

PRESENCE AND RE-SIGHTING OF SOUTHERN ELEPHANT SEAL, *MIROUNGA LEONINA* (L. 1758), ON THE NORTH-CENTRAL COAST OF CHILE

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The southern elephant seal (*Mirounga leonina*) is a large predator in the higher levels of trophic webs, and one of the principal consumers of squid and fish in the southern marine ecosystem (Bradshaw *et al.*, 2003; Hindell *et al.*, 2003). The annual cycle of this species is characterized by two terrestrial phases: one for breeding (September to November) and one for molting (December to March); and two pelagic foraging phases: post-breeding (for about 2-3 months), and post-molt (lasting 7 months) (Campagna *et al.*, 1993; 2000).

This species has a circumpolar distribution throughout the Southern Ocean with a total world population estimated of 664000 individuals (Laws, 1994), and major breeding areas close to the Antarctic Polar Front (Laws, 1994; Lewis *et al.*, 1998). The world population is divided into four distinct groups, namely the Kerguelen stock in the South Indian Ocean, the South Georgia stock in the

South Atlantic Ocean, the Macquarie stock in the southern Pacific Ocean, and Península Valdés stock in Argentina (Lewis *et al.*, 1998; 2006; McMahon *et al.*, 2003; Bester and Hofmeyr, 2005). Although there are no records of breeding colonies along the Chilean coast, opportunistic sightings of the species have been described for the north-central coast of Chile, Isla Diego Ramírez, Magellanic Region and Isla de Pascua (Sielfeld, 1978; Aguayo *et al.*, 1995; Torres *et al.*, 2000; Lewis *et al.*, 2006). Additionally, historical information indicates the presence of *M. leonina* on Isla Juan Fernandez (Sielfeld, 1983). Nevertheless, site fidelity has been not mentioned in these studies. This note reports the presence and re-sighting of southern elephant seals within the Reserva Nacional Pingüino de Humboldt (RNPH), in central Chile.

Monthly boat-surveys have been performed since February 2003 as part of the research project 'Photo-

identification of bottlenose dolphin *Tursiops truncatus* around the RNPH. The study area comprises three islands that belong to the Marine Protected Areas 'Reserva Marina Isla Chañaral' (29°02'S, 71°36'W) and 'Reserva Marina Islas Choros-Damas' (29°14'S, 71°32'W) north central Chile (Figure 1). During some of the surveys, the presence of *M. leonina* was recorded based on diagnostic characteristics observed by 8 x 42 binoculars. Once the species was identified, its geographic position and photographs were taken. Categorization of each individual was done following Laws (1953).

During the summer months from 2004 to 2007, four sightings of southern elephant seals were recorded. The first two sightings (28 December 2004 and 27 November 2005) were recorded in Isla Chañaral.

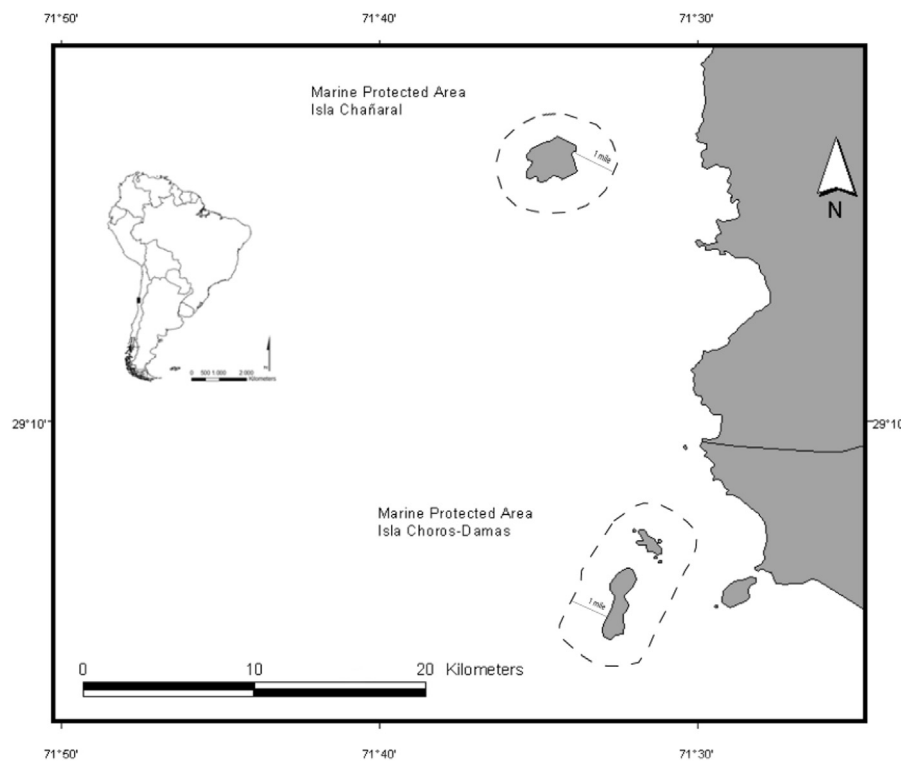


Figure 1. Study area, Marine Protected Areas 'Reserva Marina Isla Chañaral' and 'Reserva Marina Islas Choros-Damas', on the north-central coast of Chile.

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These referred to the same individual, which was classified as an immature male. The identification was based on a notorious scar on its back (Figure 2). In 2005, the seal was observed larger and darker than the previous year, and presented clear evidence of molting. Additionally, the scar was less visible than the previous record. The other two sightings (30 January 2006 and 30 January 2007) were registered in Isla Choros. Both individuals were classified as immature males, but they represented different individuals to the male found in Isla Chañaral.

Though Chile does not represent a regular breeding area for southern elephant seals, their presence in this area is not an anomalous record. Recent foraging studies demonstrate that elephant seals show some of the greatest horizontal movements of any mammal, traveling over 5000km from their breeding areas

(Hindell and McMahon, 2000; Hindell *et al.*, 2003; Campagna *et al.*, 2007). Similarly, a site preference and long-term fidelity to breeding and molting regions have been demonstrated both in juvenile and adult elephant seals (Hindell and Burton, 1988; McMahon *et al.*, 1999; Lewis *et al.*, 2006). The re-sighted individual for two consecutive years corroborates the hypothesis that elephant seals are able to select sites early in their life (Bradshaw *et al.*, 2004).

However, why do elephant seals select the RNPH during summer months? At least two explanations can be hypothesized. First, the area is an isolated and calm site that allows a seal to rest and molt, as was observed in the re-sighted individual in 2005. Second, the presence of seals in the study area could be associated with an abundant food resource as characterized by upwelling events during spring and summer (Marín *et al.*, 2003).



Figure 2. *Mirounga leonina* re-sighted individual in the Reserva Marina Isla Chañaral; (a) December 2004, and (b) November 2005.

It is generally believed that top predators such as marine mammals and birds use regions of higher productivity to supply sufficient food for survival and reproductive output (Bradshaw *et al.*, 2002). The upwelling off Coquimbo, Chile (30°S) in the Humboldt Current ecosystem represents a highly dynamic coastal environment that supports one of the most productive global fisheries (Montecino *et al.*, 1996; Montecino and Quiroz, 2000), and it serves as nutritional sources for a great diversity of marine animals, including marine birds such as Humboldt's penguins (*Spheniscus humboldtii*), Peruvian diving petrels (*Pelecanoides garnotti*), marine otters (*Lontra felina*), South American sea lions (*Otaria flavescens*), and cetaceans such as bottlenose dolphins (*Tursiops truncatus*), humpback whales (*Megaptera novaeangliae*) and fin whales (*Balaenoptera physalus*) (Capella *et al.*, 1999; Pérez *et al.*, 2006). Additionally, shallow depths located around the study area could be an advantage for seals, which could reduce the energy expenditure while foraging (Campagna *et al.*, 2007).

The presence and residence of elephant seals within the RNPH contributes to the marine ecosystem biodiversity and supports the importance of an integrated conservation of the area. A marine reserve has been recently created around the area in order to conserve and protect the ecologically representative marine environment, ensuring the sustainable use of marine resources (Subsecretaría de Pesca, Decrees no. 150 and 151, 2005). However, an effective management plan is urgently needed to minimize anthropogenic impacts and threats on marine mammals and to protect unique habitats and resident marine communities, which are the ultimate goals of Marine Protected Areas (Boersma and Parrish, 1999). The occurrence and site fidelity of *M. leonina* within this area allowed for the implementation of systematic scientific research focused on the migratory patterns of the species, as well as the development of a sustainable base for ecotourism.

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