

# Whitebait Survey *Summary of Results*



2013

## Whitebaiting

The New Zealand whitebait fishery revolves around the juvenile stage of five native *Galaxias* species. The adult stages of the five different species live and reproduce in different freshwater environments, but larvae typically develop in the sea. Whitebaiters target the juvenile stages as they return to freshwater after 3-6 months growth at sea (McDowall 1990).

Whitebaiting in Southland is considered a quintessential and almost obsessive activity, much like duck shooting. There are anecdotal accounts of endless swarms of whitebait streaming into rivers during the early European settlement. Whitebait was in such abundance that it was sometimes used as fertiliser or chicken feed. Compared with these anecdotes, whitebait stocks have suffered an almost certainly drastic reduction (McDowall 1991). This is probably due to a number of causes, with habitat alteration, wetland drainage, introduced fish and over-harvest being suggested as possible causes. These days, whitebait is a relatively rare and precious commodity, with retail values commonly in the \$100-160 per kilo range. It is probably not being used as fertiliser any more.

Despite the importance of whitebait to Southlanders and New Zealanders in general, there is very little known about the amount of time people spend whitebaiting, whether catch rates are increasing or decreasing, or whether recent declines in water quality have affected whitebait stocks. Four of the five whitebait species (all except banded kokopu) are considered to be threatened and in decline (Allibone et. al. 2010).

Environment Southland regulates and manages the permissions to occupy river banks with whitebait stands. It also has the statutory responsibility for ensuring the maintenance of the life-sustaining capacity of waterways which are inhabited by the different life stages of whitebait. The Department of Conservation manages and enforces the actual whitebait fishery.

Environment Southland wants to understand more about whitebaiting in the region, whether the experience is better or worse than it has been in previous years, and if water quality is causing problems. As such, questionnaires were mailed out to the approximate 600 registered standholders in Southland along with their registration renewal papers. The questions aimed to establish an understanding of the time people spent whitebaiting, whether symptoms of poor water quality were being observed by whitebaiters, whether fishing diaries were being kept, and whether people were happy with access to whitebait stands.

We had 103 of these questionnaires returned. Most of these were from people who fished in the Maitai River (n = 45), Aparima Rivers (n = 37) and Titiroa Stream (n = 14). There were also a few responses from people who fished in the Pourakino, Waiau and Waikawa Rivers (n = 3 for each), as well as the Wakapatu and Oreti Rivers (n = 2 each) and Waihopai R (n = 1)<sup>1</sup>.

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<sup>1</sup> Note the combined tally of the above will be more than 103, because some people fished in more than one system.

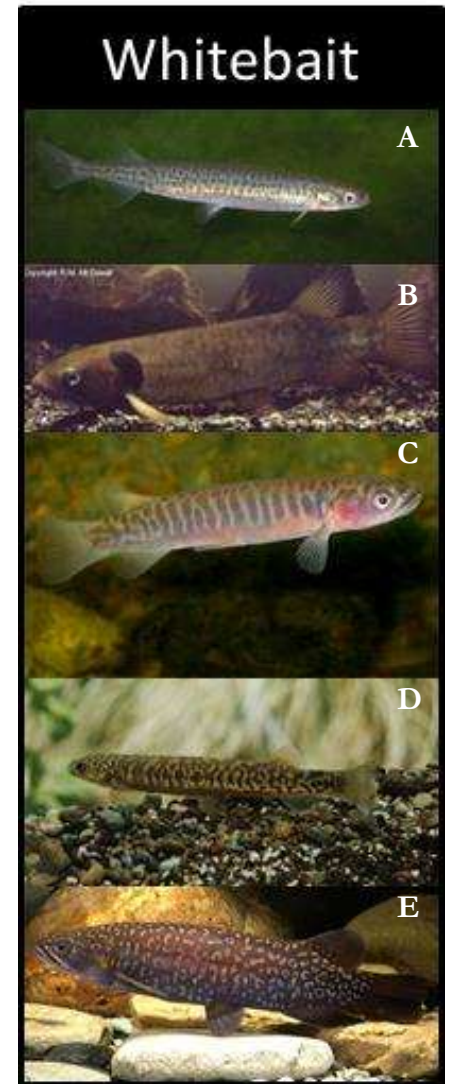


Figure 1 The adult stages of the five whitebait species. A Inanga or *Galaxias maculatus*, photo by Stephen Moore. B Shortjaw kokopu or *Galaxias postvectis*, photo by Bob McDowall. C Banded kokopu or *Galaxias fasciatus*, photo by Stephen Moore. D Koaro or *Galaxias brevipinnis*, photo by Stephen Moore. E Giant kokopu or *Galaxias argenteus*, photo by Paddy Ryan.



## Time spent whitebaiting

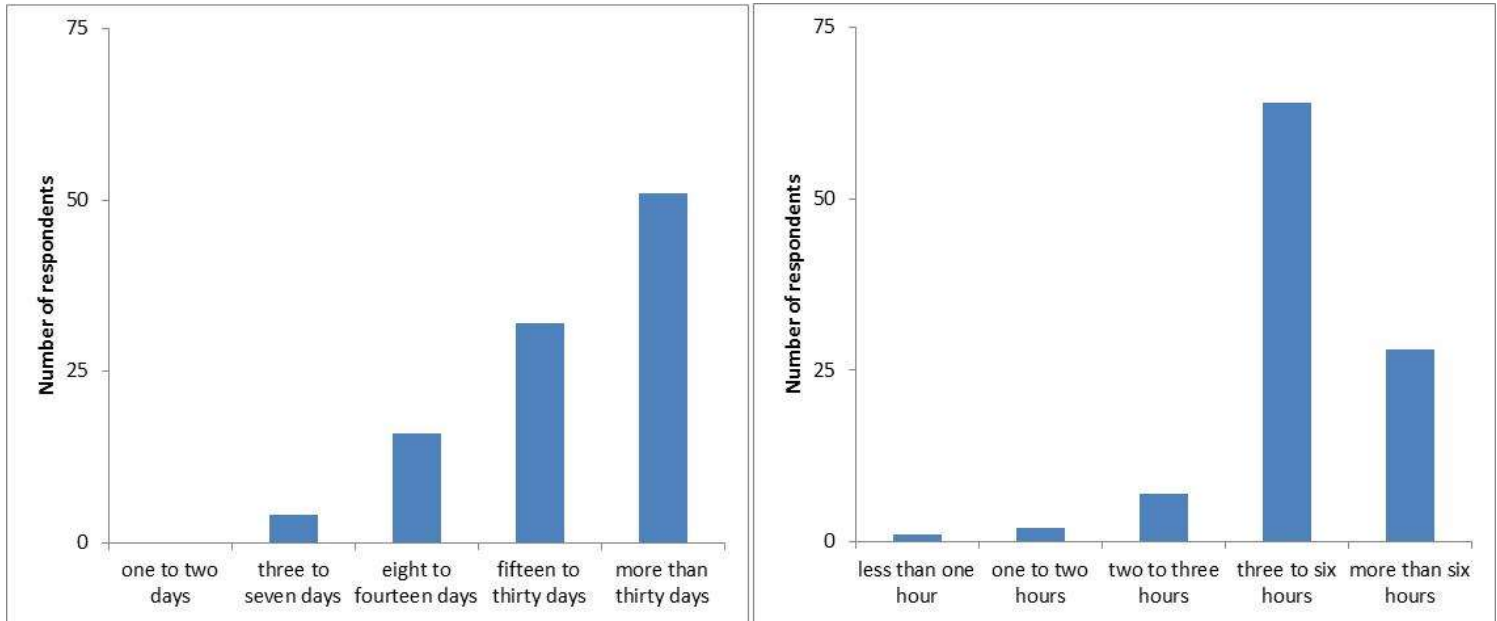


Figure 2 : The number of days and hours that stand holders spent whitebaiting.

The amount of time people spend on a recreational activity gives an indication of how valuable that activity is to them, so we asked how many days and hours the whitebait stand holders spent fishing (see Figure 1 above). Half of the respondents ( $n = 51$ ) spent over 30 days fishing each year, and the majority of respondents ( $n = 64$ ) spent between 3 to 6 hours fishing each day.

Category	Numeric
Less than one	0.5
One to two	1.5
Two to three	2.5
Three to six	4.5
Three to seven	5
More than six	8
Eight to fourteen	11
Fifteen to thirty	22.5
More than thirty	40

By assigning each of the categories a numerical value (see Table 1), we were able to estimate the total time each respondent spent fishing. This produced an average value of 148 hours per stand holder per year, with most people ( $n = 61$ ) spending between 100 and 200 hours each year (see Figure 2).

Full time work is usually considered to be approximately 40 hours per week, which means that the average stand holder is whitebaiting for almost an equivalent of one month 'full-time' work. This indicates how important whitebaiting is to these individuals.

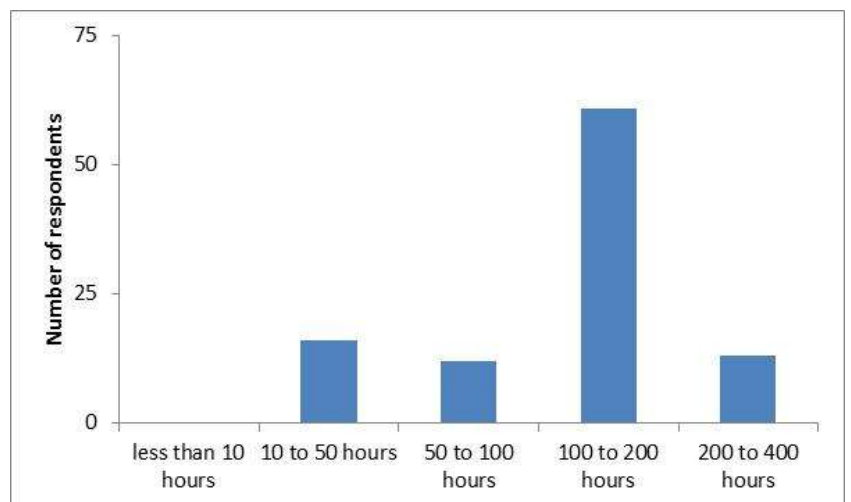


Figure 3 : The inferred number of hours spent fishing each year.

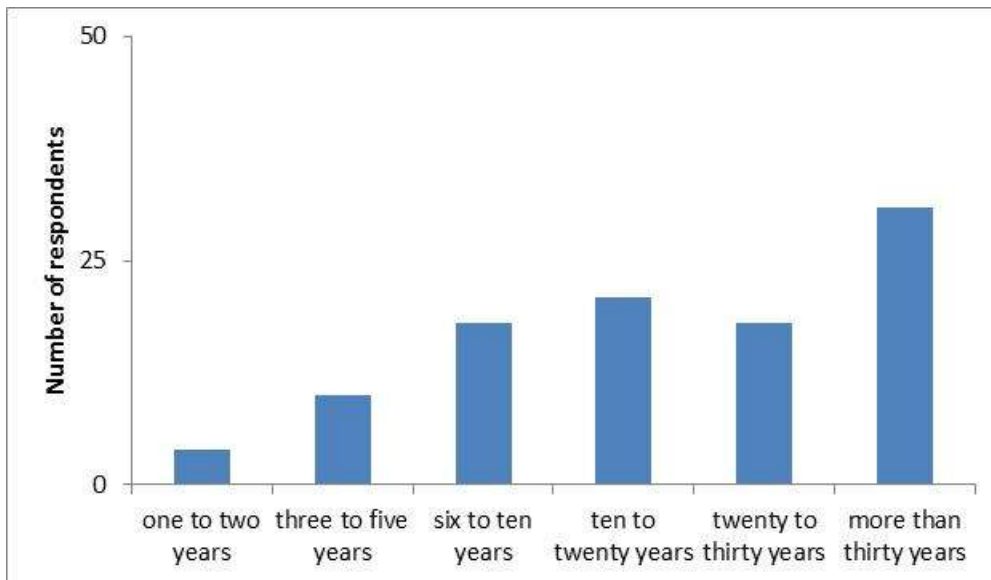


Figure 4: The numbers of years stand holders have been fishing for.

Stand holders had been fishing for a range of years. Most respondents had been fishing for more than 30 years ( $n = 31$ ), but a similar number ( $n = 32$ ) had been fishing for less than 10 years, showing a relatively even mix of both old timers and new players amongst the stand holders. Some people had only fished for one or two years, right through to people who have been fishing for 50 or 60 years.

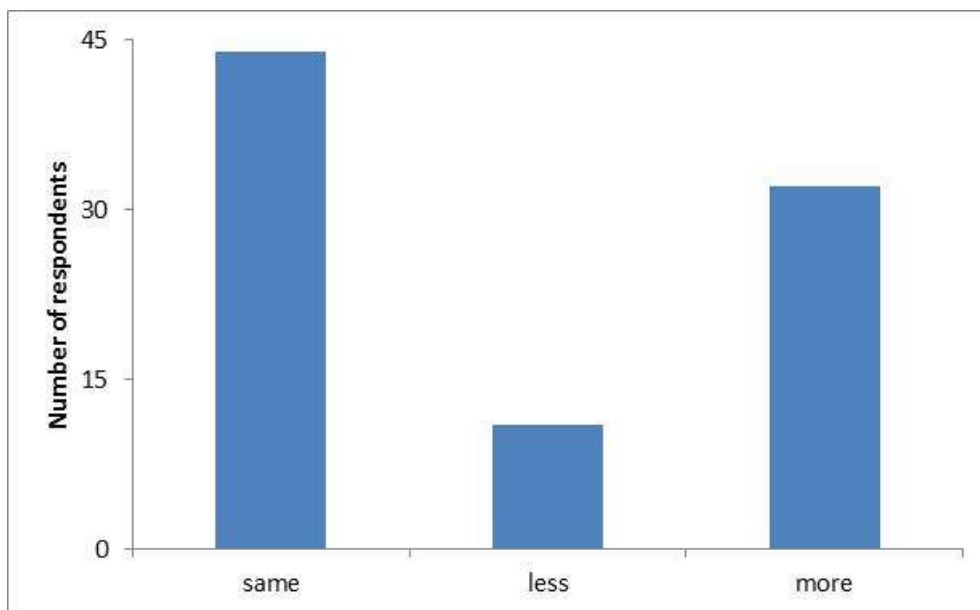


Figure 5: Are standholders fishing more or less than they used to?

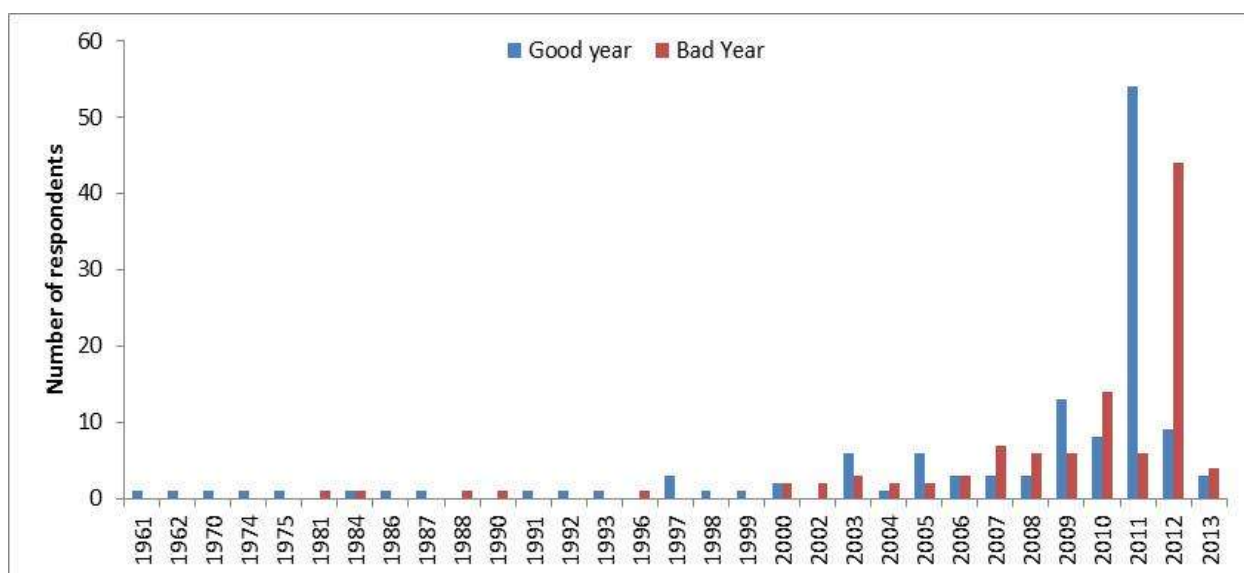
We also asked whether people fished as often as they did 10 years ago, to give an indication of whether whitebaiting may be waning or growing in importance. The most common answer was that people were fishing the same amount, but there were three times as many respondents fishing more than there were fishing less ( $n = 32$  versus 11). We do need to keep in mind that this survey was limited to current stand holders, and included new stand holders, so the results are biased against anybody who may fish less because they no longer own a stand. But nevertheless, the results do not give any indication that whitebaiting is losing popularity in Southland.

## Fishing History

We asked people to specify which years they caught a lot of fish (good years) and which years were less productive (bad years). Eighty of the respondents filled in this section, and Figure 4 presents the results. Because of the somewhat anecdotal nature of this information, it was difficult to make too many conclusions, but it would appear that 2011 was a good year for many, whereas 2012 was not. More people associated 2003, 2005 and 2009 with being a good year rather than bad. More people associated 2007, 2008 and 2010 with being bad rather than good.

Many years had a relatively even response of being associated with good and bad, e.g. 2006 and 2013. There were some respondents ( $n = 6$ ) who indicated 2011 as a bad year in contrast to the majority who indicated it was a good year ( $n = 54$ ). The mixed experiences for some years may represent different conditions in different systems, or in different reaches of the same river. We have not been able to investigate these possibilities due to limitations of the dataset.

Most respondents were able to give an approximate catch. The volume of catch for one respondent ranged from 360 kg (800 lb) in a good year to only 2.7 kg (6 lb) in a bad year, whereas another respondent caught 2.5kg in a good year and only 700g in a bad year. Environment Southland is investigating more efficient ways to collect fisheries information that may be relevant to land and water management. If we can isolate any land management related effects that seem to drive the occurrence of “bad” whitebait years, we may be able to identify ways to increase the frequency of “good” years. We are also considering projects that would enhance inanga spawning areas in the region. If we can find people to provide us catch records before and after those restoration efforts, it would provide the council with an inexpensive monitoring tool. To this end, we asked which whitebaiters keep a diary of their fishing experience, and whether they would be willing to share this information with the council. Nineteen of the respondents replied that they do keep records and would be willing to share, which is fantastic.



**Figure 6: Good versus bad fishing years.** Note, only the years that were mentioned by at least one respondent are listed, i.e. the time series is not continuous. Also, the last few years were probably mentioned by more people because there were a larger number of people fishing in these later years, and it would have been easier to remember the most recent years.

## Water Quality

Given the widespread concern around water quality both within Southland and around New Zealand, we wanted to find out whether whitebaiters were being exposed to symptoms of poor water quality. The results for all rivers are presented in Figure 5, and we were able to separate the rivers which had a large number of respondents to investigate whether different systems were exhibiting different symptoms.

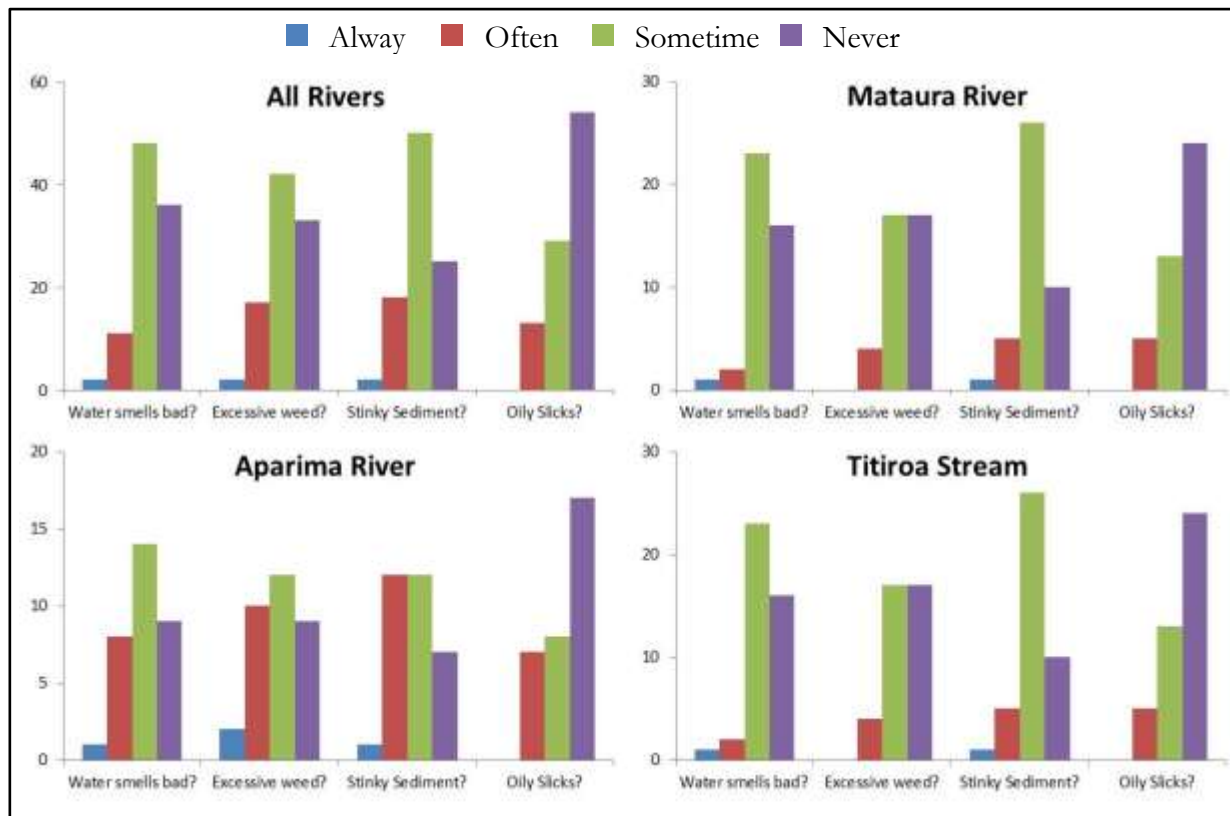


Figure 7: Water quality observations by whitebaiters

Overall, a response of “sometimes” was the most common answer when asked about whether water smells bad, excessive weed growth and stinky sediment. A response of “never” was the next most common response for these same questions when grouped across all rivers. The most common response for oily slicks was “never”. And a response of “always” was very infrequent across all questions.

When looking at the separate river systems, a slightly different picture emerges. Responses of “sometimes” and “often” had the highest frequency for the questions of excessive weed growth and stinky sediment in the Aparima River, and the responses of “often” and “never” had a similar frequency for this system when asked about water smelling bad. Conversely, there was a lesser frequency of “often” for these same three water quality questions among respondents from the Mataura River and Titiroa Stream. In other words, there were a higher proportion of people indicating negative water quality symptoms in the Aparima River when compared to the Mataura and Titiroa Rivers.

People were also given the chance of providing their own “other” comments relating to water quality, and these are given in Appendix A.

## Whitebaiting Experience

Stand holders were also asked what would improve the whitebaiting experience. Of the 102 people who filled in this section, the two most common responses were “more whitebait” (55%) and “better water quality” (50%). The next most popular response was that “nothing needs to change” (23%). People were also given an opportunity to add “other comments”, which are given in Appendix B.

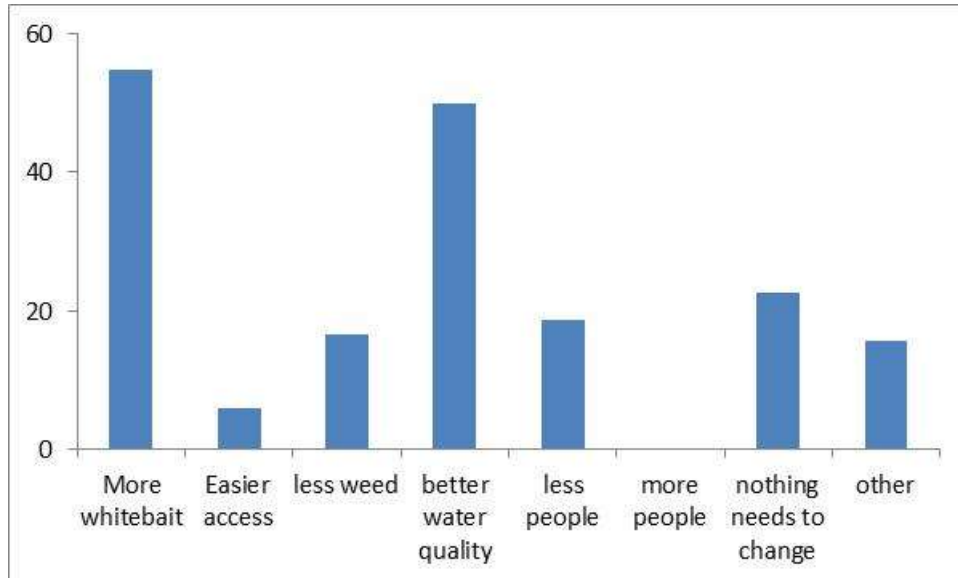


Figure 8: Aspects which would improve the whitebaiting experience for respondents

Stand holders were asked whether they were happy with site access. Over all systems, the most popular response was that people were “very happy”, with a very low frequency of people who were “unhappy” (n = 3 for all river systems), and there were no respondents who “very unhappy”.

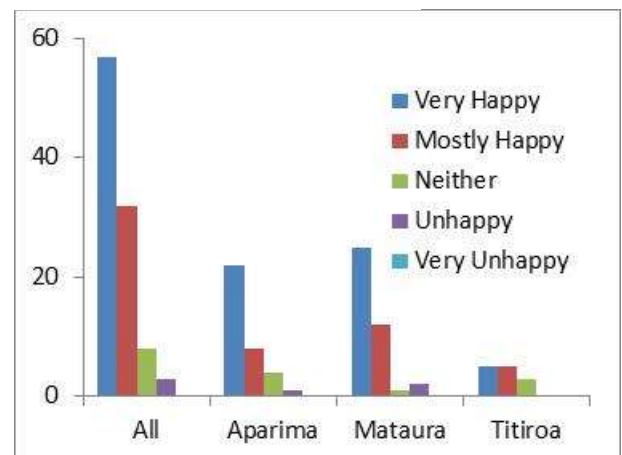


Figure 9 Ease of access for whitebaiting

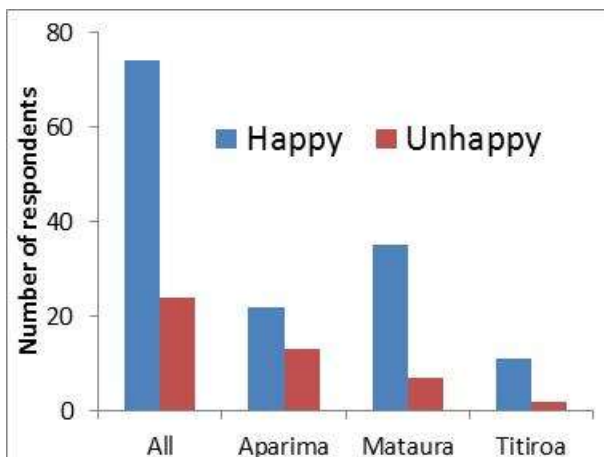


Figure 10 Level of happiness with the current experience

People were also asked whether they were happy with the current whitebaiting experience. Across all rivers, the majority were happy (n = 74 versus 24), however, slightly less ‘happy’ responses were recorded from the Aparima River (n = 22 versus 13), which may indicate a lesser level of satisfaction in this system when compared with the Maitiara and Titiroa.

## Summary

Results from this questionnaire confirm that whitebaiting is an activity highly valued by Southlanders, with the average stand holder spending the equivalent of one month of full time work fishing each year. The volumes that people catch vary widely, both among individuals and between seasons. There is no indication of a consistent decline in whitebait among those surveyed, with 2011 indicated as a “good” year and 2012 as a “bad” year. The unexplained differences among years demonstrates the need to do more work to understand what drives variability in the whitebait run, and whether there is anything we can do to encourage more “good” years. A number of people have indicated that they keep whitebait records and are willing to share this information with the Council, which may help address this knowledge gap.

Over half of all respondents wanted more whitebait, and half wanted better water quality, which gives the Council a clear indication that actions that improve water quality and increase whitebait numbers would be favoured by the whitebaiting community. Progress towards more whitebait and better water quality should be achieved via the Council’s Water and Land 2020 & Beyond project, which will tackle issues that are contributing to water quality decline. There are also Council initiatives underway that are aimed at enhancing whitebait spawning areas. For example, Council management of the recently discovered spawning areas in the Waihopai River, Otepuni Creek and Kingswell Creek will be altered to enhance the suitability of these areas for spawning (e.g. no mowing grass during the spawning season). There are also efforts underway to identify potential improvements that could take place within probable spawning areas on Council-owned land in the Oreti River, Mataura River and Titiroa Stream.

Overall, we were extremely pleased with the response and are grateful to the registered stand holders who took the time to complete and return the surveys. We hope the information summarised here is of interest to them and the broader Southland community, and welcome any feedback.



## **References**

Allibone, R., David, B., Hitchmough, R., Jellyman, D., Ling, N., Ravenscroft, P., and Waters, J. (2010). Conservation status of New Zealand freshwater fish, 2009. *New Zealand Journal of Marine and Freshwater Research* 44:271-287.

McDowall, R.M. (1990). *The Reed field guide to New Zealand freshwater fishes*. Reed Books, Auckland. 224 pp.

McDowall, R.M. (1991). *Conservation and Management of the Whitebait Fishery*. Department of Conservation Science and Research Series No. 38. Wellington.

## Appendix A: "Other" comments relating to water quality issues

- Large floating masses that look like a six inch thick crust off effluent ponds (Waiau R.)
- White froth in river sometimes. River is becoming more polluted yearly with slime and sediment. (Aparima R.)
- Cow faeces seen often, no fencing on some areas (Mataura R.)
- Weed, scum on water, water smells bad (Aparima R.)
- Normal discolouration after high rainfall. (Waikawa R.)
- Too many logs floating around. (Mataura R.)
- Rotten seaweed after storm buried then exposed. River weed as well as seaweed. Waimatuku Mouth above responses.
- Cows on river banks (Mataura R.)
- Whitebait numbers are reducing with low water flow in the river. Water quality is poor. Green colour. Flow is well down. Had a flow of 14-17m/s now down to 5-10m/s (Aparima R.)
- Slime from dairy runoff (Mataura R.)
- Dead cows and sheep floating in river. (Mataura R.)
- After large rains river runs brown with dairy run off (Aparima R.)
- Low tide sometimes smelly. (Aparima R., Pourakino R)
- Often have scum or silty substance with incoming tide. (Aparima R.)
- There is no flow to speak of- River is disgusting at present (Aparima R.)
- We often found a smelly substance would build up on top of our net, looked like effluent or dairy runoff (Aparima R.)
- Often river is very murky green colour (Aparima R.)
- Sediment stinky in floods (Mataura R.)
- The most often would be where the Makarewa enters the Oreti.
- Very bad at the top of spring tides in Easterly weather (Aparima R.)
- Cow poo bit better in last twelve months (Mataura R.)
- The Mataura has been getting cleaner every year I have been coming.
- Black sediment backed up and smell like sulphate (Aparima R.)
- Always seems dirty looking (Titiroa R.)

## Appendix B: "Other" comments on what would improve the whitebaiting experience

- I don't feel new rules are needed. I recommend 1 stand 1 net and if needed have a specified day each week where no whitebaiting is permitted. Better surveillance of current rules. Happy with experience except for water quality.
- Each whitebaiter should have to buy a licence. Only those with a special licence should be able to sell whitebait.
- Please consider making these rules; one net one stand. Often two nets fished by one or two people therefore 12 metres of river screened off. Would also be easier for compliance officers. I realise resources are needed-however many whitebaiters cheat by way of over screening and fishing two or more nets.
- Stop the sale of whitebait. Catch limit of 2kg per day.
- Should be one net per stand.
- The number of unregistered nets on the river.
- I would like to see all whitebaiters licenced and a limit of 5kg per day.
- More spot checks on rule compliance i.e. dodgy gear. Restrict stand ownership to one per person.
- River has large catchment so quite often dirty after heavy rain. (Mataura R.)
- Only one net per stand. Too many dogs running around unattended.
- I would like to know more about why Titiroa River banks are being sprayed every year as I believe it is ruining whitebait spawning habitat hence less whitebait are being caught.
- Suggest November could be removed from season to allow some whitebait to get up the river and reproduce for following years.
- No camping on river.
- I believe the Aparima stands should be balloted when someone stops using one. No money should change hands. Whitebait is a gift.
- One net, one stand
- (should be) Less water taken out of river for irrigation. This has a big impact on water flow and colour of water. Dairying has a lot to answer for, it all comes down to money. (Aparima R.)
- Too many people using more than one net and long handle scoop nets, struggling to get a feed.
- Me being able to have more time to whitebait!!!
- Treat whitebait as a game fish. No sales and fishing licence required.
- Limit number of whitebait nets and stands to one per person. Take a feed and leave the rest to breed.
- Would like to see the river fenced on the farmed side 12-15ft from water's edge. (Aparima R.)
- Farmer doesn't fence river, cows graze right to water's edge on banks of the Aparima just below Gummies Bridge. (Aparima R.)
- Stand in front of us on Aparima to close to bank slipped a few years ago and stand was moved up stream about three foot.
- Can't understand why long-drop toilet was filled in and not replaced. Now people go anywhere, what are we paying extra for? (Aparima R.)
- I reckon only one net per stand not necessary if there are more people with you.
- Make it illegal to sell whitebait, make it a food resource not a money making revenue.
- Reduce or eliminate spraying of weeds on river banks which is causing significant erosion and impacting breeding areas. (Titiroa R.)
- Make selling of whitebait illegal. There would then be less whitebaiters and a better chance for the recreational baiter.
- Stop poachers

- Unlicensed baiters breaking the rules. I believe they should have to have a licence, same as trout fishing, why should they get away scott free.
- Less cheating-not monitored-some days it is a waste of time going.
- Over the three seasons on Aparima water quality has improved. Very clear. Fencing of streams has improved whitebait habitat. (more cover for eggs)
- A rule where you can only have one net per stand.
- Only one net per stand.
- Removal of dangerous trees along the bank. Please no more water out of the Aparima, it is so low now.
- Removal of dangerous trees along the bank. (Aparima R.)
- People using way too much screen-up to 15m with two nets. Not on
- Making sure stands are usable, not just half done or broken. Council has done a good job getting owners to tidy them up, but still many not done. "Keep up the good work, it is working".
- Wonder sometimes if bait are suitable to eat due to the state of contamination in river. I think water should be tested for contamination weekly. I think more should be done on river only occasionally see anyone of authority on river. Original rule should not have been changed to conserve the fishery, six metres from end of stand or bank, environment rangers changed to six metres any part of waterway. Pulley fishing centre of rivers should be banned. (Aparima R.)
- We are happy with the status quo.
- Very happy. It's the lifestyle and not necessarily the whitebait, they are just a bonus.
- Only one net per stand.
- Too many people cheating, i.e. over screening at 'bend' on Mataura-lessens greatly our chances. More checks needed by staff.
- I would like to see all stands removed from all rivers so baiters have to fish from banks to give the bait a better chance to increase numbers.
- Erosion very bad. (Titiroa R.)
- And more control of equipment used to catch fish (whitebait) Stop the use of floating nets all over the river. And only allow 1 net per stand. Maybe a daily limit.





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