2021 ACT Murrumbidgee Fishery Survey

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Conservation Research Survey of the Murrumbidgee Fish Community 2021

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We acknowledge the Traditional Custodians of the ACT, the Ngunnawal people. We recognise the special relationship and connection that Ngunnawal people have with this Country. Ngunnawal people are a thriving community whose life and culture are intrinsically connected to this land in a way that is core to their physical and spiritual wellbeing, their cultural practices, law/lore, songlines and stories.

Ngunnawal people have maintained a tangible and intangible cultural, social, environmental, spiritual and economic connection to these lands and waters for thousands of years.

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We also extend this acknowledgment to the neighbouring peoples, the Gundungurra to the North, the Ngarigo to the South, the Yuin on the East, and the Wiradjuri inland.

This project was was conducted by Conservation Research Branch, part of Environment Planning and Sustainable Development Directorate (EPSDD) of the ACT Government and supported by Icon Water.

Background

The Murrumbidgee River is the largest river in the ACT region and is home to native aquatic plants and animals. The river is of important significance to the Ngunnawal and Ngarigo traditional custodians.

The Murrumbidgee River is also important to the ACT regions' residents as a place of beauty, for nature conservation, recreation and water supply.

ACT Murrumbidgee Fishery Survey Program

The fish populations in the Murrumbidgee River are monitored every two years. The program provides information to assist

managing the threatened and recreational fish species in the Murrumbidgee in the ACT Region.

This report describes the methods and results on the 2021 ACT Murrumbidgee Fishery Survey.

Icon Water assist by funding the survey of sites upstream of the ACT as part of their monitoring commitment to the Murrumbidgee to Googong water supply pipeline (M2G) and the results are shared with our partners in the Upper Murrumbidgee Demonstration Reach (UMDR).

For more on the UMDR

For more on Icon Water and M2G

Aims

The aims of the ACT Murrumbidgee Fishery Survey Program are to:

- **assess the fish community** of the Murrumbidgee River including pests, recreational and threatened species

- **inform management actions** for recreational fishing and conservation
- **provide advice for the UMDR and M2G** based on monitoring
- **guide advice on the potential impact of future urban development** near the Murrumbidgee River.

Threats

Threats to the Murrumbidgee River and its ecosystem in our region include:

- water extraction and flow modification
- land erosion and consequent river sedimentation
- degraded riparian vegetation

- barriers to fish passage
- illegal fishing
- urban development
- climate change
- urban and rural pollution
- pest species.

Tantangara Dam diverts 99% of the flow away from the Upper Murrumbidgee.

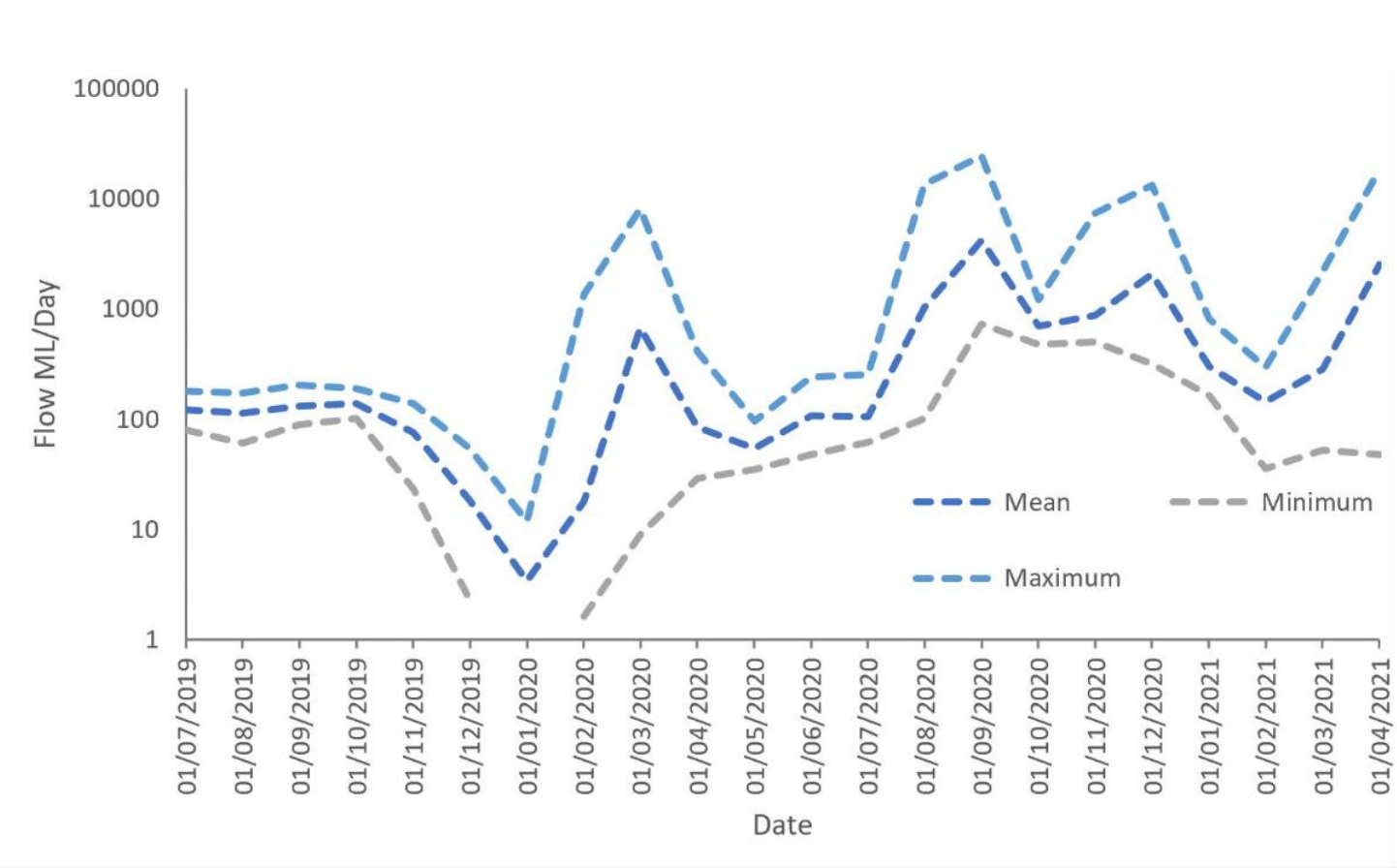
Further information about Murrumbidgee River ecosystem and associated threats can be found in the ACT Aquatic and Riparian Conservation Strategy and action plans.

ACT Aquatic Conservation Strategy

River conditions

In the seasons prior to this survey, the river experienced wildly variable environmental conditions. In late 2019, **drought** across the entire catchment resulted in the Murrumbidgee River in the

ACT ceasing to flow. This was followed in early 2020 by **bushfires** affecting many parts of the Murrumbidgee Catchment within and upstream of the ACT.

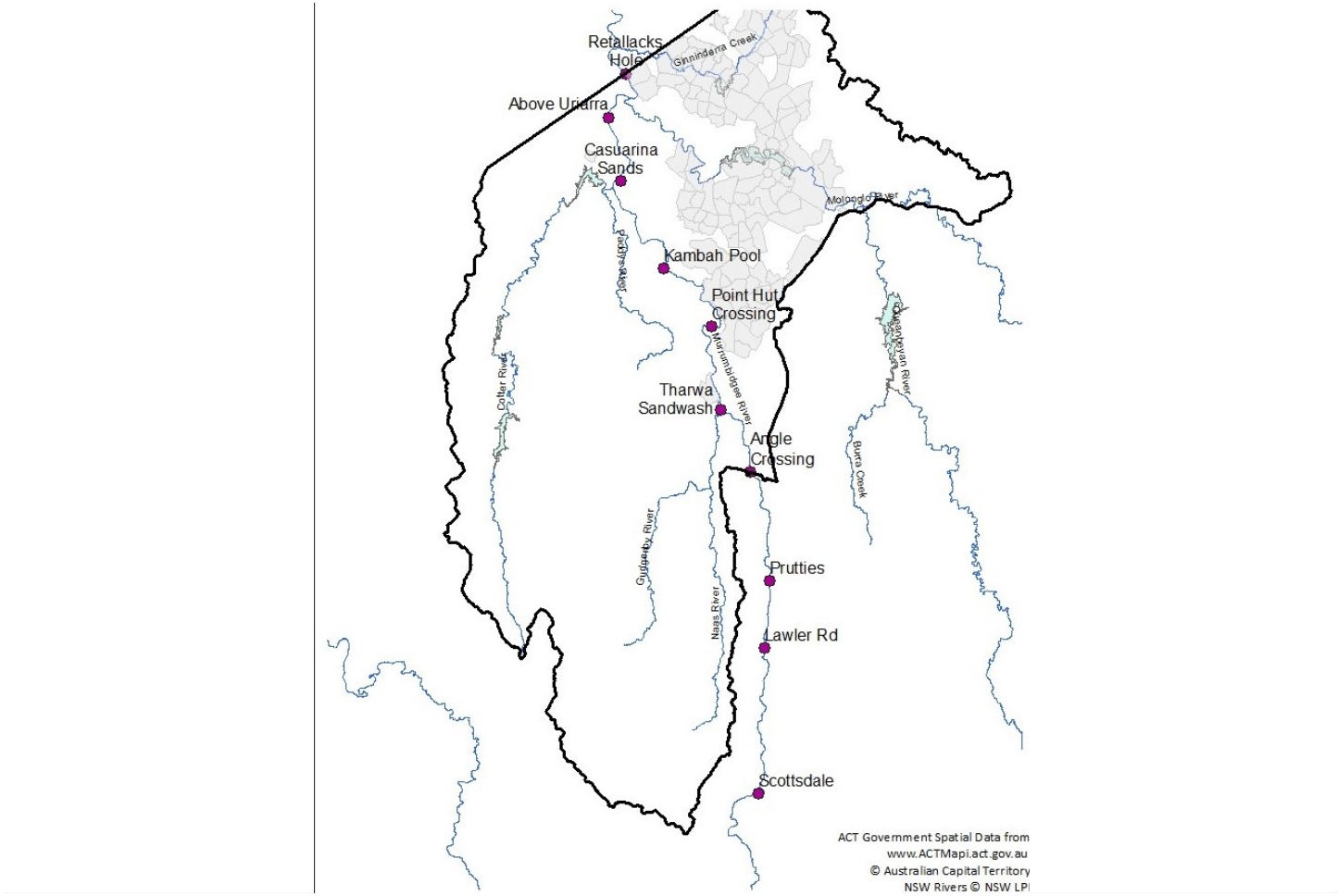


The breaking of the drought in February 2020, and the high flow events through to this study in Autumn 2021, caused the transportation of **large amounts of sediment and ash** from the

fire grounds and drought affected catchments, that were deposited in the river.

The graph shows the mean, maximum and minimum monthly flow at Lobbs Hole on the Murrumbidgee River 2019-2021.

Poor water quality and bushfire sediment deposited on the banks of the Murrumbidgee River at Tharwa, April 2020.



Survey method

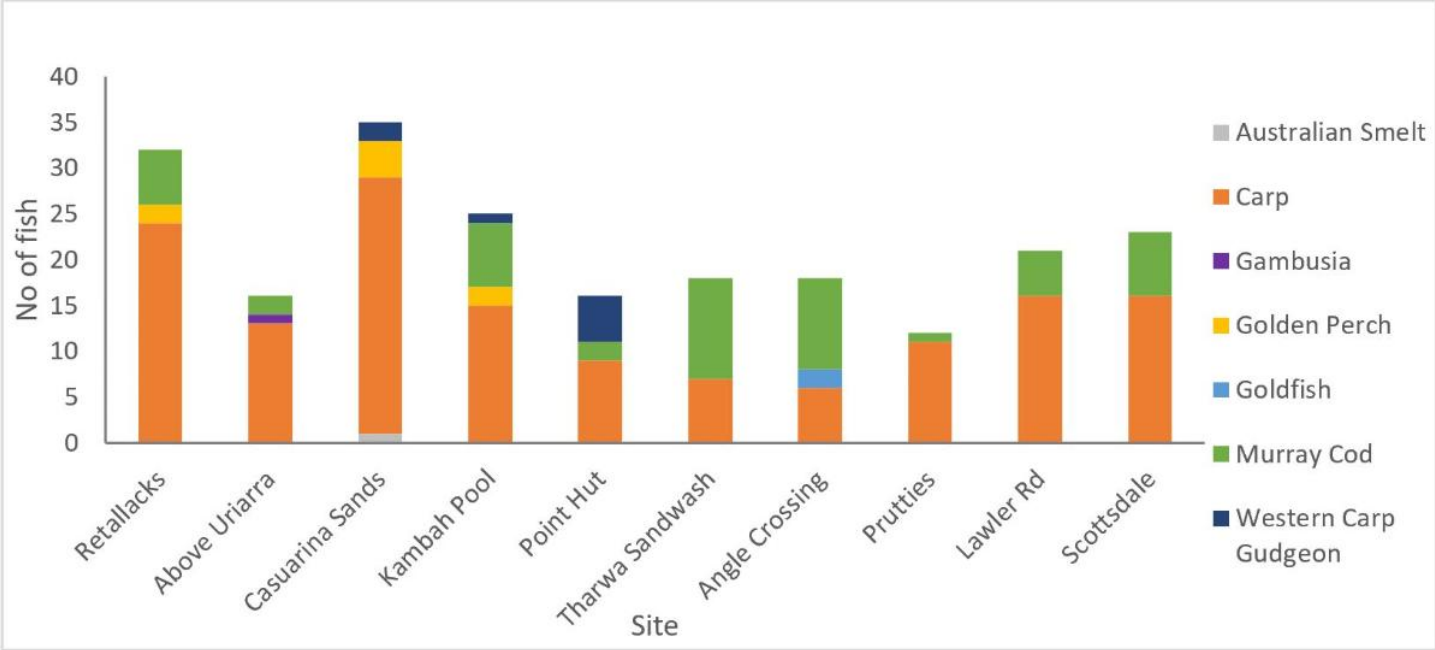
Between February and April 2021 ten sites along the river were surveyed using boat electrofishing from the northern ACT border upstream to Bredbo in NSW (**see map**).

The sites include popular recreational areas such as Casuarina Sands and Kambah Pool and more isolated locations such as Retallacks Hole, and NSW sites Prutties, Lawler Rd and the Bush Heritage property Scottsdale.

Electrofishing sampling

At each site 12 fish sampling transects or 'shots' were performed along available aquatic habitats with each shot being two minutes of active electrofishing. A GPS application is used to track and mark the location of each shot and each fish captured.

- Catch, measure, release - Fish caught are identified and measured to length and then released.
- Weights - Weights are calculated from length using the Murray Darling Basin Authority's Sustainable River Audit length weight relationships.
- Tags and samples - Internal tags are implanted and genetic samples are taken from large bodied native fish to gain information on parentage, growth and movement which will assist in managing the fishery.



Results & discussion

Species and sites

In the 2021 study, 216 fish from seven species were captured. **Four native species were caught** (Murray Cod, Golden Perch, and two small bodied species: Western Carp Gudgeon,

Australian Smelt) and **three pest species** (Carp, Goldfish, Gambusia).

Carp dominated most sites with 145 captured in total. The exceptions were Angle Crossing and Tharwa Sandwash, where Murray Cod (mainly juveniles) numbers exceeded Carp. No redfin were recorded in 2021 at any site. This is in contrast to the range expansion of redfin recorded in 2019 in sites upstream of Gigerline Gorge.

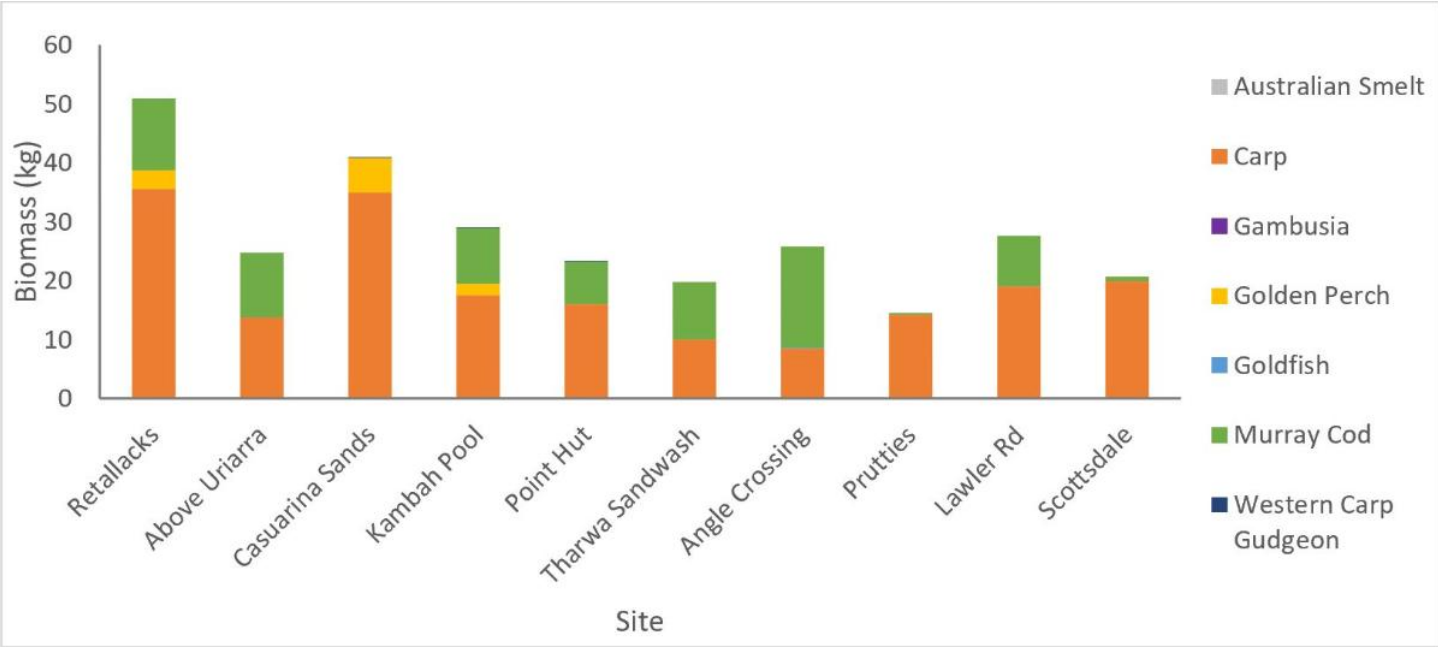
A total of **51 Murray Cod** were captured across all sites, except Casuarina Sands. The spread of Cod was different across the sites with young of year (YOY - fish less than 1 year old, spawned in spring summer 2020/21) mainly being detected in the upstream (southern) sites and only one YOY being detected in the five sites downstream of Tharwa.

The graph shows total number of fish detected across all sites

No threatened Macquarie Perch or Trout Cod were detected in this survey, although several potential Trout Cod-Murray Cod hybrids were recorded. These have been classified as Murray Cod for this analysis.

Genetic samples were taken from all cod and Golden Perch. These samples will be submitted to the **FishGen genetic parentage program** to assist with confirming their status and gain further

understanding of the breeding dynamics of the species in the region.

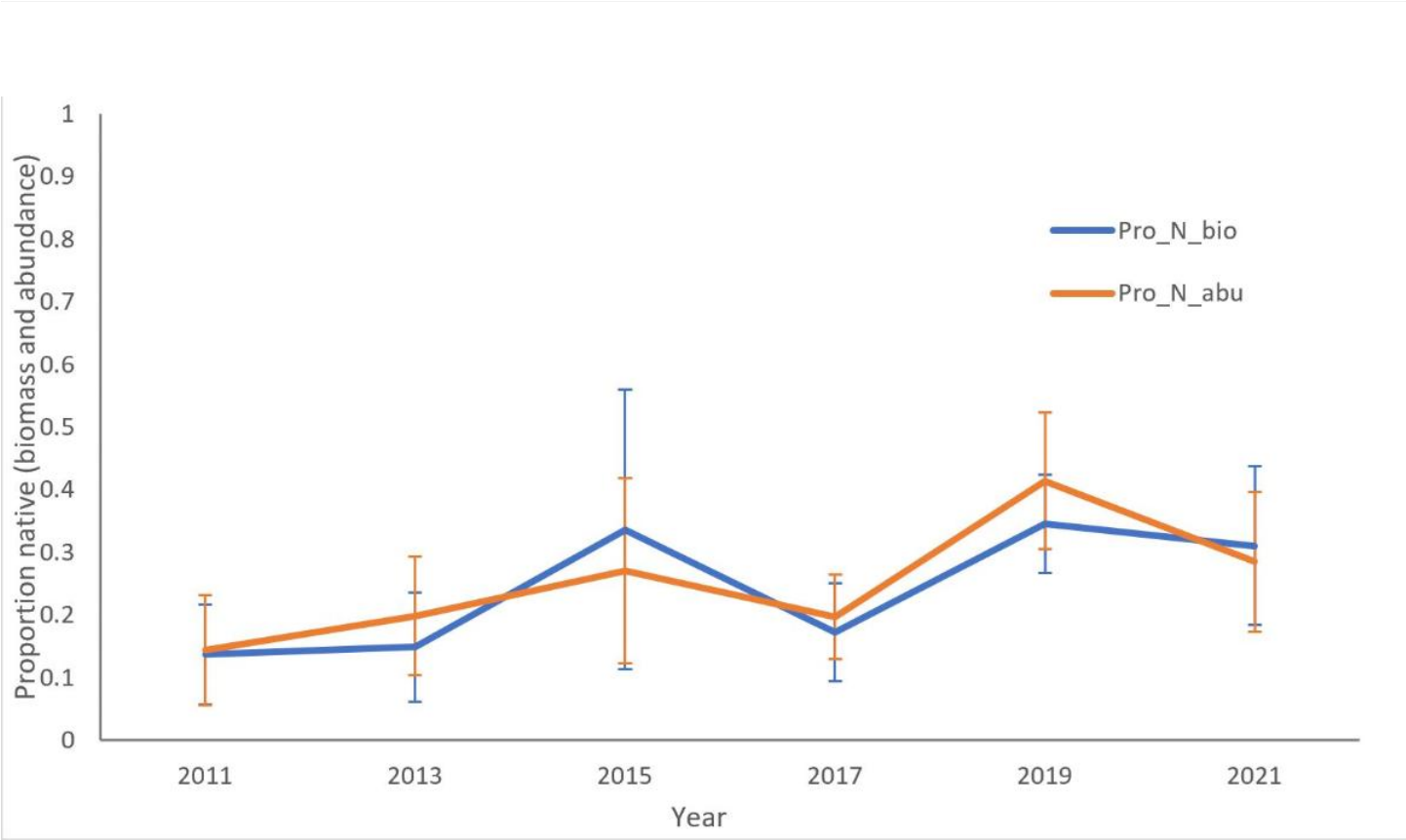


Biomass

At upstream NSW sites, Prutties and Scottsdale, the native fish biomass captured was very low. In the case of Scottsdale, though several Murray Cod were recorded, they were all juvenile

and therefore had lower native biomass. At Lawler Road NSW, a number of Murray Cod were captured in addition to pest Carp.

The graph shows total sampled biomass across all sites

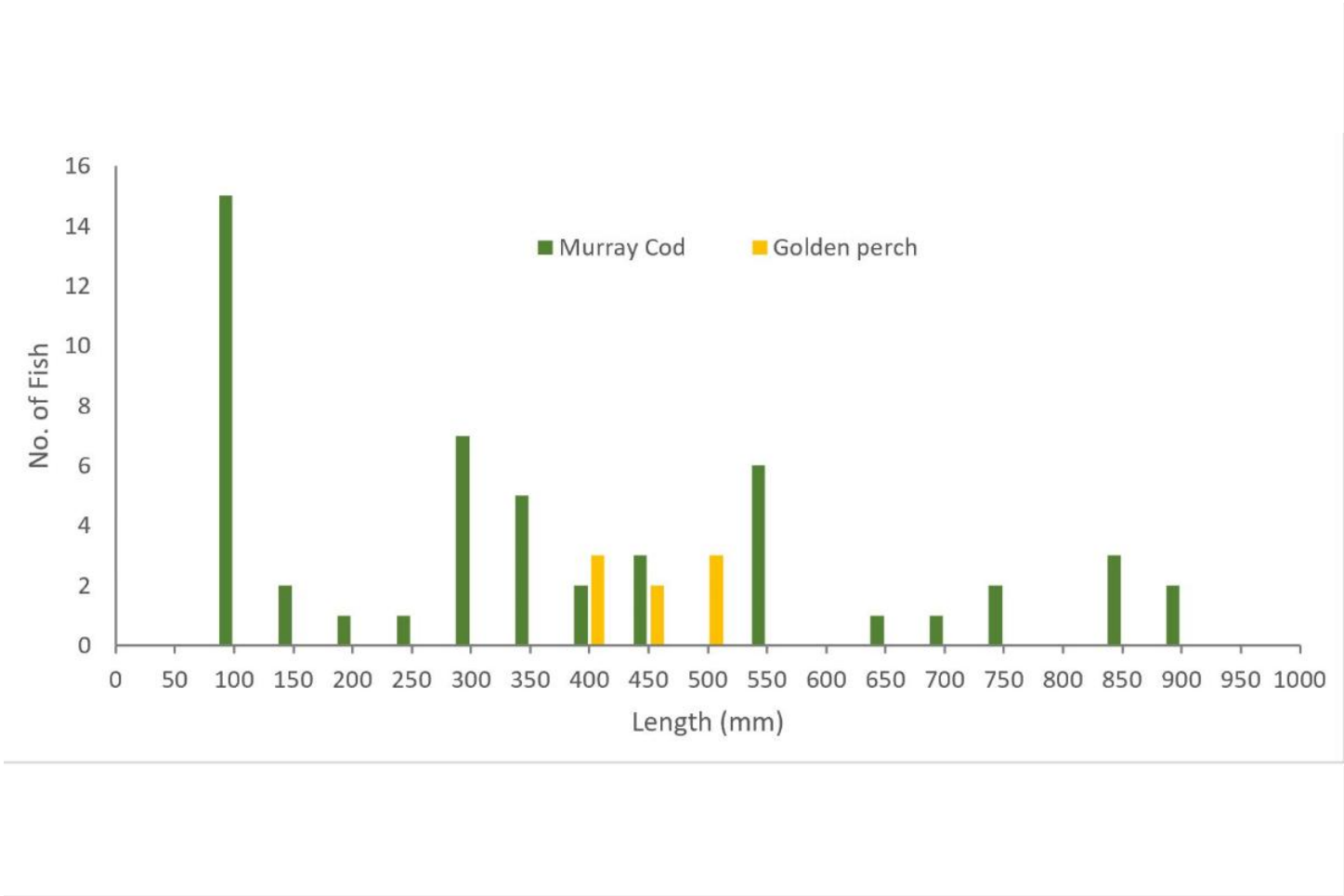


Native fish abundance and biomass

In comparison to previous years **the proportion of abundance and biomass from native fish fell from the previous survey in 2019**. Although there has been a general trend of increasing native biomass since 2011 (see graph).

This trend is common across upstream and downstream sites and is driven primarily by increases in Murray Cod. Similarly the decline since 2019, particularly in native fish abundance, is because fewer sites recorded large numbers of juvenile Murray Cod compared to 2019.

Graph shows proportion of native biomass (Pro_N_bio) and abundance (Pro_N_abu) from 2011-2021



Fish size and age

Despite fewer young of year Cod being recorded overall in 2021, there was a strong group of young of year from the upstream sites. This 2021 length frequency graph for Murray Cod (**see graph**) shows that there was **low recruitment in the drought year 2019-20.**

Fish spawned in spring 2019 would be expected to be around 200-250 mm at the time of this survey. The 2021 sampling also found strong cohorts of fish in the 300 mm and 550 mm range. It's hoped that these fish will survive and contribute to the breeding population in coming years.

As in previous years **there are few large adult Murray Cod above the 750 mm maximum size for recreational take size**. The slot limit for Murray Cod of 550 to 750 mm is intended to protect and provide an increasing population of larger individuals. It takes at least 4-6 years for fish to grow through the slot. Illegal angler take or other impacts can disproportionately affect larger fish; impacts such as water quality and thermal stress, can reduce the number of larger fish.

There was **limited capture of Golden Perch** in the 2021 survey and they were all in a similar adult size class. Notably, Golden Perch have been recently stocked by NSW DPI upstream of the Scottsdale site. Although none were recorded in our survey, juvenile Golden Perch have been reported in 2021 at Scottsdale (Mark Lintermans pers comms). This stocking is out of range of the existing Golden Perch distribution in the Murrumbidgee River.

Graph shows length frequency for Murray Cod and Golden Perch

Golden Perch

Golden Perch were recorded downstream of Kambah Pool. Although a number of fish were recorded at Casuarina Sands, **the distribution of fish was disappointing given the higher flow and potential improved connectivity flows provided in 2021.**

The origin and source of the ACT population of Golden Perch is largely unknown although some genetic samples have shown fish stocked in Burrinjuck Reservoir moving upstream to Kambah pool on flow events.

In previous high flow years Golden Perch have been detected upstream at Point Hut and Tharwa Sandwash. To improve sustainability for this species, the ACT recreational fishing limits for Golden Perch are being revised to reduce the bag limit. Additional research and improvements to connectivity are needed to improve conditions for this Golden Perch population.

Murrumbidgee to Googong Pipeline (M2G)

This 2021 survey represents the first period in which the M2G pipeline was used for water supply since its construction in 2012. Approximately 4 GL of water was transferred through the pipeline to Googong in 2020.

In relation to the fish populations, a negative effect was not detected from the pumping regime, even at the nearest downstream site, Tharwa Sandwash, in comparison to the upstream sites. However, the high variability in fish catch at the upstream sites and the influence of the drought and bushfire runoff had an overwhelming influence on all the sites.

There is no expected or planned operation of the M2G pipeline in the near future. Additional surveys during future periods of extened use of the M2G will be required to ensure that the extraction can be managed without significant impact on the aquatic ecology of the Murrumbidgee River. Additionally knowledge around the functional flow and habitat needs of native fish in the ACT region is required.

Conclusions

The Murrumbidgee fish population is in a degraded condition with native fish outnumbered by carp. A number of species which historically have been present in the river are either no longer found in the ACT or are only encountered irregularly. These include Silver Perch, Macquarie Perch, Trout Cod and Two Spine

Blackfish. These species are all listed as threatened in the ACT along with Murray Crayfish.

Murray Crayfish at Prutties on the Murrumbidgee.

The native species, Murray Cod and Golden Perch, are present and Murray Cod are naturally breeding in the Murrumbidgee River. There is some indication that the populations of Murray Cod may be increasing in the region. This trend is mainly driven by annual juvenile production at this stage.

Murray Crayfish, Macquarie Perch and Trout Cod are still present in the Murrumbidgee River in the ACT Region and **additional**

efforts need to be made to improve understanding the Murrumbidgee population of these species, prevent impacts to their survival and undertake actions that will help their recovery.

Key habitats overall are under threat from urbanisation, poor water quality and catchment changes from climate change and water extraction.

Topics for future investigation and management based on monitoring findings include:

- determining the spawning, dynamics, connectivity requirements and natal origins of the native species
- supporting the regional recovery of threatened species
- determining the functional water flow and habitat requirements for native species
- understanding, minimising and offsetting the impact of near river urbanisation
- maximising the sustainability of recreational fishing by updating and enforcing the fisheries regulations.

For more information about fisheries and fish conservation in the ACT, visit our website or check out the links below.

Fish in the ACT

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Yuma
Dhawura Nguna Dhawura Ngunnawal Ngunnawalwari dhawurawari Nginggada Dindi yindumaralidjinyin Dhawura Ngunnawal yindumaralidjinyin

Hello
This is Ngunnawal Country
We always respect Elders, male and female
We always respect Ngunnawal Country

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