

# Trout Cod

## *Maccullochella macquariensis*

February 2017, Primefact 185, Third edition  
Threatened Species Unit, Port Stephens Fisheries Institute



Figure 1: A Trout Cod (Photo by S. Thurstan, NSW DPI).

### Introduction

Trout Cod are a large, predatory freshwater fish belonging to the family Percichthyidae. Trout Cod were once widespread throughout the southern tributaries of the Murray-Darling river system, but the species has undergone a dramatic decline in distribution and abundance over the past century. Natural Trout Cod populations are now limited to a single self-sustaining population in the Murray River between the Yarrawonga Weir and Barmah. Several populations have also been re-established in Victoria and NSW by stocking of captive bred fingerlings or through translocation.

Trout Cod are listed as an **endangered species** under both NSW and Commonwealth law. There are heavy penalties for harming, buying, selling or possessing them, or for harming their habitat (see 'Legal implications').

### Description

Trout Cod can grow to 85 cm in length and 16 kg in weight, but more commonly occur up to 50 cm and 1.5 kg. They are mostly olive in colour but can range from blue-grey to dark brown on the back with a speckled pattern of dark grey to black spots. The underside is generally paler in colour ranging from grey to white.

Despite being formally described in 1829, it was not until 1972 that Trout Cod were recognised as a species distinct from the similar looking Murray Cod. A prominent feature often used to identify Trout Cod is a dark horizontal eye stripe on the side of the head. However this should not be used as the only identification feature, as juvenile Murray Cod can also possess a similar stripe and the stripe can often be absent, broken or indistinct on Trout Cod. A combination of features

should be used to distinguish Trout Cod from Murray Cod. Distinguishing features of the Trout Cod include an overhanging upper jaw, a longer and more pointed snout, a straight head profile and relatively large eyes.



Figure 2: A Trout Cod (top) and a Murray Cod (bottom) (Photo: S. Thurstan, NSW DPI).

## Habitat and ecology

- Trout Cod tend to occupy areas which have lots of large in-stream woody debris or 'snags', which provide complex habitats for each stage of the species' life cycle.
- They tend to remain at the one site with limited home ranges.
- Trout Cod are carnivores, preying mainly on crustaceans and aquatic insects but also on other fishes.
- Maximum life span is thought to be 20 - 25 years, with sexual maturity reached at 3 - 5 years, when approximately 35 cm (males) or 43 cm (females) in length, and 0.75 - 1.5 kg in weight.
- They form pairs and spawn during spring and early summer when the water temperature is around 15°C.
- Females produce 1,200 – 11,000 adhesive eggs (2.5 – 3.6 mm in diameter) that attach to hard substrates and are guarded by the male.
- Larvae hatch after 5 - 10 days when they are approximately 6 - 9 mm in length, and then disperse by drifting in the water column.

## Artificial breeding and stocking

NSW DPI maintains a conservation stocking program for Trout Cod at Narrandera Fisheries Centre. The program is run in accordance with genetic guidelines for conservation stocking in the 2006 Trout Cod Recovery Plan and the NSW Freshwater Fish Stocking Fishery Management

Strategy (2005). NSW DPI continues to monitor stocked sites to gain a clearer understanding of the effectiveness of the stocking program in contributing to Trout Cod recovery.



Figure 3: Trout Cod fingerlings being stocked into the Macquarie River in December 2016.

## Recovery plan review

A review of the 2006 Trout Cod Recovery Plan was finalised in 2017. The review assessed the implementation of recovery actions in NSW and detailed progress made toward meeting the recovery objectives.

The review found that many specific recovery plan objectives have been completed in the last 10 years or are ongoing. Significant improvements in Trout Cod population size and distribution have occurred since the recovery plan was implemented in 2006 and there is optimism for the recovery of the species. However, self-sustaining populations have only been established in a small percentage of the species' historic range indicating further work is still required to establish self-sustaining populations of Trout Cod across its historic range in the Murray-Darling Basin.



Figure 4: Trout Cod tend to occupy areas which have lots of large in-stream woody debris.



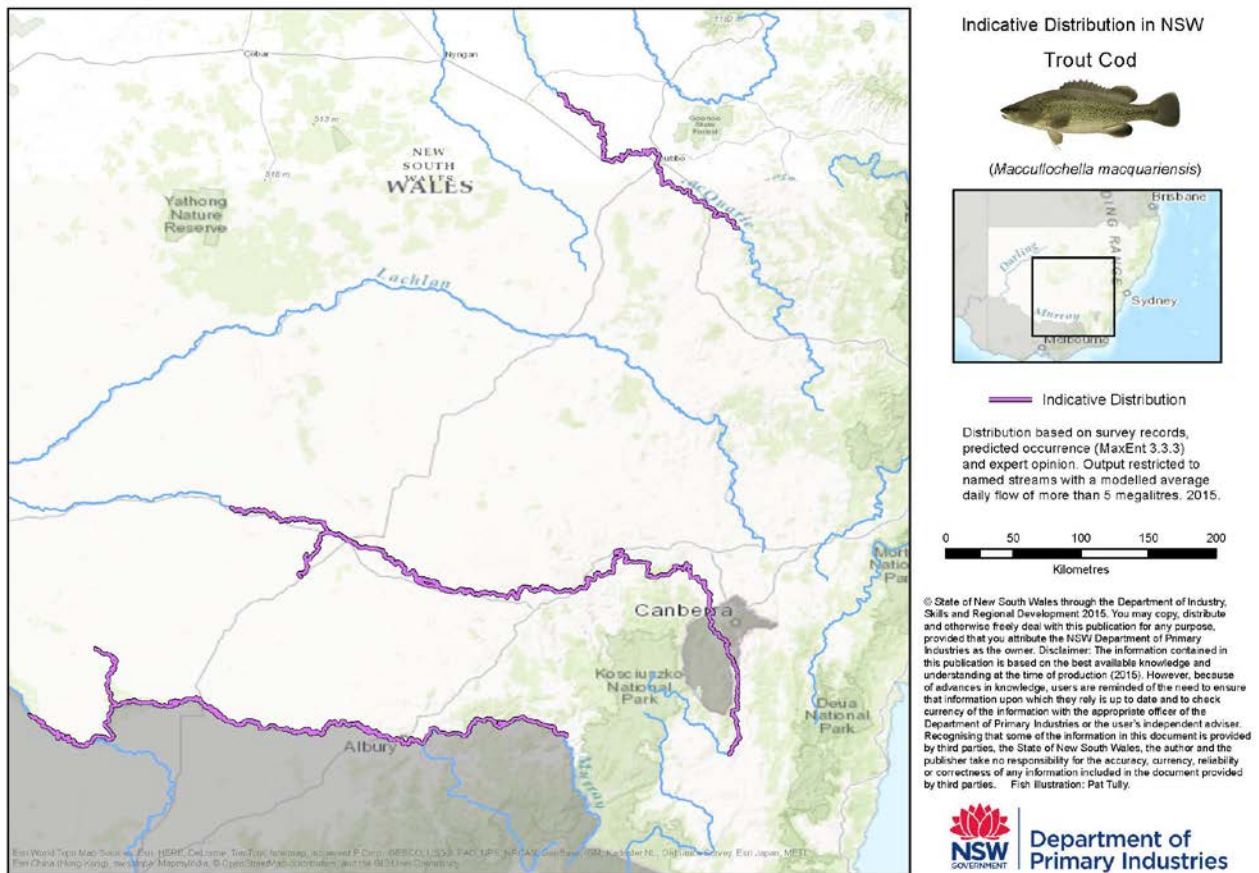


Figure 5: The indicative distribution of Trout Cod in NSW based on survey records, predicted occurrence and expert opinion.

## Why are Trout Cod threatened?

- Modification of natural river flows and temperatures as a result of river regulation has led to spawning failures, reduced fish dispersal, and reduced habitat quality for Trout Cod.
- Habitat degradation through the removal of snags, water quality impacts associated with agriculture and other land uses, and sedimentation caused by land clearing activities.
- Over-harvesting by recreational and commercial fishers has contributed to past declines. Trout Cod are now totally protected in NSW, Victoria and the ACT, but illegal fishing and hooking injuries in accidentally caught fish, still pose a threat. Targeted or indirect capture of Trout Cod can directly reduce their numbers, remove breeding age adults and disrupt breeding activities such as egg and larvae guarding.
- Competition from, or interactions with, introduced fish species such as Brown Trout (*Salmo trutta*), Redfin Perch (*Perca fluviatilis*) and common Carp (*Cyprinus carpio*).

## Conservation and recovery actions

- Continue to implement the NSW DPI Trout Cod Recovery Plan which aims to recover the species to a position of natural viability.
- Maintain bans on the taking of Trout Cod in NSW, Victorian and ACT waters and enforce compliance with fishing regulations.
- Ensure that all fish stocking activities within the natural distribution of Trout Cod comply with the NSW Freshwater Fish Stocking Fishery Management Strategy.
- Educate the community about the protected status of Trout Cod and how they can assist with recovery of this species.
- Allocate environmental flows in regulated rivers to restore natural seasonal flow patterns, improve or maintain fish passage and reduce the impact of cold water pollution downstream of dams.
- Conserve and restore riparian (river bank) vegetation and use effective sediment and erosion control measures.

- Reinstate large woody debris at key sites.
- Continue the Trout Cod conservation stocking program.
- Report any sightings of the species via the [NSW DPI online form](#).
- A full list of strategies that have been adopted for promoting the recovery of Trout Cod is set out in the [NSW DPI Priorities Action Statement](#).

## Legal implications

It is illegal to catch and keep, buy, sell, possess or harm Trout Cod (or any other threatened species in NSW) without a specific permit, licence or other appropriate approval, and significant penalties apply. For endangered species, these penalties can include fines of up to \$220,000 and up to 2 years in prison.

There can also be significant penalties for causing damage to the habitat of a threatened species without approval, through actions such as dredging river beds, removing large woody debris and constructing barriers that block the free passage of fish.

Clearing that constitutes a routine agricultural management activity, and certain routine farming practice activities (other than clearing) are permitted, provided the activities are to the minimum extent reasonably necessary and all other relevant statutory approvals or authorities have been obtained.

The impacts of developments or activities that require consent or approval in accordance with the *Environmental Planning and Assessment Act 1979* must be assessed and considered by consent or determining authorities. Where such actions are likely to result in significant impact on a threatened species or its habitat, a detailed species impact statement must be prepared.

To protect breeding Trout Cod in natural waterways, all fishing is prohibited in the Murray River and its tributaries between Yarrowonga Weir and the Tocumwal Road Bridge from 1 September to 30 November each year. The possession of fishing gear in, or adjacent to closed waters is also an offence.

## Bibliography and further reading

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NSW Department of Primary Industries (2006) Trout Cod NSW Recovery Plan. NSW Department of Primary Industries, Port Stephens Fisheries Institute, NSW.

NSW Department of Primary Industries (2017) Review of the Trout Cod Recovery Plan. NSW Department of Primary Industries, Port Stephens Fisheries Institute, NSW.

## For further information

See the NSW DPI website: [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

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ISSN 1832 6668

PUB08/85



Figure 6: An adult Trout Cod (Photo: R. Creed)