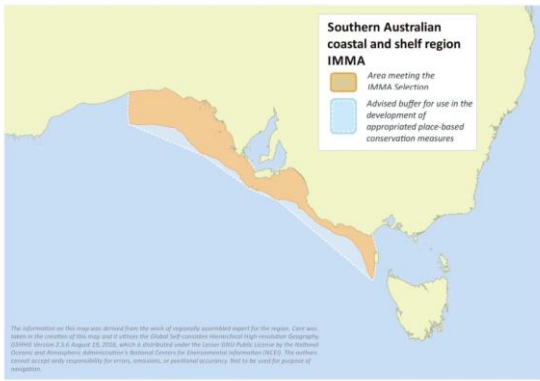


# Southern Australian Coastal and Shelf Region IMMA

## Summary

The Southern Australian coastal and shelf region IMMA is home to the largest density of marine mammals, seabirds, sharks and large pelagic fish species of any other shelf ecosystem in Australia. The region is of national and international significance for marine mammals and provides important habitat for critical activities such as breeding and foraging. Seasonal coastal upwelling along the Bonney Coast and off Kangaroo Island and lower Eyre Peninsula creates zones of high productivity, supporting plankton, pelagic fish and squid, and thus important prey for marine mammals within these regions. The IMMA is critical for Australian pinnipeds, hosting over 80% of the global population of Australian sea lions, over 80% of Australia's New Zealand fur seal population, and important breeding sites for Australian fur seals.

The IMMA also serves as habitat for up to 40% of the Australian population of southern right whales, or ~10% of global abundance, as well as Australia's largest feeding aggregation of pygmy blue whales, which occurs in mid-shelf and slope waters off Kangaroo Island, South Australia and in the Bonney Upwelling off Portland, Victoria during summer and autumn.



**Area Size** 258,364km<sup>2</sup>

## Qualifying Species and Criteria

Australian Sea Lion – *Neophoca cinerea*

Criterion A, B2, C1, C2, D1

Australian fur seal – *Arctocephalus pusillus doriferus*

Criterion C2

New Zealand fur seal – *Arctocephalus forsteri*

Criterion B2, C1, C2

Southern right whale – *Eubalaena australis*

Criterion B2, C1, C3

Antarctic blue whale – *Balaenoptera musculus intermedia*

Criterion B2, C2

Pygmy blue whale – *Balaenoptera musculus brevicauda*

Criterion A, B2, C2

## Marine Mammal Diversity (D2)

*Megaptera novaeangliae*, *Tursiops aduncus*, *Tursiops truncatus*, *Delphinus delphis*, *Tasmacetus shepherdii*,

*Mesoplodon layardii*, *Orcinus orca*, *Caperea marginata*, *Mirounga leonina*, *Hydrurga leptonyx*, *Arctocephalus tropicalis*, *Balaenoptera borealis*

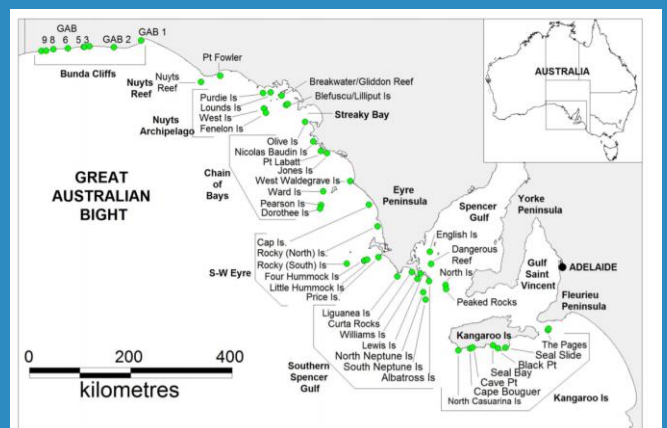


Figure 1 - Australian Sea Lion breeding sites in South Australia (Goldsworthy et al. 2010)

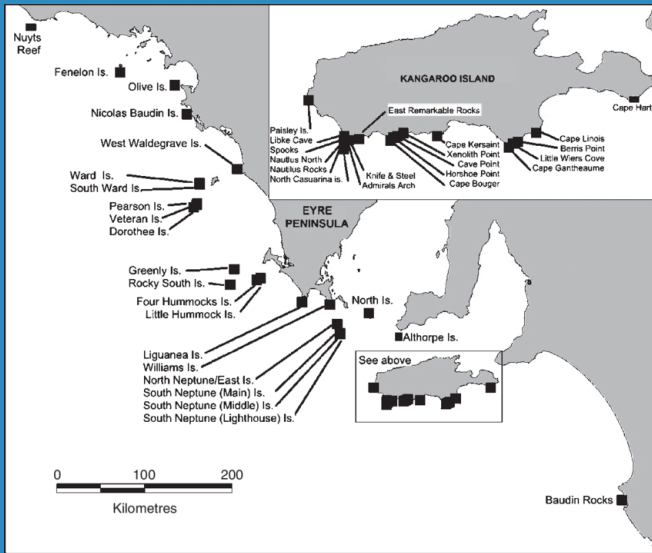


Figure 2 – Long nosed fur seal study sites and breeding locations in South Australia (source: Shaughnessy et al. 2015)

This IMMA ranges from the Western Australian and South Australian border in the west along to Cape Otway in the east and includes coastal waters to a depth of roughly 200m along the continental shelf.

The broad shelf and steep slopes are influenced by different oceanic features. Seasonal coastal upwelling occurs along the Bonney Coast and off Kangaroo Island and lower Eyre Peninsula. The enhancement of primary and secondary production during upwelling supports relatively higher production of nekton, small pelagic fish and squid, which in turn underpins important predator foraging areas within these regions. The southern Australian coast and shelf region is within the south eastern marine bioregion and encompasses two Integrated Marine and Coastal Regionalisation of Australia (IMCRA) bioregional provinces, including the Great Australian Bight Transition and the Western Bass Strait Transition. The region has complex oceanography that includes the world's only northern boundary current system, and Australia's largest coastal upwelling region.

The Bonney Upwelling is an area of high productivity with large aggregations of marine life. It is a predictable, seasonal upwelling that brings cold, nutrient rich water to the sea surface and typically occurs in the summer and autumn along

the narrow continental shelf between Robe, south Australia, and Portland, Victoria. This Bonney Upwelling phenomenon generally starts in the eastern part of the Great Australian Bight in November/December and spreads eastwards to the Otway Basin around February (Gill et al, 2011) as the latitudinal high-pressure belt migrates southward.

Primary species in the IMMA include Antarctic blue whales, pygmy blue whales, Australian sea lions, New Zealand fur seals and southern right whales. Key aggregation areas within the IMMA include the Head of the Bight which is the largest calving and nursery area for southern right whales in Australia, and Fowlers Bay, an established aggregation area adjacent to the Head of the Bight (Charlton et al. 2019b).

Coastal waters provide important habitat for resident populations of common and Indo-Pacific bottlenose dolphins which are subject to bycatch mortality in the purse-seine fishery for sardines off central South Australia and the gillnet fishery for gummy sharks off southern Australia (Bilgmann et. al. 2014 and 2018, Passadore et. al. 2017 and 2018). Other secondary species in the IMMA include: common dolphins, Shepherd's beaked whale, strap-toothed beaked whale, killer whales, pilot whales and pygmy right whales.

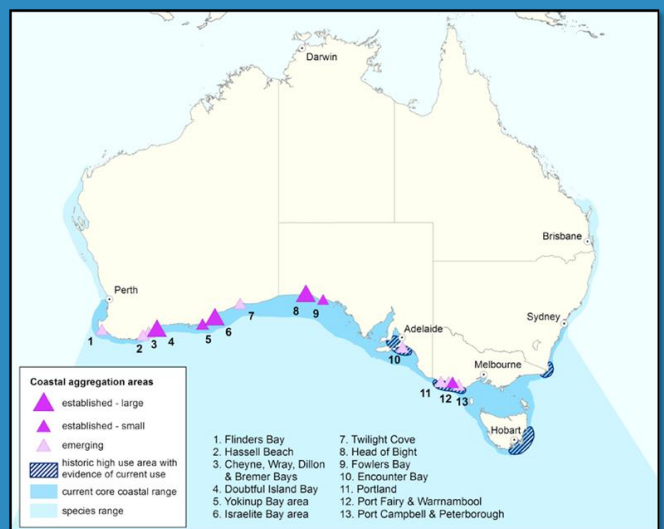


Figure 3. Southern right whale distribution range in Australia. Source: DSEWPac 2012

## Criterion A – Species or Population Vulnerability

The IMMA contains habitat important for the survival and recovery of the Critically Endangered Antarctic blue whale, the Endangered pygmy blue whale and Endangered Australian sea lion. The IMMA also provides critical habitat for a globally significant proportion of southern right whales.

## Criterion B: Distribution and Abundance

### Sub-criterion B2: Aggregations

The IMMA includes Australia's largest feeding aggregation of Antarctic blue whales and pygmy blue whales, that occur in mid-shelf and slope waters of the eastern Great Australian Bight (GAB). They also occur during summer and autumn off Kangaroo Island and in the Bonney Upwelling primarily between the 50-150m depth contour (Gill et al. 2015). The current global population of blue whales is uncertain but is plausibly in the range of 5-15,000 (Cooke 2018). For the pygmy blue whale there is uncertainty in population numbers pre-exploitation, and their current numbers are not known. Pygmy and Antarctic blue whales were acoustically detected in the Bonney Upwelling (McCauley et al. 2018). Calls from Antarctic blue whales are typically recorded between November and May, though calls have been recorded as late as June.

The Australian sea lion is the only endemic pinniped that breeds in Australia, and the least abundant. The IMMA is exceptionally important to the Australian sea lion population, supporting 50% of the species that breed on offshore islands and forage in coastal waters between Kangaroo Island and Bunda Cliffs, South Australia (Goldsworthy et al. 2015). Regional trends in aggregated abundance between 2005–2015 show a decline of 2.9% per year or 4.3% per breeding season for the Bunda Cliff area (Goldsworthy et al. 2015). The IMMA also includes >80% of the New

Zealand fur seal (*Arctocephalus forsteri*) population in Australia that breeds on the south coast of Kangaroo Island and on islands off lower Eyre Peninsula.

The established aggregation area at the Head of Bight is the largest calving and nursery area for southern right whales in Australia (Charlton et al. 2019b, DSEWPAC 2012). The south western sub-population comprises most of the Australian population and was estimated at around 3,200 individuals in 2018, increasing at an annual rate of approximately 6% per annum (Bannister 2017, Smith et al. 2019). Head of Bight represents up to 40% of the Australian total population (Burnell 2001, Charlton et al. 2019a) or ~10% of global abundance (IWC 2013). Annual abundance at the Head of the Bight

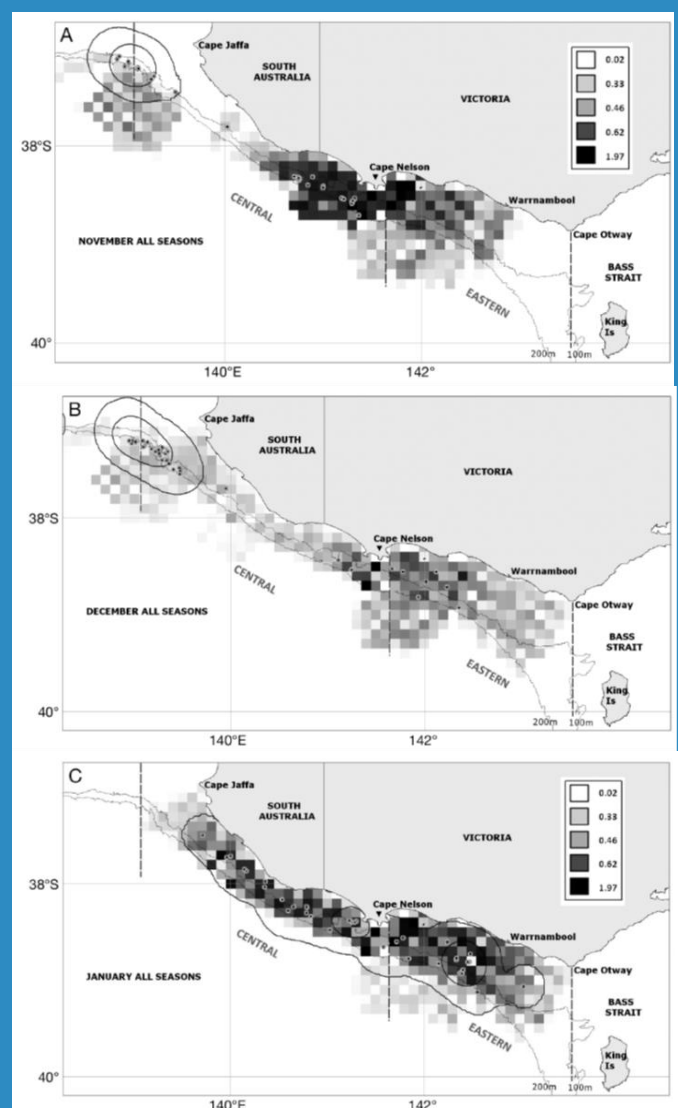


Figure 4. Blue whale sightings in the Otway Basin (Nov, Dec, Jan) (Gill et al., 2011)

frequently exceeds 200 unique individuals photo identified between July and September (Charlton et al. 2019a). The area is occupied by 80% female and calf pairs and 20% unaccompanied whales and mean residency times include 65 days for females with a calf and 15 days for unaccompanied whales (Charlton 2017). Recent studies demonstrated that the primary calving ground has reached saturation capacity due to density dependence, resulting in increased abundance and habitat shifts into adjacent habitat, such as Fowlers Bay (170 km to the south east) (Charlton et al. 2019b).

Southern right whales in the IMMA belong to the south eastern and south western Australian sub-populations, for which there is some evidence of genetic differentiation (Carroll et al. 2011). Warrnambool is a small established aggregation area and Portland, Port Fairy, Port Campbell and Peterborough are emerging breeding aggregation areas for southern right whales in the south eastern sub-population. Systematic aerial surveys and opportunistic photo identification studies have been completed in the area since the 1990s. The population is currently estimated at less than 300, with no signs of increase in these emerging aggregation areas (DSEWPac 2012; Watson et al. 2015). Photo identification studies have recorded thirteen breeding females with site fidelity to Logans Beach, Warrnambool, though no significant change has been seen in the annual abundance of mother-calf pairs over the last three decades (Stamation et al. 2020). The high marine traffic and oil and gas industry in the area, and the vulnerability of the south eastern sub-population makes the protection of the area encompassed in this IMMA critical to the sub-population's survival.

Threatened marine mammals occur regularly in this area and are concentrated to an such extent that a

single large-scale event could significantly affect the long-term survival of Australian sea lions as well as pygmy blue whales and southern right whales within the southwestern Pacific region.

## **Criterion C: Key Life Cycle Activities**

### **Sub-criterion C1: Reproductive Areas**

The IMMA includes haul-out sites and foraging grounds used by more than one pinniped population for breeding, nursing and mating. Australian sea lions breed on offshore islands and forage in coastal waters between Kangaroo Island and Bunda Cliffs. Long-nosed fur seals breed on the south coast of Kangaroo Island and on islands off lower Eyre Peninsula (Goldsworthy 2015).

The major calving and nursery aggregation areas for southern right whales at the Head of Bight and Fowlers Bay in the IMMA provide specific sites for giving birth and caring for young and are of national and global significance. Annual calf numbers in the Head of Bight, Fowlers Bay area regularly exceed 100 calves (Charlton et al. 2019a; Charlton et al. 2019b). Logans Beach, Warrnambool is the only established calving aggregation area for southern right whales in the south east of Australia and was described as critical for survival in the Conservation Management Plan for the Southern Right Whale (DSEWPAC 2012). Small emerging aggregation areas occur in Port Fairy, Portland, Port Campbell and Peterborough in Victoria.

### **Sub-criterion C2: Feeding Areas**

Australia's largest feeding aggregation of pygmy blue whales and Antarctic blue whales occurs in mid-shelf and slope waters off Kangaroo Island and in the Bonney Upwelling during summer and autumn. The Bonney Coast Upwelling is one of only two identified seasonal feeding areas for blue whales in Australian coastal waters and is one of 12 known blue whale feeding aggregation areas globally.

The time and location of the appearance of blue whales in the east generally coincides with the upwelling of cold water in summer and autumn along this coast (the Bonney Upwelling) and the associated aggregations of krill that they feed on (Gill and Morrice, 2003). Gill et al. (2011) also reported that 80% of blue whale sightings were encountered in water depths between 50 and 150 m, 93% in water depths <200 m and 10% within 5 km of the 200 m isobath in the eastern and central zones.

The IMMA includes critical foraging habitat for Australian sea lions, which forage in coastal waters between Kangaroo Island and the Bunda Cliffs. These sea lions use a variety of shoreline types, but prefer the more sheltered sides of islands and typically avoid rocky exposed coasts (Shaughnessy, 1999). They are considered to be specialised benthic foragers, i.e., they feed primarily on the shelf sea floor (DSEWPaC, 2013c). Australian sea lions feed on the continental shelf, most commonly in depths of 20–100 m, with adult males foraging further offshore and into deeper waters (DSEWPaC, 2013). They typically forage up to 60 km from their colony, but can travel up to 190 km when over shelf waters (Shaughnessy, 1999).

New Zealand fur seals in South Australia feed on a wide variety of fish, cephalopods and crustaceans. Adult males forage at the edge of the continental shelf while adult females typically use continental shelf or near-shelf waters in summer and autumn, and pelagic waters associated with the subtropical front much further south during winter, the same region that is favored by juveniles. During summer, females and juveniles forage closer to their breeding colony while moulting and, in the case of females, while feeding small pups. (Page et al. 2006, Baylis et al. 2008, Foo et al. 2019).

### **Sub-criterion C3: Migration Areas**

The coastal zone from 0-2km from shore along the

entire south coast of Australia represents important coastal movement zones and corridors for southern right whales. The movement of southern right whales between coastal aggregation areas within and across seasons, shows that the corridor between the aggregation areas is important connective habitat (Burnell, 2001; Pirzl et al. 2009). Results support the view that greater abundance promotes increased linkage via connective corridors between aggregation areas (Charlton et al. 2019b). Within year movements averaged 730 km, over 34 days. The maximum reported within-season movement of an individual southern right whale across coastal southern Australia is 1,490 km.

### **Sub-criterion D1: Distinctiveness**

Australian sea lions are endemic to Australia, occurring in coastal habitats within Western Australia and South Australia. They are unique in having large numbers of small breeding colonies, low reproductive rates, an unusually long breeding cycle (17-18 months), high site fidelity, and poor dispersal (Campbell et al. 2008).

### **Sub-criterion D2: Diversity**

Diversity of habitats and oceanographic conditions in the IMMA provide for one of the most biodiverse regions in Australia for marine mammals. A minimum of eleven marine mammal species are known to occur in the IMMA, including cetaceans: southern right, humpback, pygmy and Antarctic blue, sei, pygmy right and killer whales, common, Indo-pacific and common bottlenose dolphins, Shepard's and strapped-toothed beaked whales; and pinnipeds: Australian fur and New Zealand fur seals; and Australian sea lions.

The area is also important for humpback whales moving through the area or migrating to northern breeding grounds on the east or the west coast. Sightings and beach-washed carcasses are widely distributed throughout southern Australia from the

Victorian border to the Head of the Bight, suggesting they are present not infrequently (Kemper 2005). Ward et al. (2019) recorded humpback whale song in nearshore waters off Fowlers Bay annually during acoustic monitoring program during 2014-2017.

The coastal area and bays also represent important habitat for large populations of coastal common and bottlenose dolphins. There is some evidence for genetic differentiation of bottlenose dolphins in the southeast of Australia; the Burrunan dolphin, *Tursiops cf. australis*, represents a lineage of bottlenose dolphins that may eventually be recognized as a different species endemic to southern Australian coastal waters (Charlton-Robb et al. 2011).

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**MARINE MAMMAL PROTECTED AREAS TASK FORCE**

IUCN SSC WCPA IMMA

GOBI TETHYS since 1986 WDCS

Supported by:  
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

based on a decision of the German Bundestag

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