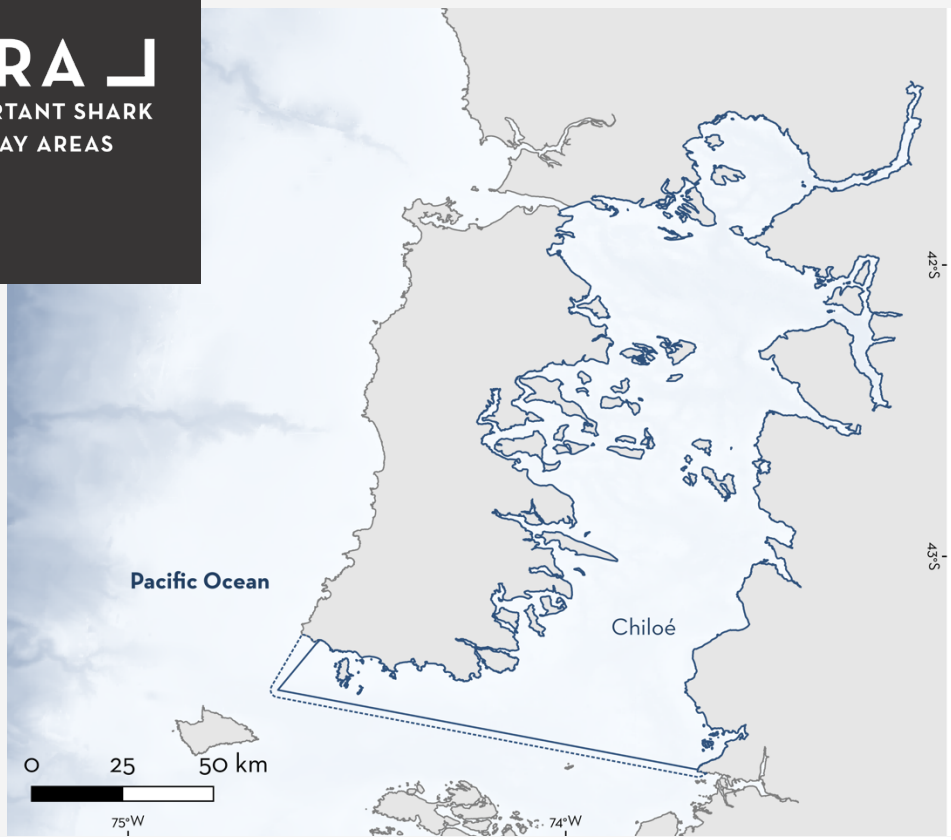
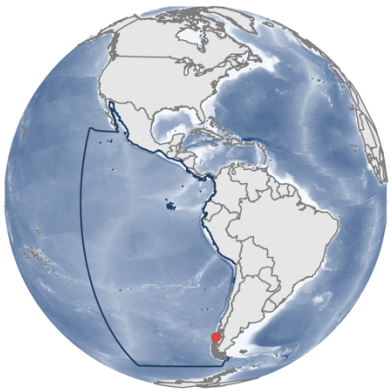
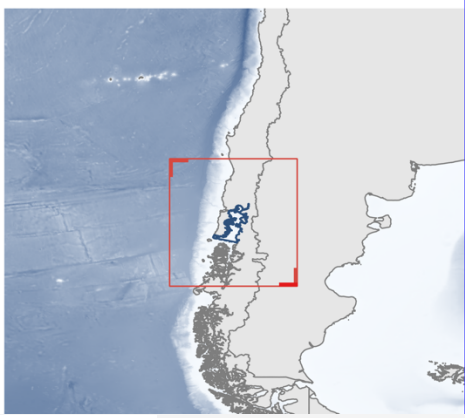
ISRA
IMPORTANT SHARK AND RAY AREAS







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

CHILOE ISRA

Central and South American Pacific Region

CHILE

0–480 metres

15,560 km²

SUMMARY

Chiloé is located in the Los Lagos region of southern Chile within the Cold-Temperate South America Province, also known as the Chiloense Ecoregion. This area overlaps with an Ecologically or Biologically Significant Marine Area, the West Wind Drift Convergence. The area has unique environmental features with the West Wind Drift striking the South American continent in a southeast direction and bringing cold waters to the coast. Habitats within the area include an intricate array of inner seas, archipelagos, channels, and fjords, and serve in many aspects like a large estuary with very high levels of primary productivity during the austral summer and autumn. Within this area there are: **threatened species** (e.g., Yellownose Skate *Dipturus chilensis*); **range restricted species** (e.g., Roughskin Skate *Dipturus trachyderma*); **reproductive** and **feeding areas** (Spiny Dogfish *Squalus acanthias*).

CRITERIA

Criterion A – Vulnerability; Criterion B – Range Restricted;
Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas

DESCRIPTION OF HABITAT

Chiloé is located in the Los Lagos region of southern Chile within the Cold-Temperate South America Province, also known as the Chiloense Ecoregion. Situated within the Humboldt Current Large Marine Ecosystem (LME), the area overlaps with the West Wind Drift Convergence, an Ecologically or Biologically Significant Marine Area (EBSA) (CBD 2017). It has been classified as a geographic priority for marine conservation in Latin America and the Caribbean for both its biological value and conservation concerns (Sullivan Sealey & Bustamante 1999). This area is where the West Wind Drift strikes the South American continent in a southeast direction (Reid 1965; Silva & Neshyba 1977), bringing cold waters to the coast (Silva & Neshyba 1979). The region is characterised by a wide tidal regime (up to 8 m in some areas) and abundant freshwater input from glacier melt, river drainage, and abundant precipitation (4,000–7,000 mm per year). Two out of three maximum values of mean annual river discharge in the world have been found in the Chiloense Ecoregion (Davila et al. 2002).

The southern Chilean coastal area of Chiloé and its immediate inner seas are recognised as a highly complex system, that behaves like a large estuary (CBD 2017). The ecology of the area is largely dependent on a dynamic relationship among waves, currents, bathymetry, substrate type, salinity, and temperature differences between the open coast and the inner seas (water mass convergence), the inorganic and organic nutrient input from local upwelling, and freshwater runoff (CBD 2017). As a result, this complexity generates a high degree of habitat diversification, biodiversity, and productivity (CBD 2017). High levels of primary productivity (phytoplankton) have been reported during the austral summer and autumn months for several hotspots off Chiloé Island and the Gulf of Corcovado (Hucke-Gaete 2004), even to a degree of surpassing productivity levels of upwelling systems in the Humboldt Current System, one of the most productive in the world. Also, the diversity of benthic macroalgae of this ecoregion (totaling altogether 60 families of macroalgae) is substantially higher than on the Chilean coasts to the north (Sullivan Sealey & Bustamante 1999).

This Important Shark and Ray Area is delineated from surface waters (0 m) to a depth of 480 m based on the maximum depth range of the habitat used by Qualifying Species.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Four Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in the area. These are the Critically Endangered Speckled Smoothhound (Dulvy et al. 2021a), the Endangered Yellownose Skate (Dulvy et al. 2021b), the Endangered Roughskin Skate (Dulvy et al. 2020), and the Vulnerable Spiny Dogfish (Finucci et al. 2019).

CRITERION B – RANGE RESTRICTED

Chiloé holds the regular presence of the Yellownose Skate and the Roughskin Skate as resident range-restricted species. Both species are restricted to the Humboldt Current LME. These species are regularly present in the area, have been commonly targeted in fisheries since 1979, and are an important bycatch (in terms of volume) of demersal fisheries operating in this location (Céspedes et al. 2005; Quiroz et al. 2008; Vargas-Caro et al. 2015). Furthermore, the Speckled Smoothhound represents the second most important shark species in terms of biomass (3% of total landings) caught incidentally in the small-scale longline skate fishery that operates within this area (Quiroz et al. 2008).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Chiloé is an important reproductive area for the Spiny Dogfish. This species is a common bycatch species (Quiroz et al. 2008) within the area with pregnant females with near-term embryos recorded (Gaitán-Espitia et al. 2017). A total of 102 (89 females and 13 males) Spiny Dogfish individuals were sampled during the austral winter and summer of 2013–2014 (Gaitán-Espitia et al. 2017). The low frequency of males observed suggests spatial sexual segregation biased towards females. Females ranged in length from 46 to 98 cm total length (TL) (mean ± SD: 79 ± 11 cm TL). The locally recorded total length at 50% maturity is 72.8 cm TL for this species. Forty-five females were recorded with embryos. Litter sizes ranged between 1 to 12 (mean ± SD: 5.52 ± 3.1) embryos per female. The body sizes of the embryos (n = 274) ranged from 3.6 to 25.8 cm TL (mean ± SD: 12.7 ± 5.7 cm TL). Considering that the size-at-birth is 18–33 cm TL (Ebert et al. 2013), some embryos were near-term.

SUB-CRITERION C2 – FEEDING AREAS

Chiloé is an important feeding ground for female Spiny Dogfish (including pregnant individuals) that feed on demersal and pelagic fishes that are abundant in this area (Gálvez et al. 2019). Gaitán-Espitia et al. (2017) sampled 26 immature (range: 46–74 cm TL; mean ± 1 SD: 57 ± 8.1 cm TL) and 63 mature (range: 71–98 cm TL; mean ± 1 SD: 85 ± 5.8 cm TL) females during the austral winter and summer of 2013–2014. Sixty-one (68.5%) stomachs contained food. The most important prey items were Southern Hake *Merluccius australis*, Peruvian Anchovy *Engraulis ringens*, and Patagonian Sprat *Sprattus fuegensis*. As indicated by the small number of prey items, Spiny Dogfish females exhibited a functional specialist feeding behaviour. This is unusual for this species as it is generally considered an opportunistic predator that feeds on many pelagic and benthic species (Alonso et al. 2002; Belleggia et al. 2012). Females also appeared to switch prey (anchovy to hake) to take advantage of seasonal changes in prey availability (Aguayo-Hernández 1995; Leal et al. 2011). The high productivity of this area sustains large aggregations of Southern Hake, the most important prey for female Spiny Dogfish. This abundance in Southern Hake might be leading to this shark presents an opportunistic feeding behaviour taking advantage the high abundance of their prey species.

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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												
Mustelus mento	Speckled Smoothhound	CR	16–50	X	X							
Squalus acanthias	Spiny Dogfish	VU	0–1,978	X		X	X					
RAYS												
Dipturus chilensis	Yellownose Skate	EN	14–600	X	X							
Dipturus trachyderma	Roughskin Skate	EN	20–480	X	X							

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Cetorhinus maximus	Basking Shark	EN
RAYS		
Bathyraja albomaculata	White-dotted Skate	VU
Bathyraja brachyurops	Broadnose Skate	NT
Bathyraja griseocauda	Greytail Skate	EN
Bathyraja multispinis	Multispine Skate	NT
Discopyge tschudii	Apron Numbfish	LC
Psammobatis normani	Shortfin Sandskate	LC
Psammobatis rudis	Smallthorn Sandskate	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.*

SUPPORTING INFORMATION

There are additional indications that this area is important for the Yellownose Skate. This species is the principal member of the family Rajidae to be exploited for commercial purposes, and one of the most important species captured in Chilean shark commercial fisheries. Fisheries landings studies indicate that over 80% of landings for this species have originated from southern Chile, from -41 to -55 (within this area) (Quiroz et al. 2009). Catches are dominated by the Yellownose Skate and the Pink Cusk-eel *Genypterus blacodes*; together these accounted for 87.8% of the total catch, with the remaining shark bycatch being less than 9% (Quiroz et al. 2008).

The Yellownose Skate presents significant genetic structure along the Chilean coast with three units identified (Vargas-Caro et al. 2017). One unit is found in the Chiloé Interior Sea and this likely represents a single, relatively isolated, population due to the unique characteristics of this area (i.e., cold subsurface currents, high freshwater contribution from precipitation and river discharges, and the depth profile [50–400 m]) (Vargas-Caro et al. 2017). Furthermore, this genetic analysis revealed that there is little or no movement of males and females of the Yellownose Skate into the Chiloé Interior Sea and, as such, population resilience will rely almost exclusively on reproduction and self-recruiting by Chiloé Interior Sea adults (Vargas-Caro et al. 2017).

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