



Large-Scale MPAs Have Limited Conservation Benefits for Pacific Tropical Tunas According to New Study

A new comprehensive study found that the Phoenix Islands Protected Area (PIPA) and development of large static oceanic no-take marine protected areas (MPAs) in the tropical Pacific do not have discernible conservation benefits for Pacific skipjack and bigeye tuna, two of the most important tropical tuna species to U.S. fisheries.

The study published in *Frontiers in Marine Science* was led by world-renowned tuna expert Dr. John Hampton of the Pacific Community (SPC) and a team of tuna scientists and oceanographers. It analyzed the efficacy of closing the PIPA on the conservation of tropical tunas since the area's prohibition of commercial fishing in 2015. The PIPA, a 408,250 sq km (more than 157,000 sq mi) UNESCO World Heritage Site located about halfway between Hawai'i and Fiji, was at one point the world's largest MPA.

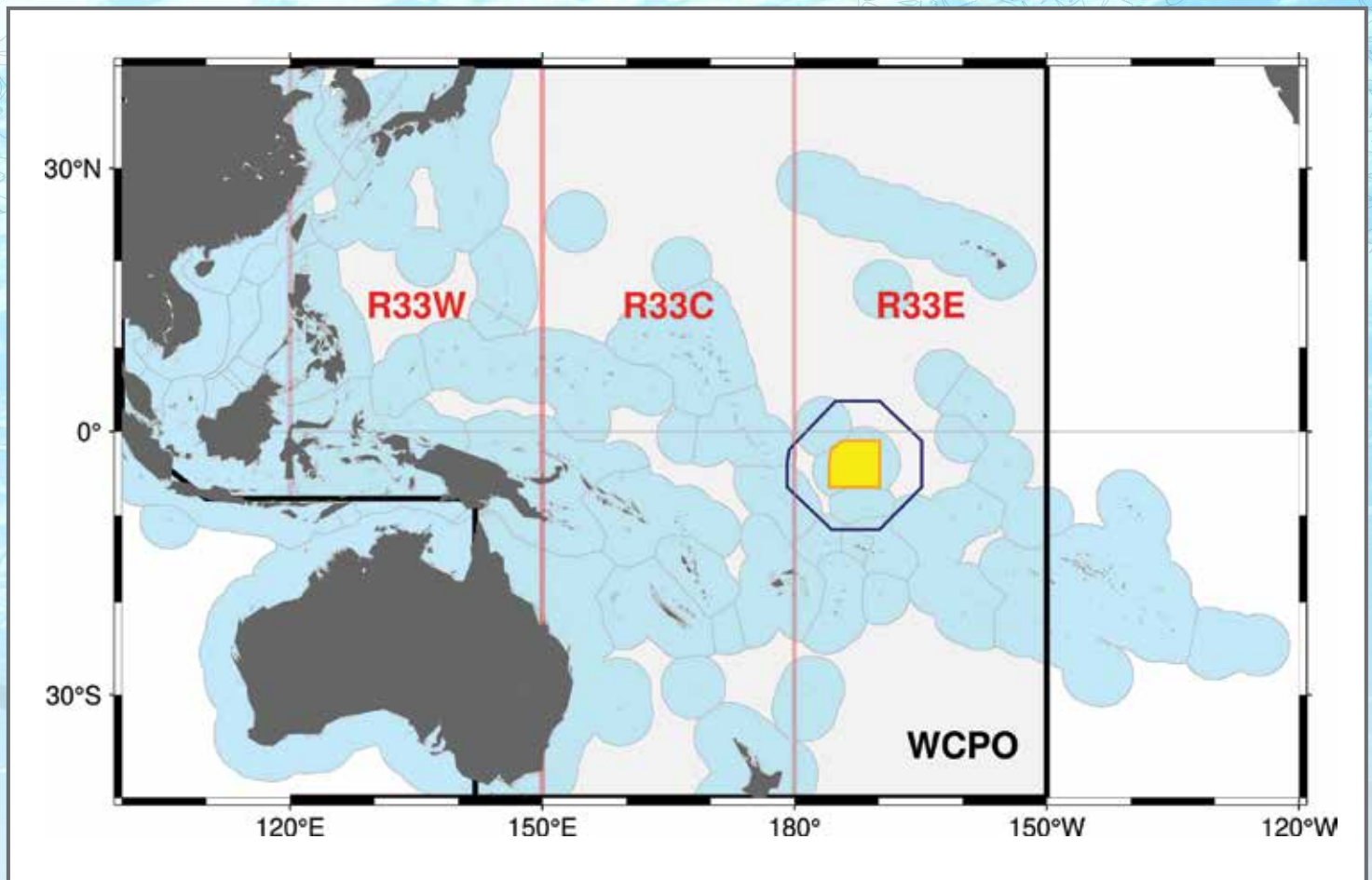
The authors evaluated the estimated population and fishery changes for these two commercially important tunas in the PIPA and a series of large hypothetical MPAs, making up approximately 33% of the western and central Pacific Ocean under jurisdiction of the Western and Central Pacific Fisheries Commission (WCPFC).

"Skipjack and bigeye tuna have a wide distribution in tropical and sub-tropical waters of the Pacific, and are capable of spawning anywhere the water temperature is greater than about 25 °C," said Hampton. "Their larvae drift in the surface water currents, and as they grow, they are able to move widely throughout the region. So closing off one part

of the area does not offer much, if any, protection to species like this." He added, "When areas like the PIPA are closed to fishing, we tend to see the vessels that would have fished there simply move their activities to adjacent areas, which again limits their conservation effectiveness."

Unlike the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands, the PIPA is in a known hotspot for tuna and has had significant historical exploitation by large industrial tuna fisheries. Purse seine fisheries operated in these waters targeting adult skipjack tuna, while incidentally catching juvenile bigeye tuna. Longline vessels also fished these waters catching adult bigeye tuna. Skipjack tuna managed under the WCPFC account for 40% of global tuna supply and two-thirds of total tuna catch in the region, accounting for 3 million tons landed in 2019. Bigeye tuna is a longer-lived and larger tropical tuna, supporting much lower catches. The PIPA was established to be a reserve for spawning tunas and to replenish tuna stocks. Proponents for the PIPA thought that a theorized "spillover effect" from this MPA would render a significant conservation benefit, given the area's biological importance and historical fishing levels. However, this benefit was never realized, according to the study authors.

Ray Hilborn, Council Scientific and Statistical Committee member and professor at the University of Washington, who was not involved in the study, noted, "The experience with small coastal MPAs has been that they often see the abundance of targeted



The western and central Pacific Ocean showing the exclusive economic zones of coastal States (light blue), PIPA (yellow) and the three large oceanic MPAs evaluated in the study. Figure taken from Hampton et al., 2023.

fish increase dramatically inside the MPA when those fish species are experiencing overfishing or have limited spatial range. However, Hampton et al. have demonstrated such MPAs do not increase populations for tropical tunas since they are not subject to the kind of overfishing seen in some coastal MPAs, and exhibit very high movement rates."

The authors also accounted for oceanographic impacts, known to be major drivers for tuna distributions, by using sophisticated modeling techniques. The authors estimated tuna stock abundance and then simulated their distributions, abundance, movement and mortality. The model accounted for biological environmental forcing, including the impact of climate, such as El Niño and La Niña phases in the ocean. The authors were then able to see any possible changes in tuna abundance related to natural population fluctuations versus

changes due to management interventions like closing the PIPA.

In November 2021, the Kiribati government announced it planned to lift prohibitions on commercial fishing in the PIPA effective January 2023. 🐟

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Pacific skipjack tuna. Credit: NOAA.



Pacific bigeye tuna. Credit: NOAA.

