

Stream works for fish

FISH-FRIENDLY STREAMS PROVIDE DIVERSE HABITATS FOR OUR NATIVE FISH AS WELL AS THE INSECTS AND PLANTS THEY NEED FOR FOOD AND SHELTER. READ THE FACTS THEN JUMP IN AND GIVE NATIVE FISH A HAND!

Mangakotukutuku stream, Hamilton.
Photo: Monica Peters, NZ Landcare Trust

Focus on the water...

Many stream protection works focus on the land such as planting slopes and banks to reduce erosion, creating grass filter strips to trap silt, and putting up fences to keep stock out. However, for our native fish surviving in the streams themselves can be a real challenge. Straightening, diverting, or dredging streams and installing weirs can dramatically alter stream flow and destroy fish habitat.

Fish-friendly streams

Riffles, pools, reaches, rapids, falls, glides, eddies, meanders, overhangs, and undercuts – there's more to a stream than just water. To survive and complete their lifecycle native fish need suitable:

- habitat type and variety
- water quality (temperature, oxygen levels, clarity, pH, nutrients)
- stream flow (quantity and speed)
- food supply (plants and insects in stream and on stream margins)
- protection from predators
- migration pathways to the sea for some species

Give our fish a hand!

Clear the water

Sediment in streams clogs fish gills, makes it harder for them to find food and can affect migration. Dense riparian vegetation can trap silt, but for a short-term fix secure hay bales across muddy ditches that enter your stream. Livestock pollute water - keep them out and provide them with tanks or nose-pumps for drinking water.

Keep predatory pests away!

Pest fish such as koi carp and gambusia prey on native fish and insects. Though it's best to leave pest fish eradication to the experts, you can help minimise their spread by carefully cleaning boating and fishing gear between waterways to destroy eggs. Never release pest fish into the wild – it's illegal.

Minimise drain maintenance

Excessive sediment, weed and algae growth can clog drains. Minimise drain disturbance by using registered sprays or weed rakes instead of digger buckets to remove excess weed growth. Leave some drains intact each year to ensure fish survive. Carry out any works in late summer/early autumn to avoid spawning and migration.



Well anchored woody debris provides important habitat for fish such as kokopu. Photo: Brenda Aldridge, NIWA. Giant kokopu. Photo: Stephen Moore, Landcare Research.

Coromandel potter Barry Brickell uses plates and bowls to create novel fish ladders. Photo: Monica Peters, NZ Landcare Trust

Designer debris

Objects in waterways like logs and boulders can cause headaches for flood managers and create hazards for swimmers and boaties, but fish need in-stream debris:

- for shelter from strong currents
- to escape predators
- to provide shade and cover during the day
- to lay their eggs on or under
- to trap or support food, like leaves, detritus and insects
- to increase habitat diversity

Leave stable debris in streams, and think twice before removing large trees that fall into waterways if they pose no hazard.

Going with the flow

Many native fish migrate between the sea and upstream habitats often as tiny fry, but dams, weirs, tide gates and poorly designed or perched culverts (the most common barrier) can block their path.

New Zealand culvert designs use the ability of eels, young kokopu, koaro and bullies to wriggle between stones, spend brief periods out of water, and climb wet margins of waterfalls and culvert sides. Note that culvert designs for trout may not suit our smaller native fish.

In some situations there is no need to install fish-friendly culverts, for instance if there is a natural barrier such as a large waterfall downstream, or no suitable habitat upstream. Barriers can also be useful tools to prevent the spread of pest fish, or to protect naturally isolated native fish, e.g., mudfish, from competitors, like trout.

Seek advice from your regional council and Department of Conservation to find out if fish-friendly culverts are appropriate for your stream.

Fish-friendly culverts ensure that:

- water flows slowly (< 30 cm per second)
- there are fish rest areas (e.g. rocks or smooth damp walls)
- at least 10 cm of water always flows through
- fish aren't required to jump

Culverts fitting in with nature:

- mimic the natural streambed by following the natural slope and original streambed direction
- are wider than the stream at average flow
- are large, and never more than half full of water during spring
- are installed in late summer/early autumn after spawning and migration

Encourage fish passage by having:

- a rough bed to slow water flow
- smooth not corrugated surfaces above water for fish to climb on
- resting areas if they are longer than a few metres

Enhance water quality by:

- diverting raceway/road run off
- fencing the stream
- having a spillway for flood flows

Protect fish habitat by:

- rock riprap at the culvert outlet to prevent scouring
- a notched rock weir or rock ramp downstream to create a resting pool
- good riparian vegetation to shade resting pools and protect stream margins

Perched culverts prevent fish passage upstream. However they can be retrofitted, such as this one (below) which has used mussel spat ropes to enable eels to access Lake Harihari. Right: A close up of whitebait climbing rope. Photos: Bruno David, Environment Waikato



 Ministry for the Environment
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Get consent

Waterways are shared resources and things you do in them can affect people and ecosystems up and down stream.

Before you undertake any in-stream works contact your regional and local council to find out if you need a resource consent or to meet a set of conditions.

Want to know more?

Use the internet to search for key phrases on the following sites.

In-stream restoration

National Institute of Water and Atmospheric Research www.niwa.co.nz
University of Auckland www.cebl.auckland.ac.nz
University of Canterbury www.sustain.canterbury.ac.nz
Waitakere City Council www.waitakere.govt.nz
Auckland Regional Council www.arc.govt.nz

Fish-friendly culverts and fish access

Environment Waikato www.ew.govt.nz
Greater Wellington www.gw.govt.nz
Auckland Regional Council www.arc.govt.nz
Department of Conservation www.doc.govt.nz

Other fishy factsheets in this series:

- #1 Our freshwater fish
- #1 Ngā ika wai māori
- #2 Stream works for fish**
- #3 Fixing your stream edges
- #4 Native fish in the city
- #5 Native fish on the farm
- #6 Caring for our catchments

All factsheets can be downloaded from: www.landcare.org.nz

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