Fisheries Management Capacity and Caribbean MPAs – Responding to Needs of the MPAConnect Network

Capacidad de los AMPs del Caribe para el Manejo de las Pesquerías – Respondiendo a las Necesidades de los Sitios Miembros de la Red MPAConnect

Capacité des AMP Caribéennes pour la Gestion des Pêches – Répondre aux Besoins des Sites Membres du Réseau MPAConnect

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ABSTRACT

MPAConnect is an initiative of the Gulf and Caribbean Fisheries Institute, NOAA's Coral Reef Conservation Program and over 30 Caribbean coral reef marine protected areas (MPAs). In an assessment of regional MPA management capacity conducted by MPAConnect in 2017, fisheries management was identified as one of the three highest priority capacity building needs of participating MPA managers. Responding to this need, in 2018, MPAConnect and the Saba Conservation Foundation co-hosted a regional peer-to-peer learning exchange that focused on fisheries management for Caribbean MPA managers. With expert guidance and MPA manager mentorship, the MPA managers refined their site-specific fisheries management goals and determined what level of capacity their management programs would require to best achieve those goals in terms of monitoring/assessment and management action. Through sharing of best practices and peer experience, the MPA managers identified the fisheries management approaches that are most feasible and appropriate for their MPAs, and determined the necessary next steps, technical support and research needed to move forward with the fisheries management approaches. These site level needs represent meaningful opportunities for the GCFI community - technical experts, authorities, students, cooperation agencies and NGOs - to collaborate with Caribbean MPAs and help advance the application of fisheries management strategies in the region.

KEYWORDS: MPAConnect, marine protected areas, fisheries management

INTRODUCTION

The premise of the MPAConnect network is to share the wealth of experience that exists among Caribbean MPA managers. A primary function of the network is to respond to local MPA management needs identified through an assessment process that allows each MPA manager to indicate their current management capacity status and requirements for the next five years. The highest overall priorities identified through the 2017 capacity assessment were, in order, sustainable financing, law enforcement, bio-physical monitoring, fisheries management tied with outreach/education (Doyle et al. 2017). Fisheries management emerged as a new capacity building priority of Caribbean MPA managers, rising to third place overall from eighth place in the previous regional assessment conducted in 2011.

The StoryMap in Figure 1 shows regional findings on capacity for fisheries management as identified in the 2017 assessment. The majority of MPA managers had not undertaken any fisheries assessment (the red dots on the map), only one-third had a fisheries management program (green dots), and the remainder had conducted some assessments but had not taken any fisheries management actions (yellow dots). Only two managers indicated that fisheries management was not an objective for their sites. All MPAConnect sites focus on coral reefs but some site managers did not perceive that their coral reefs play any role in fisheries management. The large dots in Figure 1 indicate MPAs that identified building capacity for fisheries management as one of the top three priorities from the list of 20 management elements.

MPAConnect addresses regional MPA management priorities through peer-to-peer learning exchanges - regional workshops that allow an in depth focus on individual management topics, followed by site-specific support that enables the implementation of new ideas and best practices at home and, in the process, helps build a regional network among Caribbean MPA managers. A peer-to-peer learning exchange on fisheries management for Caribbean MPAs was held in September 2018 on Saba, in The Netherlands Caribbean. It was co-hosted by Saba Conservation Foundation and 25 participants from 10 countries and territories joined the learning exchange, including participants from the MPAConnect network and beyond. MPAConnect mentor Celia Mahung from TIDE Belize provided mentorship, and expert presenters included Dr. Ron Hill from the NOAA/National Marine Fisheries Service, Dr. Alejandro Acosta from Florida Fish and Wildlife Service, Dr. Eloy Sosa from El Colegio del Sur, Mexico and Dr. David Gill from Duke University. A total of 15 MPA managers benefited from the exchange, including managers from The Netherlands Caribbean (Bonaire, Saint Eustatius and Saba), Belize, Honduras, the Turks & Caicos Islands, the British Virgin Islands and the US Virgin Islands.

APPROACH TO BUILDING CAPACITY FOR FISHERIES MANAGEMENT

The objective of the Saba fisheries management learning exchange was to clarify each MPAs' fisheries management goals and explore the programmatic capacity that was needed to achieve these objectives, especially needs for monitoring and assessment to track achievement of the fisheries goals and inform fisheries management strategies. Chief among the

representative MPAs' objectives were to support the sustainable harvest of commercially important species of fish and/or to maintain healthy diverse reef fish assemblages to support healthy coral reefs, including to benefit local tourism industries.

Existing fisheries management training materials and online resources from the Food and Agriculture Organization, Environmental Defense Fund and The Nature Conservancy provided input to shape the content of the learning exchange. Prior to the exchange, NOAA and other technical experts developed a series of worksheets and supporting materials for the meeting. Based on prior remote consultations with the MPA managers, sessions were structured around the functional groups or species that the MPA managers indicated of particular interest, including reef fish assemblages, herbivorous reef fish, fish spawning aggregations, lobster, and conch. For each of these functional groups three key topics were addressed – their importance to reefs, strategies for fisheries management and assessment methods. Participants shared with the group the coral reef fisheries management strategies in place at their MPAs and any other strategies that were of potential interest. The reference list identified in Table 1 proved to be useful throughout the learning exchange.

The fisheries exchange was complemented with tours of Saba's commercial fisheries landing sites and refrigerated storage facilities, and in-water time at the local MPA. The visiting MPA managers and fisheries experts also met with Saban fishers to discuss regional best practices in lobster fishery management. Hands-on sessions on lobster biology, fishery and sustainability were also held by the lobster fishery expert for two Saba youth education programs.

FISHERIES MANAGEMENT CONSIDERATIONS FOR MPA MANAGERS

In considering fisheries management objectives it is important to recognize that each MPA is distinct in terms of maturity - the longest at the meeting having been established nearly 40 years ago and the newest only eight years. This disparity translates into differing MPA management experience, especially in terms of enforcement and fisher engagement. MPA manager mentors from Belize shared experiences in boat-to-boat outreach, SMART enforcement, data collection from fishers, engaging with fisher cooperatives for research, livelihoods efforts and education projects. Participants expressed particular interest in replicating a community researcher

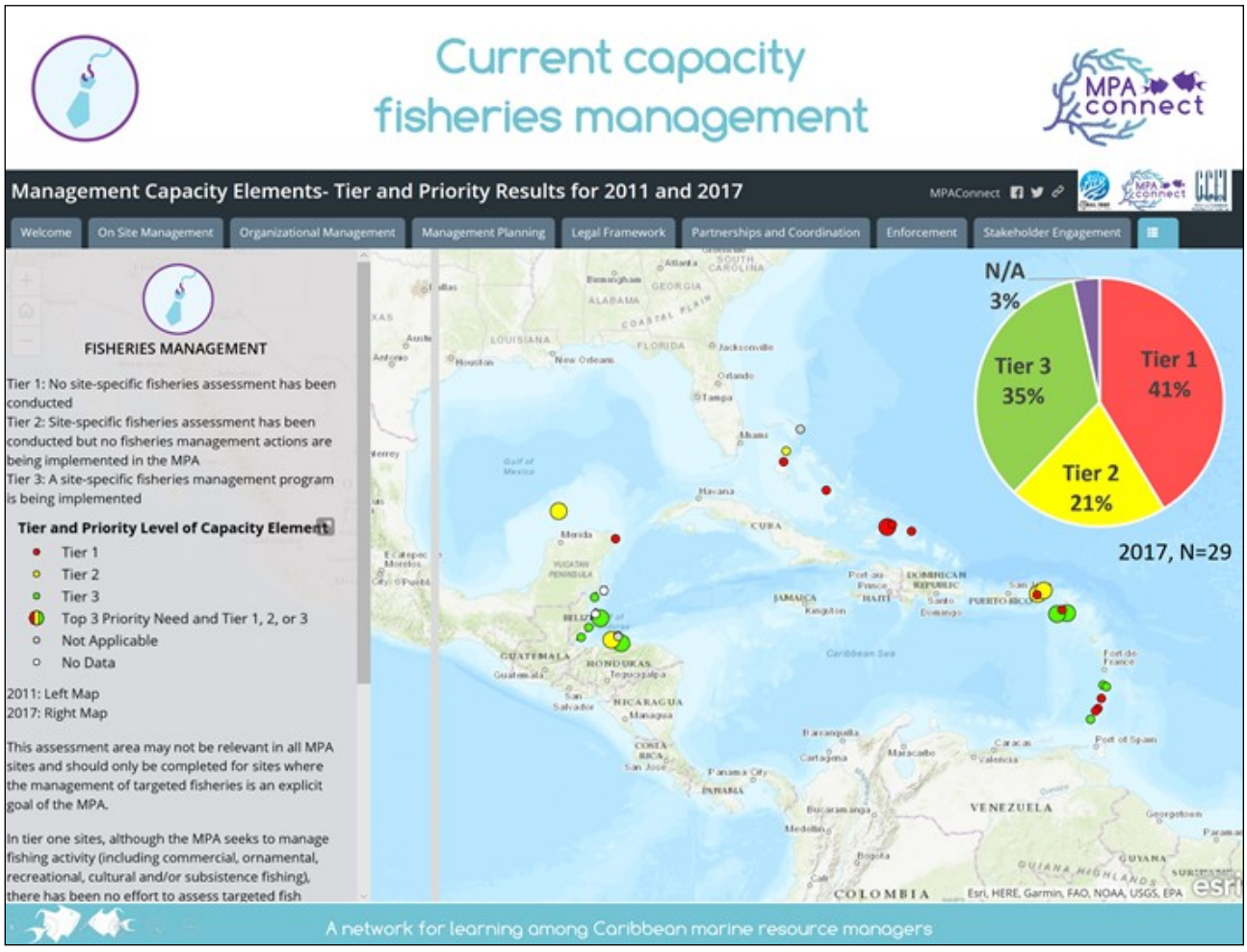

Figure 1. Regional MPA capacity for fisheries management shown in tabbed StoryMap

Table 1. Fisheries management approaches and example strategies

APPROACH	EXAMPLE STRATEGIES
MANAGE FISHING EFFORT	Fisher licensing Number of traps/lines/hooks Gear ownership ID Net set time Trip limits
LIMIT CATCH	Total allowable catch Catch quotas (individual, vessel, transferable, cooperative, community) Catch share
SIZE, GEAR RESTRICTIONS	Minimum size limit Maximum size limit No take of egg-bearing females (e.g.berried lobster) Mesh size, escape panel in traps No spearing Target species/gear switching
AREA CLOSURES	MPAs No-take zones Other zoning (e.g. habitat zones, buffer zones, FSAs)
TEMPORAL CLOSURES	Seasonal closure Time of day closure Alternate years Moratorium
TRADITIONAL OR OTHER STEWARDSHIP	TURFs (territorial user rights) Community-based (co-)management
INCENTIVES	Gear buy-back Sustainable livelihoods options Market–based programs Certification programs (e.g. MSC)
ECOSYSTEM-BASED MANAGEMENT	Watershed management Habitat protection ICZM
OTHER	

approach developed by TIDE Belize, having a community liaison officer and replicating sustainable supplemental livelihoods efforts similar to Belize Audubon Society, and implementing SMART enforcement monitoring such as in Belize and Honduras. Belizean participants also shared experiences on managed access and catch monitoring, and their MPA managers showed interest in learning how to achieve more consistent fisheries data collection. Dr. David Gill from Duke University presented on an approach to mapping fishing pressure in and around MPAs based on an example in Barbados by CERMES (Gill et al, 2017). Many locations lack fisheries dependent data and there was great interest in conducting simple fisher surveys and applying GIS methods to replicate this work in other MPAs.

Another variable of the MPAConnect network is a large disparity in size between member sites. Each tile in Figure 2 represents the relative size of the 30 MPAs in the network, with some being too small to be seen in the bottom right or register on the legend. The MPAConnect network includes a handful of larger MPAs of around 3000 km^2 and many small sites that are less than 1 km^2. The network's median-sized site is the 43 km^2 Half Moon Caye/Blue Hole Natural Monument co-managed by Belize Audubon Society. For a learning exercise, the MPA managers explored how realistic their fisheries management goals are given the size of their sites. For input on this topic, MPAConnect collaborated with Dr. Pete Mumby and Ms. Amelia Desbiens of the University of Queensland to tailor the MPA size optimization model to the Caribbean, using existing Windows software parameterized for Caribbean reef fish. This tool (see also Krueck et al. 2017) is currently being applied for the project 'Capturing Coral Reef & Related Ecosystem Services' from East Asia and the Pacific region. Its use enabled the MPAConnect site managers to see what proportion of their target species were theoretically able to be protected within their MPAs (Figure 3). This helped provide a reality check on how much protection the smaller MPAs can hope to afford to target species. Discussions related to this exercise brought home how important other fisheries management tools are in addition to MPAs for fisheries sustainability, especially the protection of fish spawning aggregations.

While working with the MPA managers in preparation for the peer-to-peer learning exchange, it became evident that there was a disconnect between existing biophysical monitoring efforts and the use of coral reef health and fisheries independent data for fisheries management at the site level. Many MPAs have good quality bio-physical

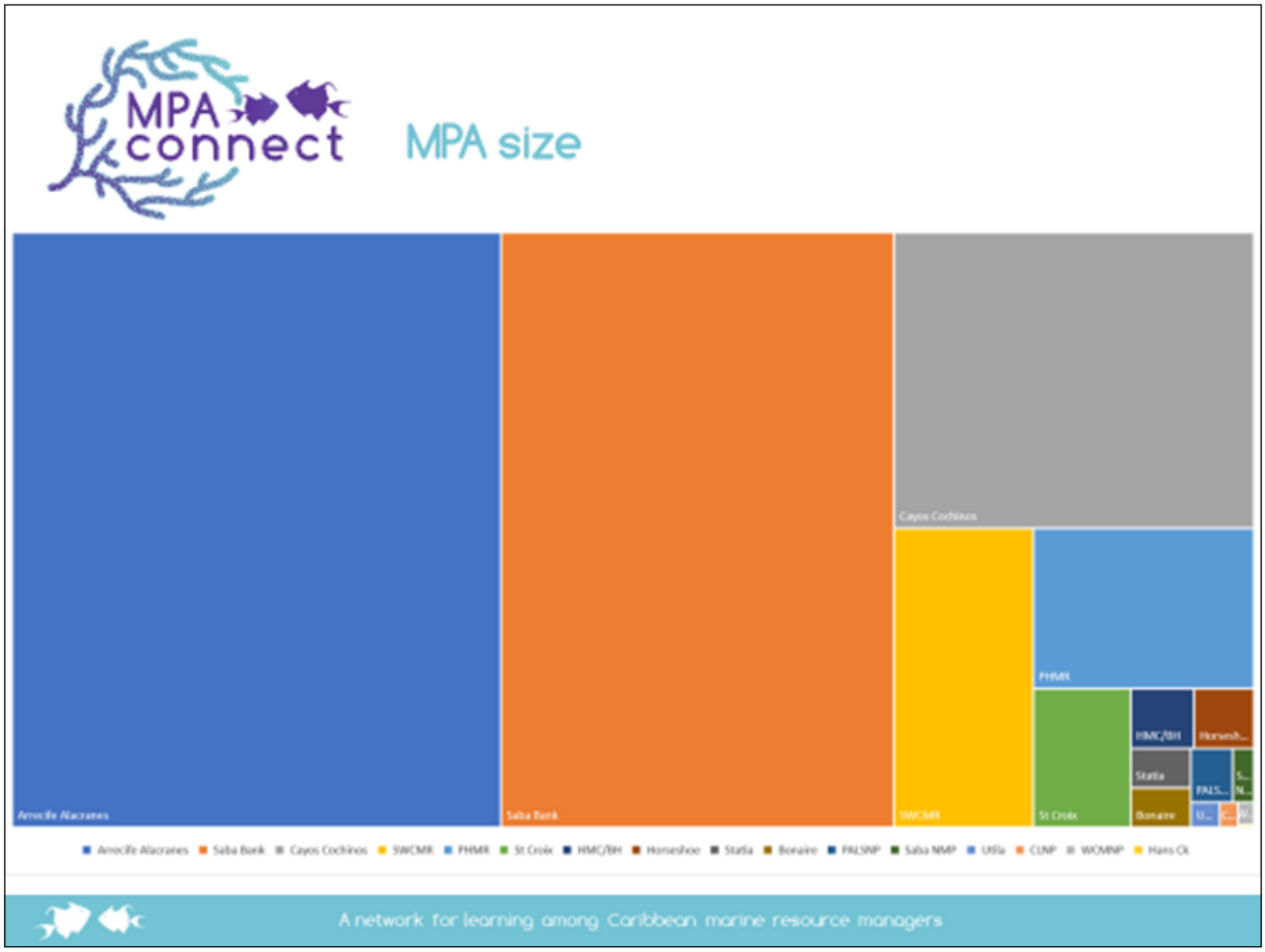

Figure 2. Relative size of MPAConnect sites

monitoring data, often applying the Atlantic and Gulf Rapid Reef Assessment (AGRRA) protocol for long-term databases. However, when MPAConnect managers were asked about the average fish size in their MPAs, to assess whether fish are achieving large enough sizes to reach maturity, it was determined that the managers did not have this information at their finger-tips. Typically, that information is hidden in coral and fish databases of different scales, such as sub-regional (eg. Healthy Reefs Initiative) or national level (eg. CaribNode). To help address this gap in applied fisheries management using existing MPA data, a summary database of AGRRA findings from priority sites was developed for MPAConnect in Excel and ArcGIS. In conjunction with the peer-to-peer learning exchange, MPAConnect developed a new platform for network members that maps existing AGRRA data for the participating MPAs (see sample in Figure 4). Specifically, the MPA boundaries were overlaid with monitoring sites to identify MPA-specific data, then for each site, managers were asked:

i) Is reef structure intact and expected to maintain integrity (e.g., coral cover, reef structure and low macroalgae, more promoters than detractors, no bleaching or disease)?

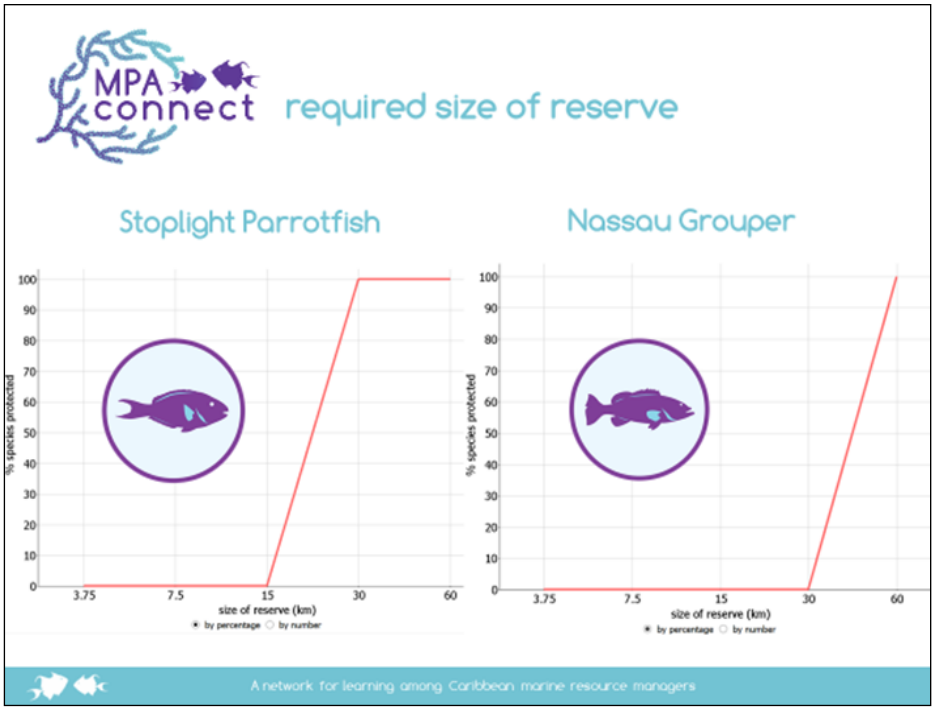

Figure 3. MPA Size Optimization Tool – sample exercise.

Figure 4. AGRRA fisheries independent data represented on MPAConnect GIS platform

ii) Are herbivorous fish populations healthy (density, biomass, fish size – esp parrotfish).
iii) Are commercial fish populations healthy (density, biomass, fish size, enough mature fish)?

Colleagues at AGRRA assisted with the interpretation of existing data to answer these questions, support that was roundly welcomed by the MPA managers. All of the participating MPA managers asked for help with data management, analysis and reporting of fisheries independent data for their sites.

A further challenge is how best to present monitoring findings in a way that can be easily communicated and applied to fisheries management. For example, TIDE strategically enforces MPA and fisheries regulations in Port Honduras Marine Reserve and was interested to measure the performance of their fisheries enforcement using existing data, a need that could be addressed with existing data but had not yet been applied. The first step was to identify which zones their AGRRA monitoring sites are located in; in this case whether no-take, general use (fishing by Managed Access licensed fishers) or outside the MPA. With this determined it was a simple step to analyze data in terms of management zones to reflect enforcement effectiveness. The other MPA managers could take a similar approach to assess their fisheries independent data according to relevant management factors, such as fishing pressure, visitation or whatever management context is most meaningful for the MPA.

MPAConnect members took the interpretation of findings beyond a table with numbers and experimented with different ways to present the data. Figure 5 shows a pilot approach where the size of the icons is to scale with the AGRRA findings. This clearly highlights a pattern between the zones of Port Honduras Marine Reserve that is broadly consistent with what we might hope for under a scenario of effective MPA implementation. The MPA managers found this to be an easy-to-communicate format for sharing with MPA field staff and stakeholders. All the participating MPA managers responded positively to such representation of science findings and they stressed a need for help with communications for their boards, stakeholders, fishers, private sector and agencies. Several managers also indicated an interest in having dedicated community liaison officers on staff to help use such materials in targeted outreach in support of effective fisheries management.

CONCLUSIONS

All participants reported that they had more confidence in their ability to address fisheries management following the peer-to-peer learning exchange. At the conclusion of the exchange, desired next steps were identified by each MPA manager, including:

Technical assistance to assess status of fisheries:

i) Assess population status from existing data (catch, fish length, key indicators) – lobster, red hind, herbivores, recreational targets
ii) Compare with fishing intensity and MPA size optimization information
iii) Identify habitat connectivity, fish spawning aggregations, corridors, pilot projects (e.g. lobster casitas)
iv) Develop template reports that meet MPA manager needs (e.g. track impact of enforcement effort, livelihoods projects)

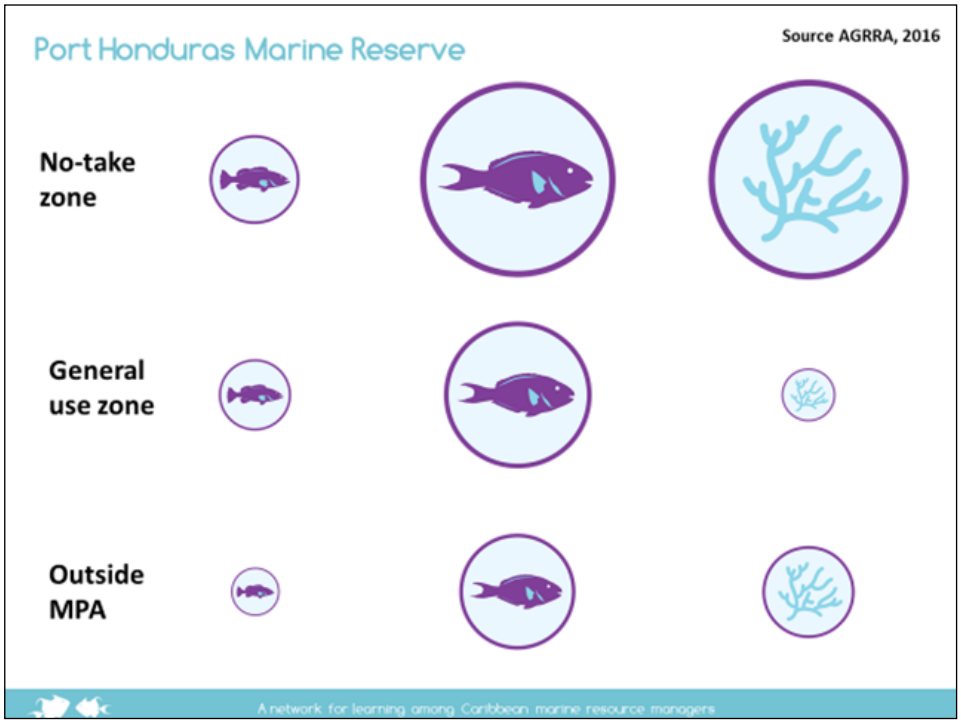

Figure 5. Fisheries enforcement performance measurement for communication with MPA field staff.

v) Train MPA staff in data management, analysis and production of standard reports
vi) Implement consistent catch and bio-physical monitoring

Small project support to:

i) Develop strategic communications plans
ii) Develop stewardship materials and programs
iii) Build capacity for MPA staff in community liaison and science communications to share findings with fishers, enforcement partners, decision makers
iv) Facilitate fisher, decision-maker and manager exchanges with mentor MPAs

All exchange participants requested follow-up support from relevant expert partners, mentors and possible donors for the implementation of these next steps. The MPAConnect team is now working to respond to these management needs and welcomes contact from those interested in lending support on these topics. For more information or to connect with the network of MPA managers and contribute to fisheries management capacity building, please contact the authors or mpaconnect@gcfi.org.

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