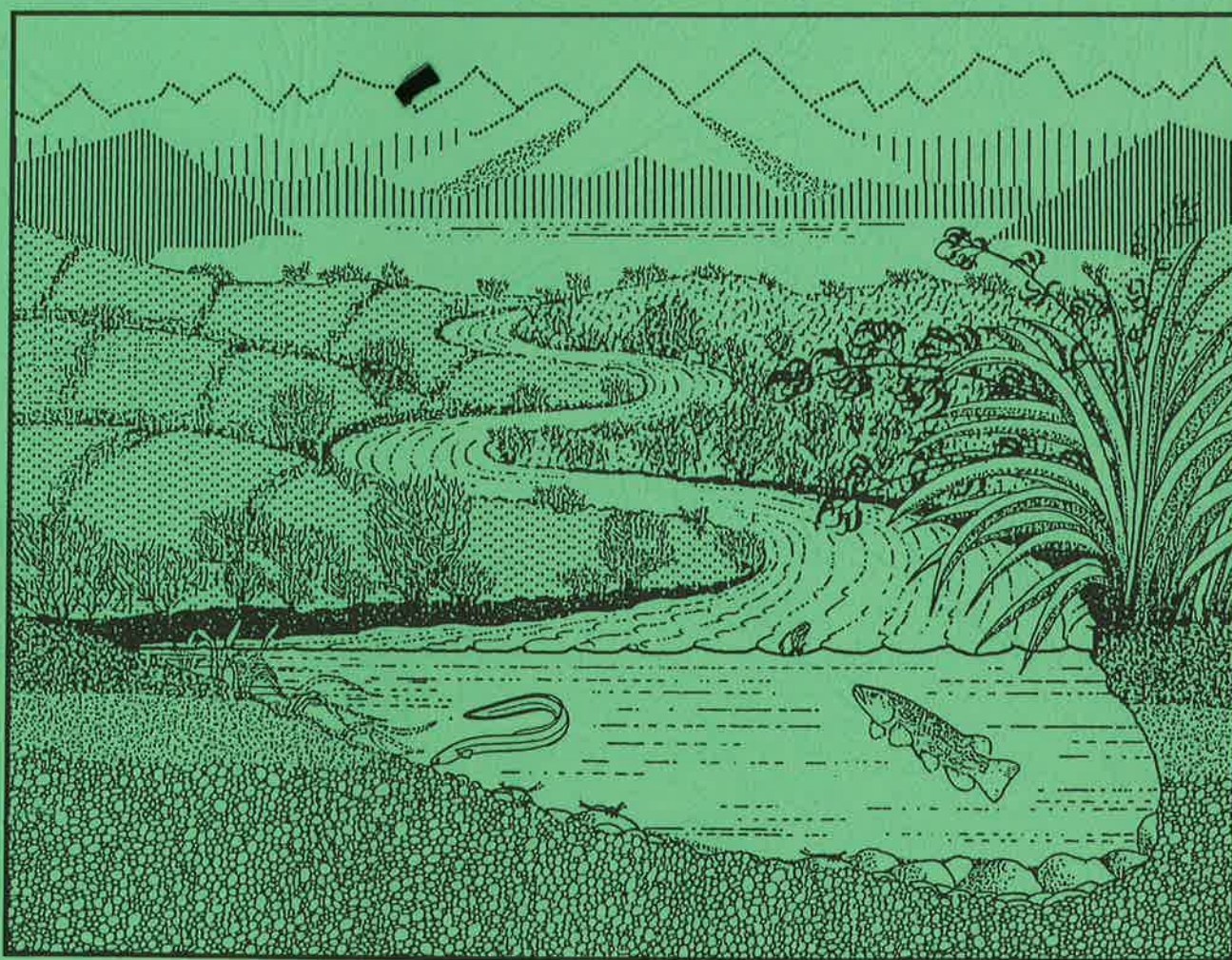


# New Zealand Freshwater Fisheries Report No. 101

## An inventory of whitebaiting rivers in the South Island



MAFFish

An inventory of whitebaiting  
rivers in the South Island

by  
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Freshwater Fisheries Centre  
MAFFish  
Christchurch

July  
1988

## NEW ZEALAND FRESHWATER FISHERIES REPORTS

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## SUMMARY

Whitebaiting is a seasonally important use of the lower reaches of many South Island rivers. Although a number of recreational use surveys have included whitebaiting among the recorded uses of rivers and streams, there has been no national survey to identify important whitebaiting rivers. Furthermore, as the fishery is unlicensed, and no catch returns are required, rivers cannot be ranked by yield. The present survey was conducted to obtain subjective assessments of the regional importance of both recreational and commercial whitebaiting on South Island rivers.

Letters were sent to 9 Regional Fishery Officers of MAFFish and subsequently to a number of acclimatisation society staff throughout the South Island. These people were asked to comment on whitebait fisheries within their district and, specifically, to rank those rivers which supported whitebait fisheries of recreational or commercial importance. A total of 75 South Island rivers and streams were listed, of which 73 were identified as supporting recreational whitebait fisheries and 43 as supporting commercial whitebait fisheries.

Ten rivers have commercial fisheries of major importance to the district, and 17 rivers were listed as providing recreational fisheries of major importance. Use of these fisheries varied greatly, from 3-4 persons per day on 1 small creek to 300 persons per day on a number of major rivers.

## 1. INTRODUCTION

Over the years, the Fisheries Research Division (now MAFFish) has gathered and published much data on the various species of galaxiids which constitute the New Zealand whitebait fishery. Most of this information deals with the identification of the species, their biology, and their behaviour. Apart from investigations on a few specific fisheries, there has been no attempt to compile a national inventory of whitebaiting rivers. This is largely because the fishery is a widespread, unlicensed, amateur fishery. Hence, there is no register of the number of persons who go whitebaiting and no catch returns are filed. To quote McDowall (1984):

"When buying was orderly and there were few buyers it was possible to estimate the amount of whitebait caught from the records of the main buyers; now it is impossible and no one knows how much is caught each year."

The whitebait fishery is recognised as being both recreationally and commercially important. For instance, several recreational surveys have shown that whitebaiters frequently make up the greatest proportion of people actively engaged in recreation on rivers during the whitebait season (e.g., Davis 1984, Jellyman et al. 1987). The current market price for whitebait is about \$50/kg; on this basis, the peak whitebait catch from the West Coast of 322 224 kg in 1955 (McDowall and Eldon 1980) would be worth \$16,111,200.

With the possible exception of the West Coast rivers, there is little knowledge about which South Island rivers support recreationally and/or commercially important whitebait fisheries. Recognising this and the impossibility of trying to obtain adequate use or catch information for important rivers, MAFFish decided to canvas the opinions of experienced Fisheries Management Officers of MAF, from 9 regions of the South Island. The results are largely subjective, but they do cover the whole of the South Island. Since this project began, responsibility for managing and conserving the whitebait fishery has passed to the newly formed Department of Conservation (DOC). It is hoped that results of this survey will assist DOC with the management of this unique and important fishery.

## 2. METHODS

Letters were sent to Fisheries Officers in 9 districts: Nelson, Blenheim, Kaikoura, Canterbury, South Canterbury, Otago, Southland, Haast, and the West Coast. Each officer was asked to "rank" the rivers and streams in his district which, in his judgement, supported a significant commercial or recreational whitebait fishery. Information was also sought from 3 Acclimatisation Society Field Officers.

The information in this report is presented in 2 forms:

1. Rivers have been grouped by district, starting from Nelson in the north and following a clockwise direction around the South Island to North Westland. The discussion of each district commences with a brief summary of the district's fishery as a whole, and it then describes each individual river and its whitebait fishery.
2. Rivers are presented in table form, grouped by district, and given a ranking in order of commercial or recreational importance. The key is as follows:

Major commercial importance	=	XXX
Significant or average commercial importance	=	XX
Minor commercial importance	=	X
Major recreational importance	=	XXX
Significant or average recreational Importance	=	XX
Minor recreational importance	=	X

The ranking of a particular river is relative to that district only, so the rankings cannot be compared between districts.

It is not difficult to identify the major recreational and commercial fisheries within a district. However, it is very difficult to rank rivers of lesser importance, because fishing pressure and catches are extremely variable. Therefore, the rankings of these less important rivers must be interpreted as a guide only, because they can change from season to season.

### 3. RESULTS

#### 3.1 Nelson District

The whitebaiting rivers in the Nelson district are scattered along the coast between Kahurangi Point on the West Coast to Durville Island in the north-east of the district (Fig. 1).

Many streams and rivers in this district attract whitebait runs. However, only the larger rivers of Tasman and Golden Bays support whitebait fisheries of note. The most popular and productive rivers are the Motueka, Takaka, Aorere, and Waimea Rivers (Table 1). In response

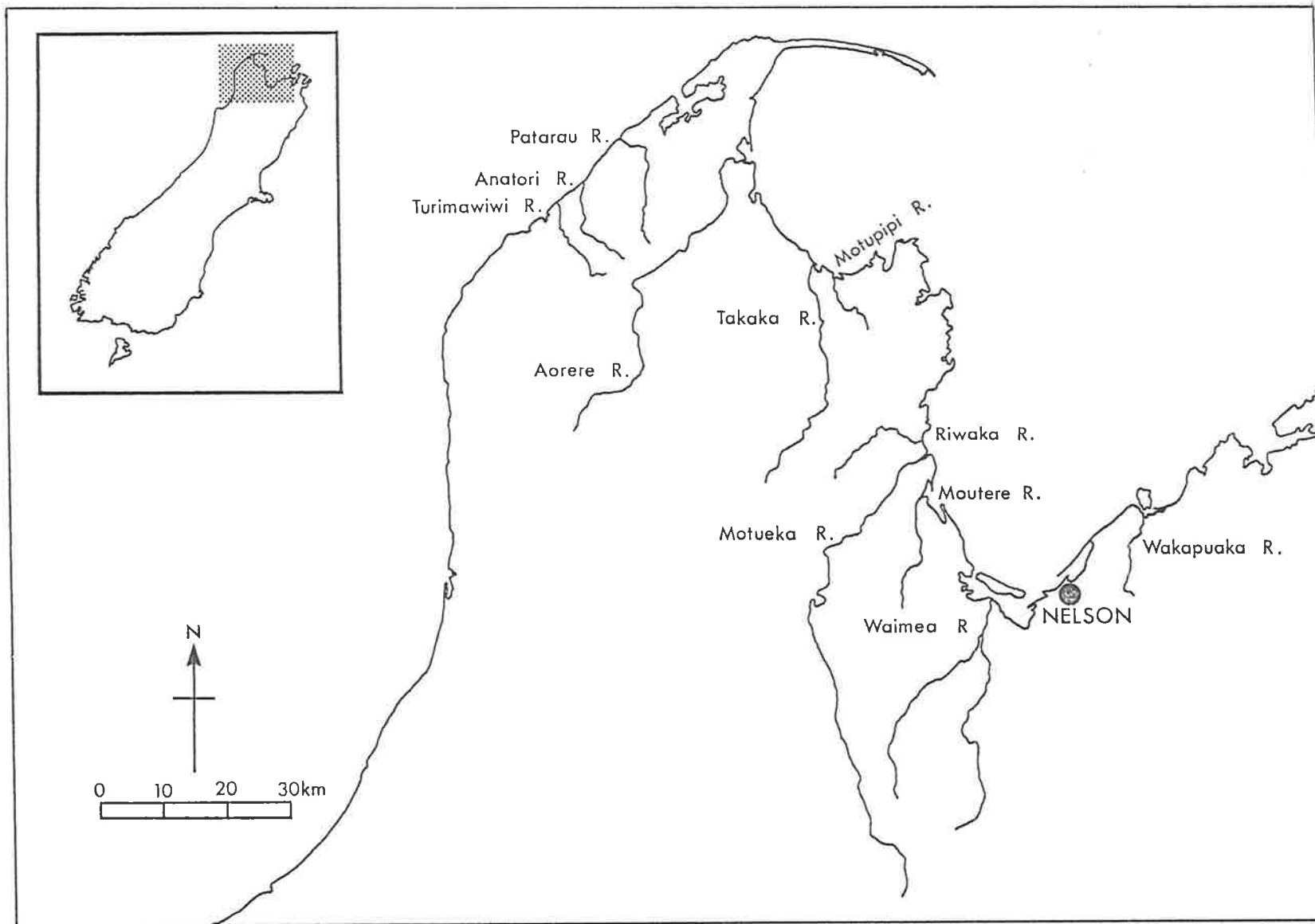


FIGURE 1. Whitebaiting rivers in the Nelson district.

TABLE 1. Commercial and recreational importance of whitebaiting rivers in the Nelson district.

River	Commercial importance	Recreational importance	Comment
Turimawivi	XXX	XX	Very isolated. Commercial fishery.
Anatori	XXX	XX	Although isolated, attracts a moderate recreational component.
Patarau	XX	X	6-8 commercial operators. Minor recreational fishery.
Aorere	XX	XXX	Very popular. Can produce catches of up to 50 kg.
Takaka	XX	XXX	Most popular river in the district.
Motupipi	-	XX	Average recreational fishery only.
Riwaka	-	X	Minor fishery. Fished by up to 15 whitebaiters.
Motueka	XXX	XXX	Very popular. Can produce catches of up to 50 kg.
Moutere	-	X	Minor recreational fishery.
Waimea	X	XXX	High recreational value. Up to 50 fishermen.
Wakapuaka	-	X	Isolated area. Low recreational importance.

to an electoral roll questionnaire of river use (Nelson Regional Water Board 1982), respondents listed the Waimea, the Motueka and its tributaries, and the Aorere as rivers visited for whitebaiting. The most popular recreational whitebait fisheries in the Nelson district are the Takaka and Aorere Rivers.

The Nelson fishery is composed mostly of recreational whitebaiters, with a small number who work the major rivers and sell their surplus catch. Of whitebaiters who could be termed professional, because they

fish for financial gain, only a few camp on the major rivers for the duration of the season. Most prefer to commute daily to the rivers they fish.

Throughout the district, a set net used in conjunction with a screen is the most popular method of fishing. "Some scoop netting is carried out on the lower reaches of the major rivers." (A.J. Bell pers. comm.).

### 3.1.1 Turimawiwi River

The Turimawiwi is the most isolated whitebaiting river in the Nelson district. A short river, it flows north for 17 km through a steep, bushclad valley to the Tasman Sea.

Throughout the season, it is fished regularly by an extended family of 10-12 commercial operators.

### 3.1.2 Anatori River

The Anatori River enters the Tasman sea 5.5 km north-east of the Turimawiwi River mouth. From its source in the Wakamarama Range, it follows a twisting 20-km course through rugged bush country. Better access contributes to this river's popularity over that of the Turimawiwi. During the season, it attracts 10-12 commercial operators and up to 20 regular recreational whitebaiters.

### 3.1.3 Patarau River

A shallow, slow-flowing river, the Patarau follows a northerly course for most of its length. Lying just south of the Whanganui Inlet, it turns and flows in a westerly direction before entering the Tasman Sea. The river is set amidst rugged bush country for most of its length, although the lower reaches have been cleared and developed as farmland. Usually, up to 8 commercial whitebaiters fish the lower river during the peak of the season. Recreational fishermen can number up to 15.

#### 3.1.4 Aorere River

From its tributaries in the Tasman Mountains, the Aorere flows for 75 km to enter Golden Bay at Collingwood. The upper reaches flow through the picturesque North West Nelson State Forest Park. Within the lower 20 km, the river valley broadens, with beech forest giving way to willows and pasture.

The Aorere is one of the most important whitebaiting rivers in the Nelson district. During an average season, it is frequented by up to 8 commercial whitebaiters and between 50 and 60 recreational whitebaiters.

#### 3.1.5 Takaka River

The Takaka River flows north from its tributaries in the Tasman Mountains, through a long narrow valley to Golden Bay. Dairy farming and, to a limited extent, horticulture are the dominant land uses in the river valley. Between 50 and 60 recreational whitebaiters and up to 10 commercial operators regularly fish the lower reaches, making the Takaka the most popular whitebaiting river in the district.

#### 3.1.6 Motupipi River

The Motupipi is a small tidal creek. Only 5 km in length, it drains a small area of lush farmland in the lower Takaka Valley. It is a minor fishery, and attracts up to 20 recreational whitebaiters a day at the peak of the season.

#### 3.1.7 Riwaka River

A small spring-fed stream, the Riwaka flows in a easterly direction to enter Tasman Bay 2.5 km north of the Motueka River mouth. It also is a minor fishery, and is fished by up to 15 recreational whitebaiters per day during the season.

#### 3.1.8 Motueka River

Stretching for 80 km from its source to the sea, the Motueka is the largest river in Tasman Bay. It has a high recreational use. A survey

conducted by the Nelson Regional Water Board in 1982 showed that recreational activities associated with the river included tramping, picnicking, swimming, canoeing, fishing, eeling, barbecuing, fly fishing, rock and fossil hunting, camping, admiring the scenery, and whitebaiting. The Motueka is one of the most popular whitebaiting rivers in the Nelson district. At the height of the season, it attracts 40-50 recreational whitebaiters per day. Commercial whitebaiters number 10-12, which gives the river the highest commercial ranking in the region.

### 3.1.9 Moutere River

The Moutere River is formed from the waters of numerous small streams and creeks which drain the surrounding farmland in the Moutere district. After flowing north for most of its length, the river turns east and enters a large tidal inlet.

The river supports a small recreational fishery only, attracting up to 20 whitebaiters per day at the peak of the season.

### 3.1.10 Waimea River

A shallow, slow-moving river, the Waimea is formed from a group of small rivers and streams which flow from the surrounding hills to the south-east of Nelson.

The main tributaries are the Wai-iti and the Wairoa Rivers. The river follows a low gradient as it flows north over the Waimea Plains. Only 2-3 commercial whitebaiters fish this river. However, depending on the conditions, it provides a valuable recreational fishery for up to 50 whitebaiters per day. Whitebaiters also fish the small creeks feeding the Waimea Inlet, which usually have 1-2 fishermen each. A recreational survey of the catchment (Nelson Regional Water Board 1986) found that 5% of users were whitebaiters.

### 3.1.11 Wakapuaka River and Inlet (Cable Bay)

This small river flows from its source in the Hira State Forest to join another main tributary, the Lud River, at Hira. It then flows

north to meet a large lagoon at Delaware Bay. The Wakapuaka fishery is strictly recreational, supporting up to 15 regular whitebaiters.

### 3.2 Marlborough District

Only 2 rivers in the Marlborough district have been considered for this inventory, the Wairau and the Awatere (Table 2 and Fig. 2). While there are a number of small streams in the Marlborough Sounds which attract whitebait, these are fished intermittently and by very few people, and have therefore been omitted from the list.

TABLE 2. Commercial and recreational importance of whitebaiting rivers in the Marlborough district.

River	Commercial importance	Recreational importance	Comment
Wairau	X	XXX	Major recreational fishery. Small commercial component.
Awatere	-	X	Minor recreational fishery only.

#### 3.2.1 Wairau River

The Wairau River is the largest river in Marlborough. From its tributaries in the Spencer Mountains, it flows north-east for 150 km to enter the sea at Cloudy Bay. For most of its course, the river flows over a braided bed through a long, wide valley.

In the lower reaches, the flow becomes sluggish and enters a large tidal lagoon. The Wairau can attract up to 140 whitebaiters on a good day, the majority coming from Blenheim. Most fishing is conducted on the lower 10 km of the Wairau and Opawa Rivers. In recent years, the Wairau diversion (1.5 km north of Spring Creek) has also proved popular for whitebaiting.

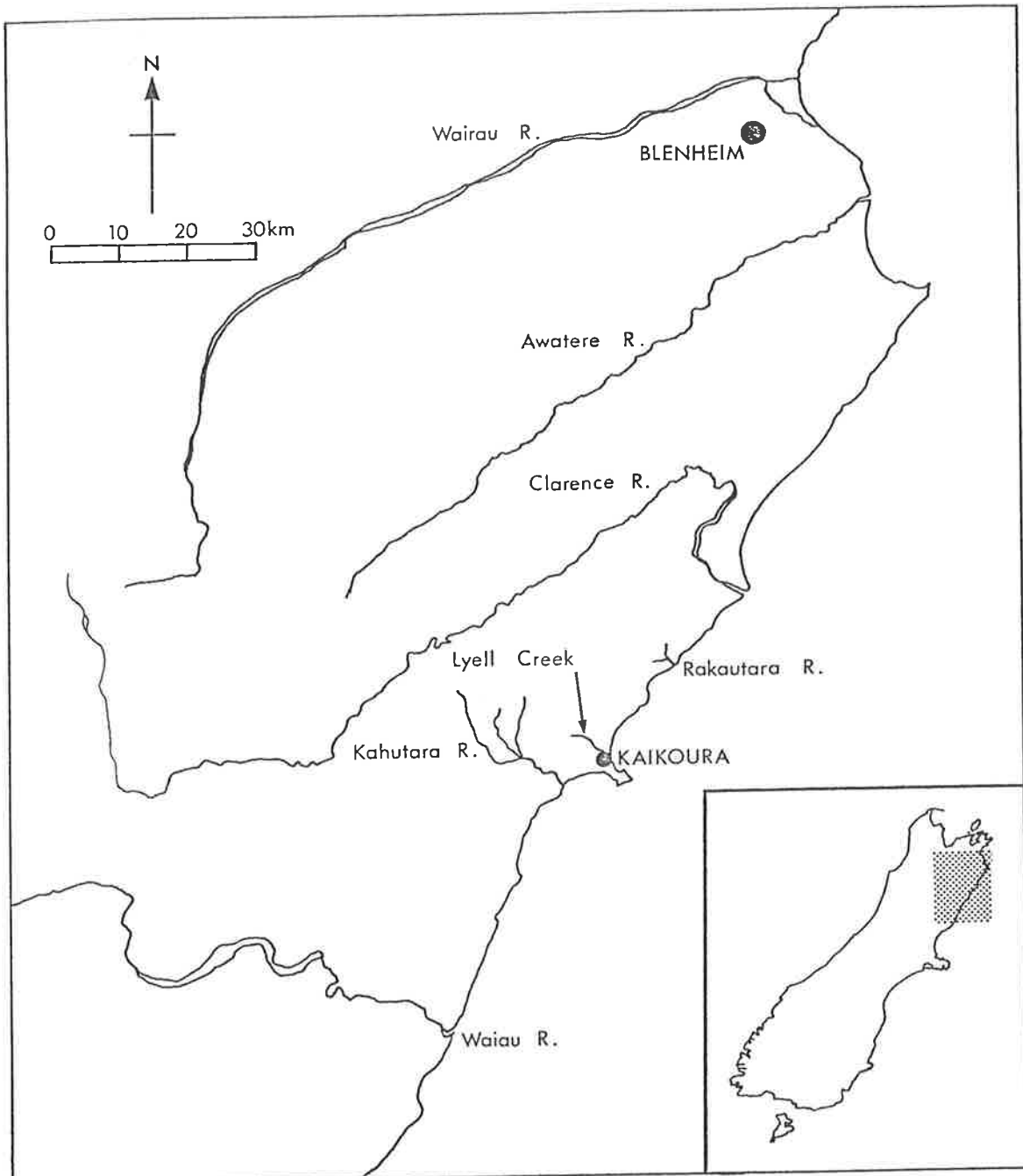


FIGURE 2. Whitebaiting rivers in the Marlborough and Kaikoura districts.

### 3.2.2 Awatere River

Stretching for over 150 km, the Awatere flows along the western side of the Inland Kaikoura Range. It enters the sea 20 km south-east of Blenheim, at Clifford Bay. The Awatere supports a minor recreational whitebait fishery. During the season, the river is fished regularly by 15-20 local fishermen from Seddon.

## 3.3 Kaikoura District

There are many small streams and a few large rivers scattered along the Kaikoura coast. Draining the ranges to the west, most of these rivers have steep gradients, and flow swiftly over rough, stony beds on their course to the sea. Most lack significant estuaries and tidal reaches, which normally provide suitable spawning habitat for whitebait.

Whitebait runs in the Kaikoura rivers are generally small and consequently attract very few whitebaiters (Table 3). The fishery is strictly recreational. Whitebaiters in this district rarely catch enough fish to have a surplus to sell.

### 3.3.1 Clarence River

Over 200 km in length, the Clarence flows south from its tributaries in the Spencer Mountains to the Hanmer Range. It then swings north-east and flows for the rest of its length down a long, tussock-covered valley between the Inland and Seaward Kaikoura Ranges. Below the S.H.1 Bridge, the river flows swiftly over a steep, braided bed, featuring long sections of white water.

The Clarence River supports a very small whitebait run, and is fished by few people. Access to the mouth is difficult, and is usually by jet boat or four-wheel drive vehicle. Set nets are the most popular fishing method, although daily catches of 1-1.5 kg have been taken by scoop netters in the sea near the river mouth.

### 3.3.2 Rakautara Stream

This small, tumbling creek flows from the bushclad faces of Rangiatea Hill (540 m) 20 km north of the Kaikoura township. Like the

TABLE 3. Commercial and recreational importance of whitebaiting rivers in the Kaikoura district.

River	Commercial importance	Recreational importance	Comment
Clarence	-	X	Fished by few whitebaiters because access is difficult.
Rakautara Stm	-	X	Minor fishery. Catches generally small.
Lyell Creek	-	XX	Fished by a few locals. Can attract up to 24 whitebaiters when whitebait are running.
Kahutara	-	XXX	Popular river with locals and tourists. Up to 30 whitebaiters on a holiday weekend.
Waiau	-	X	Very isolated. Access to river mouth is difficult. Fished by a few locals from Kaikoura. Small catches taken.

Clarence River, this fishery supports 5-6 local whitebaiters from Kaikoura, or up to 10 on a good day. Set nets with screens are the most common fishing method.

### 3.3.3 Lyell Creek

Lyell Creek drains the southern section of a small coastal plain which lies between the Seaward Kaikoura Range and the Kaikoura Peninsula. For most of its length, it flows quietly through lush pasture land dotted with dairy farms. After passing through the Kaikoura township, the creek enters the sea through a shallow gravel mouth. Lyell Creek is one of the more popular whitebait fisheries in the district. It is usually fished by 3-4 locals, and the number increases to 18-24 when the whitebait are running. Catches of up to 0.5 kg are common with set nets. "One chap with a scoop net took 4 kg over a weekend from the waves." (N. Rose pers. comm.).

#### 3.3.4 Kahutara River

The Kahutara River flows from a steep, rocky valley on the eastern face of the Seaward Kaikoura Range. Its mainstem is formed by the joining together of a number of small tributaries at a point 8 km from the coast. Over most of its length, the Kahutara follows a braided gravel bed between low coastal hills, and it enters the sea 8 km south of Kaikoura.

This is the most popular whitebaiting river in the district. With good access and a gently sloping beach, it usually attracts up to 12 local whitebaiters. However, during a holiday weekend, tourists camping on the river may swell the number to 30. Sets nets are commonly used to take catches of 0.5-1 kg.

#### 3.3.5 Waiau River

This large, braided river flows from tributaries in the Spencer Mountains. Over 160 km in length, the Waiau lies between the Clarence and Conway Rivers to the north and the Hurunui River to the south. From its tributaries in the Main Divide, the Waiau winds through a number of gorges, and then flows over the Hanmer and Waiau plains. Confined by low coastal hills, the river narrows and then enters the sea through a small tidal lagoon.

The Waiau River usually attracts about 6 whitebaiters from Kaikoura. With the river mouth being so isolated and the nearest road 6 km away, most fishermen use a jet boat for quick access to their fishing site. Set nets are used to take small catches.

### 3.4 North Canterbury District

Most rivers in the North Canterbury district support valuable recreational whitebait fisheries (Table 4 and Fig. 3). All but the Hurunui are within easy reach for Christchurch residents. The most important whitebaiting river, the Waimakariri River, is only a 20-minute drive from the centre of Christchurch City. In addition to a major whitebait fishery, this river supports many other forms of recreation. A survey conducted during 1984/85 by the North Canterbury Catchment

TABLE 4. Commercial and recreational importance of whitebaiting rivers in the North Canterbury district.

River	Commercial importance	Recreational importance	Comment
Hurunui	-	X	Popular local fishery. Small numbers of fishermen. Catch rates generally low.
Ashley	-	XX	Second most popular whitebaiting river in the region. Fished regularly by 40-50 persons.
Waimakariri	X	XXX	Most popular river in the region. Supports a major recreational fishery of regional importance. Fished regularly by more than 100 whitebaiters. Small commercial component.
Avon	-	XX	Popular because of good access and proximity to Christchurch. Used by 16% of Canterbury whitebaiters. Catch rates generally low.
Rakaia	X	X	Small recreational fishery. Fished regularly by 20+ fishermen. Catch rates good.
Lake Ellesmere outlet	-	X	Intermittent fishery. Dependent upon lake opening.
Ashburton	-	X	Minor local fishery.

Board and Regional Water Board (1986) stated that "the Waimakariri catchment is undoubtedly of very high value for recreation. Overall water related recreational usage is higher than any other South Island catchment, and there are strong indications that the catchment is amongst the most heavily used in New Zealand".

#### 3.4.1 Hurunui River

The Hurunui River is the most isolated of the North Canterbury whitebaiting rivers. It is fed by 2 major tributaries flowing from the

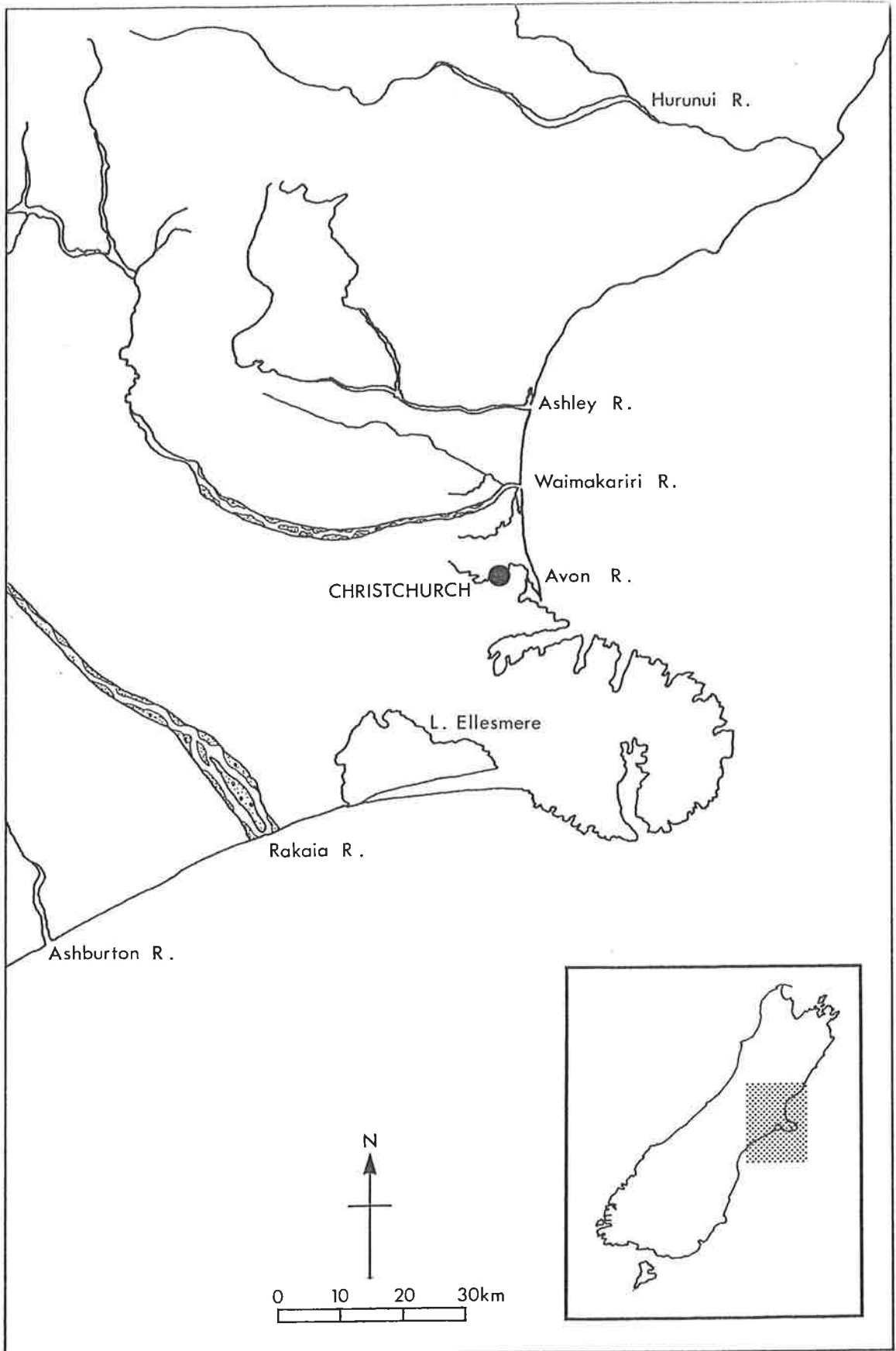


FIGURE 3. Whitebaiting rivers in the North Canterbury district.

Main Divide, the North and South Branches. The upper reaches of the Hurunui have been identified as a scenic river trout fishery of national importance (Teirney *et al.* 1982). The lower reaches, near the mouth, provide popular spots for swimming and picnicking by locals during the summer months.

Whitebaiting is concentrated around the river mouth and upstream along both sides of a long tidal lagoon. The river mouth area is usually fished by a dozen or so locals. However, a number of fishermen's baches and a camping ground nearby draw whitebaiters from further afield during weekends and holidays. During a holiday weekend, as many as 40 whitebaiters have been counted at the river mouth. Although this fishery is basically recreational, some whitebait is sold on the local market.

#### 3.4.2 Ashley River

The Ashley is a small, shallow river, about 90 km in length, which enters the sea about 30 km north of Christchurch. Its tributaries join together at the base of the Puketeraki Range, whereupon they flow south through Lees Valley, and east through the Ashley Gorge. From the gorge, the river flows east across the Canterbury Plains over a wide, braided, shingle bed, and it enters the sea through a small estuary at the Waikuku Beach settlement.

The Ashley River is the second most popular whitebaiting river in North Canterbury. During the season, it is fished regularly by between 40-50 persons. Most of the whitebaiters come from the Waikuku Beach settlement, Woodend, or Rangiora. Although fishermen use both sides of the lower river, most fish from the south side.

Whitebaiting on the Ashley is basically a recreational pursuit, with only a few people fishing solely for financial gain.

#### 3.4.3 Waimakariri River

From its western-most tributary in the Southern Alps, the Waimakariri flows east for most of its 137-km length over a wide, braided bed. After crossing the Canterbury Plains, the river enters the

sea at Kairaki Beach, 16 km north-east of central Christchurch. Within the lower reaches of the Waimakariri is a significant tidal zone which extends up to 6 km upstream from the mouth. Two small tributaries, the Kaiapoi and Styx Rivers, join the mainstem in the lower reaches.

The Waimakariri River and its tributaries are the most intensively used freshwater recreation resources in the South Island. The lower 6 km of the river receives the highest use by recreationists, with whitebaiting being the most important water-based activity on the mainstem and lower tributaries during spring. A survey of whitebaiters (North Canterbury Catchment Board and Regional Water Board 1986) made weekend counts of whitebaiters averaging 169 and weekday counts averaging 124 on fair to good whitebaiting days. A MAFFish Survey (Hardy 1987) found an average of 89 persons per survey day. Nearly all of the whitebaiters fish as a recreational pursuit, and their catches are generally large enough for most people to "obtain a feed". Although scoop nets are preferred in the slow-flowing Kaiapoi and Styx Rivers, set nets predominate in the fishery as a whole, with whitebaiters at the mouth often using small two-wheeled handcarts to transport their nets and screens (Hardy 1987).

#### 3.4.4 Avon River

The Avon River is fed by a number of small, spring-fed streams in the western suburbs of Christchurch City. As the river flows east, it is augmented by stormwater drainage and surface run-off, before entering a large tidal estuary at South New Brighton. Whitebaiting occurs from the estuary right up into the city. Numbers of whitebaiters fishing the river vary greatly, with 10-15 during a weekday and up to 100 on a good weekend day. It is strictly a recreational fishery, with generally small catches, which indicates that the popularity of the fishery is due to its accessibility to the residents of Christchurch rather than to its productivity.

#### 3.4.5 Rakaia River

The Rakaia River is the largest braided river crossing the Canterbury Plains. From its source in the Main Divide of the Southern Alps, it flows for some 150 km to reach the coast 50 km south of

Christchurch. Before entering the sea, the river sometimes passes through a long, narrow lagoon.

More famous for its salmon fishing than for whitebaiting, the Rakaia River supports a small, primarily recreational, whitebait fishery. During the 1984 season, 7% of all whitebaiting in Canterbury was carried out on this river (North Canterbury Catchment Board and Regional Water Board 1986). A Whitebaiters' Diary Scheme was used to monitor daily numbers of whitebaiters on the river during the 1978, 1979, and 1980 seasons. Results from these surveys showed that the number of whitebaiters during the 1978 season ranged from 0 to 17; in 1979, the range was 2-132, with a maximum of 150 being recorded on 27 October 1980. Although the Rakaia is fished by fewer people than the Waimakariri, Ashley, and Avon Rivers, the catch rates are generally good. Seasonal catches of 50 kg and more are still made by a few regular whitebaiters, with some of the catch being sold. The total catch estimates for the 1979 and 1980 seasons were 1350 kg and 1724 kg respectively (Unwin and Davis 1983).

#### 3.4.6 Lake Ellesmere Outlet

Lake Ellesmere is a large (182 km<sup>2</sup>), shallow, coastal lake immediately south of Banks Peninsula. It receives water from the Selwyn, L II, Kaituna, and Halswell Rivers and from Harts Creek, but it has no permanent outlet. Consequently, it is periodically opened mechanically by the catchment board when the water reaches certain levels. Should an opening be made during the whitebait season, the outflow attracts whitebait, and reasonable catches are often made.

#### 3.4.7 Ashburton River

The Ashburton River is shallow and braided, and including the South Branch, is over 100 km in length. Its 2 major tributaries, the North Branch and the larger South Branch, flow east from the Southern Alps. Both branches cross the Canterbury Plains, and then merge to form the mainstem a short distance above Ashburton township. From Ashburton, the river meanders east for 20 km between willow and scrub-lined banks, before it enters the sea at Hakatere.

The Ashburton River's popularity for both salmon and trout angling and its suitability for family outings suggest that it is clearly of considerable importance to the central Canterbury region. However, whitebaiting activity on the river is minimal, and attracts small numbers of fishermen. "Whitebaiters from the Ashburton district usually fish the more productive Rangitata or Rakaia Rivers." (B. Strange pers. comm.).

### 3.5 South Canterbury District

The rivers of South Canterbury (Fig. 4) have played a major role in the region's development. Substantial use has been made of the Waitaki River catchment for the purposes of hydro-electric power generation. About 30 m<sup>3</sup>/s of water from the Rangitata River are diverted through the Rangitata Diversion Race (RDR) which feeds 3 major irrigation schemes and various stockwater systems, and also powers a 25-MW generator at the Highbank Power Station on the Rakaia River. Minor surface water abstractions are also taken from the Orari, Opihi, and Waihao Rivers. Despite their size, neither the Waitaki nor the Rangitata support very important whitebait fisheries. In fact, none of the South Canterbury rivers are regarded as having a whitebait fishery of commercial importance (Table 5), although small quantities of locally caught whitebait are sold on the local market. The most important recreational fishery is the Waihao, a relatively small river with a catchment only one-third that of the Rangitata.

#### 3.5.1 Rangitata River

Large and braided, the Rangitata River flows east from the Main Divide in the Southern Alps, across the Canterbury Plains, to enter the Pacific Ocean 30 km north of Timaru. Its 2 main tributaries, the Clyde and Havelock Rivers, are fed by snow and ice melt from a group of glaciers. Over most of its 120-km length, the Rangitata flows over a wide, braided, shingle bed. Confined by a narrow gorge in its middle reaches, it then flows out onto the Canterbury Plains.

Like the Waimakariri, Rakaia, and Waitaki Rivers, the Rangitata is better known for its salmon and trout fisheries than for its whitebait fishery. The Rangitata whitebait fishery is recreational, comprising

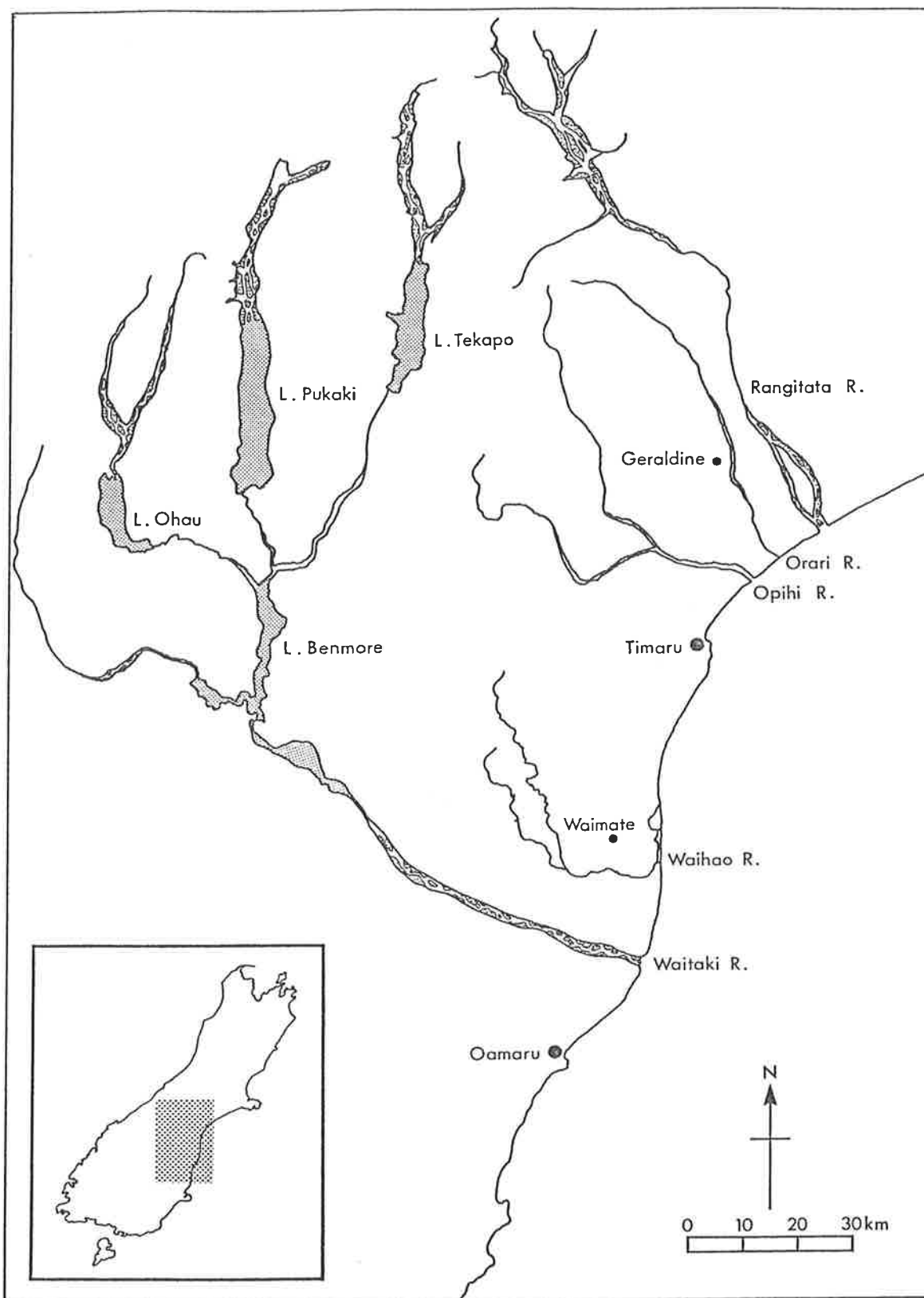


FIGURE 4. Whitebaiting rivers in the South Canterbury district.

TABLE 5. Commercial and recreational importance of whitebaiting rivers in the South Canterbury district.

River	Commercial importance	Recreational importance	Comment
Rangitata	-	XX	Average recreational fishery. Catches small.
Orari	-	XX	Average for this district. Fished by locals. Catches better than Rangitata.
Opihi	-	XX	Average, slightly more than Rangitata and Opihi. Fished by locals and tourists.
Waihao	-	XXX	Most popular river in the district. Catches good.
Waitaki	-	X	Minor fishery. Catches generally small.

about 20 mostly retired folk from the surrounding district who usually live in small huts at the river mouth for the duration of the whitebait season. In a recreational survey of the whole Rangitata River, Davis (1984) recorded that whitebaiting made up 4.9% of total use, with averages of 7 and 10 whitebaiters per weekday and weekend (or holiday) respectively. From September to November, whitebaiters comprised 54% of all recreationists at the river mouth. On odd days during the season, more than 100 casual whitebaiters from throughout the district may flock to the river after hearing of a 'good run'. People fishing the river mouth and surf use small, wire-mesh scoop nets, while others further up the river near the lagoon use square-mouthed set nets. Catches are generally small, with an average of 250 g; however, during a run, catches of 10 kg or more may be netted by a successful whitebaiter.

### 3.5.2 Orari River

A small, braided river, the Orari originates from a low valley south of the Hewson Range. It flows north-east through rugged hills and is joined by the Phantom and Hewson Rivers. The combined flow passes through a long, narrow gorge, and then crosses the Canterbury Plains to

enter the sea 10 km north-east of Temuka. On an average day during the whitebait season, this river usually attracts about 20 local people. Most use scoop nets to take 2-3 kg catches, although large catches of up to 20 kg are taken from time to time.

### 3.5.3 Opihi River

The Opihi is a small, braided, rain-fed river producing a mean flow of approximately 35 m<sup>3</sup>/s. From tributaries at the base of the Two Thumb Range near Burke's Pass, it flows in a wide arc around the Albury Range to Fairlie. Below Fairlie, the river is confined by a low-lying group of hills. It then widens as it crosses the Canterbury Plains, to enter the sea south-east of Temuka. Large estuarine backwaters form on both sides of the river mouth during the tidal cycle. Low river flows during summer and southerly storms often cause the river mouth to close.

The Opihi supports a small recreational whitebait fishery. The whitebaiters are a mixture of locals and people from Christchurch, Ashburton, Geraldine, and Timaru, who stay in residential/holiday settlements on the lower river. The river is usually fished by about 30 people per day during the season, with the number increasing during weekends and holidays. Set nets or scoop nets are used, depending on the conditions, with scoop nets being slightly more popular.

### 3.5.4 Waihao River

The Waihao is a small, sluggish river which flows from the western faces of the Hunters Hills north of Waimate. Its other main tributary is the South Branch, which joins the river approximately 20 km from the coast. Over most of its length, the Waihao flows down a low valley covered in gorse and broom, and it is prone to dry up during the summer.

The Waihao River has a boxed outlet to the sea, which is commonly called the Waiho Box. The section of river between the mouth and the Bradshaws Road bridge supports the most popular whitebait fishery in the district. On an average day, 50-60 whitebaiters will fish the lower river. "During long weekends and public holidays numbers may swell to 300." (G. Allenson pers. comm.).

Large scoop nets are used by a few fishermen who fish in the surf at the river mouth, with the majority of whitebaiters preferring to use a set net and screen. Catches vary considerably, from 1-3 kg on an average day to 10-30 kg when there is a large run.

### 3.5.5 Waitaki River

The Waitaki River is one of the largest rivers in the South Island. With a total catchment area of over 11 800 km<sup>2</sup>, it is fed by a number of large glacial rivers which drain the central Southern Alps. Its major tributaries include the Hopkins, Dobson, Murchison, Godley, and Macaulay Rivers, which feed Lakes Ohau, Pukaki, and Tekapo, and the Ahuriri River, which enters Lake Benmore. Below the Waitaki Dam at Kurow, the river flows east for 60 km down a wide, braided bed, to enter the Pacific Ocean 20 km north of Oamaru.

"The lower Waitaki River and its tributary streams contain one of the most diverse fish faunas in New Zealand. Twenty of the 33 native freshwater species and five of the seven introduced salmonids are present." (Graynoth et al. 1981). The Waitaki River trout and salmon sport fishery is regarded as nationally important (Teirney et al. 1982). The river supports a small recreational whitebait fishery, averaging 11 whitebaiters per day and with a maximum of 39 per day (Pierce 1987). Fishing is conducted in the surf and up to 1 km upstream from the river mouth. Most whitebaiters fishing in the surf use small (less than 1 m in width) scoop nets on a pole about 1-1.5 m long. Large nets are generally not used on the Waitaki River because they are both difficult to handle and dangerous in the current. The catches are generally small and are certainly less than those on the Rakaia River (Pierce 1987). For instance, diarists' catch rates on the Waitaki River for 1981/82 averaged 100 g/hour (Pierce 1987), compared to 460 g/hour for the Rakaia River for 1979/80 (Unwin and Davis 1983).

### 3.6 Otago District

Like other districts mentioned in this report, Otago has many rivers, streams, and creeks that are fished by whitebaiters. Seven rivers have been listed in the text: the Kakanui, Shag, Waikouaiti, Taieri, Clutha, and Catlins Rivers (Fig. 5 and Table 6). From the

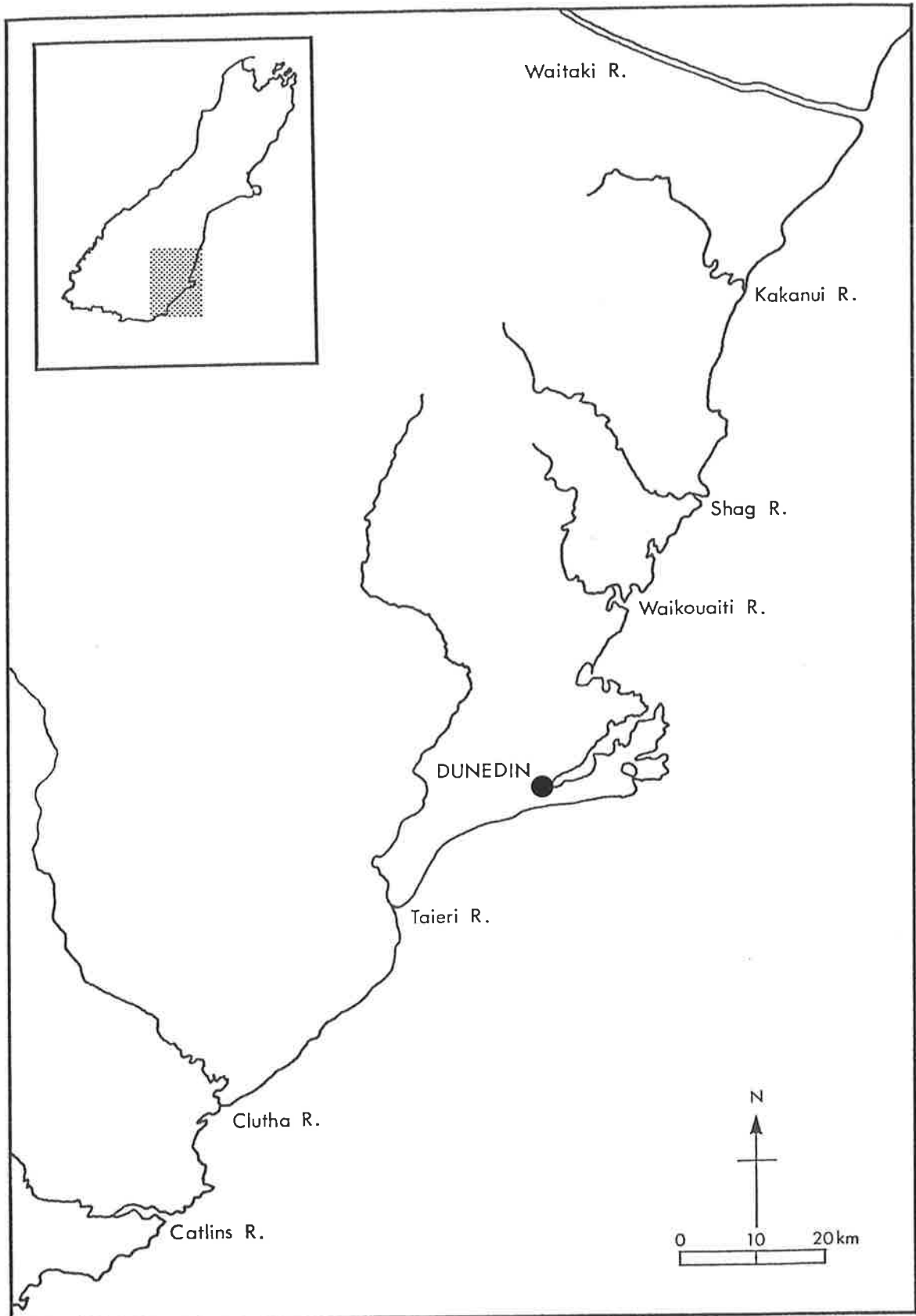


FIGURE 5. Whitebaiting rivers in the Otago district.

TABLE 6. Commercial and recreational importance of whitebaiting rivers in the Otago district.

River	Commercial importance	Recreational importance	Comment
Kakanui	-	XX	Although small, can attract up to 50 whitebaiters. Catches generally small.
Shag	-	XX	Reasonably popular. Fished mainly by locals and some from Dunedin. Up to 50 whitebaiters on a good day.
Waikouaiti	-	XX	Minor fishery. Fished mainly by retired locals, 1-50 depending on conditions. Some reasonable catches taken in the past.
Taieri	-	XX	Good access and 25-30 km of slow tidal reach to fish attracts whitebaiters from a wide area. As many as 150 when conditions are good.
Clutha	X	XXX	Major whitebait fishery of regional importance. Up to 200 whitebaiters on a good day. Catch rates consistently higher than on other rivers in the region. Minor commercial component.
Catlins	-	X	Minor fishery. Fished regularly by 10-12 whitebaiters during the season.

Kakanui in the north to the Catlins in the far south, the rivers are spread out fairly evenly along the Otago coast. Most rivers are fished in the lower reaches. However, on the 2 major rivers in the district, the Clutha and the Taieri, whitebaiters can be found fishing quite some distance from the river mouths, as the tidal influence extends many kilometres upstream.

Otago's whitebait fishery is basically recreational, with a small commercial component on the Clutha River. Although the Clutha River fishery is not in the same class as the major Southland or West Coast rivers, it is the most popular whitebaiting river in the district and is of significant regional importance. The Kakanui, Shag, Waikouaiti, and Taieri Rivers have lower catch rates than the Clutha, but still make a significant contribution to the Otago whitebait catch.

### 3.6.1 Kakanui River

The Kakanui River is a shallow, slow-flowing river which enters the sea 10 km south of Oamaru. Although it is comparatively small, the Kakanui can attract up to 50 whitebaiters on a good day when whitebait are running. A maximum count of 67 whitebaiters has been recorded (Pierce 1987). Whitebaiting is carried out for almost 6 km upstream from the mouth, but the catches are generally small.

### 3.6.2 Shag River

From its source on the south side of the Kakanui Mountains, the Shag River winds its way south-east for approximately 60 km. A small, shallow river, it enters the sea through a tidal lagoon 7.5 km east of Palmerston. The Shag River is reasonably popular with whitebaiters and is fished mainly by locals from the Palmerston district and by a few other people who travel north from Dunedin. Up to 50 whitebaiters may be found fishing on the lower reaches on a good day. Access to some parts of the river is difficult because landowners restrict passage across their farmland. The catches are generally good.

### 3.6.3 Waikouaiti River

The Waikouaiti River enters the sea at Karitane, 11 km north of the Otago Peninsula. Because of its low gradient, the river flows sluggishly over most of its 40-km length. The lower tidal reaches of the river pass through a narrow estuary before reaching the sea. The number of whitebaiters fishing the lower reaches would average about 25, with up to 100 on a holiday weekend day.

#### 3.6.4 Taieri River

The Taieri has a total catchment area of 5700 km<sup>2</sup>, which gives it the second largest catchment area of the Otago rivers. From its source in the Lammerlaw and Lammermoor Ranges, the river traces a 318-km rectilinear pattern to reach the Pacific Ocean approximately 30 km south-west of Dunedin (Otago Catchment Board and Regional Water Board 1983). The lower reaches of the river are sluggish, and, below Outram, they follow a slight gradient for 37 km before entering the sea.

Most whitebaiting occurs on the tidal reaches below Otokia 17 km upstream from the river mouth. With good access and close proximity to Dunedin and Mosgiel, the river can attract up to 150 whitebaiters on a good weekend when whitebait are running. Otago Acclimatisation Society Officers report an average density of whitebaiters fishing between Otokia and Henley as 1.26/km on 11 days over 2 seasons, or 8 whitebaiters per 7 km of river. "Catches of between 5-7 kg have been reported." (M.F.M. Wright pers. comm.).

#### 3.6.5 Clutha River

The Clutha is the largest river in New Zealand; its vast catchment area of 21 078 km<sup>2</sup> covers nearly 8% of the country. The Clutha River drains Lake Wanaka, and its 2 major tributaries drain Lake Hawea (Hawea River) and Lake Wakatipu (Kawarau River). These 3 tributaries combine to form the mainstem Clutha River, which produces a mean annual flow of 578 m<sup>3</sup>/s (Duncan 1985).

At Balclutha, the river divides into 2 large channels. The Matau (North Branch) is 32 km in length, and the Kaou (South Branch) is 20 km in length. Both feature high, willow-lined stop banks, built to protect the low-lying pasture land from floods.

Undoubtedly the most popular whitebaiting river in Otago, the Clutha can attract up to 200 whitebaiters on a good day. Although it is basically recreational, the Clutha fishery does support a small number of commercial whitebaiters. Many Clutha whitebaiters use platforms or stands from which to fish, which is a feature more commonly found on Southland and West Coast rivers. Catch rates on the Clutha River are consistently higher than on any other river in the district.

### 3.6.6 Catlins River

Over 50 km in length, the Catlins River drains a long, narrow catchment. It flows in a south-easterly direction on the northern fringes of the Catlins State Forest Park. About 9 km from the sea, the river enters a small tidal lake and estuary. Classed as a minor whitebait fishery of local importance, the Catlins River attracts 10-12 (mainly retired) locals from Owaka, during the season.

### 3.7 Southland District

All tidal streams and rivers in Southland support a whitebait fishery to one degree or another (R.A. Johnson pers. comm.). The region extends from Long Point on the south-east coast to Yates Point at the entrance to Milford Sound. The 9 rivers selected for this report are spread along the Southland Coast, from North Head at the entrance to Waikawa Harbour to the Waiau River mouth (Fig. 6 and Table 7).

There is no doubt that the rivers of Southland support a major recreational whitebait fishery and a significant commercial whitebait fishery. Commercial whitebaiters are mostly seasonal workers and retired people who seek to augment their income from their catch. They usually live in a caravan or bach close to their fishing site, so they can fish every day. A notable feature of the fishery is the use of platforms or stands from which whitebaiters fish. The stands are now registered with the Department of Conservation. The majority of Southland whitebaiters could be classed as recreational fishermen, although many sell their excess catch.

Competition for a good fishing site is fierce. The commercial operators work the best sites on the lower river, with the result that the recreational fishermen who don't live on site tend to get pushed up-river. Whitebaiters may also be found fishing beaches, river mouths, and bars. Using scoop nets, they commence fishing just after low tide and continue till high tide.

#### 3.7.1 Waikawa River

The Waikawa River drains the southern faces of the Forest and MacLennan Ranges in the Catlins State Forest park. The river has 2

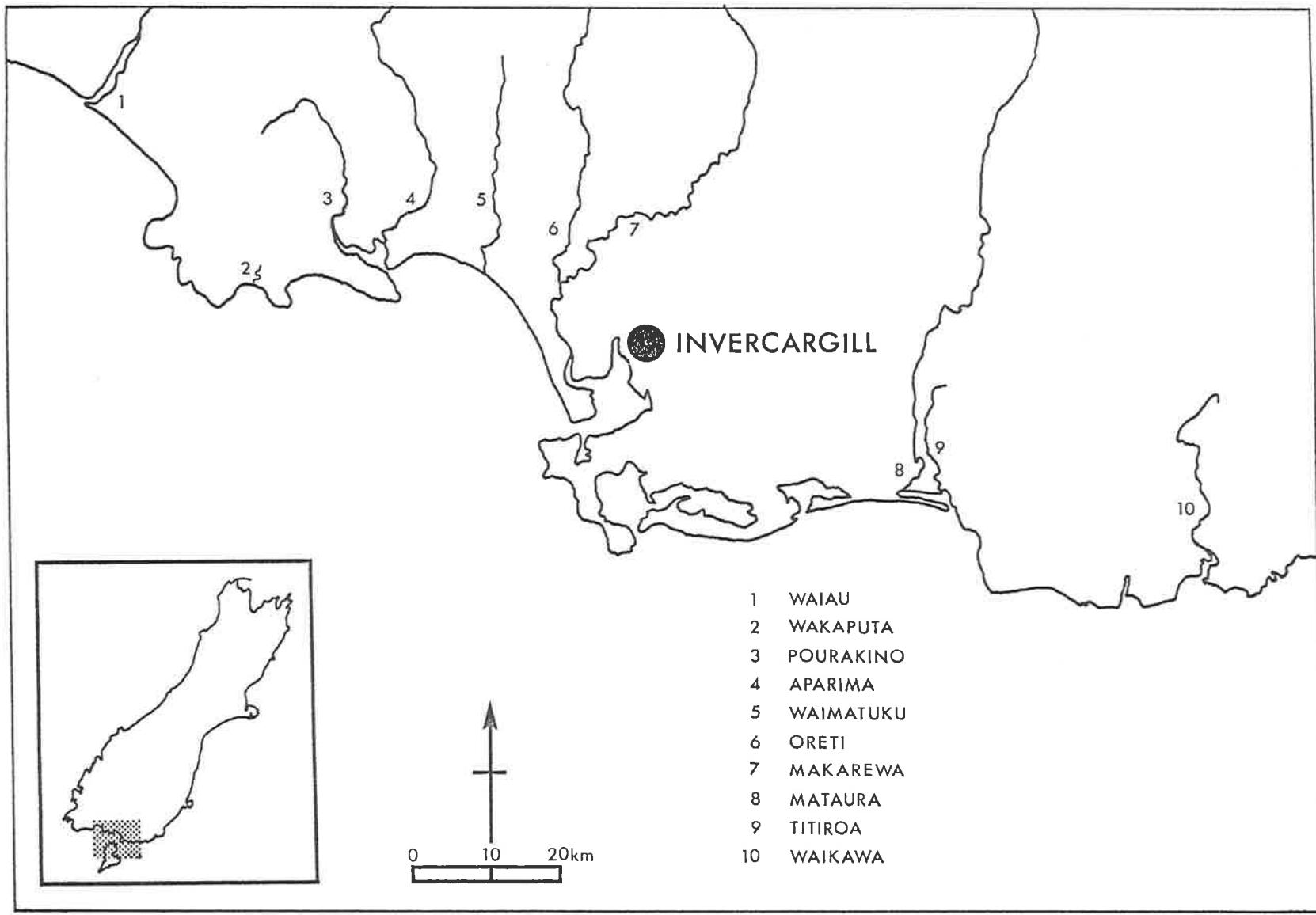


FIGURE 6. New Zealand freshwater fisheries report, no. 101 (1988). Whitebaiting rivers in the Southland district.

TABLE 7. Commercial and recreational importance of whitebaiting rivers in the Southland district.

River	Commercial importance	Recreational importance	Comment
Waikawa	-	X	Popular local fishery. 70-90 nets, 16 registered stands.
Titiroa	XXX	X	Important fishery. Large commercial component. 65 registered stands. Heavy fishing pressure during weekends.
Mataura	XX	XXX	Most important whitebait fishery in Southland. Large commercial component. Major recreational fishery. 222 registered stands.
Aparima	X	XX	Very popular, good access. Small commercial component. 125 registered stands.
Pourakino	X	X	Small local fishery. Mostly recreational.
Oreti	X	XX	Popular local fishery. Mostly recreational. 1 registered stand.
Waimatuku	-	XX	Significant fishery out of proportion to its size. Fishing pressure heavy.
Wakaputa Stm	-	X	Small local fishery. Strictly recreational.
Waiau	-	X	Significant recreational fishery. 50-60 white-baiters on an average day.

major tributaries, the East and West Branches. Including the West Branch, the river is over 35 km in length, and it enters Waikawa Harbour and estuary 4 km from the sea. Its tidal influence extends only a short distance upstream.

Whitebaiters fish a small stretch of water between the river mouth and the falls at Niagara. Scoop and set nets are used. Most whitebaiters are part-time, recreational fishermen. However, a few hardy men camp on the river for the duration of the season. On an average day, the Waikawa attracts up to 120 people attending 70-90 nets.

### 3.7.2 Titiroa River

Flowing in a southerly direction, the Titiroa drains intensively farmed pasture land south of Wyndham. Better described as a drain than a river, the Titiroa is joined by the Waimahaka Stream 3.5 km south-west of Waimahaka township. Six km downstream, the river enters the Toetoes Harbour near the mouth of the Maitara River. The most common method of whitebaiting is from floating stands using a scoop net in a fixed position.

This river comes under considerable fishing pressure, especially on weekends, and so competition is fierce (R.A. Johnson pers. comm.). The majority of whitebaiters on the river are commercial operators, but not as many live on site here as on the Maitara River. The catch rates are good.

### 3.7.3 Maitara River

The Maitara River rises in the south-east faces of the Eyre Mountains, near Lake Wakatipu. Draining a 5360-km<sup>2</sup> catchment, it produces a mean flow of 110 m<sup>3</sup>/s. The river flows south over a 239-km course before entering the Toetoes Harbour.

Waters from the Maitara and Titiroa Rivers combine at the eastern end of Toetoes Harbour, and then enter the sea at Fortrose. The Maitara River is certainly more famous for its trout fishery than for its whitebait fishery, and it has been identified as "probably the best brown trout fishery in the country and maybe the world" (Graynoth 1974). In a study of the fishery, Witherow and Scott (1984) stated that "the Maitara is a trout fishery of international reputation. Overseas anglers currently make up 5% of the angling population, and the proportion is increasing".

This river is also the most important whitebaiting river in Southland. An average number of 200 whitebaiters per day is usual (R.A. Johnson pers. comm.), but on the first day of the 1984 season, 300 nets were being fished on the Mataura, with 500 people in attendance.

The majority of whitebaiters fishing the lower reaches of the Mataura could be classed as commercial operators. Many camp on site for the whole season and fish from private stands. Large conical set nets are used, together with screens, and are set into the current. The catch rates are generally good, with lifts of up to 2.5 kg of whitebait being common.

#### 3.7.4 Aparima River

The Aparima is a long and shallow river. From its headwaters in the Takitimu Range, it traces a 145-km course over a wide, gravel bed. The Aparima River shares the Jacobs Estuary with the Pourakino River, and then enters Foveaux Strait at Riverton.

Because the lower river is close to Riverton and has good access, it can attract up to 250 whitebaiters on any 1 day. Most are recreational whitebaiters, with some commercial operators living on site and trying to earn a living from their catches. Many fishermen use stands, and a large number of others also use small box nets from the bank. The catch rates are good, with the Aparima ranking third in Southland behind the Mataura and Titiroa Rivers.

#### 3.7.5 Pourakino River

This small, tannin-stained river flows south from the forested slopes of the Longwood Range. It enters the western end of Jacobs Estuary before discharging into Foveaux Strait at Riverton. Its tidal influence extends well upstream to the forested section of the catchment.

Fishing pressure on the Pourakino is less than that on the Aparima River. This is partly due to the lack of access, and to keen competition for sites. The majority of whitebaiters are recreationists who fish from stands with set nets. There were 11 registered stands on

the river during the 1986 season. A small number of people use scoop nets.

### 3.7.6 Oreti River

The Oreti River rises between the Thompson and Eyre Mountains, south-west of Lake Wakatipu. It occupies a total catchment area of 3510 km<sup>2</sup>, which includes the catchment of the Oreti's largest tributary, the Makarewa River. Over 200 km in length, the Oreti follows a winding southerly course over a wide, shingle flood plain. In the lower reaches, below its junction with the Makarewa River, the Oreti becomes very sluggish before entering the New River Estuary south of Invercargill. With such close proximity to Invercargill (population 54 100), it is not surprising that the Oreti is fished by up to 60 whitebaiters. Most are recreational whitebaiters who fish from the banks with set nets. The catches are generally too small to attract commercial operators, although some catches of up to 7 kg per day have been taken.

### 3.7.7 Waimatuku Stream

Over 30 km in length, the Waimatuku Stream drains a long, narrow strip of lush pasture land between Otautau and the Waimatuku settlement. Its flow is augmented by Middle Creek and numerous farm drains. From its source near Otautau, the Waimatuku flows south to enter Foveaux Strait at Oreti Beach.

"This small stream has a significant fishery out of proportion to its size." (R. A. Johnson pers. comm.).

Stands are not used on the Waimatuku. Instead, a combination of scoop nets, set nets, screens, and spotter boards is employed. Fishing pressure is heavy.

### 3.7.8 Wakaputa Stream

This small stream drains Lake George, a Wildlife Reserve administered by the Southland Acclimatisation Society. It joins the Ourawera River several hundred metres upstream from the sea. Although a

small number of fishermen live on site in caravans, the whitebait fishery is strictly recreational.

Whitebaiters fishing the stream on an average day would number 30-40. Fishing is mostly conducted in the surf at the river mouth, using scoop nets, although 1 or 2 locals fish upstream with box nets set from the bank. The river supports a locally important whitebait fishery which, unfortunately, has suffered the effects of gold mining, channel straightening, and agricultural spraying. It is therefore not surprising that the catch rates have been declining.

### 3.7.9 Waiau River

The Waiau was one of New Zealand's largest rivers until, in 1976, a 4.7-m-high weir was built across it to control the water level of Lake Manapouri for hydro-electric power generation. Today, the river's flow below the weir is greatly reduced, but is augmented below Monowai by numerous tributaries as it winds its way south to Te Waewae Bay.

A feature of the Waiau River is that it enters the sea through a long lagoon, unlike other major Southland rivers which enter an estuary. The whitebaiting technique also differs, in that stands and large set nets are not used. Instead, small, steel-framed nets are used in conjunction with screens, which is a method commonly employed on Canterbury rivers. A recreational fishery only, the Waiau can attract 50-60 whitebaiters on an average day.

## 3.8 South Westland District

The south-west region of the South Island is one of the least developed and most isolated areas in New Zealand today. Many of the rivers flowing from the mountainous bushclad ranges to the east have remained unmodified by man, unlike some of the more popular whitebaiting rivers to the north.

The rivers of the Haast district enter the Tasman Sea along a 200-km coastline from Martins Bay in the south to the mouth of the Karangarua River in the north (Fig. 7). There is no doubt that the rivers within this district have supported and still do support New Zealand's most

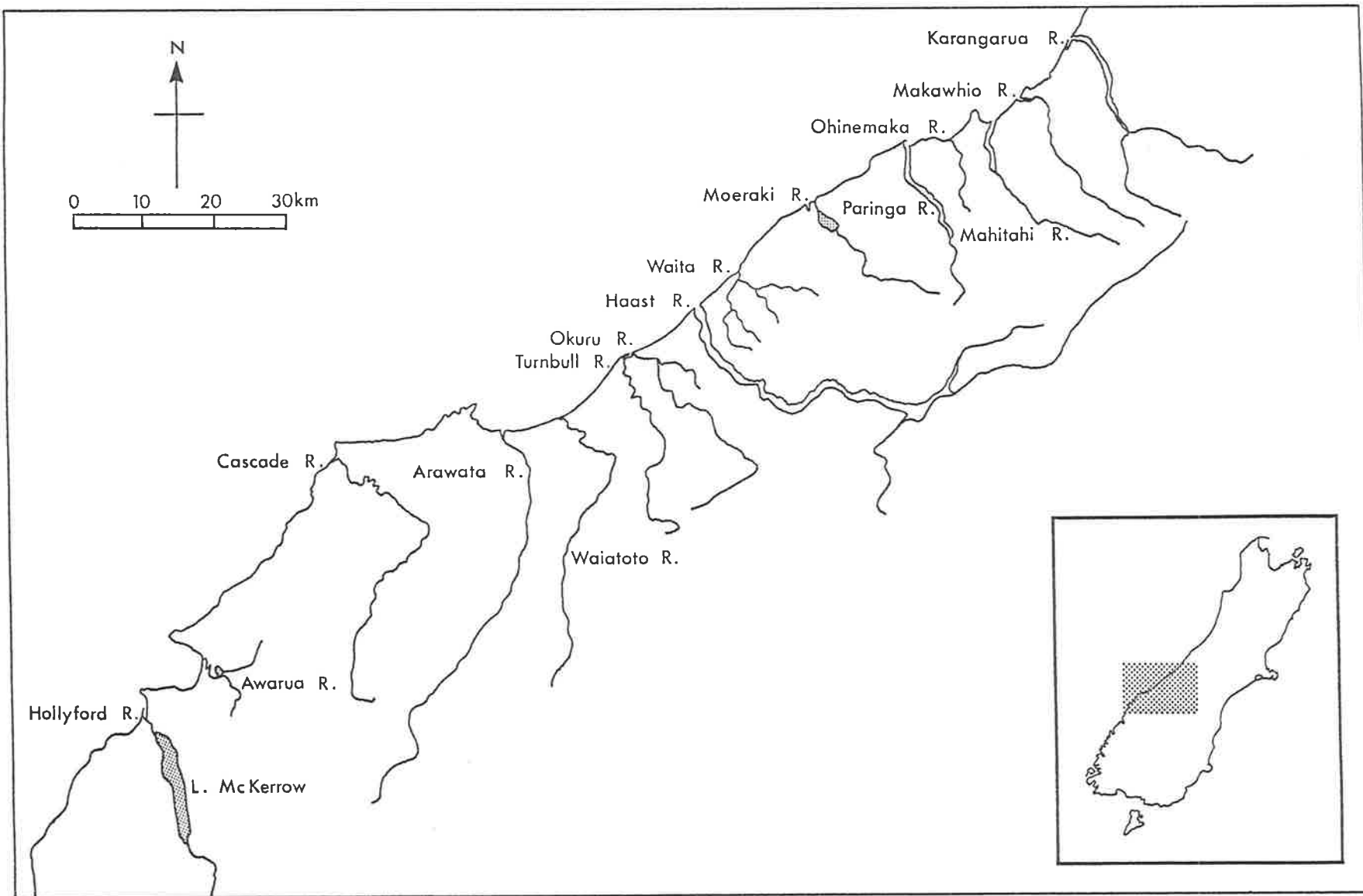


FIGURE 7. White-water rivers in the South Westland district.

productive whitebait fishery. All 15 rivers listed (Table 8), with the exception of the Mahitahi and Waita Rivers, appear in the Second Schedule of the Whitebait Fishing Regulations 1985, and are therefore subject to special conditions. Whitebaiters who fish these rivers have an option to register the site from which they fish.

During the season, the fishery attracts whitebaiters from all over the South Island. "The total number of recreational fishermen in the area at various stages during the season would probably exceed 3000." (M Freer pers. comm.). Many of the rivers have suffered a substantial increase in fishing pressure, particularly in the last 5 years. Total registrations for fishing sites on the rivers listed are usually around 300. Of those listed, the Waiatoto, Arawata, Okuru, and Haast Rivers have received significant increases in registered fishing sites over recent years.

Although the district produces huge quantities of whitebait compared to other New Zealand districts, the catch rates are only rough estimates. "There is simply no way of assessing catch rates for the area. Since the Inland Revenue Department imposed a 25% withholding tax on whitebait sales, possibly 90% or more of the bait caught is sold for cash on the black market." (M. Freer pers. comm.).

It is also extremely difficult to distinguish commercial whitebaiters from recreational whitebaiters. Not all fishermen using registered sites are in fact commercial whitebaiters. Many are recreational fishermen, who register for reasons of convenience, in order to assure themselves of a fishing site. There are also about 150 commercial whitebaiters in the district who do not bother to register a site; instead, they prefer to use a scoop net at the river mouths. Lastly, there is the fisherman who fishes for recreational purposes until he has a large catch and then decides to sell it. However, it is generally accepted that South Westland Rivers are the preserve of the commercial whitebaiter.

Table 9 summarises the annual catches for 7 South Westland rivers for the period 1969-73.

TABLE 8. Commercial and recreational importance of whitebaiting rivers in the South Westland district.

River	Commercial importance	Recreational importance	Comment
Hollyford	X	-	Minor commercial whitebait fishery. Access difficult.
Awarua	XX	X	Significant commercial fishery. Minor recreational fishery. Access difficult.
Cascade	XXX	X	Probably most productive river on the West Coast. Major commercial fishery.
Arawata	XX	XX	Significant commercial and recreational fishery. Significant increase in fishing pressure over recent years.
Waiatoto	XXX	XXX	Major commercial and recreational fishery. High catch rates. Also subject to increasing fishing pressure.
Turnbull	X	X	Minor fishery. Catches about average.
Okuru	XX	XXX	Significant commercial fishery. High number of recreational fishermen.
Haast	XX	XXX	Same as above, but generally produces less than Arawata and Okuru.
Waita	X	XX	Good access. Significant recreational fishery. Minor commercial fishery.
Moeraki	XX	X	Significant commercial fishery. Produces less than Arawata and Okuru.
Paringa	XXX	X	Major commercial fishery. Subject to high fishing pressure.
Ohinemaka	X	X	Small commercial fishery. Access difficult.

TABLE 8. (ctd.)

River	Commercial importance	Recreational importance	Comment
Mahitahi	X	XX	Small commercial fishery. Moderate number of recreational fishermen.
Makawhio	XX	X	Same as Moeraki. Access restricted.
Karangarua	XX	X	Supports significant commercial fishery. Minor recreational fishery is increasing each season.

TABLE 9. Range, mean, and standard deviation of annual whitebait catches for South Westland rivers, 1969-73. (Data from McDowall and Eldon 1980.)

River	Range (kg)	Mean (kg)	S.D. (kg)
Waia	1 202- 3 584	2 260	872
Haast	412- 3 997	1 867	1 356
Okuru	814- 5 170	2 689	1 726
Turnbull	313- 1 752	1 091	644
Waiatoto	3 955- 9 654	6 374	2 293
Arawata	1 676- 3 391	2 329	715
Cascade	6 559-19 620	11 546	5 037

### 3.8.1 Hollyford River

Over 60 km in length, the Hollyford River flows north between the Humbolt and Darran Mountains, on the northern fringes of the Fiordland National Park. Entrenched in a long, bushclad valley, the river enters the southern end of Lake McKerrow. Below the lake, the river enters a narrow tidal lagoon before discharging into Martins Bay. A minor fishery, the Hollyford River has 5 registered sites on its lower reaches. All are fished by commercial whitebaiters. Poor access to this remote river has restricted the entry of recreational fishermen.

### 3.8.2 Awarua River

The Awarua River is a small coastal river which enters the sea at the northern end of Big Bay, 12 km north-east of the northern boundary of the Fiordland National Park. The Awarua and its tributaries flow over a rectangular plain dominated by dense native forest, and enter the Waiuna Lagoon. From the lagoon, the river follows a twisting course for 7 km before reaching the sea at Big Bay.

This river has supported a significant commercial whitebait fishery since the late 1940s (McDowall and Eldon 1980). McDowall (1984) states that "it is just a small stream really, but for its size it probably outranks all the rivers including the larger Cascade and the much bigger Waiatoto."

During the infancy of South Westland's commercial whitebait fishery, the Awarua was fished by only a few whitebaiters. Because of the difficult access, supplies were flown in and the whitebait were lifted out by small fixed-wing aircraft, which used the beach as a runway. Increase in fishing pressure has been gradual on the Awarua. Today, there are 15 registered stands on the river (the maximum number allowable), and the whitebaiters come in by light aircraft and helicopter. During the 1985 season, the fishery maintained an average of 16 commercial and 3 recreational fishermen per day for a total catch of over 3000 kg (Graynoth and Eldon 1986). Annual catch estimates for 1976-85 are given in Table 10. When these data are combined with those for the years 1947-61 (from McDowall and Eldon 1980), the mean annual catch for the Awarua is 3930 kg (S.D. = 1629 kg, n = 24 years' data).

TABLE 10. Estimated annual catch from the Awarua River, 1976-85. (Data from Graynoth and Eldon 1986.)

Year	Catch (kg)	Year	Catch (kg)
1976	1 695	1981	1 769
1977	-	1982	2 600
1978	3 628	1983	3 630
1979	4 536	1984	4 250
1980	2 358	1985	3 000

- = no data.

### 3.8.3 Cascade River

With no road access, the Cascade River is as isolated as the Hollyford and Awarua Rivers. From its source, the Cascade flows north-east between the Red Hills and Olivine Ranges, and then swings west to enter the Tasman Sea 2.5 km south of Cascade Point. The lower 15 km of the river becomes tidal as it flows down through a wide, open valley. Large areas of swamp border the lower reaches, giving the water a dark, tea-stained colour.

The Cascade "is probably the most productive river on the West Coast." (M. Freer pers. comm.). The commercial whitebait fishery was developed by the Buchanan brothers in the 1940s and is still fished by members of that family. There are 31 registered stands on the Cascade, the majority of which feature large box nets and screens attached to the stand. A rough estimate of the total annual catch on the river would be 10 000-15 000 kg (Table 10).

### 3.8.4 Arawata River

A large, braided, swiftly flowing river, the Arawata rises on the northern faces of the Barrier Range within the Mount Aspiring National Park. For most of its 70-km length, the river flows north through a wide, open valley between the Olivine and Haast Ranges. It passes through a broad tidal estuary before entering the sea at Jackson Bay. With 26 registered fishing stands on its lower reaches, the Arawata supports a significant commercial fishery, with the catch shared among the ever-increasing number of recreational fishermen. As on many Westland rivers, the seasonal catch fluctuates widely, but the annual catch would generally average about 6000 kg.

### 3.8.5 Waiatoto River

The Waiatoto has been described as probably one of the most beautiful rivers in South Westland (Egarr and Egarr 1981). Separated from the Arawata catchment by the Haast Range, its headwaters drain a number of glaciers near Mount Aspiring on the western faces of the Main Divide. The Waiatoto is shorter (55 km) and the main river valley narrower than the Arawata. Over most of its length, the river is

confined to a deep, narrow channel and descends through thick native forest. Within the river mouth, there is a large estuarine zone which extends some 4 km upstream.

With a major commercial and recreational whitebait fishery on the mainstem, the Waiatoto River has been subjected to high fishing pressure over recent years. Although there are 51 registered fishing stands on the lower river, most of the pressure has come from the substantial increase in unregistered recreational whitebaiters.

Two lowland tributaries, Hindley and Content Creeks, are closed to whitebaiting.

#### 3.8.6 Turnbull River

The Turnbull is a small river which drains the western faces of the Browning Range and is located on the northern fringe of the Mount Aspiring National Park. Within its upper reaches, the river is confined to a narrow, bushclad valley featuring 2 rugged gorges. The lower 10 km of the Turnbull flows sluggishly over a narrow shingle bed to enter a large, shallow estuary which it shares with the Okuru River. A tributary, Hapuku Creek, is closed to whitebaiting. There are 24 registered stands on this river, most which are fished by commercial whitebaiters. The catch rates are generally average to low.

#### 3.8.7 Okuru River

The Okuru River is longer (approximately 40 km) and carries more water than its neighbouring river, the Turnbull. Its main tributary, the Ngatau River, flows north-east from the western slopes of the Main Divide, joins the Okuru mainstem, and then flows west between the Browning and Rark Ranges. The lower reaches flow through long pools and short rapids, bordered by beech forest and grassy flats. Waters from the Okuru and Turnbull Rivers meet in a large estuary which then enters the sea through a narrow mouth.

Generally, the Okuru is a very productive fishery. It currently supports 48 registered sites which are mainly commercial, and a high number of recreational whitebaiters.

### 3.8.8 Haast River

With a catchment area of over 1300 km<sup>2</sup>, the Haast River is one of the largest rivers on the West Coast of the South Island. The upper river is fed by numerous small creeks which drain the western face of Mount Brewster. The Haast winds its way north for 20 km until it joins its major tributary, the Landsborough River. Below the Landsborough confluence, it flows swiftly west for 40 km over a wide, braided bed. Before entering the sea, the river slows, and its shingle bed gives way to sand. There is no tidal influx at the river mouth, because, on an incoming tide, the river water still flows seaward.

A very popular river, the Haast attracts a significant number of commercial whitebaiters, some of whom camp in baches on the north bank. The river supports a major recreational whitebait fishery. There are currently 31 fishing sites registered for the 1987 season. As on other rivers in the district, the catch rates fluctuate greatly from season to season.

### 3.8.9 Waita River

The Waita is a small, rain-fed river approximately 18 km in length. It drains a catchment area of 153 km<sup>2</sup> on the western faces of the Mataketake Range. The upper reaches are fed by clear-flowing, boulder-strewn creeks. Within the lower valley, the river becomes shallow as it flows over a broad flood bed. Before it enters the sea, the mainstem is joined by its major tributary, the Maori River. This particular tributary drains an extensive area of swamp to the south.

The Waita has no registered stands or fishing sites because it was removed from the Second Schedule of the West Coast Whitebait Fishing Regulations in 1981. With easy access to the lower reaches, the river has become very popular with recreational whitebaiters. Competition for a good site is tough, even among the few commercial operators. With no stands permitted on the river, whitebaiters use scoop nets from the bank.

### 3.8.10 Moeraki (Blue) River

Approximately 30 km in length, the Moeraki River drains steep mountainous country on the northern fringe of the Mataketake Range. It meanders north-west through a steep, forested valley to enter Lake Moeraki, 5 km from the coast. Below the lake outlet, the river flows quietly for 2.5 km between steep, bushclad banks, and then enters the sea through a narrow mouth.

The Moeraki supports a significant commercial whitebait fishery, with 21 fishing sites being registered for the 1987 season. There is also a small but ever-increasing number of recreational whitebaiters who fish the river. The catch rates on the Moeraki would be about average, with the overall production being lower than that of other rivers to the south.

### 3.8.11 Paringa River

Flowing north-west, the Paringa River drains a group of spurs on the western faces of the Southern Alps. It is approximately 30 km in length, and has 1 major tributary, the Otoko River, which joins the Paringa in its middle reaches. Below the Otoko confluence, the river flows over a shingle bed, bordered by steep, bushclad hills. Located within the lower catchment is Lake Paringa (4.8 km<sup>2</sup>) which drains into the mainstem via the Hall River. There is a small settlement of whitebaiters' huts a short distance from the river mouth. Access to the river mouth is usually by jet boat or tractor.

The Paringa is certainly one of South Westland's great whitebaiting rivers. It supports a major commercial fishery with a small recreational component. There are 24 registered stands on the river, with a high number of scoop-netters between the stands and the river mouth. Fishing is also undertaken on the 'Falls' with small wire-mesh dip nets. On an average day, whitebaiters fishing the river usually number around 30. During weekends and public holidays, fishing pressure is intense, with up to 150 whitebaiters crammed within the mouth area.

The catch rates on the Paringa are generally high, with a total annual catch of approximately 7000 kg.

### 3.8.12 Ohinemaka River

The Ohinemaka is a small river which flows from the western slopes of the Douglas Range. From its boulder-strewn tributaries, the river meanders west across an extensive, bush-covered plain. This river supports a small commercial and recreational fishery of only minor importance. There are 7 registered fishing sites on the lower reaches. Whitebaiters use jet boats to reach the river mouth because there is no road access.

### 3.8.13 Mahitahi River

The Mahitahi is a small river which flows down a wide valley between the Strachan and Bannock Ranges. For most of its 30-km length, the river runs swiftly over a braided shingle bed. The lower reaches of the river are bordered by the Ohinemaka State Forest on the south bank and by private land on the north bank. Access to the lower river is very good, with S.H.6 following the north bank for 1.5 km to Bruce Bay. The Mahitahi supports a moderate number of whitebaiters, a minority of whom are commercial fishermen. There are usually about 8 stands on the river.

### 3.8.14 Makawhio (Jacobs) River

From the south-west faces of the Hooker Range, the Makawhio flows 33 km west to enter the sea 5 km north of the Mahitahi River mouth. Fed by rain and snow melt, the river follows a steady gradient down a wide valley between the Bannock Brae and Bare Rocky Ranges. In its lower reaches, it becomes flat and sluggish.

The Makawhio supports a significant commercial fishery. There are 22 registered sites in the tidal reaches. This river "has not suffered the same increase in fishing pressure as other rivers, as the land owner controls access." (M. Freer pers. comm.). The catch rates are about average, and are comparable with the Moeraki and Haast Rivers.

### 3.8.15 Karangarua River

A moderate-sized river, the Karangarua has a catchment area of 350 km<sup>2</sup> lying within the Westland National Park. Fed by rain and snow melt, it flows north-west from the Hooker Range, south of Mount Cook. The Karangarua and its major tributary, the Copland River, fall rapidly through steep, forest-clad valleys, to meet 20 km from the coast. Below the Copland confluence, the valley opens out and the river follows a wide, braided bed to a large lagoon at the mouth. Gordon and Nicholson Creeks enter the southern end of the lagoon. These creeks are tannin-stained and tidal, and they drain Hunts Beach State Forest.

The Karangarua supports a significant commercial whitebait fishery, with catches comparable to those from the Haast and Moeraki Rivers. The number of recreational fishermen is low, but it increases each season. This river "generally fishes well later in the season." (M. Freer pers. comm.)

## 3.9 North Westland District

The West Coast is separated from the rest of the South Island by a long chain of mountains, the Southern Alps. Draining the Alps are an uncountable number of creeks and streams, which form lakes, large swamps, wetlands, and rivers. Major rivers flow from the Main Divide, their cold waters augmented by snow and ice melt. Others pass through large tracts of dense native forest and swamps which give the water a dark tannin colouration. From these rivers, scattered along a 260-km coast from the Poerua River to Karamea, come large quantities of New Zealand's whitebait.

The rivers of North Westland (Fig. 8 and Table 11) generally have better access and are closer to large population centres like Hokitika, Greymouth, and Westport than the southern rivers. For these reasons, North Westland rivers attract high numbers of recreational whitebaiters. There are 321 registered sites on 15 South Westland rivers, against 367 sites on 9 northern rivers (Table 12). The Buller and Grey Rivers support major recreational whitebait fisheries and do not have registered fishing sites. Like those in South Westland, the northern rivers have sustained a significant increase in fishing pressure over

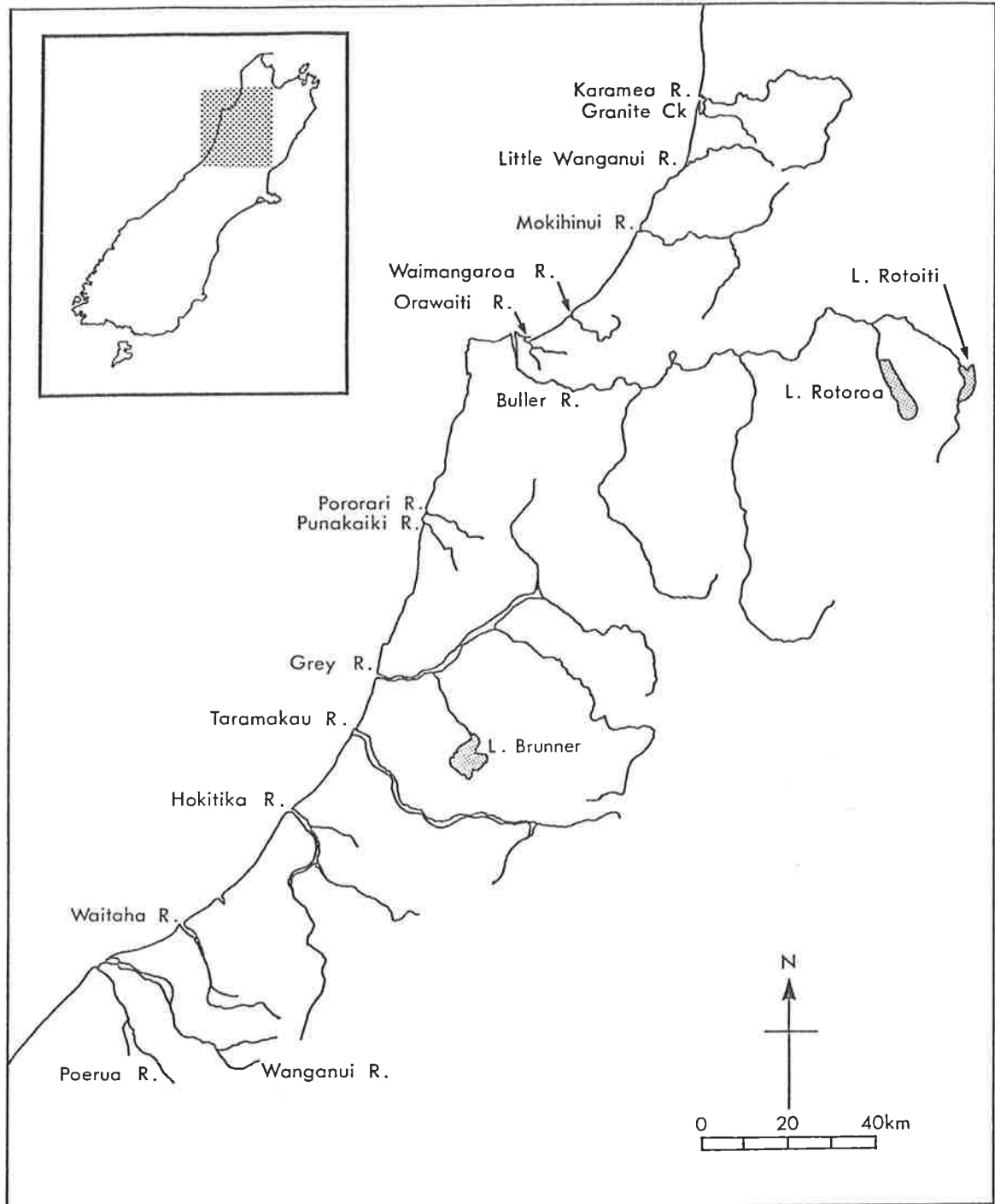


FIGURE 8. Whitebaiting rivers in the North Westland district.

TABLE 11. Commercial and recreational importance of whitebaiting rivers in the North Westland district.

River	Commercial importance	Recreational importance	Comment
Poerua	X	XX	Small commercial fishery. Access difficult.
Wanganui	XX	XX	Very popular. Highest number of registered sites on West Coast. Large commercial and recreational fishery.
Waitaha	X	X	Small commercial and recreational fishery.
Hokitika	XXX	XXX	Large commercial and recreational fishery.
Taramakau	X	XX	-
Grey	X	XX	Small commercial fishery. Very popular recreational fishery.
Punakaiki	-	X	Small recreational fishery.
Pororari	X	XX	Small competitive recreational fishery.
Buller	XXX	XXX	Largest commercial and recreational fishery in the district. Consistently produces good catches.
Orawaiti	XX	XX	Popular local fishery. Catches good, up to 30 kg.
Waimangaroa	-	X	Small recreational fishery. Has suffered from severe pollution from coal mining.
Mokihinui	XXX	XXX	Large and competitive recreational and commercial fishery.
Little Wanganui	X	X	Small recreational fishery with commercial component. Catches good.
Granite Ck	-	XX	Popular recreational fishery. Catches generally small.
Karamea	XX	XX	Small commercial fishery. Catches generally small.

TABLE 12. Registered whitebaiting sites on the West Coast, by river, 1987.

North Westland		South Westland	
Waitangi-taona	14	Hollyford	5
Poerua	13	Awarua	15
Wanganui	86	Cascade	31
Waitaha	12	Arawata	26
Hokitika	78	Waiatoto	51
Taramakau	38	Turnbull	24
Orawaiti	23	Okuru	48
Mokihinui	81	Haast	31
Little Wanganui	22	Moeraki	21
		Paringa	24
		Ohinemaka	7
		Mahitahi	8
		Makawhio	22
		Karangarua	5
		Ohinetamatea	2

the last few years, with the number of registered fishing sites in North Westland having increased by 20% since 1984. Although whitebait catches are still good, the fishery in general has declined as habitats have been destroyed on a massive scale (Eldon 1983).

A large number of the recreational whitebaiters come from Canterbury, Otago, and Nelson, or simply from "over the hill", as the locals put it. During the season, they pour into the district (particularly on public holidays) in their cars and caravans to form whitebaiters' camps near river mouths or in local motor camps. The greatest concentrations of commercial whitebaiters are found on the Hokitika, Buller, and Mokihinui Rivers. Some commercial whitebaiters are locals, but many come from outside the district and stay only for the duration of the whitebait season.

Fishing methods vary considerably from river to river. The most popular method is the scoop net; a common variation of this, the pot net, is also used. Pot nets are small scoop nets formed from fine wire mesh, and have short handles. They are mostly used for fishing on small braids or channels on a river. Square-framed set nets used with a screen and spotter board are sometimes used on rivers with gently sloping banks. Lastly, the sock net, which is a fine-meshed fyke net, is also becoming popular on some northern rivers.

### 3.9.1 Poerua River

A small river, the Poerua has a catchment area of approximately 225 km<sup>2</sup>. From its tributaries at the base of Mt Kensington (2446 m), the Poerua flows down a steep, bushclad valley between the Adams and Wilberg Ranges. The lower reaches are braided, and flow across wide river flats. A small tributary, the Hinatua River, enters the mouth area through the Kikimutu Lagoon. The 13 registered sites on the Poerua are fished mainly by commercial fishermen. Access to the mouth area is difficult, but the catches are generally good.

### 3.9.2 Wanganui River

A large river, the Wanganui is over 50 km in length and has a catchment area of over 500 km<sup>2</sup>. From its glaciated tributaries in the Main Divide, it flows west between the Wilberg and Smyth Ranges. The upper reaches flow through a narrow, bushclad valley. Below S.H.6, the river braids as it crosses an extensive flood plain. Water from Lake Ianthe enters the lower reaches through Ianthe Creek.

The Wanganui River supports significant numbers of both commercial and recreational whitebaiters. This river has 86 registered fishing sites on its lower reaches, the most of any West Coast river. On a good day, when conditions are suitable, up to 100 people can be found fishing this river. Commercial whitebaiters number about 20.

### 3.9.3 Waitaha

The Waitaha, with a catchment of 325 km<sup>2</sup>, lies between the Mikonui catchment to the north and the Wanganui River catchment to the south. Smaller than the Wanganui and not quite reaching the Main Divide, the Waitaha drains a number of the western spurs of the Southern Alps. Following a steep channel through 2 rugged gorges, the river eventually flows out across a wide valley floor. Below S.H.6, a major tributary, the Kakapotahi or Little Waitaha, joins the main river 3.5 km from the mouth. Good access to the river mouth is a bonus for older whitebaiters who cannot reach the mouths of other rivers to the south. There are 12 registered sites on the lower river. Generally, the river is fished by a dozen or so retired locals, but the catches are good.

#### 3.9.4 Hokitika River

A moderate-sized river, the Hokitika drains a number of sub-catchments flowing from the Main Divide. The Hokitika River itself has a catchment area of 352 km<sup>2</sup>, but, when combined with its major tributaries (the Styx, Kokatahi, Toaroa, and Whitcombe Rivers), its total catchment area exceeds 1100 km<sup>2</sup>. The major tributaries meet on an extensive alluvial flood plain 10 km west of Lake Kaniere. The combined flow follows a large, braided bed for 15 km, and then enters the sea at Hokitika.

There are 78 registered sites on this popular river, and, when conditions are favourable, up to 140 whitebaiters will be present. The large majority of whitebaiters could be classed as recreational fishermen. "Catches are not known, but reports of catches exceeding 20 kilos are rare." (R. Lundy pers. comm.).

#### 3.9.5 Taramakau River

The Taramakau is a large river which drains 960 km<sup>2</sup> of the Southern Alps, including the northern boundary of Arthurs Pass National Park. Its major tributaries include the Otehake, Otira, and Taipo rivers. Over most of its 80-km length, the river flows west down a wide, braided bed, littered with tree stumps and logs. The river enters the Tasman Sea 1.5 km south of Camerons township. Of the 38 registered fishing sites on the river, only 20 are fished regularly. Most of the regular whitebaiters are retired people, and a small number could be classed as commercial whitebaiters. Scoop nets are the most popular method for taking whitebait on this river.

#### 3.9.6 Grey River

A major West Coast river, the Grey rises in the Main Divide of the Southern Alps. It has a total catchment area of 3830 km<sup>2</sup>. From its source on Mount Alexander (1828 m), it follows a meandering course of 120 km west to the Tasman Sea. The Grey River's main tributaries are the Mawheraiti and Rough Rivers in the north, and the Ahaura River, which drains the south-east section of the catchment.

From the bushclad valleys of its upper reaches, the river descends and spreads out across a wide, braided bed. Sixteen km from the sea, the river is reduced to a single major channel. The lower river is regularly dredged to provide access for large ships to the port of Greymouth.

The Grey River supports a major recreational whitebait fishery. On a good day when whitebait are running, some locals in Greymouth shut up their shops and head for the river. On these occasions, up to 300 people may be found fishing the lower reaches. A small number fish for commercial gain, but the large majority are simply "fishing for a feed". Whitebaiting is conducted using scoop nets from the breakwater at the mouth, the wharf in the harbour, and off the banks lined with rip-rap.

#### 3.9.7 Punakaiki River

A small coastal river, the Punakaiki flows from rugged western faces on the Paparoa Range. From its headwaters, it meanders north-west through a wide, bush-covered valley, to enter the sea 2 km south of the Punakaiki settlement. This river supports a very popular recreational fishery for a few retired locals and a "hard core" group of visitors from Canterbury.

#### 3.9.8 Pororari River

The Pororari River is similar in character to the Punakaiki River. Within its upper reaches, it meanders over fine gravels through a wide, bushclad valley. The lower 6 km of the river passes through a narrow cutting before opening out into a small lagoon at Punakaiki. This recreational fishery attracts many of the whitebaiters from the Punakaiki River, but is more popular and productive than the Punakaiki.

#### 3.9.9 Buller River

With a catchment area of 6500 km<sup>2</sup> and a mean flow of 423 m<sup>3</sup>/s, the Buller River is one of New Zealand's largest rivers. Its upper tributaries flow from the western faces of the St Arnaud and Spencer Mountains to feed Lakes Rotoiti and Rotoroa. The Buller follows a twisting western course for 150 km, its flow augmented by the

Matakitaki, Maruia, and Inangahua Rivers. Most of the catchment is covered with dense beech forest, except for large, grassy riverflats and patches of open farmland. At Westport, the Buller runs deep and wide, and is bordered by stop banks and large rock groynes which extend for more than 200 m into the Tasman Sea.

The Buller is one of the West Coast's greatest whitebaiting rivers. It supports a major commercial and recreational whitebait fishery, identified by MAFFish as being nationally important (Teirney *et al.* 1982). On a good day, up to 360 whitebaiters will fish the lower river, the majority of whom are recreational fishermen. There are no registered stands or sites on the Buller, and whitebaiters fish from the steep, rocky banks with large scoop nets. Some commercial whitebaiters form a small group, find a good fishing spot, and then camp on it, working in shifts to prevent other fisherman using it. The catch rates on the Buller River are generally good, with some commercial fishermen making well over \$5,000 during the peak of the run.

#### 3.9.10 Orowaiti River

The Orowaiti is a small, coastal stream which enters the Tasman Sea 6 km north of the Buller River mouth. Approximately 15 km in length, it drains a number of small forested valleys south-west of Mt Rochfort. It has 1 major tributary, which drains a large section of pasture between Nine Mile Road and Sergeants Hill. The river flows into a large, muddy lagoon near Westport, and then enters the Tasman Sea through a shallow, sandy mouth. Although it is basically a recreational fishery, the Orowaiti does attract a significant number of commercial operators. Most of the whitebaiters are locals who fish with scoop nets from the 23 registered stands. A small number of the fishermen are tourists who stay in the local camping grounds. When the whitebait are running, catches of 20-30 kg are sometimes taken.

#### 3.9.11 Waimangaroa River

The Waimangaroa is a small river which drains a bush and scrub-covered valley between the Mount William Range and Mount Frederick State Forest. Over 20 km in length, it flows south, then swings west to enter the Tasman Sea 2.5 km north-west of the Waimangaroa settlement. Within

the Waimangaroa catchment are seams of coal, most of which lies within the famous Denniston Mines. Unfortunately, the extraction of coal from this area has seriously polluted the river below Denniston. This river is fished occasionally by up to 10 whitebaiters, who use scoop nets. The catches are usually quite small.

### 3.9.12 Mokihiui River

The Mokihiui River is formed by 3 major tributaries, the Hemphill River, the North Branch, and the South Branch. These tributaries drain a number of western mountain ranges between Buller and Nelson; they meet to form the mainstem a short distance upstream from the 1929 earthquake slip. Below this point, the Mokihiui follows a twisting westerly course, enclosed in a narrow, bushclad valley which opens at Seddonville and closes again before reaching the coast at Waimarie. A very popular whitebaiting river, the Mokihiui can attract as many as 180 fishermen on a weekday.

There are 81 licenced jetties on this river; 6% of these are occupied by tourists, most of whom stay in the local camping grounds. This river is not on the schedule of West Coast whitebaiting rivers, and therefore the jetties are not required to be spaced at a specific distances. This has resulted in utter chaos between fishermen competing for space. The Regional Fishery Officer for the West Coast, Mr. R. Lundy, has reported "up to 80 persons seen fishing or trying to fish, with others waiting behind the line to find a spot". Scoop nets and set nets are the most commonly used fishing methods.

### 3.9.13 Little Wanganui River

A small river, the Little Wanganui flows west between the Radiant and Scarlet Ranges. Its catchment lies within the North West Nelson State Forest Park. For most of its 30-km length, the river flows quietly over a shingle bed. Native bush surrounds the river valley, although some large areas have been cleared on the valley floor.

Three major tributaries enter the lower reaches of this river: Blue Duck Creek, Tidal Creek, and Glasseye Creek, which enters the river mouth. The headwaters of the Little Wanganui are very popular with

tramping parties. The Wangapeka Track follows the river for some distance and provides trampers with access to the upper Karamea, Wangapeka, and upper Mokihiui Rivers.

The Little Wanganui does not appear on the Second Schedule of West Coast Whitebaiting Rivers, and therefore there are no special restrictions placed on the location of the 22 jetties or fishing platforms. When conditions are suitable, the river attracts up to 30 whitebaiters, half of whom are tourists who camp in caravans for most of the season. Although it is basically a recreational fishery, the river does support a small number of commercial operators. The catches are generally good; "one catch of 30 kg was observed by me last open season." (R. Lundy pers. comm.).

#### 3.9.14 Granite Creek

This small stream drains low, bush-covered hills between the Little Wanganui and Karamea River catchments. The stream follows a gentle gradient for 18 km to enter a large tidal lagoon at Kongahu. It supports a popular recreational fishery of up to 50 people. Although no data are available, the catch is believed to be about 1-2 kg per fisherman per day.

#### 3.9.15 Karamea River

The Karamea River is moderate in size, being over 80 km in length with a catchment of 1242 km<sup>2</sup>. From its tributaries near the Wangapeka Saddle, the river flows north in a large semicircle along the base of the Arthur and Tasman Ranges. Over most of its length, it flows through picturesque but extremely rugged bush country. There are a number of large rapids on the river, which were created by slips brought down by the earthquake in 1929. The river flows swiftly through a long, narrow gorge, and then slows as the valley opens onto a small coastal plain at Karamea. Both sides of the river mouth are bordered by large tidal lagoons. The southern lagoon drains the Kongahu Swamp, and it, in particular, is an important whitebait spawning area.

The Karamea River is regularly fished by about 40 people per day, most of whom are retired locals. Like many West Coast rivers, the

fishery is basically recreational, with a small commercial component. However, it is well known that in a productive season excess whitebait is sold. This river is generally a small producer, but occasionally a catch may exceed 40 kg.

#### 4. DISCUSSION

As stated in the Introduction, the lack of catch data for the whitebait fishery means that it is not possible simply to rank rivers by their annual catch. It must also be recognised that, although catch is obviously important to commercial operators, it is not the only motivation for recreational whitebaiters. It is probable that for many of the latter, whitebaiting is a convenient excuse for being outdoors, and catching sufficient whitebait for a meal is a bonus.

Surveying Regional Fisheries Officers was decided upon as a means of obtaining an overview of the South Island whitebait fishery. It was recognised that the results would be largely subjective, making it difficult to equate the rankings from various districts. For instance, although both the Motueka River in the Nelson district and the Cascade River in South Westland were ranked as fisheries of 'major commercial importance', it should not be inferred that they are in any way equal in terms of actual production. Rather, within their respective districts, these rivers received (equal) highest rankings.

A total of 75 rivers have been listed in the text. Of these, 73 (97%) supported a recreational whitebait fishery, and 43 (60%) had a commercial fishery. As might be expected, the West Coast supported the highest number of commercial whitebait fisheries, with 27 rivers (63%) of the total commercial fisheries listed.

Seventeen major recreational fisheries have been identified within the 9 districts surveyed: 7 on the West Coast, 5 on the east coast, 4 in the Nelson district, and 2 in Southland.

Estimates of use were not provided for all the rivers listed. The data supplied were often a range of "average use", or a "peak use" figure. To provide an upper estimate of mean use per river, the peak use figure was used where available, otherwise the larger of the

estimates given for the range was taken. Addition of these figures gave a total use of 4265 persons engaged in whitebaiting on 52 of the rivers listed, with an average of 82 persons per river. Because whitebaiting is confined to the lower reaches of a river, this figure represents a substantial density of people in numbers per kilometre.

It is difficult to evaluate how comprehensive and "accurate" the present survey is, as there are virtually no comparable data. Certainly, the South Island rivers listed by Teirney et al. (1982) as nationally important whitebaiting rivers all appear in the present survey, and rank between 'average' and 'major' for commercial importance. Also, when the ranks for commercial importance of the rivers listed in Table 9 are plotted against the mean annual catch for those rivers, the result is a significant correlation ( $r = 0.80$ ,  $P < 0.05$ ). This gives some credibility to the survey results.

Several surveys of the recreational use of South Island rivers have included observations on whitebaiters (e.g., Unwin and Davis 1983, North Canterbury Catchment Board and Regional Water Board 1986), and there is 1 specific study of whitebaiting (Hardy 1987). Such studies have emphasised effort (number of people, type of gear, etc.) rather than catch. In a recent survey of whitebait fisheries in 13 Bay of Plenty rivers, Saxton et al. (1987) used interviews with whitebaiters to establish catch rates. However, they commented that some persons "were reluctant to provide details of catches, and assuming some people were reluctant to divulge details of large catches the quantity reported may be under-estimated." Despite this, if it is decided to follow up the present survey with surveys concentrating on catch, then the semi-quantitative method of catch assessment ("cupful", "half bucket" etc.) of Saxton et al. (1987) is suggested as an appropriate method.

A prominent feature of the fishery which came to light from the survey was the diversity of fishing methods used to take whitebait. Net size and type and fishing method are not only governed by the Whitebait Fishing Regulations, but are also influenced by water depth, bank contour, and, in some districts, tradition. Metal-framed set nets and scoop nets were the most commonly used, although there were many local variations of these basic types.

For many New Zealanders, whitebaiting is a popular, highly valued recreational pursuit and, for some, it is an important source of income. Therefore, it is important that catchment boards consider the activity of whitebaiting when forming management plans for rivers. However, it is even more important that the spawning areas for the main whitebait species (Galaxias maculatus) be identified and protected, because the loss of this habitat is liable to be the single most important factor controlling the overall wellbeing of New Zealand's whitebait fishery.

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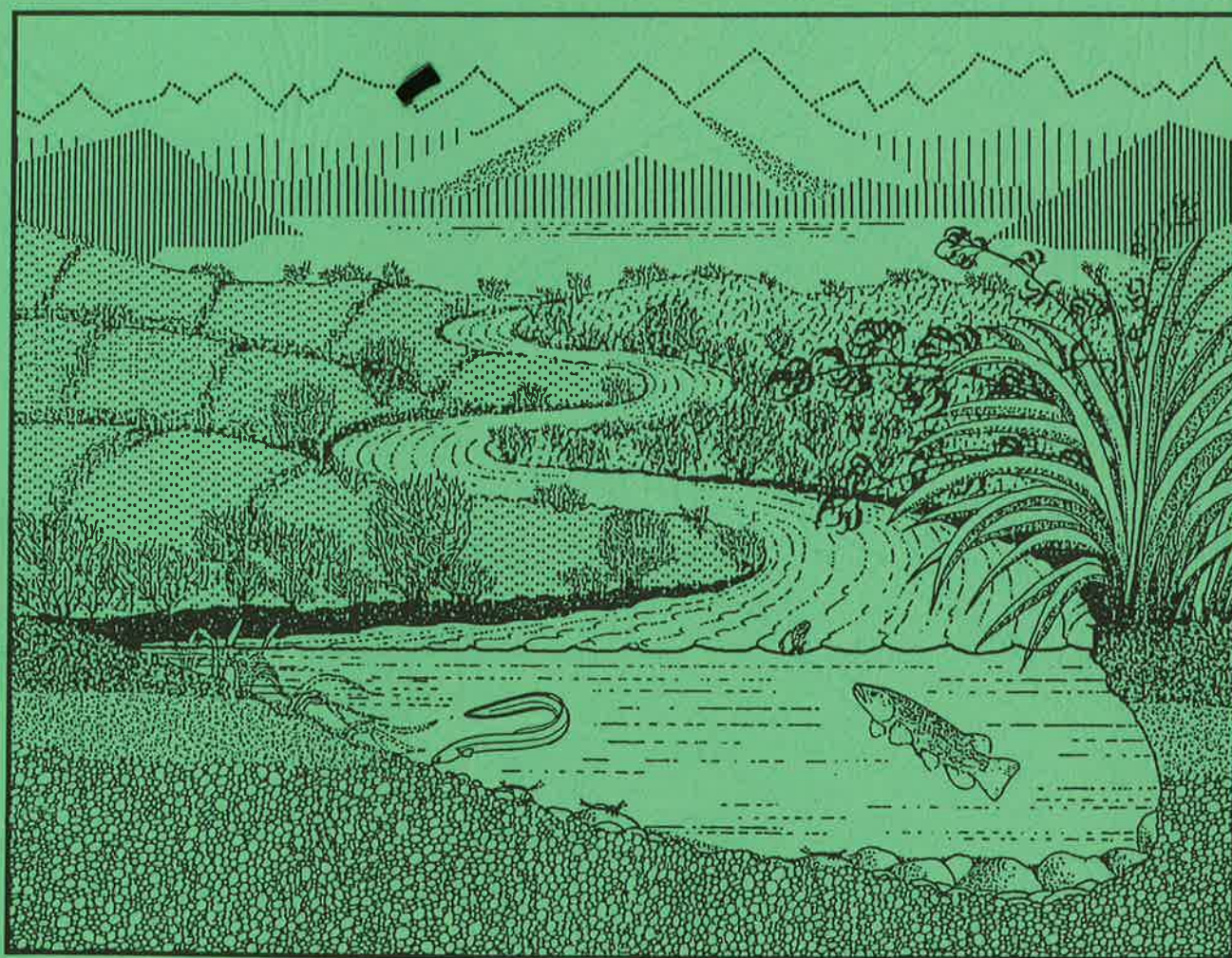
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