2025 Murrumbidgee River Fisheries Survey Report

Matt Beitzel, Lisa Evans, Mark Jekabsons and Danny Spelic

Office of Nature Conservation, City and Environment Directorate.

Executive Summary

In 2025 a fisheries survey was undertaken at 10 established sites on the Murrumbidgee River in the ACT and upstream NSW. The aim is to continue to monitor the fish population, including pests, native and threatened fish species, to aid conservation and recreation fisheries management, monitor impacts from water extraction and assess the impact of urban encroachment.

A total of 362 fish were captured, dominated by pest Carp. Murray Cod were also captured at all sites and Macquarie Perch were recorded at a larger number of sites than in previous years. It was evident that a large group of juvenile Murray Cod were predominantly recorded upstream of Canberra and that the cohort of Murray Cod that has been of note for several surveys is now mature and growing through the legal recreational fishing take. Areas of investigation and management that are recommended include:

- Determining the spawning dynamics, connectivity requirements and natal origins of the native species Murray Cod and Golden Perch.
- Supporting the regional recovery of threatened species.
- Determining the functional flow and habitat requirements for key species.
- Mapping key important habitats, impacts and refuges.
- Understanding, minimising and offsetting the impact of near river urbanisation.
- Maximising the sustainability of recreational fishing by updating and enforcing fisheries regulations.
- Supporting the fisheries by educating anglers on ethical and sustainable fishing, and enforcement of the fisheries regulations by the Fisheries Conservation Officer.

The Icon Water extraction for the Murrumbidgee to Googong at Angle Crossing has not been used for water supply over the last two years and this report serves as sentinel monitoring for that program.

Introduction

The Murrumbidgee is the largest river in the ACT region and is home to an important variety of native fish and other aquatic animals. Threats to the river and its ecosystem in our region include, water extraction and flow modification, erosion, sedimentation, degraded riparian vegetation, barriers to fish passage, illegal fishing, urban development, urban and rural pollution, and pest species.

Tantangara Dam in the upper catchment, 130 km upstream of the ACT, diverts 90% of the Murrumbidgee River's flow away to the Snowy Hydro Scheme. Despite this and extraction for irrigation upstream of the ACT, the river in NSW is considered unregulated. Icon Water can extract water under licence through the Murrumbidgee to Googong pipeline (M2G) at Angle Crossing and the Murrumbidgee Pump Station (MPS) at Casuarina Sands for Canberra and Queanbeyan's water supply. Water extraction in the ACT is managed under Licence within an Operational Environmental Management Plan and the ACT Environmental Flow Guidelines. Since the last survey in 2023, the M2G was only operated for maintenance purposes and no significant extraction has occurred within the ACT.

A recent $20.26 million Commonwealth funded Restoring the Upper Murrumbidgee River program has been announced to improve the health of the upper Murrumbidgee River. This program is being jointly administered in NSW and the ACT over the next three to five years. It aims to improve water quality, flow resilience and habitat through on ground works as well as science and monitoring projects. NSW priorities include improving the resilience of known Macquarie Perch populations, through genetic rescue and connectivity, as well as targeting woody weeds and riparian habitat restoration. The ACT aims are focused on a tributary to the Murrumbidgee, the Nass/Gudgenby catchment, to ameliorate erosion and sedimentation (sourced from deccew.gov.au).

Despite the current and historic impacts, the Murrumbidgee has sections of habitat in good condition and has populations of threatened and recreationally important native fish. Through the ACT it is managed as the Murrumbidgee River Corridor Nature Reserve. The Upper Murrumbidgee Demonstration Reach (UMDR), extending from Tantangara to Burrinjuck was established in 2009 and undertakes river and riparian rehabilitation projects with the community, NGOs and Government.

The Office of Nature Conservation (ONC) of City and Environment Directorate undertake monitoring of the fish populations in the Murrumbidgee every two years. The Murrumbidgee Fisheries Survey assists in managing the threatened and recreational fish species in the Murrumbidgee in the ACT Region. Icon Water assist by funding the survey of sites upstream of the ACT as part of their monitoring commitment to the M2G and the results are shared with our partners in the Upper Murrumbidgee Demonstration Reach (UMDR).

This study aims to:

- assess the fish community of the Murrumbidgee River including pest, recreational and threatened species;
- inform recreational fishing and conservation management actions;
- provide fish community monitoring for the UMDR and M2G;
- establish baseline data for monitoring the future urban development near the Murrumbidgee River.

Methods

Between February and March 2025 ten sites along the river, from Bredbo in NSW to the northern ACT border at Ginninderry, were surveyed using boat electrofishing (Figure *1*~~Figure 1~~). In 2025 ONC staff were assisted by staff from ACT Parks and Conservation Service, Icon Water, ACT Office of Water, Murray Darling Basin Authority, Australian River Restoration Centre and Ginninderry Conservation Trust in the survey.

Seven sites were within the ACT with six downstream of the M2G offtake at Angle Crossing. There were three sites in NSW upstream of the ACT, to the Bush Heritage property, Scottsdale, near Bredbo. The sites include popular recreational areas such as Casuarina Sands and Kambah Pool. More isolated locations such as Retallacks Hole near Gininderry and Prutties along Smiths Road are also surveyed.

Two different Smith Root electrofishing boats were used depending upon access to the site. A smaller 2.5kw single boom boat was used at sites with difficult access and a 5kw twin boomed boat was used at easier access sites. At each site, 12 transects or shots were sampled along the bank, with each shot was approximately two minutes of active electrofishing. Habitat is sampled in relative proportion to its presence. A GPS app was used to track and mark the location of each shot.

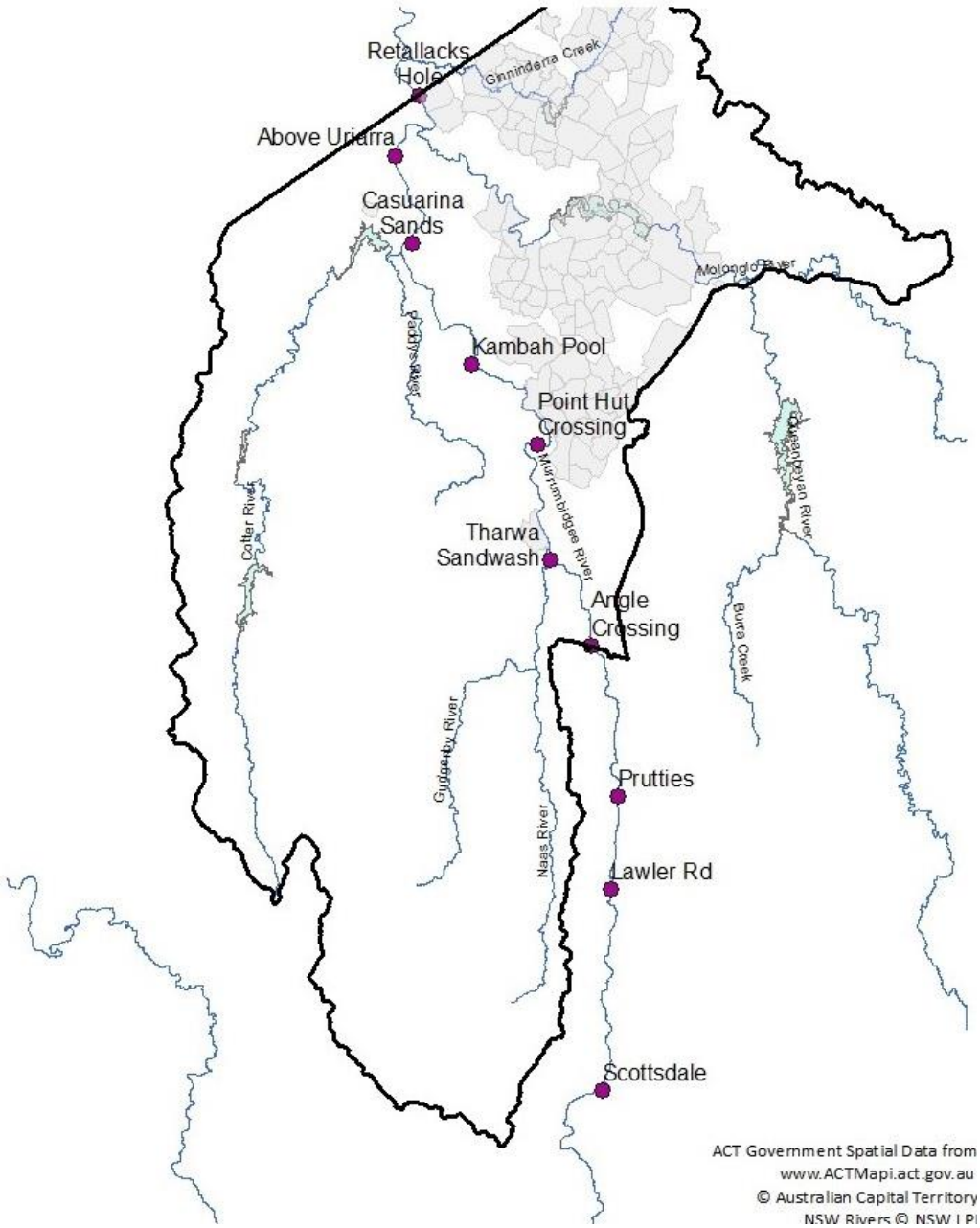

Figure 1. Location of survey sites for the 2025 Murrumbidgee River fishery survey.

Fish caught were identified to species, length measured and released. Cod suspected of being Murray Cod/Trout Cod hybrids have been included as Murray Cod for the analysis. Weight for individual fish was calculated from length using the MDBAs Sustainable River Audit length weight relationship for each species. For large bodied native fish (over 160mm) internal PIT tags were implanted. Genetic samples were taken from most cod and Golden Perch to be submitted to the FishGen genetic parentage program. This program helps to identify parentage which identifies the impact of stocking activities, assist with identification of hybrids, develops further understanding the breeding dynamics and dispersal of these species in the region. A small number of Golden Perch and Murray Cod, usually two to five over the entire survey, were retained to maintain an otolith collection.

Results and Discussion

In this study, 362 fish from five species were captured (Table 1). Four native species were caught and one pest species. Carp dominated most sites with 245 captured in total. However, at both Scottsdale and Prutties sites Carp were outnumbered by Murray Cod (Figure 3).

	Carp	Golden Perch	Macquarie Perch	Murray Cod	Australian Smelt
Number	245	20	3	91	3
Max Length (mm)	690	490	195	1040	41
Average length (mm)	351.66	406.85	186.66	319.77	39

Table 1. Fish caught in the 2025 Murrumbidgee Fish survey

Three threatened Macquarie Perch were also caught, two inside the ACT, and one in NSW at Scottsdale. Of the two in the ACT, one was captured at Casuarina Sands and is suspected as being a fish from the nearby Cotter Dam population, washed over the dam wall in high flow. The other was captured at Tharwa Sandwash and is the first Macquarie Perch caught at this site in 25 years (Figure 2 and 3). If this species becomes more common in the general survey, then dedicated surveys (such as using fyke nets) could be developed to determine breeding and recruitment, bring more information about the trajectory of this population and potentially point to preferred management actions.

Figure 2. Macquarie Perch caught at Tharwa Sandwash as part of the 2025 Murrumbidgee Fisheries Survey.

A total of 91 Murray Cod were captured across all sites, with 20 Golden Perch being caught over three of the six sites within their range (Table 1 and Figure 3). No Trout Cod were detected in this survey, though as previously mentioned, potential Murray Cod/Trout Cod hybrids were collected and are included as Murray Cod for this analysis. Golden Perch were recorded at three of the four sites downstream of Point Hut Crossing (Figure 3). A small native schooling species, Australian Smelt, was caught at two sites (Figure 3). Large numbers were observed of this species at these two sites. However, electrofishing isn't a particularly efficient method of surveying this species and they can often be injured during netting and handling, so they are not specifically targeted (ACT Gov unpublished data).

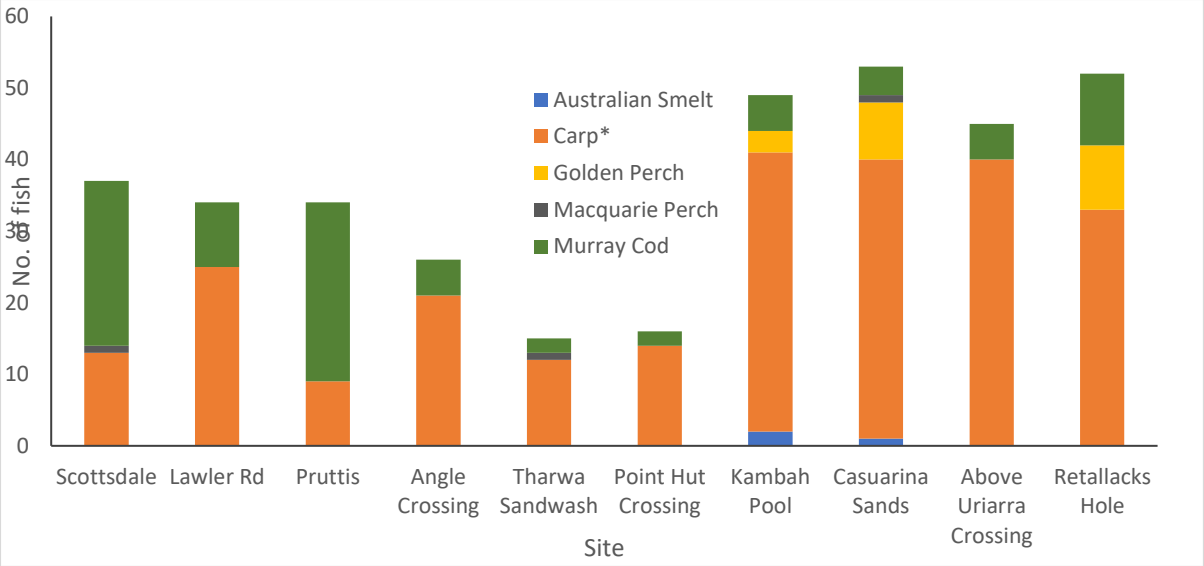

Figure 3. Stacked bar chart of catch per site from the 2025 Murrumbidgee River Survey. * indicates alien species.

A strong group or cohort of young of year (YOY) Murray Cod, being 50-100 mm in length, is evident in the length frequency (Figure 4~~Figure 3~~). These fish were spawned at the end of Spring 2024. Comparable to previous years, this cohort is primarily from the upstream sites with only one individual being detected in the four sites downstream of Point Hut. This represented more than 35% of the Murray Cod caught at these sites. Since 2017 the survey has detected 144 Murray Cod YOY, under 150 mm in length and of these 137 (95%) have come from Point Hut or above (Table 2). Research is required on the breeding dynamics and flow linkages that may be driving these patterns.

Length	**Scott-sdale**	**Lawler Rd**	**Pruttis**	**Angle Cross.**	**Tharwa Sand.**	**Point Hut**	Kambah Pool	Cas. sands	Above Uriarra	Retall-acks
0-100mm	6.6	1.6	3.6	4.4	3.8	2.8	0.8	0.4	0.2	0
100-200mm	3.2	0.4	2.2	0.6	2.2	0	0.4	0	0.2	0
200-400mm	3.6	1	2	1.6	1.6	0.4	1.6	1.4	0.4	0.4
400-600mm	0.6	0.2	0.8	0.4	0.6	0.6	3	1.6	1.2	3.4
600+mm	1.6	0.6	0	1.4	1	0.8	1.2	0.6	0.6	1.2

Table 2. Heat map of average number of Murray Cod/year for different size classes: Murrumbidgee River Fisheries Survey, 2017-2025. Sites labelled in bold fish are sampled upstream of Point Hut Crossing.

A catch and release survey was undertaken at Casuarina Sands in 2025 using the same boat based electrofishing method as this survey. YOY Murray Cod were recorded in that survey but comprised only 14% of the overall Murray Cod captured. This could indicate that YOY density is lower in the downstream areas and that higher densities are required to reliably detect Murray Cod juveniles using the single pass boat-based electrofishing method. Additional research of the breeding dynamics, habitat and external impacts is required for a better understanding of the cause and effects of the disparate spatial recruitment in the Murray Cod population.

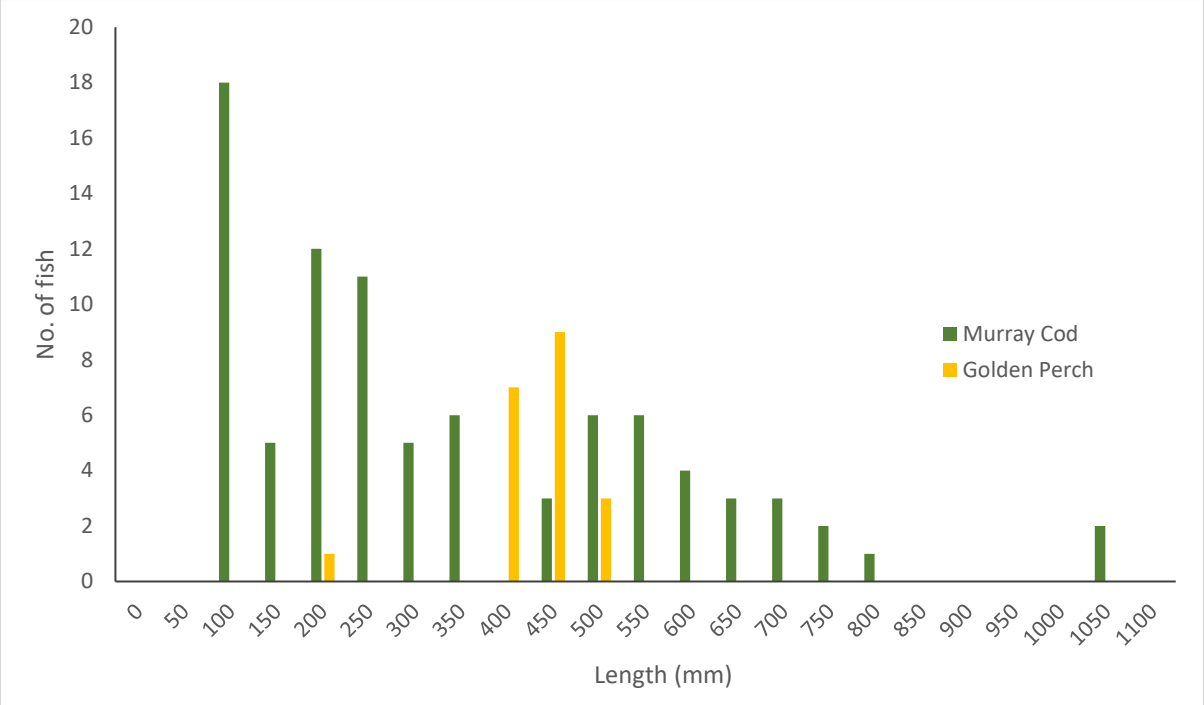

Figure 4. Length frequency of Murray Cod and Golden Perch 2025.

The length graph for Murray Cod indicates that there has also been good recruitment from fish spawned in 2023 with a strong 200-250 mm cohort (Figure 4). Through the last few surveys there has been the strong cohort of fish that was 300 - 500 mm in 2021 and 500-600 mm in 2023. This cohort has diverged somewhat but is probably represented in the 600 to 800 mm class. They are starting to grow out of the recreational take restriction of 550 -750 mm and into the protected large adult size class (Figure 5). While legal recreational take is suspected as being relatively low in the ACT (Schirmer and Mylek 2016), illegal take and excessive recreational take are still a risk to the population. Mortality from catch and release fishing is also a potential risk. Studies in the Murray Darling Basin have shown mortality from catch and release can vary from 2-15% and can be greatly improved by good fish handling and techniques used by anglers (Hall et. al. 2012). Education of anglers on best practice catch and release is important to ensure a minimal impact from this growing section of the recreational fishing public. It is hoped that as these fish grow through the take limit they will contribute to the breeding population in coming years.

Figure 5. Murray Darling Basin Staff with large Murray Cod caught in the 2025 Murrumbidgee Fishery Survey.

The length graph also shows the population of Golden Perch (Figure 4). The majority of these are in the 400-500 mm range and represent large adult fish. One smaller adult or sub adult just over 200 mm was recorded. The larger sized cohort may represent the group of fish that were 250-300 mm in the 2023 survey as Golden Perch grow very quickly when younger but can slow as they approach maximum size (Wright et. al. 2020). Golden Perch in this survey were recorded from three of the four sites below Point Hut Crossing (Kambah Pool, Casuarina Sands and Retallacks Hole). The low flow experienced in 2024/2025 may have reduced the distribution of this species, who need higher flow to enhance connectivity (Carpenter-Bundhoo et. al. 2023, Zampatti et. al. 2019). Golden Perch are occasionally recorded at Point Hut and Tharwa Sandwash but are potentially restricted by the barrier created by Point Hut Crossing. Additional research (see genetics below) and improvements to connectivity are areas which could be enhanced for the Golden Perch population.

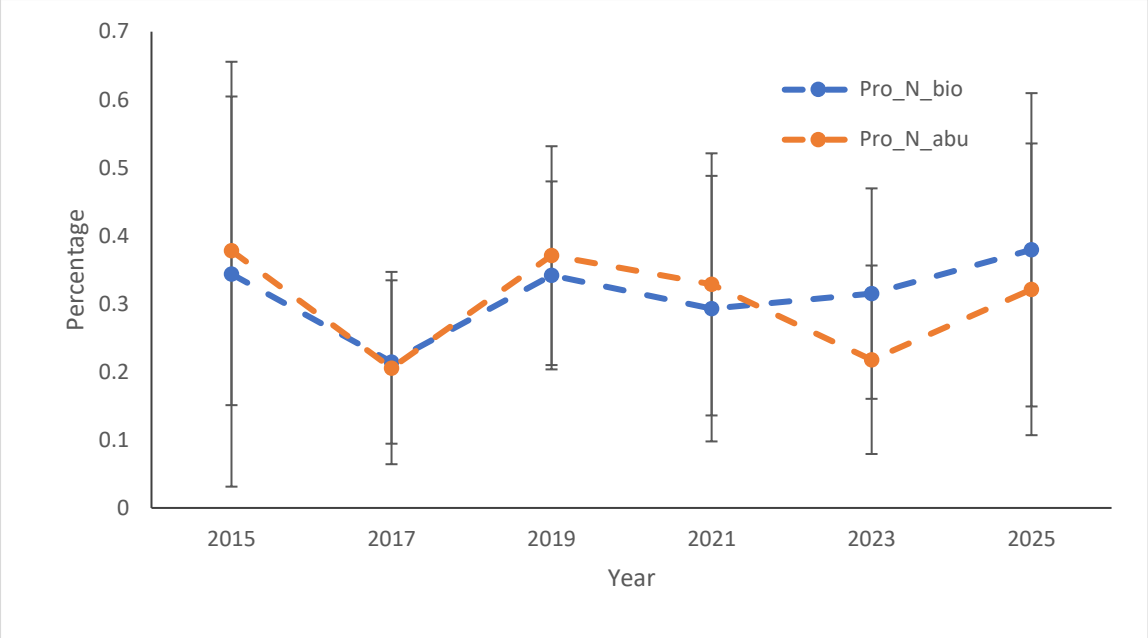

Figure 6. Proportion of native biomass (Pro_N_bio) and native abundance (Pro_N_abu) in the Murrumbidgee Fishery Survey 2015-2025

In comparison to the previous years, the proportion of native abundance has recovered since 2023 with the strong juvenile cohorts of Murray Cod in this year's survey (Figure 6). The proportion of native biomass has also increased with both the juvenile cohort and the strong older cohort of Murray Cod as it grows up through the size classes. As a cohort ages, while individuals gain in mass, it is normal for abundance to decline through migration or mortalities (Kohen and Todd 2009). This needs to be supported with good recruitment from spawning or migration for long term sustainability, as has been seen in this year's data for Murray Cod but not for Golden Perch.

A number of additional measures have been put in place recently in the ACT, with the support of anglers, to improve the sustainability of the Murrumbidgee fish populations. Enforcement and education of the fisheries regulations is important for these management actions to have the desired effect of improving the sustainability of native fish populations in the Murrumbidgee. They include:

- Prohibition on all Murray Cod take in the river downstream of Uriarra Crossing.
- Decrease in the bag limit for Golden Perch (5 fish/day to 2) and Murray Cod (2 fish/day to 1).
- Recruitment of a Fisheries Conservation Officer (currently temporary until mid 2025) to undertake enforcement and educational activities; and
- Installation of fisheries signage along the Murrumbidgee River.

Previous Fishgen genetic analysis

In 2024, results were obtained from the Fishgen genetic analysis program from samples taken during the Murrumbidgee River Monitoring program in 2023 and 2021 (as well as other monitoring over that period such as monitoring of the engineered log jams and Gigerline Gorge). While this program needs additional samples and analysis, there were several interesting results. Approximately 7% of the cod captured in the Murrumbidgee were Murray Cod /Trout Cod hybrids and no pure Trout Cod were detected. The hybrids covered most size classes and were widespread through the system. Hybridisation between these two species is known in areas where Trout Cod have been reintroduced. A viable Trout Cod population was not successfully established following the stocking

program in the upper Murrumbidgee River that ceased in 2007. Despite this, hybrids are still occurring and appear to be fertile as back crossing hybrids with Murray Cod has also been detected (Couch et. al. 2016). Additional discussion is needed to determine future actions in the management and reestablishment of Trout Cod in the ACT region.

Approximately 30% of the Golden Perch submitted to Fishgen from the Upper Murrumbidgee were directly from stocking. Predominantly these fish were stocked by NSW Department of Primary Industries and Regional Development into Burrinjuck Dam and must have migrated upstream to the ACT. This indicates the Golden Perch population is dependent upon direct supplementation and reliant on good connectivity to disperse into the ACT. It is not known if these fish breed in the ACT or move in an out of the ACT over time. Additional research is required about their breeding dynamics as well as the influence of flows and barriers in the movement and distribution of this species.

No stock spillover or those related to them were detected from Murray Cod or Golden Perch that were stocked the into Canberra's urban lakes. These lakes are stocked under the ACT Government's Stocking Plan to balance the lakes ecosystem and provide a recreational fishing resource. It should be noted that very few samples were submitted from sites downstream of the Molonglo River confluence and no sites are located in downstream NSW below the Ginninderra Creek confluence where influx from the lakes stocking could be assumed to be strongest.

A large number of sibling relationships were recorded within Murray Cod. Approximately 100 of the 180 Murray Cod sampled had relationships with at least one other individual at the full sibling level or higher. The siblings are widespread both spatially and temporally. For example, one individual fish from Angle Crossing had full siblings stretching from Lawler Road upstream in NSW, downstream to Kambah Pool in the ACT and covering size classes from 66 mm to 850 mm. It is known that adult Murray Cod are consistently breeding with the same partners in the Murrumbidgee River which would result in full siblings over multiple years (Couch et. al. 2020). There is also potential that the population is at risk from inbreeding with high levels of kinship relationships being observed from breeding of related individuals. Additional analysis is required to investigate the temporal and spatial relationships, hydrological drivers and inbreeding risk uncovered by this data. It is hoped that the samples take in this year's survey will be able to be analysed by the fish gen program in the near future.

Conclusion

This survey has confirmed that two large bodied native fish species, Murray Cod and Golden Perch were reasonably widespread and stable or increasing in the surveyed reach. However genetic investigations have discovered that the Golden Perch population is strongly linked to stocking activities in NSW and connectivity with the ACT.

The threatened Macquarie Perch was detected over a number of sites this year, including sites where they have not been detected for more than 20 years. Additional surveys for this species are not yet recommended but could be implemented if catches continue to improve and additional knowledge is required for enhancing management and recovery.

There are indications that the populations of Murray Cod are increasing, with good annual juvenile production and survival of cohorts into adulthood. However, while Murray Cod production was detected with strong cohorts from the last two years, it was again almost entirely restricted to the sites upstream of Canberra. Additional work did indicate that lower densities of YOY Murray Cod may be present in the downstream sites but are not regularly detected by the boat electrofishing

and that there is wide spatial spread of siblings within the reach. Investigation is required to understand the implication of the difference in spatial density being observed in Murray Cod juveniles.

The upper Murrumbidgee River is under still under multiple threat from urbanisation, water quality impacts, pest and weed species, climate change, extraction and barriers. It is hoped that the recent funding in NSW and ACT for Murrumbidgee River Restoration and ongoing actions including the recent presence of a Fisheries Conservation Officer will improve the sustainability of the native fish populations and restoration of threatened species.

Areas of investigation and management that are recommended include:

- Determining the spawning dynamics, connectivity requirements and natal origins of the native species Murray Cod and Golden Perch.
- Supporting the regional recovery of threatened species.
- Determining the functional flow and habitat requirements for key species
- Mapping key important habitats, impacts and refuges.
- Understanding, minimising and offsetting the impact of near river urbanisation.
- Maximising the sustainability of recreational fishing by updating and enforcement of the fisheries regulations.
- Supporting the fisheries through educating and enforcement by the Fisheries Conservation Officer.

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