

FRESHWATER FISHERIES ADVISORY SERVICE

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 31

ACCLIMATISATION SOCIETY DISTRICT: West Coast

TITLE OF JOB: Investigation of the Karamea and Oparara Rivers.

OBJECTIVES: To undertake a general evaluation of these rivers and to determine their suitability for the liberation of rainbow trout.

FINDINGS: This investigation was carried out during February and March 1961.

PART I - The Karamea River

A. PHYSICAL FEATURES

The Karamea River has its origin on the eastern slopes of the Allen Range and flows at first in an easterly direction before swinging north and then westward to the coast for a total length of approximately 50 miles (see Fig. 1). There are five main tributaries, the Kakapo, Ugly, Roaring Lion, Leslie and Crow Rivers and numerous smaller tributaries, especially in the headwaters, many of which are unmapped.

Only the final six or seven miles of the Karamea's course is through settled country, the remainder being through dense bush country with difficult and unreliable access.

It was not possible to personally inspect the river above the Kakapo confluence owing to the difficulty of obtaining suitable guides. However, stream conditions above the aforementioned point have been determined to some extent from a brief aerial survey and from films and photographs taken by deer stalkers. Even so, a description of the Karamea River has only been obtained up to the Leslie River confluence.

The 1929 "Murchison" earthquake had considerable effect in this area and was responsible for major changes in the composition of the Karamea River as numerous slips deposited much sand and grit over the river's length. The sand obviously moves during flood conditions but the larger stones and gravel are seemingly unaffected. In spite of these changes the Karamea is generally a very stable river, having a well consolidated bed and banks that are not subject to erosion.

The tidal reaches of this river extend from the mouth upstream for about two miles with the bed composed mainly of sand, interspersed with some large stones and rocks. From the tidal reaches to the mouth of the gorge the river flows over a series of short rapids and ripples with long moderately swift flats and occasional pools. Here the bed is composed of granite boulders, stones, gravel and sand; the sand being deposited between stones and boulders in all except the fastest water.

The stream varies in width from 20 yards to over 80 yards and in depth from 2 feet to 5 feet. An extensive flood bed is present in places but this is stable and generally the river is confined to a single channel between stable banks. Water weed is lacking in this section but brown algae is present on the rocks and stones of the stream bed and a filamentous green algae appears under low water conditions. The banks are kept stable by a thick covering of a mixture of native and exotic growth, i.e. Tree Ferns, King Ferns, Board Leaf, Karaka, Rata Vine, Supple Jack, Bush Lawyer, Pines, Beech, Willows and some other trees.

Two miles below the confluence of the Kakapo River, the Karamea emerges from a narrow gorge; from there to a point about $1\frac{1}{2}$ miles above the Kakapo confluence the river is very rapid with only occasional short flats. The bed is comprised of boulders and stones and the banks rise steeply for several hundred feet, covered by extremely thick bush.

Progressing upstream towards the Ugly River the rapids become shorter, the boulders smaller and the amount of holding water in the form of flats and pools increases, comprising an estimated 50% of the river.

Although the gorge is narrow, the banks do not fall directly into the river on both sides at once, except where bluffs are present. There are still alternate flood beds of stone and sand present but these are not so extensive as lower down the river. This country still has bare scars resulting from the 1929 earthquake, especially on the higher ground, but these areas are in the process of growing over.

Between the Ugly and Leslie Rivers three natural dams are present formed by slips brought down by the earthquake. These dams are fairly large and are fringed by drowned standing timber. These dammed pools have been filling up with sand over the years, but this filling process has slowed down as the slips have grown over, and substantial pools of deep water remain.

The country on either bank is steep and clothed by what is reportedly the thickest bush to be found in the north of the South Island, and, is, according to deer stalkers, comparable with the bush of South Westland.

Nothing much could be learned about the major tributary rivers. The Kakapo passes over some large boulders and waterfalls in the final stages of its course, and is believed to be inaccessible to trout. The Ugly and Roaring Lion Rivers are fast flowing and boulder strewn, but the Leslie is reported to be a very stable water, with no flood bed and the bush growing to the water's edge on both banks. Reportedly about 20% of the flow is composed of pools and flats, the remainder being of gentle ripples.

The smaller side creeks flowing into the Karamea would generally be very fast, falling down the hills as small cataracts with no pools or flats worth consideration.

B. BOTTOM FAUNA

A total of 49 samples were taken with a Surber square foot sampler in the Karamea River. Twelve samples were taken within the tidal reaches, nine from areas where the flow was flat at all times, and three from where ripples exist at low tide. The density of bottom fauna was 100 per sq.ft in the former area and 302 per square foot in the latter.

The remainder of the samples were taken in the section of the river between the upper limit of the tidal waters and the lower end of the gorge. Eighteen samples came from flats at an average of 93 animals per square foot, 16 samples from ripples at an average of 206 animals per sq. ft and three samples from pools at an average of 28 animals per sq. ft. The density of animals is extremely low here except for the ripple areas which therefore must supply most of the food for the entire water.

The single largest group of animals were the caddis fly larvae in all areas except the pools, where midge larvae were dominant. Other insect groups were present in far fewer numbers but this would be somewhat balanced by the presence of numerous freshwater prawns throughout the areas sampled. This latter group did not show up in the bottom sampling due to their free swimming nature. Gammarid shrimps were also taken in tidal waters and it is probable that their numbers were greater than was indicated by the method of collection used. Results are shown in Table 1.

C. NATIVE FISH

That part of the Karamea River which was under constant observation during the investigation, i.e. from the tidal reaches to the gorge, was extremely rich in native fish life. The common bully was abundant everywhere, the large bully was present immediately above the tidal limit, and the redfinned and bluegilled bullies put in an appearance higher up the river.

Adult whitebait (Inanga) were extremely plentiful as far up as the lower gorge and large schools were to be seen in every quiet eddy and backwash, as well as in the tidal waters. Also present in the tidal waters were herrings, blennys, kahawai and flatfish. Eels were also abundant, small ones up to 6 inches were to be found under stones everywhere (and in a trout's stomach). Stomachs of three large eels were examined and contained the following:

- A 38 inch eel - one weta, one herring
- A 43 inch eel - one moth
- A 52 inch eel - one weta and one cicada

Although not many trout were obtained during the course of the investigation, brown trout are plentiful in the lower reaches of the river and were seen ranging in size from 6 inches to 7 lbs.

Eight fish caught by rod and examined by the field officer are listed in Table 3, giving the stomach contents and condition factor. While limited, these results indicate the variety of food taken and general condition of the fish in the rivers.

Small trout of 6-8 inches are seen by local people in large shoals in the vicinity of the road bridge, but visibility was not good, owing to floods, during this investigation, and the only small fish seen were a few taken by rod and line. Karamea anglers seemed the most contented of fishermen, admitting that their rate of catch was not great, but still happy with the fish available. Thread lining, bait casting and bully fishing are the main methods used, the fly rod being less frequently used.

Large trout are reputed to inhabit all reaches of the river, and deer stalkers report seeing fish up to 7 lbs and 10 lbs in the Roaring Lion and Leslie Rivers as well as the Karamea River itself.

No anglers were interviewed who had fished these upper river waters but word of mouth reports are extremely good. Independent reports from anglers who have walked in to the headwaters from the Nelson side also tell of many large fish available to the fisherman willing to walk a "fair way in".

E. SPAWNING CONDITIONS

Spawning gravel in the lower reaches is extremely rare, and is to be found only at the edges of some ripples or the lower ends of side channels. There would undoubtedly be more gravel available if the sand were less prevalent, but in all but a very few places the sand filters down between stones and leaves but a few top pebbles exposed.

As far as could be ascertained from the descriptions given by deer stalkers the spawning potential does not improve further upstream, at least until the very headwaters are reached. The Leslie River is reportedly good, large quantities of sand free gravel, a moderate ripple and plenty of overhanging cover, but without actual inspection it is impossible to say for certain whether or not the area really is suitable. The extreme upper waters of the Karamea River are also said to contain good gravel and to coincide with the good fishery, but again this is merely hearsay.

PART II - The Oparara River

A. PHYSICAL FEATURES

The Oparara River is formed by the combination of several bush streams approximately 6 to 8 miles to the north east of Karamea Town, and flows west paralleling the Karamea River. The Oparara is in many respects a miniature of the Karamea River, with pools, flats and rapids, boulders and stones all scaled down to size.

The tidal reaches extend from the mouth to a point about half mile above the road bridge. The bed is composed mainly of sand flats interspersed with some gravel. Above the tidal waters there is a series of moderate rapids, ripples and pools, the pools being more extensive in the lower reaches. The bed is composed of stones, rocks, sand and gravel and is extremely stable. Bush clad banks up to 10 ft high are interspersed with small flood beds of stone and sand.

Three miles upstream from the limit of tidal waters the stream enters a gorge which is approximately 20 yards wide, flows over a series of short ripples and long deep pools into which the hill sides fall directly. Boulders, gravel and sand form the bed, and the banks are thickly bush covered.

B. BOTTOM FAUNA

Samples were taken with a square foot bottom sampler in this river also and totalled 20 in number. The density of animals was very light and must be a limiting factor on the weight of fish that can live in this water. Caddis flies were the most numerous group and the *Xiphocaris* prawns were also present below the gorge, although not nearly so numerous as in the Karamea River.

The results can be seen in Table 2.

C. NATIVE FISH

This river is also well endowed with native fish. The bluegilled bully appeared to be the most abundant of the bullies, but the common and redfinned bully were also present. The torrentfish (*Cheimarrichthys fosteri*) was also taken in

the area between the tidal reaches and the gorge, but did not appear to be numerous. Inanga in schools of several hundred were present as far up as the lower gorge and eels were found in large numbers also, but none of a large size.

D. THE TROUT STOCK

The Oparara River is not fished very extensively and little information is available. The number of fish that could exist in this river is limited by the inadequate food organisms present. Small fish were seen during this investigation and some up to 4 lb in the gorge area. Reportedly this river fishes well when the whitebait run, and thereafter during freshes. Fishing at other times proves rather unrewarding.

E. SPAWNING CONDITIONS

Spawning gravel is seriously lacking in this river, although not so bad, relatively, as in the Karamea. Suitable gravel is available in the lower reaches but much is lost due to a sand covering. As in the Karamea River the gravel is of a round rough granite composition.

PART III - Discussion and Conclusions

A. DISCUSSION

According to all reports the Karamea River had an extremely abundant trout population prior to the 1929 earthquake, and that the earthquake set the population back to a considerable degree. It is true today that those factors most limiting to the trout population are earthquake caused - that is, the large slips that have deposited much material in the river that immediately changed the environment and the continuing erosion from the scars adding to the material in the stream. This sand and grit severely limits the spawning potential of the lower river and, more seriously, this same sand furnishes a very poor habitat for those food organisms that trout largely depend on.

Erosion and natural revegetation are competing on the old earthquake scars and gradually the damage is being erased. Until all the bare land is covered a certain amount of silt and sand will feed into the river every year, but at a steadily lesser degree. Only when the water flow removes all the sand will conditions be suitable for a really large trout population; as they are now the conditions are superior for the native fish.

The Oparara River was not affected to such a large extent by the earthquake as was the Karamea River, but a large amount of sand is still present and the bottom fauna density is very light.

To date the absolute factors which determine the suitability of a stream for

either rainbow or brown trout are undetermined, but from all appearances these two rivers seem to offer a better habitat for brown trout. The two rivers are more stable than those generally favoured and it is unlikely that rainbow trout would be any more successful than the browns. The addition of rainbow fingerlings would only add competition for the limited food supply and cause a reduction in growth of both species of trout present.

B. CONCLUSIONS AND RECOMMENDATIONS

1. The presence of large amounts of sand and grit in the lower reaches of the Oparara and Karamea Rivers limits the amount of food present and the spawning potential.
2. These lower reaches of both rivers now carry as many trout as can be supported naturally.
3. The trout population should increase as revegetation continues, erosion slows down, and the sand is removed from the stream bed by the flow of water.
4. The rivers as they now exist offer a superior habitat for brown trout than they do for rainbow trout.
5. The addition of fingerling trout would unduly strain the carrying capacity of these rivers.
6. It is recommended that there be no release of fingerling rainbow trout in the lower reaches of the Oparara and Karamea Rivers.

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FIG. 1

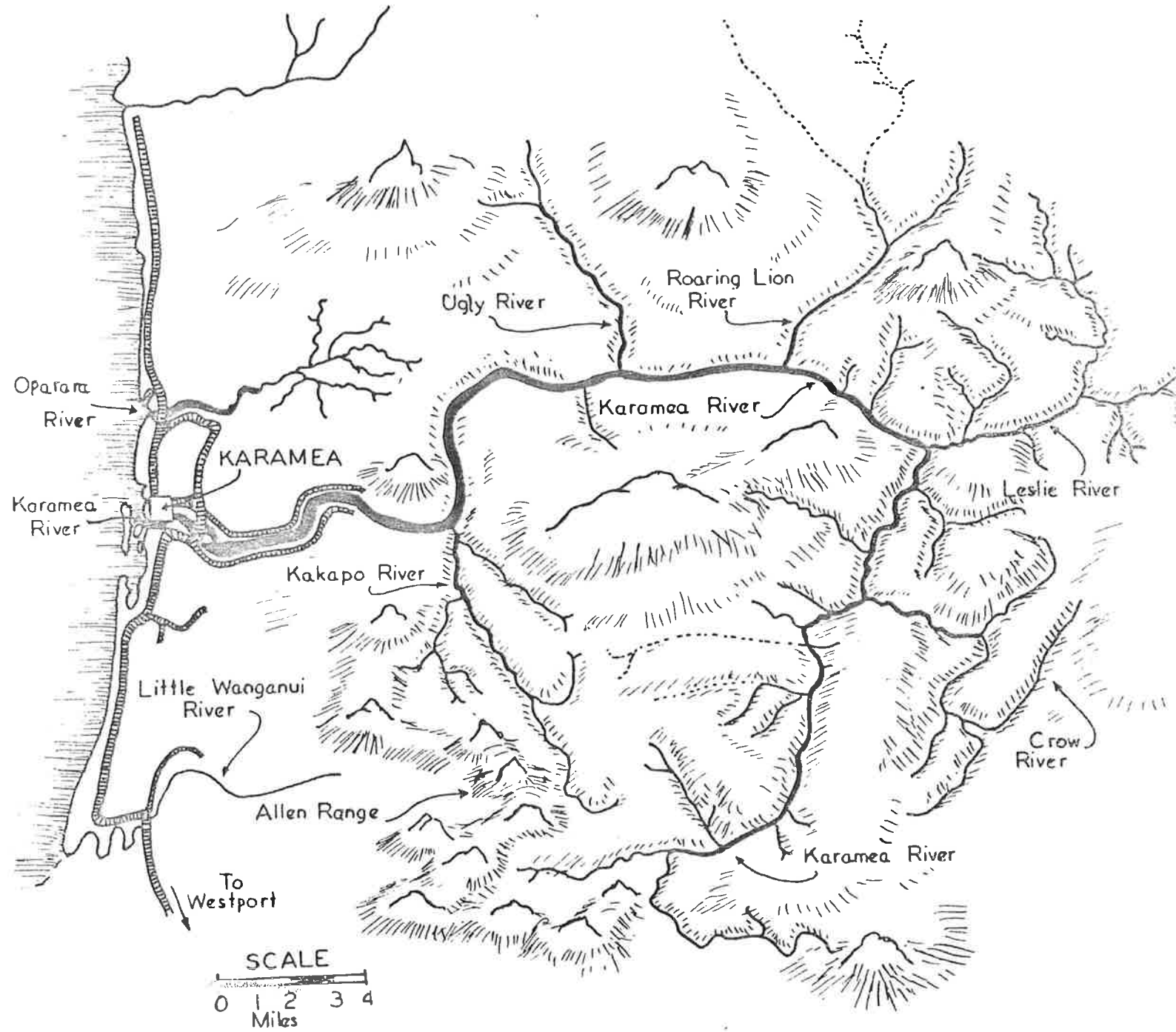


TABLE 1. Karamea River - bottom fauna. The major constituents expressed as the percentage found in the river type fished.

Area of river where sample taken	TRICHOPTERA	EPHEMEROPTERA	PLECOPTERA	DIPTERA	MOLLUSCS	ALL OTHERS
TIDAL Flats 2 samples on average of 100 animals per sq.ft	<i>Pycnocentria</i> 24.5% <i>Hydropsyche</i> 17% <i>Hydroptilid</i> <i>Olinga</i> <i>Hydrobiosis</i>	<i>Deleatidium</i> 6.5% <i>Ameletus</i>	<i>Leptoperlidae</i>	<i>Chironomid</i> 17%	<i>Potamopyrgus</i> 25%	<i>Gammarus</i> shrimps <i>Tubificid</i> worms
TIDAL Ripples (low tide) 3 samples 302 per sq.ft	<i>Hydropsyche</i> 65.5% <i>Pycnocentria</i> 25% <i>Hydroptilid</i> <i>Olinga</i>	<i>Deleatidium</i> 3% <i>Colorboriscus</i>	<i>Leptoperlidae</i>	<i>Chironomid</i> 2.5% <i>Simulidae</i>	<i>Potamopyrgus</i> 2.5%	<i>Parnid</i> larvae Leech
NON TIDAL Flats 18 samples 93 per sq.ft	<i>Pycnocentria</i> 33% <i>Hydropsyche</i> 14% <i>Hydroptilid</i> 2.5% <i>Olinga</i> 2.5%	<i>Deleatidium</i> 6% <i>Ameletus</i> 3% <i>Colorboriscus</i>	<i>Leptoperlidae</i> 1.5% <i>Stenoperla</i>	<i>Chironomid</i> 30.5% <i>Culicidae</i>	<i>Potamopyrgus</i> 2%	<i>Tubificid</i> <i>Archichauliodes</i> <i>Parnid</i> larvae <i>Ditiscus</i> larvae
NON TIDAL Ripples 16 samples 206 per sq.ft	<i>Hydropsyche</i> 47% <i>Pycnocentria</i> 23% <i>Hydroptilid</i> 2% <i>Olinga</i> 1% <i>Helicopsyche</i>	<i>Deleatidium</i> 10.5% <i>Colorboriscus</i> 3.5% <i>Ameletus</i>	<i>Stenoperla</i> <i>Leptoperlidae</i>	<i>Chironomid</i> 11.5% <i>Simulidae</i>	<i>Potamopyrgus</i>	<i>Parnid</i> larvae
NON TIDAL Pools	<i>Pycnocentria</i> 3.5% <i>Hydroptilid</i> 2.5% <i>Hydropsyche</i> 2.5% <i>Pseudonema</i>	<i>Ameletus</i>		<i>Chironomid</i> 56% <i>Culicidae</i>	<i>Potamopyrgus</i> 3.5%	<i>Tubificid</i> 15.5% <i>Ditiscus</i> larvae 6%

TABLE 2. Oparara River - bottom fauna. Major constituents expressed as the percentage found in the river type sampled.

Area of river where sample taken	TRICHOPTERA (Caddis flies)	EPHERMEROPTERA (Mayflies)	PLECOPTERA (Stoneflies)	DIPTERA (True flies)	COLEOPTERA (beetles)	ALL OTHERS
<u>Flats</u> 8 samples taken at an average of 36 animals per sq.ft.	<i>Pycnocentria</i> 41.5% <i>Hydropsyche</i> 5% <i>Hydroptilid</i> 2% <i>Pseudonema</i> <i>Olinga</i>	<i>Deleatidium</i> 12.5%	<i>Stenoperla</i> 1.5% <i>Leptoperlidae</i> 1%	<i>Chironomid</i> 30.5% <i>Simulidae</i>	<i>Parnid larvae</i> 3% <i>Dytiscus</i> 1.5%	<i>Tubificid</i>
<u>Ripples</u> 9 samples taken at an average of 67 animals per sq.ft	<i>Hydropsyche</i> 38% <i>Pycnocentria</i> 26% <i>Hydroptilid</i> 3% <i>Olinga</i>	<i>Deleatidium</i> 12.5% <i>Colorboriscus</i>	<i>Leptoperlidae</i> 4% <i>Stenoperla</i>	<i>Chironomid</i> 13% <i>Simulidae</i> 1%	<i>Parnid larvae</i> <i>Dytiscus</i>	<i>Archichauliodes</i> <i>Tubificid</i>
<u>Pools</u> 3 samples taken at an average of 21 animals per sq.ft	<i>Pycnocentria</i> 24% <i>Hydroptilid</i> 10% <i>Olinga</i> <i>Hydropsyche</i>	<i>Deleatidium</i> 34%	<i>Leptoperlidae</i> 8%	<i>Chironomid</i> 16%	<i>Parnid larvae</i>	<i>Tubificid</i>

TABLE 3. Rod and line caught fish of the Karamea River.

Length inches	Weight lb oz	Condition factor	Sex	Stomach Contents
16	1 15	47	-	Not examined
17.5	1 15	37	F	6 ameletus, 1 delectidum, 1 Hydroptilid, insect remains
17.5	2 8	47	-	Not examined
20	2 12	35	-	Not examined
20.5	3 5	39	M	6 freshwater prawns, 6 "click" beetles
22.5	4 6	39	M	2 bullies, 1 pseudonema, 3 eels
22.5	4 8	40	M	Insect remains
24	5 4	39	M	Remains of freshwater prawns

Average length = 20.1"

Average weight = 3.4 lb

Average condition factor = 40