Australian Capital Territory

Nature Conservation (Silver Perch) Conservation Advice 2025

Notifiable instrument NI2025–305

made under the

Nature Conservation Act 2014, s 90C (Conservation advice)

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1 Name of instrument

This instrument is the *Nature Conservation (Silver Perch) Conservation Advice 2025*.

2 Commencement

This instrument commences on the day after its notification day.

3 Conservation advice for Silver Perch

Schedule 1 sets out the conservation advice for Silver Perch (*Bidyanus bidyanus*).

4 Revocation

The *Nature Conservation (Silver Perch) Conservation Advice 2020* (NI2020-353) is revoked.

Linda Neaves
Chair, Scientific Committee
21 May 2025

Schedule 1

(see s 3)

CONSERVATION ADVICE

SILVER PERCH – *Bidyanus bidyanus*

CONSERVATION STATUS

The Silver Perch *Bidyanus bidyanus* (Mitchell, 1838) is recognised as threatened in the following jurisdictions:

International	**Near Threatened**, International Union for Conservation of Nature (IUCN) Redlist
National	**Endangered**, *Environment Protection and Biodiversity Conservation Act 1999*
	Endangered, ASFB Conservation Status of Australian Fishes 2016 (Lintermans 2016)
ACT	**Endangered**, *Nature Conservation Act 2014*
NSW	**Vulnerable**, *Fisheries Management Act 1994*
VIC	**Endangered**, *Flora and Fauna Guarantee Amendment Act 2019*
QLD	**No Take**, *Fisheries Act 1994*
SA	**Protected**, *Fisheries Management Act 2007*
	Endangered, Action Plan for South Australian Freshwater Fishes (Hammer et al. 2009)

ELIGIBILITY

The Silver Perch is eligible to be included in the Endangered category of the ACT Threatened Native Species List under the *Nature Conservation Act 2014* (NC Act) under the IUCN Criterion A — A2(b)(c). The factors that make the Silver Perch eligible for listing include a severe reduction of at least 62 % in national numbers over three generations (1999–2019 = 21 years), and the reduction has not ceased, the cause has not ceased, and the cause is not fully understood, noting the species is functionally extinct in the ACT.

DESCRIPTION AND ECOLOGY

The Silver Perch – *Dhingur* (Winanggaay Ngunnawal Language Aboriginal Corporation 2022) is a medium to large fish, commonly reaching 300–400 millimetres (mm) and 0.5–1.5 kilograms (kg) in rivers, but historically recorded to at least 610 mm in length and 7.7 kg in weight (Lintermans 2023; DOE 2013; DCCEEW 2024). In the ACT, exceptional Silver Perch specimens up to 3 kg have been recorded (Pratt 1979), with one record of a 5 kg specimen (Harrison 2009). In Silver Perch the head is relatively small, jaws are equal in length and eyes and

Small adult Silver Perch (Gunther Schmida) mouth are small. The body is elongate and slender in juvenile and immature fish, becoming deeper and more compressed in adults. Large specimens develop a hump-shouldered appearance (Lintermans 2023; DOE 2013; DCCEEW 2024). The scales of Silver Perch are small and thin (compared to Macquarie Perch (*Macquaria australasica*) or Golden Perch (*Macquaria ambigua*). On some specimens, dark edges to the scales create a subtle cross-hatched or checkered appearance on the flanks. The colour of Silver Perch is generally silvery grey to black on the body, with the dorsal, anal and caudal (tail) fins also grey. The pelvic fins are whitish. The caudal fin is weakly forked (Merrick and Schmida 1984; Merrick 1996; Lintermans 2007, 2023).

Silver Perch are slow-growing and long-lived, with records of fish living to 17 years in the Murray River and 27 years in Cataract Dam. Silver Perch mature at three years of age for males and five years of age for females in riverine habitats (Mallen-Cooper and Stuart 2003). Generation length has been modelled at seven years (minimum plausible 6.75 years and maximum plausible 9.2 years) (Todd et al. 2022; DCCEEW 2024).

Silver Perch undertake a wide range of migrations as juveniles and adults and can migrate long distances. They are frequently recorded moving over 200 kilometres (km), with one tagged Silver Perch recorded moving 897 km in the Murray River (MDBA 2017) and another recorded moving 2,565 km from the lower Murray River in South Australia to the Barwon River in northern NSW (Lintermans 2023). Adults move upstream in late spring and juveniles move upstream in late summer (Mallen-Cooper et al. 1995; Mallen-Cooper and Stuart 2003).

Silver Perch spawning commences in mid-spring to summer, often associated with upstream migrations when large schools of fish were historically observed. Schools of fish spawn in shallow water with a preference for gravel substrate. In the Barmah Forest region of the Murray River Silver Perch spawn between early November and mid-February — fertilised eggs are recorded in water temperatures ranging from 17^{o}C to 28^{o}C but are consistently recorded at temperatures above 20^{o}C (King et al. 2009). Approximately 170,000–250,000 eggs per kg of body weight are laid (Merrick and Schmida 1984; Rowland 2009). Silver Perch eggs are approximately 2.7 mm in diameter and semi-pelagic but will sink in non-flowing environments (Lake 1967; Clunie and Koehn 2001; DOE 2013; DCCEEW 2024). They hatch in 30 hours at 26^{o}C (longer at lower temperatures), into larvae averaging approximately 3.6 mm in length (Lake 1967). Larvae are free swimming after five days and commence feeding after six days. Eggs and newly developed larvae generally disperse using downstream drift in river and stream currents (Koehn and Harrington 2005; Tonkin et al. 2007; Koehn et al. 2020), although some larvae actively maintain their position against flow in laboratory studies (Gehrke 1990, in Clunie and Koehn 2001).

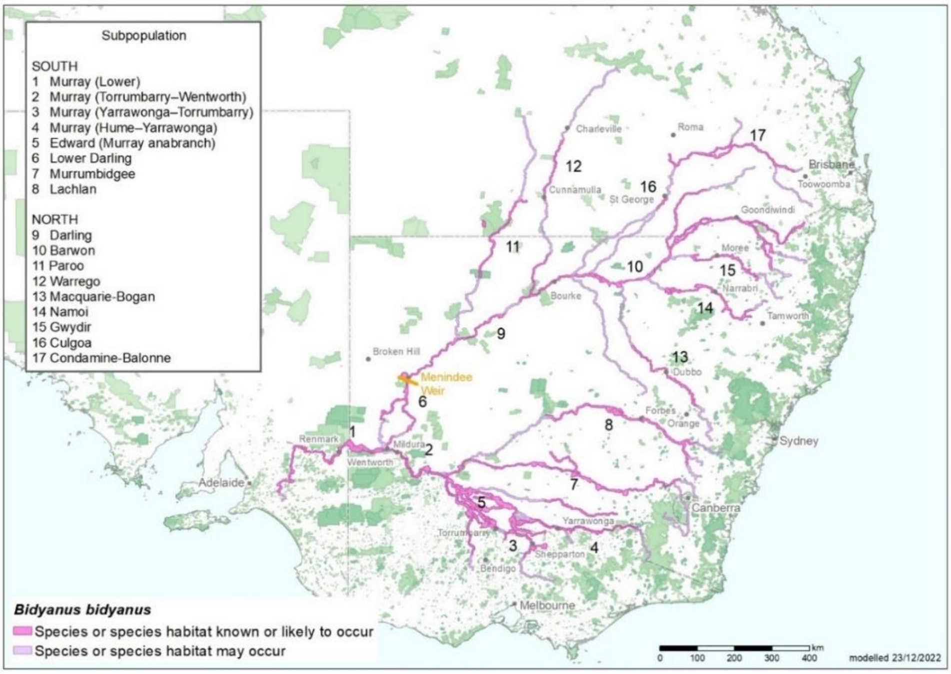
The formerly strong ‘run’ or upstream spawning migration of Silver Perch from Lake Burrinjuck up the ACT reaches of the Murrumbidgee River and beyond has not been recorded since the mid-1980s, after this large population underwent an extremely rapid and unusual collapse over the space of several years (Lintermans 2002; DOE 2013; Kaminskas 2021). At this time, the establishment of alien (‘introduced’) Carp (*Cyprinus carpio*) and Redfin Perch (*Perca fluviatilis*), as well as alien fish viruses, such as Epizootic Haematopoietic Necrosis Virus (EHN Virus) in these habitats, are strongly implicated in this population’s collapse as well as the species’ broader decline across the Murray–Darling Basin (Rowland 2020; Kaminskas 2021; DOE 2013; DCCEEW 2024).

Adult Silver Perch are omnivorous, with main food items being zooplankton, aquatic insects, molluscs, small crustaceans (*Paratya* and *Macrobrachium* shrimps), as well as worms and algae (Pollard et al. 1980; Merrick 1996; Clunie and Koehn 2001; NSW DPI 2006). Some reports suggest the species may become mainly herbivorous once they reach lengths of 250 mm, however, this may not be the case for lake populations as their diet in Googong Dam shows little change with fish size (Lintermans 2002, 2007, 2023).

DISTRIBUTION AND HABITAT

Silver Perch are endemic to the Murray–Darling Basin (Map 1). They were formerly widespread and abundant throughout the Basin's rivers and major streams, inhabiting a wide range of habitats and altitudes, ranging from meandering alluvial lowland rivers (<200 m ASL) to clear, rocky upland rivers, including the ACT Murrumbidgee (>500 m ASL) (DOE 2013; DCCEEW 2024). The ACT is towards the upper altitudinal limits of the species' distribution. Historically however Silver Perch regularly reached upland and montane sites upstream of the ACT in summer migrations, e.g. Michelago, Bredbo, Cooma (700–800 m ASL) (Pratt 1979; Harrison 2009; Trueman 2011; Lintermans 2023; DOE 2013; DCCEEW 2024). Silver Perch were also known from the Molonglo River as well as the upper and lower Yass River and the lower Goodradigbee Rivers in NSW (Pratt 1979; Trueman 2011; Kaminskas 2021, 2023; DOE 2013; DCCEEW 2024). The ACT's wild Silver Perch population collapsed in the mid-1980s and has not been recorded in the ACT Government's Murrumbidgee monitoring since 1988 (ACT Government 2018b). They are currently functionally extinct in the ACT.

Map 1: Modelled distribution of the Silver Perch (DCCEEW 2024)



Silver Perch prefer faster-flowing open waters, with rapids, runs and races (McCristal 1964; Pratt 1979; Harrison 2009; Clunie and Koehn 2001; Trueman 2011; DOE 2013; DCCEEW 2024). In lowland river habitats, Silver Perch are not dependent on coarse woody snags in the same way as Murray Cod (*Maccullochella peelii*), Trout Cod (*Maccullochella macquariensis*) and Golden Perch. Re-snagging projects in the middle-Murray River have not detected any response or increase in Silver Perch, in contrast to these other large-bodied native fish species (Lyon et al. 2019; Raymond et al. 2019). Similarly, Silver Perch showed no preference for structure (in this case, rock) over open sand in mesocosm experiments, but these experiments did suggest that the loss of macrophyte (aquatic plant) habitats caused by alien Carp may have had negative impacts on juvenile Silver Perch (Hutchison et al. 2019).

Silver Perch have been stocked into many impoundments in the region and continue to be stocked into Burrinjuck and Googong Dams by the NSW Department of Primary Industries (DPI) to provide a recreational fishery (ACT Government 2018b). However, these stocked populations of Silver Perch are not known to spawn or successfully recruit, and do not contribute to the conservation of wild Silver Perch (DOE 2013; DCCEEW 2024).

THREATS

European settlement and catchment activities (urban run-off, urban development, livestock grazing, pest animal grazing (rabbits)), forestry, cropping) have caused severe ongoing impacts to the ACT section of the Murrumbidgee River and tributaries that once provided suitable habitat for the Silver Perch. Prior to this, these upland rivers, in their natural state, were extremely low sediment environments characterised by deep rocky pools or 'holes' connected by rocky rapids and coarse gravelly races, with very-high water-quality including very-high water-clarity, high dissolved oxygen levels (D.O.) and low nutrient levels (Starr et al. 1999; Scott 2001; Olley and Scott 2002; Olley and Wasson 2003). While Silver Perch no longer occur as a viable wild population in the ACT, the main identified threats in the ACT Action Plan for Silver Perch (ACT Government 2018b) include:

- alien ('introduced') fish species:

  including Carp and Redfin predation on and competition with Silver Perch, and the physical modification and degradation of habitats by Carp

- alien fish parasites and diseases:

  including diseases such as EHN Virus and parasites such as 'Anchor Worm' (*Lernaea cyprinacea*)

- sedimentation:

  erosion and deposition of very large quantities of sand and silt in the ACT Murrumbidgee and tributaries, having many deleterious effects, including loss of fish habitat (infilling of deep pools) and harming of early life stages of Silver Perch (smothering of eggs, larvae)

- habitat modification:

  loss of fish habitat by infilling with sand and silt; also, in some locations the loss of native riparian (riverbank) vegetation, which degrades stream structure, reduces fish habitat and shading and reduces food resources for fish

- river regulation and flow reduction:

  including the significant reductions in annual flows and complete loss of the annual spring snow-melt flood-pulse caused by Tantangara Dam, as well as the large inflow reductions caused by dams on a major tributary, Cotter River (Corin, Bendora and Cotter Dams)

- barriers to fish passage:

  including both anthropogenic (man-made) barriers (dams, weirs and crossings) as well as natural barriers (e.g., rock bars, rapids and cascades) that were once frequently inundated and passable in the natural flow regime (e.g., Gigerline Gorge and Red Rocks Gorge) but are now rarely inundated or passable. Severely sedimented and very shallow sections of stream (e.g. Tharwa sand-slug) also act as barriers to fish passage under lower flows

- reductions in water quality:

  including urban, forestry and agricultural run-off with silt, nutrients (fertiliser, livestock manure) and chemical pollutants – the 2003 and 2020 bushfires also caused severe short-term water quality problems leading to localised fish kills, as well as severely exacerbating existing erosion and sedimentation problems; and another historic water quality issue occurred with gross heavy metal pollution from mining in the Molonglo River headwaters in the 1930s and 1940s)

- historical overfishing
- changing climate.

MAJOR CONSERVATION OBJECTIVE

The overall objective of the Action Plan for Silver Perch (ACT Government 2018b) is to assist, where possible, the re-establishment of Silver Perch in the upper Murrumbidgee Catchment by providing suitable habitat and assisting cross-jurisdictional actions to re-establish the species, should resources become available.

CONSERVATION PRIORITIES

The 2018 Action Plan for Silver Perch (ACT Government 2018b) identifies actions and the following main priorities to:

- support projects aimed at improving understanding of the biology and ecology of the species as the basis for managing its habitat
- protect sites and habitats that are critical to the survival of the species
- manage activities in the Murrumbidgee Catchment in the ACT to minimise or eliminate threats to fish populations
- increase community awareness of the need to protect fish and their habitats.

CONSERVATION ISSUES

It is recommended that quantitative targets and resourcing requirements are clearly identified in any Action Plan or other related projects/programs relevant to this species. Broader conservation issues need to be considered in developing and implementing actions arising from this advice and the species listing assessment (DCCEEW 2024).

Critical Habitat

The Commonwealth Conservation Advice for Silver Perch (DCCEEW 2024) states habitat critical to the survival of the Silver Perch includes the area of known subpopulations and areas of similar habitat adjoining known subpopulations (as described in the habitat section), which provide the potential for range extension through natural migration.

Whenever possible, habitat critical to the survival of the species should not be destroyed or modified. Actions that have indirect impacts on habitat critical to survival should be minimised, and actions that compromise adult and juvenile survival should also be avoided.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Climate Change

Climate change impacts are inevitable and will affect the persistence of many species within the ACT. Climate change poses a threat to any future re-established Silver Perch population in the ACT through increasing periods of low flows and ceased flow, deleterious water quality (excessively high water temperatures and low dissolved oxygen levels) and desiccation (drying out) of habitats. Such conditions also encourage heavy infestations of alien fish parasites such as 'Anchor Worm', which causes severe physiological distress and emaciation in native fish, and likely causes some cryptic mortality.

Jurisdictional Collaboration

As a species formerly distributed across the Murray–Darling Basin, including the Murrumbidgee River upstream and downstream of the ACT, the development of any policies, plans or strategies for Silver Perch — particularly in regard to re-establishing a population in the ACT — will need discussion and collaboration between relevant jurisdictional entities, chiefly NSW.

Ngunnawal Community Engagement

The ACT Government should actively facilitate, the inclusion of the Ngunnawal people in the conservation of this species and its habitat as part of Ngunnawal Country. Reference to the draft Cultural Resource Management Plan (ACT Government in prep.) would be useful to inform culturally appropriate resource management including of native species that aligns with achieving conservation outcomes for the species.

OTHER RELEVANT ADVICE, PLANS OR PRESCRIPTIONS

- ACT Aquatic and Riparian Conservation Strategy (ACT Government 2018a)
- ACT Action Plan – Silver Perch (ACT Government 2018b)
- Commonwealth Conservation Advice – Silver Perch (DOE 2013)

LISTING BACKGROUND

The Silver Perch was initially listed in the ACT as **Endangered** on 26 October 2001 in accordance with section 21 of the *Nature Conservation Act 1980*. At that time, the Flora and Fauna Committee (now the Scientific Committee) concluded that the assessment satisfied the following criteria:

1.2 species is observed, estimated, inferred or suspected to be at risk of premature extinction in the ACT region in the near future as demonstrated by:

1.2.1 current severe decline in population or distribution from evidence based on:

1.2.1.1 direct observation, including comparison of historical and current records

1.2.1.2 severe decline in rate of reproduction or recruitment, severe increase in mortality, severe disruption of demographic or social structure

1.2.1.4 very high actual or potential levels of exploitation

1.2.1.5 severe threats from herbivores, predators, parasites, pathogens or competitors.

The Silver Perch retained its Endangered listing status under section 91 when it was transferred to the *Nature Conservation 2014*, which supersedes the *Nature Conservation Act 1980.*

The Silver Perch was listed as **Critically Endangered** under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), effective 21 December 2013. The Silver Perch was then reassessed in 2022–2023 and re-listed as an **Endangered** species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), effective 16 July 2024. It is assessed as **Endangered** under Criterion 1 (A2bc) of the EPBC Act.

ACTION PLAN DECISION

Silver Perch currently has an Action Plan in the ACT under the *Nature Conservation Act 2014*. The ACT Scientific Committee recommends to the Minister for the Environment that the ACT continue having an action plan for Silver Perch under the ACT Aquatic and Riparian Conservation Strategy.

The Commonwealth Conservation Advice for Silver Perch (DCCEEW 2024) recommends that a National Recovery Plan is not required for Silver Perch as an approved, updated, and detailed (Commonwealth) Conservation Advice for the species would provide sufficient direction to implement priority conservation actions, mitigate against key threats, enable recovery, and provide foundation for further planning, a national Recovery Plan is not required at this time. Many of the threats to the Silver Perch are threats to other EPBC Act listed threatened inland riverine species which occur within the MDB. Actions and mechanisms are being implemented through a variety of existing programs, including in other species recovery plans, the Native Fish Recovery Strategy (MDBA 2020), the National Carp Control Plan (FRDC 2022), the Northern Basin Toolkit (Capon et al. 2020), water management plans, and actions being undertaken by relevant catchment management authorities. These actions are likely to be of benefit to the Silver Perch, however, these actions are most likely to apply to the regulated reaches of the Murrumbidgee River downstream from Burrinjuck Dam and not impact the ACT.

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FURTHER INFORMATION

Further information on the related Action Plan or other threatened species and ecological communities can be obtained from: Environment, Planning and Sustainable Development Directorate (EPSDD). Phone: (02) 132281, EPSDD – Environment Website: https://www.act.gov.au/environment

ATTACHMENT A: LISTING ASSESSMENT (DCCEEW 2024)

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Threatened Species Scientific Committee finalised this assessment on 6 November 2023.

Attachment A: Listing Assessment for *Bidyanus bidyanus*

Reason for assessment

The silver perch was listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2013 (DOE 2013a).

This assessment follows consultation with the states and territories as part of systematically reviewing species that are inconsistently listed under the EPBC Act and relevant state or territory legislation.

Assessment of eligibility for listing

This assessment uses the criteria set out in the EPBC Regulations. The thresholds used correspond with those in the IUCN Red List criteria except where noted in criterion 4, sub-criterion D2. The IUCN criteria are used by Australian jurisdictions to achieve consistent listing assessments through the Common Assessment Method (CAM).

Key assessment parameters

Table 5 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria. The definition of each of the parameters follows the Guidelines for Using the IUCN Red List Categories and Criteria.

Table 5 Key assessment parameters

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	903,000	500,500	1,305,000	Estimated using empirical and modelled data (C. Todd 2023 pers comm 4 Oct), with numbers heavily weighted toward the mid-Murray (Todd et al. 2022a).
Trend	Likely contracting across the distribution.			See Criterion 1 and Todd et al. (2022a).
Generation time (years)	7	6.75	9.2	The estimate used and minimum plausible value were calculated by Todd et al. (2022a), who used 3 measures of age-structured models as recommended by IUCN Standards and Petitions Committee (2022). These all gave similar values (6.75, 6.86, 6.98 years). The maximum plausible value is derived from a simpler formula (IUCN Standards and Petitions Committee 2022), including an age of first reproduction of 4 years (average of male and female values; Mallen-Cooper & Stuart 2003), length of the reproductive period of 13 years (given a maximum age of 17 years of the oldest collected wild fish; Mallen-Cooper & Stuart 2003), and a Z value

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
				of 0.4 (reflects the survivorship and relative fecundity of young vs. older individuals).
Extent of occurrence (EOO) (km²)	819,000	819,000	978,000	EOO was calculated as a minimum convex hull in GeoCat (Bachman et al. 2011) using species occurrence records (see Distribution section and Table 1). The minimum plausible value includes only records from 1999 onwards (to include data over the last 3 generations), whilst maximum value also includes records from before 1999.
Trend	Likely contracting.			For the EOO to contract would require local extinctions at sites on the edge of the distribution, which is most likely in the Northern MDB, e.g., Culgoa and Condamine-Balonne, which were identified as the most likely subpopulations to suffer extinction in viability models (Todd et al. 2022a).
Area of Occupancy (AOO) (km²)	> 2000	1856	3700	AOO was calculated in GeoCat (Bachman et al. 2011) with the standard IUCN cell size of 4 km² (IUCN Standards and Petitions Committee 2022). The minimum plausible value represents known distribution records since 1999 (see Distribution section and Table 1). However, this may be an underestimate given sampling issues (see Criterion 1) and so the estimate used is assumed to be greater than 2000 km². The maximum plausible value is difficult to calculate as the silver perch is a highly mobile species (Lintermans 2023), and it is not clear precisely what to include as 'occupied' habitat (see Criterion 2). Therefore, the maximum is precautionarily estimated at double the minimum. The AOO should be updated as surveys provide better distributional data.
AOO is a standardised spatial measure of the risk of extinction, that represents the area of suitable habitat known, inferred or projected to be currently occupied by the taxon. It is estimated using a 2 x 2 km grid to enable comparison with the criteria thresholds. The resolution (grid size) that maximizes the correlation between AOO and extinction risk is determined more by the spatial scale of threats than by the spatial scale at which AOO is estimated or shape of the taxon's distribution. It is not a fine-scale estimate of the actual area occupied. In some cases, AOO is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g., breeding sites for migratory species).				
Trend	Very likely contracting.			Almost all modelled scenarios from Todd et al. (2022a) show a population decline, as does empirical data post 2010 (Crook et al. 2023).
Number of subpopulations	17	8	17	The maximum plausible value represents all subpopulations (see Table 1). Minimum assumes the

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
				following adjacent subpopulations are connected and form discrete subpopulations: 1) Murray/Edward/ Lower Darling, 2) Murrumbidgee, 3) Lachlan, 4) Paroo, 5) Warrego, 6) Macquarie-Bogan, 7) Darling/ Barwon/Namoi/Gwydir, 8) Condamine/Culgoa.
Trend	Likely contracting			The models of Todd et al. (2022a) show non-zero probabilities of extinction of several subpopulations (metapopulations), particularly if the climate becomes dryer.
Basis of assessment of subpopulation number	The metapopulations of Todd et al. (2022a) are based on both geography and silver perch ecology/biology. Whilst there is very limited data on genetic relationships across the MDB, Moore et al. (2010) suggest the Paroo, Condamine, and Border Rivers are distinct (based on Keenan et al. 1995; Bearlin & Tikel 2003).			
No. locations	2	1	2	The northern and southern MDB are distinct hydrologically, resulting from natural processes (seasonal climate) and human development (river regulation) (Koehn et al. 2020a). This leads to a slightly different threat profile and emphasis in each region.
Trend	Stable or contracting.			If the northern MDB were to become extinct, as projected under Todd et al (2022a), then the number of locations would contract.
Basis of assessment of location number	The Northern and Southern MDB are considered naturally distinct regions (Koehn et al. 2020a). This is based on existing different ecological drivers (seasons, climate, geomorphology, hydrology; Koehn et al. 2020a), and potentially differing responses to climate change (MDBA 2019b; Bureau of Meteorology 2020). These differences carry across to the intensity and type of human impacts, largely related to water regulation, with the Murray River and the rest of the Southern MDB regulated to the point that there is now a seasonal reversal of flows and a large loss of flow due to irrigation (Koehn et al. 2020a). This different natural and human template means the 2 areas may not experience the exact same threat profiles and so are considered as 2 locations. The main threat in the Northern MDB is related to the loss of long stretches of lotic habitat associated with barriers and weirs, while in the Southern MDB it is changing flow patterns through regulation. However, both regions share all threats, most of which will continue to intensify with climate change. Modelling suggests the silver perch population of the Northern MDB has declined precipitously, including under various alternate scenarios, while the Southern MDB has also declined but less quickly (Todd et al. 2022a). The delineation between the locations is reinforced by the hard barrier on Menindee Weir which prevents immigration and emigration, thus limiting the opportunity for natural recolonisation after localised extinction events.			
Fragmentation	Not known to be severely fragmented as there are no data on fragmentation; however, continued declines in geographically isolated subpopulations in the Northern Basin are likely to lead (or may have already led) to some functional extinctions, meaning there may be no appreciable geneflow between some subpopulations, which can lead to demographic fragmentation (Todd et al. 2022a).			
Fluctuations	Not known to be subject to extreme fluctuations.			

Criterion 1 Population size reduction

Reduction in total numbers (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered **Very severe reduction**	**Endangered** **Severe reduction**	**Vulnerable** **Substantial reduction**
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [*(a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

Based on any of the following

(a) direct observation [except A3]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Criterion 1 evidence

Eligible under Criterion 1 A4bc for listing as Endangered

There is little doubt that the overall silver perch population has declined precipitously over an extended period (Clunie & Koehn 2001b). However, for a population reduction to be considered in an assessment, it must be over a maximum of three generations (~21 years for the silver perch; Todd et al. 2022a).

The silver perch has a broad range with low local density, and is haphazardly distributed across a very large area, much of which has been poorly sampled. This distribution pattern generally requires large amounts of good quality abundance data, with spatial and temporal replication, to effectively track population change through time (Jeliazkov et al. 2022).

To enable assessment of this species, two main approaches and sources of data were used to identify any putative population reductions: observed catch data (empirical) and data derived from models based on ecological processes (modelled). Empirical and modelled datasets can be used in concert, and to cross-validate each other, to come a conclusion that might be challenging with either dataset in isolation. Hale et al. (2023) did this for another riverine MDB fish (golden perch), comparing NSW empirical datasets with that derived from a population model (Todd et al. 2022b).

Empirical data

There are no population size estimates for the silver perch over three generations across its entire Murray-Darling distribution, although there are local catch data from various river basins, but of variable quantity and quality (see Distribution section and Table 1 above). The most substantial estimate has been for five NSW river valleys in the Murray-Daring Basin for every year from 1994 to 2022 (Crook et al. 2023). However, there is considerable uncertainty in the data, and no overall clear trend for silver perch (Crook et al. 2023). Tentatively, the dataset shows an overall decline from the start to the end, but confidence intervals overlap. After an initial decline, until 2002, abundance does begin to rise and reaches a peak in 2010, but then falls rapidly until 2015, before slowing to a more gradual decline. This trend is supported by higher proportions of juveniles in years preceding the peak (Tonkin et al. 2019) and low proportions of juveniles in years since, indicating low recruitment (Crook et al. 2023).

The 2010 peak may reflect good antecedent conditions for the silver perch for the preceding few years, punctuated by high flows and flooding of 2010 completing this recruitment cycle (Tonkin et al. 2019; Crook et al. 2023). It is also possible that the increased flows of 2010 stimulated adult silver perch to move as a vital stage of their breeding cycle, thus making them easier to catch. This pulse of silver perch adults was evident in the local catch data at Torrumbarry in the mid-Murray, where more than twice as many adults were caught in 2010 (4202) than even the second most abundant year between 1991-2019 (1999 individuals in 2005; MDBA 2022). This important flow-related breeding event also appears to be evident in the modelled data, but lagged four years due to the time taken for recruits to mature (see *Modelled data* section below; Todd et al. 2022a).

A limitation for interpreting silver perch distributional data is a lack of a wide, geographic representation in the available catch data (e.g., 96 % of specimens from the five NSW river valleys are from the Southern Basin; Crook et al. 2023). Density varies greatly across the MDB, with the species relatively much more abundant in the mid-Murray than in the rest of the distribution (Tonkin et al. 2019). Sites in the Northern MDB have been much less intensively sampled, and so are consequently difficult to characterise (Lintermans et al. 2023). This is compounded by the related issue of sample size. Yen et al. (2021) found their abundance estimates for silver perch were highly uncertain because of low sample sizes, even in the relatively abundant mid-Murray River subpopulation. The relative rarity of silver perch is evident in the five NSW valleys considered above (and five valleys unable to be assessed due to low numbers), where 12–13 times more golden perch and Murray cod individuals were sampled relative to silver perch (Crook et al. 2023). Further, the issue of zero detections prevented the silver perch from being included in the statistical models to estimate the spatial extent of ubiquitous fish in the MDB (2004-22) (Lintermans et al. 2023). In this context, the silver perch population of the mid-Murray, which is much larger and better sampled, drives the pattern of overall numbers for the species in the MDB.

It should also be noted that the presence of stocked silver perch complicates interpretation of the trend in the wild population. Stocked individuals should not be included in an assessment as they do not represent the current local subpopulation (IUCN Standards & Petitions Committee 2022). However, it is impractical in most situations to differentiate stocked individuals, or assess their impact on the wild population, without large-scale and specific programs to do so (Crook et al. 2006). Silver perch have been extensively stocked into reservoirs, dams, impoundments, and rivers across the MDB (at least 8.2 million stocked 1999-2021; DAF 2021c,d; DPI 2021b; VFA

2021). The suspected presence of stocked individuals can complicate the interpretation of basic catch records. This is especially so if the catch numbers are small, as the increase of only a few potentially stocked individuals may incorrectly imply stability or a relative increase in abundance.

Modelled data

Population models can provide complementary data that can be combined with and compared to empirical data, such that each can provide support for or identify weaknesses in the other. Consequently, a Basin-wide population model was developed for silver perch (Todd et al. 2022a), which was adapted and reparametrized from a golden perch model (Todd et al. 2022b). The silver perch model was applied to 13 metapopulations, using daily flow and temperature data (1983-2019) for each metapopulation, and known stocking rates (Todd et al. 2022a). This, in effect, created hindcast estimates of population size of silver perch from 1983-2019 for the entire MDB, and the Northern and Southern Basin separately, as well as minimum population size estimates for each metapopulation (Todd et al. 2022a).

The results of the model showed a downward trend in population numbers through time for the MDB (and Southern Basin), punctuated by occasional population increases associated with good years, with favourable flow conditions (last one 2014). In contrast, the Northern Basin declined precipitously, with a small, brief increase in abundance in 2015. At the MDB scale, the mean population size change estimate between 1999-2019 was a 62 % reduction (best case 39 %, worst case 77 %), with the Southern Basin very similar (mean 61 % reduction) and the Northern Basin much worse (mean 96 % reduction).

Models are simplifications and cannot include every possible factor (Hale et al. 2023). For example, the silver perch population model did not incorporate a number of threats that could negatively impact abundance, including a) the loss of flowing water habitats (Mallen-Cooper & Zampatti 2018); b) recent increased floodplain harvesting in the Northern Basin; c) unscreened pumps (Koehn et al. 2017; Boys et al. 2021); d) cold water pollution from dam releases (Todd et al. 2005; Michie et al. 2020); e) instream barriers (Koehn et al. 2020b); f) fish kills resulting from blackwater events linked with floods, droughts, heat, and fires (Australian Academy of Science 2019; Vertessy et al. 2019). Similarly, Hale et al. (2023) found that misalignments between golden perch modelled and empirical data in a number of subpopulations were likely due to factors that had not been built into the model, including blackwater events and stocking. Whilst some basic stocking data were included in the silver perch model (Todd et al. 2022a), detailed information on survival, breeding and movement for stocked fish was not, and these could be very influential on the model outputs.

Modelled datasets also have inbuilt limitations, as their results are contingent on the data with which they were fed. The various datasets used to inform the silver perch model (Todd et al. 2022a) were not originally collected for that purpose and so may not represent all possible scenarios, which can lead to poor model performance (Hale et al. 2023). For example, Hale et al. (2023) found that modelled and empirical population data for golden perch agreed the least when flow was very high or very low, but were much more similar when there was intermediate flow. The model's output was more reliable when the conditions experienced more closely matched those that were included in the model, with extreme conditions making the modelled results less reliable (Todd et al. 2022b; Hale et al. 2023).

Assessing the silver perch under past population reduction (A2)
The best way to characterise the current status of the overall silver perch population qualitatively, given the available data, is of a species in broad decline. The two regions of the MDB are quite distinct, with the silver perch possibly declining, but more gradually, in the Southern Basin, and still relatively common in some parts of the mid-Murray system. Subpopulations in the mid-Murray are likely a source (Zampatti et al. 2018; Thiem et al. 2022), propping up most of the other southern subpopulations. Since the population increases of around 2010, the relative abundance of silver perch has declined, with low levels of recruitment (Crook et al. 2023).

In the Northern Basin, the species is highly imperilled and on the brink of functional extinction. This means that many of the northern subpopulations are currently persisting at very low levels, evidenced by the small number of fish that are occasionally caught (possibly including stocked fish). However, these local subpopulations exist largely in isolation, neither providing nor receiving immigrants. Thus, there is little resilience in the system to current and future threats. They are, in effect, largely demographically, genetically, and ecologically separate from the larger population as a whole (Redford et al. 2011). A small number of individuals in each northern subpopulation breed each generation, but recruitment is low and declining and is not self-sustaining in the long-term (Redford et al. 2011).

There is considerable agreement between the empirical and modelled datasets in detail and overall tenor, with both datasets showing peaks in the more recent parts of the time series associated with high flows 2010/14. Both datasets also show subsequent average population reductions of 22 to 58 % to 2019 (end of modelled dataset) and 2022 (end of empirical dataset) depending on the starting year. Both datasets show similar estimated reductions from their respective flow-related peaks to 2019/22 (empirical 58 %, modelled 52 %).

Despite these commonalities, when focusing solely on a past reduction in total numbers over the previous three generations, the datasets do not agree sufficiently, and so the species is not eligible for listing under category A2 (past population reduction).

Assessing the silver perch under past and future population reduction (A4)
The major threats to the silver perch (altered flow regimes, barriers to fish movement, increased frequency and severity of droughts, competition with the common carp) have not ceased and may not be reversible. This is particularly the case for climate change related threats, which describes and/or interacts significantly with almost all of them (see threat interactions in Table 3). Climate change is predicted to amplify these threats, with an accompanying loss of suitable habitat (Galego de Oliveira et al. 2019).

Neither the modelled nor empirical datasets formally projected forward in time. However, the modelled datasets explored a range of alternate environmental scenarios (flow, temperature) which assumed both dry and wet conditions (Todd et al. 2022a). "Dry" conditions used the 12 years of least flow between 1983-2019 to represent the whole period, which broadly represents the Millennium drought. However, this may also be indicative of future dry conditions under climate change (Balcombe et al. 2011; Dyer et al. 2014; Kirono et al. 2020). When dry conditions were assumed, the Basin-wide population of the silver perch collapsed to the verge of extinction, with a mean population reduction of 80 % (63 % to 91 % best and worst case) (Todd et al. 2022a).

Whilst elements of climate change (flow, temperature) were included in the modelling, a number of potentially significant processes were not, including hypoxia. Hypoxia (blackwater events) is a looming and possibly highly impactful and intensifying process, that is linked to increased drought, temperature, flood and fire (Australian Academy of Science 2019; Vertessy et al. 2019; Sheldon et al. 2022). This was not integrated into the silver or golden perch models (Todd et al. 2022a,b) and may explain differences in modelled and empirical data (Hale et al. 2023). Blackwater events have proliferated recently, including a very large-scale fish kill of tens of millions of fish in the Lower Darling–Baaka River in 2018-20 (Stocks et al. 2022). This was followed in 2023 by another fish kill in the Lower Darling–Baaka River in mid-March 2023 of an estimated 20-30 million fish, and further mass fish deaths are likely (Office of the NSW Chief Scientist & Engineer 2023). Sequential fish kills are likely greatly reducing the species' resilience to weather future impacts.

Both datasets show estimated declines of similar ranges from the flow related peaks of 2010/2014 of over 50% (empirical 58%, modelled 52%). The population reductions reflected in both datasets represent roughly one silver perch generation (~7 years; Todd et al. 2022a). The empirical data show evidence of occasional juvenile recruitment (<20 cm total length) before 2000, but since then the size/age profile is overwhelmingly of larger fish, implying low recruitment (Crook et al. 2023), and thus a lower chance of recovery and high susceptibility to decline without further significant pulses of recruitment. The higher chance of future severe droughts lessens the chances of successful recruitment, which, if extended for more than one generation, can mean local extinctions.

Both lines of evidence suggest ongoing declines of roughly 50 % over the previous silver perch generation (Todd et al. 2022a; Crook et al. 2023). Given the intensifying nature of the ongoing threats detailed above, the silver perch is highly susceptibility to intensifying population declines. The population reduction projected over the upcoming two generations (to roughly 2031) is likely to worsen, meaning population reductions include both the past and future (A4).

Given a precautionary and realistic approach (IUCN Standards & Petitions Committee 2022), the balance of probability of empirical and modelled data, biological and ecological studies (Koehn et al. 2020a; Lintermans 2023; Lintermans et al. 2023) and future climate impacts suggest the silver perch is in serious decline. Given this, thresholds for Criterion 1 should be precautionary (Keith et al. 2000). The population reduction for the silver perch across the whole MDB distribution over the previous one generation or so (2010) is estimated to be 52–58 %, and likely to be greater than that for the next two generations (to 2031), thus meeting the threshold of Endangered under category A4 (> 50 % from 2010-31), with subcriteria (b) (an index of abundance appropriate to the taxon) and (c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality. The index of abundance is the estimated, modelled and projected population size, which given the level of decline, would also mean a reduction in AOO and possibly EOO, and the decline in habitat quality in the Murray-Darling is well established (see Threats).

The Committee considers that the species has and will undergo a severe reduction in numbers over three generations (21 years for this assessment; 2010-31), of at least 50 % and the reduction has not ceased, the cause has not ceased and may not fully reversible. Therefore, the species has met the relevant elements of Criterion 1 to make it eligible for listing as **Endangered**.

Criterion 2 Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

		Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1.	Extent of occurrence (EOO)	**< 100 km^2**	**< 5,000 km^2**	**< 20,000 km^2**
B2.	Area of occupancy (AOO)	**< 10 km^2**	**< 500 km^2**	**< 2,000 km^2**
AND at least 2 of the following 3 conditions:				
(a)	Severely fragmented OR Number of locations	**= 1**	**≤ 5**	**≤ 10**
(b)	Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c)	Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Criterion 2 evidence

Not eligible

Extent of occurrence

The EOO for the silver perch has been calculated as a range between 819,000–978,000 km^2 (see Table 5). The small numbers of fish sampled (Table 1) and modelling (Todd et al. 2022a) suggest that the Northern MDB may be functionally extinct, or nearly so (see Criterion 1), and that northern subpopulations have the highest probability of extinction (see Criterion 5). If the Northern MDB were to be excised from the distribution, then the EOO for the Southern MDB alone, based on sampling records, would be approximately 300,000 km^2 (Table 6). The widely distributed nature of the species means that the EOO under all assumptions is well above the threshold value for listing (20,000 km^2 for Vulnerable); therefore, the silver perch is not eligible for listing under sub-criterion B1.

Area of occupancy

The silver perch is a highly mobile species (Lintermans 2023), so it is not clear precisely what to include as 'occupied' habitat, or how well an AOO might represent this. If every area through which a highly mobile species ever passed (potential habitat) were to be counted as occupied, then its distribution would likely be an overestimate (IUCN Standards and Petitions Committee 2022), as in Riches et al. (2016) and Gilligan et al. (2019). However, only including where every individual is at a single point in time, even though impossible to know, would be an underestimate for a species that clearly moves a great deal.

Table 6: Silver perch AOO and EOO estimates based on catch records (1999-2022) arranged by region and subpopulation (*sensu* Todd et al. 2022 with addition of Lachlan, Paroo, Macquarie-Bogan, Namoi).

Subpopulation	AOO		EOO
	Km^2	% total	(km^2)
Murray (Lower)	312	16.8%	16,214
Murray (Torrumbarry– Wentworth)	280	15.1%	18,792
Murray (Yarrawonga–Torrumbarry)	344	18.5%	7,074
Murray (Hume– Yarrawonga)	40	2.2%	1,063
Edward (Murray anabranch)	208	11.2%	4,633
Lower Darling	40	2.2%	5,072
Murrumbidgee	156	8.4%	43,124
Lachlan	100	5.4%	19,239
South - subtotal	**1480**	**79.7%**	**300,336**
Darling-Baaka	16	0.9%	2,968
Barwon	176	9.5%	101,765
Paroo	36	1.9%	5,316
Warrego	16	0.9%	147
Macquarie-Bogan	52	2.8%	2,378
Namoi	32	1.7%	5,880
Gwydir	8	0.4%	8
Culgoa	16	0.9%	53
Condamine-Balonne	24	1.3%	8,882
North - subtotal	**376**	**20.3%**	**457,244**
MDB - total	**1856**		**819,383**

AOO has been calculated based on the distributional data as a range between 1,856–3,700 km^2 (see Table 5). If the Northern MDB were to be discounted as functionally extinct, the resulting minimum AOO for the remaining Southern MDB would be 1,480 km^2. Whilst the lowest full estimate of 1,856 km^2 is below the threshold of listing (2,000 km^2), this is likely an underestimate given sampling issues (see Criterion 1). Further, while the Northern MDB may be functionally extinct and could be in a terminal decline under most assumptions (Todd et al. 2022a), it is not yet extinct as defined by the IUCN guidelines (population size reaching zero; IUCN Standards and Petitions Committee 2022). Therefore, the silver perch is not eligible for listing under sub-criterion B2.

Locations

There are two locations for the silver perch based on slightly divergent threat profiles relating to differences in the natural and human environments (Table 5).

Continuing decline

Empirical and modelled data suggest an ongoing population decline (see Criterion 1), satisfying the inferred and projected conditions *(ii) area of occupancy* and *(v) number of mature individuals*. The continuing poor state of aquatic habitats in the MDB (Koehn et al. 2020a), which will likely continue to decline with climate change (Balcombe et al. 2011), means an inferred and projected condition *(iii) area, extent and/or quality of habitat* is likely also met.

Following assessment of the data, the Committee considers that the species is not eligible for listing in any category under this criterion as neither the EOO nor AOO are likely to be limited.

Criterion 3 Population size and decline

		Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals		< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true				
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)		Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generation (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:				
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a)	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals				

Criterion 3 evidence

Not eligible

There are an estimated 503,000 to 1,505,000 mature silver perch individuals across the entire MDB distribution (C. Todd 2023 pers comm 4 Oct), heavily weighted toward the mid-Murray (Todd et al. 2022a).

The total number of mature individuals is > 10,000 adults which is not considered limited. Therefore, the species has not met this required element of this criterion.

Criterion 4 Number of mature individuals

	Critically Endangered Extremely low	**Endangered Very Low**	**Vulnerable Low**
D. Number of mature individuals	< 50	< 250	< 1,000
D2.[1] *Only applies to the Vulnerable category* Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time			D2. Typically: area of occupancy < 20 km² or number of locations ≤ 5

[1] The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the *common assessment method*.

Criterion 4 evidence

Not eligible

The total number of mature individuals is > 1000 adults, which is not considered low. Therefore, the species has not met this required element of this criterion.

Criterion 5 Quantitative analysis

	Critically Endangered Immediate future	**Endangered Near future**	**Vulnerable Medium-term future**
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

Criterion 5 evidence

Insufficient data to determine eligibility

No species-wide population viability analysis has been undertaken on the silver perch with derived extinction probability estimates. Therefore, there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

There have been several catchment-scale studies which modelled the silver perch population dynamics relating to specific management actions. In the Namoi River, Todd et al. (2019) estimated the effectiveness of stocking and the impacts of cold-water pollution, and Koehn et al.

(2020b) looked at unscreened diversions and barrier impacts on the silver perch. The estimated minimum population size was very low in both studies, declining to almost zero without remedial actions. Another modelling study looked at the impact of flow management on silver perch subpopulations in the Goulburn and Campaspe rivers in northern Victoria (Todd et al. 2020). It highlighted the importance of connectivity and movement for juveniles in maintaining these subpopulations. However, the studies are too localised and habitat conditions across the distribution too varied to allow for a species-wide probability of extinction to be calculated across the MDB from these estimates.

A much larger study considered most of the areas of the MDB where the silver perch has been reported (Table 1; excluding the Lachlan, Paroo, Macquarie-Bogan, Namoi subpopulations) (Todd et al. 2022a). This study does not include a forward extinction probability estimate, but rather a hindcast (up to 2019). It did not estimate extinction probabilities of the entire population, which would be meaningless as the species did not go extinct in 2019. However, extinction probabilities by 2019 were estimated at the regional and metapopulation level under several scenarios (variables included in the model: climate, stocking, and resumption of recreational fishing). The Southern MDB silver perch metapopulation was modelled to persist but in long-term, decline. However, the modelling did not account for catastrophic events like fish kills from hypoxia or account for the effects of water extraction. The Northern MDB metapopulation was modelled to be likely functionally extinct or near so. Probabilities of extinction were higher for the Northern MDB metapopulation as a whole, as well as individual local metapopulations, with probability increasing under scenarios that included a drier climate and a resumption of recreational fishing. However, as this study did not estimate the probability of species-wide extinction in the future, it cannot be used as evidence to support listing under this criterion.

Adequacy of survey

The survey effort has been considered adequate and there is sufficient scientific evidence to support the assessment.

Public consultation

Notice of the proposed amendment and a consultation document was made available for public comment for at least 30 business days between 22 January 2021 and 12 March 2021. Any comments received that were relevant to the survival of the species were considered by the Committee as part of the assessment process and provided to the Minister for the Environment with the Committee's advice.

Listing and Recovery Plan Recommendations

The Threatened Species Scientific Committee recommends:

(i) that the list referred to in section 178 of the EPBC Act be amended by transferring *Bidyanus bidyanus* from the Critically Endangered category to the Endangered category.

(ii) that there not be a Recovery Plan for this species in accordance with the provisions of the EPBC Act and the Committee's conservation planning principles as follows:

- An approved conservation advice is an effective, efficient and responsive document to guide the implementation of priority management actions, mitigate key threats and support the recovery for this EPBC Act listed Endangered species.
- An approved conservation advice would support the species recovery by identifying priority actions, stakeholders for engagement, and the survey and research priorities to facilitate a better understanding of key threats as well as biological and ecological knowledge gaps.
- The threats facing the entity, and the recovery actions needed can be effectively guided via an approved conservation advice.
- Many of the threats to the species are threats to other EPBC Act listed threatened inland riverine species which occur within the MDB. Actions and mechanisms are being implemented through a variety of existing programs, including in other species recovery plans, the Native Fish Recovery Strategy (MDBA 2020b), National Carp Control Plan (FRDC 2022), Northern Basin Toolkit (Capon et al. 2020), water management plans, and actions being undertaken by relevant catchment management authorities. These actions are likely to be of benefit to the silver perch.

(iii) Having regard to the above factors, a recovery plan is not required as it would not provide a significant conservation planning benefit above existing mechanisms.