

Silverlip Pearl Oyster (2020)

Pinctada maxima



Anthony Hart: Department of Primary Industries and Regional Development, Western Australia, **Thor Saunders:** Department of Industry, Tourism and Trade, **Anthony Roelofs:** Department of Agriculture and Fisheries, Queensland

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Sustainable	CPUE, recruitment surveys, population surveys, biomass prediction modelling
Northern Territory	Northern Territory	Sustainable	Biomass, fishing mortality
Queensland	Queensland	Sustainable	Catch, effort

STOCK STRUCTURE

Pinctada maxima or the Silverlip Pearl Oyster is the largest species in the pearl oyster family [Shirai 1994], and produces the largest pearls. It is distributed within the central Indo-Pacific region, bounded by the Bay of Bengal to the west, Solomon Islands to the east, Taiwan to the north, and Northern Australia to the south [Southgate et al. 2008], at depths from the shallow sub-tidal to more than 50 m. Within Australia, the population genetic distribution has been investigated in Western Australia and Northern Territory [Benzie et al. 2006]. The biological stock structure is uncertain; however, Western Australian stocks are generally considered to be one stock (with the possible exception of a localised population in Exmouth Gulf), separate from stocks in the Northern Territory. The biological stock structure for Queensland is unknown.

Here, assessment of stock status is presented at the jurisdictional level—Western Australia, Northern Territory and Queensland.

STOCK STATUS

Northern Territory Large catches of Silverlip Pearl Oyster were taken from Northern Territory waters between 1901 and 1966. The catch peaked at 804 tonnes (t) in 1937 and the last significant catch was 339 t in 1957. Since that time, annual catches have been very low, primarily because the market for mother-of-pearl collapsed. Heavy historical fishing is considered to have depleted the stock in many areas

along the Northern Territory coast [Knuckey 1995].

Surveys conducted in the 1990s found significant numbers of large, mature individuals, indicating that recruitment was occurring [Knuckey 1995]. Catches have remained low (generally <10 t) and sporadic since 1991 to supply niche markets and the catch in the Northern Territory was 10.5 t in 2019. A preliminary assessment using catch data applied to a modified catch-MSY model (developed by Martell and Froese [2013] and modified by Haddon [2018]), estimated that the 2019 biomass of Silverlip Pearl Oyster was 93 per cent of unfished levels [Saunders 2020] suggesting that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Similarly, the relatively low harvest in 2019 meant that the fishing mortality was well below the limit reference point indicating that this catch level is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, Silverlip Pearl Oyster in the Northern Territory is classified as a **sustainable stock**.

Queensland The East Coast Pearl Fishery (Queensland) is a small-scale, wild-harvest fishery that enables the collection of broodstock for the pearl aquaculture industry. The general demand for wild-harvested pearl oysters is very low as the aquaculture industry produces the majority of its broodstock needs from its own hatcheries. Catches have been low in recent years, rarely exceeding 500 shells per year and 50 days of effort [QFISH 2020]. There has been a long history of low catches and effort and no collection of Silverlip Pearl Oyster occurred between 2013 and 2017. Annual catches since 2017 have averaged 115 kg per year, suggesting that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Similarly, the harvest rate in 2019 was zero as there was no catch of this species indicating 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, Silverlip Pearl Oyster in Queensland is classified as a **sustainable stock**.

Western Australia The Western Australian Pearl Oyster Managed Fishery is the only remaining significant wild stock fishery for pearl oysters in the world. It is a quota-based dive fishery, operating in shallow coastal waters along the north-west shelf or North Coast Bioregion. The harvest method is drift diving, in which six–eight divers are attached to large outrigger booms on a vessel and towed slowly over the pearl oyster beds, harvesting legal sized oysters by hand as they are seen. The species targeted is the Indo-Pacific, Silverlip Pearl Oyster (*P. maxima*). The Western Australian pearling industry comprises three main components: the collection of pearl oysters from the wild; production of hatchery-reared pearl oysters and the seeding of pearls, followed by grow-out of pearl oysters on pearl farm leases. Quota limits are set for the take of pearl oysters from the wild to ensure the long-term sustainability of the resource.

In the Western Australian Fishery, the standardised catch per unit effort (CPUE) increased by 200 per cent between 2003 and 2010, declined during 2011 to 2015 and increased again from 2016 to 2019. It is currently above the target reference level in the harvest strategy [DoF 2016]. The large fluctuation in standardised CPUE was due to an order of magnitude variation in recruitment. Recruitment in this fishery is measured using a spat settlement index (oysters aged 0+ years and 1+ years) and the large recruitment variability is caused by environmental variation, which also affects the fishing efficiency of the pearl oyster fleet [Hart et al. 2011]. The stock-prediction model, which uses the spat settlement index to predict future stock abundance, is forecasting an increase in standardised CPUE in 2020 and 2021. Overall the stock is entering a period of increased recruitment. Additional data, including population surveys, show that breeding stock levels are also currently above the target reference point [DoF 2016], suggesting that the biomass of this stock is unlikely to be depleted and

that recruitment is unlikely to be impaired. Also, abundance of the silverlipped pearl oyster increased in 2019, which 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, Silverlip Pearl Oyster in Western Australia is classified as a **sustainable stock**.

BIOLOGY

Silverlip Pearl Oyster biology [Hart and Joll 2006]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Silverlip Pearl Oyster	30 years, 250 mm DVM	Males: 2–3 years, 110 mm DVM Females: 7–8 years, 175 mm DVM

DISTRIBUTION



Distribution of reported commercial catch of Silverlip Pearl Oyster

TABLES

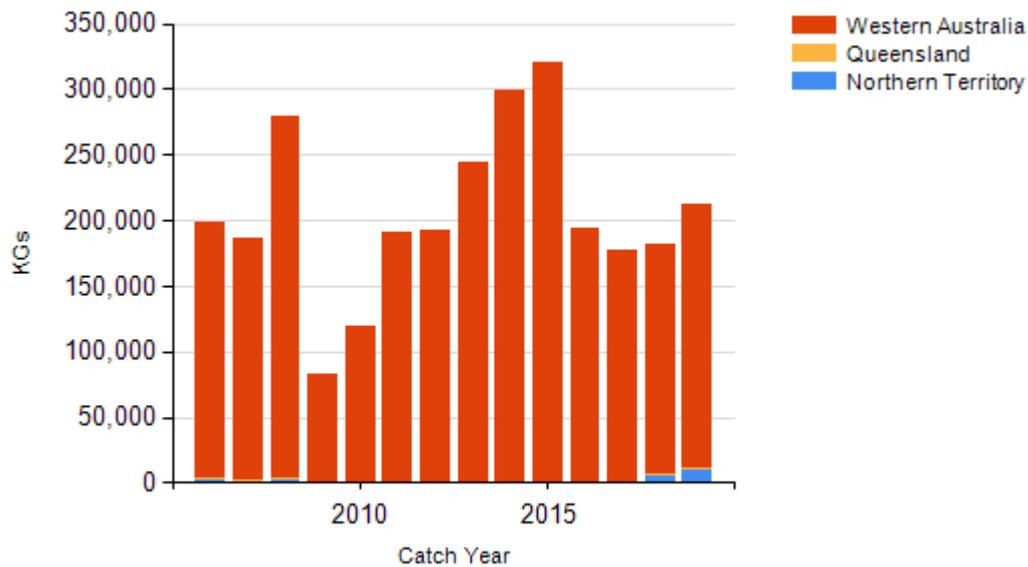
Fishing methods	Northern Territory	Queensland	Western Australia
Commercial			
Diving		✓	✓
Hand	✓		
Recreational			
Diving		✓	
Unspecified			✓
Management			

Methods			
	Northern Territory	Queensland	Western Australia
Commercial			
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Size limit		✓	✓
Spatial closures		✓	
Spatial zoning	✓		✓
Total allowable catch			✓
Recreational			
Gear restrictions		✓	
Limited entry		✓	
Size limit		✓	
Spatial closures		✓	

Catch			
	Northern Territory	Queensland	Western Australia
Commercial	10.4652 t	0.094 t	201.224 t
Indigenous	Unknown	Unknown	Unknown
Recreational	Unknown	Unknown	No Catch

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

CATCH CHART



Commercial catch of Silverlip Pearl Oyster - note confidential catch not shown

References	
Shirai, 1994	Shirai, S 1994, Pearls and pearl oysters of the world. Marine Planning Co. Japan. 95 pp. (in Japanese and English).
Southgate et al. 20008	Southgate PC, Strack E, Hart AM, Wada KT, Monteforte M, Carino M, Langy S, Lo C, Acosta-Salmon H and Wang A 2008, Chapter 9: Exploitation and Culture of Major Commercial Species. pp. 303–56. In: The Pearl Oyster, Eds Southgate PC and Lucas J, Elsevier London.
Benzi et al., 2006	Benzie, JAH and Smith-Keune, C 2006, Microsatellite variation in Australian and Indonesian pearl oyster <i>Pinctada maxima</i> populations. Marine Ecology Progress Series. 314: 197–211.
DoF, 2016	DoF 2016, Western Australian Silver-Lipped Pearl Oyster (<i>Pinctada maxima</i>) Resource Harvest Strategy 2016–2021, v1. Fisheries Management Paper No. 276.
Hart et al. 2011	Hart AM, Thomson AW and Murphy D 2011, Environmental influences on stock abundance and fishing power in the silver-lipped pearl oyster fishery. ICES Journal of Marine Science, 68(3): 444–53.
Knuckey, 1995	Knuckey IA 1995, The Northern Territory Pearl Oyster Fishery. FRDC final report 1991/14. 47 pp.
Hart and Joll, 2006	Hart, AM and Joll, L 2006, Growth, mortality, recruitment, and sex ratio in wild stocks of the silver-lipped pearl oyster <i>Pinctada maxima</i> (Jameson) (Mollusca: Pteriidae) in Western Australia. Journal of Shellfish Research, 25 (1): 201–210.
Saunders 2020	Saunders T. 2020, Northern Territory Silverlip Pearl Oyster Stock Status Summary - 2020. Unpublished Fishery report.
QFISH 2020	QFish, Department of Agriculture and Fisheries, www.qfish.gov.au
Haddon et al. 2018	Haddon M., A Punt and P. Burch (2018). simpleSA: A package containing functions to facilitate relatively simple stock assessments. R package version 0.1.18.
Martel and Froese (2013)	Martell, S. and R. Froese (2013). A simple method for estimating MSY from catch and resilience. Fish and Fisheries 14: 504-514.