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Salas y Gomez and Nazca Ridges Literature Synthesis

Pew

Review of scientific papers to understand threats and fishery impacts on the Salas y Gómez and Nazca Ridges

Observer paper submitted by The Pew Charitable Trusts and Conservation International

Summary

Recalling the South Pacific Regional Fishery Management Organisation’s (SPRFMO) [Decision 17-2024](#), which tasks the Scientific Committee (SC) to consider and review relevant scientific information and data about the Salas y Gómez and Nazca Ridges area, this paper provides a summary of a selection of recent scientific research that document the ecological value and environmental vulnerability of this area. This paper is meant to provide members with additional context and, in line with Decision 17-2024, inform the SC’s recommendations of possible measures to the Commission. The studies, summarized in this paper, suggest:

- At least 82 endangered, threatened, or protected (ETP) species are present within the boundary of the Salas y Gómez and Nazca Ridges;
- High levels of endemic fish species are present in shallow and deep water; and,
- A fisheries closure is a tool that could safeguard the ecosystem and, where needed, aid in its potential recovery.

Papers documenting high biodiversity and ecosystem vulnerability

[The Salas y Gómez and Nazca ridges: A review of the importance, opportunities and challenges for protecting a global diversity hotspot on the high seas](#) (Wagner et al., 2021) – This review summarizes the literature on biodiversity in the Salas y Gómez and Nazca ridges. Using IUCN data, it finds that these biodiversity hotspots “are home to 82 species that are endangered, near threatened, or vulnerable to extinction.” In the Salas y Gómez Ridge specifically, studies have found that each seamount appears to host a distinct set of species, indicating that protecting each seamount is vital to fully conserve the region’s unique biodiversity. The ecological importance of the region has been recognized by several international organizations or initiatives, such as the Global Ocean Biodiversity Initiative in 2011, and the Convention on Biological Diversity in 2014.

[Borderless conservation: Integrating connectivity into high seas conservation efforts for the Salas y Gómez and Nazca ridges](#) (Boteler et al., 2021) – This article argues that a better understanding of connectivity in the Salas y Gómez and Nazca ridges should be integrated into conservation strategies for this region. The ridges are a key habitat for both localized and migratory species. For example, they are one of the few places in ABNJ where seamounts peak in waters shallower than 200 meters, shallow enough for photosynthetic reef-building corals. The authors explain that natural obstacles, such as the Atacama Trench and Humboldt Current, act as dispersal barriers and reduce connectivity for many species, isolating the region and creating high levels of endemism. However, these barriers are overcome by highly mobile species such as turtles, birds, and whales, many of which use the ridges as essential movement corridors. These species, alongside those which undergo vertical migrations, emphasize the need for protection of the entire water column, not just the seafloor. The uniqueness of the region leads these authors to caution that the loss or degradation of these habitats “could therefore lead to species extinctions.”

[Meiofaunal nematode abundance, composition, and diversity at bathyal to hadal depths in the Southeast Pacific Ocean](#) (Horacek et al., 2022) – By collecting samples from a number of seamounts including two in the Salas y Gómez Ridge, these authors observe high levels of diversity in the

meiofauna communities between seamounts. These differences appear to depend on whether the seamounts are located in the Salas y Gómez or the Nazca Ridge, but also on the specific area sampled on the seamount (base, flank or summit). The causes of these differences are not certain, but these authors note that these variations could be the result of food availability and quality as well as small differences and heterogeneity of the shapes of the seamounts and of surrounding water movement.

Papers that document the impact on the area from fisheries

Deep-sea biodiversity at the extremes of the Salas y Gómez and Nazca ridges with implications for conservation (Friedlander et al., 2021) - In this study, researchers conducted expeditions to Rapa Nui (RN), and the Salas y Gómez islands in 2011 as well as expeditions to Desventuradas Islands in 2013. While the focus on this study is on the biodiversity of this region, researchers also provided supporting literature that shows how fisheries can be a threat. Large scale fishing fleets serve as an immediate threat to the Salas y Gómez and Nazca ridges, due to its seamount landscape. Deep-sea fish species often use seamounts as spawning zones and tend to recover slowly from environmental disturbances. Seamounts are also often home to deep-sea coral and sponge species that regenerate slowly, making them incredibly susceptible to disturbance and slow to recover post-disturbance. Lastly, as an example of damage that can occur in the region if fishing activities are left unregulated, the authors point to the heavy fishing of the northwestern Hawaiian Ridge and Emperor Seamount Chain from the 1960s – 1980s which resulted in the “the largest quantity of fish and invertebrate biomass removed from any documented seamount fishery in the world” (pg. 18). Researchers note how even after gaining protections in the early 1980s, these ridges currently show only “signs of limited recovery” (pg. 18).

Importance of the Salas y Gómez and Nazca ridges (Gaymer et al., 2022) - This report on the Salas y Gómez and Nazca ridges reviews literature that was presented to the South Pacific Regional Fisheries Management Organization (SPRFMO) Committee in 2020 and adds new data that has emerged since 2020. Using deep-water surveys, researchers have learned that the seamounts in this region each have a unique faunal composition. Because of this, to preserve the representative biodiversity, researchers recommend that all seamounts be protected, rather than select areas. The researchers also stress the importance of closing the area to fishing activities in part because the shallow and deep-water fish assemblages of the region contain some of the most unique fish faunas. Additionally, the authors warn that “this high degree of endemism also suggests that these assemblages have relatively little dispersal potential and therefore pose higher extinction risks compared with more widely dispersed species.” Another risk that was identified is bottom trawling. Soviet trawling for Jack mackerel and redbaits used to occur on the seamounts of the Nazca and Salas y Gómez ridges in the 1970s and 1980s (pg. 20). To demonstrate damage of trawling, researchers used the example of the nearby Juan Fernández Archipelago where a commercial fishery operated from 1998 until 2006. In this area, ROV surveys found damage from bottom trawling a decade after the fishery closed. Because fishing effort has been relatively low in this region, conservation efforts would not significantly impact the fishing industry. While management measures are developed, no new proposals should be accepted for exploratory fishing in this region.

Seafloor litter at oceanic islands and seamounts of the southeastern Pacific (Mecho et al., 2021) – This study examined the different kinds of litter found in the waters of Rapa Nui (RN) and Desventuradas Islands (DI) from 60 to 320 m of depth. Litter data, sampled between 2014 – 2019, was compiled from 84 stations. In the DI area, very little floating litter and microplastics was found. Additionally, no seafloor or benthic litter was observed. It is hypothesized that this is because of the low population on the islands and because most fishing activity is “occasional”. In contrast, RN had 93 litter observations, 87% of which came from fishing related debris like anchor stones and fishing litter (pg. 3). In the conclusion of

this study, the authors affirm that a majority of RN litter comes from fishing activity, and recommend that in addition to regulating plastics, “emphasis should be placed on reducing fisheries’ debris” (pg. 5).

Effects of isolation and fishing on the marine ecosystems of Easter Island and Salas y Gómez, Chile (Friedlander et al., 2013) - The study assessed the effects of marine protections by comparing the seamounts of a no-take marine reserve near the Salas y Gómez islands, Motu Motiro Hiva Marine Park (MMHMP), to Easter Island where no protections have been enacted. Results showed that overfishing had a negative impact on fish biomass and diversity at Easter Island compared to the Salas y Gómez islands. In particular, apex predators were greatly affected by fishing, where they made a majority of the fish biomass at Salas y Gómez and were “virtually absent” at Easter Island (pg. 527). The researchers stressed that this loss of apex predators, who “exert strong top-down control on the entire ecosystem”, can lead to a domination of smaller lower trophic-level species “that do not represent the natural state and may give a false impression of true ecological processes” (pg. 527). The researchers also noted that seamounts worldwide are under assault from destructive fishing practices, and once overexploited, often do not recover (pg. 528).

Papers that document impacts from a potential fisheries closure

The Salas y Gómez and Nazca ridges: a global diversity hotspot in need of protection (Wagner et al., 2020) – In this report, researchers propose a fishing closure in the ABNJ of the Salas y Gómez and Nazca ridges. Currently, a majority of the ridges are in ABNJ and unprotected. One supporting argument for closing fisheries in this region is that fishing activity is already relatively low. This means that protecting these waters would have very little impact on the fishing industry. Regional fishery management organizations in other regions with the competency to manage bottom fisheries have also established protected areas in ABNJ, and so protecting the Salas y Gómez and Nazca region would keep in alignment with these organizations. Lastly, the authors pose that protecting this region can be an opportunity for neighboring countries with a shared ecosystem to collaborate, thereby “showcasing global leadership” (pg. 17).

Advancing marine biodiversity protection through regional fisheries management: A review of bottom fisheries closures in areas beyond national jurisdiction (Wright et al., 2015) – This paper examines the effectiveness of RFMOs in implementing bottom fisheries closures in the high seas. The authors note that seamounts are at high risk for damage from seabed mining and fishing (especially bottom trawling) as it can damage or destroy long-lived species and decrease faunal biomass and species diversity. Once destroyed, the slow growth of these ecosystems means that it can take decades or centuries to recover, if ever. To improve the performance of RFMOs, the authors recommend that 1) RFMOs follow the advice of scientific bodies more rigorously and in a timely manner, and 2) they collaborate with other regional bodies to implement joint management tools, such as fisheries closures.

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