

# Lessons Learnt 007

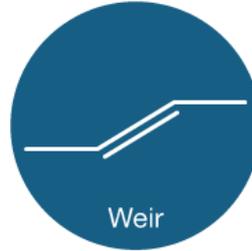


April 2018

## Retrofitting weirs to create fish ramps in Gibbons Creek, Hamilton

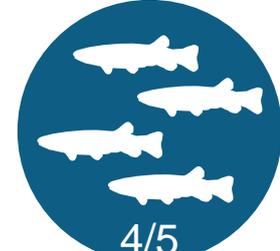
This case study forms part of a series that provides key information and guidance about how to potentially improve a fish passage barrier in a New Zealand waterway.

While providing fish passage is advantageous to most fish, removing or remediating a barrier can also affect fish populations by introducing invasive species to new areas.



Weir

STRUCTURE TYPE



4/5

SUCCESS RATING\*

### What was the problem?

Gibbons Creek is a catchment in central Hamilton that joins the Waikato River through Memorial and Parana Parks. Four weirs have reduced fish passage (Figure 1) for the two weak swimming species, inanga (*Galaxias maculatus*) and common smelt (*Retropinna retropinna*).

Prior to installing these fish passes, only five native fish species were present in Gibbons Creek; tuna (shortfin eels (*Anguilla australis*), and longfin eels (*Anguilla dieffenbachii*)), banded kokopu (*Galaxias fasciatus*), giant kokopu (*Galaxias argenteus*) and common bullies (*Gobiomorphus cotidianus*). Exotic fish species gambusia (*Gambusia affinis*) and catfish (*Ameiurus nebulosus*) were also found prior to the installation.



**Figure 1:** One of four weirs on Gibbons Creek that impeded passage for weak swimming fish, December 2015.

Photo: NIWA

### What was the solution?

A collaborative project between NIWA, NZ Landcare Trust, Waikato Regional Council, Hamilton City Council, Waikato Raupatu River Trust, Waikato River Authority and Ngati Wairere aimed to enhance native biodiversity and maximise the number of species that will inhabit Gibbons Creek.

In February 2016, concrete rock ramps were built at the downstream face of three weirs and a fourth removed (Figure 2). Rocks were laid on geotextile and rapid-set concrete was used to secure the smaller rocks in place and create a continuous wetted path for fish on the new ramps.

Boulders and logs were installed to protect banks from erosion, enhancing instream habitat.



**Figure 2:** After installation of a concrete rock ramp to provide passage for swimming fish species, March 2016. Photo: NIWA

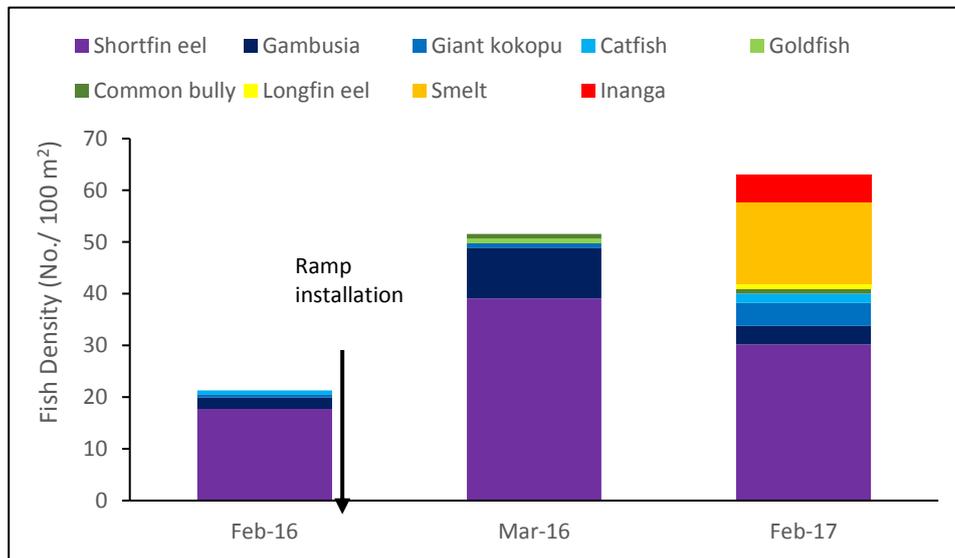
\* Success rating: 4/5 – Good improved passage upstream and downstream for all species



## Monitoring results

Monitoring showed that installation of the fish ramps and weir removal allowed more fish species to access Gibbons Creek, including inanga and smelt for the first time (Figure 3).

Unfortunately, higher numbers of exotic fish were also found above the weirs, including gambusia, catfish & goldfish. However, these species were already present further upstream and likely to have recruited from headwaters. Despite this, the density and diversity of native fish has improved indicating that the ramps are beneficial overall to native fish passage.



**Figure 3:** Standardised single pass electrofishing results of fish communities before and after installation of the fish ramps in Gibbons Creek. The survey reach is located upstream of the second retrofitted weir.

## Did it work?

Yes, smelt and inanga successfully migrated upstream over the first two fish ramps within a year of installation. They have not yet been found above the third fish ramp which suggests this ramp may still be a partial barrier to these weaker swimming fish.

Juvenile giant kokopu have been found above all four of the modified weirs, showing that the changes are successful for both swimming and climbing native fish species.

## Lessons learnt

1. Without monitoring we would not know if the ramps were successful at improving fish passage.
2. Further modifications may be required to weir three to enable weak swimming fish species to pass upstream.
3. Inexpensive concrete rock-ramps can mitigate low head/small migration barriers.
4. This project demonstrates small weir remediation is valuable. It raises awareness and educates the community about fish passage restoration work for native fish.

## For further information

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