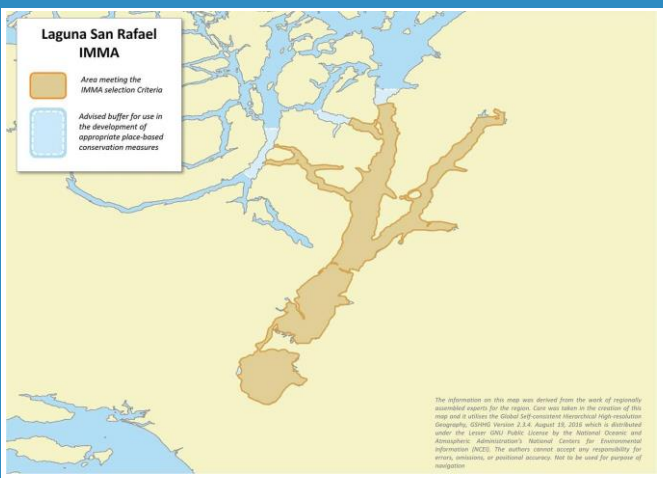

Area Size

758 km²

Qualifying Species and Criteria

Chilean dolphin – *Cephalorhynchus eutropia*

Criterion A; B (1); D (1)

Leopard seal – *Hydrurga leptonyx*

Criterion D (1)

Southern elephant seal – *Mirounga leonina*

Criterion D (1)

Other Marine Mammal Species Documented

Balaenoptera borealis, Cephalorhynchus australis, Lontra provocax, Otaria byronia, Phocoena spinipinnis

Summary

The Laguna San Rafael IMMA is located at the southern-most extent of north-western Patagonia, southern Chile, and features unique habitat characteristics. The San Rafael glacier calves large icebergs into a 10 km wide lagoon which is only accessible via a narrow channel from Estero Elefante and the Chonos Archipelago. A small, resident population of about 100 Chilean dolphins (*Cephalorhynchus eutropia*) inhabits both the lagoon and the limited shallow waters in the adjacent, much deeper fjords. Dolphin mother-calf pairs are observed throughout this area, including in the ice-filled

Laguna San Rafael IMMA

Summary, continued.

lagoon. A small number of leopard seals (*Hydrurga leptonyx*) regularly haul-out on the ice inside the lagoon and at least one pup has been born there. More recently, southern elephant seals (*Mirounga leonina*) have started to haul-out and moult on beaches inside the lagoon. Peale's dolphins (*Cephalorhynchus australis*), Burmeister's porpoises (*Phocoena spinipinnis*), sei whales (*Balaenoptera borealis*), South American sea lions (*Otaria byronia*) and marine-living river otters (*Lontra provocax*) are also seen regularly in the IMMA area.

Description:

Laguna San Rafael National Park was created in 1959 and constitutes the only ice-filled tidal lagoon in North-western Patagonia (Glasser et al., 2006). Building-sized icebergs regularly calve off the San Rafael glacier which links directly to the Northern Ice Cap. Icebergs of different sizes offer reliable haul-out platforms for pagophilic pinnipeds such as leopard seals. The lagoon itself is about 10 km wide, up to 125 m deep and has only one narrow (<800 m wide) access channel (Rio Tempano) at its north-western end (Nakajima et al., 1987). The channel opens into Estero Elefante which connects northwards to Canal Moraleda and west to the South Pacific via various channels in the Chonos Archipelago. Estero Cupquelán is an inland fjord branching off Estero Elefante to the east with glacial sedimentary deposits at the head and in Bahia Exploradores to the north-east. This is a remote area which does not have any permanent human settlements or direct road access (a minor dirt track road leads to Bahia Exploradora) but there are several salmon farms and associated large-scale support infrastructure in Esteros Elefante and Cupquelán. Laguna San Rafael is visited regularly by tourist boats.

Figure 1: Chilean dolphin mother and calf (*Cephalorhynchus eutropia*) surface in front of an iceberg inside Laguna San Rafael. Photo credit: Sonja Heinrich

The Laguna San Rafael National Park (CONAF, Chile) covers the land surrounding the lagoon and the enclosed waters. The entire area is also located inside the Westwind Drift EBSA.

Criterion A: Species or Population Vulnerability

Chilean dolphins (*Cephalorhynchus eutropia*) are endemic to south-central and southern Chile and are listed as Near Threatened on the IUCN Red List (Heinrich & Reeves, 2017). Overall abundance is not

Figure 2: Leopard seal (*Hydrurga leptonyx*) hauled out on ice in front of San Rafael glacier. Photo credit: Daniel Torres / Destinopatagonia

Figure 3: Southern elephant seal (*Mirounga leonina*) surfacing in Laguna San Rafael. Photo credit: Daniel Torres / Destinopatagonia

known but the species is thought to number in the low thousands which, if confirmed, would meet the criteria for Vulnerable status (Heinrich & Reeves, 2017). Chilean dolphins in the southern fjord region are considered genetically distinct from those along the open coast to the north of Chiloé (Pérez-Alvarez et al., 2015). The exact genetic boundary remains unclear due to a 500 km gap in sampling locations. Chilean dolphins have become entangled and drowned in the nets of open-pen fish farms that abound in the region where the IMMA is located (Espinosa-Miranda et al., 2019). Regular bycatch of only a few individuals could have negative effects on the small local dolphin population estimated to be around 100 individuals (Heinrich, 2021; Heinrich & Espinosa-Miranda, 2019).

Criterion B: Distribution and Abundance Sub-criterion B1: Small and Resident Populations

A small population of Chilean dolphins has been documented in Laguna San Rafael and the adjacent Esteros Elefante and Cupquelán since at least 2000 (Hoelzel et al., 2003; Viddi et al., 2010). In 2018, the population was estimated at 98 adult individuals (C.I. 82-119) using mark-recapture photo-identification methods (Heinrich, 2021; Heinrich & Espinosa-Miranda, 2019). Chilean dolphins use the inside waters of the lagoon as well as the shallows of Bajo Porvenir and the bays of Esteros Elefante and Cupquelán for foraging, socialising and resting. Mother-calf pairs have been observed throughout the entire IMMA area including inside the ice-filled lagoon. Several salmon farms overlap with Chilean dolphin habitat outside the lagoon. At least one Chilean dolphin became entangled and drowned in a salmon farm net in Estero Cupquelán (Espinosa-Miranda et al., 2020).

Criterion D: Special Attributes Sub-criterion D1: Distinctiveness

Chilean dolphins in the fjord region south of Puerto Montt (and including Laguna San Rafael) are considered genetically distinct from those along the open coast in the northern portion of the species' range (Pérez-Alvarez et al., 2015). The exact boundary between the genetically distinct populations is not clear but genetic samples obtained in the IMMA showed clear differences to those obtained north of Chiloé (Pérez-Alvarez et al., 2015). Various research groups have reported extra-limital sightings of Commerson's dolphins in the Laguna San Rafael area (F. Viddi , C. Olavarria pers. comms) with possible hybridisation with Chilean dolphins (Heinrich, pers. obs.). These sightings of Commerson's dolphins are more than 1,000 km north of the species' usual Pacific range in the Magellan Strait.

A small number of leopard seals have been seen in Laguna San Rafael since at least the late 1970s (Aguayo-Lobo et al., 2011) and they have been sighted so regularly that individuals hauled out on the ice have become a major attraction to the tourist vessels visiting Laguna San Rafael. In 2013 a recently born leopard seal pup was seen on the ice with its mother (Boop, 2014). Vagrant individual leopard seals are observed occasionally along the length of the Chilean coast. However, Laguna San Rafael is one of only two locations along the Pacific coast and outside of the Antarctic where leopard seals are seen regularly and where pups have been born (Acevedo et al., 2016).

Figure 4: Leopard seal (*Hydrurga leptonyx*) on icy Laguna San Rafael. Photo credit: Daniel Torres / Destinopatagonia

Figure 5: Leopard seal (*Hydrurga leptonyx*) in Laguna San Rafael IMMA. Photo credit: Daniel Torres / Destinopatagonia

Figure 6: A pair of leopard seals (*Hydrurga leptonyx*) spotted in Laguna San Rafael. Photo credit: Daniel Torres / Destinopatagonia

Figure 7: An immature leopard seal (*Hydrurga leptonyx*) hauled out on a piece of ice in front of the San Rafael glacier. Photo credit: Sonja Heinrich

Since 2018, several Southern elephant seals have also been observed to haul-out and moult in small numbers on beaches inside Laguna San Rafael (Donke and Segura, 2019). The nearest colony of Southern elephant seals is located about 1,000km further south in Golfo Almirante Montt near the Magellan Strait (Capella et al., 2017).

Figure 8: Southern elephant seal (*Mirounga leonina*) in Laguna San Rafael IMMA. Photo credit: Daniel Torres / Destinopatagonia

Figure 9: Southern elephant seal (*Mirounga leonina*) in the Laguna San Rafael IMMA. Photo credit: Daniel Torres / Destinopatagonia

Figure 10: Southern elephant seal (*Mirounga leonina*) in ice-filled Laguna San Rafael. Photo credit: Daniel Torres / Destinopatagonia

The wider IMMA area outside of Laguna San Rafael area is also used by Peale's dolphins (*Cephalorhynchus australis*), Burmeister's porpoises (*Phocoena spinipinnis*), sei whales (*Balaenoptera borealis schlegelii*), South American sea lions (*Otaria byronia*) and marine-living river otters (*Lontra provocax*). Not enough research has been undertaken in this area to assess the importance of the IMMA area for those species. However, this IMMA is the only area in the world where those diverse lineages of marine mammals (and marine living river otters) co-occur.

Supporting Information

Acevedo, J., González, A., Garthe, S., Gonzalez, I., Gómez, R., and Lobo, A. 2016. 'Birth of leopard seals in southern Chile.' Polar Biology 40:713-717.

Aguayo-Lobo, A., Acevedo, J., Brito, J., Acuña, P., Bassoi, M., Secchi, E., and Dalla Rosa, L. 2011. 'Presence of the Leopard seal, *Hydrurga leptonyx* (De Blainville, 1820), on the coast of Chile: An example of the Antarctica – South America connection in the Marine environment.' Oecología Australis 15:69-85.

Boop, P. 2014. 'Foca leopardo (*Hydrurga leptonyx*) en el Parque Nacional Laguna San Rafael. Biodiversidata 1:47. https://cetap.cl/foca-leopardo-hydrurga-leptonyx-en-el-parque-nacional-laguna-san-rafael/

Capella, J., Toro, F., Kush, A., and Gibbons, J. 2017. Nueva colonia reproductiva de foca elefante del sur *Mirounga leonina* (Linnaeus 1758) (Phocidae) en el sur de Chile. Anales del Instituto de la Patagonia 45:87-92.

Donke, M. and Segura, A. 2019. 'Presence of Southern elephant seal (*Mirounga leonina*), in Costa Sur of the Laguna San Rafael, at Laguna San Rafael National Park.' Report for CONAF. Pdf available at: http://www.parquesnacionales.cl/documento/presencia-de-elefantes-marinos-del-sur-mirounga-leonina-costa-sur-laguna-san-rafael-parque-nacional-laguna-san-rafael/.

Glasser, N., Jansson, K., Mitchell, W., and Harrison, S. 2006. 'The geomorphology and sedimentology of the Tempanos moraine at Laguna San Rafael, Chile.' Journal of Quaternary Science 21:629-643.

Heinrich, S. 2021. First region-wide estimates of population size and status of endemic Chilean dolphins in southern Chile. IWC final report,

https://iwc.int/population-endemic-chilean-dolphins-southern-chile.

Heinrich, S. and Espinosa-Miranda, C. 2019. Counting needles in a complex haystack – first abundance estimates for endemic Chilean dolphins in northern Patagonia, Chile. World Marine Mammal Conference (SMM & ECS), Barcelona, Spain. December 2019. (Oral presentation).

Hoelzel, A. R., C. Olavarría, M. Flores, F. Viddi, R. Crawshaw and A. Robinson. 2003. Biodiversity Aysen: Marine Mammal Survey. Report to the Biodiversity Aysen Project (unpublished).

Hucke-Gaete, R., Bedriñana-Romano, L., Acevedo, J., Viddi, F., Buchan, S., Sielfeld, W., Aguayo-Lobo, A., Zárate, P., Cari, I., Zerbini, A., and Redfern, J. 2022. Diseño para la estimación poblacional de cetáceos en aguas jurisdiccionales de Chile, FIPA 2021-18. Pre-Informe final. Fondo de Investigación Pesquera y de Acuicultura, Subsecretaría de Pesca y de Acuicultura. Unpublished report. 229 pp.

Nakajima, C., Inoue, J., Fujiyoshi, Y., and Nagao, I. 1987. Water depth of Lagoon San Rafael, Patagonia. Bulletin of Glacier Research 4: 103-105.

Pérez-Alvarez, M.J., Olavarría, C., Moraga, R., Baker, C.S., Hamner, R.M., and Poulin, E. 2015. 'Microsatellite Markers Reveal Strong Genetic Structure in the Endemic Chilean Dolphin.' PLoS ONE 10(4): e0123956. Available at: DOI: 10.1371/journal.pone.0123956.

Viddi, F.A., Hucke-Gaete, R., Torres-Florez, J.P., and Ribeiro, S. 2010. 'Spatial and seasonal variability in cetacean distribution in the fjords of northern Patagonia, Chile.' ICES Journal of Marine Science 67:959-970.

Acknowledgements

We would like to thank the participants of the 2022 hybrid IMMA Regional Expert Workshop for the identification of IMMAs in the South East Tropical and Temperate Pacific Ocean. Funding for the identification of this IMMA was provided by the Global Ocean Biodiversity Initiative funded by the German government's International Climate Initiative (IKI). Support was also provided by Whale and Dolphin Conservation, the Promar Foundation, and the Tethys Research Institute.

Suggested Citation: IUCN-MMPATF (2024) Laguna San Rafael IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2024.

PDF made available for download at ***https://www.marinemammalhabitat.org/factsheets/laguna-san-rafael-imma/***