

# Longfin Eel (2020)

*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]. The 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. It lives in estuaries and freshwater systems east of the Great Dividing Range until sexual maturity, and then migrates downstream and into the deep tropical ocean waters of the Coral Sea to spawn once before dying. 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 30 cm TL for Longfin Eel was introduced in 1997 and later increased to 58 cm TL in 2007. Some historical catches of juvenile 'glass eels' (40–70 mm total length, TL) and undersized 'yellow eels' (30–58 cm 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 per cent of the catch. 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 the last four years when the export market decreased and processing facilities closed. As a result catches decreased from 82.6 t in 2014–15 to 8.2 t in 2018–19. Standardised catch rates for eel trapping (in kg per days fished) had been declining before the reduction in catches and have continued to decrease rapidly over the last two years [Hall 2020]. In contrast, standardised daily catch rates (in kg per trap) indicate a more stable trend, with a less pronounced decline over the last two years, suggesting that the number of traps fished per day has also decreased. An interim total commercial access level (ITCAL) of 139.9 t was introduced in New South Wales in 2017 and will remain in place until transitioning to an adjustable total allowable commercial catch (TACC) in 2024. Current harvests are well below the ITCAL and it is not known whether a TACC of that magnitude would be sustainable.

Recreational harvests of freshwater eels (of combined species) are estimated to be small in New South Wales, with the most recent estimate of approximately 2 955 eels or around 2.18 t during 2017–18, although another 8 744 eels were caught and released [Murphy et al. 2020]. 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 estimated recreational harvest in 2013–14 was smaller, at around 1 024 eels, but a larger number of 16 479 eels were caught and released [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.

While the data from the commercial fishery suggest that some reduction in biomass has occurred, and a more detailed stock assessment is warranted, 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 (157 days fished in 2018–19 compared with 1 880 in 2014–15 and 6 721 in 2001–02). 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** Anguillid eels in Queensland are represented by three species, the Southern Shortfin Eel (*Anguilla australis*), Pacific Shortfin Eel (*A. obscura*) and the Longfin Eel (*A. reinhardtii*). All three are restricted to rivers flowing east of the Great Dividing Range. South-eastern Queensland is considered the northern extent of the distribution of Southern Shortfin Eel, the Pacific Shortfin Eel is restricted to North Queensland and the Longfin Eel is common throughout eastern drainages of Queensland. The target species in the Queensland commercial eel fishery is predominantly the Longfin Eel. The Southern Shortfin Eel is also targeted but numbers captured are negligible.

These species 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 catch but also in angler effort. Changes in angler attitudes have also resulted in a decrease in the percentage harvested from 44 per cent in 2000 [Henry and Lyle 2003] to 7.5 per cent and then insignificant numbers in 2010 and 2014 respectively [Webley et al. 2015]. Harvest was estimated at  $7\,766 \pm 2\,728$  [Henry and Lyle 2003] and  $2\,306 \pm 1\,075$  individual eels [Taylor et al. 2012]. Subsequent estimates in 2000, 2010 and 2014 are considered unreliable [Webley et al. 2015]. Too few eels were reported in the 2019 survey to provide estimates with any confidence [Teixeira et al. 2021].

The Queensland commercial eel fishery 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 the 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 14 eel and 12 juvenile eel licences in Queensland.

The commercial harvest of eels fluctuated widely with effort through the 90s peaking at 50 t in 2002 and decreasing to only 3 t in 2019 with only three active licences fishing 106 days. The catch-per-unit-effort (CPUE) has remained stable since 2007 at an average of 32.4 kg per day, though prior to 2007 the average catch rate was 164.2 kg 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 culminating in no harvest in 2014 and 2016 to 2018. The 2019 harvest (490 kg) may indicate an upturn in demand in the aquaculture industry for these species. Likewise, the CPUE for juvenile eels was historically stable at approximately 1 kg per day but increased to more than 13 kg per day in 2019.

The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished. However, the recently reported increases in catch of juvenile eels may cause growth overfishing if similar levels of effort occur at the recent CPUE across the latent effort in this fishery. 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 five per cent 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 per cent of rivers. Harvesting of juvenile eels is prohibited through application of a minimum legal size limit. Regular commercial catch estimates are not available but have historically ranged between 30 t and 70 t per annum for both species combined [Purser et al. 2014]. Consequently the Longfin Eel component of the catch is likely to be under 5 t per annum.

Recreational eel fishing is limited by a bag limit, possession limit and minimum legal size limit which apply to both species. Estimates of recreational catches are

unavailable [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. 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 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.

From 1979–80, annual catch increased to a peak of 56 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. In the last two years effort has been low. The number of licenses has declined steadily since the early 1990s.

Nominal CPUE during the 1980s averaged 6.6–6.3 kg per net-day but following a peak of 25.5 kg per net-day in 1990–91, CPUE has steadily declined. Since 2000–01 CPUE has continued to decline and over the last decade has been low but stable, fluctuating between 0.24 and 1.79 kg per net-day.

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 per cent of anglers fishing in rivers and lakes preferred to catch eels and just 2.6 per cent 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 thirty per cent 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, 165 cm; Males: 22 years, 62 cm	Size at migration: females 74–142 cm; males 44–62 cm

**DISTRIBUTION**



**TABLES**

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

Management Methods				
	New South Wales	Queensland	Tasmania	Victoria
<b>Commercial</b>				
Catch limits	✓			
Gear restrictions	✓	✓		✓
Limited entry	✓	✓		✓
Size limits	✓	✓		
Spatial closures	✓	✓		
Spatial restrictions				✓
<b>Recreational</b>				
Bag and possession limits			✓	
Bag limits	✓			✓
Gear restrictions	✓	✓		✓
Licence	✓			✓
Possession limit		✓		
Size limit	✓	✓		
Spatial restrictions			✓	

Catch				
	New South Wales	Queensland	Tasmania	Victoria
<b>Commercial</b>	8.1617 t	6.047 t	0 t	0 t
<b>Indigenous</b>	Unknown	Unknown	Unknown	Unknown
<b>Recreational</b>	2 955 eels (2.2	Unknown	Unknown	Unknown

t) of mixed freshwater eels (2017–18)			
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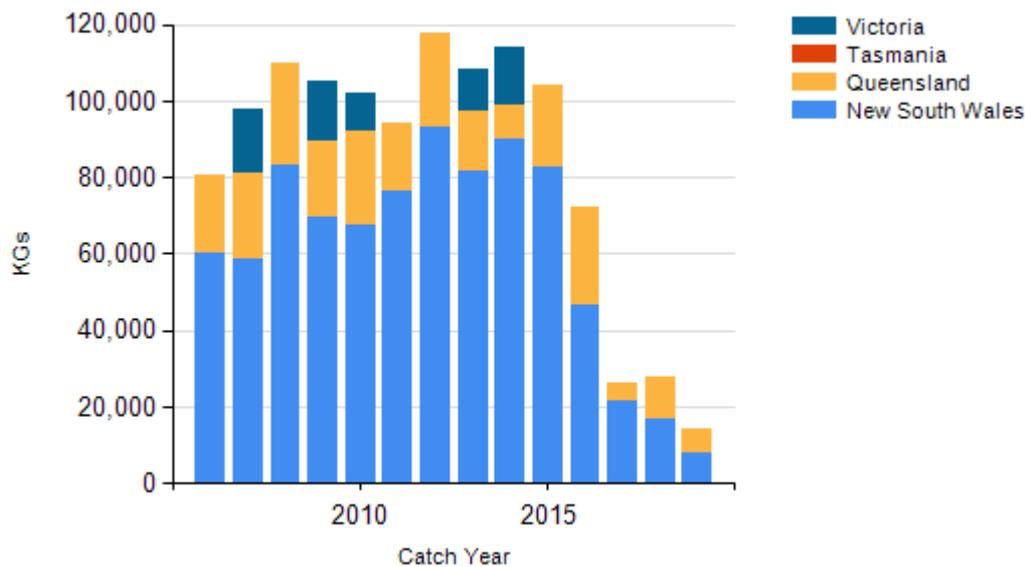
**New South Wales – Recreational (catch totals)** Estimate from Murphy et al. [2020], based on a survey of Recreational Fishing Licence households.

**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>

**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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