THE RELATIVE VALUE OF SOUTH CANTERBURY RIVERS TO SOUTH CANTERBURY ANGLERS: A PRELIMINARY REPORT

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* This report is exempt from this condition.

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PREFACE

The rivers and streams of New Zealand, many of which support salmon or trout fisheries, are the subject of frequent water management decisions. Some of these decisions result in significant alterations to existing fish habitat, thereby reducing angling opportunities. Any case presented by fisheries interests to either the Regional Water Board or the National Water and Soil Conservation Authority (NWASCA), in support of a particular river, will obviously be strengthened by the inclusion of information about the angling experience afforded by that river. As hydroelectric, irrigation and other river developments place ever-increasing demands on the remaining freshwater resource, the need for up-to-date information on current angling usage has become acute. In particular, there is a need for comparative data about the relative importance and highly valued aspects of the angling experience offered by a particular river. Such information will enable water managers to take into account the angling value of a river in a regional or national context, rather than in isolation as tends to happen at present.

In 1979, Fisheries Research Division (FRD) of the Ministry of Agriculture and Fisheries (MAF), together with the New Zealand Acclimatisation Society movement, began a postal survey of anglers in all acclimatisation districts with significant sales of fishing licences. The survey had four major objectives:

(1) To collect, directly from the adult angling population of New Zealand, quantitative and comparative information on every river supporting a significant sports fishery.

(2) To identify those attributes which characterise particular rivers of importance.

(3) To determine from this information, those rivers which constitute fisheries of national, regional and local importance.

(4) To obtain a data base for future work.

Lake fisheries were deliberately excluded from the survey, since it was considered impractical to design a single questionnaire capable of adequately coping with the full range of lake and river fisheries.

A questionnaire booklet, containing a list of rivers within a given acclimatisation district, was mailed to anglers in each society. Anglers were asked to identify rivers which they had fished over a three to five year period by assessing, for each river, its importance to them (on a 1-5 scale), and the relative importance of seven listed qualities (distance from home, access, area of fishable water, scenic beauty, feelings of peace and solitude, catch rate and size of fish) in determining why they fished that particular river. Information was also requested on average number of visits, reach of river fished, fishing methods used and any associated recreational activity.

Out of the more than 10 700 anglers contacted, approximately 4 000 completed their booklets, providing over 20 500 individual assessments of more than 800 rivers and streams throughout the country. Both because of the sheer volume of data collected, and the amount of detailed information contained therein, full analysis of the data is expected to take at least a further twelve months. The present series of reports is aimed at bridging this gap by making available those aspects of the results which are of direct relevance to individual societies. A further series of reports will identify rivers of regional and national importance.

While these reports are final in the sense that they are an accurate and detailed assessment of the survey data as they now stand, they are subject to five major limitations:

(1) Response rates varied between societies, but generally between 40% and 50% of the anglers returned booklets indicating which rivers

they had fished. These reports are based solely on the responses received from these anglers, and no attempt has been made to extrapolate the raw data to the society as a whole. Consequently, estimates of total anglers and total effort for each river have not been included.

(2) Analysis of data from anglers who travelled to fish rivers outside their home society has yet to be completed. Some locally and regionally important rivers can therefore be determined from these reports, but the identification of nationally important rivers will not be possible until all visiting angler information is available. Rankings assigned in this report are therefore subject to revision and are definitely minimum; a river identified here as regionally important may well be considered as nationally important when all the data have been analysed.

(3) For those rivers which fall within more than one society district, the data presented relate only to the society under discussion.

(4) Information other than that specifically relating to river fisheries has not been included. Details relating to the anglers themselves, such as their fishing success, age, sex and occupational status, and their attraction to rivers in other society districts, will be incorporated in later reports.

(5) The survey methodology and the methods of analysis are not discussed. Since the same techniques were used in all society districts, these aspects of the survey will be discussed in detail in a later report.

1. INTRODUCTION

The South Canterbury Acclimatisation District (Fig. 1) falls naturally into two distinct geographical regions of almost equal size. The eastern half lies between the Rangitata River to the north and the Pareora River to the south, and extends inland as far as Burkes Pass. The western half, lying inland of Burkes Pass in the Mackenzie Country, takes in the upper Waitaki catchment above the Pukaki River.

The eastern half is dominated by the Opihi/Temuka River system, and to a lesser extent by the Rangitata. With the exception of the latter, which is a glacier-fed river rising on the main divide, all the rivers in this region are rain or snow-fed rivers rising in the foothills. In their lower and middle reaches, the rivers north of the Opihi traverse the Canterbury Plains, and typically have open shingle beds with willows lining the banks. Elsewhere, the terrain is more diverse, ranging from rolling hill country in the vicinity of the Pareora and Tengawai to the steeper headwater catchments of the Orari and Opuha. Much of the region is farmed, and is well serviced by a network of minor roads.

The inland portion of the district basically consists of the Tekapo River and its catchment. The landscape in this area is typical of the Mackenzie Country, with open tussock lands rising towards the mountains. All of the region is above 380 m in elevation, with the catchment above Lake Tekapo exceeding 700 m. Glacial flour is present in both the Godley and Tekapo Rivers, but the remaining rivers in the area are all clear snow or rain-fed rivers, flowing swiftly through generally open stony beds. Apart from S.H.8, which traverses the area from Pukaki to Burkes Pass, vehicle access is confined to a few minor dirt roads.

There are few catchments in the district which remain in an unmodified condition. The Rangitata supplies up to 30 cumecs to the Rangitata Diversion

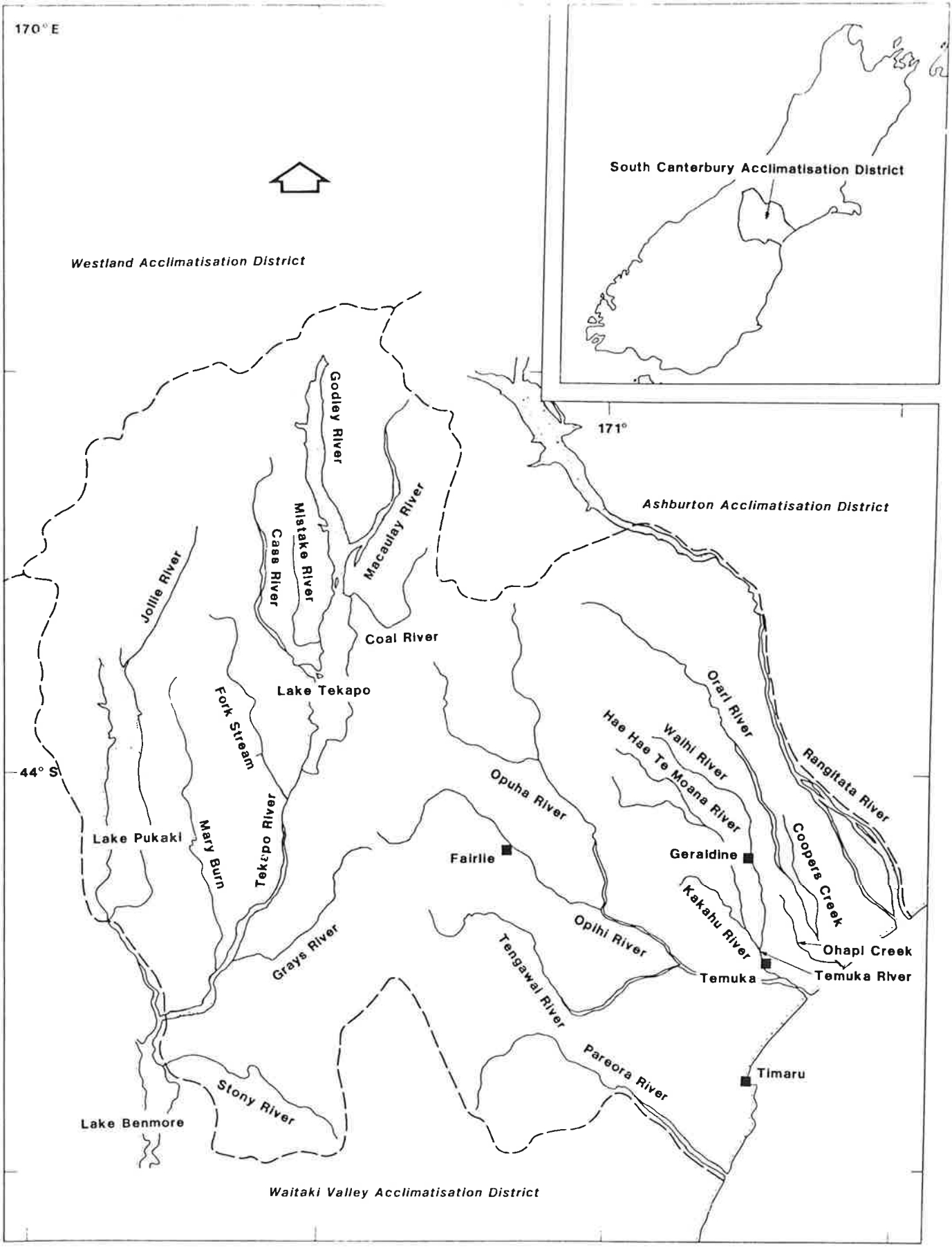

FIGURE 1. South Canterbury Acclimatisation Society district.

Race (RDR), with a consequent reduction in flow below the intake. Both the Pareora and the Opihi are extensively used for irrigation, to the extent that sections of the Opihi become dry during times of low flow (Hardy 1972). More recently, hydroelectric development of the upper Waitaki has controlled the level of Lake Tekapo, so that flows in the Tekapo River are subject to artificial variation, and raised the level of Lake Pukaki.

Timaru, with a population of 28 412, is the main centre of the district, with Temuka (3771), Geraldine (2128) and Fairlie (882) the main rural centres (Department of Statistics 1981). Fishing is an unusually popular activity in this area (Graynoth and Skrzynski 1973), with 3477 adult whole season fishing licences sold during the 1979/80 season. In addition to holding good stocks of brown trout, the South Canterbury Society is one of four societies (along with North Canterbury, Ashburton and Waitaki) whose rivers support major quinnat salmon fisheries.

In March 1980, survey booklets were mailed to 483 anglers selected at random from the 3477 South Canterbury adult licence holders. This report deals with the responses of 203 (42%) of the anglers sampled who returned booklets providing information on South Canterbury rivers. An example of the booklet is included as Appendix I.

2. RESULTS

To assess the relative value of South Canterbury rivers to anglers, two measures of importance were used. Firstly, the raw data were tabulated to show the number of respondents who fished each river. Any river for which more than fifteen anglers had provided data was automatically selected for further consideration. Rivers with fewer respondents were considered only if there was reason to believe, from the data, that they had some particularly noteworthy feature. Both the number of anglers fishing a particular river, and to a lesser extent, the total number of visits, were taken as an indication of the relative use made of that river.

TABLE 1. Measures of angler use and quality of the angling experience associated with South Canterbury rivers.

River	No. of anglers	% of respondents	No. of visits	Visits/ angler	Assessment of importance
Rangitata (S)+	149	73	2388	16.0	5
Rangitata (T)+	80	39	551	6.9	2
Orari (S)	58	29	359	6.2	1
Orari (T)	58	29	368	6.3	2
Ohapi	26	13	145	5.6	2
Coopers	4	2	4	*	*
Opihi (S)	117	58	1514	12.9	4
Opihi (T)	121	60	1346	11.1	4
Temuka	67	33	502	7.5	3
Hae Hae Te Moana	17	8	53	3.1	1
Waihi	34	17	202	5.9	2
Kakahu	14	7	87	6.2	2
Tengawai	27	13	138	5.1	3
Opuha	25	12	82	3.3	2
Pareora+	48	24	315	6.6	2
Tekapo	60	30	276	4.6	4
Mary Burn	14	7	27	1.9	3
Grays	16	8	50	3.1	3
Fork	6	3	13	*	*
Cass	4	2	12	*	*
Mistake	2	1	4	*	*
Macaulay	13	6	30	2.3	3
Coal	1	0.5	1	*	*
Jollie	2	1	2	*	*
Stony (L. Benmore)	29	14	97	3.3	3

S = Salmon

T = Trout

Scale of importance: 1 = insignificant

5 = exceptional

+ The Rangitata and Pareora Rivers form the boundary with Ashburton and Waitaki Valley Acclimatisation Districts respectively.

* Too few responses to analyse.

The second measure of importance was based on the anglers' ratings, on a 1-5 scale, of the overall importance of each river taking into account the whole angling experience. For those rivers with sufficient responses, these ratings were compared to identify the relative value, or quality, of the angling. As a visual aid to performing this comparison, histograms showing the distribution of the 1-5 ratings were constructed for each river (Appendix II). Each river was then assessed on a 1-5 scale, ranging from 1 (insignificant) to 5 (exceptional).

Table 1 shows the number of anglers and number of visits for all South Canterbury rivers for which data were collected. For those rivers (16 in all) selected for further examination, Table 1 also shows the visits per angler and overall importance, or angling quality.

To investigate the relationship between usage made of each river and angling quality, the rivers were ordered according to the number of anglers fishing them. Rivers which support both salmon and trout fisheries were listed twice in the survey booklet, so that there is some overlap between the figures for these rivers. Since many anglers fished for salmon and trout, and therefore appeared twice in the raw data, these anglers had to be taken into account when determining the total number of anglers fishing the Rangitata, Orari and Opihi (Table 2).

TABLE 2. Determination of the total number of respondents who fished the salmon rivers.

	Rangitata		Orari		Opihi	
	No. of anglers	Percentage	No. of anglers	Percentage	No. of anglers	Percentage
Salmon only	83	50.9	20	25.7	29	19.3
Trout only	14	8.6	20	25.7	33	22.0
Both salmon and trout	64	40.5	38	48.6	88	58.7
Total	161	100.0	78	100.0	150	100.0

The results of this analysis are shown in Table 3. Clearly, those rivers which attracted the greatest number of anglers were not necessarily the most highly valued.

TABLE 3. Number of anglers and importance or quality of angling experience associated with the nine most-fished rivers in South Canterbury.

River	No. of anglers	Percentage of respondents	Assessment of Importance	
			Salmon	Trout
Rangitata	163	80.3	5	2
Opihi	150	73.9	4	4
Orari	78	38.4	1	2
Temuka	67	33.0		3
Tekapo	60	29.6		4
Pareora	48	23.6		2
Waihi	34	16.7		2
Stony	29	14.3		3
Tengawai	27	13.3		3

Scale of importance: 1 = insignificant
5 = exceptional

For example, anglers who fished the Orari (for either salmon or trout), the Pareora and the Waihi Rivers assigned average or below average ratings to these rivers. In order to examine why a comparatively high number of anglers were attracted to these rivers, the data were studied further to determine how each of the seven qualities listed in the questionnaire was assessed from river to river. As with the overall importance, each quality was ranked on a 1-5 scale, with histograms again being used to aid interpretation of the results (Appendix II).

The results of this analysis are summarised in Table 4. The Orari, Waihi and Pareora all provide angling opportunities in close proximity to

TABLE 4. Assessment by anglers of seven factors which contribute to the angling experience provided by South Canterbury's 16 most-fished rivers.

	Distance	Access	Area Fishable	Scenic Beauty	Solitude	Catch Rate	Size of Fish
Rivers close to anglers' homes							
Temuka	*****	*****	***	**	***	***	**
Opihi (S)	*****	*****	***	**	***	***	*****
Opihi (T)	*****	*****	****	***	***	***	**
Waihi	*****	****	****	***	****	***	**
Pareora	*****	****	**	***	***	**	**
Rivers moderate distances from anglers' homes							
Tengawai	****	****	***	***	****	**	**
Orari (S)	****	****	**	**	***	*	****
Orari (T)	****	***	***	***	****	**	**
Hae Hae Te Moana	***	***	***	****	****	**	**
Ohapi	***	**	**	***	****	***	**
Kakahu	***	***	***	***	****	***	**
Rangitata (S)	***	***	****	**	****	**	*****
Rangitata (T)	***	***	****	***	****	***	**
Rivers remote from anglers' homes							
Opuha	**	**	***	***	****	***	***
Macaulay	*	**	***	*****	*****	***	***
Tekapo	*	***	****	****	*****	****	***
Grays	*	**	***	****	*****	***	***
Mary Burn	*	**	**	*****	*****	***	***
Stony	*	***	***	****	****	****	***

S = Salmon

T = Trout

* = lowest rating

***** = highest rating

anglers' homes and, apart from the Orari, were considered to be easily accessible. None of the other five factors examined appeared to contribute significantly to the high angling use made of either the Pareora or the Orari. A similar pattern characterised the Temuka, considered one of the most accessible of all the 16 rivers. Anglers who were unable to expend the time, effort or money involved in travelling to a more remote river appeared therefore to be attracted to these rivers despite the lower quality of the angling. They are also the only rivers, apart from the Opihi, where the majority of anglers could enjoy a couple of hours fishing and be home shortly afterward.

In contrast, anglers who fished the Rangitata, Opihi, Tekapo, Stony and Tengawai Rivers valued the angling very highly. All five rivers received generally positive ratings for access, area of fishable water, scenic beauty and feelings of peace and solitude. When considered as trout fisheries, the rivers were also characterised by moderately good catch rates and reasonably large fish. Anglers were evidently prepared, if necessary, to commit a considerable amount of time and effort in order to enjoy the particularly positive combination of attributes provided by these rivers.

When all 16 rivers were considered together, two rather distinct types of angling experience emerged. Easily accessible rivers located close to population centres afforded fishing opportunities which encouraged high angler usage despite the lower quality of scenery, lack of solitude and generally smaller fish which characterised these rivers. On the other hand, the attraction of solitude, scenery and generally larger fish outweighed the effort involved in travelling long distances and negotiating more difficult access in order to fish the more remote rivers. All of the upper Waitaki rivers came into this latter category, as well as the upper reaches of the Orari and Opuha.

3. CHARACTERISTICS OF 16 SOUTH CANTERBURY RIVERS

The following section provides a summary of the survey results in relation to each of the 16 South Canterbury rivers listed in Table 4. In addition to the information presented in this table, use has also been made of Table 5 (summarising angler responses on which reach of each river was fished), and Tables 6 and 7 (detailing preferred fishing methods and other activities associated with each river). Many anglers provided written comments when they returned their booklets. Where more than one or two comments were received for a particular river, they have been included as received. The rivers are dealt with in geographical order from the north to south, followed by the upper Waitaki rivers. Within each catchment, tributaries have been numbered in ascending order from the lower reaches to the headwaters.

3.1 Rangitata River

Of the rivers which support a salmon fishery, the Rangitata attracted the most salmon anglers, the highest number of visits and was considered by the respondents to be the most important river fishery within the district. When compared to the Opihi, anglers had to travel further and negotiate more difficult access in order to fish the Rangitata. Once at the river, however, anglers fished extensive areas of water available in both the lower and middle reaches. By contrast, salmon angling in the Opihi was mostly confined to the lower reaches.

Neither the angling effort expended on the Rangitata nor the high regard which anglers have for this river can be explained solely by reference to the seven contributing factors. One important attribute not considered in this analysis was the size of the river and its associated flow regime. Certainly the above average ratings for both area of fishable water and solitude would support the value placed on a big river fishery by anglers. Although water is diverted from the Rangitata for irrigation, this river still remains the largest river in the district. While the current Water

TABLE 5. Popularity of individual river reaches associated with South Canterbury's 16 most-fished rivers. (Reaches fished by less than 5% of the respondents have been left blank.)

River	Headwaters	Middle reaches	Lower reaches
Rangitata (S)	*	* * * *	* * * *
Rangitata (T)	* *	* * *	* * * *
Orari (S)		*	* * * * *
Orari (T)	*	* *	* * * * *
Ohapi	*	* * * *	* *
Opihi (S)		* *	* * * * *
Opihi (T)	*	* * * *	* * * *
Temuka		* * * *	* * *
Hae Hae Te Moana	*	* * * * *	* *
Waihi		* * * *	* *
Kakahu	* *	* * * *	* *
Tengawai	* *	* * * *	* * *
Opuha	* * *	* * * *	* *
Pareora	* *	* * * *	* * *
Tekapo	* *	* * * *	* * * *
Mary Burn	*	* * *	* * * *
Grays	*	* * * *	* * *
Macaulay		* *	* * * * *
Stony	*	* *	* * * *

S = Salmon anglers

T = Trout anglers

* = 5-20% of respondents fished that reach

* * = 21-40% of respondents fished that reach

* * * = 41-60% of respondents fished that reach

* * * * = 61-80% of respondents fished that reach

* * * * * = 81-100% of respondents fished that reach

TABLE 6. Preferred angling methods associated with South Canterbury's 16 most-fished rivers. (Methods used by less than 5% of the respondents have been left blank.)

River	Dry fly	Wet fly	Nymph	Live bait	Spinner
Rangitata (S)		*			*****
Rangitata (T)	*	**	*	**	****
Orari (S)	*	*	*	*	*****
Orari (T)	**	***	**	**	***
Ohapi +	****	**	**		*
Opihi (S)		*			*****
Opihi (T)	**	***	**	**	***
Temuka	***	***	**	**	***
Hae Hae Te Moana	***	**	**	**	**
Waihi	***	**	**	**	**
Kakahu	****	**	***	**	*
Tengawai +	****	**	***		*
Opuha	***	**	**	**	**
Pareora	***	**	**	**	**
Tekapo	***	**	**	*	***
Mary Burn	***	*	***		**
Grays	****	***	****	*	*
Macaulay	****	***	**		**
Stony	**	***	**	*	***

\+ Artificial fly only (Acclimatisation Society Regulations)

S = Salmon anglers

T = Trout anglers

* = 5- 20% of respondents used that method

** = 21- 40% of respondents used that method

*** = 41- 60% of respondents used that method

**** = 61- 80% of respondents used that method

***** = 81-100% of respondents used that method

TABLE 7. Other recreational activities associated with angling on South Canterbury's 16 most-fished rivers. (Activities listed by less than 10% of the respondents have been left blank.)

River	No. of Respondents	Enjoying Scenery	Picnicking	Swimming	Camping	Tramping	Shooting
Rangitata (S)	149	**	**		**		*
Rangitata (T)	80	**	**		**		
Orari (S)	58	**	**				*
Orari (T)	58	**	***				
Ohapi	26	**					
Opihi (S)	117	*	**	*			*
Opihi (T)	121	**	****	**			*
Temuka	67	**	****	**			*
Hae Hae Te Moana	17	***	****	****	*	*	*
Waihi	34	**	**	*			*
Kakahu	14	**	***	*			
Tengawai	27	****	****	**		*	*
Opuha	25	****	****	*	**	**	**
Pareora	48	***	****	**			*
Tekapo	60	****	***	*	*****	*	**
Mary Burn	14	***	**				*
Grays	16	*****	****		***	*	***
Macaulay	13	*****	*****			*	***
Stony	29	****	***	*	****		**

S = Salmon anglers

T = Trout anglers

* = 10-19% of respondents participated in that activity

** = 20-29% of respondents participated in that activity

*** = 30-39% of respondents participated in that activity

**** = 40-49% of respondents participated in that activity

***** = 50 + % of respondents participated in that activity

Allocation Plan (South Canterbury Catchment and Regional Water Board 1977) and associated minimum flow governs the abstraction of water from the river it will continue to gain a measure of protection from extreme low flows which characterise, for example, the Opihi River during summer droughts. It is important therefore, that sharing of the water resources does not further reduce the river's summer flow when the plan is revised.

Although 80.3% of the anglers who fished and responded to the survey questionnaire spent some time at the Rangitata, only 18.7% of the total number of visits to this river were made by anglers who wished to catch trout. Even so, only the Opihi was visited more frequently by anglers fishing for trout. Despite this high angling effort, the Rangitata trout fishery was not greatly valued, being below average in relation to the 16 trout fisheries considered. Apart from size of fish, no significant difference was found when salmon anglers' ratings of the other contributing factors were compared to those of trout anglers. However, when the ratings of anglers who fished only the middle reaches were compared with those from anglers who confined their efforts to the lower reaches, both salmon and trout anglers considered the middle reaches to be more scenic and afford more solitude than the lower reaches. Salmon anglers also regarded the middle reaches as being more easily accessible than the lower reaches. Spinning was the preferred method used by both salmon and trout anglers on the Rangitata.

The most popular recreational activities associated with angling were picnicking, camping and shooting. Also recorded were whitebaiting, floundering, seafishing, rock collecting and blackberrying. Hardy (1975) also found that picnicking was an important recreational activity on the Rangitata. The few comments made by anglers about the river suggest that its rugged nature enhances the angling experience.

Comments included:

"A good river to fish, will be a tragedy if lost to irrigation.

A good rugged river.

Unpredictable river conditions.

Rough and desolate.

Clean air, good exercise, relaxing.

Good outdoor living and peace.

Concerned by draw-off of water.

Middle and lower reaches understocked with trout."

3.2 Orari River

The Orari was the third most-fished river in the district, attracting 38.4% of the respondents, the majority of whom fished for both salmon and trout in the lower reaches. Despite this high angler usage, the fishery was considered to be inferior to that of most other rivers. While access to limited areas of fishable water was relatively easy, neither scenic beauty nor peace and solitude were highly regarded. One of the lowest trout catch rates was sustained by anglers who used both wet fly and spinner to land small fish. In comparison the spinner was used almost exclusively by salmon anglers who considered the catch rate to be lower than that from either the Opihi or Rangitata. While several anglers reported whitebaiting and floundering at the river mouth, picnicking was the most popular recreational activity associated with angling on the Orari.

3.2.1 Ohapi Creek

One third of the number of anglers who fished the Orari were attracted to one of its small tributaries, Ohapi Creek. Fishing was confined mainly to the middle reaches where access across private land to very restricted areas of fishable water was considered to be difficult. While similar scenic ratings were awarded to both the Orari and Ohapi, anglers valued the tributary more highly for the opportunity of fishing in peace

and solitude. As a result of Acclimatisation Society regulations which prohibit the use of spinner and live bait, almost 80% of the respondents employed the dry fly to land trout of a similar size to those landed from the Orari. However, despite the regulations, two anglers used the spinner. Reasonably good catch rates were backed up by several comments which referred to the Ohapi as an excellent dry fly fishery.

3.3 Opihi River

In contrast to the Rangitata, approximately equal numbers of salmon and trout anglers were attracted to the Opihi, which was fished by 73.9% of the respondents. It was not only fished by more trout anglers than any other river in the district, but also received 2.4 times more trout fishing visits than the Rangitata. The Opihi was highly valued by both salmon and trout anglers. Importance ratings were only slightly lower than those awarded to the Tekapo for trout fishing. The exceptionally high fishing pressure which anglers exerted on this river is a function of its proximity to the population centres of Temuka, Timaru, Geraldine and Fairlie. Whether anglers fished for salmon in the lower reaches or trout in both middle and lower reaches, the access to extensive areas of fishable water was considered excellent. The Opihi was not valued for scenic beauty, and solitude ratings were among the lowest in the district (although the middle reaches received higher scenic beauty and solitude ratings than the lower reaches).

Almost every angler employed the spinner while fishing for salmon and it remained the preferred method with trout anglers, although both wet and dry flies were also used by approximately 40% of the respondents. Anglers' ratings suggested that the Opihi and Rangitata sustained similar trout catch rates. While a few anglers participated in whitebaiting, floundering and eeling, the most popular recreational activities associated with the Opihi were picnicking, swimming, shooting and camping.

Anglers' comments concentrated on changes in the quality of the trout fishery and the effect which Catchment Board activities were having on the river channel. They included:

"Fly fishing not as good as previously.

Salmon and trout fishing not a patch on earlier years.

Trout population deteriorating, river damaged by Catchment Board activities.

Now ruined by Catchment Board.

Bulldozer activities cause pea soup conditions in the river bed; Catchment Board should be asked to cease working during the summer months unless absolutely essential. (Although this anglers' bach is on the Opihi which he prefers, he feels forced to fish the Tengawai where the water is clearer.)

Affected by low flows as a result of irrigation draw-off.

As demands for water increase, this will become a dry river.

Over the years poaching and irrigation have spoilt this river for good fishing.

The most central large river in South Canterbury nearest to the only city - should be patrolled more for poachers and stocked more often.

Three comments about the lack of fish.

1979/80 season very poor.

Willows in the gorge makes access to good holes difficult.

Lots of eels.

Smooth and even.

Quiet and peaceful.

Fast moving good fighting fish in great condition."

3.3.1 Temuka River

The Temuka, which anglers considered to be one of South Canterbury's closest and most easily accessible rivers, attracted the fourth highest number of respondents. From the confluence of the Hae Hae Te Moana and Kakahu Rivers, it flows past the township of Temuka before meeting with the lower reaches of the Opihi. The Temuka was regarded as being one of the least

scenic rivers in the district, offering anglers little opportunity for fishing in peace and solitude.

All the rivers which reach the coast, however, including the Rangitata, Orari, Opihi and Pareora, received low scenic beauty and solitude ratings, so that the Temuka is not unusual in this respect. Although both wet and dry flies were equally popular, all five methods were used by anglers, who sustained a low catch rate of small trout from the Temuka. Picnicking and swimming were associated with fishing as often on this tributary as on the Opihi.

3.3.2 Hae Hae Te Moana River

Distance ratings indicated that the Hae Hae Te Moana, one of the least valued rivers of those under discussion, attracted local anglers more often than those who lived further away. The 17 respondents who fished this tributary concentrated their efforts in the middle reaches which flow close by the township of Geraldine before reaching the Temuka River. While scenic beauty and solitude ratings were above average, only restricted areas of fishable water were available. Small trout were a feature which characterised all the rivers in the Temuka drainage. Catch rates were also considered to be low by anglers, who preferred the dry fly to other fishing methods. Swimming and picnicking were equally popular with anglers who visited the Hae Hae Te Moana.

3.3.3 Waihi River

The proximity of the Waihi to the towns of Geraldine and Temuka and the reasonably large and easily accessible areas of fishable water, attracted the second highest number of anglers of any tributary in the Opihi catchment. Fishing was concentrated in the middle reaches where every method was used, a feature common to most of the Opihi tributaries. Although trout landed were small, both the catch rate and anglers' comments indicated that stocks were plentiful. The only other comments were about

the high quality of this small river as a dry fly fishery.

3.3.4 Kakahu River

Of the rivers under consideration in the Opihi catchment, this small tributary of the Hae Hae Te Moana was fished by the lowest percentage of respondents. While a few anglers lived close by, the majority had to travel some distance in order to fish the middle reaches of the Kakahu, where both access and area of fishable water received average ratings. Although dry fly was preferred, all methods were used. Catches comprised small trout, and the catch rate was considered to be on a par with the Opihi.

3.3.5 Tengawai River

The Tengawai was the most highly valued of the Opihi tributaries. Anglers did not have to travel far to fish the middle and lower reaches where reasonably large stretches of water were easily accessible. Of the artificial fly methods allowed by Acclimatisation Society regulations, the dry fly was used by the majority of anglers, who landed trout of a similar size to those landed from the neighbouring Opuha and the Opihi. Despite society regulations, the spinner was used by two of the 27 anglers who fished this river. Comments about a decline in the fish stocks reinforced anglers' assessment of low catch rates. The most popular activity associated with fishing was picnicking which was recorded by almost half of those who fished the Tengawai.

3.3.6 Opuha River

Although a similar number of respondents fished the Opuha as were attracted to the Tengawai, they visited this tributary of the Opihi less frequently and did not value the quality of the angling experience as highly. In comparison to the other rivers which flow to the coast within this district, anglers had to travel a considerable distance in order to fish the headwaters and middle reaches of the Opuha, where the majority of angling

took place. Similar ratings were awarded to this river and the Tengawai for area of fishable water, scenic beauty and solitude, although access was considered to be more difficult. As with all other Opihi tributaries, the dry fly was the most popular method with anglers, who caught similar sized trout to those landed from the mainstem. While picnicking was the most popular activity associated with angling, tramping was also frequently combined with fishing on the Opuha.

3.4 Pareora River

The easily accessible middle and lower reaches of the Pareora, which is located in close proximity to the city of Timaru and forms the boundary with the Waitaki Valley Acclimatisation Society district, attracted 23.6% of the South Canterbury respondents. Once at the river however, very restricted areas of water supported one of the lowest catch rates of small trout in the district. Neither scenic beauty nor solitude were highly valued by anglers, whose low ratings were shared by both the Opihi and Rangitata Rivers. Over half of the anglers combined fishing the middle reaches with picnicking and swimming. Their comments indicated the reasons why the Pareora is no longer highly regarded. They included:

> "Fifteen years ago until the sap-sucking irrigators got going, this was the finest fly fishing river in the district.
>
> Over the years irrigation and poaching have spoilt the good fishing.
>
> Spent hours of pleasure teaching many anglers the art of dry fly fishing on this river. Now that I want to teach my son, there are only memories.
>
> Low flows are a problem.
>
> Shame to see it dry in the summer nowadays when spray irrigators are working.
>
> Unfortunately the good natural holes are being drastically changed.
>
> Not enough fish in this river."

3.5 Tekapo River

Although the Tekapo was fished by only half as many anglers as the

Opihi, the overall importance ratings indicated that it was as highly valued, making it one of the two most important trout fisheries in the district. Anglers had to expend considerable time, energy and money in order to fish this river, which they considered to be remote from their homes. As a result correspondingly fewer visits were made to the Tekapo when compared to rivers located closer to the population centres.

The majority of angling took place in the middle and lower reaches where some of the most extensive stretches of water could be fished. One of the best catch rates of reasonable sized trout was sustained by anglers, who preferred spinning to the use of artificial flies in the lower reaches. All methods, except live bait, were equally popular in the middle reaches. As with all the upper Waitaki rivers, the scenic beauty and peace and solitude of the Tekapo were the most highly valued attributes. While camping was especially popular with anglers who fished the lower reaches, camping, picnicking and shooting were all equally popular with anglers who visited the middle reaches.

As a result of hydro development in the upper Waitaki basin, the natural flow regime of the Tekapo River has been significantly modified. Initially, a control structure was built on the lake outlet in the early 1950's. Since the diversion of Lake Tekapo's outflow to the power canal in 1977, frequent releases of flood water down the Tekapo have continued (Graynoth in press). The effects of this practice on fish stocks and habitat are currently under investigation (Stancliff, Hablous and Thornton 1982). Anglers' comments reflected the concern they felt about the effects of hydro development on the Tekapo.

After the postal survey had been completed, the Tekapo River was channelised from 2 km below the Mary Burn confluence to just above the Pukaki confluence. Although the river resumed a braided form as a result of releases from Lake Tekapo during the following months, the disruption to trout habitat occurred during the spawning period. In light of the fact that the Tekapo is regarded as one of South Canterbury's most important river fisheries, future river control activities should only be undertaken after the fisheries managers have been consulted.

Anglers' comments included:

"Consistently fluctuating river levels have down graded what was once a fine stretch of dry fly water.

Good fishing when hydro allows. Very bad fluctuating flows this year.

Since hydro affected it, the river is not as good as it used to be.

Still OK from Grays down to Lake Benmore.

When the flow is steady this river's alright.

First-class trout stream, one of the best in the area.

Better access roads needed."

3.5.1 Mary Burn

In addition to being the most important spawning tributary of the Tekapo, the Mary Burn was also highly rated as a trout fishery. Angling effort was confined to the lower and middle reaches where areas of fishable water were very restricted. Otherwise this river was characterised by the same attributes as the Grays. Dry fly and nymph were equally popular with anglers who caught trout of a similar size to those landed from the Tekapo. In contrast to other remote rivers, fishing was not often combined with other recreational activities.

3.5.2 Grays River

Although more fishing pressure was exerted on the Grays than the Mary Burn, these two remote tributaries of the Tekapo afforded anglers similar angling experiences. More extensive areas of water could be fished in both the middle and lower reaches of the Grays, although both rivers were characterised by some of the most difficult access in the district. Considered to be among the most scenic of South Canterbury's rivers, they also received the highest solitude ratings. Anglers landed some of the largest trout from the Grays where, of the artificial flies used, the dry fly was preferred. Picnicking, shooting and camping were all popular with anglers who fished this tributary of the Tekapo.

3.5.3 Macaulay River

Like most of the remote rivers, the Macaulay was not subject to high fishing pressure. Those who made the long drive however, and negotiated difficult access in order to fish only limited stretches of water in both the lower and middle reaches, valued the quality of the angling experience very highly. Regarded as one of the most scenic rivers in the district, the Macaulay also afforded excellent opportunities for fishing in peace and solitude. Seven of the 13 respondents combined picnicking with fishing and 4 combined shooting. A reasonable catch rate was sustained by anglers who preferred the dry fly, and landed some of the largest trout in the district.

3.6 Stony River (Lake Benmore)

After the Tekapo, the Stony was subject to the most fishing pressure of the remote Waitaki basin rivers. Similarities between the angling experience associated with each of these highly valued rivers were highlighted when anglers' ratings of each of the seven contributing factors were compared. Again, solitude and scenic beauty were the most highly valued attributes. Easy access was available to the more highly fished lower reaches, by boat from Lake Benmore. Access to the middle reaches involved crossing private land which was made more difficult when gates were locked. Anglers employed the spinner, wet and dry flies in that order, to catch trout of a similar size to those landed from the Tekapo. The Tekapo and Stony were also the only rivers in the district which anglers rated as having above average catch rates. The pattern of recreational activities associated with angling was identical for both.

4. DISCUSSION

Of the 16 rivers examined in this report, the Rangitata and the Opihi clearly stand out from the rest, with regard to both popularity and angling

quality. The Rangitata was fished by 80% of the respondents, and was the only river for which an importance or quality rating of 5 was awarded more often than any lower value. Although the Opihi system was as popular (the Opihi and its tributaries were fished by over 80% of the respondents), the angling quality of this river was ranked slightly lower than the Rangitata. However, while the Rangitata's value derived primarily from its salmon fishery, the Opihi was considered equally valuable for both salmon and trout. Both the Rangitata and the Opihi are clearly rivers of at least regional importance.

While the Tekapo River was fished by only 30% of the respondents, it received a similar rating to the Opihi for angling quality. Half of the anglers who fished the Tekapo awarded it a rank of 5 for peace/solitude, indicating the exceptional value placed by anglers on the wilderness atmosphere of the upper Waitaki. This river was also unusually popular for camping, particularly in the lower reaches above Lake Benmore. While recent disruptions may have compromised the Tekapo's value as a fishery, on the basis of the survey data this river is also considered to be of regional importance.

Despite the fact that the Orari, Temuka and Pareora Rivers all attracted a moderate number of anglers, these rivers were not highly valued. What was valued was their proximity to population centres and average to good access, but they lacked the particular combination of attributes that typified the more highly valued rivers. However, their level of use indicates that they are fisheries of considerable significance to the South Canterbury angling population, and for this reason they are considered to be rivers of local importance.

Two further rivers that deserve mention are the Stony and Tengawai. Neither of these rivers was fished by more than 15% of the respondents, so their level of use does not seem to justify a regionally important

classification. However, their relatively high ratings for angling quality indicate that they have a value over and above that suggested on the basis of usage alone. An appropriate classification for rivers of this nature will be developed when the data from all Societies have been considered, and other rivers with similar characteristics have emerged. This classification system will be presented in a later series of reports discussing rivers on a wider regional basis.

5. ACKNOWLEDGEMENTS

We would like to thank John Bull, Graham McLintock and the Council of the South Canterbury Acclimatisation Society for their help in conducting this survey. Max Burnet, Eric Graynoth and Sally Davis provided constructive criticism on earlier drafts of this manuscript. Finally, we would like to thank all those South Canterbury anglers who made the survey a success by taking the trouble to complete and return their questionnaires.

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South Canterbury Acclimatisation Society

A Survey To Assess

THE RELATIVE VALUE OF NEW ZEALAND RIVERS TO THE RECREATIONAL ANGLER

Conducted in association with the Ministry of Agriculture and Fisheries

Dear Angler

Over the years numerous development schemes have substantially altered a large number of our rivers, resulting in a cumulative loss of high quality angling waters. It has become increasingly obvious that if we want to retain even a few valuable recreational fisheries, we must identify those rivers which, in our opinion, should not be modified, and be prepared to fight for them. To be able to do this we must understand the reasons why anglers value the various rivers they fish and be able to use this information when proposed developments threaten those rivers.

As you can see, this survey booklet, which has been designed to give us this information, applies specifically to the Acclimatisation Society district. The results from a pilot scheme carried out recently by Wellington Society anglers look very promising. I would therefore encourage you to fill in the booklet as soon as possible, and return it in the envelope provided.

For the results to be meaningful, every angler receiving a booklet must complete the questionnaire. Any angler who does not return the booklet or advise as to the inability to do so would affect the survey's random selection basis. Individual returns will be confidential to Fisheries Research Division staff who are responsbile for analysing the results.

The information collected will be used to protect valuable angling water for the present anglers and those of the future. I cannot emphasise strongly enough the need for your co-operation.

Thanking you in advance for your valued assistance.

Best Wishes and Good Fishing.

L.G. Evans
President

If you have not fished at all during the past 2 years, please tick this box and return the booklet promptly

☐

Before filling in this booklet, please read the detailed explanation of each category on the next two pages.

leave blank

☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Name _____

Address _____

_____

_____

Sex: (TICK box which applies)

MALE ☐ FEMALE ☐

Age: _____ (YEARS)

Please TICK the box below which best describes your employment status.

SELF EMPLOYED ☐

WORKING FOR SALARIES OR WAGES ☐

RETIRED ☐

OTHER (e.g. housewife, student) ☐

Average number of fish you catch each year _____

Explanation of categories used in the recreational angling survey booklet

You should only fill in the categories if you have actually fished the river under consideration. In other words leave a blank beside those rivers you are not familiar with.

1. Importance of the river to you as an angler

This category relies on your own judgement and feelings about the rivers you fish. The score you give each river is not necessarily related to the amount of time you spend angling on it. You may for instance, value the headwaters of a remote river highly, because of the quality of the whole angling experience even although you only manage a trip every 2-3 years. On the other hand, you may value a river close to home as it allows you to go fishing frequently. One way of assessing the importance of a river to you is to imagine how you would feel if you no longer had the opportunity of fishing it.

2. Average number of visits you make to fish this river each year

You probably don't visit a river to fish it the same number of times each year and therefore your average should be taken over the past 3-5 years angling experience. If you stay at the river for more than 1 day in order to fish, then fill in the average number of days on which you fished during your stays. If you have difficulty remembering exactly how often you fished a river an approximation will do.

3. Stretch of water fished

You may fish the whole length of a particular river or you may have a preferred fishing locality. As the character of a river may alter from the headwaters to the middle and lower reaches, please tick which length of river you fish. If you fish the whole river then you would tick all three categories.

4. The aim of this section is to find out why you value each river you fish. Consider each river in isolation of the others and then grade each reason between 1-5. Most of the reasons are self explanatory:

(a) Close to where you live would include rivers which can be reached by a short drive.

(b) Easy access would include rivers which can be driven to, or that only involve a short walk to reach the river bed.

(c) Large area of water fishable incorporates the possibility of walking beside, or wading through long stretches of water, which may contain both pools and riffles in order to continue angling without having to leave the river.

(d) Scenic beauty should include the river bed, the river, the river banks and surrounding views, either immediate or panoramic.

(e) Feelings of solitude/peace may be gained without being in a wilderness area and will be influenced by the geography of the river. For instance, if fishing in a gorge, the existence of a road above may not detract from feelings of solitude if it is out of sight and the traffic noise cannot be heard.

(f) Good catch rate refers to the number of fish you catch in a certain amount of time. You may fish some rivers all day without success and yet catch several fish in the same time from another river.

(g) Size of fish:
1. Smaller than 23 cm (9 inches)
2. 23 cm (9")-38 cm (15")
3. 38 cm (15")-53 cm (21")
4. 53 cm (21")-65 cm (26")
5. Larger than 65 cm (26").

5. Which methods do you usually use

Tick the appropriate categories for each river. Naturally the regulations will restrict the use of some methods from some waters and these will be taken into account in the analysis of results.

6. Other recreational activities

You may visit some rivers purely for the angling experience, but there are many other recreational activities which can be carried out in conjunction with angling and which may involve family and friends. You can indicate the other activities you participate in by ticking the appropriate categories.

Rivers outside of the South Canterbury Acclimatisation Society

You will notice at the end of the booklet that spaces have been left for you to fill in information about rivers outside of your society district which you may visit to fish. Fill in the categories in the same way as you did for the rivers in your own society district.

Rivers in which both Salmon and Trout are caught: As salmon and trout fishing tend to be rather different experiences we have provided separate lines for each type of angling on those rivers supporting a salmon run. If you fish for both salmon and trout you should fill in both lines.

Average number of fish you catch each year

This is the total number of fish you catch from all the rivers you fish during the year. Once again you may like to take an average from your last 3-5 years of catches. If you find it difficult to remember exactly, an approximation will do.

Contacts within the South Canterbury Acclimatisation Society

If you have any queries about the survey or categories included in the booklet, or if you need some assistance to fill in the questionnaire, the people whose names, addresses and phone numbers are listed below will be only too willing to help you:

Mr R.L. Dockrill
M.L.C. Building
Timaru
Phone: 89-092 Timaru

Mr J. Bull
Richard Pearse Drive
Temuka
Phone: Temuka 584

Mr A.B. Curtis
Orari Road
R.D. 2
Geraldine
Phone: Geraldine 776

Mr A.H. Braddick
Kimbell
Fairlie
Phone: Fairlie 8270

River	Code	(1) Grade from 1-5 the the importance of the river to you as an angler 1 - lowest value 2 - average/low 3 - average value 4 - average/high 5 - highest value	(2) Average number of visits you make to fish this river each year	(3) Stretch of water fished (please tick)			(4) Grade from 1-5 (as in column 1) all of the following for each river by ticking the appropriate number.													
				Headwaters	Middle Reaches	Lower Reaches	(a) Close to where you live					(b) Easy access to the river					(c) Large area of water fishable				
							1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Example river	xx	4	15	✓	✓				✓				✓						✓		
Rangitata Salmon	01																				
Trout	02																				
Orari Salmon	03																				
Trout	04																				
Ohapi	05																				
Coopers	06																				
Opihi Salmon	07																				
Trout	08																				
Waihi	09																				
Hae Hae Te Moana	10																				
Temuka	11																				
Kakahu	12																				
Opuha	13																				

Grade from 1-5 (as in column 1) all of the following for each river by ticking the appropriate number.																					(5) Which method do you usually use on this river? (please tick)					(6) Do you combine angling with any other recreational activity on this river? (please tick)									(7) Additional comments
(d) Scenic beauty					(e) Feelings of solitude/ peace					(f) Good catch rate					(g) Size of fish (see instructions)																			
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		Dry Fly	Wet Fly	Spinner	Nymph	Live Bait	Picnicing	Camping	Swimming	Tramping	Canoeing	Rafting	Shooting	Enjoying the scenery	
		✓						✓						✓				✓			✓			✓					✓				✓	

River	Code	(1) Grade from 1-5 the the importance of the river to you as an angler 1 - lowest value 2 - average/low 3 - average value 4 - average/high 5 - highest value	(2) Average number of visits you make to fish this river each year	(3) Stretch of water fished (please tick)			(4) Grade from 1-5 (as in column 1) all of the following for each river by ticking the appropriate number.																	
				Headwaters	Middle Reaches	Lower Reaches	(a) Close to where you live					(b) Easy access to the river					(c) Large area of water fishable							
							1	2	3	4	5	1	2	3	4	5	1	2	3	4	5			
Example river	xx	4	15	✓	✓				✓				✓						✓					
Tengawai	14																							
Pareora	15																							
Macaulay	16																							
Tekapo	17																							
Fork	18																							
Grays	19																							
Maryburn	20																							
Stony (L. Benmore)	21																							
Jollie	22																							

Grade from 1-5 (as in column 1) all of the following for each river by ticking the appropriate number.																					(5) Which method do you usually use on this river? (please tick)					(6) Do you combine angling with any other recreational activity on this river? (please tick)									(7) Additional comments
(d) Scenic beauty					(e) Feelings of solitude/ peace					(f) Good catch rate					(g) Size of fish (see instructions)																				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		Dry Fly	Wet Fly	Spinner	Nymph	Live Bait	Picnicing	Camping	Swimming	Tramping	Canoeing	Rafting	Shooting	Enjoying the scenery	
		✓						✓						✓				✓			✓			✓					✓				✓	

River	Code	(1) Grade from 1-5 the the importance of the river to you as an angler 1 - lowest value 2 - average/low 3 - average value 4 - average/high 5 - highest value	(2) Average number of visits you make to fish this river each year	(3) Stretch of water fished (please tick)			(4) Grade from 1-5 (as in column 1) all of the following for each river by ticking the appropriate number.													
				Headwaters	Middle Reaches	Lower Reaches	(a) Close to where you live					(b) Easy access to the river					(c) Large area of water fishable				
							1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Example river	xx	4	15	✓	✓				✓				✓						✓		
Other Rivers in the South Canterbury District (please specify)																					
Other Rivers outside the South Canterbury District																					

Grade from 1-5 (as in column 1) all of the following for each river by ticking the appropriate number.																			(5) Which method do you usually use on this river? (please tick)					(6) Do you combine angling with any other recreational activity on this river? (please tick)								(7) Additional comments
(d) Scenic beauty					(e) Feelings of solitude/ peace					(f) Good catch rate					(g) Size of fish (see instruct-ions)																
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	Dry Fly	Wet Fly	Spinner	Nymph	Live Bait	Picnicing	Camping	Swimming	Tramping	Canoeing	Rafting	Shooting	Enjoying the scenery	
		✓						✓						✓				✓		✓			✓					✓				✓	

APPENDIX II. Histograms of rankings assigned by respondents to the relative importance of the angling experience and seven other qualities (distance from home, access, area of fishable water, scenic beauty, feelings of peace and solitude, catch rate and size of fish) for the 16 most-fished rivers in South Canterbury Acclimatisation district. Histograms of reach of river fished, fishing methods used and associated recreational activities by anglers visiting each river are also shown. (Although some anglers did not respond to all questions, this information has not been shown in the histograms.)

Codes: 1 = insignificant

5 = exceptional

Reach of river fished: H = headwaters

M = middle reaches

L = lower reaches

Fishing method used: D = dry fly

W = wet fly

S = spinner

N = nymph

B = live bait

Recreational activities: P = picnicking

C = camping

S = swimming

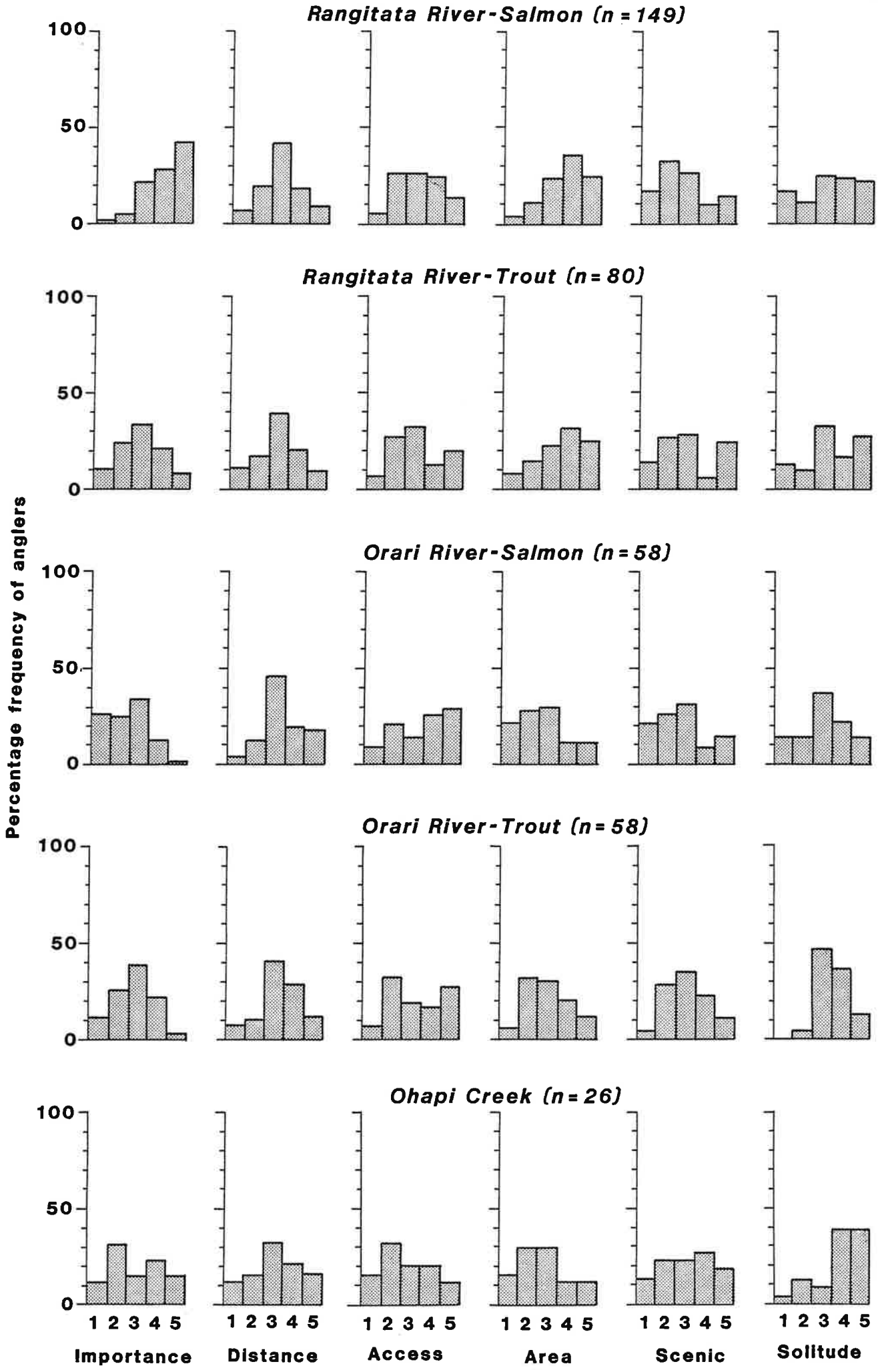
T = tramping

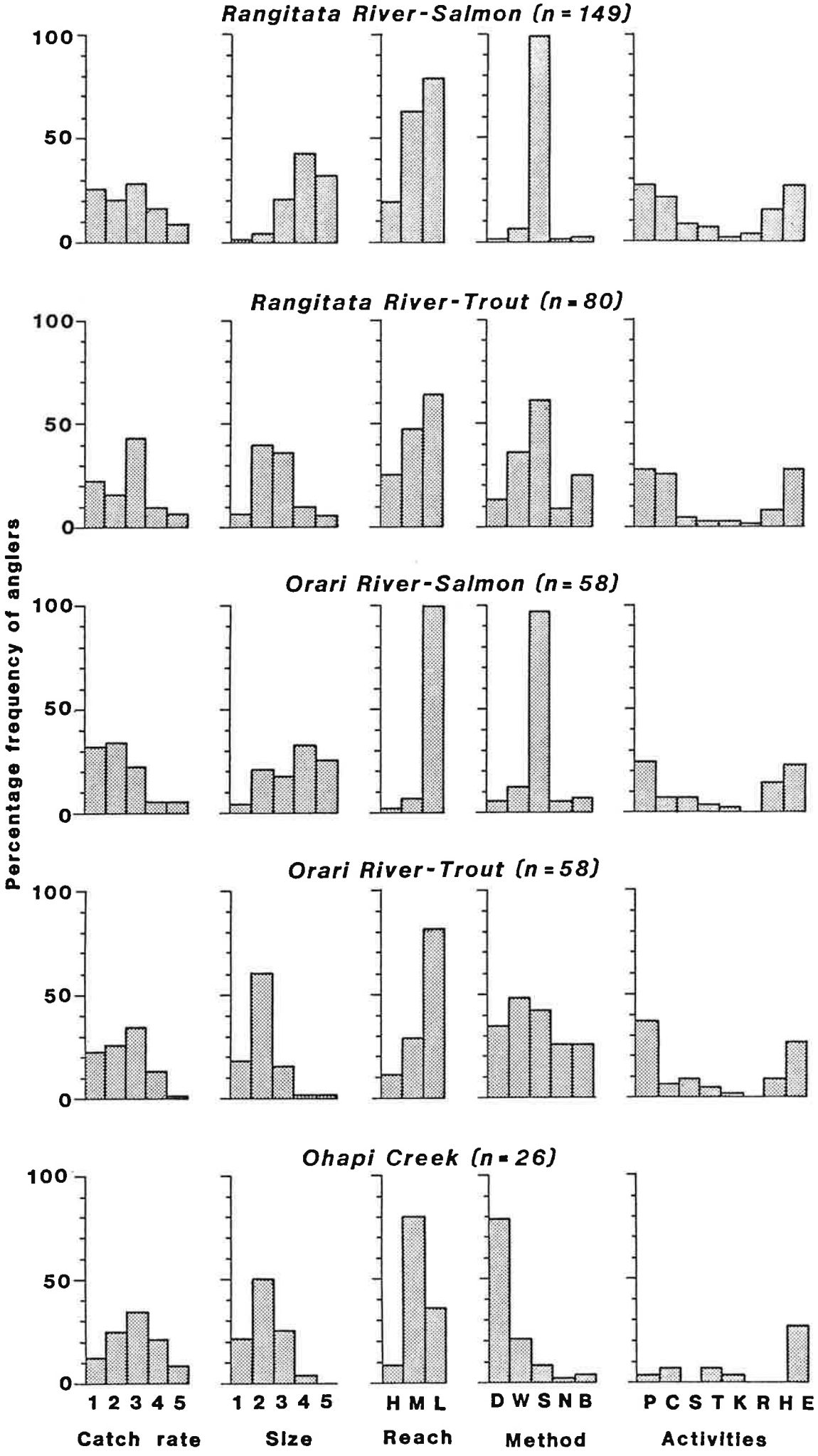
K = canoeing

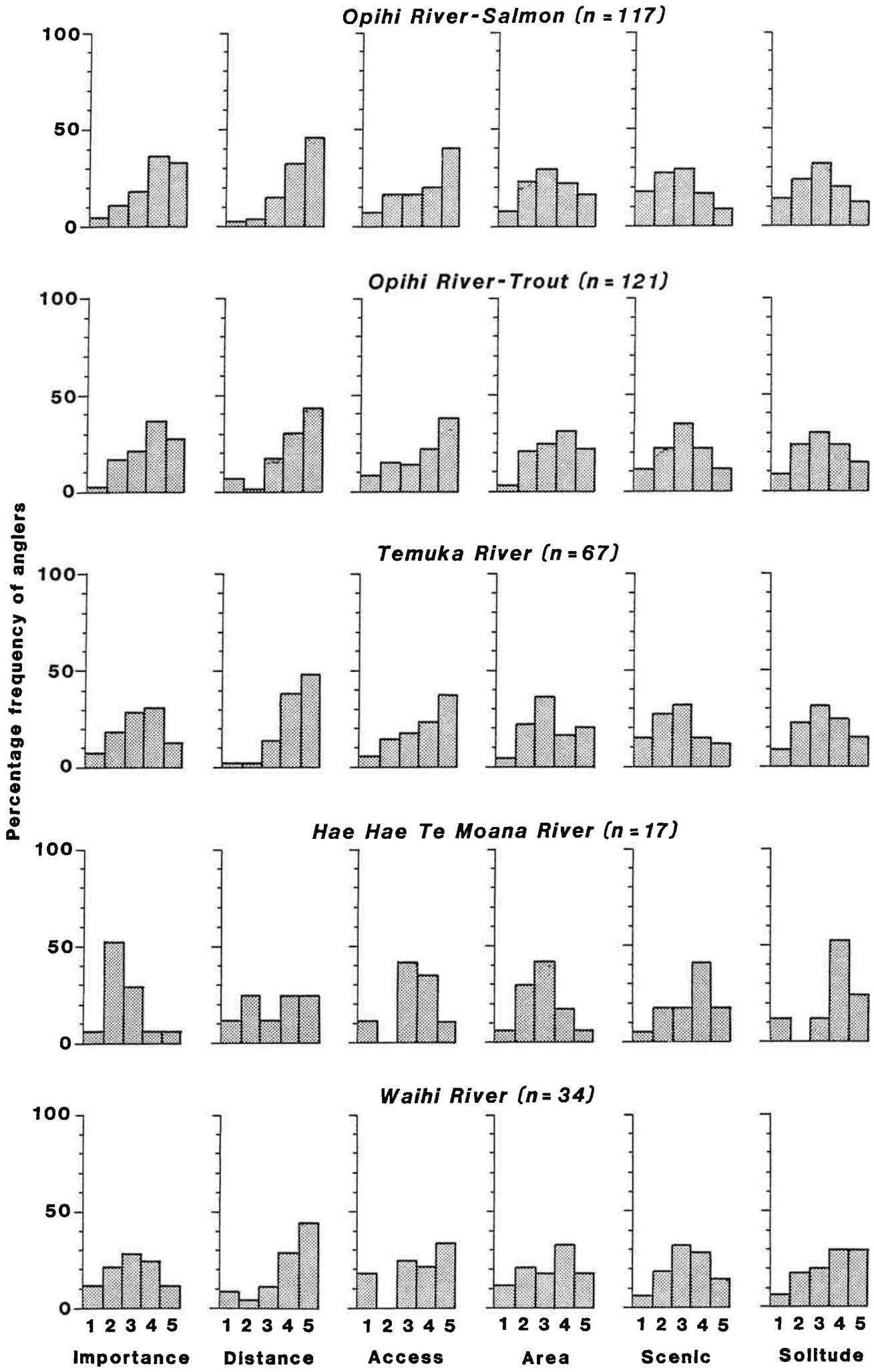
R = rafting

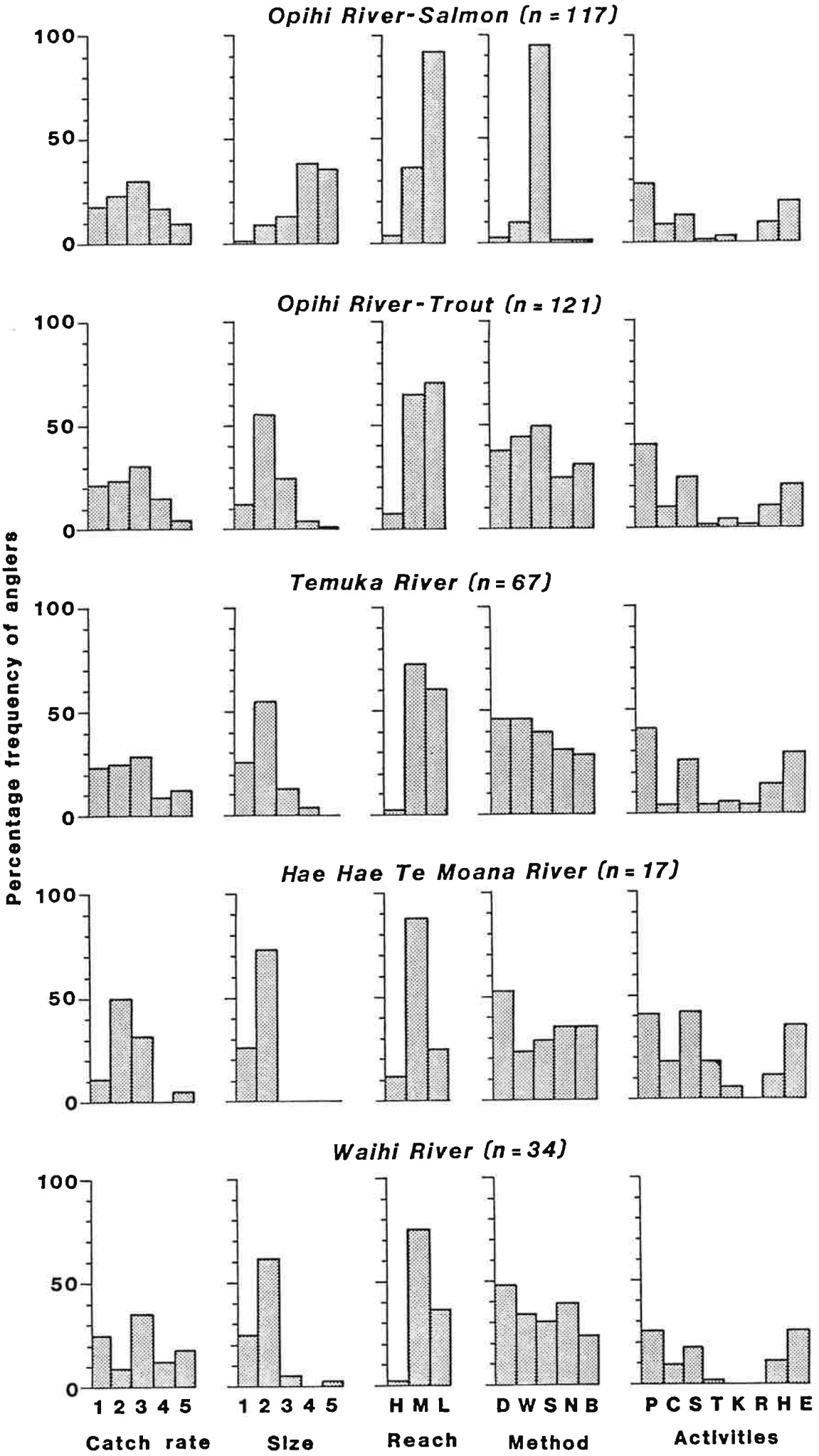
H = shooting

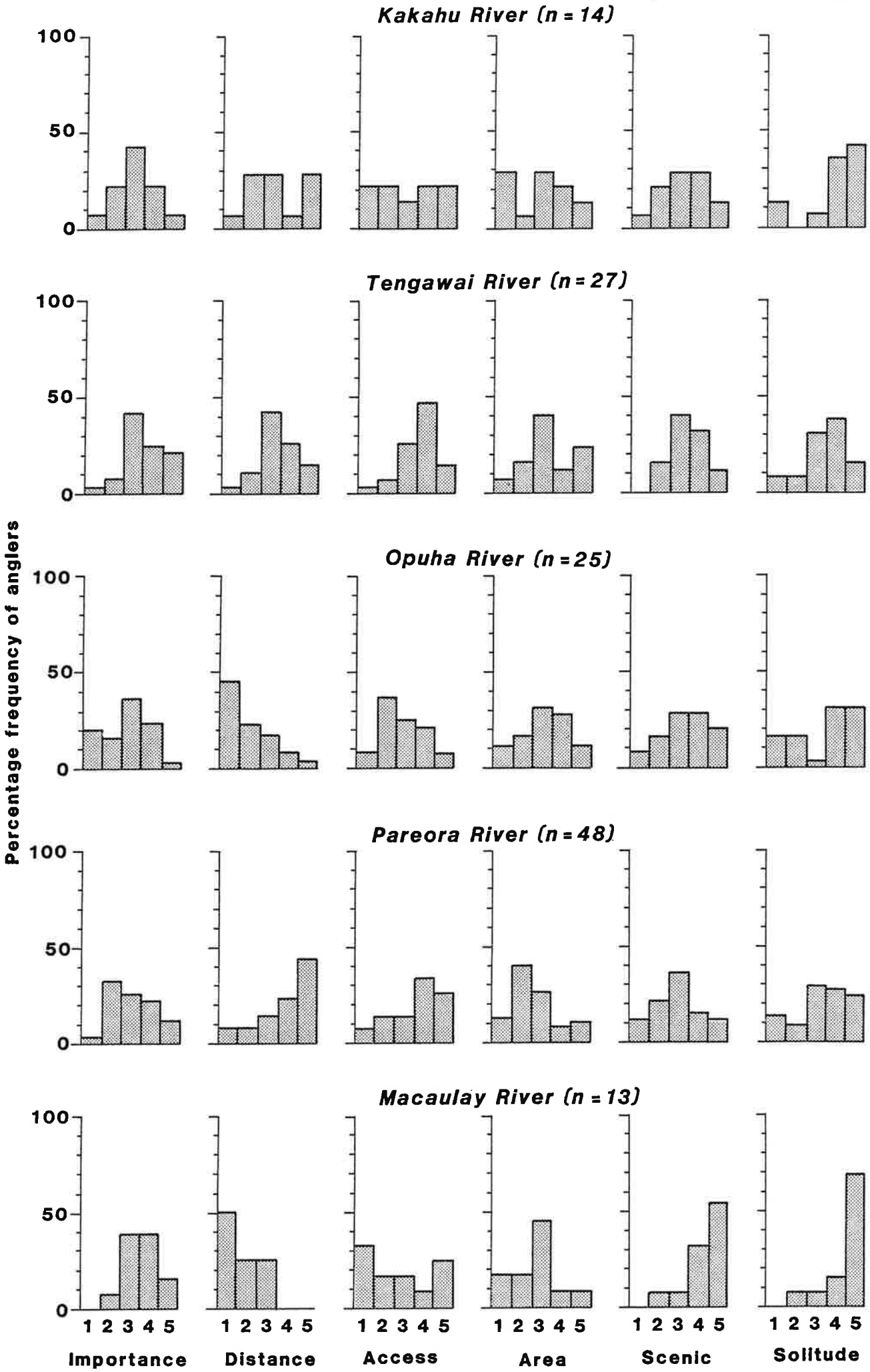
E = enjoying scenery

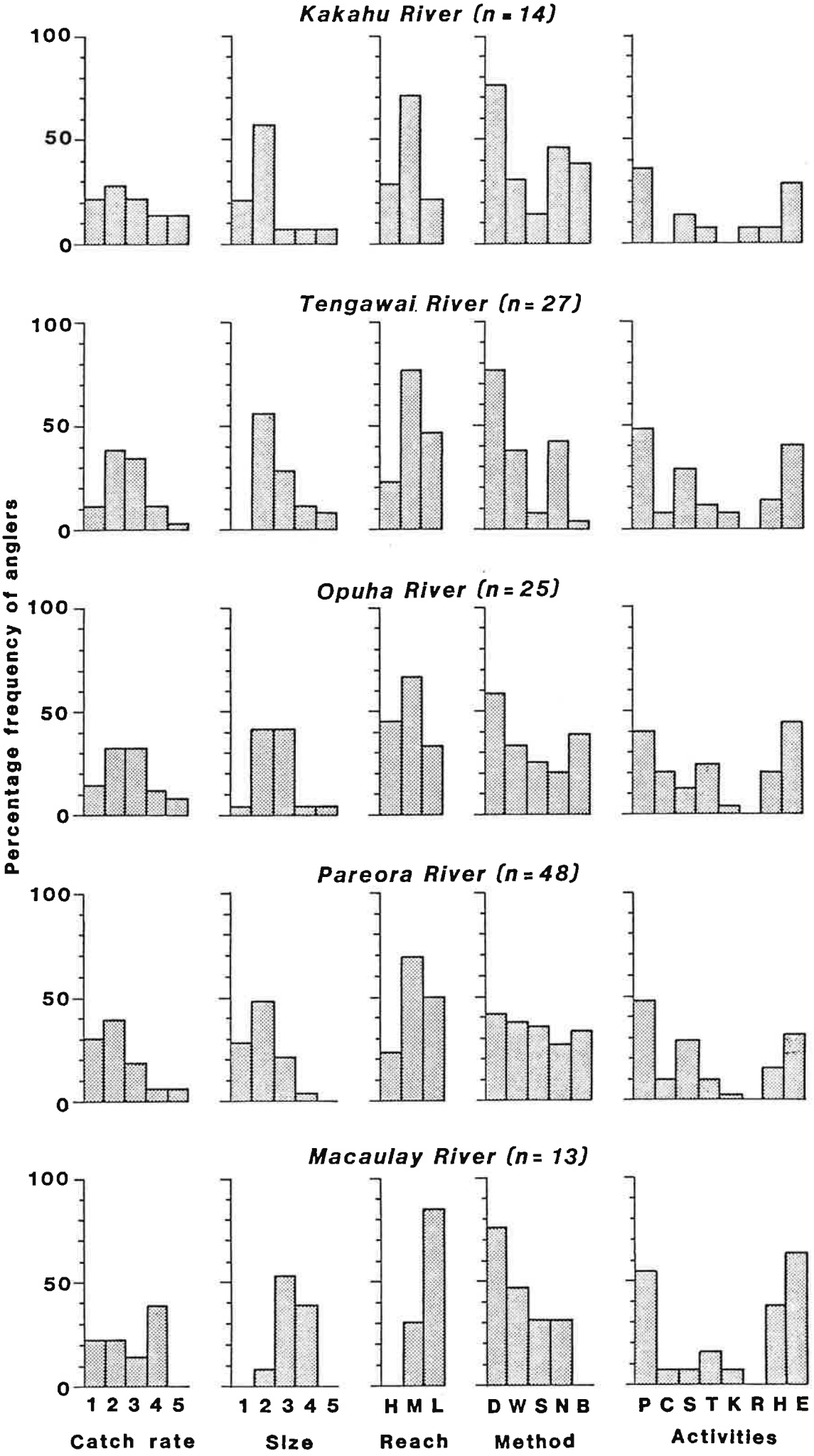

Rangitata River-Salmon (n=149)
Rangitata River-Trout (n=80)
Orari River-Salmon (n=58)
Orari River-Trout (n=58)
Ohapi Creek (n=26)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Importance
Distance
Access
Area
Scenic
Solitude

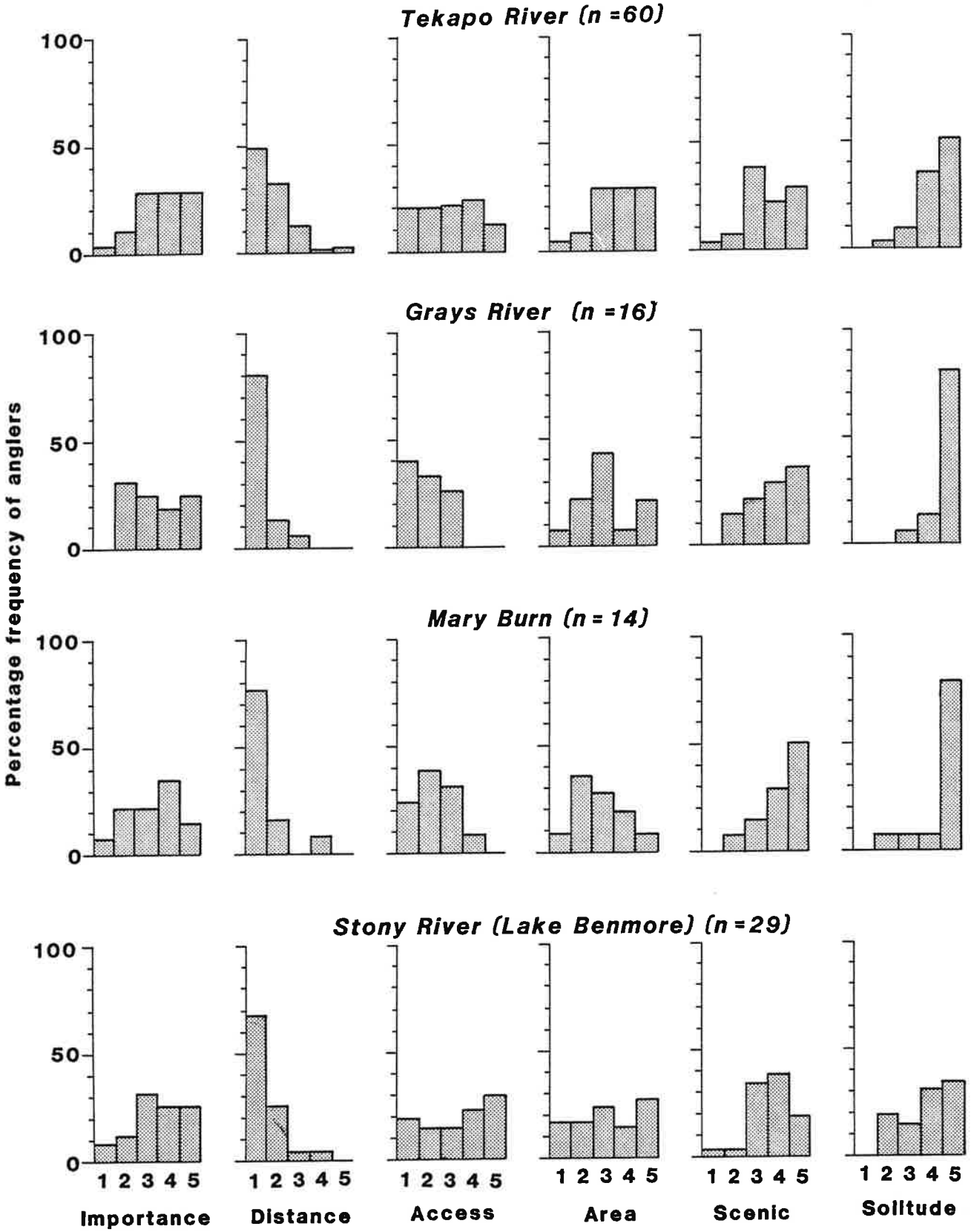

Rangitata River-Salmon (n = 149)
Rangitata River-Trout (n = 80)
Orari River-Salmon (n = 58)
Orari River-Trout (n = 58)
Ohapi Creek (n = 26)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Catch rate
1 2 3 4 5
Size
H M L
Reach
D W S N B
Method
P C S T K R H E
Activities

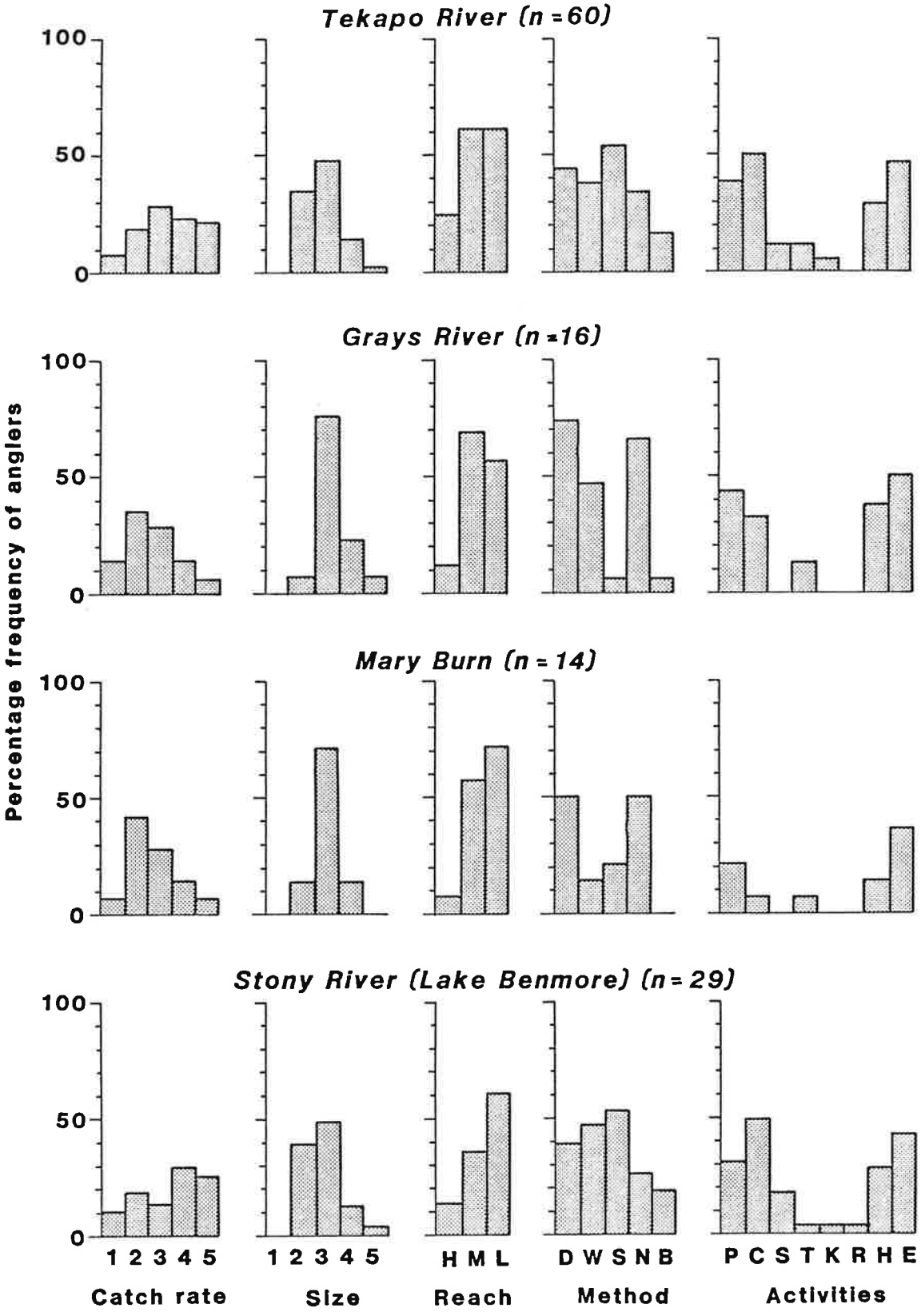

Opihi River-Salmon (n = 117)
Opihi River-Trout (n = 121)
Temuka River (n = 67)
Hae Hae Te Moana River (n = 17)
Waihi River (n = 34)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Importance
Distance
Access
Area
Scenic
Solitude


Opihi River-Salmon (n = 117)
Opihi River-Trout (n = 121)
Temuka River (n = 67)
Hae Hae Te Moana River (n = 17)
Waihi River (n = 34)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Catch rate
1 2 3 4 5
Size
H M L
Reach
D W S N B
Method
P C S T K R H E
Activities


Kakahu River (n = 14)
Tengawai River (n = 27)
Opuha River (n = 25)
Pareora River (n = 48)
Macaulay River (n = 13)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Importance
Distance
Access
Area
Scenic
Solitude


Kakahu River (n = 14)
Tengawai River (n = 27)
Opuha River (n = 25)
Pareora River (n = 48)
Macaulay River (n = 13)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Catch rate
1 2 3 4 5
Size
H M L
Reach
D W S N B
Method
P C S T K R H E
Activities


Tekapo River (n =60)
Grays River (n =16)
Mary Burn (n = 14)
Stony River (Lake Benmore) (n =29)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Importance
Distance
Access
Area
Scenic
Solitude


Tekapo River (n = 60)
Grays River (n = 16)
Mary Burn (n = 14)
Stony River (Lake Benmore) (n = 29)
Percentage frequency of anglers
100
50
0
1 2 3 4 5
Catch rate
1 2 3 4 5
Size
H M L
Reach
D W S N B
Method
P C S T K R H E
Activities

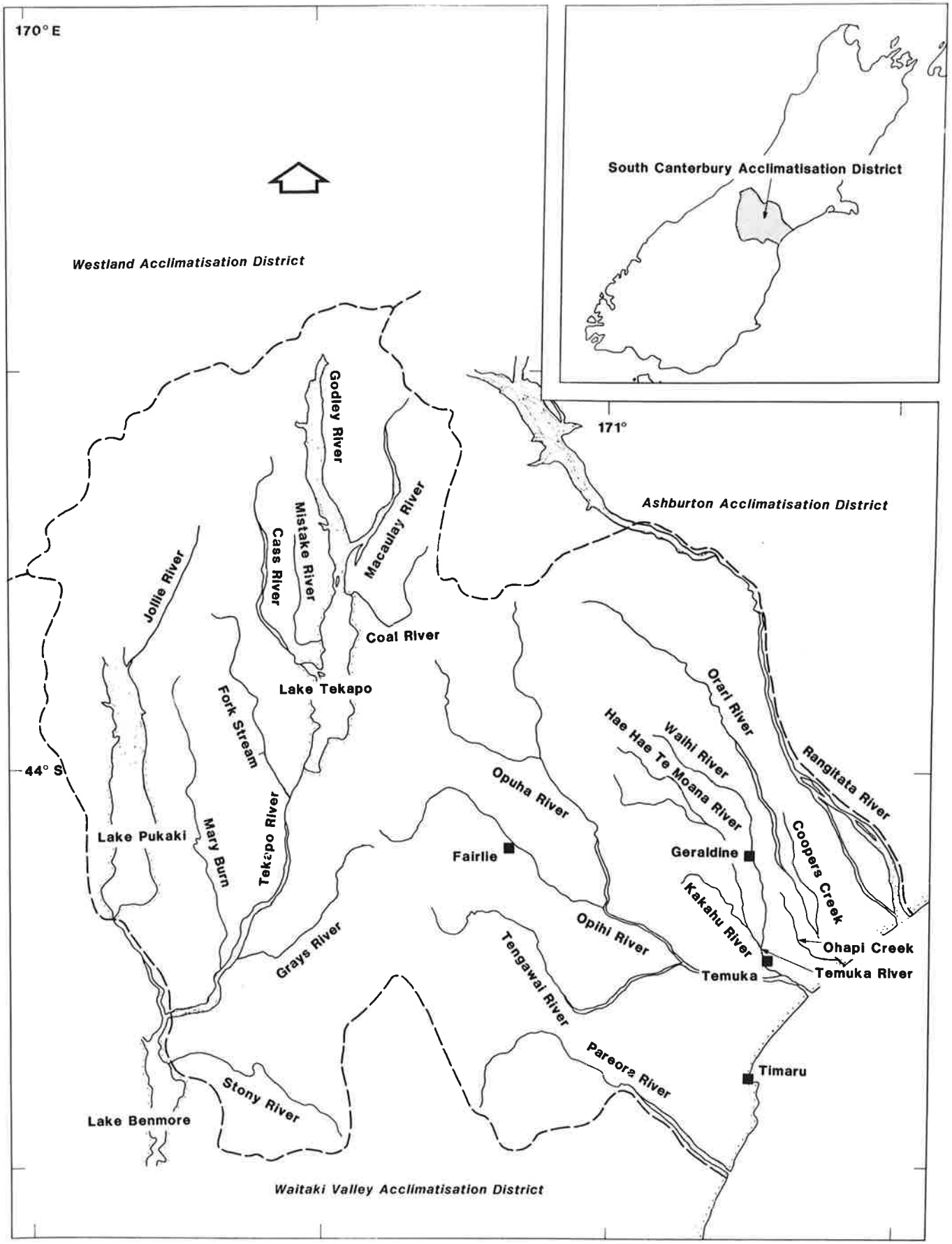


FIGURE 1. South Canterbury Acclimatisation Society district.