Gillnetting Survey of Lake Mapourika

Results of Lake Mapourika Gillnetting Survey, November 2024

West Coast Fish & Game Region

Baylee Kersten, Senior Fish & Game Officer, December 2024

A brown trout being released after being measured and weighed as part of the Lake Mapourika survey, November 2024.

Summary

Lake Mapourika is a nationally significant sports fishery, largely due to its salmon fishery, located in South Westland, nearby to Franz Josef. Current trends in the size, condition and relative abundance of the trout fishery population were established. Eighty-eight brown trout were caught over three days in November 2024 using standardised procedures established during previous surveys. Brown trout captured in the survey had a mean weight of 2.1kg, mean length of 587mm, a mean condition of 1.04 and a catch rate of 3.71 trout/hr/100m. Lake Mapourika brown trout size and abundance was above average relative to other West Coast lakes. Staff recommendations: That the council receives the report. Maintains current regulations for Lake Mapourika. Lake Mapourika should only be gillnetted again in response to concerns raised for the fishery. The data from this survey be stored and used as baseline for the Lake Mapourika brown trout fishery.

Introduction

Lake Mapourika is located on State Highway 6 approximately 10 kilometres north of Franz Josef and 21 kilometres south of Whataroa and lies within the West Coast Fish & Game region. Lake Mapourika covers an area of approximately 8.9km^2, making it the third largest lake on the West Coast. The lake has a maximum depth of approximately 60m and is surrounded by the Westland Tai Poutini National Park.

Lake Mapourika is a popular location for angling on the West Coast, being the seventh most popular waterbody and the second most popular lake during the 2021-22 national angling survey (Stoffels & Unwin, 2023). Estimated angling effort was 1,512 angling days in 2021/22, down on peak activity during strong salmon runs, but aligns closely with its 25-year average (Stoffels & Unwin, 2023). The salmon fishery has large influence on Lake Mapourika usage, with 61% of angling activity recorded during the 2021/22 angling survey occurring during February/March (Stoffels & Unwin, 2023).

The aim of the current survey was to:

1) assess trends in the size, condition and relative abundance of the Lake Mapourika's sports fish population using the standardised procedures established during previous surveys.
2) to use trend data from other West Coast lakes as a comparison to that obtained from Lake Mapourika.
3) and make recommendations for future management of the fishery.

Survey Method

Fifty-four sites were selected around the perimeter of Lake Mapourika for nets to be set. Sites were located from a 14ft alloy boat by GPS and surveyed over three days, from the 10th - 12th November 2024 (Appendix 1). Nine 20 m long sinking monofilament gill nets were used with stretched mesh sizes of 115mm (4.62") (3 nets), 87mm (3.5") (3 nets), and 70mm (2.5") (3 nets). Net size was randomly selected for each site with nets set with one end attached to the shore and positioned at tangents to the shoreline. The placement of the nets meant that only shoreline habitat was surveyed. Nets were

set in the morning for approximately 2hrs to avoid net saturation and decrease variability in the method (Appendix 1).

Each fish caught was weighed to the nearest 10gms using electronic scales and measured (fork length) to the nearest 5mm. Healthy fish were returned immediately to the water while dead fish were retained, and their otoliths removed for future research. Fish condition factor was calculated using the formula:

$$CF = \frac{W * 100{,}000}{L*L*L}$$

Where CF is condition factor, W is weight in grams and L is the fork length in millimetres.

Catch per unit effort (CPUE) was calculated for each net size and expressed as catch per 100m net per hour.

$$CPUE = N / T*5$$

Where N is the number of fish caught, and T is the time the net was set for in hours.

Data was compared statistically using a one-way ANOVA. Probability (P) values are given for all analyses and significant differences noted where values are 0.05 or below (95% Confidence).

Results

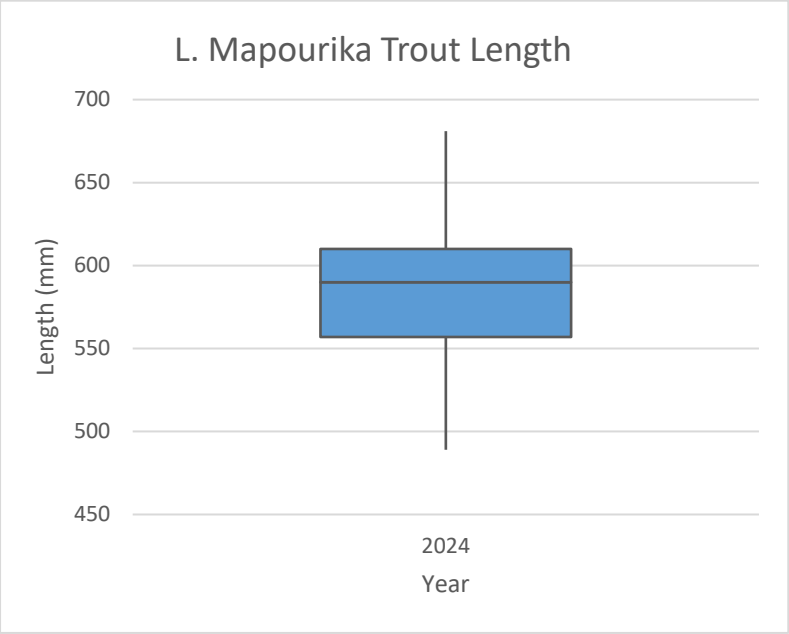


Figure 1. *Box plot showing length of brown trout caught in gill nets at Lake Mapourika 2024*.

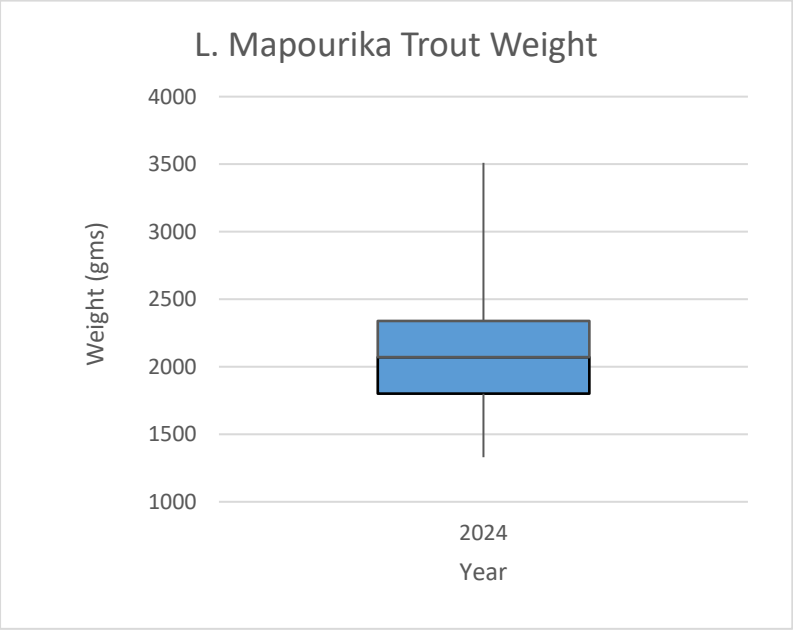


Figure 2. *Box plot showing weight of brown trout caught in gill nets at Lake Mapourika 2024.*

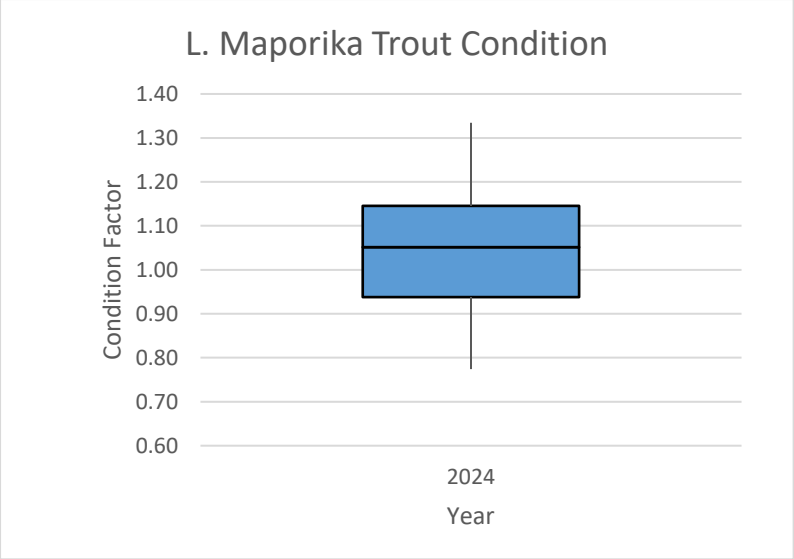


Figure 3. *Box plot showing condition factor of brown trout caught in gill nets at Lake Mapourika 2024.*

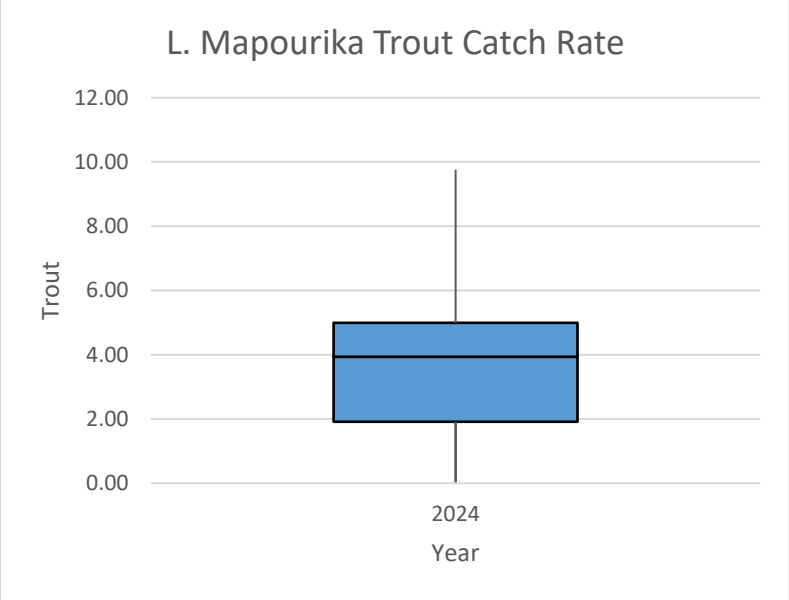


Figure 4. *Box plot showing catch rate of brown trout caught in gill nets at Lake Mapourika 2024.*

Table 1. *Summary data of brown trout observed in Lake Mapourika 2024.*

Attribute	
Mean Length (mm)	587
Mean Weight (g)	2121
Mean Condition (cf)	1.04
Mean CPUE (#/100m/hr)	3.71
Fish Caught (n)	88

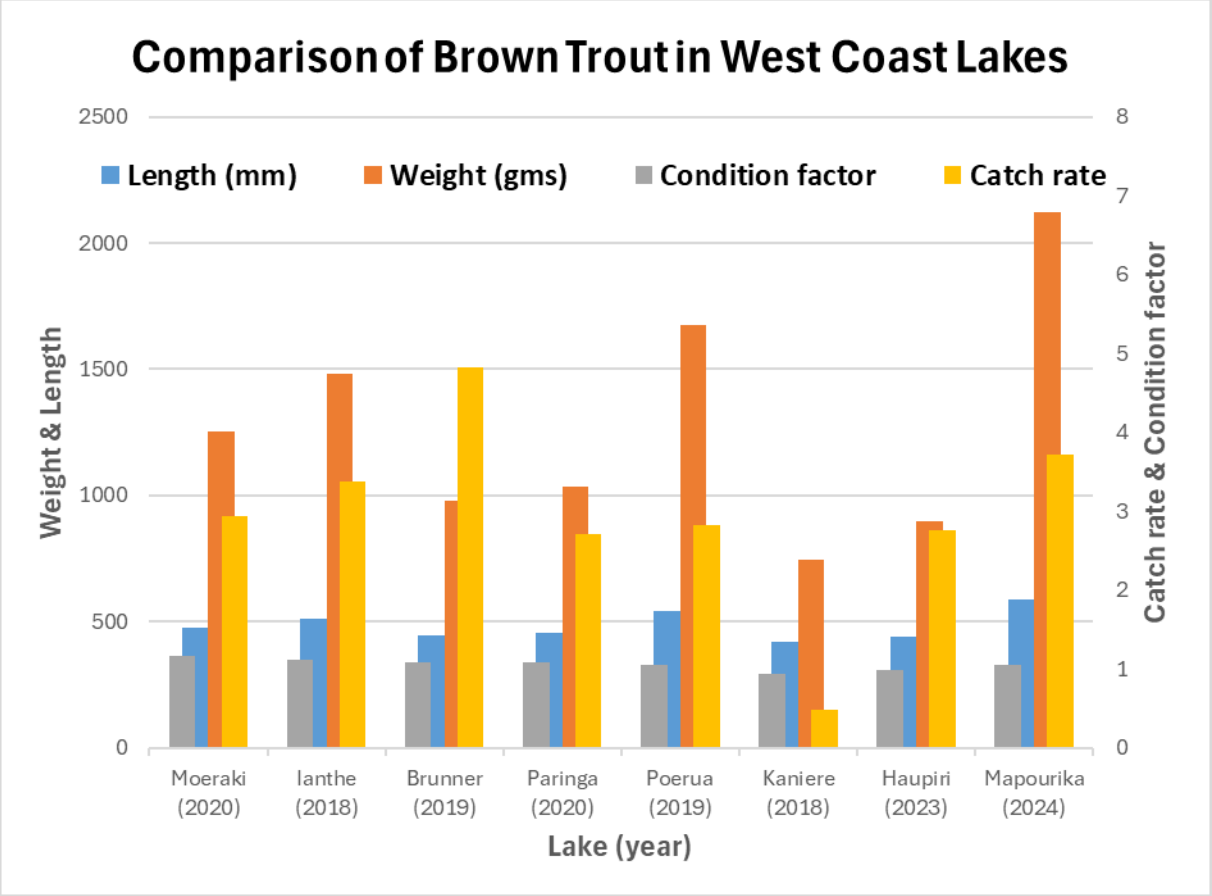


Figure 5. Comparison of average size, condition and catch rate of brown trout caught in gillnets in West Coast lakes.

The brown trout netted in Lake Mapourika were well above average in size, although their condition was only average. Lake Mapourika has a higher catch rate in comparison to most other West Coast lakes.

Discussion

The data collected for brown trout in Lake Mapourika indicated no discernible trends that would affect angler success, suggesting no immediate need for further investigation. The survey confirmed a healthy population of brown trout, with many individuals reaching impressive sizes.

Previous reports have highlighted the influence of water temperature on trout activity which in turn can impact catch rates. During this survey, the water temperature ranged from 14.7°C to 16.5°C, which falls within the optimal range for brown trout (14°C – 17°C) as identified by Hay, Hayes, and Young (2006). Additionally, the survey was conducted shortly after heavy rainfall, which raised lake levels and likely enhanced trout activity along the flooded shoreline, particularly within 20 meters of the water's edge. This increase in trout movement may have contributed to a higher catch rate relative to the population present in the fishery.

It is recommended that future surveys of Lake Mapourika be conducted in the latter half of spring. This timing would offer better comparisons, as well as the mild water temperatures reducing stress on the trout, resulting in fewer casualties.

Notably, no salmon were captured during this survey. This outcome is consistent with prior surveys conducted on other South Westland lakes, where salmon are found to occupy deeper waters, beyond the reach of the survey's methodology. The absence of salmon further supports the idea that the survey design is only suitable for assessing the brown trout population.

A total of 16 brown trout died during this survey. Their otoliths were removed and preserved for research purposes, and their gut contents were examined. The analysis revealed that the trout's diet primarily consisted of bullies, dragonfly nymphs, damselfly nymphs, and backswimmers, providing valuable insights into their feeding habits.

Recommendation

- That the council receives the report.
- Maintains current regulations for Lake Mapourika.
- Lake Mapourika should only be gillnetted again in response to concerns raised for the fishery.
- The data from this survey be stored and used as baseline for the Lake Mapourika brown trout fishery.

References

Hay, J., Hayes, J., & Young, R. (2006). *Water Qaulity Guidelines To Protect Trout Fishery Values.* Cawthron.

Stoffels, R., & Unwin, M. (2023). *Angler usage of New Zealand lake and river fisheries. Results from the 2021/22 National Angler Survey.* NIWA.

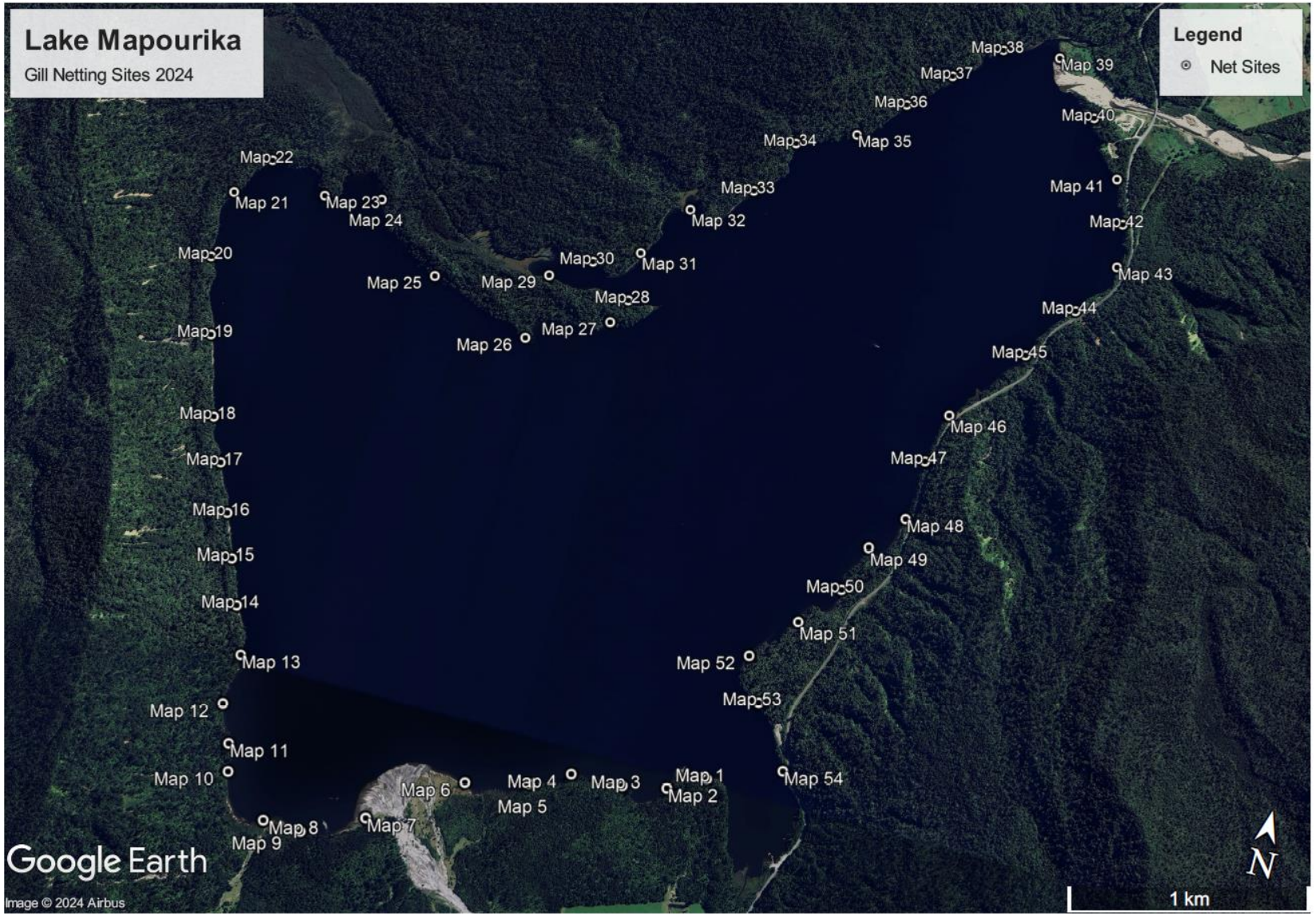
Unwin, M. (2016). *Angler usage of New Zealand lake and river fisheries. Results from the 2014/15 National Angling Survey.* NIWA.

Appendix 1 – Net Sets

Date	Set #	Site #	Mesh size	Time set	Time in	Total hrs	# Trout
10/11/2024	1	1	small	7:56	9:59	2:03	2
10/11/2024	2	2	medium	8:01	10:07	2:06	3
10/11/2024	3	3	large	8:05	10:13	2:08	2
10/11/2024	4	4	medium	8:10	10:19	2:09	1
10/11/2024	5	5	small	8:15	10:23	2:08	0
10/11/2024	6	6	large	8:21	10:28	2:07	2
10/11/2024	7	7	large	8:30	10:45	2:15	3
10/11/2024	8	8	medium	8:35	10:44	2:09	0
10/11/2024	9	9	small	8:41	10:50	2:09	2
10/11/2024	10	10	small	10:59	13:04	2:05	1
10/11/2024	11	11	medium	11:04	13:09	2:05	0
10/11/2024	12	12	large	11:09	13:14	2:05	1
10/11/2024	13	13	large	11:13	13:19	2:06	1
10/11/2024	14	14	small	11:19	13:25	2:06	2
10/11/2024	15	15	medium	11:24	13:31	2:07	3
10/11/2024	16	16	large	11:29	13:45	2:16	4
10/11/2024	17	17	medium	11:34	14:05	2:31	0
10/11/2024	18	18	small	11:39	14:08	2:29	0
11/11/2024	19	46	large	6:28	8:32	2:04	3
11/11/2024	20	47	small	6:34	8:42	2:08	2
11/11/2024	21	48	medium	6:39	8:48	2:09	2
11/11/2024	22	49	medium	6:44	8:53	2:09	0
11/11/2024	23	50	small	6:50	8:50	2:00	1
11/11/2024	24	51	large	6:56	9:04	2:08	2
11/11/2024	25	52	large	7:02	9:12	2:10	3
11/11/2024	26	53	medium	7:08	9:25	2:17	2
11/11/2024	27	54	small	7:13	9:30	2:17	4
11/11/2024	28	19	small	9:49	12:22	2:33	1
11/11/2024	29	20	medium	9:57	12:29	2:32	2
11/11/2024	30	21	large	10:02	12:35	2:33	2
11/11/2024	31	22	large	10:07	12:40	2:33	1
11/11/2024	32	23	small	10:11	12:48	2:37	2
11/11/2024	33	24	medium	10:16	12:55	2:39	4
11/11/2024	34	25	medium	10:24	13:02	2:38	1
11/11/2024	35	26	small	10:29	13:10	2:41	3
11/11/2024	36	27	large	10:34	13:15	2:41	1
12/11/2024	37	37	large	6:40	8:41	2:01	2
12/11/2024	38	38	small	6:46	8:50	2:04	4
12/11/2024	39	39	medium	6:50	8:56	2:06	0
12/11/2024	40	40	medium	6:58	9:00	2:02	0
12/11/2024	41	41	small	7:03	9:05	2:02	1
12/11/2024	42	42	large	7:09	9:10	2:01	0
12/11/2024	43	43	large	7:15	9:18	2:03	4
12/11/2024	44	44	medium	7:19	9:26	2:07	2
12/11/2024	45	45	small	7:13	9:30	2:17	0
12/11/2024	46	28	small	9:43	11:43	2:00	0
12/11/2024	47	29	medium	9:50	11:50	2:00	2
12/11/2024	48	30	large	9:55	11:57	2:02	2
12/11/2024	49	31	large	10:01	12:06	2:05	1
12/11/2024	50	32	small	10:08	12:10	2:02	1

12/11/2024	51	33	medium	10:15	12:16	2:01	1
12/11/2024	52	34	medium	10:23	12:23	2:00	2
12/11/2024	53	35	small	10:38	12:38	2:00	0
12/11/2024	54	36	large	10:45	12:47	2:02	3

Appendix 2


Lake Mapourika
Gill Netting Sites 2024
Legend
Net Sites
Map 1
Map 2
Map 3
Map 4
Map 5
Map 6
Map 7
Map 8
Map 9
Map 10
Map 11
Map 12
Map 13
Map 14
Map 15
Map 16
Map 17
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