

Longfin Eel (2023)

Anguilla reinhardtii



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Queensland	Queensland	Undefined	Catch, Effort, CPUE
New South Wales	New South Wales	Sustainable	Catch, effort, standardised CPUE
Victoria	Victoria	Sustainable	Catch, nominal CPUE
Tasmania	Tasmania	Sustainable	Catch, spatial limitations

STOCK STRUCTURE

The Longfin Eel has a wide species distribution that extends the entire eastern Australian coast from Cape York to Tasmania and is also found at Lord Howe Island and Norfolk Island [Beumer and Sloane 1990], and in northern New Zealand [Jellyman et al. 1996]. The Australian stock structure was investigated via a microsatellite genetic study, and the results indicated a single panmictic biological stock along the east coast [Shen and Tzeng 2007]. However, there is currently no cross-jurisdictional stock assessment undertaken for the shared stock, so this assessment of stock status is presented at the jurisdictional level—New South Wales, Queensland, Tasmania and Victoria

STOCK STATUS

**New South
Wales**

The Longfin Eel is a slow growing species that takes up to 22 years for males and 52 years for females to reach sexual maturity. In Australia, it mainly inhabits the lower reaches and tidal areas of rivers east of the Great Dividing Range until sexual maturity, and then migrates into the deep tropical ocean waters east of the Coral Sea to spawn once before dying [Pusey et al. 2004]. This life history strategy can make eels particularly vulnerable to recruitment overfishing [Hoyle and Jellyman 2002]. The New South Wales commercial fishery targets the fully pigmented sub-adults or 'yellow eels' that return to the estuaries and does not permit fishing on adult eels upstream of tidal waters. A minimum size limit of 300 mm total length (TL) for Longfin Eel was introduced in 1997 and later increased to 580 mm TL in 2007. Some historical catches of juvenile 'glass eels' (40–70 mm TL) and undersized 'yellow eels' (300–580 mm TL) were permitted from estuarine tidal waters for aquaculture seed stock and grow-out between 1995 and 2010 [Pease 2004]. Permitted quantities were highly restricted, with total catches of less than 300 kg of 'glass eels' per year (undersized 'yellow eel' catches were included in commercial catch statistics) and aquaculture production of eels in New South Wales ceased in 2014–15.

Most of the New South Wales commercial catch is taken by eel trapping in the Estuary General Fishery, with seven main estuaries on average accounting for 73% of the catch [Hall 2020]. Commercial catches of Longfin Eel rapidly increased in the early 1990s to a peak of 167 tonnes (t) in 2000–01 and then remained at around 80 t until 2014–15. Over the last six years the export market for live eels decreased and processing facilities in NSW closed. As a result catches decreased rapidly and the total commercial catch in 2021–22 was 14.2 t.

Historical standardised catch rates for eel trapping (in kg per days fished) from monthly records declined by over 50% during the 1990s, increased back toward the long-term average (25 kg per days fished) during the 2000s [Hall 2020]. Recent standardised daily catch rates (in kg per trap) suggest further declines occurred during the early 2010s, but over the last 6 years catch rates have fluctuated around the long-term average (4.8 kg per trap) and indicate a more stable trend [Hall 2023]. An interim total commercial access level (ITCAL) of 137 t was introduced in New South Wales in 2017 and will transition to an adjustable total allowable commercial catch (TACC) in 2024. Current harvests are well below the ITCAL and a more comprehensive stock assessment is planned prior to the transition to support determination of an appropriate catch limit.

Recreational harvests of freshwater eels (of combined species) are estimated to be small in New South Wales, with the most recent estimate of approximately 2,605 eels during 2019–20, although an additional 7,369 eels were caught and released [Murphy et al. 2022]. These estimates were based on a survey of Recreational Fishing Licence (RFL) Households, comprised of at least one fisher possessing a long-term (1 or 3 years duration) fishing licence and any other fishers resident within their household. The equivalent estimates from previous surveys in 2017–18 and 2013–14 were 2,955 and 1,024 eels, with an additional 8,744 and 16,479 eels caught and released, respectively [Murphy et al. 2020]. A survey of Aboriginal cultural fishing in the Tweed River catchment identified freshwater eels as one of the main components of freshwater catches [Schnierer and Egan 2016]; however, statewide estimates of the annual Aboriginal harvest of eels in New South Wales waters are unknown but likely to be significant.

While the data from the commercial fishery suggest that some reduction in biomass has occurred historically, and a more detailed stock assessment is warranted before a TACC is introduced in 2024, overall the above evidence

indicates that the biomass of the stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Additionally, current fishing effort is a fraction of past levels (169 days fished in 2020–21 compared with 1,880 in 2014–15 and 6 721 in 2001–02) [Hall 2023]. This is providing a temporary hiatus, and the current level of fishing mortality is considered unlikely to cause the stock to become recruitment impaired. On the basis of this evidence, the New South Wales part of the stock is currently classified as a **sustainable stock**.

Queensland The Southern Shortfin Eel (*Anguilla australis*), Pacific Shortfin Eel (*A. obscura*) and the Longfin Eel (*A. reinhardtii*) all occur in Queensland rivers flowing east of the Great Dividing Range. South-eastern Queensland is considered the northern extent of the distribution of the Southern Shortfin Eel, while the Pacific Shortfin Eel is restricted to North Queensland and the Longfin Eel is common throughout eastern drainages of Queensland. The Longfin Eel is the main target of the Queensland commercial eel fishery. The Southern Shortfin Eel is also targeted though to a negligible extent.

Freshwater eels are not key recreational targets. Creel surveys to determine recreational angler participation and catch within Queensland were undertaken in 2000, 2010, 2014 and 2019 [Henry and Lyle 2003; Webley et al. 2015; Teixeira et al. 2021]. Estimates from these surveys for catch, harvest, and numbers of eels released suggest a progressive decline in both catch and angler effort. A downward trend in the percentage of harvested eels has been observed with a decrease from 44% in 2000 [Henry and Lyle 2003] to 7.5% in 2010, and with insignificant numbers reported in 2014 [Webley et al. 2015]. Too few eels were reported in the 2019 survey to provide estimates with any confidence [Teixeira et al. 2021]. This shift is likely attributed to a change in the attitude of recreational anglers.

The commercial Queensland Eel Fishery (QEF) consists of two separate fisheries, adults and juveniles. The adult eel fishery has been managed as a closed fishery (closed to new applicants) since 1999. Current licences are non-transferable, they cannot be bought, sold or leased. This is a major input control on the fishery, as well as the restrictions on trapping areas, limited number of traps allowed for use in each area, and a minimum size limit. The juvenile eel fishery targets glass eels and elvers. These may be sold to authorised aquaculture enterprises in Australia for on-growing only. The export of juvenile eels is not permitted. There are presently eight adult eel and 12 juvenile eel licences in Queensland.

The commercial harvest of eels has fluctuated widely with effort peaking at 50 t in 2002, decreasing to 0.3 t in 2023 with only two active licences fishing five days. The catch per unit effort (CPUE) has remained relatively stable since 2007 at an average of 0.03 t per day, though prior to 2007 the average catch rate was 0.16 t per day. The last three years have seen an increase in CPUE to 0.55 t per day.

The glass eel fishery was established in 2006 and developed rapidly with a total harvest of 582 kg in 2007, this was followed by a similarly rapid decline resulting in no harvest from 2015–16 to 2017–18 and from 2021–22 to 2022–23. Total catch has remained under 0.02 t since 2013–14.

The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished. Based on this information, there is insufficient evidence to confidently classify this stock.

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

Tasmania In Tasmania the freshwater eel fishery catches adult Southern Shortfin Eel and Longfin Eel. The fishery is primarily focused on Southern Shortfin Eel, with Longfin Eel typically constituting less than 5% of the harvest by weight. The commercial fishery is managed by the Inland Fishery Service (IFS) with 12 commercial fishing licences that restrict operators to geographically defined areas. Fishing is not permitted in an extensive region in Tasmania including the World Heritage Area and 99% of rivers. Harvesting of juvenile eels is prohibited through application of a minimum legal size limit. The retained commercial catch for all eel species for the 2021–22 season was 31.2 t (at or exceeding minimum legal size limit), whereas, the total catch was recorded as 56.8 t (includes released animals). The Longfin Eel component is a small proportion of the overall eel catch, and the retained catch is estimated at 3 t. Recreational eel fishing is limited by a bag limit, possession limit and minimum legal size limit which apply to both species [IFS 2018].

The IFS supports the fishery and the stock through annual catch of juvenile eels during their annual upstream migration and relocating these above stream structures [Purser et al. 2014]. Eel ladders and dam bypasses to assist eel migration have continued to be developed by IFS and Hydro Tasmania. Eel catches across both species are reported to have remained consistent over decades, with most of the fluctuation in catches due to changes in the commercial fishing sector and fluctuating market demand. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Longfin Eel is a small proportion of the Tasmanian eel catch. Tasmania is at the extreme end of the species' distribution and there is a naturally low abundance. A substantial portion of Tasmania's waterways are protected from eel fishing including those in the World Heritage Area where there are also fewer barriers to eel migration. Existing management restrictions appear to have successfully maintained catches of both species at a consistent level (although data available to assess this is limited). This evidence indicates that the currently level of fishing mortality is unlikely to cause the stock to become recruitment impaired. On the basis of the evidence provided above, Longfin Eel in Tasmania is classified as a **sustainable stock**.

Victoria The Victorian Eel Fishery catches both Longfin Eel and Southern Shortfin Eel, which have different but overlapping distributions in estuarine and freshwaters east and south of the Great Dividing Range. Commercial fishing is generally confined to lower and estuarine reaches of waters that are open to fishing and predominantly targets migrating eels.

The Victorian Longfin Eel Fishery, which is managed as one stock, supports both recreational and commercial fisheries. The status of the Victorian Longfin Eel fishery has been evaluated using catch and nominal CPUE for the commercial eel fishery [Bell et al. 2023].

From 1979–80, annual catch increased to a peak of 59 t in 2004–05. The Millennium Drought (2001–11) affected Longfin Eel catch less than that of Southern Shortfin Eel. Fishing pressure (effort) increased dramatically in the late 1990s but declined into the early 2000s, after which it was variable from year-to-

year. Since the Millennium Drought annual catch has been variable (2.7-17.8 t).

Between 1979–80 and 2000–01 nominal average annual CPUE was 1.6–18.8 kg per net-day (mean 10.3 kg per net-day). Throughout the Millennium Drought CPUE declined, reaching its lowest value of 0.24 kg per net-day in 2011–12. Since then, however, CPUE has been slowly but steadily increasing to an annual average of 0.5–1.09 in the last three years.

Juvenile and undersized eels (elvers and “snigs”), known as “restock”, are netted from coastal rivers and relocated into designated culture lakes (confined lakes and impoundments) in inland western Victoria for on-growing to market size under an Aquaculture Licence. This practice, which commenced in the 1960s, is dependent on access to restock eels. Productivity from culture lakes is highly susceptible to short and long term and seasonal environmental variations, particularly drought [Victorian Fisheries Authority 2017].

There is no long-term estimate of recreational harvest of Longfin Eel in Victoria but it is believed to be very low. In recent surveys of recreational fishing licence holders, less than 0.4% of anglers fishing in rivers and lakes preferred to catch eels and just 2.6% indicated their favourite fish to catch was eel [Australian Survey Research 2012; Australian Survey Research Pty Ltd 2018].

Eel is an important resource for some Aboriginal communities. The use of fish traps, channels, and aquaculture systems (ponds and dam walls) in western Victoria dates back tens of thousands of years [Head 1989; Richards 2011]. However, there are no catch statistics for the Aboriginal harvest of eels from Victorian waters.

Despite strong environmental drivers that can severely reduce productivity, the Victorian Longfin Eel fishery is well-managed using a range of input controls and at least 30% of all connected rivers, creeks and streams with a common opening to the sea are closed to commercial fishing. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. The above evidence also indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

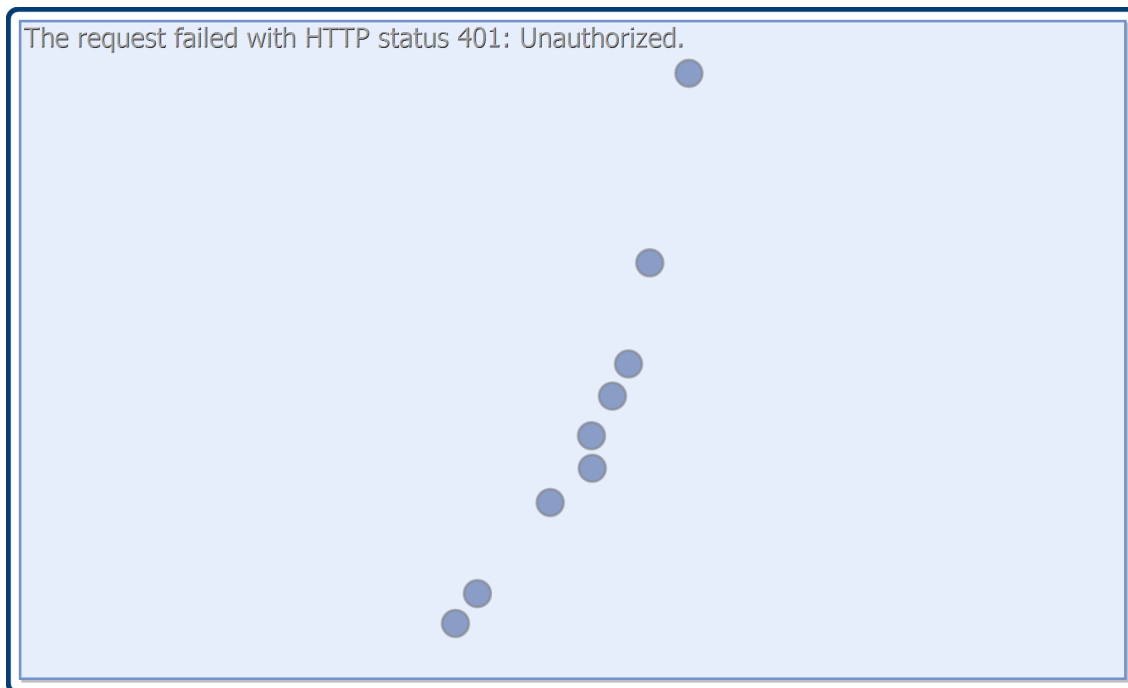
On the basis of the evidence described above, Longfin Eel in Victoria is classified as a **sustainable stock**.

BIOLOGY

[Walsh et al. 2003, 2004]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Longfin Eel	Females: 52 years, 1,650 mm; Males: 22 years, 620 mm	Size at migration: females 740–1,420 mm; males 440–620 mm

DISTRIBUTION



Distribution of catches of Longfin Eel.

TABLES

Fishing methods	New South Wales	Queensland	Tasmania	Victoria
Commercial				
Fish Trap	✓			
Net				✓
Traps and Pots		✓		
Various	✓			
Recreational				
Hook and Line		✓	✓	✓
Line	✓			

Management Methods	New South Wales	Queensland	Tasmania	Victoria
Commercial				
Catch limits	✓			
Gear restrictions	✓	✓		✓

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Longfin Eel (2023)

Limited entry	✓	✓		✓
Seasonal or spatial closures		✓		
Size limits	✓	✓	✓	
Spatial closures	✓		✓	
Spatial restrictions				✓
Vessel restrictions		✓		
Recreational				
Bag and possession limits			✓	
Bag limits	✓			✓
Bag/possession limits		✓		
Gear restrictions	✓	✓		✓
Licence	✓			✓
Size limit	✓			
Size limits		✓		
Spatial restrictions			✓	

Catch	New South Wales	Queensland	Tasmania	Victoria
Commercial	14.1685 t	0 t	0 t	5.4059 t
Indigenous	Unknown	Unknown	Unknown	Unknown
Recreational	2,605 mixed freshwater eels (2019–20)	Unknown	Unknown	Unknown

New South Wales – Commercial (Catch). Data are provided in financial years.

New South Wales – Recreational (Catch). Estimate from Murphy et al. [2020, 2022], based on a survey of Recreational Fishing Licence households. Note, estimates for eels are highly uncertain, with a relative standard error of greater than 30% and based on survey data from fewer than 20 households.

New South Wales – Indigenous (Management Methods). <https://www.dpi.nsw.gov.au/fishing/aboriginal-fishing>

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

Queensland – Commercial (Catch). Queensland commercial and charter data have been sourced from the commercial fisheries logbook program. Further information available through the Queensland Fisheries Summary Report <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/queensland-fisheries-summary-report>

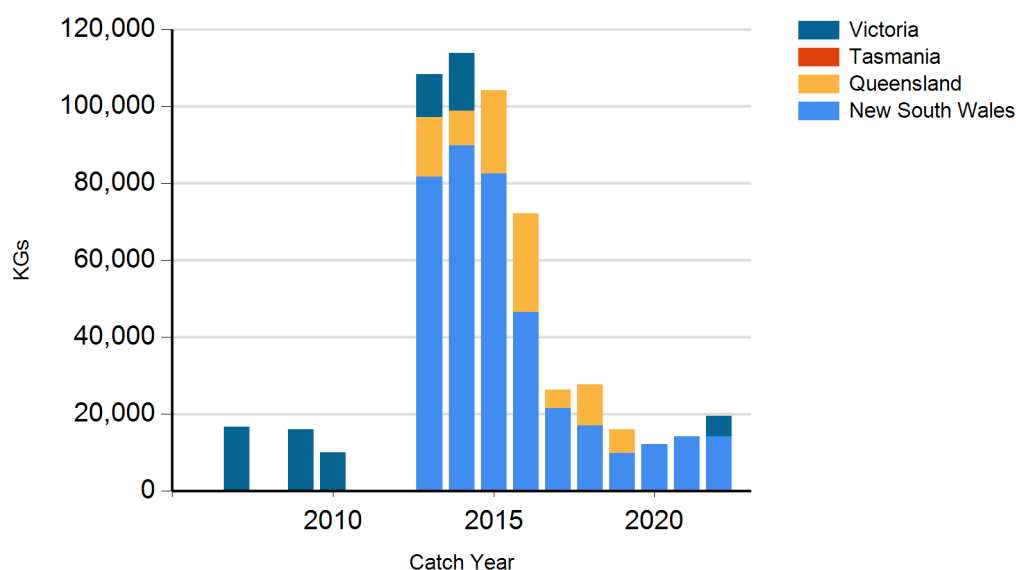
Victoria – Indigenous (Management Methods). A person who identifies as Aboriginal or Torres Strait Islander is exempt from the need to obtain a Victorian recreational fishing licence, provided they comply with all other rules that apply to recreational fishers, including rules on equipment, catch limits, 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*.

Tasmania - Recreational (Management Methods). In Tasmania, an angling licence is required to take eels. There is a 12 fish daily bag limit for eels with a minimum size of 300 mm and a possession limit of 24 eels at any one time [IFS 2018].

Tasmania - Indigenous (Management Methods). In Tasmania, Indigenous persons engaged in traditional fishing activities in marine waters are exempt from holding recreational fishing licences, but must comply with all other fisheries rules as if they were licensed. For details, see the policy document 'Recognition of Aboriginal Fishing Activities' (<https://fishing.tas.gov.au/Documents/Policy%20for%20Aboriginal%20tags%20and%20alloting%20an%20UIC.pdf>).

CATCH CHART

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Longfin Eel (2023)



Commercial catches of Longfin Eel.

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STATUS OF AUSTRALIAN FISH STOCKS REPORT
Longfin Eel (2023)

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