

# Roe's Abalone (2020)

*Haliotis roei*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia Area 2 Fishery	Sustainable	Catch, CPUE
Western Australia	Western Australia Area 5 Fishery	Sustainable	Catch, CPUE
Western Australia	Western Australia Area 6 Fishery	Sustainable	Catch, CPUE
Western Australia	Western Australia Area 7 Fishery	Sustainable	Catch, CPUE, fishery-independent recruitment surveys
Western Australia	Western Australian Area 8 Fishery	Depleted	Catch, CPUE, fishery-independent surveys
South Australia	South Australia Western Zone Fishery	Undefined	

## STOCK STRUCTURE

Roe's Abalone are distributed from Shark Bay in Western Australia south around to western Victoria. Recent genetic evidence indicates the existence of a single Roe's Abalone meta-population across the species' distribution (sampled from Kalbarri in Western Australia to Spencer Gulf in South Australia) but with three differentiated adaptive population clusters [Sandoval-Castillo et al. 2015]. The southern adaptive population cluster extends across a substantial geographic range (Albany in Western Australia to Spencer Gulf in South Australia) traversing jurisdictional boundaries. The stock is currently managed as several separate units.

Assessment of stock status is therefore presented here at the management unit level—Western Australia Area 2 Fishery, Western Australia Area 5 Fishery, Western Australia Area 6 Fishery, Western Australia Area 7 Fishery and South Australia Western Zone Fishery.

## STOCK STATUS

### South Australia Western Zone Fishery

Prior to commercial catches, an experimental fishery for Roe's Abalone caught 45 t (whole weight) from November 2000 to December 2002 [Preece et al. 2004]. Results from the experimental fishery suggested that Roe's Abalone are widely, but patchily distributed across the Western Zone of South Australia with limited areas of high abundance [Preece et al. 2004]. In 2014, a commercial catch limit of 11 t (whole weight) with a minimum legal length of 75 mm shell length (L50 estimated at 50–59 mm shell length [Preece et al. 2004]) was implemented under a Ministerial exemption. Best estimates of annual catch were between 65 per cent and 85 per cent of the total catch limit, with the species being targeted on very few days and by a small percentage of licence holders. CPUE was between 30 and 33 kg/hr from 2017 to 2019. There is no published assessment available for Roe's Abalone, and the data available are inadequate to estimate biomass or exploitation rates. There is little knowledge on recruitment or harvestable biomass, and there are no defined target or limit reference levels. This prevents assessment of current stock size or fishing pressure. Consequently, there is insufficient information available to confidently classify the status of this stock.

Based on the evidence provided above, the **South Australia Western Zone Fishery** management unit is classified as an **undefined** stock.

### Western Australia Area 2 Fishery

Catches in the Western Australian Abalone Fisheries (Areas 2, 5, 6 and 7) are controlled by a total allowable commercial catch (TACC), set annually by the harvest control rule defined in the Abalone Resource of Western Australia Harvest Strategy 2016–21 [DoF 2017]. The harvest control rule uses a three-year moving average of standardised catch per unit effort (CPUE) as the key Performance Indicator (PI) against area-specific limit, threshold and target reference levels, which correspond to commercial catch rates at 20 per cent, 30 per cent and 40 per cent of unfished stock levels. Reference levels were calculated using an index of spawning biomass derived from fishery-independent surveys in the Western Australia Area 7 Fishery during a specified reference period of recruitment stability (1997–2010). These fishery-independent data were used to calibrate the fishery-dependent CPUE for Roe's Abalone to unfished levels in the management units, based on data collected from an area closed to fishing during the same reference period [DoF 2017].

In the Western Australia Area 2 Fishery (WAA2F) the TACC was increased from 12 t to 13.2 t in 2019, after it had been reduced from 18 t in 2018 given the lower catches over the previous four years (between 61% and 90% of annual TACC). Before 2014 over 90% of the annual TACC was caught with the full allocation generally caught through the 2000's. The commercial industry has attributed the reduced catch in recent years to economic (beach price and market competition) and accessibility (remote region and prevailing weather) factors. Annual CPUE exhibited a sharp decline after 2012 and reached a historical low in 2015. It then increased over the next two years (2016-17) to pre-2012 levels but has declined slightly in the last two years. Even at the historical low in 2015 the annual SCPUE and PI were above the target reference level. The fishery has a legal minimum length of 60 mm, which allows 1–2 years of spawning to occur before recruitment to the fishery. The above evidence indicates that the biomass of this stock is unlikely to be depleted, that recruitment is unlikely to be impaired and that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

Based on the evidence provided above, the **Western Australia Area 2 Fishery** management unit is classified as a **sustainable stock**.

**Western  
Australia  
Area 5  
Fishery**

Catches in the Western Australia Area 5 Fishery (WAA5F) are managed by the same process as described above in the WAA2F and defined in the Abalone Resource of Western Australia Harvest Strategy 2016–21 [DoF 2017]. In the WAA5F over the last seven years less than 53 per cent of the annual TACC has been caught, and the full allocation has not been caught since the early 2000s. The commercial industry has attributed the reduced catch in recent years to economic (beach price and market competition) and accessibility (remote region and prevailing weather) factors. Annual SCPUE was relatively stable between 1995 and 2012, declined in 2013 and then remained stable but slightly lower than the historical average over next six years. In 2019 the SCPUE increased back to the 1995 to 2012 level and the annual SCPUE and PI have always been above the target reference level. The fishery has a legal minimum length of 60 mm, which allows 1–2 years of spawning to occur before recruitment to the fishery. The above evidence indicates that the biomass of this stock is unlikely to be depleted, that recruitment is unlikely to be impaired and that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

Based on the evidence provided above, the **Western Australia Area 5 Fishery** management unit is classified as a **sustainable stock**.

**Western  
Australia  
Area 6  
Fishery**

Catches in the Western Australia Area 6 Fishery (WAA6F) are managed by the same process as described above in the WAA2F and defined in the Abalone Resource of Western Australia Harvest Strategy 2016–21 [DoF 2017]. In the WAA6F the annual TACC had been constant since 1999 (12 t whole weight) but in 2019 it was reduced to 7.5 t due to the implementation (start of 2019 season) of the Ngari Capes Marine Park which excludes abalone fishing from regions within the WAA6F [Hesp et al. 2008]. Prior to 2012, 90 per cent or greater of the TACC was caught annually but since then the catch has declined to less than 7 t annually and remained at this level for the last seven years. The commercial industry has attributed the reduced catch in recent years to economic (beach price and market competition) and accessibility (remote region and prevailing weather) factors. After a period of relative stability (1998 to 2011) the annual SCPUE declined sharply between 2011 and 2013 to the lowest level on record but remained just above the target reference level. In 2014 the annual SCPUE increased and since then has remained stable, although with a high degree of uncertainty around the estimate. The increase in annual SCPUE and high uncertainty from 2014 onwards has resulted from the decline in catch since 2011 and the very low levels of catch between 2014 and 2017. This reduction in catch contributed to the annual SCPUE remaining above the target reference level. The fishery has a legal minimum length of 60 mm, which allows 1–2 years of spawning to occur before recruitment to the fishery. The above evidence indicates that the biomass of this stock is unlikely to be depleted, that recruitment is unlikely to be impaired and that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

Based on the evidence provided above, the **Western Australia Area 6 Fishery** management unit is classified as a **sustainable stock**.

**Western  
Australia  
Area 7  
Fishery**

Catches of Roe's Abalone in the Western Australia Area 7 Fishery (WAA7F) are managed as described for other management units above, with the addition of a stock prediction model [DoF 2017]. This model uses a fishery-independent survey recruitment index (Age 1+) along with an annual environmental factor (summer sea surface temperature - SST) to predict the density of harvest-sized animals (71+ mm) and set the annual TAC. The TAC is then separated into the commercial TACC and recreational TARC by using the available biomass in each

habitat and both sectors' pattern of usage.

The commercial catch in the WAA7F was 100 per cent of the TACC in 2019 (24 t whole weight) and has exceeded 97 per cent of the allocated TACC every year other than 2012 and 2016. Changes in catch therefore result from changes in the TACC. The recreational catch estimate for 2019 was 24–28 t (26 t) whole weight and has been managed to the 20 t ( $\pm$  2 t) TARC for the last nine years. The catch was higher than the TARC in 2019 due to larger size of abalone taken, favourable weather conditions and a recovering stock.

The annual SCPUE steadily declined between 2005 and 2014 but has since increased in each of the last five years and is currently above the target reference level. This trend in annual SCPUE resulted partially from a TACC reduction in 2014 (11 per cent), a voluntary in-season commercial catch reduction in 2016, and implementation of the stock prediction model in the Harvest Strategy to set TACC in 2017 (setting the TACC at 67 per cent of long-term commercial sustainable harvest level).

The marine heatwave in 2011 had a range of effects on the abalone stocks, including the decline in large animals and spawning biomass, growth stunting and recruitment impairment [Hart et al. 2018]. Fishery-independent surveys determined that the density of harvest-sized Roe's Abalone in both the subtidal and platform habitats, and across both fished and unfished areas experienced substantial declines between 2003 and 2012. The density of harvest-sized animals then increased from record-low levels during 2012–2016, and in 2020 was near record-high levels in both the platform and subtidal habitats. This increase in density has continued in unfished stocks and indicates increased productivity (recruitment and growth) in response to good environmental conditions (low summer SST) during this time. Spawning biomass also increased in 2020 with fished areas having now reached, and unfished areas approaching, pre-marine heatwave levels. Age 1+ (17–32 mm) animals have also shown an increase in density over the last five years, after the juvenile recruitment density declined by 80 per cent between 2010 and 2013 (following the marine heatwave), with 2015 being the lowest year on record. All stock indicators (harvest-size animals, spawning biomass and recruitment) have returned to pre-marine heatwave levels.

The fishery has a legal minimum length of 60 mm, which allows 1–2 years of spawning to occur before recruitment to the fishery. However, the commercial sector targets large animals (71+ mm), which allows 2–3 years of spawning to occur before harvest. The above evidence indicates that the biomass of this stock is unlikely to be depleted, that recruitment is unlikely to be impaired and that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

Based on the evidence provided above, the **Western Australia Area 7 Fishery** management unit is classified as a **sustainable stock**.

**Western  
Australian  
Area 8  
Fishery**

Catches in the Western Australia Area 8 Fishery (WAA8F) are managed by the same process as described above in the WAA2F and defined in the Abalone Resource of Western Australia Harvest Strategy 2016–21 [DoF 2017]. The WAA8F has been closed to both commercial and recreational abalone fishers since the 2011–12 season. This was in response to the Roe's abalone populations in WAA8F suffering catastrophic mortality (99.9 per cent in certain areas) due to an anomalous environmental event in the summer of 2011 [Strain et al. 2019]. During this event (marine heat wave) a sustained period of elevated sea surface temperatures rose to lethal levels for Roe's Abalone and effectively wiped out an entire stock. The marine heatwave in 2011 not only impacted the WAA8F but had a range of effects on the WAA7F, including the decline in large animals and spawning biomass, growth stunting and recruitment impairment [Hart et al. 2018].

Prior to the 2011 marine heat wave the WAA8F had a TACC of 9 t whole weight (2010–11 season) and even with fluctuations from year to year was expected to continue at this harvest level. The SCPUE had fluctuated above the target reference level ever since a TACC was specified for the Management Area in 1999. Fishery-independent surveys in the major region of the WAA8F, as identified by commercial catch distribution, have shown no evidence of natural recovery since 2012 [Strain et al. 2019].

The above evidence indicates that the biomass of this stock is depleted due to environmental conditions. Based on the evidence provided above, the Western Australia Area 8 Fishery management unit is classified as a **depleted stock**.

## BIOLOGY

**Roe's Abalone biology** [Keesing 1984, Hancock 2004]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Roe's Abalone	15 years, 89 mm SL	3 years, 40 mm SL

## DISTRIBUTION



Distribution of reported commercial catch of Roe's Abalone.

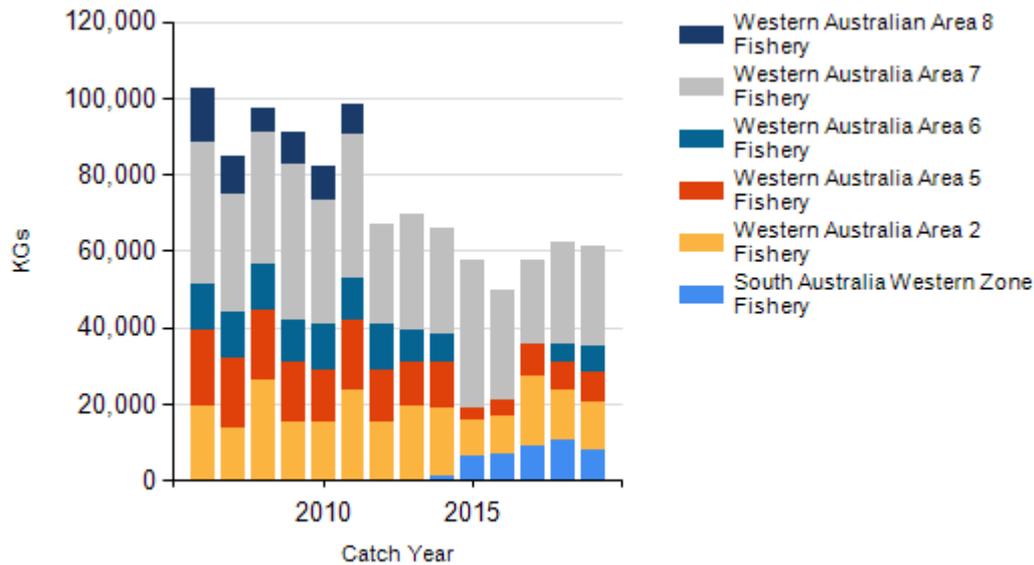
## TABLES

Fishing methods		
	South Australia	Western Australia
<b>Commercial</b>		
Diving	✓	✓
<b>Recreational</b>		
Diving		✓
Various	✓	

<b>Management Methods</b>		
	<b>South Australia</b>	<b>Western Australia</b>
<b>Commercial</b>		
Limited entry	✓	✓
Size limit	✓	✓
Total allowable catch	✓	✓
<b>Recreational</b>		
Bag limits	✓	✓
Licence		✓
Size limit	✓	✓
Spatial closures		✓
Temporal closures		✓

<b>Catch</b>		
	<b>South Australia</b>	<b>Western Australia</b>
<b>Commercial</b>	7.96998 t	53.1182 t
<b>Indigenous</b>	Unknown	Unknown
<b>Recreational</b>	Unknown	26 t in WAA7F plus 14 t in WAA2F, WAA5F and WAA6F combined

**CATCH CHART**



Commercial catch of Roe's Abalone - note confidential catch not shown.

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