

# Freshwater pest fish in New South Wales

## Aquatic Biosecurity & Risk Management Unit

Freshwater ecosystems are very vulnerable to invasion by pests, including introduced animals and weeds. Since European settlement many exotic fish have been accidentally or deliberately introduced into NSW waterways, and some have become widespread pests. The potential impacts of pest fish include competition with native species for food and habitat, predation and introduction of disease.

Deliberate introductions include gambusia (*Gambusia holbrooki*), which were introduced in the early 20<sup>th</sup> century from North America in an attempt to control mosquitoes. Other fish may have been introduced by accident through the escape of aquarium or aquaculture fish (such as redclaw crayfish, *Cherax quadricarinatus*), and the contamination of shipments of fish destined for fish stocking (such as banded grunter, *Amniataba percooides*).

Unfortunately, once pest fish become established in a waterway it can be almost impossible to eradicate them.



Banded grunter (*Amniataba percooides*) are listed as Class 2 noxious in NSW. Photo: Gunther Schmida

### Aquarium or 'ornamental' fish

While several pest species have been in NSW for many decades, recently an increasing number of aquarium fish species have established in the wild. Keeping aquarium or 'ornamental' fish as pets in aquaria or garden ponds is a popular pastime in NSW. Many hundreds of fish species, both native and exotic, are sold by aquarium suppliers.

Some of the established ornamental pest fish species in NSW may have escaped or may have been released accidentally. However, it is thought that some have been released by owners who no

longer wanted them and were unaware of the options available for humane destruction, or the environmental consequences of release. Once in the wild, these fish can become pests, potentially impacting native species and habitat, and may have the ability to spread throughout entire river systems.



Ornamental koi carp (*Cyprinus carpio*) are listed as Class 3 noxious in NSW. Photo: Melissa Walker

Industry and Investment NSW (I&I NSW) encourages aquarium fish owners to give unwanted fish to a friend or pet shop. If a suitable home cannot be found there are humane methods for destruction of unwanted fish (visit the website and search for 'humane destruction of fish' for acceptable euthanasia practices). Most importantly, **don't dump fish into any waterway!**

It is illegal to release or stock fish for any reason into NSW public waters without a permit, whether for recreational fishing, environmental or cultural purposes. Visit the website and search for 'fish stocking' for information on fish stocking in NSW.

### Noxious fish

There are 3 classes of noxious fish in NSW, representing the different levels of threat they pose to the NSW aquatic environment. Different rules apply for each class in regard to the possession or sale of these species and penalties of up to \$11,000 can apply. The Class 1 noxious listing prohibits sale and possession, Class 2 prohibits sale but allows possession in fully-contained aquaria, and Class 3 allows sale and possession. Visit the website and search for 'noxious fish' to see the current list and rules.



*Oriental weatherloach (Misgurnus anguillicaudatus) are listed as Class 1 noxious in NSW. Photo: Gunther Schmida*

## What freshwater pest fish are found in NSW?

Some of the freshwater pest fish species that have established populations in NSW include carp (*Cyprinus carpio*), redfin perch (*Perca fluviatilis*), eastern gambusia, oriental weatherloach (*Misgurnus anguillicaudatus*), banded grunter and goldfish (*Carassius auratus*). There are also several other ornamental fish species that have established populations in NSW. Two of the most widespread freshwater pest fish in NSW waterways are carp and redfin perch.

### Carp

Carp are a large freshwater fish that belong to the Cyprinidae family and are native to Asia and Eastern Europe. They were introduced to Australia both deliberately, in an attempt to imitate the European environment, and accidentally, through the escape of ornamental or aquaculture fish.

Carp are very versatile, and can survive in a great variety of habitats including highly degraded areas. They are now widespread throughout most of NSW, and in many areas dominate the fish biomass at the expense of native species.

Carp can be distinguished by their pair of barbels (whiskers) at each corner of their mouth. They have small eyes, thick lips, a forked tail and a single dorsal (top) fin with strongly serrated spines. The scales are large and thick.

Carp are listed as Class 3 noxious in NSW. This listing recognises that wild carp are a commercial fisheries species and koi carp are a popular ornamental fish in NSW. I&I NSW raises awareness of the risks associated with escapee fish and promotes secure fish pond design to minimise risks of escape.

I&I NSW has developed a carp control plan that consolidates up-to-date information about the biology and impacts of carp and outlines current and recommended actions to stop further spread, control the size of populations, and increase the understanding and involvement of the community.

The plan outlines the limited control options currently available for carp and concludes that any one option on its own is unlikely to be effective. It is



*Carp (Cyprinus carpio) are listed as Class 3 noxious in NSW. Photo: Gunther Schmida*

not feasible to attempt a comprehensive eradication program for carp in NSW; instead several collaborative projects are underway to improve management of carp. By combining a range of techniques in the one location and by targeting high priority areas such as carp breeding 'hotspots', the effectiveness of control efforts can be maximised.

### Redfin perch

Redfin perch (redfin) are medium sized freshwater fish native to northern Europe. Redfin were first introduced to Australia in the 1860s for angling, as they were a popular fish for their fighting qualities and taste in the UK. Redfin are now widespread across much of NSW.



*Redfin perch (Perca fluviatilis) are listed as a Class 1 noxious in NSW. Photo: I&I NSW*

Redfin live in a wide variety of habitats, but prefer still or slow-flowing waters such as lakes, dams, billabongs, swamps and slower moving streams and rivers. They prefer areas with good shelter such as snags (submerged dead wood and trees), vegetation or rocks, but have also been caught in open water.

Some distinguishing features of redfin include a deep body and slightly forked tail, two distinctly separate dorsal fins, a pattern of five or more broad black vertical bands across the back, and bright reddish-orange pelvic and anal fins and tail.

In December 2010 redfin were listed as Class 1 noxious fish as they are considered a serious pest in NSW. They are voracious predators of other fish and invertebrates, can destroy recreational fisheries, and can devastate native fish populations by carrying the viral disease epizootic

haematopoietic necrosis (EHN). A number of native species, including silver perch, Murray cod, mountain galaxias and particularly Macquarie perch, are highly susceptible to this disease, and EHN virus may be one factor responsible for the decline in various native species over the last few decades.

### Species of potential concern to NSW

Any species that establishes in an area where it does not naturally occur has the potential to become a pest and a serious threat to our native species. Two species of concern that pose a potentially significant threat to NSW waterways are tilapia and didymo.

#### Tilapia

Tilapia are listed in the top 100 of the world's worst introduced fish species. Tilapia is the common name given for fish from *Oreochromis* spp., *Sarotherodon* spp., *Serranochromis* spp. and *Tilapia* spp., all from the Cichlidae family. These varieties of tilapia were previously traded in the aquarium industry. They are extremely hardy fish with highly efficient breeding strategies (including mouthbrooding), simple food requirements and flexible habitat preferences.

While there are no existing populations of tilapia in NSW, three species of tilapia, Mozambique mouthbrooder (*Oreochromis mossambicus*), black mangrove cichlid (*Tilapia mariae*) and redbelly tilapia (*Tilapia zillii*) have established successful breeding populations in Queensland, Victoria and Western Australia. These species would pose a significant threat to NSW native fish species if they were to spread to and establish in NSW.

#### Didymo

Didymo (*Didymosphenia geminata*), a freshwater algae more commonly known as 'rock snot', is not known to occur in Australia but has established in areas of the northern hemisphere and the South Island of New Zealand. This highly invasive species can be easily spread by just one drop of affected water. It forms dense brown clumps and can smother aquatic habitats.



Mozambique mouthbrooder (*Oreochromis mossambicus*) are listed as Class 1 noxious in NSW. Photo: Gunther Schmida



Didymo (*Didymosphenia geminata*), a freshwater diatom, forms a thick brown slimy layer and is commonly referred to as 'rock-snot'. Photo: Stuart Sutherland

Didymo can attach to clothing and shoes, fishing gear or boating equipment. Eradication is virtually impossible once it has become established within a waterbody. Fishers are at risk of accidentally introducing didymo in NSW waters by using contaminated fishing gear and equipment, such as felt-soled waders. If you have visited an area known to contain didymo, please ensure you check, clean and dry fishing gear and equipment before bringing your gear home.

#### Pest fish and recreational fishing

Recreational anglers are often the first to notice new pest species in NSW waterways and can provide valuable information on new incursions of pest fish by reporting new sightings to I&I NSW.

Pest fish, including carp and redfin, can be popular with anglers; however it is recommended that pest fish be humanely dispatched and utilised, and not returned to the water.



Anglers can provide valuable information by reporting sightings of pest fish. Photo: Glen Towler

Anglers should note that it is illegal to use live bait in NSW freshwater systems and any fish or any part of a fish not native to the waters of NSW (other than dead carp).

## Aquatic habitat rehabilitation

Protection and restoration of aquatic habitats can help to tip the balance in favour of native fish and away from introduced pests such as carp.

I&I NSW is involved in several aquatic habitat rehabilitation projects funded by local, state or federal bodies including councils, Catchment Management Authorities, and the Murray-Darling Basin Authority.

Current projects include actions such as replanting riparian (riverbank) areas, returning woody debris ('snags') to rivers as fish habitat, and building fish ladders to allow fish to pass in-stream barriers, such as weirs.



*Aquatic revegetation at the Namoi River. Photo: Milly Hobson*

Angling clubs, community groups, local councils, Landcare and Rivercare groups and individuals interested in rehabilitating fish habitats throughout NSW can apply for grants. Some grants are made available from the Recreational Fishing Trust using funds generated by recreational fishing licence fees.

For more information on aquatic habitat rehabilitation visit the website and search for 'habitat management'.

## Freshwater weeds

For information on freshwater weeds in NSW visit the website and search for 'freshwater weeds'.

## Help prevent the spread of freshwater pests!

- Don't keep noxious fish – most noxious fish species are illegal to possess and sell. For the current noxious fish list see the website.
- Don't return pest fish to the water – if you catch a pest fish dispatch it humanely and utilise or dispose of it appropriately.
- Keep a lookout for suspected pest fish in your local waterways and report suspected new locations (see details at end of publication).

- Don't transfer fish between waterways, and don't use live fish as bait in freshwater - it's illegal!
- Never dump or release fish for any reason, including for recreational fishing, environmental or cultural purposes – this can spread disease and result in a species becoming a pest.
- Obtain a permit to stock fish and buy fingerlings from a registered hatchery to minimise the chances of purchasing juvenile fish contaminated with undesirable species.
- Prevent unwanted hitchhikers – check, clean and dry boats and gear between waterways.
- Design fishponds so that plants, snails, fish or eggs can not escape during heavy rains, and screen all overflow areas.
- It is illegal to buy fish, plants or 'live rock' from overseas on the internet; instead purchase them from a reputable local dealer.

## Recommended reading

These I&I NSW publications can be found at [www.industry.nsw.gov.au](http://www.industry.nsw.gov.au) (go to Primary Industries)

- NSW Control Plan for the Noxious Fish Carp (*Cyprinus carpio*)
- Fish in farm dams NSW DPI Primefact No 89
- 7 Key Tips for a Fish Friendly Farm

## For further information contact:

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[www.industry.nsw.gov.au](http://www.industry.nsw.gov.au) (go to Primary Industries)

## To report the sighting of aquatic pests

Phone the 24hr reporting hotline on 02 4916 3877 or email [aquatic.pests@industry.nsw.gov.au](mailto:aquatic.pests@industry.nsw.gov.au)

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