



Managing ^{coastal} stormwater drains ^{for} fish habitat

Stormwater infrastructure is essential for quality of life, safety and health in urban environments. It is also increasingly recognised that open stormwater systems can provide environmental benefits and habitat for aquatic plants and animals. Improving the quality of stormwater can also reduce the pollution of downstream receiving waters and improve in-stream habitat for native fish.

This is the second factsheet in a series designed to inform drain managers how stormwater drains can be managed to improve their habitat value and to assist in implementing the National Recovery Plan for the endangered Oxleyan pygmy perch (*Nannoperca oxleyana*), a small native fish which inhabits wetlands in coastal NSW. The other factsheets are:

- Assessing the habitat values of stormwater drains in coastal areas (#1)
- Retrofitting drains using *Water Sensitive Urban Design (WSUD)* principles (#3)
- Preparing a stormwater drain management plan in coastal areas (#4)

Management objectives

Best practice management of stormwater drainage infrastructure in coastal lowland areas balances safe and effective drainage with the maintenance of the features of natural ecosystems. This can provide aquatic habitat values in drains and the waterways they flow into.

One of the outcomes of meeting best practice in Northern NSW is the protection of Oxleyan pygmy perch (OPP) (*Nannoperca oxleyana*) habitat. This small native endangered¹ fish is distributed patchily in the coastal floodplains of northern NSW and south-east Queensland.



Oxleyan pygmy perch.
Photo Gunther Schmida

A high priority for management is the maintenance of natural stream bank vegetation, in-stream habitat structure and natural water flow and quality. The objectives within the National Recovery Plan for OPP include:

- minimise the impacts from current and future urban development, agriculture and forestry
- identify and restore degraded OPP habitats.

¹ Endangered species NSW *Fisheries Management Act 1994* (NSW); Endangered species *Environment Protection and Biodiversity Conservation Act 1999* (Cth); Vulnerable species *Nature Conservation Act 1992* (QLD).

Management issues

Traditional drain maintenance practices can degrade habitat and water quality, threatening the well being of native fish, and typically consists of:

- de-silting - undertaken when sediment or vegetation prevents the drain from functioning properly. Low lying drains, typical of coastal floodplains, are highly susceptible to accumulation of sediment. Mechanical de-silting often disturbs and removes vegetation, changes the bed depth and mobilises both sediment and any contaminants contained within it
- slashing - organic matter which ends up in waterways, can, under certain conditions, lead to low dissolved oxygen levels in the water as it decomposes resulting in localised fish kills
- chemical application either for weed control or as an alternative to mechanical vegetation removal
- culvert repairs can disturb vegetation and the banks in the immediate vicinity of the culvert.

New drainage and road construction can impact by:

- disturbing or destroying habitat
- fragmenting habitat
- increasing pollutant loading
- mobilising acid sulfate
- increasing energy of stormwater (volume, velocity and peaks).

Drain management plans which avoid or minimise impacts on OPP populations and habitats are advised within the National Recovery Plan (see Factsheet #4).

Best management practices

Install sediment and pollution controls

Prevention is preferable to having to remove sediment and pollutants once in a waterbody. Sediment traps and energy dissipaters at the immediate drain outlet concentrate sediment and reduce the frequency of maintenance required. In some circumstances, constructed wetlands are appropriate for trapping sediment and nutrients.

Attention should be given to erosion and sediment control when working on culverts or other works which disturb vegetation and / or soil.

Provide adequate fish passage

Weirs and culverts can impede fish passage. Culverts should sit at or below bed level and should not funnel water into dark, fast moving streams.

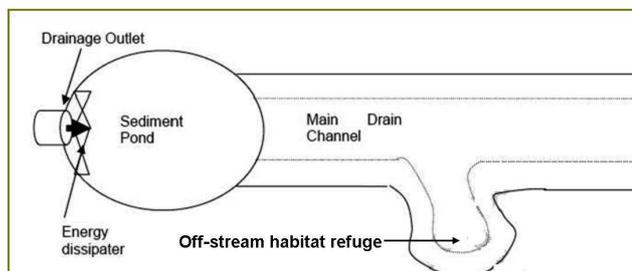


Crossings should always include a low-flow culvert to ensure adequate fish passage under all conditions. Photo I&I NSW

Further information: Industry & Investment NSW *Policy and Guidelines for Fish Friendly Waterway Crossings*. Available online at: <http://www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/toolkit>

Minimise impacts on stream flows

Drainage systems should minimise the negative effects of stormwater run-off. Options for slowing water down and reducing high speed / high volume flows include reed beds, wide profile drains with intermittent infiltration / retention areas and sediment traps.



Sediment ponds and energy dissipaters slow down stormwater entering drains. Illustration: Richmond Valley Council

Minimise impacts on habitat connectivity

Stormwater systems should connect to natural waterways and wetlands after sediment, nutrients and other pollutants have been removed.

Minimise impacts on aquatic and riparian vegetation and soils

Acid sulfate soils should not be disturbed during construction or maintenance. If using chemical weed control, only use herbicides registered for use in waterways. Operators need to be trained in the use of the chemical.

Alternative equipment & practices

- Using grated buckets on excavators will reduce sediment disturbance.
- Slashing or brushcutting rather than desilting.
- Encourage overhanging vegetation as shading reduces growth of in-stream vegetation.
- Use a mosaic maintenance pattern, leaving habitat refuge areas.
- Restrict maintenance to strategic locations: for example, in the immediate vicinity of outlets.
- Restrict chemical application to specific areas within identified drains.
- Concentrate maintenance within 20 – 50m of the immediate drainage outlets. (It is advisable to seek advice from Fisheries about disturbance downstream from outlets).
- Excavate a small width 'low flow' channel to minimise disturbance to the overall channel.

Oxleyan pygmy perch habitat areas

The general best management practices described above apply in areas where OPP may be present. In addition:

- maintain low flow regimes
- avoid maintenance during the wet season when the impacts of soil and vegetation disturbance will be greater
- only undertake works between May and September to minimise impacts during the OPP breeding season.

For more information and technical advice:

Industry and Investment NSW
Fisheries Conservation and Aquaculture Branch
Wollongbar Primary Industries Institute
Telephone: 02 6626 1200
www.dpi.nsw.gov.au/fisheries

These factsheets are part of ongoing commitment to improving the aquatic habitat values of stormwater drainage systems and to the implementation of the Recovery Plan for the Oxleyan pygmy perch by Richmond Valley Council and Industry and Investment NSW, supported by the NSW Government through its Environmental Trust.



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