Venus Clam (2018)

Venerupis largillierti

John Keane: Institute for Marine and Antarctic Studies, University of Tasmania, **Klaas Hartmann**: Institute for Marine and Antarctic Studies, University of Tasmania

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Tasmania	Georges Bay Venus Clam Fishery	GBVCF	Recovering	Biomass surveys, CPUE, catch

GBVCF Georges Bay Venus Clam Fishery (TAS)

STOCK STRUCTURE

Venerupis largillierti (commonly known as 'Venus Clams') is endemic to New Zealand, but its range extended to Tasmania in 1963, where it remains genetically indistinguishable from New Zealand populations on the basis of allozyme analysis [Maguire and Ward 2005]. It is found sub-tidally in both muddy and sandy substrates in shallow estuarine waters [Gabriel and Macpherson 1962] on parts of Tasmania's east and south east coasts [Grove 2011]. There is limited information on stock structure; however, given the relatively short larval life span, it is expected that the 'Venus Clams' in individual bays would constitute separate stocks. The only commercial fishery for this species in Tasmania is at Georges Bay, St Helens, where it forms beds on intertidal sandbars and in deeper channels.

Here, assessment of stock status is presented at the management unit level—Georges Bay Venus Clam Fishery (Tasmania).

STOCK STATUS

Georges Bay Venus Clam Fishery

The harvest strategy for 'Venus Clams' in Tasmania in the Shellfish Fishery Policy Document [DPIPWE 2007] uses estimated total biomass and size structure as performance indicators, but does not identify levels or limit reference points below which the stock would be classified as recruitment overfished. A commercial fishery has operated for the 'Venus Clams' in Georges Bay since around 1985 and until 2007 the fishery was managed principally through the allocation of half yearly or yearly permits. From 2007 a formal total allowable commercial catch (TACC) structure was introduced, splitting Georges Bay into two zones with two associated commercial licences in the northern zone and one in the southern zone [DPIPWE 2007]. The recreational catch is considered

negligible compared to the commercial catch.

In the southern zone of the fishery, there has been a fishery closure in place since 2013. The sudden decline in biomass was attributed to prolonged rainfall in the bay's catchment during 2011 [Tarbath and Gardner 2013], which led to low salinity levels and extensive mortality of the 'Venus Clams' population. A survey conducted in 2013 indicated there was no fishable stock, although a juvenile cohort (mode 15–19 mm) was present, which was expected to grow to legal size within two years [Tarbath and Gardner 2013]. However, there has been no indication of any stock recovery to date which may be linked to the environmental changes within the bay accentuated by the extensive development of seagrass beds on the previously productive sand spits.

In the northern zone of the fishery, biennial surveys have provided estimates of biomass since 2007, with TACCs determined from the biomass estimate up to a maximum harvest fraction of 10 per cent [TAFI 2009, Tarbath and Gardner 2012, 2013, 2014]. Biomass estimates in 2012 and 2014 were 537 and 467 tonnes (t), the highest on record in the fishery, with a mean estimate since 2003 of 412.9 t (± 110.5 t standard deviation) [Tarbath and Gardner 2014].

In 2013 the TACC was set at to 53.7 t, 10 per cent of the estimated biomass. Catches were 42.2 t and 39.9 t at a catch per unit effort (CPUE) of 76.4 and 64 kg per hour in the 2013 and 2014 seasons, respectively. In 2015 only 24.3 t of the 46.3 t TACC was landed and CPUE fell to the lowest rate since records began (27 kg per hour) [Jones and Gardner 2016]. With total catches for 2013, 2014 and 2015 at less than eight per cent of the estimated biomass, fishing mortality is unlikely to be responsible for the biomass decline [Jones and Gardner 2016]. Absolute fishing mortality is also likely to be less than indicated by this percentage as 'Venus Clams' also occur outside areas that are fished and used for biomass estimates. Consequently, the reduction in biomass is most likely attributable to environmental causes affecting recruitment. Length frequency distribution data indicated a settlement pulse in 2012 [Tarbath and Gardner 2013], but this failed to translate to significant recruitment to the fishery.

In response to the declines in biomass for the 2015–16 fishing season the two Georges Bay northern zone licensees took a voluntary reduction in TACC to 3 t (less than one per cent of 2014 estimated biomass) [Jones and Gardner 2016]. The above evidence indicates that the current level of fishing pressure is expected to allow the stock to recover.

A survey in 2017 estimated biomass at 76.2 t (95 per cent C.I. 54.7 t to 97.6 t), with 65 per cent (49.4 t) of the biomass was above the legal size limit of 40 mm [Keane and Gardner 2017]. The total biomass was 15 per cent of that than when last surveyed in 2014 (463 t), due to decreases in clam density, the area of fishable clam beds, and the size of clams. The 2017 survey showed large numbers of pre-recruits in length frequency distributions with cohorts of clams around 24 and 40 mm. In terms of total abundance, 69 per cent of the estimated population was under the minimum size limit of 40 mm. The apparent strength of sub-legal size classes suggests there will be increases in fishable biomass in coming years. The TACC was set at 4.9 t, or 10 per cent of the fishable biomass.

The above evidence indicates that the biomass of this stock is depleted and that recruitment is likely to have been impaired. However, the current level of fishing mortality and the evidence of high numbers of pre-recruits in the 2017 survey should allow the stock to recover from its recruitment impaired state.

On the basis of the evidence provided above, the Georges Bay Venus Clam Fishery (Tasmania) management unit is classified as a **recovering stock**.

BIOLOGY

Venus Clams biology < [Kent et al. 1999, Tarbath and Gardner 2014]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Venus Clam	700 mm TL	< 27 mm

DISTRIBUTION

Distribution of reported commercial catch of Venus Clams

TABLES

Commercial Catch Methods	Tasmania
Diving	✓

Fishing methods	
	Tasmania
Commercial	
Diving	✓
Recreational	
Hand collection	✓

Management Methods	
	Tasmania
Commercial	
Gear restrictions	✓
Limited entry	✓
Size limit	✓
Spatial closures	✓

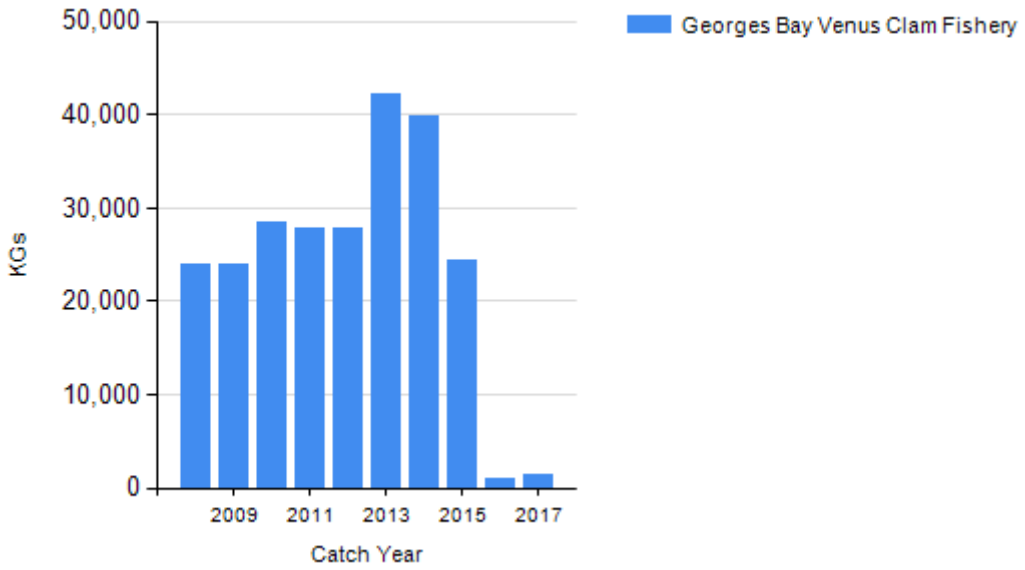
Total allowable catch	✓
Recreational	
Bag limits	✓
Gear restrictions	✓
Size limit	✓

Active Vessels

Catch	
	Tasmania
Commercial	1.505t in GBVCF,
Recreational	100 per day

GBVCF Georges Bay Venus Clam Fishery (TAS),

CATCH CHART



Commercial catch of Venus Clam - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Venus Clam

References	
786	DPIPWE, 2007, Shellfish Fishery Policy Document. Information Supporting the Shellfish Management Plan for the Fisheries (Shellfish) Rules 2007. Department of Primary Industries and Water, Hobart. Tasmania.
787	Gabriel, CJ and Macpherson, JH 1962, Marine Molluscs of Victoria, Melbourne University Press.

788	Grove, SG, 2011, The seashells of Tasmania: a comprehensive guide, Taroona Publications, Hobart, Australia.
789	Jones, H and Gardner, C, 2016, 2016 Small Bivalve Survey Assessment and Stock Status Update, Institute for Marine and Antarctic Studies Report, University of Tasmania, Hobart.
790	Keane, JP and Gardner, C 2017, 2017 Small Bivalve Fishery Assessment. Institute for Marine and Antarctic Studies Report. University of Tasmania, Hobart. 18 p.
791	Kent, GN, Maguire, GB, Duthie, I and Pugh R, 1999, Spawning, settlement and growth of the New Zealand venerid Ruditapes largillierti (Philippi 1849) in culture. New Zealand Journal of Marine and Freshwater Research, 33: 55–62.
792	Maguire, GB and Ward, RD 2005, Genetic comparison of populations of a venerid clam Ruditapes largillierti (Philippi 1849) in Tasmania and New Zealand, in G. B. Maguire (ed.), Enhancing Tasmanian Clam Resources, FRDC Report 93/232. University of Tasmania, Hobart, Australia.
793	TAFI, 2009 Georges Bay Venerupis Dive Fishery Survey March 26–27, 2009, Tasmanian Aquaculture and Fisheries Institute, University of Tasmania, Hobart.
794	Tarbath, D and Gardner, C 2012, 2012 Small Bivalve Fishery Assessment, Institute for Marine and Antarctic Studies Report, University of Tasmania, Hobart.
795	Tarbath, D and Gardner, C, 2013, 2013 Small Bivalve Fishery Assessment, Institute for Marine and Antarctic Studies Report, University of Tasmania, Hobart.
796	Tarbath, D and Gardner, C, 2014, 2014 Small Bivalve Fishery Assessment, Institute for Marine and Antarctic Studies Report, University of Tasmania, Hobart.