



Investigation of the Mawheraiti River & the New River Brown Trout Fisheries 2022

*Results from sports fish spawning surveys, electric fishing, drift dives and environmental data collected between May 2021-May 2022 from the Mawheraiti River & the New River
Brown Trout Fisheries*

West Coast Fish & Game Region

Baylee Kersten, Fish & Game Officer, August 2022



Trout captured electric fishing Adamstown Creek, Mawheraiti Catchment in April 2021.

Interim report for: 1115 Sports Fishery Research

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Summary

Fish & Game is carrying out research on the Mawheraiti River brown trout fishery in attempt to better understand the fluctuations observed in the fishery. From three years of data collection, greater understanding of the roles different streams play on the fishery and the influence of flooding is being obtained. Lastly environmental data collected has reiterated findings of previous work, with the Mawheraiti River temperature often exceeding desirable levels in summer. Looking at data collected over the last three years in the Mawheraiti catchment, it appears that the recruitment year 2021-22 was a very productive one. Monitoring is also being carried out in the New River as it is believed the fishery is in a stunted state. From sonde deployments and electric fishing, issues regarding sediment have been identified. Electric fishing has resulted in very few trout being captured and low numbers of macroinvertebrates being observed, likely a result of sediment issues. Staff recommendations are that: The council receives this report. The Mawheraiti trout recruitment research programme continues. The New River continues to be monitored. Continue to work closely with WCRC and encourage them to proactively protect the Mawheraiti River and New River trout habitat considering their duty to do so under Section 7(h) of the Resource Management Act 1991.

Introduction

The Mawheraiti River and the New River have been identified as locations requiring research. The Mawheraiti River is a river that requires attention as the brown trout population has undergone significant decreases and increases over the years showed by drift diving and angler reports. To ensure the fishery is correctly managed and protected it is essential we understand these fluctuations and try to mitigate the significant drops in the brown trout population.

Little is known about the New River but given its proximity to Greymouth, it would be beneficial for local licence holders for it to be a thriving fishery. What is limiting the fishery, hopefully will be identified by the work carried out in this project but what is ensured to happen is a better understanding of the fishery will be obtained.

The Mawheraiti or Little Grey River is a tributary of the Grey River. Its catchment incorporates tributaries from the inland mountainous flanks of the Paparoa Ranges and from the rolling hills of the Reefton and Ikamatua areas. The Mawheraiti River joins the Grey River near the township of Ikamatua.

The Mawheraiti River fishery is identified as 'regionally significant' in its rural reaches (FGWC, 2011) and receives between 150 & 480 angling days each season (Unwin, 2016). The Mawheraiti River has long

been regarded by anglers as a nursery for the greater Grey River fishery and this is confirmed by the large number of small and medium size brown trout that have been observed in drift dive surveys.

The New River or Kaimata headwaters are in the hills to the west of Lake Brunner and flows down the north edge of the floodplain of the Taramakau River then turns north joining with Saltwater Creek before meeting the Tasman Sea. The New River fishery is identified as 'locally significant' (FGWC, 2011) and as of the 2014/15 angler survey, was estimated to receive 170 ± 70 angling days a season (Unwin, 2016).

This report is intended to provide an overview on the information gathered and reviewed for the work plan project 1115 – Sports Fishery Research in the past year and build on former reports where relevant. The information gathered is also intended to inform resource consent processing.

Methods

In 2019, Mawheraiti River tributaries were identified as potential spawning streams and spawning counts were carried out when possible, during the spawning season. Three suitable streams following conformation of significant spawning activity from the counts were chosen to be research streams. The three streams represented a mixture of land uses and stream types. Electric fishing is carried out on the research streams three times between November and May. Temperature loggers were installed into two of the study streams. West Coast Regional Council (WCRC) has aided in the collection of additional environmental data to allow potential identification of correlations between spawning/recruitment success and environmental impacts. Lastly annual drift dives were completed on the Mawheraiti as done so intermittently since 1993.

Working with WCRC a sonde was installed into the New River upstream of State Highway 6 in October 2019. The sonde has been serviced by WCRC staff and the data has been sent through to Fish & Game. The sonde deployment was to obtain environmental data on the New River and the conditions trout are exposed to, providing some scope on what may be limiting the fishery and requires further investigation. In addition to this electric fishing and spawning counts have been carried out in the catchment to aid in better understanding the fishery.

Results – Mawheraiti River

Spawning Surveys

During the 2021 spawning period three spawning surveys were carried out on the Mawheraiti research streams as can be seen in table one below. Very few trout were observed in O'Malley Creek mean while Rough and Tumble Creek was observed having its highest density of spawning trout yet. Spawning peaked this season in late May for two sites while the last site, Adamstown Creek, highest count was in mid-June.

Table 1: Highest spawning survey count in the Mawheraiti Research streams between 2019 - 2021.

Date	Research Site	Brown Trout	Length surveyed (km)	Trout/km
26/05/21	Rough & Tumble Creek	17	1.6	10.63
09/06/20	Rough & Tumble Creek	10	1.6	6.25
20/05/19	Rough & Tumble Creek	25	6	4.17
26/05/21	O'Malley Creek	4	1.7	2.35
09/06/20	O'Malley Creek	22	1.7	12.94
04/06/19	O'Malley Creek	10	1	10
17/06/22	Adamstown Creek	7	1.6	4.38
09/06/20	Adamstown Creek	7	1.6	4.38
04/06/19	Adamstown Creek	4	1.6	2.5

Electric Fishing

The electric fishing of research sites this recruitment year seen high levels of recruitment, similar to last year. The data in graphs only show the number trout believed to be from that year's spawn, not the total number of trout in the stream. O'Malley Creek remained steady, with over the three years little fluctuation observed than an elevated count in November 2020 (Figure 1). Adamstown Creek had its strongest year yet, with counts remaining high on all three electric fishing counts (Figure 2). Rough and Tumble Creek also seen elevated levels on the 2019/20 season and similar counts to last year (Figure 3). This season's recruitment had similar growth rates to the previous years but again the trout in O'Malley Creek tended to be smaller.

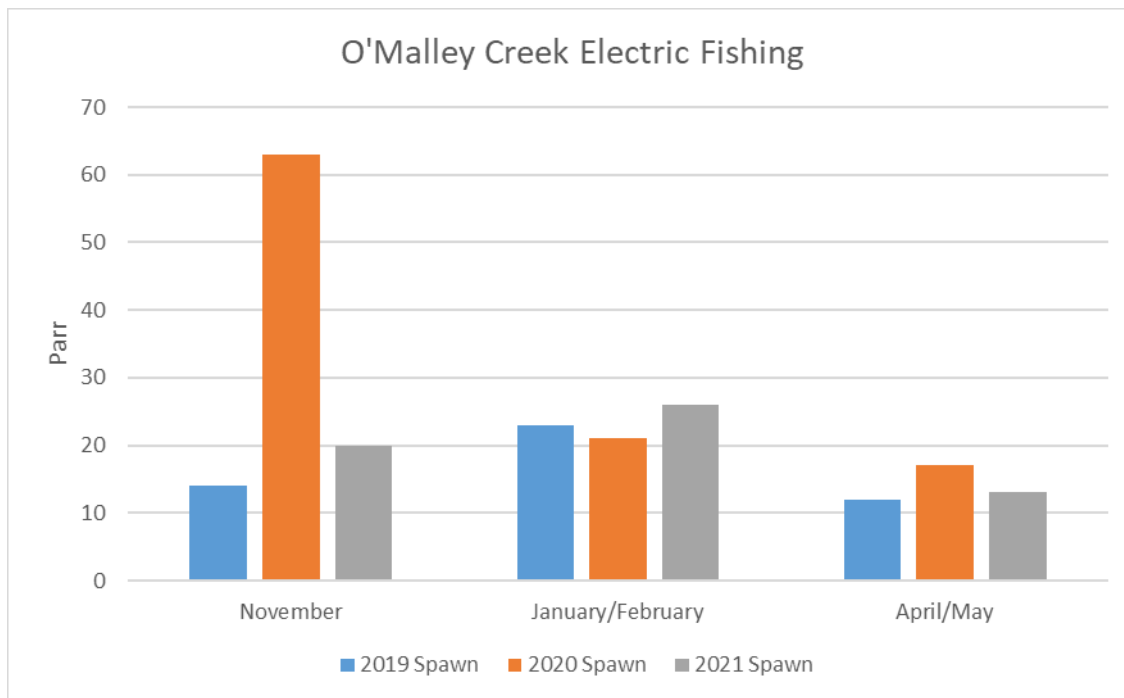


Figure 1: The number of brown trout parr captured from that seasons spawn electric fishing in O'Malley Creek 2019-2022.

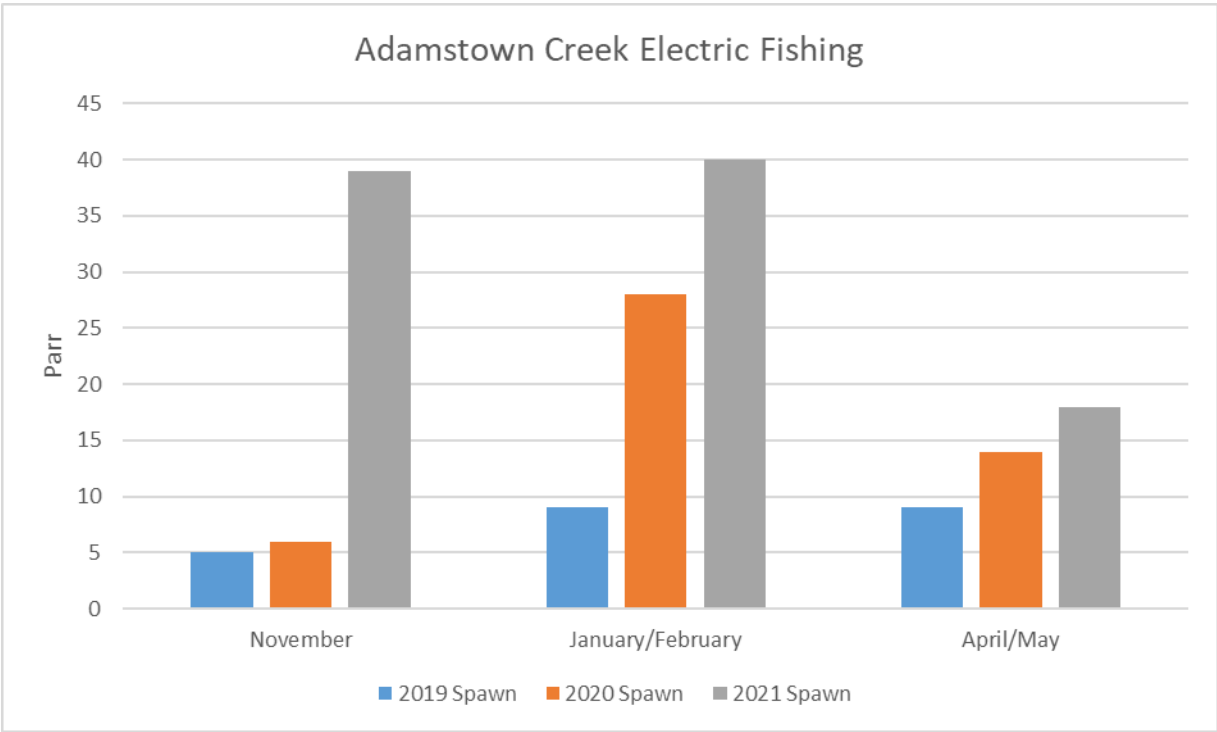


Figure 2: The number of brown trout parr captured from that seasons spawn electric fishing in Adamstown Creek 2019-2022.

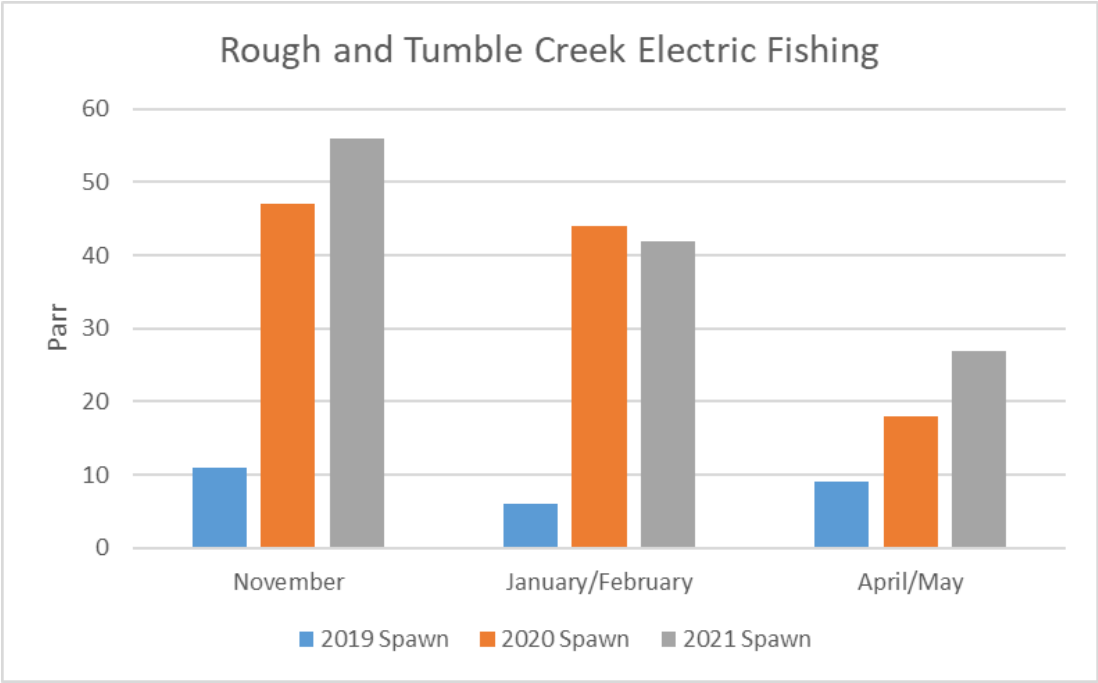


Figure 3: The number of brown trout parr captured from that seasons spawn electric fishing in Rough and Tumble Creek 2019-2022.

Drift Dives

This year the dives on the Mawheraiti River were completed on the 20 December 2021. The Mirfin’s Bridge count was 78 small/km, 57 medium/km, and 8 large/km. Numbers of small and medium fish were above average while numbers of large fish were below average. The total count was the second highest count recorded but well down on the record count obtained in February 2016. The SH7 bridge count resulted 86 small/km, 71 medium/km, and 27 large/km. Numbers of small and large fish were average, while numbers of medium were slightly below average. River flows were slightly elevated following rain regularly in December likely reducing the count.

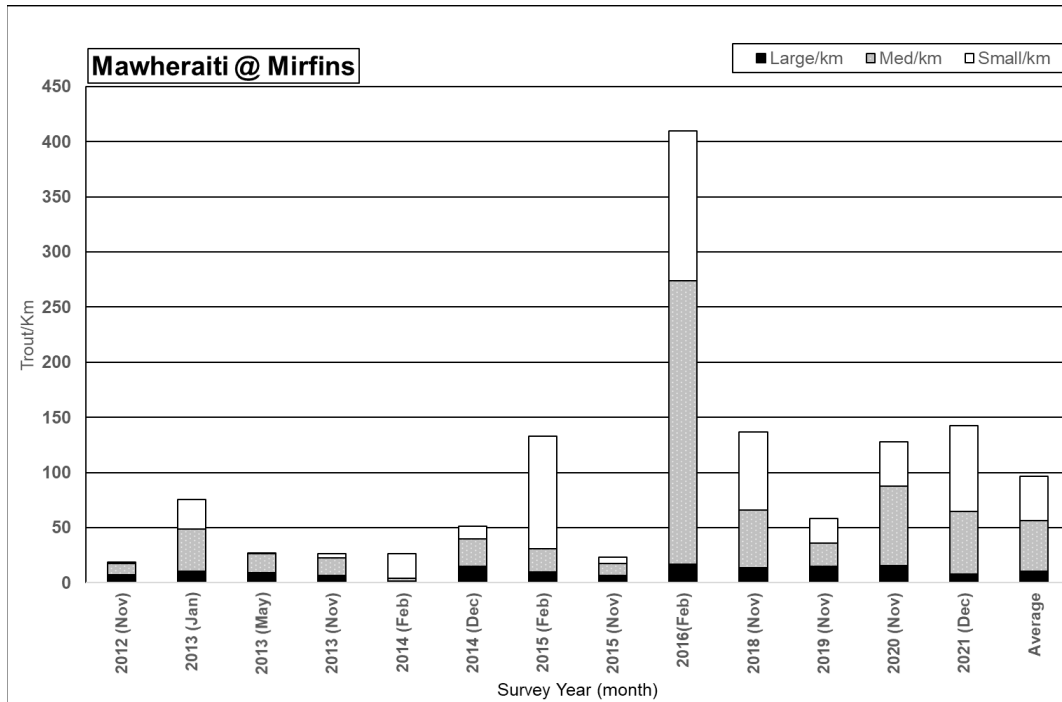


Figure 4: Number of Brown Trout recorded during drift dive surveys at the Mawheraiti River Mirfins Bridge site 2012-2021.

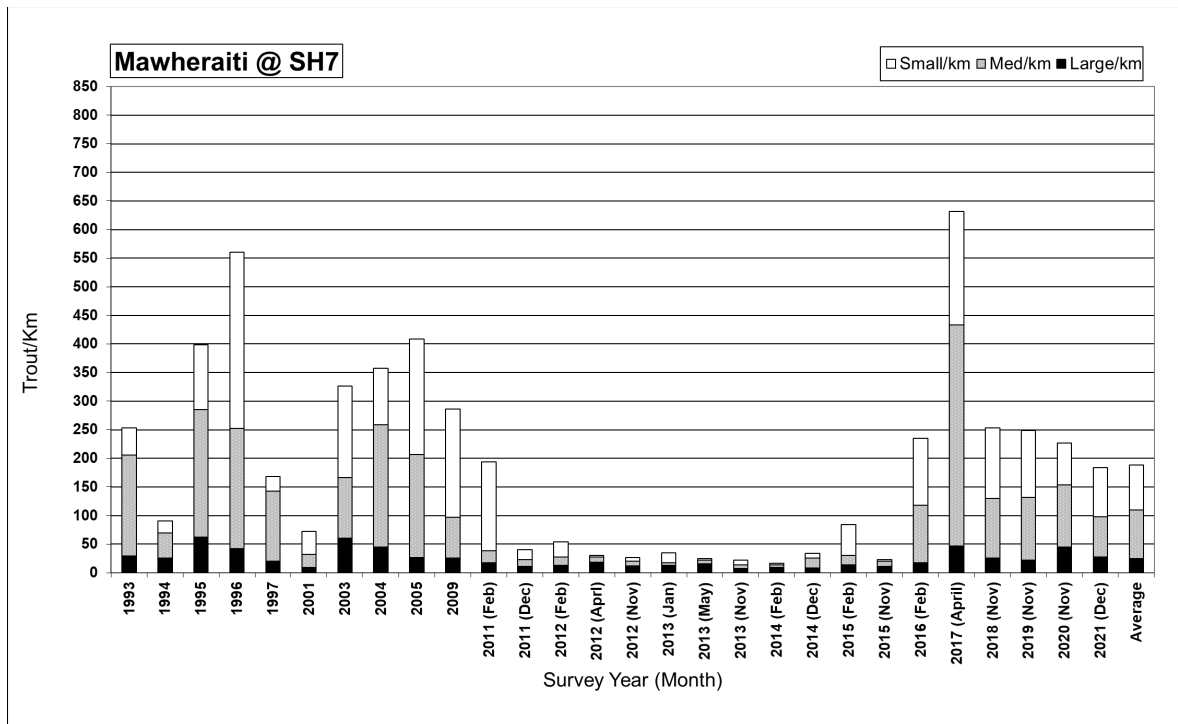


Figure 5: Number of Brown Trout recorded during drift dive surveys at the Mawheraiti River Mirfins Bridge site 2012-2021.

Environmental Data

Cawthron’s paper *Water Quality Guidelines To Protect Trout Fishery Values* recommends that temperature does not exceed 19°C to avoid brown trout behavioural disturbances (Hay, Hayes, Young 2006). Below in figure 6, it shows the Mawheraiti at Maimai exceeding 19 °C 81 days this season with the hottest temperature recorded being 25.2°C. For the Maimai site, 19°C days were exceeded 26 and 19 more times than in the previous two summers. Despite this the peak temperature was 0.5°C cooler than last summer and the same as the previous. The downstream temperature site at Atarau data could not be used again this year as the temperature probe malfunctioned during the peak of summer.

Research streams temperatures were also recorded either directly or by obtaining data of a stream nearby with similar characteristics. All three streams again ran cooler than the Mawheraiti River, with Rough and Tumble Creek (using Stoney Creek data) and Adamstown Creek peaking around 22-23 °C during January. O’Malley Creek ran much cooler never exceeding 19°C, likely a reflection of its dense riparian cover.

The Mawheraiti exceed ten times the median flow 29 days from May 2021 to April 2022. Of the 29 days that exceeded ten times the median flow, 19 were during winter or spring – when trout recruitment is most vulnerable. Flood frequency compared to the previous two years was considered average, being up 10 days on last year and down 10 days on 2019/20. The largest flood occurred on 10th February 2022 with a flow of 520m³/s and was an above the average maximum annual flood, with it being the largest flood since 2017’s flood of 593m³/s. Flow events that exceed 10 times the median flow has been shown in most rivers to disturb a substantial portion of the substrate. Therefore, flows above this magnitude

also have the potential to displace or kill trout, especially juveniles. (Holmes, Gabrielsson, Matthaei, Closs 2017).

The median turbidity for the Mawheraiti was calculated from the continuous logger at the Atarau Bridge as 1.3 NTU. This is more than double the recommended level of 0.5 NTU (Hay, Hayes, Young 2006). Other environmental data collected by West Coast Regional Council has been put in *table 2*, to compare recommended levels.

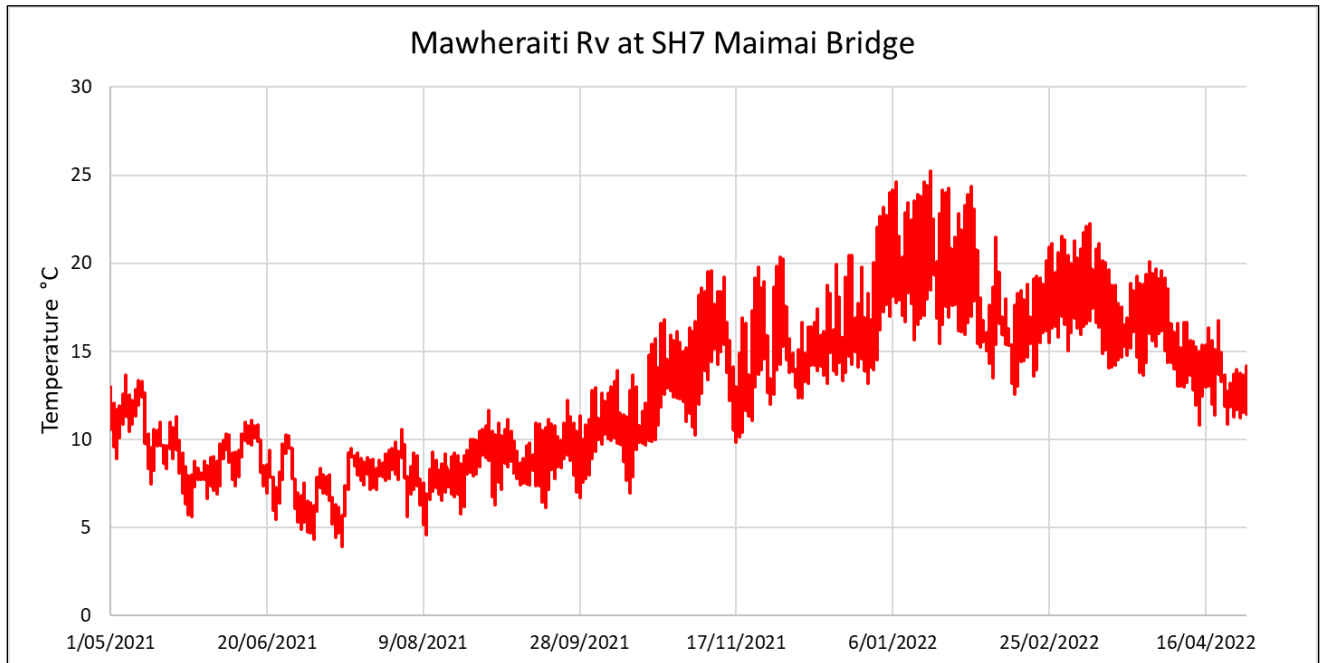


Figure 6: Temperature of the Mawheraiti River at State Highway 7 Maimai Bridge May 2021 - April 2022.

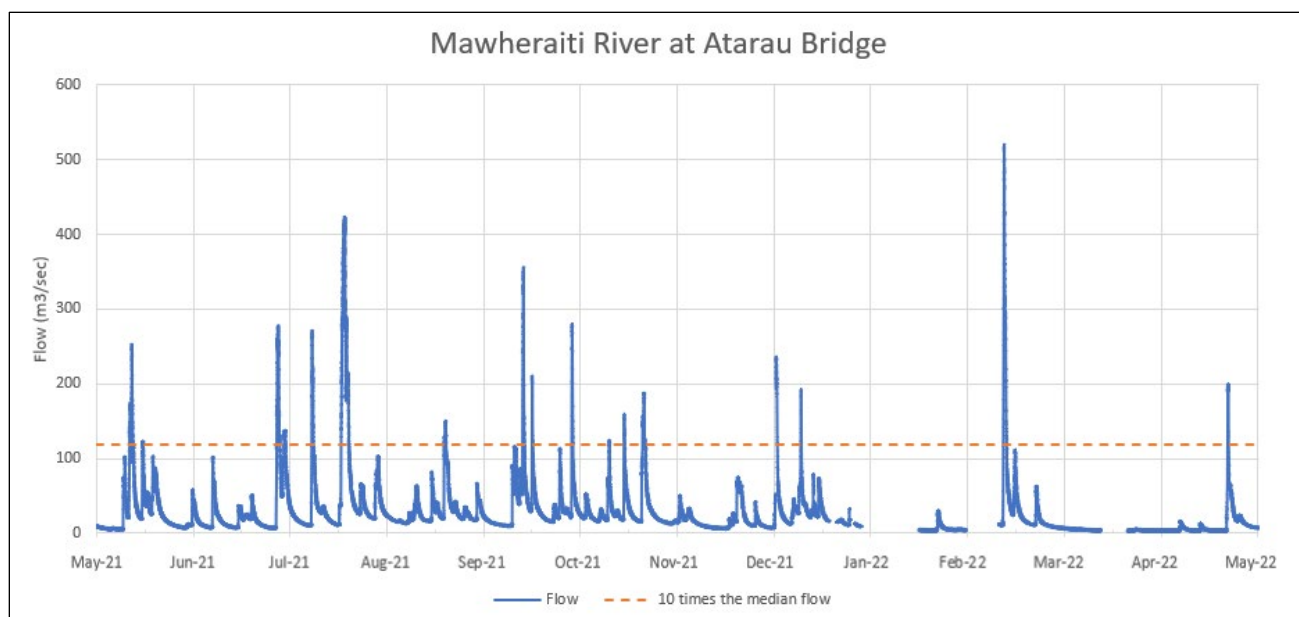


Figure 7: Flow of the Mawheraiti River at Atarau Bridge May 2021 - April 2022.

Table 2: Water Quality variables measure for the West Coast Regional Councils Mawheraiti River 'State of the Environment' (SOE) monitoring site at SH7 Maimai and continuous monitoring site at the Atarau Site 2021-22

Variable	Range	WCRC Recommended Level	Fishery Recommendations	Concern
MCI - Macroinvertebrate Community Index	115.4-128.3	>120	>120	Yes
Temperature	3.89 – 25.22	<20°C	<19°C	Yes
Ammonia- N	0.002 – 0.096	<0.021mg/L	<0.21mg/L & <0.01mg/L*	Yes
Turbidity (median)	1.3	<5.6 NTU	<0.5 NTU	Yes
Clarity	2.68 – 6.88	>1.6m	>5m	Yes
E. Coli	6 - 3800	<260		Yes
Periphyton	4.57 – 9.83	>5		Yes
Dissolved Reactive Phosphorus	0.0005 – 0.022	<0.03mg/L		No
Dissolved Oxygen	82.8 – 117.1	>80%	>80%	No
Nitrate	0.026 - 0.89	<0.1mg/L		Yes

* Lower value for upland streams >150m above sea level

Results - New River

Electric Fishing

One day was spent electric fishing in the New River Catchment in 2021-22 research period. When the fishing was conducted on 28th of January 2022 the West Coast was experiencing a prolong dry spell. As a result, sites previously electric fished such as Cockabulla Creek were no longer flowing. The opportunity

of low flows was taken to electric fish the New River throughout its length instead at four sites. The fishing produced high numbers of bullies, torrent fish, eels, and galaxiids but unfortunately very few trout. The trout caught increased in size as we moved down stream. A few potential negative influences on trout abundance were observed and noted whilst electric fishing. There were very few macroinvertebrates observed on nets compared to the Mawheraiti sites when electric fishing. Sediment issues and a lack of habitat for trout was also observed whilst fishing.

Table 3: Electric Fishing carried out in the New River Catchment in 2020-21

Date	Location	Area Sampled (m²)	No. of trout from this year's spawn	No. trout 1+ years	No. Trout (per m²)
28/01/2022	New River @ Dungaville	400	3	0	0.008
28/01/2022	New River @ Cockabulla Ck Junction	500	0	1	0.002
28/01/2022	New River @ Marsden	275	0	3	0.011
28/01/2022	New River @ Dredge Pond	N/A*	0	1	N/A*

*Presence/absence electric fishing due to river size

Spawning Surveys

A spawning survey of 1.5kms was carried out on the 10th of June 2021, at each of the three sites that have been previously electric fished. The New River at Dungaville site had a count of three spawning brown trout, with four locations identified as appearing to have redds. Two trout were observed in Cockabulla Creek and one in Card Creek, with limited spawning activity observed in both creeks.

Sonde Data

Unfortunately, the sonde data collected over the majority of this summer's low flow period was either missed or inaccurate due to the river mouth being blocked. From 12th January 2022 to 27th February 2022 there is a gap in the data. Then for the majority of March, with the mouth blocked, the water backed up beyond the sonde located 90m upstream of State Highway 6 resulting in invalid data for the New River. From the data available the trends still remained consistent. Sediment continues to be a serious concern to the trout fishery with the New River data having a median of 3.2 NTU, well above the recommended level of 0.5 NTU (Hay, Hayes, Young 2006). Temperature and dissolved oxygen likely were at their least favourable conditions in the missed low flow periods but looking at previous years data, the New River tends to maintain adequate levels with temperatures below 19°C and an oxygen saturation above 80% (Hay, Hayes, Young 2006).

Discussion

The year from May 2021 to April 2022 has been a year of extremes, with periods of frequent flooding followed by prolong periods of fine weather. Despite the fluctuating conditions and, the pressure they apply to the fisheries, the research streams yielded above average levels of recruitment. O'Malley Creek had low numbers of spawners observed potentially explaining the lower initial count compared to last year. Despite the difference in the November electric fishing counts, the second and third electric fishing counts have all resulted in similar counts in all three years. Although temperatures might remain

suitable in O'Malley Creek, the available habitat reduces with low flows and likely drives downstream migration until numbers fall below the carrying capacity at the reduced flows.

The environmental data continues to raise concern with many variables either at or below the recommended levels. Notably this year the Mawheraiti at Maimai exceeding 19°C 81 days this summer is a serious concern. At 19°C trout have been shown to reduce feeding, which means that for over two and half months during the summer period in the Mawheraiti trout feeding activity was likely limited (Hay, Hayes, Young 2006). This both impedes angling and applies significant stress to the fishery when trout should be gaining condition as they prepare for their next spawn.

Monitoring in the New River continues to support that trout numbers are at a depressed state and a significant contributing factor is the sediment coming downstream. Although high levels of other fish species have been observed, if conditions continue to decline, they too will become impacted. Trout with their low tolerance of poor water quality are typically the first indication of reducing water quality.

Recommendations

- The council receives this report.
- The Mawheraiti trout recruitment research programme continues.
- The New River continues to be monitored.
- Continue to work closely with WCRC and encourage them to proactively protect the Mawheraiti River and New River trout habitat considering their duty to do so under Section 7(h) of the Resource Management Act 1991.

References

Adams, R (2015). Investigations of the Mawheraiti brown trout fishery. Fish & Game internal report.

Fish & Game West Coast Region (FGWC) (2011). Sports Fish and Game Management Plan for the West Coast Fish & Game Region. Fish & Game West Coast, internal report

Hay J, Hayes J, Young R 2006. Water quality guidelines to maintain trout fisheries values. Prepared for Horizons Regional Council. Cawthron report No. 1205. 17p

Holmes R, Gabrielsson R, Matthaei C, Closs G 2017. Literature review to support a limiting factor analysis for stream brown trout populations. Prepared for Cawthron Institute. Cawthron Report No. 3072. 34 p

Horrox J, Chaney E, Eaves A, 2015. West Coast Surface Water Quality – state of the environment technical report 14001 for the West Coast Regional Council (WCRC).

Kersten, B (2020). Drift Dive Report 2021. Fish & Game internal report.

Unwin, M.J. (2016). Angler usage of lake and river fisheries managed by Fish & Game New Zealand: results from the 2014/15 National Angling Survey. NIWA Client Report 2016021CH. 127-128 p.

Appendix 1: Location of research sites in the Mawheraiti Catchment.

