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FISHERIES TECHNICAL REPORT
No. 103

THE MARLBOROUGH TROUT FISHERY

E. GRAYNOTH and W. SKRZYNSKI

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FISHERIES MANAGEMENT DIVISION
MINISTRY OF AGRICULTURE AND
FISHERIES
WELLINGTON

Fisheries technical report no. 103 (1973)

C O N T E N T S

SUMMARY

This report describes the trout fisheries of Marlborough Acclimatisation District. It is based on angling results collected since 1949 by six angling diary schemes.

Angling has increased in popularity in recent years but licence sales remain low. The average Men's Whole Season Licence Holder fishes for about 13 days to catch about 8 fish per annum, the total district catch of about 4,700 trout being caught in just under 9,000 days.

The majority of fish caught are brown trout, although a few rainbow trout are caught in the Pelorus system. The trout are large and the average size has not deteriorated for many years. Trout densities have not been assessed but it is thought that the anglers in some areas catch quite a high percentage of the stock. There appears to be a depreciation in the fishery of Spring Creek.

The seven principal waters and anglers' catches are described. The fisheries regulations have little restrictive effect and fisheries management can be improved by further scientific surveys of the waters.

INTRODUCTION

The Marlborough Acclimatisation District covers the north east corner of the South Island of New Zealand in which region there are only three major river systems, the Pelorus, Wairau and Awatere Rivers (Fig. 1). The majority of the population is centred around Blenheim in the lower Wairau River valley.

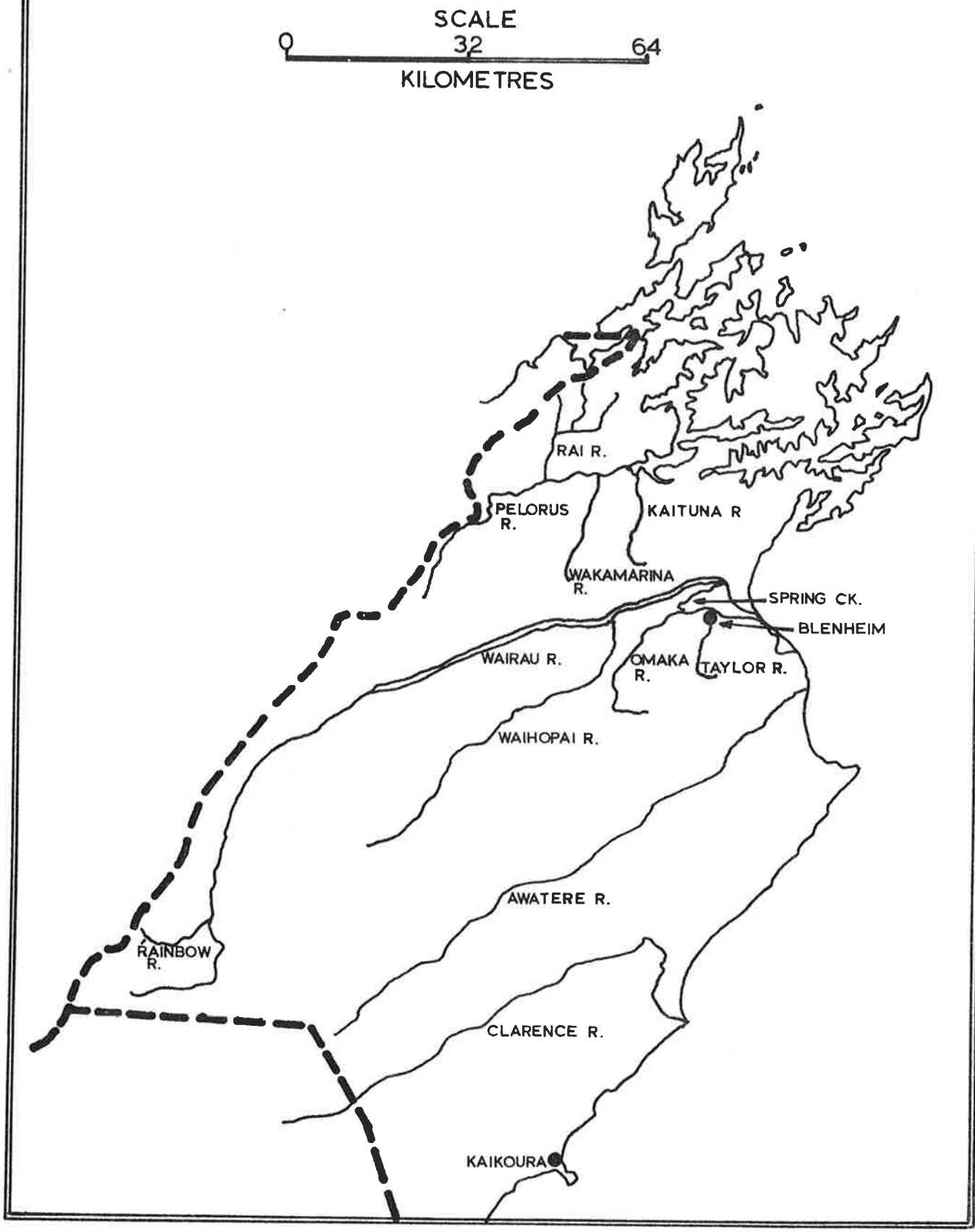
The fish stocks are managed by the Marlborough Acclimatisation Society who receive advice from the Ministry of Agriculture and Fisheries (formerly the Marine Department).

In 1949 the Marine Department, with the Society's assistance, commenced an angling diary scheme. This scheme continued until 1952, the results being published by Allen and Cunningham (1957). Additional angling diary schemes were run in 1957, 1962 and 1967. The number of licences sold by the Society is small and less than 100 diaries have been returned in all years of this diary scheme. The low return of diaries makes certain derived statistics subject to possible errors as described in Graynoth (1973). A few scientific surveys have been carried out by the South Island Technical Field Service, but generally there is a great lack of information on the fish stocks in this region.

The aim of this report is to summarise the information contained in the angling diary schemes and so assist the Society in formulating long term management plans for each water. The report also aims to assist anglers in finding the best waters and best methods to use.

FIG. 1.

MARLBOROUGH ACCLIMATISATION DISTRICT



THE ANGLERS

The Number of Anglers

Freshwater angling as a sport has recently become more popular in the Marlborough district. Since 1963 there has been a steady growth from under 200 to 350 sales of Men's and Boy's Whole Season Licences per annum. This is similar to an increase shown in the early fifties when for some reason angling suddenly became popular.

The percentage of licence holders in the population in 1951 was calculated at 1.5%, slightly lower than in Nelson Acclimatisation Society district. The present figure is probably around 4½% compared to Nelson's 7%.

The Average Angler's Fishing Effort, Catch and Catch Rate

The anglers who return diaries tend to be more skillful and fish more than usual. The average Men's Whole Season Angler in the Marlborough Acclimatisation District fishes for about 13 days per year to catch about eight fish. Table 1 shows the slightly higher effort and catch recorded by anglers who returned diaries. The average angler's catch rate is not good, averaging about 0.6 fish per day which is slightly worse than that found in Wellington district and a good deal less than that found in Nelson.

Including the angling done by visitors, who catch approximately 30% of the district crop of fish, the total catch is about 4,700 trout which takes about 8,900 days to achieve (1967 results).

The crop of 4,700 fish is probably the same as in the past. The diaries show (Table 1) a drop in catch rate and the mean number of fish caught over the past twenty years. The trend shown may not be typical as only a few anglers returned

diaries. If it is typical, the fewer anglers in the past would have caught more fish and the district crop would be similar to that recorded at present.

TABLE 1

Average Annual Fishing Effort and Catch of Men's Whole Season Diarists from 1949 to 1967

Year	1949-52	1957-58	1962-63	1967-68
MWS Licence Sales per annum	110	259	184	297
Total Diaries returned	12	15	12	12
Percentage return	3.6 (3 years)	5.8	6.5	4.0
Mean Days/Season own district	21.2	15.1	15.2	18.6
Hours/day	2.48	3.1	2.66	2.83
Mean Fish kept/ Season	27.9	17.0	11.83	13.75
Fish/day	1.32	1.12	0.78	0.74
Fish/hour	0.53	0.36	0.29	0.26

THE FISH STOCKS

Distribution of Species

The angling records from Marlborough are scanty, but there is no doubt that brown trout are the only species of importance. Rainbow trout and quinnat salmon are also present and their distribution in Marlborough is of scientific interest, because the Marlborough district is on the fringe of their distribution range in New Zealand.

The large rivers of Marlborough the Clarence, Awatere and Wairau flow into the Pacific Ocean at the northernmost limits of the quinnat salmon range in New Zealand. Ecological factors, still not clearly understood, prohibit the quinnat's spread further north or round to the West Coast of the South Island. The diarists have not recorded any quinnat in their catches, but one diarist noted a catch of two quinnat by another angler in the Wairau at the Narrows in 1968. These fish weighted 7.3 and 2.6 kg respectively.

The diarists caught a few rainbow trout mainly in the Pelorus and Rai rivers. Allen and Cunningham (1957) also recorded rainbows in the Wakamarina (Pelorus tributary) and Kaituna, from which there are no recent angling records. The Pelorus and Kaituna are the only two major rivers flowing into the Marlborough Sounds, an area separated by ranges from the rest of both Marlborough and Nelson. The records are not adequate, but the percentage of rainbow in the Pelorus system is significant (possibly 30% or more) and it is suggested that the rivers of the Marlborough Sounds differ from most rivers of the South Island in some characters vital for the success of rainbow trout. In this they may be more similar to some rivers on the west coast of the Wellington district. The only other record of rainbow trout comes from Spring Creek where one was caught in 1957 and one in 1962.

Sea run brown trout run up the Wairau River and possibly other rivers in the winter. Crucian carp or goldfish have been found in a small tributary of the Wairau near Woodbourne.

The Size of Trout

Marlborough along with the Southern Lakes District produces on average the largest trout in the South Island. The angler can expect his average fish to be 1 kg or over and 2 kg fish are common. The size of trout caught in different waters is fairly similar, but the diary returns were very scanty and no doubt differences in average size between populations exist.

The diaries show that there has been no change in fish size for 20 years. There are adequate records only from the Wairau, and reasonable records from Spring Creek and the Pelorus and Rai rivers. The Wairau and Spring Creek fish are some of the largest in the district (Table 2).

The majority of large fish over 2.5 kg in weight are caught in the Wairau and a few in the Opawa, a lower Wairau tributary near Blenheim. Occasional fish of this size are caught in most other waters. To catch these large fish it seems best to fish at night using a wet fly or live bully in the lower reaches of the Wairau.

There are differences in the average size of fish caught by location. In 1962 in the Wairau most trout were caught in the lowest 0-16 km section, none between 16 and 64 km and progressively more from 64 to 112 km upstream. The trout caught were on average 10 cm longer in the upper reaches compared to the lower reaches of the Wairau. Opawa fish were larger than fish upstream in the Omaka. The size of fish caught also varies according to the method employed. In 1962 most fish were caught on a wet fly and spoon and these also had the largest average size (52.3 and 50.0 cm respectively). Trout caught using dry fly techniques were unusually small at 45.2 cm in 1962. In 1967 most fish over 60 cm were caught on bully and other live bait but wet and dry fly fish were the largest on average (53.1 and 51.1 cm respectively). Spoon caught fish were the smallest (45.5 cm).

TABLE 2

ANGLING RESULTS IN THE MAJOR RIVERS

RIVER	Approx. Length Kilo-metres	1967-68 Anglers' Crop	Crop per Kilo-metre	1962 and 1967 Hours Per Fish	1962 and 1967 Fish Per Hour	*Approx. Stock Per Kilo-metre	Very Approx. Crop Rate %	Fish Avg. Lngt. cm	Fish Avg. Wgt. kg	Kg Per Hour
Pelorus	58	400	7	4.35	0.23	5- 25	33	45.2	1.1	0.25
Rai	26	390	15	4.25	0.22	5 -25	60	47.8	1.3	0.28
Other Tributaries		70								
Kaituna	16	20	1.2							
Wairau	160	2200	14	2.85	0.35	20 -100	40	50.0	1.5	0.53
Opawa-Omaka	60	400	7					48.3	1.4	
Spring Creek	11	390	35	5.60	0.18	5 - 25	nearly 100	50.3	1.6	0.28
Taylor	20	110	6							
Other Tributaries		410								
Awatere	112	40	0.6					40.1	0.8	
Clarence	160	90	0.6							
Other Waters		190								
TOTAL		4700								

* Derived from Anglers' catch rates (See Graynoth 1973)

In the Wairau in 1962 most fish were caught on a spoon and in 1967 most fish were caught on live bait. In the Pelorus and Rai most fish were caught on artificial fly. Most rainbow trout in the Pelorus were caught on minnow and spoon. In Spring Creek artificial fly caught most fish and in 1962 live bait was almost as successful.

In the Wairau the size fluctuated through the season, most fish being caught in summer. Records for other rivers were not sufficient to show any seasonal size changes.

The Stock and Anglers' Crop of Trout

As shown in Table 1 diarists showed a general drop in the rate at which they catch fish. It is suspected that the total catch of trout has increased little over the past twenty years. It is quite likely that this catch rate drop shown could just be a statistical error due to the low diary returns. The overall catch rate results could also be lowered by an apparent depreciation in the stock of fish in Spring Creek, where the anglers' catch rate has dropped from 0.3 to 0.7 fish per hour in 1949-52 to 0.4 in 1957-58 to 0.2 in 1962 and to 0.16 in 1967-68. A drop in anglers' catch rate has not been shown in any other water.

The crop of fish from the various waters in the district was estimated from the cumulative catch of fish from all diarists from 1949 to 1967. The total district catch of 4,700 fish was distributed to the various waters in the same proportions. The individual estimates are subject to a fairly high $\pm$ 50% possible error but give a general overall guide to the fishing pressure and crop.

The average Men's Whole Season Diarist's rate of catch in 1962-63 and 1967-68 is shown in Table 2 for the principal waters. It will be noticed that it is rather poor. I have shown (Graynoth 1973) that there is a rough relationship between anglers' catch rates and the densities of the fish stocks.

This has been used to estimate the stocks of fish in some rivers (Table 2). From this table it seems possible that the Spring Creek stock of fish is supplemented by fish migrating from the main river. The estimated crop rate from the other waters is fairly high compared to the Wellington and Nelson Acclimatisation Districts. Diving and electric fishing surveys need to be carried out to check the stock estimates. If the stock is as low as suspected it may be wise to limit the crop especially in the Pelorus and Rai system. The situation in the Wairau is more complex. The 1965 Experimental Winter Season has shown the presence of small sea run brown trout in the lower reaches and these fish may re-populate the river should it be overfished. At the moment the Wairau probably is not overfished and the bag limit of four fish could well be relaxed.

Fisheries Regulations

Bag Limit

A bag limit of four fish per day is in force in the upper reaches of the Wairau River beyond the Wash bridge. This limit is also found in the Goulter Stream, a tributary of the Wairau and in the Rai River. All other waters have a bag limit of ten fish per day. No limit bags of ten fish were achieved in 1,261 days angling in 1957-58, 1962-63 and 1967-68. No information is available on the effect of the bag limit of four in the upper Wairau and Goulter. It is unlikely to have a restrictive action. In 95 days angling on the Rai, the maximum bag recorded was three fish and hence there it has no restrictive action. If as suspected the anglers take too many fish from the Pelorus and Rai system, the bag limit would need to be reduced to 1 or 2 fish per day to restrict the catch. This would be very low and it would perhaps be better to reduce the catch in other ways.

Size Limits

The size limit is 30.5 cm (12 inches). In this district as in Nelson the trout are of a high average size and anglers would be unlikely to keep fish below 30.5 cm even if this was legal. The number of undersized fish caught is generally low. The Opawa records the most at around 20% of the catch. The Pelorus surprisingly has more (10%) than the Rai (0-5%) and the Wairau at 10% of the catch has considerably more than Spring Creek where only 1 or 2% of the catch is undersized.

It is doubtful whether the catch could be regulated by the size limit unless it was unreasonably high at 35-40 cm. It is biologically efficient to catch fish when they are young and small and it is generally wasteful to have a high size limit.

Lure and Method Restrictions

Artificial fly only is allowed in the Rai River. In the Waihopai artificial fly and artificial bait are allowed. In all other waters spoon and minnow fishing is legal but natural bait such as live bullies and creeper can only be used in the lower Wairau River. If surveys show an adequate population of fish in the Wairau system, I see no reason why natural bait should not be allowed everywhere in it. The Awatere system should be opened up to any method of angling.

Closed Season

Experimental winter fishing in the lower Wairau by permit holders of the Marlborough Angling and Surfcasting Club revealed a good run of sea run brown trout and a few quinnat salmon. Whilst a few anglers did not like fishing in the discoloured water and in bad weather, the majority found it well worth while, the rate of catch at 0.5 fish per hour being good. An open winter season should be allowed in the lower Wairau, for otherwise there will be a waste of this resource. Experimental angling in the lower reaches of the other rivers in winter could assess the runs of sea trout there.

Pelorus River (National Publicity Studios)

Rai River (National Publicity Studios)

THE RIVERS

Pelorus River

The Pelorus is about 56 kilometres long, with numerous tributaries, and drains an area of 900 sq. kilometres. The Rai River is the most important tributary for angling. In the upper reaches the Pelorus flows through deep, rocky gorges but below the confluence with the Rai it follows a more open and winding course in a fairly wide valley, to join the sea at the top of the large Pelorus Sound.

The Pelorus and its large tributary the Wakamarina are subject to large sudden floods. These floods can be very heavy and debris were noted up to 3 metres above the normal level in all these rivers (Investigation Report 4).

The river below the gorges is rather slow and it has many pools of up to 3 metres in depth. The bottom substrate changes from mud and sand near the mouth to shingle, rock and stones in the gorges. The river banks below the gorges are mainly in pasture, willows and scrub. The bottom fauna densities are moderate to low.

The trout spawning facilities appear to be generally very limited in the Pelorus system (Investigation Report 4). There is only one 5 kilometre section in the main river, below the Rai junction which provides some spawning gravel.

Brown trout are the predominant species caught and no rainbow trout were recorded during a survey a few years ago. During the 1962 season the diarists caught 35 brown and seven rainbow trout. In 1967 ten rainbow and 27 brown trout were recorded. Recent releases of rainbow trout appear to be successful, approximately 200 being caught per annum.

The average size of trout caught has shown no real change since 1949-52, ranging from 41 to 48 centimetres and averaging 45.2 centimetres or 1.1 Kg.

The percentage of undersized fish in the catch was very low in 1949 and 1962, but high in 1957. Large variations in the number of undersized fish in the stock of this river could be caused by the floods, which could affect spawning and recruitment in some years.

The rates of catch have always been poor, there being insufficient information to show any historical changes. The average catch rate is about 1 fish every 4.3 hours. This river is similar to the Otaki River, a survey of which (Graynoth 1973) showed a density of 16 fish per kilometre. Artificial minnow and spoon are the most popular angling methods, followed closely by wet and dry fly, all these methods being equally efficient. Of the seven rainbow recorded in 1962, four were taken on minnow and two on wet fly.

The estimated crop is about 400 trout out of an estimated catchable stock of 900 to 1200 fish. Flooding and erosion probably limit the trout population and their food in the Pelorus River and its tributaries. Any improvements in this situation would be very costly. Fishing pressure at present levels probably has little effect on the trout population. The bag limit, even if it was reduced to four fish as in the Rai- would still have little effect on the catch. Most bags in 1962 were of one fish and only one bag exceeded three, and contained five fish.

There have been recent suggestions to introduce coho salmon (*Oncorhynchus kisutch*) into this river. This river is at the limits of the coho's sea temperature range and any stocking with expensive disease free ova or fry could easily be negated by the large floods which occur. The poor spawning grounds and lack of food support a low trout population of large probably cannibalistic brown trout. At all stages of the coho's life cycle this river would be unsuitable.

Rai River

The Rai River is one of the largest tributaries of the Pelorus and is the most important for angling. It is about 14 kilometres long, drains an area of about 220 sq. kilometres and joins the Pelorus about 16 Km from the Pelorus Sound. The Rai has its source in steep, bush clad hills and follows a comparatively sinuous course through flat, open country, except for the last 5 Km, where it flows in a rocky gorge. The stream bed is mainly shingle and the banks are 0.3-1.5m high with some wide shingle beaches in the flood bed. In the gorge the stream bed is largely rock with banks up to 4.5 m high. The bottom fauna appears to be moderate throughout the river. Although there are large amounts of shingle and stones only some areas are suitable for trout spawning (Investigation Report 4). In other areas the bed is too unstable and subject to flooding. Some super-imposition of the trout redds takes place. The trout fry production of Rai and its tributaries was estimated to be about twice as large as of the rest of the Pelorus system.

Brown trout are the major species caught, rainbow trout were only recorded in 1957. The records obtained from the angling diaries are not sufficient to show any historical trends. The average size is 47.8 centimetres with a few undersized fish present in the catch. The average catch per hour was 0.22 with little difference in the effectiveness of dry and wet fly methods.

The recent restriction on the bag limit to four fish would not have had any effect in 1962, when the largest bag was three fish and the majority one fish only. The estimated crop of just under 400 fish is probably an appreciable proportion of the stock.

Wairau River

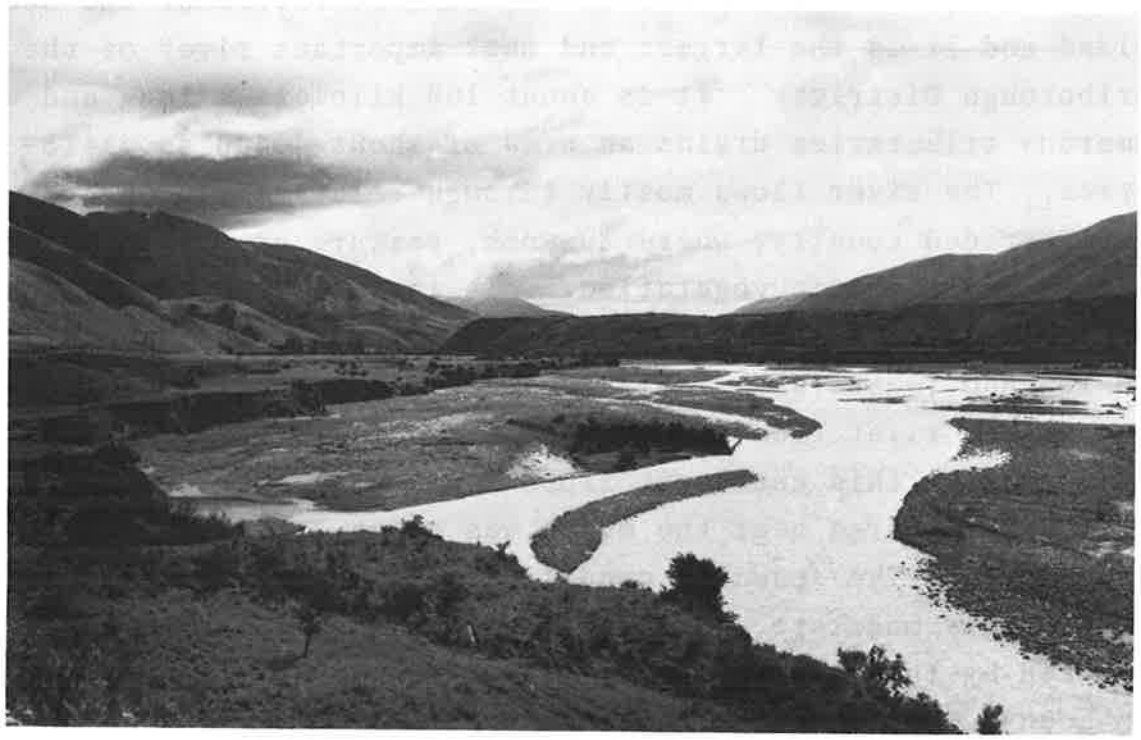
The Wairau River is one of the largest rivers of the South Island and it is the largest and most important river of the Marlborough District. It is about 160 kilometres long and with numerous tributaries drains an area of about 4,400 sq. kilometres. The river flows mostly through relatively open and partly eroded country, where tussock, pasture grasses and some willows are the main vegetation. It is relatively fast flowing to within about 13 kilometres of the lagoon mouth. The banks are low and relatively stable in the upper reaches. In lower reaches the river flows over extensive shingle flats. All the rivers in this catchment flood frequently and the highest recorded discharge near the mouth was about 2,500,000 litres per second. The spawning conditions and bottom fauna densities are probably moderate, but the spawning is probably adversely affected by the rivers' instability. Only the Waihopai River has been surveyed (Investigation Report 17).

The average size of the brown trout caught is large, fluctuating between 46 and 53 centimetres since 1949. The smallest average size of 41.9 was recorded in 1950. The overall average is 50.0 centimetres i.e. 1.5 Kg. The percentage of undersized fish has always remained low around 10% of the catch. The rates of catch have declined a little from 1949 (0.74) to 0.35 in 1957 and 1967.

In the 1962 season most legal angling methods were used in the river. The most popular methods were spoon and dry fly, which accounted for about 60% of the fishing time. The best catch rates were obtained, however, with one of the less popular methods, live bait.

One of the most popular methods, dry fly, brought by far the poorest results of 0.06 fish per hour, and the highest percentage of undersized fish caught at 52%. The poor catch rate on dry fly was due to Nelson Acclimatisation Society anglers using it in the upper reaches where spoon was far more successful.

Wairau River (National Publicity Studios)



Wairau River
(N.Z. Forest Service Photo By J.H.G. Johns, A.R.P.S.)

In 1967-68 bully was used more often and had a considerably better catch rate than other methods. Most angling was done in the lowest 30 kilometres, there being no real difference in catch rates in any other part of the river.

The majority of the angling was done in October, but December and January were also popular. The bag limit of 10 fish in the lower reaches was not achieved by the diarists. The maximum bag in 1962 was 7 fish and in 1967, six fish.

The anglers' crop is quite high at about 2,200 trout per annum and may be as much as 40% of the stock.

The river is still little used compared to its size, although it is by far the most popular river in the district where 38% of the district's fishing was done in 1962. Little is known about the resident and sea run brown trout stocks. Becuase of its unstable nature and floods the river is probably not able to support a dense population of trout, although some sections could be very good. Since the fish caught are quite large and there appear to be no complaints about their condition, little may need to be done by the Society.

Spring Creek

This small stream, which is about 11 kilometres long, flows into the Wairau River near the sea. Because of its close proximity to Blenheim this stream is the most heavily fished stream in Marlborough, where 8% of the district fishing was concentrated in 1962.

Spring Creek is about 9 metres wide, fairly deep (1 - 2 metres) with a smooth slow flow. The banks are low and overgrown with mainly willows and grass. From the nature of the stream it is possible that spawning is limited due to the lack of coarse material.

Opawa River (M.M. Small,
Internal Affairs Department)

Wakamarina River

The brown trout have maintained a good average size over many years (50.3 centimetres, 1.5 kg) ranging from 47.5 to 51.1 centimetres. One rainbow trout was caught in 1962. The percentage of undersized fish in the catch has usually been nil. The rate of catch has dropped in recent years from 0.4 in 1957 to 0.16 fish per hour in 1967. Of the several methods used in 1962 wet fly and live bait were the most popular, whilst dry fly (0.59 fish per hour) and live bait (0.32 fish per hour) were the most effective.

The estimated annual crop is about 390 trout and probably more than the stock at any given time. Since this small stream is the most heavily fished in the District, it warrants careful management especially because of the recent drop in catch rate. It would be important to know the extent of spawning in it, and if the population of trout is resident or migratory. If the population is migratory or dependant on spawning outside the stream, any change in the general conditions in the main river and tributaries could affect it and the fishing in the stream could suffer even though the conditions in it would remain unchanged.

Opawa-Omaka River

The Opawa-Omaka River is about 60 kilometres long and joins the Wairau River near the mouth. In the upper reaches it flows through tussock, rough pasture and scrub and in the lower reaches through the centre of Blenheim. It is similar to the other rivers of the Wairau system. Nothing is known about the conditions for trout in it, but it can be affected by floods.

Little angling has been recorded by the diarists. The average size of fish caught appears to be not less than 46 centimetres. In 1957 when 41 fish were recorded, the catch per hour was 0.45 and there was a very large percentage of undersized fish (45%),which in other years, however, remained at nil. The estimated crop is about 400 fish and the stock is unknown.

This river must be much less attractive to anglers than Spring Creek, although its lower reaches are even closer to town. This is not for lack of success, as the rate of catch and size appear to compare quite favourably.

Waihopai River

The Waihopai River is the largest tributary of the Wairau. It is 67 kilometres long and with several tributaries drains an area of over 750 sq. kilometres. It flows through similarly unstable and open country as other rivers in this area.

It is the only river in the Wairau catchment which has been surveyed by the Marine Department (Investigation Report 17). During the survey the bottom fauna was found to be scarce and eels and other native fishes were not abundant. Although the spawning areas were found to be very limited, it appeared that the river contained a fair number of takeable fish from 0.5 to 3 kg in weight, except that the main tributary, the Avon River appeared to be without fish.

The conclusions reached after the survey were that the spawning conditions balance the low food supply and that the river holds the maximum stock it is capable of supporting.

The Waihopai is practically unfished, no records at all were received in 1962 and 1967. The general character of the river does not make it particularly attractive to anglers and there are other more accessible rivers in the district.

Awatere River

The Awatere River is one of the three largest rivers in the Marlborough District. It is about 110 kilometres long and drains an area of 1550 sq. kilometres. It flows mainly through open tussock and pastoral land.

A road runs along the river for much of its course. The catchment suffers from erosion and it appears that the river bed materials may be too fine or too loose for trout spawning. No surveys have been undertaken of this river. Lack of cover, instability and probable paucity of bottom fauna do not appear to make this river suitable for trout.

The information from the angling diaries is insufficient to provide much indication of the trout stock, which is probably adequate although small. In 1962 the diarists spent 21 hours fishing in the Awatere and caught nine brown trout of average length 41.7 centimetres. In 1967 the diarists caught two fish. The percentage of the total district angling effort spent on the Awatere in 1962 was below 2%. A major reason for lack of popularity of this river could be not the lack of trout, but the relatively unattractive surroundings. The river is reported to contain quinnat salmon.

FISHERIES MANAGEMENT

The Marlborough Society has recently employed a full time ranger to carry out fisheries surveys in this district. Fisheries management in the past has included fish salvage from small streams liable to dry up and the employment of protective fishing regulations. No scientific data have been accumulated on the fish stocks and habitats etc.

Diving surveys should be carried out in the Pelorus and Rai rivers and if the stocks are as low as suspected, it may be wise to make additional ova plants or fry releases and restrict the anglers' catches.

Spring Creek should be surveyed to determine the reasons for its decline. The sea run brown trout should be investigated and the close season relaxed to allow exploitation of these fish by anglers. Other problems can await the completion of these studies.

ACKNOWLEDGMENTS

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