Native Fish

Native fish communities in larger rivers

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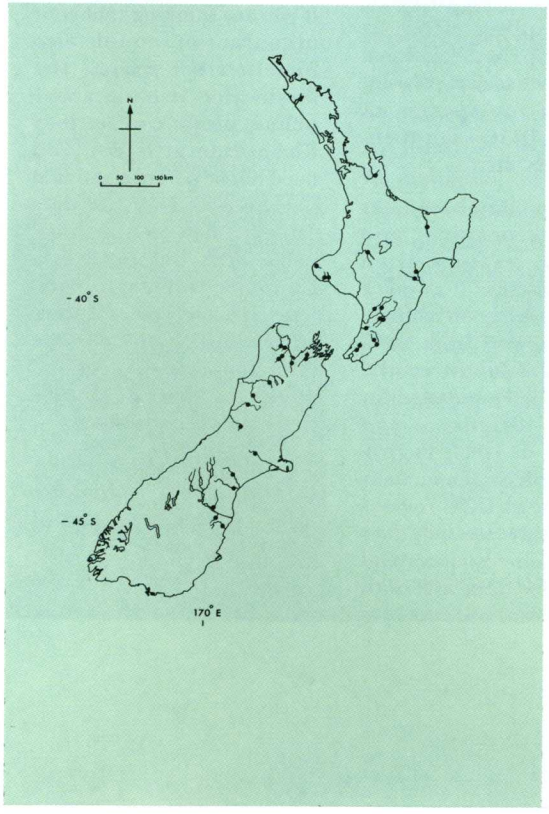
In Water & Atmosphere 2*(1), Gordon Glova presented preliminary results from a native fish study which concentrated on a single, small catchment – Pigeon Bay Stream on Banks Peninsula, near Christchurch. This article presents initial results from a complementary study which focused on the distribution and density of native fish in larger rivers throughout New Zealand.*

THERE is relatively little quantitative information on the native fish species present in our larger rivers. One reason for this is that New Zealand's native fish are small, cryptic, benthic and do not have a high public profile. As a result, water management issues have tended to focus on introduced salmonids, with little attention given to the native fish in larger rivers. Our study goes some way toward redressing this deficiency, by seeking to provide water managers with the information needed to make ecologically sound decisions about acceptable flows for the maintenance of native fish habitat.

Methods

Our sampling sites were located in rivers selected from the "100 rivers"[1] database to give a range of rivers on the east and west coasts of both islands (see map). Sites were downstream of major dams and waterfalls, so that passage for migratory species was unrestricted, at least by major obstacles. Hydrological, water quality, catchment and in-stream habitat data were available for all sites.

Locations of native fish sampling sites on larger New Zealand rivers.



In each river, depth stratified lanes in two runs and two riffles were sampled by downstream electroshocking. Lanes with relatively uniform hydraulic characteristics for each habitat type were marked by weighted ropes placed at depths of about 0.125, 0.25 and 0.5 m. Depths greater than 0.5 m were sampled in runs but not in riffles because of the practical difficulty of electroshocking in deep, swift water. The lane length was 15 m. The width of each lane was measured at three points to calculate the area fished.

The number, total weight and the size range of each species of fish caught were recorded; these data were converted to density per square metre to allow comparisons between lanes, habitat types and rivers. Water depths and velocities were measured at 12 points within each sampling lane and the mean values calculated. Substrate composition was assessed in each habitat type by measuring at least 50 randomly selected stones.

Preliminary results

In all, 16 native and 3 introduced species were found at the sampling sites. Eight native species: longfin eel, shortfin eel, torrentfish, upland bully, redfin bully, bluegill bully, common river galaxias and common bully were reasonably common (n>200 for each species), whereas Cran's bully, lamprey, koaro, inanga, shortjaw kokopu, common smelt, dwarf galaxias and black flounder were rarely encountered (n<40). Juvenile brown trout were relatively common (n=175), but the other two salmonid species (rainbow trout and chinook (quinnat salmon) were rare (n<20).

Bluegill bullies were most numerous, followed by upland bullies, longfin eels, common bullies and shortfin eels (Table 1). Collectively, these five species made up over 80% of the total fish numbers and relative biomass. Eels alone accounted for two thirds of the biomass. With the exception of lamprey, which Glova found in large numbers, this is a similar community structure to that found in Pigeon Bay Stream.

The analysis of data by habitat type showed that generally native fish were more abundant in riffles than runs, with 70% of all fish caught in riffles (Table 1). Two species, upland bully and redfin bully, were more numerous in runs than riffles, whereas torrentfish and bluegill bullies were found predominantly in riffles. Again, this is similar to Glova's results.

[1] The "100 rivers" project was a multi-disciplinary study, carried out between 1987 and 1991, by scientific staff currently working within NIWA. Its aim was to characterise New Zealand's rivers for a range of physical and biological variables and to develop predictive relationships between the variables, on a regional basis. The resulting database now forms a valuable resource for continuing studies such as the one described in this article.