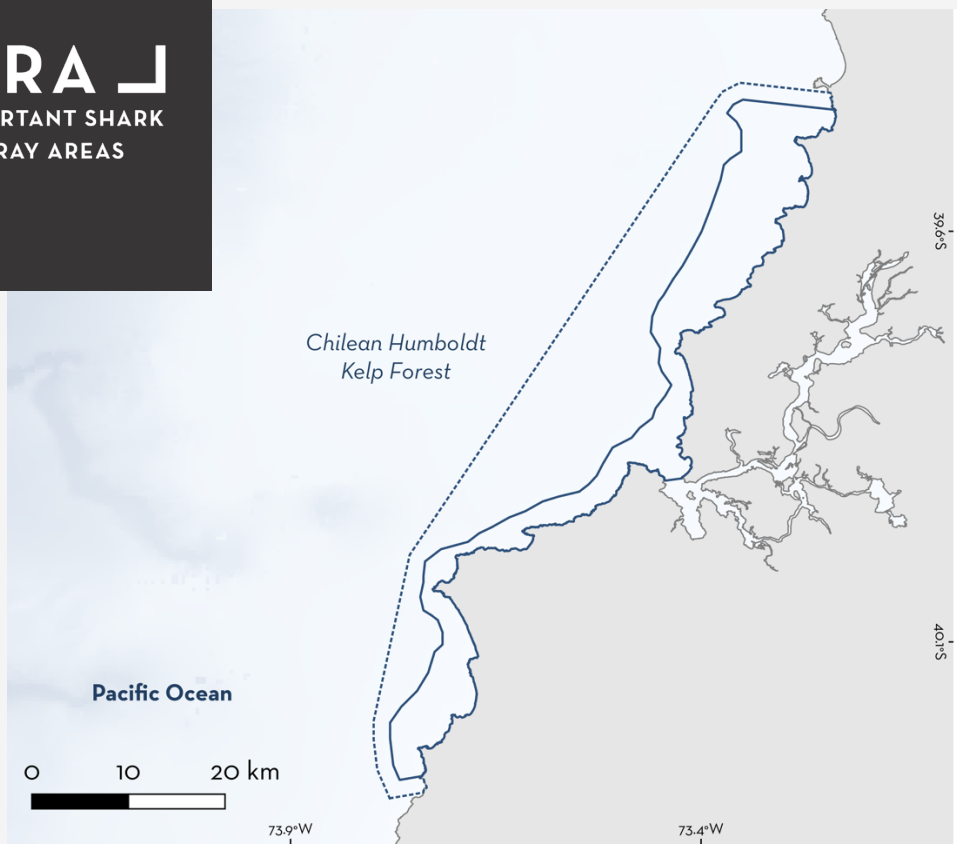
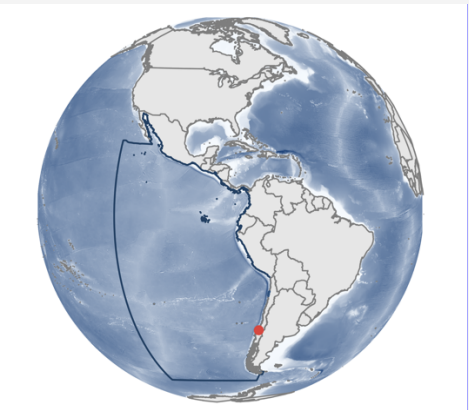
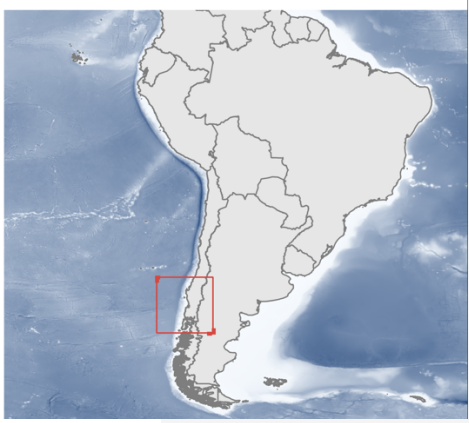
ISRA
IMPORTANT SHARK AND RAY AREAS







Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

CHILEAN HUMBOLDT KELP FOREST ISRA

Central and South American Pacific Region

CHILE

0–35 metres

1,345.34 km²

SUMMARY

Chilean Humboldt Kelp Forest is located in the coastal region of Los Rios in south-central Chile, in the Southeast Pacific. Oceanographic conditions allow kelp forests to thrive with cold and nutrient-rich waters drawn to the surface by coastal upwelling. Kelp forests are mainly composed of one range-restricted intertidal or subtidal kelp species *Lessonia trabeculata* in a habitat dominated by large rocks and boulders. This creates structurally complex habitat that sustains high biodiversity. Within this area there are **reproductive areas** (Chilean Catshark *Schroederichthys chilensis*).

CRITERIA

Sub-criterion C1 – Reproductive Areas

DESCRIPTION OF HABITAT

Chilean Humboldt Kelp Forest is located in the coastal region of Los Rios in south-central Chile, in the Southeast Pacific. Situated within the Humboldt Current Large Marine Ecosystem, this area is associated with kelp forests that exist across the Humboldt Current System (HCS) and is characterised by high productivity (Chavez et al. 2008). At the coastal edge of the HCS, where the kelp forests are found, upwelling, whether seasonal or constant, promotes high biological productivity (Montecino & Lange 2009). The HCS is affected by several spatial/temporal scales that goes from coastal trapped waves, inter-annual warming events (e.g., El Niño-Southern Oscillation), to multidecadal.

Kelp forests thrive on the rock substratum, attaining some of the highest rates of primary production of any natural ecosystem (Wernberg et al. 2019). Along the HCS, five kelp forest species are reported (Giant Kelp *Macrocystis pyrifera*, Calatillo *Lessonia trabeculata*, *L. berteroana*, *L. spicata*, *Eisonia cokeri*) in the intertidal and shallow subtidal zone (Thiel et al. 2007; Pérez-Araneda et al. 2020). In this area one kelp species is common (*L. trabeculata*) which is endemic to the HCS. The three-dimensional complexity promoted by the stipes, blades, and holdfast of the kelp species in the HCS offer diverse microhabitats (Carbajal et al. 2022) and provide protection against mechanical stress produced by waves and currents (Steneck et al. 2008).

The Important Shark and Ray Area is delineated from inshore and surface waters (0 m) to 35 m depth based on the depth of the habitat.

ISRA CRITERIA

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Chilean Humboldt Kelp Forest is an important reproductive area for the oviparous Chilean Catshark since this habitat functions as an egg case nursery. Egg-bearing females use fronds and stipes of the subtidal kelp forest as anchoring structures for egg-capsule deposition. Since sharks select areas with greater densities and plant aggregations with taller, physically stable, and thicker kelps to deposit their egg capsules (Trujillo et al. 2019), the selection of appropriate physical structures should result in better protection, and thus increased temporal persistence of eggs for their development.

In the coastal region of Los Rios in south-central Chile, in Huiro and Morro Gonzalo, there are *L. trabeculata* forests of around 500 m^2 for each site. In this area, 787 egg cases of Chilean Catshark have been reported within a year of sampling, with a maximum of 341 capsules in fall (Trujillo et al. 2019). In this same study, 38 egg capsules were observed in single kelp *L. trabeculata* individual with no egg cases observed outside *L. trabeculata* kelp forests. Egg cases were recorded in advanced developmental stages (indicative of temporal persistence).

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QUALIFYING SPECIES

Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
SHARKS												
Schroederichthys chilensis	Chilean Catshark	LC	0–100			X						

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Mustelus mento	Speckled Smoothhound	CR
Mustelus whitneyi	Humpback Smoothhound	CR
Notorynchus cepedianus	Broadnose Sevengill Shark	VU
RAYS		
Discopyge tschudii	Apron Numbfish	LC
Sympterygia lima	Filetail Fanskate	LC
CHIMAERAS		
Callorhinchus callorynchus	American Elephantfish	VU

IUCN Red List categories: *CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.*

REFERENCES

Carbajal P, Gamarra Salazar A, Moore PJ, Pérez-Matus A. 2022. Different kelp species support unique macroinvertebrate assemblages, suggesting the potential community-wide impacts of kelp harvesting along the Humboldt current system. *Aquatic Conservation: Marine and Freshwater Ecosystems* 32(1): 14–27. https://doi.org/10.1002/aqc.3745

Chavez FP, Bertrand A, Guevara-Carrasco R, Soler P, Csirke J. 2008. The northern Humboldt Current System: brief history, present status and a view towards the future. *Progress in Oceanography* 79: 95–105. https://doi.org/10.1016/j.pocean.2008.10.012

Montecino V, Lange CB. 2009. The Humboldt Current System: Ecosystem components and processes, fisheries, and sediment studies. *Progress in Oceanography* 83: 65–79. https://doi.org/10.1016/j.pocean.2009.07.041

Pérez-Araneda K, Zevallos S, Arakaki N, Gamarra A, Carbajal P, Tellier F. 2020. *Lessonia berteroana* en Perú: Comprobación de la identidad de la especie y diversidad genética en el borde norte de distribución. *Revista de Biología Marina y Oceanografía* 55: 270–276. http://dx.doi.org/10.22370/rbmo.2020.55.3.2591

Steneck R, Bustamante R, Dayton P, Jones G, Hobday A. 2008. Current status and future trends in kelp forest ecosystems. In: Polunin NVC, ed. *Aquatic ecosystems*. Cambridge: Cambridge University Press, 226–241.

Thiel M, Castilla JC, Fernández Bergia ME, Navarrete S. 2007. The Humboldt current system of northern and central Chile. *Oceanography and Marine Biology: An Annual Review* 45: 195–344.

Trujillo JE, Pardo LM, Vargas-Chacoff L, Valdivia N. 2019. Sharks in the forest: relationships between kelp physical-complexity attributes and egg deposition sites of the red-spotted catshark. *Marine Ecology Progress Series* 610: 125–135. https://doi.org/10.3354/meps12818

Wernberg T, Krumhansl K, Filbee-Dexter K, Pedersen MF. 2019. Status and trends for the world's kelp forests. In: Sheppard C, ed. *World seas: An environmental evaluation,* London: Academic Press, 57–78.