey methodology was used to interview all anglers by boat and from the shore, and the standard reporting sheet was used to document angler and catch information. On each survey day a ranger would interview all anglers encountered in one pass of the perimeter of the lake. If anglers were interviewed in the initial pass of the lake shore, they would not be interviewed on the return journey. All survey information has been recorded.

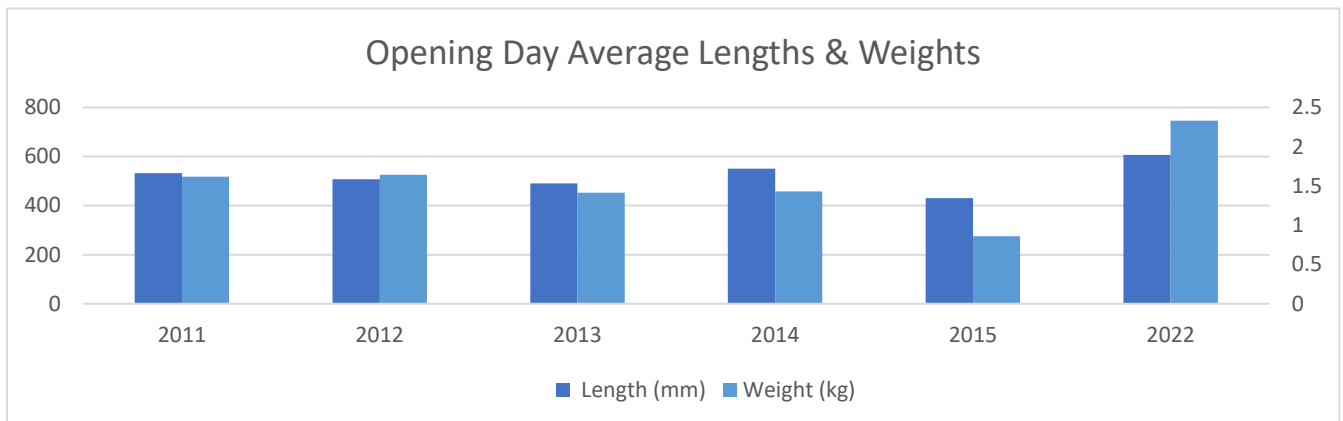
#### Results

Between 1<sup>st</sup> October 2022 and 3<sup>rd</sup> March 2023, 13 surveys were undertaken, and three surveys were cancelled due to unfavourable weather or ranger unavailability. Anglers were encountered on 13 of the survey days with a total of 270 anglers interviewed. The average fish length for this season was 592mm.



Comparison of the Average Length of kept Poolburn Trout 1973 - 2006

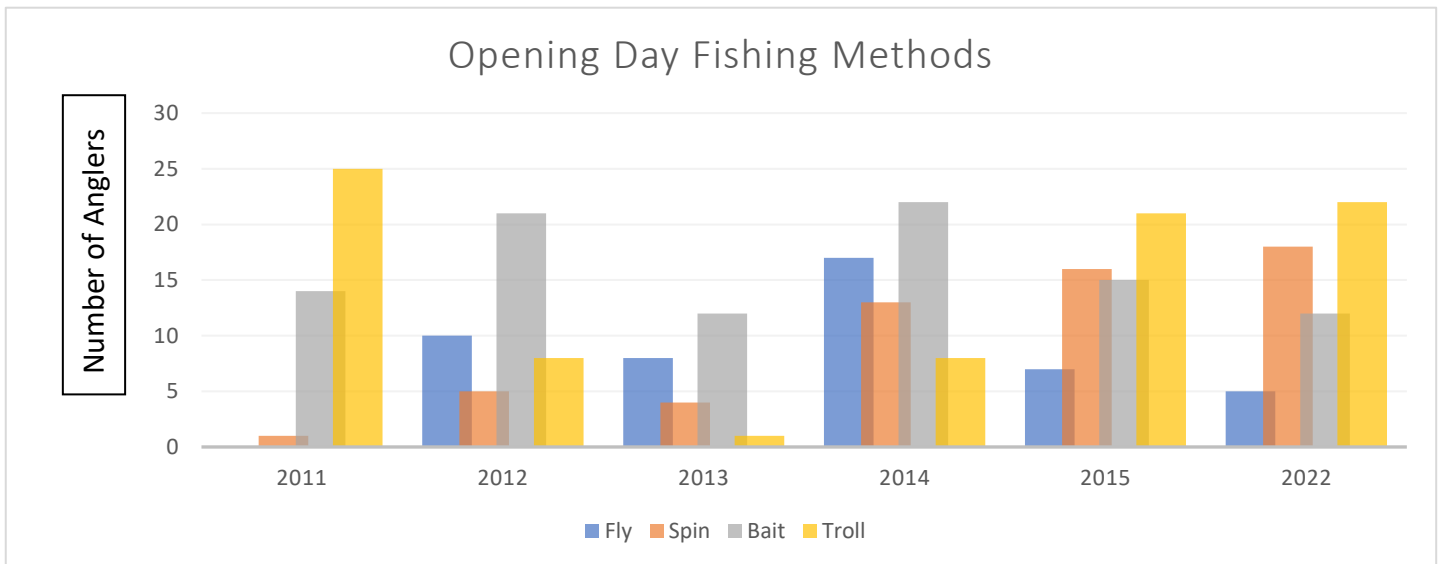
The graph above shows a remarkable jump in length from 260mm during the 73/74 season to just above 500mm in the 05/06 season (Trotter 2006).



Comparison of the Average Lengths and Weights of Poolburn Trout 2011 – 2022

Creel survey results from 2022 opening day indicate that the fishery is in good health. The present average length of Poolburn trout is significantly higher than surveys conducted from 1973 – 1981, 1994 – 2006 and 2011 – 2015, also noted by staff was the huge increase in weight of the fish this season and after talking with anglers both these factors were the reason for multiple visits by them to the reservoir.

There were no creel surveys conducted between 2016 & 2021 seasons.



Fishing methods from 2011 – 2022

Methods have changed over time with more effort being placed on trolling in the latter years although bait and spin fishing at the beginning of the season is still very popular.

Fly anglers during the early summer (when green/brown beetle activity was high) experienced some good fishing success, but diminished a little when the cicada hatches were light or didn't happen.

Most spin & bait anglers were encountered near huts and easy access points which may have put some pressure on these locations.

Trolling anglers caught good numbers of fish early season but struggled a little as the reservoir water warmed up and dropped.

It was also noted during the surveys the abundance of koura being caught in cray pots by anglers, some measuring up to 180mm in length.

## Rock Marking

When conducting this season's creel surveys using OFG1 (5.25 Stabi-Craft) it was noted how dangerous some of the rocks were at different water levels (Figure 1).

A decision was made to conduct a joint exercise with Otago Regional Council Harbour Master to mark the most dangerous rocks that hinder fishing and boating in the dam (Figure 2 & 3). ORC supplied the buoys, chain & shackles and Fish & Game staff provided advice & transport around the dam. Twelve rocks were identified and marked with a red buoy (Figures 3 & 4)

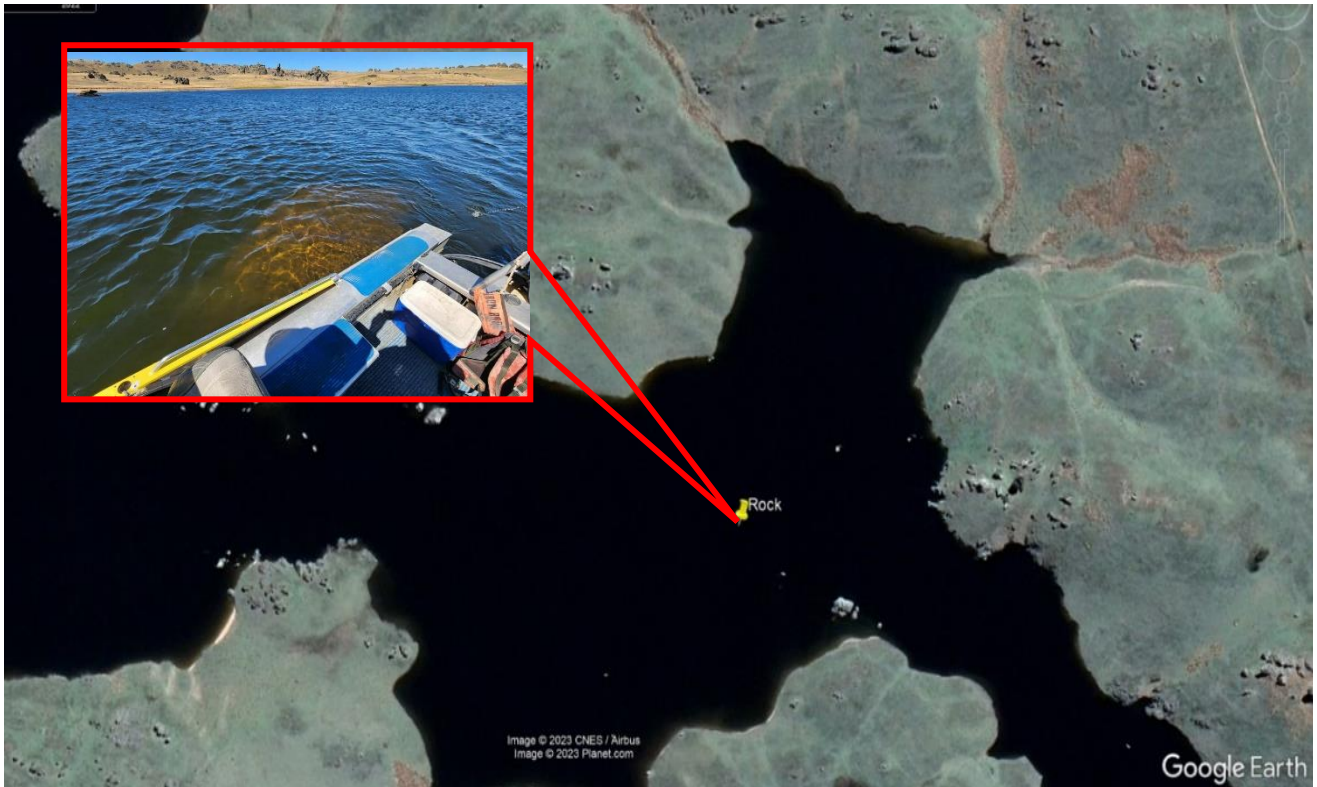


Figure 1. Submerged rock 200mm below surface in the middle of the dam.

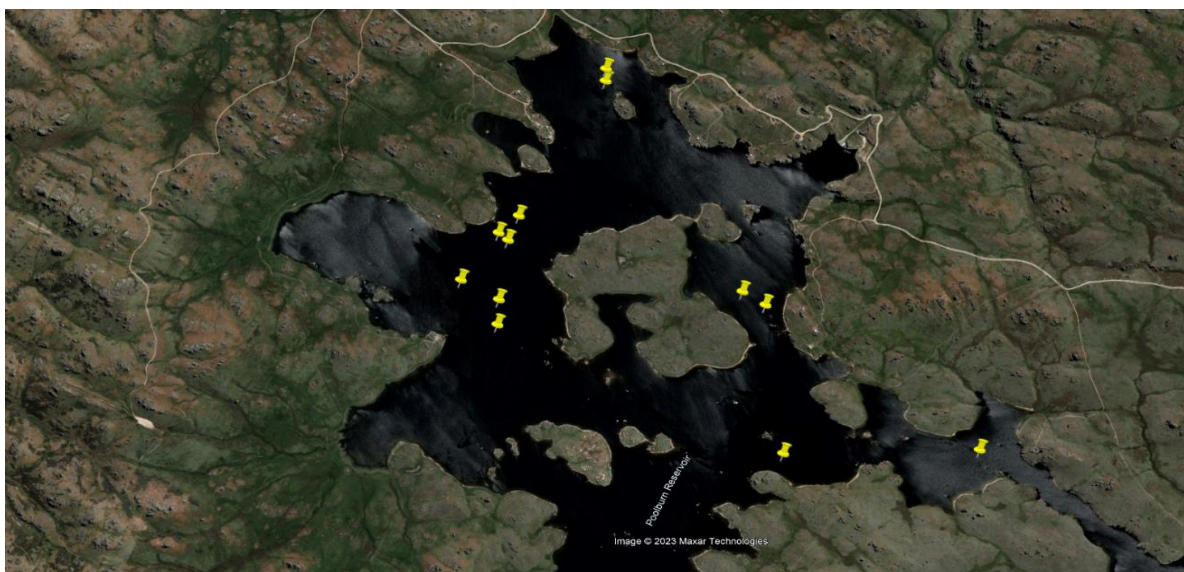


Figure 2.





Figure 3.



Figure 4. Pete Dryden from ORC attaches a buoy to a rock



Figure 4.

Signage was also erected at boat ramps to inform anglers and boaties of the dangers of submerged rocks (Figure 4).

### **Conclusions**

The Poolburn Dam continues to attract anglers and is a regionally important still water fishery, which produces quality brown trout. Nearly all anglers commented about the size and visual appearance of the fish saying they are the most beautiful of all Otago waterways.

The productivity of this fishery is largely dependent on lake levels and the sustainability of the fishery is dependent on the limited spawning habitat present in Cranky Woman and Poolburn Creek. Future management of this fishery should aim to protect these spawning grounds.



**Recommendations:**

**A copy of this report should be sent to the local angling clubs.**

**That this report be received**

**Acknowledgements:**

I am grateful to Mike Teasdale, Ross Taylor & OFG staff for assisting with the creel surveys.

A huge thankyou to Otago Regional Council and Pete Dryden for organising and supplying the materials and tools needed for the rock marking project. These marked rocks are going to be beneficial to all boaties on the water next season.

Steven Dixon

Fish and Game Officer

12/06/2023

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## 14.5 Acoustic Monitoring of the Southern Lakes

The following report was produced by NIWA (National Institute of Water and Atmospheric research) on the recently completed 2023 acoustics monitoring programme on the Southern Lakes. The report was contracted and funded by the Otago Fish and Game Council and the Clutha Fisheries Trust and builds on previous surveys that took place between 2007 and 2009. The main findings of the report were:

- Relative to the previously run surveys, the density of tracked targets, thought to be fish were:
  - Similar in Lake Hawea
  - Up in Lake Wakatipu
  - Down in Lake Wanaka
- The target strength which is correlated to fish size was consistent with previous surveys.
- The average depth of fish in lakes Dunstan, Wanaka, Hawea and Wakatipu were 10.5, 16.9, 19.1 and 20.5 metres respectively.
- The method was found to be not suitable for use in Lake Dunstan due to submerged trees, vegetation and bubbles.
- A well-structured acoustic monitoring programme will be a cost-efficient and effective approach to assess the stocks of salmonid species in the Otago lakes.

The key recommendations of the report were:

- That acoustic surveying is continued on lakes Wakatipu, Hawea and Wanaka in 2024 and then on a biennial or triennial basis.
- The use of gillnets and camera drops are continued to verify identification of fish and determine species composition.
- Carry out experiments to establish a relationship between target strengths obtained from the acoustic surveying and fish size.

In addition to conducting the surveys, NIWA scientists, Richard O’Driscoll (chief scientist – fisheries) and Pablo Escobar-Flores (Group Manager - Fisheries Monitoring and Acoustics) trained Otago Fish & Game staff on; equipment setup, surveying methods and data analysis and interpretation. Alongside this training, NIWA have offered to hire the acoustic surveying gear in future, which will allow Otago Fish & Game staff to carry out surveying more regularly and at a significantly reduced cost.

For future acoustic work, it is estimated that the required time commitment will be approximately 25 staff days per survey, with the breakdown as follows:

Equipment setup and calibration ..... 1 staff day  
Acoustic Surveying ..... 10 staff days  
Gillnetting and camera surveys ..... 2-4 staff days  
Data processing..... 5 staff days  
Reporting..... 5 staff days

There may be additional time required in the initial stages of the survey as more staff are internally trained on data collection and analysis.

Outside of staff time the costs of the project are expected to be minimal. There will be small cost associated with hiring the gear and some money should be put aside to contract NIWA for troubleshooting if required. Due to the size of the acoustic data and the processor intensive algorithms used, it is recommended that a more powerful laptop with a graphics processing card is purchased to aid processing and reduce the time taken to analyse the data. It is also recommended that two deep cycle batteries and a second charger are purchased as staff personally provided these for this year's survey.

Long term it may be useful to purchase the equipment however costs are expected to be high due to the amount of specialised equipment required. Purchase of the equipment would likely require a cost sharing arrangement with other Fish & Game regions. Eastern Fish & Game currently hires the NIWA equipment to monitor smelt populations in their lakes while Southland, CSI and North Canterbury have been involved with previous NIWA acoustic surveys. As the method works best on large deeper lakes, it is unlikely to be taken up by regions outside the ones listed above. It is recommended that the report is provided to staff in other regions to assess interest and the practicality of extending this method to other regions.

NIWA have recommended a survey in 2024 followed by biennial or triennial surveying of the lakes in future. Staff would like to use the data gathered in the 2024 survey to determine the following survey. If the data across the two years is highly variable, there is a case for more frequent surveying. More frequent surveying over the next few years would be advantageous in allowing staff to get more familiar with the method while the training is recently completed and for internal training to take place. It may be beneficial to align future surveys with the triennial Anglers Notice review.

## **Acknowledgments**

Thanks to the Clutha Fisheries Trust for funding the surveying of Lake Dunstan and to Richard O'Driscoll and Pablo Escobar-Flores at NIWA for their expertise and support throughout the surveying, analysis, reporting and training.

## **Recommendations**

- 1. That acoustic surveys are conducted by Fish & Game staff in January 2024**
- 2. That results from the 2024 survey are used to inform future survey frequency.**
- 3. That the report is distributed to other Fish & Game regions to determine interest in the method.**

**Jayde Couper,  
Fish & Game Officer  
July 2023**