Eastern School Prawn

Metapenaeus macleayi

Matthew Taylor (Department of Primary Industries, New South Wales), **James Andrews** (Department of Economic Development, Jobs, Transport and Resources, Victoria), **Megan Leslie** (Department of Agriculture and Fisheries, Queensland)

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	New South Wales	EGF, EPTF, OTF	Sustainable	Catch, CPUE, environmental models
Queensland	Queensland	ECOTF, RIBTF	Sustainable	Catch, CPUE
Victoria	Victoria	ITF	Undefined	Catch

ECOTF East Coast Otter Trawl Fishery (QLD)
EGF Estuary General Fishery (NSW)
EPTF Estuary Prawn Trawl Fishery (NSW)
ITF Inshore Trawl Fishery (VIC)
OTF Ocean Trawl Fishery (NSW)
RIBTF River and Inshore Beam Trawl Fishery (QLD)

STOCK STRUCTURE

Eastern School Prawn fisheries occur along the east coast of Australia, in Queensland, New South Wales and Victoria. Genetic work on the biological stock structure of this species is limited. There is some evidence for genetic differentiation between populations occurring from Tweed Heads northward (north of the Noosa River and Tweed River) and those from estuaries in New South Wales (estuaries within New South Wales were genetically homogenous) [1]. Little genetic information is available for Victorian populations.

As a result of uncertainty regarding the biological stock structure of Eastern School Prawn, here assessment of stock status is presented at the jurisdictional level—Queensland, New South Wales and Victoria.

STOCK STATUS

Queensland

Biomass and fishing pressure evidence for the status of Eastern School Prawn in Queensland is primarily derived from the River and Inshore Beam Trawl Fishery (RIBTF), which targets this species. Catch and effort within the East Coast Otter Trawl Fishery is opportunistic and highly variable, and has not been used to determine stock status.

Annual catches in the RIBTF have tended to be variable, peaking at more than 130 tonnes (t) in 1991, 1995 and 2004, but averaging less than 60 t over the entire period 1990–2015. The mean annual catch (13 t) in recent years (2011–15) has been below the long-term average. Nominal catch rates were reasonably stable over the early part of the fishery, and then increased from 47 kg per day in 2000 (62 per cent of the 1990–2015 long-term average of 76 kg per day), to more than 120 kg per day in 2014–15 (60 per cent greater than the long-term average).

Eastern School Prawn inhabit numerous estuarine habitats in Queensland and a portion of this biomass remains unfished, with fishing effort being confined to accessible sections of larger river systems due to vessel size. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished.

Fishing effort has declined steadily over the history of the fishery, and particularly since 2009, following several licence reduction schemes. After fluctuating around an average of about 930 days fished per year from 1990–2010, effort decreased to around 280 days fished per year over the 2011–13 period, declining further to slightly more than 30 days fished per year in 2014–15 [2].

A recent ecological risk assessment established that Eastern School Prawn had a high resilience to fishing pressure [3], and found that the species was at a low risk of being overfished at 2009 effort levels. Current effort (days fished) is substantially less than 2009 effort levels and the number of licences reporting catch is also at historically low levels. This current low level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, Eastern School Prawn in Queensland is classified as a **sustainable stock**.

New South Wales

Eastern School Prawn is commercially fished throughout most of its range in New South Wales, although there has been limited harvest between the latitudes 35 and 36°S in recent years. Destructive flooding on the New South Wales east coast and associated deterioration in water quality likely affected catches in 2015, particularly on the mid-New South Wales coast. This was observed as a decrease in the Estuary Prawn Trawl Fishery (EPTF) catches in the Hunter River and Hawkesbury River relative to the previous year, and in the Estuary General Fishery catches in the central and mid-north coast regions.

Catches of this species have tended to fluctuate around a long-term average of about 780 t over the period 2000–15 [4]. In 2002–09, catches increased steadily from 460–1115 t, and decreased thereafter to 621 t in 2015. Average annual catches over these two periods remained at 780 and 782 t respectively. Recent research and modelling have established that environmental factors can have a strong influence on Eastern School Prawn catches [5], and this has likely contributed to the patterns observed. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished.

Effort in the EPTF in 2015 was slightly greater than the average across the period 2010–14 (around 4027 days), although there was no fishing effort in the Hunter River within the EPTF in the spring/summer of the 2015–16 season due to a voluntary fishery closure. Catch rates of Eastern School Prawn in the EPTF were higher in 2015 than for the period 2010–14, driven mainly by greater catches and higher catch rates in the Clarence River. Since 2005, overall catch rates have tended to be positively correlated with catches [4], indicating that catch trends are largely driven by changes in availability and abundance, probably caused by environmental factors affecting spawning and recruitment success. Thus, fluctuations in stock abundance appear to be environmentally-driven, rather than driven by the fishery itself. This level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, Eastern School Prawn in New South Wales is classified as a **sustainable stock**.

Victoria

Between 2000 and 2008, the annual catch for Eastern School Prawn in Victoria averaged about 9 t (range 1–20 t). From 2008 onwards catches increased, reaching 50 t by 2012 and a historical peak of 76 t in 2015. These higher catches may represent the start of an upward trend related to increasing water temperatures and a climate-driven southwards shift in distribution, as noted under the environmental effects below.

Nearly all the catch is landed by vessels belonging to the Inshore Trawl Fishery and since 2008 the maximum number of vessels participating in this fishery was 12. The average effort by the fleet since 2000 was 160 days per year and this has been exceeded consistently since 2010. The relatively low but variable levels of catch are likely to reflect targeting of the species when prawns are more available to trawlers and market prices are favourable. For this reason, catch rate is not a reliable proxy for abundance. In the absence of reliable estimates for current biomass and sustainable yield, there is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, Eastern School Prawn in Victoria is classified as an **undefined stock.**

BIOLOGY

Eastern School Prawn biology [6]

Biology

Species	Longevity / Maximum Size	Maturity (50 per cent)
Eastern School Prawn	Male: 32 months; 32 mm CL Female: 32 months; 32 mm CL	Male: 97 mm TL Female 132 mm TL

DISTRIBUTIONS

Distribution of reported commercial catch of Eastern School Prawn

TABLES

Fishing methods

	Queensland	New South Wales	Victoria
Commercial			
Beam Trawl	✔		
Otter Trawl	✔	✔	✔
Stow Net		✔	
Haul Seine		✔	
Indigenous			
Cast Net	✔		
Coastal, Estuary and River Set Nets	✔	✔	✔
Beach Seine	✔		✔
Recreational			
Cast Net	✔		
Coastal, Estuary and River Set Nets	✔	✔	✔
Beach Seine	✔		✔

Management methods

Method	Queensland	New South Wales	Victoria
Commercial			
By-catch reduction devices	✔	✔	
Limited entry	✔	✔	✔
Size limit		✔	
Spatial closures	✔	✔	✔
Temporal closures	✔	✔	
Vessel number restrictions	✔	✔	✔
Indigenous			
Bag limits		✔	✔
Section 31 (1)(c1), Aboriginal cultural fishing authority		✔	
Recreational			
Bag limits		✔	✔
Possession limit	✔		✔
Recreational fishing licence		✔	✔

Active vessels

	Queensland	New South Wales	Victoria
	21 in ECOTF	137 in EGF, 91 in EPTF, 51 in OTF	

ECOTF East Coast Otter Trawl Fishery (QLD)
EGF Estuary General Fishery (NSW)
EPTF Estuary Prawn Trawl Fishery (NSW)

OTF Ocean Trawl Fishery (NSW)

Catch

	Queensland	New South Wales	Victoria
Commercial	1.24t in ECOTF, 3.47t in RIBTF	160.35t in EGF, 394.28t in EPTF, 65.99t in OTF	75.77t in ITF
Indigenous	Unknown	Unknown	Zero
Recreational	Unknown	<110 t (2000–01, all prawn species)	Unknown

ECOTF East Coast Otter Trawl Fishery (QLD)
EGF Estuary General Fishery (NSW)
EPTF Estuary Prawn Trawl Fishery (NSW)
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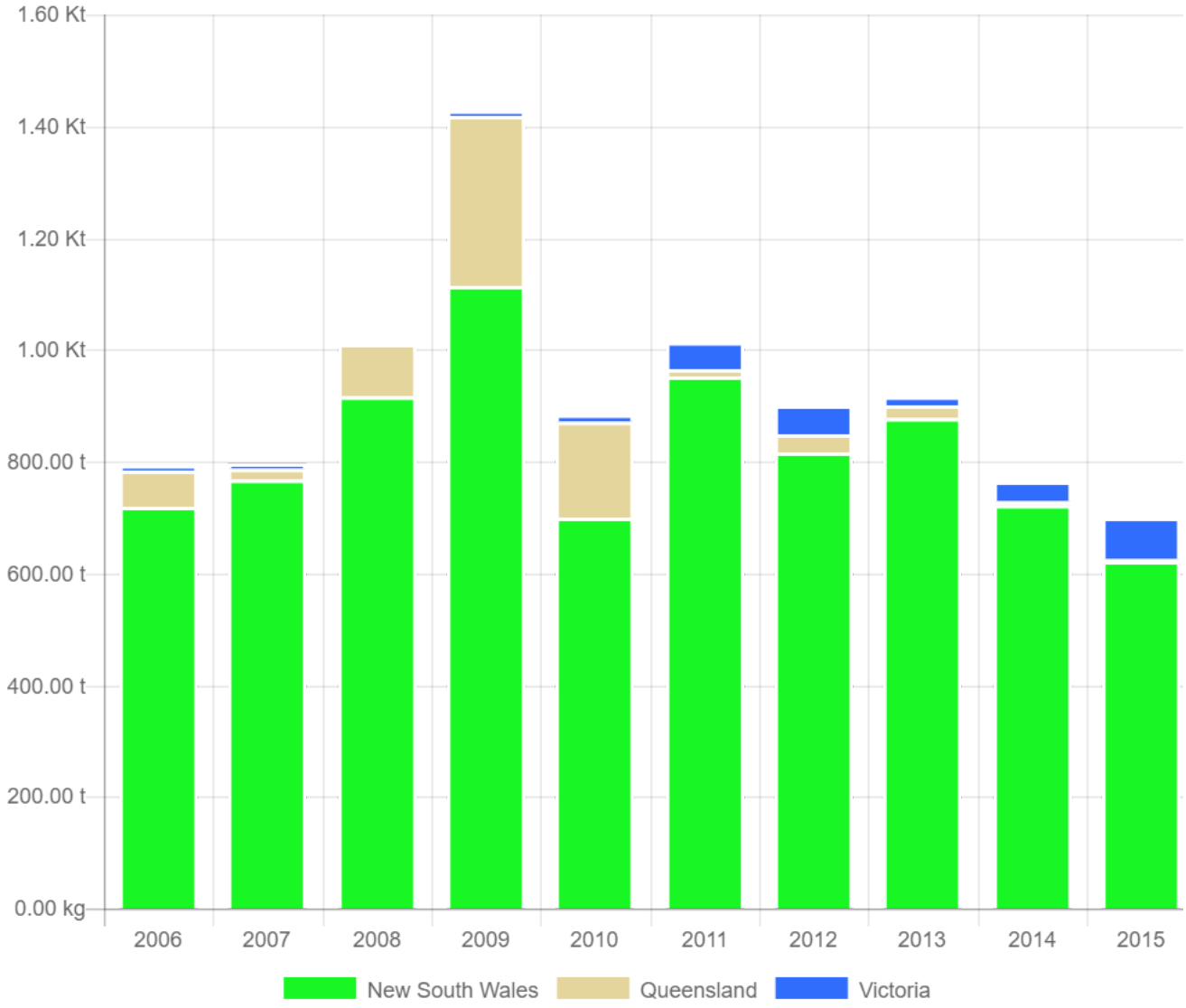
a Queensland – Indigenous Under the Fisheries Act 1994 (Qld), Indigenous fishers in Queensland are entitled to use prescribed traditional and non-commercial fishing apparatus in waters open to fishing. Size and possession limits, and seasonal closures do not apply to Indigenous fishers. Further exemptions to fishery regulations may be applied for through permits.
b New South Wales – Commercial (management methods) Prawn counts apply to commercial fisheries in NSW and serve as a proxy to size limit.
c New South Wales – Indigenous (management methods) Aboriginal Cultural Fishing Interim Access Arrangement allows an Indigenous fisher in New South Wales to take in excess of a recreational bag limit in certain circumstances, for example, if they are doing so to provide fish to other community members who cannot harvest themselves.
d New South Wales – Indigenous (management methods) Aboriginal cultural fishing authority - the authority that Indigenous persons can apply to take catches outside the recreational limits under the Fisheries Management Act 1994 (NSW), Section 37 (1)(c1), Aboriginal cultural fishing authority.
e Victoria – Indigenous In Victoria, regulations for managing recreational fishing are also applied to fishing activities by Indigenous people. Recognised Traditional Owners (groups that hold native title or have agreements under the Traditional Owner Settlement Act 2010 [Vic]) are exempt (subject to conditions) from the requirement to hold a recreational fishing licence, and can apply for permits under the Fisheries Act 1995 (Vic) that authorise customary fishing (for example, different catch and size limits or equipment). The Indigenous category in Table 3 refers to customary fishing undertaken by recognised Traditional Owners. In 2015, there were no applications for customary fishing permits to access Eastern School Prawn.
f Victoria – Indigenous Subject to the defence that applies under Section 211 of the Native Title Act 1993 (Cth), and the exemption from a requirement to hold a recreational fishing licence, the non-commercial take by indigenous fishers is covered by the same arrangements as that for recreational fishing.

CATCH CHART



Commercial catch of Eastern School Prawn

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

- Prawn trawling causes a physical disturbance of the seafloor [8], and interacts with benthic communities [9]. A comprehensive study in the Clarence River estuary did not find any significant impacts of estuarine prawn trawling on benthic assemblages [10].
- Non-target species caught incidentally by trawl nets are generally discarded, either because they have low market value or are not permitted to be retained. Bycatch consists mainly of small fish, crabs, other penaeid prawns, small Eastern School Prawn, and numerous other bottom-dwelling invertebrate species, including sponges, sea stars and gastropod shellfish.

- Small Eastern School Prawn that escape from trawl codends generally have reasonable survival [11], although trawl sorting time has a major effect on prawn survival following discarding [12].
- Various approaches have been adopted to reduce by-catch in prawn trawl fisheries, including various codend modifications [13,14].

ENVIRONMENTAL EFFECTS ON EASTERN SCHOOL PRAWN

- Climate change may have a significant effect on the distribution of this species. Under a scenario of increasing sea surface temperatures and a strengthening East Australian Current, the distribution of Eastern School Prawn is predicted to shift southwards, resulting in a southward shift in availability, potentially impacting the timing of spawning and migration for Eastern School Prawn and decreasing variability in their recruitment [15]. Recent reductions in northern catches and increases in southern catches may be evidence of such a shift.
- Environmental models have also indicated that the growth and movement of Eastern School Prawn are affected by rates of river discharge, and that higher rates of river discharge may generate increased commercial catches and a higher stock biomass [5].
- Broader catchment condition can lead to changes in estuarine water quality, especially during times of high river discharge. Such changes have been shown to affect catches of Eastern School Prawn in temperate New South Wales [16].
- Production of prawn species is often positively correlated with the availability of key habitats in estuarine systems [17].

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