# Black mudfish in the red

**Five species of mudfish are found in New Zealand. Waikato, along with Auckland and Northland, is home to the black mudfish, *Neochanna diversus*, found nowhere else in the world.**

Once widespread, they have disappeared from many areas in the lower Waikato and Hauraki Plains, mostly due to widespread loss of habitat (at least 75% of Waikato wetlands have been drained). Black mudfish are now included in the threat classification system as 'at risk', and would likely be in an even more critical state if not for the presence of large populations protected within specific areas of public conservation land at Whangamarino Wetland and the Kopuatai Peat Dome.

**Mudfish (waikaka) are a curious native species with very specific habitat requirements.**

Mudfish are becoming increasingly threatened by habitat loss, invading pest fish, and reduced water quality. This brochure focuses on our local black mudfish, and explains how mudfish can live on land and some simple ways to help save them from decline.

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*Cover image: The Whangamarino Wetland and Kopuatai peat dome are among the last strongholds for populations of black mudfish. Photo: Mike Lake—taken at Lake Kaituna in Horsham Downs.*

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# Mucking in for mudfish

a rare native species in your backyard

Department of Conservation
*Te Papa Atawhai*

# What are mudfish?

**Ask your average Kiwi to name a native fish off the top of their head. Odds are 'mudfish' won't be the first one they think of.**

Not surprising. These small fish with leathery, scale-free skin are reclusive creatures that hide out under logs during the day. Coloured black or speckled brown, they're hard to spot even when you know what you're looking for.

Mudfish are shaped like a torpedo, with no pectoral fins, and contrary to their name, they prefer clear, not muddy, water. They grow to an average size of 10 cm (but can reach 16 cm) and live for around 10 years. Adult mudfish are nocturnal and eat aquatic insects and tiny crustaceans called amphipods.

BLACK MUDFISH *(Neochanna diversus)*

## What's in a name?

**While their common name is hardly endearing, their scientific name is much more interesting.**

Mudfish belong to the genus Neochanna in the family Galaxiidae, an ancient family of fish that make up more than half of our native freshwater fish species (22 Galaxiid species are described in New Zealand). They get their family name from the starry patterns on their skin, which resemble a galaxy of stars.

Māori named them waikaka, meaning cunning in water. This reflects their clever ability to bury themselves into moist mud or under logs to survive dry periods.

INANGA *(Galaxias maculatus)*

KŌARO *(Galaxias brevipinnis)*

BANDED KŌKOPU *(Galaxias fasciatus)*

*Note: images not to scale.*

*Measuring mudfish. Photo: Kathryn Duggan.*

## Survival skills

**Like other mudfish species, black mudfish have a number of very unusual adaptations for the wetlands and peat lakes in which they live.**

They can survive out of water and breathe oxygen for several months when their wetland habitat dries out over summer, as long as they are kept moist by burrowing under tree roots or into mud or damp leaf litter. Black mudfish can slow down their heart rate and the amount of energy they need to live (similar to hibernating bears but called aestivation in mudfish), but immediately wriggle into life when water returns. Their skin is coated in tear-like mucus, which helps keep them moist out of water and also protects the fish against infection. They can even breathe air through their skin.

## Threats

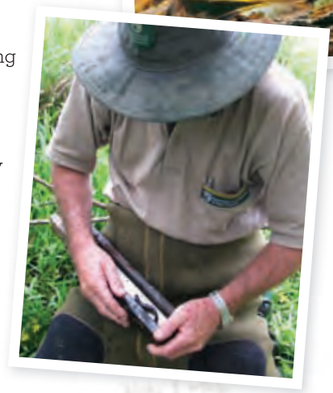
**Despite these clever adaptations, black mudfish have very specific habitat requirements, more so than other species of mudfish, and are particularly vulnerable to habitat loss, pest fish and water quality decline.**

They are swamp dwellers and prefer low-nutrient, acidic peat bogs and peat lakes with clear water and overhanging reeds, rushes or sedges. They are found more rarely in higher nutrient wetlands characterised by vegetation such as raupō (*Typha orientalis*). You can also find them in farm drains on peat soils with good plant cover. Early settlers to New Zealand sometimes found mudfish as they dug vegetables like potatoes out of the earth—an early version of fish and chips perhaps?

### *Habitat loss*

Probably the most pressing threat to black mudfish is the ongoing loss and fragmentation of habitat, reducing the number of places the fish are able to live. Drainage and vegetation clearance means wetlands stay drier for longer over summer, pushing the fish to the limits of their endurance. As fish populations decline so does their genetic diversity, making the species less able to adapt to changes in its environment.

*Black mudfish. Photo: Rod Morris.*



*Chris Annandale measuring mudfish. Photo: Kathryn Duggan.*

'Drain maintenance that removes in-stream plants and stirs up sediment further reduces habitat quality and can lead to populations of mudfish becoming locally extinct ...'

### *Pest fish*

Gambusia (*Gambusia affinis*), also known as mosquitofish, are a small, aggressive fish introduced from North America to (unsuccessfully) control mosquitoes. They are the biggest predator to black mudfish and will eat mudfish fry (young, recently hatched fish) and attack adults. Gambusia are an 'unwanted organism' in New Zealand and it is illegal to release them into waterways.

### *Water quality decline due to agriculture*

Mudfish living in drains or wetlands on farmland are vulnerable to sediment and nutrient-laden run-off, which feeds algal blooms, increases the turbidity of the water and reduces the good quality habitat they need. Drain maintenance that removes in-stream plants and stirs up sediment further reduces habitat quality and can lead to populations of mudfish becoming locally extinct.

# What you can do to help

**Here are some things we can do to keep mudfish in the Waikato.**

- Fence stock out of waterways.
- Plant harakeke/flax, and native sedges like carex and toetoe (not pampas) along stream banks and drains. Vegetation rooted in shallow water in and around farm drains helps provide black mudfish with shelter and food, and reduces the water temperature, retaining moisture which is essential for mudfish survival.
- Clear farm drains less frequently, retaining vegetation to provide habitat and shade. Use a digger arm to protect drain-side vegetation.

*An example of good riparian management protecting mudfish habitat. Photo: Michael Paviour.*

*Weighing mudfish. Photo: Kathryn Duggan.*

- Protect wetlands on your property. As well as being mudfish habitat, they filter farm run-off and help keep the streams clean
- Create a farm management plan that includes nutrient budgeting, effluent disposal and sustainable peatland management. You can get help with creating farm management plans from theWaikato Regional Council, Dairy NZ, and NZ Landcare Trust.
- Read NZ Landcare Trust's Fish Factsheet 'Native fish on the farm' at www.landcare.org.nz.

## Getting funding and advice

The Biodiversity Condition Fund supports the enhancement of biodiversity on private land through projects such as fencing, restoration planting, weed control or pest control. See www.biodiversity.govt.nz/land to find out more.

The Nature Heritage Fund and QEII National Trust help landowners look after wetlands and other areas of high ecological value on private land, either by purchase for reserve or leaving it in your hands secured for future generations through an open space covenant.

For help with writing funding applications, contact the Biodiversity Forum coordinator on 0800 BIODIV or see www.waikatobiodiversity.org.nz/funding/.

Your local or regional council may also be able to provide grants, plants, or other forms of assistance.

**For more information**

To find out more or to get advice about promoting mudfish habitat on your property, contact:

**Department of Conservation Waikato Conservancy Office**
07 858 1000
www.doc.govt.nz/waikatoconservancy

**NZ Landcare Trust**
0800 526 322
www.landcare.org.nz