

Native Fish Report Card

Lower Goulburn River 2024

Goulburn Broken Region

This report card summarises the **2024** Native Fish Report Card (NFRC) survey in the lower Goulburn River



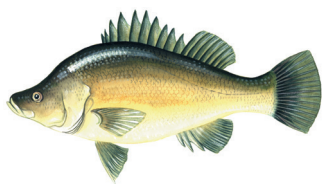
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ELECTROFISHING

Fish found in the lower Goulburn River in our 2024 surveys

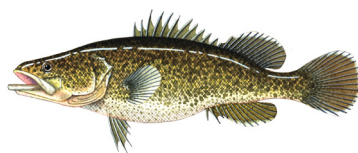
Target Species

✓ recorded in 2024



✓ **Golden Perch**

Macquaria ambigua



✓ **Murray Cod**

Maccullochella peelii



✓ **Silver Perch**

Bidyanus bidyanus



✓ **Trout Cod**

Maccullochella macquariensis

Non-target species

✓ recorded since 2017*

Large-bodied native species

- ✓ Bony Bream
- ✓ River Blackfish

Small-bodied native species

- ✓ Australian Smelt
- ✓ Carp Gudgeon
- ✓ Flatheaded Gudgeon
- ✓ Murray-Darling Rainbowfish
- ✓ Unspecked Hardyhead

Exotic species

- ✓ Common Carp
- ✓ Eastern Gambusia
- ✓ Goldfish
- ✓ Oriental Weatherloach
- ✓ Redfin
- ✓ Roach

* These non-target species were incidentally captured during NFRC

Lower Goulburn River 2024

Fish community

The NFRC Program began in 2017 to monitor population dynamics of key iconic fish species that have high recreational and/or conservation values, in large rivers across Victoria. In the Goulburn River, the target species are Murray Cod, Golden Perch, Silver Perch and Trout Cod. The equipment used and habitats surveyed target these species, which are measured to determine their population structures. Other fish species that are incidentally captured are counted, but not measured. Surveys occur in April/May each year, at 11 sites from just downstream of Lake Nagambie (Goulburn Weir) to upstream of the junction with the Murray River (Sun Valley). The timing of the surveys coincides with reduced flows immediately following the irrigation season, when the target species are most easily captured.

Summary of key health indicators for target species in 2024

Species	Key Health Indicators		
	Recent recruitment	Multiple size classes	Mature fish present
Golden Perch	No	Yes	Yes
Murray Cod	Yes	Yes	Yes
Silver Perch*	-	-	-
Trout Cod	No	Yes	Yes

Recent recruitment means young-of-year fish

* - cannot be determined due to low numbers

Both Silver Perch and Trout Cod were historically abundant in the lower and mid Goulburn River, with Silver Perch historically abundant up to the Nagambie area and Trout Cod present upstream of the Lake Eildon confluence. These species have experienced dramatic declines across their range, reflected in their classification as threatened species nationally under the *Environment Protection and Biodiversity Conservation Act 1999*. Recently, the status of both species has improved, with Trout Cod now having a self-sustaining population downstream of Lake Nagambie and Silver Perch present, although in lower densities. Overall, the Goulburn River appears to be maintaining healthy populations of Golden Perch, Murray Cod and Trout Cod. The following pages have more detail about the population structures of each target species.

Non-target species

The non-target fish species that have been incidentally recorded in the Goulburn River during NFRC surveys since 2017 are:

Large-bodied native species Bony Bream was the only other large-bodied native fish species recorded in the 2024 survey. It has only been recorded in three of the eight

NFRC surveys. This is a lowland species only expected to be found in the lower Goulburn River. It is found in lowland rivers across the Murray-Darling Basin and is intolerant of cold water. River Blackfish has been recorded in four of the eight NFRC surveys. It is a lowland species, generally found at altitudes below 200m. This species has declined in distribution and abundance across the State. It has low abundance in this section of the Goulburn River and has only been recorded near Murchison.

Small-bodied native species Australian Smelt was the only small-bodied native species recorded in the 2024 survey. It is expected to be widespread throughout the Goulburn River and more broadly within the Murray-Darling Basin. Previous NFRC surveys have also recorded Carp Gudgeon, Flatheaded Gudgeon, Murray-Darling Rainbowfish and Unspecked Hardyhead. With the exception of Murray-Darling Rainbowfish, these species are common and are expected to be widespread throughout the Goulburn River and more broadly within the Murray-Darling Basin. Murray-Darling Rainbowfish has been recorded in all seven prior NFRC surveys. It was historically present to 130m altitude in the Goulburn River system. While once widespread in the Murray-Darling Basin, its range has become more restricted. The species now has a patchy distribution and is listed under the *Flora and Fauna Guarantee Act 1988* in Victoria.

Exotic fish species Common Carp, Goldfish, Redfin and Roach were recorded in 2024 NFRC surveys. Common Carp and Goldfish have been recorded in all eight NFRC surveys and are widely distributed across the Goulburn River. Redfin are also widely distributed, albeit in low abundances and have only been recorded in 2023 and 2024. Roach, encountered for the first time during NFRC in 2024, are more common in the Goulburn River upstream of Goulburn Weir to Lake Eildon. Eastern Gambusia and Oriental Weatherloach have also been previously recorded in NFRC surveys. Eastern Gambusia are more common in the slower flowing waters and have been recorded in three of the eight NFRC surveys. Oriental Weatherloach, first recorded in 2020, are increasing in distribution and abundance and are found in slower flowing areas, often in silt substrate. Weatherloach often disperse during floods.

Other native fish species known from the lower Goulburn River

Some fish species known to occur in the Goulburn system have never been recorded during NFRC surveys (e.g. Freshwater Catfish, Flatheaded Galaxias, Obscure Galaxias and Southern Pygmy Perch). The two galaxiid species are hard to detect using the NFRC sampling method. Flatheaded Galaxias, Freshwater Catfish and Southern Pygmy Perch are more frequently found in offstream habitats such as billabongs, wetlands and lagoons within the Goulburn system.

Other notable species

Surveys have also recorded Murray Crayfish, Yabbies and turtle species.

Environmental and Management Context

Environment

Stream flow was marginally higher in 2018, 2020-22 compared to 2017, 2019, 2023 and 2024, due to water management (i.e. Inter Valley Transfers) and this may have decreased electrofishing efficiency in those years. During 2020 and 2021 surveys there was elevated turbidity following earlier flooding, which also further decreased electrofishing efficiency for all species

Waterway and fisheries management efforts in the Goulburn River

Many rehabilitation actions have occurred, and are underway, to improve the health of the Goulburn River and its fish community. These include revegetation, weed control and fencing of riparian areas, reintroduction of instream woody habitat, allocations of water for the environment, fish stockings and rubbish removal. Regular monitoring of the fish community has occurred for over 10 years. Current research and monitoring programs include the Victorian Environmental Flows Monitoring and Assessment Program ([VEFMAP](#)) and [Flow-MER \(fish theme\)](#). Recent work has focused on the role of flows for spawning of Golden Perch and Silver Perch using drift net surveys, as well as links between flows and movements of these species using telemetry techniques. Organisations involved in rehabilitation and management of the Goulburn River and its fish community include the [Goulburn-Broken Catchment Management Authority](#), DEECA, the [Victorian Fisheries Authority](#) and Yorta Yorta Nation Aboriginal Corporation support rehabilitation and management of the lower Goulburn River and its fish community.

See the ARI website for further information on the [Native Fish Report Card](#) program.

The NFRC program, and related monitoring initiatives, provide improved understanding of the structure of fish communities and how rivers can be best managed.

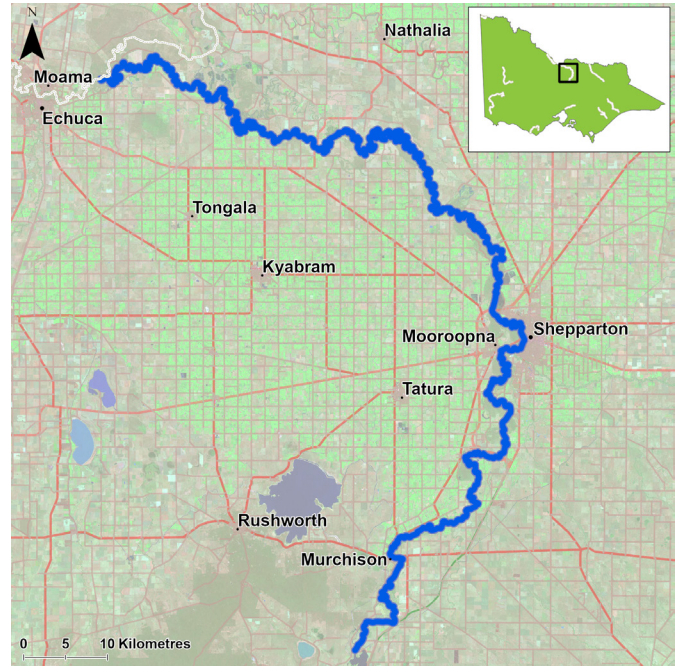


Figure 1. Map showing the section of Goulburn River where NFRC sampling occurs



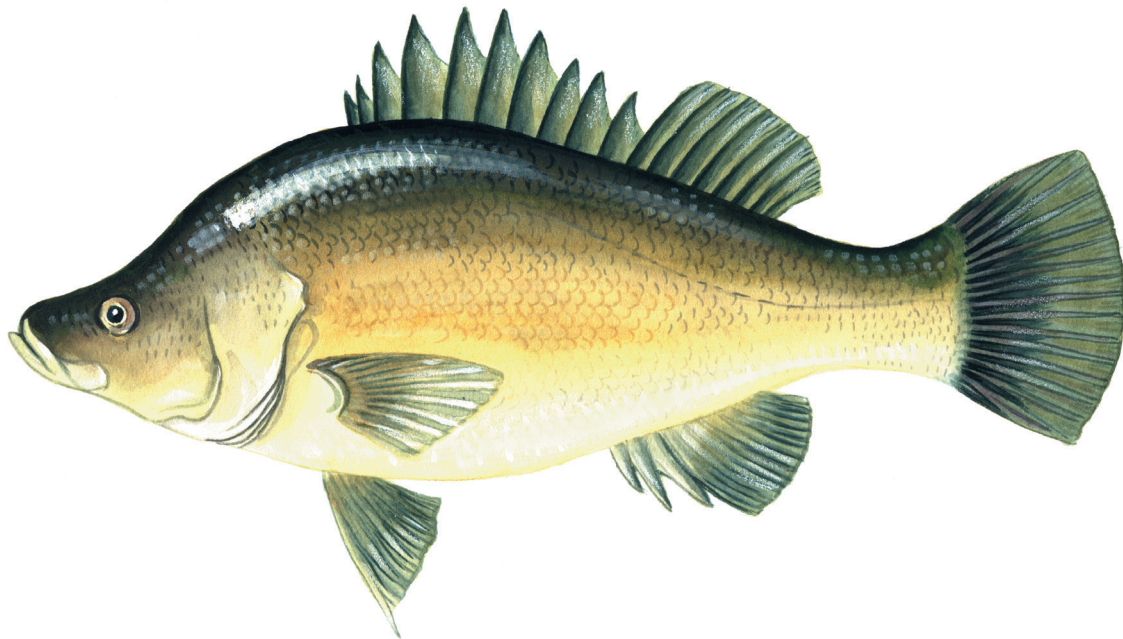
Figure 2. A juvenile Silver Perch



Figure 3. A Trout Cod

Golden Perch

Macquaria ambigua



Key Health Indicators

- ✗ Recent recruitment
- ✓ Multiple size classes
- ✓ Mature fish present

Monitoring Results

Total number of fish caught	60
Fish per 1km of waterway	4.67
Largest fish by length (cm)	50.5
Largest fish by weight (kg)	2.1
% of the catch that is legal size	85

Lower Goulburn

RECREATIONAL SPECIES

Adult Golden Perch (*Macquaria ambigua*) have been detected in all years of sampling and a large proportion of Golden Perch collected have been adults (Figure 4), including 85% in 2024 (Figure 5). Juveniles have been recorded in seven of the eight years of sampling, being absent in 2020 (Figure 4). Lower abundances recorded between 2020 and 2022 were likely caused, at least partly, by high flows and associated high turbidity reducing the likelihood of capturing fish. It is possible that the higher flows that resulted in flooding in 2016 and 2022 provided immigration events for Golden Perch from the Murray River, resulting in the highest abundances detected in 2017 and 2023 (Figure 4).

Recruits of this species are difficult to catch using the NFRC survey method and none have been detected in all eight years of sampling (Figure 4). It is worth noting that other surveys have shown that Golden Perch recruitment is low or often zero in the Goulburn River, with less than 20% spawned locally, over 60% were stocked and 20% were migrants into the system¹. This indicates that natural immigration of adults as well as stocking is maintaining a large proportion of the Golden Perch population within the Goulburn River.

Stocking Fifty-thousand Golden Perch were stocked in 2016; 44,000 in 2017; 59,000 in 2018; 89,950 in 2019; 61,000 in 2020; 115,000 in 2021; 150,000 in 2023 and 100,000 in 2024. No fish were stocked in 2022. These fish were released downstream of Lake Nagambie (where NFRC surveys occur).

Golden Perch

Macquaria ambigua

Goulburn River densities of Golden Perch size classes from 2017 to 2024

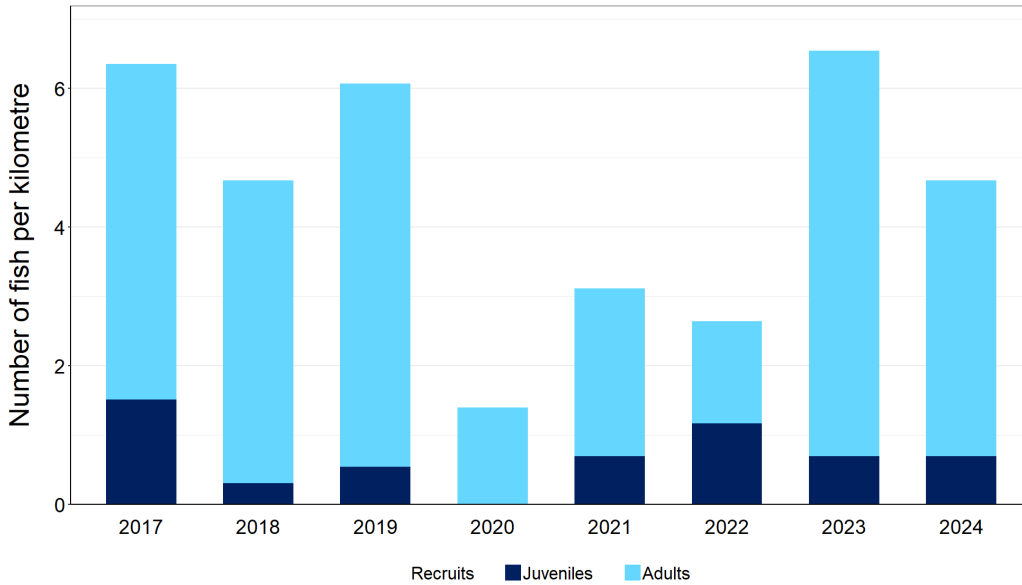


Figure 4. The densities of recruits, juveniles and adult Golden Perch for NFRC surveys in the Goulburn River from 2017 to 2024

Golden Perch size range percentage for Goulburn River in 2024

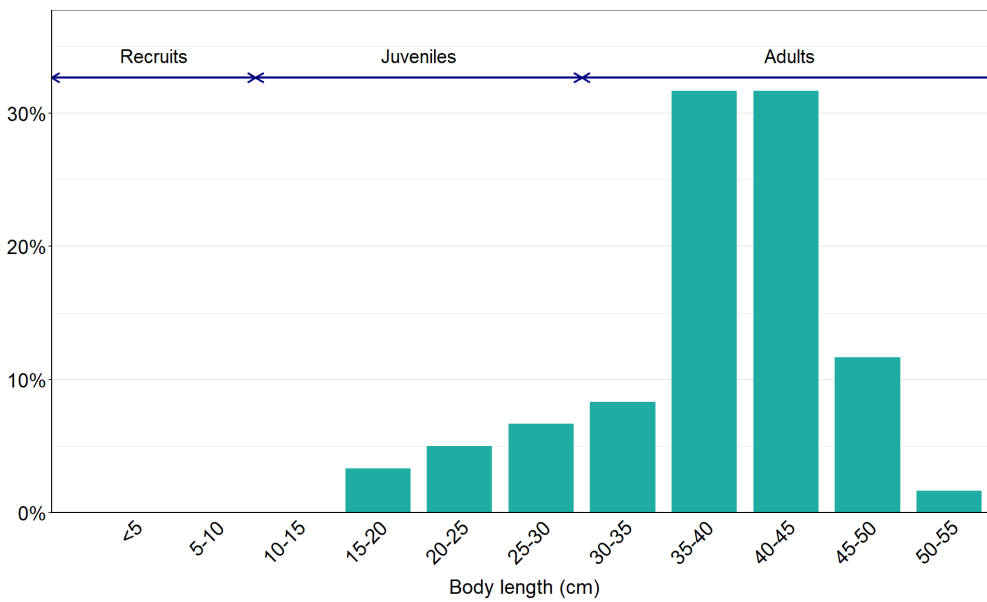
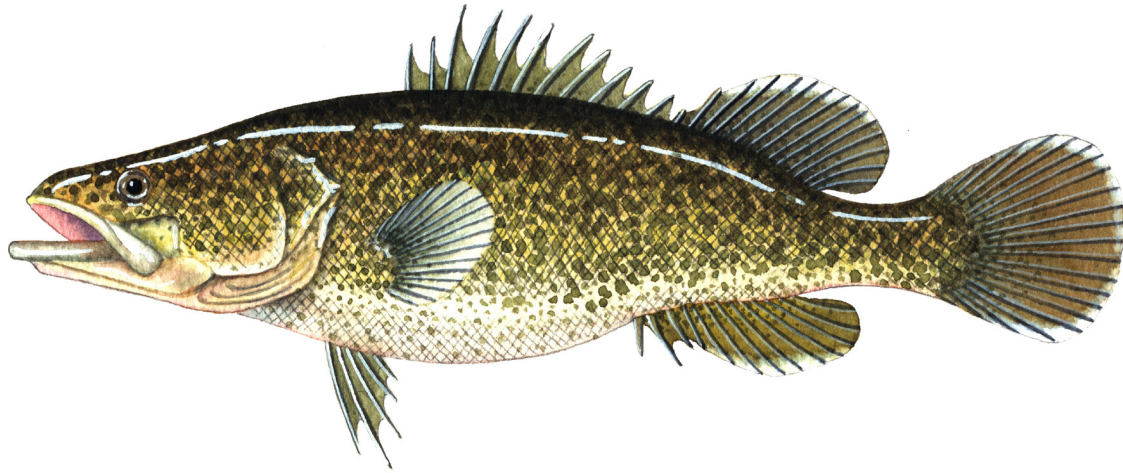


Figure 5. The size range percentage of Golden Perch measured from the Goulburn River during NFRC surveys in 2024

¹ Tonkin, Z., Kitchingman, A., Ingram, B., Lieschke, J., Koster, W., Lyon, J., Lutz, M. and Pavlova, A. (2019). Smarter stocking: a synthesis of existing data to assess native fish stocking success in Victorian rivers. Unpublished Client Report for the Victorian Fisheries Authority. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning, Heidelberg, Victoria.

Murray Cod

Maccullochella peelii



Key Health Indicators

- ✓ Recent recruitment
- ✓ Multiple size classes
- ✓ Mature fish present

Monitoring Results

Total number of fish caught	50
Fish per 1km of waterway	3.89
Largest fish by length (cm)	98
Largest fish by weight (kg)	18
% of the catch that is legal size	18

Lower Goulburn

RECREATIONAL SPECIES

Low numbers of Murray Cod (*Maccullochella peelii*) were captured in 2024 (Figure 6). Multiple size classes including adult, juvenile and recruits have been recorded in all eight NFRC surveys (Figure 6). A wide range of sizes was captured in 2024, however, they predominantly consisted of 35-55cm fish (Figure 7). The lower abundances in 2020 and 2021 correlate with higher flows and associated high turbidity reducing the likelihood of capturing fish. Lower abundances recorded in 2024 could be related to a low dissolved oxygen event in the downstream reaches of the Goulburn in January 2024, however, no mass fish mortality was reported.

A large proportion of Murray Cod in the Goulburn River are from wild spawning. An otolith* study showed that all Murray Cod from the 2016/17 and 2017/18 year classes, and most fish (65%) from the 2018/19 year class were spawned in the river². Similarly, Murray Cod collected from the Goulburn River for the Long-Term Intervention Monitoring (LTIM) project (otoliths collected in 2016 and 2017) showed most were wild fish. This indicates that stocked Murray Cod are making a very small contribution to the Murray Cod population in the Goulburn River.

Stocking

In 2016, 54,000 Murray Cod were stocked; 102,000 in 2017; 50,000 in 2017; 40,000 in 2018; 21,000 in 2019; 96,000 in 2020; 17,000 in 2021; and 50,000 in 2022. No stockings occurred in 2023 or the first half of 2024. These stockings occurred below Lake Nagambie (where NFRC surveys occur).

*Otoliths are fish earbones

Goulburn River densities of Murray Cod size classes from 2017 to 2024

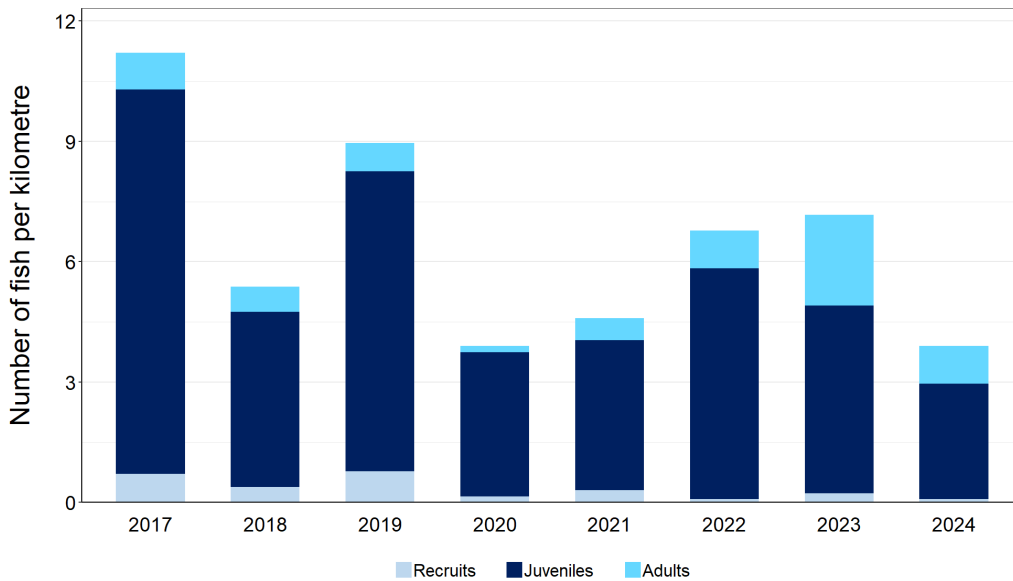


Figure 6. The densities of recruits, juveniles and adult Murray Cod for NFRC surveys in the Goulburn River from 2017 to 2024

Murray Cod size range percentage for Goulburn River in 2024

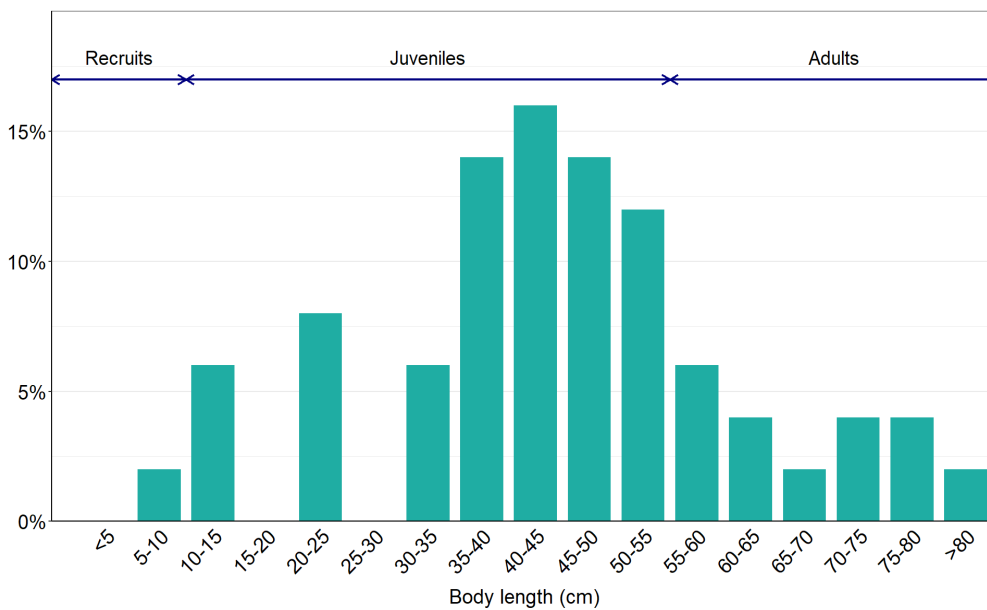


Figure 7. The size range percentage of Murray Cod measured from the Goulburn River during NFRC surveys in 2024

² Harris, A., Tonkin, Z., Moloney, P., and Woodhead, J. (2020). Using Otolith Microchemistry to Assign Natal Origin to Juvenile Murray Cod. Unpublished Client Report for Water and Catchments, Department of Environment, Land, Water and Planning. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning, Heidelberg, Victoria

Silver Perch

Bidyanus bidyanus



Key Health Indicators

- Cannot be determined
- Cannot be determined
- Cannot be determined

Monitoring Results

Total number of fish caught	1
Fish per 1km of waterway	0.08
Largest fish by length (cm)	35.1
Largest fish by weight (kg)	1.58
% of the catch that is legal size	NA [#]

[#] This species is a Protected Freshwater Species and taking or possessing is prohibited (Victorian Recreational Fishing Guide 2023-24).

Lower Goulburn

THREATENED SPECIES

The natural range of Silver Perch (*Bidyanus bidyanus*) includes most of the Murray-Darling Basin, excluding the cool, higher altitude upper reaches of streams. Within the Goulburn River, Silver Perch were historically abundant up to the Nagambie area. Cold water pollution, river regulation and barriers are all factors that have negatively affected Silver Perch populations, and all of these are relevant to the Goulburn River. The NFRC does not expect to capture enough Silver Perch to measure key health indicators. However, collecting data for non-recreational species including threatened species such as Silver Perch, allows for a greater understanding of the current status of the populations providing essential information to the management of these species. Silver Perch is listed as endangered in Victoria (*Flora and Fauna Guarantee Act 1988*) and nationally (*Environment Protection and Biodiversity Conservation Act 1999*).

A single adult Silver Perch was captured during 2024 surveys, the lowest number so far. Low abundances of Silver Perch have been detected in all eight years with juveniles and adults captured in six of the eight years (Figure 8; Figure 9). Only adults were captured in 2021 and 2024 (Figure 8). Recruits of this species are difficult to catch using the NFRC sampling method and none have been detected in all eight years of sampling. Silver Perch recruitment is low or often zero in the Goulburn River, with 90% of the population classified as migrants (unpublished report for GBCMA).

Goulburn River densities of Silver Perch size classes from 2017 to 2024

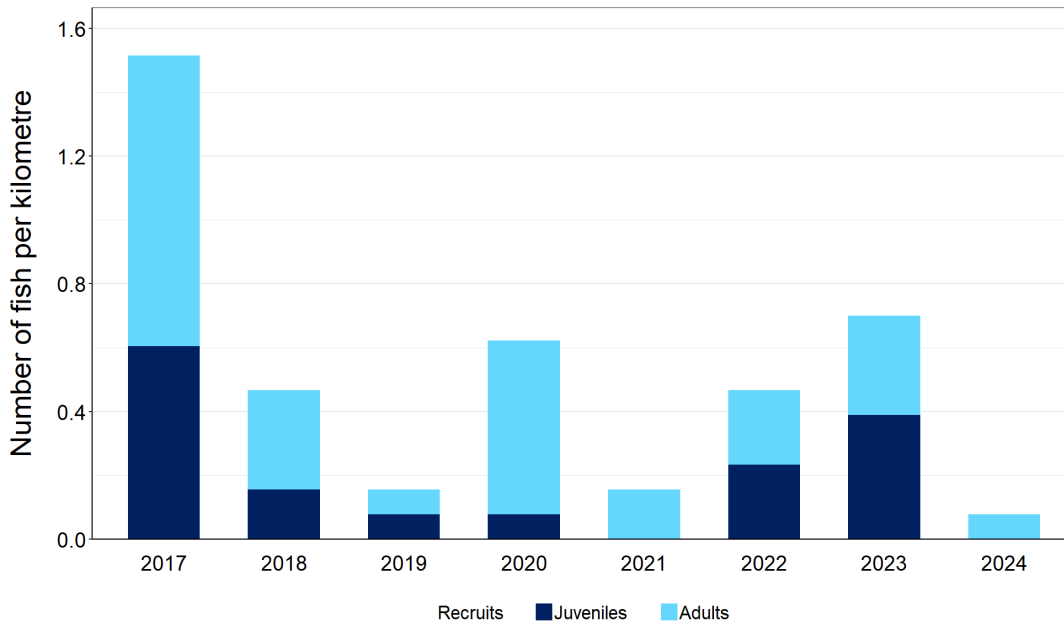


Figure 8. The densities of recruits, juveniles and adult Silver Perch for NFRC surveys in the Goulburn River from 2017 to 2024

Silver Perch size range percentage for Goulburn River in 2024

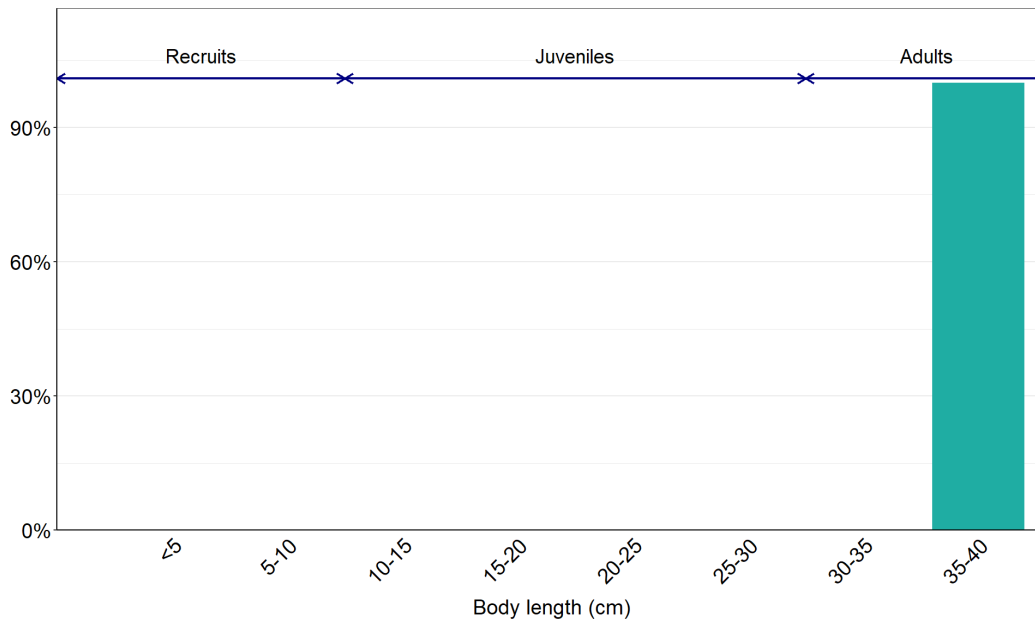
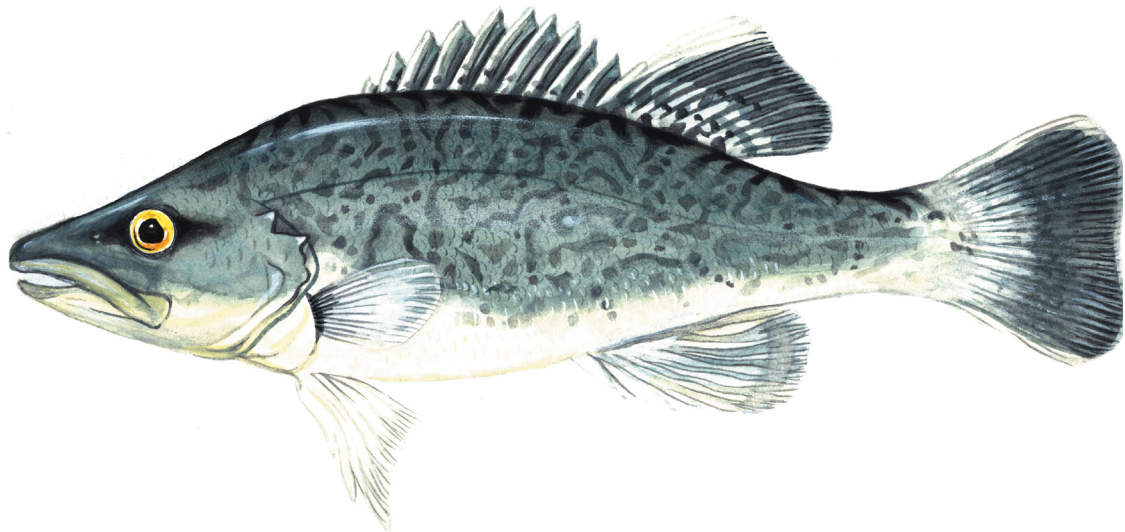


Figure 9. The size range percentage of Silver Perch measured from the Goulburn River during NFRC surveys in 2024

Trout Cod

Maccullochella macquariensis



Key Health Indicators

- ✗ Recent recruitment
- ✓ Multiple size classes
- ✓ Mature fish present

Monitoring Results

Total number of fish caught	33
Fish per 1km of waterway	2.57
Largest fish by length (cm)	478
Largest fish by weight (kg)	1.58
% of the catch that is legal size	NA [#]

[#] This species is a Protected Freshwater Species and taking or possessing is prohibited (Victorian Recreational Fishing Guide 2023-24).

Stocking

There has been no stocking below Lake Nagambie (where NFRC surveys occur) since 1997. Between 1993 and 1997, a total of 58,500 fish were stocked below Lake Nagambie.

Lower Goulburn

THREATENED SPECIES

Trout Cod (*Maccullochella macquariensis*) were absent in surveys downstream of Lake Nagambie from 1982–1983³, with low numbers detected in 2003–04⁴ and low numbers persisting since then⁵. Abundance of Trout Cod recorded in 2024 returned to levels similar to previous surveys after being much higher in 2023 (Figure 10). Only adults and juveniles were detected in 2024. The proportion of adult fish to juvenile fish was similar to 2023 (Figure 10). Recruits have only been detected in 2018–20 but juveniles and adults have been recorded every year (Figure 10). Trout Cod captured in 2024 ranged from 20–50 cm in length (i.e. juveniles and adults), apart from one individual measuring only 10.4 cm which may represent a fast-growing recruit from the 2023 spawning season (Figure 11). The presence of several Trout Cod larvae in Flow-MER larval sampling of the lower Goulburn in spring 2023 suggests breeding did occur. Very few Trout Cod have been caught downstream of Shepparton, indicating a restricted distribution between Shepparton and Lake Nagambie. This is consistent with other research, including the Long-Term Intervention Monitoring program/Flow-MER. Prior to 2022, both the Flow-MER and NFRC had caught relatively few Trout Cod downstream of Shepparton. However, both programs recorded increased abundances and from a greater number of sites in recent years. The whole of Murray River monitoring program (River Murray Channel Monitoring Plan⁹) also recorded Trout Cod down to Swan Hill in 2022, indicating Trout Cod dispersing throughout 2021 and early 2022.

Trout Cod

Maccullochella macquariensis

Goulburn River densities of Trout Cod size classes from 2017 to 2024

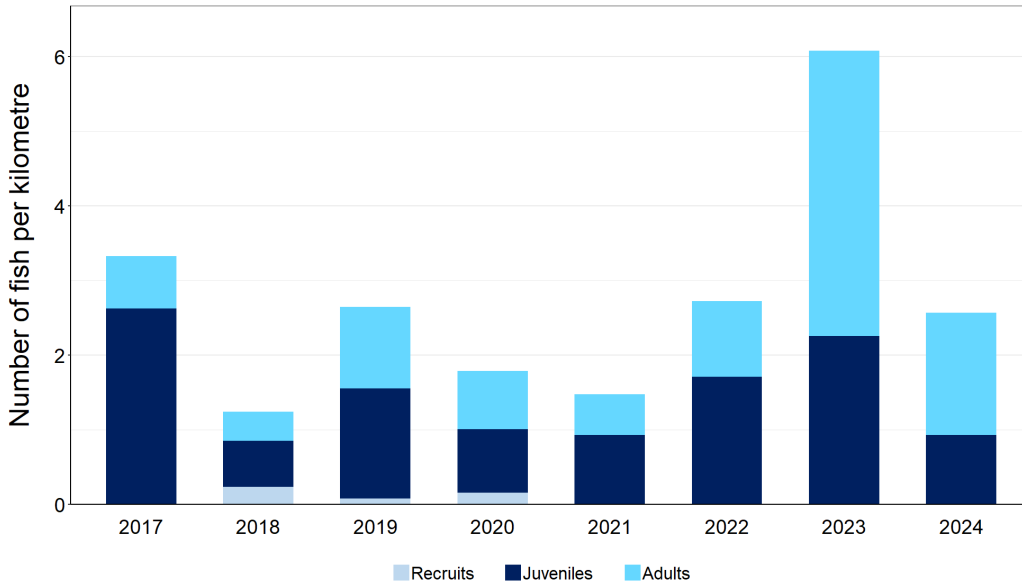


Figure 10. The densities of recruits, juveniles and adult Trout Cod for NFRC surveys in the Goulburn River from 2017 to 2024

Trout Cod size range percentage for Goulburn River in 2024

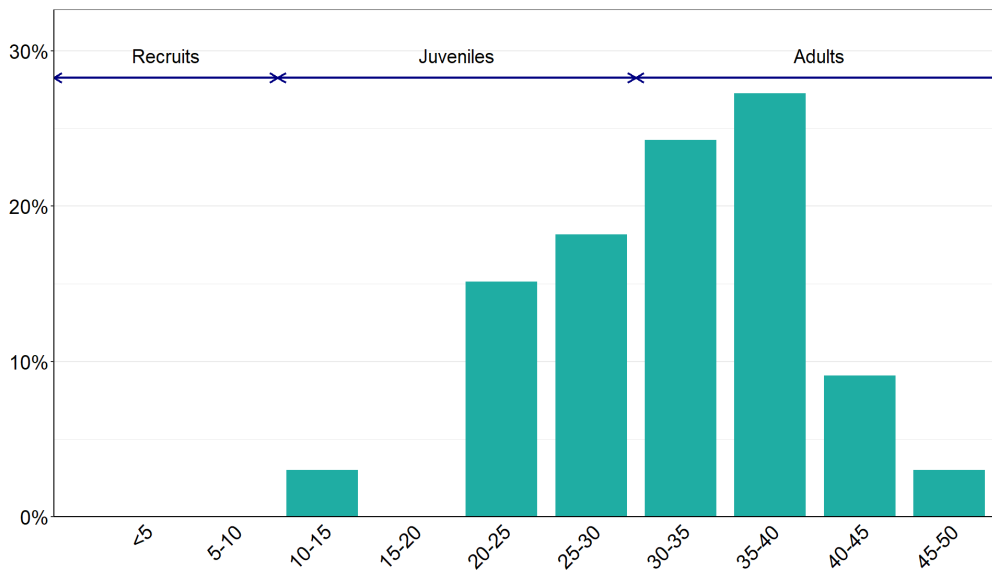


Figure 11. The size range percentage of Trout Cod measured from the Goulburn River during NFRC surveys in 2024

Trout Cod

Maccullochella macquariensis

³ Brumley et al. (1987). Revision of the conservation status of several species of warmwater native fish after surveys of selected sites in northern Victoria. (1982–1984). Technical Report Series No. 33. Arthur Rylah Institute for Environmental Research, Department of Conservation, Forests and Lands, Shepparton, Victoria.

⁴ Koster et al. (2012) Status of fish populations in the lower Goulburn River (2003–2012). Arthur Rylah Institute for Environmental Research Unpublished Client Report for Goulburn Broken Catchment Management Authority, Department of Sustainability and Environment, Heidelberg, Victoria.

⁵ Webb et al. (2021). Commonwealth Environmental Water Office Long Term Intervention Monitoring Project Goulburn River Selected Area Scientific Report 2020–21.

⁶ River Murray Channel Monitoring Plan. The Department of Agriculture, the Environment and Water, through its Commonwealth Environmental Water Office (CEWO), on behalf of River Murray jurisdictions (via the Southern Connected Basin Environment Watering Committee), has agreed to engage a consortium team, led by CSIRO, to implement the River Murray Channel Monitoring Plan





We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it.

We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

DEECA is committed to genuinely partnering with Victorian Traditional Owners and Victoria's Aboriginal community to progress their aspirations.



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