

Presentation by Dr Mike Hickford on Whitebait Research
2020 AGM West Coast Whitebait Association

Topic - Closed Rivers.

Recent research, which began in 2018 and is ongoing, has been undertaken on the impact of closed rivers on the fishery. The West Coast has 22 closed rivers as well as the whole of Fiordland so provide a great opportunity to compare like rivers which are fished with those which are not. DOC are now using the term 'refuge' rather than closed river.

On initial investigation these rivers have been closed for various times and for various reasons - none of which were scientifically based. They are spread the length of the Coast but on a random basis. The proportion closed is very small - in most cases only tributaries of a larger river and these are often only closed well up the river after the whitebaiters have had a go. The only thing these rivers are closed to is whitebaiting. There is no other protection or management.

The purpose of research is to compare whitebait populations in rivers closed to whitebaiting with similar rivers which are fished. Evidence can be found in the number of fish supported in the river - ie the carrying capacity. Carrying capacity is governed by the environment and can be measured by population dynamics, increase in spawning numbers, or fish size and eggs produced.

Species composition of whitebait on the West Coast based on provided catch has been measured as follows:-

Inanga -	75%
Banded kokopu	12%
Koara	12%
Giant kokopu	1%
Short Jaw Kokopu	0.01%

Two different research projects were set up to investigate Inanga (Andrew Watson) and Banded Kokopu (including Giant and Short-jaw Kokopu) (Ben Crichton) respectively. Their different life cycle being the reason.

Inanga Life Cycle	Banded Kokopu Life Cycle
Most live one year, max 2years.	Live 9 or more years
Generalist habitat	Habitat specific
Breed once and die	Breed repeatedly over 4 - 5 years
Coastal	Lowland
Diurnal (daytime activity)	Nocturnal (nighttime activity)
Live in schools, for protection	Solitary

Inanaga Research - Does whitebaiting affect the dynamics and structure of the population?

The research was carried out in the Karamea, Buller, Hokitika and Haast areas where two similar rivers were trapped. The traps were set over a 150m reach of the rivers where they attempted to catch everything swimming past.

Major differences were found in the abundance of fish between the open and closed rivers, with increased numbers in the closed rivers. Also the size of the fish varied between the two. While the size of the fish was similar during the fishing season, they were bigger in Open rivers during the rest of the year than the Closed rivers. This factor is important as the fish continue to grow during their life cycle and the bigger the fish the more eggs they can carry.

(A 50 mm fish can carry 261 eggs while a 68mm fish can carry 560 eggs.) It was found that whitebait in the Open rivers grew faster due to lower density, probably due to less competition for food, as there was a higher density of fish in the closed rivers.

Banded Kokopu Research - *Does Whitebaiting affect the dynamics and structure of the population?*

Counting fish numbers was done slightly differently for these fish as they are active at night. Again two similar rivers were chosen at various places along the Coast. Fish freeze in the bright light at night so were able to be counted. This also allowed the other varieties (Short-jaw and Giant) to be counted too. However, the research was done on the Banded Kokopu. When checking the size of the fish again larger numbers of smaller fish were found in the closed rivers with larger ones found in open rivers. Bank cover was also examined in this research with a comparison between the weight of the fish and the amount of bank cover. There was a clear correlation - as the amount of bank cover increased, so did the biomass of the fish. Also it was found that as the size of the pool increased, so did the biomass of the individual fish. As the cover changed to forest the biomass increased even more.

Dr Hickford concluded that if DOC's management goal of "ensuring healthy and restored whitebait populations and provide for a sustainable fishery" then closing rivers alone is pointless. There needs to be a parallel increase in the carrying capacity of these rivers by increasing the cover and food in their habitat, and removing migration barriers. It is noted that many West Coast rivers are already in their pristine natural state with unmodified habitat.

Question Time

1. Do fish go up the middle of the river? They come up the middle at the mouth but at some stage something draws or guides them to the side.
2. Do the big ones eat the little ones? Yes they are predatory.
3. What is the biggest fish caught? They caught a big Banded one the other day - 580mm.
4. Are back markers a form of closure? Yes and most rivers of the West Coast have back-markers. Not so in the rest of the country.
5. What are fish numbers in Fiordland? Not sure but rivers were different -being short and lacking the flat swampy areas. A fisherman reported big shoals of whitebait in the fiords.
6. Can farmed Giant Kokopu be used to restock? Their release would probably not affect the fishery.
7. Is there research in other places? Not much. Some in the Westhaven Inlet which is a closed area with new bush is being carried out.
8. Does he work with DOC or NIWA? The research is appreciated by DOC and they work in with NIWA.
9. Why remove the willows? The willows poison anything on the ground underneath and create a rootball which is unsuitable for spawning. But they need to put something else back to make it suitable for spawning.
10. How valid is the fresh water data base? Some issues with the validity of this. If there seem to be low numbers they are listed here. Short-jaws are rare anyway so probably endangered. He challenged the classification of Inanga as at risk as this is not data based. There is however, an on-going decline in their habitat which will be affecting them. Banded Kokopu are not threatened but possibly on the edge. Lack of data is the main difficulty in establishing status.
11. Is there research on shortening the season? This needs further research but may be introduced to protect the Giant Kokopu and the banded Kokopu.
12. Do our bait come from South Westland? Currents off the West Coast are complex and Oceanography is costly to carry out. Marine SAR research is happening and it is

apparent there are seasonal changes. The South Australian current does affect us and it is possible whitebait from Tasmania could arrive here too.

Dr Hickford concluded with two statements:-

1. It appears the Government has been held up by Covid and that they may come back for more consultation. But we can expect some changes for 2021.
2. If we want to protect our fishery we need to get involved with habitat restoration.