Sharks in the Southeastern Pacific: Conservation and Management Challenges in Peru

Tiburones en el Pacífico Sudeste: desafíos para la conservación y el manejo en el Perú

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RESUMEN

Los tiburones son depredadores tope, esenciales para regular los ecosistemas y mantener el equilibrio trófico marino. En el Perú, la presión pesquera de tiburones se debe principalmente al consumo humano, ya que 33 de las 56 especies reportadas interactuan con la pesquería y la mayor parte del esfuerzo pesquero se centra en únicamente seis especies. Esta recopilación de información analiza el marco regulatorio vigente de las pesquerías de tiburones en el Perú y la necesidad de fortalecer estas normativas. Aunque la Unión Internacional para la Conservación de la Naturaleza (UICN) ha identificado cinco Áreas de Importancia para Tiburones, Rayas y Quimeras (ISRA) en aguas peruanas, estas aún no se integran en las estrategias nacionales de conservación. Asimismo, se insta a las instituciones a reforzar la investigación en este grupo de condrictios, a fin de implementar un manejo adaptativo basado en evidencia científica para evitar el colapso poblacional de estos depredadores ocasionado por la sobrepesca.

Palabras clave: *depredadores tope, tiburones, sobrepesca, ISRA*

ABSTRACT

Sharks are apex predators, essential for regulating ecosystems and maintaining marine trophic balance. In Peru, fishing pressure on sharks is driven primarily by human consumption, with 33 of the 56 reported species interacting with fisheries and most of the fishing effort concentrated on only six species. In this synthesis, we analyze the current regulatory framework governing shark fishing in Peru and address the need to strengthen existing measures. Although the International Union for Conservation of Nature (IUCN) has identified five Important Shark, Ray and Chimaera Areas (ISRAs) in Peruvian waters, these have yet to be integrated into national conservation strategies. In addition, we call upon institutions to increase research on this group of chondrichthyans, in order to facilitate the implementation of evidence-based adaptive management, with the aim of preventing the population collapse of these apex predators as a result of overfishing.

Keywords: *apex predators, sharks, overfishing, ISRAs*

Introduction

International trade in shark products is driven primarily by high demand for shark fin soup and meat for human consumption (Dulvy *et al.*, 2014). In 2011, the declared value of global shark fishing was USD 438.6 million from 17,154 tons of exported fins and USD 379.8 million from 121,641 tons of imported shark meat (Dulvy *et al.*, 2017). Furthermore, previous studies have indicated that a large proportion of the fins taken come from species listed in CITES Appendix II (Partin *et al.*, 2022; Villate-Moreno *et al.*, 2021; Da Silva Ferrette *et al.*, 2019).

In Peru, Ministerial Resolution No. 209-2001-PE establishes minimum catch sizes for fourteen species, leaving most shark species not covered by specific size-based management measures. Along the Peruvian coast, there are a total of 59 authorized landing sites (PRODUCE, 2025). While the National Plan of Action for Sharks (PAN Tiburón - Perú) does not establish minimum landing sizes, it does compile existing regulations and outline management and conservation strategies (PRODUCE, 2014). Rather than being limited to shark meat consumers, conservation campaigns should also target the general public, fishers, businesses and government institutions (De la Lama *et al.*, 2018).

Approach and discussion

Important Shark and Ray Areas (ISRAs) are spatially defined regions identified through a global assessment process led by the IUCN Shark Specialist Group (ISRA, 2025). These spatially delineated areas are defined by a rigorous set of ecological criteria, such as the presence of essential life-cycle stages, critical migratory routes and endemic populations (Jabado *et al.*, 2025). Five ISRAs have been identified within Peruvian waters (Figure 1; Supplementary material S1). Of these, three are located entirely within national jurisdiction and two are shared with Honduras, Nicaragua, Costa Rica, Panama, Colombia and Ecuador (Jabado *et al.*, 2023).

Peru hosts one of the largest shark fisheries in the Southeastern Pacific (González-Pestana *et al.*, 2022), exerting strong pressure on shark and ray populations (Worm *et al.*, 2024), while conservation efforts are undermined by weak management and enforcement (González-Pestana *et al.*, 2016; Jabado *et al.*, 2024). Along the Peruvian coast, 56 shark species have been recorded (Campos-León *et al.*, 2025; Cornejo *et al.*, 2015), of which 33 interact directly with fisheries (González-Pestana *et al.*, 2016). Landing composition indicates that blue sharks (*Prionace glauca*) and shortfin mako sharks (*Isurus oxyrinchus*) dominate artisanal catches in northern Peru, and in many cases size structure analysis has revealed a substantial proportion of immature individuals, particularly in the case of hammerhead sharks (*Sphyrna* spp.) (Gonzalez-Pestana *et al.*, 2016; Gonzalez-Pestana *et al.*, 2020).

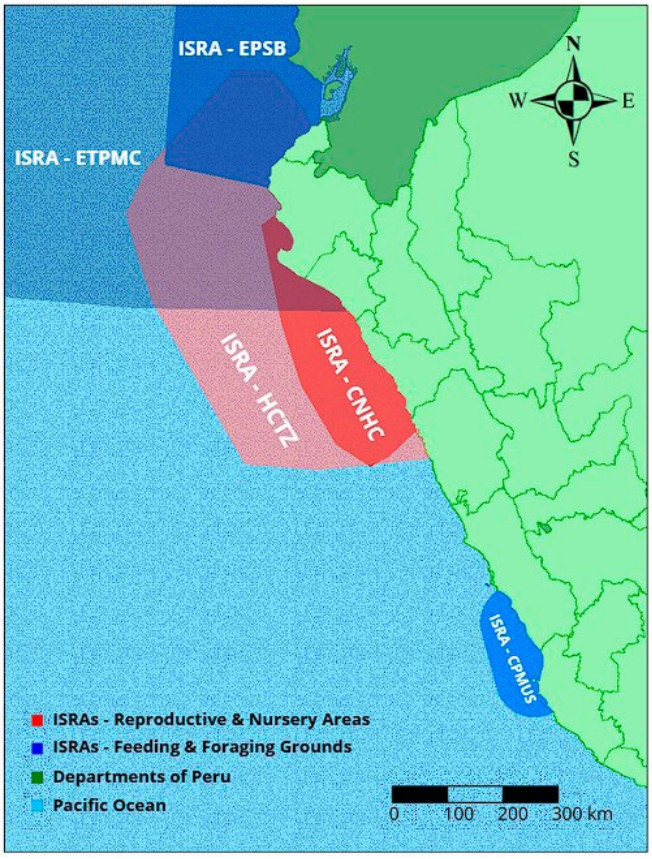

Figure 1. Important Shark and Ray Areas (ISRAs), Peru
Note: Adapted from ISRA Database, IUCN Shark Specialist Group (2025).

Their reproductive characteristics make shark species particularly susceptible to overfishing. These characteristics include slow growth, late maturity, low fecundity and an extended reproductive cycle (Huynh *et al.*, 2022). Further studies focused on the reproductive biology and development of elasmobranch will be essential, in order to facilitate the proposal of appropriate fisheries management measures, by providing the scientific data required to safeguard their different life stages and, consequently, to ensure the sustainability over time of fishing activity (Kinney and Simpfendorfer, 2009; Fernandez, 2014). However, historically such studies have been rare in Peru, in a situation that highlights the need to apply the precautionary principle established in the General Environmental Law (Law No. 28611). Lack of absolute scientific certainty should not be used as an argument for not implementing, or for postponing the adoption of, effective and efficient fisheries management measures aimed at preventing or reducing the risk of serious or irreversible damage to the marine ecosystem (SPDA, 2024).

Fishing alters trophic dynamics by selectively removing top predators, lowering the mean trophic level of catches

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and disrupting energy flow (Bănaru *et al*., 2013). Evidence from the Balearic Islands shows that adjustments in fishing intensity and fleet composition can restore trophic structure (Sánchez-Zulueta *et al*., 2023), while properly enforced marine protected areas maintain higher trophic levels and more stable dynamics (Marguin *et al*., 2025). In addition, genetic analysis of landings has exposed misidentification (Marín *et al*., 2022), while satellite-tagging studies have revealed fine-scale diel movement patterns that influence how sharks interact with fisheries, with implications for vulnerability to capture (Vedor *et al*., 2021). Moreover, monitoring conducted by the IUCN Red List reveals that overfishing remains one of the primary causes of population decline for many chondrichthyan species across the world (Ebert *et al*., 2023; Worm *et al*., 2024).

Peruvian law establishes minimum catch sizes for fourteen shark species (PRODUCE, 2001) and prohibits the landing of detached fins or trunks (PRODUCE, 2016); however, this measure to control catch sizes is rendered largely ineffective by the variability in size across different species, as well as the limited scope of control and inspection (González *et al*., 2016).

Important management tools such as gear restrictions, catch limits, bycatch regulation and seasonal closures are also absent from the National Action Plan for Sharks, Rays and Related Species (PRODUCE, 2014) and to date Peru has no Fisheries Management Regulations (ROP) to cover any shark species (SPDA, 2020). A seasonal closure from January 1 to March 10 (RM 008-2016-PRODUCE) governs the landing of smooth hammerhead sharks (*Sphyrna zygaena*), but only the whale shark (*Rhincodon typus*) is fully protected (RM 331-2017-PRODUCE).

Across Latin America, shark protection laws remain uneven and inconsistently enforced. Since 1975, Peru has been a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Presidencia de la República del Perú, 1975), which regulates the trade in threatened species. However, regional inconsistencies in implementation persist. In Ecuador, shark fishing has been banned since 2003 (Jacquet *et al*., 2008), and yet the sale of bycaught individuals has made it one of the region's main shark fin exporters (Carr *et al*., 2013). In November 2023, CITES reported high levels of fin trafficking from Ecuador to Peru and, in March 2024, it suspended Appendix-II shark and ray trade from Ecuador (Notification No. 2024/043), under a restriction that remains in effect. In Peru, irregularities have also been identified in the issuance of export permits for shark fins and meat, underscoring the urgent need to strengthen monitoring and enforcement mechanisms (Castañeda and Delgado, 2023; Oceana Perú, 2022).

Bycatch is one of the major threats to marine fish populations, although in risk assessments species-specific survival rates are rarely considered (Gallagher *et al*., 2014). Regulations often require the release of incidentally caught individuals of threatened species; however, post-release survival varies widely. In Costa Rica, Executive Decree No. 43900-MAG-MINAE (2023) mandates the immediate release of incidentally caught hammerhead sharks (*Sphyrna* spp.). Nevertheless, studies indicate that such measures are largely ineffective, as most individuals die shortly after being caught on pelagic longlines (Gallagher *et al*., 2014), highlighting the need to incorporate post-release mortality into regional bycatch management and risk assessment frameworks.

Conclusion and recommendations

In Peru, shark populations face intense fishing pressure and an inadequate regulatory framework. While 56 species and five ISRAs have been identified, significant knowledge gaps persist, in terms of monitoring, traceability and the study of migratory behavior. Improved research on species diversity, distribution and ecological roles is urgently required, together with pilot projects incorporating genetic identification, satellite tagging and population assessments in the context of fisheries.

Although no conclusive evidence of a decline in shark populations in Peruvian fisheries has been published, observed landing patterns point to the need for precautionary management. There is an urgent need for Peruvian institutions such as the Marine Institute of Peru (IMARPE), the Ministry of the Environment (MINAM), the Ministry of Production (PRODUCE), the National Service of State-Protected Natural Areas (SERNANP), and the National Council for Science, Technology and Technological Innovation (CONCYTEC) to implement plans for strengthening scientific research and promoting adaptive management strategies for shark conservation. Any such efforts will need to recognize both the ecological role that sharks play as apex predators, as well as their importance in terms of the sustainability of marine ecosystems.

Several Peruvian universities, including Universidad Científica del Sur, the National Agrarian University-La Molina, San Marcos National University, Cayetano Heredia Peruvian University, the National University of Piura, and San Agustín National University, together with research centers such as IMARPE, are actively conducting research focused on sharks and rays. These studies range from trophic ecology and taxonomic identification to fishery monitoring and the conservation of ecologically important species and critical habitats, such as nursery and migratory zones. Improved collaboration between universities, government agencies and non-governmental organizations will be required, as an essential component in the generating of updated scientific knowledge and the promotion of public policies designed to ensure shark conservation in Peruvian waters.

Authors' contributions

The authors participated equally in the conceptualization, development, analysis and writing of this document, contributing their individual knowledge and expertise throughout each stage of the process.

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The authors declare no conflicts of interest that could have influenced the content, analysis or conclusions of this policy brief.

AI declaration

The authors declare that no artificial intelligence tool was used in any part of the manuscript preparation process.

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