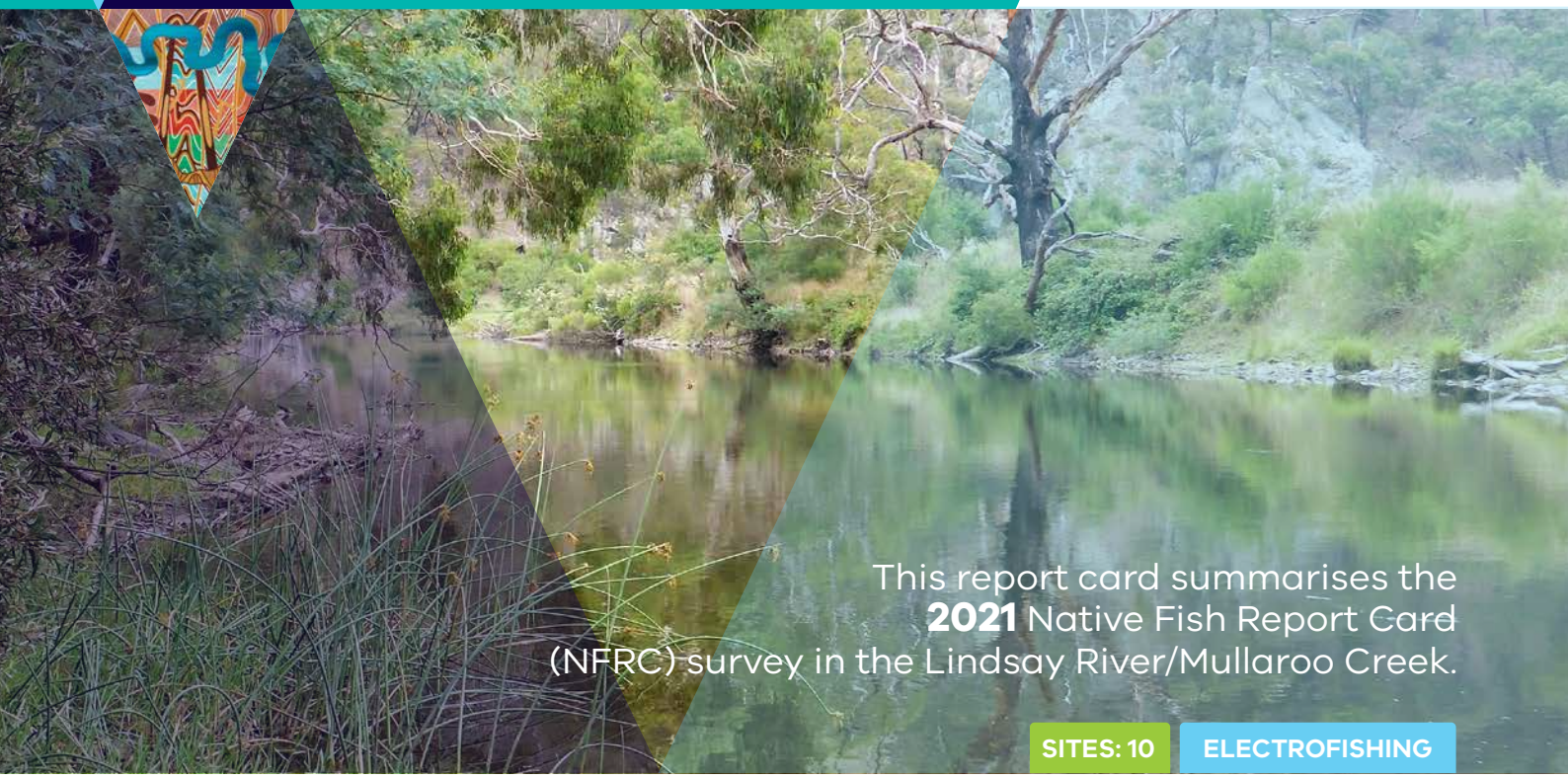
Lindsay River System 2021
Mallee Region

Native Fish Report Card



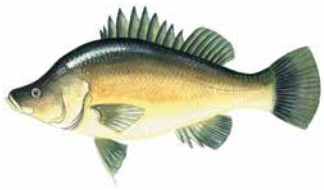
This report card summarises the **2021** Native Fish Report Card (NFRC) survey in the Lindsay River/Mullaroo Creek.

SITES: 10 | ELECTROFISHING

Fish found in the Lindsay River System for NFRC

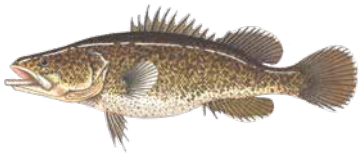
Target Species

✓ *recorded in 2021*



✓ Golden Perch

Macquaria ambigua



✓ Murray Cod

Maccullochella peelii

✓ Silver Perch

Bidyanus bidyanus

Non-target species

✓ *recorded since 2017**

Large-bodied native species

- ✓ Bony Bream
- ✓ Freshwater Catfish

Small-bodied native species

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

Exotic species

- ✓ Common Carp
- ✓ Eastern Gambusia
- ✓ Goldfish
- ✓ Redfin

** These non-target species were incidentally captured during NFRC surveys since 2017 but not measured as for target species.*

Fish community

The NFRC Program began in 2017 with a focus on targeting the monitoring of population dynamics of key iconic fish species that have high recreational and/or conservation values, in large rivers across Victoria. In the Lindsay River System, the target species are Golden Perch, Murray Cod and Silver Perch. Surveys occur in March each year, at 10 sites from the Mullaroo offtake with the Murray River upstream of weir seven to the junction of the Lindsay and Murray rivers. The equipment and habitats surveyed are focused on these species, which are measured to determine population structures. Other fish species that are incidentally captured are recorded, but not measured to determine their population structures, except Freshwater Catfish which are also captured, measured and weighed.

Summary of key health indicators for target species in 2021

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

Recent recruitment means young -of-year fish.

** - cannot be determined due to low abundances*

Silver Perch were historically abundant throughout the Lindsay River system but have experienced dramatic declines across their range. Silver Perch are present in low densities. Overall, the Lindsay River system appears to be maintaining healthy populations of Golden Perch with the Murray Cod population recovering following the 2016 blackwater event.

Non-target species

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

Large-bodied native species

Other large-bodied species recorded in surveys are Bony Bream and Freshwater Catfish. Bony Bream which are cold water intolerant are common in the lower Murray-Darling Basin, including the Lindsay River system. The species is often in higher abundances in slower flowing habitats. Freshwater Catfish are a lowland species, generally found at altitudes below 200 metres. This species has suffered a decline in distribution and abundance across Victoria. Low abundances of Freshwater Catfish have been recorded from 2018 onwards. In 2021, young-of-year were collected for the first time during NFRC surveys.

Small-bodied native species

The small-bodied species Australian Smelt, Carp Gudgeon, Flatheaded Gudgeon and Unspecked Hardyhead are common and are expected to be widespread throughout the Lindsay River system and more broadly within the Murray-Darling Basin. Murray-Darling Rainbowfish are common throughout the Lindsay River system. This species was once widespread in the Murray-Darling Basin, and now has a patchy distribution and a restricted range and is considered threatened in Victoria.

Exotic fish species

Common Carp and Goldfish are widely distributed across sampling sites. Eastern Gambusia are not as widely distributed and are more likely to be collected in the slower flowing waters. Redfin are also distributed throughout, but in low abundances.

Other native fish species known from the Lindsay River System

There is a range of other species historically known from this system, although they have not been detected for many decades.

Other notable species

Surveys have also recorded Yabbies and turtle species.

Environmental and Management Context

Environment

A blackwater event impacted the fish population in late 2016. Generally, stream flows were similar during the autumn sampling periods in 2017 to 2021. The Murray River has not connected with the upper Lindsay River since the 2016 flood. Therefore the upstream reaches of the Lindsay River (above the Mullaroo Creek junction) have experienced lower flows and water levels since 2017. Ten sites were surveyed by an electrofishing boat, between 16 and 18 March 2021.

River rehabilitation efforts in the Lindsay River System

A range of rehabilitation actions to improve the health of the Lyndsay River system and its fish community, have been identified within the Mallee Waterway Strategy 2014-2022. The core current focus involves allocation of water for the environment and improving fish passage. Since 2006, fish monitoring has occurred for the Lindsay, Mulcra, Wallpolla Islands, as part of The Living Murray Program. The Mallee Catchment Management Authority, DELWP and the Victorian Fisheries Authority support rehabilitation and management of the Lindsay River and its fish community.

See the ARI website for more information about 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 Lindsay River system where NFRC sampling occurs.

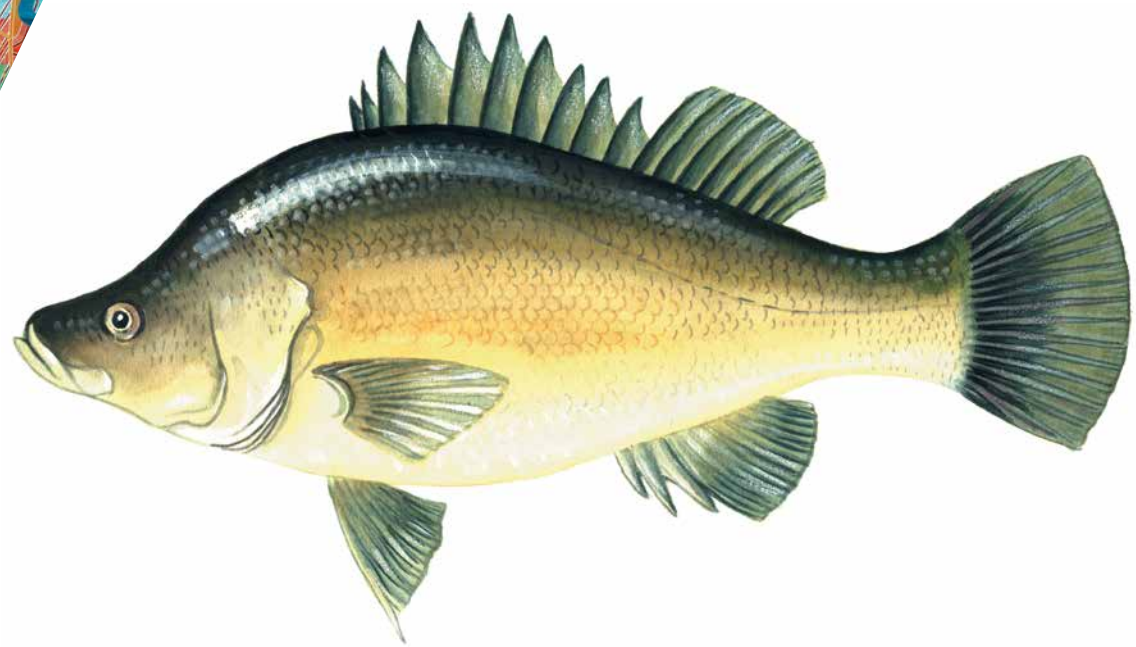
Figire 2. A Murray Cod

Figure 3. A juvenile Silver Perch

Golden Perch

Macquaria ambigua

Native Fish Report Card



Lindsay River System | RECREATIONAL SPECIES

Key Health Indicators

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

Monitoring Results	
Total number of fish caught	36
Fish per 1km of waterway	2.98
Largest fish by length (cm)	47
Largest fish by weight (kg)	1.61
% of the catch that is legal size	97.2

The abundance of Golden Perch (*Macquaria ambigua*) appears to decrease after higher abundances were recorded in 2017 and 2018 (Figure 4). It is likely that the 2016 floods attracted Golden Perch into the system, with abundances in the upper Lindsay system (above the Mullaroo Creek junction) being highest in 2017 and decreasing as this part of the system has reduced flows. In addition, the higher proportion of juveniles in 2017 were also in the upper Lindsay River. A large proportion of Golden Perch collected are adults (Figure 4) with 97% adults in 2021 (Figure 5). Overall, there is a consistently productive Golden Perch population. Recruits of this species are difficult to catch using this sampling methodology. The juveniles in 2017 are now approaching adult size, with all fish in 2021 above 25 centimetres (Figure 4).

Stocking

No stocking has occurred.

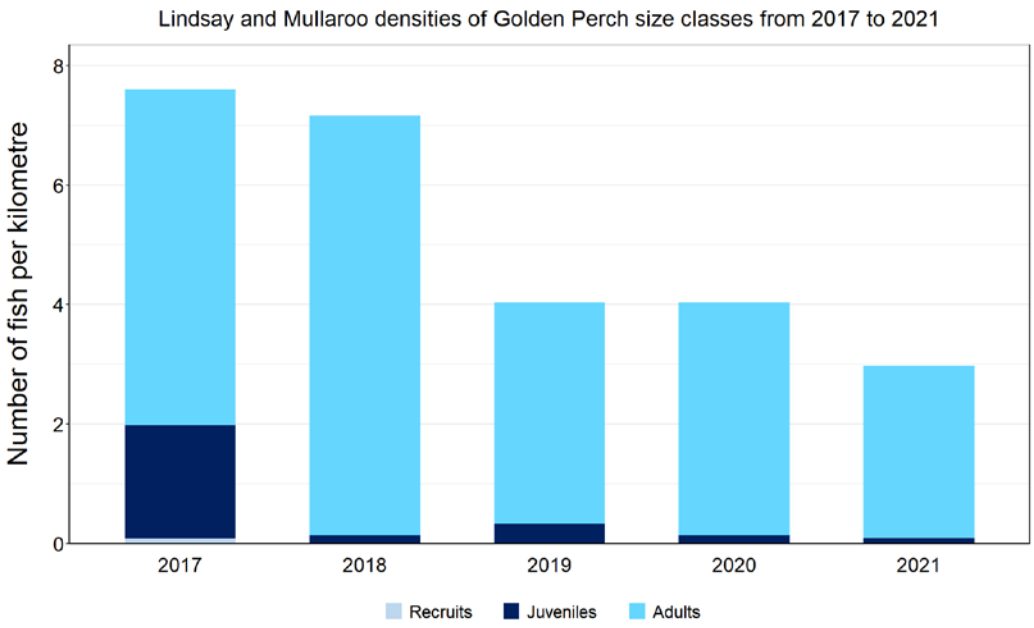


Figure 4. The densities of recruits, juveniles and adult Golden Perch for NFRC surveys in the Lindsay Mullaroo river system from 2017 to 2021

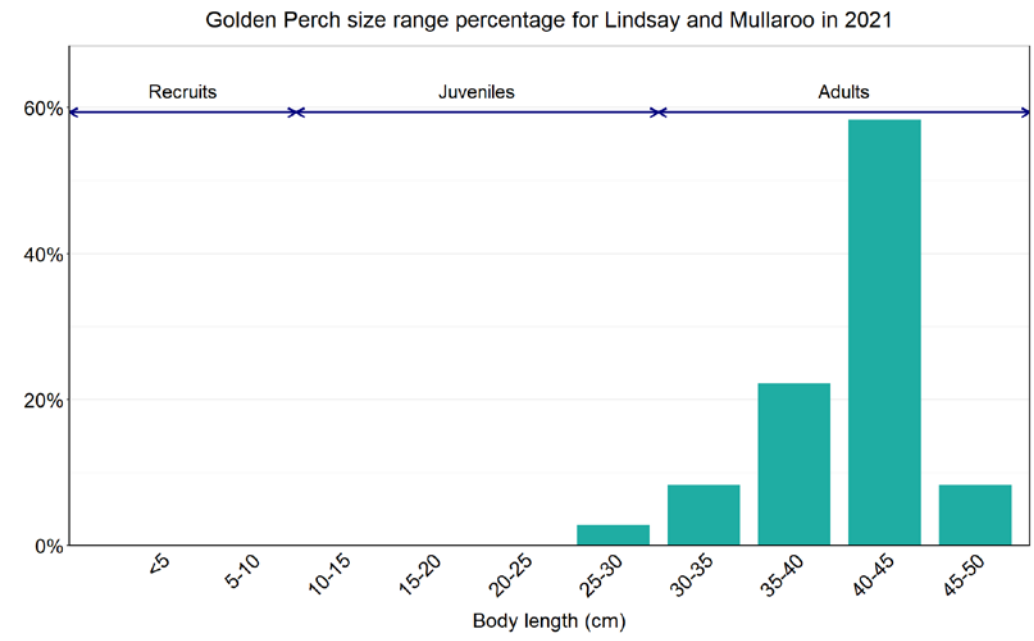
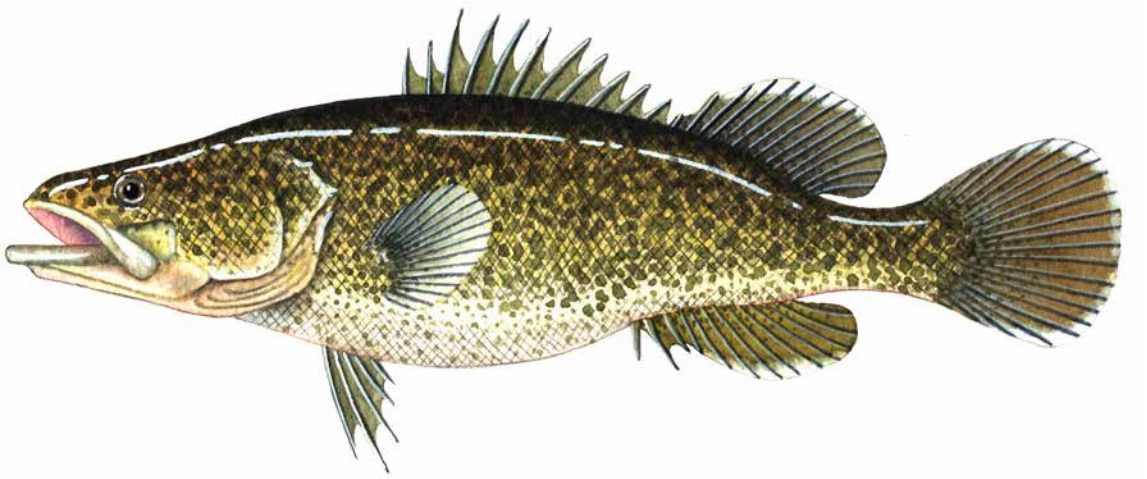


Figure 5. The size range percentage of Golden Perch measured from the Lindsay Mullaroo river system during NFRC surveys in 2021.

Murray Cod

Maccullochella peelii

Native Fish Report Card



Key Health Indicators

- Recent recruitment
- Multiple size classes
- Mature fish present

Monitoring Results	
Total number of fish caught	75
Fish per 1km of waterway	6.2
Largest fish by length (cm)	118
Largest fish by weight (kg)	28.5
% of the catch that is legal size	14.7

Stocking

Twenty-seven thousand Murray Cod were stocked into the Lindsay River in March 2021. Note this stocking occurred after the 2021 surveys.

*Otoliths are fish earbones

Lindsay River System | **RECREATIONAL SPECIES**

The abundance of Murray Cod (*Maccullochella peelii*) in the Lindsay River system declined dramatically following the 2016 blackwater event either through emigration or mortality[1]. Murray Cod have subsequently increased from 2017 (where no Murray Cod were captured at NFRC sites, although one juvenile was captured during The Living Murray survey (unpublished data) (Figure 6). Murray Cod have only been recorded from the Mullaroo Creek and never in Lindsay River itself in all five years. From 2018 to 2021 multiple size classes including mature and young-of-year fish have been recorded with the number of adults highest in 2021 (Figure 6). As no stocking has occurred prior to the 2021 surveys, these are all likely to be wild spawnings. The NFRC has set recruits for Murray Cod across all priority rivers as 10 cm (based on previous research). In the Lindsay River system in 2018 approximately 71% of fish captured were 90 – 150 mm TL, representative of young-of-year fish spawned in spring 2017 (a subsample was aged by otoliths*), indicating a faster growth rate following the blackwater event[2]. As a result, the abundance of recruits is most likely under-represented in Figures 6 and 7. For example, the 10-15 cm fish in 2021 (Figure 7) are likely recruits from 2020 spawnings. In 2020, where Murray Cod were aged, the 2017 spawning made up approximately 50 % of Murray Cod in the system[2]. Overall, the Murray Cod is showing a strong recovery.

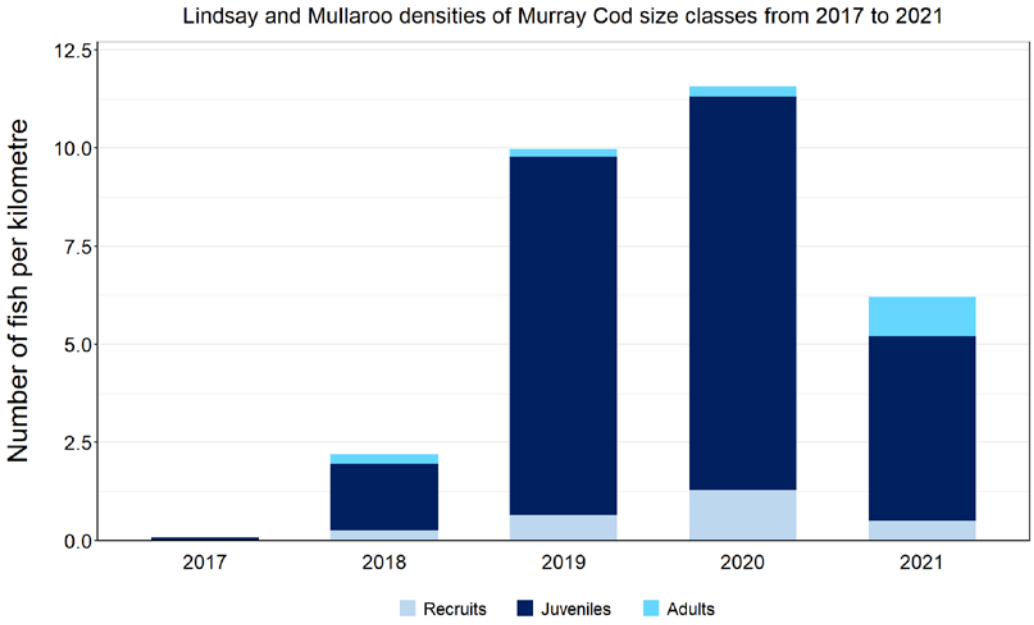


Figure 6. The densities of recruits, juveniles and adult Murray Cod for NFRC surveys in the Lindsay Mullaroo river system from 2017 to 2021

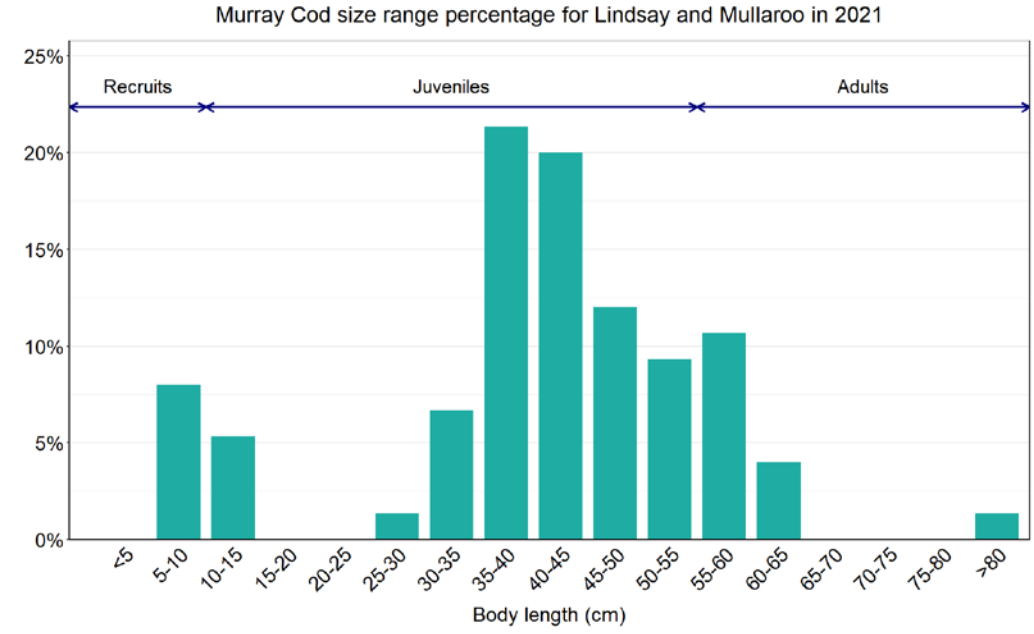


Figure 7. The size range percentage of Murray Cod measured from the Lindsay Mullaroo river system during NFRC surveys in 2021.

[1] *Tonkin et al. (2017) Fish movement in the Lindsay and Mulcra Island anabranch systems: 2017 Progress report. Unpublished Client Report for the Mallee Catchment Management Authority. Arthur Rylah Institute for Environmental Research. DELWP.*

[2]. *Tonkin et al. (2020). Murray Cod movement and population structure in the Lindsay Island anabranch system: 2020 Report. Unpublished Client Report for the Mallee Catchment Management Authority. Arthur Rylah Institute for Environmental Research. DELWP*

Silver Perch

Bidyanus bidyanus

Native Fish Report Card

Key Health Indicators

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

Monitoring Results	
Total number of fish caught	4
Fish per 1km of waterway	0.33
Largest fish by length (cm)	39.8
Largest fish by weight (kg)	0.79
% of the catch that is legal size	NA

Lindsay River System

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. River regulation and barriers have been listed as factors impacting Silver Perch populations, with these relevant to the Lindsay River system. While the NFRC only expects to capture low numbers of this species, the monitoring can provide a greater understanding of the current status of the populations which is essential to inform management of these species. Due to the low abundances of Silver Perch collected during NFRC the key health indicators cannot be measured. Low abundances of Silver Perch have been detected in all five years (Figure 8). The Silver Perch detected are a mixture of recruits (2020), juveniles (2017, 2019 and 2021) and adults (2018, 2019 and 2021 (Figures 8 and 9)). Recruits of this species are difficult to catch using this sampling methodology, with recruits only detected in 2020, indicative of spawning success in 2019.

Stocking

No stocking has occurred.

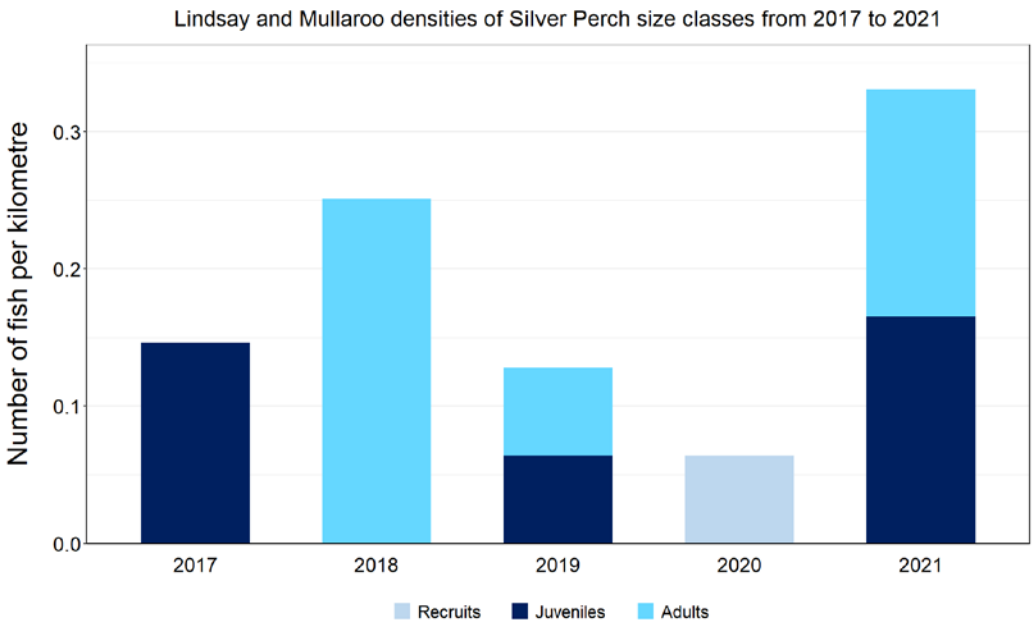


Figure 8. The densities of recruits, juveniles and adult Silver Perch for NFRC surveys in the Lindsay Mullaroo river system from 2017 to 2021

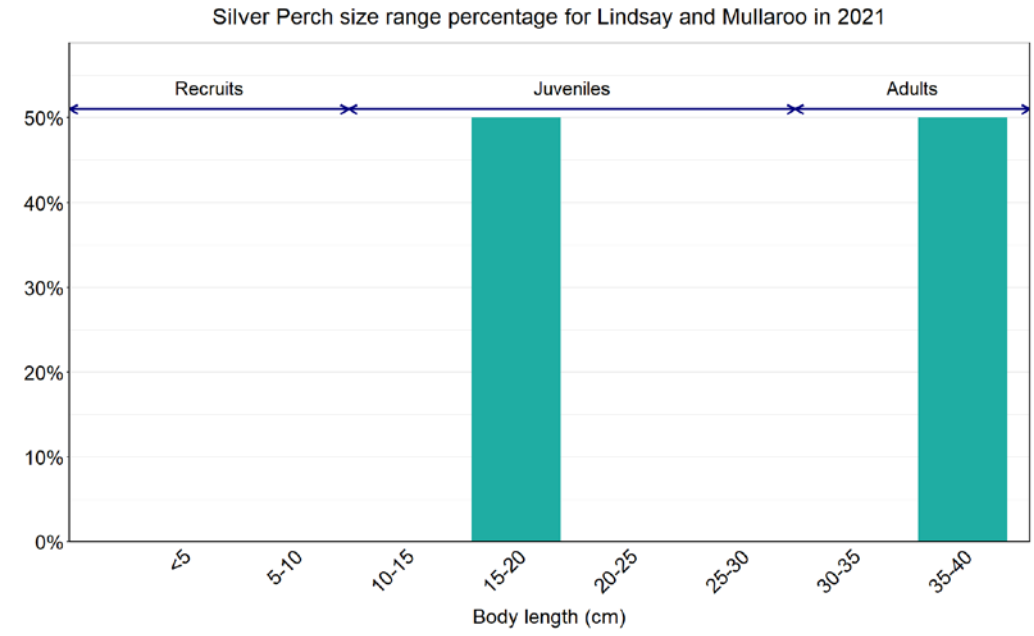


Figure 9. The size range percentage of Silver Perch measured from the Lindsay Mullaroo river system during NFRC surveys in 2021.