



Consultation Document on Listing Eligibility and Conservation Actions

Mirounga leonina (southern elephant seal)

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Mirounga leonina* (southern elephant seal) for confirmation on the EPBC Act threatened species list in the **Endangered** category; and
- 2) the necessary conservation actions for the above species.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Responses are to be provided in writing either by email to:
species.consultation@environment.gov.au

or by mail to:

The Director
Marine and Freshwater Species Conservation Section
Wildlife, Heritage and Marine Division
Department of the Environment
PO Box 787
Canberra ACT 2601

Responses are required to be submitted by 17 June 2016.

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General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/index.html>.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at: <http://www.environment.gov.au/biodiversity/threatened/pubs/guidelines-species.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at: <http://www.environment.gov.au/biodiversity/threatened/nominations.html>.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/recovery.html>.

Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

Mirounga leonina

southern elephant seal

Taxonomy

Conventionally accepted as *Mirounga leonina* (Linnaeus 1758). No subspecies are recognised (Committee on Taxonomy 2015).

Species Information

Description

The southern elephant seal is the largest pinniped species and exhibits the most extreme sexual dimorphism of any mammal with males weighing up to 3800 kg and up to 9 times more than females (Hindell & Perrin 2009). The male southern elephant seal reaches over 4 m from head to tail, although size can vary somewhat between localities (Hindell 2008). Adult males often have intensive scarring on the neck and carry a prominent erectile proboscis, or trunk, which gives the species its common name and adds resonance to the male's vocal challenges to other adult males. Females are much smaller (200-260 cm and 250-800 kg) and lack the intensive scarring and prominent proboscis of adult males. Females and young males have a robust body, large eyes and bulbous nostrils (Menkhorst & Knight 2001). On land both sexes are brown above, slightly paler below, and in water they appear uniformly dark grey. Pups are black. Females and young males can be distinguished from other true seals in the region, as other species are paler or have spots or streaks which southern elephant seals lack (DEH 2004a). Like other members of the 'true' seals (family Phocidae), the southern elephant seals are unable to 'walk' using their fore flippers. Rather, they move on their belly in a lunging, caterpillar-like motion (DEH 2004b).

Distribution

Globally, the southern elephant seal has a nearly circumpolar Southern Hemisphere distribution with most breeding colonies and haul-out areas occurring on subantarctic islands north of the seasonal pack ice zone. Their range extends throughout most of the Southern Ocean down to high latitude sites on the Antarctic continent (Ling & Bryden 1992).

In the Australian region, southern elephant seals range widely in the Southern Ocean and breed and haul-out mainly on Macquarie Island approximately 1500 km south-southeast of Australia, and Heard Island approximately 4000 km southwest of Australia (Shaughnessy 1999; Hindell 2008). Historically, large colonies of southern elephant seals occurred on islands in the western Bass Strait before these were extirpated by European sealers in the early 1800s (Ling & Bryden 1992; Ling 1999; Shaughnessy 1999) and subfossils have been found from the northwest coast of Tasmania (Bryden et al., 1999).

Some individuals have been recorded in coastal habitats from Tasmania and southern Australia with mainland records extending from New South Wales near Sydney, to Victoria, South Australia and Western Australia (Mawson & Coughran 1999; Shaughnessy 1999; Hindell 2008; Shaughnessy et al., 2012). Occasional pupping is seen on Maatsuyker Island (southern Tasmania) (Shaughnessy 1999) where there are semi-regular surveys conducted and the last count in 2015 recorded 12 mostly sub-adult males (Alderman pers. comm., 2016). Some individuals from Macquarie Island move north to southern Australia (Hindell 2008) or migrate south to the Antarctic coast (Hindell 1991). Adult seals (mostly males) are found near Davis and Casey Stations in Antarctica (Hindell et al., 1991; Ling & Bryden 1992; Shaughnessy 1999) and although limited pupping occurs in Antarctica (Hindell & Perrin 2009), no new colonies have emerged (van den Hoff pers. comm., 2016).

Tagging and branding studies show interchange of southern elephant seal populations between Heard Island and the nearby population at Kerguelen Island (Ling & Bryden 1992; Shaughnessy 1999). Tagging studies at Macquarie Island, the most substantial of the Pacific Ocean stock,

shows very limited mixing with Indian Ocean stocks and small numbers of animals migrating to and from the New Zealand subantarctic islands, especially Campbell Island (van den Hoff 2001).

Relevant Biology/Ecology

Southern elephant seals spend most of their lives at sea and prefer to haul-out on gently sloping sandy and cobblestone beaches but will also use sea ice, snow and rocky terraces, and rest in vegetated habitats and mud wallows above beaches (Ling & Bryden 1992; Shaughnessy 1999; Jefferson et al., 2008). Animals appear to be largely solitary at sea and can disperse some thousands of kilometres away from breeding colony sites during their pelagic phase with strong preferences evident for individual foraging regions (Hindell & McMahon 2000; Bradshaw et al., 2002, 2004; Hindell et al., 2003).

Elephant seals exhibit a polygynous mating system with large males establishing dominance, hierarchies on breeding beaches and defending their territory where they monopolise mating with up to 100-300 or more females in harems during the two month breeding period (Ling & Bryden 1992; van den Hoff et al., 2007; Hindell & Perrin 2009). Southern elephant seals have an annual breeding, moulting and foraging cycle, with adults coming ashore to reproduce from August to October and pregnant females arriving at their natal breeding sites from September to October to give birth, mate and then rapidly wean their pups approximately 23-25 days after birth (Ling & Bryden 1992; Hindell 2008; Hindell & Perrin 2009). They return to sea for approximately 10-14 weeks then haul-out during summer to moult, with few southern elephant seals, mostly juveniles, onshore during winter (Shaughnessy 1999; Field et al., 2005).

After the brief breeding and subsequent moulting season, southern elephant seals return to sea for many months and migrate to distant foraging grounds where they feed intensively to increase blubber reserves used during migration back to natal breeding colonies where they fast (Hindell & Perrin 2009). They are major upper trophic level predators of the Southern Ocean with key foraging areas including cold Antarctic waters, frontal zones with increased productivity and water masses between the northern edge of the pack ice zone up to subantarctic waters north to 50°S (Hindell et al., 1991, 2003; Bradshaw et al., 2004). Females forage in deep open ocean habitats, while adult males travel to higher latitude feeding areas in the Southern Ocean including the Antarctic continental shelf where they appear to target more benthic prey, while juvenile males may remain in the pack ice (Hindell et al., 1991; Field et al., 2007; Hindell & Perrin 2009). Older southern elephant seals tend to make fewer trips but travel further from their natal colonies (Field et al., 2005). Southern elephant seals feed mainly on deep-water squid and to varying extents on myctophid and other fish, with some records of *Euphausia* spp. krill in stomach contents; and differences in diet are evident between sexes and age groups indicating some degree of resource partitioning (Slip 1995; van den Hoff et al., 2002; Newland et al., 2009, 2011). Southern elephant seals are extraordinary divers, remaining submerged for up to 90 percent of their time at sea and often reaching depths of 600 m or greater during dives lasting 20-35 minutes (Hindell 2008). Dive records include dive depths of over 2000 m, and dive lengths up to two hours (see for example Hindell et al., 1992; McIntyre et al., 2010).

Female southern elephant seals are sexually mature at 3-6 years and males are sexually mature at 4-6 years but few males breed successfully until at least 10 years of age and do not usually control a harem until they are approximately 12-14 years of age (Jones 1981; Ling & Bryden 1992; McMahon et al., 2003; Hindell 2008). Pupping interval is 1 year (Shaughnessy 1999) with females typically giving birth to a single pup with rare twin births (McMahon & Hindell 2003). Maximum longevity is 20-23 years for females and 20-25 for males (Jones 1981; Hindell 2008).

Surveys of the southern elephant seal population are regularly undertaken on Macquarie Island, with a subset of breeding sites surveyed annually and the whole island surveyed every five years when possible (van den Hoff et al., 2014). The most recent island census was undertaken in October 2014 when an estimated 15,265 breeding females were counted (providing a total population estimate of 48,000 individuals) (van den Hoff pers. comm., 2016). The 2014 total is smaller than the estimated 64,180 individuals for 2004 (van den Hoff et al., 2007). This

corresponds with the premise that the number of southern elephant seals at Macquarie Island continues to decrease (van den Hoff et al., 2014) albeit at a rate slower than previously detected (Hindell & Burton 1987). The exact causes of this continued decline remain uncertain; however climate related factors such as sea-ice extent and associated changes in food supply are likely factors (van den Hoff et al., 2014).

Southern elephant seal numbers on Heard Island suffered a sharp (50 percent) decline from the 1950s to the 1990s as did other population areas in the Indian Ocean (Burton 1986; McMahon et al., 2005a). The Kerguelen Islands, approximately 450 km northwest, are regularly surveyed and the colonies there appear to have stabilised. The Indian Ocean includes populations on Heard, Kerguelen, Crozet and the Prince Edward Islands. The International Union for the Conservation of Nature (IUCN) considered that the Indian Ocean populations had recorded either increasing numbers or had ceased decreasing (Hofmeyr 2015). Observations by Slip & Burton (1999) have suggested a stabilisation of the Heard Island subpopulation between 1985 and 1992 however no further ground surveys have been undertaken to verify the population trend. Slip & Burton's estimated count for total breeding females in the 1992/93 summer was 17-18,000 and the current status for the species on Heard Island is unknown (Woinarski et al., 2014).

The southern elephant seal population at Australian sites have not increased nor are they stable. The population at Macquarie Island continues to decline though at a slower rate than previously observed and the present status and population trend for Heard Island remains unknown (see for example McMahon et al., 2003; McMahon et al., 2005a, 2005b; van den Hoff et al., 2007). The causes of the population decline at Macquarie Island are more likely related to changes in food supply mediated by climate and oceanic variability (de Little et al., 2007; van den Hoff et al., 2007, 2014) than direct anthropogenic impacts (Burton & van den Hoff 2002; McMahon et al., 2005a).

Threats

Threats to the southern elephant seal are outlined in the table below (modified from Woinarski et al., 2014 and DotE 2016).

| Threat factor | Consequence rating | Extent over which threat may operate | Evidence base |
|--------------------------------------------------|---------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Climate and oceanographic variability and change | Moderate to severe | Large | Altered climate and oceanographic conditions and El Niño events in the Southern ocean have been correlated with changes in foraging success, pup production and survival, and changes in population dynamics for southern elephant seals in the Australian region and elsewhere (e.g. McMahon & Burton 2005; de Little et al., 2007; McMahon et al., 2008) |
| Fisheries catch, entanglement and bycatch | Minor | Moderate | There are some records of direct interactions between southern elephant seals and fisheries in the Australian region. A few southern elephant seals have died in aquaculture nets, trawl nets and longline gear (including at least 18 deaths since 2004, van den Hoff pers. comm., 2016) (Burton & van den Hoff 2002; van den Hoff et al., |

| | | | |
|----------------------------------------------------|-------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | 2002; Shaughnessy et al., 2003; Kemper et al., 2003). It is also possible that some unreported deaths occur from illegal fishing. |
| Prey depletion due to fisheries (potential threat) | Minor | Minor | Toothfish and <i>Euphausia</i> spp. krill remains have been recorded from some southern elephant seal stomachs but the extent of spatial overlap with foraging areas and potential competition for food resources with these fisheries is likely to be low at present, but may increase as Southern Ocean fisheries expand in future (van den Hoff et al., 2002; Hindell et al., 2003) |
| Pollution | Minor | Minor | There is some potential for increasing exposure to chemical pollution and ingested plastic fragments to cause stress or impair health and potentially increase disease risks for individuals (Shaughnessy 1999; Evans 2003) |

Assessment of available information in relation to the EPBC Act Criteria and Regulations

| Criterion 1. Population size reduction (reduction in total numbers) | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------|
| Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4 | | | |
| | Critically Endangered Very severe reduction | Endangered Severe reduction | Vulnerable Substantial reduction |
| A1 | ≥ 90% | ≥ 70% | ≥ 50% |
| A2, A3, A4 | ≥ 80% | ≥ 50% | ≥ 30% |
| A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased. | <i>based on any of the following</i> | (a) direct observation [except A3] | |
| A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible. | | (b) an index of abundance appropriate to the taxon | |
| A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3] | | (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat | |
| A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. | | (d) actual or potential levels of exploitation | |
| | | (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites | |

Evidence:

The generation time for the southern elephant seal population at Macquarie Island was initially estimated to be 7.9 years (McMahon et al., 2005b) and thus Woinarski et al. (2014) considered the population decline at Macquarie Island to be under 30 percent over three generations. However, recent work by Marine Desprez (unpublished PhD data) found that the generation time for southern elephant seals at Macquarie Island was 11.3 years. The earlier result was based on a smaller data set and shorter time series (McMahon pers. comm., 2015). McMahon

and Hindell (McMahon pers. comm., 2015) have re-evaluated survey data of southern elephant seals at Macquarie Island using a number of methods and concluded that the decrease for the population was 1.5 percent per year over the 64 year time series. They also found no compelling evidence for any change to this rate. When taking into account the modified generation length, the population has therefore declined by approximately 40 percent over three generations. The exact causes of the decline are not clear (see for example McMahon et al., 2005a; de Little et al., 2007; van den Hoff et al., 2007, 2014). This would make the Macquarie Island population eligible to be listed as Vulnerable (A2ab; A4ab).

Though the Heard Island population was estimated to be relatively stable from 1985-1992 (Burton 1986; Slip & Burton 1999), it has not been assessed in recent decades. Woinarski et al., (2014) considered the overall rate of decline likely to approach but unlikely to exceed 30 percent over 3 generations when using the previous generation length of approximately 24 years. Due to the paucity of survey data for the Heard Island population since 1992 (Slip & Burton 1999), there is insufficient information to demonstrate if the species at Heard Island is eligible for listing under this criterion.

The data presented above appear to be insufficient to demonstrate if the species, as a whole, is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------|-------------------------------|
| | Critically Endangered Very restricted | Endangered Restricted | Vulnerable Limited |
| B1. Extent of occurrence (EOO) | < 100 km ² | < 5,000 km ² | < 20,000 km ² |
| B2. Area of occupancy (AOO) | < 10 km ² | < 500 km ² | < 2,000 km ² |
| AND at least 2 of the following 3 conditions indicating distribution is precarious for survival: | | | |
| (a) Severely fragmented OR Number of locations | = 1 | ≤ 5 | ≤ 10 |
| (b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals | | | |
| (c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals | | | |

Evidence:

Southern elephant seals have a broad geographic pelagic distribution encompassing millions of km² but they aggregate to reproduce in breeding colonies where harems are spread over smaller areas of coastal habitat (Hindell & Perrin 2009; Hofmeyr 2015). Therefore the extent of occurrence during their dispersed pelagic phase is very large, but their area of occupancy in natal breeding colonies is small (Woinarski et al., 2014).

Consequently, southern elephant seals have an extent of occurrence >20,000 km², and their area of occupancy at the two main breeding areas on Macquarie and Heard Islands is less than 500 km² (Woinarski et al., 2014). The population is restricted to ≤ 5 locations (in the Australian region) and there is an observed and projected continued decline observed in the number of mature individuals (see Criterion 1).

The data presented above appear to demonstrate that the species is **eligible for listing as Endangered (B2ab(v))** under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should

therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 3. Population size and decline | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| | Critically Endangered Very low | Endangered Low | Vulnerable Limited |
| Estimated number of mature individuals | < 250 | < 2,500 | < 10,000 |
| AND either (C1) or (C2) is true | | | |
| C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future) | Very high rate 25% in 3 years or 1 generation (whichever is longer) | High rate 20% in 5 years or 2 generation (whichever is longer) | Substantial rate 10% in 10 years or 3 generations (whichever is longer) |
| C2 An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions: | | | |
| (a) (i) Number of mature individuals in each subpopulation | ≤ 50 | ≤ 250 | ≤ 1,000 |
| (a) (ii) % of mature individuals in one subpopulation = | 90 – 100% | 95 – 100% | 100% |
| (b) Extreme fluctuations in the number of mature individuals | | | |

Evidence:

The total abundance of southern elephant seals in the Australian region is difficult to estimate due to their widely dispersed distribution over millions of square kilometres of the Southern Ocean during their foraging phase, while their remote breeding distribution, particularly on the isolated Heard Island makes repeated monitoring surveys logistically difficult. However, the most recent Macquarie Island census was undertaken in October 2014 which resulted in a total population estimate of 48,000 individuals (van den Hoff pers. comm., 2016). Slip and Burton's (1999) estimated count for total breeding females/pup production on Heard Island in the 1992/93 summer was 17-18,000 and although there have been no further surveys there, it is unlikely the population would now be under 10,000.

The data presented above appear to demonstrate that the species is not eligible for listing under this criterion as the number of mature individuals is not limited. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 4. Number of mature individuals | | | |
|--------------------------------------------------|------------------------------------------------|--------------------------------|---------------------------|
| | Critically Endangered Extremely low | Endangered Very Low | Vulnerable Low |
| Number of mature individuals | < 50 | < 250 | < 1,000 |

Evidence:

As noted under Criterion 3, the number of mature individuals of southern elephant seals is not low and these data appear to demonstrate the species is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be

tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 5. Quantitative Analysis | | | |
|-------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------|
| | Critically Endangered Immediate future | Endangered Near future | Vulnerable Medium-term future |
| Indicating the probability of extinction in the wild to be: | ≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.) | ≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.) | ≥ 10% in 100 years |

Evidence:

A population viability analysis (PVA) has been undertaken for the Macquarie Island population of southern elephant seals which estimates earliest and mean time to extinction as 307 and 564 years respectively and indicates a low probability of extinction within 300 years (McMahon et al., 2005b). This PVA analysis was undertaken prior to the recent work that concludes the generation length for elephant seals at Macquarie Island is 11.3 years (Desprez, unpublished PhD data). An updated PVA may now estimate different extinction times. It has not been possible to undertake a PVA for the Heard Island population.

There are insufficient data to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species’ status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Conservation Actions

Recovery Plan

The combined *Sub-Antarctic Fur Seal and Southern Elephant Seal Recovery Plan* (DEH 2004b) has two main objectives: to maintain current levels of protection for these two species to enable population growth so that these species can be removed from the threatened species list under the EPBC Act, and; to ensure that any future anthropogenic impacts are not limiting their recovery. The Recovery Plan noted that in the absence of significant current anthropogenic threats, the only identified action was to monitor populations of these species in the Australian region to:

- determine population size and the rate of population change by completing scientifically robust, regular and repeatable population surveys; and
- identify any emerging impacts that will have an immediate effect on these species and their recovery, and to facilitate development of appropriate management responses.

The *Review of the Sub-Antarctic Fur Seal and Southern Elephant Seal Recovery Plan* (DotE 2016) was conducted in 2015 and found that the population monitoring activities did occur at Macquarie Island, but not Heard Island. Research has not yet clearly identified causes for the ongoing decline at Macquarie Island but it is likely that it is linked to changes in food supply mediated by climate and oceanic variability than direct anthropogenic impacts.

The review therefore recommended that a recovery plan was not needed for the two species as significant anthropogenic threats were still not demonstrated and a revised Conservation Advice would update relevant information and conservation/research priorities. The review also noted that this status re-assessment would generate a new Conservation Advice and a decision whether to continue to have a recovery plan for the species would be part of the re-assessment process.

A decision about whether there should be a recovery plan for this species has not yet been made. The purpose of this consultation document is to elicit additional information to help inform this decision.

Primary Conservation Action

Primary conservation actions are one or two actions that are key to the continued survival of the species. The primary conservation actions for this species have not been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

Conservation and Management Priorities

Southern elephant seals are managed as a listed Vulnerable species and a marine species protected under the Commonwealth EPBC Act. They are also listed as Rare under the South Australian *National Parks and Wildlife Act 1972*, and as Endangered under the Tasmanian *Threatened Species Protection Act 1995* with corresponding protection and management in Tasmanian and South Australian jurisdictions. The two major Australian breeding colonies occur in protected areas in the Macquarie Island Nature Reserve and the Heard Island Wilderness Reserve, and both islands are listed as World Heritage sites. Macquarie Island is also protected under Tasmanian legislation as a Nature Reserve and is on the National Heritage List, thereby providing additional protection under the EPBC Act. Waters around Macquarie Island are protected up to three nautical miles from the coast under Tasmanian legislation and 3 - 20 nautical miles from the coast in the Commonwealth Macquarie Island Marine Park. Waters down to 1000 m depth around Heard Island are similarly protected in the Commonwealth Heard Island and McDonald Islands (HIMI) Marine Reserve. Southern elephant seals also occur regularly, and some pups have been recorded, at Maatsuyker Island off Tasmania, which is part of the Tasmanian Southwest National Park and the Tasmanian Wilderness World Heritage Area.

The *Threat Abatement Plan for the impacts of marine debris on vertebrate marine life 2009-2014* (DEWHA 2009) is currently being reviewed and a new plan is expected in early 2016. The issue of impacts of marine debris in the Southern Ocean and subantarctic islands will be reflected in the revised plan.

Recommended management actions are outlined in the table below (modified from Woinarski et al., 2014 and DotE 2016).

| Theme | Specific actions | Priority |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Active mitigation of threats | Continue high levels of protection for the southern elephant seal in important breeding, foraging and haul-out sites. Ensure Macquarie Island/HIMI management plans include reference to monitoring and protection for the species. | High |
| | Continue, and where necessary adapt, management actions to reduce disturbance and pollution/marine debris impacts on southern elephant seals and their important breeding, foraging and resting habitats | Medium-high |
| | Improve data collection and reporting of fisheries interactions throughout the southern elephant seals' foraging ranges. Including | Medium |

| | | |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | improving species identification; expanding data collected by observers (photos/samples from mortalities); utilising deep sea observation systems (e.g. cameras) to observe underwater interactions. | |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

Survey and Monitoring priorities

| Theme | Specific actions | Priority |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Continue ongoing monitoring program based on Tasmanian DPIE (2005) survey methodology guidelines | Continue long-term population and demographic monitoring at Macquarie Island and resurvey the population at Heard Island to better quantify current abundance, pup production, movements and population trends | High |
| Survey to better define distribution (with reference to guidance documents noted above) | Expand surveys to better define distribution patterns and movements of individuals between breeding colonies and key foraging areas and potential dispersal to Antarctica and other subantarctic islands | Medium-high |

Information and Research priorities

| Theme | Specific actions | Priority |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Assess impacts of threats on species | Improve understanding of climate and oceanographic variability, including El Niño events, to affect southern elephant seal foraging and reproductive success and subsequent juvenile survival and population trends | High |
| | Improve understanding of the potential risks of fisheries interactions, and potential prey depletion to affect the recovery and growth rates of populations. Including analysis of logbook data and any reported interactions between HIMI or Macquarie Island fisheries and southern elephant seals. | Medium-low |
| | Assess the impacts of disturbance, pollution and associated risks of disease on the health status of southern elephant seals | Low-medium |
| | Analysis of the occurrence and characteristics of marine debris (including micro-plastics) on | Low-medium |

| | | |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| | remote sub-Antarctic islands and associated impacts on southern elephant seals. | |
| Assess relative effectiveness of threat mitigation options | Assess the effectiveness of fisheries management and monitoring in reducing potential impacts of fisheries on southern elephant seals | Medium |
| Assess habitat requirements | Expand research to better understand key foraging areas for southern elephant seals and changes resulting from climate and oceanographic variability and El Niño events | Medium-high |
| Assess diet and life history | Improve understanding of diet and foraging ecology, and improve understanding of life history parameters controlling population growth and determine generation time for the Heard Island population of southern elephant seals | Medium |
| Undertake research to develop new or enhance existing management mechanisms | Investigate the efficacy of using remote survey techniques such as satellite imagery for census counts on remote islands | Low-medium |

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Consultation questions

1. Do you agree with the current taxonomic position of the Marine Mammal Society Committee on Taxonomy for this taxon (as identified in the draft conservation advice)?
2. Can you provide any additional references, information or estimates on longevity, age of maturity, average life span and generation length?
3. Has the survey effort for this taxon been adequate to determine its national distribution and adult population size?
4. Do you accept the estimate provided in the nomination for the current population size of the taxon?
5. For any population with which you are familiar, do you agree with the population estimate provided? If not, are you able to provide a plausible estimate based on your own knowledge? If so, please provide in the form:
 - Lower bound (estimated minimum):
 - Upper bound (estimated maximum):
 - Best Estimate:
 - Estimated level of Confidence: percent
6. Can you provide any additional data, not contained in the current nomination, on declines in population numbers over the past or next 10 years or 3 generations, whichever is longer?
7. Is the distribution as described in the nomination valid? Can you provide an estimate of the current geographic distribution (extent of occurrence or area of occupancy in km²) of this taxon?
 - 7a. Do you have information on the level of connectivity between the populations on Macquarie and Heard Islands?
 - 7b. Do you have information on the level of connectivity between the populations on Heard Island and the Kerguelen Islands?
8. Has this geographic distribution declined and if so by how much and over what period of time?
9. Do you agree that the taxon is eligible for inclusion on the threatened species list, in the category listed in the nomination?
10. Do you agree that the threats listed are correct and that their effects on the taxon are significant?
11. To what degree are the identified threats likely to impact on the taxon in the future?
12. Can you provide additional or alternative information on threats, past, current or potential that may adversely affect this taxon at any stage of its life cycle?
13. In seeking to facilitate the recovery of this taxon, can you provide management advice for the following:
 - What individuals or organisations are currently, or need to be, involved in planning to abate threats and any other relevant planning issues?

- What threats are impacting on different populations, how variable are the threats and what is the relative importance of the different populations?
- What recovery actions are currently in place, and can you suggest other actions that would help recover the taxon? Please provide evidence and background information.

14. Can you provide additional data or information relevant to this assessment?

15. Can you advise as to whether this species is of cultural significance to Indigenous Australians?