

Palau's National Marine Sanctuary: Managing Ocean Change and Supporting Food Security

**REPORT OF AN EXPERT WORKING GROUP
CONVENED BY PALAU INTERNATIONAL CORAL REEF CENTER
AND STANFORD CENTER FOR OCEAN SOLUTIONS**

in anticipation of the implementation of the
Palau National Marine Sanctuary in January 2020



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With Support From



Foreword from Co-Chairs

Four years ago, Palau embarked on an extraordinary journey, announcing protection of 80% of the waters in its domain. In creating the Palau National Marine Sanctuary, Palau once again asserted its visionary leadership in ocean conservation and its determination to chart its own destiny.

The Palau National Marine Sanctuary is one of the largest marine protected areas (MPAs) in the world. Crucially, unlike many large-scale MPAs, the Sanctuary has the entire population of the country residing at its heart. Thus, implementation of the Sanctuary provides both the opportunity and the imperative to demonstrate how ambitious protection of ocean resources can enable an island nation to ensure its food security and grow its economy in an era of tumultuous change in the climate and in the ocean.

This Working Group brought together diverse experts from Palau and around the world to address those questions. Over the past year, we have collaborated to marshal what is known about the resources in Palau's waters and the challenges and opportunities that lie ahead, and to outline options for the Government and others to consider as they implement the Sanctuary.

We hope this report will provide the Government and the people of Palau with a strong foundation for full implementation of the Palau National Marine Sanctuary policies. We hope it will also inspire a commitment to continue learning along the way—through an ongoing investment in monitoring, research, and exploration, and a continual commitment to consultation and engagement with all of those who have a stake in the process and outcomes.

Embodying a deep tradition of ocean stewardship, the PNMS is a legacy of immeasurable value for the people of Palau. It is also a beacon for the rest of the world. In the coming year, the global community will gather to drive progress in achieving the ocean agenda embodied in Sustainable Development Goal 14, to set new ambitions for protecting the earth's biodiversity, and to step up efforts to fight climate change. It is our hope that Palau's leadership, in declaring the Sanctuary and in now translating that declaration into action, will inspire other nations to rise to these pressing challenges. We submit this report in support of that cause.



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Objectives



The goal of this report is to support implementation and decision making for the Palau National Marine Sanctuary (PNMS).

Specific objectives are to:

- Distill and clarify the PNMS legislation
- Synthesize knowledge about social, ecological, and economic dimensions of the PNMS
- Conduct new analyses to begin filling knowledge gaps
- Present informed policy options for achieving desired outcomes
- Identify priorities for future research, monitoring, and evaluation

We have prepared this report for the Government of Palau and decision makers tasked with developing policies and regulations surrounding implementation of the PNMS. However, we hope the report is also a resource for other stakeholders working on fisheries management, marine conservation, and sustainable development in Palau, including the broader public interested in understanding impacts of the PNMS. These audiences include non-governmental organizations, the research community, women's and cultural groups, educators, and others. This report is based on best available knowledge, while recognizing that new information will always appear that can inform additional decision making. This document is also relevant to the broader Pacific Region and for governments, practitioners, researchers, and other groups interested in understanding the Palauan process and insights that could be applied in other large-scale marine protected area contexts.

Executive Summary

In 2015, Palau enacted the Palau National Marine Sanctuary (PNMS) Act, establishing a strictly protected sanctuary covering 80% of its exclusive economic zone (EEZ) and instituting reforms to foster a stronger domestic pelagic fishery sector. The PNMS fully enters into force on January 1, 2020 with the full closure of the 80%. This report provides analyses and options for the Government of Palau and decision makers tasked with developing policies, institutions, and regulations for implementation of the PNMS legislation, and a resource to the public and other stakeholders working on fisheries management, marine conservation, and sustainable development in Palau.

800 recorded animal species, of which at least nine are endangered, including the critically endangered hawksbill and leatherback sea turtles. It is also home to manta rays, many species of seabirds, whales, sharks, billfishes, and tunas, all of great cultural and socioeconomic importance to Palauans. Given its vast extent, the PNMS encompasses entire home ranges of many of these species and protects essential habitats like seamounts and spawning aggregation sites that fulfill important ecological requirements. In addition to reducing pressure on fish stocks, the PNMS is expected to reduce mortality of seabirds, turtles, sharks, and billfishes that are currently caught as by-catch by

“Euotelel a klingil a debel Belau”

This phrase captures the meaning of the Palau National Marine Sanctuary in the Palauan language. *“Euotelel”* is derived from the word *“Euatel,”* meaning refuge or sanctuary; *“klingil”* refers to all life; and *“debel”* signifies ocean with *“debel Belau”* referring to Palauan’s ownership or claim to it. This translation was submitted by a young Palauan, Tkerbai Junior, capturing Palau’s connection to life in the ocean and the PNMS’s role in creating a sanctuary for future generations of Palauans.



The Sanctuary (80% of Palau’s EEZ)

The PNMS is one of the largest no-take marine protected areas (MPAs) in the world, covering 475,077 km²; 38 km² for every Palauan citizen (Figure 1). The PNMS closes off waters that are currently fished by longline and purse seine fleets and adjacent to Palauan customary fishing grounds. Implementation of no-take regulations, therefore, will significantly reduce fishing pressure on species and ecosystems that are important to the people of Palau.

The PNMS will protect significant and unique marine biodiversity. The Sanctuary is home to nearly

industrial vessels. Protection of these pelagic species has both conservation and socioeconomic benefits, as spillover of juveniles and adults from the Sanctuary into the fishing zone and nearshore environment, expected for several of these mobile species, may enhance commercial pelagic fisheries and tourism.

The PNMS may help make Palau’s ocean resources more resilient to climate change. Models project that climate change will increase average sea surface temperatures (SST) in the Pacific region by 1–3°C by 2100 and reduce dissolved oxygen in the surface layer of the ocean by 15–30%. These changes will have major consequences for the physiology, diversity, abundance,

size structure, and distribution of fishes and other ocean animals. In the near term, climate change will also continue to increase the frequency and intensity of extreme events, such as marine heatwaves and tropical storms, leading to acute impacts on ecosystems and species distribution. Droughts and extreme rainfall are expected to further impair agricultural production and increase sediment flowing into coastal waters, increasing reliance on marine resources for food supply and income while also reducing productivity of coastal fisheries. By reducing mortality due to fishing, the PNMS is expected to promote the resilience of both resident and transient exploited populations to these growing stresses.

The success of the PNMS will depend on long-term funding commitments to enable enforcement, monitoring, and research needed to achieve its objectives. Implementing the new policies established by the PNMS legislation will require sustained additional funding to the Ministry of Justice (MOJ), the Ministry of Natural Resources, Environment & Tourism (MNRET), and the Palau International Coral Reef Center (PICRC). The PNMS legislation allocates a share of the Pristine Paradise Environmental Fee (PPEF) to support those functions, in addition to the existing yearly budget allocations, yet it will not fully fund the costs of the PNMS legislation implementation for these institutions.

There is much more that needs to be known about the PNMS. Research is needed to describe its biodiversity, oceanographic features, and geological features and to understand, for example, how species of high conservation and economic importance use and depend on the Sanctuary; the presence and characteristics of seamounts and of reproductive and feeding aggregations for key species; how these features and resources will be affected by climate change; what benefits protection provides to fisheries in the Domestic Fishing Zone (DFZ) and nearshore waters; and the socioeconomic implications of the PNMS for tourism, commerce, and Palau's national identity.

Fishing in Palau's Waters (20% of Palau's EEZ)

The PNMS legislation aims to foster the creation of a more productive domestic pelagic fishery sector to

benefit local livelihoods and food security. The pelagic fishery sector is currently dominated by foreign-owned businesses. A foreign-owned and foreign-operated fleet of purse seine and longline vessels fish in the EEZ. They pay licensing fees and buy vessel days but export all of their catch and don't pay tax. A foreign-owned, locally operated fleet of longline vessels, based in Koror, land all of their catch in Palau but export nearly 90% of their fish without local processing. The remaining lower-value fish is sold in Palau, accounting for 84–94% of pelagic fish in the local market. Palau's domestic pelagic fishers supply the remaining 6–16%.

The PNMS legislation significantly changes the opportunities and costs for industrial fishing operations in Palau. The legislation restricts longline and purse seine fishing to a portion of the DFZ, referred to as the Fishing Permitted Area (this term was coined by the Working Group for the purpose of this report), that is 17.8% of the EEZ. The remaining 2.2% of the EEZ, within the DFZ, is Palau's Contiguous Zone, where pole-and-line fishing and small-scale fishing by recreational vessels are permitted. Analysis of Automatic Identification System (AIS) data indicates that between 2012–2018, the Fishing Permitted Area has accounted for only 10.6% of longline fishing activity and 5.9% of purse seine activity within Palau's waters, suggesting it is not a prime fishing ground for these fisheries. The legislation also requires that all foreign fleets now land all their catch in Palau unless exempted, and that they all pay the export tax, set to increase by 40% in 2020. **Closure of productive fishing grounds, landing requirements, and increased tax rates could lead foreign fleets to scale back their operations in Palau or to depart altogether, reducing the supply of pelagic fish in Palau's market.**

A reduction in the pelagic fish supply could have consequences for Palau's reef fish populations and for public health. If the local supply of pelagic fish does not meet demand or if prices increase, consumers will likely shift to eating more reef fish and more processed foods, contrary to the intention of the PNMS legislation. **It is therefore important that the Government consider policy measures to maintain the supply of pelagic fish to Palau in the short term, while also pursuing a long-term strategy for its domestic pelagic fishery sector.**

Several policy options could help to maintain the viability of the current foreign-owned, locally operated



fleet. The Government could consider lowering the recently revised export tax and increasing the vessel days available for the Fishing Permitted Area; it is unclear whether these measures would be sufficient to entice the foreign fleet to stay in Palau's waters. The Government should also consider requiring that a minimum portion of catch from all foreign longline fleets, based on demand, be sold in the domestic market at a price negotiated with the fishing business sector. These options should be weighed against the alternative of importing pelagic fish from neighboring countries to meet demand while the domestic fleet develops.

In pursuing the long-term goal of a strong domestic pelagic fishery sector, Palau will face significant challenges. A domestic pelagic fishery could include industrial boats that use longlines or pole-and-line and/or the current smaller-scale day-boat operations that use trolling and other methods. Experience in other island states demonstrates that building a local industrial pelagic fishery, specifically longline and pole-and-line fleets, is costly and difficult. Incentivizing local small-scale fishers may help to meet local pelagic seafood demands, however, while also generating new employment. Here we highlight the main challenges and possible opportunities going forward.

Climate change is expected to reduce the productivity of Palau's fisheries by changing the distribution, size, and availability of fishes. An ensemble of model projections focused on current and

future suitability of the environment for target species indicates that total fisheries catch potential within the Western-Pacific Region will likely decrease by 25% by 2050 and by 30–50% by 2100 (from a baseline year of 2010). For commercially important skipjack, yellowfin, and bigeye tuna species (representing 95% of total tuna catch between 2007–2017), analysis shows that biomass could decrease by up to 33% by 2100 (from a baseline year of 2010). A recent study suggests that less abundant and less profitable species, such as mahi mahi and amberjack, may fare better in a changing ocean. A central challenge for Palau, therefore, will be to manage its fisheries adaptively, informed by monitoring and research, to respond to fluctuations in existing commercial stocks from climate change, and, as tuna decline, to be able to shift to more resilient species.

A domestic pelagic fishery could include industrial boats that use longlines or pole-and-line and/or the current day-boat operations that use various methods, although some of these vessels (i.e., longline and pole-and-line) have higher operational costs and infrastructure investments. **Several policy and investment priorities are important no matter which vessels and gear are used.** In particular, a central marketplace would facilitate sale and processing of pelagic fishes, and a cold chain—actions or equipment that maintain high product quality from harvest to consumption—would allow fishers both to preserve quality and to offer buyers a reliable year-round supply. Palau would also need to take proactive measures to build domestic demand for pelagic fish to sustain a growing sector. The Palau Conservation Society and The Nature Conservancy's "Choose Pelagics" program to build consumer interest through community outreach is showing promise. Surveys indicate that a local, sustainable brand of pelagic-fish meals appeals to tourists, offering higher returns to local fishers. Banning or limiting the sale of reef fish in restaurants is another measure that could promote a reliable demand for pelagic fish, as surveys have shown that reef and pelagic fish are close substitutes for tourists.

The creation of a domestic pole-and-line and/or longline fishery is not promising. Building such fisheries would require significant capital investments (e.g., infrastructure and gear), and operational costs will be high. The current domestic market offers low returns; even if export were allowed, it is unlikely that it would



Photo courtesy of Ian Shive

offer a compelling return on investment.

Scaling up the current small day-boat fleet offers more potential. A few Palauans currently operate small-scale recreational vessels using a variety of gear types to catch pelagics for sale in the domestic market. These operations are limited by infrastructure needs and gaps in the supply chain, as described earlier. Operational costs are high, and while returns are potentially higher than for reef fishing, they are also more uncertain. The Government could bolster the small day-boat pelagic fishing operations by including a carefully designed startup package that helps operations acquire safety gear and fishing gear, provides training for fishers, supports fish prices, and/or defrays operational costs; a benefits package that provides fishers with services similar to government employees (e.g., retirement, sick leave); and a functioning network of Fish Aggregating Devices (FADs) that helps fishers more easily find fish. Support to provide equipment and boats must be carefully controlled to ensure that these capital investments are not used to expand reef fishing. The Government could also improve potential economic returns by allowing local small-scale fishers to sell their product to the more lucrative international market (i.e., lift the export ban for local fishers) and providing technical assistance to help them develop the commercial capacity to export.

Palau could capture more value from the other components of its pelagic fishery sector instead of, or in addition to, developing a domestic pelagic fishery. If Palau sustains a pelagic fleet, foreign or domestic, a requirement that fish be processed prior to export

could stimulate an onshore industry. Development of value-added products, such as fish loins, dried fish, and jerky, could create additional economic opportunities and food security benefits. Relaxation or repeal of the export ban for such locally-made products would allow access to international markets that offer higher returns without necessarily raising domestic prices.

Finally, **there are critical analyses that were not possible with data available to the working group but that should be conducted before Palau determines how best to develop its domestic pelagic fishery sector.** Specifically, it will be essential to develop a more robust assessment of how the PNMS policies will impact the foreign fleets, fishing effort, and government-related revenues from these fleets; gain a better understanding of how climate change and associated stressors will affect fisheries productivity; assess the scope of a value-added industry and the economic viability of value-added products; and identify which measures are most appropriate for building and sustaining a domestic pelagic fishery sector.

Effective Implementation

Successful implementation of the PNMS legislation will depend on active engagement of the public and stakeholders to cultivate support, build human dimensions into decision making, and avoid or address conflicts. Effective engagement enables co-development of adaptive governance, monitoring, and management processes.

To promote active engagement, PICRC, the Ministries, and partner organizations should lead a participatory process to develop and execute a science, monitoring, and evaluation plan. An initial framework is provided in this report with the intention that a stakeholder advisory group in Palau could use this scaffolding to build a process that meets the needs of the PNMS legislation and the institutions and stakeholders involved.

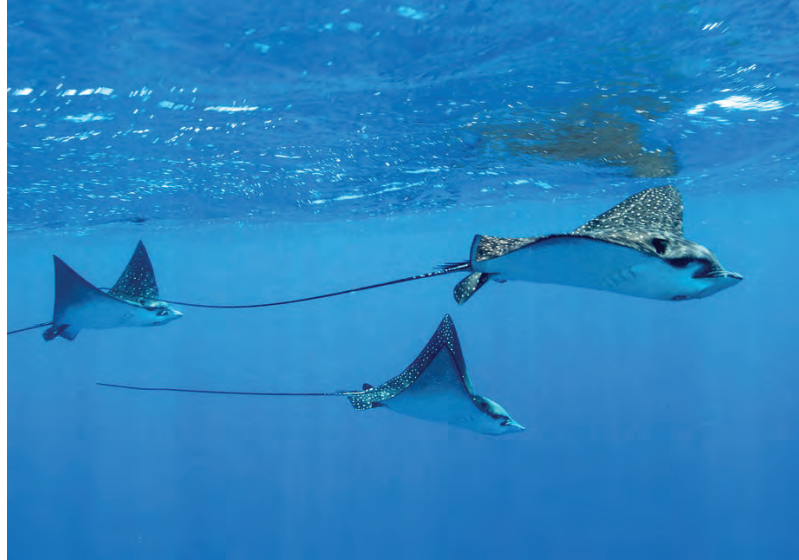
A robust participatory process should start with open reflection on the process to date, acknowledging missteps and committing to accountability and transparency moving forward. It will then require a strong communication and engagement plan, and development of a stakeholder advisory group that can be an active partner in design and implementation.

In addition to tracking performance, informing future directions, and disseminating information, a participatory process can aid in building trust among management and stakeholder bodies and smoothing the path for successful implementation.

In the long term, there is exciting potential to build innovative partnerships. New partnerships should leverage domestic and international capacity for data collection to enable effective management of the Sanctuary and enforcement of its restrictions, and long-term monitoring of the most critical social, economic, and ecological indicators of the effects of the PNMS.

A Legacy for Palau, A Legacy for the World

The people of Palau have a rich cultural heritage, anchored in the ocean. The PNMS legislation affirms the enduring customary value of ocean stewardship while celebrating Palauan sovereignty over the vast seascape of its EEZ. Policies of the PNMS offer the opportunity to improve food security and public health, while supporting a domestic pelagic fishing sector that can decrease reliance on imported foods, offer new opportunities for sustainable economic development, and reduce pressure on coral reef ecosystems. With strategic marketing and careful planning, the PNMS can



also help grow Palau's vital tourism industry.

The PNMS can provide a strong example for the rest of the world, yielding long-term conservation benefits for the region and charting a course that others can follow. The PNMS is a strategic solution at a crucial moment to ever-increasing threats from global climate change and declining local and regional fisheries. As the world struggles to find pathways to sustainable development, the PNMS story offers a ray of hope—the potential for a small island or a large ocean state to shape its future. By engaging Palauans' ancestral ties to their open ocean, the PNMS offers the opportunity to strengthen cultural identity and add depth to a Pacific voice increasingly audible around the world.

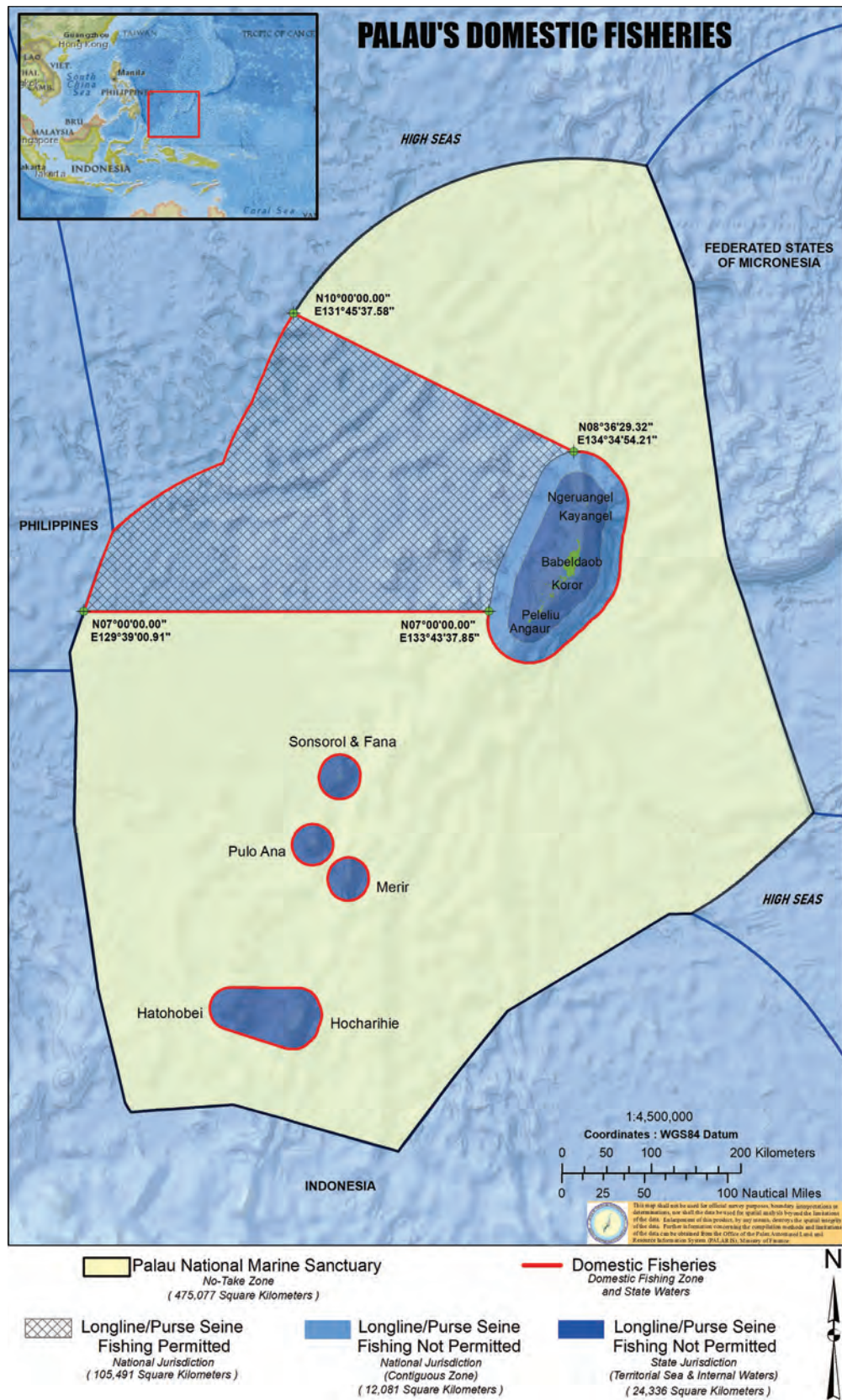


Stakeholder engagement meeting organized by PICRC, May 2019

Image courtesy of PICRC

Figure 1.

The Palau National Marine Sanctuary comprises 80% of Palau’s Exclusive Economic Zone (yellow) and Palau’s Domestic Fishing Zone (DFZ) comprises the remaining 20% (bounded by the red line encircling the Northern Archipelago and excluding its territorial sea (dark blue)). The DFZ has two zones: the Contiguous Zone (pale blue; 12nm-24nm zone surrounding the Northern Archipelago) and the Fishing Permitted Area (FPA) (hashed) beyond the Contiguous Zone. Pole-and-line and personal and recreational fishing vessels are permitted in the entire DFZ. Purse seine and longline fishing are only permitted in the FPA (hashed) beyond the Contiguous Zone. State rights in the Territorial Sea and Internal Waters remain unaffected. Figure provided by PALARIS.





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For more information visit:

picrc.org/picrcpage/palau-national-marine-sanctuary

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