



GUAM COASTAL FISHERIES MANAGEMENT PLAN 2026

“Ginen i tasi, lina’la’; gi inafa’maolek, inagofli’e.”
(From the ocean comes life; through mutual care, it endures.)

Prepared by the University of Guam
Center for Island Sustainability
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Table of Contents

EXECUTIVE SUMMARY	6
A. INTRODUCTION	7
1. Problem Statement	7
2. Policy Context	8
3. Fisheries Management Program	9
4. Goals and Objectives of the Guam Fisheries Management Plan (FMP)	11
B. GUAM REEF FISHERIES PROFILE	12
1. Geographic Context of Guam's Reefs	12
2. Guam's Reef Fisheries	12
3. Fisheries Science Context	14
<i>Maximum sustainable yield / Overfishing</i>	14
<i>Mechanisms to Maintain Sustainable Fishing</i>	14
<i>Fishery Management Reference Points and Harvest Control Rules</i>	15
4. Existing Monitoring Data	17
<i>Fisheries-dependent datasets</i>	17
<i>Fisheries-independent datasets</i>	18
5. Current Understanding of Guam's Fish Stocks	20
<i>Population assessments conducted for top species</i>	21
C. STAKEHOLDER ENGAGEMENT & COMMUNITY PERCEPTIONS ON MANAGEMENT STRATEGIES	24
1. Community-led Petition on Nighttime Spearfishing	28
D. MANDATORY FISHING LICENSES TO UNDERSTAND & SUPPORT FISHING ACTIVITY	29
1. Recreational & Subsistence Fishing License	30
2. Commercial Fishing License	31
3. Visitor and Non-Resident Fishing License	32
4. Commercial Seafood Vendor and Market License	34
E. FISHERIES MANAGEMENT MEASURES	37
1. Minimum Size Limit	38
2. No-Take Protection of Nearly-Depleted Species	39
3. Commercial Harvest, Sale, and Import Restrictions for Vulnerable Species	40
4. Restriction on Nighttime Commercial Spearfishing	42
<i>Link to Species-Specific Management Measures</i>	44
F. SPECIES-SPECIFIC MANAGEMENT MEASURES	44
1. No-Take of <i>Bolbometopon muricatum</i> (Atuhong)	46
2. Minimum Size Limits for 9 Species	47
a. 12-inch Minimum Size Limit	47

b. 24-inch Minimum Size Limit	48
3. “Big Six” Commercial Measures	49
<i>Table 4. Summary of Species-Specific Management Measures</i>	50
G. LIFE HISTORY INFORMATION FOR SPECIES UNDER MANAGEMENT	51
H. UPDATES TO CURRENT FISHERIES REGULATIONS	53
I. COMPLIANCE AND ENFORCEMENT	55
1. Importance of Compliance and Enforcement.....	55
2. Outreach & Community Awareness Approaches	56
3. General Enforcement Priorities and Capacity Considerations	56
4. Guam Conservation Officer Law Enforcement Program.....	57
<i>Authority & Staffing</i>	57
<i>Roles & Activities</i>	57
<i>Enforcement Improvements & Capacity Building</i>	57
<i>Collaboration & Resource Support</i>	57
<i>TOKA Hotline and Mobile App</i>	57
5. Fines and Penalties	58
J. ADAPTIVE MANAGEMENT	59
1. Data & Monitoring	60
<i>Fisheries-dependent monitoring</i>	60
<i>Fisheries-independent monitoring</i>	61
2. Review and Decision-Making Process.....	61
<i>Regular Review Cycles</i>	61
<i>Stakeholder Engagement</i>	61
<i>Decision-Making Framework</i>	61
K. CONCLUSION	62
L. REFERENCES	63

LIST of TABLES

Table No.	Description	Page No.
1	Guam's top fishing methods for its reef-associated fisheries	13
2	Types of indicators and management measures that could be considered for a harvest control rule	16
3	Proposed Licensing for the Guam Coastal FMP & Fee Schedule	36
4	Summary of Species-Specific Management Measures for the Guam Coastal FMP	50
5	Summary of Existing Gear-based Regulations & Proposed Revisions	53
6	Summary of Existing Species-based Regulations & Proposed Revisions	54
7	Prohibited Activities and their Proposed Fine	58

LIST of FIGURES

Figure No.	Description	Page No.
1	Elements of the Guam Coastal Fisheries Management Program	10
2	Map of Guam's five marine protected areas	12
3	Top fish families caught in Guam's reef-associated fisheries	13
4	The relationship between an indicator and its reference point	16
5	An example graph illustrating a harvest control rule for <i>Naso unicornis</i>	16
6	Reported landings from the creel data collection program	20
7	Representation of the catch composition shift over time with increasing fishing pressure	20
8	Population assessments for key species comprising Guam's top landings	21-22
9	Results from a community survey administered in 2024	25
10	Representation from 18 villages at the 2025 townhalls for the Guam Coastal FMP	25
11	Support versus opposition received by townhall attendees for proposed measures	27
12	Length-at-age plots for species under management in the Guam Coastal FMP	52
13	Adaptive management framework	60

LIST of IMAGES

Image No.	Description	Page No.
1	Standard measuring board used in fisheries-dependent surveys	17
2	Dr. Brett Taylor surveying using the stereo-video method to collect fisheries-independent data	19
3	Stakeholder working group with fishers discussing management options	24
4	Chelsa Muna, director of DoAg DAWR, presents at the Southern Townhall in 2025	26
5	A fisherman raises his hand to ask a question during the Southern Townhall in 2025	26
9	A fisherman votes in favor of minimum size limits as a management strategy at the Northern Townhall in 2025	26
10	Fisheries technician, Robert Koss, presents during the Central Townhall in 2025	26



EXECUTIVE SUMMARY

The coral reef ecosystems surrounding Guam support a vibrant and deeply rooted fishing community that has sustained the CHamoru people for millennia. Reef fishing is interwoven with cultural identity and daily life, serving not only as a source of food but also as an expression of shared values such as *ina'famaolek* – the principle of cooperation, reciprocity, and respect for one another and the environment. Traditional fishing practices and knowledge continue to be passed down through generations, reinforcing strong connections between people and the sea.

Over the past several decades, however, Guam's reef fish populations have experienced substantial declines, with overall reductions estimated at approximately 60%. These declines signal growing challenges to the sustainability of local fisheries and reef ecosystems. While fishing pressure remains a primary driver, multiple interacting stressors contribute to these trends, including erosion and sedimentation from land-based activities, tourism-related impacts, climate change, increased access to advanced fishing technologies, and nutrient pollution. Together, these pressures highlight the need for thoughtful, coordinated approaches that support both ecological recovery and continued community use of marine resources.

These concerning trends underscore the need for comprehensive fisheries management, which has led to the development of the Guam Coastal Fisheries Management Plan. In partnership with the fishing community, marine scientists, and local stakeholders, the Guam Department of Agriculture's Division of Aquatic and Wildlife Resources (DAWR) is committed to assessing the health of Guam's fisheries and implementing management strategies that support long-term sustainability. The overarching goal of this plan is to rebuild fish populations, enhance reef ecosystem health, and secure a sustainable future for Guam's fisheries and fishing communities. To achieve this, the plan focuses on the following key strategies:

- 1) introducing fishing licenses to distinguish between commercial and non-commercial fishing activities;
- 2) establishing size limits to protect immature fish and support reproductive sustainability;
- 3) prohibiting the commercial sale of vulnerable species identified as being at elevated risk of overexploitation;
- 4) restricting nighttime commercial spearfishing to reduce high-efficiency harvest pressure on reef fish populations;
- 5) strengthening outreach, monitoring, and enforcement efforts; and
- 6) applying an adaptive management approach that allows strategies and measures to evolve over time in response to monitoring results, emerging science, and community input.

By adopting these strategies, the plan aims to balance the needs of the community with the preservation of Guam's vital marine resources.



A. INTRODUCTION

1. Problem Statement

Guam's limited reef habitat, spanning approximately 220 km², supports thousands of commercial and non-commercial fishers who rely on its rich biodiversity. These reefs host over 150 species of reef fish and 50 species of corals, forming the foundation of an ecosystem that is critical to the island's food security, economy, and cultural heritage. Fishing within these reef ecosystems not only provides sustenance and livelihoods but also plays a key role in maintaining social ties and perpetuating long-standing cultural traditions. As tourism continues to grow, the economic value of Guam's coral reef fisheries also increases, contributing substantially to local revenues.

Despite these benefits, Guam's coral reef ecosystems—and the communities that depend on them—are increasingly at risk. Over the decades, Guam has undergone significant development, driven by western colonization and the expansion of its economy as a small island. This development has introduced numerous environmental stressors that have contributed to the degradation of its fragile reef fisheries. These drivers include:

- 1) erosion, sedimentation, and nutrient enrichment caused by urban development, off-roading, and wildfires;
- 2) the rise of tourism, which places additional pressure on natural resources;
- 3) climate change, with warming seas and more intense storms impacting reef health; and
- 4) fishing pressure, exacerbated by a lack of comprehensive policies and enforcement and the availability of advanced and efficient fishing gear.

Among these threats, overfishing remains the most significant and persistent driver of decline in Guam. Long-term data collected by the Guam Department of Agriculture's Division of Aquatic and Wildlife Resources (DAWR) through creel surveys since the early 1980s reveal alarming trends. Fisheries-dependent data show a 63% decline in total landings over a 25-year period, alongside a notable decrease in key target species. The composition of catches has shifted as large-bodied species—such as parrotfish, surgeonfish, groupers, and snappers—have dwindled, replaced by smaller species in their respective families. Large, slow-growing species like *tanguison* (Napoleon wrasse) and *atuhong* (bumphead parrotfish), which have longer maturation periods, have become particularly vulnerable to fishing pressure and are now scarce in many areas.

This shift in species composition has affected the broader fishing community, which now expends greater effort to achieve smaller and less profitable harvests compared to historical catch rates. What was once a thriving

fishery dominated by large-bodied species has become a reefscape filled with smaller fish, reducing the overall function and cultural value of the fishery.

Recognizing the urgency of restoring Guam's fish stocks to support both ecological sustainability and the needs of its diverse communities, DAWR initiated the development of a comprehensive Coastal Fisheries Management Plan in 2021. This plan seeks to address the ongoing challenges and reverse the decline in fish populations through science-based management strategies and through collaborative discussions with the Guam fishing community.

2. Policy Context

In response to escalating concerns about the health of its fisheries, Guam's political leadership has strengthened partnerships with natural resource management agencies. In 1997, Public Law No. 24-21 established five marine preserve areas (MPAs) to safeguard vital habitats and reef ecosystems from fishing pressure. These MPAs – Tumon Bay, Piti Bomb Holes, Pati Point, Sasa Bay, and Achang Reef Flat – protect approximately 16% of Guam's nearshore waters. Although fishing regulations differ among these preserves, spearfishing is prohibited across all MPAs. Some MPAs allow seasonal fishing with a permit, while others are designated as no-take zones year-round. A 2012 study by Williams et al. found that Guam's MPAs support a higher overall abundance of fish compared to non-MPAs lacking fishing regulations.

In March 2020, the passing of Public Law 35-53 marked a significant milestone by banning SCUBA spearfishing – an issue that had sparked contentious debate for over 30 years due to its detrimental impact on viable reef fish populations. SCUBA spearfishing was predominantly employed in the commercial sector, enabling fishers to harvest larger quantities of fish with less effort compared to traditional spearfishing. This practice primarily targeted vulnerable, slow-growing species such as large parrotfish, Napoleon wrasse, and sizable groupers, which have seen a decline over the years.

While Marine Preserve Areas (MPAs) and the 2020 prohibition on SCUBA-assisted spearfishing represent important steps toward reef conservation, these measures alone are unlikely to address the full range of pressures affecting Guam's fisheries. Continued declines in key reef fish species and ongoing fishing pressure outside protected areas highlight the need for additional, complementary management measures that support long-term sustainability.

In response to these challenges, the Guam Department of Agriculture's Division of Aquatic and Wildlife Resources (DAWR) initiated a fisheries management planning process in 2021 that brought together partners from the University of Guam Marine Laboratory, the UOG Center for Island Sustainability & Sea Grant, NOAA Fisheries, and the local fishing community. This collaborative effort was designed to strengthen understanding of fishery conditions, evaluate potential management strategies, and support the development of a coordinated fisheries management framework for Guam.

Through this planning process, partners have worked to:

- assess the status and trends of commonly harvested species using available fisheries-dependent and fisheries-independent data;
- evaluate management measures that could contribute to long-term fishery sustainability and reef ecosystem health;

- identify monitoring, surveillance, outreach, and enforcement needs necessary to support future management actions; and
- encourage meaningful participation by fishers and community members throughout the fisheries management process.

Together, these efforts contribute to a more cohesive and informed fisheries management framework – one that emphasizes shared stewardship, adaptive learning, and the long-term sustainability of Guam’s marine resources for future generations.

3. Fisheries Management Program

The fisheries management program described in this plan provides a structured framework for the planning, implementation, and adaptive management of Guam’s fisheries resources. The program is intended to support sustainable use of marine resources by combining scientific information, local ecological knowledge, and community participation to guide fisheries management decision-making over time.

Key components of this program include:

Setting Clear Management Objectives:

Establishing species- and fishery-specific objectives that reflect ecological conditions, fishing pressure, cultural importance, and community priorities within Guam’s fisheries.

Developing Fisheries Profiles:

Compiling and evaluating fisheries-dependent and fisheries-independent information to assess the status of key fish stocks, understand fishing patterns, and characterize the ecological conditions influencing fishery performance.

Identifying and Evaluating Management Measures:

Assessing management strategies that could support fishery sustainability, while considering biological effectiveness, feasibility, community input, and implementation considerations.

Implementation of Management Strategies:

Supporting outreach, community engagement, monitoring, surveillance, and enforcement efforts necessary to implement management measures effectively and fairly.

Monitoring Progress and Fishery Conditions:

Regularly evaluating biological, ecological, and socioeconomic indicators to assess fishery trends, management performance, and community outcomes over time.

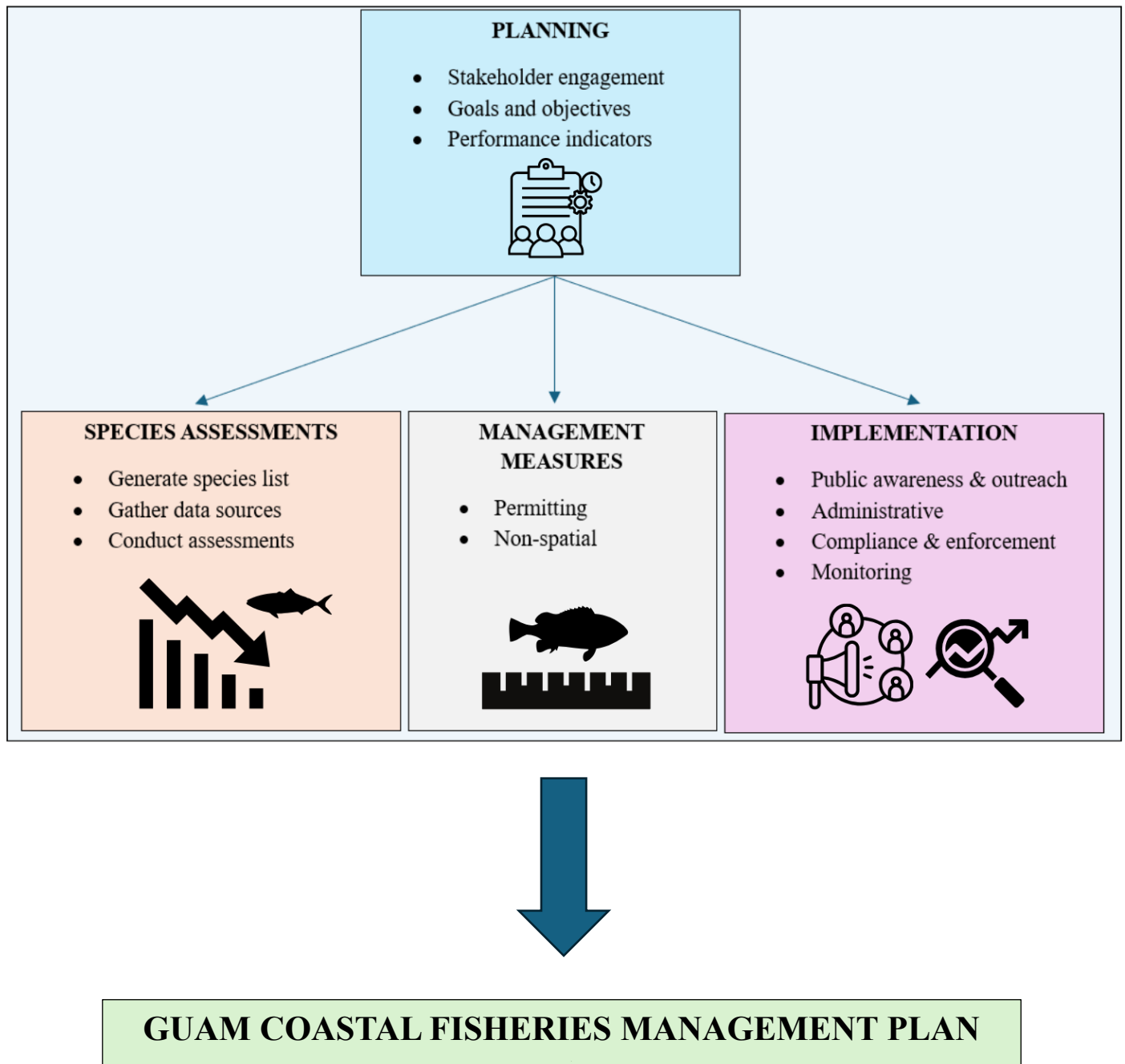
Adaptive Management:

Applying a flexible management approach that allows strategies and measures to be refined in response to monitoring results, emerging scientific information, environmental change, and continued community feedback.

Through these elements, Guam’s fisheries management program aims to support sustainable fisheries, healthy reef ecosystems, and resilient coastal communities. The following chapters describe the fisheries profiles,

management measures, implementation considerations, and adaptive management processes that together form the foundation of the Guam Coastal Fisheries Management Plan.

Figure 1. ELEMENTS OF THE GUAM FISHERIES MANAGEMENT PROGRAM





4. Goals and Objectives of the Guam Fisheries Management Plan (FMP)

The Guam Coastal Fisheries Management Plan is guided by priorities expressed by the Government of Guam, resource managers, stakeholders, and the fishing community. Collectively, these priorities reflect a shared commitment to sustaining healthy reef ecosystems while maintaining the cultural, food security, and livelihood benefits that Guam's fisheries provide.

The overarching goals of the plan are to:

- 1) rebuild fish populations and improve reef ecosystem health to support the long-term sustainable use of marine resources; and
- 2) ensure that the people of Guam continue to have meaningful access to fisheries resources and benefit directly from responsible stewardship of these resources.

To achieve these goals, the plan establishes the following objectives:

- 1) improve capacity to support the implementation, monitoring, and enforcement of fisheries management measures;
- 2) strengthen public awareness, understanding, and community support for fisheries management through continued outreach and engagement;
- 3) encourage inclusive participation by incorporating diverse community perspectives and local knowledge into fisheries management discussions and decision-making;
- 4) support fisheries-dependent and fisheries-independent data collection and analysis to inform adaptive management and evaluate management effectiveness over time; and
- 5) maintain access to fisheries resources in ways that support community needs, cultural practices, and livelihoods while promoting long-term sustainability of fish stocks and reef ecosystems.

This Fisheries Management Plan is intended to serve as a living document that guides fisheries management actions and decision-making in Guam. Recognizing that fisheries are dynamic systems influenced by environmental change, fishing pressure, and socioeconomic conditions, the plan is designed to evolve as new information becomes available. The plan integrates scientific research, local life-history information, and community knowledge to support management strategies that can be refined and adjusted over time through adaptive management.

B. GUAM REEF FISHERIES PROFILE

1. Geographic Context of Guam's Reefs

Guam's coastal waters encompass approximately 42 square miles of shallow coral reefs, along with an additional 43 square miles of deeper reefs located at least 3 nautical miles offshore. The southern region of the island features a lagoon ecosystem that extends beyond Cocos Island, providing vital habitat for a variety of marine life.

The windward coast of Guam is characterized by strong winds and high seas for most of the year, making its reefs largely inaccessible. In contrast, the leeward coast boasts the most accessible reefs, with all boat ramps situated here, alongside numerous access points for shore-based fishing. This region includes four main fishing ports and boat ramps: Agana Boat Basin, Agat Marina, Umatac boat ramp, and Merizo Pier. Due to this accessibility, the leeward coast experiences the highest levels of fishing pressure annually.

Several Marine Protected Areas (MPAs) are located along the leeward coast, including Sasa Bay, Piti Bomb Holes, and Tumon Bay. These MPAs benefit from high visibility and community engagement, facilitating easier enforcement of fishing regulations. In contrast, the Pati Point MPA and Achang Bay MPA, located along the northern and southern reefs respectively, face more significant management challenges due to their lower visibility and accessibility. Overall, the geographic features of Guam's reefs play a critical role in shaping both the ecological dynamics of these marine environments and the patterns of fishing activity, influencing the effectiveness of conservation efforts and the sustainability of fish stocks.

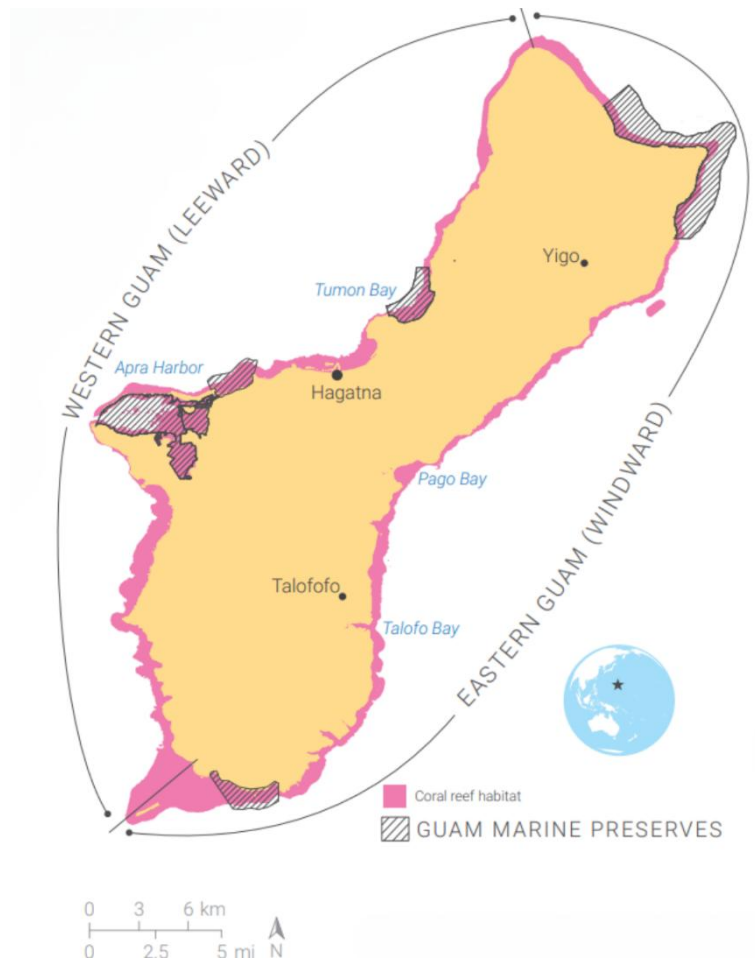


FIGURE 2. Map of Guam, displaying respective reefs and MPAs. Photo by Guam Coral Reef Initiative.

2. Guam's Reef Fisheries

Guam's fishing community is a vibrant tapestry of diverse ethnicities and fishing practices, each contributing to the island's rich cultural heritage. Traditional harvesting methods continue to be practiced, including *talaya* (cast net), *tekken* (gill net), and *chenchulu* (surround net). These techniques not only reflect the cultural significance of fishing in Guam but also demonstrate the community's deep understanding of local marine ecosystems. According

to the Guam DAWR, recent participation counts highlight the variety of fishing methods employed by local fishers, showcasing the intricate relationship between traditional fishing practices and sustainable resource management.

Table 1: Guam’s top fishing methods within its reef-associated fisheries, from 2024-2025.

Method	% Contribution
Hook-and-line	69
Spearfishing	13
Talaya (cast net)	11
Tekken (gill net)	5
Other methods	2

While Guam boasts some of the highest fish biodiversity in the Pacific, certain families of food fish are more heavily targeted in reef fisheries. Notable among these are the Acanthuridae (surgeonfishes), Scaridae (parrotfishes), Lutjanidae (snappers), Carangidae (trevallies), and Lethrinidae (emperors). These species are not only vital for local diets but also play crucial roles in maintaining the health and balance of reef ecosystems. A comprehensive, one-year fisheries-dependent data collection effort led by Leilani Sablan Naden provided valuable insights into the top species harvested through various fishing methods within Guam’s reef-associated fisheries from 2021-2022 (Figure 3). This intensive study not only underscored the economic importance of these species to the fishing community but also highlights the need for ongoing monitoring and management to ensure the sustainability of these vital resources (Sablan et al., 2025).

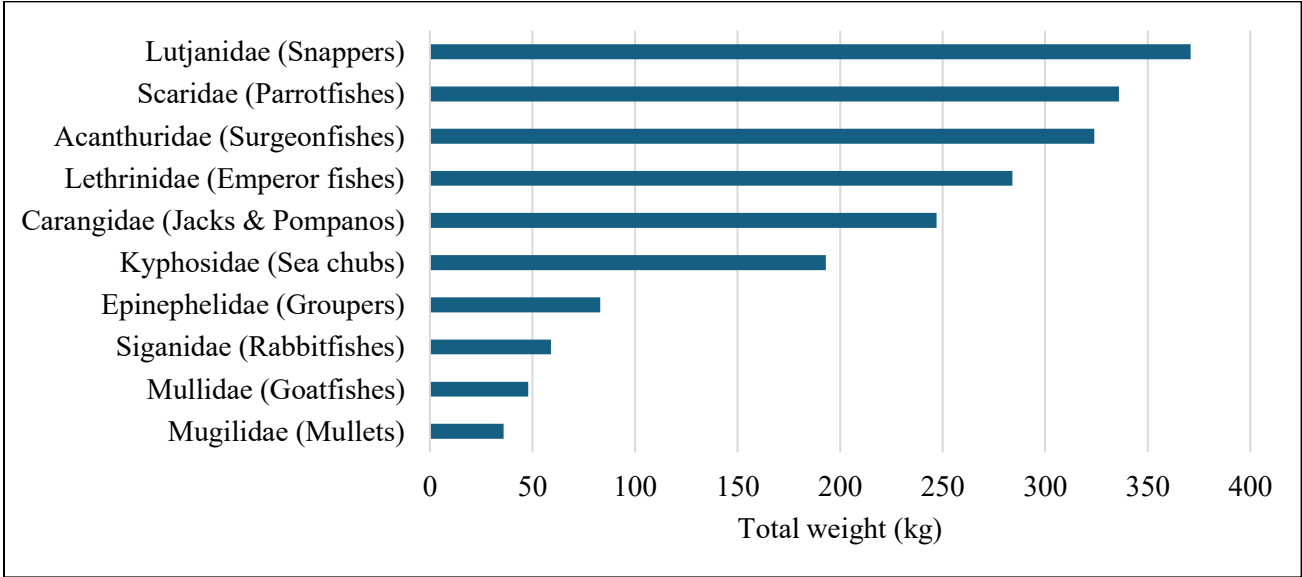


FIGURE 3. Guam’s top ten harvested fish families within reef-associated fisheries.

As Guam's reef fisheries continue to face challenges such as overfishing and environmental changes, understanding the dynamics of these fisheries and their contribution to both the local culture and economy is essential. Efforts to promote sustainable practices and integrate traditional knowledge into modern fisheries management will be crucial in preserving Guam's rich marine heritage for future generations.

3. Fisheries Science Context

Maximum sustainable yield / Overfishing

Fishery management aims to maintain fish populations at sustainable levels, thereby minimizing the risk of stock collapse. This approach also prioritizes the preservation of marine ecosystems and seeks to optimize economic benefits from fisheries while recognizing the rights and needs of local fishing communities and stakeholders. Achieving these goals requires regulations that effectively limit or reduce fishing pressure on fish stocks.

The sustainability of any fish stock hinges on its ability to reproduce effectively, which is influenced by the rates of fishing mortality (F) and natural mortality (M). Fishing mortality refers to the percentage of a fish population removed through fishing activities over a specified time frame. It is a vital metric in fisheries management, providing insight into the intensity of fishing pressure faced by a stock. *Maximum sustainable yield* (MSY) is the maximum amount of fish that can be harvested sustainably from a fishery over the long term without depleting the population. This balance is crucial; when fishing occurs at rates above the MSY, it can result in *overfishing*. This situation arises when the removal of individuals from a stock exceeds the population's natural capacity to replenish itself. A stock is deemed *overfished* when its recruitment – the influx of new individuals – is significantly compromised due to excessive fishing pressure. Furthermore, *ecosystem overfishing* is a broader concern that occurs when the removal of one or more key species undermines the ecosystem's ability to sustain essential functions, jeopardizing its overall health. This can lead to disruptions in food webs and habitat structures, with potentially severe consequences for marine biodiversity.

To navigate these complexities, effective fisheries management relies on a deep understanding of these dynamics, promoting sustainable practices that ensure long-term viability of fish stocks and the ecosystems they inhabit. By prioritizing these principles, fisheries management can support the resilience of both marine environments and the communities that depend on them.

Length frequency distributions taken from fishery dependent or independent surveys can provide valuable insight into the status of the fish stock and fishing pressure. A length frequency distribution represents the summation of individual length measurements at every size-category measured. *Spawning potential ratio* (SPR) is a measure of the sustainability of fishing pressure. SPR is defined as the reproductive output of a fished cohort relative to the reproductive output of that same cohort of fish in an unfished state. SPR can be estimated through interpreting the size structure of the stock as well as basic biological information such as the length at reproductive maturity. The size structure of the catch is directly related to the SPR of the stock, assuming the data are non-biased and representative of the entire stock.

Mechanisms to Maintain Sustainable Fishing

To support sustainable fishing practices and the long-term health of Guam's reef ecosystems, the Guam Coastal Fisheries Management Plan identifies a range of management measures designed to reduce fishing pressure on vulnerable species while maintaining continued community access to marine resources. These measures are

intended to work together as part of a broader fisheries management strategy that balances ecological sustainability with cultural, subsistence, and economic needs.

Key management approaches included in this plan include:

- **Minimum Size Limits:**

Minimum size limits establish the smallest legal size at which fish may be harvested, helping ensure that individuals have an opportunity to mature and reproduce before being subject to fishing pressure. Size limits are informed by available biological and life-history information, including growth rates and size at reproductive maturity. In some cases, these measures may also support target levels of spawning potential, commonly referred to as Spawning Potential Ratio (SPR), which represents the reproductive capacity of a population relative to its unfished condition.

- **Species Protections and Harvest Restrictions:**

Species protections may include full harvest prohibitions or restrictions on commercial sale for species identified as particularly vulnerable to overfishing or population decline. These measures are intended to reduce fishing mortality on depleted or slow-recovering species and support long-term rebuilding of fish populations before sustainable harvest can resume.

- **Gear-Based Management Measures:**

Gear-based measures regulate the types of fishing methods or equipment that may be used in order to reduce excessive harvest efficiency, minimize impacts to reef habitats, and protect vulnerable species. Examples include restrictions on SCUBA-assisted spearfishing and proposed limitations on nighttime commercial spearfishing activities. By reducing pressure associated with highly efficient fishing methods, these measures can help maintain more balanced fish populations and encourage more selective fishing practices.

Together, these management measures are intended to support sustainable fisheries by aligning harvest practices with the biological characteristics of reef fish species and the ecological conditions of Guam's marine ecosystems. The approaches described in this plan are designed to reflect both scientific information and community input, recognizing the importance of adaptive management in responding to changing environmental conditions, fishery trends, and community needs over time.

Fishery Management Reference Points and Harvest Control Rules

Effective fishery management requires regular evaluation of information and periodic adjustments to ensure that management targets and objectives – whether social, economic, or biological – are being achieved. A structured and logical way to make such adjustments is through the use of **harvest control rules**. These rules provide an objective decision-making framework that guides management actions. They do so by interpreting the status of measurable indicators, such as stock size or fishing pressure, relative to established reference points. Based on this comparison, adjustments are made to management measures in response to how the indicator aligns with, exceeds, or falls short of the reference point (Figure 4).

The indicators crucial for effective fisheries management are outlined in Table 2. These indicators may include estimates, spawning potential ratio (SPR) metrics, catch rates, total landings, and others. Based on these indicators, management measures may be adjusted to sustain fish populations. Possible adjustments could include

modifying size limits, extending or reducing species-specific bans, altering seasonal closure periods, adjusting the number of permits issued, or capping the total allowable catch for individual fishers or the entire fishery. The selection of the appropriate management measure and the extent of the adjustment will depend on several factors, such as the biology of the target species, the likelihood of compliance, the social and political acceptability of the action, enforcement capacity, and data availability.

To ensure effective implementation and higher compliance, it is essential for stakeholders and managers to agree on harvest control rules before any new management decisions are needed. This collaborative approach promotes consistency, transparency, and objective responses to changing fishery conditions, fostering better long-term outcomes for both the fish populations and the communities that rely on them.

Types of Indicators	Reference Points
Spawning potential ratio (SPR)	SPR 20%, SPR 30%
% of catch > size of maturity	100%
Total landings	Historical average, predetermined amount
Catch per unit effort (CPUE)	Fraction of historical maximum; Average over a selected period of time
Transect density/abundance estimates	Baseline averages; Baseline minimum or maximums

Table 2. Types of indicators that could be considered for a harvest control rule.

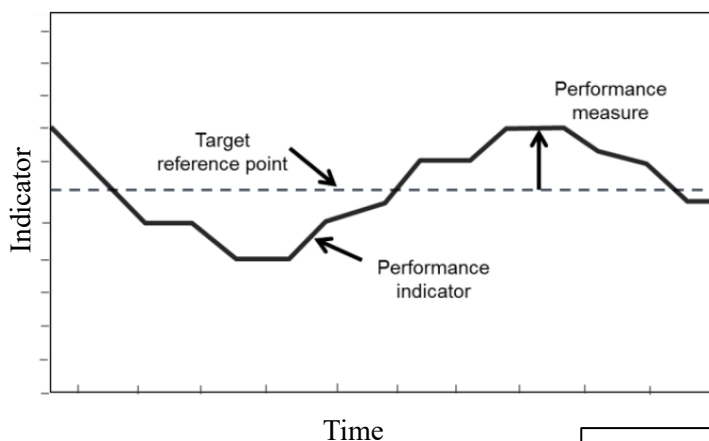
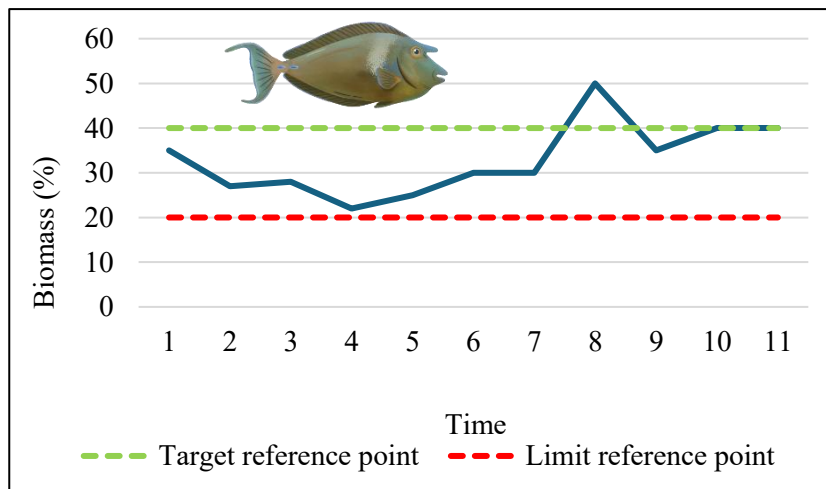


Figure 5: An example graph illustrating a harvest control rule for *Naso unicornis* (tataga') based on fished biomass over time. The graph shows how biomass fluctuates around the target reference (green) and limit reference (red) and reflects adjustments in management based on those fluctuations.

Figure 4: The relationship between an indicator and its reference point, known as a performance measure, informs management adjustments. This decision-making framework is called a harvest control rule.



4. Existing Monitoring Data

Fisheries-dependent datasets

Since the 1980s, Guam's Department of Agriculture (DoAg) Division of Aquatic and Wildlife Resources (DAWR) has maintained a fisheries-dependent monitoring program, a rarity among small-scale coastal fisheries. This program monitors both commercial and recreational fishers through a creel survey approach. Interviews are conducted by intercepting fishers during both shore-based and boat-based trips. Surveys are scheduled regularly, covering weekdays, weekends, and evening shifts, and are conducted eight days per month. During each survey, fish fork-lengths are measured, and fishers are asked standardized questions about their fishing locations, methods, and other relevant details. The species-specific data collected are entered into a standardized database, which can be requested from Guam DoAg DAWR. Despite the program's temporal consistency, interception rates remain low, resulting in relatively small sample sizes each year.

In addition to its creel surveys, Guam DoAg DAWR conducted five bottom-fishing trips to three remote banks in the fall of 1998 and spring of 1999: Galvez Bank, White Tuna Bank, and Bank A. Each bank, differing in distance from Guam, was visited for 3 to 5 days per trip. The surveys aimed to assess bottom-fishing resources at these remote locations, where distance from Guam was seen as a proxy for accessibility and fishing pressure. Standardized fishing was conducted with fishers randomly assigned to different boat positions. All landed fish were measured, and their weights were recorded.

Over the past decade, fisheries-dependent data have been collected through collaborative efforts across Micronesia, including Guam, the Commonwealth of the Northern Mariana Islands (Saipan and Tinian), Yap, Pohnpei, Chuuk, Kosrae, the Republic of Palau, and the Republic of the Marshall Islands (Majuro and Arno atolls). The data sets used in the species assessments in section B6 were derived from standardized, intensive data collection efforts, typically spanning one year or across major fishing seasons in some cases. These efforts provided representative snapshots of nearshore spearfishing, net, and bottom fisheries. Regular visits were made to key fish markets or prominent fishers, where fishers were interviewed, and each landed fish was photographed on a measuring board. Fork lengths were generated from the photographs, and daily or seasonal trends were analyzed by combining length data with interview information to approximate fishing locations. For Guam, comparative data were sourced from Guam DoAg DAWR creel surveys over the past decade, along with size data from a recent University of Guam Marine Lab thesis by Leilani Sablan Naden.

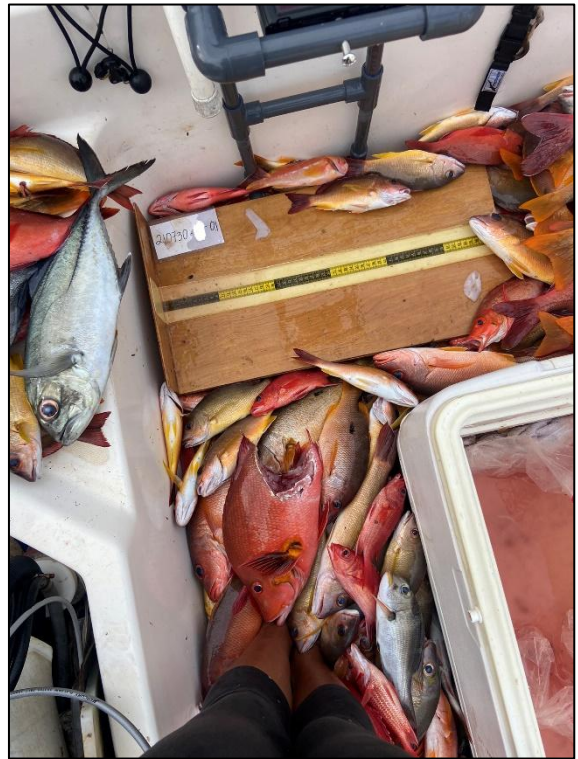


Image 1. A standard fish measuring board utilized in fisheries-dependent survey efforts across Guam and Micronesia.

Fisheries-independent datasets

From 2020 to 2022, coral, benthic, and fish assemblage data were collected on reefs adjacent to 26 southern Guam watersheds as part of a ridge-to-reef study. The objective was to explore potential linkages between watersheds, fishing access, and the condition of ecological assemblages, using key metrics of coral, benthic, and fish populations (Houk et al. 2022). Fish assemblage data were specifically used for species assessments conducted for this fisheries management plan. Survey locations were situated at the southern end of each channel associated with watershed discharge. Five 50-meter transects were deployed along the 8–10 m reef slope contour, following protocols from previous studies aimed at ensuring sufficient statistical power for site-level resolution (Houk and Van Woesik 2013, Houk et al. 2015). Food-fish populations were assessed using 12 stationary-point counts (SPC) at ~20 m intervals along each transect. During each SPC, a trained observer identified and recorded the species and size of all food-fish within a 5–6 m radius over a 3-minute period. Food-fish were defined as species from the following families: acanthurids, scarines, labrids, serranids, siganids, carangids, lethrinids, lutjanids, balistids, kyphosids, mullids, holocentrids, and sharks. Fish fork lengths were converted to biomass using coefficients derived from regional fishery-dependent data when available, or from FishBase (www.fishbase.org) when not. Species assessments based on these data included examining spatial trends in both biomass and size structure for target species across MPAs and different geographic regions.

NOAA's Pacific Islands Fisheries Science Center (PIFSC) Ecosystem Sciences Division conducts a national coral reef monitoring program across all U.S.-affiliated Pacific Islands and territories. Sites are selected around each island based on major habitat and depth strata. For Guam, strata included geographic regions (west versus east) and Marine Protected Area (MPA) status. Between 30 and 100 sites were surveyed in each of the three monitoring years (2011, 2014, and 2017), ensuring consistent sampling effort across strata and years. All sites were surveyed using a modified Stationary Point Count (SPC) method, where pairs of divers conducted simultaneous fish counts within adjacent cylindrical plots (15-meter diameter) extending from the substrate to the limit of vertical visibility. Before each SPC began, a 30-meter line was laid across the seafloor to assist divers with maintaining survey boundaries. Each survey had two components: first, a 5-minute species enumeration period where the diver recorded all species observed within their cylinder. Afterward, the tallying phase began, during which the divers systematically counted each species recorded, estimating the number of individuals and measuring their total length (TL) to the nearest centimeter. The divers performed rapid visual sweeps of the area for each species, one group at a time, while remaining at the center of their cylinder as much as possible. If a species was observed during the enumeration period but was not present during the tallying phase, divers recorded their best estimate of size and number from the first encounter, marking it as 'non-instantaneous.' For use in species assessments within the Guam Fisheries Management Plan, biomass and size data were aggregated to the site level, then averaged across the island to produce annual means for each target species. Pairwise testing was used to analyze data across years, treating each year as a discrete factor to account for the high variability and statistical uncertainty observed within MPAs and geographic strata. This approach ensured consistent comparisons, given that site selection was proportional across strata for each survey year.

The Guam long-term coral reef monitoring program complements NOAA's National Coral Reef Monitoring Program (NCRMP), with the primary difference being the survey design, although the protocols remain identical (Burdick 2023). The Guam program also conducted two resilience-based snapshot surveys during the 2015-2017 El Niño Southern Oscillation events. In each time frame, 20 sites were selected around the island at shallow (3 m) and intermediate (8 m) depths. At each site, 3 x 50 m transect lines were laid out, and six replicate SPC (Stationary Point Count) surveys were conducted, focusing exclusively on herbivores and mobile predators.

The SPC protocols were similar to those used in the national program. This dataset allowed for comparisons between east and west geographic regions, as well as between Marine Protected Areas (MPAs) and reference (non-MPA) sites, providing valuable insights into MPA efficacy over time. Between 20 and 35 sites were monitored in both MPA and reference locations during each survey year. The monitoring program began in 2010, with current data covering Tumon (five years), Piti (three years), and Achang (two years).

In addition to the aforementioned FI-datasets, stereo-video surveys of Guam reef fishes were completed by the UOG Marine Lab. These surveys represent repeat assessments of reef fish assemblages on the outer reef slopes of Guam during two time periods a decade apart (2011/2012 and 2021) and the most recent surveys conducted in 2024. Currently, only parrotfishes have been annotated for the 2021 survey period, and annotations

for all relevant species are still underway for the 2024 surveys. The aim was to examine the effects of fishing pressure, habitat variability, and time on fish composition, size structure, and ecological functions, such as the grazing potential of parrotfishes. Surveys were conducted using diver-operated stereo video at 17 fixed sites around Guam, with timed swims of 24 minutes (2011/12) or 30 minutes (2021, 2024) at two depth ranges (6-10 m and 18-20 m). The area covered per site averaged 1.1 hectares, with distance measured by GPS using a surface buoy. Fish within 8 m ahead and 2.5 m on either side of the camera were identified to species level, color phase (for species like parrotfish and humphead wrasse, where color



Image 2. Dr Brett Taylor from the UOG Marine Lab conducts a stereo-video survey.

phase is linked to sex), and measured to the nearest millimeter fork length. These 17 sites span multiple Marine Protected Areas (MPAs) and encompass a range of environmental and anthropogenic factors, such as exposure, benthic substrate, fishing pressure, and adjacent habitats, all incorporated into the dataset. The extensive survey area at each site allows for detailed size structure analysis of common species, with over 15,000 total fish observations. Previous studies have used this dataset to assess changes in parrotfish biomass, species composition, and size structure across gradients of fishing pressure over time, as well as to examine how life-history traits affect species' vulnerability to overexploitation.

Overall, the existing fisheries data for Guam was robust enough to support the species assessments necessary for the Guam Fisheries Management Plan. Data gathered from ongoing monitoring programs—such as DAWR's creel surveys, long-term coral reef monitoring, and stereo-video surveys—provided essential insights into fish population dynamics, species composition, and habitat conditions. These programs are critical for tracking key biological indicators, such as biomass, size structure, and species abundance, which are fundamental for assessing the health of Guam's fisheries. As the Guam Coastal Fisheries Management Plan moves forward, data derived from ongoing monitoring programs will continue to play a pivotal role in evaluating the effectiveness of management measures and informing adaptive management strategies. The consistent monitoring of biological indicators will be invaluable for applying harvest control rules, ensuring that the fisheries are sustainably managed

in response to changing environmental conditions and fishing pressures. Long-term, these programs will help maintain a balance between sustainable harvests and the conservation of Guam’s vital marine resources.

5. Current Understanding of Guam’s Fish Stocks

Guam’s reef fish stocks have experienced significant changes over the past few decades, influenced by a combination of intense fishing pressure, environmental degradation, and shifting ecosystem dynamics. As outlined by Weijerman et al. (2016), Guam’s reef fisheries, exploited since the 1960s, have shown widespread signs of depletion. Overfishing has led to a reduction in the biomass of key species, with herbivores and predators – essential for maintaining ecosystem health – among the most affected. Populations of large, slow-growing species have declined, giving way to smaller, faster-growing species as fishers target what remains accessible. This shift has led to reduced ecosystem resilience and a weakened ability to withstand environmental disturbances.

In their 2018 study, Houk et al. expanded on these findings by providing a detailed analysis of the changing dynamics of Guam’s fisheries over 25 years of exploitation. The study emphasized that density dependence – the relationship between fish population density and growth rates – has varied significantly across species and fishing zones. Houk et al. observed a "restructuring" of Guam's coral reef fisheries, where fishing pressure has led to a decline in high-trophic-level predators, such as groupers and snappers, and a relative increase in herbivorous species like parrotfish and surgeonfish in certain areas. This restructuring is particularly concerning because the removal of top predators can destabilize the reef food web, resulting in cascading effects on coral reef health. Houk et al. also pointed to

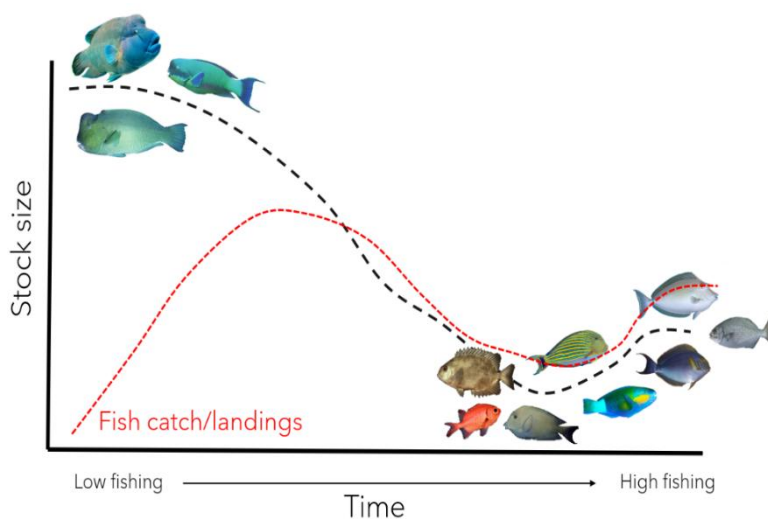


Figure 7. Representation of the catch composition shift over time with increasing fishing pressure. Graph courtesy of P. Houk.

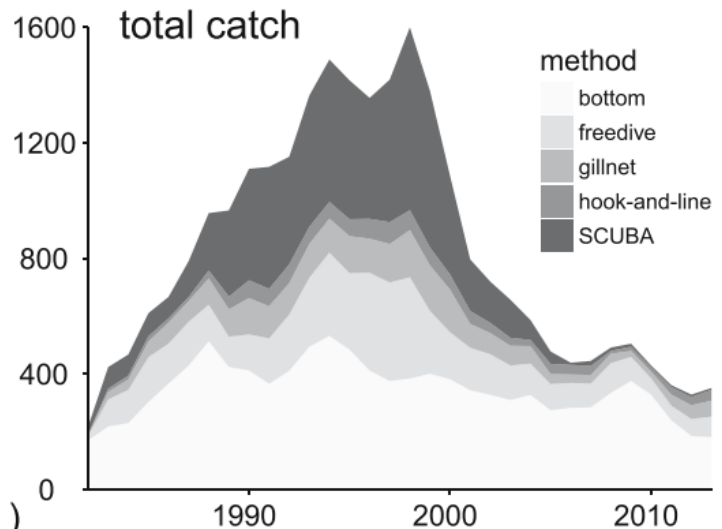


Figure 6. Reported landings from the creel data collection program. (from Houk et al., 2018)

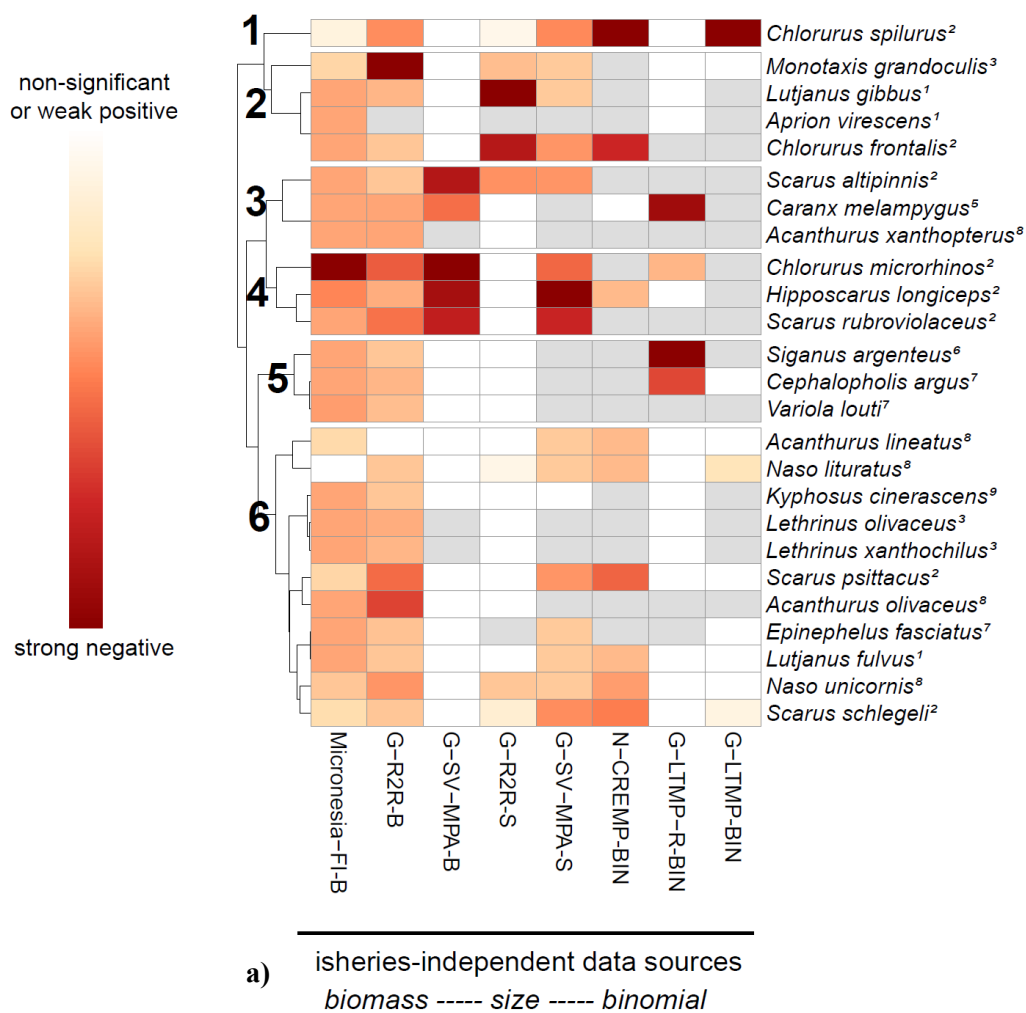
spatial variability in fishing intensity, with some areas, particularly closer to population centers, showing more pronounced depletion than more remote or less accessible zones. Their work indicated that fishing pressure was the primary driver of these changes, though habitat degradation from factors like land-based pollution and coral bleaching events exacerbated the issue.

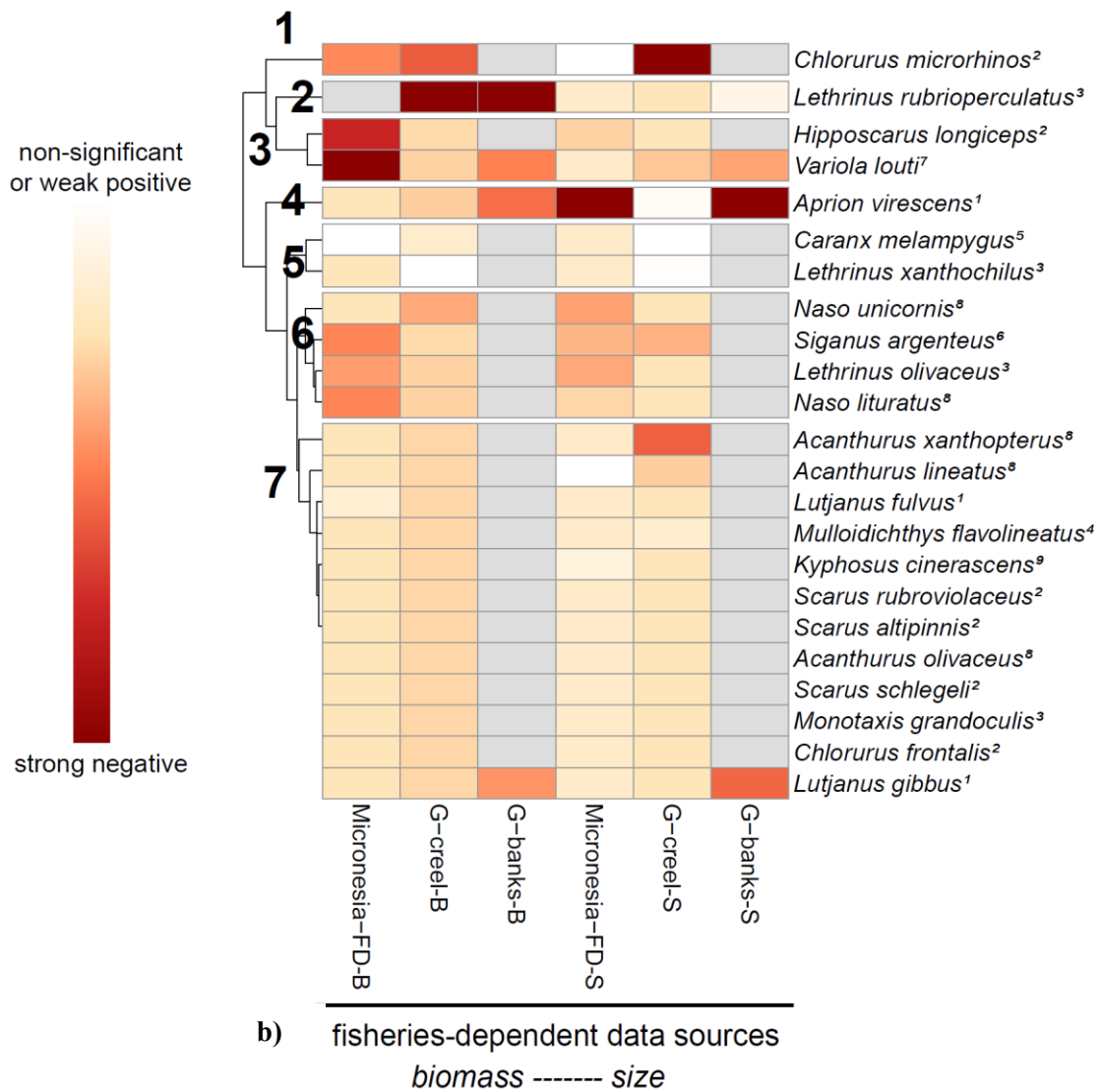
Both Weijerman et al. (2016) and Houk et al. (2018) suggest that while Guam’s fish stocks have been compromised, the situation is not irreversible. The establishment of marine protected areas (MPAs), alongside adaptive fisheries management strategies, offers hope for

recovery. Houk et al. stressed the importance of understanding species-specific responses to fishing and habitat pressures in guiding management decisions. They also highlighted the need for more refined, spatially explicit management approaches that consider the heterogeneous nature of fishing impacts across Guam’s reefs.

Population assessments conducted for top species

In 2024, Dr. Peter Houk and Dr. Brett Taylor of the University of Guam Marine Laboratory published a comprehensive assessment of top species that comprise more than 70% of the landings in Guam, using the monitoring data detailed in section B5. The culmination of nine unique fisheries-dependent and fisheries-independent datasets provided a consensus assessment for each species and revealed how each species may respond to fishing pressure gradients. Houk and Taylor reported declining biomass and/or size trends for most species with sufficient FI or FD data for examinations, comprised of mainly large-bodied species in their respective families (Figures 8a-b). These findings generally agree with studies over the past decade reporting: 1) declines in many target species sizes and biomass on Guam (Taylor et al. 2014, Houk et al. 2018, Taylor et al. 2022), 2) regionally low, often lowest, fish biomass for many species and overall fish biomass on Guam compared to other Pacific islands (Williams et al. 2012, MacNeil et al. 2015, Houk et al. 2021), and 3) significantly lower catch success and observed biomass on Guam’s leeward, more accessible reefs compared to windward, wave-exposed reefs (Houk et al. 2022, Taylor et al. 2022, Sablan et al. 2025).





Figures 8a-b. Heatmaps visualizing the effect sizes of statistical tests for each species-dataset derived from fisheries-independent data sources (a) and fisheries-dependent sources (b). Target species were clustered into groups based upon the effect sizes describing the strength of their responses to fishing pressure. Data sources on the x-axis were organized from left to right based upon biomass or size examinations within each. Grey colors indicate that insufficient data were available to perform tests. The gradient of white to dark red colors scales with the magnitude of standardized effect sizes. Numbers after species indicate their respective families: ¹snappers (Lutjanidae), ²parrotfishes (Labridae: Scarinae), ³emperorfishes (Lethrinidae), ⁴goatfish (Mullidae), ⁵trevally (Carangidae), ⁶rabbitfishes (Siganidae), ⁷groupers (Epinephelidae), ⁸surgeonfishes (Acanthuridae), and ⁹rudderfish (Kyphosidae). Graph taken from Houk and Taylor, 2025.

As fishing pressure increases, the target species that dominate landings can shift, and some species can become “winners” or “losers” based upon their biological capacity to cope with and recover from exploitation (Houk et al. 2021). For example, the results suggested that three of the selected target species have experienced highly significant declines in proportional biomass through time and across spatial fishing gradients: the large-bodied parrotfish *Chlorurus microrhinos*, the large-bodied grouper *Variola louti*, and the large-bodied emperor *Lethrinus rubrioperculatus*. Identifying these sensitive species among multi-species fisheries can be difficult because sensitive populations may be compromised by the time regular monitoring or data collection events begin.

This has been previously hypothesized for the largest target species that were selected for assessments but did not have sufficient data: the bumphead parrotfish (*Bolbometopon muricatum*) and the Napoleon wrasse (*Cheilinus undulatus*). Meanwhile, other desirable species have shown non-significant trends, size-based responses, or both size-and-biomass trends equally. These contracting responses helped to identify management interventions that may be best suited for each target species.

Ideally, management interventions would be designed to match the biology of each target species. Therefore, outcomes were linked with two broad classes of management interventions: size-based or effort-based. Species with strong size-based responses to fishing pressure often remained dominant in landings despite size shifts, as discussed above. These species represent ideal candidates for size-based policies as one means of potential management (i.e., minimum, maximum, or slot-based). Meanwhile, species with strong biomass-based responses represent ideal candidates for management interventions that control overall fishing effort (i.e., gear restrictions, marine protected areas, commercial-vs-subsistence fishing pressure, spawning seasons, and other similar approaches that address entire populations). Therefore, the results of the stock assessment conducted by Houk and Taylor can provide a guide for discussing the status and potential management of target species.

While spawning potential ratio (SPR) analyses were conducted as part of the stock assessment, the SPR outcomes often provided inconsistent results with the fisheries-independent and fisheries-dependent outcomes. However, SPR metrics describing whether size, biomass, or both responses would be most important for managing each species often aligned well with fisheries-independent and fisheries-dependent size-and-biomass recommendations. Thus, using SPR as a tool to identify potential management interventions appeared to have merit for data-poor fisheries that might not have extensive fisheries-independent and fisheries-dependent data and are perceived to be in decline based upon stakeholder opinions. Therefore, for the purposes of the Guam Coastal Fisheries Management Plan, Houk and Taylor recommend a strong reliance on the fisheries-independent and fisheries-dependent outcomes to interpret the species status assessments. However, for potential management interventions, both approaches may provide similar guidance.

In conclusion, the current understanding of Guam's fish stock status is one of concern but also cautious optimism. Decades of overexploitation have led to shifts in species composition and ecosystem structure, but with the right management measures, there is potential for recovery. Adaptive, data-driven strategies will be essential.

To read the full report, "Population assessments for 28 target coral-reef fishes of Guam based upon extensive fisheries-dependent and fisheries-independent data sources" -

https://www.uog.edu/_resources/files/ml/technical_reports/UOGML_TechRep171_Houk_2024.pdf

C. STAKEHOLDER ENGAGEMENT & COMMUNITY PERCEPTIONS ON MANAGEMENT STRATEGIES

While fisheries science provides the foundation for sustainable management, input from the fishing community ensures that management strategies are practical, culturally relevant, and responsive to local needs. Recognizing the value of community voices, the Guam Department of Agriculture, Division of Aquatic and Wildlife Resources initiated a series of engagement efforts following the inception of the FMP in 2020.

The first set of community meetings took place in 2021 across northern, central, and southern villages. These open-forum townhalls provided fishers the opportunity to share their priorities, concerns, and expectations for the management plan. Fishers could highlight regulations or measures they felt were necessary, ensuring that the perspectives of those who regularly fish Guam's waters informed the plan from its earliest stages. These initial meetings established a framework for ongoing engagement, emphasizing that community input would guide the FMP's development alongside scientific evidence.

Building on this foundation, DAWR collaborated with the University of Guam Center for Island Sustainability (UOG CIS) and Sea Grant to facilitate additional engagement in late 2023. This effort included a structured stakeholder meeting that brought together fishers, scientists, and managers to evaluate potential management measures (Image 3). Participants considered which options were scientifically justified, feasible for fishers, and enforceable given available resources.

The outcomes of this meeting helped refine the list of potential fisheries strategies which were then presented in a formal community survey. Fishers could provide input online or in person, and their feedback indicated strong support for size limits, licensing, and marine protected areas (MPAs) as priority management approaches (Figure 9).



Image 3. Leilani Sablan Naden from the UOG CIS & Sea Grant engages with fishers during a roundtable discussion on prioritized management measures during a stakeholder meeting held in October of 2023.

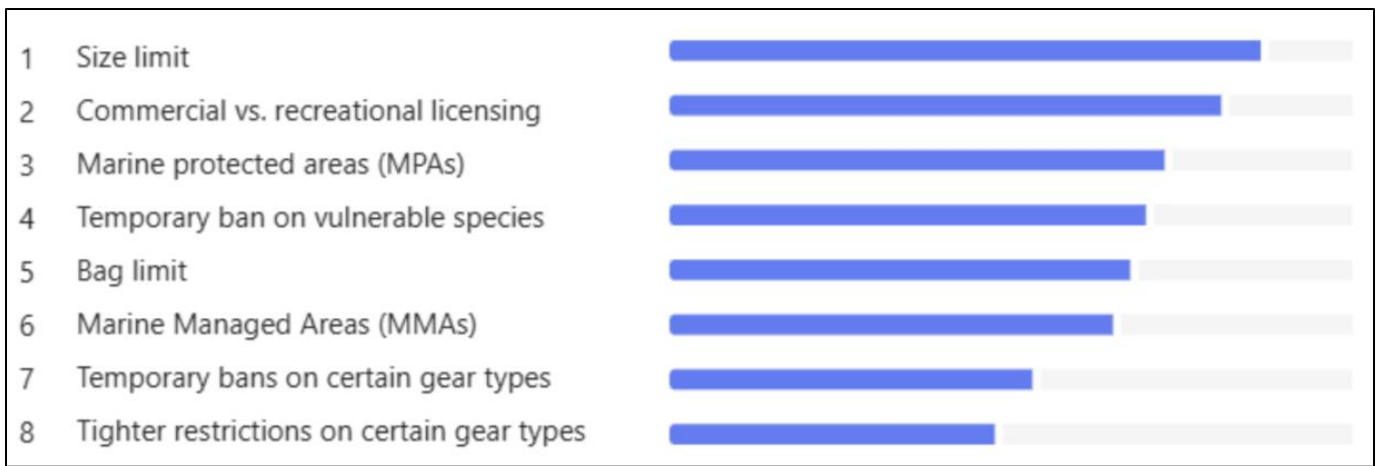


Figure 9. Results from a community survey that was administered in early 2024.

Community input continued to inform internal discussions among resource managers over several months, ensuring that management decisions considered both ecological sustainability and the practical realities of the fishing community.

To further refine management strategies that would work for Guam, DAWR hosted four townhall meetings during the summer of 2025, attended by over 200 fishers and community members representing northern, central, and southern villages (Figure 10). Each session began with a presentation introducing the FMP initiative, summarizing the scientific research supporting the plan, and highlighting initial input from the fishing community. Several management strategies were then described in detail, followed by a Q&A session to clarify questions and concerns. Participants also engaged in individual feedback activities to express their level of support for each measure (Figures 11a-e).

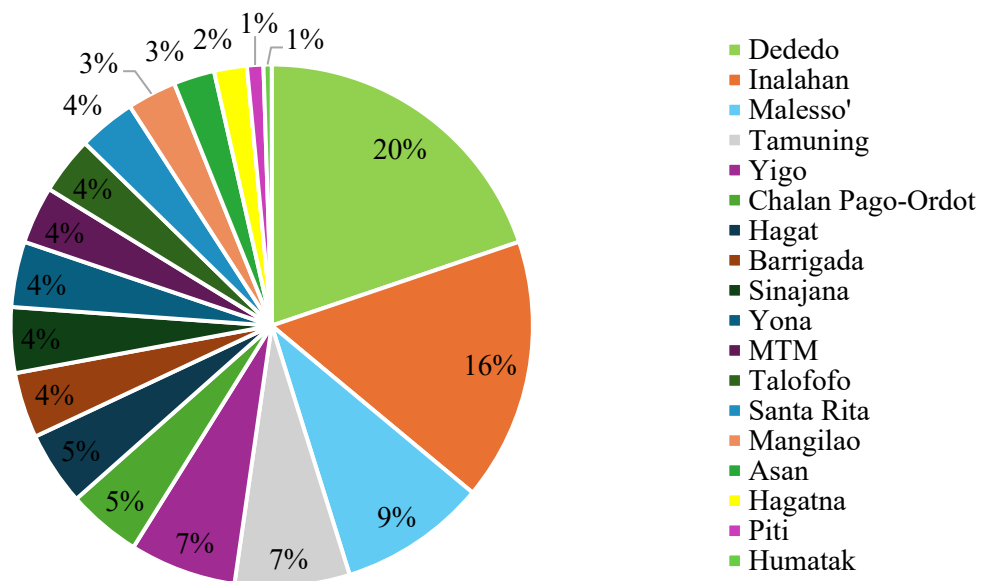


Figure 10. Representation from 18 different villages throughout Guam at the four community meetings for the FMP in 2025.



Image 4. Chelsa Muna, director of Department of Agriculture, answers questions at the Southern Town Hall held on June 25, 2025.



Image 5. A fisherman raises his hand to ask a question at the Southern Town Hall held on June 25, 2025.

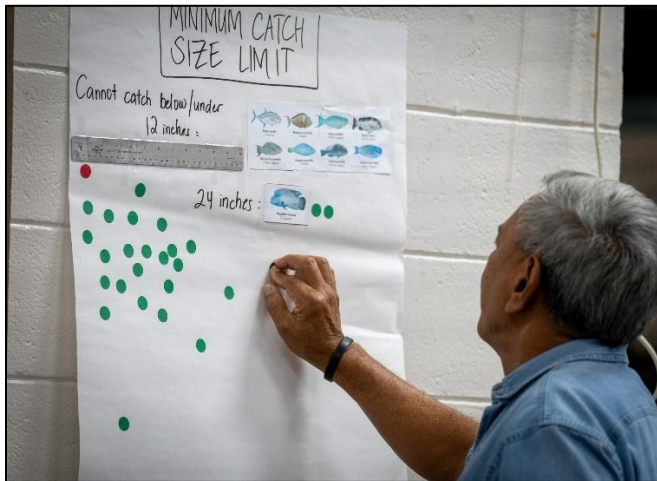
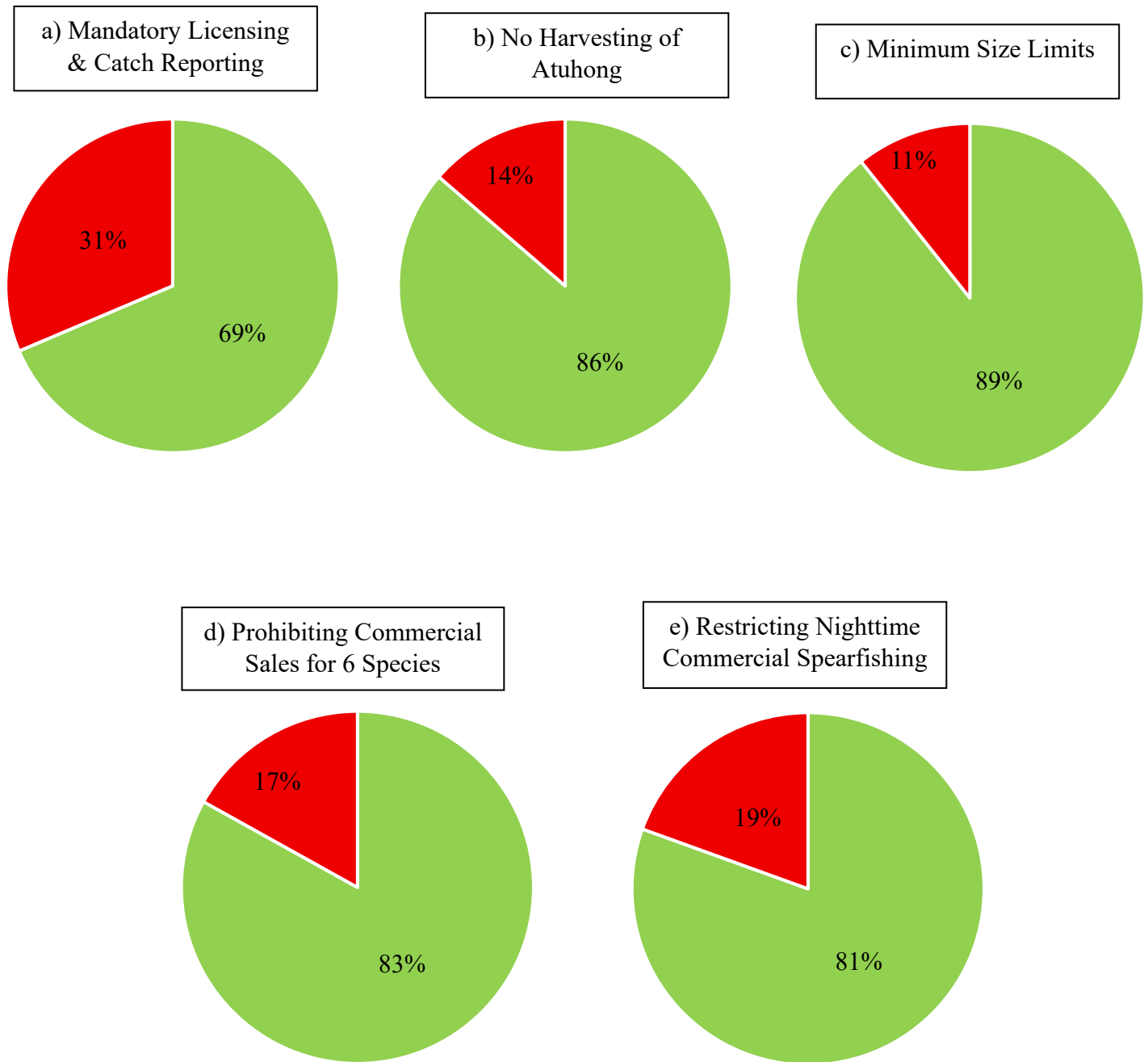


Image 6. A fisherman places a green sticker to reflect support for the proposed measure on minimum catch size limits at the Northern Townhall, held on June 23, 2025.



Image 7. Robert Koss, fisheries technician at DAWR, presents the portion on community feedback during the Central Town Hall held on June 24, 2025.

These iterative engagement efforts demonstrate a commitment to co-developing fisheries management strategies with the community. By actively incorporating fisher input, the FMP aims to ensure that proposed measures are both ecologically effective and aligned with the priorities and practices of those who rely on Guam's fisheries.



Figures 12a-e: Support (green) versus opposition (red) received by townhall attendees for proposed fisheries measures.

1. Community-led Petition on Nighttime Spearfishing

In addition to formal engagement processes such as townhall meetings, stakeholder workshops, and surveys, members of Guam's fishing community have also independently organized around shared concerns related to fishing pressure and resource sustainability. One such effort included a public petition calling for a temporary moratorium on nighttime spearfishing and gillnetting across all sectors. This initiative reflects a grassroots expression of concern and highlights the role that community members continue to play in shaping fisheries management dialogue in Guam.

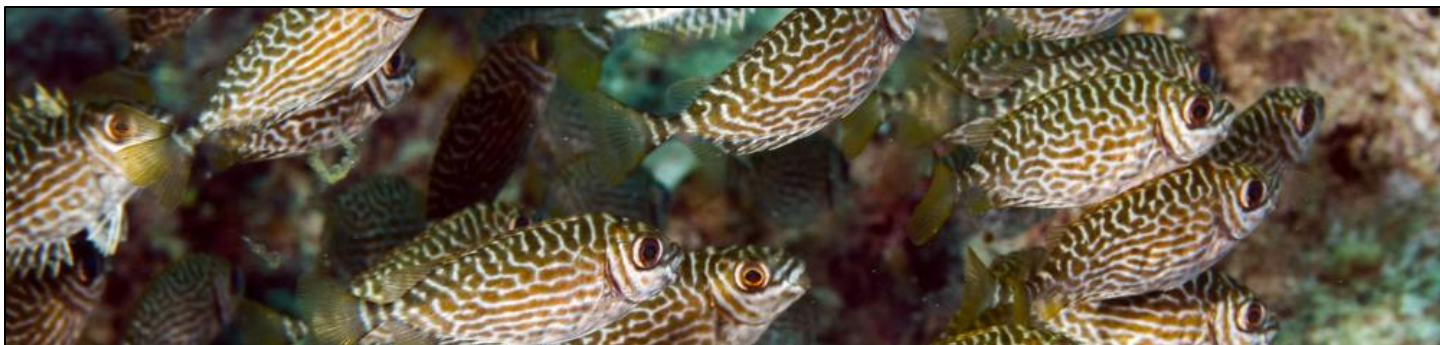
The petition, which received support from over 180 individuals, was developed and circulated by community members seeking more immediate and precautionary action to address perceived declines in reef fish populations. Central to the petition was the concern that nighttime fishing methods – particularly spearfishing and gillnetting – can be highly efficient, as many reef species are less active, more aggregated, or otherwise more vulnerable during nighttime hours. Petition supporters emphasized that this increased efficiency, when occurring frequently or at larger scales, may contribute to disproportionate harvesting pressure on already stressed reef systems.

In addition to ecological concerns, the petition also reflects broader community perspectives related to fairness, access, and long-term stewardship. Some supporters expressed concern that certain fishing practices, particularly when conducted at a commercial scale, may limit opportunities for other fishers or reduce the availability of fish for subsistence use. Others highlighted the importance of taking proactive measures to ensure that future generations are able to continue fishing as both a livelihood and a cultural practice. These perspectives align with recurring themes raised during formal engagement efforts, including the need to balance sustainability with equitable access to marine resources.

While the management measures outlined in this plan focus specifically on restricting commercial nighttime spearfishing, the petition demonstrates that there is also community support for broader, more precautionary approaches. This range of perspectives is important to acknowledge, as it reflects the diversity of experiences, values, and priorities within Guam's fishing community. Not all stakeholders will agree on the scope or type of management measures needed; however, documenting these viewpoints ensures that the full spectrum of community input is recognized and considered within the management process.

Importantly, this petition represents a form of engagement that occurs outside of structured planning processes. Its inclusion in this plan highlights the value of remaining attentive to community-led initiatives, which may emerge in response to changing conditions or perceived gaps in management. These efforts can provide early signals of concern, identify emerging issues, and contribute to ongoing dialogue between managers and the community. As part of the adaptive management framework described in this plan, perspectives expressed through both formal and informal channels – including petitions such as this – may help inform future evaluation and refinement of management strategies. Continued monitoring, outreach, and engagement will be essential to better understand the outcomes of implemented measures and to assess whether additional or alternative approaches may be warranted over time. By acknowledging not only structured input but also grassroots efforts, the plan reflects a commitment to shared stewardship and ensures that management approaches remain grounded in both scientific understanding and community experience.

Petition link: <https://www.change.org/p/support-a-temporary-pause-on-nighttime-spearfishing-and-gillnetting-in-guam>



D. MANDATORY FISHING LICENSES TO UNDERSTAND & SUPPORT FISHING ACTIVITY

The licensing measures described in this chapter were developed through collaborative discussions among fishing community members, scientists, and resource managers, with consideration given to practicality, fairness, and the unique characteristics of Guam's fisheries. These measures are intended to improve understanding of who is fishing, how fishing activities occur across sectors, and how harvested fish enter local markets and communities. Licensing is a widely used fisheries management tool that supports sustainable fisheries by improving understanding of fishing participation, catch, and effort. In Guam, a structured licensing system would help distinguish between commercial, subsistence, recreational, and non-resident fishing activities, while supporting more accurate fisheries-dependent data collection and more informed management decision-making.

In addition to improving fisheries information, licensing can strengthen communication between fishers and resource managers by establishing clearer expectations and creating more consistent opportunities for outreach, education, and engagement across fishing sectors. When paired with reporting requirements, market monitoring, or fisheries surveys, these measures can improve understanding of fishing pressure and support adaptive management over time.

Clearly defining categories of fishing activity may also help reduce ambiguity surrounding harvest practices and commercial sales, while supporting more consistent implementation of fisheries regulations. Improved understanding of participation and fishing effort can help managers evaluate trends, identify potential resource concerns, and assess the effectiveness of management measures through time.

Licensing may also improve accountability and traceability within Guam's fisheries. In some cases, licensing structures can provide mechanisms to align fishing activity with reporting expectations, monitoring capacity, and existing business registration systems. Revenue generated through licensing programs may further support fisheries management activities, including outreach, monitoring, and data collection.

Under this licensing framework, all individuals participating in fishing activities within Guam's waters would be required to possess a valid fishing license corresponding to their fishing activity. Minors under the age of 13 would not be required to obtain a fishing license under this Fisheries Management Plan, provided they are accompanied by an individual holding a valid Guam fishing license while engaged in fishing activities. Individuals 13 and older may apply for a license.

License categories are intended to distinguish among recreational, subsistence, commercial, and visitor fishing sectors in order to improve fisheries monitoring, strengthen accountability, and support more effective implementation of management measures. To reduce ambiguity and improve consistency in fisheries reporting and enforcement, individuals would be limited to a single primary fishing license category within a given licensing period. Establishing one license per individual helps clearly define fishing activity and harvest intent, supports more accurate fisheries-dependent data collection, and reduces opportunities for regulatory circumvention between fishing sectors.

1. Recreational & Subsistence Fishing License

A Recreational and Subsistence Fishing License is established under this Fisheries Management Plan to support sustainable non-commercial fishing activities within Guam's waters. In this context, subsistence fishing refers to the harvest of marine resources for personal consumption, sharing among family and community members, and the continuation of cultural practices and obligations. This license category also recognizes artisanal fishing practices involving occasional, small-scale sales intended to offset fishing-related expenses rather than function as a primary source of income. Eligibility for this license category is intended primarily for Guam residents in recognition of the local, cultural, and community-based nature of subsistence and recreational fishing practices on Guam.

Purpose

The Recreational and Subsistence Fishing License is intended to improve understanding of non-commercial fishing activity and strengthen the management of Guam's subsistence and recreational fisheries. By distinguishing non-commercial fishing from commercial harvest, the license would support improved tracking of participation, catch, and fishing effort while helping ensure that harvest levels remain consistent with long-term sustainability goals.

Key Considerations

- Fishers may be considered artisanal when small-scale sales are limited to offsetting fishing-related expenses and general operational costs, rather than generating primary income or sustained commercial profit.
- Participation in fisheries-dependent data collection efforts, including creel surveys, fisher interviews, or catch reporting tools, will be incorporated to improve understanding of non-commercial fishing activity while minimizing unnecessary burden on fishers.
- Clear distinctions between recreational/subsistence fishing and commercial fishing activities would be necessary to support consistent implementation and enforcement.

Anticipated Benefits

- Improves fisheries-dependent information on subsistence and recreational catch, effort, and participation to support fisheries management and stock assessments.
- Provides better understanding of the number and distribution of individuals participating in non-commercial fishing activities.
- Helps identify patterns of fishing effort and areas experiencing concentrated fishing pressure.
- Strengthens communication, outreach, and shared stewardship between fishers and resource managers.
- Supports more informed and adaptive fisheries management decision-making over time.

Implementation & Enforcement Approaches

- Outreach materials, workshops, and community engagement efforts could be used to improve understanding of license requirements, reporting expectations, and management objectives.
- Visible license identification or documentation will assist enforcement officers in distinguishing between commercial and non-commercial fishing activities.
- Landing sites, shoreline access points, and commonly used fishing areas may serve as practical locations for monitoring participation and conducting outreach.
- Coordination between fishers, resource managers, and enforcement personnel would support more consistent implementation of license requirements and management measures.
- Encouraging voluntary participation in reporting and fisheries surveys may improve information quality while strengthening community involvement in fisheries management.

Monitoring Approaches

- Trends in license participation over time may be evaluated to better understand changes in fishing activity across seasons and years.
- Catch and effort information collected through creel surveys, interviews, reporting tools, or other fisheries-dependent monitoring approaches may be used to assess fishing patterns and resource use.
- Field observations, community feedback, and fisheries monitoring results may help evaluate how the licensing program is functioning and identify areas where adjustments or improvements may be needed.
- Information generated through the licensing program will contribute to future stock assessments, management evaluations, and adaptive management decisions.

2. Commercial Fishing License

A Commercial Fishing License is established under this Fisheries Management Plan to support the sustainable harvest and sale of marine resources within Guam's fisheries. Commercial fishing is defined as fishing conducted primarily for the purpose of selling catch to markets, restaurants, seafood vendors, wholesalers, or other buyers. Distinguishing commercial fishing activity from subsistence and recreational fishing is intended to improve understanding of fishing pressure, harvest patterns, and the movement of seafood through Guam's commercial markets. This license category also supports improved accountability, fisheries monitoring, and implementation of management measures associated with commercial harvest activities.

Purpose

The Commercial Fishing License is intended to improve oversight and understanding of commercial fishing activity in Guam. By clearly distinguishing commercial harvest from non-commercial fishing, the license would support improved monitoring of catch, fishing effort, and market activity while helping ensure that commercial harvest remains consistent with long-term fisheries sustainability goals.

Key Considerations

- Fishing activity is classified as commercial when catch is regularly sold for the purpose of generating income or profit beyond recovery of fishing-related operational expenses. Indicators of commercial activity may include repeated seafood sales, supply of seafood to markets or restaurants, operation under a business license with the Guam Department of Revenue & Taxation, or revenues exceeding documented fishing and vessel-related expenses.

- Commercial license holders may be required to maintain documentation associated with seafood sales, business activity, or operational income to support implementation of fisheries licensing categories.
- Participation in fisheries-dependent reporting, creel surveys, dockside sampling, or other monitoring programs may be required to improve understanding of commercial fishing effort and harvest trends.
- Alignment with existing business registration systems may support accountability, traceability, and implementation of fisheries regulations.
- Clear identification of commercial fishing activity would help distinguish commercial harvest from subsistence and recreational fishing practices.

Anticipated Benefits

- Improves understanding of commercial fishing pressure on reef fish populations and marine resources.
- Supports more accurate fisheries-dependent data collection for stock assessments and management evaluations.
- Strengthens accountability and traceability within Guam's commercial fisheries sector.
- Helps identify patterns of fishing effort, harvest trends, and areas experiencing elevated fishing pressure.
- Improves communication and coordination among fishers, seafood buyers, vendors, and resource managers.

Implementation & Enforcement Approaches

- Commercial license holders may be required to carry and present license documentation during fishing, landing, or sales activities.
- Landing sites, fish markets, roadside vendors, and seafood establishments may serve as practical locations for monitoring and enforcement activities.
- Outreach and education efforts could help improve understanding of reporting requirements, species restrictions, and other fisheries regulations associated with commercial fishing.
- Coordination between resource managers, enforcement personnel, and seafood vendors may strengthen implementation of fisheries regulations and improve seafood traceability.
- Penalties for unlawful commercial harvest or sales activities may help discourage repeated violations and support fair participation within the fishery.

Monitoring Approaches

- Trends in commercial fishing participation may be evaluated through license records, business registrations, and fisheries-dependent monitoring programs.
- Catch and effort information collected through creel surveys, dockside sampling, reporting tools, or market monitoring may be used to assess harvest trends and fishing pressure over time.
- Collaboration with seafood vendors, markets, and buyers may improve understanding of fish landings, sales patterns, and species composition within Guam's fisheries.
- Monitoring information generated through the licensing system may support stock assessments, management evaluations, and adaptive fisheries management decisions over time.

3. Visitor and Non-Resident Fishing License

A Visitor and Non-Resident Fishing License is established under this Fisheries Management Plan to support sustainable fishing practices among tourists, temporary visitors, and non-residents participating in fishing activities within Guam's waters. This license category recognizes the importance of tourism to Guam's economy

while helping ensure that visitor fishing activity aligns with local fisheries regulations, sustainability objectives, and community values. The license system is also intended to improve accountability, increase awareness of Guam's fisheries regulations among visitors, and support more accurate understanding of fishing activity occurring across all sectors of the fishery.

Purpose

The Visitor and Non-Resident Fishing License is intended to improve understanding and oversight of fishing activity conducted by visitors and non-residents, including individuals participating in guided fishing charters or short-term recreational fishing activities. By distinguishing visitor fishing participation from resident fishing activity, the license would support improved monitoring of fishing effort, strengthen awareness of local fishing regulations, and help ensure that visitor harvest remains consistent with long-term sustainability objectives.

Key Considerations

- This license category would apply to tourists, temporary visitors, non-resident fishers, and participants in guided fishing charter activities.
- License durations may vary depending on the length and nature of fishing activities, including short-term recreational or charter-based fishing trips.
- Clear communication of Guam's fisheries regulations, allowable gear types, protected species, and management measures would be essential to support responsible fishing practices among visitors.
- Collaboration with charter operators, hotels, tourism agencies, and other partners may support license application, outreach, and education efforts prior to fishing activities.
- Charter operators conducting fishing trips may be required to ensure that clients possess valid licenses and are informed of applicable fisheries regulations.

Anticipated Benefits

- Reduces the likelihood of unintentional violations or overharvesting by visitors unfamiliar with Guam's fisheries regulations and cultural fishing practices.
- Supports outreach and education regarding sustainable fishing practices, reef conservation, and culturally important marine resources.
- Improves understanding of total fishing effort occurring within Guam's waters, including contributions from tourism and charter-based fishing activities.
- Strengthens coordination between the fisheries and tourism sectors.
- Provides additional fisheries-dependent information that may support future management evaluations and adaptive management decisions.

Implementation & Enforcement Approaches

- Visitor and non-residents may apply for a license through online platforms, or by other easily-accessible means to improve compliance and awareness.
- License documentation will be required while participating in fishing activities and presented upon request by enforcement personnel.
- Outreach materials summarizing local fishing regulations, protected species, and allowable fishing practices could accompany license issuance.
- Shoreline access points, marinas, charter vessels, and commonly used visitor fishing areas may serve as practical locations for outreach, monitoring, and enforcement activities.

- Coordination among resource managers, charter operators, tourism partners, and enforcement personnel may support consistent implementation of license requirements and fisheries regulations.

Monitoring Approaches

- License records may be used to evaluate patterns in visitor and non-resident fishing participation over time.
- Information collected through charter operators, creel surveys, shoreline observations, or fisheries-dependent monitoring programs may help assess visitor fishing effort and harvest trends.
- Collaboration with tourism partners and charter businesses may improve understanding of seasonal fishing activity and visitor participation levels.
- Monitoring information generated through the license program may contribute to fisheries assessments, management evaluations, and adaptive management efforts over time.

4. Commercial Seafood Vendor and Market License

A Commercial Seafood Vendor and Market License is established under this Fisheries Management Plan to support sustainable seafood sales and improve accountability within Guam's fisheries supply chain. This license category applies to businesses and individuals engaged in the commercial sale or distribution of marine resources, including fish markets, restaurants, roadside vendors, wholesalers, and other seafood sellers. By strengthening oversight at the point of sale, this licensing system is intended to improve traceability of seafood products, strengthen implementation of fisheries regulations, and improve understanding of how marine resources move from harvest to market within Guam's fisheries.

Purpose

The Commercial Seafood Vendor and Market License is intended to improve oversight, traceability, and transparency within Guam's seafood market sector. By linking seafood sales to licensed fishing activity and authorized vendors, the license would support improved monitoring of seafood distribution, strengthen implementation of fisheries regulations, and help ensure that commercially sold seafood is harvested in accordance with management measures established under the Guam Coastal Fisheries Management Plan.

Key Considerations

- This license category would apply to businesses and individuals engaged in the commercial sale or distribution of seafood products within Guam.
- Vendors may be required to source seafood from appropriately licensed commercial fishers or legally authorized suppliers.
- Clear communication regarding protected species, size limits, seasonal restrictions, and other applicable fisheries regulations would be necessary to support lawful seafood sales.
- Coordination between fishers, seafood vendors, restaurants, wholesalers, and resource managers would support more consistent implementation of fisheries management measures.
- Recordkeeping or reporting requirements may help improve seafood traceability and strengthen fisheries-dependent data collection.

Anticipated Benefits

- Improves understanding of how seafood moves through Guam's commercial markets and contributes to overall fishing pressure.

- Strengthens traceability and accountability within the seafood supply chain.
- Supports implementation of fisheries regulations related to protected species, size limits, and commercial harvest restrictions.
- Enhances awareness among vendors and consumers regarding sustainable seafood practices and responsible sourcing.
- Improves coordination and information-sharing among fishers, vendors, buyers, and resource managers.

Implementation & Enforcement Approaches

- Seafood vendors and markets may be required to maintain valid license documentation and present records upon request by enforcement personnel.
- Market inspections, vendor outreach, and dockside monitoring may help support implementation of fisheries regulations and improve seafood traceability.
- Educational materials and outreach efforts could help vendors better understand species protections, size restrictions, and sourcing requirements.
- Coordination among resource managers, enforcement officers, seafood vendors, and commercial fishers may strengthen implementation of seafood regulations and reduce unlawful sales activities.
- Penalties for unlawful sale, purchase, or distribution of restricted species may help discourage repeated violations and support fair participation within the seafood marketplace.

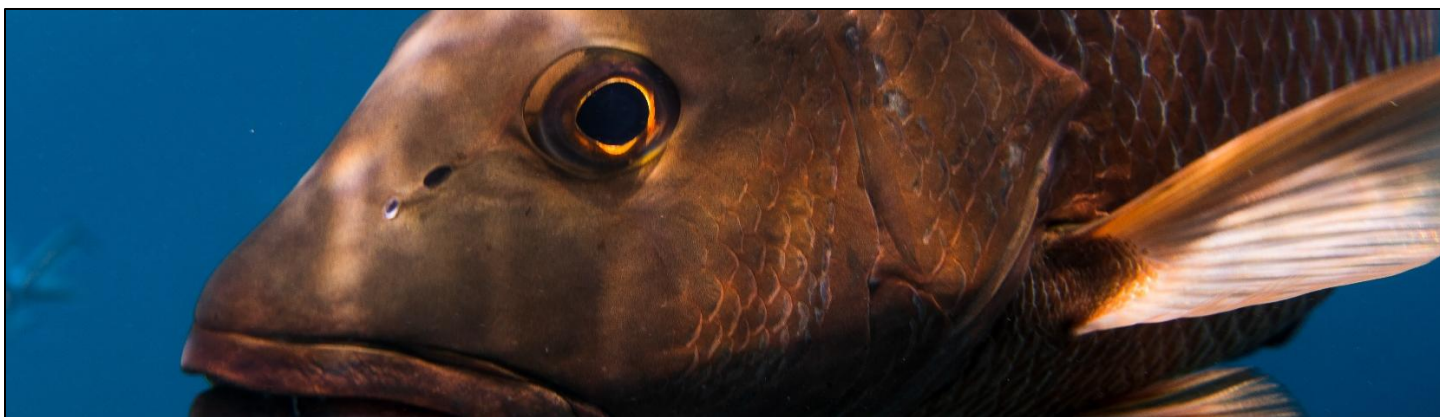
Monitoring Approaches

- License records and vendor participation data may be used to evaluate trends in seafood sales and market activity over time.
- Market observations, seafood sales records, and fisheries-dependent monitoring information may provide insight into harvest trends, species composition, and seafood distribution patterns.
- Comparing information from commercial fishing reports, vendor records, and market availability may improve understanding of how marine resources move through Guam's fisheries system.
- Monitoring information generated through the vendor licensing system may support stock assessments, management evaluations, seafood traceability efforts, and adaptive fisheries management decisions.

Collectively, the licensing and permitting measures described in this chapter are intended to strengthen understanding, accountability, and communication across Guam's fisheries. By improving visibility into fishing participation, harvest activities, and seafood distribution, these measures can support more informed fisheries management, strengthen implementation of regulations, and improve the ability to evaluate fishing pressure over time

Table 3: Proposed Licensing for the Guam Coastal FMP & Fee Schedule

Licenses	Description	Proposed Fee	Review/ Adjustment Process
Recreational & Subsistence Fishing License	A person must have a Recreational/Subsistence Fishing License in order to fish within the waters of Guam for sustenance and recreational purposes. Primarily for Guam residents.	Free/one-year	Phase in with 6-month grace period; review and adjust in three years
Visitor & Non-Resident Fishing License	Non-residents, visitors, and tourists who are fishing in the waters of Guam.	\$10/day/person <i>or</i> \$40/week/person <i>or</i> \$70/year/person	Phase in with 6-month grace period; review and adjust in three years
Commercial Fishing License	A person must have a CFL in order to fish commercially, with the primary purpose of selling. CFL holders should also be registered with a Business License at Guam Rev & Tax.	Residents: \$100/year/person Non-Residents: \$200/year/person	Phase in with 6-month grace period; review and adjust in three years
Commercial Seafood Vendor & Market License	Every business that sells fish – such as roadside vendors and commercial fish markets – must have a commercial vendor license.	Annual fee of \$250	Phase in with 6-month grace period; review and adjust in three years



E. FISHERIES MANAGEMENT MEASURES

Non-spatial fisheries management measures focus on regulating how fishing occurs, rather than restricting where fishing may take place. In island fisheries, these measures are commonly used to reduce fishing pressure on vulnerable species, protect critical life stages, and align harvest practices with the biological characteristics of fish populations, while maintaining access to fishing grounds that are culturally, socially, and economically important to local communities. Unlike area-based closures, non-spatial measures can be applied across broad geographic areas and may provide flexible management tools for addressing observed declines in fish size, biomass, abundance, or reproductive capacity.

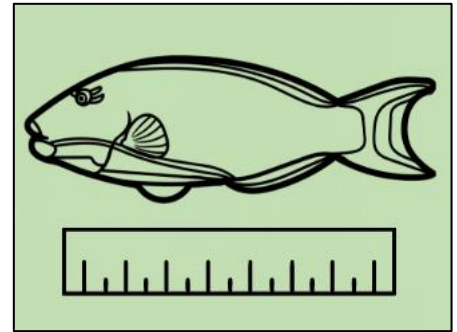
The management measures described in this chapter are intended to function as complementary components of a broader fisheries management strategy. Depending on species biology, fishing pressure, and management objectives, these measures may be implemented individually or in combination to support stock rebuilding, improve long-term fisheries resilience, and reduce the likelihood that more restrictive management actions become necessary in the future. The measures outlined in this chapter include minimum size limits, species protections, commercial harvest and sales restrictions, and regulations on high-efficiency fishing practices.

These measures are informed by fisheries science, local ecological knowledge, community input, and management approaches used throughout Micronesia and other Pacific Island jurisdictions facing similar fisheries challenges. Together, they provide a structured regulatory framework that can be aligned with specific species of concern based on available biological information, fisheries monitoring data, and community priorities.

Importantly, these management measures are intended to operate within an adaptive management framework. Monitoring results, fisheries-dependent and fisheries-independent data, and continued feedback from fishers and community members will help inform future evaluations of effectiveness and guide potential adjustments to management strategies over time.

1. Minimum Size Limit

Minimum size limits are a fisheries management measure established under this plan to ensure that fish have the opportunity to reach sexual maturity and reproduce at least once before being harvested. For species experiencing declines in size, biomass, or overall abundance, minimum harvest sizes are intended to reduce fishing pressure on juveniles and smaller sub-adults while still allowing continued fishing opportunities for mature individuals.



In reef fisheries, size-based management is particularly effective because fish size is closely linked to reproductive output. Larger individuals generally produce more eggs, spawn more frequently, and contribute disproportionately to population replenishment. By protecting immature fish from harvest, minimum size limits help maintain reproductive capacity, support stock rebuilding, and improve long-term fishery sustainability without requiring full harvest closures or restricting access to fishing grounds.

Minimum size limits established under this plan are intended to be informed by available biological and life-history information, including species-specific size at maturity, growth patterns, and reproductive characteristics. Where possible, management thresholds should reflect Guam-specific life-history data and local ecological conditions rather than relying solely on generalized regional estimates. This approach allows management measures to better reflect the biology of Guam's reef fisheries and improve the likelihood of long-term effectiveness.

Anticipated Benefits

Minimum size limits established under this plan are expected to:

- increase spawning output by allowing fish to mature and reproduce before harvest;
- support long-term stock rebuilding while maintaining fishing opportunities;
- preserve more natural size and age structures that contribute to population stability, ecosystem resilience, and reef health;
- provide a clear, measurable, and science-based management threshold that can be readily communicated, monitored, and enforced; and
- align fishing practices with Guam-specific biological information and fisheries management objectives.

Minimum size limits are among the most widely used fisheries management measures throughout Micronesia and the broader Pacific region. Jurisdictions such as Palau and the Commonwealth of the Northern Mariana Islands have implemented minimum harvest sizes for key reef fish species, including groupers and parrotfishes, as a means of reducing juvenile harvest and supporting long-term fisheries sustainability.

Implementation & Enforcement Approaches

- Minimum size limits would establish clearly defined legal harvest sizes for designated species based on available biological and fisheries information.
- Outreach materials, species identification guides, measuring references, and community workshops may be used to improve understanding of species-specific size requirements and regulations.
- Size measurements may be conducted during dockside inspections, market monitoring, shoreline observations, and other fisheries enforcement activities.

- Fish markets, roadside vendors, restaurants, and seafood distributors may be monitored to discourage the sale, possession, or distribution of undersized fish.
- Coordination among fishers, vendors, resource managers, and enforcement personnel would support consistent implementation and improve awareness of applicable regulations.

Monitoring Approaches

- Fisheries-dependent and fisheries-independent monitoring programs will be used to evaluate changes in fish size, biomass, and population structure over time.
- Creel surveys, dockside sampling, market observations, fisher interviews, and fisheries surveys may provide information on harvest composition and compliance with minimum size limits.
- Monitoring data may be periodically evaluated to assess whether size limits are contributing to increased reproductive capacity, stock rebuilding, and improved fishery conditions.
- Life-history information and fisheries monitoring results may be used to refine minimum size thresholds through adaptive management as new biological data become available.

2. No-Take Protection of Nearly-Depleted Species

Full harvest prohibitions, or no-take protections, are among the strongest fisheries management measures available for species experiencing severe depletion, extremely low abundance, or heightened biological vulnerability to fishing pressure. Under this plan, no-take protections are intended for species whose populations have declined to levels where continued harvest may compromise recovery or threaten long-term persistence within Guam’s waters.



This management measure is most appropriate for species exhibiting characteristics such as slow growth, delayed maturity, low reproductive rates, limited population densities, or high susceptibility to fishing pressure. In these situations, partial management measures such as size limits or gear restrictions may not provide sufficient protection to allow meaningful stock rebuilding within an ecologically relevant timeframe.

By eliminating harvest pressure on highly depleted species, no-take protections are intended to allow populations the opportunity to rebuild reproductive capacity, increase abundance, and restore ecological function over time. These protections may also serve as a precautionary management response when scientific uncertainty exists but available biological information and fisheries observations indicate elevated risk of local population collapse or extirpation.

Anticipated Benefits

No-take protections for nearly-depleted species are expected to:

- support population rebuilding by eliminating direct fishing mortality;
- protect remaining reproductive individuals that are critical for recovery of spawning populations;
- maintain ecological functions performed by vulnerable species within Guam’s reef ecosystems;
- provide a precautionary management response when population status is uncertain but risk of collapse is high; and
- reduce the likelihood of local extirpation and the need for more restrictive recovery measures in the future.

Throughout Micronesia and the broader Pacific region, full harvest prohibitions have been implemented for highly vulnerable reef fish species, particularly large-bodied and slow-growing fishes that are highly susceptible to overfishing. While no-take protections may present social and economic challenges, they are generally most effective when supported by biological data, fisheries monitoring, and clear recovery objectives.

Under this plan, no-take protections are intended to be applied selectively to species identified as being at elevated risk of severe depletion or local collapse. These protections would be accompanied by continued fisheries monitoring, outreach, and periodic evaluation to assess recovery trends and management effectiveness over time.

Implementation & Enforcement Approaches

- No-take protections would prohibit the harvest, possession, sale, purchase, and distribution of designated protected species within Guam's fisheries.
- Outreach materials, species identification guides, and public education efforts may be used to improve awareness of protected species and applicable regulations.
- Fish markets, seafood vendors, restaurants, roadside sellers, landing sites, and shoreline access points may be monitored to discourage unlawful harvest or sale of protected species.
- Enforcement personnel may conduct inspections during fishing, landing, transport, or commercial sales activities to verify compliance with species protections.
- Coordination among fishers, vendors, resource managers, and enforcement agencies would support implementation, awareness, and reporting of unlawful harvest activities.

Monitoring Approaches

- Fisheries-independent monitoring programs may be used to evaluate changes in species abundance, biomass, size structure, and distribution over time.
- Underwater surveys, creel surveys, dockside observations, market inspections, and fisher interviews may provide information on species occurrence and potential unlawful harvest.
- Monitoring results may be periodically evaluated to assess recovery progress, population trends, and effectiveness of species protections.
- Biological monitoring and community observations may inform future adaptive management decisions, including potential adjustments to protection measures if recovery objectives are achieved.

3. Commercial Harvest, Sale, and Import Restrictions for Vulnerable Species

Commercial harvest, sale, and import restrictions are fisheries management measures intended to reduce market-driven fishing pressure on vulnerable reef fish species while allowing limited subsistence, cultural, or recreational harvest where appropriate. These measures are particularly relevant for species that are large-bodied, slow-growing, highly valued in seafood markets, or biologically vulnerable to overfishing and slow population recovery.

Commercial demand can substantially increase fishing pressure beyond levels associated with personal or cultural harvest. By restricting the commercial sale and importation of designated vulnerable species, this management approach is intended to reduce economic incentives that contribute to intensive harvest and localized depletion, while helping maintain community access for non-commercial purposes where biologically appropriate.



Under this plan, commercial restrictions may include prohibitions on the sale, purchase, trade, distribution, or importation of designated species identified as vulnerable to overexploitation. These measures are intended to support stock rebuilding, reduce commercial fishing pressure, and improve long-term sustainability without necessarily requiring full no-take protections across all fishing sectors.

Anticipated Benefits

Commercial harvest, sale, and import restrictions for vulnerable species are expected to:

- reduce fishing pressure associated with market demand and commercial exploitation;
- support rebuilding and long-term sustainability of biologically vulnerable fish populations;
- prioritize local subsistence, cultural, and recreational access over commercial market use;
- improve traceability and accountability within Guam's seafood marketplace;
- reduce the likelihood of population collapse and the need for broader harvest prohibitions in the future; and
- support more precautionary management of species exhibiting signs of population decline.

Commercial restrictions provide a balanced management approach by reducing intensive market-driven harvest while maintaining limited community access for traditional, subsistence, or recreational purposes. Within Guam, these measures are intended to be applied to selected species identified through fisheries monitoring, life-history information, and community input as being particularly vulnerable to commercial fishing pressure or population decline.

Implementation & Enforcement Approaches

- Designated species would be prohibited from commercial harvest, sale, purchase, trade, distribution, or importation within Guam.
- Fish markets, seafood vendors, restaurants, wholesalers, roadside sellers, and import pathways may be monitored to discourage unlawful sale or distribution of restricted species.
- Outreach materials, species identification guides, and vendor education efforts may be used to improve awareness of commercial restrictions and protected species.
- Commercial fishers, seafood vendors, and importers may be required to maintain documentation demonstrating lawful sourcing of seafood products.
- Coordination among resource managers, enforcement agencies, seafood vendors, and commercial fishers would support implementation, seafood traceability, and consistent application of regulations.

Monitoring Approaches

- Fisheries-dependent and fisheries-independent monitoring programs may be used to evaluate changes in abundance, biomass, size structure, and harvest trends for restricted species over time.
- Market inspections, dockside surveys, seafood monitoring, creel surveys, and fisher interviews may provide information on harvest trends and potential unlawful sales activity.
- Monitoring of seafood imports and market availability may help assess effectiveness of commercial restrictions and identify shifts in fishing pressure.
- Biological monitoring and fisheries data may be periodically evaluated to assess population responses and inform future adaptive management decisions.

4. Restriction on Nighttime Commercial Spearfishing

Nighttime commercial spearfishing is identified under this plan as a high-efficiency fishing activity capable of placing disproportionate pressure on Guam's reef fish populations. Many reef-associated species become less alert at night, aggregate in predictable locations, or seek shelter within reef structures, making them particularly vulnerable to nighttime harvest. When combined with commercial harvest incentives, this fishing method can result in rapid and concentrated extraction of reef fish biomass over relatively short periods of time.



In Guam, fishing activity that violates Marine Preserve Area regulations most frequently occurs during nighttime hours and is often associated with coordinated harvest activity intended for commercial sale. Outside of Marine Preserve Areas, sustained nighttime commercial spearfishing effort has resulted in high rates of extraction occurring repeatedly in some reef areas. The frequency, consistency, and efficiency of this fishing practice place additional pressure on reef fish populations that are already affected by fishing pressure, habitat degradation, and other environmental stressors.

To address these concerns, this plan establishes restrictions on nighttime commercial spearfishing for individuals operating under a Commercial Fishing License. Under this management measure, individuals licensed for commercial fishing would be prohibited from engaging in spearfishing activities during nighttime hours. This restriction is intended to reduce excessive harvest efficiency while maintaining access to daytime fishing opportunities and other lawful fishing methods.

The measure is designed to specifically address market-driven nighttime harvest pressure while minimizing impacts to subsistence, cultural, and non-commercial fishing practices. By reducing commercial extraction during nighttime periods when reef fish are most vulnerable, this management measure is intended to support stock rebuilding, improve reef fish resilience, and complement existing conservation measures already implemented in Guam.

Anticipated Benefits

Restrictions on nighttime commercial spearfishing are expected to:

- reduce fishing efficiency and extraction rates for heavily targeted reef fish species;
- protect vulnerable nighttime behaviors, resting aggregations, and sheltering habitats used by reef fishes;
- reduce concentrated harvest pressure on parrotfishes and other reef-associated species vulnerable to nighttime harvest;
- support stock rebuilding while maintaining access to commercial fishing through less intensive daytime methods;
- complement existing management measures, including Marine Preserve Areas and the prohibition on SCUBA-assisted spearfishing; and
- improve the long-term sustainability and resilience of Guam's reef fish populations.

Restrictions targeting nighttime commercial harvest may provide an effective means of reducing fishing pressure without implementing full fishery closures or eliminating access to reef fisheries entirely.

Implementation & Enforcement Approaches

Because nighttime fishing activity can be difficult to observe directly, implementation of this management measure would rely on a combination of licensing requirements, market oversight, field observations, and community-based reporting approaches.

- Individuals operating under a Commercial Fishing License would be prohibited from conducting spearfishing activities during nighttime hours.
- Commercial license holders found in possession of spearfishing equipment and freshly harvested fish with spear wounds during nighttime hours may be subject to inspection or enforcement action, particularly when circumstances indicate potential commercial harvest activity. This approach would allow enforcement efforts to rely not only on direct observation of fishing activity, but also on possession, transport, landing, or sale of catch associated with nighttime commercial spearfishing.
- Enforcement efforts may prioritize landing sites, boat ramps, marinas, shoreline access points, and fish markets where commercial catch enters the seafood supply chain.
- Early morning dockside inspections and market observations may be used to identify patterns consistent with nighttime commercial harvest activity.
- Fish markets, seafood vendors, restaurants, and roadside sellers may be monitored to discourage unlawful sale of fish harvested through nighttime commercial spearfishing.
- Coordination among resource managers, enforcement officers, seafood vendors, and fishing communities would support improved communication, reporting, and implementation of the restriction.
- Outreach materials and public education efforts may be used to clearly communicate allowable activities, license expectations, and the rationale for the restriction.
- Meaningful penalties for repeated or intentional violations may help discourage unlawful commercial nighttime harvest activity.
- Anonymous community reporting mechanisms may assist resource managers and enforcement personnel in identifying repeated or large-scale violations.
- Monitoring and enforcement efforts may prioritize locations or activities associated with repeated nighttime commercial fishing concerns identified through fisheries observations or community input.

Monitoring Approaches

- Fisheries-dependent and fisheries-independent monitoring programs may be used to evaluate changes in reef fish biomass, abundance, and size structure following implementation of nighttime commercial spearfishing restrictions.
- Creel surveys, dockside sampling, market monitoring, and fisher interviews may provide information on changes in nighttime fishing activity and commercial harvest trends over time.
- Monitoring of fish markets and seafood vendors may help evaluate whether restricted nighttime commercial harvest continues entering the marketplace.
- Field observations and enforcement records may provide additional information on implementation challenges, recurring violations, and areas requiring increased outreach or enforcement presence.
- Community feedback and fisher observations may contribute to ongoing evaluation of how the restriction is functioning and whether additional adjustments are needed through adaptive management.
- Monitoring results may be periodically reviewed to assess whether the restriction is contributing to reduced fishing pressure and improved reef fish population conditions over time.

Link to Species-Specific Management Measures

The non-spatial strategies outlined above are intended to be applied selectively, based on species-specific life history characteristics, population status, and community input. In the following section, *Species-Specific Management Measures*, these strategies are aligned with individual species that are experiencing declines or elevated fishing pressure. This stepwise approach – first identifying available management options, then matching them to species needs – supports a transparent, science-informed, and community-responsive fisheries management framework.



F. SPECIES-SPECIFIC MANAGEMENT MEASURES

Guam’s coral reef fisheries are composed of hundreds of species that collectively support food security, cultural practices, livelihoods, and ecosystem health. While many species continue to persist under current fishing pressure, others show signs of decline, including reductions in abundance, biomass, and average size over time. Addressing these trends requires careful prioritization to ensure that management actions are effective, measurable, and socially feasible.

The species addressed in this plan exhibit different life-history characteristics, ecological roles, levels of fishing pressure, and population trends. As a result, management measures were selected on a species-by-species basis using available fisheries-dependent and fisheries-independent data, local life-history information, fisher observations, and community input gathered throughout the fisheries management planning process.

Rather than applying identical management measures across all reef fish species, this plan uses a targeted management approach intended to align conservation measures with the biological vulnerability and fishery status of each species. Species exhibiting signs of severe depletion or slow recovery may require stronger protections, while species with moderate declines may be managed through size limits or restrictions on commercial harvest.

Together, these species-specific management measures are intended to reduce fishing pressure, protect reproductive capacity, support stock rebuilding, and maintain long-term access to Guam’s reef fisheries.

OVERVIEW OF SPECIES UNDER MANAGEMENT IN THE GUAM COASTAL FISHERIES MANAGEMENT PLAN



Bolbometopon muricatum
Humphead parrotfish
Atuhong



Naso unicornis
Bluespine unicornfish
Tataga'



Caranx melampygus
Bluefin trevally
Tarakitu



Chlorurus frontalis
Tanface parrotfish
Palakse', laggua'



Chlorurus microrhinos
Steephead parrotfish
Palakse', laggua'



Scarus altipinnis
Filament-fin parrotfish
Palakse', laggua'



Hipposcarus longiceps
Longnose parrotfish
Gualafi'



Scarus rubroviolaceus
Ember parrotfish
Palakse', laggua'



Monotaxis grandoculis
Bigeye bream
Matan hagan

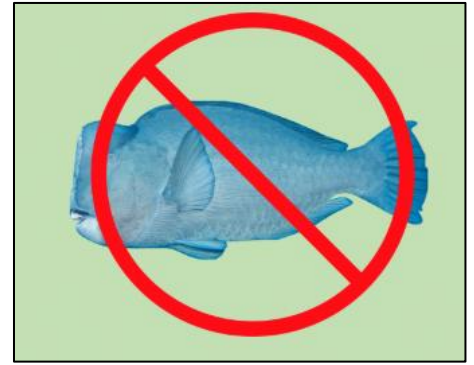


Cheilinus undulatus
Napoleon wrasse
Tangison

1. No-Take of *Bolbometopon muricatum* (Atuhong)

Background and Ecological Importance

The humphead parrotfish (*Bolbometopon muricatum*), locally known as atuhong, is one of the largest reef-associated herbivorous fishes in the Indo-Pacific and plays a critical ecological role in maintaining coral reef health and function. As a powerful grazer and bioeroder, this species helps control algal growth, facilitate coral recruitment, and contribute to reef sediment production and structural complexity. Through these ecological functions, *B. muricatum* supports the resilience and long-term stability of coral reef ecosystems.



Due to its large body size, slow growth, delayed maturity, long lifespan, and tendency to form predictable aggregations, *B. muricatum* is highly vulnerable to overfishing. These biological characteristics limit the species' ability to recover quickly from population declines and make it particularly susceptible to targeted harvest pressure.

Long-Term Management Goal

The long-term management goal for *B. muricatum* is to rebuild local populations to levels capable of supporting ecological functionality, population recovery, and potential future cultural or subsistence use, while ensuring long-term sustainability through continued protection, monitoring, and adaptive management.

Status and Observed Trends in Guam

In Guam, adult humphead parrotfish have been largely absent from both fisheries-dependent and fisheries-independent datasets for several decades. Recent fisheries-independent monitoring efforts have documented the presence of juveniles within nearshore habitats, indicating that reproduction is still occurring somewhere within or near Guam's waters. However, the persistent absence of adult individuals suggests that fish may be experiencing high fishing mortality before reaching reproductive maturity, preventing meaningful contribution to local spawning populations.

This pattern – characterized by the presence of juveniles without corresponding adult representation – is a strong indicator of recruitment bottlenecks, severe depletion, and unsustainable fishing pressure. Given the species' life-history characteristics and extremely low observed abundance, continued harvest of adult individuals could further delay recovery and increase the risk of local functional extinction.

Management Measure

To support recovery of *Bolbometopon muricatum* within Guam's waters, this plan establishes a full no-take protection for the species. Under this management measure, the harvest, possession, sale, purchase, distribution, and importation of *B. muricatum* would be prohibited.

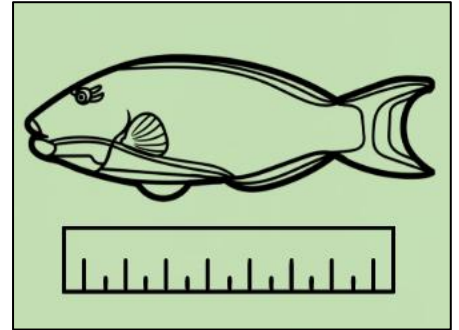
Because of the species' severely depleted status, slow recovery potential, and ecological importance to coral reef ecosystems, partial management measures such as minimum size limits or commercial-only restrictions are not considered sufficient to support recovery at this time. Full protection is intended to eliminate direct fishing mortality and maximize the likelihood of long-term population rebuilding.

2. Minimum Size Limits for 9 Species

Minimum size limits established under this Fisheries Management Plan are intended to protect juvenile and immature fish by ensuring individuals have the opportunity to reach reproductive maturity and contribute to spawning populations before harvest. This management measure directly addresses long-term declines in fish size, biomass, and reproductive capacity documented through fisheries monitoring and repeatedly observed by Guam's fishing community.

Many of Guam's most commonly harvested reef fish species are experiencing continued fishing pressure across both commercial and non-commercial sectors. Fishers have consistently expressed concerns regarding the harvest of undersized fish and the need to maintain healthy breeding populations capable of replenishing Guam's fishing grounds over time. By protecting immature fish from harvest, minimum size limits are intended to support stock rebuilding, maintain more natural age and size structures, and improve long-term sustainability of Guam's reef fisheries.

Minimum size thresholds identified under this plan are informed by available local life-history information, fisheries-dependent and fisheries-independent monitoring data, and community input gathered throughout the fisheries management planning process.



a. 12-inch Minimum Size Limit

Under this Fisheries Management Plan, the following eight species would be managed under a minimum harvest size limit of 12 inches fork length. Harvest, possession, sale, or distribution of individuals below 12 inches fork length would be prohibited within Guam's water:

1. *Caranx melampygus*
2. *Chlorurus frontalis*
3. *Chlorurus microrhinos*
4. *Hipposcarus longiceps*
5. *Monotaxis grandoculis*
6. *Naso unicornis*
7. *Scarus altipinnis*
8. *Scarus rubroviolaceus*



The only exception would apply to newly recruited juvenile bluefin trevally (*Caranx melampygus*; i'e'), which may continue to be harvested at sizes up to 3 inches fork length to accommodate traditional and culturally important harvest practices.

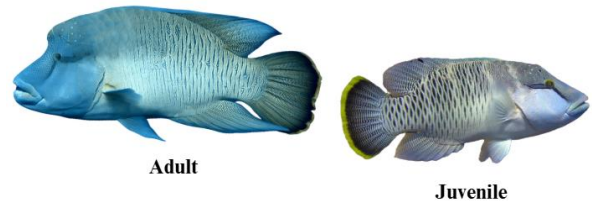
These species collectively represent some of Guam's most commonly harvested reef fishes and have shown moderate to severe signs of decline through fisheries-dependent and fisheries-independent assessments. Observed declines in fish size, biomass, and population structure are consistent with long-standing concerns expressed by fishers regarding increasing harvest pressure and reduced availability of larger fish on Guam's reefs.

For these species, a 12-inch minimum size limit is intended to reduce juvenile harvest, improve reproductive output, and maintain spawning populations capable of supporting long-term fisheries sustainability. This

management measure also aligns harvest practices more closely with species-specific maturity patterns and locally derived biological information.

b. 24-inch Minimum Size Limit

Under this Fisheries Management Plan, the Napoleon wrasse (*Cheilinus undulatus*) would be managed under a minimum harvest size limit of 24 inches fork length. Harvest, possession, sale, or distribution of individuals below 24 inches fork length would be prohibited within Guam's waters.



Fisheries-dependent and fisheries-independent monitoring efforts contain insufficient observations of *C. undulatus* to detect meaningful trends in abundance, biomass, or size structure over time. However, the absence of detectable trends reflects the rarity of the species rather than limitations in monitoring effort. Low encounter rates across multiple surveys indicate that *C. undulatus* remains uncommon throughout Guam's reef ecosystems and may be highly vulnerable to even limited fishing pressure.

Members of Guam's fishing community have anecdotally reported increased sightings of humphead wrasse in recent years, potentially associated with the 2021 prohibition on SCUBA-assisted spearfishing. While these observations may represent early signs of localized recovery, there are currently limited species-specific protections in place to ensure that recovering individuals are able to reach reproductive maturity before harvest. Without additional management measures, any localized recovery may be vulnerable to renewed fishing pressure.

The 24-inch minimum size limit for *C. undulatus* is intended to provide additional protection for immature and sub-adult individuals while supporting rebuilding of local populations over time.

Long-Term Management Goal

The long-term management goal for species managed under minimum size limits is to maintain healthy age and size structures, protect reproductive capacity, support ecological balance within Guam's reef ecosystems, and sustain fisheries resources for future subsistence, cultural, recreational, and commercial use.

3. “Big Six” Commercial Measures

Under this Fisheries Management Plan, the following six reef fish species would be prohibited from commercial harvest, sale, purchase, trade, distribution, and importation within Guam:

1. *Cheilinus undulatus*
2. *Chlorurus frontalis*
3. *Chlorurus microrhinos*
4. *Hipposcarus longiceps*
5. *Scarus altipinnis*
6. *Scarus rubroviolaceus*



Collectively referred to throughout the management planning process as the “Big 6,” these species represent some of Guam’s largest, most culturally recognized, and ecologically important reef fishes. Several of these species are large-bodied parrotfishes that play critical functional roles on coral reefs through grazing and bioerosion, helping control algal growth, facilitate coral recruitment, and maintain reef resilience. Due to their relatively slow growth, delayed maturity, predictable behavior, and high market value, these species are particularly vulnerable to sustained fishing pressure and commercial exploitation.

Fisheries-dependent and fisheries-independent analyses conducted for this FMP identified concerning trends among multiple species within this group, including decadal declines in fish size, biomass, and overall abundance. These trends closely align with long-standing concerns expressed by Guam’s fishing community regarding the increasing rarity of large-bodied reef fish – most notably, parrotfishes – and reductions in the availability of mature individuals within nearshore fishing grounds.

Commercial demand can substantially increase fishing pressure by creating financial incentives for repeated and high-volume harvest. For biologically vulnerable reef fishes, market-driven harvest can accelerate population declines beyond levels associated with subsistence, cultural, or recreational fishing alone. Restricting commercial harvest and sale is therefore intended to reduce intensive extraction pressure while still maintaining limited community access for non-commercial purposes where biologically appropriate.

The prohibition on commercial harvest, sale, and importation of these six species is intended to:

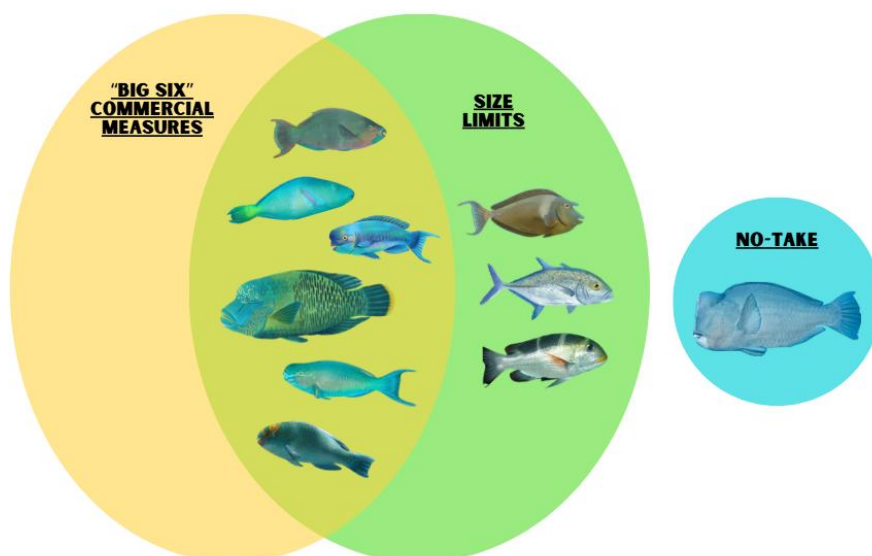
- reduce market-driven fishing pressure on vulnerable reef fish populations;
- support rebuilding of spawning biomass and reproductive capacity;
- maintain ecological functions performed by large-bodied reef herbivores and predators;
- prioritize subsistence, cultural, and recreational access over commercial exploitation; and
- improve long-term sustainability and resilience of Guam’s reef fisheries.

For imported seafood products, restricting importation of these species would further support enforcement and seafood traceability by reducing opportunities for illegally harvested fish to enter local markets under the appearance of imported product. This measure is intended to improve consistency in implementation and strengthen accountability throughout the seafood supply chain.

Together, these commercial restrictions represent a targeted management response for species identified as particularly vulnerable to continued fishing pressure and market-driven exploitation. The long-term management goal for the “Big 6” is to support rebuilding of fish populations to levels capable of sustaining ecological function, cultural importance, and long-term community use within Guam’s reef ecosystems.

Table 4. Summary of Species-Specific Management Measures

Management Measure	Species Under Management	Projected Benefits	Target	Review/ Adjustment Process
No-Take	<i>Bolbometopon muricatum</i>	- Rebuild stocks - Restore ecosystem and fishery benefits	Detect ≥ 1 adult at $\geq 5\%$ of standardized transect sites within 10-15 years	Evaluation after 10 years
Minimum size limit of 12 inches	<i>Caranx melampygus</i> <i>Chlorurus frontalis</i> <i>Chlorurus microrhinos</i> <i>Hipposcarus longiceps</i> <i>Monotaxis grandoculis</i> <i>Naso unicornis</i> <i>Scarus altipinnis</i> <i>Scarus rubroviolaceus</i>	- Allow fish to reproduce before harvest - Protect juvenile fish - Increase population resilience - Reduces risk of stock collapse	Size at selectivity (SL50) increases to 12 inches or greater	Evaluation after 3 years
Minimum size limit of 24 inches	<i>Cheilinus undulatus</i>	- Allow fish to reproduce before harvest - Protect juvenile fish - Increase population resilience - Reduces risk of stock collapse	Size at selectivity (SL50) increases to 12 inches or greater	Evaluation after 3 years
“Big Six” Commercial Measures	<i>Cheilinus undulatus</i> <i>Chlorurus frontalis</i> <i>Chlorurus microrhinos</i> <i>Hipposcarus longiceps</i> <i>Scarus altipinnis</i> <i>Scarus rubroviolaceus</i>	- Reduces harvest pressure on vulnerable, heavily targeted species - Encourages targeting alternative species that are more resilient or better managed - Prevents dominance of smaller, faster-growing species	20% increase in mean transect density	Evaluation after 3 years



G. LIFE HISTORY INFORMATION FOR SPECIES UNDER MANAGEMENT

Effective fisheries management depends not only on understanding which species are experiencing fishing pressure, but also on understanding how those species grow, mature, reproduce, and respond biologically to harvest. For the majority of species identified under this Fisheries Management Plan, Guam is in a strong position to support science-based management because locally derived life-history information is available for most species to be managed. These datasets provide a critical biological foundation for developing management measures that align harvest regulations with the natural life cycles and reproductive capacity of targeted species.

Life-history information refers to the biological characteristics of a species, including growth rates, age and size at sexual maturity, reproductive output, longevity, and population dynamics. These characteristics are essential for evaluating how species respond to fishing pressure and determining what management measures are necessary to maintain sustainable populations over time. Within fisheries management, life-history information is commonly used to establish biologically informed regulations such as minimum harvest sizes, harvest restrictions, and rebuilding measures intended to protect reproductive individuals and maintain spawning populations.

Locally derived life-history information is particularly important because reef fish species often exhibit substantial variation in biological traits across geographic regions and environmental conditions. Factors such as habitat quality, fishing pressure, reef productivity, and local oceanographic conditions can influence growth rates, maturity schedules, and reproductive output. For example, the growth patterns and reproductive characteristics of *Chlorurus microrhinos* in Guam may differ significantly from populations occurring elsewhere in Micronesia or the broader Pacific region. Reliance solely on generalized regional information may therefore result in management thresholds that do not accurately reflect the biological conditions of Guam's fisheries.

For species managed under this plan, locally derived life-history information has been generated through collaborative research efforts involving scientists, fisheries monitoring programs, and Guam's fishing community. These studies have produced Guam-specific estimates of size at maturity, growth parameters, age structure, and reproductive characteristics that directly inform management decisions. This information allows management measures to be established using biological thresholds that are relevant to Guam's reef ecosystems rather than relying on assumptions derived from other jurisdictions.

For example, minimum size limits established under this Fisheries Management Plan are informed by locally derived size-at-maturity estimates whenever available. Aligning minimum harvest sizes with reproductive maturity increases the likelihood that fish are able to reproduce at least once before becoming vulnerable to harvest, an approach widely recognized as a foundational principle of sustainable fisheries management. Similarly, understanding growth rates, longevity, and reproductive vulnerability helps identify species that may require stronger protections, such as commercial harvest restrictions or no-take management measures.

Even where local life-history datasets exist, fisheries management must recognize that biological traits are not static. Long-term fishing pressure can alter population structure and shift important life-history characteristics, including growth rates, age at maturity, and maximum size. Tropical reef ecosystems are also highly dynamic, with biological traits varying across habitats, environmental conditions, and time periods. As a result, fisheries management should not rely on the assumption of a single fixed biological value, but instead seek to develop management measures that reflect the best available understanding of species biology within Guam's reef ecosystems.

While life-history information is available for most species identified in this plan, important information gaps remain. No local life-history information currently exists for *Bolbometopon muricatum* due to the species' extreme rarity and the inability to sample individuals without causing additional harm to the population. Similarly, Guam-specific life-history information for *Monotaxis grandoculis* has not yet been collected. These information gaps highlight priorities for future research and fisheries monitoring efforts. However, the absence of complete biological information does not preclude management action. For rare or data-limited species, precautionary management measures are often necessary to reduce the risk of further depletion while additional information is collected.

Overall, the availability of Guam-specific life-history information substantially strengthens the scientific foundation of this Fisheries Management Plan. By aligning management measures with the biological characteristics and reproductive capacity of targeted species, the plan supports more informed, adaptive, and precautionary fisheries management. This approach improves the ability of management measures to support stock rebuilding, reduce the risk of overexploitation, and sustain Guam's reef fisheries for future generations.

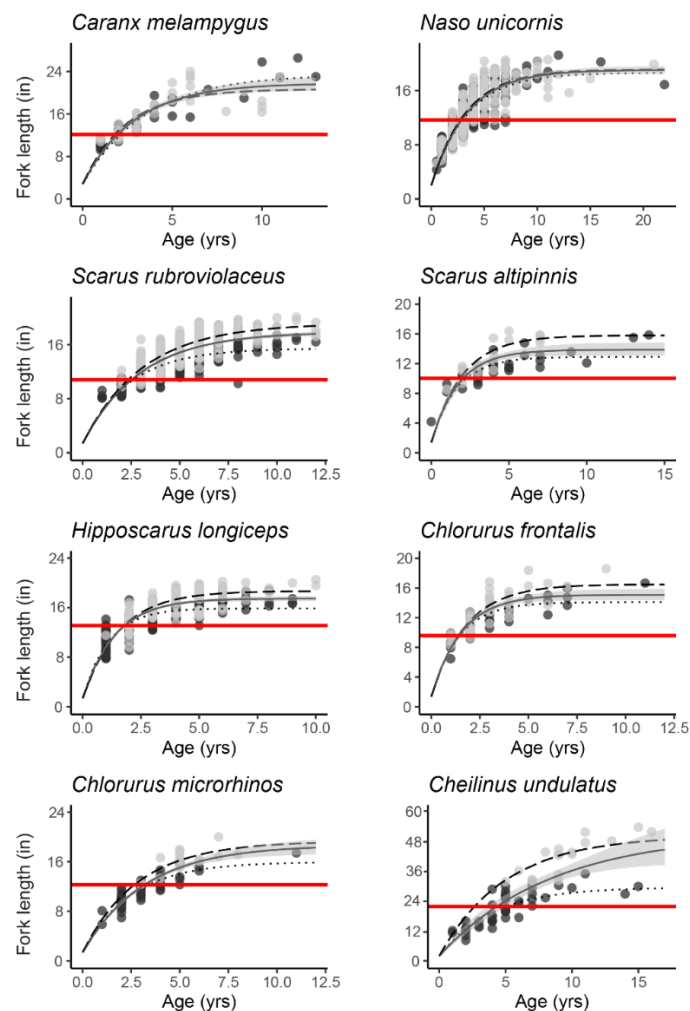


Figure 12. Length-at-age relationships for eight of the ten Species of Concern. Red lines indicate L_{50} , defined as the average length at which at least 50% of individuals in the population have reached sexual maturity and have had the opportunity to reproduce at least once. Local life-history information is not yet available for *Monotaxis grandoculis* and *Bolbometopon muricatum*.

H. UPDATES TO CURRENT FISHERIES REGULATIONS

Guam’s existing fisheries regulations primarily focus on Marine Preserve Areas, selected gear restrictions, and catch or size limits for a limited number of marine invertebrates, such as sea cucumbers. While these regulations represented important conservation measures when first established, many were developed decades ago under substantially different ecological conditions, fishing practices, and levels of fishing pressure. Since that time, Guam’s reef fisheries have experienced continued declines in fish size, biomass, and abundance, while fishing technology, market demand, and patterns of resource use have evolved considerably.

Throughout the fisheries management planning process, members of Guam’s fishing community consistently expressed concerns that existing fisheries regulations are no longer sufficient to address current fishery conditions or protect vulnerable reef fish populations. Fishers repeatedly identified gaps within the current regulatory framework, particularly regarding finfish management, commercial fishing pressure, and the harvest of immature or ecologically important species. Many community members emphasized the need for updated management measures that more accurately reflect present-day fishing realities and the observed condition of Guam’s reef ecosystems.

In response to these concerns, this Fisheries Management Plan identifies updates and additions to Guam’s fisheries regulations intended to strengthen long-term sustainability of reef fisheries while maintaining opportunities for cultural, subsistence, recreational, and commercial fishing. These updates focus on improving management of finfish species, addressing high-efficiency fishing practices, strengthening fisheries monitoring and accountability, and aligning harvest regulations more closely with available biological and fisheries information.

Importantly, the management measures identified in this plan are intended to function within an adaptive management framework. Fisheries conditions, community priorities, and ecological responses will continue to evolve over time, and management strategies may therefore require future adjustment or refinement. Continued participation and feedback from Guam’s fishing community will remain essential in evaluating how these regulations function in practice and identifying where modifications may be necessary to better support both sustainable fisheries and community needs.

TABLE 5: Summary of Existing Gear Regulations & Proposed Revisions

Gear Type	Current Regulation	Revised Regulation
Surround nets	Must be removed within 6 hours of setting.	Must be removed within 6 hours of setting; net must be registered and tagged by the DoAg DAWR.
Gill net	The use of a gill net for the commercial harvest of aquatic animals is prohibited. Net length is limited to 1,000 feet and must be removed within 6 hours.	The use of a gill net for the commercial harvest of aquatic animals is prohibited; net length is limited to 100 feet and must be removed within 6 hours; net must be registered and tagged by the DoAg DAWR.

TABLE 6: Summary of Existing Species Regulations & Proposed Revisions

Species	Current Regulation	Proposed Revised Regulation
<i>Trochus niloticus</i> (aliling)	• 4-inch size limit for commercial harvest, local sales only • No commercial export • No more than 1,000 pieces of <i>Trochus</i> can be taken per person per year for local commercial sale. • The island-wide total commercial harvest shall be set at 10,000 pieces annually. Once this total is obtained, the season shall be closed. • 50 per day, including shells, for personal use	• (All commercial verbiage will be removed.) • No commercial harvesting of <i>Trochus</i> shall be allowed. This does not include cultured <i>Trochus</i> in a Department of Agriculture approved facility. • 25 per day, including shells, for personal use
Harvest of Marine Gastropods Other Than <i>Trochus</i> for Personal Use	• Harvest shall be limited to 30 pieces, shells included of mixed gastropods per person per day. ○ Exception: The personal harvest of selected conchs is permitted. No more than 1,000 per day per person combined of the species <i>Strombus fragilis</i>, <i>Strombus gibberelus</i>, <i>Strombus luhuanes</i>, locally referred to dogas, may be taken.	• Harvest shall be limited to 25 pieces, shells included, of mixed gastropods per person per day. This bag limit includes the personal harvest of selected conchs of the species <i>Strombus fragilis</i>, <i>Strombus gibberelus</i>, and <i>Strombus luhuanes</i>.
Harvest of Marine Bivalves (clams, oysters, and mussels) other than <i>Tridacna</i> for Personal Use	• Harvest shall be limited to 200 pieces, shells included of bivalves combined per person per day.	• Harvest shall be limited to 25 pieces, shells included of bivalves combined per person per day.
Harvest of Echinoderms	• Harvest shall be limited to 100 pieces combined per person per day.	• Harvest shall be limited to 10 pieces combined per person per day.



I. COMPLIANCE AND ENFORCEMENT

1. Importance of Compliance and Enforcement

Effective compliance and enforcement are essential to the success of fisheries management. Even well-designed management measures are unlikely to achieve their intended objectives if regulations are poorly understood, inconsistently applied, or difficult to enforce. In Guam, where reef fisheries hold ecological, cultural, subsistence, and economic importance, effective compliance is necessary to support stock rebuilding, maintain food security, and sustain traditional fishing practices for future generations.

Successful fisheries management depends on a combination of clear regulations, effective monitoring, consistent enforcement, and strong community engagement. Fishers, vendors, and community members must understand the purpose and biological basis of management measures — including minimum size limits, species protections, commercial restrictions, and gear-based regulations — in order to support informed participation and long-term stewardship. Outreach, education, and continued communication with Guam’s fishing community are therefore essential components of effective implementation.

Enforcement provides accountability and helps ensure that unlawful harvest, sale, or fishing practices do not undermine the effectiveness of management measures or place unfair burdens on law-abiding fishers. Effective enforcement requires coordination among enforcement officers, resource managers, seafood vendors, community members, and other partners involved in Guam’s fisheries. Practical enforcement tools may include penalty systems, market inspections, dockside monitoring, reporting requirements, field observations, and possession-based enforcement approaches for certain activities.

This Fisheries Management Plan also recognizes the practical limitations of fisheries enforcement capacity within Guam. With limited personnel and resources available for monitoring and enforcement across Guam’s coastal waters, successful implementation will require strategic prioritization, interagency coordination, and continued support from the fishing community. Community reporting, fisher participation, and public awareness can substantially strengthen the effectiveness of fisheries enforcement efforts by improving communication and increasing visibility of unlawful activities.

By combining clear regulations, consistent enforcement, and community-driven stewardship, the management measures identified in this plan can be implemented more effectively and equitably. Compliance and enforcement

are therefore not solely regulatory functions, but foundational components of long-term fisheries sustainability and shared responsibility for Guam’s marine resources.

2. Outreach & Community Awareness Approaches

Outreach and education will play a critical role in supporting implementation of the management measures identified in this Fisheries Management Plan. Because Guam’s fisheries are closely tied to cultural traditions, food security, and community livelihoods, effective outreach approaches are necessary to ensure that fishers, seafood vendors, businesses, and the broader community clearly understand applicable regulations, the biological rationale behind management measures, and the long-term goals of the plan.

Outreach efforts may include:

- development of clear, user-friendly educational materials explaining species protections, minimum size limits, licensing requirements, and commercial restrictions;
- distribution of illustrated species identification guides, waterproof measuring references, signage, size-limit stickers, and mobile-friendly outreach materials through fishing supply stores, community centers, schools, fish markets, and online platforms;
- community meetings, fisher forums, workshops, and public demonstrations focused on species identification, fish measurement, sustainable fishing practices, and fisheries stewardship;
- outreach campaigns through radio, social media, and local media platforms to improve public awareness of fisheries regulations and management goals;
- engagement with seafood vendors, restaurants, wholesalers, and retailers to improve understanding of commercial restrictions and sustainable seafood sourcing; and
- youth and school-based educational efforts intended to strengthen long-term stewardship and awareness across future generations.

In addition to broad public outreach, continued dialogue with Guam’s fishing community will remain important throughout implementation of this Fisheries Management Plan. Fishers possess valuable local ecological knowledge and observations that can help identify implementation challenges, emerging concerns, and opportunities for future refinement of management measures.

3. General Enforcement Priorities and Capacity Considerations

Due to limited fisheries enforcement capacity within Guam, enforcement efforts under this Fisheries Management Plan will prioritize approaches that maximize visibility, accountability, and effectiveness. Enforcement activities may focus on:

- fish markets, seafood vendors, and other points of commercial sale;
- landing sites, marinas, boat ramps, and commonly used fishing access points;
- activities involving protected species, undersized fish, or unlawful commercial harvest;
- nighttime fishing activity associated with commercial harvest concerns; and
- repeated or large-scale violations of fisheries regulations.

Implementation of fisheries regulations will rely on coordination among resource managers, enforcement personnel, seafood vendors, commercial operators, and the fishing community. Market monitoring, dockside

inspections, shoreline observations, penalty systems, fisheries reporting, and possession-based enforcement approaches may all contribute to improving implementation and accountability across Guam’s fisheries.

Community reporting and public participation are also expected to play important roles in supporting fisheries enforcement efforts. Anonymous reporting mechanisms, communication between fishers and resource managers, and continued public engagement may help improve awareness of unlawful activities and strengthen overall compliance with fisheries regulations.

Specific implementation, enforcement, and monitoring approaches associated with individual management measures are described in Chapter E: Fisheries Management Measures.

4. Guam Conservation Officer Law Enforcement Program

Authority & Staffing

The Director of Agriculture serves ex officio as the Chief Conservation Officer and appoints Deputy Conservation Officers, all of whom have full peace-officer authority—enabling them to carry firearms, make arrests, and issue citations under Guam law. The program is supported by the Civilian Volunteer Conservation Officer Reserve, a volunteer force created to provide supplemental enforcement capacity. Volunteer officers receive training, equipment, and a modest allowance if they volunteer at least 42 hours per month, and they carry the same powers and rights as full-time officers during their service.

Roles & Activities

Conservation officers enforce local and federal natural-resource laws related to fisheries, wildlife, forestry, and conservation. Their duties include investigating violations, apprehending offenders, and ensuring the protection of endangered species, marine preserves, and conservation lands.

Their core mission emphasizes a science-based, community-oriented approach—coupling law enforcement with education and outreach.

Enforcement Improvements & Capacity Building

Guam has strengthened enforcement through key capacity enhancements:

- **Apprenticeship Program:** In 2025, Guam launched its first Conservation Officer Apprenticeship program, inducting 11 new recruits who are undergoing intensive training.
- **Training Academy:** The Guam Community College’s Criminal Justice Division established a Regional Conservation Terrestrial and Marine Enforcement Academy, setting the standard for local and regional enforcement training.

Collaboration & Resource Support

To enhance enforcement effectiveness, the program has forged agreements and partnerships:

- The program works collaboratively with federal and armed forces agencies – particularly through increased surveillance and shared resources – to monitor both terrestrial and marine environments more effectively. Partners include the United States Coast Guard and the Guam Army National Guard.

TOKA Hotline and Mobile App

- With support from the University of Guam Center for Island Sustainability and Sea Grant, the TOKA Hotline was launched to provide the public with a direct line to conservation officers. Community members

can call or text 671-864-TOKA to report illegal fishing or related activities. In addition, the TOKA mobile application, available on both Android and iPhone, offers another convenient platform for reporting violations and strengthening community involvement in conservation.

5. Fines and Penalties

The effectiveness of fisheries management depends not only on well-designed regulations, but also on meaningful and consistent consequences for violations. Fines and penalties serve as important tools to discourage unlawful fishing activity, promote fairness among fishers, and uphold the integrity of fisheries management measures. These penalties are intended not solely as punitive actions, but as safeguards to protect Guam’s marine resources, cultural fishing practices, and community food security for future generations. Individuals found in violation of fisheries regulations would be subject to the fines and penalties identified in the table below. Each individual violation may be treated as a separate offense and subject to separate penalties as applicable.

Table 7. Prohibited Activities and their Proposed Fine

Prohibited Activity	Fine
Fishing without a license – recreational/subsistence fishing	\$100
Fishing without a license – commercial fishing	\$200
Fishing without a license– visitors and non-residents	\$100
Operating without a Seafood Vendor License – vendors and market owners	\$1000
Harvesting, taking, or possessing <i>atuhong</i>	\$1000
Harvesting, taking, or possessing undersized fish with size limits	\$100 per undersized fish
Spearfishing at night while in possession of a commercial fishing license	Confiscation of all assets
Repeat offenses may be subject to escalating penalties, including increased fines, confiscation of fishing gear or catch, suspension of licenses or permits, or other enforcement actions deemed appropriate under applicable regulations.	



J. ADAPTIVE MANAGEMENT

Fisheries in Guam are complex social-ecological systems, where biological, ecological, and human dimensions interact in ways that are not fully predictable. While scientific studies and traditional ecological knowledge provide essential insight into the status of stocks and ecosystems, data gaps and natural variability introduce a level of uncertainty into management decisions. Adaptive management is a structured approach that treats management actions as experiments, allowing measures to be refined over time as new information becomes available and as the effects of interventions are better understood.

Adaptive management in Guam follows a structured sequence:

1. *Information Gathering* – Collect baseline data on fish populations, harvest patterns, and ecosystem health, integrating both fisheries-dependent and fisheries-independent sources, as well as local fisher knowledge.
2. *Planning and Objective Setting* – Clearly define management objectives and specify alternative scenarios or hypotheses regarding stock response to management measures.
3. *Implementation of Management Measures* – Apply the selected measures, including size limits, species bans, sales restrictions, and nighttime spearfishing regulations, while continuing monitoring.
4. *Monitoring and Data Collection* – Track measurable indicators such as catch composition, size distribution, density per transect, population trends of key species, compliance rates, and community engagement metrics.
5. *Review and Adjustment* – At predetermined intervals, evaluate monitoring results using harvest control rules to determine whether management measures are meeting objectives. Adjust regulations as needed, considering both scientific data and community input.

In the context of this management plan, all proposed measures are considered provisional until reviewed through this adaptive process. Each action will be evaluated at specific time periods to determine effectiveness, identify unintended consequences, and explore alternative strategies where necessary. The harvest control rule

framework described in Section 3 of *Guam Reef Fisheries Profile* provides an objective mechanism for decision-making, linking measurable indicators to management adjustments. By applying this framework, Guam’s fisheries management can remain flexible, evidence-based, and responsive to changes in stock status, ecosystem conditions, and community needs, ensuring the long-term sustainability of critical marine resources.

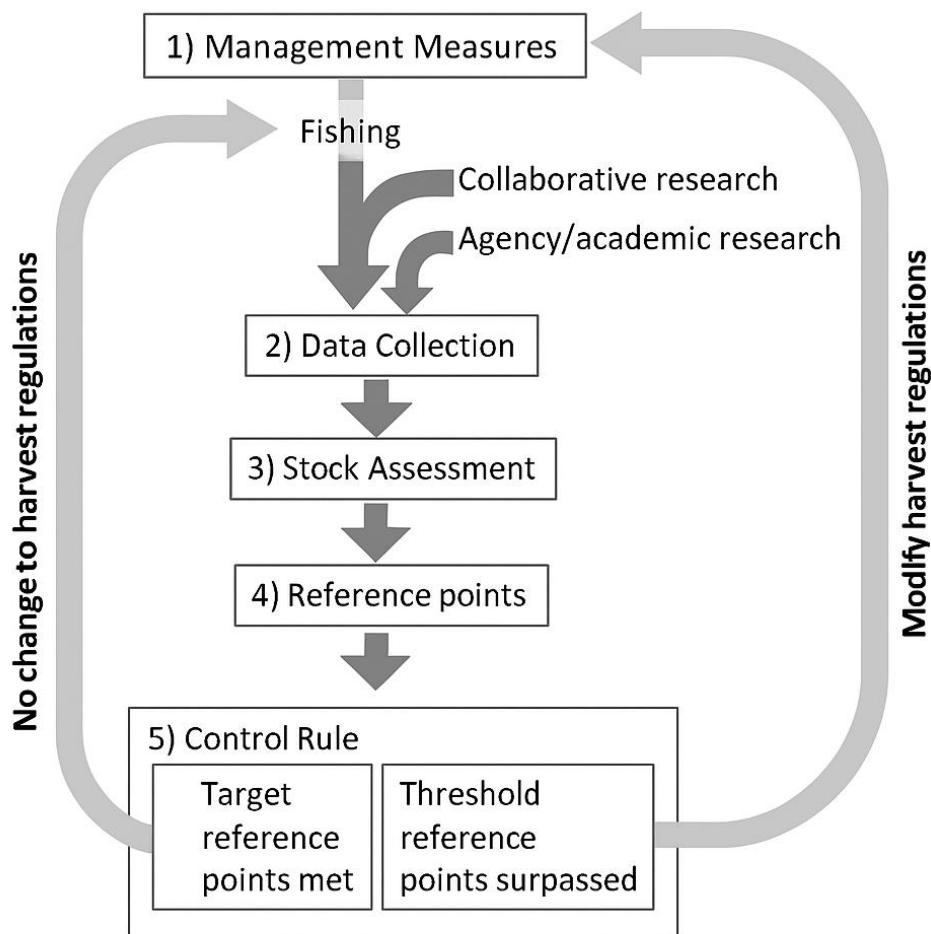


Figure 13. Adaptive management uses monitoring data and assessments to guide decisions, applying a control-rule approach to adjust management measures as needed.

1. Data & Monitoring

The following monitoring programs will be prioritized to track the status of fish stocks and evaluate the effectiveness of management measures, providing the information needed to support adaptive management and informed decision-making. Many of these programs contributed data to the initial population assessments described in Section B6 (Current Understanding of Guam’s Fish Stocks) and will continue to collect data to inform future assessments.

Fisheries-dependent monitoring

- DAWR monthly creel surveys – described in Section B6.

- UOG Center for Island Sustainability & Sea Grant catch data – Fishers submit catch data using a catch-mat approach to extract precise fork-lengths and species IDs, along with associated fishing information.

Fisheries-independent monitoring

- Guam Long-term Coral Reef Monitoring Program – described in Section B6
- Stereo-video long-term monitoring program (Taylor Lab) – described in Section B6
- Micronesia Coral Reef Monitoring Program – described in Section B6

2. Review and Decision-Making Process

The review and decision-making process ensures that fisheries management is responsive, evidence-based, and adaptive. By systematically evaluating monitoring data, stock assessments, and stakeholder input, managers can adjust management measures to maintain sustainable fish populations and support resilient fishing communities. This process integrates scientific information, traditional ecological knowledge, and socio-economic considerations to guide transparent and accountable decisions.

Regular Review Cycles

Management measures and monitoring results will be reviewed on a regular, predefined schedule:

- **Annual Reviews:** Focus on operational and compliance data, fishing effort, and preliminary stock indicators to identify emerging trends or issues.
- **Periodic Assessments:** Comprehensive population assessments for target species are conducted every 3-5 years, or more frequently if significant ecological or socio-economic changes occur.
- **Ad Hoc Reviews:** Additional reviews may be triggered by unexpected changes in stock status, environmental disturbances, or new scientific findings.

Stakeholder Engagement

Incorporating stakeholder input is central to transparent and effective decision-making:

- **Consultation:** Fishers, community members, and relevant organizations provide observations, traditional knowledge, and feedback on management measures.
- **Workshops & Meetings:** Periodic engagement sessions allow stakeholders to review findings, discuss concerns, and contribute to decision-making.
- **Feedback Integration:** Stakeholder insights are documented and considered alongside scientific data when evaluating management options.

Decision-Making Framework

Decisions regarding management measures follow a structured, adaptive framework:

- **Evidence-based Adjustments:** Management measures are modified based on monitoring results, assessment findings, and stakeholder input.
- **Control Rules:** Predefined harvest control rules guide responses to changes in stock status (e.g., adjust size limits, implement seasonal closures, etc.)
- **Documentation:** All decisions and the rationale behind them are recorded and communicated to stakeholders to ensure transparency.

This process ensures that fisheries management remains dynamic, evidence-driven, and responsive to both ecological and social factors, supporting the long-term sustainability of Guam's fisheries.



K. CONCLUSION

The Guam Coastal Fisheries Management Plan represents an important step toward strengthening the long-term sustainability of Guam’s reef fisheries and marine ecosystems. Developed through collaboration among fishers, scientists, resource managers, and community members, the plan reflects a shared commitment to protecting marine resources while supporting the cultural, subsistence, recreational, and economic benefits that fisheries provide to the people of Guam.

The management measures identified in this plan are intended to function together as a coordinated fisheries management framework. Through a combination of species protections, size limits, commercial restrictions, licensing systems, outreach, monitoring, and enforcement, the plan seeks to reduce fishing pressure, support stock rebuilding, and improve the long-term resilience of Guam’s reef fisheries.

Rebuilding fish populations is a long-term process, and recovery timelines will vary among species depending on their biology, fishing pressure, and environmental conditions. Some species may respond relatively quickly to management actions, while others — particularly large-bodied or slow-growing reef fishes — may require many years before measurable recovery becomes evident. Continued monitoring and adaptive management will therefore be essential to evaluating progress, refining management strategies, and responding to changing ecological and community conditions over time.

This Fisheries Management Plan is intended to function as a living document that can continue evolving alongside Guam’s fisheries and the communities that depend on them. Ongoing participation from fishers, scientists, resource managers, and community members will remain critical to ensuring that management approaches continue to reflect the best available information, community priorities, and the realities of Guam’s changing marine environment.

Ultimately, this plan represents an investment in the future of Guam’s fisheries, coral reef ecosystems, and coastal communities. Through shared stewardship, informed management, and continued collaboration, the people of Guam can work toward sustaining healthy reef fisheries and preserving the island’s marine resources for future generations.

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