2019 MURRAY CODFERENCE

CONFERENCE PROCEEDINGS

Sunday 8th December, Eastbank Conference Centre, Shepparton

We're hooked on SAFETY

Target One Million
More Victorians fishing, more often

Victorian Fisheries Authority

VICTORIA State Government

Partners

Editors

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Presenters and chapter contributors: Travis Dowling, Uncle Cole Walker, Rob Paxevanos, Anthony Forster, Nick Bond, Brett Ingram, Jarod Lyon, Danny Simpson, John Douglas, John Cahil, Graeme Dear and Taylor Hunt.

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Aboriginal acknowledgement

The Victorian Government proudly acknowledges Victoria's Aboriginal community and their rich culture and pays respect to their Elders past, present and emerging.

We acknowledge Aboriginal people as Australia's first peoples, and as the Traditional Owners and custodians of the land on which we work and live.

We recognise the strength of Aboriginal people and communities and value the ongoing contribution of Aboriginal people and communities to Victorian life, through their daily work and at key events, and how this enriches us all.

We recognise all Aboriginal cultures and communities are diverse, and should be celebrated.

We acknowledge that the land and water is of spiritual, cultural and economic importance to Aboriginal people. We embrace the spirit of reconciliation: guaranteeing equality of outcomes and ensuring an equal voice.

We have distinct legislative obligations to Traditional Land Owner groups that are paramount in our responsibilities in managing Victoria's resources.

Ray Ahmat (Yorta Yorta Water Policy Officer) and Neil Morris of the Yorta Yorta Nations 'Woka-Walla Natural Resource Management Program' participating in the FRDC funded 'scientific Murray Cod fishery management project'

Foreword

What a wonderful time it is for Victorian recreational fishing, especially for our native fisheries! And with our Target One Million program, your fishing will only get better and better. We are giving you more year-round opportunities to catch more cod than ever before.

We are in a golden time of native fishing in all our waters. Lake Eildon is always on song to satisfy your hunger for big cod, and our rivers such as Goulburn, Ovens, Campaspe and Loddon are giving us plenty of options too. Our staple fisheries at Cairn Curran and Eppalock continue to be exciting fisheries for all and give it a few seasons, Rocklands Reservoir will rival Lake Eildon.

Let's also not forget our other beloved native species, silver and golden perch, offering such great fishing especially for the kids. We are also devoted to our threatened brethren's, Macquarie perch, trout cod and river blackfish. These guys need our help and we will ensure they receive the help they desperately need.

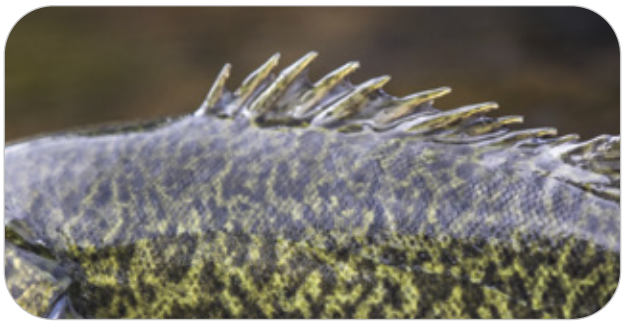
Our commitment to increasing fish stockings, providing new on-water access arrangements and expansion of native fisheries into urban waters and reservoirs, will ensure Victoria is regarded as THE primary destination for targeting native fish in Australia. We are also excited to continue our work into building a new northern native fish hatchery, opening access to new fishing spots, improving river health, building partnerships as well as developing a highly unique fishing app, GoFishVic, to help further improve your fishing experience.

CODferences put the spotlight on our favourite native fish as well as a deeper understanding of our cod fisheries. As a special treat this year, we are combining CODference 2019 with a VicFish Kids event to provide you with a wonderful family weekend to celebrate all things native fish, not just Murray cod.

I am proud of our staff in helping to deliver all these fantastic fishing options, and you all for getting out there and enjoying these amazing fishing opportunities.

In signing off, I want to personally welcome all recreational fishers to CODference 2019 and wish you all the best of luck out chasing your dream catch around our magnificent fishing state.

Travis Dowling
CEO - Victorian Fisheries Authority (VFA)



CARE FOR COD

Photography: Josh Hutchins

Conference program

9.00 to 9.30 am	Registration & coffee	
9.30 to 9.40 am	Conference launch	Travis Dowling, VFA
9.40 to 9.50 am	Welcome to country	Yorta Yorta traditional owners
9.50 to 10.30 am	**KEYNOTE:** Murray cod - The best fishing destinations, tactics and stories the video premiere - Total Native 2	Rob Paxevanos
10.30 to 11.00 am	Morning tea / coffee	
SESSION 1: Managing native fish (Chair - Chris Rose, VFA)		
11.00 to 11.15 am	Native fisheries management highlights 2019	Anthony Forster, VFA
11.15 to 11.40 am	Lower Darling River fish loss: An independent review	Nick Bond, Latrobe Uni
11.40 to 12.00 pm	Native fish report cards 2019	Brett Ingram, VFA
12.00 to 12.15 pm	Evidence driven management is crucial	Jarod Lyon, ARI
12.15 to 12.30 pm	Northern native hatchery update	Danny Simpson, VFA
12.30 to 12.45 pm	Changing channels - Native fish salvage and relocation	John Douglas, VFA
12.45 to 1.30 pm	Lunch (Foyer displays)	
SESSION 2: Better fishing (Chair - Karen Rees, WIRF)		
1.30 to 1.45 pm	New age bait for BIG cod	John Cahill
1.45 to 2.00 pm	Fishing for Gippsland Australian Bass	Graeme Dear, VFA
2.00 to 2.15 pm	GoFishVic App - Better Data, Better Fishing	Taylor Hunt, VFA
SESSION 3: Open session (Chair - Travis Dowling, VFA)		
2.15 to 2.45 pm	Questions & answers - what's on your mind	All
2.45 to 3.00 pm	Codference reflections	Graeme Dear, VFA
3.00 to 3.15 pm	Wrap up & acknowledgements	Travis Dowling, VFA
3.15 pm	Conference ends	
3.15 to 3.45 pm	Afternoon Tea	

Murray cod - The best fishing destinations, tactics and stories the video premiere - Total Native 2

Rob Paxevanos

Fishing Australia TV

Rob Paxevanos is an Australian fishing icon and the host of the ever-popular Fishing Australia TV program, our countries longest running national series on angling.

His first memory of childhood is catching a redfin in Lake Eppalock with his grandad over 50 years ago. He can still picture, hear and sense the excitement of that bite on a handline followed by the cheering of the grownups as he pulled out of the deep a live flapping fish.

His love of fishing stems from his fishing crazy dad who took Rob and his brothers fishing every weekend and school holiday since Rob can remember...often missing footy and cricket commitments that impressed his coaches no end.

Via his dad and his media career, Rob has travelled around Australia full time for some 35 years… and if you ask him what fishing he loves most - it's a clear-cut answer - the mighty Murray Cod!

Rob got the bug for big cod back in the mid 90's when they were still a giant mystical creature that you would hear the old timers talk about… his obsession led him into becoming a full time native fish guide…he got the gig for the Fishing Australia TV program when he produced Murray cod and golden perch with only 30 min of camera time during a screen test in 1997.

Just a few years later, an episode on giant 1.1m cod on fly rocked the TV world when it out rated the AFL finals…from here it was clear it wasn't just him that loved these beautiful fascinating fish.

This year Rob embarked on his biggest media project to date…Total Native 2…the country's biggest ever native fish film showcasing 12 destinations across QLD, NSW and Victoria including Lake Eildon.

Working with cinematographer Andrew Barnes and dozens of our countries best anglers they created a cinematic journey that is already a hit and is gobsmacking people with the joy and experience that only native fish can bring - Total Native 2 includes the biggest Murray Cod ever captured on film.

Rob's presentation at this year's Codference will yield some incredible vision, insights and stories on our iconic native fish and is a talk not to be missed.

Native fisheries management highlights 2019

Anthony Forster

Manager Inland Fisheries, Victorian Fisheries Authority

Let me start by saying, it's been a big year for developing Victoria's native fisheries! At the risk of stealing some thunder from other Codference speakers, here's a taste of what we've been up to in 2019.

Establishing a new native fish hatchery, near Shepparton

Twelve months ago, the Andrew's Government announced a Target One Million plan to build a native fish hatchery near Shepparton. This plan was inspired by the Freshwater Fisheries Management Plan (2018 -2028) which described Snobs Creek hatchery as being at "full capacity" and, highlighted the uncertainty and risks in relying on future supply of native fish fingerlings from private sector hatcheries. The VFA have been busy ever since implementing this policy, with our initial focus on finding the right site for the hatchery.

At I write this update, I can tell you, we have found a preferred site after an exhaustive search that included, assessment of 21 sites against more than 24 site selection criteria. By the time the Codference Proceedings are published, I'm confident we will have acquired our preferred site which is a critical milestone for the project. At this year's Codference, we will give a detailed presentation about our hatchery plans including the site and our concept designs.

Native Fish report cards

The Freshwater Fisheries Management Plan supports the systematic collection of native fish population data to monitor the performance of our key native fisheries. To ensure this information is well communicated, fish population data is been turned into Native Fish Report cards and, is also available through a web portal site.

The Native Fish Report Card Program covers 10 important recreational and threatened non-recreational native freshwater fish from 10 priority streams in Victoria in which they commonly occur. This initiative is a partnership between the Department of Environment, Land, Water and Planning (DELWP) and the Victorian Fisheries Authority (VFA) and Recreational Fishing License Holders (through Recreational Fishing License Trust Recreational Fishing Grants Program).

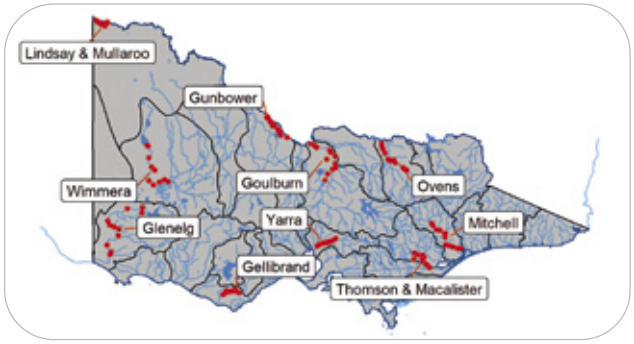


Figure 1. Location of streams surveyed in 2019 for the Native Fish Report Card Program.

The latest data shows; overall species abundance was highest for Australian bass in the Mitchell River (7 fish/100 m) followed by Murray cod in the Ovens River (5 fish/100 m), and lowest was for freshwater catfish (0.02 fish/100 m) and then silver perch (0.07 fish/100 m) both from the Wimmera River. Brett will provide a full account of this data over the last 3 years.

Importantly, we are seeing strong signs of survival and growth of Bass stocked in Gippsland and encouraging signs of stocked Macquarie perch surviving, growing and moving along the Ovens river.

Lake Eildon Murray cod monitoring

In May of this year, our researchers revisited Lake Eildon and spend a week monitoring changes in the Murray cod population in this exciting and developing native fishery. More than 380 Murray cod were caught and released with the biggest fish measuring 127 cm long and weighing more than 32kg. This monitoring showed since 2014, Lake Eildon Murray cod abundance has increased by more than 80% and the average fish size has increased by around 18%. A total of 125 of these fish were also tagged and released to encourage anglers to report catches which will tell us, there grown and movement over time. Lake Eildon continues to improve and has a growing national reputation as a high-quality trophy fishery. Increasingly we are seeing interstate anglers making the pilgrimage to chase the mighty Eildon cod.

Expanding estuary perch stocking

Our estuary perch breeding and stocking program is going from strength to strength. Over the last 7 years, the VFA have stocked almost 1 million estuary perch in 16 waters. Our estuary perch are performing very well in most waters. We are seeing, for example, stocked estuary perch of up to 45cm in our more productive waters.

This year we stocked two new waters with estuary perch; Maribyrnong River (133,000) and the Barwon river, near Geelong (75,000). Unlike most other waters stocked, these waters hold remnant populations of estuary perch and, by stocking these waters, we are looking to rebuild perch populations, so they ultimately become self-sustaining. Stockings perch into the Maribyrnong Rivers is part of the Maribyrnong River Native Fish Revival project which includes; installation of fish habitat through the upper estuarine reaches, fish habitat mapping, fish population surveys and an historical study of fishing and fish habitat in the river.

Channel harvesting of native fish

Native fish can become trapped in irrigation channels where conditions, at time, are not favourable for them. At the end of each irrigation season many of these channels are lowered or drained for maintenance purposes. Some of these channels are drawdown for weed control, siphon clearing, bank stabilisation or regulator upkeep works. At these times native fish can become stranded and are at risk.

In May of 2019, in partnership with Goulburn Murray Water (GMW), the Victorian Fisheries Authority (VFA) contracted Austral Research and Consulting to catch and relocate native fish from several northern irrigation channels. Over a two-week period around

300 Murray cod and golden perch were electro-fished and relocated into 6 waters, including the Broken Creek at Nathalia, the Goulburn River at Shepparton, Lake Victoria, (Shepparton), Benalla lake (Benalla), Ferntree Gully Quarry (Ferntree Gully) and Casey Fields (Cranbourne East).

With GMW managing over 5,900 km of channels in the Shepparton district alone, the scale of this harvest and relocation opportunity is significant. This project is funded by the Recreational Fishing Licence Grants Program and will continue for next year.

Darling River cod rescue

Murray cod fishers from far and wide are saddened by the death of large Murray cod in the drying water of the Darling River in NSW and, so are we. That's why in October this year, a Victorian team lead by VFA recently ventured north over the border to help NSW DPI Fisheries catch and relocate native fish from drying pools in the Darling River near Pooncarie. During our week there, more than 300 native fish including big Murray

cod to 1.2m (~30kg), golden perch and silver perch were rescued and transported downstream to more secure water closer to Wentworth.

The Victorian crew, which included electro-fishing experts from the Department of Environment, Land, Water and Planning's Arthur Rylah Institute, also brought back to Victoria 22 Murray cod that will contribute to our future broodfish population at the new Shepparton hatchery. Given the hatchery is still in the planning stages, those future broodfish were released into private ponds near Euroa and other ponds back t o Snobs Creek for safe-keeping.

Finally

While we are making great strides in recovering native fish through stocking, river health restoration and improved river connectivity, however there's a lot more to do. The new hatchery will create opportunities to free up capacity at Snobs Creek to re-focus and expand breeding and stocking of trout cod and Macquarie perch. This can only be achieved through investment partnerships and, by integrating breeding, stocking, river health restoration and following up monitoring and evaluation. This is our next big challenge and opportunity.

Lower Darling River Fish Loss: An independent review

Professor Nick Bond, et al.

Centre for Freshwater Ecosystems, La Trobe University, Wodonga

Over the 2018-19 summer there were three significant fish death events in the lower Darling River near Menindee, New South Wales. Species involved included Murray Cod, Silver Perch, Golden Perch and Bony Herring, with deaths estimated to be in the range of hundreds of thousands to over a million fish. These events were a serious ecological shock to the lower Darling region and attracted significant national and international attention.

The Independent Panel Assessment examined i) the water management arrangements and conditions leading up to the events to identify likely causes, ii) the effectiveness of fish management responses to the fish deaths, and, iii) provided recommendations to help minimise the risk of future fish deaths, and to promote long-term native fish recovery.

Ongoing dry conditions mean the risk of further fish deaths remain high for the coming summer. This presentation will provide a summary of the Independent Panel findings and a brief overview of fish management responses that are currently underway.

Native fish report cards 2019

Brett A. Ingram - Victorian Fisheries Authority
Jason Lieschke - Arthur Rylah Institute (DELWP)
Fiona Warry - Water and Catchments (DELWP)

Aim

Produce health report cards for each of Victorian streams monitored for native fish to give fishers and managers a better understanding of the past and current health of our native fish streams.

Native Fish Report Card Program and portal

The native report cards provide a quick and concise means of presenting complex and detailed fish population data in a simplified format for readers to digest. These report cards are being used by the Victorian Fisheries Authority (VFA) to engage and inform anglers about the status and health of important recreational species in the state now and into the future.

The Native Fish Report Card Program (NFRCP) is the first time that scientific fish population surveys have been used to produce report cards on 10 important recreational and threatened non-recreational native freshwater fish from 10 priority streams in Victoria in which they commonly occur (Figure 1, Table 1). These priority rivers were selected in collaboration with catchment management authorities (CMAs), scientists and expert recreational fishers, and are identified as reference for monitoring and assessment in the Victorian Freshwater Fisheries Management Plan (Victorian Fisheries Authority 2018).

The NFRCP is a partnership between the Department of Environment, Land, Water and Planning (DELWP) and the Victorian Fisheries Authority (VFA) and Recreational Fishing License Holders (through Recreational Fishing License Trust Recreational Fishing Grants Program).

Results from scientific fish surveys are summarised into a Health card for each species and river and key health indicators assessed, which is published electronically on the Native fish report card portal (https://www.nativefishreportcard.org.au/) (Figure 2).

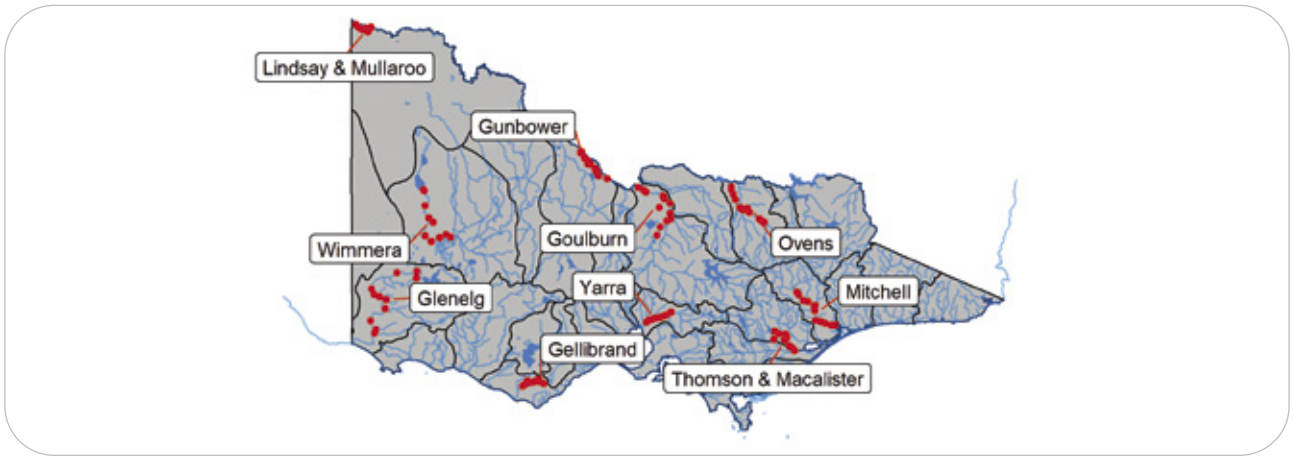


Figure 1. Location of streams surveyed in 2019 for the Native Fish Report Card Program.

Figure 2. The Native fish Report Card portal (https://www.nativefishreportcard.org.au/).

Priority river	Region	Recreational species	Threatened non-recreational species
Gellibrand River	Corangamite CMA	River blackfish	Australian grayling
Glenelg River	Glenelg Hopkins CMA	Estuary perch	
Lower Goulburn River	Goulburn Broken CMA	Golden perch Murray cod	Silver perch Trout cod
Gunbower Creek	North Central CMA	Golden perch Murray cod	Silver perch Trout cod
Linday River & Mullaroo Creek	Mallee CMA	Golden perch Murray cod	Silver perch
Mitchell River	East Gippsland CMA	Australian bass	Australian grayling
Ovens River	North East CMA	Golden perch Murray cod	Macquarie perch Trout cod
Thomson & Macalister rivers	West Gippsland CMA	Australian bass	Australian grayling
Wimmera River	Wimmera CMA	Freshwater catfish Golden perch	
Yarra River	Melbourne Water	Macquarie perch Murray cod	Australian grayling

Table 1. Priority rivers and species survey as part of the Native Fish Report Card Program.

Methods

Data collection (also known as sampling) for the NFRCP commenced in 2017 and is conducted once a year. Sampling is done in autumn to avoid the spring periods of peak migration when some native fish undertake long distance movements into or out of rivers.

Fish are sampled from multiple sites in each priority river, predominantly using electrofishing. Smaller streams are surveyed with a backpack electrofisher for approximately 90 minutes, while larger streams are surveyed with an electrofishing boat for about 60 minutes. A combination of both boat and backpack electrofishers are used in some streams, depending on site conditions. Fyke netting is also used in two rivers where target species that live on the bottom of the river are difficult to catch using electrofishing. These are river blackfish (Gellibrand River) and freshwater catfish (Wimmera River).

Electrofishing and fyke netting are scientific sampling methods used to provide a snapshot of the presence and abundance of fish present in waterways at the time of sampling. However, no method is perfect and able to catch all the fish present in a waterway. Therefore, the numbers of fish presented in the Native Fish Report Cards should be considered a sample only. There are likely to be many more fish in the waterways than just those recorded. Fish may also move about and populations will fluctuate due to natural variations in the environment.

Eight to 14 sites are surveyed in each stream, and 90 – 3,000 m of stream was surveyed at each site. The length of fish caught were measured and their abundance (number of fish caught per length of stream) is estimated.

Report cards presented in this report

For this report, summarised scientific survey data for eight native fish species, which combine results for one to four rivers for each species, is presented in a report card format (Table 2).

In these report cards, information from electrofishing surveys conducted for the NFRCP (2017 - 2019) was used to estimate fish abundance (fish per 100 m). This information was combined with historic electrofishing surveys to assess long term trends. These included.

- VFA fish surveys records (Snobs Creek Survey Database - 1989-2011). Goulburn River (1996-2011), Gunbower Creek (1993-2007), Lindsay and Mullaroo (1994-1998), Mitchell River (1990-2001), Ovens River (1992-2011), Thomson and Macalister (1989-1999) and Wimmera river (1994-1999)
- The Living Murray Program (Murray-Darling Basin Authority) (https://www.mdba.gov.au/publications/brochure/living-murray-program). Gunbower Creek (2008-2017)
- The project, Integrating fisher-derived and fishery-independent survey data to better understand and manage the Murray Cod fishery in the Murray-Darling Basin (FRDC Project 2013/022) (Ingram and Raymond 2018). Goulburn and Ovens rivers (2015-2017)
- Monitoring fish stockings in Victoria: 2014 native fish surveys (Ingram et al. 2015). Goulburn River and Gunbower Creek (2014)
- Yarra River surveys conducted by DELWP on behalf of Melbourne Water (Tonkin et al. 2017). Yarra River (2007-2015)
- Victorian Environmental Flows Monitoring and Assessment Program (VEFMAP) (DELWP

2017a, DELWP 2017b). Glenelg River (2009-2018), Goulburn River (2004-2019), Thomson and Macalaster (2005-2016)), Wimmera River (2005- 2016), Yarra River (2007-2012)

- Mitchell River SRA/SB data supplied by DELWP. Mitchell River (2009).

In addition, angler catch rate information from the Angler Fishing Diary Program (AFDP) is presented for estuary perch in the Glenelg River. The AFDP, which commenced in 1997, is the principal means of monitoring recreational fisheries in Victorian estuaries for assessment purposes (Conron et al. 2010, Conron and Oliveiro 2016). The AFDP provides time-series data on catch rates, catch length-frequency, and catch age-frequency composition for key target species in selected Victorian recreational fisheries, including estuary perch in the Glenelg River which was last assessed in 2016 (Ingram et al. 2016).

Species	Mitchell	Thomson & Macalister	Glenelg	Ovens	Goulburn	Gunbower	Lindsay & Mullaroo	Wimmera	Yarra
Australian bass	■	■							
Estuary perch			■						
Macquarie perch				■					■
Trout cod				■	■				
Murray cod				■	■	■	■		
Golden perch					■	■	■	■	
Freshwater catfish								■	
Silver perch								■	

Table 2. Species and rivers assessed for each species that are presented in a report card format in this report.

How to read the Native fish report cards

Each report card presented in this report is broken into several sections as follows.

Overall rating

Overall rating of the health of the species in the selected rivers assessed as part of the report card, which is a synthesis of the fish population performance measures (health indicators). The Overall ratings are:.

Overall Rating 2019	Low	Moderate	Good	Very Good	Excellent

Fish population performance measures (health indicators).

This section provides an easy to read evaluation of key fish population performance measures (health indicators) for each stream and all streams combined. The performance measures are:

Stock abundance	*Definition*	Trend in abundance over last three years as indicated by average annual catch rates. Data may be from various sources including electro-fishing surveys and the Angler Fishing Diary Program (AFDP). Note that abundance can be strongly influenced by a number of variables including timing of surveys around recruitment (and stocking) events.
	Scores	▲ Increasing (slope of linear trend > 0.05) ▼ Decreasing (slope of linear trend < -0.05) ◀▶ Stable or variable (up and down) (slope of linear trend between -0.05 and 0.05). ? Insufficient information to assess
Multiple size classes	*Definition*	Wide range of fish sizes present indicating regular successful spawning events and recruitment is occurring present in the stream. Data from measurement (fish length) of fish caught.
	Scores	✔ Wide range of fish size classes present. Some Some fish size classes present. ✘ Very few fish size classes present.
Mature size classes	*Definition*	Mature fish capable of spawning are present in the stream. Data from measurement (fish length) of fish caught. Size at maturity is indicative only as this may vary between streams, years and sex of fish for each species. Size at maturity: Australian bass (>27 cm). Estuary perch (>27 cm). Freshwater catfish (>30 cm). Golden perch (>30 cm). Macquarie perch (>30 cm). Murray cod (>55 cm). Silver perch (>30 cm). Trout cod (>30 cm).
	Scores	✔ Good numbers of mature fish present. Some Some mature fish present. ✘ No mature fish present.
Recent recruitment	*Definition*	Number of small fish (recruits presumed to be less than one year old) (<10 cm) present indicating that fish have spawned recently (in last 12 months). May also indicate recent stocking of hatchery-bred fish. Size is indicative only as growth of juveniles may vary between species, streams, time of year sampled and years.
	Scores	✔ Good numbers of small fish present. Some Some small fish present. ✘ No small fish present.
Mature size classes	*Definition*	Fish approaching maximum size present indicating sustainable fishing pressure. Maximum size is indicative only as this may vary between streams and sex of fish for each species. Maximum size: Australian bass (>40 cm). Estuary perch (>50 cm). Freshwater catfish (>50 cm). Golden perch (>50 cm). Macquarie perch (>37 cm) Murray cod (>100 cm). Silver perch (>40cm). Trout cod (>80 cm).
	Scores	✔ Good numbers fish approaching maximum size present. Some Some fish approaching maximum size present. ✘ No fish approaching maximum size present.

Assessment statement

Provides a summary health assessment for the species in the selected rivers assessed as part of the report card.

Map

Map showing locations of selected rivers assessed for the species.

Assessment statement

Monitoring results on the second page of the report card include the following information.

- Average annual catch rate of species in selected rivers based on all available data from various sources, and long-term average catch rate. This information is used to assess stock abundance performance measure.
- Size of fish caught in 2019 surveys, including size range of fish measured, percent of fish that are legal size, percent of fish that are mature and percent of fish that are recent recruits.
- Years that the selected rivers have been stocked with hatchery-bred fish.
- Number of hatchery-bred fish stocked into the selected rivers in the last four seasons.
- Top four species caught and observed during electro-fishing surveys of selected rivers over the last three years (2017 and 2019).
- Length frequency distribution of fish caught during electro-fishing surveys of the selected rivers over last three years (2017 - 2019) and number of fish caught each year in the selected rivers. This information is used to inform fish size performance measures.

What we found

Information for eight native fish species and nine rivers (Table 2). is presented in the report cards. A summary of the key health indicators for the eight native fish species assessed are provided in Table 3. An overall rating of Good to Very good was recorded for five species (Australian bass, estuary perch golden perch, Murray cod and trout cod), Moderate for two species (Macquarie perch and silver perch) and Low for one species (freshwater catfish).

2019 Results							
Stream	**Rivers**	**Abundance**	**Multiple year classes**	**Mature fish**	**Recent recruitment**	**Maximum size**	**Overall rating**
Australian bass	Mitchell River and Thomson & Macalester rivers	◀▶	✔	✔	Some*	✘	Good (variable)
Estuary perch	Glenelg River	▼▲	✔	✔	✘	✘	Good
Freshwater catfish	Wimmera river	◀▶	?	?	?	?	Low

Golden perch	Goulburn River, Gunbower Creek, Lindsay River and Mullaroo Creek and Wimmera River	◀▶	✔	✔	✘	Some	Good (variable)
Macquarie perch	Ovens River and Yarra River	▼	✔	Some	Some	✘	Moderate
Murray cod	Goulburn River, Gunbower Creek, Ovens River, Lindsay River & Mullaroo Creek	▲	✔	Some	✔*	Some	Very good, (improving)
Silver perch	Wimmera River	◀▶	?	?	?	?	Low
Trout cod	Goulburn & Ovens rivers	◀▶	✔	✔	✔	✘	Very good, (improving)

Table 3. Summary of key health indicators for six native fish species. * May include stocked fish.
(Note: for detailed results of each river and species, please contact the editor.)

Fish abundance

Quantile ranges were used to assign levels of abundance to all electrofishing catch records (average of sites within each river each year) (historic and contemporary) for each native fish species assessed in this report (Table 4). Abundance ranged from low (up to 0.25 fish/100 m) (55% of records) to exceptional (> 5 fish/100 m) (1% of records) (Table 4, Figure 3), the greatest being 7.28 fish/100m recorded for Australian bass in the Mitchell River in 2019 when many small fish (recruits) were caught. Throughout the 1990s and 2000s abundance was general low to moderate, however, since the mid-2010s high, very high and exceptional abundances have been recorded for some species in some rivers (Figure 4). In 2019, abundance was highest for Australian bass in the Mitchell River (7.28 fish/100 m) followed by Murray cod in the Ovens River (5.33 fish/100 m), and lowest was for freshwater catfish (0.02 fish/100 m) and then silver perch (0.07 fish/100 m) both from the Wimmera River (Figure 5). These low abundances contributed to poor health ratings given these species (Table 3).

Abundance level	Quantile range	Average abundance range (fish/100 m)	Number of observation
Low	< 0.05	0 – 0.25	102
Moderate	0.05 to < 0.25	0.26 – 1.21	64
High	0.25 to < 0.5	1.33 – 2.1	12
Very high	0.5 to < 0.99	2.55 – 5.0	6
Exceptional	≥ 0.99	5.33 – 7.28	2

Table 4. Abundance levels of native fish and associated quantile ranges, abundance ranges (fish/100 m) and number of observations.
(Based on average abundance for each species, river and year for historic and contemporary catch electrofishing catch records).

Table 2. Species and rivers assessed for each species that are presented in a report card format in this report.

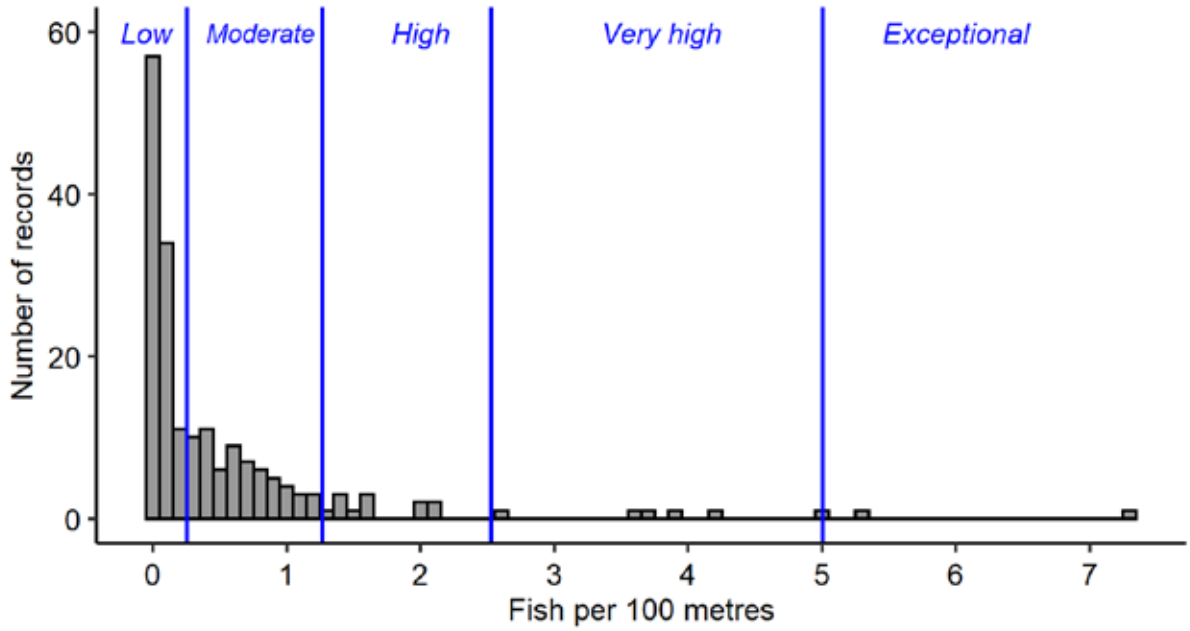


Figure 3. Frequency distribution native fish abundance (fish/100 m) for different abundance levels (Based on average abundance for each species, river and year for historic and contemporary catch electrofishing catch records).

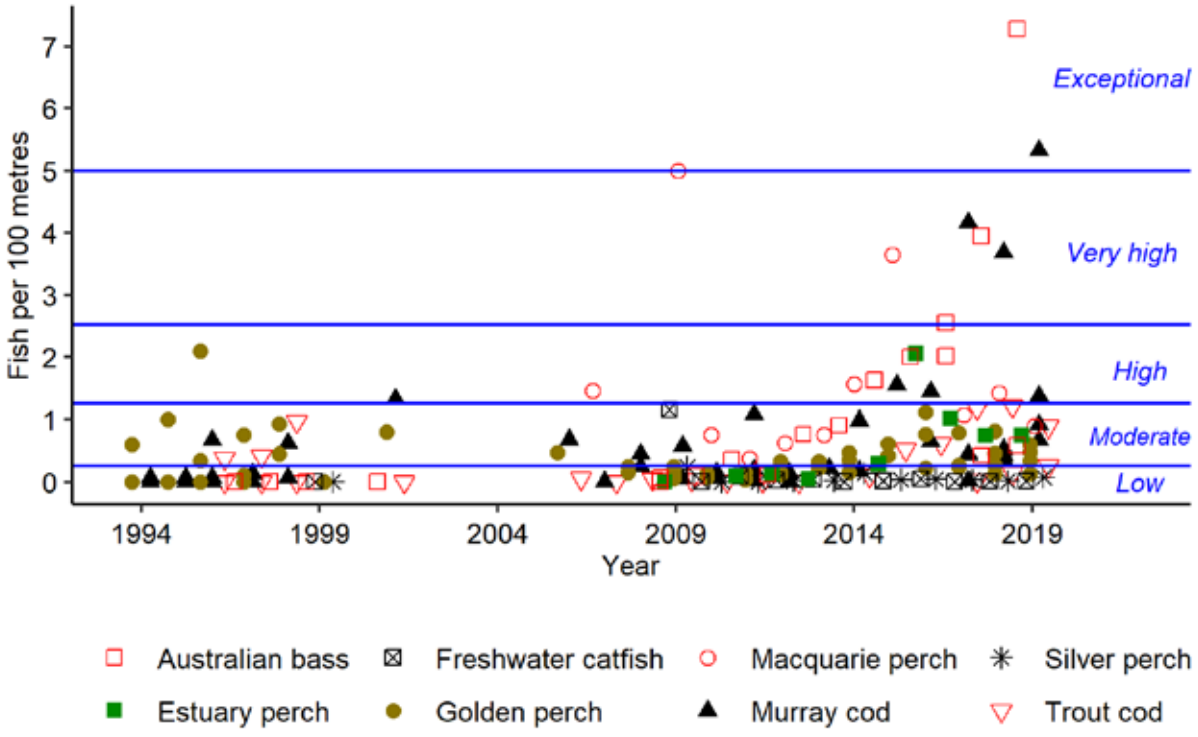


Figure 4. Average abundance records for eight native fish species estimated from historic and contemporary catch electrofishing catch records and associated abundance levels.

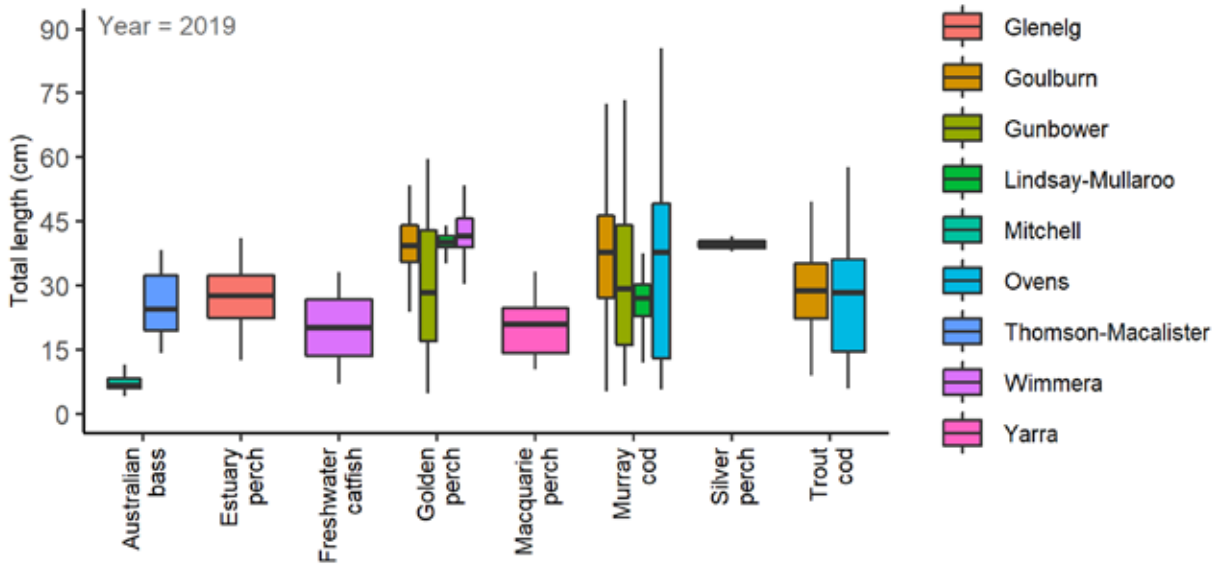


Figure 5. Average abundance of eight native fish species recorded in selected rivers surveyed in 2019.

Fish sizes

A summary of size ranges of eight native fish species recorded in selected rivers surveyed in 2019 is provided in Figure 6.

The length – weight relationships for eight native fish are presented in Appendix 1.

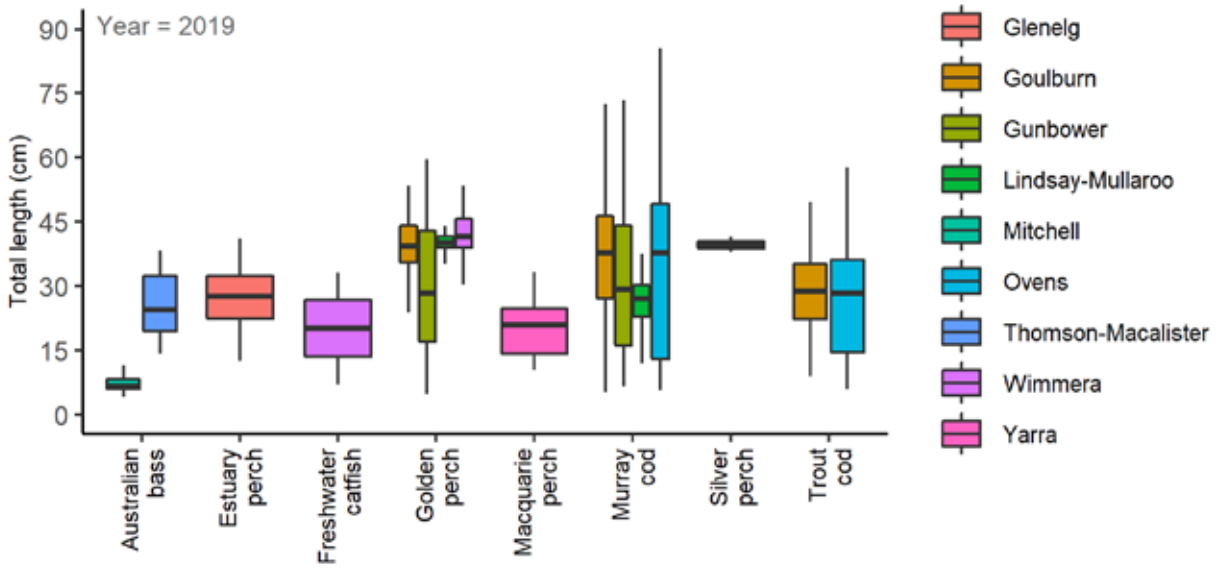


Figure 6. Size range (total length) of eight native fish species recorded in selected rivers surveyed in 2019.

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Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Australian bass

This report card describes the status of Australian bass in two streams in 2019 and trends in population key performance measures that are based on scientific data provided by scientific fishery surveys.

OVERALL RATING - 2019:	Good (variable)

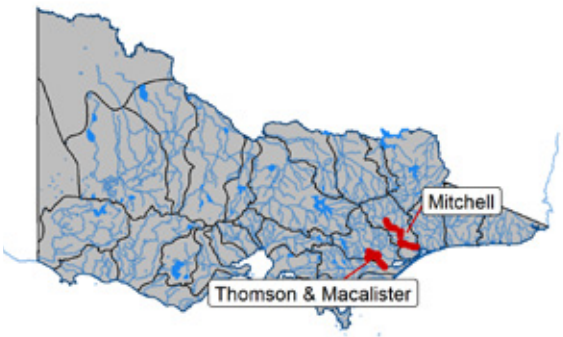
Performance measures (health indictors)	Stream		Status[1]
	Mit	T-M	
Stock abundance			
Trend in abundance over the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys.	⇧	⇩	⇔
Fish size (length/age)			
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	✓	✓	✓
Mature fish present, as indicated by the presence of fish over 27 cm in the catch.	✓	✓	✓
Signs of recent recruitment, as indicated by the presence of fish under 10 cm.	✓*	✘	**Some**
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (>40 cm).	✘	✘	✘

1. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information. ✓ = Good numbers present. **Some** = Some present. ✘ = Nil present.

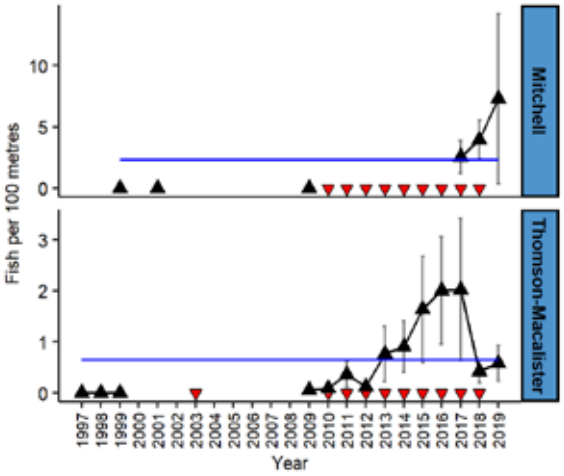
* May include stocked fish.

Assessment statement

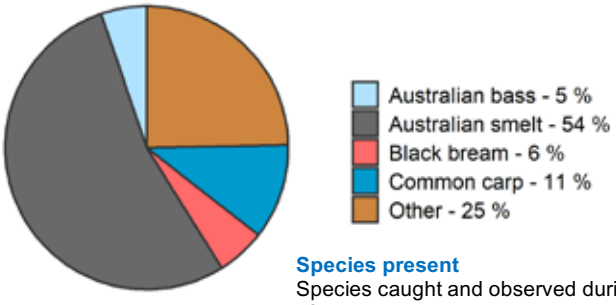
Australian bass represented 5% of fish caught and observed in the two streams surveyed (Mitchell and Thomson -Macalister). Since 2017 Australian bass abundance ranged from moderate to exceptional. Electrofishing catch rates in recent years have increased in the Mitchell but declined in the Thomson -Macalister. A wide range of fish sizes were observed in both streams. The percentage legal size fish was higher in the Thomson -Macalister than the Mitchell. Very large numbers of small fish were caught in the Mitchell in 2019, which may be fish that were stocked recently. Despite large numbers of fingerlings being stocked into the Thomson -Macalister in recent years, no small fish were observed in 2019 suggesting recent stockings have not been successful. Mature fish were present in both streams. On this basis Australian bass populations in the two streams surveyed were moderate to good though variable.



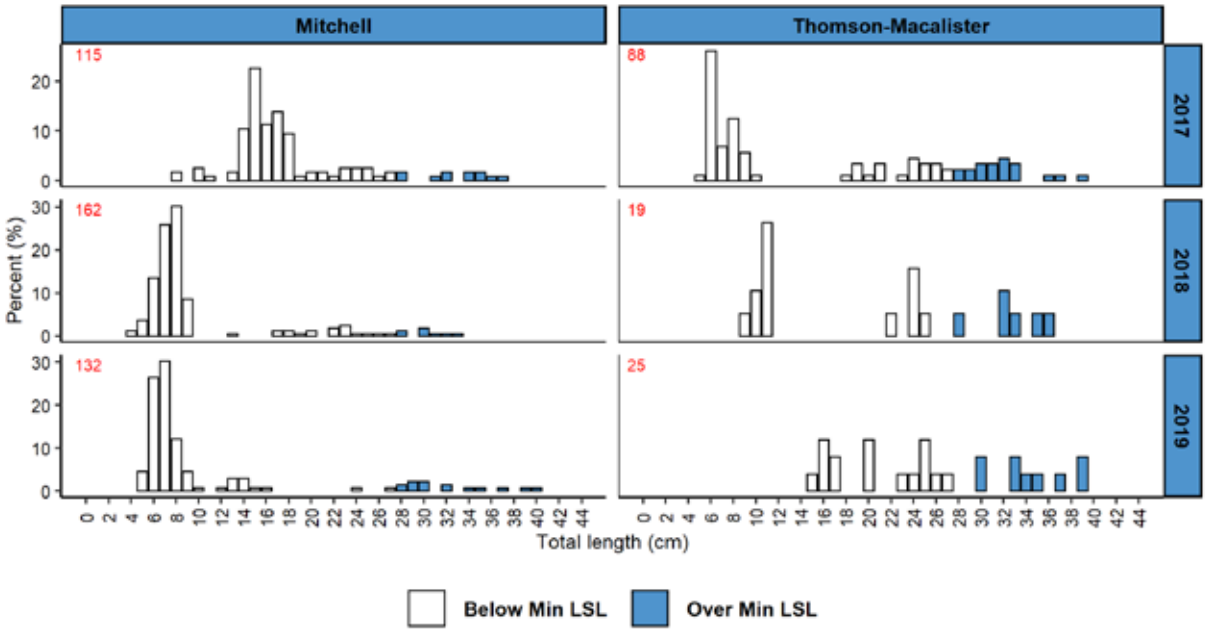
Australian bass sizes measured during electro-fishing surveys in 2019	Mit	T-M
Size range (cm)	4-39	14-38
Percent (%) that are legal size (> 27 cm)	11	36
Percent (%) that are mature (> 27 cm)	11	36
Percent (%) that are recent recruits (< 10 cm)	78	0
Number of fish measured	132	25
Stockings of rivers in recent seasons (1,000s stocked)		
2015/16	10	11
2016/17	10	11
2017/18	150	46.5
2018/19	30	7



Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of Australian bass caught during electro-fishing surveys of two streams. Red triangles = stocking years.



Species present
Species caught and observed during electro-fishing surveys of two Australian bass streams between 2017 and 2019.



Size distribution
Length frequency distribution of Australian bass caught during electro-fishing surveys of two streams between 2017 and 2019 (white bar = below minimum LSL, Blue bar = over maximum LSL, red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au

Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Estuary perch

This report card describes the status of the estuary perch in the Glenelg River in 2019 and trends in key population performance measures that are based on scientific data provided by scientific fishery surveys and recreational fishers.

OVERALL RATING - 2019:	Good

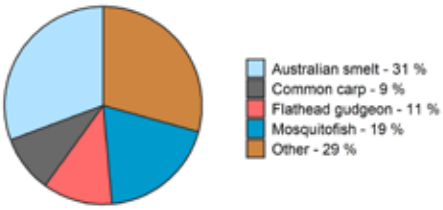
Performance measures (health indictors)	Status[1]
Stock abundance	
Trend in abundance the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys	⇩
Trend in abundance as indicated by trend in average annual angler catch rate from the *Angler Fishing Diary Program.*	⇧
Fish size (length/age)	
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	✓
Mature fish present, as indicated by the presence of fish over 27 cm in the catch.	✓
Signs of recent recruitment, as indicated by the presence of fish under 10 cm.	✘
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (>50 cm).	✘

1. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information. ✓ = Good numbers present. **Some** = Some present. ✘ = Nil present.

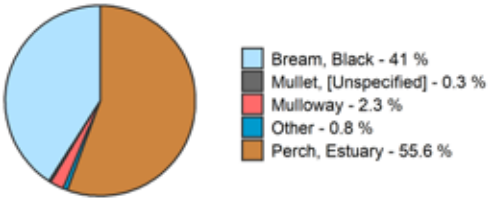
Assessment statement

Estuary perch represented 3% of fish caught and observed in electrofishing surveys and 56% of the angler catch in the Glenelg River. Since 2017 estuary perch abundance (electrofishing data) has been moderate. Electrofishing catch rates in recent years have declined but angler catch rates have increased steadily since the early 2010s, which may be due to better targeting by anglers. A wide range of fish sizes were observed. 51% of fish caught by electrofishing were legal size. Large numbers of small fish (recruits) were caught in 2019 indicating recent spawning. Mature fish were present. On this basis the estuary perch population in the Wimmera River was rated as very good.

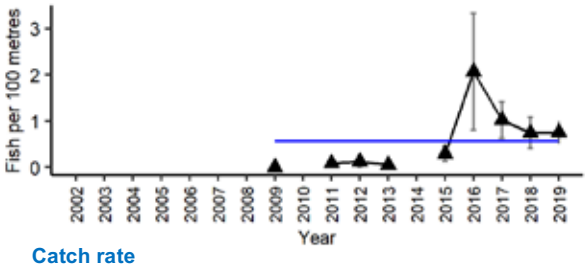
Estuary perch sizes measured during an electro-fishing survey of the Glenelg River in 2019 and by angler diarists in 2018	Angler Diary	Electro-fishing
Size range (cm)	12 – 59	13 – 41
Percent (%) that are legal size (> 27 cm)	97	51
Percent (%) that are mature (> 27 cm)	97	51
Percent (%) that are recent recruits (< 10 cm)	0.1	0
Number of fish measured	892	47
Stockings of river in recent seasons (1,000s stocked):		**NIL**



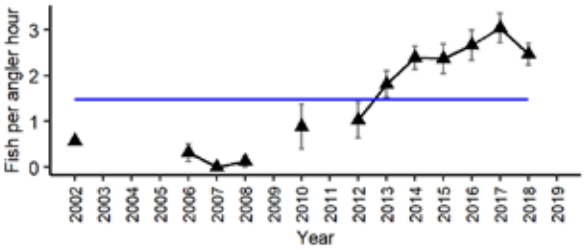
Species present (electro-fishing)
Species caught and observed during electro-fishing surveys of the Glenelg River between 2017 and 2019.



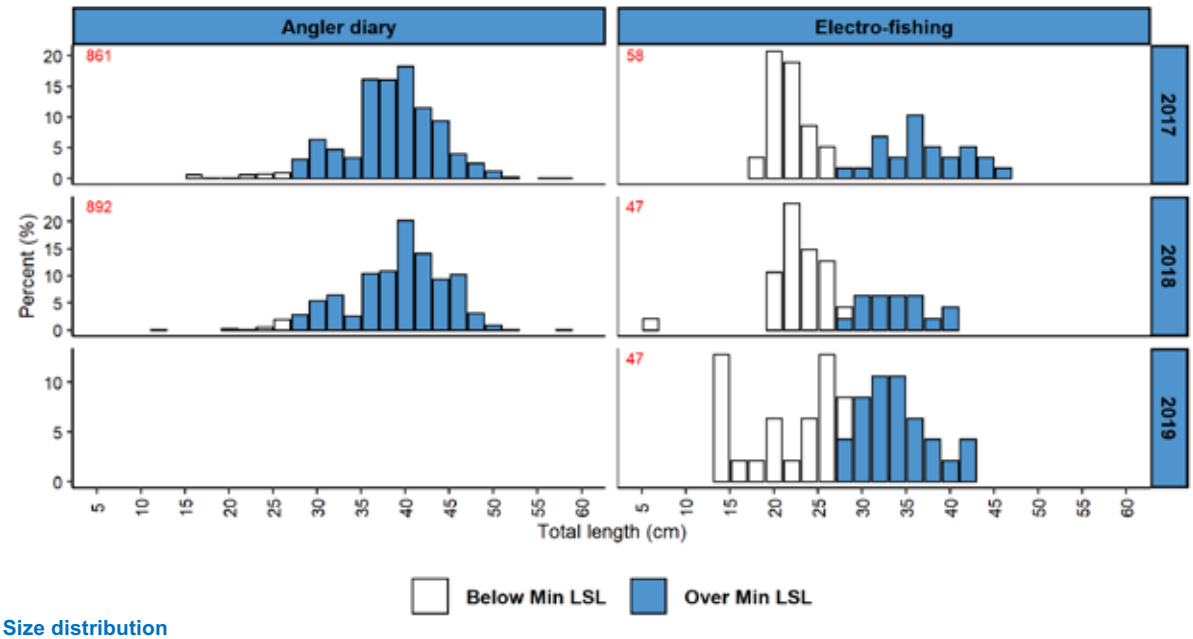
Species present (angler)
Species caught by anglers in the Glenelg River over the last five years (FVA Angler Diary Program).



Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of estuary perch caught during electro-fishing surveys of the Glenelg River.

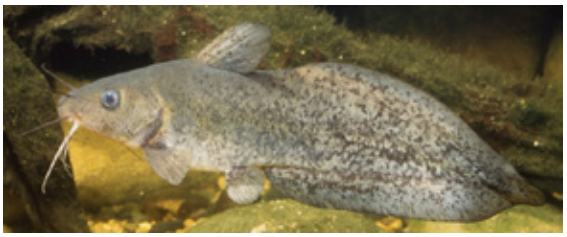


Angler catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of estuary perch caught anglers in the Glenelg River (VFA Angler Diary Program).



Size distribution
Length frequency distribution of estuary perch in the Glenelg River caught by anglers (2017 - 2018) and by electro-fishing (2017 - 2019) (white bar = below minimum LSL, Blue bar = over maximum LSL, red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au



Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Freshwater catfish

This report card describes the status of the freshwater catfish in the Wimmera River in 2019 and trends in key population performance measures that are based on scientific data provided by scientific fishery surveys.

OVERALL RATING - 2019:	Low

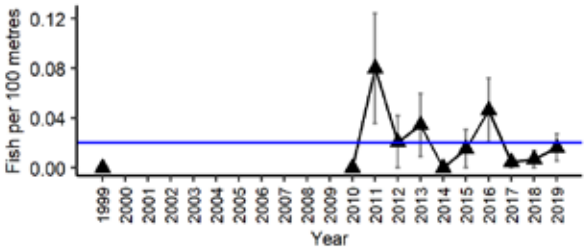
Performance measures (health indictors)	Status[1]
Stock abundance	
Trend in abundance the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys	⇔
Fish size (length/age)	
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	?
Mature fish present, as indicated by the presence of fish over 30 cm in the catch.	?
Signs of recent recruitment, as indicated by the presence of fish under 10 cm.	?
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (>50 cm).	?

1. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information. ✓ = Good numbers present. **Some** = Some present. ✖ = Nil present.

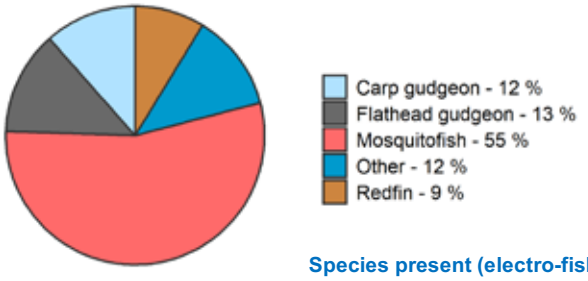
Assessment statement

Freshwater catfish represented <1% of fish caught during electrofishing surveys in the Wimmera River. Although the electrofishing catch rate has increased slightly from 2017 to 2019, the catch rate in 2019 was very low (only 2 fish caught). One fish was 7 cm in length, suggesting that spawning had occurred in the river recently, but no mature fish (>45 cm) were caught. On this basis the freshwater catfish population in the Wimmera River was rated as low due to the very low abundance of fish.

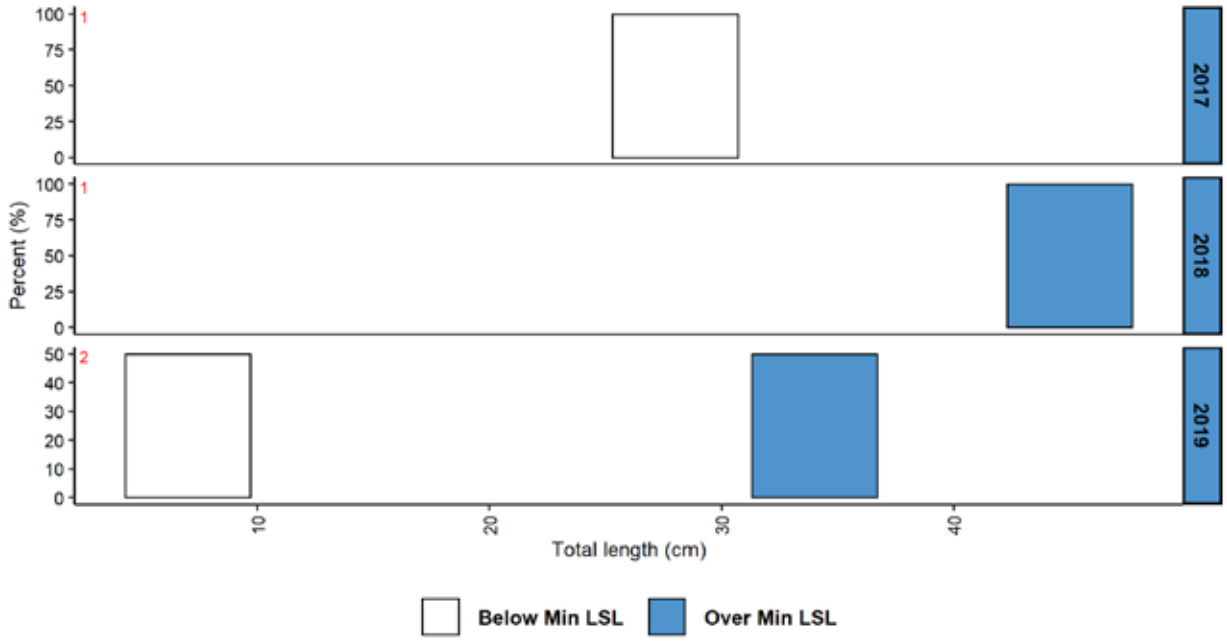
Freshwater catfish sizes measured during electro-fishing surveys of the Wimmera River in 2019	Electro-fishing
Size range (cm)	7 – 33
Percent (%) that are legal size (> 30 cm)	50
Percent (%) that are mature (> 30 cm)	50
Percent (%) that are recent recruits (< 10 cm)	50
Number of fish measured	2
Stockings of river in recent seasons (1,000s stocked): **NIL**	



Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of freshwater catfish caught during electro-fishing surveys of the Wimmera River.



Species present (electro-fishing)
Species caught and observed during electro-fishing surveys of the Wimmera River between 2017 and 2019.



Size distribution
Length frequency distribution of freshwater catfish in the Wimmera River caught during electro-fishing surveys (2017 - 2019) (white bar = below minimum LSL, Blue bar = over maximum LSL, red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au

Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Golden perch

This report card describes the status of golden perch in four streams in 2019 and trends in key population performance measures that are based on scientific data provided by scientific fishery surveys.

OVERALL RATING - 2019:	Good (variable)

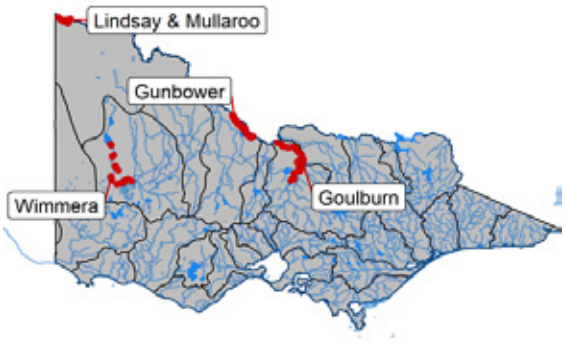
Performance measures (health indictors)	Stream				Status[1]
	Gou	Gun	L&M	Wim	
Stock abundance					
Trend in abundance the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys	⇧	⇔	⇩	⇔	⇔
Fish size (length/age)					
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	✓	✓	Some	✓	✓
Mature fish present, as indicated by the presence of fish over 30 cm in the catch.	✓	✓	✓	✓	✓
Signs of recent recruitment, as indicated by the presence of fish under 10 cm.	✘	Some*	✘	✘	✘
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (>50 cm).	Some	Some	✘	Some	Some

1. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information. ✓ = Good numbers present. **Some** = Some present. ✘ = Nil present.

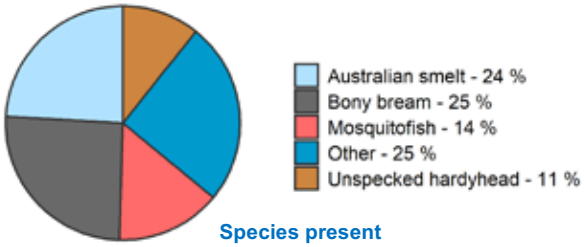
* May include stocked fish.

Assessment statement

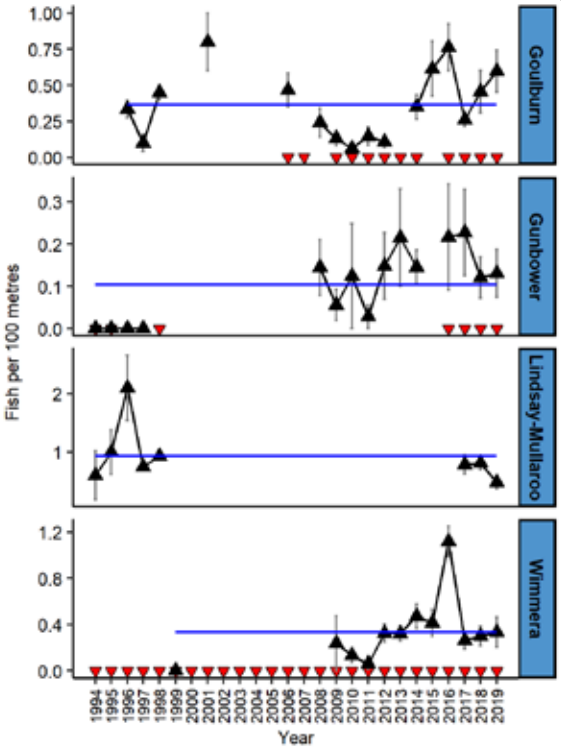
Golden perch represented 1% of fish catch in the four streams surveyed (Goulburn, Gunbower, Lindsay-Mullaroo and Wimmera). Since 2017 golden perch abundance ranged from low (Gunbower) to moderate (other streams). Electrofishing catch rates in recent years have increased in the Goulburn and Wimmera but were declining in other streams. A wide range of fish sizes were observed in most streams. A high percentage (47-92%) of fish caught were legal size. Despite large numbers of golden perch fingerlings being stocked into the Goulburn, Gunbower and Wimmera in recent years, small fish (recruits) were only observed in the Gunbower, which may be from either stocking or natural recruitment. Small numbers of mature fish were present in all streams. On this basis golden perch populations in the four streams surveyed were good though variable.



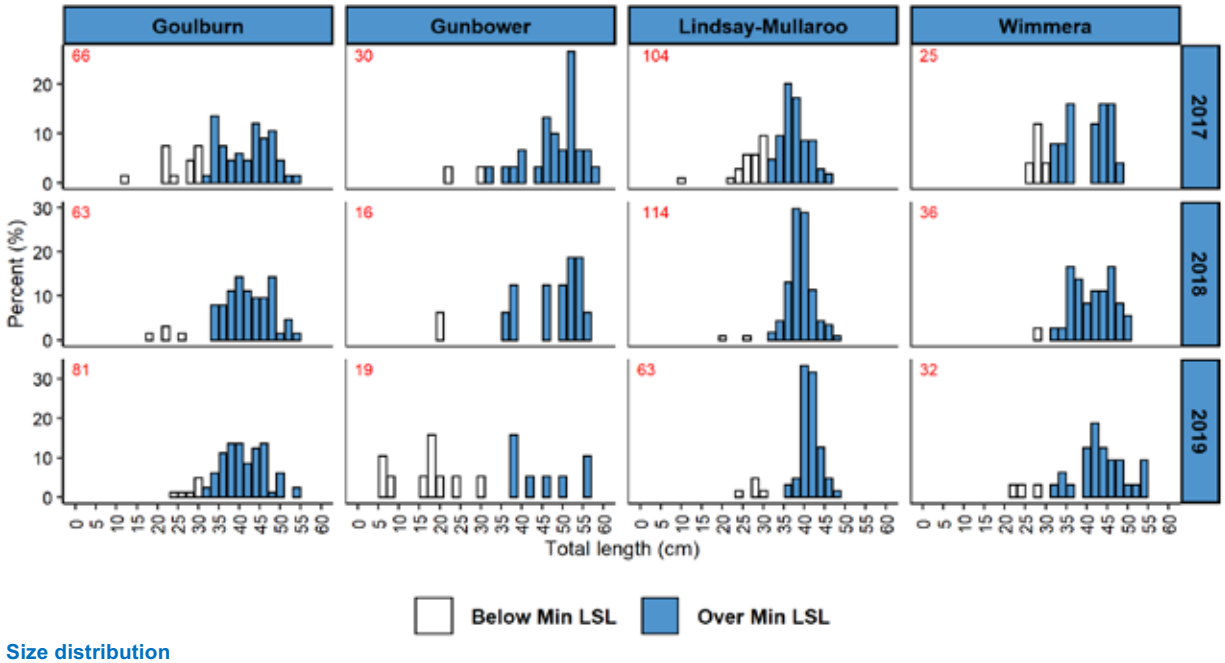
Golden perch sizes measured during electro-fishing surveys in 2019	Gou	Gun	L & M	Wim
Size range (cm)	24-54	5-60	23-48	21-54
Percent (%) that are legal size (> 30 cm)	92	47	92	91
Percent (%) that are mature (> 30 cm)	92	47	92	91
Percent (%) that are recent recruits (< 10 cm)	0	16	0	0
Number of fish measured	81	19	63	32
Stockings of rivers in recent seasons (1,000s stocked)				
2015/16	150	20	-	80
2016/17	214	40.5	-	68
2017/18	259	200	-	110
2018/19	368	70	-	150



Species present
Species caught and observed during electro-fishing surveys of four golden perch streams between 2017 and 2019.



Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of golden perch caught during electro-fishing surveys of four streams. Red triangles = stocking years.



Size distribution
Length frequency distribution of golden perch caught during electro-fishing surveys of 4 streams between 2017 and 2019 (white bar = below minimum LSL, Blue bar = over maximum LSL, red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au

Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Macquarie perch

This report card describes the status of Macquarie perch in two streams in 2019 and trends in key population performance measures that are based on scientific data provided by scientific fishery surveys.

OVERALL RATING - 2019:	Moderate

Performance measures (health indictors)	Stream		Status[1]
	Ove	Yar	
Stock abundance			
Trend in abundance the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys	⇩	⇩	⇩
Fish size (length/age)			
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	✓	✓	✓
Mature fish present, as indicated by the presence of fish over 30 cm in the catch.	**Some**	**Some**	**Some**
Signs of recent recruitment, as indicated by the presence of fish under 10 cm.	✓*	✘	**Some**
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (>37 cm).	✘	✘	✘

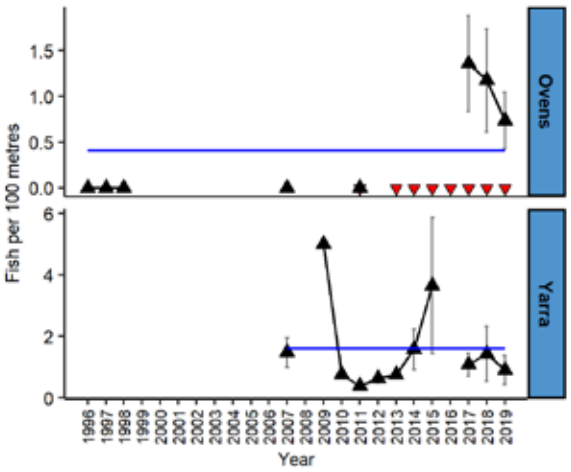
1. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information. ✓ = Good numbers present. **Some** = Some present. ✘ = Nil present

* May include stocked fish.

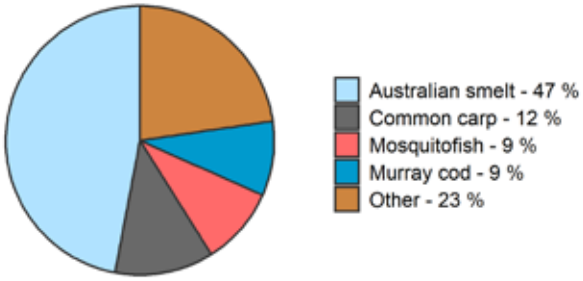
Assessment statement

Macquarie perch represented 3.5% of fish catch in the two streams surveyed (Ovens and Yarra). Since 2017 Macquarie perch abundance was moderate to high. Electrofishing catch rates in recent years have declined in the Ovens and been variable in the Yarra. A wide range of fish sizes were observed in both streams. No fish of legal size were caught. Large numbers of small fish were caught in the Ovens which may be from either recent natural spawnings or recent stocking of hatchery-bred fish, or both. Some small fish were caught in the Yarra. Some mature fish were present in both streams. On this basis Macquarie perch populations in the two streams surveyed was moderate. Macquarie perch can only be taken from Lake Dartmouth, the Yarra River and the Upper Coliban Reservoir (and their tributaries) where a bag limit, size limit and closed season apply. The taking of Macquarie perch in all other waters is prohibited.

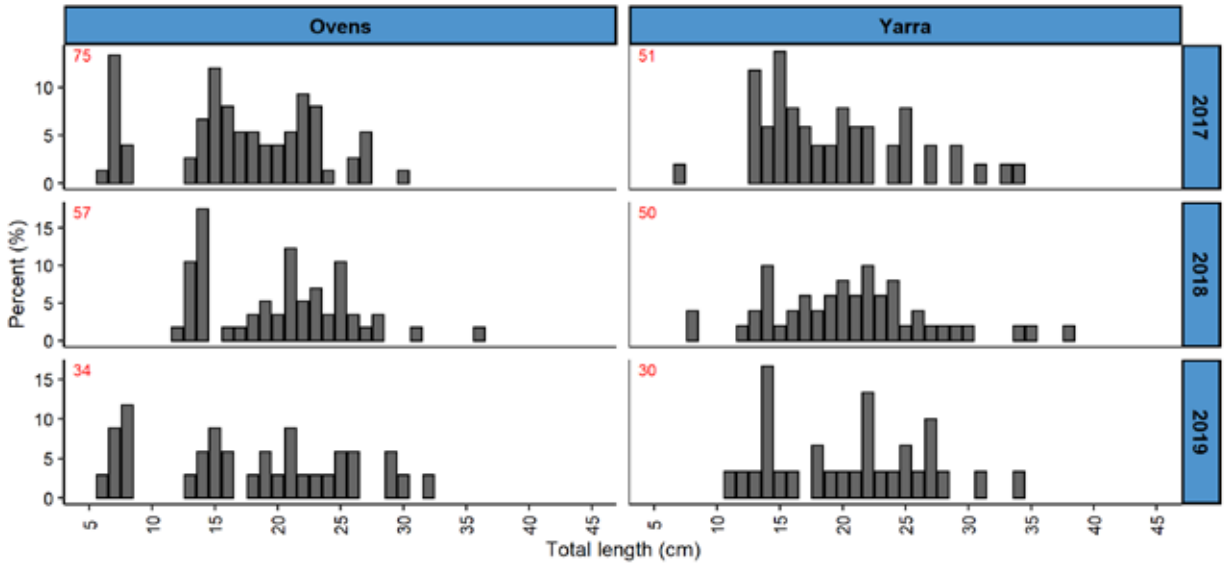
Macquarie perch sizes measured during electro-fishing surveys in 2019	Ove	Yar
Size range (cm)	6 - 31	10 – 33
Percent (%) that are legal size (>35 cm)	0	Protected species
Percent (%) that are mature (> 30 cm)	3	7
Percent (%) that are recent recruits (< 10 cm)	41	30
Number of fish measured	34	30
Stockings of rivers in recent seasons (1,000s stocked)		
2015/16	6.5	
2016/17	8.3	
2017/18	15.0	
2018/19	7.5	



Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of Macquarie perch caught during electro-fishing surveys of two streams. Red triangles = stocking years.



Species present
Species caught and observed during electro-fishing surveys of two Macquarie perch streams between 2017 and 2019.



Size distribution
Length frequency distribution of Macquarie perch caught during electro-fishing surveys of two streams between 2017 and 2019
(red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au

Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Murray cod

This report card describes the status of Murray cod in four streams in 2019 and trends in key population performance measures that are based on scientific data provided by scientific fishery surveys.

OVERALL RATING - 2019:	Very good (improving)

Performance measures (health indictors)	Stream				Status[1]
	Gou	Gun	L&M	Ove	
Stock abundance					
Trend in abundance the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys	⇧	⇧	⇧	⇧	⇧
Fish size (length/age)					
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	✓	✓	Some	✓	✓
Mature fish present, as indicated by the presence of fish over 55 cm in the catch.	Some	✓	Some	✓	Some
Signs of recent recruitment, as indicated by the presence of fish under 15 cm.	✓*	✓*	Some	✓	✓
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (> 100 cm).	Some	Some	Some	✘	Some

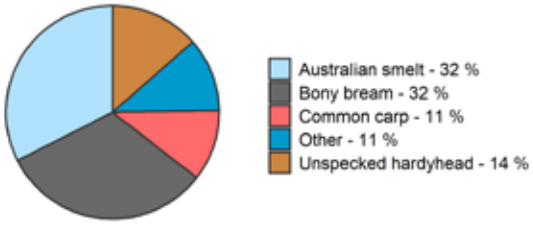
2. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information.
✓ = Good numbers present. **Some** = Some present. ✘ = Nil present.

* May include stocked fish.

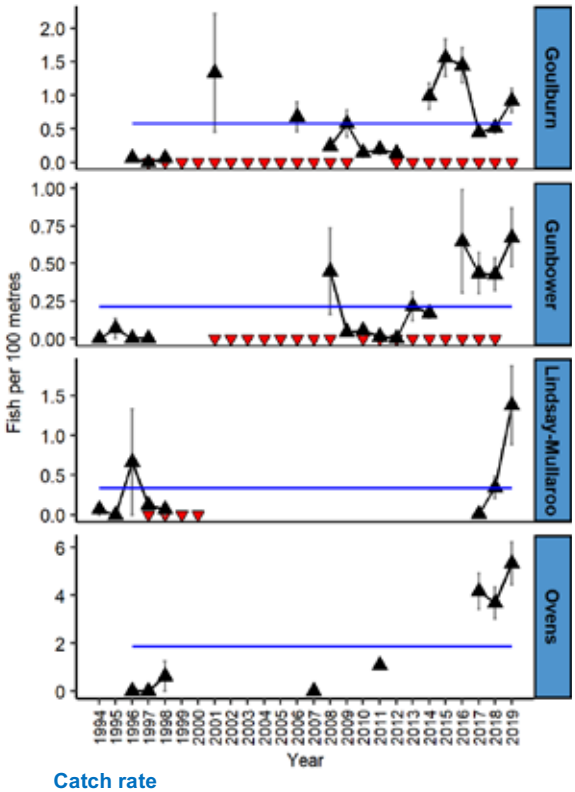
Assessment statement

Murray cod represented 3% of catch in four streams of surveyed. Since 2017 Murray cod abundance ranged from low (Lindsay & Mullaroo) to exceptional (Ovens). Electrofishing catch rates have increased in all streams over last three years. The Lindsay & Mullaroo population appears to be recovering from the 2016 blackwater event. A wide range of fish size were observed in most streams, except for the Lindsay & Mullaroo. The percent of fish that were legal size (between 55 & 75 cm) was low (0.6 – 14.3%). Small fish were present in all streams indicating either recent natural recruitment (Ovens) or recent stocking of hatchery-bred fish. Small numbers of mature fish were present in all streams. On this basis Murray cod populations in the four streams surveyed were good and showing signs of improving.

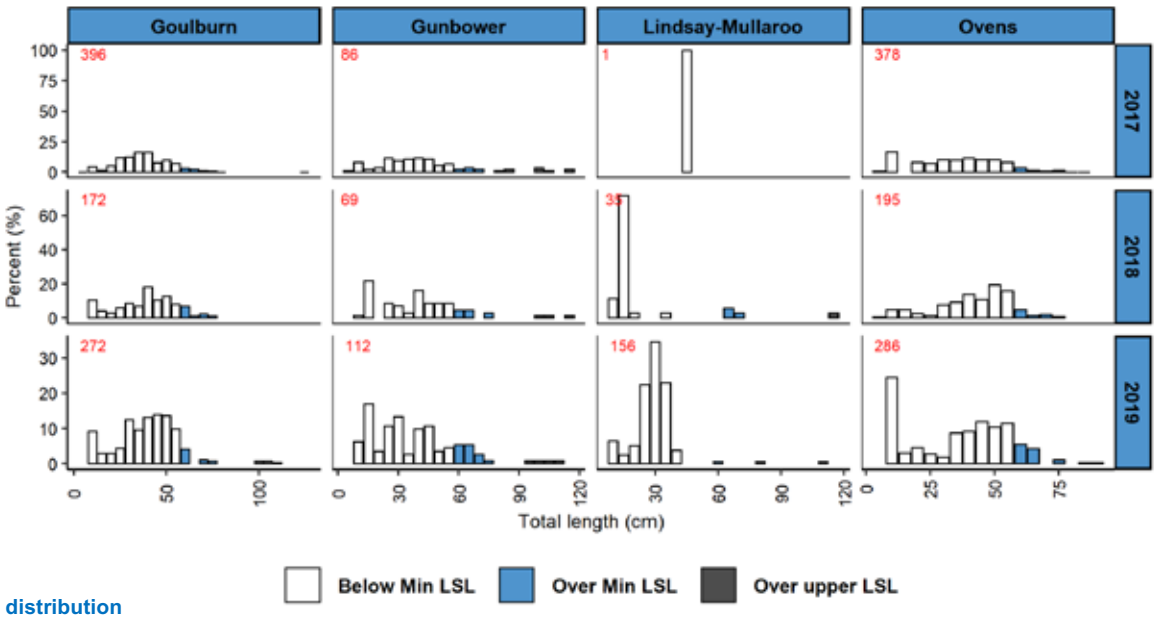
Murray cod sizes measured during electro-fishing surveys in 2019	Goulburn	Gunbower	Lindsay & Mullaroo	Ovens
Size range (cm)	5.2-106	6.5-110	6.7-107	5.6-86
Percent (%) that are legal size (between 55 & 75 cm)	5.9	14.3	0.6	10.8
Percent (%) that are mature (> 55 cm)	8	18	2	11
Percent (%) that are recent recruits (< 15 cm)	12	22	9	27
Number of fish measured	272	112	156	286
Stockings of rivers in recent seasons (1,000s stocked)				
2015/16	50	20		
2016/17	102	55		
2017/18	50	100		
2018/19	61	50		



Species present
Species caught and observed during electro-fishing surveys of four Murray cod streams between 2017 and 2019.



Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of Murray cod caught during electro-fishing surveys of four streams.
Red triangles = stocking years.



Size distribution
Length frequency distribution of Murray cod caught during electro-fishing surveys of 4 streams between 2017 and 2019 (white bar = below minimum LSL, Blue bar = over maximum LSL, red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au

Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Silver perch

This report card describes the status of the silver perch in the Wimmera River in 2019 and trends in key population performance measures that are based on scientific data provided by scientific fishery surveys.

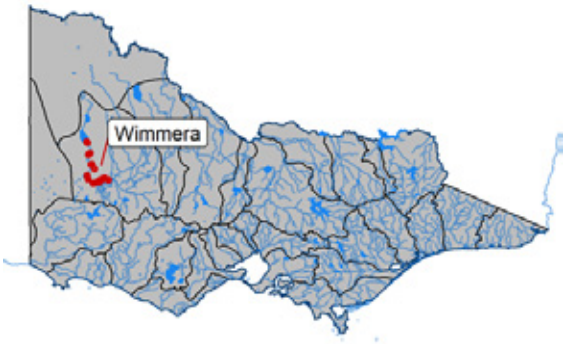
OVERALL RATING - 2019:	Low

Performance measures (health indictors)	Status[1]
Stock abundance	
Trend in abundance the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys	⇔
Fish size (length/age)	
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	?
Mature fish present, as indicated by the presence of fish over 30 cm in the catch.	?
Signs of recent recruitment, as indicated by the presence of fish under 10 cm.	?
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (> 40 cm).	?

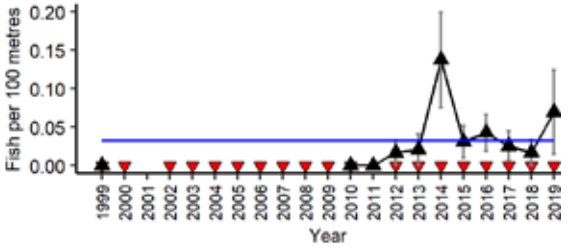
1. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information. ✓ = Good numbers present. **Some** = Some present. ✖ = Nil present.

Assessment statement

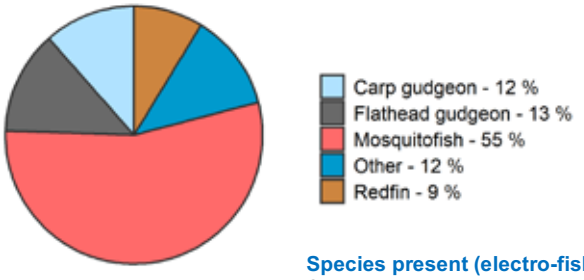
Silver perch represented just 0.1% of fish caught during electrofishing surveys in the Wimmera River. Since 2017 silver perch abundance in the Wimmera river has been low (8 fish caught). Electrofishing catch rate has increased from 2018 to 2019. No fish under 29 cm were caught during surveys over the last three years. There were no signs of recent spawning. Despite regular annual stockings of fingerlings, the absence of small suggests recent stockings have failed. Mature fish were present. On this basis the silver perch population in the Wimmera River was rated as low due to the very low abundance of fish.



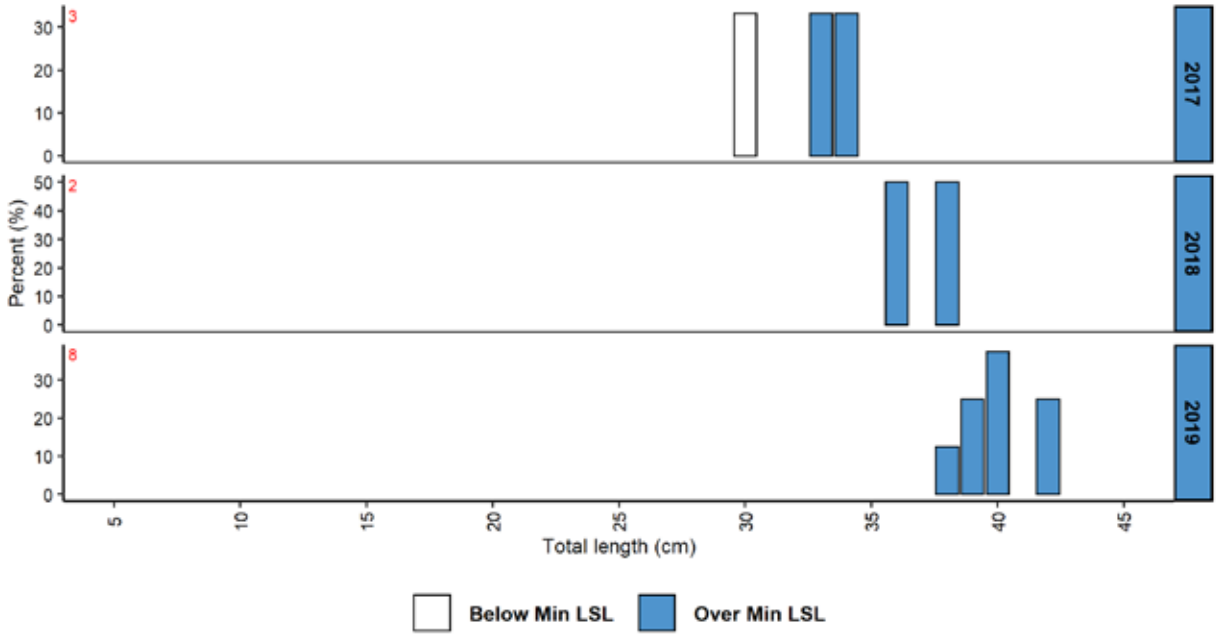
Silver perch sizes measured during electro-fishing surveys of the Wimmera River in 2019	Electro-fishing
Size range (cm)	38 - 41
Percent (%) that are legal size (> 30 cm)	100
Percent (%) that are mature (> 30 cm)	100
Percent (%) that are recent recruits (< 10 cm)	0
Number of fish measured	8
Stockings of river in recent seasons (1,000s stocked):	
2015/16	15
2016/17	20
2017/18	20
2018/19	20



Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of silver perch caught during electro-fishing surveys of the Wimmera River. Red triangles = stocking years.



Species present (electro-fishing)
Species caught and observed during electro-fishing surveys of the Wimmera River between 2017 and 2019.



Size distribution
Length frequency distribution of silver perch in the Wimmera River caught during electro-fishing surveys (2017 - 2019) (white bar = below minimum LSL, Blue bar = over maximum LSL, red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au

Native Fish Report Card
Supported by the Department of Environment, Land, Water and Planning, and Victorian Fisheries Authority.

Native Fish Report Card – 2019: Trout cod

This report card describes the status of trout cod in two streams in 2019 and trends in key population performance measures that are based on scientific data provided by scientific fishery surveys.

OVERALL RATING - 2019:	Very good (variable)

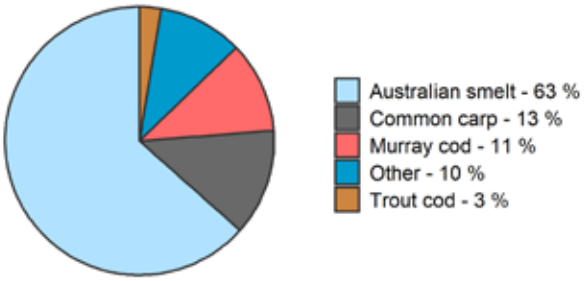
Performance measures (health indictors)	Stream		Status[1]
	Gou	Ove	
Stock abundance			
Trend in abundance the last 3 years as indicated by trend in average annual catch rate from electro-fishing surveys	⇧	⇩	⇔
Fish size (length/age)			
Wide range of fish size classes present in recent three years, indicating regular successful spawning events and recruitment to the population.	✓	✓	✓
Mature fish present, as indicated by the presence of fish over 30 cm in the catch.	✓	✓	✓
Signs of recent recruitment, as indicated by the presence of fish under 10 cm.	**Some**	✓	✓
Signs of sustainable fishing pressure as indicated by the presence of fish approaching maximum size (>80 cm).	✘	✘	✘

1. ⇧ = Increasing, yes and positive. ⇩ = Decreasing, no and negative. ⇔ = Stable. **?** = Insufficient information. ✓ = Good numbers present. **Some** = Some present. ✘ = Nil present.

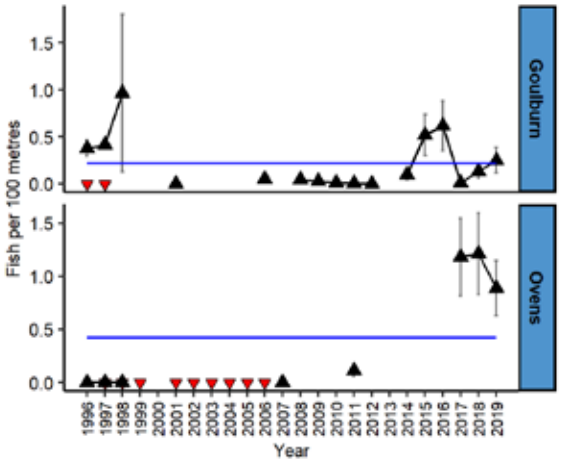
Assessment statement

Trout cod represented 3% of fish catch in the two streams surveyed (Goulburn and Ovens). Since 2017 trout cod abundance was low (Goulburn) to moderate (Ovens). Electrofishing catch rates in recent years have been stable in the Goulburn but declined increased in the Ovens. A wide range of fish sizes were observed in both streams. Large numbers of small fish (recruits) were caught in the Ovens, indicating spawning in the river has occurred recently. No stockings of hatchery-bred trout cod fingerings have occurred in these streams in recent years. Mature fish were present in both streams. On this basis trout cod populations in the two streams surveyed were good to very good though variable. Trout cod is a protected species. Taking or possessing trout cod is prohibited, except in Lake Sambell and Lake Kerferd where size and bag limits apply.

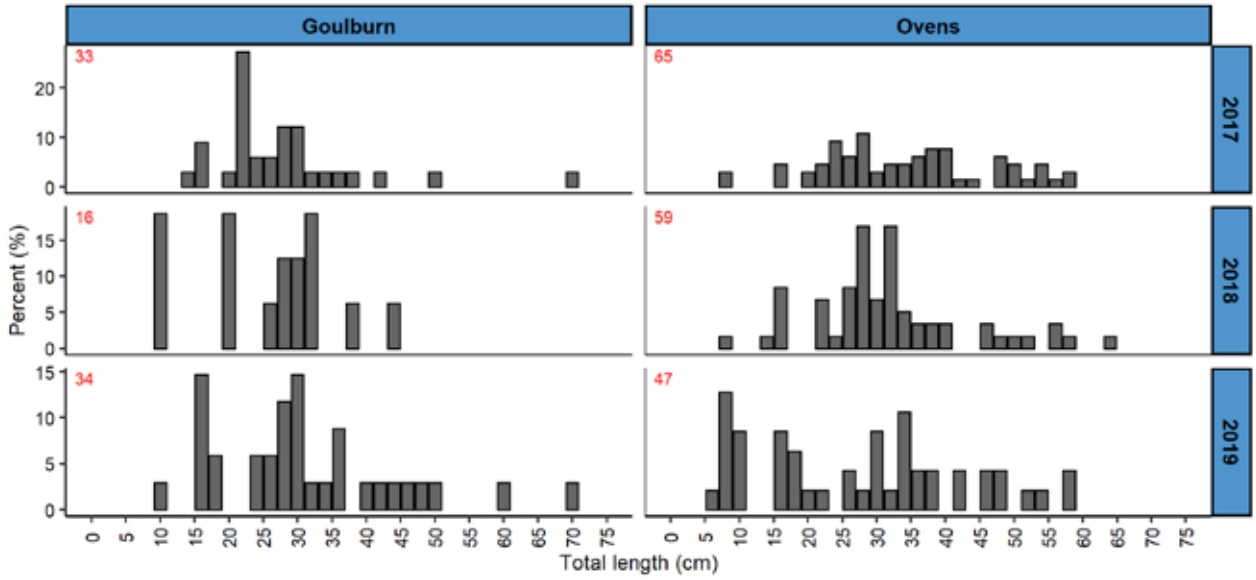
Trout cod sizes measured during electro-fishing surveys in 2019	Gou	Ove
Size range (cm)	9 - 70	6 - 58
Percent (%) that are legal size	Protected species	
Percent (%) that are mature (> 35 cm)	38	43
Percent (%) that are recent recruits (< 10 cm)	12	28
Number of fish measured	34	47
Stockings of rivers in recent seasons (1,000s stocked)	**NIL**	



Species present
Species caught and observed during electro-fishing surveys of two trout cod streams between 2017 and 2019.



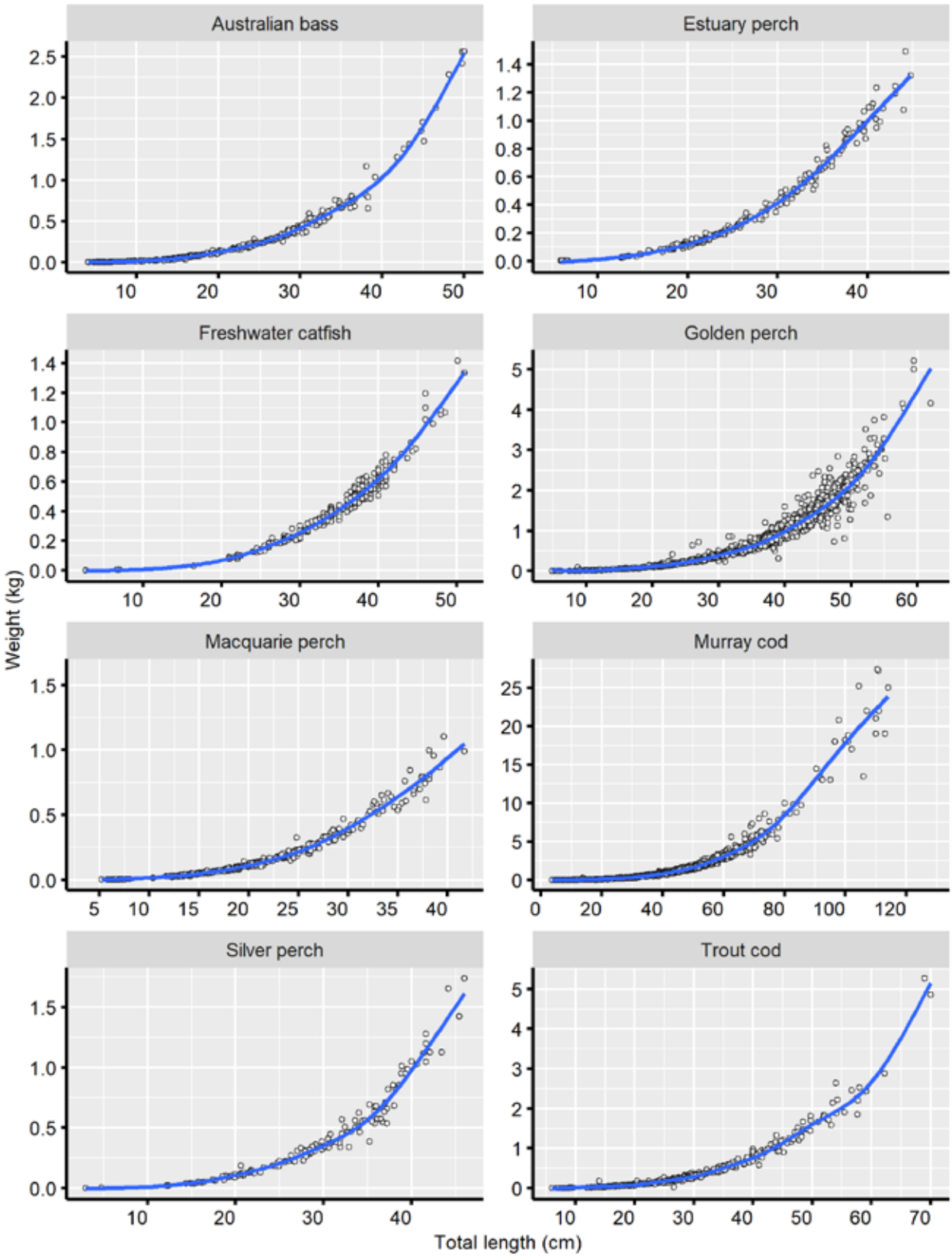
Catch rate
Average catch rate (± s.e.) (black line) and long-term average catch rate (blue line) of trout cod caught during electro-fishing surveys of two streams. Red triangles = stocking years.



Size distribution
Length frequency distribution of trout cod caught during electro-fishing surveys of two streams between 2017 and 2019 (red numbers = number fish measured).

Further information: www.nativefishreportcard.org.au

Appendix I: Native fish length – weight relationships



Evidence driven management is crucial

Jarod Lyon
Arthur Rylah Institute

There is a growing effort to embed science within fisheries management decisions to deliver better fisheries. Targeted research and monitoring help us measure how effective fisheries management actions are - do they lead to increased fish numbers to show return on investment? By improving our understanding of what the key drivers of successful fish recruitment and stocking are, we can be smarter about where and how we invest. For Murray cod, there are several opportunities for us to greatly increase their biomass by using an evidence driven approach. This talk provides several case studies to demonstrate how this may work, to ensure the best bang for buck. Further, there is also an opportunity to establish a plan to increase Murray Cod biomass in a Victorian context, which builds on the strong scientific knowledge base we have already established. Good science can pay for itself by targeting priority management efforts to support fisheries and fishers long into the future.

Northern native fish hatchery update

Danny Simpson
Victorian Fisheries Authority

The Shepparton region of north central Victoria will soon be known as the epicentre of native fish production in Victoria when the Victorian Fisheries Authority commences construction of the new northern native fish hatchery (NNFH).

It's been only a year since this incredibly exciting initiative was announced as an election commitment by the state government and the VFA have wasted no time in getting stuck into this landmark project. During this time, the NNFH project team, led by Anthony Forster, Manager of the VFA's Inland Fisheries program, has taken giant strides towards making the dream a reality by identifying the best possible location for the hatchery.

The early concept vision for the project was to identify a suitable location where over 100 plankton ponds (where the little fish grow) and broodstock ponds (where the breeders live) could be built to produce up to 5 million Murray cod and Golden perch fingerlings each year for stocking into Victoria's waterways. To produce a facility of this scale would require over 100 hectares of land with suitable access to sufficient water to run the hatchery and which would also need to meet a whole bunch of other criteria - 24 in fact - to fit the bill!

This comprehensive mapping process identified 21 properties adjacent to the Goulburn River within 30 km of Shepparton that might prove suitable for the hatchery. Following preliminary investigations this was reduced to 8 priority properties and at this point, the VFA engaged with landholders to determine their interest in the project. As a result, 3 properties were identified for further investigation.

In July, critical site-specific investigations commenced to determine the availability of suitable quantities of good quality groundwater and the presence of enough clay resources for the construction of ponds.

Groundwater is the preferred water source as it is often free of contaminants, comes at a consistent temperature and is much cheaper to buy than surface water and most of the time it is also clear, meaning that the production of zooplankton and macroinvertebrates (the stuff the baby cod and perch feed on) is much better.

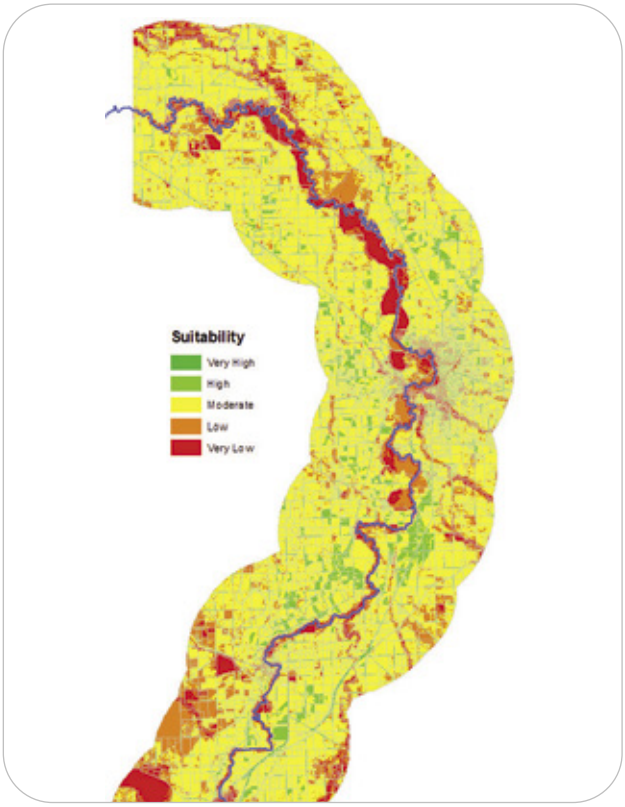


Figure 1. Desktop mapping outputs showing areas suitable for investigation for the northern native fish hatchery.

The results of the investigation quickly showed that only one of the sites investigated featured all of the attributes necessary for the NNFH.

The second focus of activity for the project team has been the development of concept designs and associated costings for the hatchery facility. This process began in March 2019 with the convening of a best practice design workshop at Lake Eildon which brought together most of Australia's best native fish farming expertise. The workshop discussed the many crucial aspects of designing and constructing a large-scale native fish farm and hatchery and identified many opportunities to build upon on the practices currently employed within the industry. Issues discussed included optimising plankton pond size, hatchery layout to improve production flow through and managing biosecurity.

Since the Best Practice Workshop, the design team has developed a series of design options to meet various scales of hatchery production. The primary determinant of production output is the number and size of plankton ponds to produce fingerling Murray cod and Golden perch. To meet this challenge and to allow for cost effective expansion, a modular approach to the design of the hatchery was developed. Each module contains 18 ponds arranged around a central collection point where fingerlings are harvested into a mobile purpose-built tank. This new technology means that the small cod and perch are not handled at all during the harvest process thus reducing stress and damage. This is great news as it means that more fish are available for stocking into our waterways.

Figure 2 Installing a groundwater test well at one of the priority properties

Critical success factors	Preferred site
Ground water availability	✔
Surface water availability	✔
Flood risk	✔
Environmental due diligence	✔
Clay available	✔
Compatible with planning zone	✔

Figure 3 Attendees at the Best Practice design workshop from left; standing; Taylor Hunt, VFA; Karl Mathers, The Wedge Group; Geordie McKinlay, The Wedge Group, Steve Vidler, FishTech Services, Brian Mottram, VFA, Matt McLellan, NSW Fisheries, Noel Penfold, Murray Darling Fisheries, Danny Simpson, VFA, Duncan McCallum, Murray Darling Fisheries; seated Brett Ingram, VFA, Matt Landos, Future Fisheries Veterinary Service; Anthony Forster, VFA.

What does a best practice design look like?

Flexible

- Scalable and modular to meet current and future production needs
- Allows for retrofitting to meet changing technologies

Meets purpose

- Designed to meet the needs of species
- Optimises energy and water use
- Improves production efficiency

Biosecurity

- Water treatment to reduce disease
- Buffered from surrounding land use

In the coming months the VFA project team will commence the important process of developing the detail design for the northern native fish hatchery with the aim of commencing construction of the new facility in late 2020 or early 2021. This will be followed by a period of commissioning which will include a pilot production phase in early 2022.

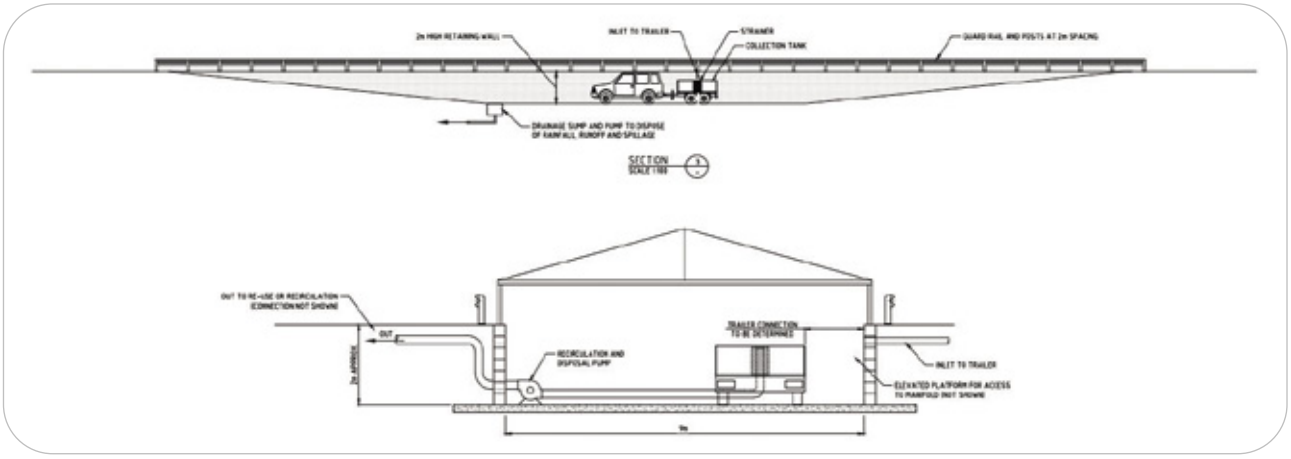
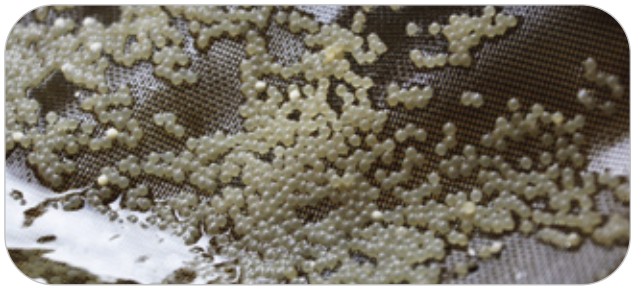


Figure 4 Fingerling Murray cod and Golden perch are harvested directly into a purpose designed tank



Changing channels - Native fish salvage and relocation

John Douglas - Victorian Fisheries Authority
David Irvine - Goulburn Murray Water
Dion Lervasi - Austral Research and Consulting

Background

Fish stocking

The stocking of fish is a common fisheries management tool. Most native fish stocking is generally undertaken with small young fish (<50mm). Growing large numbers of native fish to a reasonable size is problematic and costly to a greater or lesser extent depending on the species. Some species do not wean on to artificial food well, the technology to grow the fish is often expensive and technical to run and has space limitations, and there is the added risk of domestication. Stocking young fish results in a considerable time lag while the fish grow to a size to either enter the fishery or if establishment is the aim, to potentially breed.

Stocking larger fish is useful-depending on the purpose of the stocking-but these fish are difficult to procure and, if available from commercial groweres, are very expensive.

Irrigation channels

Goulburn Murray Water (GMW) oversee the delivery of water for irrigation purposes across much of northern Victoria. GMW is Australia's largest rural water corporation managing around 70 per cent of Victoria's stored water resources Australia's largest irrigation delivery network.

GMW manages water related services over a region of 68,000 square kilometres, bordered by the Great Dividing Range in the south and the River Murray in the north and stretching from Corryong in the east down river to Nyah. There are more than 21,000 customers using over 39,000 services in northern Victoria.

The length of channels under GMW's control is huge and the Shepparton Irrigation Area alone has over 5900 km of channels.

Fish in channels

Water storages along major rivers are often stocked with fish for recreational fishing purposes. The storages in the mid to lower sections of the catchments are often stocked with native species such as Murray cod and golden perch which are popular with recreational fishers.

Murray Valley Irrigation area	881 km
Shepparton Irrigation Area	596 km
Central Goulburn Irrigation Area	1217 km
Rochester Irrigation Area	478 km
Loddon Valley Irrigation Area	948 km
Torrumbarry Irrigation Area	1266 km
GMID - Goulburn Murray Irrigation District (Total)	5387 km

Table 1. Goulburn Murray Water irrigation channels length.

The water storages are primarily built for the irrigation system and feed water into the kilometres of channels. Fish in the impoundments can and do enter these channels. Often the channels are one-way trips as regulators prevent upstream movement. Once in the channels, the fish are lost to most recreational fishers.

To maintain the efficient delivery of water, channel maintenance is undertaken annually which can vary but includes seasonal drawdown for weed control, siphon clearing, bank stabilisation or

regulator upkeep works. At such times, fish are often restricted in shallow water between regulators, or trapped in the dewatered siphons or in located in shallow areas vulnerable to predation and adverse environmental conditions.

Fish translocation

The maintenance of the channels allows access to retrieve some of the isolated fish.

In 2017 GMW lowered sections of the East Goulburn Chanel for weed control and contracted Austral Research and Consulting to relocate fish. Around 560 Murray cod, golden perch and Blackfish were relocated into several local waters including the Nathalia Creek, Victoria lake at Shepparton, Numurkah Lake and the Goulburn River.

In partnership with GMW, the Victorian Fisheries Authority (VFA) contracted Austral Research and Consulting to relocate fish from sections of channels again in 2018. The channel fish are mostly adult size and therefore the maintenance work provides an opportunity to procure these hard-to-get, larger native fish, and translocate them back into waters where they can be accessed by recreational fishers and/or to create instant recreational fisheries in areas such as urban ponds where it is not suitable to stock smaller fish.

Over a two-week period around 300 Murray cod and golden perch were relocated into 6 waters, including the Broken Creek at Nathalia, the Goulburn River at Shepparton, Lake Victoria, (Shepparton), Benalla lake (Benalla), Ferntree Gully Quarry (Ferntree Gully) and Casey Fields (Cranbourne East).

Future works

Based on the success of the fish re-claim, an RFL grant was sought and received for recreational fish stocking sourced from fish translocated from Goulburn Murray Water irrigation channels.

Next winter, and in conjunction with GMW's maintenance schedule, Victorian Fisheries Authority will again reclaim large on-grown Murray cod and golden perch from irrigation channels and relocate into accessible waters or create new fishing opportunities by stocking them into urban lakes and selected local waters.

The work is a win-win situation for Goulburn Murray Water, for Victorian Fisheries Authority and the wider community by relocating iconic Murray Cod and golden perch while important winter maintenance is undertaken.

New age baits for BIG Murray cod

John Cahil

I am not here to convince you to spend more money on fancy lures but let me share my views on why you should consider them!

Murray cod are an exciting but very frustrating fish to target on a cast lure, however the rewards when an aggressive cod smashes your artificial offering are immensely worth it. 'Cod on the cast' as it is known, has had an extremely dedicated following for a long time. Although over the last five years, this form of cod fishing has boomed and has easily been the biggest growth area with trolling and bait fishing remaining relatively steady in that time.

The appeal of cod on the cast relates to a number of things. Most noteworthy, I argue that it's actually the best and most effective way to target them! But aside from my obvious favouritism towards casting, in reality each cast is an educated foray deep into the prime cod ambush zones. Flicking close to snags, cover, undercuts, between standing timber and shady pockets that are hard to reach by other methods gives you a higher chance of getting connected than any other lure fishing method. With trolling for example, you are scraping past the edges of these zones often in 'dead' water. It can take many kilometres simply 'covering the water' to cross paths with a fish by trolling, but don't get me wrong, it also works for plenty, but it doesn't suit how I like to fish. The second point that makes Cod on the Cast great, is the hit! Let's face it, cod aren't the most spirited fighters on appropriate tackle, nevertheless the hit is often spectacular! So why miss the best bit with your rod in a holder, get casting and prepare to hang on!

Along with the rise in cod casting has been a significant development in the tackle, techniques and baits used to throw at them (I should add, the term baits being the general term to describe lures of all sorts, such as spinnerbait, crankbait, swimbait etc). Some of this tackle has been developed locally, but a good percentage have been imports from the USA, Europe and Japan. It's no mistake that a fair bit of modern cod casting tackle has been derived or styled from the international bass fishing scene, and while bass and cod are very different beasts, they have enough in common to make researching 'what works over there' very worthwhile for our fish over here.

The Australian Fishing Trade Association annual trade conference has for the last three or four years had a heavy focus on ‘new’ Murray cod tackle, in particular swimbaits and the longer and heavier rods designed to be used with them. As I type this, I anticipate the protests; “but what is the fuss all about, our divers and spinnerbaits catch plenty of big cod” I hear you say, “the tackle shops just want more of our money with the latest fad”!

Now before responding to that very reasonable statement, let me pose a question myself. Do you think fish learn from being caught and then released again? The answer is undoubtedly yes! There are a number of US and European based studies that show that a range of predatory fish caught on a lure and released are far less likely to fall for the same lure again. Of course, we also know that plenty do, some being fooled multiple times, however they are identified as essentially the less intelligent or ‘risk taking’ fish that we perhaps most often catch!

Catch and release fishing, and in particular the paradigm created by our Murray cod slot limit, is ensuring that the bigger presumably smarter cod we catch go back to hopefully be caught again. As well as releasing these seemingly more vulnerable, risk taking fish consider the very smart fish and risk averse that have perhaps never been caught in their life to that point, now released returning to their lair much wiser for the experience and immeasurably harder to catch. These are the big smart ones we all know exist and want to catch!

With all respect to the fish raising prowess of conventional cod lures which we know catch plenty of big cod, most baits could be described as an ‘impression’ or a bait fish or other forage. With the bait wobbling, vibrating or flashing not always in an overly realistic way but certainly enough to raise the interests of a ‘risk taking’ fish who is convinced enough that it’s food, but perhaps the true smart ones never touch a lure or bait of this type, or perhaps only in a moment of extreme weakness or aggression or in dirty water where a positive identification is more tricky?

The kicker is, no matter how smart or educated a cod is, it has to eat at some point. And there is no doubt whether a cod is a risk taker or more educated, plenty of baitfish pass those raspy lips often. This is where swimbaits, glidebaits and other ‘new age baits’ come into their own, with some doing an exceptional job of imitating the slow and subtle swim of a bait fish, with almost neutral buoyancy and the visual appeal of a real live bait so much so that the educated cod perhaps can’t tell the difference, even in gin clear water where it has an abundance of food on offer and can inspect your bait with vigour before committing.

This is never to say that traditional cod lures are past it, far from it, but in pressured waterways perhaps with a healthy population of educated cod, investing in these techniques and baits might just catch you some more. It’s not a case of put down your traditional gear and walk away from what you know though, casting a swimbait in a hard flowing turbid river like the Murray is a risky business and I would argue not the highest percentage play you might make. But put me in a clear lake with lots of bait and fat cod that have seen lots of lures go overhead, and you might need to rethink your game to get more big bites. So to answer that earlier hypothetical statement; yes of course tackle shops want your business for sure, but 100% this is not a scam, these new age baits work too!


TIDE

Fishing for Gippsland Australian bass

Graeme ‘Gus’ Dear

Victorian Fisheries Authority

Victoria’s dedication to a strategy of increased fish stocking, management changes like adjusting size limits for Murray cod and broader participation by partner agencies and anglers in things like habitat improvement are working to improve our fishing experience.

I have concerns though. Angler mates of mine from other states are expressing jealousy and constantly asking me for free accommodation at my place to go fishing. Free bed and breakfast is now being provided more regularly; and the kicker is, they are catching our fish too. How annoying is that! It appears that Victoria’s strategy is impacting my personal bottom line, directly impacting my electricity bill and worst of all mates are drinking all my grog!

My financial dilemma is proving the opposite for the Victorian economy. My friends and your friends are spending their hard-earned income in regional Victoria. They all want to catch a big Murray cod in Eildon, or a beautiful Bass in East Gippsland and who can blame them. Essentially, the resurgence of the native fishery is also helping drive our regional visitor economies.

Further, fishing is getting people out and about which provides positive health and wellbeing outcomes as well. Previous Murray cod conferences have shown me the extent to which fishing is reaching into broader benefits than just angling enjoyment.

My task for the conference is to introduce you to other native fish options in Victoria, such as the beautiful Australian Bass. Don’t let looks deceive you though; they are street fighters, capable of messing up an anglers day if they are not properly prepared. I will discuss options and methods to catch them and hopefully convince you to come and have a go. Accommodation is plentiful, but my B&B is already fully booked!

GoFishVic is a game-changer for keen fishers and beginners alike because it synthesises complex information and presents it in simple graphs and tables that are easy to understand. The GoFishVic app will be released in late 2019 for anglers to trial throughout Victoria.

GoFishVic App - Better Data, Better Fishing

Taylor Hunt

Victorian Fisheries Authority

Introduction

Monitoring our fisheries is important to understand and share their performance, identify any issues and find out what we can do to make them even better.

In Victoria we estimate that there are over 500 waterways that support valuable Murray cod and native fisheries. Unfortunately, it is not possible to survey and monitor all of these waterways, and this may limit their best management.

However recreational fishers are increasingly sharing their fishing experiences on social media from fishing trips right across the state. Social media groups on Facebook (for example 'Murray cod Fishing') are used by tens of thousands of anglers to share fishing catch and effort data and this information if harnessed, could greatly improve our understanding of how our fisheries are performing. The increasing use of smartphones, apps and social media by anglers provides new opportunities for us to establish innovative monitoring programs to improve fisheries management and recreational fishing for everyone!

Angler diary smartphone 'apps' are being trialled worldwide and show promise as a cost-effective and angler engaging method of collecting valuable recreational fishing catch and effort data. This information has been found to be scientifically robust, comparable to traditional monitoring methods like creel surveys, and it can provide high-resolution real-time information on many locations. In other words, it could be a gamechanger.

Citizen science improves your fishing

In Victoria we have had fantastic experiences using citizen science programs to collect

angler catch and effort data to inform management and improve our fisheries.

Collection and analysis of 6000+ angler catch and effort records from the Lake Purrumbete Angling Club showed strong relationships with stocking. The learnings led to improved stocking strategies and restored trophy trout and salmon fishing at the Crater Lakes.

The Victorian Angler Diary Program has been operating for over 20 years with over 300 dedicated volunteer diary anglers recording their catch and effort data in marine bays and inlets. This valuable catch and effort information has been used to support stock assessments and improve management for black bream, dusky flathead and Australian Bass.

Better fishing, it's fun and free

Under the Victorian Government's Target One Million Plan to improve recreational fishing, the Victorian Angler Diary Program has been expanded via creation of a smartphone App - GoFishVic.

The GoFishVic App will make it easier for anglers to record their fishing activities and gather standardised recreational fishing catch and effort data, as a direct measure of the performance of our key recreational fisheries.

Measuring the performance of recreational fisheries will enable us to compare key fisheries and provide valuable insight to the effectiveness of various fishery management interventions such as fish stocking, habitat restoration, changes to river flows etc.

Even better, the GoFishVic App will help Victorian recreational fishers digitally record and keep complete fishing histories at their fingertips and uncover secrets to catching more fish. Th app replaces the need for paper-based angler diaries to record details of weather, tide and moon, along with catch data like fish length, species, numbers, location, bait and method.

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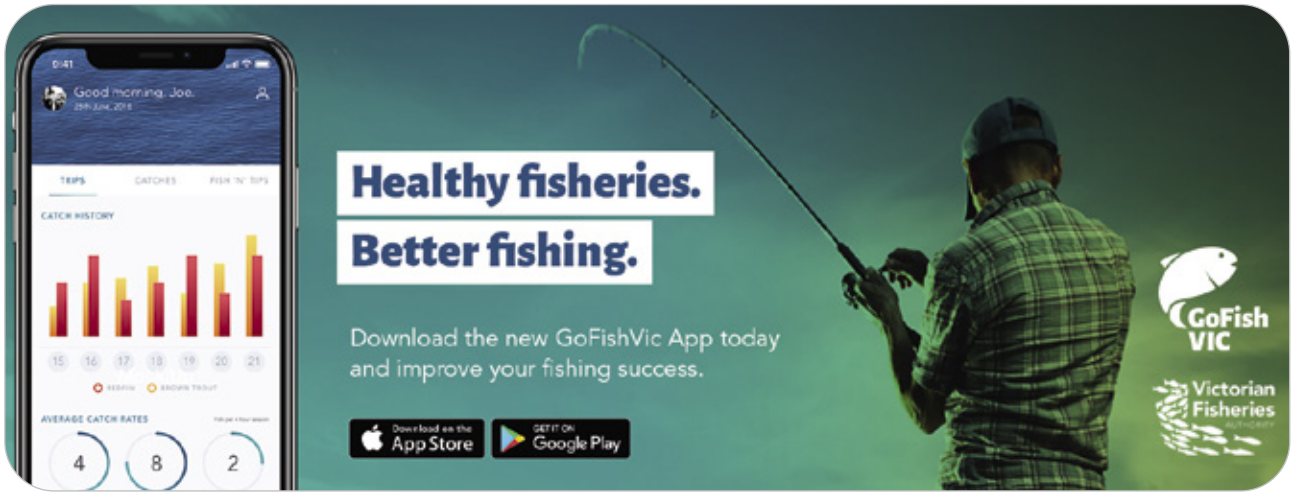

Lake Eildon: Cod's Country

Taylor Hunt - Fisheries Manager, Victorian Fisheries Authority
Jason Lieschke - Fish Researcher, Arthur Rylah Institute, (DELWP)
Andrew Pickworth - Fish Researcher, Arthur Rylah Institute, (DELWP)

Background

Lake Eildon is now one of Victoria's premier native fisheries, with recreational fishers reporting incredible catches of trophy Murray cod. Since 1990, almost 3 million Murray cod and 3.4 million golden perch have been stocked in Lake Eildon to enhance recreational fishing. Lake Eildon is now rivalling the best Murray cod fisheries for anglers to visit alongside the Ovens River, Lake Mulwala and Copeton Dam.

The last fish population survey of Lake Eildon was conducted in 2014 and found large numbers of Murray cod, of which 99.6% were from stocking. Murray cod were found to have exceptional growth rates, with some fish reaching 60cm at three years old. In 2017, the closed season for Murray cod at Lake Eildon was removed making it Victoria's first "year-round' Murray cod recreational fishery.

Since 2014, a further 1 million Murray cod have been stocked into Lake Eildon. Considering the large investment at Lake Eildon through fish stocking and the last fish population survey was conducted five years ago, it was timely to reassess the health of the Murray cod population and success of fish stocking at Lake Eildon.

How, where and when was the survey done?

The Victorian Fisheries Authority engaged Arthur Rylah Institute researchers to repeat the same survey methods and locations from the 2014 fish population survey in 2019. This meant surveying key sites in the southern portion of Lake Eildon including the Dam Wall, Jerusalem Creek Arm, Big River Arm and Goulburn Arm. The survey took six days and night and all caught fish were measured, weighed and released unharmed. All Murray cod caught over 35cm in length were tagged for anglers to report recaptures of in future.

What did we find out?

The survey found very large numbers of Murray cod and golden perch are present at Lake Eildon, indicating stocking efforts have been successful at building a strong population of native fish for anglers to catch.

The numbers of Murray cod caught in the 2019 were 81% higher than in 2014 indicating that more stocked fish are surviving are recruiting into the fishery at Lake Eildon.

The sizes of Murray cod caught in the 2019 survey were on average 18% larger than in 2014, indicating that stocked Murray cod are finding ample food resources to grow to maturity.

More specifically, 380 Murray cod were caught, measured and released in the survey. Fish ranged from newly stocked 4cm fingerlings to mature trophy fish up to 123cm and over 32kg (70lb).

59 golden perch were caught as bycatch, measured and released in the survey. Fish ranged between 3cm and 56cm or 4kg.

The survey also found larger numbers of trophy Murray cod including 29 fish over 75cm and seven fish over 1 metre.

These findings show that stocking of Lake Eildon with Murray cod is resulting in more Murray cod for anglers to catch and those stocked fish are growing to larger sizes, including trophy fish over 1 meter.

The survey also tagged and released 125 Murray cod so that anglers can report recaptures and through citizen science we can understand growth and movement of Murray cod in Lake Eildon. Already over 10 tagged Murray cod have been reported by anglers revealing fascinating insights.

Boat-based electrofishing was used in the survey of Lake Eildon.

Arthur Rylah Institute researchers measuring and tagging Murray cod caught in the 2019 fish population survey of Lake Eildon.

Murray cod to 123cm were caught in the survey.

A 116cm or 32kg (70lb) Murray cod caught in survey

Andy Smith with a tagged Murray cod from Lake Eildon.

Taylor Hunt (Fisheries Manager), Bailey Thomas (Recreational Fisher) and Andrew Pickworth (Fish Ecologist) with electrofishing boat at Lake Eildon.


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