CASE STUDY – BRINGING BACK THE FISH: NORTHERN RIVERS

NSW Department of Primary Industries is working with Catchment Management Authorities, landholders, volunteers, fishing groups and local councils to **Bring Back the Fish** to our rivers, creeks, lagoons and wetlands.

What needs to happen? Firstly, fish need to be able to move up and down our waterways and between freshwater and the ocean. Secondly, fish need suitable habitat: different habitat for different needs (feeding, breeding) at different times of the year.

Across New South Wales, barriers to fish passage are being modified or removed to enable fish to move more freely up- and downstream. Habitat is being rehabilitated or even created in areas where it has been completely destroyed.

This case study provides an example of a project designed to **Bring Back the Fish** in the Northern Rivers region.

GRADYS CREEK ROAD, GRADYS CREEK, KYOGLE

[An extract from: NSW DPI (2005) *Reducing the impact of road crossing on aquatic habitat in coastal waterways – Northern Rivers, NSW*, Report to the Northern Rivers Catchment Management Authority, NSW DPI, Wollongbar, NSW]

Description and setting

Gradys Creek Road crosses Gradys Creek in the Kyogle Shire local government area. The causeway measured 24 metres in length (from bank to bank) and 4 metres wide, conveying water over the structure in a shallow laminar flow. The crossing prevented fish passage in the upstream direction during low-flow conditions due to shallow flow depths.

Prioritisation of road crossings in the Northern Rivers subregion highlighted the crossing on Gradys Creek as a medium priority for remediation due to the following factors:

- Gradys Creek is a perennial flowing, upper level tributary of the Richmond River that supports a diverse range of native fish species;

- Gradys Creek is within the known historical range of the endangered Eastern Freshwater Cod (*Maccullochella ikei*); however, the creek is not believed to support a self-sustaining population of the species;
- Riparian and instream condition within Gradys Creek ranges from good to excellent.
- The crossing quickly drowns out following minor river rises;
- Stream connectivity is fragmented downstream of the crossing due to the presence of numerous barriers within Gradys Creek, as well as within the mainstem Richmond River; and
- During low-flow conditions, the crossing restricts fish passage to 18 km of upstream habitat.

Proposed remediation actions

The crossing is owned by Kyogle Shire Council and provides the primary access way for ten properties on Gradys Creek Road. In addition to fish passage considerations, Council and the surrounding community were interested in improving the safety and reliability of the crossing during minor river rises when the crossing drowns out.

Kyogle Shire Council initially proposed to remove the existing causeway and insert a two-celled box culvert structure (2 x 2400 mm2) set approximately 0.5 m below bed level. Consultation with NSW DPI resulted in a revision of the design to a three-celled box culvert that would include a low-flow channel through the middle cell. Creek bed level surveys were consulted to determine the invert level of the low-flow channel that would ensure the pooling of water through the structure at a minimum depth of 300 mm. Alternative access was available to property owners during the proposed works, therefore construction of a temporary crossing was not required.

Remediation works

Designs and permits for the crossing were approved by NSW DPI in June 2005, with works commencing in following September. Prior to the start of on-ground works, instream sediment control consisting of multiple rows of hay bales wrapped in geotextile fabric was inserted across the full width of the downstream channel.

A coffer dam was formed on the upstream side of the causeway to divert water flow through a diversion channel running along the creek's right bank (**Plate a-b**).

The diversion channel was rock protected and underlaid with geotextile fabric to limit bed erosion. The existing causeway, including approaches, was removed using an excavator fitted with a rock hammer (**Plate a**).

Footings were prepared for the new crossing prior to the insertion of the box culverts, with the middle low-flow channel being formed directly into the concrete slab (**Plate c-d**).

The coffer dam and diversion channel were subsequently removed, allowing stream flow to return through the structure. Approaches for the new road were then graded (**Plate e**), with rock protection being placed on disturbed banks to limit erosion and sedimentation.

Banks adjacent to the removed causeway were battered to a slope not exceeding 1:7, with sediment fencing being sediment fencing being erected on all disturbed banks. Bank revegetation is scheduled to occur at the site in Autumn 2006. Works

were completed over a 6 week period, with Fish-Friendly Road Crossing sings being inserted at the site shortly thereafter (**Plate e-f**).

a)

b)

c)

d)

e)

f)

Benefits associated with remediation

The main outcomes of the proposed project at Gradys Creek were:

- Improved stream connectivity for native fish species (Plate g-h);
- Education of Kyogle Shire Council of best-practice techniques for the construction of fish-friendly road crossings; and
- Improved safety and reliability of the crossing during minor river rises for ten property owners.

g)

h)