



## Perched culverts for rare Galaxiid fish protection

The Thomsons Catchment Project has created three in-stream refuges/reserves for the Central Otago roundhead galaxias, a small native fish endemic to the region that inhabits lowland creeks in the Manuherekia and Upper Taieri Valleys. Unfortunately, their population has declined by approximately half over the past 20 years, and they are now classified as nationally endangered.

One of the threats to galaxias, alongside habitat loss is predation by sports fish. While waterfalls often act as natural barriers, the Thomsons catchment lacks these features. To address this, and with the support of the Otago Regional Council (ORC) and local landowners, we have installed a barrier in Thomsons Creek and perched culverts in two of its tributaries. These measures will prevent exotic fish, like trout and perch, from entering the habitats of three key galaxias populations in the catchment.

*“Given the scale of the impact of salmonids in New Zealand, more research needs to be directed at developing effective brown trout control and galaxiid restoration techniques. If galaxiid populations are not given sufficient protection and reserves are not established, there is a high risk that incremental decline will lead to the eventual extinction of many galaxiid populations and ultimately species, especially the most range-restricted.” – (McDowall, 2006)*

This factsheet provides information about our perched culverts. You can find a detailed factsheet on the main stem Thomsons Fish barrier on our [website](#).



September 2024 Hepburn Road perched culvert

## Galaxias in the Thomsons catchment

As part of the Thomsons Catchment Project, a survey conducted across the entire catchment in early 2021 identified where galaxias are located. This data was compared with work done 20 years earlier to understand changes in Galaxiid populations.

The survey found only three remaining significant populations of galaxias: one in the main stem of Thomsons Creek and two others in small tributaries of the Sluice Channel sub-catchment.

Trout and perch were absent from the galaxias locations in the two small tributaries but were present in adjacent creeks.

This information led to the creation of two refuges/reserves to protect these important fish populations.



**Photo Source:** Daniel Jack – Department of Conservation.



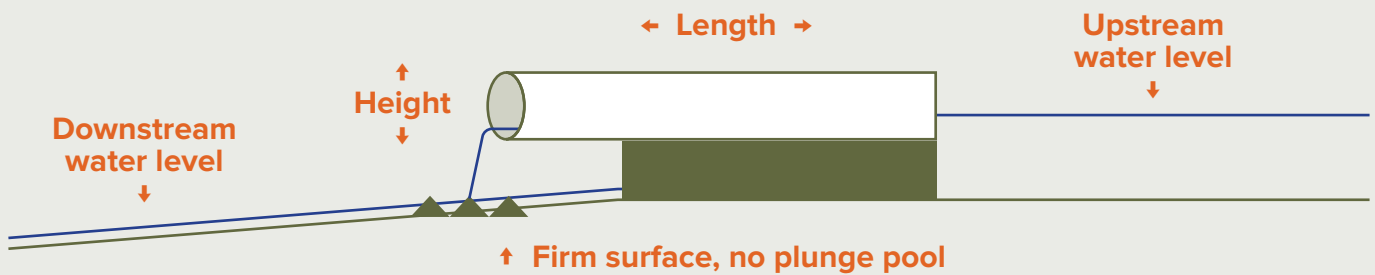
Galaxiids found in the catchment in January 2021

## Things to consider before installing a perched culvert or fish barrier

- ▶ Always seek expert guidance and advice before installing a fish barrier.
- ▶ Understand the fish community both above and below the proposed site. If you are replacing an existing culvert, determine if it currently acts as a barrier to trout and perch and whether it needs to remain that way to protect a galaxiid population. Remember, it only takes two breeding fish to initiate a population decline!
- ▶ If you're installing a new barrier, consider whether fish passage for native fish needs to be maintained. Is there already good fish passage for native species, or is the area an important trout spawning site?
- ▶ The ORC is available to assist by electric fishing potential galaxiid areas and providing advice on where barriers might be beneficial.
- ▶ Check if a consent is required for your project.

The Thomsons Catchment Project needed a consent to create a barrier in Thomsons Creek and the two perched culverts, and were able to utilise the ORC Community Fund to cover the consent processing costs.

## Perched Culvert design principles



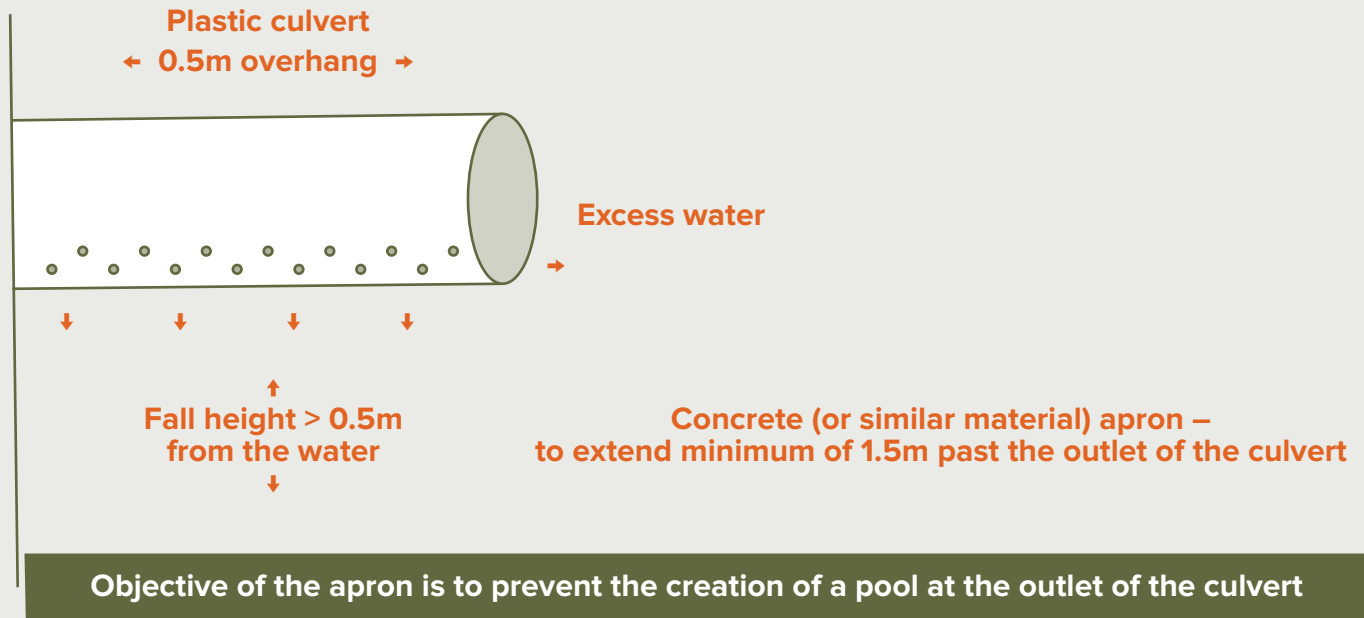
Culvert concept design

### When creating a perched culvert, there are some key design principles to follow:

1. Create overhang and height. The culvert needs to stick out over the downstream stretch of the creek. Exotic fish will swim to the base of the culvert and try to jump up, so the longer the overhang, the less height above the water is required.
2. The height of the culvert pipe above the creek depends on the size and flow of the water. Lower flows require less height, while higher flows need more height. This ensures exotic fish cannot jump into the culvert pipe. A good starting point is a 900mm overhang and 900mm height above the downstream water flow.
3. Equally important is that the water spilling from the culvert pipe should land on a hard surface to prevent the creation of a plunge pool. Getting rid of the plunge pool is critical. Ensure the hard surface extends far enough downstream to avoid the plunge pool effect.
4. Plastic culverts are preferable to concrete as they have less friction, which helps maintain water velocity through the culvert and prevents trout from accessing it.
5. Design the culvert based on the size of the catchment area above it. Avoid creating a flooding or erosion hazard by installing a culvert that is too small. Refer to the **NZ fish passage guidelines**.
6. In some locations, existing partial barriers, like small waterfalls, can be modified to offer better protection for upstream fish populations.
7. It's not always possible to place a perched culvert or barrier in the perfect location. Compromise when necessary.
8. Design and install the culvert in a way that minimises long-term maintenance.
9. Exclude stock from the area, and plant natives alongside the creek to further enhance the habitat for galaxias.
10. Regularly monitor the culvert and undertake any maintenance to ensure it continues to function as intended.
11. The Otago Regional Council is very supportive and can assist with monitoring galaxias populations.

# The Thomsons perched culverts

## Overhanging culvert design



The culverts were installed in two small tributaries in December 2023. Each culvert consists of a 300mm plastic pipe with a slight slope from top to bottom. At one site, second-hand paving tiles were used downstream to create a hard surface and eliminate the plunge pool. The second site featured natural rocks and didn't have a plunge pool, so no additional hard surfaces were needed.

As these sites had minimal natural slope, holes were drilled into the bottom side of the culverts to allow water to flow out along the length, reducing the creation of a scour or plunge pool that salmonids use to jump. This approach has had mixed results, as weeds tend to clog the holes and require occasional clearing. We wouldn't recommend this method for other sites unless the benefits outweigh the maintenance required.

The work involved removing the old culverts, preparing the creek bed, placing the new culverts, and backfilling with gravel. The entire process took a day with a digger and a couple of workers.

The night before installation, fish traps were set at the site to relocate any fish before work began. Around 100 galaxias were caught and safely released upstream.

Both culverts are located in sheep paddocks and were previously used for stock crossing. These areas have now been fenced to exclude stock, and the surrounding land has been regressed. At one site, native plants have been introduced upstream to provide shading and riparian habitat for the galaxiids.



Completed Hepburn Road site.



Hepburn Road site pavers in place to avoid the creation of a pool.



Holes drilled in the pipe to disperse water flow.



Culvert site in December 2021.



Downstream of culvert site prior to works.



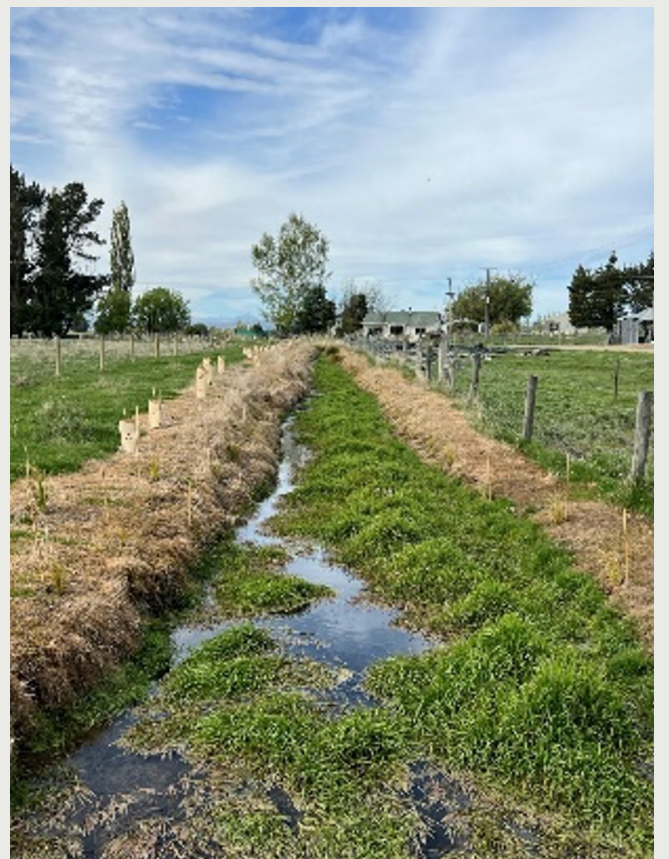
Installing the culvert sides.



Downstream of culvert post works.



Upstream of proposed perched culvert prior to works.



Fenced and planted upstream of culvert in September 2024.



Wallington Road culvert and perched culvert prior to changes.



Wallington Road, installation.



Wallington Road perched culvert prior to fence installation.



Wallington Road fenced culvert and creek March 2025.

## Inspiration from other installed barriers for galaxiids in Otago

There are an additional four installed or enhanced barriers supporting galaxiids in Otago, bringing the total to seven.

These are located in Akatore (1), Swin Burn (2), and Cardrona (1).

The ORC is developing an Otago galaxiid monitoring programme and is looking to identify further sites where galaxiid refuge areas could be created.

If you think galaxiids might inhabit your streams and would like to learn more, contact **Pete Ravenscroft at ORC on 0800 474 027.**



A weir structure designed to prevent salmonids entering a population of threatened galaxiids. Akatore Creek.  
(photo source: Daniel Jack)



Galaxias.



Swin Burn. (photo source: Daniel Jack)



## Where can I get advice and help?

YOU CAN GET GUIDANCE AND ADDITIONAL INFORMATION FROM

Department of Conservation: [www.doc.govt.nz](http://www.doc.govt.nz)

Otago Regional Council: [www.orc.govt.nz](http://www.orc.govt.nz)

Thomsons Project: [www.mcg.org.nz/thomsons-project](http://www.mcg.org.nz/thomsons-project)

To find out more about the Thomsons Catchment Project, follow us on Facebook at [www.facebook.com/ThomsonsCatchmentProject](http://www.facebook.com/ThomsonsCatchmentProject)

Visit [www.mcg.org.nz/thomsons-project](http://www.mcg.org.nz/thomsons-project) for copies of our fish barrier, perched culvert and galaxias planting factsheets.