



**NOAA**  
**CORAL REEF**  
CONSERVATION PROGRAM

# Fishing Impacts Implementation Plan

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FY2013 – FY2017

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## A. Executive Summary

The National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program (CRCP) has developed this plan for implementing the fishing impacts goals and objectives from the CRCP's National [Goals and Objectives 2010-2015](#).

### Background

In 2010, the Coral Reef Conservation Program (CRCP) developed national 20-year goals and five-year objectives to address three threats to coral reef ecosystems: climate change, fishing impacts, and land-based sources of pollution. In addition to these national level goals and objectives, the CRCP facilitated development of management priorities in each of seven states and territories with coral reef ecosystems. The National [Goals and Objectives 2010-2015](#) and jurisdictional [Coral Reef Management Priorities documents](#) resulted in many priorities, and this document strives to focus CRCP attention on a subset of these over the next few years.

CRCP's initial implementation of the fishing impacts goals and objectives focused primarily on addressing Objective F2.4, improving marine protected area (MPA) management. While Objective F2.4 is still an important target for the Program, there are multiple tools available to fisheries managers to improve sustainability and reduce adverse impacts of coral reef fisheries. For example, a consistent need across the seven coral reef ecosystem jurisdictions is better data on current stock status and vulnerability to fishing impacts to inform fisheries management actions.

### Next Steps

In order for the CRCP to effectively conserve coral reef ecosystems the Program must continue to strategically prioritize activities that support reduction of fishing impacts. This plan seeks to provide guidance on where and how to focus future resources, with an acknowledgement that specific activities will still need to be identified on an annual basis. Over the next five years, the Program should:

- Direct the National Program to collect priority life history and ecological information (Obj. F1.3), collect information on fishing effort (Obj. F1.4), conduct research to identify priority areas for protection (Obj. F2.1), and evaluate MPA performance (Obj. F2.5) for adaptive management; Continue to invest in national coral reef monitoring to provide needed ecological information (Obj. F1.3) and data for evaluating effectiveness of management actions (F1.6)
- Focus the external cooperative agreements and grants on building MPA management capacity (Obj. F2.4), increasing stakeholder engagement in fisheries management (Obj. F3.1), improving enforcement capacity (Obj. F3.2), and conducting education and outreach to improve community understanding and support of effective fisheries management (Obj. F4.3); and
- Improve CRCP coordination with fisheries managers by: prioritizing key species for research and management (Obj. F1.2), learning about emerging techniques to model ecosystem dynamics to inform fisheries management (Obj. F1.5), leveraging existing national coral reef monitoring data to fill fishery-independent data needs for managed stocks and protected species (Obj. F1.6), and identifying opportunities for providing data to inform siting of new or changes to existing MPAs (Obj. F2.3).

More specific actions are presented in this plan under Next Steps, organized by reducing fishing impacts inside and outside of MPAs in order to better track progress towards reducing fishing impacts, via two new Program performance measures, stabilizing or increasing biomass outside of and within MPAs.

## B. Introduction

### *Purpose Statement*

The purpose of this plan is to refine the Coral Reef Conservation Program's (CRCP's) approach to achieving its National Goals and Objectives (G&Os) related to fishing impacts and direct future CRCP investments towards reducing this threat in U.S. coral reef ecosystems over the next five years.

The CRCP has invested considerable energy to outline national-level goals and objectives, and facilitated development of coral reef management priorities in each of seven jurisdictions. Given available time and resources, CRCP needs a targeted approach to implement the fishing impacts-related National G&Os and Jurisdictional Management Priorities. The CRCP has an incomplete picture of the effectiveness of past investments to reduce fishing impacts, and there is no strategy for when, where, how, or to what extent an objective should be addressed. Additionally, collaborations with other NOAA programs that work on coral reef fisheries management issues are in need of renewed attention.

This plan was developed for CRCP's Senior Management Council and Staff Evaluation and Assessment Team to direct prioritization of annual activities and for CRCP's project managers and partnering agencies and organizations to communicate where to focus collaborative projects and proposals. The plan identifies existing programs and projects where improved collaboration with CRCP could support mutual goals. This plan should be updated annually to capture progress towards the objectives of focus.

## C. NOAA Mandates

The National Oceanic and Atmospheric Administration (NOAA) operates under various statutory authorities to reduce adverse fishing impacts in coral reef ecosystems, including:

- [\*The Magnuson-Stevens Fishery Conservation and Management Act\*](#)
- [\*The Coral Reef Conservation Act\*](#)
- [\*The Endangered Species Act\*](#)
- [\*The Marine Mammal Protection Act\*](#)
- [\*The National Marine Sanctuaries Act\*](#)
- [\*The Coastal Zone Management Act\*](#)
- [\*The Lacey Act\*](#)
- [\*The Fish and Wildlife Coordination Act\*](#)

Working collaboratively and leveraging resources gives CRCP and other NOAA offices and programs the best chance at meeting our collective mandates to support conservation and sustainable use of healthy (coral reef) ecosystems.

## D. CRCP's National Goals and Objectives

The Coral Reef Conservation Program (CRCP) underwent a comprehensive [external review](#) in 2007 and one of the primary recommendations in the [Final Report](#) was to consolidate and sharpen the goals of CRCP from the original 13 under the [National Coral Reef Action Strategy](#). The panel's recommendations prompted the genesis of a [Roadmap for the Future](#) of the Coral Program in 2008 which guided a reprioritization process, and ultimately, the development of the CRCP's National [Goals and Objectives 2010-2015](#) document. The document features 20-year goals and five-year objectives that are centered around three priority threats: climate change impacts, fishing impacts, and impacts from land-based sources of pollution (LBSP). The following four goals and 19 objectives were developed to address some of the primary fishing impacts to coral reef ecosystems, including direct overexploitation of fish, invertebrates, and algae for food and the aquarium trade; removal of a species or group of species impacting multiple trophic levels; and by-catch and mortality of non-target species:

1. Goal 1: Increase the abundance and average size of key<sup>1</sup> coral reef fishery species to protect trophic structure and biodiversity and improve coral reef ecosystem condition.
  - i. Obj. F1.1: Support the creation or improvement of coral reef fisheries management plans that address ecological, social, and economic considerations.
  - ii. Obj. F1.2: Prioritize key coral reef associated species or functional groups (e.g., herbivores, apex predators) on which to focus management, research and monitoring activities for each jurisdiction or managed area.
  - iii. Obj. F1.3: Obtain essential life history and ecological information on key species or functional groups to support management actions.
  - iv. Obj. F1.4: Obtain necessary information on fishing effort in U.S. coral reef ecosystems by measuring fishing intensity, fishing mortality, frequency, area coverage, community dependence, etc. to inform management activities.
  - v. Obj. F1.5: Predict appropriate levels of extraction for key species or groups by developing and utilizing valid, precise, place-based and realistic ecosystem dynamics models.
  - vi. Obj. F1.6: Conduct applied biological, social, and economic research and monitoring to evaluate effectiveness of coral reef ecosystem management actions on key species or groups.
2. Goal 2: Support effective implementation and management of marine protected areas (MPAs) and ecological networks of MPAs that protect key coral reef ecosystem components and functions.
  - i. Obj. F2.1: Identify, characterize and rank priority areas for protection within each jurisdiction.

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<sup>1</sup> Key coral reef species (or functional groups) should be identified by each jurisdiction or managed area, and are defined as the composite of species essential to effective ecosystem-based function. Key species/groups may be those most affected by extractive activities, those that serve as indicator or keystone species, or other criteria.

- ii. Obj. F2.2: Synthesize research on the performance of MPAs that protect key coral reef ecosystem components and functions.
  - iii. Obj. F2.3: Using outputs of Objective 2.1 and 2.2, appropriate models, and socioeconomic considerations, identify MPAs that require increased protections or improved management, and areas to be considered for siting of new MPAs that protect key coral reef ecosystem components and functions.
  - iv. Obj. F2.4: Work with relevant agencies, offices, and communities to create, implement, and improve the management of MPAs that protect key coral reef ecosystem components and functions.
  - v. Obj. F2.5: Conduct biological and socioeconomic research and monitoring to assess the performance of MPAs with respect to protection and restoration of key coral reef ecosystem components and functions.
3. Goal 3: Increase stakeholder engagement and capacity to improve local compliance with and enforcement of fisheries management regulations that further coral reef ecosystem conservation.
- i. Obj. F3.1: Increase participation of stakeholder or citizen groups in fisheries management planning, decision-making, and monitoring activities that improve conservation of coral reef ecosystems.
  - ii. Obj. F3.2: Strengthen local agency and community capacity for effective and consistent enforcement of regulations or behaviors that reduce impacts of fishing on coral reef ecosystems.
  - iii. Obj. F3.3: Work with partners to identify economic alternatives that reduce effects of non-traditional extractive livelihoods on coral reef ecosystems and provide options for communities impacted by coral reef fisheries management actions.
  - iv. Obj. F3.4: Conduct biological and socioeconomic research and monitoring necessary to assess the effectiveness of compliance and enforcement activities, understand community concerns, flag roadblocks to implementation, and incorporate into management efforts.
4. Goal 4: Utilize locally relevant education and communication strategies to increase public and policy maker understanding of fishing impacts in coral reef ecosystems and support for effective management options.
- i. Obj. F4.1: Develop curricula incorporating locally relevant lessons plans about coral reef ecosystems and fisheries management that meet current state and national standards.
  - ii. Obj. F4.2: Develop and implement effective strategies and tools to improve communication between scientists, managers and policy makers on best management practices to protect key coral reef ecosystem species and functional groups.
  - iii. Obj. F4.3: Develop targeted, locally-relevant outreach and communication strategies to increase community understanding and support for regulations to protect key coral reef ecosystem species/functional groups and expanded use of marine protected areas.
  - iv. Obj. F4.4: Obtain socioeconomic and human dimension data to inform jurisdiction-specific education and communication strategies and initiatives and monitor program outcomes.

Additionally, there may be transferable and synergistic benefits of work to reduce multiple threats, including LBSP and climate change. A [Land-Based Sources of Pollution Implementation Plan](#) was

developed in 2011 and a plan for the climate change impacts G&Os is under way. The CRCP should look address multiple threats synergistically and update these plans accordingly.

## E. Jurisdictional Coral Reef Management Priorities

The [Roadmap for the Future](#) also outlined the development of management priorities by each of the seven U.S. state and territorial coral reef jurisdictions. In 2009 and 2010, the CRCP provided support to the jurisdictions to coordinate with the broader management community in each place to determine a set of strategic coral reef management priorities. The final jurisdictional [Coral Reef Management Priorities documents](#) were completed in 2010.

Similar to CRCP's national objectives, the seven states and territories developed jurisdiction-specific goals and objectives to address various adverse impacts of fishing and fisheries management needs (see Appendix 1). Most of the jurisdictions identified high priority geographic areas to execute these management priorities. These areas represent a ridge-to-reef approach to coral reef management and include both coral reef habitat and associated watershed areas.

Combined together, the National [Goals and Objectives 2010-2015](#) and jurisdictional [Coral Reef Management Priorities documents](#) resulted in too many priorities to focus on over the next five years. Subsequently, a comparative analysis was conducted to identify intersections of management priorities across the seven jurisdictions' management priorities, and with the Program's National G&Os (see Appendix 2). The national objectives that overlapped with most jurisdiction priorities were F2.4, which seeks to improve the management of MPAs, F1.4, which focuses on obtaining necessary information on fishing effort, and F3.2, which seeks to strengthen capacity for effective enforcement. In 2011 and 2012 CRCP highlighted objective F2.4 in its NOAA-internal Request for Proposals in order to target activities to reduce fishing impacts and address one of the Program's performance measures.

## F. CRCP's Performance Measures

In 2010, CRCP developed performance measures and evaluation criteria to track progress toward reaching CRCP's National G&Os. There are six performance measures across the four goals addressing fishing impacts (see Appendix 3). Given the Program's focus on national objective F2.4 for the last two fiscal years, CRCP is actively tracking the status of the most relevant performance measure, F2 PM2: "Increase in management effectiveness of priority coral reef MPAs, measured using the CRCP MPA Management Assessment Checklist." The [MPA Management Assessment Checklist](#) measures management capacity of a site against fourteen assessment areas that are key components of a successful MPA management program. CRCP conducted baseline assessments for 20 MPAs in the domestic priority geographic areas in 2011 (See Appendix 4). The reporting periodicity of this measure is every three years and the first evaluation to assess progress towards this measure will be in fiscal year (FY) 2014. In order to track progress towards meeting the Program's conservation goals, CRCP should begin tracking more conservation outcome-oriented performance measures, such as F1 PM1, "Stable or

increasing biomass (g/m<sup>2</sup>) of key taxa in areas outside of Marine Protected Areas (MPAs),” and F2 PM1, “Stable or increasing biomass (g/m<sup>2</sup>) of key taxa in MPAs.”

## G. Recent CRCP Efforts to Address Fishing Impacts

The CRCP addresses adverse impacts from fishing using four main tools: management-relevant research, monitoring, management implementation and support, and stakeholder engagement and partnership building. CRCP implements work primarily through three different mechanisms: 1) the National Program which is implemented by NOAA project managers, 2) the Coral Reef Conservation Grant Program, which builds partnership through domestic grants to academics and non-governmental organizations (NGOs) and cooperative agreements with regional fishery management councils (FMCs), state/territorial agencies, international organizations, and NGOs, and 3) the Coral Reef Conservation Fund, a private-public partnership with the National Fish and Wildlife Foundation (NFWF). An overview of current capabilities and recent activities and gaps is provided below for the National Program and the Coral Reef Conservation Grant Program, as they are directly administered by CRCP.

### *National Program*

The tools the CRCP uses to address fishing impacts include stakeholder engagement and partnership building, primarily through CRCP field staff (~ 20% of fishing impacts funds during FY10-12), long-term biological monitoring (~ 35%), management implementation and support (~ 9%), and research to inform management (~ 36%; Appendix 5, Figure1).

Since the National G&Os were developed, the CRCP National Program has implemented numerous projects in support of the objectives to address fishing impacts. Many of those projects contributed to multiple fishing impacts objectives; however, it is clear that the focus of the National Program over the last three years has been on two of the objectives in particular. The greatest investments were in monitoring to inform effectiveness of MPAs (Objective F2.5) and other management actions (Objective F1.6) to reduce fishing impacts. This work includes extensive biological monitoring of reefs around the Pacific Islands through the Reef Assessment and Monitoring Program, of the reefs of the Florida Keys and Dry Tortugas through the Reef Visual Census, and specific reefs around Puerto Rico and USVI via the Caribbean Coral Reef Ecosystem Monitoring Project. Moving forward, a great deal of the biological data collection that contributed to these objectives is evolving into the CRCP’s National Coral Reef Monitoring Program (NCRMP). NCRMP activities include fish and benthic visual surveys to describe the status and trends of the Nation’s coral reefs, including all seven of the coral reef jurisdictions, the Northwestern Hawaiian Islands, the Pacific Remote Islands, and Flower Garden Banks. NCRMP is taking a phased approach to implementation and will rotate jurisdictions on a biennial or triennial basis. NCRMP data may be used in some cases to inform stock assessments, Critical Habitat designations for Protected Species, MPA effectiveness, etc., or can be used as a platform to build on with partner contributions to answer fishing impacts-relevant questions.

Another focus of the Program, over the last three years, has been in activities to increase stakeholder engagement in management (Objective F3.1) and improve understanding and support for effective coral reef fisheries management through targeted education and outreach (Objective F4.3). This has been largely through the on-the-ground efforts of field staff, such as CRCP's fisheries liaisons. Examples include conservation action planning, Participatory Learning and Action projects, engaging fishers in collaborative research through Scientists and Fishermen Exchange meetings, coastal use mapping workshops, development and support for community coral reef monitoring programs, and development of education and outreach materials to improve compliance with fishing regulations.

CRCP has also provided support for research to identify areas that are candidates for increased protection (Objective F2.1), particularly through studies to identify and characterize spawning aggregations and understanding larval connectivity, utilizing tools to inform changes to existing MPAs or designation of new ones (Objective 2.3), and supporting MPA management (Objective F2.4), particularly through management planning efforts and capacity building networks, such as the [Pacific Islands Marine Protected Areas Community](#) (PIMPAC).

Through the National Program, CRCP has only made modest efforts towards supporting improved information on fishing effort (Objective F1.4) and strengthening enforcement (Objective F3.2), two of the three objectives that had the greatest intersection with the jurisdictions' management priorities. CRCP has supported creel surveys in CNMI and developed training materials and held workshops to educate enforcement personnel on field skills, species identification, and relevant regulations. These are both areas with significant gaps in which CRCP may be able to better address by utilizing partnerships with other NOAA offices and programs and existing field staff.

### *Coral Reef Conservation Grant Program*

The CRCP partners with State and Territory Governments, academia, and non-government organizations through external funding programs to support CRCP's National G&Os and other jurisdiction management priorities. In 2010, the CRCP streamlined the grant process and aligned the grant subprograms with the new Program G&Os. At this time, there were two major changes to the grant program: 1) the State and Territory Management and Monitoring Cooperative Agreements were merged into a single subprogram, the State and Territory Coral Reef Conservation Cooperative Agreement and 2) the Program eliminated the Coral Reef Conservation Research Grants. To date, approximately 45% of the CRCP's external funding has supported activities to reducing fishing impacts in U.S. waters.

By providing funds to the FMCs and the state and territory management agencies, CRCP is able to partner with entities that have local and regional management authority over coral reef resources. The Program provides funding to the FMCs via the Fishery Management Council Cooperative Agreements to support activities that improve coral reef fishery or ecosystem management plans or support essential fish habitat protection. Some of the activities supported through this agreement sought to increase understanding of the role that mesophotic reefs play in supporting coral reef fisheries (Objective F1.3),

develop geospatial tools to support coral reef fishery management and fill gaps in life history information (Objectives F1.2 and F1.3), and understand the effectiveness of their protected areas to help recover species and protect habitat (Objectives F1.6 and F2.5). The FMCs have also been able to find mutual areas of interest with the states' and territories' needs, such as gathering life history information (Objective F 1.3) on coral reef species of mutual concern. The states and territories use their cooperative agreements to address activities listed in their jurisdictional priority documents or local action strategies. The states and territories have primarily focused efforts on implementation and management their marine protected areas (Objectives F2.3 and F2.4) and continuation of long-term monitoring (Objective F1.6). However, they also have supported local enforcement operations and community-based coastal watches (Objective F3.2), outreach to improve fishery and marine protected area regulation compliance (Objective F4.3), and species life history assessments (Objective F1.3).

Additionally, the CRCP has partnered with NGOs and academics to help further address national and jurisdictional priorities. The Domestic Coral Reef Conservation Grant program addresses a broad range of priorities in which fishing impacts is one component. Through the Domestic Grant program, the CRCP has supported development of stock assessment models (Objective 1.6), development of community-based coral reef resource monitoring (Objective F3.1), marine protected area management and monitoring (Objectives F2.4 and F2.5), and educating fishers about fishing regulations (Objective F4.3). The CRCP uses a NGO Partnership Cooperative Agreement to leverage NGO capacity to further coral reef conservation in the seven jurisdictions. The current partnership is with The Nature Conservancy (TNC) and supports jurisdictional development of functional marine protected area networks (Objectives F2.3 and F2.4) through enhancing community support and management effectiveness (Objectives F3.1 and F4.2).

## H. Current State of U.S. Coral Reef Fisheries Management

Addressing fishing impacts in coral reef ecosystems is primarily the responsibility of the fisheries management agencies of the seven states and territories, four regional FMCs, and NOAA Fisheries. Additionally, fishing impacts may be ameliorated through designations, closures, permit requirements, or other restrictions enacted by the National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), National Marine Sanctuaries, other state and territorial agencies, local municipalities, and community initiatives.

Federal and state/territorial fisheries management actions intersect through the regional FMCs. Despite the fact that majority of U.S. tropical, hermatypic coral reefs are located within state and territorial waters, there is considerable overlap between federally and state/territorially managed coral reef fishery stocks and there are priority stocks and data gaps of mutual interest. The management process implemented by the FMCs allows for engagement of multiple stakeholder groups, including representatives from the relevant federal and state/territorial agencies, fishing and conservation sectors, and a forum for public participation. Additionally data on biology and abundance is shared across agencies in an effort to assess the status of entire range of a given stock or complex. Federal and state/territorial agencies often attempt to develop compatible regulations for overlapping stocks. This

process has clear requirements and sequence of events that CRCP has and should continue to contribute to.

Focusing in on some of the common fishery management tools currently utilized by the four regional fishery management councils and seven states and territories that manage coral reef fisheries, a brief snapshot is provided to highlight some potentially fruitful areas for CRCP to concentrate on (see Appendix 6). For instance, a consistent need across the seven coral reef jurisdictions is better data on current stock status to inform fisheries management actions. With the recent requirement for all federal fisheries to have annual catch limits and accountability measures and the corresponding adoption of these measures by many of the states and territories, the need for high quality data to inform these measures is all the more important. Status is unknown for the majority of coral reef fishery stocks. It would be helpful to have a prioritized list of stocks to begin to fill the necessary data gaps for, but not every jurisdiction has gone through a prioritization process. Criteria that could be used to prioritize stocks might include those of particular ecological significance (e.g., herbivores, apex predators), stocks that are overfished or undergoing overfishing (see [Status of U.S. Fisheries](#) for latest status of federal stocks), or stocks for which life history or population assessment information has never been collected.

Additionally, collection of catch and effort information has been inadequate in most of the seven jurisdictions (e.g., inconsistent over time, insufficient sampling, problems with design), particularly for the recreational and subsistence sector. Based on the limited information available, the recreational and subsistence catch may be equal to or greater than that of the commercial sector in some of these jurisdictions and therefore a significant portion of annual catch may be underreported. Most of the jurisdictions also do not currently have recreational fishing licensing programs. Such programs could improve recreational fisheries data collection, provide financing for data collection or other management needs, and contribute information to the national saltwater angler registry.

Existing MPAs in coral reef ecosystems also have known deficiencies and needs. CRCP conducted baseline assessments for 20 MPAs in the domestic priority geographic areas in 2011 (See Appendix 4). Among the 20 MPAs assessed, the areas with the biggest gaps in “effective conservation” were socioeconomic monitoring, conflict resolution mechanisms, management planning, and onsite management, respectively. It is important to note that not all of the 20 MPAs have regulations to reduce fishing impacts, and only nine of them have no-take areas at least part of the year.

Enforcement and compliance continue to be issues that the state and territorial and federal fisheries management agencies struggle with. Enforcement-related management priorities were developed for five of the seven jurisdictions. Capacity gaps regarding enforcement were identified in recent capacity [assessments](#) of two of the jurisdictions and are likely to surface in other jurisdictions.

## I. Next Steps

In order for the CRCP to effectively conserve coral reef ecosystems, the Program must continue to strategically prioritize activities to achieve the most valuable conservation benefit. This is especially critical given federal budget constraints, limited personnel resources, and the high cost of effectively managing coral reef fisheries. However, the complex nature of coral reef fisheries and the diversity of the communities dependent upon them, the numerous management tools available, and the deficiency of information to base sound management decisions on, preclude a simple, homogenous, and prescriptive approach to implementing the CRCP's National G&Os to address adverse fishing impacts. Additionally, the authority to manage coral reef fisheries and the predominant impacts of fishing are not with CRCP. The primary responsibility rests with the state and territorial fisheries management agencies, the FMCs, and the Sustainable Fisheries divisions of NOAA Fisheries. CRCP can only play a supporting role to these entities to assist them in reducing fishing impacts through data collection, capacity building, and providing technical expertise and training. This plan provides guidance on where and how to focus resources, with an acknowledgement that specific activities will still need to be identified on an annual basis, based on available funding and priority needs.

When the National G&Os were developed, the primary concern was addressing the direct and indirect impacts of removing biomass of coral reef fishery stocks. We used Goal 1, "Increase the abundance and average size of key coral reef fishery species to protect trophic structure and biodiversity and improve coral reef ecosystem condition," as the overarching goal to frame recommendations for this plan. To further prioritize actions, we considered: 1) the greatest needs and gaps for addressing these fishing impacts at a jurisdictional and regional scale, and 2) where CRCP has the technical capacity and can be most effective in reducing fishing impacts. Multiple tools are necessary to be effective in reducing fishing impacts and protecting coral reef ecosystem function and integrity. In order to address fishing impacts throughout U.S. coral reef ecosystems, recommended actions are organized below by: 1) reducing fishing impacts within MPAs, and 2) reducing fishing impacts outside of MPAs.

### *Reducing Fishing Impacts within MPAs*

Marine protected areas can be extremely useful, place-based fisheries management tools when effectively implemented, and all seven coral reef jurisdictions, the four regional FMCs, NOAA (e.g., National Marine Sanctuaries), and other federal agencies (e.g., NPS, FWS) utilize them to some degree. Their effectiveness may depend on a variety of factors, including but not limited to sufficient individual size or a network of properly spaced individual MPAs to capture the full range of habitat types and dispersal kernels, protection of critical areas and key functional groups, protection from land-based sources of pollution, incorporating socio-economic context of stakeholders interacting with the reefs, political will, and enforcement and compliance (Cinner et al. 2009, McLeod et al. 2009, Mora et al. 2006). CRCP does not have direct management authority over any MPAs, but there are several steps that the Program can take to support reduction of fishing impacts via MPAs. Below is a list of actions the Program should focus on in the near-term:

1. Identify and characterize areas that may be candidates for protection, including, but not limited to: spawning sites, nursery habitats, or other areas critical to particular life-history stages; biodiversity hot spots; areas of potentially high resilience; and areas facing the greatest threats (supports Objectives F2.1, F2.3)

*Rationale:* Given the deficiency in understanding of ecosystem impacts from fishing in combination with other threats, the precautionary approach would be to protect particularly vulnerable or ecologically significant areas from additional threats. The CRCP has a demonstrated track record of conducting studies that have identified areas of particular ecological significance or vulnerability to fishing impacts and resulted in the expansion of existing MPAs or designation of new ones.

*Progress to date:* There are numerous examples of CRCP studies that identified vulnerable or ecologically significant areas that resulted in changes to existing MPAs or siting of new ones. In particular, several studies have been successful in identifying and characterizing active fish spawning aggregations in Florida, Puerto Rico, USVI, and the Gulf of Mexico.

*Next steps:*

- Expand similar work to areas with active management partners, for example, providing biological data to the relevant agencies involved in the Southeast Florida Coral Reef Initiative
2. Increase participation of stakeholder or citizen groups in MPA management planning, decision-making, and monitoring activities (supports Objective F3.1)

*Rationale:* Stakeholder engagement in MPA planning and management can foster increased public understanding, support, and compliance due to perceived legitimacy, ownership, and direct and indirect benefits. Stakeholder involvement can also take advantage of local knowledge and reduce potential user conflicts (Davis and Moretti 2005). This work also supports assessment area no. 10 in the [MPA Management Assessment Checklist](#).

*Progress to date:* A considerable amount of the work executed by TNC, through the Partnership Cooperative Agreement, has supported stakeholder involvement in MPA planning processes in most of the seven jurisdictions. The Domestic Grant Program provided funds to NGOs to work with communities to develop management plans for several MPAs. Additionally, through the Domestic Grant Program and the National Program, CRCP has supported community monitoring efforts, particularly in Hawaii and Guam, to assess the effectiveness of MPAs or provide baseline information for new MPAs.

*Next steps:*

- Continue to support the states and territories and NGOs to provide forums to garner public input to MPA development through the Cooperative Agreements and grants with potential technical support from CRCP's fisheries liaisons or other field staff
- Investigate the utility of community monitoring programs in other areas

3. Work with relevant agencies to improve the management of MPAs that protect key coral reef ecosystem components and functions (supports Objective F2.4), particularly those with existing or planned fishing regulations

*Rationale:* Many existing MPAs are still in great need of management support so they can achieve their management and conservation objectives. Among the 20 MPAs CRCP assessed with the [MPA Management Assessment Checklist](#), conflict resolution mechanisms, management planning, and onsite management were among the areas with the biggest gaps in “effective conservation”.

*Progress to date:* CRCP support via the National program has aided PIMPAC in MPA capacity building efforts such as workshops on management planning, socio-economic monitoring, and enforcement training. Many of the jurisdictions have used the cooperative agreements with the CRCP to enhance the management of their MPAs through the support of key personnel (MPA managers and enforcement personnel), sustainable financing development and administration needs. Additionally, work through the Domestic Grants and the Partnership Cooperative Agreement has supported the development or revision of sustainable financing plans for MPAs and MPA management planning and implementation. CRCP conducted baseline assessments for 20 MPAs using the MPA Management Assessment Checklist (see Appendix 4). Coral reef management capacity assessments are being conducted in each of the seven jurisdictions and MPA-relevant recommendations can be found in the [final reports](#) for the first two completed jurisdictions, American Samoa and USVI.

*Next steps:*

- Utilize MPA Management Assessment Checklist baseline assessments and jurisdictional capacity assessment reports to identify priority MPA management gaps to focus on
  - Utilize the network created by PIMPAC to continue MPA management capacity building trainings and workshops
4. Develop targeted, locally relevant outreach and communication strategies (supports Objective F4.3) and strengthen local agency and community capacity for effective and consistent enforcement of regulations (supports Objective F3.2)

*Rationale:* Support for and compliance with fishing-relevant MPA regulations remains a major gap which severely limits effectiveness of MPAs in reducing fishing impacts on coral reef ecosystems. Objective F3.2 had the greatest number of intersections with jurisdictional coral reef management priorities (11; see Appendix 2). Additionally, these activities support assessment areas 5 and 12 in the MPA Management Assessment Checklist.

*Progress to date:* Education and outreach efforts have been spearheaded by state and territorial agencies, NGO partners, CRCP fisheries liaisons, and other CRCP project managers. Through the Grant Program, CRCP has supported key personnel to work with specific MPAs to conduct outreach

and education activities to improve understanding of MPAs and associated regulations. Efforts to support enforcement capacity have been mostly focused on trainings.

*Next steps:*

- New activities should build on existing education and outreach and enforcement enhancing activities in the jurisdictions to improve compliance, particularly in MPAs that need improvement in these areas based on the MPA Management Assessment Checklist
  - Coordinate with Office of National Marine Sanctuaries on innovative approaches to addressing enforcement issues
  - Consider an add-on to the State and Territorial Cooperative Agreements or separate competition targeted at filling enforcement needs highlighted in the jurisdictional capacity assessments
  - Consider revising the Domestic Grant Program priorities to include studies that assess level of compliance and acceptance of MPAs
5. Conduct biological and socioeconomic research and monitoring to assess the performance of actively managed MPAs (supports Objective F2.5) and ensure that proper communication mechanisms are in place to assimilate this information into adaptive management processes.

*Rationale:* Conducting biological and socioeconomic monitoring will not only provide information for MPA managers to use for adaptive management and education and outreach (supports Objective F4.3), but also inform the Program on the effectiveness of its investments and partnerships, and contribute to performance measure F2 PM1, “Stable or increasing biomass of key taxa in areas in MPAs.” This also supports assessment areas 7, 8, and 9 in the MPA Management Assessment Checklist.

*Progress to date:* Through the National Program, the CRCP has supported long-term biological monitoring of some MPAs, particularly in Florida, Puerto Rico, and USVI. CRCP has also conducted more targeted assessments, particularly in Hawaii, Guam, and the Gulf of Mexico. Socioeconomic studies on perceived efficacy of MPA regulations have been recently conducted in Hawaii and Puerto Rico.

*Next steps:*

- Mine data and results from past MPA monitoring and assessments to better understand the effectiveness of CRCP’s investments and partnerships
- Select targeted MPAs with active management and fishing restrictions to assess performance and contribute to performance measure F2 PM1 through NCRMP monitoring or additional assessments
- Support improved socioeconomic monitoring in MPAs that are deficient in this assessment area in the MPA Management Assessment Checklist; short term assessments may be supported through the National Program and the Domestic Grant Program, whereas longer term may be addressed through cooperative agreements or potentially NCRMP

## *Reducing Fishing Impacts Outside of MPAs*

MPAs are just one of the tools that can be used by fisheries management and existing MPAs are not sufficient enough to guard against overexploitation of coral reef fisheries resources. There is also a need to manage fisheries outside of MPAs and this is often an iterative process that requires a substantial amount of data. The fisheries management process followed by the four FMCs is a useful model for CRCP to following prioritizing efforts for several reasons. First, there is considerable overlap between federally and state/territorially managed coral reef fishery stocks and the FMCs contain representation from and share data across the pertinent states and territories, NOAA Fisheries, and multiple stakeholder groups. The types of data needed for the FMCs and NOAA Fisheries to make management recommendations and promulgate regulations, can also inform jurisdictions' fisheries management decisions, and there is often an effort to develop compatible regulations. To better support reduction of fishing impacts outside of MPAs, the Program should focus on the below in the near term:

1. Work with relevant agencies to prioritize key coral reef associated species or functional groups (e.g., herbivores, apex predators) on which to focus management, research, and monitoring activities for each jurisdiction or managed area (supports Objective F1.2)

*Rationale:* There are too many species to focus management-relevant research on them all in the short-term and some functional groups may be more ecologically significant or vulnerable to overfishing.

*Progress to date:* CNMI and Hawaii have identified key taxa and Florida is in the process of doing so. NOAA Fisheries recently updated list of stocks to be tracked via the Fish Stock Sustainability Index. While the FMCs have not worked with the CRCP to identify key taxa, they have identified some species that are in need of more information as part of their 5-year research plans.

*Next steps:*

- Work with the remaining jurisdictions and the four FMCs to identify key taxa to focus on; criteria might include stocks of particular ecological significance (e.g., herbivores, apex predators), stocks that are overfished or undergoing overfishing, stocks that life history or population assessment information has never been collected
  - Coordinate with the Habitat Assessment Prioritization Working Group (lead by NOAA Fisheries Office of Science & Technology) as they identify key stocks for habitat assessments , to highlight coral reef dependent stocks for consideration
2. Obtain essential life history (e.g., age and growth, reproductive characteristics, mortality rates and longevity), and ecological information (e.g., trophic interactions, habitat requirements) for key taxa (supports Objective F1.3)

*Rationale:* This information is deficient for many federally and state/territorially managed stocks in coral reef ecosystems and is needed to assess vulnerability to fishing impacts and inform management regulations, such as annual catch limits and accountability measures, which are now required for all federally managed stocks and adopted by many of the states and territories.

*Progress to date:* The [Southeast Data Assessment and Review](#) lists all past assessments and final reports for stocks in the Caribbean, Gulf of Mexico, and South Atlantic regions on their website. The assessment reports often highlight data deficiencies that can be used to help target work. The Hawaii Fisheries Local Action Strategy (LAS) has funded collection of life history data for several coral reef species in Hawaii (see [final reports](#) and [Life History Compendium for Exploited Hawaiian Fishes](#)).

*Next steps:*

- Using the information collected in the previous step, conduct studies to fill high priority gaps for key taxa
- Coordinate with PIFSC and SEFSC biosampling programs and other data collection programs (e.g., Marine Fisheries Initiative Program), NOAA Fisheries Office of Science & Technology Assessment Methods Working Group or the Habitat Assessment Improvement Plan Team) in attempt to leverage resources and reduce duplication of effort

### 3. Obtain necessary information on fishing effort (supports Objective F1.4)

*Rationale:* Fisheries catch and effort data has been collected at varying levels of consistency and quality across coral reef jurisdictions and this is complicated by the many dominant sectors of fishing in coral reef ecosystems, including commercial, recreational, charter, and subsistence.

*Progress to date:* Recreational fishing data has been collected consistently for Florida (since 1979), Puerto Rico (since 1999), and Hawaii (starting in 2001, consistently since 2004) through what is now referred to as the Marine Recreational Information Program (MRIP); MRIP is currently working to improve the methodology for data collection in Hawaii and Puerto Rico and collecting information to inform a new data collection program in the USVI. See [MRIP Implementation Plan 2012-2013 Update](#). Fisheries data from the Western Pacific Region is collected and made accessible through the Western Pacific Fisheries Information Network (WPacFIN) program. Additionally, community-based CREEL studies have been conducted in several areas in Hawaii (see list of [Hawaii Coral Reef Strategy completed projects](#)).

*Next steps:*

- Coordinate with the state and territorial governments, MRIP, and WPacFIN to identify pilot areas for data collection to inform improvements in survey design and capture baseline information. Focus on USVI initially to leverage current MRIP efforts
- Encourage and assist jurisdictions in establishing recreational fishing licensing programs to improve understanding of data pool of recreational fishers and provide finances to support priority fishery data collection or other management needs

4. Develop and utilize valid, precise, place-based and realistic ecosystem dynamic models (supports Objective F1.5)

*Rationale:* There is a need to move from the labor intensive and costly single-species stock management approach to the more holistic and cost-effective ecosystem-level approaches. Work to advance these models should be in close partnership with the appropriate fisheries management organizations to ensure products will be utilized.

*Progress to date:* The NOAA Integrated Ecosystem Assessment (IEA) Program has pilot projects in Hawaii and the Gulf of Mexico; an Atlantis ecosystem model is being developed in support of the Pacific Islands Regional Initiative under the Habitat Blueprint.

*Next steps:*

- Coordinate with the IEA Program to understand outcomes of regional pilot programs and how they can be used as models elsewhere
- Support targeted efforts to advance fisheries modeling to include ecosystem dynamics through small pilot efforts (e.g., Atlantis model under Habitat Blueprint) and providing key inputs or parameters

5. Increase participation of stakeholder or citizen groups in fisheries management planning, decision-making, and monitoring activities (supports Objective F3.1)

*Rationale:* Stakeholder engagement in fisheries management planning, decision-making, and monitoring activities can be an important first step to developing effective policies and regulations to reduce fishing impacts and improve support for and compliance with resulting management actions, which are currently known issues in most of the jurisdictions.

*Progress to date:* Progress has been made in several jurisdictions to incorporate stakeholders in resource planning processes, such as using conservation action planning models. Additionally, efforts like the Hawaii Fisheries Extension Program include communities' and fishers' input into research through projects like Scientists and Fishermen Exchange meetings.

*Next Steps:*

- Provide technical support through CRCP's field staff for the jurisdictions to continue to enhance stake holder engagement
- Work with the jurisdictions and FMCs to encourage more stakeholder involvement in collaborative research and management programs

6. Develop targeted, locally relevant outreach and communication strategies (supports Objective F4.3) and strengthen local agency and community capacity for effective and consistent enforcement of regulations (supports Objective F3.2)

*Rationale:* As mentioned regarding MPAs, support for and compliance with fishing-relevant regulations remains a major gap which severely limits effectiveness of those regulations in reducing fishing impacts on coral reef ecosystems. Objective F3.2 had the greatest number of intersections with jurisdictional coral reef management priorities (11; see Appendix 2).

*Progress to date:* Education and outreach efforts have been spearheaded by state and territorial agencies, the FMCs, NGO partners, CRCP fisheries liaisons, and other CRCP project managers. Efforts to support enforcement capacity have been mostly focused on trainings.

*Next steps:*

- Build on existing activities in the jurisdictions to continue to enhance education and outreach and enforcement to enhance compliance with fishery regulations
- Consider an add-on to the State and Territorial Cooperative Agreements or separate competition targeted at filling enforcement needs highlighted in the jurisdictional capacity assessments
- Coordinate with NOAA Office of Law Enforcement to target activities for building capacity in the jurisdictions, by leveraging existing training capacity and materials, creating coral specific training materials or adapting current material, and exploring using the Joint Enforcement Agreements
- Increase coordination with the Fisheries Communications Office to ensure that consistent messages regarding fishing impacts are communicated

7. Conduct biological and socio-economic monitoring to evaluate effectiveness of management actions (supports Objective F1.6)

*Rationale:* Monitoring to evaluate effectiveness of management actions is necessary for adaptive management, including providing information into stock assessments, and can assist with evaluating the Program's performance towards meeting its goals.

*Progress to date:* Much of the ongoing biological monitoring is evolving into NCRMP. Recent short-term socioeconomic assessments include a study on the effectiveness of the St. Croix gill and trammel net ban and buyback program. Through NCRMP, CRCP's socioeconomic team is developing surveys of residents and tourism operators that are expected to be conducted in each jurisdiction every 3-4 years.

*Next steps:*

- Coordinate with the Science Centers to leverage biological data collected via CRCP's NCRMP for evaluating effectiveness of fisheries management actions
- Utilize data to begin tracking performance measure F1PM1, "Stable or increasing biomass of key taxa in areas outside MPAs"

## *Program Executing Mechanisms*

In order to maximize the benefits derived from the resources and programs that CRCP possesses, the Program should concentrate the above listed activities to the most effective mechanism. Below are recommendations on where to primarily focus those activities, with recognition that there needs to be some flexibility in mechanisms to ensure that priority activities can be implemented:

### **National Program**

Based on the types of activities that CRCP has focused on to reduce fishing impacts in the past, the Program's capabilities and strengths are in management-relevant research and monitoring and on-the-ground management capacity and expertise in the fisheries liaisons. CRCP should continue to take advantage of in-house capabilities to address adverse impacts of fishing. However, the CRCP should increase program focus on the collection of life history and ecological information (Objective F1.3) and fishing catch and effort data (Objective F1.4) to determine appropriate harvest levels and resulting management measures, and data to identify priority areas for protection (Objective F2.1) and evaluate performance (Objective F2.5) to inform adaptive management of MPAs. Through existing field capacity, such as the fisheries liaisons, the Program may continue to support targeted stakeholder engagement and education and outreach activities. It is important to note that CRCP does not have enough resources to meet all of these needs in every jurisdiction and annual investments will need to be directed to the timeliest issues.

### **Coral Reef Conservation Grant Program**

Sufficient capacity in coral reef jurisdictions remains one of the major gaps to effective coral reef fisheries management. This appears to be particularly true with regards to management of MPAs (Objective F2.4) and enforcement of fisheries regulations (Objective F3.2), as these were the national objectives with the greatest overlap with the jurisdictional management priorities. Addressing these capacity needs is best led by the jurisdictional agencies with the authority to do so. Additionally, increasing community stewardship through improved engagement (Objective F3.1) and outreach and education (Objective F4.3) is most effective through locally-driven efforts. As such, CRCP should focus these efforts through the cooperative agreements with states and territories and NGOs, and the domestic grants. The coral reef management priorities documents and local action strategies highlight the jurisdiction-specific priorities in these areas. Regional FMCs have not gone through a similar priority setting process with CRCP regarding their coral reef fisheries goals, though they do develop research priorities across all the fisheries that they manage. As such, a formal process may not be needed, but improved communication on how projects in the cooperative agreements will be used to inform and/or improve coral reef fisheries management and fit into the FMCs' larger management strategies is warranted. This could be accomplished through amending the proposal and reporting requirements and enhancing coordination, beginning with the new cooperative agreements for FY14-16. Additionally, the FMC should primarily focus efforts on obtaining essential life history and ecological information for key species (Objective 1.3), understanding fishing effort (Objective F1.4), and assessing the effectiveness of their regulations and protected areas to help recover species and protect habitat (Objectives F1.6 and F2.5).

## Staff Coordination

Coordination between CRCP and the various agencies, offices, and programs involved in coral reef and fisheries management could be improved, particularly when it comes to working together to leverage resources and identifying priority actions to implement each year. Additionally, CRCP could serve a role in highlighting the ecological, economic, and societal significance of coral reef fisheries to other programs and partners that are balancing resources across different fisheries and ecosystems. Some specific areas to focus additional coordination on include connecting with the jurisdictions, FMCs, NOAA, and other federal agencies' efforts to prioritize key species to focus research and management on (Objective F1.2), learning about emerging techniques to model ecosystem dynamics to inform fisheries management (Objective F1.5), leveraging existing national coral reef monitoring data collection to fill fishery-independent data needs for managed stocks and protected species (Objective F1.6), and determining where there are receptive management partners to work with in providing information to inform siting of new or changes to existing MPAs (Objective F2.3).

## *Emerging Issues*

As the landscape for coral reef fisheries management evolves, so too should the CRCP's approach to addressing adverse fishing impacts. Because the CRCP National G&Os were developed in 2009, changes have necessarily occurred with regards to acute issues, management strategies, and NOAA's priorities. Research for this plan revealed that there is still a great deal of work needed to accomplish the National G&Os and CRCP should continue to focus activities in support of them. However, this is an appropriate time to highlight some areas that have risen in importance over the last three years. Some of the issues and priorities that did not surface in the National G&Os, but are worth some attention, and potentially investment by the CRCP include:

- Addressing loss and degradation of habitats that coral reef fisheries depend;
- Supporting recovery of threatened and endangered species that support coral reef fisheries – for instance, examining whether increasing biomass of key herbivores may contribute to the recovery of ESA-listed coral species;
- Addressing threats to coral reef fisheries caused by invasive species, such as lionfish in the Atlantic, Caribbean, and Gulf of Mexico;
- Utilizing synergistic approaches to considering and addressing multiple threats, such as targeting multiple threat reduction activities in one place; and
- Taking better account of the human dimension (e.g., dependence on, interactions with) of the ecosystem when developing management strategies.

## J. Conclusion

This document outlines a strategic plan to address adverse fishing impacts via implementing the CRCP National G&Os and supporting jurisdictional priorities. Over the next five years, the CRCP should focus on implementing 12 of the 19 national fishing impacts-related national objectives. Exact executing mechanism may vary, but the National Program should increase focus towards data collection to inform

fishery management plans (Objectives F1.3 and F1.4) and siting and management of MPAs (Objectives F2.1 and F2.5). External investments could be maximized through filling capacity gaps in MPA management (Objective F2.4) and fisheries enforcement (Objective F3.2), and improving community engagement (Objective F3.1) and outreach and education (Objective F4.3). Additionally, improved coordination with other NOAA programs, federal agencies, and state and territorial partners can help CRCP maximize its investments, particularly in prioritizing key species to focus research and management on (Objective F1.2), learning about emerging techniques to model ecosystem dynamics (Objective F1.5), leveraging existing national coral reef monitoring data collection to support managed stocks and protected species (Objective F1.6), and determining where to inform changes to MPAs (Objective F2.3). The Coral Program's effectiveness at addressing adverse fishing impacts should be evaluated in priority geographies through the MPA Management Checklist (F2 PM2) and assessments of biomass changes in key taxa outside (F1PM1) and within MPAs (F2 PM1).

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## L. Appendices

## Appendix 1. Fishing-Related Jurisdictional Coral Reef Management Priorities

Goals and objectives extracted from the 7 jurisdictional [Coral Reef Management Priorities documents](#) to address the adverse impacts of fishing on coral reef ecosystems. Goals are in bold font. Priority objectives are italicized. Under Hawaii’s goals and objectives, the following abbreviations are utilized below: MHI = Main Hawaiian Islands, PMNM = Papahānaumokuākea Marine National Monument, and ARCH = Archipelago wide.

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
<p><b>GOAL 1: To maintain and, where necessary, improve the status of fish stocks through protection and sustainable use.</b></p> <p><i>1.1: Effectively enforce regulations to sustainably manage marine resources.</i></p>	<p><b>GOAL 2: Increase the abundance and average size of CNMI’s key coral reef fishery species to protect trophic structure and biodiversity and improve coral reef ecosystem condition (within and outside of existing MPAs).</b></p> <p><i>2.1 Increase compliance with fishing laws and regulations that affect key coral reef fishery species by 2015. Focus these efforts in priority watersheds (those with completed CAPs).</i></p>	<p><b>GOAL 2: Protect Guam’s coral reef fisheries resources for current and future generations through effective management that conserves aquatic and marine ecosystems and ensures the condition, welfare and integrity of marine ecosystems.</b></p> <p><i>2.1 Increase management-related monitoring and research of coral reef fisheries to determine the status of target reef fishery stocks, levels of effort that are sustainable, habitat impacts and management effectiveness.</i></p>	<p><b>GOAL 1: Coral reefs undamaged by pollution, invasive species, marine construction and marine debris.</b></p> <p><i>1.1 (MHI) Reduce key anthropogenic threats to two priority nearshore coral reef sites by 2015 using ahupua’a-based management. Two sites—Ka’anapali- Kahekili and Pelekane-Puako-Anaeho ‘omalu Bay—were identified as 3–5 year priority areas for the program funding support.</i></p>	<p><b>GOAL A1: Manage the Florida Reef Tract and Ecosystem using an ecosystem-based approach, including zoning/marine spatial planning and other appropriate tools.</b></p> <p><i>A1.1 Create a Florida Reef Management Council within three years to oversee a coordinated ecosystem-based management approach for the entire Florida Reef Tract and Ecosystem (spanning the full range of reef habitats and associated reef resources from the Dry Tortugas to Stuart, including the backcountry Gulf side of the Keys).</i></p>	<p><b>GOAL B1. Protect coral reef ecosystems from large- and small-scale fisheries impacts through an informed planning process.</b></p> <p><i>B1.1: Identify, designate and implement a minimum of 3% of the insular platform as no-take marine reserves in compliance with Resolution Number 307 and prepare management plans in collaboration with communities as practicable for these reserves. The areas to be designated should be concerned with the protection of coral reefs ecosystems.</i></p>	<p><b>GOAL 2: Develop and implement a comprehensive education and outreach program to create buy-in and build public support for an effective coral reef conservation program that targets resource users, general public and decision-makers.</b></p> <p><i>2.1 Convey the importance and economic value of the reef to key constituencies and measure their understanding of the effect of human impacts, such as overfishing, pollution, etc., on this value.</i></p>

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
<p>1.2: To promote and facilitate the development of a network of no-take Marine Protected Areas (MPAs) to assist the territory in efforts to meet the 20% goal 2, in addition to continuing the development and incorporation of other MPAs, some of which may be designated for purposes other than improving the status of fish stocks (e.g., resource protection) into a wider network to ensure the long-term health and sustainability of the region's coral reef resources.</p> <p>1.3: Strengthen fisheries regulations to increase stock abundance and occurrence of large coral reef fish on local reefs.</p> <p>1.4: Conduct studies to identify factors impacting the coral reef fisheries in order to improve the effectiveness of management.</p> <p>1.5: Monitor long-term trends in population parameters of key fish and invertebrate species for adaptive management.</p>	<p>2.2 Strengthen the information base for fisheries management by 2012. Collect, analyze and manage fishery-dependent and -independent data about the status of stocks, including relevant life history information for targeted coral reef fishes. (Refer to Summary Recommendations [Urgent/Critical] in "Coral Reef Stock Assessment Workshop" [Western Pacific Regional Fishery Management Council (WPRFMC), Feb. 2008]).</p> <p>2.3 Enact the Fishery Management Act and accompanying regulations by 2010.</p> <p>2.4 Take necessary action to ensure that CNMI is a decision-making partner in Mariana Trench Marine National Monument management. Ensure that the Monument incorporates local initiatives and laws.</p> <p>2.5 Implement major objectives in the NOAA National Marine Fisheries Service (NMFS) Habitat Assessment Improvement Plan, which are relevant to CNMI coral reefs.</p>	<p>2.2 Create community management programs that increase public knowledge of, support for, and participation in marine preserves and science-based management.</p> <p>2.3 Increase socioeconomic monitoring and research to better understand the interactions of users with the resources.</p> <p>2.4 Support, enhance and improve the regulations of resource use activities that impair fisheries or fish habitat.</p> <p>2.5 Improve educational programs to enhance understanding of fisheries status and management needs.</p>	<p>1.2 (ARCH/MHI) Prevent new AIS introductions and minimize the spread of established AIS populations by 2020.</p> <p>1.3 (PMNM) Derelict fishing gear will be removed from coral reef environments at or above the rate at which it is introduced, minimizing damage to coral reefs.</p> <p><b>GOAL 2: Productive and sustainable coral reef fisheries and habitat.</b></p> <p>2.1 (MHI) Increase the abundance and average size of ten targeted coral reef fisheries species critical to reef health and ecological function by 2020.</p>	<p>A1.2 Develop and implement a comprehensive zoning plan for the entire Florida Reef Tract and Ecosystem and implement through placed-based entities and management plans within three to five years.</p> <p>A1.3 Establish a regulatory coordination committee under the Florida Reef Tract and Ecosystem Management Council within three to five years.</p> <p><b>GOAL A2: Build political will and public support to establish the governing policies and administrative structure needed to make reef conservation a priority for Florida.</b></p> <p>A2.1 Implement a broad marketing campaign to brand the Florida Reef Tract and Ecosystem within three to five years.</p>	<p>B1.2: Develop criteria to establish new protected areas.</p> <p>B1.3: Search for and identify management tools that could be applied to fisheries and related ecosystem protection and management in Puerto Rico.</p> <p>B1.4: Reduce overfishing on critical stocks that most directly affect the health and resilience of the reef system by immediately implementing a closed season and catch limits of known spawning and aggregating species.</p> <p><b>GOAL B2. Enhance enforcement and management programs to reduce fishing impacts to coral reef ecosystems.</b></p>	<p>2.2 Ensure public support for resource management actions by hosting conferences, workshops and making school presentations. This outreach program should enable stewardship at all levels of society to affect long-term behavioral change.</p> <p>2.3 Emphasize transfer of information and research findings to the general public, developers and decision-makers.</p> <p><b>GOAL 3: Increase the ability to effectively enforce existing rules, regulations and laws.</b></p> <p>3.1 Maintain sufficient law enforcement staff and enforce regulations on priority rules and regulations, such as development practices, permit conditions, MPA regulations and fisheries regulations.</p>

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
1.6: Reduce commercial fishing pressure on coral reef fish by redirecting fishing efforts off of coral reefs and introducing alternative sources of marine-based protein.		<p>2.6 Develop partnerships with federal resource managers to facilitate effective management of aquatic resources in federally controlled areas (e.g., National Park Service).</p> <p>2.7 Develop management strategies to address indigenous fishing rights as ordered by Public Law 29–127.</p>	<p>2.2 (MHI) Designate a sufficient area of marine waters under effective conservation by 2020 to ensure sustainable and resilient coral reef ecosystems.</p> <p>2.3 (MHI) Reduce anchor damage and trampling on coral reefs through the implementation of no-anchor zones, utilization of day-use mooring buoys and other means by 2020.</p>	<p><b>GOAL D1: Develop and implement conservation programs to increase the size, abundance and protection, as appropriate, of coral reef species (both fish and invertebrates), including targeted species critical to reef health and ecological function, such as, but not limited to, game species and organisms collected for aquaria.</b></p> <p>D1.1 Fill monitoring and assessment gaps, including fisheries dependent and independent monitoring, to further understand the effects on other trophic levels. This would include assessing the sustainable limits and impacts of all fishers, including the “curio” trade and recreational and commercial aquarium collectors. Obtain enough information to run population connectivity models for coral reef dependent species.</p>	<p>B2.1: Enhance the fisheries data collection programs.</p> <p>B2.2: Support new and existing regulations that eliminate or reduce impacts on fisheries and coral reef habitat from gear and overfishing.</p>	<p>3.2 Develop and provide incentive mechanisms for enforcement programs and enforcement officers to keep existing staff and attract new staff.</p> <p>3.3 Provide cross training between science and management departments and enforcement officers to increase enforcement capacity and enable cross-enforcement of existing regulations.</p>

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
			<p><b>GOAL 4: increased public stewardship of coral reef ecosystems.</b></p> <p><i>4.1 (ARCH) Provide at least 8 community organizations working at priority sites** with technical support needed to implement coral reef management strategies that are consistent with ahupua'a principles and that enhance ecological resilience by 2020.</i></p>	<p><i>D1.2 Identify larval sources, spawning areas and aggregations. Understand sources of coral and reef fish larvae so that these can be conserved for necessary regeneration and restoration.</i></p> <p><i>D1.3 Support and enhance current efforts to update existing stock assessments, eventually developing appropriate criteria to guide harvest regulations (i.e., Maximum Sustainable Yield, Optimal Sustainable Yield). This would include zoning strategies and the potential use of no-take marine areas as well as appropriate legislation to affect those zoning strategies and regulations.</i></p> <p>D1.4 Synthesize existing fish population data to identify information gaps and direct needs for additional monitoring.</p>	<p>B2.3: Support and review the existing fishing and coral reef laws and regulations for taking of reef fish to ensure that they are applicable to current issues and can be efficiently administered.</p> <p>B2.4: Support the development of guidelines and regulations and determine the impact of aquaculture projects to ensure that they contain adequate requirements for both their placement and operations. Use existing information and programs for aquaculture development and customize them for application in Puerto Rico.</p> <p><b>GOAL B3. Utilize enforcement and education to encourage public compliance with fishing regulations and reduce impacts of fishing.</b></p>	<p>3.4 Determine the success of existing enforcement efforts and management measures that are already in place to build on what works. This includes the determination of success for compatible regulations established in state waters and the territory's ability to enforce them. This may also include a gap assessment to determine where enforcement is currently directed compared to issues presented in this document.</p> <p>3.5 Inform and educate judicial and legislative decision-makers to increase support for law enforcement actions.</p> <p>3.6 To create separation between enforcement officials and resource users, consider bringing in outside enforcement presence (e.g., exchanges, temporary assignments, etc.) to focus on priority enforcement issues.</p>

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
				<p>D1.5 Develop strategy to formalize coordination among fisheries management and regulatory agencies.</p> <p><b>GOAL D2: Reduce physical marine benthic impacts from recreational and commercial activities and marine debris.</b></p> <p><i>D2.1 Reduce benthic habitat impacts by implementing, among other actions, appropriate marine zoning (i.e., the potential use of no-take zones, no-anchor zones, no-motor zones, mooring buoy systems) and by providing education and enforcement in sensitive, unique or highly productive habitat areas.</i></p>	<p><i>B3.1: Create an outreach and educational campaign to reduce fishing impacts over coral reef ecosystems aimed at the following: a. Recreational fishing community. b. Commercial fishing community. c. The judicial system.</i></p> <p><i>B3.2: Provide education to enforcement personnel strengthening their understanding of impacts from recreational and maritime uses on coral reef ecosystems.</i></p> <p>B3.3: Export positive experiences from communities that have successfully implemented no-take zones to other communities that would benefit from such an approach.</p>	<p>3.7 Provide training along with education and field materials to enforcement officers.</p> <p>3.8 Develop and implement outreach and education strategies in partnership with other agencies and programs to work with user groups to increase compliance and reduce the need for enforcement.</p> <p>3.9 Work with user groups to promote public support and compliance through workshops, orientations, provision of reporting hotlines and service as interpretive guides.</p>

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
				<p><i>D2.2 Reduce misuse of recreational and commercial fishing gear by:</i> • <i>Establishing gear-restrictive zones in areas with sensitive benthic resources.</i> • <i>Requiring education programs regarding natural resources to obtain commercial and recreational fishing license.</i> • <i>Enforcing existing standards for illegal gear.</i> • <i>Reviewing and establishing BMPs for commercial activities.</i> • <i>Reviewing rules and guidelines for activities on or around coral reefs.</i></p> <p>D2.3 Develop a centrally located volunteer-based marine-debris reporting and removal program.</p> <p><b>GOAL D3: Improve the efficacy of law enforcement activities.</b></p> <p><i>D3.1 Obtain additional resources (e.g., staff, equipment, statutory authority).</i></p>	<p>B3.4: Empower enforcement agencies so they are able to implement existing regulations in areas that require immediate protection.</p> <p>B3.5: Enable joint enforcement agreement between local, national and federal agencies to improve efficiency of operations.</p>	<p><b>GOAL 4: Reduce fishing impacts on critical stocks that most directly affect the health and resilience of the reef ecosystem.</b></p> <p><i>4.1 Reduce fishing effort on prioritized key coral reef associated species or functional groups (e.g., herbivores, juveniles, apex predators, etc.).</i></p> <p><i>4.2 Reduce the use of inappropriate gear and fishing in MPAs by strengthening local enforcement and through educational efforts.</i></p> <p><i>4.3 Improve commercial fisheries recordkeeping and fisher compliance by developing and implementing an effective mechanism to improve the current data-gathering process.</i></p>

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
				<p><i>D3.2 Implement regular interagency law enforcement coordination activities (e.g., cross-deputization, review/ updating of law enforcement authorities / capacity, etc.).</i></p> <p>D3.3 Improve education and outreach programs as they pertain to fishing/ diving/boating regulations.</p> <p>D4.4 Through interagency coordination efforts, establish regional consistency standards and communication efforts for fisheries, diving and boating regulations (e.g., central Web site, standard format for brochures, etc.).</p> <p>D4.5 Develop a Florida Reef Tract and Ecosystem law enforcement training program specific to reef-related regulations and resources for all agencies.</p>		<p>4.4 Clarify jurisdictional-specific fishery management responsibilities and collaborate to ensure effective implementation.</p> <p>4.5 Improve understanding of the current status of fisheries resources and patterns of fishing effort through collaboration with local and federal researchers pursuing management driven fisheries science.</p> <p>4.6 Build comparative USVI fisheries health trend data through studies that identify behaviors of present fishery status and trends within the USVI and throughout the region, including studies comparing managed areas to unmanaged areas and managed stocks to similar unmanaged stocks.</p> <p>4.7 Develop and implement effective strategies created and enforced by fishers to identify, understand and apply fisheries self-management practices.</p> <p><i>4.8 Obtain the necessary information to understand the impacts of recreational fisheries in the USVI.</i></p>

American Samoa	CNMI	Guam	Hawaii	Florida	Puerto Rico	USVI
						<p>4.9 Continue to develop and implement a recreational license program with associated legislation for recreational fishing regulations and clear requirements and authorities for monitoring and enforcement.</p> <p>4.10 Incorporate a mandated sampling program to gauge the status of recreational fisheries.</p> <p><i>4.11 Understand ecological connectivity through dispersal of eggs and larvae to identify key sources and sinks; assess connectivity between existing and potential MPAs and between spawning aggregations and juvenile habitat to identify resilient areas for protection.</i></p> <p><i>4.12 Support the effective implementation of marine protected areas (MPAs).</i></p> <p><i>4.13 Assess the effectiveness of MPAs in meeting their stated management goals.</i></p> <p>4.14 Understand the social impacts of legislation and regulatory actions on the fishing community and identify alternatives to mitigate the negative impacts of these actions.</p> <p>4.15 Develop and implement enhanced tools to preserve and restore fisheries resources.</p>

## Appendix 2. Intersections between National G&Os and Jurisdictional Priorities

Agreement between the 7 jurisdictions' **priority**, fishing impacts-related objectives and the CRCP's national objectives. An "x" indicates overlap between a jurisdictional objective and one of the national objectives. The number of "x"s are summed for each jurisdiction in the light gray rows. "# INTXNs" refers to the number of objectives across all the jurisdictions overlapping with a given national objective." # States /Terrs" refers to the number of jurisdictions that have objectives overlapping with a given national objective.

National G&O's	Goal F1	Obj F1.1	Obj F1.2	Obj F1.3	Obj F1.4	Obj F1.5	Obj F1.6	Goal F2	Obj 2.1	Obj 2.2	Obj 2.3	Obj 2.4	Obj 2.5	Goal F3	Obj F3.1	Obj F3.2	Obj F3.3	Obj F3.4	Goal F4	Obj F4.1	Obj F4.2	Obj F4.3	Obj F4.4
	# INTXNs		5	3	6	8	4	6		6	2	6	9	4		3	11	1	3		1	4	7
# States /Terrs		5	3	5	6	4	5		5	2	5	6	4		3	5	1	3		1	3	5	1
<b>AS</b>		1	0	0	0	0	0		1	0	1	1	0		0	1	0	0		0	0	0	0
Obj 1.1																x							
Obj 1.2									x		x	x											
Obj 1.3		x																					
<b>CNMI</b>		1	1	1	1	1	1		0	0	0	0	0		1	1	0	1		0	1	1	0
Obj 2.1															x	x		x				x	
Obj 2.2			x	x	x	x	x																
Obj 2.3		x																			x		
<b>GU</b>		1	0	1	2	1	1		0	0	0	1	1		1	0	0	1		0	0	1	0
Obj 2.1				x	x	x	x																
Obj 2.2												x			x							x	
Obj 2.3					x								x					x					
Obj 2.4		x																					
<b>HI</b>		1	1	1	1	1	1		1	1	1	3	1		1	0	1	1		0	0	0	0
Obj 1.1												x											
Obj 1.2																							
Obj 1.3																							
Obj 2.1		x	x	x	x	x	x																
Obj 2.2									x	x	x	x	x										
Obj 2.3																							
Obj 4.1												x			x								
<b>FL</b>		0	0	2	1	1	2		2	1	2	1	1		0	3	0	0		0	1	2	0
Obj A1.1																							
Obj A1.2									x	x	x	x	x										
Obj A2.1																					x	x	
Obj D1.1				x	x		x																
Obj D1.2									x														

	National G&O's																							
	Goal F1	Obj F1.1	Obj F1.2	Obj F1.3	Obj F1.4	Obj F1.5	Obj F1.6	Goal F2	Obj 2.1	Obj 2.2	Obj 2.3	Obj 2.4	Obj 2.5	Goal F3	Obj F3.1	Obj F3.2	Obj F3.3	Obj F3.4	Goal F4	Obj F4.1	Obj F4.2	Obj F4.3	Obj F4.4	
Obj D1.3				x		x	x				x													
Obj D2.1																								
Obj D2.2																x							x	
Obj D3.1																x								
Obj D3.2																x								
<b>PR</b>		0	0	1	1	0	1		1	0	1	1	0		0	2	0	0		0	0	1	0	
Obj B1.1									x		x	x												
Obj B2.1				x	x		x																	
Obj B3.1																x							x	
Obj B3.2																x								
<b>USVI</b>		1	1	0	2	0	0		1	0	1	2	1		0	4	0	0		1	2	2	1	
Obj 2.1																								x
Obj 2.2																					x		x	
Obj 2.3																						x	x	
Obj 3.1																x								
Obj 3.2																x								
Obj 3.3																x						x		
Obj 4.1		x	x																					
Obj 4.2												x				x								
Obj 4.3					x																			
Obj 4.8					x																			
Obj 4.11									x		x													
Obj 4.12												x												
Obj 4.13													x											

### *Appendix 3. Fishing Impacts-Related Performance Measures*

CRCP's Fishing Impacts-Related Performance Measures (PMs). Bolded performance measures are actively being tracked by the Program.

F1 PM1: Stable or increasing biomass (g/m<sup>2</sup>) of key taxa in areas outside of Marine Protected Areas (MPAs)

F2 PM1: Stable or increasing biomass (g/m<sup>2</sup>) of key taxa in MPAs

**F2 PM2: Increase in management effectiveness of priority coral reef MPAs, measured using the CRCP MPA Management Assessment Checklist**

F2 PM3: Number of acres of coral reefs effectively conserved within designated MPAs

F3 PM1: Percent of jurisdictional residents who have observed non-compliance with local fisheries management regulations

F4 PM1: Percent of jurisdictional residents who support management approaches including MPAs that reduce fishing impacts to coral reefs

## Appendix 4. MPA Management Assessment Checklist Baseline Assessments

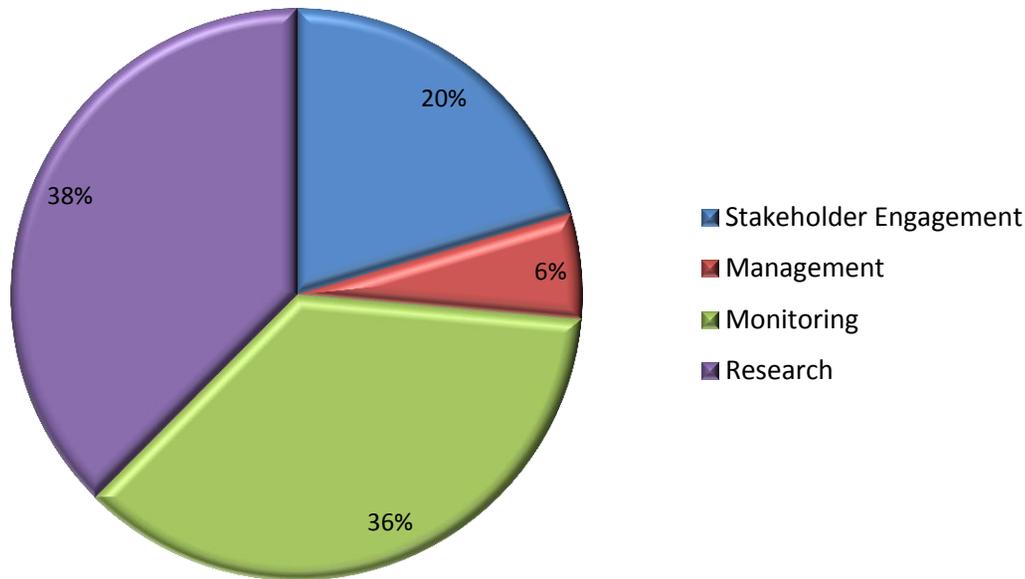
[MPA Management Assessment Checklist](#) baseline assessments for 20 MPAs in U.S. coral reef jurisdictions. Baseline assessments were conducted in 2011 through interviews with site managers or other knowledgeable representatives from the government agency, community or non-governmental organization that has been authorized to oversee the management of the site. MPAs that were selected for tracking met the following criteria: 1) were located in one of the CRCP's priority geographic areas, 2) a legally established MPA, and 3) have some ongoing management activity. Colors correspond to performance with regards to the "Effective Conservation" targets: light green = exceeds target, dark green = meets target, orange = one step from target, red = two steps from target.

Jurisdiction	Priority Area	MPA	Management Planning	Ecological Network Development	Governance	On-Site Management	Enforcement	Boundaries	Biophysical Monitoring	Socio-economic Monitoring	MPA Effectiveness Evaluation	Stakeholder Engagement	Financing	Outreach and Education	Conflict Resolution Mechanism	Climate Change Resilience	FY11
American Samoa	Vatia	Vatia Community-based Fisheries Management Program Reserve	3	1	3	1	2	2	3	1	1	3	1	3	1	1	61.9
CNMI	Lao Lao Bay	LauLau Bay Sea Cucumber Sanctuary	2	2	1	2	2	3	2	2	2	1	2	2	3	1	64.3
CNMI	Garapan	Managaha Marine Conservation Area	2	2	3	2	2	3	2	1	2	2	2	2	3	1	69
Guam	Apra Harbor	Sasa Bay Marine Preserve	1	2	2	2	2	3	1	1	1	1	2	1	1	1	50
Guam	Piti-Asan	Piti Bomb Holes Marine Preserve	2	2	2	2	2	3	2	1	2	2	2	2	1	2	64.3
Guam	Manell-Geus	Achang Reef Flat Marine Preserve	2	2	2	2	2	3	2	1	2	2	2	2	1	2	64.3
Hawaii	Kaanapali-Kahekili	Kahekili Herbivore Fisheries Management Area	1	1	3	2	2	3	3	1	2	3	1	2	2	2	66.7
Hawaii	Pelekane Bay-Pauko-Anaeho-omalu Bay	Puako Bay/Reef Fishery Management Area	2	3	3	2	3	1	3	1	3	3	2	2	3	1	76.2
Hawaii	Pelekane Bay-Pauko-Anaeho-omalu Bay	Puako-Anaeho'omalu Fisheries Replenishment Area	2	3	3	2	2	3	3	2	3	3	1	3	3	1	81

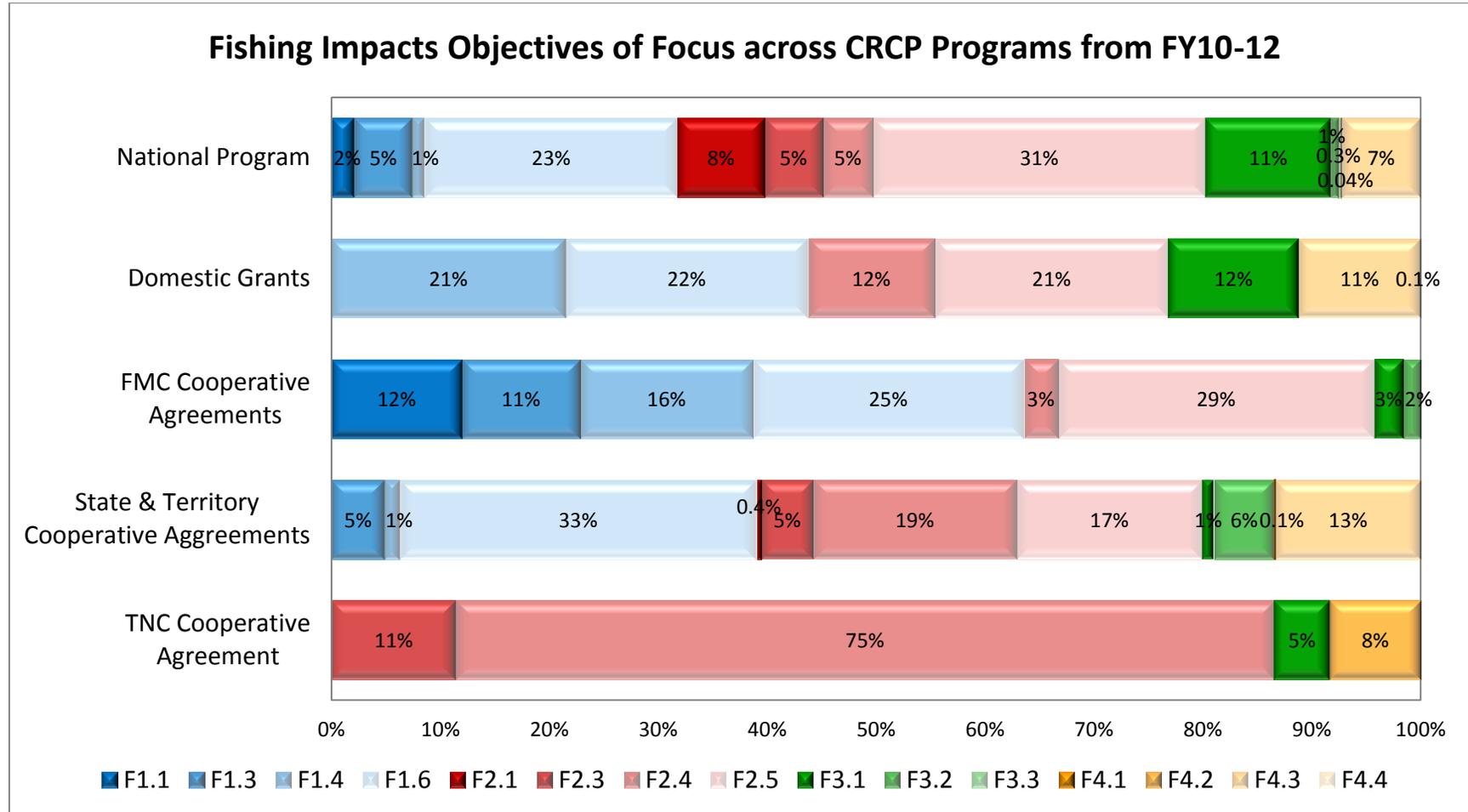
Jurisdiction	Priority Area	MPA	Management Planning	Ecological Network Development	Governance	On-Site Management	Enforcement	Boundaries	Biophysical Monitoring	Socio-economic Monitoring	MPA Effectiveness Evaluation	Stakeholder Engagement	Financing	Outreach and Education	Conflict Resolution Mechanism	Climate Change Resilience	FY11
Hawaii	Pelekane Bay-Pauko-Anaeho-omalu Bay	Waialea Bay MLCD	1	2	3	1	2	3	1	1	1	1	1	2	1	1	50
Puerto Rico	Culebra	Canal Luis Pena Natural Reserve	2	2	3	1	2	3	1	1	1	2	2	2	1	1	57.1
Puerto Rico	Northeast Reserves	Arrecifes de la Cordillera Natural Reserve	2	2	2	1	2	3	1	1	1	2	1	2	1	1	52.4
Puerto Rico	Northeast Reserves	Cabezas de San Juan Natural Reserve	1	2	1	1	2	2	1	1	1	2	1	2	1	1	45.2
Puerto Rico	Cabo Rojo	Arrecifes de Tourmaline Natural Reserve	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33.3
Puerto Rico	Cabo Rojo	Abrir La Sierra Bank Red Hind Spawning Aggregation Area	2	1	3	1	3	3	3	1	3	3	1	2	3	2	73.8
Puerto Rico	Guanica	Guanica State Forest and NR marine extension	1	1	2	3	2	2	1	1	1	1	2	2	1	1	50
Puerto Rico	Other	La Parguera Natural Reserve	1	1	1	2	2	1	2	2	1	3	2	3	1	1	54.8
USVI	Coral Bay, St. John	Coral Bay Area of Particular Concern	1	1	1	1	1	2	1	1	1	2	2	1	1	2	42.9
USVI	St. Thomas East End Reserve (STEER)	STEER	1	1	1	1	1	3	1	1	1	2	1	1	1	2	42.9
USVI	St. Croix East End Marine Park (STXEEMP)	STXEEMP	3	1	2	3	1	3	2	1	1	2	2	2	1	1	59.5
Average Score			1.65	1.65	2.1	1.65	1.9	2.5	1.8	1.15	1.55	2.05	1.55	1.95	1.55	1.3	<b>57.98</b>
'Effective Conservation' Target			<b>3</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>		

*Appendix 5. Supplementary Material on Historical CRCP Focus*

**Figure 1.** Percent of total, internal CRCP investments in fishing impacts across 2010-2012 across 4 broad tools: stakeholder engagement and partnership building, management support, biological monitoring, and science and research to inform management.



**Figure 2.** Percent of total fishing impacts-related investments across the 19 National Objectives for five CRCP programs: 1) the National Program, 2) domestic grants, 3) cooperative agreements with four fishery management councils (FMCs), 4) cooperative agreements with seven states and territories, and 5) a cooperative agreement with The Nature Conservancy (TNC), during fiscal years 2010-2012. Colors correspond to the four national goals, with different shades for individual objectives: blue refers goal 1, red refers to goal 2, green refers to goal 3, and yellow refers to goal 4.



## Appendix 6. Summary of Fisheries Management

Summary of fishery management tools currently utilized by the four regional fishery management councils and seven states and territories for stocks associated with tropical, shallow-water coral reefs. Note: overfished stocks are in bold and stocks undergoing overfishing are denoted by an asterisk\*.

Region / State / Territory	Relevant Fishery Management Plans	Commercial License Required	Additional Licenses, Permits, Endorsements	Commercial Landings Reporting	Recreational License Required	Recreational Catch Data	Overfished or Undergoing Overfishing*	Prohibited Stocks
WPFMC	<a href="#">Crustaceans, Coral Reef Ecosystems</a> ; also <a href="#">Archipelago-based Fishery Ecosystem Plans</a>	NO	Special Coral Reef Ecosystem Fishing Permit	if subject to special use permit, required to submit logbook information within 30 days of trip	N/A	N/A	None per <a href="#">FSSI</a>	live rock, coral
American Samoa		YES	aquarium fish; fish weir; trapping; coral harvesting; shell harvesting; scientific collection; mariculture	mandatory commercial purchase system (receipt book) and voluntary boat- and shore-based creel surveys	NO	YES		<i>Chelonia mydas</i> , <i>Eretmochelys imbricata</i> , <i>Dermochelys coriacea</i> ; marine mammals
CNMI	Three-Year Coral Reef Protection LAS (2003), largely replaced by the CAP process	NO General license required	cast net; dead coral; aquarium fish (non-commercial only); scientific collection	voluntary creel surveys (boat and lagoon shore), Commercial Purchase System (trip tickets), commercial nighttime spear catch data (MES)	cast net and aquarium fish only	voluntary creel surveys (boat and lagoon shore)	unknown but doubtful, local depletion is a possibility	hard corals, soft corals, stony hydrozoans, Protected Species (e.g. green and hawksbill sea turtles); Also a moratorium on take of all sea cucumbers and trochus through 2017
Guam		NO General license required	trochus	voluntary cooperation of fishermen with the creel surveys and dealer	NO; Permit required for aquarium fish	Voluntary creel surveys (boat and shore-based)	Unknown but local depletion likely for some species	Protected Species (e.g. green and hawksbill sea turtles), Corals; Also no commercial harvest of tridacnid clams, sea urchins, or sea cucumbers
Hawaii		YES	Wahiawa Public Fishing Area Permit, Bottomfish Fishing Vessel Registration, Aquarium Permit, Nu'uānu Entry Card, Special Marine Product License, Aquaculture Facility License, Aquaculture Dealer License, Special Activity Permit, Special Permit, NWHI Entry Permit	monthly catch report (collected since 1948)	NO	Collected since 2001 through <a href="#">MRIP</a>		sea turtles, Hawaiian monk seal, stony coral, pink or gold coral, clams, oysters, or other shellfish

Region / State / Territory	Relevant Fishery Management Plans	Commercial License Required	Additional Licenses, Permits, Endorsements	Commercial Landings Reporting	Recreational License Required	Recreational Catch Data	Overfished or Undergoing Overfishing*	Prohibited Stocks
CFMC	<a href="#">Spiny Lobster</a> , <a href="#">Shallow Water Reef Fish</a> , <a href="#">Coral</a> , <a href="#">Queen Conch</a>	NO			NO		<b>queen conch; Caribbean grouper unit 1; Caribbean grouper unit 2; Caribbean grouper unit 4</b> per <a href="#">FSSI</a>	queen conch, goliath and Nassau groupers, midnight, blue, and rainbow parrotfishes, corals and live rock, butterflyfishes, seahorses
Puerto Rico		Yes; Since 1936	<i>Panulirus argus</i> , <i>Strombus gigas</i>	Required on a trip basis	Yes, but not instituted in practice	Collected since 2000 through <a href="#">MRIP</a>		goliath and Nassau groupers, corals, butterflyfishes, seahorses; no sale of additional spp.
USVI		Yes; Since 1972; moratorium on new licenses	fish helper permit	Required on a biweekly basis	NO; investigating feasibility	Not currently being collected		goliath and Nassau groupers, midnight, blue, and rainbow parrotfishes
GMFMC	<a href="#">Reef Fish</a> , <a href="#">Spiny Lobster</a> , <a href="#">Corals</a>		Reef Fish, Spiny Lobster	Required on a trip basis, within 7 days of the trip	N/A	N/A	<b>Gag*; gray triggerfish*; greater amberjack*; red snapper</b> per <a href="#">FSSI</a>	stony corals, <i>Gorgonia flabellum</i> , <i>G. ventallina</i> , goliath grouper, red drum, Nassau grouper
SAFMC	<a href="#">Coral</a> , <a href="#">Snapper-Grouper</a> , <a href="#">Spiny Lobster</a>		Snapper-Grouper Charter	Required on a trip basis, within 7 days of the trip	N/A	N/A	<b>red grouper*; red porgy; red snapper; snowy grouper*; gag*; speckled hind*; Warsaw grouper*</b> per <a href="#">FSSI</a>	stony corals, black coral, hydrocorals, <i>Gorgonia flabellum</i> , <i>G. ventallina</i> , goliath and Nassau groupers, wild live rock, red snapper, speckled hind, Warsaw grouper
Florida		YES	marine life, spiny lobster, stone crab, pompano	Trip Tickets and Trip Interview Program	YES	Collected since 1979 through <a href="#">MRIP</a>		goliath, Nassau, and Warsaw groupers, speckled hind, tarpon, manta and spotted eagle rays, sawfishes, black, fire, hard, and stony corals, queen conch, Venus and common sea fans, Bahama starfish, longspine urchin, 26 spp. of sharks

Appendix 6 Continued

Region / State / Territory	Seasonal Closures	Size Limits	Annual Catch Limits	Other Bag Limits or Quotas	Managed Areas	Gear Restrictions	Regulations Online	Prioritized List of Key Taxa	Current Fishing LAS
WPFCM	NO	NO	YES	YES	YES	YES	<a href="#">YES</a>		
American Samoa	NO	tridacnid clams, spiny lobster		NO	YES	YES	<a href="#">YES</a>		Finalized October 2012
CNMI	NO	lobster, trochus after end of the moratorium	YES	NO	YES	YES, no harvesting with scuba or hookah, no drag, trap, gill, or surround nets, no chemicals or explosives, no electric shocking devices	<a href="#">YES</a>	YES	No
Guam	NO	Tridacnid clams, trochus, lobsters, crabs; no size limits on fishes		trochus, sea cucumber; tridacnid clams, bivalves, gastropods (personal use only)	YES	YES	<a href="#">YES</a>		Finalized 2005
Hawaii	YES	YES		YES	YES	YES	<a href="#">YES</a>	YES	Finalized Dec. 2008
CFMC	YES	YES	YES	YES	YES	YES	<a href="#">YES</a>		
Puerto Rico	YES	YES	YES	YES	YES	YES	<a href="#">YES</a>		Finalized March 2012
USVI	YES	YES	YES	YES	YES	YES	<a href="#">YES</a>		STXEEMP finalized Dec. 2005; Coral Bay & Fish Bay still in draft
GMFMC	YES	YES	YES	YES	YES	YES	<a href="#">YES</a>		
SAFMC	YES	YES	YES	YES	YES	YES	<a href="#">YES</a>		
Florida	YES	YES	NO	YES	YES	YES	<a href="#">YES</a>	NO	Finalized Dec. 2004

## *Appendix 7. List of Acronyms*

ARCH	Archipelago Wide
AS	American Samoa
CFMC	Caribbean Fishery Management Council
CNMI	Commonwealth of the Northern Mariana Islands
CRCP	Coral Reef Conservation Program
FL	Florida
FMC	Fishery Management Council
FWS	U.S. Fish and Wildlife Service
FY	Fiscal Year
G&Os	Goals and Objectives
GMFMC	Gulf of Mexico Fishery Management Council
GU	Guam
HI	Hawaii
IEA	Integrated Ecosystem Assessment
LAS	Local Action Strategy
LBSP	Land-Based Sources of Pollution
MPA	Marine Protected Area
MRIP	Marine Recreational Information Program
NCRMP	National Coral Reef Monitoring Program
NFWF	National Fish and Wildlife Foundation
NGO	Non-governmental Organizations
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NWHI	Northwestern Hawaiian Islands
PIMPAC	Pacific Islands Marine Protected Areas Community
PM	Performance Measure
PR	Puerto Rico
SAFMC	South Atlantic Fishery Management Council
STEER	Saint Thomas East End Reserve
STXEEMP	Saint Croix East End Marine Park
TNC	The Nature Conservancy
USVI	United States Virgin Islands
WPacFIN	Western Pacific Fisheries Information Network
WPFMC	Western Pacific Fishery Management Council