

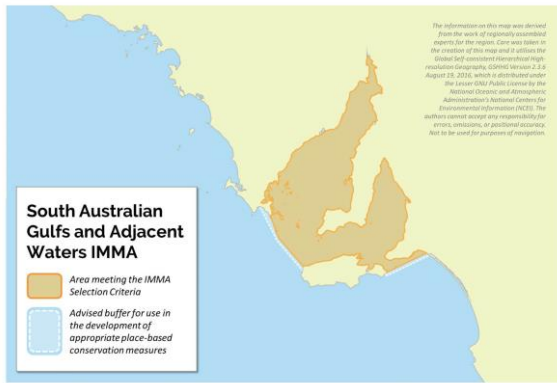
South Australian Gulfs and Adjacent Waters IMMA

Description:

This IMMA includes Spencer Gulf, Gulf St Vincent bioregion and Investigator Strait, South Australia, and is located on the south-central coast of the continent. The unique oceanographic system includes the largest, south-facing inverse estuaries in the Southern Hemisphere. These are very shallow (<50 m), with high salinity and high water temperatures, especially in the north (Nunes Vaz 2014). Changes in sea levels have inundated/drained the region multiple times during the last several hundred thousand years (Cann et al. 1988), giving opportunities for evolutionary processes for marine mammals. This is especially true for inshore cetaceans such as the Indo-Pacific bottlenose dolphin, which has diverged from conspecifics elsewhere along the Australian coast (Jedensjo et al. 2020). Investigator Strait is a buffer zone between the gulfs and oceanic environments, being substantially influenced by the high-energy Southern Ocean to the south. A frontal system at the mouth of Spencer Gulf (within the IMMA) is likely to be an important feeding area for marine mammals, as are adjacent upwelling systems outside the IMMA. The Australian sea lion



Figure 1 – Indo-Pacific bottlenose dolphin mother and calf.
Photo credit: Michael Bossley.



Area Size

47,516km²

Qualifying Species and Criteria

Australian sea lion – *Neophoca cinerea*

Criterion A, B2, C1, C2, D1

Southern right whale – *Eubalaena australis*

Criterion B2, C1, C3

Indo-Pacific bottlenose dolphin – *Tursiops aduncus*

Criterion B2

Long-nosed fur seal – *Arctocephalus forsteri*

Criterion B2

Humpback whale – *Megaptera novaeangliae*

Criterion C3

Marine Mammal Diversity

Orcinus orca, *Kogia breviceps*, *Kogia sima*,
Balaenoptera acutorostrata, *Tursiops truncatus*,
Hydrurga leptonyx, *Delphinus delphis*

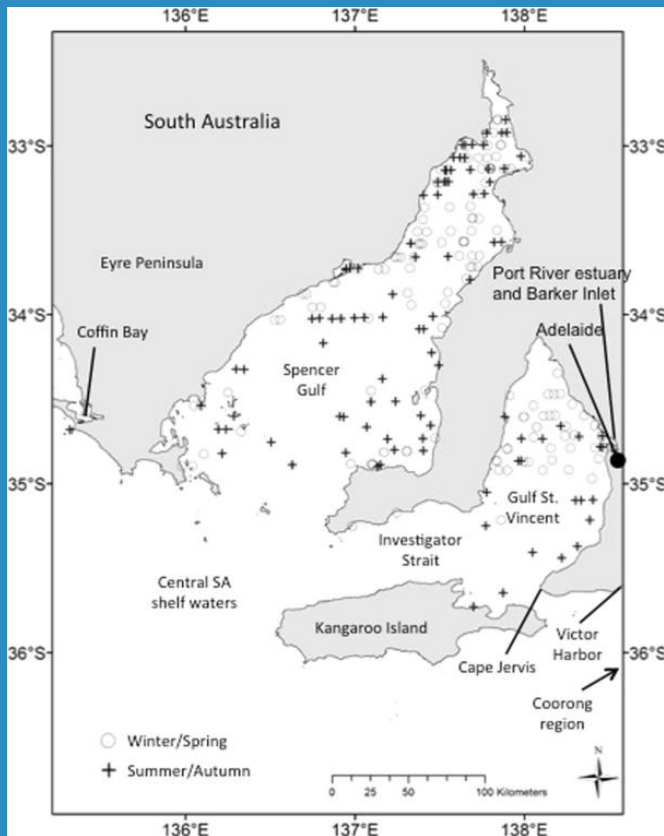


Figure 2 – Distribution of coastal bottlenose dolphins recorded during aerial line-transect surveys in central South Australia, using double observer platforms. Summer/autumn sightings are displayed as black crosses, and winter/spring sightings as non-filled circles. All unique bottlenose dolphin sightings on transect were included (no truncation of data) (Bilgmann et al. 2019).

colonies are located there (Goldsworthy et al. 2015). Females also utilise the IMMA as a feeding ground (Goldsworthy et al. 2009). Southern right whales migrate through the IMMA and have re-established calving sites in some locations. The Victor Harbor area is recognised as a small, established aggregation/calving site important for the recovery of the intensively-harvested, southeastern Australian sub-population (DSEWPac 2012, Kemper et al. 2022). Humpback whales also use the IMMA as migratory corridor, likely on their northward migration during autumn and winter (Kemper 2005). Other cetacean and pinniped species may be vagrants or occasional visitors based on the paucity of sighting and stranding records but more data are needed to confirm this. Some may use the IMMA as a temporary/seasonal feeding area (e.g. *Kogia* spp., killer whale) or simply be passing through (e.g. common bottlenose dolphin, blue whale).

Marine mammals in this IMMA are impacted in short- and long-term by human activities because it is the centre of the South Australian human population (Edyvane 1999). Expert elicitation identified noise, shipping, and net fishing as the greatest region-specific individual threats to marine mammals in Spencer Gulf with the common dolphin, Indo-Pacific bottlenose dolphin, and Australian sea lion showing particular susceptibility to these threats (Robbins et al. 2017). Mortality in fishing and aquaculture operations, shipping and recreational vessel strikes and illegal killing of dolphins are well documented (Segawa and Kemper 2015, Kemper and Gibbs 2001, Kemper et al 2008, Hamer et al. 2008). The semi-enclosed and slow-flushing nature of the region increases the risk of disease (Kemper et al. 2016) and exposure to chemical contamination (Lavery et al. 2009, Kemper et al. 2014).

Criterion A – Species or Population Vulnerability

The Australian sea lion is listed as Endangered on the IUCN Red List. Population size is estimated at 9650 in South Australia with a small population in Western Australia and numbers in most colonies declining (Goldsworthy et al. 2015; Goldsworthy et al. 2021). Approximately 50 % of the species' global population occurs in the IMMA.



Figure 3 – Indo-Pacific bottlenose dolphins travelling slowly near pelicans. Photo: Michael Bossley.

Criterion B: Distribution and Abundance

Sub-criterion B2: Aggregations

Many haul-out and pupping sites of Australian sea lions are located within the IMMA. These pupping sites accounted for 60% of the estimated number of pups in South Australia in 2015 (Goldsworthy et al. 2015) and hence 50% of the global total. The IMMA includes the two largest aggregations of the species, at Dangerous Reef and The Pages islands. Australian sea lions are particularly susceptible to entanglement in gill nets (Hamer et al. 2013) and to a shark gill net fishery that operates within the region, with exclusion zones around all sea lion colonies in the IMMA (AFMA 2010). Southern right whales have been aggregating in increasing numbers since the late 1990s in the Victor Harbor/Encounter Bay area in the southeastern part of the IMMA (Kemper et al., 2022). Up to 25 whales can be seen each day during the austral autumn and winter. This exceeds other number of whales in the only other south-eastern Australian aggregation, at Warrnambool, Victoria. Fourteen small haul-out sites for the long-nosed fur seal are found in the IMMA, as well as three small breeding colonies. The area is inhabited by what is probably the largest proportion of the Indo-Pacific bottlenose dolphin population in southern Australia, and estimated numbers within the IMMA are about 3500 (Bilgmann et al. 2019).

Criterion C: Key Life Cycle Activities

Sub-criterion C1: Reproductive Areas

The largest pupping colonies for Australian sea lions are located at The Pages and Dangerous Reef, both in the IMMA. These are two of only five breeding colonies globally that produce more than 100 pups each breeding season (Goldsworthy et al. 2015). The aggregation of southern right whales in the Victor Harbor area has recently been recognised as a small, established aggregation where a mean of 4.4 calving females are resident each year (Kemper et al. 2022) and is significant for the southeastern

Australian sub-population. The area is also frequently used by transient, unaccompanied adults and mating behaviour has been observed. Females with calves have also been observed within the inner parts of the gulfs (Kemper et al. 1997).

Sub-criterion C2: Feeding Areas

Australian sea lions feed in the benthic zone on the continental shelf, including within this IMMA. Foraging areas for lactating females are located near pupping colonies and are important to maintain pup condition in the first 18 months of their lives. In addition, the species displays Area Restricted Foraging for lactating adult females. The females from Dangerous Reef, in southern Spencer Gulf, undertook short duration feeding trips of 1.16 days (+/- 0.57 days) to an average maximum distance of 23.3 +/- 18.5 km, diving to the sea bed at 30–45 m soon after leaving the colony (Goldsworthy et al. 2009). Sea lions from Dangerous Reef feed on the bottom (Frangito 2013) on a wide variety of fish, sharks, rays, cephalopods and crustaceans based on DNA studies of faeces (Oxley 2019).

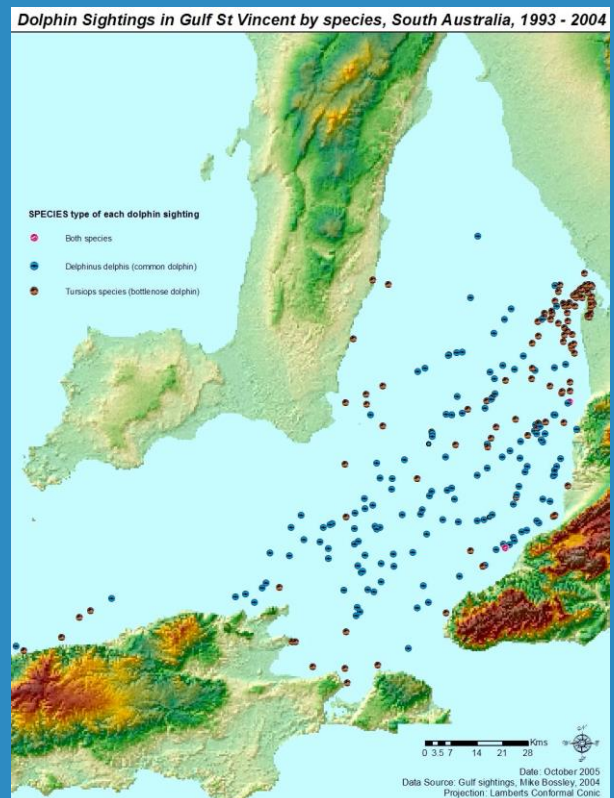


Figure 4 – Dolphin Sightings in Gulf St Vincent by species, South Australia, 1993 – 2004. Source: Michael Bossley.

Sub-criterion C3: Migration Routes

Southern right whales migrate along the South Australian coast, generally in an east to west direction during winter (DSEWPaC 2012). These whales can stop-off in the IMMA and have been seen well within the gulfs, including at the far northern end of Spencer Gulf. Humpback whales have been seen in increasing numbers along the coast and within the IMMA during the last 30 years. It is likely that they are on their northward migration (Kemper 2005).

Criterion D: Special Attributes

Sub-criterion D1: Distinctiveness

Australian sea lions exhibit strong philopatry for pupping colonies (Lowther et al. 2012). The two largest colonies located within the IMMA are genetically distinct from those to the west of the region and the occupants use different foraging areas. There is strong evidence that foraging specialization within discrete fine-scale foraging areas and habitats at the individual level limit the dispersive capacity of adult female Australian sea lions, which in turn drives population structure.

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