

BETWEEN AUGUST AND DECEMBER each year, millions of tiny glass-eels (so-called because they lack pigmentation and are thus transparent) enter rivers and streams around the country. Previously, and far out in the Pacific Ocean, they had hatched into the distinctive larval stage of the eel known as leptocephalus larvae (so named because of the leaf-like shape).

It is not until they are ready to migrate into fresh water, thought to be about a year after hatching, that they transform into the familiar elongate glass-eel stage and begin an active swimming life.

Soon after they enter estuaries or the lower reaches of rivers the glass-eels begin to develop colouration. In large rivers they then migrate upstream in large shoals. The number of glass-eels in these shoals can be enormous. For example, an observer in the lower Waikato River in 1941 recorded a shoal 4.5 m wide and 2.5 m deep that ran continuously for 8 hours.

Surveys were carried out approximately every fortnight between early August and December in a number of rivers and small streams on eastern and western coasts of both North Island and South Island. Glass-eels were caught by electric fishing in measured areas of shallow water, either in or near the intertidal zone at river mouths. In each of the sites estimates of glass-eel density were made. Samples were retained for laboratory analysis because examination is needed to determine the species and to assess accurately the stage of pigmentation.

One of the features of the first two seasons has been the high proportion of shortfin eels in the catch of glass-eels in many sites around the country. Of particular interest was the high abundance of shortfin glass-eels in rivers which we would expect to have adult populations. This begged the question as to the fate of all the "spare" juvenile shortfins which migrate into longfin territory (see *Water & Atmosphere* 4(3): 26-27).

It is possible that the high proportion of shortfin glass-eels in the catch is more a reflection of low numbers of longfins rather than a superabundance of shortfins. Has there been a very poor recruitment of longfin glass-eels over the past two seasons?

NATIVE FRESHWATER FISH

Reflections on glass-eel migrations

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During the spring of 1995 and 1996, teams of NIWA staff surveyed glass-eels in rivers and streams around the country. The main purpose of the research is to investigate regional differences in the timing of migrations, and to compare densities of glass-eels over a three-year period. At the completion of the second year we reflect on some of the results to date.



Don Jellyman and Julian Sykes electrofishing for eels in Purau Stream, Canterbury. (Photo: The Press)

Mean densities over fortnightly sampling periods indicate that west coast sites from either island generally contained 5-10 times the number of longfin glass-eels per square metre than east coast sites as shown in the graphs (below).

Shortfin glass-eels appeared to be more uniformly distributed, although east coast sites seemed to support higher densities of shortfin eels than west coast sites.

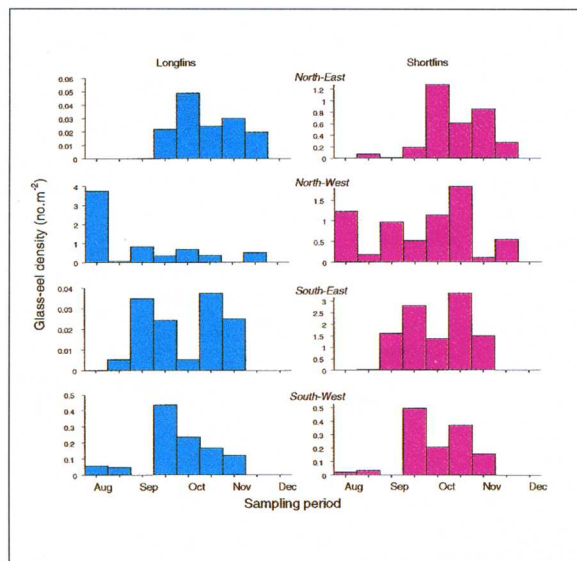
During the 1996 season, the run of glass-eels into fresh water started (and possibly peaked) earlier at west coast sites than on the east coast. From the data presented here, there is little to indicate that shortfins and longfins migrate into fresh water at different times. However, it is difficult to determine the timing and peak of glass-eel "runs" without intensive (and expensive) sampling over the whole season. Samples collected later in the season often contain significant numbers of pigmented glass-eels which have been in fresh water for some weeks, so that peak migrations can be more accurately determined from densities of "fresh" (unpigmented) glass-eels. It is also difficult to repeat accurately any quantitative sampling because of the changeable nature of river flows and stream beds in New Zealand streams.

In summary it appears that the migration of glass-eels into fresh water is not uniform around the country. In the areas surveyed:

- longfin glass-eels were mostly found in west coast streams of both North Island and South Island;
- shortfin glass-eels were generally more abundant and more uniformly distributed;
- the migrations of both species of glass-eels into fresh water began earlier in the west than in the east.

Differences in glass-eel migrations are more apparent between east and west coasts than between North Island and South Island.

The addition of a further year's data should clarify these trends, and provide us with a better understanding of glass-eel migrations nationally. ■



Densities of glass-eels recorded during the 1996 season from east and west coasts of both North and South Islands. Note that different vertical scales apply to each histogram.

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