FISH SPECIES
IN THE UPPER WAITAKI
LAKES AND RIVERS

BY

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1. INTRODUCTION

The Upper Waitaki (Figure 1) is at present under study by the Ministry of Agriculture and Fisheries, Fisheries Research Division, to establish the effects of present and proposed hydro electric power developments on the fishery. The waters of this area provide a habitat for a range of species, both native and introduced. The purpose of this paper is to identify the species present, their habitat, significance, and the possible effects of future development.

2. METHODS

Fish samples were collected by netting, using both seine and gill nets of various mesh sizes, as described in Lagler (1952), electrofishing (Burnet 1959), and visual observations during fieldwork. Specimens taken were preserved in 10% formalin for laboratory identification, which was carried out using McDowall (1978).

3. FISH SPECIES COMPOSITION AND DISTRIBUTION

(a) Native

Seven species of native fish were found in this area. Some spend their entire life cycle in one location, others migrate around the area at various stages during their life history. Their known distribution is shown in Figure 2.

(i) Longfinned Eel (*Anguilla dieffenbachii*)

Found in most of the lakes and in many of the rivers and streams, it lives under cover or in muddy areas. The population density is light except for Lake Waitaki, where the population level is higher. The juveniles (glass eels) enter the Waitaki system from the sea during

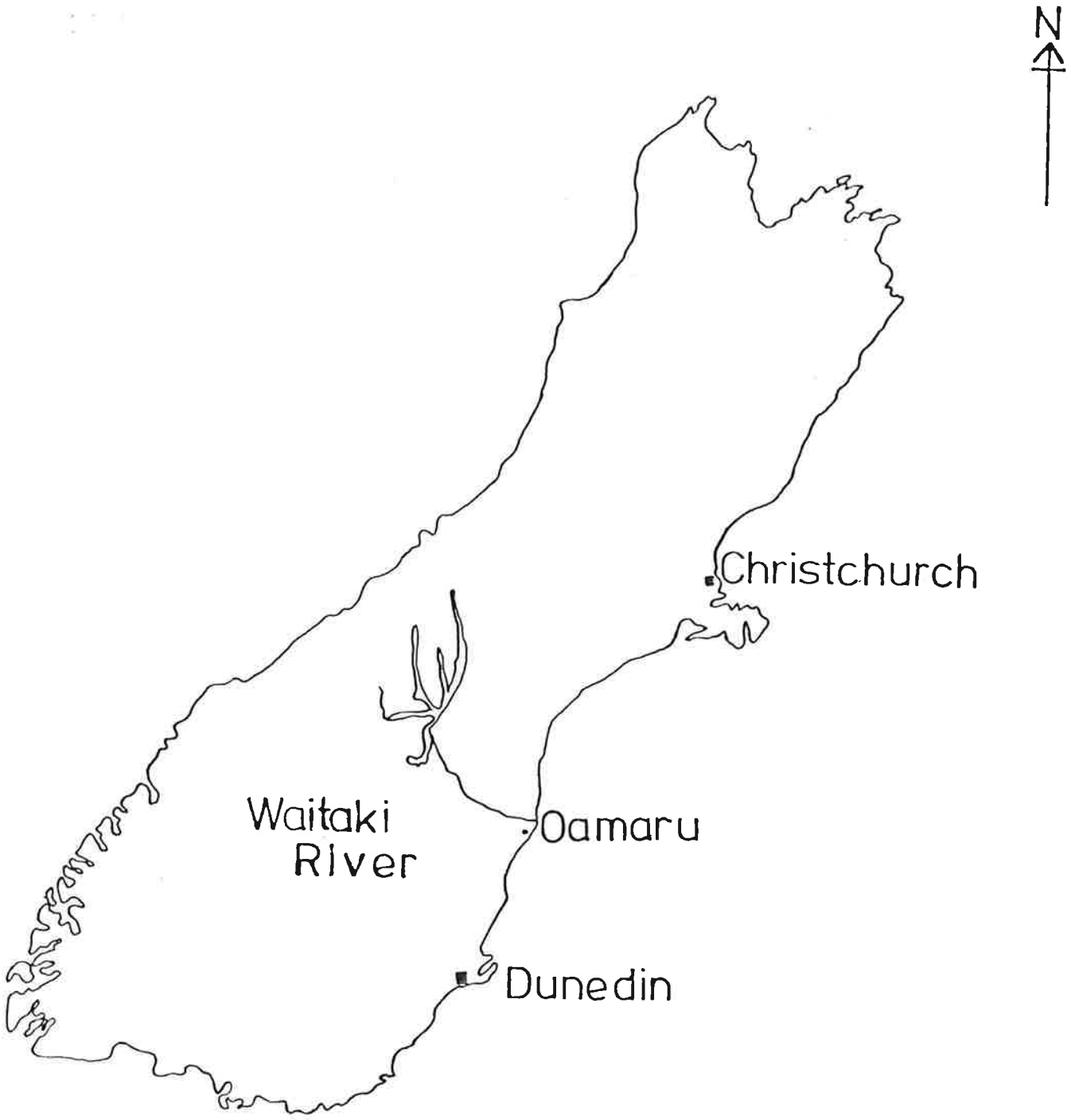

FIGURE 1. The Waitaki River system.

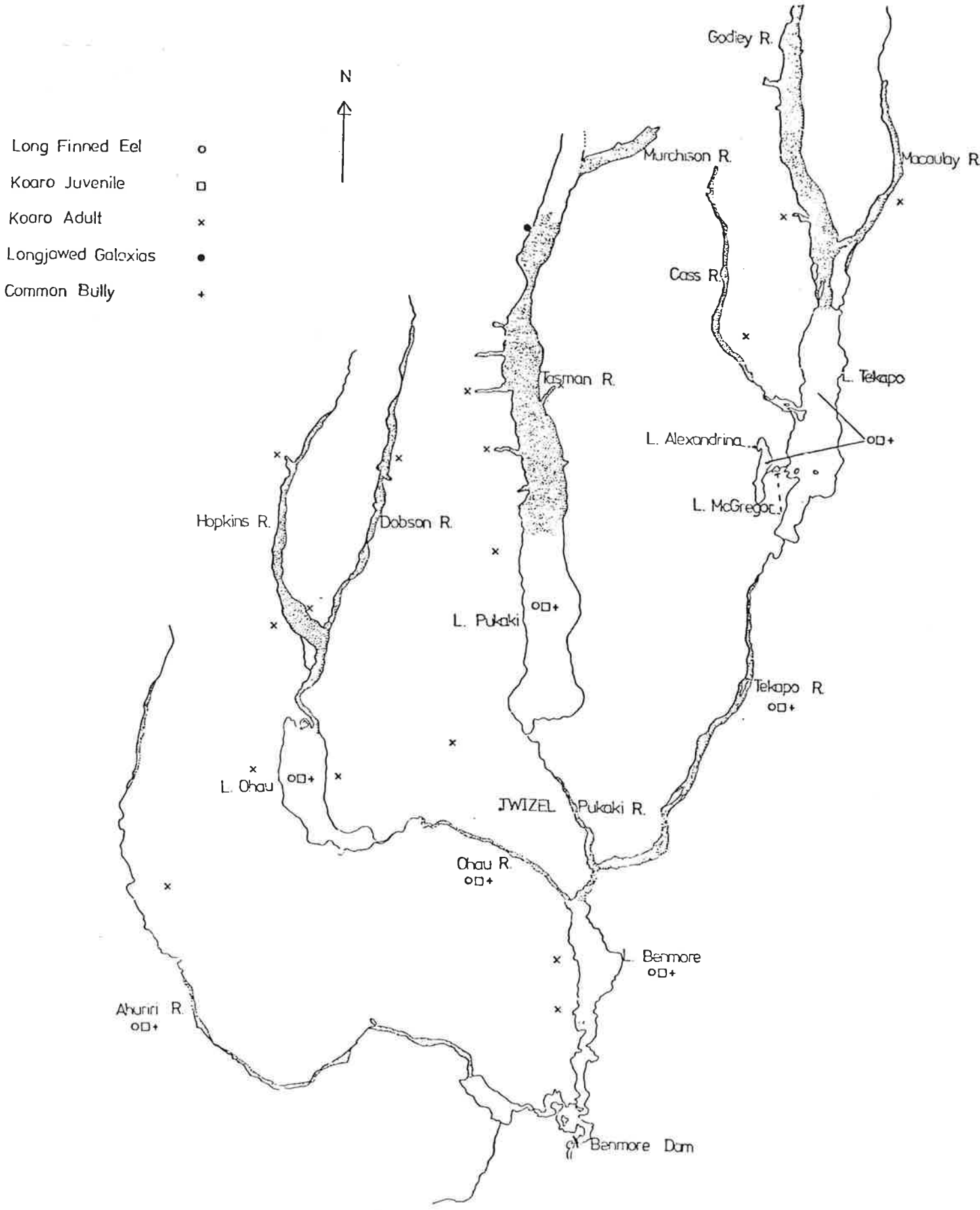

FIGURE 2. Distribution of native fishes in the upper Waitaki system.

August-December. They can surmount the Waitaki dam, but at present no evidence exists to show passage past the Aviemore and Benmore dams. The adults migrate to sea in March - April to spawn, (probably in deep areas in the Pacific Ocean), after a number of years in fresh water. The average age of males is 22 years, whereas females average age is 33 years. The average size of adult males is 645 mm, that of females is 1193 mm (McDowall 1978). Eels feed on both insects and other fish.

This species is of commercial value with some harvesting being done in the hydro lakes. As they are dependent on recruitment of new stock over the dams, it is anticipated that stock numbers will diminish in the areas affected by hydro-electric power development, to below economic levels.

(ii) Shortfinned Eel (*Anguilla australis*)

This species has similar habits to the longfinned eel but does not grow to such a large size. It is also of commercial value.

(iii) Koaro (*Galaxias brevipinnis*)

Juveniles are found in large numbers in the various lakes, shoaling as whitebait. The adults live high in the upland streams, spawning here during autumn - early winter. Upon hatching, the young migrate to the lakes, shoaling and moving back up the rivers after about six months. Juveniles are capable of climbing wet rock faces such as waterfalls, or wet concrete at hydro dam spillways. This species provides food for large fish. The adult size range is 160 - 180 mm.

(iv) Common River Galaxias (*Galaxias vulgaris*)

This fish is present in moderate to high numbers in most rivers and streams. Spawning occurs in the adult habitat during late winter and spring. The fry appear in shoals in backwaters and in the shallows along the stream margins. The adult size range is 100 - 115 mm, and this fish provides some food for trout.

(v) Longjawed Galaxias (*Galaxias prognathus*)

This species is rarely seen, occurring only in high alpine streams. In the upper Waitaki system it has been identified in streams above Lake Pukaki. Spawning possibly occurs in the spring time. Adults range in size from 60 - 70 mm.

(vi) Common Bully (*Gobiomorphus cotidianus*)

This species is very common in most areas, occurring in both lakes and streams. Adults spawn in spring and summer on stones and boulders in the rivers or lakes. The larvae migrate to the lakes, where they are found from midwater to the surface up to 10 mm in length and then become bottom living. Some migrate into the streams at 15 - 20 mm, others stay in the lakes as adults. The adult size range is 70 - 150 mm. This species is important as a food fish for trout.

(vii) Upland Bully (*Gobiomorphus breviceps*)

A very common species occurring in lakes, rivers and streams. Spawning takes place in the adult habitat on rocks etc., during spring and summer. The young do not migrate but free-swim in the pools and quiet areas. Adult size averages 85 - 90 mm. This species is another food fish.

(b) Introduced

The distribution of the four species of introduced salmonids is shown in Figure 3.

(i) Rainbow Trout (*Salmo gairdnerii*)

Introduced into New Zealand in 1883, the adult fish are an important game fish in this area. This species is found in all lakes and most rivers and streams. The adults migrate to suitable areas to spawn, in rivers and tributary streams, from June to September. They are mature after three years. The adult average size is 460 mm. Population densities are high.

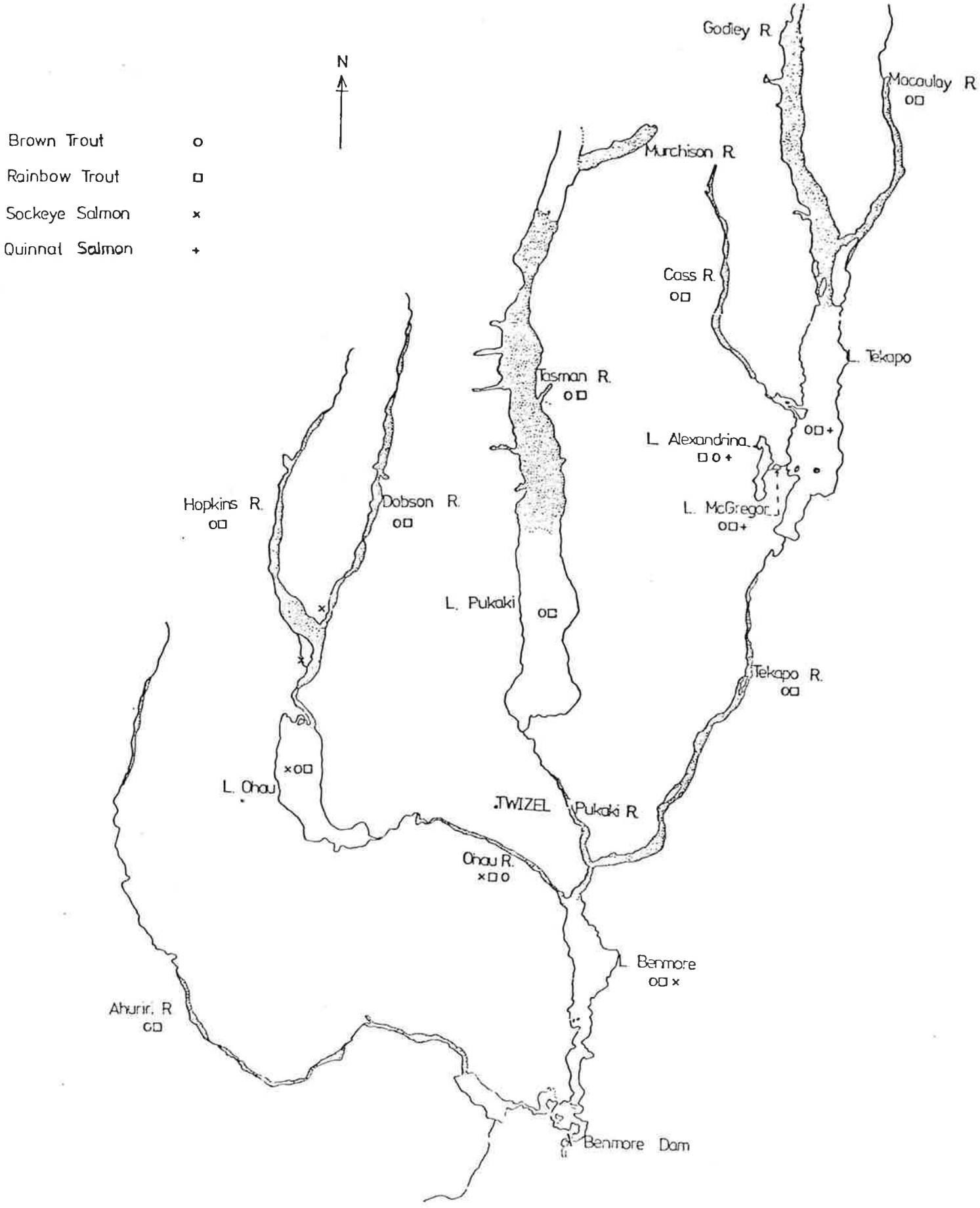

FIGURE 3. Distribution of introduced salmonids in the upper Waitaki system.

(ii) Brown Trout (*Salmo trutta*)

This is also an important game species, found in all areas. It was introduced into New Zealand in 1867. The adults migrate to suitable areas to spawn in rivers and tributary streams, from April-June. The adult average size is 450 mm. Population densities are also high.

(iii) Quinnat Salmon (*Oncorhynchus tshawytscha*)

This species occurs as a landlocked population in Lakes Alexandrina, McGregor and possibly Tekapo. Originally introduced into New Zealand in 1901, this population is possibly the result of an accidental liberation mixed with salvaged trout from the South Canterbury area. Adults spawn in tributary streams from March - June. The population density is moderate - low.

(iv) Sockeye Salmon (*Oncorhynchus nerka*)

This species occurs in Lakes Ohau, Benmore, Aviemore and Waitaki with a high population density in Ohau and Benmore. It was originally introduced into New Zealand in 1901-2. Sockeye live in the lakes where they feed on plankton, etc. When the adults mature after about 2-3 years, they migrate during January - February to suitable spawning areas where spawning occurs during February - March. Streams used include Larch Stream and Stockyard Creek for Lake Ohau stocks and Stoney Creek and Deep Stream for Lake Aviemore stocks. This species is probably not often caught by anglers, although it could be wrongly identified. Its main value is that of a food converter, the sockeye feeding on the plankton and then being eaten by larger fish. Adult size averages 300 mm.

4. DISCUSSION

Whilst some of the fish species present are of little more than scientific interest, others are necessary links in the aquatic food chain of the upper Waitaki system. Of the introduced species, brown trout and

rainbow trout provide excellent sporting recreation, attracting large numbers of people to this area. Sockeye salmon also offer a large and mainly untapped resource, with both sporting and commercial potential. Of the native species, eels provide a source of overseas income. However, unless moves are made to recruit new stocks through releases of juveniles, this fishery could become uneconomic. The native bullies and galaxiids provide the necessary food to maintain the stocks of the larger fish. A calendar breakdown of migrations and critical periods of the life history of some of the species is given in Figure 4.

Past, present and future developments in this area have, and will continue to modify the fishery. For example, the salmon run from the sea which existed prior to the construction of the Waitaki Dam has been replaced by a lake fishery in the man-made lakes. If future developments are not carefully planned, this fishery could change again if spawning areas are destroyed or barred from access. This could leave these lakes barren of sporting species, or alternatively, a fishery which must be maintained at enormous cost by artificial means.

The sockeye salmon present since 1901-2 and now well established in Lake Benmore, traditionally spawn in small tributary streams at the head of Lake Ohau, which are now threatened. Developments on the Ohau River are blocking this access and their future survival will depend on efforts being made to re-establish them in suitable areas still connected to Lake Benmore. Migratory native species such as the Koaro, could also be affected by such developments.

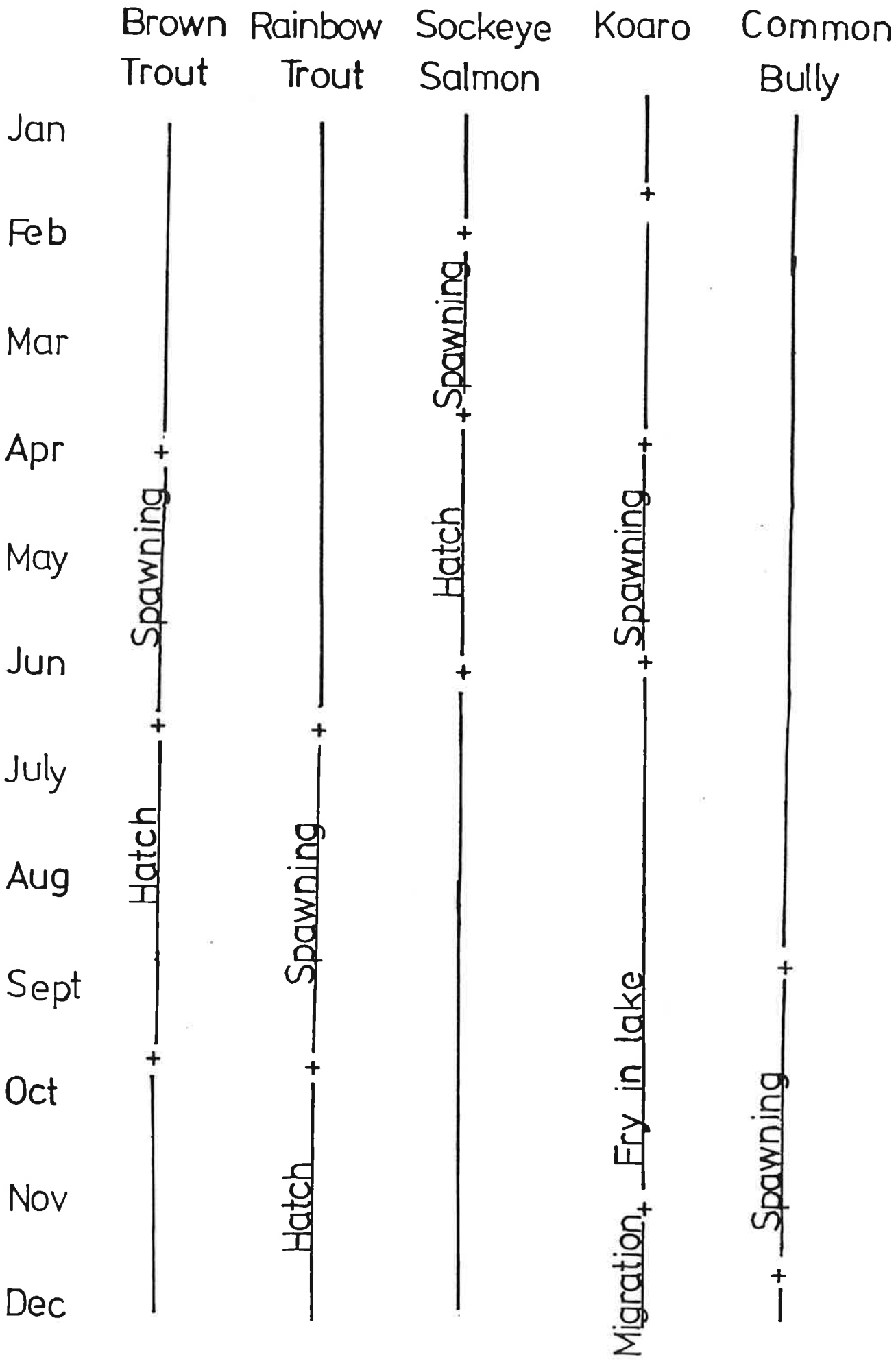

FIGURE 4. Timing of the life history of some upper Waitaki fish species.

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