

# Estuary Cobbler (2020)

*Cnidoglanis macrocephalus*



**Rodney Duffy:** WA Department of Primary Industries and Regional Development, **Amy Smoothey:** NSW Department of Primary Industries

## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia South Coast Estuaries	Recovering	Catch, Biomass, Catch Rate, SPR, Recruitment Index
Western Australia	Western Australia West Coast Estuaries	Sustainable	Catch, Biomass, Catch Rate
New South Wales	New South Wales Estuary General	Undefined	

## STOCK STRUCTURE

Estuary Cobbler are distributed across the southern half of Australia [Kowarsky 1975]. They occur in estuaries, embayments and marine environments but most of the commercial catch is taken in estuarine waters [Smith et al. 2018]. A study in Western Australia found that there are genetic differences between estuarine populations and adjacent marine populations [Ayvazian et al. 1994], indicating that stock structure is complex and that there may be a number of separate biological stocks. No genetic information is available for the east coast stock. Consequently, the biological stock structure of Estuary Cobbler is not well understood.

Here, assessment of stock status is presented at the Management Unit level—Western Australia West Coast Estuaries, Western Australia South Coast Estuaries and New South Wales Estuary General.

## STOCK STATUS

**New South Wales Estuary General** Since 2009, commercial catches of Estuary Cobbler in New South Wales have ranged between 6 and 21 tonnes (t) per year with the majority caught using mesh nets. In the Estuary General Fishery, Estuary Cobbler is taken largely as by-catch or by-product. As in Western Australia, most of the NSW Estuary

Cobbler catch comes from a small number of estuaries, with the Clarence River contributing the greatest proportion. During the past seven years, catches have consistently been stable between 12.5 and 17.5 t, increasing from 6 t in 2017 to 12.6 t in 2018–19. While the total recreational and indigenous harvest is unknown, it is thought that those caught by recreational fishers are mostly released alive [West et al 2015]. There is insufficient information to confidently classify the status of this stock.

On the basis of the evidence provided above, Estuary Cobbler in New South Wales is classified as an undefined stock.

**Western  
 Australia  
 South Coast  
 Estuaries**

The assessment of Estuary Cobbler in south coast estuaries is based on Wilson Inlet only, where most of the state's catch is taken. The assessment incorporates size and age composition data sampled from the commercial fishery between 2010 and 2017. It also includes fishery-independent recruitment data from annual trapping surveys undertaken from 2007 to 2019, and fishery-independent abundance and size/age composition data collected by gillnetting in 2017–18, which enabled comparison with fishery-independent data collected in the late 1980s and mid-2000s.

Cobbler are a primary target species of the South Coast Estuarine Managed Fishery (SCEMF). Until 2018, cobbler have comprised ~50 per cent of the annual commercial catch from Wilson Inlet, which in turn has been ~30 per cent of the total annual SCEMF catch by weight. The inlet is considered to host a discrete breeding stock of cobbler that is distinct from populations in adjacent ocean waters and in other estuaries.

Commercial catch and CPUE data provide no indication of a decline in abundance, although high inter-annual variability is observed. Juvenile recruitment has been highly variable but without a directional trend since the recruit-index sampling started in 2007. There is no evidence that recruitment failure has occurred in any year. Truncated length distributions and strongly truncated age distributions in recent years provide evidence for high fishing pressure on adult fish in the areas of the estuary open to fishing. The area closed to fishing (~20 per cent) provides increased resilience to the Estuary Cobbler stock as evidenced by a higher proportion of older fish in this area.

Estimates of fishing mortality ( $F$ ) and spawning potential ratio (SPR) from equilibrium catch curve and per-recruit analyses are uncertain and highly sensitive to the assumed value of natural mortality ( $M$ ) for the species. For some of the scenarios of  $M$  explored, catch curve estimates of the long-term average  $F$  experienced by fully-vulnerable fish, based on the fishery-independent age sample from 2017–18, did not differ markedly from an  $F$  estimate obtained from a tag-attribution model fitted to cobbler tag-recapture data collected between 2011 and 2014.

Results from several assessment models fitted to the catch and catch rate data for Estuary Cobbler in Wilson Inlet suggest a Maximum Sustainable Yield (MSY) of around 50 t for the stock. Outputs from a Schaefer production model, fitted to catch and catch rate data and the tag-recapture estimate of  $F$ , indicate that, on average, exploitation since 2000 has been above the average level expected to maintain catches at MSY. This has reduced the stock biomass to just below BMSY (i.e. the threshold level) in 2018. These results suggest it is possible that the stock has been depleted to an undesirable level but is unlikely to have fallen below the point at which recruitment has been impaired (i.e. limit level of 0.5BMSY).

Although stock status in 2018 may have been undesirable, there has been a recent reduction in effort and catch. Model projections of stock biomass suggest that maintaining catches at a level below MSY (40 t or less) is likely to recover the stock.

On the basis of the evidence provided above, the Western Australia South Coast Estuaries management unit is classified as a **recovering stock**.

**Western Australia West Coast Estuaries**

Almost all commercial landings of Estuary Cobbler in the Western Australia West Coast Estuaries have occurred from the Peel-Harvey Estuary. No published assessment for stock status of Estuary Cobbler on the West Coast is available.

Catches of Estuary Cobbler in the Peel-Harvey Estuary from 1975 to 1985 were regularly over 50 t and often over 150 t. Catches then declined until 1996, and annual landings of Estuary Cobbler in the West Coast Bioregion have since ranged from < 1 t to 10 t [Smith et al. 2018]. Commercial landings of Estuary Cobbler from the Peel-Harvey Estuary are managed under a Harvest Strategy [Department of Fisheries 2015] that is currently under review. Recreational catch from boat-based anglers is considered to be negligible [Ryan et al. 2019]. Shore based recreational catch is unknown, but also thought to be negligible. The above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, Estuary Cobbler in the Western Australia West Coast Estuaries management unit is classified as a **sustainable stock**.

**BIOLOGY**

**Estuary Cobbler biology** [Chuwen et al. 2011]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Estuary Cobbler	16 years [Wilson Inlet, WA, unpublished], 910 mm	2.9 years (95 per cent CL=2.6–3.1 years) Wilson Inlet <sup>1</sup>
Estuary Cobbler	20 years [New South Wales, unpublished], 700 mm	Unknown

**DISTRIBUTION**



Distribution of reported commercial catch of Estuary Cobbler

**TABLES**

<b>Fishing methods</b>		
	<b>New South Wales</b>	<b>Western Australia</b>
<b>Charter</b>		
Rod and reel		✓
<b>Commercial</b>		
Crab Trap		✓
Gillnet		✓
Haul Seine		✓
Mesh Net	✓	
Various	✓	
<b>Recreational</b>		
Hook and Line	✓	✓
Net		✓
Spearfishing	✓	

<b>Management Methods</b>		
	<b>New South Wales</b>	<b>Western Australia</b>
<b>Commercial</b>		
Fishing gear and method restrictions	✓	
Gear restrictions		✓
Limited entry	✓	✓
Spatial closures	✓	✓
Temporal closures	✓	✓
Vessel restrictions		✓
<b>Recreational</b>		
Bag limits	✓	✓
Gear restrictions	✓	✓
Licence	✓	
Licence (boat-based sector)		✓
Spatial closures		✓
Spatial zoning	✓	

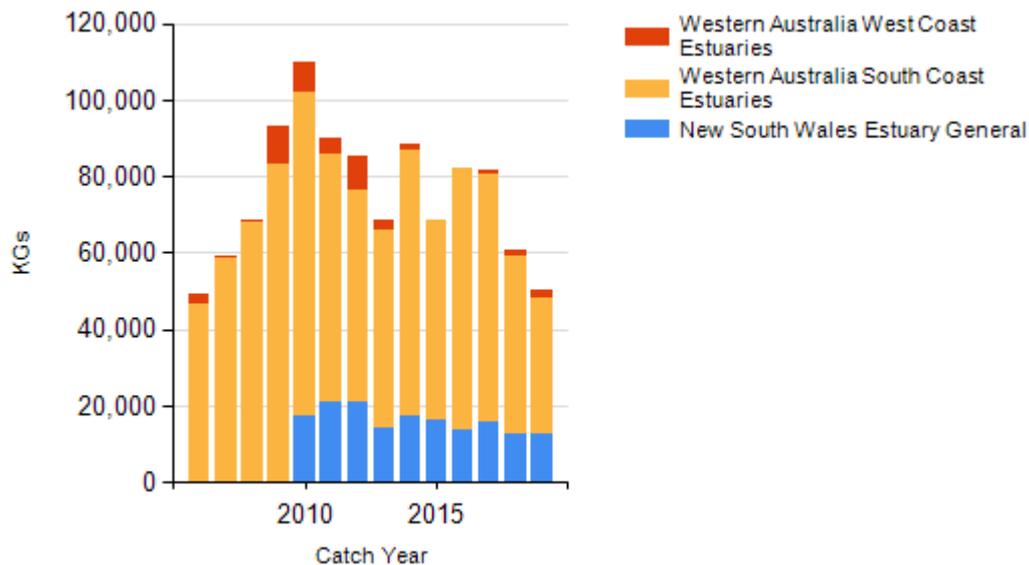
Catch	New South Wales	Western Australia
Commercial	12.5617 t	37.644 t
Indigenous	Unknown	Unknown
Recreational	Unknown	Unknown

**Western Australia – Recreational (Management methods)** In Western Australia a recreational fishing license is only required for fishing from a boat

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

**New South Wales – Recreational (Catch)** Murphy et al. [2020].

### CATCH CHART



Commercial catch of Estuary Cobbler - note confidential catch not shown

References	
Department of Fisheries 2015	Department of Fisheries 2015, Finfish Resources of the Peel-Harvey Estuary Harvest Strategy 2015–2020. Version 1.0. West Coast Estuarine Managed Fishery (Area 2). May 2015. Fisheries Management Paper No. 274. Department of Fisheries, Western Australia. 28pp.
Smith et al. 2018	Smith, K, Holtz, M, Bunbury, E, O'Malley, J and Yerman, M 2018, West Coast Nearshore and Estuarine Finfish Resource Status Report 2017 In: Status Reports of the Fisheries and Aquatic Resources of Western Australia 2016/17: The State of the Fisheries eds. D.J. Gaughan and K. Santoro. Department of Primary Industries and Regional Development, Western Australia. pp. 50–56.
Kowarsky 1975	Kowarsky, J 1975, An ecological study of the estuarine catfish, <i>Cnidoglanis macrocephalus</i> . Ph.D. thesis. University of Western Australia, Nedlands, WA.

Ayvazian et al. 1994	Ayvazian, SG, Johnson, MS and McGlashan, DJ 1994, High levels of genetic subdivision of marine and estuarine populations of the estuarine catfish <i>Cnidogobius macrocephalus</i> (Plotosidae) in southwestern Australia. <i>Marine Biology</i> 118: 25–31
Chuwen et al. 2011	Chuwen, BM, Potter, IC, Hall, NG, Hoeksema, SD and Laurenson, LJB 2011, Changes in catch rates and length and age at maturity, but not growth, of an estuarine plotosid ( <i>Cnidogobius macrocephalus</i> ) after heavy fishing. <i>Fishery Bulletin</i> , 109(3): 247-260
Ryan et al. 2019	Ryan, KL, Hall, NG, Lai, EK, Smallwood, CB, Taylor, SM and Wise, BS 2019, Statewide survey of boat-based recreational fishing in Western Australia 2017/18. Fisheries Research Report No. 297, Department of Primary Industries and Regional Development, Western Australia.
West et al. 2015	West, LD, Stark, KE, Murphy, JJ, Lyle, JM and Ochwada-Doyle, FA 2015, Survey of recreational fishing in New South Wales and the ACT, 2013–14, Fisheries Final Report Series 149, NSW Department of Primary Industries, Sydney.
Murphy et al. 2020	Murphy, J.J., Ochwada-Doyle, F.A., West, L.D., Stark, K.E. and Hughes, J.M., 2020. The NSW Recreational Fisheries Monitoring Program - survey of recreational fishing, 2017/18. NSW DPI - Fisheries Final Report Series No. 158.