

FRESH OUT OF WATER Introduced, native or extinct freshwater fish

Introduced freshwater fish species.

New Zealand freshwater ecosystems have their own equivalents to the possums, stoats and rats that plague our native forests.

Nine species of exotic freshwater fish can be found in the lakes, rivers, streams and wetlands of Wairarapa Moana and some of these species are now the most abundant and commonly seen fish in the region. While some species were introduced for ornamental value, e.g., goldfish, or for perceived biological control value, e.g., Gambusia, the majority were deliberately transported, bred and spread throughout New Zealand for recreational fishing, e.g. brown trout and perch. Most of these species were legally introduced by acclimatisation societies over one hundred years ago.



Mosquitofish (*Gambusia affinis*), Lake Wairarapa. Photograph Alton Perrie



Perch with eleven native bullies removed from its stomach, Lake Wairarapa. Photograph Alton Perrie

Just as on land, where introduced predators plague our native forests and the animals and birds living there, exotic fish species pose significant threats to our indigenous freshwater ecosystems. Perch and brown trout – the most widespread exotic fish in Wairarapa Moana – both grow a lot larger than most native fish species, are aggressive and, in some cases, feed exclusively on native fish. Even when not directly preying on native fish, they are competing for the same resources of food and habitat. The exotic rudd is also widespread and as adults, this species is exclusively herbivorous and can cause changes to the ecosystem by interrupting food chains and degrading water quality.



Rudd, Lake Wairarapa. Photograph Alton Perrie



Large goldfish, Lake Wairarapa. Photograph Alton Perrie

In an unfortunate conflict of interest, the threat some exotic fish species pose to our indigenous freshwater ecosystems are often not well publicised because of their recreational and economic value, e.g. trout and perch which are classified as sports fish. This is despite scientific evidence indicating they are having significant impacts on indigenous freshwater fish populations and are even implicated in the extinction of the grayling (an extinct native freshwater fish). Surprisingly, in a country respected worldwide for its actions to combat the impacts of introduced species in general, exotic fish such as trout are currently given more legal protection than our threatened indigenous freshwater fish.

Native freshwater fish in Wairarapa Moana: a fauna in decline.

There are approximately 35 species of native freshwater fish in New Zealand, around 22 of these can be found in Wairarapa Moana. The majority are endemic, which means they are found nowhere else in the world and most are unknown to the public because they are small, cryptic and nocturnal. Most of the 22 species are far less common than they used to be and many are now extremely rare in Wairarapa Moana. Six are classed as threatened species by the Department of Conservation.

Threats to native freshwater fish in Wairarapa Moana include:

- Clearing of native forest and scrub – many species have evolved to live in forested rivers and streams and these days can only be found where significant stands of native forest remain
- Drainage of wetlands – some species are wetland specialists; in the Wellington region only 2.3% of wetlands remain
- Deterioration of water and habitat quality, through agricultural land use, such as nutrient enrichment and sediment inputs, as well as stock access to streams and riverbeds
- Deterioration of water and habitat quality through urban land use, such as piping of streams and discharges of stormwater contaminants, e.g., heavy metals, and in some cases treated municipal wastewater
- Instream structures, like dams and weirs that stop migration – the majority of New Zealand's freshwater native fish species are diadromous, which means they migrate between rivers/streams and the sea for part of their reproductive lifecycle. Instream structures are stopping some species from migrating into some rivers and streams
- Commercial fishing – eel and whitebait species continue to be commercially fished, despite declining populations
- Predation and competition from introduced species, such as trout and perch.



Torrentfish. Photograph Alton Perrie

Banded kokopu. Photograph Alton Perrie



Black flounder. Photograph Alton Perrie

Blunghill bully. Photograph Alton Perrie



Dwarf galaxias. Photograph Alton Perrie

Lamprey. Photograph Mike Joy



Giant kokopu. Photograph Alton Perrie

Koaro. Photograph Alton Perrie



Inanga. Photograph Alton Perrie

Longfin eel. Photograph Alton Perrie



Redfin bully. Photograph Alton Perrie

Shortjaw kokopu. Photograph Alton Perrie



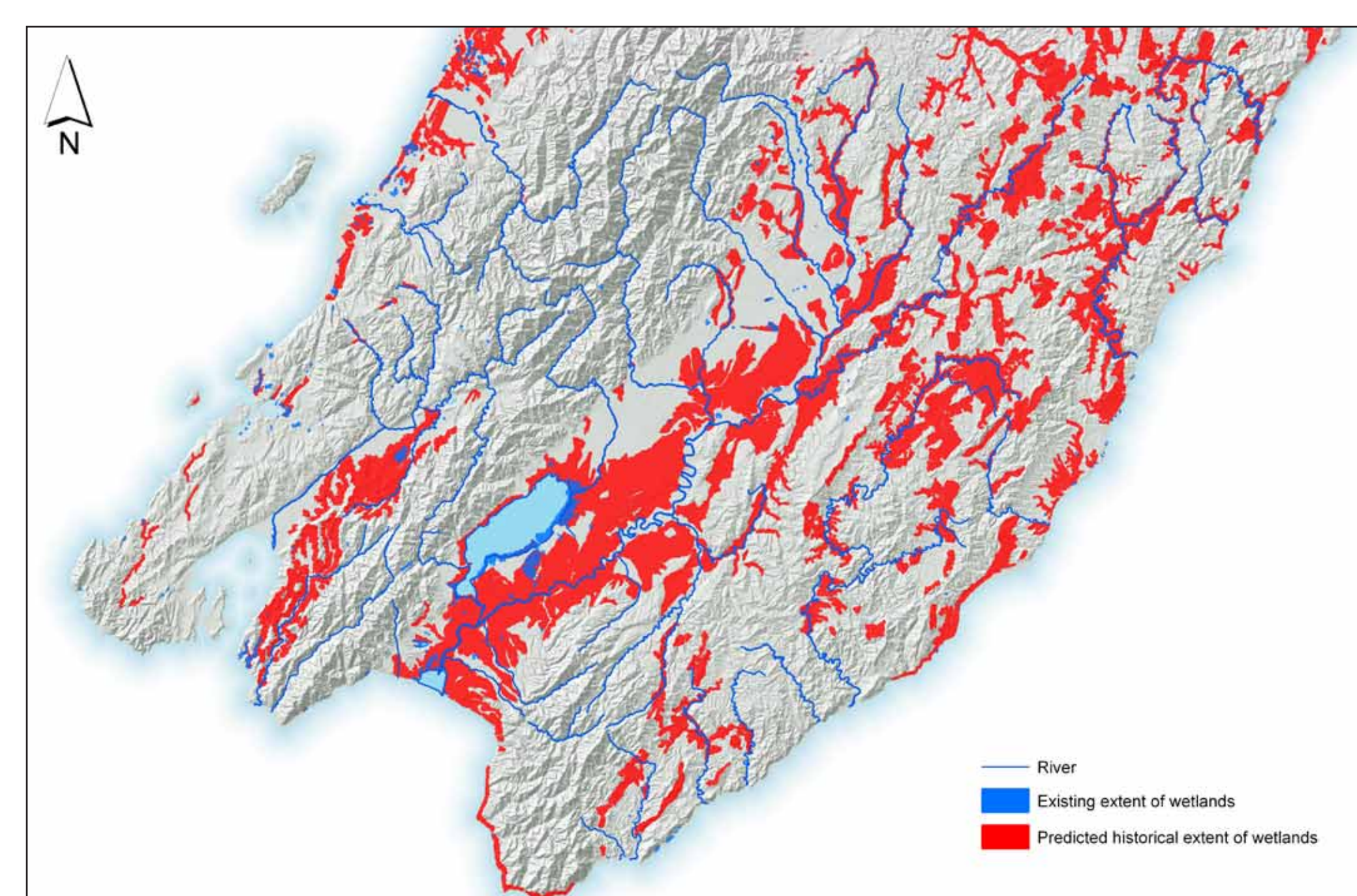
Brown mudfish. Photograph Alton Perrie

Brown mudfish: a fish out of water and a fish out of habitat.

There are not many fish that can survive out of water for several months each year but the brown mudfish can and they do it every year in Wairarapa Moana.

Brown mudfish are one of five mudfish species that are endemic to New Zealand. They grow to around 15cm long and have evolved an elongated, eel-like body. Brown mudfish are perfectly adapted to life in wetlands, so much so that they are unlikely to be found in any other freshwater environments. Being nocturnal and living in typically inaccessible wetland environments means they are mostly unknown to the public, even when they are on their property.

An ideal wetland for a brown mudfish has dense vegetation and dries up during summer months. In these wetlands mudfish can be found happily living in small, shallow puddles of water. To us they don't look like a great place to live but to a mudfish, they're paradise. When these wetlands dry, the mudfish will shelter under damp vegetation and woody debris. As long as they remain damp they can survive dry periods for several months – this process is called aestivation, like hibernation but occurring during summer. When the autumn and winter rains re-flood the wetlands, mudfish resume an aquatic lifestyle. The ability of mudfish to live in wetlands that seasonally dry allows them to live where most other fish can't, meaning less competition for resources, e.g., food and less risk of being eaten by other fish.



The major threat to the survival of the Brown mudfish is environment decline. GWRC

However, all is not well for this truly remarkable fish.

Despite being able to survive some very trying conditions, survival of this species is not assured. More than 97% of wetlands in the Wellington region have been drained to make way for agricultural and urban development. For a species only found in wetlands, this is disastrous. Unfortunately, many of the remaining wetland fragments are still under threat from further agricultural development, i.e., drainage, water abstraction, nutrient enrichment, etc and urban development, e.g. pipping.

Remaining mudfish wetlands also face additional threats, including colonisation from introduced plants that can alter the ecosystem, as well as predation from introduced fish, e.g., perch that can invade wetlands during the wetter parts of the year.

If this unique and fascinating fish is to continue to live in Wairarapa Moana, greater protection of remaining wetlands is required.



Brown mudfish's preferred environment. The trap is used to catch mudfish for study. Photograph Alton Perrie



Drainage of the preferred Brown mudfish habitat. Photograph Alton Perrie