



# A guide to improving fish access through culverts



Excellent culvert design providing year round fish access

There are thousands of culverts placed in waterways across Southland. Culvert crossings ensure vehicle and stock access in all weather and flow conditions and, if well designed and maintained, they can contribute to water quality protection.

Unfortunately, many culverts stop or restrict freshwater fish movement throughout our river catchments. New Zealand has 50 species of native freshwater fish and 10 species of sports fish that can be affected by the loss of access. Many

of these species move into different habitats like wetlands, ponds, lakes, estuaries and even the ocean to complete their life cycle. The loss of access to even some of these areas can have long term negative impacts on populations.

## ► Fish access problems caused by culverts

Culverts create high velocity flows, shallow water levels, high water temperatures and steep water falls that prevent access. The three key fish access barriers culverts create are:

### 1. Perched culverts

Perching is caused by a culvert installed on top of the waterway bed. This prevents bed materials from naturally moving downstream building them up, creating a waterfall.

### 2. High water velocity

As water flows through a culvert it is concentrated and speeds up greatly. This is increased even more in long culverts with smooth sides.

### 3. Shallow water levels and warm water temperatures

Many culverts have concrete bases to prevent erosion but this also creates a shallow water depth that restricts larger fish access. This shallow area also heats up quickly on sunny days creating a thermal barrier that can kill fish trying to swim through.

## ► Correcting fish access problems in culverts

### New or replacement culvert installation

The best practice to ensure fish access is to not alter the waterway channel alignment and gradient. Install an open bottom culvert or invert 25% – 50% of a round culvert into the bed so the natural bed is present through the culvert. Do not use box culverts or install concrete steps as these create shallow water, reducing fish access.

### Improving an existing culvert

This depends on the species needing access, and the culvert design. Ramps can be added to the downstream end to bridge a waterfall from a perched culvert. Ropes or baffles can be



A perched culvert preventing fish access

added to the inside culvert surface to help fish climb or swim through high velocity water. Rocks, sandbags or boards can be placed in the waterway below the culvert to create a series of small pools to increase water depth and reduce velocity, allowing fish to swim through. For large high culverts, a fish ladder featuring a number of pools may be required.

## ► Legal requirements to provide fish access through culverts

The Resource Management Act 1991, Conservation Act 1987 and the Freshwater Fisheries Regulations 1983 require that culverts must not impede the movement of fish and protect both the fish and their habitats. Environment Southland has rules in the proposed Southland Water and Land Plan on culvert sizes, placement and consent may be needed.

## More information

Fish passage guidelines and assessment tools are available online from:

- NIWA – [www.niwa.co.nz](http://www.niwa.co.nz)
- Department of Conservation – [www.doc.govt.nz](http://www.doc.govt.nz)
- Environment Southland – [www.es.govt.nz](http://www.es.govt.nz)
- Fish and Game New Zealand – [www.fishandgame.org.nz](http://www.fishandgame.org.nz)

## Further assistance

For advice on whether your culverts provide fish access and solutions to correct this, call Environment Southland on 0800 76 88 45 to arrange a free visit by our land sustainability team.