




**WWF Chile’s Marine Program** The unique marine **ecosystems** in **Southern Chile**, characterized by pristine environments shaped by amazing fjords and channels that allow for **rich biological** diversity, are currently **threatened** by several human activities. The most evident activities are **Intensive salmon farming**, residential and industrial **coastal pollution**, bycatch in some fisheries, increasing maritime **traffic** and other poorly regulated and/or uncontrolled **industrial** activities.

Some arguments cite the lack of an integral and **participatory** planning approach for the conservation of coastal and ocean areas as the cause of these pressures on marine biodiversity. In response to this situation, WWF Chile **created** its **Marine Program**, the main purpose of which is to:

- **Develop** and **implement** a systematic **planning** process for **marine conservation** in Southern Chile, thereby helping mitigate the main pressures that impact the ecoregion’s unique biodiversity and ecosystems, with focus on cetaceans in general and the blue whale, the largest creature that has ever lived on Earth, in particular. To achieve this, WWF focuses on three actions:
- **Identify** high conservation value areas in the marine and coastal areas of the Chiloense Ecoregion through internationally accepted methodologies that consider ecological, social and cultural aspects;
- **Develop** a conservation proposal based on the areas identified that considers, among other categories, Multiple Use Marine and Coastal Protected Areas (MU-MCPA) through the effective participation of local communities (residents, fishermen, indigenous peoples, etc.), governmental agencies, NGOs, and the salmon farming industry, among other stakeholders.
- **Promote** the conservation proposal(s) that result from the participatory process –particularly those aiming to protect visiting blue whale populations– among stakeholders and decision-makers at the local, regional and national levels.

Common name	Scientific name	Conservation status
Blue whale	<i>Balaenoptera musculus</i>	 Endangered
Southern Right whale	<i>Eubalaena australis</i>	
Southern river otter	<i>Lontra provocax</i>	
Commerson’s Dolphin	<i>Cephalorhynchus commersonii</i>	
Red knot	<i>Calidris canutus</i>	 Vulnerable
Pink-footed Shearwater	<i>Puffinus creatopus</i>	
Humpback whale	<i>Megaptera novaeangliae</i>	 Data deficient
Humboldt penguin	<i>Spheniscus humboldti</i>	
Chilean dolphin	<i>Cephalorhynchus eutropia</i>	
Marine otter	<i>Lontra felina</i>	

Black-browed albatross, © WWF - C. Plante

Blue whale, © CBA - R. Huckle-Garza

Marine birds and mammals, in the Chiloense Ecoregion, with conservation problems according with the Chilean wildlife conservation status system (RCE)

**Working group for the conservation of the Chiloense Ecoregion** We understand that this conservation challenge is too large for one organization alone. Therefore, two of the world’s most prestigious and renowned nature conservation organizations, WWF and The Nature Conservancy, along with two local NGOs, the Blue Whale Center and Marine Conservation, have joined efforts and capacities to promote effective marine conservation actions in the Chiloense Ecoregion. We are convinced that these partners’ dedicated, professional and transparent efforts, along with the support of local communities, will benefit current and future generations of Chileans who share their love for this exceptional area.

**WWF Mission** WWF works for a living planet. Its mission is to stop the degradation of the planet’s natural environment and to build a future where humans live in harmony with nature by:

- Conserving the world’s biological diversity;
- Ensuring that the use of renewable natural resources is sustainable;
- Promoting the reduction of pollution and wasteful consumption.

**Acknowledgements** / We would like to thank the following institutions for making our conservation efforts possible with their generous support: Government of Chile – Chilean Economic Development Agency, Government of Chile – Under secretariat for Economy, WWF Germany, WWF Austria, WWF Canada, WWF Galapagos, WWF Latin America and the Caribbean, Mountagu Foundation, Sherman Family.

**Credits / General Editors:** Susan Díaz & Mauricio Gálvez, **Production and Design:** Nury Lagos, **Illustrations:** Marcos Navarro, **Original idea:** WWF Canada, Northeast Pacific Marine Region Office, **Texts:** Sandra Mielthke, Mauricio Gálvez, Susan Díaz, Claudio Delgado, **English Translation:** Irene Alvear, Emily Owen





for a living planet®



# The Chiloense Marine Ecoregion

## Unique Natural Treasures




Fact Sheet N° 1




Deep sea fish and shrimp, © V. Häussermann & G. Förstner

Pelee's dolphins, © WWF Chile - C. Guila

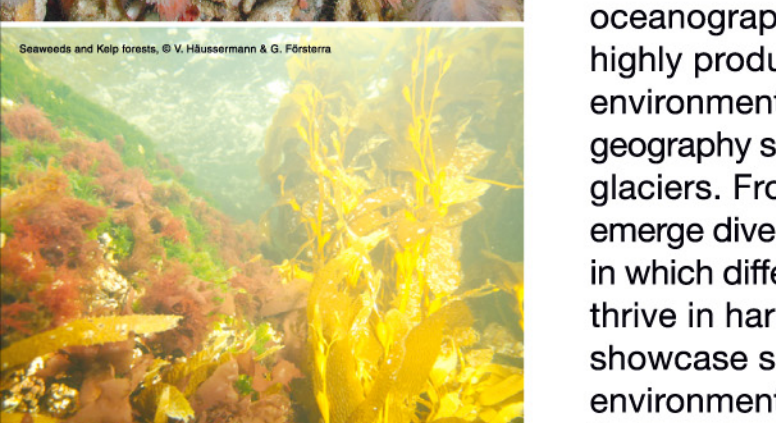
Guafío island, © WWF Chile - M. Bello



Stony corals, © V. Häussermann & G. Förstner



Seaweeds and kelp forests, © V. Häussermann & G. Förstner



Sea anemone in Huhay, © V. Häussermann & G. Förstner

## Unique Richness

Thousand of different species, many of them still unknown to science, dwell in the marine environments of the Chiloense Ecoregion, which spans from Reloncaví Sound (41°42'S) to Taitao Peninsula (47°00'S). This mix of unique species only exists thanks to complex oceanographic patterns, highly productive environments and intricate geography shaped by ancient glaciers. From these factors emerge diverse environments in which different species can thrive in harmony. Here we showcase some of the environments and species that are found in this area.

## Submarine Canyons

Submarine canyons are steep-sided valleys on the sea floor, the walls of which have been eroded by currents, forming very turbid environments with high concentrations of food. These canyons are used for breeding and feeding by certain species, such as hakes, for which submarine

canyons are key spawning and breeding areas. Despite the fact that their large extensions and varying depths serve as shelter for a wide variety of habitats and species, submarine canyons remain one of the least studied ecosystems in Chile.

## Cold-water Corals

Cold-water corals in the Chiloense Ecoregion are colony species that form complex underwater structures, serving as the habitat for many other species. Recently, German researchers found reef formations in Southern Chile. Corals coexist with *gorgonians* (octocorals or sea whips), *actinias*, *brachiopods* (two-valve invertebrates also known as lampshells), *gastropods* (limpets, abalones and snails), *polychaete* (marine worms) and a variety of sponges. Both the abundance of cold-water corals and the fact that they are found in the Chiloense Ecoregion is extraordinary and unique. Many of these corals and associated species have not yet been scientifically described, and other stony coral (scleractinian) aggregations are estimated to be up to 200 years old.

## Sea Otters

Sea otters, the world’s smallest marine mammal, are currently an endangered species according with the IUCN Red List. These shy and rarely seen creatures are an indicator of a healthy ecosystem. They mainly live along exposed rocky coasts and are one of the top predators in the coastal-marine food web, with their favorite foods being crab, fish and sea urchins.

## Blue Whales

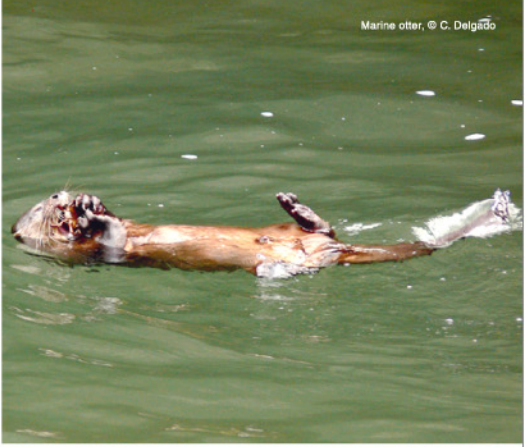
The blue whale, stretching over 30 meters long, is the largest mammal that has ever lived on the earth. Whales swim in the waters of the Chiloense Ecoregion and nurse their calves in the Gulf of Corcovado, where krill are abundant and waters are deep enough for these giant animals to submerge. Blue whales were heavily hunted in the past and their populations were reduced to critical levels. Due to their global importance and endangered status, it is our responsibility to care for this species that has chosen to live in Chilean waters.

## Complex and Dynamic Ecosystems

The physical, hydrographic and climatic conditions prevailing in the Chiloense Ecoregion result in strong variations in temperature, salinity, currents, light penetration, and oxygen and nutrient concentrations. The interaction of all these elements gives rise to complex patterns at the local level as well as in fjords, channels and outer sea, where a large amount of unique habitats can be found. Such varied ecosystems accommodate a diverse range species, as well as create inhospitable conditions for other species. For instance, in marine areas strongly influenced by glacial melt, salinity varies notably along a horizontal gradient. Additionally, given the significant influx of nutrients from watersheds, fjord heads have been known to present oxygen-less (anoxic) conditions, restricting this habitat to a select group of species. Other examples of this complexity are water layers with drastic changes in density and “bottlenecks” in channels, which result in sudden habitat changes over very short distances.




Zooplankton, © PUCV - S. Palma



Marine otter, © C. Delgado



Blue whale, © WWF Chile - M. Bello



Pelee's dolphin, © WWF Chile - T. Crowley



Blue whale spout, © CBA - R. Huckle-Garza





# Unique Natural Treasures

The sea stretching between Reloncaví Sound and Taitao Peninsula constitutes the habitat of a remarkable number of species, complex natural processes and relationships, and globally unique life forms.

**Sea Lions and Seals:** Both South American sea lions and South American fur seals have established colonies in the ecoregion. The population of South American fur seals is five times smaller than that of South American sea lions. Both species exhibit elaborate social behavior, which is clearly depicted by territorial males. These animals are at the top of the food web and actually help regulate this web. Their natural predators are the orcas that visit the area.

**Birds:** One third of the ecoregion's marine birds use sandy beaches as their habitat. For example, the western shoreline of Chiloe Island is an important area for the Hudsonian Godwit in its migration cycle from Canada and Alaska. In addition, birds such as the red-legged cormorant also use rocky shorelines for building nests out of seaweed and feeding on small fishes.

**Sea Otters:** This species needs a large home range to survive, particularly one that contains kelp forests which serve as both refuge and a source of food. The sea otter is currently endangered and its population is extremely fragmented.

**Kelp forests and sea urchins:** Kelp forests, which form in intertidal and subtidal environments, are exceptionally important in ecological, economic and social terms. They provide habitat and refuge for crustaceans, sea urchins, Chilean abalone and several types of fish. Once washed ashore, kelp serves as food for birds and marine invertebrates.

**Juvenile Hakes:** In addition their north-south migration, hakes show an inner- and outer-water migration pattern. After spawning in the submarine canyons of outer waters, juveniles migrate to inner waters through gulfs and channels. In these inner waters, the hakes grow up before returning to the outer ocean to complete their cycle.

**Aportes de agua dulce:** la notable cantidad de agua dulce aportada por el drenaje de ríos, deshielo de glaciares y de las copiosas lluvias, determinan patrones muy complejos en la salinidad, densidad y temperatura del agua marina, lo que genera múltiples hábitat para la vida marina.

**Ocean Floor:** Rocky and rugged areas in the ocean floor provide stable shelter for seaweed, sea anemones, rock fish and eels, among other beings, in an oftentimes harsh environment. Sea anemones, for instance, are one of the thousands of invertebrates found on the ocean floor. These carnivorous creatures, rooted to one particular spot, use their tentacles to trap small crustaceans and fish.

**Blue Whales and Krill:** Although baleen whales like blue and Sei whales are extremely large, they survive by feeding on one of the ocean's smallest creatures, krill, which form part of the zooplankton. Blue whales use their baleen, which acts as a filter, to capture their food from the tons of water they drink daily. The main component of their diet is krill, a shrimp-like marine invertebrate that is at the bottom of the complex food web. Krill feed on small phytoplankton algae –and, to a lesser extent, on zooplankton– and then in turn become subsistence for other animals, such as the blue whale. A blue whale is estimated to eat between two and eight tons of krill per day during its peak feeding period.

**Submarine Canyons:** Submarine canyons are basically cracks in the ocean floor. They provide special oceanographic conditions for critical life cycle stages of certain species, like the spawning of hoki and southern hake. There are at least seven submarine canyons in the Ecoregion, the most important of which are located southeast of the Guafo island and south of the Guambín island.

**Adult Hakes:** Hoki and southern hake are of great ecological and economic importance. The southern hake is a long-lived species that can live up to 30 years and feeds on other fish, including the hoki. Both species share the same habitat and form the link between the upper and lower levels of the food web.

**Sardines and Small Fish:** Sardines (southern and common) and juvenile hoki, referred to as forage fish, are a key source of food for many other marine creatures. These fish, strongly associated with upwelling areas, are at bottom of the food web and are essential for the Chiloense Ecoregion's ecosystems.

**Dolphins:** Chilean and Peale's dolphins are endemic to the fjords and Southern Cone, respectively, and are extremely valuable to the ecoregion's biodiversity. Since these dolphins are both endemic and sociable with humans, they could easily become endangered.

**Cold-water Corals:** Cold-water corals are similar to their tropical relatives in that they provide habitat for other species and organisms. The ecoregion is home to unique stony and gorgonian corals that can live in aggregations for thousands of years if untouched by human activities.

**Upwelling and Phytoplankton:** As wind blows across the ocean, cold, deep water masses appear on the surface in a process known as upwelling. Oxygen- and nutrient-rich emerging waters, combined with energy from the sun, trigger a bloom of phyto and zooplankton, which are small algae and animals that form the basis of life in the ocean. These upwellings make the waters around Chiloé some of the most productive in the world.

Marcelo Navarrete 2000