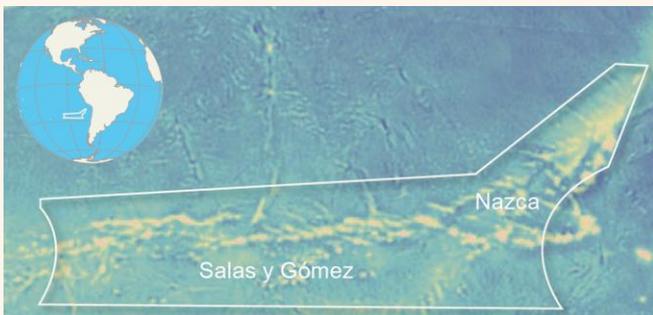




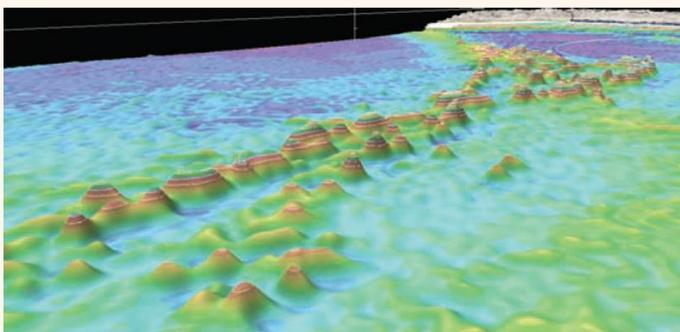
# The High Seas of Salas y Gómez and Nazca Ridges



The area beyond national jurisdiction described covers about 1,246,608 km<sup>2</sup>, and at least part of it is likely to lie on the extended continental shelf of Chile (preliminary notice to the UN Commission on the Limits of the Continental Shelf, Chile 2009).

## LOCATION

The Salas y Gómez and Nazca ridges are two sequential chains of submarine mountains of volcanic origin located in the Southeastern Pacific Ocean, jointly extending over 2,900 km. The Salas y Gómez ridge lies in a west-east orientation between 23°42' S and 29°12' S and 111°30' W and 86°30' W. Its western end intersects the East Pacific Rise inside the Chilean Exclusive Economic Zone (EEZ) of the Easter Islands and its eastern end adjoins the western end of Nazca ridge. The Nazca ridge spreads in a southwest-northeastern direction and is localized between 15°00' S and 26°09' S and 86°30' W and 76°06' W. Its southern end includes part of the Chilean EEZ of San Felix Island, while its northern end meets the Peru-Chile subduction zone inside the Peruvian EEZ (see map).



3D perspective of seamounts of Salas y Gómez and Nazca ridges. Altitude x 10; view pointing to Northeast.

The Nazca area is influenced slightly by the eastern boundary currents of the South Pacific anticyclonic gyre. The Chile current carries subantarctic water north, along the coast of Chile towards the equator, along the coast of Chile. At approximately 20° S, influenced by the southeast trade winds and coastal configuration, the current turns westward, away from the coast influencing Nazca area with nutrient-rich waters (Galvez, M., 2010).

The Salas y Gómez and Nazca ridges are a long chain of tall seamounts and guyots that vary greatly in depth, and are isolated from the nearest continental margin by a deep trench (Parin *et al.*, 1997). The ridge area beyond national jurisdiction contains about 110 seamounts with summits at fishable depths down to 2'000 m, representing 41 % of the seamounts in the south-eastern Pacific Ocean. The benthic

# THE HIGH SEAS OF SALAS Y GÓMEZ AND NAZCA RIDGES



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170 species of fish belonging to 31 families have been recorded. 41% of fishes are endemic.



25 species of deep-sea coral belonging to Scleractinian and Antipatharian families have been recorded in Salas y Gómez and Nazca ridges.

and benthopelagic invertebrates and fishes of the area are much more closely related to the Indo-West Pacific than to the eastern Pacific fauna.

Currently, 226 species of benthic and benthopelagic invertebrates and 171 fish species of 64 genera are known to inhabit the 22 explored seamounts of the ridges (Parin *et al.*, 1997). Considering the overall number of seamounts in the region, many more species can be expected. Further, the bottom areas of Salas y Gómez and Nazca ridges have not been sampled biologically. The area is a biodiversity hotspot with one of the highest levels of marine biological endemism, amounting to 41.2 % of fish species and 46.3 % of benthic invertebrates (Parin *et al.*, 1997; Mironov *et al.*, 2006) even surpassing the rates for hydrothermal vent ecosystems (Richer de Forges *et al.*, 2000).

The ridges offer habitat to a number of low resilience and long-lived species like deep water sharks (Parin and Kotlyar, 2007), oreos, alfonsino, and reef-builder corals (e.g., *Madrepora oculata*). They are likely to be speciation centers and provide the only extensive hard substrate available for propagation of benthic suspension feeders like black (Antipatharia) and stony corals (Scleractinia), of which at least 19 genera have been recorded, with many more species (Molodtsova, 2005).

The seamounts of the ridges were found to host aggregations of vertically migrant, seamount-associated mesopelagic fishes and migratory pelagic fishes: Pelagic sharks, in particular schools of large (2 - 3 m TL) adult male blue sharks have been observed to aggregate over Nazca ridge. Also bigeye thresher sharks (*Alopias superciliosus*) were more abundant over seamounts than in the surroundings (Litvinov, 1989). The ridges function as recruitment and nursery areas for swordfish (*Xiphias gladius*) (Yañez *et al.*, 2004, 2006, 2009) and are part of the breeding zone described for Chilean jack mackerel (*Trachurus murphyi*) (Arcos *et al.*, 2001; Anon., 2007).

The high pelagic productivity indicated by the formation of Taylor caps and local upwelling processes observed over the Nazca Ridge may support blue whales (*Balaenoptera musculus*), for which it is considered to be a likely reproductive zone and stepping stone during their extensive migrations (Hucke-Gaete and Mate, 2005). Satellite tagging on blue whales carried out during Jan-Feb 2004 in Southern Chile's Corcovado Gulf, showed 60 % of tagged whales migrating 2,500-3,500 km from the feeding area to Nazca ridge zone, remaining in the area during August 2004.

## REASONS FOR SELECTION

These relatively well investigated ridges meet all criteria except “naturalness” for ecologically or biologically significant marine areas [...] (EBSAs) adopted by the Convention on Biological Diversity in 2008 (Decision IX/20, Annex I: CBD 2008).

The ridges' ecosystems should also be classified as vulnerable according to all of the FAO criteria for vulnerable marine ecosystems (FAO 2008).

## CONSERVATION CONSIDERATIONS

It can be assumed that most seamounts along the Nazca ridge were at least explored once. There is evidence of sporadic deep water fishing for seamount fishes by the USSR/ Russian and Chilean fleet and recently also by Spanish vessels (Clark *et al.* 2007; Galvez, M., 2010).

Overall, like in other regions, deepwater fishing and the occurrence of vulnerable benthic species coincide to a large extent (see Fig. 1). There are indications of abundant mega- and macrofauna bycatch in trawls, including large branches of gorgonians. Between 1979/80 and 1987 significant changes in the benthic communities such as loss of antipatharian corals were observed in consequence of bottom trawling. On Salas y Gómez ridge, most of the fishing activity carried out is pelagic (Vega *et al.*, 2009).

The area is likely to be on the route of cargo ships that transit between Asia Pacific countries and Chilean ports; therefore, strikes with blue whales may occur.

Currently, one of the seamounts is known to carry a cobalt-manganese crust of considerable cobalt grade (0.8-2%) which may attract mining activities.



Results of satellite tagging research allow postulating Nazca ridge as a likely reproductive area for blue whale.



The effective conservation of Nazca ridge, a breeding zone for Jack mackerel, will facilitate the recovery this important fishery.

## Possible conservation objectives

- Contribute to protect our global marine heritage for future generations
- Protect unique seamount communities from adverse fishing impact
- Protect critical life stages for fishes as the basis for very important commercial fisheries like swordfish and jack mackerel
- Ensure the long term recovery, conservation and maintenance of populations of highly mobile and migratory species
- Protect key biological process (i.e. reproduction) for endangered species like blue whales
- Provide reference sites for future scientific research and public education
- Improve resilience to the accelerating impacts of climate change



Big pelagic sharks and turtles are also found in the area and may be threatened by longliners.



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## POSSIBLE IMPLEMENTATION

WWF proposes a multilevel network of Marine Protected Areas of multiple use, with considerable proportions of no-take areas, on the Salas y Gómez and Nazca ridges. The Lima Convention for the Protection of the Marine Environment and Coastal

Area of the South-East Pacific (1981) administrated by the CPPS, and its Protocol for the Conservation and Management of Protected Marine and Coastal Areas of the South-East Pacific, provide the framework for establishing spatial conservation measures by a multilateral regional agreement. The protocol applies to all waters under national jurisdiction of its parties and aims to “protect and preserve those ecosystems which are fragile, vulnerable or of unique natural value, and flora and fauna threatened by depletion and extinction”. Parties are to establish protected areas and apply integrated management, with any activity liable to have adverse effects on the ecosystem, flora and fauna or their habitat to be prohibited. A regional action plan shall lead to the establishment of a regional network of marine protected areas.

Fisheries management for non-highly migratory species is subject to regulation by the Convention on the Conservation and Management of the High Seas Fishery Resources of the South Pacific Ocean (SPRFMO), which has adopted interim measures, including a freeze of the bottom fishing footprint, to implement UNGA Resolutions 61/105 and 64/72. Fishing with bottom contacting gear within the footprint should be prohibited. A precautionary catch quota on vulnerable species such as alfonsino (*Beryx* spp.), spiny lobster (*Projasis bahamondei*) and Cardinalfishes (*Epigonus* spp.) should be agreed. In ridge areas under Chilean jurisdiction, complementary measures will be required. Mineral prospection, exploration and exploitation should not be permitted by the International Seabed Authority or Chile.

The conservation of tuna and measures to eliminate incidental catch of or interference with marine turtles, pelagic sharks and cetaceans should be addressed by the Inter American Tropical Tuna Commission (IATTC; Antigua Convention).

In case of verifying this area as a reproductive zone for the endangered blue whale, the International Whaling Commission should implement conservation measures and promote research in this area.

For full references, please download an extended briefing from [wwf.panda.org/high\\_seas](http://wwf.panda.org/high_seas)

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WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which 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.

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