



# Te Wiki o Te Taiao



Timberlands Environment Week 2024 | Page 1

## FISH IN FORESTRY

### Fish Passage Remediation

In FY23, Timberlands completed a strategic project aimed at reviewing all culverts across the Kaingaroa Forest estate that were installed before March 2018. The goal was to assess their condition and gather information on any necessary maintenance. From this review, a remediation programme has been developed to carry out improvements on culvert structures throughout the ngahere. One key area identified for improvement was **fish passage**. Timberlands has an obligation to ensure our infrastructure allows for migration of native fish, supporting biodiversity and healthier ecosystems.

During August and September 2024, members of the Roding and Sustainability teams completed two levels of fish passage remediation training with ATS environmental.



TEAM IN TRAINING

### BEFORE



### AFTER



EXAMPLE OF BEFORE AND AFTER OF CULVERT REMEDIATION – WITH BAFFLES, MUSSEL ROPE & RAMP

This training was undertaken for several reasons including:

- Providing a better understanding of the impacts our culverts have on the natural freshwater environment.
- Understanding why fish passage is important.
- Learning how to identify non-natural barriers created by our culverts.
- Learning how to remediate each barrier appropriately.
- Meeting our NES-CF
- Going a step further and remediating historic culverts to ensure we are doing our best as a company.

The training included a half-day office-based course that provided the theory and background of fish passage remediation. This was then used to complete two in-field training days with the Roding team and contractors who will complete this work for Timberlands in the future.

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## FISH IN FORESTRY

### The Technique

Mussel rope was installed through the culvert to slow water flow, which increases the surface area of the flow to provide areas of rest for fish.

A V-baffle, mussel rope, and flexible ramp were installed at the pipe outlet to bridge the gap to the natural flow below. This disperses the water, creating wetted margins and pooling areas for fish to rest before continuing their journey.

### Why is the passage of fish important?

Many freshwater fish species are in decline and a major reason is due to the number of barriers to migration preventing access to natural habitats.

About 70% of our native fish are threatened or at risk. If their movement up and downstream is delayed or blocked completely, fish may not be able to get to the habitats they need to complete their lifecycle. Their numbers can be reduced, or they may be completely lost from a stream. Some fish species are more affected by instream structures than others. For example, inanga are weak swimmers, whereas kōaro whitebait and baby eels can climb wet surfaces very effectively. Note that natural barriers are important as they help protect native species and ecosystems by keeping invasive fish out. Click [here](#) for more on the Doc website.

Info Source and Credits: ATS Environmental Training Aid.

## | TRAINING AND INSTALLATION TAKING PLACE



### Fish Passage Remediation Solutions

- Flexible baffles
- V-baffles
- Mussel rope
- Flexible ramp with mussel rope
- Floating ramps

## RDG GOAL: TIKANGA MĀORI

The cultural considerations and values of Māori are an important component of our training and include:

- Spiritual connection and responsibilities to the water: **Te Mauri o Te Wai**
- Taking of water: **Te mihi o Te Wai**
- Recreational connection with water: **Takaaro Wai**
- Responsibilities to all water life: **Te Ora Wai**
- Gathering of food: **Mahinga Kai**

[Source: ATS Environmental Training Aid]

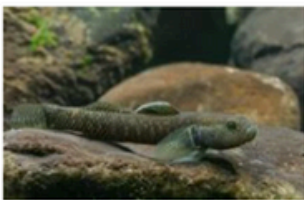


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## FISH IN FORESTRY

### Bullies



There are seven species of bullies in New Zealand. They are found in a range of freshwater habitats.

### Eels



Eels migrate up streams as elvers to find suitable adult habitat. After many years they return to the Pacific Ocean to breed and die.

### Lamprey



Lamprey are primitive, jawless fish. They look like eels but are more closely related to sharks and rays.

### Mudfish



New Zealand's mudfish are small, native freshwater fish, regarded as a treasure to iwi.

### Non-migratory galaxiids



Non-migratory galaxiids belong to an ancient, scaleless fish family called Galaxiidae – for the galaxy-like gold flecks and patterns on their backs.

### Smelt



Whitebaiters call smelt 'cucumber fish'. There are two species of these small shimmering silver fish.

### Torrentfish/panoko



The streamlined shape of this native fish must have influenced Concord designers.

### Whitebait - migratory galaxiids



Whitebait are the juveniles of six species of fish. Five of these are migratory galaxiids: inanga, banded kōkopu, giant kōkopu, kōaro and shortjaw kōkopu. The sixth species is common smelt.

**Image Source** <https://www.doc.govt.nz/nature/native-animals/freshwater-fish/>

### Helpful links to explore:

- [Freshwater fish videos: Fish passage management \(doc.govt.nz\)](https://www.doc.govt.nz/nature/native-animals/freshwater-fish/)
- <https://youtu.be/5pbv13MG2-Q> (roughly 1min in shows fish moving up waterfall)
- [Fish passage management in New Zealand \(doc.govt.nz\)](https://www.doc.govt.nz/nature/native-animals/freshwater-fish/)
- [ATS Environmental \(ats-environmental.com\)](https://www.ats-environmental.com/)