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Cover: Whale Shark *Rhincodon typus* and Reef - made with poster colours. © P. Kritika.



The Marine Otter *Lontra felina* (Molina, 1782) (Mammalia: Carnivora: Mustelidae) along the marine protected areas in Peru

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Abstract: *Lontra felina* (Molina, 1782) or Marine Otter is an endangered species according to the IUCN Red List and lives mainly on the rocky coast of Peru and Chile. In Peru it inhabits some marine protected areas, ports and some rivers. To determine the current state of conservation, monitoring data of National Reserves of Paracas, San Fernando & the Guano's Islands, Islets & Capes National Reserve System were analysed as well as the management plans of each marine protected area. According to the results, the Marine Otter is only a target species in the Paracas Reserve. The Guano's Islands, Islets & Capes National Reserve System is a network of mini-reserves that maintains the largest population of Marine Otters in Peru in at least 14 of its 33 protected sites. The effectiveness of management for *L. felina* is only verified in the case of the National Reserve of Paracas.

Keywords: Effective conservation, Guano's Islands, Islets & Capes National Reserve System, Mustelids, Paracas, population.

The Marine Otter *Lontra felina* Molina, 1782 is an 'Endangered' species on the IUCN Red List (Mangel et al. 2022). This otter is distributed along the rocky shore from northern Perú to southern Chile as well as in some rivers in Peru (Jefferson et al. 2015). The habitat fragmentation, the entanglement in fishing gear of artisanal fisheries, the attack of dogs and pollution are considered the main menaces for *L. felina* (Medina-Vogel et al. 2008; Pizarro 2008; Valqui 2012). In Peru the National Service of Protected Areas (SERNANP in Spanish) manages some sites inhabited by Marine Otters

(Ortiz et al. 2021). However, the current population size of Marine Otter along the Peruvian marine protected areas is unknown. The current population status and management effectiveness of the Marine Otter in the Peruvian marine protected areas is described in the present note.

MATERIALS AND METHODS

The study sites: Three national reserves were studied using monitoring data of *L. felina* requested from SERNANP in December 2020. The location, coordinates and coastal length of the sites are shown in the Table 1. The coastal length was estimated using the multimedia tool 'Catastro Acuicola Nacional' (Ministerio de la Producción, 2022). The reserves are in fact marine protected areas as follows:

National Reserve of Paracas was the first marine protected area of Peru. Paracas was initially planned as a sanctuary for marine life with an area of 8 km² (ONERN 1974). Finally, it was established as an MPA (Marine protected area) with an area of 3,350 km² and a coast-line length of 140 km approximately. Paracas shoreline includes fishermen settlements, rocky and sandy beaches and two islets. Furthermore, currently Paracas is part of the hemispheric network of bird reserves and

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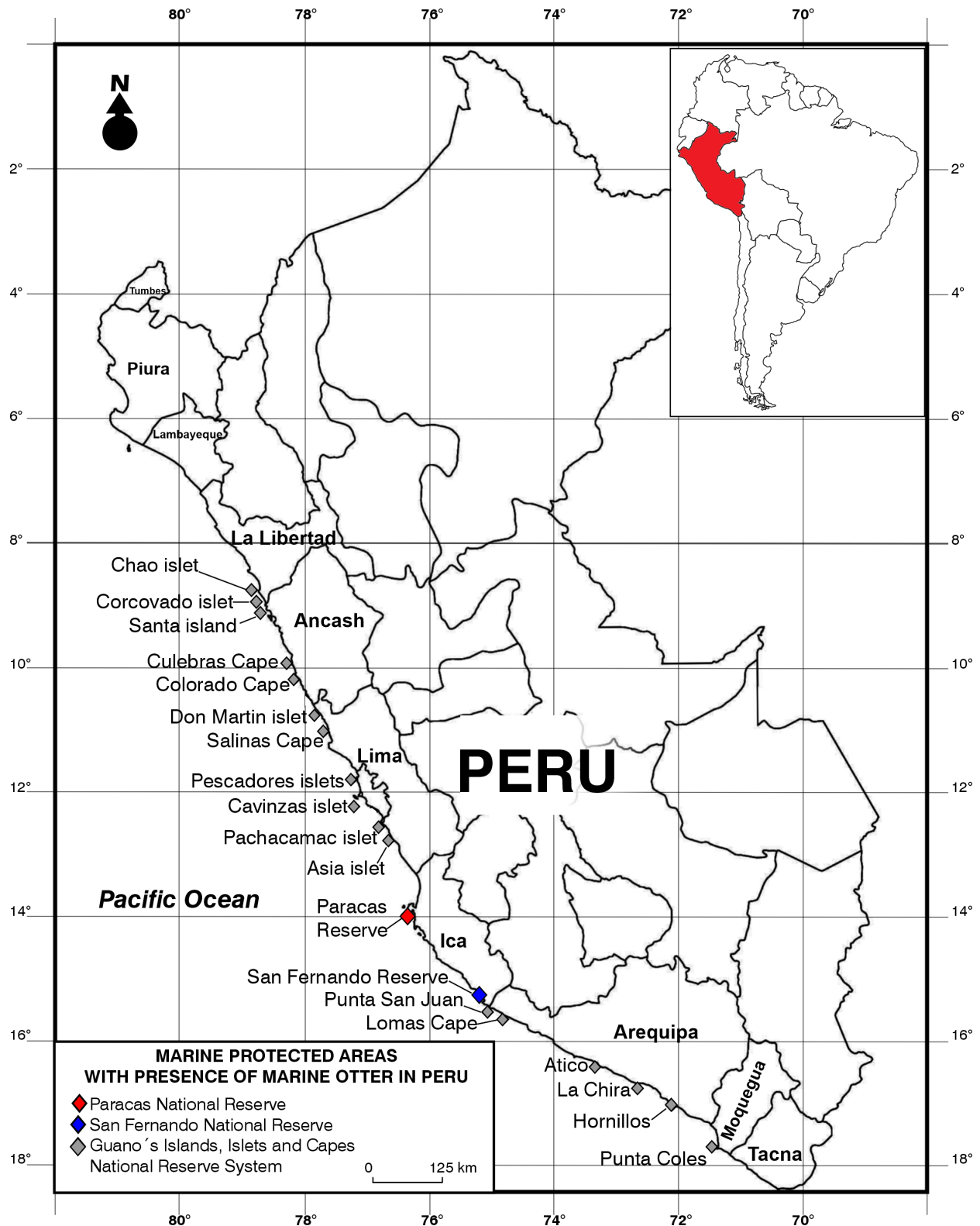


Figure 1. Study area.

is a RAMSAR site as well. Many threatened species as seabirds, and marine mammals, including the Marine Otter would be seeing within the reserve (SERNANP 2016a).

Guano's Islands, Islets and Capes National Reserve System (RNSIIPG by its acronym in Spanish) was created in 2009 comprising 22 islands or islets and 11 capes, covering more of 1,400 km² (SERNANP 2016a). It is the first MPA founded in Peru designed as a network of several small protected sites. The RNSIIPG has as purpose conserve a representative sample of the biological diversity of coastal and marine ecosystems of the Humboldt cold sea current, ensuring continuity of the biological cycle of the species that inhabit there, as well as their use sustainable with fair participation and equitable benefits derived of the use of their resources (Ortiz et al. 2021). Almost all the RNSIIPG sites were in the past capes and islands managed for the exploitation of guano along the coast by the Peruvian government and therefore the establishment of a marine protected area inspired by a model of several mini reserves matches perfectly (Figure 1). The main threatened species to conserve in RNSIIPG are the Guano birds: *Phalacrocorax bougainvilli*, *Sula variegata* and *Pelecanus thagus*. Another endangered species protected within the RNSIIPG are the South American Fur Seal *Arctocephalus australis*, the South American Sea Lion *Otaria byronia*, the Green Turtle *Chelonia mydas* as well as the Humboldt Penguin *Spheniscus humboldti* (SERNANP 2016b).

National Reserve of San Fernando was founded in 2011, under the perspective of the conservation of a biological corridor between the highlands and the coast to permit migration of fauna such as Andean Condor *Vultur gryphus* and Guanaco *Lama guanicoe*. The main part of this reserve is terrestrial and includes fragile ecosystems as the "lomas", a plant formation endemic of the desert in Peru and northern Chile. The marine zone of the reserve comprises mainly cliffs and small-scale fishery villages as well. San Fernando is a refugee for guano birds, Humboldt Penguins, pinnipeds and associated fauna like the Marine Otter. There is very little information about Marine Otter population in this reserve.

To obtain data about population of *L. felina* in the reserves above mentioned, the author requested this information to the SERNANP in December 2020. In January 2021 SERNANP answered with the letter CARTA N° 0001- 2021-SERNANP-AIP (see Annex 1), with the correspondent data of Marine Otter population. The information about Marine Otters was ordered by population in each site, coastal length and coordinates

(Table 1). For the National Reserve of San Fernando the data were taken data from Apaza & Romero (2012).

To determine the effective conservation of the species, were analyzed management plans from each marine protected area looking for indicators of conservation and management of *L. felina*, following in part the recommendations of Hockings et al. (2015).

RESULTS AND DISCUSSION

According to the data recorded, the population size of Marine Otters within the three protected areas studied during 2020 is 120 individuals. In addition, the RNSIIPG exhibits the largest population of *L. felina* among the marine protected areas of Peru with 71 individuals monitored (Table 1). SERNANP communicated that currently in the Reserve of San Fernando has no Marine Otters, therefore was consigned the population size mentioned by Apaza & Romero (2012) for this site.

On the other hand, the review of the reserve management plans shows that the Marine Otter is only a target species within the Paracas National Reserve. Following the management plan of the Paracas Reserve, at least 20 individuals of *L. felina* should live in this protected area to reach the goal of conservation of this species (SERNANP 2016a). According to the population reported for Paracas in the Table 1, the effective conservation of this species has been achieved. The RNSIIPG and the Reserve of San Fernando do not include the Marine Otter as an element of conservation (SERNANP 2016b, 2019).

The population of *L. felina* in Peru estimated by various authors is variable. Recent studies estimate a population between 789 and 2131 individuals for Peru and Chile (Valqui 2012), while Apaza & Romero (2012) suggest that 756 individuals inhabit Peru. However, the latter authors analyzed data from 130 different locations in Peru while Valqui (2012) only used a few sites to record the presence of Marine Otters in Peru. In any case, using the estimates of Apaza & Romero (2012), and according to the data presented here, the Marine Otters that inhabit marine protected areas in Peru represent about 15% of the total extant in the country and these MPA are located mainly in the central and northern coast of Peru (Figure 1). The Marine Otters outside marine protected areas are distributed mainly in the southern coast of Peru (Ortiz et al. 2021) and there is a population living in freshwater habitats at the Department of Arequipa, located at the south of the country (Duplaix & Savage 2018).

In relation with the management effectiveness of the Marine Otter within the reserves, the fact that the Marine

Table 1. Population of *Lontra felina* (Molina, 1782) in marine protected areas of Peru.

Marine protected area	Location	Marine Otter population (year)	Coastal length (km)***
National Reserve of Paracas	-14.116666667, -76.216666667	45 (2019) *	140
National Reserve San Fernando	-15.136111112, -75.367777778	1-4 (2012) **	88
RNSIIPG-Punta Coles Cape	-17.702777778, -71.379444445	5 (2020) *	5
RNSIIPG-Hornillos Cape	-16.875555556, -72.285	Without data	6.3
RNSIIPG-La Chira	-16.516388889, -72.933333334	1 (2020) *	2
RNSIIPG-Atico Cape	-16.231388889, -73.695555556	10 (2020) *	6.4
RNSIIPG-Lomas Cape	-15.571388889, -74.8525	5 (2020) *	2
RNSIIPG-San Juan Cape	-15.3655, -75.1921	1 (2018) *	4.7
RNSIIPG-Asia Islet	-12.788055556, -76.286944445	5 (2020) *	7.3
RNSIIPG-Pachamac Islet	-12.30256, -76.90055	4 (2020)	2.6
RNSIIPG-Cavinas Islet	-12.115833334, -77.205277778	9 (2020) *	1.7
RNSIIPG-Pescadores Islands	-11.786111112, -77.205833334	8 (2020) *	4
RNSIIPG-Salinas Cape	-11.291388889, -77.318888889	3 (2020) *	5.2
RNSIIPG-Don Martin islet	-11.020277778, -77.669722223	1 (2020) *	2.4
RNSIIPG-Colorado Cape	-10.49138, -77.9641	2 (2020) *	1.4
RNSIIPG-Culebras Cape	-9.949722223, -78.233611112	6 (2020) *	4.7
RNSIIPG-Santa Island	-9.024166667, -78.668333334	12 (2020) *	9.2
RNSIIPG-Corcovado islet	-8.939444445, -78.701388889	2 (2020)*	0.8
RNSIIPG-Chao Islet	-8.759722223, -78.790833334	3 (2020)*	3

Source: Letter CARTA N° 0001 - 2021-SERNANP-AIP*, Apaza & Romero (2012)** and Ministerio de la Producción (2022)***.

Otter appears as a conservation element only in the Reserve of Paracas would means that this species counts with previous studies which has been used to design the protected area and to perform a better management plan. Effectively, Grimwood (1969) mentioned that *L. felina* was abundant in Paracas before the elaboration of their first management plan. Later, several authors mentioned *L. felina* as a common species in Paracas (Brack-Egg 1978; Majluf & Reyes 1989; Pulido 1991; Sánchez 1992; Ormeño et al. 2008). Conversely, the vision of the management plan of the RNSIIPG explain that the outputs and outcomes of the management of the reserve are based in the protection of guano birds, pinnipeds as well as fishes and invertebrates of importance to the small-scale fisheries (SERNANP 2016b). It is a characteristic of MPA within the category VI of IUCN, where the main objective is to protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial (Dudley et al. 2012). In this context, the conservation of Marine Otter has been not prioritized. However, the fact that in the RNSIIPG the Marine Otter is part of a biodiversity monitoring programme could be seen as an attempt to achieve biological integrity of the reserve. And it opens the option to include the Marine

Otter as target species in the RNSIIPG; there are sufficient data that evaluate the persistence of the species in some sites of this network of mini reserves. Moreover, since the Marine Otter is distributed in isolated patches along the coast and has a limited home range to 1-4 lineal km (Medina-Vogel et al. 2008; Jefferson et al. 2015), a network of sites would be a proper measure to conserve this species. In the case of the Reserve San Fernando the main problem to conserve the Marine Otter is the shore geomorphology with predominance of cliffs, wherein it is difficult to monitor the otters; the reason for few data from this site. Consequently, Sánchez (1992) as well as Apaza & Romero (2012) report only 1–4 otters there.

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