

# Pipi (2020)

*Donax deltoides*



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## STOCK STATUS OVERVIEW

| Jurisdiction    | Stock           | Stock status | Indicators   |
|-----------------|-----------------|--------------|--|
| New South Wales | New South Wales | Sustainable  | Catch, Standardised catch rates, estimated biomass         |
| Victoria        | Victoria        | Undefined    |  |
| South Australia | South Australia | Sustainable  | Fishery-independent relative abundance and size structures |

## STOCK STRUCTURE

Pipi is common on high-energy sandy beaches from southern Queensland to the mouth of the Murray River in South Australia [Murray-Jones and Ayre 1997] and the distribution may extend further westwards. High genetic variation between populations on either side of Bass Strait indicates at least two biological stocks, with the East Australian and South Australian Currents acting as key drivers of gene flow on the east and south coasts of Australia respectively [Miller et al. 2013]. A study of Pipi from Fraser Island, Queensland, to southern New South Wales, indicated a single biological stock over this area, with genetic mixing driven by ocean currents associated with the East Australian Current [Murray-Jones and Ayre 1997]. For locations west of Bass Strait in South Australia and western Victoria, no evidence of genetic structuring has been detected [Miller et al. 2013]. The degree of larval mixing is thought to be related to spawning and larval duration, although these are poorly understood [King 1976, Ferguson 2013, Gluis and Li 2014, Miller et al. 2013]. Although no genetic differences were detected among Pipi populations on beaches along the east coast of Australia, in any given year, most recruits are likely to be self-seeded or to come from nearby, adjacent beaches [Murray-Jones and Ayre 1997]. This is also likely the case for the fisheries located to the west of Bass Strait. Despite the work outlined above, the biological stock delineation of Pipi remains unclear.

Here, assessment of stock status is presented at the jurisdictional level—New South Wales, Victoria, and South Australia.

## STOCK STATUS

**New South  
Wales**

The harvest of Pipi in New South Wales is shared between the commercial sector, recreational fishers and for at least 10 000 years Pipi have provided a source of food for Indigenous people in this region [Murray-Jones 1999]. Steeply declining commercial catches over a six-year period (568 tonnes (t) in 2004–05 to 9 t in 2010–11) suggested that New South Wales Pipi stocks were depleted. Input controls were implemented which aimed to stabilise catches. These included: (1) spatial closures (i.e. within-beach closures), (2) temporal closures of the commercial fishery (i.e. 6 months per-annum), and (3) a minimum legal size limit (i.e. 45 mm total length) to allow spawning to occur at least once before recruitment to the fishery [Murray-Jones 1999], as well as a daily catch limit of 40 kg per fisher. Annually, harvest is reported from a small proportion (less than 20 per cent) of the total number of beaches from which harvest is permitted. From 2010–11 to 2015–16, catches increased from 9 t to 176 t (26 per cent of historical peak), likely resulting from these management measures. Reported commercial landings in 2018–19 declined to 132.5 t.

The primary indicators for biomass and fishing mortality are commercial catch and standardised commercial catch rate. Standardised commercial catch rate (in mean CPUE kg-h<sup>-1</sup>) is likely to be the most reliable index of relative abundance for Pipi in NSW. Generalised linear models (GLM) provided estimates of standardised mean catch rates, corrected for differences among fishing years, months, management regions, individual fishing operations, and their transformed fishing effort. Mean daily catch rates (2009–10 to 2018–19), for all regions combined have remained stable, and above the 9-year average over the previous 7 years [Johnson 2020].

Statewide catches and catch rates have generally increased since 2010–11. For the three main regions of the fishery (Region 1, adjacent to the Queensland border and Regions 3 and 4, located to the south), annual catches have increased and annual catch rate has been stable since 2010–11. In each of these regions, from 2012–13 to 2018–19, monthly catch rate has generally remained stable across the six-month fishing season. For the years in which simple stock depletion models were applied (i.e. when within-season declines in catch rate occurred, estimated exploitation rates in Region 1 and Region 4 were < 30 per cent [Johnson 2020]. In Region 3, which includes the greatest number of accessible beaches and highest number of endorsed fishers, within-season exploitation rates ranged from 28–73 per cent [Johnson 2020].

Commercial catches from 1984 to 2019 were assessed using the catch-MSY model from the 'simpleSA' package in R [Martell and Froese 2013, Haddon et al. 2018]. Results suggested that the current biomass of Pipi in NSW waters is depleted to 33 per cent (95 per cent confidence interval 9–49 per cent) of the estimated maximum biomass. Five-year stock projections at a constant catch of 150 t (TAC currently 147.4 t) indicated that biomass is predicted to increase slowly [Johnson 2020].

Estimates of state-wide recreational catches are available from the National Recreational and Indigenous Fishing Survey and New South Wales state-wide surveys completed in 2000–01 [Henry and Lyle 2003], 2013–14 [West et al. 2015] and 2017–18 [Murphy et al. 2020] financial years. The estimated recreational catch in 2000–01 was 7 t, and in 2017–18 was 1.1 t, representing less than one per cent of the combined recreational and commercial harvest in each survey period. In 2000, recreational harvesting of Pipi for human consumption was prohibited, restricting recreational fishers to harvesting for bait use only. Although Indigenous fishers harvest Pipi throughout New South Wales, there are no state-wide estimates of Indigenous harvest. Onsite interviews of Indigenous fishers in the Tweed Heads region (Northern New South Wales) estimated an annual Pipi harvest in that region of 3 056–7 380 individuals [Schnierer 2011]. Using a regional weight multiplier estimated at 14.81 g per Pipi (Murphy et al. 2020), indigenous harvest was estimated to be less than 0.12 t. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, 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, Pipi in NSW is classified as a **sustainable stock**.

## South Australia

Indigenous Australians have occupied the Coorong region in south eastern South Australia for at least 16 000 years and have harvested Pipi (also known as Goolwa Cockles in South Australia) for the past 10 000 years [Godfrey 1989]. Middens in the vicinity of the Murray River mouth in South Australia are composed almost exclusively of adult Pipi shells [Luebbbers 1978].

The commercial fishery for Pipi has been managed under an individual transferable quota system with an annual total allowable commercial catch (TACC) since 2007–08, following fishery-dependent information indicating that Pipi had declined during the mid to late 2000s [Ferguson and Mayfield 2006, Ferguson 2013, Ferguson et al. 2015]. Fishers with quota for Pipi from the Lakes and Coorong Fishery (LCF) and the Marine Scalefish Fishery (MSF) operate mainly on the ocean beaches of Youngusband Peninsula, adjacent to the Coorong. Since 2012, the TACC has been determined under the harvest strategy for Pipi, which is described in the *Management Plan for the Lakes and Coorong Fishery* [PIRSA 2016] and a minimum legal length of 35 mm is in place to allow spawning to occur at least once before recruitment to the fishery [Ferguson 2013]. The recreational and commercial Pipi fisheries are spatially separated onto beaches that are, respectively, west and east of the River Murray mouth. Estimates of recreational catch range between 5 t and 33 t (whole weight) per year, reflecting between 0.8 and 7 per cent of the combined recreational and commercial state-wide catch [Jones 2009, Jones and Doonan 2005, Giri and Hall 2015].

The most recent stock assessment was completed in 2017 and reported up to the conclusion of the 2015–16 season [Ferguson and Hooper 2017]. The primary measures for biomass and fishing mortality are fishery-independent estimates of mean annual relative biomass [Ferguson et al. 2015] and population size structure. From 2009–10, increasing mean annual relative biomass and increasing complexity of size structures indicated recovery of the resource [Ferguson 2013, Ferguson et al. 2015]. From 2015–16 to 2017–18, following several years of successful recruitment, estimates of mean annual relative biomass were the highest on record and ranged from 44–61 per cent above the most recent ten year average (2008–09 to 2017–18). In 2018–19, relative biomass was five per cent below the ten year average but remained above (11 per cent) the target reference point in the harvest strategy [PIRSA, 2016]. Pre-recruits were present (46 per cent) in the population size structure in 2018–19. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, 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, Pipi in South Australia is classified as a **sustainable stock**.

## Victoria

The presence of shells in middens provides evidence that Pipi were harvested historically by Indigenous communities along the Victorian coastline for the past 10 000 years [Godfrey 1989]. Pipi are also harvested by the commercial sector and by recreational fishers.

The commercial Pipi fishery has operated since 1990, when small, infrequent catches were targeted towards the bait market. With development of the fishery, targeting of commercial catches has been increasingly directed at the human consumption market. The Pipi fishery transitioned to quota management in April 2020 with an annual total allowable commercial catch (TACC) for each of

three management zones and a specific Pipi Fishery Access Licence required for fishers. Recreational fishers harvest Pipi for food and bait, primarily in the summer months with the impacts of recreational harvesting thought to be localised around beach access points [Lewis et al. 2012]. Most recreational Pipi fishing occurs in Venus Bay, although anecdotal evidence suggests increasing numbers of recreational fishers are visiting Discovery Bay, and elsewhere. Although the recreational fishery in Venus Bay is significant, the size of its landings is currently unknown [Conron et al. 2020].

Commercial fishery CPUE (catch rate) provides the only available index of relative abundance for Pipi in Victoria. Currently, there is uncertainty around CPUE as an index of relative abundance due to changing fishing practices (e.g. numbers of people catching Pipi under a licence on a given day) and changes in the way that effort and gear have been reported over time [Conron et al. 2020]. With the introduction of the quota fishery in 2020, a Pipi fishery-specific logbook has been introduced as well as a regulation change to limit the number of fishers to two per fishing operation. These changes will lead to improvements in catch and effort reporting [Conron et al. 2020].

Statewide commercial landings were very low and sporadic during the early 1990s with effort less than 90h.y-1 until 2010 before a seven-fold escalation in 2011 when the more active commercial fishery in the far west at Discovery Bay became established [Conron et al. 2020]. In 2013–14 the commercial Pipi catch increased to 86 t, but by 2019–20 it had declined to 54 t. The Total Allowable Catch for the 2020–2021 season was set at 10 t in Discovery Bay Western Zone, 40 t in Discovery Bay Eastern Zone and 2 t in the Venus Bay Commercial Zone. Past assessments of Pipi have been limited, and there are no data available to directly estimate biomass or exploitation rates. In addition, there is no knowledge on recruitment or harvestable biomass, and there are no defined target or limit reference levels. Previous investigation of the impact of recreational collection of pipis over a number of seasons showed:

- No measurable effect on the numbers of pipis on the beach,
- No measurable effect on the numbers of pipi recruits (<1 to 16 mm) or immature juvenile pipi (17 to 36 mm) at these beaches,
- It reduced the proportion of adult pipis (≥37 mm in length) in the populations at several beaches,
- It altered the population structure of pipis on the harvested beaches, so that sexually immature pipis dominate.

Although a new research project has commenced in 2020 to provide biomass and stock structure information for Victoria, the limited data available at present precludes an assessment of current Pipi stock size or fishing pressure. Initial results have shown that the total numbers of pipis have increased across the year with the most abundant areas of large mature pipis found within a short walk from the main beach access points.

Notwithstanding these recent observations, there remains insufficient information available to confidently classify the status of this stock.

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

## BIOLOGY

**Pipi biology** [King 1976, Murray-Jones 1999, Ferguson 2013]

| Species | Longevity / Maximum Size                                  | Maturity (50 per cent)                                      |
|---------|---|---|
| Pipi    | South Australia: 3–5 years, 61 mm SL. New South Wales: 1– | South Australia: ~12 months, fifty per cent mature at 28 mm |

|  |                   |                                       |
|--|-------------------|---------------------------------------|
|  | 2 years, 75 mm SL | SL. New South Wales: 1 year, 37 mm SL |
|--|-------------------|---------------------------------------|

**DISTRIBUTION**



Distribution of reported commercial catch of Pipi

**TABLES**

| <b>Fishing methods</b> | <b>New South Wales</b> | <b>South Australia</b> | <b>Victoria</b> |
|------------------------|------------------------|------------------------|-----------------|
| <b>Commercial</b>      |                        |                        |                 |
| Hand collection        | ✓                      |                        | ✓               |
| Hand held-Implements   |                        |                        | ✓               |
| Rake                   |                        | ✓                      |                 |
| Various                | ✓                      |                        |                 |
| <b>Recreational</b>    |                        |                        |                 |
| Hand collection        | ✓                      | ✓                      |                 |
| Hand held-Implements   |                        |                        | ✓               |
| Rake                   |                        | ✓                      |                 |

| <b>Management Methods</b> | <b>New South Wales</b> | <b>South Australia</b> | <b>Victoria</b> |
|---------------------------|------------------------|------------------------|-----------------|
| <b>Commercial</b>         |                        |                        |                 |
| Bag limits                |                        |                        | ✓               |
| Catch limits              | ✓                      | ✓                      |                 |

|                          |   |   |   |
|--------------------------|---|---|---|
| <b>Effort limits</b>     |   |   | ✓ |
| <b>Gear restrictions</b> | ✓ | ✓ | ✓ |
| <b>Licence</b>           |   |   | ✓ |
| <b>Limited entry</b>     | ✓ | ✓ | ✓ |
| <b>Size limit</b>        | ✓ | ✓ | ✓ |
| <b>Spatial closures</b>  | ✓ | ✓ | ✓ |
| <b>Temporal closures</b> |   | ✓ |   |
| <b>Recreational</b>      |   |   |   |
| <b>Bag limits</b>        | ✓ | ✓ | ✓ |
| <b>Gear restrictions</b> | ✓ | ✓ | ✓ |
| <b>Licence</b>           |   |   | ✓ |
| <b>Possession limit</b>  | ✓ | ✓ |   |
| <b>Seasonal closures</b> |   | ✓ |   |
| <b>Size limit</b>        |   | ✓ |   |
| <b>Spatial closures</b>  |   | ✓ |   |

| <b>Catch</b>        |                        |   |                 |
|---------------------|------------------------|---|-----------------|
|                     | <b>New South Wales</b> | <b>South Australia</b>                                | <b>Victoria</b> |
| <b>Commercial</b>   | 132.472 t              | 646.975 t   | 53.9198 t       |
| <b>Indigenous</b>   | Unknown                | Unknown   | Unknown         |
| <b>Recreational</b> | 1.1 t (2017–18)        | 22.9 t (in 2000),<br>5 t (in 2007),<br>33 t (in 2013) | Unknown         |

**Active Vessels** Because Pipi are collected from beaches, ‘vessels’ is not used. Hence, numbers of licences and fishers are presented here instead of vessel numbers. Licences refer to the number of licence holders with an endorsement to take Pipi for sale.

**Victoria - Indigenous (management methods)** A person who identifies as Aboriginal or Torres Strait Islander is exempt from the need to obtain a Victorian recreational fishing licence, provided they comply with all other rules that apply to recreational fishers, including rules on equipment, catch limits, size limits and restricted areas. Traditional (non-commercial) fishing activities that are carried out by members of a traditional owner group entity under an agreement pursuant to Victoria’s *Traditional Owner Settlement Act 2010* are also exempt from the need to hold a recreational fishing licence, subject to any conditions outlined in the agreement. Native title holders are also exempt from the need to obtain a recreational fishing licence under the provisions of the Commonwealth’s *Native Title Act 1993*.

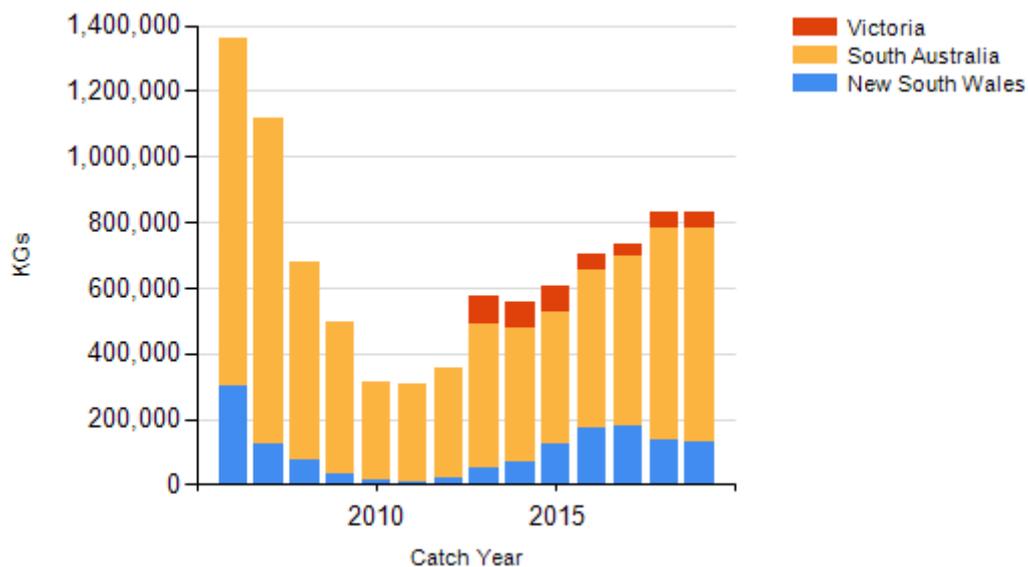
**New South Wales – Indigenous (management methods)**<https://www.dpi.nsw.gov.au/fishing/aboriginal-fishing>.

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

**South Australia and Victoria - Commercial (catch)** Catches from the MSF in South Australia, and the BF and OF in Victoria cannot be reported separately for confidentiality reasons as there are fewer than five licences.

**South Australia – Indigenous (management methods)** In South Australia, regulations for managing recreational fishing may not apply to fishing activities by Indigenous people. South Australian traditional owners may have rights under the Commonwealth's *Native Title Act 1993* to hunt, fish, gather and conduct other cultural activities for their personal, domestic or non-commercial communal needs without the need to obtain a licence.

**CATCH CHART**



Commercial catch of Pipi - note confidential catch not shown

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