

NATIVE FISH

NATIVE FRESHWATER fish, like many other small and cryptic creatures in New Zealand, have received relatively little attention from conservationists. Most people have heard of the kakapo, tuatara and kokako, but few know of the plight of the short-jawed kokopu, Canterbury mudfish or dwarf inanga.

New Zealand has 26 native fish species in seven families, excluding the extinct grayling and several undescribed species in Otago. Twenty-three of the 26 are endemic.

Native fish, like other indigenous animals, depend on good quality habitat. The protection of fish habitats containing representative or distinctive fish communities for their own sake has been poor. Fortunately, fish are often helped by the protection of habitats (wetlands, rivers and estuaries) for other conservation reasons.

It's all very well setting aside fish habitat. However, for more than half of our native fish this may not prevent local extinctions. Sixteen of the 26 species are *diadromous*, which means that they routinely migrate between freshwater and seawater.

These diadromous species include lampreys, eels, smelts, several galaxiids (whitebait species) and bullies, torrent-fish and black flounder. They all have complex combinations of movements

upstream and downstream involving larval, juvenile or adult fish. For these fish, it is essential that pathways to and from the sea are available. Therefore, measures aimed at conserving native fish communities involving diadromous species must be considered on a catchment-wide basis.

Most of the migrating species have young that move upstream after spending their early larval lives in the sea. A good example is the spring-time whitebait runs, which comprise the juveniles of up to six species of native fish.

Unfortunately, artificial barriers and river alterations have made thousands of kilometres of habitat inaccessible to many native fish. Migration can be impeded by dams, culverts, flood-control structures and tide gates, water diversion and removal, rapid or drastically fluctuating flows, channelisation and, in some cases, chemical and thermal pollution.

Some migrating native fish can negotiate obstacles. Those wonderful shots on television natural history programmes of salmon leaping high into the air during their upstream migrations often come to mind. While the large and powerful salmon can jump, some of New Zealand's small native fish (often at this stage only 15-55-mm-long juveniles) have evolved a different strategy. These fish are not strong swimmers, but are excellent climbers.

Using surface tension, their small light bodies can stick onto moist surfaces allowing them to wriggle up almost vertical planes.

Young eels, several of the whitebait species (koaro, banded kokopu and short-jawed kokopu) and red-finned bullies can all climb and make their way past quite formidable barriers. Provided the surface is kept moist and is not too high, unassisted passage is possible, although it may be delayed.

For most of the other species, a vertical wall of any height prevents passage. Some species may even be stopped by swiftly flowing water. Many native fish require a relatively gentle flow, moderate gradients and plenty of resting areas to pass upstream.

Unaltered rivers without barriers will obviously provide the best migration routes. But for those rivers and streams with existing barriers, or where future developments are proposed, there are some methods available to help fish over or around the blockages.

For climbing species, fish passes can be constructed from relatively low-cost, low-maintenance materials. Passes for swimmers are more difficult, but recent design developments are showing



Banded kokopu, the smallest of the whitebait species. Adults lay their eggs on vegetation in fresh water and when the eggs hatch the larval fish are carried out to sea. The juvenile fish later migrate up rivers in large numbers. A common frequenter of bush streams, this fish has declined in numbers as riverside vegetation has been removed.

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The grayling was described by W. J. Phillips as "certainly the most beautiful" of New Zealand fishes and was widely distributed throughout the country. It began to disappear soon after European settlement, probably as a result of catchment clearance and predation from trout. It became extinct about 1930 and remains the only member of New Zealand's freshwater fish fauna to have disappeared since European settlement. Rather laughably it was given official protection in 1952.

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promise. Elver passes made from large PVC pipes containing "bottle-brushes" or gravel-coated interiors are being tried out at a number of lake control gates and hydro dams in Taranaki, the Waikato and Bay of Plenty. Plans are in place for similar passes on major dams in the Waitaki catchment. Improved design and management of flood and tide gates can provide for times of fish migrations. Culverts can be designed with reduced velocities, better entry, and irregularities for fish to rest in.

Not all the problems of fish passage are easily dealt with and the Department of Conservation has identified fish passage as being a "priority threat" to native fish conservation which must be addressed. The awareness of water managers and development agencies to the needs of native fish has increased in recent years but significant progress has yet to be made.

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