Estuary Cobbler (2018)

Cnidoglanis macrocephalus

Rodney Duffy: Department of Primary Industries and Regional Development, Western Australia, **Amy Smoothey**: Department of Primary Industries, New South Wales

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia	Western Australia South Coast Estuaries	SCEMF	Recovering	Catch, Biomass, Catch Rate, SPR, Recruitment Index
Western Australia	Western Australia West Coast Estuaries	WCEMF	Sustainable	Catch, Biomass, Catch Rate
New South Wales	New South Wales Estuary General	EGF, N/A	Undefined	

EGF Estuary General Fishery (NSW), N/A Not Applicable (NSW), SCEMF South Coast Estuarine Managed Fishery (WA), WCEMF West Coast Estuarine Managed Fishery (WA)

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 between estuarine 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 Fishery 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

Since 2009, commercial catches of Estuary Cobbler in New South Wales have ranged between six and 20 t per annum with the majority caught using mesh nets. In the Estuary General Fishery, Estuary Cobbler is taken largely as by-catch or by-product. Similar to Western Australia, a small number of estuaries

General

account for the majority of the catch of Estuary Cobbler with the most taken from the Clarence River (42 per cent of catch in 2017). During the past five years, catches have consistently been stable between 13 and 17 t, but declined to 6 t in 2017. This harvest reduction was likely associated with reduced fishing effort as a result of the commercial fisheries consolidation. 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]. Currently there is insufficient information available to assess the likely biomass size or the adequacy of controls over fishing pressure on the stock.

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

Western Australia South Coast Estuaries

Total catch of Estuary Cobbler from Western Australia South Coast Estuaries has ranged between 40 t and 100 t, with more than 70 per cent of this catch from a single estuary, Wilson Inlet. Recent commercial catch and catch rates in this estuary are within the historical range, although catch/catch rate trends may not provide reliable information to assess stock status for this species. An unpublished stock assessment completed by the Department of Primary Industries and Regional Development in 2016, using biological data collected during 2010–14, indicates that spawning potential ratio (SPR) is currently below a limit reference level of 20 per cent. Unpublished annual fishery independent surveys of juveniles, undertaken since 2007, indicate that juvenile recruitment declined since 2012. This evidence indicates that the biomass of Estuary Cobbler in Wilson Inlet is likely to be depleted and that recruitment is likely to be impaired.

In the last few years, there has been a marked reduction in the effort directed towards targeting of Estuary Cobbler in Wilson Inlet, resulting in a catch decrease of approximately 40 per cent. This evidence indicates that the current level of fishing mortality in Wilson Inlet should allow this component of the stock to recover from its recruitment impaired state.

The majority of the remainder of the catch comes from Oyster Harbour, Irwin Inlet, Beaufort Inlet, Princess Royal Harbour and King George Sound. No published assessment of stock status of Estuary Cobbler in these estuaries has been undertaken. Therefore, catch-only Catch-MSY analysis [Martell and Froese 2013] using the R package simpleSA [Haddon et al. 2018], was used to estimate relative biomass and harvest rate for these estuaries. All of these estuaries, were estimated to a have a biomass above the limit of 20 per cent of unfished biomass. However, harvest rate estimates indicate that Oyster Harbour and Beaufort Inlet are experiencing overfishing, whereas harvest rates in Irwin Inlet, Princess Royal Harbour and King George Sound were estimated to be sustainable. Estuary Cobbler populations in Oyster Harbour and Beaufort Inlet are therefore considered to be depleting, whereas Estuary Cobbler populations in Irwin Inlet, Princess Royal Harbour and King George Sound are considered to be sustainable. Recreational catch from boat-based anglers is negligible [Ryan et al. 2017]. Although shore based recreational catch is unknown, it too is thought to be negligible.

Overall, and given that the majority of Estuary Cobbler are caught in Wilson Inlet, the combined evidence indicates that the biomass of this stock is likely to be depleted and that recruitment is likely to be impaired, but that the current level of fishing mortality should allow the stock to recover from its recruitment impaired state.

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

Western Australia

Almost all commercial landings of Estuary Cobbler in the Western Australia West Coast Estuaries have occurred from the Peel-Harvey Estuary. No published

West Coast Estuaries

assessment for stock status of Estuary Cobbler on the West Coast is available. Here stock status is evaluated using an unpublished catch-only Catch-MSY analysis [Martell and Froese 2013] (using the R package simpleSA [Haddon et al. 2018], which provided estimates of relative biomass in relation to MSY and harvest rate for the Peel-Harvey Estuary, in addition to catch data. Catch-MSY estimates of biomass indicate that the stock has recovered from a more than 20 year period below the biomass limit of 20 per cent of unfished biomass, and has been above this level, but below the 40 per cent target for the last six years. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Catches of Estuary Cobbler in the Peel-Harvey Estuary from 1975 to 1985 were regularly over 50 tonnes (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 now managed under a Harvest Strategy that uses a target for catch (< 9 t) and catch rate (> 6 kg/fishing day) as indicators of fishery performance [WA Department of Fisheries 2015]. Both catch and catch rate were within the target range in 2017. Recreational catch from boat based anglers is considered to be negligible [Ryan et al. 2017]. 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 Inlet1
Estuary Cobbler	20 years [New South Wales, unpublished], 700 mm	Unknown

DISTRIBUTION

Distribution of reported commercial catch of Estuary Cobbler

TABLES

Commercial Catch Methods	New South Wales	Western Australia
Gillnet		✓
Haul Seine		✓
Haul Seine/Beach Seine	✓	
Mesh Net	✓	
Unspecified	✓	✓

Fishing methods		
	New South Wales	Western Australia
Commercial		
Gillnet		✓
Haul Seine		✓
Mesh Net	✓	
Unspecified	✓	✓
Indigenous		
Hook and Line	✓	✓
Net		✓
Spearfishing	✓	
Recreational		
Hook and Line	✓	✓
Net		✓
Spearfishing	✓	

Management		

Methods		
	New South Wales	Western Australia
Commercial		
Fishing gear and method restrictions	✓	
Gear restrictions		✓
Limited entry	✓	✓
Spatial closures	✓	✓
Temporal closures	✓	✓
Vessel restrictions		✓
Indigenous		
Bag limits	✓	
Gear restrictions		✓
Native Title	✓	
Section 37 (1d)(3)(9), Aboriginal cultural fishing authority	✓	
Recreational		
Bag limits	✓	✓
Gear restrictions	✓	✓
Licence	✓	
Licence (boat-based sector)		✓
Spatial closures		✓
Spatial zoning	✓	

Active Vessels		
	New South Wales	Western Australia
	51 Fishing Business in EGF,	20 in SCEMF, 4 in WCEMF,

EGF Estuary General Fishery(NSW)

SCEMF South Coast Estuarine Managed Fishery(WA)

WCEMF West Coast Estuarine Managed Fishery(WA)

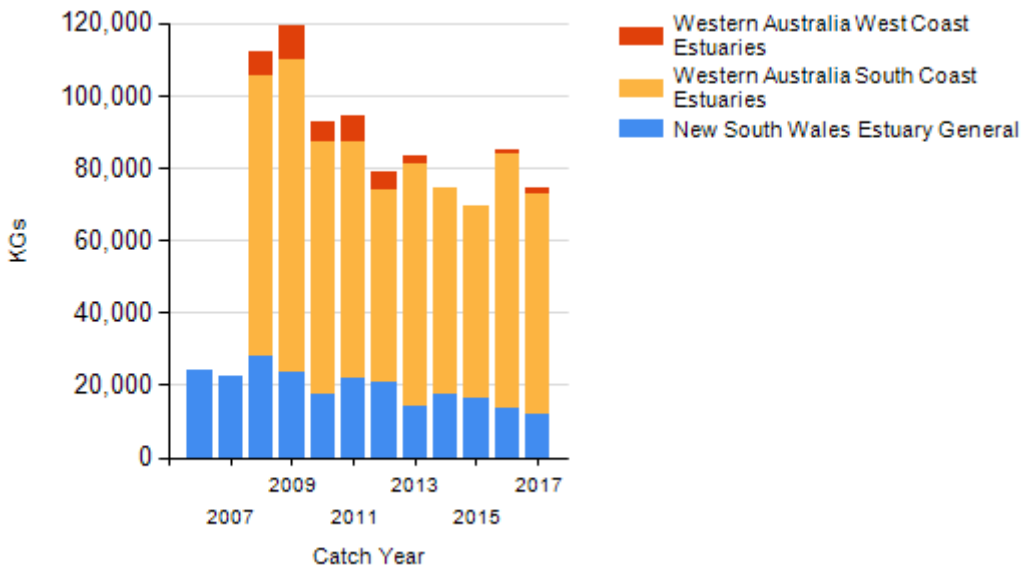
Catch	

	New South Wales	Western Australia
Commercial	10.555t in EGF, 1.506t in N/A,	60.555t in SCEMF, 1.851t in WCEMF,
Indigenous	Unknown	Unknown
Recreational	Unknown	< 700 fish

EGF Estuary General Fishery (NSW), N/A Not Applicable (NSW), SCEMF South Coast Estuarine Managed Fishery (WA), WCEMF West Coast Estuarine Managed Fishery (WA),

Western Australia – Recreational (Management methods) In Western Australia a recreational fishing license is only required for fishing from a boat
NSW – Indigenous (Management methods) (a) The 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; (b) The Aboriginal cultural fishing authority is the authority that Indigenous persons can apply to take catches outside the recreational limits under the Fisheries Management Act 1994 (NSW), Section 37 (1d)(3)(9), Aboriginal cultural fishing authority; and (c) In cases where the Native Title Act 1993 (Cth) applies fishing activity can be undertaken by the person holding native title in line with S.211 of that Act, which provides for fishing activities for the purpose of satisfying their personal, domestic or non-commercial communal needs. In managing the resource where native title has been formally recognised, the native title holders are engaged with to ensure their native title rights are respected and inform management of the State's fisheries resources.

CATCH CHART



Commercial catch of Estuary Cobbler - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Estuary Cobbler

References	
1664	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.

1665	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.
1666	Kowarsky, J 1975, An ecological study of the estuarine catfish, Cnidoglanis macrocephalus. Ph.D. thesis. University of Western Australia, Nedlands, WA.
1667	Ayvazian, SG, Johnson, MS and McGlashan, DJ 1994, High levels of genetic subdivision of marine and estuarine populatins of the estuarine catfish Cnidoglanis macrocephalus (Plotosidae) in southwestern Australia. Marine Biology 118: 25–31
1668	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 (Cnidoglanis macrocephalus) after heavy fishing. Fishery Bulletin, 109(3): 247-260
1669	Ryan, KL, Hall, NG, Lai, EK, Smallwood, CB, Taylor, SM and Wise, BS 2017, Statewide survey of boat-based recreational fishing in Western Australia 2015/16. Fisheries Research Report No. 287, Department of Primary Industries and Regional Development, Western Australia.
1670	Martell, S and Froese R 2013, A simple method for estimating MSY from catch and resilience. Fish and Fisheries 14: 504-514.
1671	Haddon M, Punt A and Burch P 2018, simpleSA: A package containing functions to facilitate relatively simple stock assessments. R package version 0.1.18.
1672	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.