

Golden Perch (2023)

Macquaria ambigua



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Queensland	Queensland	Undefined	Recreational fishing surveys
New South Wales	New South Wales	Depleted	Catch, fishery-independent surveys, recreational fishing surveys
Victoria	Victoria	Recovering	CPUE
South Australia	South Australia	Depleting	Catch, CPUE, fishery-independent surveys

STOCK STRUCTURE

Golden Perch occur throughout most of the Murray–Darling system, as well as in the Lake Eyre and Bulloo drainage systems of Queensland, New South Wales and South Australia, and the Dawson-Fitzroy river system in southern Queensland [Lintermans 2007]. Translocated fish also occur in numerous other waterways and impoundments throughout south-eastern Australia [Allen et al. 2002].

Golden Perch in the Murray-Darling Basin are genetically distinct from Golden Perch in the Lake Eyre, Bulloo and Fitzroy systems [Faulks et al. 2010a,b; Beheregaray et al. 2017]. Murray-Darling Golden Perch form a well-connected metapopulation with low-level basin-wide population structure, reflecting their ability to migrate and disperse long distances [Faulks et al. 2010b; Beheregaray et al. 2017; Attard et al. 2018; Zampatti et al. 2018]. However, subtle genetic differences and regional differences in population structures driven by unique recruitment sources suggest sub-structuring across some regions. Examples include the Lower Lakes [Earl et al. 2015] and Paroo River [Attard et al. 2018], and potentially the physically

disconnected and hydrologically impacted Victorian tributaries of the River Murray and some NSW tributaries of the Barwon-Darling (e.g., Lachlan River [Shams et al. 2020]). Sub-structuring is also evident in the Lake Eyre Basin [Faulks et al. 2010b]. Although genetic studies suggest the existence of several biological stocks, there are differences in management arrangements and available information in the various jurisdictions that access Golden Perch.

To account for these differences, assessment of stock status is presented here at the jurisdictional level—Queensland, New South Wales, Victoria and South Australia.

STOCK STATUS

New South Wales A commercial fishery for Golden Perch operated in New South Wales (NSW) from the 1880s to the early 2000s. Commercial fishery data spanning 1947 to 1996 show peak annual catches of 310 tonnes (t) in 1954–55, 293 t in 1975–76, and 173 t in 1993–94 [Reid et al. 1997]. In 1997, the first comprehensive fishery-independent survey of freshwater fish populations in NSW [NSW Rivers Survey; Harris and Gehrke 1997] found that native fish populations, including Golden Perch, were depleted due habitat degradation, fishing pressure, disease, and introduced species. Following a review of the inland commercial fishery in 1998, commercial fishing for native finfish ceased in September 2001.

Golden Perch currently constitutes a major component of the freshwater recreational fishery in NSW. They are also of high cultural significance for Aboriginal people [e.g., Martin et al. 2023], although the current level of Indigenous fishing for Golden Perch in NSW has not been quantified in sufficient detail for inclusion in this assessment. Recreational fishing for Golden Perch in NSW is open year-round, with a minimum legal length of 300 mm, a daily bag limit of five fish, and a possession limit of 10 fish per licence holder. The NSW Golden Perch fishery is augmented by the stocking of hatchery-produced juveniles. Stocked fish can make a substantial contribution to biomass, especially in impoundments and rivers fragmented by artificial barriers [Crook et al. 2015]. Impoundment fisheries for Golden Perch are generally considered as 'put-and-take' in NSW because natural recruitment is absent or very limited, and fishery viability is reliant on continued stocking [Forbes et al. 2015]. This assessment therefore focusses only on the riverine fishery.

Fishery-independent monitoring data have been collected for riverine sites across the MDB since 1994. These data are collected using a standardised electrofishing protocol to facilitate calculation of catch-per-unit-effort over time. Analyses of the data provide no evidence of a sustained recovery in stock biomass since closure of the commercial fishery in 2001 [Crook et al. 2023a,b]. Data on the recreational catch of Golden Perch in NSW have been collected periodically via household and licence holder surveys since 2000-01. Over this period, there has been a sharp decline in fishing effort and retained catch, and an increase in the rate of catch-and-release from 46% in 2013–14 to 81% in 2021–22 [West et al. 2015; Ochwada-Doyle et al. 2023; Crook et al. 2023b]. The most recent, comparable estimates of retained catch (numbers of fish) in the riverine fishery are 51,604 ($\pm 12,422$ SE) in 2017–18, 38,521 ($\pm 15,565$ SE) in 2019–20 and 14,994 ($\pm 4,699$ SE) in 2021–22.

There is strong evidence that environmental forcing is an overriding driver of recruitment to the Golden Perch fishery. Episodic recruitment events occur in response to high flows and other aspects of river hydrology [Thiem et al. 2023], flow regulation and fragmentation has adverse effects on recruitment across the MDB [Koehn et al. 2014], and large-scale fish kills during hypoxic conditions

have caused severe depletion in affected regions [Stocks et al. 2021]. In comparison to these broad-scale environmental disturbances, the effects of current levels of fishing mortality are considered minor. Recovery of the NSW Golden Perch stock is contingent on appropriate water and habitat management to ameliorate the threats posed by human disturbance to riverine ecosystems and climate change.

The above evidence indicates that the biomass of this stock is likely to be depleted and that recruitment is likely to be impaired. Furthermore, the above evidence indicates that current fishing mortality has been reduced by management to a level that should allow the stock to recover from its recruitment impaired state; however, measurable improvements are yet to be detected.

On the basis of the evidence provided above, Golden Perch in New South Wales is classified as a **depleted stock**.

Queensland Golden Perch in Queensland is represented by three separately evolving metapopulation lineages [Beheregaray et al. 2017]. These lineages occur separately in the Murray–Darling Basin, Lake Eyre catchment and Fitzroy–Dawson systems. Queensland has never supported a commercial fishery for Golden Perch. However, Golden Perch is a key target for recreational fishing in Queensland and have been translocated into most south-east Queensland drainages to create recreational fisheries.

It is generally accepted that native fish populations in the Murray–Darling Basin’s rivers have declined to an estimated 10% of the levels before European settlement [Murray–Darling Basin Commission 2004]. The decline is thought to have resulted from a combination of flow regulation, habitat degradation, reduced water quality, barriers to movement, introduced species and overexploitation resulting from illegal fishing [Murray–Darling Basin Commission 2004]. Recognising these declines and the importance of recreational fishing in western Queensland, Fisheries Queensland initiated the Recreational Fishing Enhancement Program in the 1980’s and commenced a stocking program. Stocking ceased in the mid 1990’s in the Lake Eyre Basin as most declines were found to be localised events due to overfishing [Bailey and Long 2001; Long and Humphery 1995]. Monitoring of more isolated waterholes revealed evidence of strong natural recruitment events away from more accessible, heavily fished areas.

Surveys of recreational angler participation and catch within Queensland were conducted in 2000, 2010, 2014 and 2019 [Webley et al. 2015; Teixeira et al. 2021]. These surveys did not differentiate between the three genetically separate populations of Golden Perch found in Queensland from those stocked in impoundments. However, data from these surveys provide some trends. Estimates from these surveys for catch, harvest, and released Golden Perch have progressively declined over time. It was estimated that anglers harvested 262,000 ± 38,000 fish in 2000 [Henry and Lyle 2003], followed by 87,000 ± 1,500 [Taylor et al. 2012] and 78,000 ± 17,000 [Webley et al. 2015] in 2010 and 2013, respectively. The 2019–20 survey estimated that 20,000 ± 4,000 fish were harvested, suggesting further declines in harvest have occurred [Teixeira et al. 2021]. Recent research has further demonstrated the impact anglers have on Golden Perch populations, with a strong relationship found between the mean length of Golden Perch and their proximity to population centres. As the distance from town increased so did the mean length within the population [Nixon et al. 2022].

Extensive drought conditions were experienced throughout 2018, 2019 and 2020. These conditions resulted in widespread localised fish kills throughout western Queensland. These were not well documented or quantified due to the remote locations. While the impacts of these conditions on populations are unknown, Golden Perch are highly mobile enabling them to move between regions and access favourable environmental conditions which may enhance population resilience to environmental changes [Zampatti et al. 2018].

The Murray–Darling Basin Authority Murray-Darling Basin Fish Survey (MDBFS), formerly the Sustainable Rivers Audit, fishery-independent monitoring suggested an increase in numbers in the Condamine–Balonne and Warrego rivers, whilst the population in the Paroo River is recovering after blackwater events during 2018–19. Minimal data is available on the populations in Lake Eyre Basin or the Fitzroy–Dawson river systems.

There is no published assessment of this species, and there are no data available to estimate biomass or exploitation rates. In addition, there is no knowledge on recruitment or harvestable biomass, and there are no defined target or limit reference levels. This prevents assessment of current stock size or fishing pressure. Consequently, there is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, Golden Perch in Queensland is classified as an **undefined stock**.

South Australia

Golden Perch supports important commercial and recreational fisheries in South Australia, primarily in the River Murray, including the Lower Lakes (i.e., Lake Alexandrina and Lake Albert). The commercial Lakes and Coorong Fishery (LCF) targets Golden Perch in the Lower Lakes, and upstream to Wellington.

The most recent assessment for Golden Perch in the LCF was completed in 2023 and used a weight-of-evidence approach that considered fishery catch and effort data to the end of June 2022 [Earl 2023]. The primary measures for biomass and fishing mortality are total catch and targeted catch per unit effort (CPUE) using large-mesh gillnets (115–150 mm mesh) in the LCF [Earl 2023], and fishery-independent estimates of relative abundance from annual electrofishing surveys in: (1) the Chowilla anabranch and floodplain system of the lower River Murray (near the SA-NSW border) from 2005–22 [Fredberg et al. 2023]; and (2) the gorge section of the lower River Murray (i.e., upstream of the Lower Lakes and downstream of Chowilla) from 2015–22 [Ye et al. 2023].

Long-term commercial fishery data are characterised by cyclical interannual variation in total catch, which has been closely linked with variations in target effort and CPUE using large-mesh gillnets [Earl 2023]. In 2021–22, catch declined to its lowest level since 2012–13 and gillnet CPUE declined to its lowest level since 2010–11. These measures were indicative of low-moderate fishable biomass in the Lower Lakes in 2021–22.

Golden Perch are periodic strategists that spawn and recruit periodically in association with elevated river flows [Mallen-Cooper and Stuart 2003]. Annual electrofishing surveys from 2005–22 indicated that Golden Perch were most abundant in the Chowilla region in 2011, after large-scale overbank flooding in the Murray-Darling Basin (MDB) supported enhanced recruitment and subsequent higher abundances of young-of-the-year (YOY) Golden Perch [Zampatti and Leigh 2013]. Following a succession of low flow years (2015–21), except for a flood in 2016 and elevated flows in 2022, the abundance of Golden

Perch at Chowilla has remained low [Fredberg et al. 2023].

A progressive decline in abundance was also evident in the gorge section of the lower River Murray, with annual electrofishing CPUE declining by 52% from 2015–20 [Ye et al. 2023]. Potential factors contributing to the decline in abundance in the lower River Murray are limited spawning and recruitment since 2011 [Fredberg et al. 2023; Ye et al. 2023], emigration of adult fish to upstream regions [Zampatti et al. 2018], natural mortality during a widespread hypoxic blackwater event associated with flooding in 2016 [Thiem et al. 2017], and the removal of fish by fishing. In 2022, abundance in the gorge section of the lower River Murray increased due mainly to higher abundances of YOY and the appearance of small cohorts from spawning in 2016–17 and 2018–19.

The recreational fishery for Golden Perch in South Australia is mainly confined to the River Murray, although the species has been stocked in several reservoirs around the State over recent years. The State-wide recreational survey in 2021–22 estimated that 24,220 Golden Perch were captured, of which 12,721 fish were retained [Beckmann et al. 2023]. The estimated total weight of the retained recreational catch for 2021–22 was 11.2 t, which was 70% lower than the previous estimate of total recreational harvest weight of 37.4 t in 2013–14 (Giri and Hall 2015).

The above evidence indicates that the biomass of this stock is not yet depleted, and recruitment is not yet impaired. The above evidence indicates that, for the period from 2011–22, the biomass declined and that the current level of fishing mortality is likely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, Golden Perch in South Australia is classified as a **depleting stock**.

Victoria

Commercial harvest of Golden Perch in Victoria ceased in 2001 and there is no recent information on recreational harvest or effort at state level. In the absence of consistent, long-term estimates of population abundances and harvest by recreational anglers, the status of Golden Perch in Victoria was assessed using nominal catch estimates and length composition from infrequent and irregular fishery-independent (electrofishing) surveys of six indicator riverine populations (Broken Creek and River, Campaspe River, Goulburn River, Gunbower Creek, Loddon River and Wimmera River) [Conron et al. 2020, Ingram and Lieschke 2023].

In recent years, electrofishing survey catch per unit effort (CPUE; number of fish per machine minute) has increased in five indicator rivers (Broken Creek and River, Campaspe River, Goulburn River, Loddon River and Gunbower Creek), and declined in one river (Wimmera River), the CPUE of which was below the average CPUE for the reference period (1996–2015) for the recent three years [Bell et al. 2023]. The CPUE for the Goulburn River and Gunbower Creek have been above the average for the reference period since the early 2010s, for the Campaspe River and Broken Creek and River, Goulburn River since the mid-2010s and for the Loddon River since the late 2010s.

All six indicator rivers are stocked annually with hatchery-bred juveniles, which may be masking natural recruitment. Regular stocking into the Campaspe, Goulburn and Loddon rivers is making a substantial contribution to populations [Ingram et al. 2015; Tonkin et al. 2019]. All Golden Perch sampled from the Campaspe River above Rochester were stocked and the majority of fish sampled from the Goulburn and Loddon rivers were stocked [Tonkin et al. 2019]. There is

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no definitive information available to determine if stocked fish are contributing to fisheries in the Broken Creek and River, Gunbower Creek, Loddon River and Wimmera River.

There is no information on fishing pressure, biomass and size composition for Golden Perch in impoundments in Victoria, where populations are largely sustained by stocking rather than natural recruitment. In 2021–22, 2.968M Golden Perch were released across Victoria [<https://vfa.vic.gov.au/recreational-fishing/fish-stocking>, accessed on 18-Sep-2023].

On the basis that CPUE appears to be increasing in five of six indicator rivers, it is anticipated that the Golden Perch stock will continue to improve, and in instances where environmental conditions are favourable, the re-stocked populations are expected to support recovery via natural recruitment.

The above evidence indicates that the biomass of this stock is likely to be depleted and that recruitment is likely to be impaired. However, recent increases in annual electrofishing survey CPUE for five of six indicator riverine populations suggest a recovering stock.

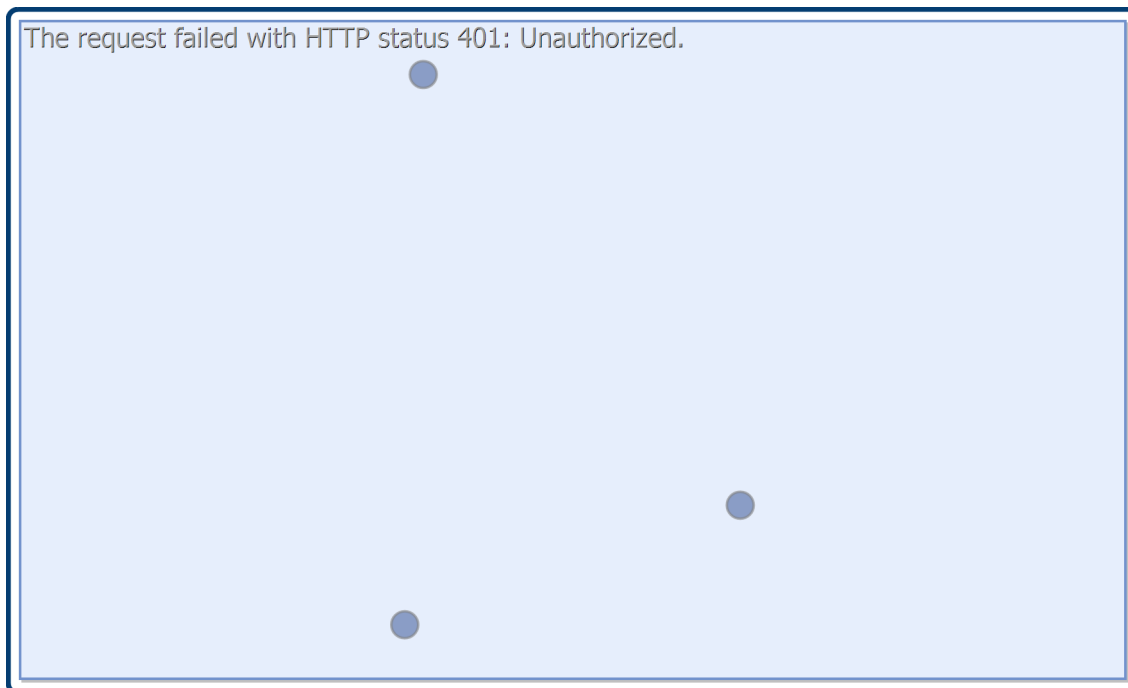
On the basis of the evidence provide above, Golden Perch in Victoria is classified as a **recovering stock**.

BIOLOGY

[Roberts et al. 2008; Forbes et al. 2015; Mallen-Cooper and Stuart 2003]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Golden Perch	27 years; 640 mm TL	225–371 mm TL; 2–4.9 years. Variable across geographical regions.

DISTRIBUTION



Distribution of reported commercial catch of Golden Perch.

TABLES

Fishing methods	New South Wales	Queensland	South Australia	Victoria
Commercial				
Gillnet			✓	
Net				✓
Unspecified	✓		✓	
Various		✓		
Recreational				
Gillnet			✓	
Hook and Line	✓	✓	✓	✓

Management Methods	New South Wales	Queensland	South Australia	Victoria
Commercial				
Gear restrictions			✓	
Limited entry			✓	

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Size limit			✓	
Spatial restrictions			✓	
Temporal closures			✓	
Total allowable effort			✓	
Recreational				
Bag and boat limits			✓	
Bag and possession limits	✓	✓		
Bag limits				✓
Gear restrictions	✓	✓	✓	✓
Licence				✓
Size limit	✓	✓		✓
Spatial restrictions			✓	
Temporal closures			✓	

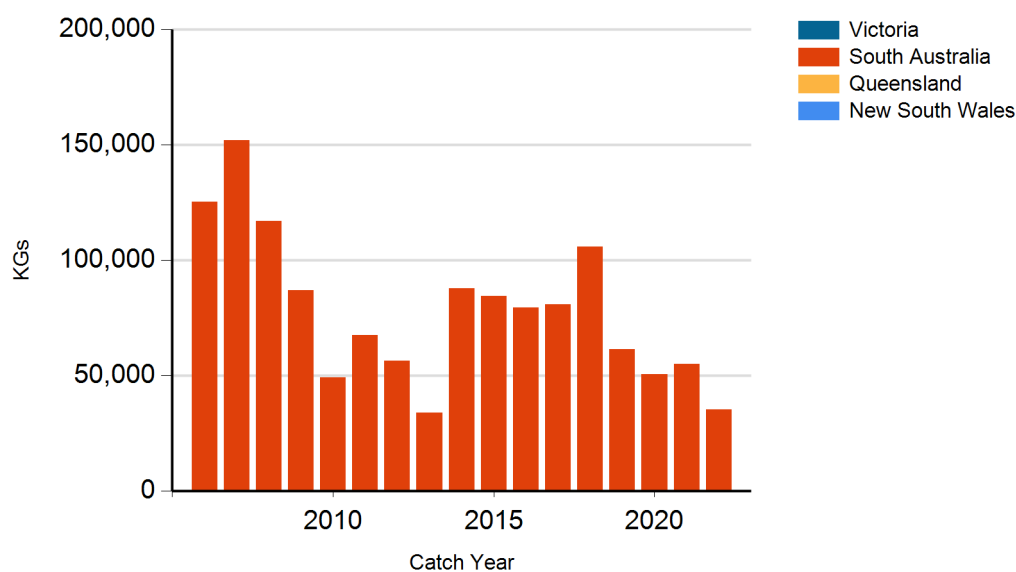
Catch				
	New South Wales	Queensland	South Australia	Victoria
Commercial	0 t	0 t	35.1859 t	0 t
Indigenous	Unknown	Unknown	Unknown	Unknown
Recreational	15,000 individuals (river), 9,000 (impoundment)	19,854 individuals (2019–20)	11.21 t (in 2021–22)	Unknown

Queensland – Indigenous (management methods). For more information see <https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing>

Queensland – Recreational Fishing (Catch). Data are based at the whole of Queensland level and derived from statewide recreational fishing surveys. Where possible, estimates have been converted to weight (tonnes) using best known conversion multipliers. Conversion factors may display regional or temporal variability. In the absence of an adequate conversion factor, data presented as number of fish.

Victoria – Indigenous (Management Methods). A person who identifies as Aboriginal or Torres Strait Islander is exempt from the need to obtain a Victorian recreational fishing licence, provided they comply with all other rules that apply to recreational fishers, including rules on equipment, catch limits, size limits and restricted areas. Traditional (non-commercial) fishing activities that are carried out by members of a traditional owner group entity under an agreement pursuant to Victoria’s *Traditional Owner Settlement Act 2010* are also exempt from the need to hold a recreational fishing licence, subject to any conditions outlined in the agreement. Native title holders are also exempt from the need to obtain a recreational fishing licence under the provisions of the Commonwealth’s *Native Title Act 1993*.

CATCH CHART



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