Arctocephalus tropicalis – Subantarctic Fur Seal


Nico de Bruyn

Regional Red List status (2016)	**Least Concern***
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (2015)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing (1977)	Appendix II
Endemic	No

*Watch-list Threat

Commercial sealing in the 18th and 19th centuries over-exploited fur seals and reduced this species to the brink of extinction by the beginning of the 20th century.

Taxonomy

Arctocephalus tropicalis (Gray 1872)

ANIMALIA - CHORDATA - MAMMALIA - CARNIVORA - OTARIIDAE – *Arctocephalus - tropicalis*

Synonyms: *Arctocephalus elegans* (Peters 1876); *Gypsophoca tropicalis* (Gray 1872)

Common names: Subantarctic Fur Seal, Amsterdam Island Fur Seal (English), Subantarktiese Pelsrob (Afrikaans)

Taxonomic status: Species

Taxonomic notes: This species was referred to formerly as *Arctocephalus elegans*, *A. gazella* and *A. tropicalis tropicalis*. It is now named as *A. tropicalis* (Repenning et al. 1971; Rice 1998). In 2011 the Taxonomy Committee of the Society for Marine Mammalogy revised the genus of this, and many other species of fur seals to *Arctophoca* based on evidence presented in Berta and Churchill (2012). However, in 2013, and based on genetic evidence presented in Nyakatura and Bininda-Emonds (2012), this change was considered to be premature and these species were returned to the genus *Arctocephalus* pending further research (Committee on Taxonomy 2013).

Assessment Rationale

The total population of *A. tropicalis* within the Prince Edward Islands is estimated at 108,000 individuals, although the most recent population assessment has reported an inflexion from positive (up to 2007) to a current negative population trend. Pup production in the assessment area was estimated at 14,130 at Prince Edward Island in 2008/2009 (Bester et al. 2009) and 8,312 (CI: 7,983–8,697) at Marion Island in the 2012/2013 summer. This represents a mean annual decline at both sites: 0.3% since 2001/2002 at Prince Edward Island and 6.4% between 2003/2004 and 2012/2013 at Marion Island. Population decline at Marion Island was highest at high-density rookeries despite negligible changes in female attendance patterns, pup mortality or the median pupping date over the last 25 years. It is currently unclear why this population is declining and further research is ongoing to assess the cause and to determine whether it will continue. However, the subpopulation on Marion Island, while having declined by 46% between 2004 and 2013, has remained stable over the past three generations (1989: 8,684 pups; 2015: 8,312 pups). Thus, although a net population decline was observed recently, which necessitates continued monitoring, the population remains well above 10,000 mature individuals within the assessment region and thus the Least Concern listing remains. The species should be reassessed if the declining population trend continues.

Although there are no major threats facing this species at present, climate change may become a concern if prey species dwindle or re-distribute. Furthermore, commercial exploitation of fish in their feeding range has the potential to influence the environment of these seals even though it does not target their predominant prey species. Subantarctic Fur Seals experienced a population bottleneck during the 19th and early 20th centuries that presumably reduced their genetic variation and which may render this species vulnerable to disease or climate change. Protection is provided for this species at the Prince Edward Islands under the Sea Birds and Seals Protection Act (Act No. 46 of 1973). Furthermore the Prince Edward Islands were proclaimed a Special Nature Reserve in 1995 under the South African Environmental Conservation Act (No. 73 of 1989) and a Marine Protected Area in 2013.

Regional population effects: Subantarctic Fur Seals have a continuous global range in the Southern Ocean (Wynen et al. 2000, Figure 1) and there is potential for immigrants from other subpopulations in the sub-Antarctic

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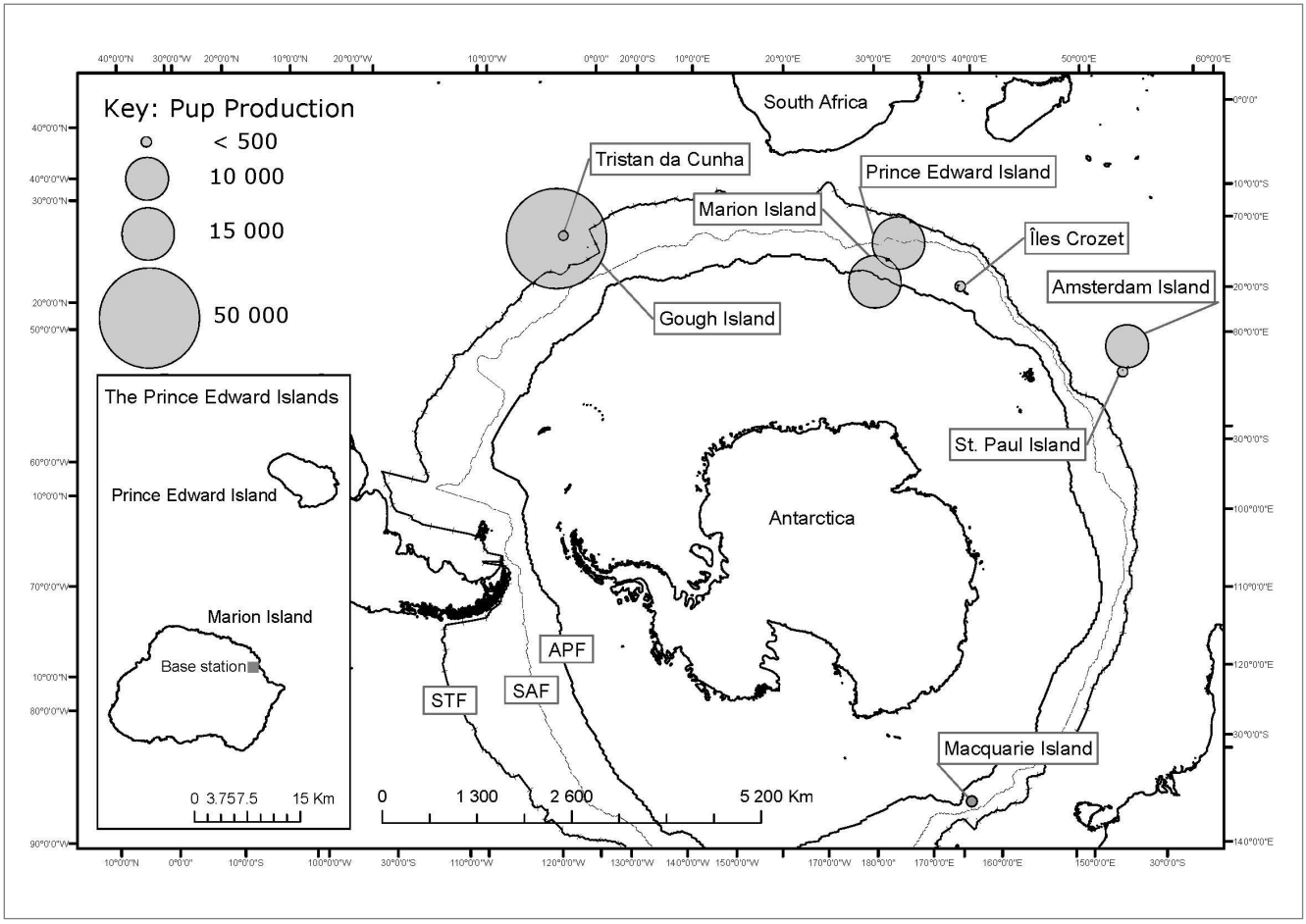

Figure 1. The global distribution of Subantarctic Fur Seal (*Arctocephalus tropicalis*)

Table 1. Countries of occurrence within southern Africa

Country	Presence	Origin
Botswana	Absent	-
Lesotho	Absent	-
Mozambique	Extant	Rare vagrant
Namibia	Extant	Rare vagrant
South Africa	Extant	Native
Swaziland	Absent	-
Zimbabwe	Absent	-

region to augment or re-colonise the local Prince Edward Island subpopulation in case of decline or extinction. While there is currently no direct evidence of immigration to the Prince Edward Islands, this is most probably due to limited research effort in terms of marking individuals. Hence, the Least Concern listing is supported.

Distribution

Subantarctic Fur Seals are widely-distributed in the southern hemisphere. They breed on sub-Antarctic islands north of the Antarctic Polar Front (SCAR 2008), including both islands in the Prince Edward Islands Archipelago (Bester et al. 2003; Wege et al. 2016). At sea they are wide-ranging (de Bruyn et al. 2009), and vagrants have been recorded widely, including on the South African coast (Shaughnessy & Ross 1980; Bester 1989), on the East African coast as far north as Tanzania (Hofmeyr & Amir 2010) and on the West African coast as far north as Gabon (Zanre & Bester 2011).

Figure 1 shows the present distribution of Subantarctic Fur Seal breeding colonies. Pup production at each location is presented by graduated symbols (pup production data for Marion Island from Wege et al. (2016); and other locations' data obtained from Scientific Committee of Antarctic Research Expert Group on Seals; http://www.seals.scar.org). The average positions of major fronts of the Antarctic Circumpolar Current (Subtropical Front, STF; Subantarctic Front, SAF; Antarctic Polar Front, APF) are indicated. The inset shows the Prince Edward Islands in closer detail.

Population

Globally, the total population was estimated to be greater than 400,000 animals in the early 2000s and all indications are that it has been steadily growing since that time (SCAR 2008). Subantarctic Fur Seals breed at numerous sites on eight islands or island groups. Some 99% of Subantarctic Fur Seals breed at three of these sites (Gough Island, Prince Edward Islands and Amsterdam Island). About 63% of global pup production takes place at Gough Island (Bester et al. 2006) and a further 11% at Amsterdam Island (Guinet et al. 1994). The Prince Edward Islands are responsible for some 25% of global pup production (SCAR 2008; Bester et al. 2009; Wege et al. 2016). While all other populations are considered to be either stable or increasing (SCAR 2008), new assessments are required.

Within the assessment region, there were approximately 14,130 pups born at Prince Edward Island during the 2008/2009 summer (Bester et al. 2009) and 8,312 (CI: 7,983–8,697) at Marion Island in 2012/2013 (Wege et al. 2016). Thus, there are currently around 22,453 pups born each year within the assessment region, which can be extrapolated to a total population of 108,000 individuals based on the ratio of births to total numbers being 1:4.8 (Kerley 1987). While both components of the population increased steadily to the early 21st century, Marion Island pup production declined by 6.4% between 2003/2004 and 2012/2013 (Wege et al. 2016), which represents a 46% (95% credible interval CI: 43%–48%) decline in the pup population between 2004 (mean=15,260, CI: 14,447–16,169 pups) and 2013 (mean=8,312, CI: 7,983–8,697), and mirrored by a 58%–60% decline at rookeries counted annually (2007–2015). This decline is not an anomaly but due to a real decline evidenced by continuous annual decreases (2007–2015) (Wege et al. 2016). It is unlikely that this slowed growth is a result of interspecific competition for breeding space as Subantarctic Fur Seals prefer to breed on boulder/jumbled rocky beaches (Bester 1982), whereas Antarctic Fur Seals prefer small-pebble beaches backed by vegetated slopes (Kerley 1984).

The Prince Edward Island component was very close to stability between 2001/2002 and 2008/2009 (0.3% mean annual decline, Bester et al. 2009), compared to the natural population increase of 9.3% per annum between 1987/1988 and 2001/2002, but it is unknown whether there has been a more recent decline mirroring that at Marion Island. The population decline at Marion Island was highest at high-density rookeries despite negligible change in female attendance patterns, pup mortality or median pupping date over the last 25 years (Wege et al. 2016). It is currently unclear why this population is declining and further research is needed to assess the cause of decline and determine whether it will continue.

Generation length is estimated as 10.7 years (Pacifici et al. 2013), yielding a 32-year three generation window (1983-2015). On Marion Island, the 2013 total population estimate of pups (8,312; 95% CI: 7,983–8,697) is equivalent to that of 1989 when the population was still increasing exponentially (8,684 pups, Wilkinson & Bester 1990). Thus, there has been no net decline over three generations.

Current population trend: Declining

Continuing decline in mature individuals: Yes

Number of mature individuals in population: 400,000 (global)

Number of mature individuals in largest subpopulation: 107,000 (assessment region)

Number of subpopulations: One (both Marion and Prince Edward Island)

Severely fragmented: No

Habitats and Ecology

Subantarctic Fur Seals are sexually dimorphic. Females attain sexual maturity between 4 and 6 years of age at Gough Island (Bester 1995) and presumably at the Prince Edward Islands as well. Gestation lasts 51 weeks (Bester 1995). Longevity is unknown (Reijnders et al. 1993), although counts of incremental lines in the dentine of tooth sections suggest that males may live up to 18 years and females up to 23 years (Bester 1987).

Subantarctic Fur Seals are polygynous with males defending territories with vocal and postural displays and fighting (Bester 1981; Kerley 1983). Females give birth within 6 days of arriving at the colony in the austral summer. Females spend the perinatal period with their newborn pup. Oestrous lasts *c.* 1 day (Daniel 1981) and occurs 6–10 days after parturition at which time mating occurs (Rand 1955; Craig 1964; Boyd 1991). Following this, adult females depart on the first of a series of foraging trips that they will make before weaning their pup at approximately 11 months of age (Bester 1981; Kerley 1983; Kirkman et al. 2002). Dives become deeper and slightly longer over the summer, starting at a mean depth of 16.6 m and increasing to 19 m at Amsterdam Island. At Marion Island, females dive on average between 34 m deep in the summer and 45 m in winter (Wege 2013). Dives are seldom deeper than 100 m or longer than 4 min (Georges et al. 2000). However, foraging behaviour of conspecifics from different localities seem to differ markedly, with adult females from Marion Island making significantly longer foraging trips (Kirkman et al. 2002; Wege et al. 2016) at greater distances than those from Îles Crozet (de Bruyn et al. 2009), with diving behaviour similarly differentiated (Wege 2013).

Subantarctic Fur Seals are opportunistic and pelagic foragers. They feed on a variety of myctophid and notothenid fish, cephalopods, and small numbers of crustaceans at Macquarie Island (Robinson et al. 2002), Gough Island (Bester & Laycock 1985) and at the Prince Edward Islands (Klages & Bester 1998; Makhado et al. 2013).

Ecosystem and cultural services: Subantarctic Fur Seals are a source of food for larger carnivores such as Killer Whales (*Orcinus orca*) and sharks (Souto et al. 2009; Reisinger et al. 2011). As top predators within the Prince Edward Islands ecosystem, they form important links in the islands' marine food web. Through the import of nutrients from the ocean, when they breed and moult on the islands, they markedly enhance soil and plant nutrient status in the vegetated areas in which they occur (Smith 2008). However, such nutrient enrichment, in combination with physical disturbance through trampling, facilitates the undesirable establishment of exotic vascular plants (Haussmann et al. 2013).

Use and Trade

The species is not traded nor under threat of future trade as it is largely protected by the isolation of its distribution.

Threats

Commercial sealing in the 18th and 19th centuries over-exploited fur seals and reduced this species to the brink of extinction by the beginning of the 20th century. Since then, populations have increased rapidly and much of the former range has been re-occupied. This population bottleneck has potentially reduced their genetic variation and may render this species vulnerable to disease or climate change (Wynen et al. 2000; Kovacs et al. 2012). However, genetic diversity remains relatively high for the species (Wynen et al. 2000). Fur seals are also at risk of mass mortality from infectious diseases, though the isolation of their island habitat affords some species a higher degree of protection from disease (Lavigne & Schmitz 1990; Chown et al. 1998). The transfer of pathogens from invasive species, such as the House

Table 2. Threats to the Subantarctic Fur Seal (*Arctocephalus tropicalis*) ranked in order of severity with corresponding evidence (based on IUCN threat categories, with regional context)

Rank	Threat description	Evidence in the scientific literature	Data quality	Scale of study	Current trend
1	*11.5 Climate Change & Severe Weather*: climate change affecting prey base and facilitating disease transmission.	Lavigne & Schmitz 1990	Indirect	International	Increasing
		de Bruyn et al. 2008	Indirect	International	
		Wege et al. 2016	Empirical	Local	
2	*5.4.4 Fishing & Harvesting Aquatic Resources*: competition from new fisheries resulting in a loss of a species' prey base. Current stress *2.3.2 Competition*.	Wickens et al. 1992	Empirical	Regional	Increasing
		Hanchet et al. 2003	Indirect	International	
3	5.4.3 Fishing & Harvesting Aquatic Resources: entanglement in coastal fisheries.	Shaughnessy 1980	Empirical	Regional	Increasing. Entanglement in marine debris occurs at the Prince Edward Islands but incidences are low at 0.24%.
		Chown et al. 1998	Indirect	International	
		Hofmeyr et al. 2002	Empirical	Regional	
4	*6.1 Recreational Activities*: human intrusions and disturbance due to ecotourism, at breeding grounds.	Hofmeyr & Bester 2008	Indirect	International	Stable

Mouse (*Mus musculus*) may potentially lead to mass mortality events (de Bruyn et al. 2008).

Commercial exploitation of fish in their feeding range has the potential to influence the environment of these seals (Hanchet et al. 2003) even though it does not target predominant prey species (Klages & Bester 1998; Makhado et al. 2013). While few fisheries exploit waters occupied by Subantarctic Fur Seals, these may expand and are potentially detrimental (Hanchet et al. 2003). Entanglement in marine debris occurs at the Prince Edward Islands but incidences are low at 0.24% for this species and the sympatric Antarctic Fur Seal combined for the period 1996–2001 (Hofmeyr et al. 2002). Tourist visits to Subantarctic Fur Seal haul-out sites are rare and thought to cause minimal disturbance (Shirihai 2002; Hofmeyr & Bester 2008). Tourism does not take place at the Prince Edward Islands (Prince Edward Islands Management Plan 2010).

Subantarctic Fur Seals are sympatric with Antarctic Fur Seals at the Prince Edward Islands (Bester et al. 2006) and the Îles Crozet (Guinet et al. 1994), and with both Antarctic Fur Seals and New Zealand Fur Seals at Macquarie Island (Goldsworthy 1999), leading to hybridisation at all three sites. Levels of hybridisation at the Prince Edward Islands are very low and no threat to the species at this site.

The recent decline in pup production is possibly linked to density-dependent factors but to what extent has not been determined (Wege et al. 2016). It is unknown if this is a consequence of the potentially detrimental effects of climate change (Chown et al. 1998; Learmonth et al. 2006; Kovacs et al. 2012).

Current habitat trend: Stable

Conservation

Subantarctic Fur Seals live in some of the most remote oceanic areas and breed on many of the most isolated islands on earth. All of the breeding islands are managed as protected areas or parks by the governments that claim these territories. Seals on the Prince Edward Islands are protected by the South African Seabirds and Seals Protection Act (Prince Edward Islands Management Plan 2010). The islands themselves are a Special Nature Reserve (de Villiers & Cooper 2008) and part of a Marine Protected Area (DEA 2013), and thus the breeding grounds within the assessment region are secure. Special management areas restrict visitor access to specific areas, including all of Prince Edward Island itself and most of Marion Island (Prince Edward Islands Management Plan 2010). Tourism does not take place in the Prince Edward Islands (Prince Edward Islands Management Plan 2010). No specific interventions are required at present, but the population should continue to be monitored.

Recommendations for land managers and practitioners:

- Continuation of monitoring and research programme conducted to date (over the past 2 decades) by the

Table 3. Conservation interventions for the Subantarctic Fur Seal (*Arctocephalus tropicalis*) ranked in order of effectiveness with corresponding evidence (based on IUCN action categories, with regional context)

Rank	Intervention description	Evidence in the scientific literature	Data quality	Scale of evidence	Demonstrated impact	Current conservation projects
1	*2.1 Site/Area Management*: continue to monitor population trends in relation to climatic variables and minimise human disturbance at breeding rookeries.	Wege et al. 2016	Empirical	Local	Population has increased.	Mammal Research Institute, University of Pretoria

Marion Island Marine Mammal Programme under the auspices of the Mammal Research Institute, Department of Zoology and Entomology, University of Pretoria. Especially continued assessment of population trends and foraging behaviour, given the recently identified declining population trend.

Research priorities:

- Assess the causes of the recently identified inflexion in population trajectory, from positive to negative, at Marion Island.
- Determine the effect of global climate change on the foraging and breeding behaviour of this species.
- Assess the effects of local fisheries on prey populations.

Encouraged citizen actions:

- Foraging ecology research is progressing but has been impeded by the financial investment that is required for satellite telemetry. Aid in funding this aspect can be securely provided through http://www.givengain.com/cause/4655/.
- Due to the isolation of Antarctic Fur Seal habitat, citizen actions are limited. However, citizens can report potential sightings on virtual museum platforms (for example, iSpot and MammalMAP).

Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Subantarctic Fur Seal (*Arctocephalus tropicalis*) assessment

Data sources	Field study (literature, unpublished)
Data quality (max)	Estimated
Data quality (min)	Estimated
Uncertainty resolution	Confidence intervals
Risk tolerance	Evidentiary

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Details of the methods used to make this assessment can be found in *Mammal Red List 2016: Introduction and Methodology.*