Capacity Assessment Synthesis

A Synthesis of Issues Affecting the Management of Coral Reefs and Recommendations for Long-Term Capacity Building in U.S. Jurisdictions

March 2015

sustainametrix

An Analysis of Issues Affecting the Management of Coral Reefs and the Associated Capacity Building Needs Across U.S. Jurisdictions

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National Oceanic and Atmospheric Administration's
Coral Reef Conservation Program

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Cover Photo: Coral Reef Image in Caribbean (Photo credit: Annelise Hagan.)

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Acronym List

Use of Acronyms in the Document: For the purpose of consistency and brevity, acronyms will be used and are spelled out in detail below. If full names of acronyms presented below are spelled out in the document, they are done so for the purpose of clarity.

AIC	U.S. All Islands Coral Reef Committee
CNMI	The Commonwealth of the Northern Mariana Islands
CRCA	Coral Reef Conservation Act
DLNR	Department of Land and Natural Resources
DoD	Department of Defense
EBM	Ecosystem-Based Management
EPA	Environmental Protection Agency
EPSCoR	Experimental Program to Stimulate Competitive Research
IDRC	International Development Research Centre
IGBP	International Geosphere-Biosphere Programme
IHDP	International Human Dimensions Programme on Global Environmental Change
JCAT	Jurisdictional Capacity Assessment Team
LAS	Local Action Strategies
LBSP	Land Based Sources of Pollution
LOICZ	Land-Ocean Interactions in the Coastal Zone
NGOs	Non-Governmental Organizations
NAS	National Coral Reef Action Strategy
NOAA CRCP	NOAA Coral Reef Conservation Program
NOAA OLE	NOAA Office of Law Enforcement

NSF	National Science Foundation
PCR	Project Completion Report
PIMPAC	Pacific Islands Managed and Protected Areas Community
POC	Point of Contact
PSD	Priority Setting Documents
SCUBA	Self-Contained Underwater Breathing Apparatus
USCRTF	U.S. Coral Reef Task Force
USFWS	U.S. Fish and Wildlife Service
USVI	U.S. Virgin Islands
VINE	Virgin Islands Network of Environmental Educators

Executive Summary

Coral reef management is a complex challenge. In 2011-2014, an ambitious project was conducted to analyze the issues that affect capacity to manage coral reefs at all seven U.S. Flag Jurisdictions (jurisdictions). This activity followed a 2007 recommendation of an external panel at the conclusion of a review of NOAA's Coral Reef Conservation Program (NOAA CRCP). They recommended that CRCP *"conduct a substantial study of the range and nature of capacity-building requirements for ongoing effectiveness of the CRCP."* The work was competitively bid and awarded to SustainaMetrix with a specific focus on capacity of the US jurisdictions to implement priority actions defined in recently completed priority management plans. It became evident mid-way through the assessment process that none of the jurisdictions were exclusively following the priority management plans. Instead, management was driven by a wide number of plans, responding to emerging and pressing issues, and following new directives not identified in plans. Thus, the SustainaMetrix team adapted their strategy in partnership with an ad-hoc jurisdictional capacity assessment (J-CAT) team. Together, the team composed of a small but diverse group of coral reef management experts representing government and Non-Governmental Organizations (NGOs), academia and market forces worked in collaboration and help to steer and guide the focus of the capacity assessment process. The results are documented in a series of seven documents, one for each of the seven jurisdictions, produced and written by SustainaMetrix between 2012-2014.

This document was prepared as a brief synthesis of common issues across the jurisdictions and includes potential short and long-term strategies to build adaptive capacity at the scale of the network of jurisdictions. While this synthesis was commissioned by and prepared for the CRCP, they cannot be expected to be the sole lead in a capacity building program to improve coral reef management. The intended audience for this document is therefore the U.S. Coral Reef Task Force (USCRTF), the All Islands Committee (AIC) as well as all state and local government agencies and the non-governmental and academic communities involved in coral reef management who contribute capacity to address these persistent issues. The USCRTF and CRCP are large and mature programs and therefore deserving, particularly at this time, of a thoughtful look to the future as to what adjustments can be made to increase management of coral reefs under U.S. jurisdiction.

The purpose of the capacity assessment process is:

- To identify technical and management capacity gaps in each of the U.S. coral reef jurisdictions;
- To provide specific recommendations to address these gaps and increase effectiveness of management of U.S. coral reef ecosystems;
- To support the implementation of strategic coral reef management priorities, Local Action Strategies, and other strategic management initiatives in each jurisdiction; and,
- To better understand the roles, responsibilities, missions, capabilities and needs of management agencies.

Major findings regarding capacity to manage coral reefs that shape short-term and long-term recommendations:

Building capacity to apply the attributes of ecosystem-based management is a primary capacity challenge. While much progress has been made and capacity built over the past 20-30 years of management, the challenges of coral reef management continue to outstrip the investments. Managers recognize the pressing need for an integrated or ecosystem-based approach to better streamline and increase the efficiency of management. Unfortunately, the current institutional or governance systems are not well matched for this challenge and management is largely sector based focused on economically important species rather than integrated across a landscape/seascape. Current governance systems across all jurisdictions feature multiple agencies with sometimes conflicting mandates, often-unclear authorities, with no single institution responsible for ensuring collective action. A conspicuous mismatch exists between the preferred path for an integrated approach and the actual management of coral reefs. The ecosystem approach requires a whole new way of doing business that involves a range of capacity building efforts in terms of personnel, infrastructure, funding, data gathering systems, legal authorities, policies, procedures and processes as well as organizational reform. More and more, managers want to shift to an ecosystem approach yet much of the work remains as traditional sector-based management.

Two short-term strategies are recommended. The first is the development of a management effectiveness framework that is grounded in a baseline understanding of the governance dimensions. Such a framework is necessary to document the unique governance contexts in each jurisdiction so that reform to an ecosystem approach can be measured. A transition from traditional resource management to an ecosystem approach requires leadership from multiple agencies and organizations who can create incentives for greater collaboration, build on small successes and sector reform, test and refine area-based management tools that fits the local context, acknowledge trade-offs and collectively shape a new mandate for an ecosystem-approach. To move further in this direction, well-coordinated interdisciplinary science is required to investigate the effectiveness of the process and outcomes of management to support managers and decision-makers. Investment in management science is needed to investigates ways to bridge biophysical science and social science and how results can best to inform management and decision support as well as policy development.

Defining and periodically updating purpose with clear time-bound and measurable goals and objectives is a primary capacity challenge. At present, there are a number of different expressions of goals, objectives strategies in all jurisdictions. With multiple expressions of goals and objectives, there are some that are complimentary and consistent, some that overlap, and there are some that are in conflict. Many of the goals are generic and lack timelines and regulatory teeth. As a management tool, goals should be as specific as possible, unambiguous, and have metrics and indicators that link to coral reef health and societal well-being against which coral reef management efforts can be measured. The current focus of management is largely on implementing a range of projects that don't necessarily link to changing the biophysical conditions of the reef and with very little attention given to the sequence of steps that are needed to assemble the pre-conditions that are essential to implement management plans and policies. This situation is understandable given that there is currently no accepted common framework in place across all jurisdictions for basic monitoring of progress of coral reef management that provides guidance to sequence and prioritize what is

needed to build the essential enabling conditions to increase management effectiveness, track the attainment of outcomes and achievement toward policy and management objectives.

A short-term recommendation is to sharpen goals at the scale of the jurisdiction and do so in collaboration with the other managers and other agencies involved in coral reef management. This should also include clear metrics and indicators for how assessment is conducted, over what time frame, and providing resources for adaptive management actions as needed.

Stronger formal commitment within each jurisdiction for effective coral reef management is a necessary enabling condition and an ongoing capacity challenge. In each jurisdiction, formal commitment for coral reef management expressed commonly as political will is highly variable within and uneven across the jurisdictions. Despite the predictable influx of federal support for coral reef management, the degree of formal commitment can change dramatically with change in political administrations in each jurisdiction. This will continue to be a persistent capacity challenge but there are some suggested actions. We recommend that the USCRTF and AIC assist jurisdictions with routine engagement between the Governor's office and senior administrators from the jurisdictions. Specifically, we recommend routine briefings at events such as the National Governor's Association Meetings and other venues. The business case needs to both communicate the value of coral reefs but also align with the political aspirations. This is a major challenge and best done on a routine basis, with professional assistance and constant adaptation to test message delivery and make changes as needed to secure formal commitment.

At the federal scale, the reauthorization of the Coral Reef Conservation Act (CRCA) is a major capacity issues that underscores the challenges associated with formal commitment. While progress is already underway, we strongly endorse all actions by USCRTF to assist in the reauthorization process. However, much of the work that is required can only be conducted by entities outside of government. A recommendation is for USCRTF to convene a summit of interested NGOs and other non-federal partners on the topic of a collaborative approach to CRCA reauthorization to identify leaders who will take on the challenge. The lack of reauthorization plays out in increasing uncertainty for long-term support of coral reef management in the jurisdictions. As a result, many of the investments in coral reef management are short-term projects rather than long-term program investments. Six of the seven jurisdictional programs also operate as initiatives within their jurisdictions and have no secure mandate for sustained funding. Only Florida has a formally constituted coral conservation and management program. While efforts are already underway to ensure reauthorization of the CRCA is introduced to the 114th Congress, a process is needed to clearly define an action agenda to secure the passage of this crucial legislation.

Far more work is needed within the jurisdictions to create a balanced portfolio of sustainable funding beyond federal support. Once again, there are no simple solutions as each jurisdiction is facing their own set of issues regarding sustainable financing, accounting, grants management, hiring and procurement. A short-term recommendation is to document successful and unsuccessful sustainable financing attempts and share lessons learned and support pilot demonstration efforts for new and innovative ways to broaden the funding base. Such an activity must be linked with strong understanding of current and future financing mechanisms (e.g. revenues associated with tourism, fishing licenses, real estate and development rights, for-profit investments, and grants and donations). Strategies must also fit

well with the governance context to ensure there is a match between the strategy and the institutional structures and authorities that would need to support them.

Political will for more effective coral reef management is best shaped through supportive and informed constituencies which is another significant capacity challenge across jurisdictions. There are expressions of local support and in each jurisdiction for coral reef management, particularly in locations where livelihoods and fishing are linked to the health of coral reefs. However, there is an overall lack of supportive and informed constituencies across the wider population of each jurisdiction for effective coral reef management. While there are notable exceptions, managers describe stakeholders as rarely engaged in coral reef management and a broader public that is generally unaware of the status, importance and potential role to support for more effective coral reef management. A short-term recommendation is to invest in a lessons learned effort of what has worked and what has not to build constituencies for greater support of coral reef management. Establishing Citizen Advisory Panels in each jurisdiction that serve as a conduit to broader constituencies would serve as a network connection as long as it is well staffed and supported with a clear purpose, thoughtful process and target outcomes.

Four other issues common across jurisdictions need to be addressed for more effective management include closing the implementation gap, reform of enforcement to support compliance, the structure and function of management agencies, and collaboration across management agencies.

A widening gap exists between planning and the actual implementation of formally endorsed management plans with sufficient regulations that are coupled with effective enforcement. This issue is perhaps the most critical feature of coral reef management across the jurisdictions. Considerable effort is directed towards planning. The result often means multiple forms of management plans, often with different management goals and objectives and few with comprehensive implementation strategies, enforcement actions and evaluation built into the plan. Many of the plans do not receive, or simply do not seek formal endorsement by local authorities for the management plan and therefore often are not implemented. When implementation does occur, it is largely pilot scale actions, focused on a specific issue or place and is dependent on the tenacity and creativity of the management team. Across all jurisdictions there is a need to close the implementation gap, establish consistent planning that receives the formal commitment of local leaders and is adaptively implemented and evaluated.

A short-term recommendation is to adopt a common language and tracking tool for both process and outcomes of management to sequence and prioritize essential actions. These include issue analysis, preparation of plans that address the issues, formal commitment with the necessary resources and authority to implement an appropriate evaluation strategy that informs adaptive management. This needs to be coupled with a focus on coral reef management outcome attainment, particularly the conditions that enable more effective management and the necessary changes in behavior by resource users, managers and funders of management. Such outcomes can and should be tracked using simplifying scorecards that are shared as a learning tool to help summarize the return on investment. It is critical that funding be linked with the building and maintaining of enabling conditions.

The most telling feature of effective implementation of a plan of action is enforcement that supports compliance with appropriate rules and regulations. With few exceptions, both enforcement and voluntary compliance are weak across

all seven U.S. jurisdictions. Managers describe a common situation where sufficient legal and regulatory frameworks are in place, but the enforcement and adjudication process is in need of serious reform. A short-term recommendation to address this is in the next 12 months, USCRTF and AIC in partnership with NOAA Office of Law Enforcement and all relevant federal, state and territorial agency law enforcement programs to create a high-level enforcement and compliance working group with an action plan. Ideally, this working group is linked to the USCRTF and focused on improving and further developing joint enforcement agreements by exploring enforcement challenges from across all seven jurisdictions.

All jurisdictions have experienced an increase in the number of people and institutions concerned with coral reef management. While this has a net effect of increasing capacity is also increases the challenges associated with the function and structure of management agencies and collaboration across the agencies. Managers describe significant challenges associated with basic human resources such as hiring and promotion, cumbersome procurement requirements, uneven compensation levels and other institutional issues lead to high rates of staff turnover, burnout, and lack of motivation. These issues go far beyond coral reef management and affect all natural resource management endeavors and there are no easy answers. A short-term recommendation is for USCRTF to support a series of steps in each jurisdiction. A first step is to simply understand and map the administrative systems for hiring, procurement and grants management for each jurisdiction. A second step is to define the specific points in the system flow that are redundant, unnecessary or present persistent challenges. A third step would be to define the potential return on investment for reforming these systems to improve hiring, procurement and grants management practices. If significant, the case for hiring, procurement or grants management reform should be brought to the Governor's office, and high-level meetings should then be held to decide on revision or total overhaul. If implementation of reform does not or cannot occur, then using the results to train management staff on the realities of the management system and innovative alternatives are suggested.

Managers across all jurisdictions described the critical importance of fellowships, internships, professional development, and federal details. The USCRTF should prioritize these programs as a signature effort and pool resources to provide long-term support for more fellowships such as the annual Governor Tauese P.F. Sunia Memorial Coral Reef Conservation Summer Internship. The NOAA Coral Reef Management Fellowship Program should also be institutionalized and not subject to budget cuts as it was specifically established to build coral reef management capacity in the jurisdictions.

Finally, there exists a need for greater integration and coordination among coral reef managers. With few exceptions, integration and coordination among managers across the coral reef management system is fragmented and weak. A short-term recommendation is to focus on a series of actions to generate and measure high quality collaboration. The actions include ways to operationalize the concept of high quality collaboration, to map the management realm and areas for increased collaboration, monitor stages of development, define levels of integration and build capacity for better dialogue, decision-making, acting upon the decisions, and reflection on effectiveness of the entire process.

Long-term Recommendations for a Capacity Building Program

Short-term investments are insufficient to deal with the cumulative nature of impacts to coral reefs when coupled with the major capacity gaps. This includes a long-term focus on management effectiveness across jurisdictions, paying particular attention to moving from planning to implementation and evaluation, as well as the development of the essential enabling conditions that serve as the scaffolding for changes in collective behaviors that will lead to desired management results. Section Three features a strategy to build toward a long-term capacity building program. Too often, the focus of building capacity is on short-term actions that are directed at an individual or group of individuals through training that builds knowledge skills and hopefully affects attitude toward management. While this is important, we believe it is just a starting point and a long-term capacity building program is needed to address and adapt to coral reef ecosystem change into the future. This section outlines three key bundles of actions that together form a platform for building long-term capacity.

The long-term strategy begins with a dedicated set of reference sites in each of the seven jurisdictions that focus on modeling adaptive ecosystem management. Through periodic assessment of management process and outcomes to measure progress, the capacity for learning and adapting management strategies will be better developed. The strategy also features a recommendation for a curated learning network and strong leadership to guide and support a capacity building investment. Investment in building capacity to manage coral reefs will likely require sustained political support to ensure the necessary resources are available to address the issues confronting coral reef management at all seven U.S. coral reef jurisdictions. Long-term investment is needed to break the current cycle of short-term capacity-building efforts, move away from short-term projects to long-term and sustained coral reef programs, pool resources from across federal agencies and link funding and reporting to the process and outcomes of coral reef management.

In conclusion, the recent work edited by Jeremy Jackson et al. (2014) provides a compelling rationale for the actions suggested in this document and underscores the need for dramatic increase in management capacity. This comprehensive analysis documents the abundant data that has been generated regarding coral reef health in the Caribbean and presents the analysis in terms of Status and Trends of Caribbean Coral Reefs from 1970-2012. The authors and contributors call for robust conservation and management strategies, simplified and standardized monitoring protocols, increased quality of communication and exchanges, and the development and implementation of adaptive legislation and regulations.

The analysis is based on over 35,000 documented quantitative reef surveys, the largest amount of data every complied for such an assessment. There is no equivalent supply of data that investigates management effectiveness and the basis for an objective and comparable assessment of the management response simply does not exist in any form. While he does not go into exhaustive detail, his recommendations underscore the need for management science. We would support this and further state that our analysis makes clear the need for drastic reform to enforcement of regulations and comparative studies are needed to select for principles and practices for fisheries and land-based sources of pollution (LBSP) that can guide the strategies and tailor them to the local and unique governance context. They conclude with dire prediction that Caribbean coral reefs and their associated resources will virtually disappear within just a few decades unless all of these measures are promptly adopted and enforced. We concur with this and

strongly encourage a major focus on a long-term and sustained capacity building effort aimed at addressing governance dimensions and management issues.

Short-Term Recommendations

Short-Term Rec #	Recommendation	Related Issue	Page #
1	USCRTF provide support to the jurisdictions to develop a coral reef management effectiveness evaluation framework. With a framework in place, funding agencies can support building capacity for an ecosystem approach for management in a step-wise fashion to build management response to the growing complexity of coral reef ecosystem change.	Issue 1	16
2	Ensure Sufficient Capacity to Analyze and Utilize Biophysical Data and Build Management Science Capacity, Invest in Lessons Learned From Management Science at the Jurisdictional Scale	Issue 2	19
3	Define the Purpose and Set Clear Three to Five Year Goals for both Biophysical Reef Health and Societal Well-being at each Jurisdiction	Issue 3	22
4	Strategically Engage Governors of all Seven U.S. Coral Reef Jurisdictions through The National Governors Association Meetings to Champion Coral Reef Conservation and Management	Issue 4	24
5	Support a Collaborative Approach for Coral Reef Conservation Act Reauthorization	Issue 5	25
6	USCRTF to Host Sustainable Financing Summit	Issue 5	26
7	Invest in Lessons Learned and Capacity Building Efforts Specifically Designed to Build Constituencies for Greater Support of Coral Reef Protection and Citizen Advisory Panels that Support Management Actions	Issue 6	29
8	Close Implementation Gap With Portfolio Approach: Common Framework For Tracking and Evaluating Project and Program Management Process Effectiveness and Support Federal and NGO Staff Presence on the Ground to Assist in Implementation and Evaluation of Projects	Issue 7	31
9	Establish an Enforcement Working Group That Engages Agencies with Enforcement Authorities to Improve Coral Reef (Fisheries, LBSP, etc.) Enforcement Chain Effectiveness	Issue 8	35
10	Support Innovative Solutions to Hiring, Procurement and Grants Management and if not Possible, Create Detailed Training on These Administrative Actions	Issue 9	37

Long-term Recommendations

Section One: Introduction

In partnership with each of the seven U.S Flag Jurisdictions, the NOAA CRCP supported the completion of Coral Reef Management Capacity Assessments in all seven jurisdictions led by the consultant team SustainaMetrix. The capacity assessments were designed to identify capacity gaps in each jurisdiction, and provide specific recommendations to fill those gaps. Rather than a program evaluation, the project focused on how to best move forward with building a sustainable and effective management structure in each jurisdiction. The assessments were geared toward understanding capacity gaps in local agencies with the responsibility to manage coral reef ecosystems, but the recommendations are meant to engage the larger coral reef conservation community in the U.S. including federal partners on the U.S. Coral Reef Task Force (USCRTF) and any relevant Non-Governmental Organizations (NGOs) or academic institutions.

Figure 1: Covers of all completed capacity assessment reports for each of the seven U.S. Flag Jurisdictions.

Detailed capacity assessment documents for each jurisdiction are available online. This document presents a synthesis of findings on what we consider to be key issues affecting capacity to manage coral reefs across all jurisdictions, and is divided into four sections. Section One provides a brief summary of the capacity assessment process. More detailed information on assessment approach and methodology can be found in each of the seven jurisdictional capacity assessment documents. Section Two focuses on the issues and potential short-term actions that can be implemented to enable capacity development in the jurisdictions to support coral reef management effectiveness. Section Three focuses on the steps needed to advance a long-term capacity building program. Capacity building is defined as a long-term collective effort needed to nurture, enhance, and utilize the knowledge, abilities, relationships, and values of people and institutions at all levels, locally, nationally, regionally and globally, that enable organizations, groups and individuals to attain their goals (National Research Council 2002, 2008). Section Four concludes with an urgent call for investments in long-term capacity building to be designed and delivered to meet the unique context of each jurisdiction. Local investments must be present and matched by federal investments. The lead coral reef management agency within each jurisdiction is at the center of a larger, and growing network of coral reef management entities within the states, territories or commonwealths, and all need to have some part in a comprehensive and holistic approach to building capacity. A broader view of "capacity" in needed that moves beyond the more traditional financial, personnel and equipment that reside within an organization. Capacity needs to focus on management

process and management outcomes. Thus a rethink of the overall science agenda to balance investment in management science versus more biophysical science is a primary conclusion.

A core conclusion of an external review of the NOAA CRCP conducted in 2007 revealed the need for capacity assessments at each of the seven U.S. jurisdictions. The review provided a set of recommendations including a narrower focus on goals set out in The National Action Plan to Conserve Coral Reefs, a movement towards place-based management priorities developed with coral reef managers, and an assessment of the capacity building needs suggested by these priorities. In response to the external review, NOAA CRCP developed the "Roadmap for the Future" for FY 2010-2015 focusing on three key threats to coral reef ecosystems: climate change impacts, fishing impacts, and impacts from land-based sources of pollution. The roadmap also called for working with leaders and stakeholders in each jurisdiction to define the priority coral reef conservation goals and to assess capacity to implement them. Between 2010 and 2011, an external consultant team produced Priority Setting Documents (PSDs) for each of the jurisdictions by working with NOAA and jurisdictional leaders. The capacity assessment was not conducted at the same time due to budget issues. Two years after the initiation of the PSD process, resources were allocated and a three-year contract was awarded to SustainaMetrix in September 2011 to conduct the seven jurisdictional capacity assessments, provide a brief synthesis of the issues and recommended actions for building capacity to manage coral reefs. A schedule is presented in Appendix B.

A feature of the SustainaMetrix approach was the assembly of a jurisdictional capacity assessment team (JCAT) that participated in a sequence of six to seven meetings, conducted primarily via teleconference. SustainaMetrix met with JCAT members during site visits to each jurisdiction to discuss our observations and to prioritize our recommendations. Further discussions based on drafts of our report took place after the site visit. We developed a website for all JCAT members to use and stay linked.

KEY EVALUATION PROCESS STATISTICS

- **Site Visit Durations:** 70 days
- **Interviews:** 370 interviewees representing 193 agencies
- **J-CAT Meetings:** 42 Meetings for 7 Jurisdictions

An ecosystem approach to management has been expressly endorsed by NOAA CRCP in its 2010-2015 Goals and Objectives document and in the jurisdictional PSDs. The ecosystem approach requires a paradigm shift that transcends single-species management, and requires the consideration of larger natural systems (e.g., watersheds, coral reefs), that explicitly include their human and social dimensions. It further accepts that natural and social systems are dynamically linked, that changes in one realm have impacts in the other and that these impacts can include self-reinforcing feedback loops (McCleod and Leslie 2009). Since there were no existing published methods for conducting an assessment of capacity to implement an ecosystem approach, SustainaMetrix prepared an adaptive methodology for this purpose as a "Coral Reef Management Capacity Assessment Methodology."

Our approach to assessing the capacity to practice the ecosystem approach applies a peer-reviewed set of tools and a common vocabulary to conduct a rapid diagnostic, generating a set of actionable recommendations in each of the jurisdictions. These methods are designed to recognize and respond to the features of the local social, political, cultural and economic context of each jurisdiction and can be used repeatedly to assess the evolution of capacity in

a given management system. The capacity assessments for the seven jurisdictions were conducted in a relatively rapid and synoptic manner. A report was prepared for each jurisdiction containing an issue analysis and recommendations for short-term actions (one to three years) that address capacity gaps given the current political climate and the existing institutional structures. Two analytical frameworks that focus on the process and outcomes of management were applied in all seven jurisdictions to assess the maturity of the management efforts and progress towards long-term goals. These frameworks are central to this synthesis and are described in detail in each of the jurisdictional capacity assessment reports.

The numbers of agencies and organizations involved in coral reef management is growing across all seven jurisdictions making it difficult to know precisely who is doing what, where, and to what effect. The increase in conflicting mandates and differences in management approaches complicate the prospects for pooling resources and collaboration. This underscores the importance of building enabling conditions that include setting clear, realistic and shared goals, having supportive and informed constituencies, and obtaining formal commitment across all levels of government.

The lead coral management agency within each jurisdiction is at the center of a larger and growing system of coral reef management entities within each state, territory or commonwealth, and includes local government, several NGOs and other local and federal management agencies. Such complex management structures necessitate a broader view of "capacity" beyond the more traditional knowledge, skills and attitudes of an individual that must be addressed through adaptive capacity (Armitage 2005).

Five general issue themes and ten overarching issues were common across jurisdictions. A full list of issues and recommendations suggested for each jurisdiction is presented in Appendix C. A summary of the issues themes and ten overarching capacity challenges are presented in the table below.

Given the complexity and interdependence of the issues and their unpredictable ways of unfolding, we don't believe that any one of these recommendations is the answer. Instead, we believe the recommendations are starting points, places where more learning is needed across the seven jurisdictions, relevant federal agencies and other partners in the coral reef conservation community. We offer both short-term (this chapter) and long-term recommendations (next chapter) because both are needed to develop a robust strategy to grow coral reef management capacity.

List of Issue Themes and Ten Issues Common Across the Seven U.S. Jurisdictions

Issue Theme	Issue #	Issue Description
Building Capacity to Apply the Attributes of EBM	1	Lack of an integrated management approach that is highly attuned to local context and the failure of one-size-fits-all approaches in addressing complex challenges of coral reef management
	2	Lack of science to effectively inform management action and policy
Defining Purpose and Objectives for Effective Coral Reef Management	3	Lack of clearly expressed and unambiguous goals against which coral reef management efforts can be measured
Stronger Commitment to Effective Coral Reef Management	4	Lack of political will and formal commitment for increased capacity for coral reef management
	5	Lack of long-term and sustainable financing of coral reef management
Supportive and Informed Constituencies for Effective Management	6	Lack of supportive and informed constituencies for effective management
Increased Capacity to Practice Effective Management	7	Need to close the implementation gap and move from planning to implementation
	8	Ineffective enforcement and poor compliance
	9	Ineffective and inefficient function and structure of management agencies
	10	Lack of integration and coordination among coral reef managers

Section Two: Analysis of Issues and Short-Term Recommendations

Short-Term Recommendations

Short-Term Rec #	Recommendation	Related Issue	Page #
1	USCRTF provide support to the jurisdictions to develop a coral reef management effectiveness evaluation framework. With a framework in place, funding agencies can support building capacity for an ecosystem approach for management in a step-wise fashion to build management response to the growing complexity of coral reef ecosystem change.	Issue 1	16
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10	Support Innovative Solutions to Hiring, Procurement and Grants Management and if not Possible, Create Detailed Training on These Administrative Actions	Issue 9	37
11	Support, Expand and Institutionalize Staff Capacity Building Programs in the Jurisdictions through Fellowships, Internships, Professional Development, Federal Details with Training on how to Collaborate Across Agencies and Professional Development Series for Coral Reef Managers	Issue 10	39
12	Operationalize High Quality Collaboration With Multiple Entry Points Such as Ensuring Federal Agencies are Represented at Local Working Groups and Local Interests are Represented at Federal Working Groups	Issue 10	40

Building Capacity to Apply the Attributes of Ecosystem-Based Management

Issue 1: Complete the transition to an ecosystem approach

In 2010, Ecosystem-Based Management (EBM) became a core principle in the United States as part of the new National Ocean Policy and has been adopted by NOAA and most of the federal agencies on the USCRTF. Adoption of EBM core principles were strongly recommended by the U.S. Commission on Ocean Policy because the principles are place-based, recognize humans as integral parts of the ecosystem, and focus management efforts on preserving basic structure and function of whole ecosystems. A "place-based" approach means strong understanding of the social, cultural, governance and biophysical context of a place and matching management strategies to more effectively integrate across traditional sector-based management approaches. Ideally, management of fisheries, aquaculture, port/harbor development, coastal development, tourism, and recreation are integrated, are well matched to the local context and adapt to changes as they occur. By recognizing "humans as integral elements of coastal and marine ecosystems", management strategies must consider human dimensions through a wide spectrum of socio-economic and governance indicators.

The capacity assessment found that, across jurisdictions, there are growing examples of an ecosystem approach to management but conventional resource management remains the standard. We did not find evidence that a common set of methods, frameworks or procedures are being used across all jurisdictions to apply an ecosystem approach. We were struck by the lack of common baselines. Without a common language and framework for integrating across biophysical, institutional and societal dimensions, there is little opportunity for a comparative approach across jurisdictions to track evidence of change in coral health let alone human dimensions such as livelihoods, social well-being, and response to issues that matter most to the people of each place. Instead, we found that managers face a widening range of challenges, frequently institutional or governance challenges that affect capacity to manage coral reefs. As a result, much of the current response is conventional with occasional pilot demonstrations of an integrated approach. Increasingly, managers face a wide range of multiple stressors that defy simple linear solutions that may have worked in the past.

All jurisdictions can point to some set of projects that are creatively implemented by staff who work hard to find innovative solutions, but integration across projects, sectors, and management domains remains the outlier and not the dominant form of management. Given the wide range of capacity challenges described later in this section, this situation is understandable and may be unavoidable in the short-term. One coral reef manager described the situation as "whack-a-mole"; when progress is made in one area, more issues emerge elsewhere and divert attention. Challenges of ocean acidification and climate change adaptation loom larger on the horizon, while long-standing management challenges of over fishing and land-based sources of pollution (LBSP) still have not been solved. Issues are often unique and arise from interplay between biophysical, governance and social contexts. What works well in one region may have little success in another and therefore scaling interventions from one region to another is often ineffective.

Timescales for addressing management issues are often out of sync with funding or political cycles. Ecosystem protection and restoration often requires long-term time horizons. For example, restoration of a watershed could take

decades and still may not generate the desired biophysical outcomes. Funding cycles are typically two years. Political leadership often changes every four years. Such tight timeframes can lead to crisis management, a common reality described by many of the managers, with little flexibility and time available to take a more measured ecosystem approach.

While all managers seem to want a more holistic approach, capacity simply does not exist at the present time to deal with the increasing complexity of the management challenge. While positive steps have been taken, transitioning from conventional resource management to an ecosystem approach will require time and attention and strong leadership from the USCRTF, from all federal partners and from those within each jurisdiction. As shown in the image below, a study by Danter (2000) described a threshold or tipping point needed to move from conventional management to an ecosystem approach. His work focused on one resource agency, U.S. Fish and Wildlife Service (USFWS), and the increase in leadership direction and resources required to move from a mostly conventional resource management approach toward an ecosystem approach (See Figure 2 below).

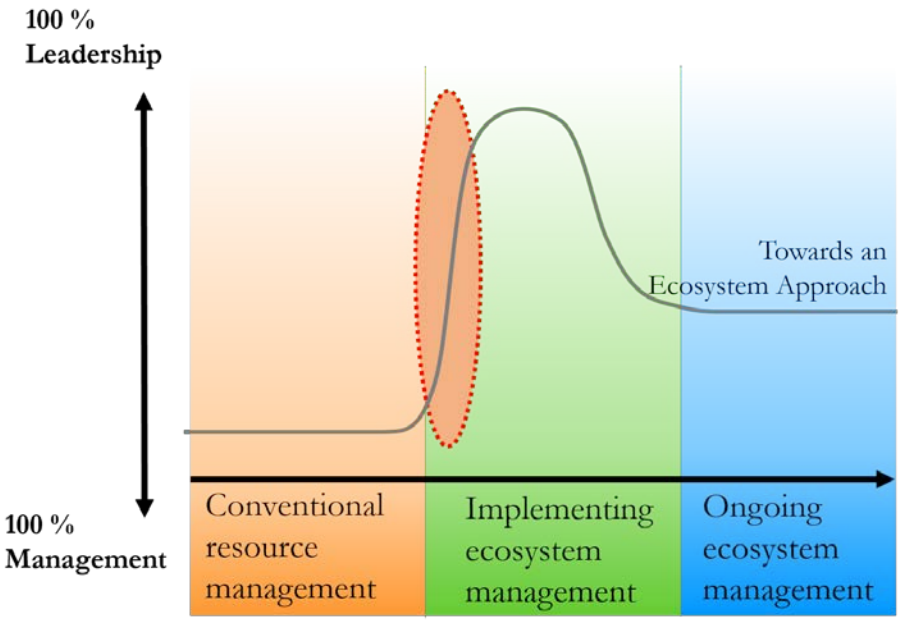

Figure 2: Leadership Required for Implementing an Ecosystem Approach

The role of leadership is considered essential to first instigate and then to maintain support for an ecosystem approach. Far too often, the ecosystem approach is encouraged in plans but not supported in meaningful ways and therefore management remains as conventional 'sector by sector' or 'species by species' management. To fully effect a transition from conventional to ongoing ecosystem management a high level of leadership, often by a wide range of leaders, is needed to effectively break through towards and ecosystem approach (Source Danter 2000).

Thus a primary recommendation to the USCRTF is to set forth a process defining a timetable with both qualitative and quantitative metrics for success, marking the departure from a conventional resource management approach to an ecosystem approach. A key first step is the development of a management effectiveness framework that determines what it would take to move toward an ecosystem approach in each jurisdiction.

SHORT-TERM RECOMMENDATION #1

USCRTF provide support to the jurisdictions to develop a coral reef management effectiveness evaluation framework. With a framework in place, funding agencies can support building capacity for an ecosystem approach for management in a step-wise fashion to build management response to the growing complexity of coral reef ecosystem change.

A coral reef management effectiveness evaluation framework currently does not exist and is strongly recommended. An example of such a framework is a baseline established and then used to measure and track management effectiveness. A baseline has two parts. Part One is the documentation and analysis of how the governance system in a specific place has responded – or failed to respond - to the issues associated with coral reef ecosystem change. Part Two outlines a strategic approach to designing a formal coral reef management program to address the integrated management issues of the place, build upon the strengths of the existing governance system and reduce its weaknesses. A management effectiveness framework would then be prepared in each of the seven jurisdictions and would provide a reference point against which future changes in the condition of the coral reef ecosystem – both its human and environmental components – and the actions of a coral reef conservation program can be measured and assessed. The jurisdictional coral reef capacity assessment reports contain a large portion of the information and analysis needed for a baseline for each jurisdiction. The development and tracking of progress in reference to the baselines has far greater value and is described as part of a long-term capacity building strategy.

First Step: USCRTF Mandate

A clear mandate by the USCRTF to develop a coral reef management effectiveness framework, and the resources to guide its implementation, would provide the necessary impetus to conduct the work across jurisdictions. Once a common baseline is established for each jurisdiction from which to measure progress, and to sequence and prioritize action, progress across jurisdictions can be measured and compared with common metrics and indicators. To demonstrate, one jurisdiction could be selected for implementation of a baseline and results shared with the rest for review, with adaptations made prior to implementation across a wider region. Establishing an interdisciplinary science advisory group at each of the jurisdictions when the baseline process is initiated would be useful to ensure integration with existing science activities and information management systems, encourage participation of the managers in presenting their baseline results in regional/national science conferences, and provide guidance and advice on how to convene structured dialogues between scientists and policymakers.

Second Step: Pilot Coral Reef Management Effectiveness Framework

Once a baseline has been established in a jurisdiction, identify one location, preferably within a designated priority location to conduct an analysis of the factors that affect management response and the effectiveness of that response to coral reef ecosystem change. Such an exercise would follow a step-by-step process for assembling the trends in the condition and use of the coral reef ecosystem and how the existing management and governance systems respond to – or fail to respond – to the issues produced by those trends and overall trajectory of change. Through documentation

and analysis conducted by an interdisciplinary team, the strengths and weaknesses of the existing management institutions and governance system are made clear. The next step is to share the information with a wide group of stakeholders and then use the results to design a new (or revise the current) management program to address the current and emerging issues that matter most to the people of the place. The design builds upon the strengths of the current system and works to reduce the weaknesses. Both strengths and weaknesses can be identified through the use of case studies such as the positive examples defined in the jurisdictional capacity assessment reports.

Third Step: Training and Lessons Learned

To build adaptive learning and further the transition toward an ecosystem approach, the USCRTF should create training modules based upon the work done to include steps for, and examples of, completed baselines, define the time and resources needed to accomplish each baseline, and provide examples of the benefits gained in the transition from sector-based management to an ecosystem approach. In addition, training support should be provided that features in-person and web-based guidance and support for assembling a baseline and how to customize the resulting products to be most useful and practical for the local context and management approach. The product of the training would be a first-cut analysis of management issues. Such analysis must define issues related to key sectors including agriculture, coastal development, environment, economic development, and public safety, and sources of knowledge about the issues including elders, cultural practices, local resource users, NGOs, businesses, governmental agencies and academia. One example of such a framework is The Analysis of Governance Response to Ecosystem Change: A Handbook for Assembling a Baseline (Olsen et a. 2009), published by the Land-Ocean Interactions in the Coastal Zone (LOICZ), a core project of the International Geosphere-Biosphere Programme (IGBP) and the International Human Dimensions Programme on Global Environmental Change (IHDP).

Fourth Step: Incorporate Coral Reef Management Effectiveness Framework into Management Plans

The information generated by the coral reef management effectiveness baseline would shape the issues to be addressed in comprehensive coral reef management plans, plans that describe the process and desired outcomes of management and how learning will be documented and factored into adaptations.

Fifth Step: Learning Forums to Improvement Coral Reef Management Effectiveness

USCRTF, CRCP and other federal partners jointly convene a coral reef management effectiveness summit every two to three years, inviting members of the jurisdictions to share results of their baselines and lessons learned for building capacity to address issues posed by management of coral reef ecosystems. Specifically they would share how the action strategies have succeeded (or not) in influencing collective changes in behaviors needed to realize management objectives and increase overall effectiveness. Behavior is focused on the actions of the resource users such as fishers, developers, divers, or vessel operators as well as resource managers and the funders, investors and administrators of the resource agencies. The forum would feature a deep contextual understanding of each jurisdiction and the impact it has on shaping the process and outcomes of management. The proposed strategy is a novel approach for synthesis of ecosystem-based management knowledge and could be the subject of funding from the National Science Foundation (NSF) or other agencies with funding programs.

Issue 2: "Saturated" with biophysical data - research to support coral reef management and inform policy decisions

"We're saturated with reef data with no time to analyze it and no time to apply it" was a comment by one manager and echoed by others. Clearly, considerable expertise and capacity has been built in all jurisdictions to collect data on the health and condition of coral reefs. Analysis and use of the biophysical data remains a capacity challenge. Nevertheless, demand to collect more biophysical data will remain strong. Analysis of this situation across jurisdictions revealed two capacity challenges. The first is the capacity to use the biophysical data collected, analyzed, and ideally peer-reviewed, and the second is the need to shift emphasis from an exclusive focus of biophysical science to management science.

In all jurisdictions, some degree of biophysical monitoring is in place but managers frequently describe these monitoring programs as not well linked to management actions. While there were exceptions, it was uncommon to find a well-defined monitoring process where researchers, managers and policy makers routinely met to close the gaps on data analysis and use analyzed data to frame management issues, leading to a plan of action to collect more data to test implementation of management actions. Florida had some examples of this but even managers there describe major gaps in the fisheries data for the SEFCRI region. When integrated and effective science does inform policy, it has been described as a unique set of circumstances, where something happened to come together. One manager described it as a window of opportunity opened, but often not repeated. There was strong agreement among the managers that this is a clear management goal and that capacity is needed to both analyze the current biophysical monitoring data and to use it to help shape planning and policy-making.

All jurisdictions have demonstrated capacity to implement sound scientific research and most have considerable expertise available particularly from academic partners who are coral reef experts. Hawaii in particular is notable for their world-class research capacity and willingness to work across other jurisdictions. Academic facilities and expertise exist across jurisdictions and range from adequate to excellent. The knowledge of the ecological structure and functioning of coral reef ecosystems is fairly well understood. Biophysical science is not a glaring capacity gap, although many managers would argue that there are essential data holes that need to be filled.

The major capacity gap from our perspective was the lack of science dedicated to understanding management response given dynamic institutional, political and cultural contexts. Unfortunately, when hearing this conclusion, managers may perceive that management science means that they are the unit of analysis for the research. When carefully designed, this is not the case. Management science includes an analysis of what needs to be known, and what is knowable in advance, for decision support and policy design. Management science also focuses on the effectiveness of management from a process and outcome perspective.

Management science includes scenario building and foresight, modeling capacity that incorporates data from physical, ecological, socio-economic and behavioral sciences. More reliable reflection and forecasting enables the evaluation of the effect of management actions, and, once known, factoring that into scenario planning and the development of forward-looking policy initiatives. Political and social sciences contribute to a greater understanding of institutional

barriers and opportunities for change initiatives. Understanding what factors are needed to initiate change and sustain change can be used to rethink and redesign systems to support change.

SHORT-TERM RECOMMENDATION #2

Ensure Sufficient Capacity to Analyze and Utilize Biophysical Data and Build Management Science Capacity, Invest in Lessons Learned From Management Science at the Jurisdictional Scale

It's easy to get lost in the desire for more biophysical data. The first part of this recommendation is to simplify and standardize monitoring (as recommended by Jackson et al. 2014), and to more effectively translate biophysical data and make results available on an annual basis that can be shared widely. Such an approach would foster more robust means of communication and exchange of data collected and avoids the trap of drowning in biophysical data that is not analyzed and used in a timely fashion. This may also require the development of a simple audit to learn about backlogs of data streams that is not easily analyzed, interpreted and used. From our analysis, it is equally urgent to shift emphasis from an exclusive focus of biophysical science to balance attention to management science.

There is a pressing need to recruit, train and develop individuals focused on management science in each jurisdiction. Currently, management personnel have primarily natural science backgrounds and limited experience, skills and interest in management, management science and in translating science to inform management. An example of an output that should be generated on an annual basis is the documentation of three to five examples of lessons learned about management effectiveness. By reflecting on the success and challenges of management actions in light of governance context, regional trends, synergistic threats and cumulative impacts, coral reef managers could better prepare for the challenges ahead.

All U.S. coral jurisdictions except Florida are eligible for funding support through the NSF's Experimental Program to Stimulate Cooperative Research (EPSCoR) program. The University of Virgin Islands received funding for research relating to the social-ecological system link to coral reefs in the U.S. Virgin Islands (USVI). This funding program could be a model for all jurisdictions to build management science capacity.

With this capacity in place, each jurisdiction would compile a lessons learned summary of results from major management actions to be shared within and across jurisdictions, reflecting on ways to work more effectively within the local governance context and on what strategies can be transferred and adapted to other jurisdictions. Individuals with management science expertise should be located at each jurisdiction and would serve as part practitioner, someone who understands the day to day management realities, as well as part academic, someone who understands how to document and disseminate data regarding management process, outcomes, ecosystem governance, etc. Ideally, a common training framework would be developed that features a common language of coral reef management science, with methods common across all jurisdictions.

These experts would also advise managers how best to communicate the lessons learned about management actions to senior administrators and decision-makers in order to improve effectiveness. Communicating management science to a non-specialist audience means limiting jargon and details, and placing attention on a central message that is useful to decision-makers. Ideally, management scientists should be able to build capacity across management networks in ways that directly connect with any audience, responding spontaneously and actively, and distilling their messages into conversational nuggets that resonate with their audience. Improvisational acting is a tool scientists can use to build needed capacity. For example the Alan Alda Center for Communicating Science located at Stony Brook University has developed a curriculum that uses improvisational theater as a foundation to practice and improve how young scientists communicate with the public, and with elected officials.

Ideally, the focus on management science capacity and sharing lessons learned becomes a mechanism for consistent, systematic, and interdisciplinary transfer of knowledge within and across the jurisdictions. At least one case example per year, per jurisdiction, should be selected as a topic for an article so that there are seven articles per year on management effectiveness emanating from the U.S. Flag coral jurisdictions. Lessons learned should feature both successes and failures with thoughtful analysis of what can be taken forward and shared.

The priority watershed focus is an important development that would benefit from applied management science beyond current project success standards. In each of these cases, managers should document the process of sharing information with and receiving feedback from resource users, managers and funders. There are a growing number of examples where these groups are engaged in issue analysis, decision-making, and implementation of coral reef management actions. Managers recognize the need to better blend natural and social sciences and the use of more explicit management science to guide management actions.

Clear Purpose and Attention to the Goals of Coral Reef Management

Issue 3: Need for shared purpose and unambiguous goals against which coral reef management efforts can be measured

The actual implementation of the capacity assessment process revealed a capacity gap relating to shared purpose and goals for management actions. While all jurisdictions are working to improve the protection and conservation of coral reefs, their management involves many different stakeholders offering different perspectives, articulating different and sometimes competing values, and often proposing conflicting solutions. While everyone wants more reef fish and healthy reefs, there are intense disagreements across the coral reef management community regarding which approaches produce the best results. Marine spatial planning and Self-Contained Underwater Breathing Apparatus (SCUBA) spearfishing are examples of two issues that generate huge controversy across all jurisdictions. The more points of view, the greater the debate among stakeholders, and the more socially complicated the situation becomes. Power to control outcomes is often expressed in a wide variety of ways that can further complicate a situation.

In 2007, an external review of the NOAA CRCP placed emphasis on this issue and recommended a Management Priority Setting Process. In 2010, NOAA CRCP implemented these recommendations and a process "to articulate a set of strategic coral reef management priorities developed in consensus by the coral reef managers in seven U.S. coral reef jurisdictions." When the capacity assessment project was initiated in 2012, the entire scope was based upon the capacity needed to implement the goals and objectives contained in the PSD, a PSD predicated on a common set of goals and actionable strategies. At all seven jurisdictions, it became clear that the PSD was not the management tool common for all management actions. While the PSD was used by some coral reef management agencies, it was not a consensus document at any jurisdiction. Florida's SEFCRI process was closest to achieving a common set of goals but even in that case the goals and objectives associated with the management of the SEFCRI region were quite different, for many reasons, from those of the Florida Keys. It was far more common to encounter a range of goals and objectives across a range of agencies and NGOs, some duplicative and some in conflict with those of other organizations.

Even when considerable effort is made to harmonize goals and objectives, disagreements are common. Disagreements may exist over the degree of technical challenges involved in coral reef management, and how much certainty exists about how to produce a desired outcome. In many other cases, disagreements are about fundamental value differences and how to define the problem. It is a massive challenge to bring all stakeholders together to work towards common goals and a shared purpose. It was not uncommon to engage with people who feel they were not invited to "the table" to contribute to the goal-setting process, and such efforts were considered exclusionary. Without strong consensus on overall purpose and clear goals across a jurisdiction, effort was directed to more specific geographies where the number of stakeholders was more manageable and common goals more achievable. The result was often a wide range of management plans that mostly featured a list of "to do" activities rather than a clear and unambiguous set of goals connected to all the other management plans, with clear enforcement and compliance sections, and a common evaluation protocol with clear metrics and indicators linked to reef health and societal well being.

This is a complex challenge as there is growing uncertainty in attaining goals and potentially high social conflict in participating and defining goals. In Puerto Rico, two examples illuminate these challenges. Recent Local Action Strategies (LAS) were developed in 2011 to address the issue of a comprehensive strategy and featured a list of 80 potential projects. While many of the projects were clearly described, none of the projects could be linked to an improved state of the reef. From our analysis, 8 of the 80 could be classified as implementation actions, and the rest were a combination of elements such as research, monitoring, planning, public education, training, and interagency collaboration. While progress in each of these areas was essential, there was no overarching and clear framework that linked how these actions were designed to transform behavior or improve coral reef health.

In another example, the Guanica priority watershed project located in Puerto Rico did feature an ambitious goal encouraged by the funder National Fish and Wildlife Foundation (NFWF) to increase live coral cover by 30% within ten years. This strategy, set for other priority watershed initiatives in Faga'alu in American Samoa and West Maui in Hawaii, is to serve as a pilot demonstration effort to link management actions with bold restoration goals. While such a goal can be a motivational force, the NFWF evaluation of the Guanica investment pointed to the fact that the goals

were not even close to being met. In the analysis, the evaluator identified a lack of sufficient enabling conditions including financial resources for full implementation and the need for clear goals and measures of progress to guide management. These examples underscore the need to set clear, practical, achievable and unambiguous goals within a set time frame. Ideally, the goals focus on both social and environmental targets.

SHORT-TERM RECOMMENDATION #3

Define the Purpose and Set Clear Three to Five Year Goals for both Biophysical Reef Health and Societal Well-being at each Jurisdiction

A clear and concise "business" case is recommended for each jurisdiction to clarify the purpose of coral reef management. There is a growing base of socio-economic information and expertise provided by federal agencies to assist jurisdictions with a clear and concise business case. We recommend that the economic benefits of coral reef health are reviewed every three to five years with coral reef managers and across sectors such as tourism bureaus, chambers of commerce, etc. A clear economic argument for coral reef management would help senior managers provide leaders in the Governor's office, Legislature and the Judiciary with economic data to support arguments for public investment in coral reef management. Ideally, the messages are clear, concise and directly link to the value of coral reefs and what will be lost if their management capacity remains weak or under-supported. A clear business case could then be shared broadly throughout social, print and electronic media and with local stakeholders such as mayors, faith-based leaders, foundation and corporate executives and NGOs.

With a clear and concise business case prepared in each jurisdiction, the next step is to prepare a summary of management actions and the rationale behind them. Ideally, graphics, tables, etc., are used to describe other agencies involved, and their role, mission and mandate relating to coral reef management. If well written and articulated, the business case and description of management partners is inspirational and welcoming and not confrontational. At the very least, it should define the large-scale changes that are desired in each jurisdiction and the specific interrelated economic, social or political issues and assumptions that are factored into management actions. A brief cost benefit analysis would articulate the value. With a clear business case in place, coral reef managers must continue to address the conflicts and diverse values that exist, but at least will be able to invoke a common purpose defining both social and economic goals as well as environmental health. Clearly, an evaluation strategy that features markers for assessing progress must be included. Few organizations can take on this work alone, so dividing up who does what, where and to what extent becomes a critical task. As noted above, the SEFCRI process in Florida is an excellent example of how this process can work and the investment that is required. American Samoa and their Coral Reef Advisory Group is another example of where this capacity has been built and seems to be working well.

Short-term unambiguous management goals are also needed that define the qualities of the environment and the societal conditions that the coral reef management effort is working to achieve. Where feasible, such goals should be time bound and quantitative – how much, by when. Such goals need to appeal to the values of the local community and society as a whole and reflect a solid understanding of the ecosystem and institutional process that must be

orchestrated to achieve them. Outcomes could be measurable improvements in biological parameters associated with healthy reefs or abundance of priority fish species. Complementary societal conditions would also need to be developed and might include: positive changes in local community income and social conditions; improved health care, education and greater security from violence. Without clear goals that tie directly to the health of coral reefs it is difficult or impossible to assess the long-term impacts of an investment. Defining the goal of a program to be simply reducing impacts of LBSP or improving sustainable fisheries indicates the desired direction of change but little more. It is far easier to assess a program that has set specific targets defining "how much and by when". Questions that programs can pose to sharpen their focus include:

- Have major management issues been identified and prioritized?
- Do the program's goals define both desired societal and environmental conditions?
- Are the programs goals linked directly to the management issues and expressed as time-bound and quantitative targets?

Formal Commitment to More Effective Coral Reef Management

Issue 4: Lack of political will and formal commitment for increased capacity for coral reef management

Formal commitment by government is an essential enabling condition to provide the necessary authorities and resources required to manage coral reefs. Typically, the Governor's office sets the agenda for the direction of resource management. Ideally, this direction is complimented and informed by federal resource management programs, spend plans, grant requests, implementation actions and evaluation of management actions. A high degree of engagement with the Governor's office is rare and depends on a wide range of factors (i.e. party in power, importance on the political agenda, access and connections). Due to changes in administration, the degree of formal commitment for coral reef management actions is dynamic and subject to frequent change. With each new administration comes turnover in senior level appointees who oversee resource management agencies. Few elected officials and appointed resource managers have formal training in resource management. Few elected officials actively seek scientific information to help guide decisions. When elected officials seek information, it is often linked to a specific issue or crisis situation that is high on the political agenda. When Governors agree to host or choose to attend the USCRTF meetings, opportunities exist for briefings with staff within the Governor's office on the status and trends of coral reefs. Otherwise, there are few mechanisms and few examples where managers routinely meet with Governor's office staff to discuss the issues surrounding coral reef conservation and to shape policy for more effective response.

In Florida, coral reef management is a formalized program with legislative and executive support. In all other jurisdictions, coral reef management is commonly referred to as an "initiative" frequently subject to budget cuts and housed under a broader resource management mandate. In Hawaii, coral reef management is housed in the State Department of Aquatic Resources as an initiative but programs that affect the management of coral reefs are also conducted within the state Coastal Zone Management Program, Hawaii Sea Grant, Environmental Protection Agency

(EPA), National Park Service (NPS), Army Corps of Engineers (ACOE) , Cooperative Fisheries Research Unit, etc. In all jurisdictions, there are a number of responsible institutions with varying degrees of authority, each with different budgets and funding streams, and different regulatory and enforcement mechanisms. Thus, management responsibilities are distributed widely. In the absence of a formalized program and clear mandate with the necessary authorities and resources required to manage coral reefs, the formal commitment by the Governor's office is essential.

SHORT-TERM RECOMMENDATION #4

Strategically Engage Governors of all Seven U.S. Coral Reef Jurisdictions through The National Governors Association Meetings to Champion Coral Reef Conservation and Management

We recommend that the USCRTF and U.S. All Islands Coral Reef Committee (AIC) assist jurisdictions with routine engagement between the Governor's office and senior administrators from the jurisdiction in order to respect local authority and chain of command. Setting up specific briefings at events such as the National Governor's Association Meetings and other venues where the USCRTF and AIC can assist the jurisdictions in communicating the business case for coral reef management will be helpful. Ideally, presentations would focus on the value of coral reefs and how coral reef management fits within an overarching political agenda. Expertise in communications may be needed to translate and effectively present economic valuations of the goods and services that coral reefs provide and how coral reef management supports political goals. Periodic commitments to increase management effectiveness from all seven Governors of the U.S. coral jurisdictions should be a goal for such a meeting. An early commitment could be phrased in such a way as to seek agreement from the Governor to receive annual briefings from coral reef managers about the status and trends of coral reefs and the issues related to persistent challenges of hiring, retention of staff and procurement practices described in later sections of this report.

Since Florida is the only jurisdiction that has a formally constituted coral reef management program, a model exists for other programs. Although the context for Florida's formal commitment is highly unique, lessons can be learned and shared with each jurisdiction. However, it is essential that a strategy for coral reef management originates from the jurisdiction and fits within the current governance context.

Issue 5: Lack of long-term and sustainable financing of coral reef management

Funding for coral reef management is currently not sustainable. There are two main capacity gaps. The first is tied to the lack of reauthorization of the federal Coral Reef Conservation Act (CRCA) of 2000. The second is linked to the need for a diverse portfolio of funding sources at the jurisdictional scale. Both have an effect on the capacity to manage coral reefs.

The CRCA has not been reauthorized leading to program and funding uncertainty. As a result, many of the investments in coral reef management are short-term projects rather than long-term program investments. The CRCA provides NOAA with essential tools to research, manage and protect coral reef ecosystems. The following is a brief summary of the five major activities as described in the NOAA website:

1. *The CRCA required NOAA to draft and submit to Congress a National Coral Reef Action Strategy (NAS), including a statement of goals and objectives and an implementation plan. The NAS was submitted to Congress by NOAA in 2002, and a report on U.S. Coral Reef Task Force activities to implement the NAS was submitted to Congress by NOAA in July, 2005. Every two years, NOAA is mandated to submit a follow-up report to Congress.*
2. *The CRCA provides additional authority for NOAA to implement a national program to conserve coral reef ecosystems. Through the CRCP, NOAA conducts activities such as mapping, monitoring, assessment, research, and restoration that benefit coral reef ecosystems; enhancing public awareness of such ecosystems; assisting states to remove abandoned vessels and marine debris from reefs; and conducting cooperative management of coral reef ecosystems.*
3. *The CRCA authorizes the Coral Reef Conservation Program (CRCP) to provide matching grants for coral reef conservation projects to states, territories, educational and non-governmental institutions, and fishery management councils. NOAA submitted a report on the Coral Reef Conservation Grants Program to Congress in December 2003.*
4. *The CRCA authorizes establishment of the Coral Reef Conservation Fund. Through the Fund, NOAA works with the non-profit National Fish and Wildlife Foundation to build public-private partnerships to reduce and prevent degradation of coral reefs.*
5. *Lastly, the CRCA provides the NOAA Administrator the authority to provide grants to state and local governments to respond to unforeseen or disaster-related coral reef emergencies. This last authority has not been effectively implemented as grants are not an efficient mechanism for addressing emergency events. Due to the lengthy grants awarding process, funding would not be immediately available to state and local governments to minimize damage to coral reefs during an emergency injury event and to support time-sensitive emergency response and restoration activities.*

Since 2004, numerous attempts have been made to reauthorize the CRCA by the 109th Congress, the 110th Congress, the 111th Congress and the 112th Congress but in each case it failed to pass because both House and Senate versions must be identical.

SHORT-TERM RECOMMENDATION #5

Support a Collaborative Approach for Coral Reef Conservation Act Reauthorization

The USCRTF should convene a summit of interested NGOs and other non-federal partners on the topic of a collaborative approach to CRCA reauthorization. While efforts are already underway to ensure reauthorization is introduced to the 114th Congress, a process is needed to clearly define an action agenda to secure the passage of this act. Ideally, an organization that is not directly or indirectly linked to the government will step forward to lead a collaborative approach.

In the most recent Congress, the differences between the House and Senate versions for a reauthorization of the CRCA do not seem to be major. Most recently introduced on January 3, 2013, the Coral Reef Conservation Act Reauthorization and Enhancement Amendments of 2013 amends the Coral Reef Conservation Act of 2000 "to extend the award of remaining coral reef conservation program grant funds to appropriate projects, including monitoring and assessment, research, pollution reduction, education, and technical support. Authorizes actions to: (1)

minimize injury to a coral reef or loss of an ecosystem function resulting from human activities; and (2) stabilize, repair, or restore the reef… Makes the destruction, loss, or injury of a coral reef not unlawful in certain circumstances, including if it was: (1) from permitted usage of fishing gear; (2) caused by an authorized activity; (3) subject to exception, the necessary result of marine scientific research; (4) caused by a federal agency in certain circumstances; or (5) unavoidable. Modifies the Act's purposes, the goals and objectives of the national coral reef action strategy, and the Act's authorized activities. Allows the Coral Reef Conservation Fund to be used to address emergency response actions. Authorizes the Administrator of the National Oceanic and Atmospheric Administration (NOAA) to: (1) make community-based planning grants for increased protection of high priority coral reefs, (2) maintain an inventory of all coral reef vessel groundings, (3) identify all coral reefs with a high incidence of vessel impacts, and (4) identify measures to reduce such impacts. Directs the Secretary of Commerce to submit an international coral reef ecosystem strategy to Congress and authorizes the Secretary to establish an international coral reef ecosystem partnership program. Establishes the USCRTF (Coral Reef Task Force) to coordinate federal actions. Authorizes the Secretary of the Interior, subject to appropriations, to provide financial assistance for coral reef conservation."

A strategy and timetable is needed to convene such a summit that dovetails with the new 114th Congress. The strategy could feature a summary of the major phases in program development. What initially started out as investments in mapping the coral reef resource has developed into a collaborative science-based management program to implement tangible early actions. A wide range of approaches have been tested and now investment is needed to scale up congressional support to focus on management science, balance place-based activities with wider regional and international efforts, strengthen a growing expertise in education and outreach, support the development of management effectiveness tools, define ways to leverage other federal investments to synergize federal support, identify where federal support creates conflicts, and how to best build the capacity and effectiveness of USCRTF in its role as a global leader by connecting with international efforts, lessons learned, grant programs, etc.

SHORT-TERM RECOMMENDATION #6

USCRTF to Host Sustainable Financing Summit

Coral reef managers described funding as an important capacity gap. When the topic was explored more deeply, it was surprising that the answer was not just about receiving more money, although it's safe to say all managers would welcome more funding. The capacity challenges and potential solution strategies were far more nuanced and contextually related to funding access, funding leverage and the major challenges associated with reporting and accounting for funding.

All jurisdictions have access to funds. While there are funds allocated through NOAA CRCP, there are also a wide range of other funding mechanisms through other federal programs, within the jurisdictions, through other grants and partnerships with academic institutions and NGOs as well as through philanthropy. For example, in Hawaii, budgets for just a few state, federal and NGO resource management agencies add up to over 100 million dollars (Hawaii DAR, Hawaii CZM, Hawaii Sea Grant, National Resource Conservation Service, EPA, USACOE, USFWS, Conservation

International, Kohala Watershed Partnership, West Maui Watershed Partnership) but how each of these investments affect coral reef management is unclear and possibly unknowable. Millions of tourists travel to the jurisdictions, with little to no opportunity to contribute to the protection and management of coral reefs, and potential funding opportunities are unrealized.

A major capacity challenge is the ability of managers to identify, access, leverage, secure and grow a diverse portfolio of funding. While part of this capacity gap rests in having available staff dedicated solely to the task of fundraising for coral reef management, no positions exist currently in any of the jurisdictions. Another major aspect of this capacity gap are the institutional arrangements and structures necessary for raising money beyond a limited number of sources. Ideally, each jurisdiction would be empowered to grow an endowment secured for coral reef management and not be raided for other purposes.

Details about the funding challenges in each of the seven jurisdictions are defined in their capacity assessment reports with several specific recommendations that range from setting up a "Friends of" organization with the capacity to raise and allocate funds for coral reef management by attracting foreign investment in coral reef destination travel, to increasing hotel taxes and mooring fees, and working with the local chambers of commerce to define joint strategies to sustain and grow reef-based tourism. In all cases, actions need to be verified by social science that quantifies the economic value of coral reefs and by testing mechanisms that are contextually appropriate for raising funds.

Given that there is a wide range of strategies underway in each jurisdiction, the USCRTF should invest in a summit every two to three years on lessons learned from the most effective approaches for sustainable financing of coral reef management. Ideally such a summit would feature experts who can report on examples in other jurisdictions or other parts of the world in emerging areas of blue carbon investments, payments for ecosystem services, debt-for-nature swaps, use of conservation trust funds, links to corporate social responsibility, growing public-private partnerships, and redirection of insurance premiums. Such a summit could have workshops in conservation business planning and conservation financing with actual case studies that could be analyzed and shared with local jurisdictions. Such a summit would explore options for innovative mechanisms to adjust current bureaucratic structures to allow for a broader portfolio approach. As ecological services are more effectively quantified and valued by governments and their constituencies, new financial and business models are being developed around the world to effectively capture the value of coral reefs and provide needed resources for management actions. The USCRTF can be a global leader in this effort with pro bono partners from major financial markets. Organizations such as NFWF have board members who are experts in such areas and could serve as leaders or connect to interested parties to lead such endeavors. Ideally, the summit would conclude with a guidance document that provides resources for the jurisdictions to create a more flexible process for raising capital. Issues associated with accounting and grants management are significant and addressed later in this report.

An ideal starting point for the summit would be a detailed literature review such as the work of Barry Spergel and Melissa Moye (2004) from World Wildlife Fund's Center of Conservation Finance who summarized the wide range of options for financing marine conservation and included the following:

- **Tourism revenues:** protected area entry fees; recreation fees, e.g., diving, angling, and yacht/mooring fees; airport passenger and cruise ship fees, taxes and fines; hotel taxes; tourism-related operations of conservation agencies; and, voluntary contributions by tourism industry groups.
- **Energy and Mining revenues:** oil spill fines and funds; taxes, royalties and fees from offshore mining and oil and gas; right-of-way fees for pipelines and telecommunications infrastructure; hydroelectric power revenues; and voluntary contributions by energy companies.
- **Fishing industry revenues:** tradable quotas; catch and service levies; eco-labeling and product certification; fishing access payments; recreational fishing license fees and excise taxes; and, fines for illegal fishing.
- **Real estate and development rights:** purchases and donations of land and/or underwater property; conservation easements; real estate tax surcharges for conservation; tradable development rights and wetland banking; and conservation concessions.
- **For-profit investments:** private sector investments promoting conservation; biodiversity prospecting.
- **Grants and donations:** donors; foundations; non-governmental organizations; private sector; and conservation trust funds.
- **Government revenue allocations:** direct allocations from government budgets; earmarked government bonds and taxes; lottery revenues, wildlife stamps and tags; economic instruments to stimulate environmental investment; and debt relief.

Supportive and Informed Constituencies for Effective Management

Issue 6: The persistent need for supportive and informed constituencies for effective management

An essential ingredient for building political will is a supportive and informed constituency. Public perceptions of coral reef health, response to change in coral health and long-term stewardship are closely linked to values, personal experiences and local cultural, social and economic context. From our experience, stewardship action was not simply linked to affluence. In the SEFCRI region of Florida, managers describe the enormous wealth of coastal residents, huge demand for beach renourishment, and little overall appreciation for, and investment in, actions to protect the offshore reef. Conversely, in remote jurisdictions like Guam, CNMI and American Samoa, there are extraordinary accounts of individuals and communities engaging in large-scale watershed protection. These stewards describe a "love of the place" that drives inspiration for such actions.

To many, coral reefs are dangerous places. Swimming on or near reefs is perceived to be risky. In Puerto Rico, we heard one senior coral reef manager say, "…our people have turned their backs to the sea and our coral reefs." Such barriers create challenges in building constituencies. To others, coral reefs are perceived to have limited value from an economic development perspective. For one group, learn-to-swim programs may be the gateway experience towards stewardship while the other may be a program on the economic value of coral reefs.

Capacity is being built across all jurisdictions to raise awareness of the importance of coral reefs using customized strategies. Formal and informal education programs are also being developed in all jurisdictions. Unfortunately, capacity simply does not meet the challenge needed to grow sufficient numbers of supportive and informed constituencies who are able to create political will for increased coral reef conservation and management. American Samoa and USVI may be the closest with their signature programs and relatively small populations, yet greater capacity to build a coral constituency is still needed there and across all jurisdictions. Jurisdictions with higher populations face a greater challenge. In Florida, the *Our Florida Reefs* campaign is taking important steps towards understanding behaviors that can either support or limit stewardship action. In Guam, American Samoa and CNMI greater attention is being directed towards engagement with local mayors who have respect and influence with the local community. While progress is being made, more capacity is needed to support the development of supportive and informed constituencies.

SHORT-TERM RECOMMENDATION #7

Invest in Lessons Learned and Capacity Building Efforts Specifically Designed to Build Constituencies for Greater Support of Coral Reef Protection and Citizen Advisory Panels that Support Management Actions

Across all jurisdictions, progress in basic coral reef education and outreach is growing and there are some great examples. However, a major capacity gap lies in linking human activities to reef heath and linking reef health to social well-being. The USCRTF and AIC should identify a logical partner, possibly the U.S. Department of Education, possibly an NGO focused on environmental education such as an Aquarium or the American Zoo and Aquarium Association, to work with local jurisdictions. Ideally, the partner would work with USCRTF and AIC to create a lessons learned process and a dedicated capacity building effort to summarize what efforts have worked across all seven U.S. jurisdictions. For example, programs such as VINE (Virgin Islands Network of Environmental Educators) or Le Tausagi in American Samoa connect educational components of resource agencies and create ridge-to-reef programming. These are both excellent examples of the creative thinking being applied to building supportive and informed constituents of the future. Innovations in Hawaii have resulted in remarkable models of linking formal K-12 education programs with coral reef stewardship. Defining how to leverage this progress in order to grow a wide base of political will could become a regular agenda item.

In each of the jurisdictions, Citizen Advisory Panels should be established for growing supportive constituencies to assist local coral reef managers, to build an understanding of the nature of the challenges and to help to shape solutions. Results could then be shared with staff at the USCRTF and AIC and partners to track progress and disseminate model program materials. There are several examples from the National Estuaries program where Citizen Advisory Committees have been established that contribute to program development and could be used as models.

Increased Capacity to Practice Effective Coral Reef Conservation and Management

Issue 7: Close the implementation gap - move to comprehensive and integrated planning that leads to implementation and evaluation

Considerable capacity has been developed for the identification of issues that affect the health of coral reefs and drive management actions. Mapping of the location of coral reefs combined with biophysical assessment has generated a fairly clear picture of their extent and condition. Capacity has also been built to understand the drivers, threats and factors that contribute to the decline of reef health. Managers now describe the next big capacity building challenge as the widening implementation gap. Currently, managers describe the significant time and effort they dedicate to relatively short cycles of planning still largely focused on short-term projects. Instead, most managers seek to build the capacity for comprehensive and integrated land and water use planning that has a defined end point, leads to formal commitment plans of action and gains the necessary resources and authority for implementation in a comprehensive manner, implementation that includes evaluation and assessment to inform adaptive management. Several managers describe a current state of "planning paralysis" or continuous processes to shape the better plan while at the same time many coral reefs continue to decline in their jurisdictions.

Clearly many projects are underway, but managers describe them as small-scale, pilot actions often disconnected from other management actions. Other than a few places where comprehensive watershed management is being practiced, managers describe a growing frustration with routine cycles of planning followed by modest to no implementation. This implementation gap is common throughout the world and can occur when well-intentioned managers and administrators invest the majority of their effort in the identification of issues and development of plans that don't receive the necessary level of support and investment from political leaders and senior administrators.

The implementation gap is evident in all jurisdictions and chronic in many. There is a wide range of contributing factors unique to each jurisdiction and are detailed in each of the jurisdictional capacity assessment reports. The causal factors are many and highly contextual depending on the jurisdiction. Principle factors include the strong emphasis on economic recovery at all costs including coastal development, putting economic recovery plans at odds with comprehensive land and water planning. Changes in political administrations lead to changes in senior leadership of resource agencies. This often leads to new cycles of planning. Funding cycles tend to be short-term, one- to two-year grant cycles, and best suited for projects rather than long-term investments for integrated implementation. There is no accepted and common evaluation framework in any jurisdiction that enables qualitative and quantitative results of coral reef projects to be gathered and shared within and across jurisdictions. Overall funding is fragmented across many agencies resulting in a greater number of organizations working with less and less. Crisis management is common, leading managers to shift attention from one burning issue to another with little capacity to sustain large initiatives. Institutional issues such as overly cumbersome procurement and hiring protocols, low salaries compared to other organizations, weak financial management, and regular patterns of organizational restructuring contribute to staff turnover. Conflict among stakeholder groups over management strategies such as marine spatial planning or fishing rights can cause significant disruption and delay and lead to persistent acrimony.

Many who were interviewed described planning as a relatively easy activity in contrast to the much harder work of securing formal commitment to a plan of action followed by implementation and evaluation. The creation of a plan was often described as an end in itself followed by a modest or low-level implementation effort. One manager described plan implementation as "buying time until the next round of planning." Plans were abundant across all jurisdictions. Local action strategies, watershed management plans, management priority documents, area specific management plans, mitigation plans, and port and harbor development plans are all examples of the many types of documents that exist, each with their own planning framework. Consistency and quality are uneven without a common planning framework, some with and many without metrics or indicators for success embedded in an evaluation framework. Approved grants serve as their own implementation plans, sometimes well linked to a management plan, sometimes disconnected from existing plans. Managers simply accept this reality and optimize their efforts within the reality but acknowledge the growing implementation gap.

The focus on priority sites with clear boundaries has been a positive step, and progress is being made with actions such as the Coral Reef Advisory Group in American Samoa, the SEFCRI process in Florida, or the ranges of expressions of Conservation Action Planning often facilitated by The Nature Conservancy. The priority watershed focus in American Samoa, Puerto Rico and Hawaii, supported by NFWF and partners within the USCTRF has provided additional capacity for integrated management and is a positive step, but far more capacity is needed to close the implementation gap. Outside of integrated watershed management efforts, implementation occurs mostly in the form of pilot-scale restoration activities, mitigation for regulatory impacts, or geographically focused action plans often driven by resource management agencies such as at National Wildlife Refuges and Department of Defense (DoD) installations, and work conducted by motivated watershed groups. Frequently, these actions are disconnected from one another and don't fit together as part of a comprehensive implementation strategy for a well-conceived plan of action.

SHORT-TERM RECOMMENDATION #8

Close Implementation Gap With Portfolio Approach: Common Framework For Tracking and Evaluating Project and Program Management Process Effectiveness and Support Federal and NGO Staff Presence on the Ground to Assist in Implementation and Evaluation of Projects

Given the wide range of contributing issues, closing the implementation gap is a complex challenge requiring a range of strategies adapted to fit the context of each jurisdiction. At the national scale, the USCRTF can work to establish a common management framework but this must be adopted by the agencies and NGOs within the jurisdictions. The management framework should be designed to track movement and progress from issue analysis and planning to the securing of formal commitment toward pilot scale and full-scale program implementation and follow-up evaluation for adaptive management. Ideally, such a framework would have simplifying tools such as scorecards to track achievement of the necessary actions associated with all steps within a management cycle.

Two analytical frameworks are recommended to guide the development and maturity of management efforts and progress towards long-term goals. The first is the Adaptive Management Cycle (Figure 3).

This cycle identifies the essential actions of the resource management to a five-step management process:

- Step 1: Analysis of issues (both challenges and opportunities across) a wide geographic area of integrated land and water;
- Step 2: Formulation of a course of action to address the issues that matter most to the people of the place;
- Step 3: Formalization of a commitment to a set of policies and a plan of action and the allocation of the necessary authority and funds to carry the plan forward;
- Step 4: Implementation of the policies and actions that received formal commitment; and,
- Step 5: Evaluation of successes, failures, learning and a re-examination of how the issues themselves have changed.

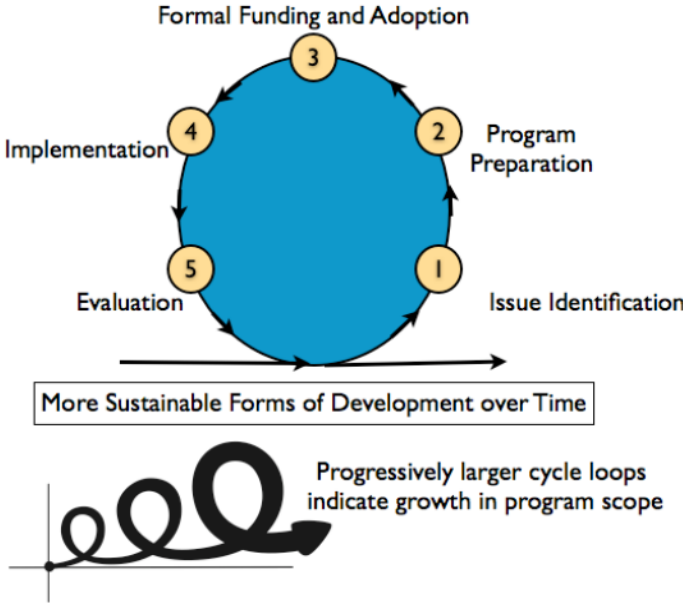

Figure 3: *The Adaptive Management Cycle.*

Ideally the steps are conducted in a sequence and conclude as a "generation" of integrated coral reef management. The start of the new generation of planning, every five years or so, incorporates what was learned through evaluation (Step 5) in a new round of analysis. Initiation of a new cycle builds upon the experience gained and adapts to changes in the social, economic, political and governance system. Thoughtful progression through linked cycles signals true "adaptive management."

The second framework, Orders of Outcomes, complements the Management Cycle by examining the outcomes of management that should be the product of planning, implementation and intentional ecosystem change (Figure 4).

The 1st Order assesses the degree to which the enabling conditions for the implementation of a resource management plan are in place. These are the outcomes that signal the successful completion of Steps 1 through 3 of the management cycle. The implementation of a management plan is assessed as the 2nd Order by examining the degree to which the behavior of the resource user groups, coral reef managers and those who fund coral reef management have been modified as the result of implementing a management plan. These are the outcomes produced by Steps 4 and 5 of the Management Cycle.

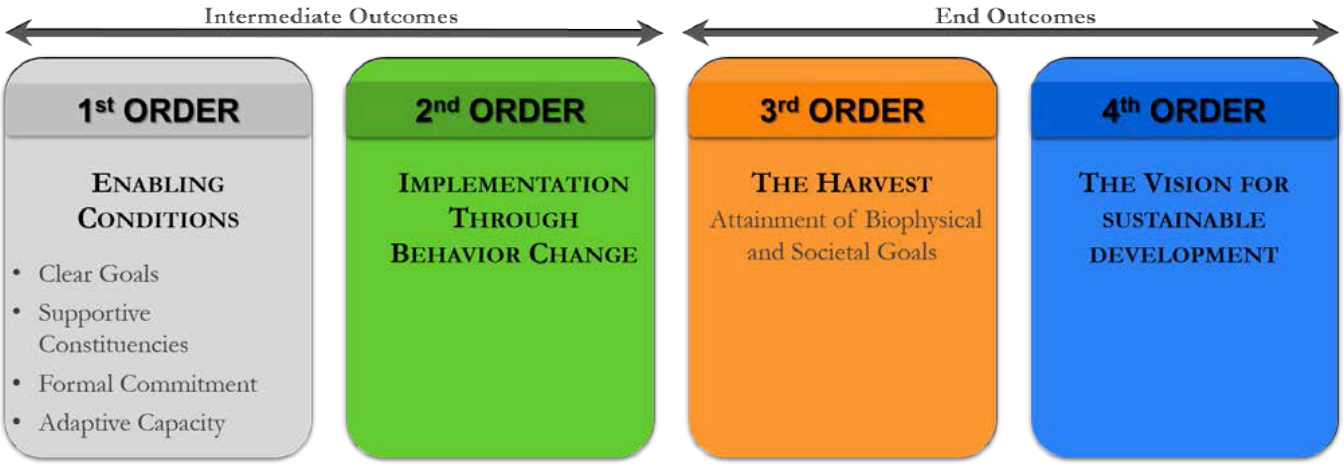

Figure 4: *Orders of Outcomes analysis helps focus analysis clearly on the specific, intended outcomes of programs that seek to work generally to achieve societal and environmental goals (Olsen et al., 2009).*

The 3rd Order assesses the changes in the biophysical condition of coral reefs coupled with societal conditions that can be attributed to the implementation of the program. Routine biophysical monitoring of the condition of coral reefs fits well here as long as it is tied to the process and outcomes of management as well as societal well-being.

Finally, a 4th Order assessment probes the contributions of a set of linked cycles of an adaptive management plan towards more long-term sustainable development and quality of life issues (i.e. food security, health care, education, and ecosystem services) balanced with economic development.

Assembling the First Order enabling conditions for the successful implementation of coral reef management plans and policies lies at the heart of adaptive management. These outcomes of analysis and planning are as follows:

- Unambiguous goals address the conditions that coral management is designed to achieve;
- Well informed constituencies have not only participated in shaping the plan but support the goals and the means by which they will be achieved;
- The capacity is present within the institutions responsible for the plan to successfully implement its procedures and policies; and,
- Commitment for the implementation of the plan is expressed by the endorsement of the plan by the lead jurisdictional authorities and financial resources for its implementation are in place.

Simplified assessment tools and scorecards are presented in Appendices D and E and provide samples of the types of tools that can be used to assess capacity, identify gaps and share results to ensure progress is made toward closing the implementation gap. Jurisdictions should routinely report on the methods that work best for them to sequence and prioritize management actions and track movement and effectiveness through the steps in the management cycle. Together, the completed steps form a generation of coral reef management and provide evidence of a closing the implementation gap. As an example, the successes of the CRTF watershed partnership should be replicated by

applying place-based approaches to other issues in addition to reducing LBSP and using these recommended strategies to ensure strong process and outcomes.

Issue 8: Ineffective enforcement and poor compliance

The most telling feature of effective implementation of a plan of action is enforcement that supports compliance with rules and regulations. With few exceptions, both enforcement and voluntary compliance are weak or poor across all jurisdictions. Consistent and balanced enforcement, compliance and support by the judiciary have been major challenges. Managers across all jurisdictions describe a major capacity gap to enforce regulations and limited compliance with national and local regulations. Illegal, unreported and unregulated fishing, for example, is a recurring issue across all jurisdictions and is described as a major management challenge. Several particularly damaging methods have become widespread, such as fishing with dynamite and poisons as well as using very small mesh-size nets while illegally fishing in nursery areas.

Compliance with fisheries rules and regulations will be low when breaking the rules is profitable, necessary for food security where few other options exist, and when the punishments applied do not deter the behavior. In such situations individuals who would otherwise wish to conform to the rules conclude that such conformance is foolish when "everyone else is breaking the rules". Breaking the pattern is a major challenge that requires a set of strategies to increase voluntary compliance while improving the fairness and effectiveness of penalties by apprehending and charging those who violate the rules in an even handed manner.

The issue of enforcement and voluntary compliance is a major barrier to implementation and documented in each of the capacity assessment reports. Enforcement issues include effectiveness of enforcement, degree of voluntary compliance, and the degree to which sanctions are appropriate and graduated to meet the severity of the issue. Enforcement issues are somewhat different in each jurisdiction but common to all is the relationship between weak enforcement and weak compliance. Managers describe four factors when deciding whether to comply with a rule or regulation by considering:

- What will be gained from violating the rules?
- What is the size and severity of the expected penalty?
- Are the rules and their enforcement perceived to be fair and just?
- What are the social rewards and punishments exerted by a fisher's peer group and community?

It is important to note that all jurisdictions report having adequate legal frameworks in place at the jurisdictional scale for coral reef management, some clearly more robust than others. A major issue is the formal commitment to enforce existing regulations and the commitment to routine adjustments in regulations, training of the judiciary, increased capacity for enforcement and building a culture of compliance. All jurisdictions have elections cycles every four years and the new elected official has the authority to select individuals to lead resource management agencies, and as a result can completely change the enforcement paradigm – for better or for worse. In other words, capacity to enforce

rules and support compliance of rules designed to protect coral reefs can and does change dramatically on a regular basis.

SHORT-TERM RECOMMENDATION #9

Establish an Enforcement Working Group That Engages Agencies with Enforcement Authorities to Improve Coral Reef (Fisheries, LBSP, etc.) Enforcement Chain Effectiveness

In the next twelve months, USCRTF and AIC in partnership with NOAA Office of Law Enforcement (NOAA OLE) and all relevant federal, state and territorial agency law enforcement programs should create a high-level enforcement and compliance working group with action steps. Ideally, this working group is linked to the USCRTF and focused on improving and further developing joint enforcement agreements by exploring enforcement challenges from across all seven jurisdictions. A first step is to invite NOAA OLE to USCRTF meetings and seek their feedback on enforcement programs across all seven jurisdictions with a clear summary of the issues, gaps and recommendations. This presentation should define the need for an enforcement working group within the USCRTF. Enforcement experts have noted that they believe national level assessments are not useful. Instead, the focus should be on local level assessments specific to each jurisdiction. What works in one jurisdiction may be completely unsuitable in another as culture and socio-political context are crucial. With a strong understanding of local context, we recommend the working group determine the best methods for conducting an "enforcement chain analysis" in each jurisdiction.

An enforcement chain analysis is a process that summarizes the strengths and weaknesses of the legal framework and their compatibility with existing management plans. It may also include an evaluation of the design and effectiveness of law enforcement programs and a summary of cost-effective actions to improve enforcement programs. An excellent example is the work led by Conservation International and WildAid who published an enforcement chain analysis of the Eastern Tropical Pacific Seascape. The analysis in each jurisdiction should focus on fisheries and LBSP issues and be supported by the USCRTF. The working group should draw lessons learned from other effective enforcement capacity building efforts such as Pacific Islands Managed and Protected Areas Community (PIMPAC), program exchanges, and advances and innovations in technology and homeland security.

Implementing an effective enforcement working group requires understanding of local context including such issues as how to engage in sustained dialogue with resource users as well as dissemination and refinement of the goals of fisheries/LBSP program and its regulations. Enforcement must be evenhanded to be effective. The behavior of enforcement officers influences willingness to comply. Punishments need to fit the crime. This warrants graduated sanctions so that more serious offenses are more severely punished. In order to achieve adherence to the rules, the judiciary needs to thoroughly understand the fishery regulations and to be aware of the implications of different scales and types of violations. Communication strategies must become a centerpiece of enforcement policy and should be a focus of the working group.

Issue 9: Challenges and opportunities with function and structure of management agencies

Managers face a range of challenges associated with the function and structure of management agencies that affect the capacity to manage coral reefs. Problems with hiring, promoting and retaining qualified staff can lead to high turnover. Procurement actions required to purchase necessary equipment and supplies are often overly cumbersome, can take months, and therefore affect implementation. Grants management and accounting is a necessary task for all jurisdictions and presents challenges for some, significant challenges for others. These are a few of the major, but by no means the only, capacity challenges associated with the function and structure of management agencies. Unfortunately, these issues go far beyond coral reef management and affect other natural resource management endeavors and other work at the state and territorial scale, and there are no easy solutions.

Managers in each jurisdiction describe a common issue of turnover. Hiring full time staff even when money is in place can be difficult to impossible given hiring freezes and difficulty in creating new positions. Figure 5 provides an illustration of the hiring process in CNMI where there are feedback loops and the Governor must approve of the request for personnel action. Even filling vacant positions can be quite difficult and has led to innovative work-arounds where management agencies partner with organizations in academia or NGOs who have less administrative burden. When positions are filled, they are often short-term, fill a specific need, and are unlikely to be professional positions with secure funding. Compensation levels are generally lower (often significantly lower) in state and territorial agencies than in similar federal, foundation, or NGO workplaces. Workload is often quite high and can lead to burnout. Motivation becomes an issue where there is persistent conflict within the resource management agency or community. Collectively, these issues can lead to high rates of turnover. In remote island jurisdictions, where significant effort has been placed in the training and capacity building of an individual with high potential, turnover can be far more impactful and result in a "brain drain" effect when bright, committed and effective staff depart.

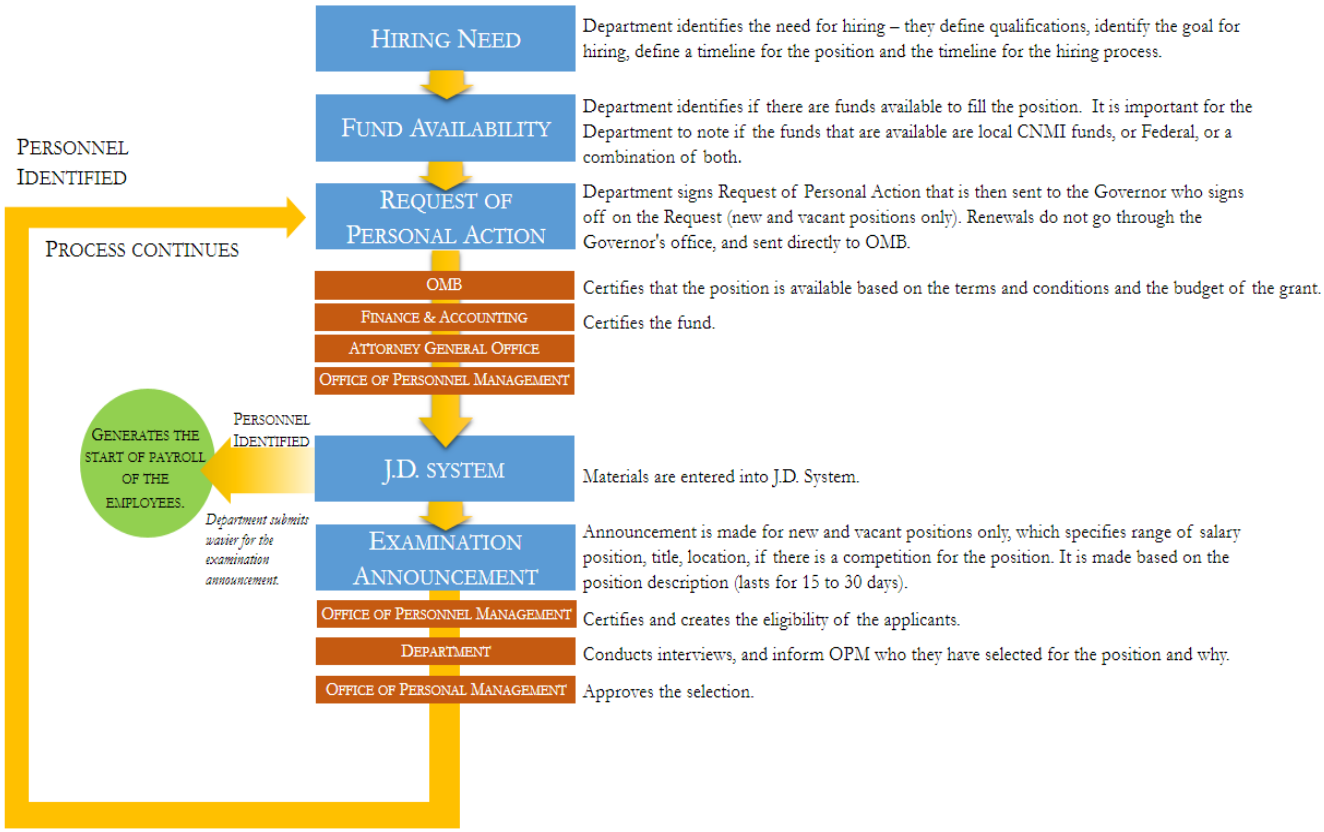

Figure 5: *Outline of the hiring process and associated CNMI government agencies.*

SHORT-TERM RECOMMENDATION #10

Support Innovative Solutions to Hiring, Procurement and Grants Management and if not Possible, Create Detailed Training on These Administrative Actions

A first step is to simply understand and map the administrative systems for hiring, procurement and grants management for each jurisdiction. Flow charts such as that presented in figure 5 above took about two days to develop, and was validated through several interviews with key people who understood the hiring process. This was new information for many and serves as an example of how to map a complex system to identify areas for reform. A second step is to define the specific points in the system flow that are redundant, unnecessary or present persistent challenges. A third step would be to define the potential return on investment for reforming these systems to improve hiring, procurement and grants management practices. If significant, the case for hiring, procurement or grants management reform should be brought to the Governor's office, and high-level meetings should then be held to decide on revision or total overhaul. If needed, experts in the Office of Management and Budget may be willing to consult on potential actions necessary to transform the system. There are no easy solutions to these issues. If there are no options for transformation of the system, then detailed step-by-step training programs should be developed

that describe in detail the most effective and efficient ways to engage with the existing system, and reform implemented when more favorable conditions exist and windows of opportunity open.

Issue 10: Challenges of integration and coordination among coral reef managers and partners.

The number of agencies and organizations involved in coral reef management is growing across all seven jurisdictions. While this adds capacity, it also increases the potential for fragmentation. It is difficult to know precisely who's doing what, where and to what effect. Adding institutional components to a complex management system without factoring in the need to coordinate and collaborate may only slightly increase that institution's capacity. With greater numbers of actors, the potential for conflicting mandates, management philosophies, and methods and practices increases. Potential for pooling resources and collaboration can actually decrease. When collaboration is effective, it can be a major capacity enabler and there are examples of this in all jurisdictions outlined in the jurisdictional reports. There are also examples of fragmentation where collaboration is weak and management capacity declines.

Due to fragmentation in the jurisdictions, opportunities have been missed to share ideas, assets, and learning. Often efforts to build capacity are aimed at specific issues such as fishery management, LBSP or enforcement and can lead to further fragmentation. Programs that have added capacity such as internships, fellowships and professional development have been subject to sweeping budget cuts. It is becoming a necessity to do more with less. Building capacity across sectors is much more complicated than traditional sector-based capacity building but is now becoming an urgent need. This capacity challenge will require long-term investment as well as short-term actions and will never be fully solved as new leaders and new organizations continue to enter into the coral reef management system with different management approaches and create the potential for greater fragmentation.

Working across disciplines is a related capacity challenge, evident the world over and particularly important for the complex challenges associated with coral reef management. Biologists or ecologists don't normally team up with economists, lawyers, journalists and political scientists, but such collaborations are increasingly necessary. Such professionals have been shaped by their specialized education and possess distinct vocabularies, use different conceptual frameworks, have different social networks, and often possess worldviews shaped by distinct values and beliefs. However, the holistic nature of the ecosystem approach requires competencies to understand together the complex dynamics of the functioning, condition, use and governance of coral reef ecosystems. This is a new paradigm and requires teams with capabilities in diverse fields that can engage in high quality collaboration to analyze and act upon the issues they face. Funding necessary to conduct interdisciplinary science and management is rarely available. Academic partners, particularly junior-level faculty without tenure, often work at institutions with reward systems that create disincentives for working across disciplines or on applied science. Spending too much time in this domain can be damaging to a promising career of a young academic, yet these are precisely the people who are needed to contribute to complex challenges of ecosystem-based coral reef management.

SHORT-TERM RECOMMENDATION #11

Support, Expand and Institutionalize Staff Capacity Building Programs in the Jurisdictions through Fellowships, Internships, Professional Development, Federal Details with Training on how to Collaborate Across Agencies and Professional Development Series for Coral Reef Managers

Managers in all jurisdictions describe the importance of capacity building through fellowships, internships, professional development, and federal details. The USCRTF should prioritize these programs as a signature effort and pool resources to provide long-term support for more fellowships such as the annual Governor Tauese P.F. Sunia Memorial Coral Reef Conservation Summer Internship. The NOAA Coral Reef Management Fellowship Program should also be institutionalized and not subject to budget cuts as it was specifically established to build coral reef management capacity in the jurisdictions. Highly qualified candidates are selected as Fellows to spend two years working on specific projects that reflect each jurisdiction's particular coral reef needs and complement other ongoing local projects and management. The host jurisdiction provides a supervisor to integrate the fellow into coral reef management activities building professional experience in coastal and coral reef resources management. Additional training and focus should be on the role as connector. Fellows often work across agencies and if well trained can serve as forces of collaboration and learning across agencies. Further program development should be modeled after the existing programs at specific federal agencies such as NOAA and at NGOs such as TNC.

Other federal programs should be examined to build collaborative capacity. For example, the Intergovernmental Personnel Act Mobility Program (IPA) is a program within the federal government that supports temporary assignment of personnel between the Federal Government and state and local governments, colleges and universities, research and development centers that are federally funded, and other eligible organizations. All seven U.S. coral jurisdictions could take full advantage of the IPA program. If used strategically, the IPA program can help management agencies fill positions on a reimbursable or non-reimbursable basis. This means IPA assignments may be cost-neutral as determined by the agency and non-Federal entity involved in the assignment. Federal employees serving in IPA assignments can become recruiters and ambassadors for a successful program leading to a steady demand for assignments.

Ideally, each of the federal partners within the USCRTF could take on responsibility for building capacity through internships, fellowships, IPAs and linking the programs to a specific area of focus while also training staff in high quality collaboration. For example, EPA could oversee all recruitment and placement activities related to building staff capacity in the jurisdictions to address LBSP, including the training required to work with staff within the jurisdictions. The Fisheries Management Councils have the potential to be strong allies in ecosystem-based fisheries management and could take a leadership role in inventories of available fisheries data, establishing a centralized data clearinghouse, and, more importantly, collaborating effectively with managers on innovative practices that result in higher levels of cooperation and collaboration.

The Point of Contact (POC) in each jurisdiction should be trained and required to pay close attention to the degree and quality of collaboration across the jurisdiction. They are the ones who are most aware of, and have vested interest

in ensuring, high quality collaboration across managers of places-based areas such as wildlife refuges, national parks, state parks, DoD installations, etc., as well as other cooperative research activities, NGO programs and other government agencies. The responsibility of ensuring that all management activities related to coral reef conservation and protection are connected to the USCRTF should be clearly defined as a role of the POC or designee. Given that the Governor appoints the POC, the POC should serve as proxy across all managers within a jurisdiction, reducing the degree of fragmentation and increasing the degree of coordination and collaboration.

As discussed in the next section, a professional development series is recommended that focuses on building core competencies for integrated coral reef management to include:

- Analysis of long-term changes in the condition and uses of coral reefs;
- Analysis of governance structures and processes in the home jurisdiction that encompass the values, policies, laws and institutions that determine how coral reefs are managed and used;
- Strength in facilitation, mediation, stakeholder engagement and public education to increase supportive and informed constituencies for coral reef conservation;
- Leadership required to build the "political will" to design, adopt and implement plans of action that address the complex challenges posed by the likely downward trend of coral reef ecosystems;
- Strategic design of core components of a coral reef management plan and program; and,
- Design and implementation of routine monitoring and evaluation in support of adaptive learning, management and improved governance.

SHORT-TERM RECOMMENDATION #12

Operationalize High Quality Collaboration With Multiple Entry Points Such as Ensuring Federal Agencies are Represented at Local Working Groups and Local Interests are Represented at Federal Working Groups

Promising new work is being done to evaluate organizational collaborations both within organizations and across institutional boundaries in fields such as education, public health and social programs. Collaboration is a primary strategy for cultivating innovation, conserving resources, and addressing complex challenges that fall outside the grasp of any one group. Participation in collaborative platforms is critical and ensuring that federal agencies are represented in local working groups is as important as local interests being represented at federal working groups. The following are recommended entry points developed by Rebecca Woodland and Michael Hutton (2012).

Phase #1 Operationalize Concepts of Collaboration: Collaboration can be characterized by specific attributes and variables to better observe, measure and document the existence, development, quantity, quality and contextual effects of collaboration in support of improved coral reef management. These attributes include the essential pre-requisite of a shared purpose of improved coral reef management. Collaboration for improved coral reef management is developmental, evolves in stages over time, and varies in terms of level and degree of integration. Building literacy on collaboration across the coral reef community can be done by building a simple reference library of relevant literature

and case examples of high quality collaboration and what constitutes effective meetings, forums and locations for where coral reef management takes place in a collaborative fashion.

Phase #2 Identify and Map Communities that Practice Coral Reef Management: For more effective management, it's important to gain a more accurate picture of high-leverage groups working together. Specifically identify what teams, committees, federal partners, state agencies, local governments, NGOs, university projects, legislative groups, etc., are carrying out the tasks and activities most central to coral reef management. A simple inventory and mapping product can be generated to reveal:

- Teams and committees that make up key strategic alliances within the coral reef management community;
- The purpose and primary task of each group;
- The members of the group and any criteria for membership;
- How often, where, and through what medium each group meets;
- How long each group has been in existence; and
- Relative importance of the group to the purpose of coral reef management.

Phase #3 Monitor Stages of Development: Collaboration moves through predictable stages of development. One stage may go faster than another, or a group can get stuck in one stage for a long time. A team may find itself moving in and out of one stage. Knowing the stages and how to navigate and emerge from each stage of development is critical to building higher quality collaboration. Partnerships first assemble and then develop norms for how they act together at an early stage. Success often hinges on how well they are able to invoke clarity of purpose and then define the decision-making structures, strategies, leadership roles and clear tasks. Identifying a code of conduct with clear roles and responsibilities as well as identifying what high quality dialogue, decision-making, action and reflection really looks like is extremely useful at this stage. Once the group has assembled and begins to wrestle with purpose and governance, the next stage in development is typically marked by enthusiasm centered around the shared purpose which tends to evoke feelings of urgency, defining the resources, establishing turf boundaries, understanding where the expertise resides and who's really willing to take on tasks. A third stage is the transition to actually performing, often marked by implementing toward the common purpose as well as building and safeguarding resources, strengthening the validity of the collaboration, and infusing energy in pursuit of the shared purpose. A final stage of collaboration is marked by an end of the current collaboration or transformation to another form of collaboration. This typically happens after some milestones have been reached and the group has faced a series of both planned and unplanned events moving toward a decision to refine, reconfigure or dissolve their collaboration.

Phase #4 Define Levels of Collaboration: A fundamental aspect of collaboration is acknowledging the levels of integration that exist between and within organizations. More integration is not necessarily better. Better integration is better and the degree should vary according to the purpose and goals. A simple rubric has been developed to gauge integration over time based on a total of five levels that move from no integration to full integrated, all unified toward a common goal. These levels range from independent (no integration) to networking (lowest level of integration such as exploring shared interest) to cooperating (working together for reasons beyond ensuring that tasks are done) to partnering (using shared resources to address common issues and to reach common goals) and finally to unifying

(merging resources to create something new often requiring commitment over long periods to achieve short- and long-term outcomes).

Phase #5 Model and Identify High Quality Collaboration: The characteristics of the four core elements of collaboration (dialogue, decision-making, action and reflection) can each be defined through using low, medium or high-quality levels. Each collaborative alliance should define what they consider to be the ranges of each. This information is used to inform decisions about how to further develop and strengthen the collaborative process.

Section Three: Long-term Capacity Building Program

List of Long-term Recommendations

Based on a comprehensive review of issues that affect capacity to manage coral reefs, a primary recommendation is that the USCRTF adopt a resolution to support a long-term and sustained capacity building effort for coral reef management. A long-term effort is needed because coral reefs continue to decline in health as the threats, opportunities and urgency for management actions increase dramatically. Short-term ad hoc capacity building strategies will not be adequate to address the nature of these challenges. A pooled resource is needed to establish a long-term investment in building the capacity to respond effectively to emerging issues outlined in this document, jurisdictional reports and a growing number of other sources. Investment in a long-term capacity building program will require clear commitment by all federal partners of the USCRTF and a well-conceived strategy. The three core elements are:

- Reference sites and periodic assessments of the process and outcomes of management;
- Development of a peer-to-peer learning network; and,
- An investment strategy that advises, steers and financially supports a long-term capacity building program.

LONG-TERM CAPACITY BUILDING RECOMMENDATION #1

Periodic Assessments of the Processes and Outcomes of Coral Reef Management

Capacity building strategies need to be anchored in an established framework with well-documented set of methods that build an understanding of the local context, feature an analysis of local coral management issues, and their current range, magnitude and interconnection. The comprehensive framework and methods for improving management process and outcomes serve as the core for this program to sequence, prioritize and measure progress.

Management Science Reference Sites

The first step is to identify management science reference sites in each of the jurisdictions. The reference sites would not be used for more biophysical monitoring. Instead, the sites would be used to train, implement and measure progress towards adaptive management that is done in a wider governance context. Six of the seven jurisdictions have designated priority sites. It is recommended that a reference site be established in one or two of these existing sites in each jurisdiction. Florida does not have priority sites but a reference site could be defined.

The reference sites would serve to benchmark the condition of the coral reefs and how the people of the place perceive and have responded to change in the ecosystem. The emphasis on perception is crucial because perception and values influence behavior. The perceptions and behavior of resource users in a given location provide insight as to the functioning of the governance system and what is possible to achieve from a management perspective. These sites would become case studies of management activities and help identify additional research needs. The sites serve as baselines of management response to ecosystem change.

The monitoring and analysis would be aimed at documenting the responses and effectiveness of management to societal and environmental change (ecosystem change), which will be accelerating over the coming decades. Applied research should be aimed at a subset of the management and capacity building issues at the reference sites. The research agenda should be designed to inform better management of coral reefs with regard to climate change, fisheries and LBSP, and define where more information is needed. The reference sites would serve as case studies of how things have changed societally and environmentally and how they have responded to issues, and will inform management actions and further training programs across the jurisdiction a whole.

Periodic Review

Periodic review of the management processes and outcomes related to these issues are recommended every three to four years. In addition, the dynamic nature of the socio-ecological environment in which managers operate, such as changing political administrations, leadership changes at the local level, economic shifts and natural disasters can alter management effectiveness. A periodic assessment of each jurisdiction would document process and outcomes of management at the jurisdictional scale. The assessment would focus on adaptive learning, identifying persistent capacity gaps and summing up management progress. Timed to occur at the end of a funding cycle, the assessment would inform issue analysis and the development of action plans for a new grant period. Lessons learned, and potentially scalable or transferrable ideas for other jurisdictions could be shared at conferences and other learning forums.

Long-Term Capacity Building Recommendation #2

Coral Reef Management Learning Network Development

The creation of a network designed specifically to support the practitioners of coral reef management across U.S. jurisdictions would foster the development of an epistemic community with a common purpose and shared language for improving management. Peer-to-peer learning, exchanges, and regional in-person meetings would be features of an active network supported by a well curated website providing virtual interaction. PIMPAC is a capacity building program that has been implemented for several years and is a model example.

Adaptive Learning Within the Network:

Learning within the Network must relate primarily to the processes and outcomes of management. Facilitated discussions of current and emerging trends in ocean acidification and sea level rise, for example, could provide an impartial summary of the knowledge base and some potential management responses. Podcasts of these discussions

would enable the sharing of vital information with the entire network in a timely manner. For example, a segment confirms that sea level rise is expected to increase by an additional two to three meters by the end of the century, as opposed to half a meter. What do we do to respond? While this may be a topic for high-level leaders, a well-structured dialogue on the implications for coral reefs and their management could be useful across all jurisdictions. Strong curatorial oversight of the content and regular reference back to the shared language will contribute to the development of a learning community.

The network would also be the site dedicated to training on specific core competencies such as:

- Analysis of long-term changes in the condition and uses of coral reefs;
- Analysis of governance structures and processes in the home jurisdiction that encompass the values, policies, laws and institutions that determine how coral reefs are managed and used;
- Strength in facilitation, mediation, stakeholder engagement and public education to increase supportive and informed constituencies for coral reef conservation;
- Leadership required to build the "political will" to design, adopt and implement plans of action that address the complex challenges posed by the likely downward trend of coral reef ecosystems;
- Strategic design of core components of a coral reef management plan and program; and,
- Design and implementation of routine monitoring and evaluation in support of adaptive learning, management and improved governance.

Regional Coral Reef Management Learning Centers:

Universities and community colleges could provide managers with an intellectual home to learn more about how to shape the process and outcomes of management. Ideally these inherently interdisciplinary management strategies are blended with ongoing training in marine biology, etc. Resource centers such as the National Sea Grant College Program or the Coral Reef Institute programs are examples of where capacity can be built with existing partners to combine research and education, and serve as primary nodes to coordinate plans to address local issues.

Development of Professional Standards:

Professional standards for managers should focus on what they need to know in order to successfully manage coral reefs in response to ecosystem change. The emphasis is on the do! This could be the basis of a certification that fits with the cooperative grant process. One level of training would focus on how to work effectively with resource users and partners in management, such as those related to diving, fishing, tourism, and hotel management. Another level of training would focus on the multiple scales of resource management (including academic institutions and NGOs) and feature people involved in field operations as well as mid-level managers and administrators. A final level of training would be for higher-level decision-makers at the jurisdictions (Governors, staff, NOAA CRCP, AIC, USCRTF) who fund management. At this level, the focus would be on the use of decision support tools such as risk assessment and decision theory, scenario planning and modeling.

Documenting Learning through an Interview process:

Learning across the network can be combined with documenting progress. A three-stage process of interviews was developed by International Development Research Centre (IDRC) to streamline their documentation process and has greatly increased learning across programs (Cardin and Earl, 2007). In 2005, IDRC adopted the rolling Project Completion Report (PCR) that featured a cross-organization interactive process to gather staff reflection, deepen learning associated with project implementation, and provided an accountability function for the organization. The interactive process is based on a set of interviews structured to last roughly 20-minutes, pre-scripted and conducted by staff at three different levels: senior leader, program manager, and junior staffer with high management potential. Three interviews are conducted over a generation of program implementation and timed when learning is highest: prior to start, six months into project implementation, and at end of the grant cycle. The results have been significant in terms of learning about different contexts, adaptive nature of management, what may work in a given context and what may be transferrable. The following is a recommended strategy for applying such a model to building capacity for more effective coral reef management:

Stage 1 Early stage of an initiative: The interviews in the first stage are timed with the provision of funding (ideally NOAA CRCP as well as other grant awards) and designed to stimulate reflection and identify issues that go beyond what is usually considered during a program funding review. Leaders are encouraged to look ahead and imagine the additional learning and capacity building that is needed in the current generation. The interviewers gather simple documentation of the features of the grant and specifically target the issues and behaviors that are the program's intended focus. Questions would largely focus on the changing context and adaptations needed for effective implementation and the degree to which the enabling conditions are in place. An example of a question for such an interview could be: to what degree have the coral reef management issues been identified by the initiative?

Stage 2 Mid-stage of an initiative: Interviews focus on both process and outcomes. To understand process, the interview focuses on movement through the steps in the Management Cycle. To understand outcomes, the interview focuses on the degree to which the enabling conditions are present (1st Order Outcomes) as well as evidence that there is some form of implementation that is targeted at changing collective behavior of the resource users, managers and funders of coral reef management (2nd Order Outcomes). Information is gathered on trends regarding the biophysical and societal dimensions (3rd Order) as well as the overall purpose of coral reef management (4th Order). Inquiry is directed at what has worked well, what are the overall concerns and challenges, how the project teams are working together, and what are some practical lessons that can be shared across all other jurisdictions. An example of a question for such an interview could be: to what degree do the institutions that are assisting in coral reef management understand and support the agenda?

Stage 3 End stage of an initiative: As the funding cycle nears its end, interviews focus on key accountability elements surrounding the results aspects of the funding, concentrating on the program's relative success in terms of objectives met for 1st and 2nd order outcomes, and its effectiveness in moving through the steps in the Management Cycle. An example of a question for such an interview could be: have important actions and policies been tested at the pilot scale and, if so, what has been learned?

LONG-TERM CAPACITY BUILDING RECOMMENDATION #3

Oversight and Support For Long-Term Capacity Building Strategy

Many capacity building program efforts wither and die when external funding ends. Long-term funding is needed that is carefully managed and overseen by a capacity building advisory group. A senior level capacity building advisory group or council would also steer and guide the overall strategy. This group would be tasked with seeing the whole program, and explore synergies across examples of capacity building programs throughout the world, such as a mentoring program making great progress in better preparing enforcement officers, or innovations in management science to inform policy. An expert and integrative group would be able to discuss models and consider if they could be transformed to fit another context or if they succeed best due to local conditions and unique leadership. This group would need to be informed about capacity building programs across the world.

Building a culture of adaptive learning and self-assessment involves the design of a common incentive and reward structure linked to an evaluation framework. This framework needs to be built into both the grant selection/priority setting/accountability process within the funding agencies and organizations, and must shape how funded activities relate to the management process in each jurisdiction. Funding agencies should intentionally link all federal funding to an expectation that evidence will be seen of enabling conditions being developed to support coral reef management policies. The responsibility of designing plans is done at the jurisdictional scale and led by the POC who gathers the most appropriate people to determine biophysical and societal outcomes. This work would include the identification of issues and the target behavior changes that are needed to address the issues. Funding agencies would help by lending support for the development of the enabling conditions but allow the local jurisdictions to take on the role of defining the interventions and programs needed to mark progress and reach defined goals.

Section Four: Conclusion

Coral reefs are irreplaceable. Economic analysis assigns tangible value to them, but the loss of ecosystem goods and services to future generations is incalculable. As summarized in this report, a growing number of issues affect the capacity to manage coral reefs and there is no simple solution, blueprint or panacea to solve them. Instead, a range of capacity building actions are needed, some short-term, and some long-term and sustained. Investments in capacity building efforts need to be designed and delivered to meet the needs of the people and fit the context of the jurisdiction. Local investments must be complemented by federal investments. The lead coral reef management agency within each jurisdiction is at the center of a larger, and growing network of coral reef management entities within the states, territories or commonwealths, and all need to have some part in a comprehensive and holistic approach to building capacity. This necessitates a broader view of "capacity" beyond the more traditional financial, personnel and equipment resources that reside within the target organization, and demands a focus on management process and management outcomes. Thus a rethink of the overall science agenda to balance investment in management science versus more biophysical science is a key first step. Other short-term priorities described in this report include:

- Foster and facilitate peer-to-peer learning exchanges between the jurisdictions, federal agencies and NGO partners for coral reef management;
- Strategically engage governors (National Governors Association) to champion coral reef conservation and management;
- Establish enforcement working group that engages agencies with enforcement authorities to improve coral reef (fisheries, LBSP, etc.) enforcement chain effectiveness;
- Support, expand and institutionalize staff capacity building programs in the jurisdictions: fellowships, internships, professional development, federal details; and,
- Support a collaborative approach to CRCA reauthorization.

While responsibilities for these and other actions should be assigned, the USCRTF sets the political agenda for the federal response to coral reef management and could be a national and international leader in support of building capacity through a range of actions described in this report as well as:

- Adopt a new USCRTF resolution on capacity building for effective coral reef management with specific action items;
- Determine how these capacity building activities fit under existing USCRTF strategic priorities and define the resources necessary for their implementation;
- Evaluate which recommendations could be adopted by existing USCRTF working groups and what ad hoc or long-term working groups may be needed; and,
- Establish a USCRTF working group on coral reef management capacity building with regular meetings for implementing jurisdictional capacity assessment to track progress and identify gaps.

All jurisdictions have built capacity to manage reefs as evidenced by the shear number of government institutions and agencies with a mission of resource protection, as well as NGOs, academic institutions, and funders bringing investment from civil society. Nevertheless, during this same period of increased attention came significant decline in coral reef health. In the Caribbean, Jackson et al. describe this in remarkable detail in the recently published Status and Trends of Caribbean Coral Reefs: 1970-2012. The authors and contributors describe three major phases, starting with 1970-1983 as mass mortality of *Diadema antillarum* and first reports of White Band Disease. They describe the second phase from 1984-1998 as the period after the *Diadema* die off and transition to a more degraded ecosystem that culminated in the 1998 extreme heating event. In the third phase of 1999-2011, they describe this as the modern era of massively degraded reefs. Each of these eras are supported with considerable biophyscial data gathered from a 90 locations in 34 countries and more than 35,000 quantitative reef surveys. This remarkable and sobering analysis applies a comparative approach and points to consistent drivers of change "inextricably linked" that include introduced alien species, human population growth, ocean warming, coastal pollution, and overfishing. Yet analysis of the data and summary conclusions challenges conventional wisdom about the importance of the global drivers:

> *"Our results contradict much of the rhetoric about the importance of ocean warming, disease, and hurricanes on coral reefs and emphasize the critical importance of historical perspective for coral reef management and conservation. The threats of climate change and ocean acidification loom increasingly ominously for the future, but local stressors including an explosion in tourism, overfishing, and the resulting increase in macro algae have been the major drivers of the catastrophic decline of Caribbean corals up until today. What this means is that smart decisions and actions on a local basis could make an enormous difference for increased resilience and wellbeing of coral reefs and the people and enterprises that depend upon them."*

The conclusions are important for capacity building across all seven jurisdictions for several reasons. First, they call for robust conservation and fisheries management strategies, and the paramount importance of the protection of grazers such as parrotfish because of the essential nature of their ecological service in removing macroalgae from coral reefs. This underscores the value of ecosystem science coupled with a comparative approach that can point towards fisheries management goals. Unfortunately, even this "simple" management strategy, is complicated by a variety of social factors, notably changes of behavior of fishers, formal commitment by political leaders, structure and function of bureaucracies and issues associated with compliance and enforcement. Therefore whatever management action is done must be in harmony with the reality of the governance context in each jurisdiction. For example, in Frederiksted, a fishing community on the island of St. Croix in USVI, spearfishing and consumption of parrotfish are very important to the community. Developing an effective parrotfish management strategy will require deep engagement, cooperation and dialogue with local communities, fishers, spear-fishers, scientists, and other key leaders such as fishing cooperatives, management councils, faith-based leaders, etc. Even this level of outreach is not enough. What is needed is a carefully designed strategy that recognizes the strengths and weaknesses of the existing governance structures, built upon scenario thinking and economic analysis, rooted in cognitive psychology, an understanding of human behavior and social-ecological systems and tested through adaptive implementation and the routine monitoring of coral reef health to detect change. What appears to be a simple action is actually a socially and technically complex management challenge.

Second, they call for the simplification and standardization of biophysical monitoring of coral reefs and to make results available on an annual basis. This recommendation makes good sense as long as there is a balance with investment in a simplified and standardized monitoring of management practices and their outcomes and fits with the overall governance context. Currently, there is no accepted management framework in place across all jurisdictions for monitoring of progress in coral reef management that provides any guidance to sequence and prioritize what is needed to build the essential enabling conditions, track the attainment of outcomes and achievement toward policy and management objectives.

Third, they highlight the importance of fostering communications and exchange across a network of scientists and practitioners so that local authorities can benefit from experience elsewhere. What began as a few dedicated people interested in coral reef ecology in the 1970s began to shift dramatically in the turn of the 21st century with the reality of the ecosystem decline in many places and political and funding support through U.S. legislation such as the CRCA. With investments now coming from a wider range of federal partners, the management community has grown considerably, with different mandates, funding cycles, management goals and philosophies, evaluation strategies and hierarchies, often not integrated. What was described as a once "tight network of people" with similar goals, has become a widening range of resource management priorities with a wide range of competencies, values and political agendas. High quality collaboration across civil society, government and market forces, is crucial but not taught in traditional academic courses, training, and exchanges. The competencies associated with situation recognition, high quality collaboration, conflict resolution and adaptive learning is as important, or more so, than marine biology and coral reef ecology.

Finally, the recommendations by Jackson et al. to develop and implement adaptive legislation and regulations are crucial reminders of the importance of building and sustaining political will. Once again, building supportive and informed constituencies who can help shape a political agenda needs to be well matched with the local governance context which is highly variable across all seven jurisdictions. Marine spatial planning is a highly charged concept in many, if not all jurisdictions and adds enormous complexity to protected area planning and other forms of area based management. What is possible in one jurisdiction may be impossible in another. Knowing when, where and how to shape policy, legislation, and regulations must be matched with a deep appreciation of what is possible and how institutional structures function to affect management capacity.

Defining and integrating the socio-economic, governance and biophysical information that is needed for decision support is a complex challenge that requires integration across many disciplines, sectors, agencies, etc. There is progress underway with this form of cooperative research, featuring observations and ecological knowledge of the resource users, forecasting and scenario planning relating to management actions. However, without leadership providing formal commitment and long-term investment, the comprehensive and urgently needed management philosophy of an ecosystem approach remains unrealized in practice leaving abundant strategic plans unrealized.

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Appendix A: Interview List

USVI

Kostas Alexandridis, Alicia Barnes, Kent Bernier, Rafe Boulon, Marilyn Brandt, Jeanne Browne, Carol Burke, James Byrne, Lisamarie Carrubba, Paul Chakroff, Sharon Coldren, Carlos Farchette, John Farchette, Howard Forbes, Zandy Hillis-Starr, Anne-Marie Hoffman, Alexandra Holecek, Aaron Hutchins, Winston Ledee, Kemit Lewis, Julian Magras, Christy McManus, Marija Micuda, Jeff Miller, Daisymae Millin, Anita Nibbs, John Ogden, David Olsen, Jean-Pierre Oriol, Jose Sanchez, Roy A. Pemberton Jr., Tricia Reed, Migdalia Roach, Caroline Rogers, Paige Rothenberger, Edward Schuster Sr., Christine Setter, David Simon, Phillip Smith, Stuart Smith, Thomas Kelley, Tyler Smith, Syed Syedali, Roberto Tapia, Joel Tutein, and Norman Williams,

American Samoa

Ufagafa Ray Tulafono, Lelei Peau, Dr. Seth P. Galea'i, Michael Reynolds, Fanuatele Dr. T. Vaiaga'e, Jacinta Galea'i, Matt Lei, Hideyo Hattori, Fatima Sauafea-Le'au, Ephraim Temple, Dr. Doug Fenner, Christianera Tuitele, Dr. Domingo Ochavillo, Gene Brighouse, Dr. Dan Aga, Sandra Lutu, Sean Morrison, Reinette Niko-Thompson, Kristine Bucchianeri, Leifiloa Carol Tanoi, Trevor Kaitu'u, Soli Tuaumu, Marvis Vaiagae, Tino Mao, Tumau Lokeni, Nate Mease, Selaina Vaitautolu, Alice Lawrence, Tafito Aitaoto, Mike King, Dr. Tim Clark, Bert Fuiava, Kelley Anderson, Sean Eagan, Frank Pendleton, John Womack, Nick Saumweber, Dr. Wendy Cover, Veronika Mortenson, Emily Gaskin, Ben Carroll

Puerto Rico

Richard Appeldoorn, Miguel (Menqui) Canals, Constance Carpenter, Lisamarie Carrubba, Ruperto Chaparro, Jaime Collazo, Jorge Corredor, José Cruz, David Cuevas, Damaris Delgado, Ernesto Díaz, Carlos Diez, Raimundo Espinoza, Misael Feliciano, Humberto Figueroa, Jorge (Reni) García, Miguel García, William Gould, Carmen Guerrero, Edwin Hernández, Anthony Hooten, Kasey Jacobs, Nilda Jiménez, Ricardo Laureano, Craig Lilyestrom, Jaime López, Paco Lopez, Mary Ann Lucking, Kathleen McGinley, Pablo Méndez Lázaro, Leopoldo Miranda, Michael Nemeth, José Norat, Álida Ortiz, Silmarie Padrón, Michelle Pico, Rosalie Ramos, Marcos Ramos, Lynn Ríos, Pedro Ríos, Aida Rosario, Ana Román, Idelfonso Ruiz, Michelle Scharer, Susan Silander, Paul Sturm, Samuel Suleiman, Alejandro Torres-Abreu, Vance Vicente, and Abbie White

Hawaii

Greta Aeby, William Aila, Emma Anders, Aric Arakaki, Leo Asuncion, Kawika Auld, Randy Awo, Brian Bowen, Donna Brown, Tova Callendar, Jay Carpio, Athline Clark, Eric Co, Jim Coon, Gerry Davis, Josh Demello, Emily Fielding, Liz Foote, Steve Frano, Alan Friedlander, Rick Gaffney, Rick Gmirkin, Ranae Granske-Cerizo, Dave Gulko, Mike Hamnett, Skippy Hau, Elia Herman, Kim Hum, Nahaku Kalei, Mike Lameier, Jo-Ann Leong, Arielle Levine, Ekolu Lindsey, Kem Lowry, Sarah McLane, Risa Minato, Robin Newbold, Watson Okubo, Robert Parsons, Mac Poepoe, Dan Polhemus, Jeffrey Pollack, Melora Purell, Matt Ramsey, Francis Ruddle, Bob Schroder, Hudson Slay,

Russell Sparks, Carolyn Stewart, Bill Tam, Wayne Tanaka, Allen Tom, William Walsh, Carlie Weiner, Darla White, Chad Wiggins, Aulani Wilhelm, Ivor Williams, Wendy Wiltse, Paul Wong, Matthew Wung

Guam

Franklin Arriola, Bo Baba, Laura Biggs, Joann Blas, Raymond Blas, Joanne Brown, Valerie Brown, David Burdick, Christine Camacho, Tom Camacho, Joseph Artero-Cameron, Ernest Chargualaf, Lorilee Crisostomo, Benjamin Cruz, Jon Nathan Denight, Manny Duenas, Mike Duenas, Mike Gawel, Fred Gofigan, Gretchen Grimm, Carlotta Leon Guerrero, Vicente Gumataotao, Jay Gutierrez, Peter Houk, John Jocson, Shahram Khosrowpanah, John Lawrence, Trina Leberer, Evangeline Lujan, Antonio Muña, Eric Palacios, Felix Pangelinan, Angel Parquez, Tim Perez, John Peterson, Champ Quinata, Tom Quinata, Jeffrey Quitugua, Laurie Raymundo, John Rios, Louise Rivera, Joseph Rouse, Angel Sablan, Justin Santos, Esther Taitague, Brent Tibbatts, Victor Torres, Ansito Walter

CNMI

Ana Agulto, Roman Benavente, Fran Castro, Doris Chong, Frankie Eliptico, Sue Ellis, Esther Fleming, Kate Fuller, John Furey, Nancy Gottfried, John Gourley, Gus Harb, Avra Heller, John Iguel, Steven Johnson, James Kearney, Tim Lang, Larissa Larson, Trina Leberer, Sean Macduff, Tony Mareham, Steven McKagan, Greg Moretti, Brooke Nevitt, Ryan Okano, Arnold Palacios, Bernie Palacios, Manny Pangelinan, Frank Rabauliman, Jack Reyes, Mathilda Rosario, Marlowe Sabater, Chech Sablan, Herman Sablan, Sam Sablan, Frannie Salas, Nicole Schafer, Richard Seman, Mike Tenorio, Mike Trianni, Patrick Ulechong, Kodep Uludong, Virginia Villagomez, Gene Weaver, Toshi Yamaguchi

Florida

Jason Andreotta, Jennifer Baez, Ken Banks, Drew Bartlett, Rene Baumstark, Jeff Beal, Chris Bergh, David Bingham, Steve Blair, Jim Bohnsack, Karen Bohnsack, Christopher Boykin, Kevin Claridge, Chuck Collins, Paul Davis, Beth Dieveney, Richard Dodge, William Fisher, Pamela Fletcher, Dave Gilliam, Kurtis Gregg, Lisa Gregg, Richard Harvey, Julio Jimenez, Terri Jordan-Sellers, Jocelyn Karazsia, Chris Kelble, Mike Kennedy, Linda Knoeck, Vladimir Kosmynin, Lisa Krimsky, Bob Leeworthy, Audra Livergood, Kate Lunz, Jessica McCawley, Gil McCrae, Erin McDevitt, Ron Messa, Keith Mille, Cheryl Miller, Jamie Monty, Sean Morton, Jennifer Peterson, Melissa Recks, Bernard Reigl, Patricia Rose, Kelly Samek, Jena Sansgaard, Melissa Sathe, Jen Schull, Marty Seeling, Manoj Shivlani, Jennifer Smith, Kent Smith, Kristina Trotta, Tom Twyford, Joanna Walczak, Brian Walker, Lauren Waters, Melody White, Amber Whittle

Appendix B: Schedule of the Process

	USVI	American Samoa	Puerto Rico	Hawaii	Guam	CNMI	Florida
J-CAT #1	1/31/2012	02/22/2012	8/29/2012	10/23/2012	4/8/2013	4/18/2013	9/4/2013
J-CAT #2	2/23/2012	03/21/2012	9/13/2012	11/4/2012	5/6/2013	5/8/2013	9/18/2013
J-CAT #3	3/13/2012	03/11/2012	10/3/2012	11/19/2012	5/28/2013	5/29/2013	10/2/2013
J-CAT #4	3/30/2012	04/27/2012	10/2/2012	12/7/2012	6/14/2013	6/21/2013	10/25/2013
J-CAT #5	04/17/2012	05/09/2012	11/16/2012	1/9/2013	7/17/2013	7/24/2013	11/20/2013
Additional J-Cat Meetings	05/22/2012	06/06/2012	1/17/2012	02/27/2013 03/28/2013	8/26/2013	8/28/2013	1/7/2014
Final Deliverable	Oct-12	Oct-12	May-13	Oct-13	Jan-14	Feb-14	TBA
Site Visits	03/26/2012- 04/7/2012	04/23/2012- 04/27/2012	10/24/2012- 11/2/2012	11/27/2012- 12/08/2012	06/10/2013- 06/14/2013	06/17/2013- 06/21/2013	10/21/2013- 10/25/2013

Appendix C: Recommendations by Issue Themes

The following table features specific capacity building recommendations for each jurisdiction. Each recommendation is categorized into 3 groups (Group 1, Group 2, and Group 3). Perceived level of challenge are expressed by three scales (time, complexity and monetary scale). Please see the tables below for detailed description of the groups and scales.

Groups

Group 1: Politically Challenging Goals for Improving Formal Commitment to Coral Reef Conservation

The recommendations are politically challenging, and in many respects, accomplishing them will require actions beyond the reach of the partner agencies and the larger coral reef management network in each jurisdiction.

Group 2: Using a Common Management Framework to Pursue Ecosystem-based Management at Priority Sites

Recommendation require a collaborative and coordinated approach to implementation from leaders across management agencies and will likely involve interconnected systems and engagement with multiple resource users, government entities, NGOs and funders

Group 3: Tractable Projects

Recommendations require a degree of control over their implementation that can be expressed by an individual, a small group of people, an organization or a network of organizations. This group of recommendations includes programs and trainings that focus on building a range of technical, financial, social, institutional and political capacities.

Scales

T	C	$*
TIME SCALE	COMPLEXITY SCALE	MONETARY SCALE
Short = <1 year	**Simple** = Somewhat context independent recommendations such as "best practices" and "standard operating procedures" that have fairly high certainty of building capacity.	**$** - Less than $5,000
Medium = 1 to 2 years	**Complicated** = Context is more important and the recommendation may require either coordination of technical expertise that may or may not be present in the system, or may require a degree of social engagement and relationship building that creates a common ground; i.e., either socially or technically complicated.	**$$** - Between $5,000 and $20,000 **$$$** - Between $20,000 and $100,000
Long = >2 years	**Complex** = Context is highly dependent and the recommendation may require strategies that are adaptively implemented and address dynamic, emergent, non-linear and complex conditions.	**$$$** - Greater than $100,000

* All other U.S. Flag coral jurisdiction capacity assessment reports have a consistent Monetary Scale except for SEFCRI region capacity assessment, which was adjusted to $ - Less than $50,000; $$ - Between $50,000-$100,000; $$$ - Between $100,000 and $250,000; and, $$$$ - Greater than $250,000).

Issue Theme Group 1

USVI

Group #	Rec #	Recommendation	T	C	$
Group 1	1.4e	Commission a stand-alone study of status of wastewater treatment infrastructure and possible solution strategies	1	3	3
Group 1	3.4	Harmonize MPA Boundaries and Rules	3	2	2
Group 1	4.1	Examine Feasibility of Shifting Fishing Effort	2	2	2
Group 1	4.2	Promote Measures to Shift Effort	2	3	3
Group 2	2.6	Communicate BMPs	1	1	2
Group 2	2.7	Promote S&E Control Training and Possible Certification	2	2	2
Group 2	3.3	Define Cost vs. Benefit of Illegal Fishing	1	2	1
Group 2	3.9	Explore Co-management	3	3	2
Group 2	4.4	Improve MPA Marker Programs	2	2	3
Group 2	4.5	Dramatically Improve Fisheries Record Keeping	3	3	2
Group 2	6.1	Strengthen Linkages Between Science and Management	2	2	2
Group 2	6.2	Pursue Management-focused Science	1	2	1
Group 3	1.2	BMP Training	1	2	2
Group 3	1.4c	Provide professional wastewater operator certification for WMA employees	2	1	2
Group 3	1.4f-3	Increasing pump-out capacity at anchorages and moorings, including pump-out boats and shore-based facilities, and creating a public information campaign to improve compliance with pump-out regulations			

American Samoa

Group #	Rec #	Recommendation	T	C	$
Group 1	5.1	Align MPA Goals Within American Samoa	2	3	2
Group 1	5.2	Further Develop the "Two Samoas Initiative"	3	2	1
Group 1	8.3	Create New Human Relations Position to Increase Hiring and Retention of Samoan Job Applicants	3	1	4
Group 1	12	Maintain Phosphate Ban	1	2	1
Group 1	13	Increase Trained Engineers in American Samoa	2	3	2
Group 2	1.3	Outreach Programs on Importance of Land Use Permits/Storm Water Management	1	2	2
Group 2	1.6	Build Capacity to Collect Lessons Learned in Promoting Stewardship at the Community Scale	1	1	1
Group 2	2.8	Continued Focus on Priority Sites	1	1	1

Group 2	4.1	Compile Comprehensive List of Monitoring Programs	1	1	1
Group 2	4.4	Promote the Use of Territory-wide Centralized Data Storage	2	3	3
Group 2	8.2	Encourage Samoan Applicants	3	3	2
Group 2	10	Integrate Plans at the Village Level	1	3	1
Group 2	11.2	Fund Fish Aggregating Devices (FADs) for CFMP	2	1	3
Group 3	3	Wood Chipper for Piggeries:	1	1	2
Group 3	4.2	Identify Practical Capacity Gaps in Generating Science to inform Management Decisions	2	2	2
Group 3	11.1	Identify Direct Consumption of Local Fish for Local Population	1	2	2
	9.4	Maintain and Expand Marker Signs and Buoys for Community-based Fisheries Management Program (CFMP)	2	1	3

Puerto Rico

Group #	Rec #	Recommendation	T	C	$
Group 2	2.1D	Link Funding of Research and Monitoring to Management Outcomes	2	2	1
Group 2	2.2A	Pursue Ecosystem-based Management at One or Two Areas	1	2	1
Group 2	2.5A	Institutionalize Monitoring and Evaluation (M&E) that Links Science to Management Process and Outcomes	2	2	3
Group 2	2.5C	Use Scorecards to Track Evidence of Enabling Conditions for Improved Coral Reef Management	2	2	2
Group 3	3.2A	EPA Approved Local Water Quality Standards	2	3	3
Group 3	3.2B	Link with EPA Region 2	2	2	1
Group 3	3.3A	Re-invigorate Coral Committees and Fisheries Working Group (Junta de Pesca)	1	2	1
Group 3	3.4	Valuation Studies	2	2	3
Group 3	3.6	Focus of Any Coral-Related Conferences and Symposia to Management Process and Outcomes	2	2	1

Hawaii

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1C	Create a CBSFA Program within DAR with Program Manager, CBSFA Planner and Makai Watch Coordinator Positions	1	1	4
Group 1	4.1M	Provide Specific Guidance on Coral Reef Mitigation Standards	2	3	2
Group 2	4.2.1A	Increase Engagement with Local Government and Traditional Authorities	3	2	3
Group 2	4.2.1B	Establish a Community-Based Management Network and Learning Group	1	1	2
Group 2	4.2.2A	Increase Facilitation Capacity at Public Meetings and within DAR to Improve Management Plans	1	2	1

Group 2	4.2.3A	Use Social Science to Secure Formal Commitment for Natural Resource Protection	2	2	2
Group 2	4.2.5C	Case Study Curriculum	2	1	2
Group 2	4.2.5D	Use Scorecards and Inventories to Track Evidence of Enabling Conditions for Improved Coral Reef Management	1	1	2
Group 3	4.3C	Inventory BMP Status, Regulation Guidance, Compliance and Enforcement, and Engage County as well as Federal and State Stakeholders	1	1	2
Group 3	4.3F	Define the Range of Potential MPA Structures	2	3	3
Group 3	4.3H	Targeted Outreach to Build Eco-Cultural Capacity	2	1	2

Guam

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1A	Clarify the Legal Roles, Mandates, and Responsibilities of Local and Federal Partners and Identify Obvious Areas of Overlap	2	3	2
Group 1	4.1E	Update and Adopt Sediment Erosion and Control Guidelines, Rules and Regulations for BMPs	3	3	2
Group 1	4.1G	Hire and Train Fire Protection Personnel	2	2	4
Group 2	4.2A	Further Build Engagement with Mayors, Church Leaders, Youth Organizations, Elders and Other Influential Community Members at Priority Sites	2	3	2
Group 2	4.2B	Increase Social Science on Human Dimensions to Help Inform Management in Priority Sites	3	3	3
Group 2	4.2C	Continued Trainings for Contractors Related to BMPs for Sediment Control	1	2	4
Group 2	4.2D	Strategic Public Outreach Campaign to Gain Support for Stronger Sediment Control Regulations	1	2	2
Group 3	4.3B	Establish On-island Native Species Nurseries	1	1	3

CNMI

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1E	Fill Critical Vacancies and Identify Critical Hires in Near Future for Natural Resource Management Positions at CRM, DFW, DEQ	3	2	1
Group 2	4.2A	Science to Inform Management: Social Science to Better Define Human Dimensions and Traditional Relationships to Reef	3	1	1
Group 2	4.2B	Science to Inform Management: Update Economic Value of Coral Reefs Study	2	1	4
Group 2	4.2I	Native Plant Nursery for Restoration at Priority Sites (Possible Training Program at Juvenile Detention Center)	3	3	4
Group 3	4.3C	LBSP: BMP Tour – Engage Mayors, Churches, Elders, Community Groups, Fishermen's Associations in "Ridge to Reef" Demonstration Projects	1	1	1
Group 3	4.3D	LBSP: Implement Comprehensive Monitoring Of Post-Construction Site Inspections	1	2	2

Group 3	4.3E	LBSP: Establish Procurement Process that Incentivizes Certified Professionals	1	1	1
Group 3	4.3G	LBSP: Define (Current and Possible Future) Site Development Process, Time to Permit, Clear Rules/Regulations, and Incentives for Following Rules	2	2	1
Group 3	4.3I	LBSP: Develop Inventory of Professionals Associated with Site Development and Initiate Certification Process for Low Impact Development	2	2	3

Florida

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1B	Build FWC Capacity	3	2	2
Group 1	4.1E	Integrated Management for SEFCRI Region	3	3	3
Group 2	4.2H	Cooperative Research Institute	3	2	3
Group 2	4.2K	Valuing Ecosystem Services and Socio-economic Database	3	3	2
Group 2	4.2L	Biophysical and Human Dimensions Science Database	3	3	2

Issue Theme Group 2

USVI

Group #	Rec #	Recommendation	T	C	$
Group 1	1.4a	Improve land registry and sewer/septic connection data infrastructure	1	3	3
Group 1	1.4f-2	Increasing enforcement and inspection capacity within DPNR			
Group 1	3.6	Expert Monitoring, Surveillance and Enforcement (MSE) Consultation	1	1	2
Group 1	3.7	Increase Staff/Resources for Enforcement	2	2	4
Group 1	4.3	Support and Re-Invigorate VIMPAN	3	2	3
Group 1	6.3	Examine Costs and Benefits of Coral "Initiative" versus "Formal Program"	1	1	2
Group 1	6.8	Improve Administrative Function and Hiring/Staffing Procedures at DPNR	2	2	1
Group 1	6.9	Depoliticizing/Improving Selection Process for DPNR Directors and Assistant Directors	2	3	1
Group 2	1.7	Share lessons learned from effective watershed scale programs	2	2	3
Group 2	2.5	Conduct Professional Analysis of Social Marketing Potential	2	2	3
Group 2	3.2	Build Awareness of Rules and Regulations	2	2	2
Group 2	3.5	Pilot Inter-Agency Agreements	2	3	1
Group 2	3.8	Cross Training of Rangers / Enforcement Staff	2	2	2
Group 2	5.2	Develop Compelling Climate Change Visual Aids as Part of a Public Information Campaign	1	1	2

Group 2	5.3	Investigate Lessons Learned on Climate Change Adaptation from other Insular States	2	1	1
Group 2	6.5	Strengthen and Reinvigorate VICRAG and VIMPAN	1	1	3
Group 2	6.7	Support and Encourage Regional Partnerships	3	2	2
Group 3	1.1	Revise DPNR Environmental Handbook	1	1	2
Group 3	1.4b	Create a best practices training program for designers, plumbers and installers of wastewater treatment systems that is linked to licensing/license renewal	2	2	2
Group 3	6.4	Dive Reciprocity Program	1	2	1
Group 3	6.6	Support and Encourage Local Leaders	2	1	1

American Samoa

Group #	Rec #	Recommendation	T	C	$
Group 1	1.1	Inform Judges, Legislators, Mayors, Fono, Community Leaders on Importance of Natural Resource Conservation	2	2	2
Group 1	2.6	Dedicated CRAG Financial Administrator	2	2	3
Group 1	2.7	Encourage DOE Participation in CRAG	1	2	1
Group 1	7.1	Inform Key Leadership of Challenges in Financial Administration	1	2	1
Group 1	9.1	Expert Monitoring, Surveillance and Enforcement (MSE) Consultation:	2	2	2
Group 1	9.5	Legal Review of Enforcement Regulations/Environmental Attorney	1	2	2
Group 2	2.1	Timing of Coordinator Position	1	2	1
Group 2	2.2	Clarify and Document CRAG Purpose and Create CRAG "Handbook"	1	2	1
Group 2	2.3	Create Terms of Reference (TORs) for All CRAG Participants and Examine CRAG Roles	2	2	1
Group 2	2.4	Other Measures to Enhance CRAG Independence and Equity	2	2	2
Group 2	2.5	CRAG Data, Records and Project Management	2	3	2
Group 2	4.3	Carefully Manage Territory-wide Monitoring	2	3	2
Group 2	4.5	Investigate Novel Partnerships for Collecting Data	1	1	1
Group 2	6.1	Planning and Budgeting Schedule	2	3	1
Group 2	6.2	Employ Simple Tools to Enhance Integration	1	2	1
Group 2	7.2	Facilitated Intervention to Develop Solution Strategies	2	2	1
Group 2	8.1	Create Clear Guidance for Job Responsibilities to Improve Retention	2	3	3
Group 3	9.2	Create a Suite of Enforcement Training Modules and Match to Officer Needs	2	2	3
Group 3	14.1	Assess Territory-Wide Training Needs	2	1	1
Group 3	14.2	Develop List of Training Modules Needed	2	2	1
Group 3	14.3	Develop Specific Training Modules	2	3	2

Group 3	14.4	Match Modules to Staff Needing Training and Role Out Training Program	2	2	1

Puerto Rico

Group #	Rec #	Recommendation	T	C	$
Group 1	1.1A	External Review of DNER Ranger Corps	2	3	3
Group 1	1.1B	Specific DNER Ranger Corps Reforms	2	2	3
Group 1	1.1C	Limited External Investment in DNER Ranger Corps Until Review Complete	1	2	1
Group 1	1.4	Increase Staff Capacity for Coral Management within DNER	2	2	3
Group 1	1.5	Improve Coordination with Environmental Quality Board	1	2	1
Group 1	1.6	Create Hiring Practices Briefing for New DNER Secretary	1	2	1
Group 2	2.1A	Promote the Use of a Common Language and Management Analysis Tools Through Management Training	2	2	3
Group 2	2.1B	Case Study Curriculum	2	2	3
Group 2	2.2B	Ridge to Reef Summit	1	2	3
Group 2	2.3	Create and Adopt Improved Management Plans	2	2	2
Group 2	2.4	Enhance Collaboration and Employ Collaboration Frameworks	2	2	2
Group 2	2.5B	Revise Primary Management Documents	3	3	3
Group 3	3.1C	Strategies to Improve Grants Management	3	2	3
Group 3	3.3B	Link to Regional Initiatives	2	2	2
Group 3	3.5A	Document Case Examples That Encourage Compliance	3	3	4

Hawaii

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1A	Ensure Department of Land and Natural Resources (DLNR) Hires and Creates Thorough Orientation for an Effective New DAR Administrator	2	3	1
Group 1	4.1D	Improve Hiring and Retention at DLNR	3	2	4
Group 1	4.1E	Strengthen DOCARE Enforcement and Encourage Voluntary Compliance	3	3	4
Group 1	4.1J	Move Forward with the First CBSFA Rules Package	1	1	1
Group 1	4.1K	Move Forward with the Draft Coral and Live Rock Damage Rules	1	1	3
Group 1	4.1L	Institutionalize Standards into the Tourism Permitting Process	3	2	3
Group 2	4.2A	Promote the Use of a Common Language and Management Analysis Tools Through Management Training	2	2	2
Group 2	4.2.4B	Strategies to Improve Program Implementation Through More Effective Grants Management	2	2	2

Group 2	4.2.4C	Reinvigorate the Managing Better Together Learning Network	2	2	3
Group 2	4.2.5A	Learn from CAP Process and Explore Ways to Expand It	2	2	2
Group 2	4.2.5B	Create an Inventory of Completed Coral Reef Management Projects	2	2	1
Group 3	4.3B	Increase Quality of Formal Communication between DLNR and BLNR on Coral Reef Management Status	1	1	1
Group 3	4.3D	Move Forward with Implementation of the Rapid Response Contingency Plan	2	2	3
Group 3	4.3E	Re-invigorate the Coral Reef Working Group	1	2	1

Guam

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1C	Add Administrative Component for the Citation System Related to Marine Preserves	1	1	1
Group 1	4.1D	Improve Internal Management of Conservation Officer Program	1	1	3
Group 1	4.1I	Continue Efforts to Streamline Procurement and Grants Management Processes	2	1	1
Group 2	4.2E	Build Adaptive Capacity of NGOs	3	2	3
Group 2	4.2F	Apply Lessons learned from Humatak Project's Implementation of Watershed Restoration Efforts	3	2	4

CNMI

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1C	Reinvigorate the CRI Science Committee to Work in Coordination Across all Three CRI Agencies	2	3	4
Group 1	4.1F	Clarify Hiring Processes and Consider Options for Reform	3	3	1
Group 1	4.1G	Clarify Procurement Processes and Consider Options for Streamlining	3	3	1
Group 1	4.1K	Addressing Staff Retention within CRI	3	3	4
Group 1	4.1L	Revive the Joint Enforcement Task Force	2	3	3
Group 1	4.1M	Clarify Grants Management Processes and Consider Options for Streamlining	1	1	1
Group 2	4.2C	Collaborate Across Natural Resource Agencies To Define Agenda for Response to DoD Readiness	1	2	4
Group 2	4.2D	Conduct Lessons Learned Process for First Generation of Tasi Watch for Continued Program Development	3	1	3
Group 2	4.2H	Apply Lessons learned from Implementation of Laolao Bay Watershed Restoration Efforts	1	1	2
Group 2	4.2J	Develop Lessons Learned from CAP Process and Management Plans	1	1	3
Group 3	4.3A	Continue to Develop Opportunities for the CRI Internship as well as the Coral Fellowship / Link NRM Students with Academic and Professional	1	1	1

		Development Opportunities			

Florida

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1A	Increasing FDEP CRCP Capacity	3	3	3
Group 1	4.1F	Coherent Enforcement and Compliance Program Across Agencies	3	3	3
Group 2	4.2I	Support the Further Development and Role of Bridging Institutions	1	1	2
Group 2	4.2J	Sequence and Prioritize Management Actions of SEFCRI	1	2	3
Group 3	4.3N	High Quality Collaboration and Conflict Resolution	1	2	1
Group 3	4.3P	Systems Map	1	1	1

Issue Theme Group 3

USVI

Group #	Rec #	Recommendation	T	C	$
Group 1	1.4f-1	Raising and leveraging funds to upgrade failing infrastructure	1	1	3
Group 1	1.5	Update USVI Zoning Code and Implement Subdivision Law	2	2	2
Group 1	1.6	Support Master Planning Process	3	3	3
Group 1	3.1	Increase understanding of key decision-makers about coral reef and natural resource issues	1	1	2
Group 2	1.4d	Targeted Stakeholder Education Campaigns	2	1	2
Group 2	2.2	Support and develop programs to increase the connection between young people, oceans and reefs	3	3	3
Group 2	2.3	Assess VINE Capacity and Willingness to Further Develop	1	2	2
Group 2	2.4	Inventory Off-Island Models of Environmental Education	1	1	1
Group 2	5.1	Improve Internal and External Climate Change Communications	2	2	2
Group 2	6.10	Realistic Goal Setting With Reference to Reef Health, Human Well Being	1	2	1
Group 2	6.11	Explore Alternate Funding Strategies and Track Progress to Protected Area Goals	1	1	1
Group 3	1.3	BMP Mini-Grant Program	2	2	2
Group 3	2.1	Inventory Existing Education Programs	1	1	1

American Samoa

Group #	Rec #	Recommendation	T	C	$
Group 1	1.4	Define Target Number of Scholarships Per Year for Samoans to Complete Degrees Relevant to Marine Resource Management	2	3	1
Group 1	4.6	Present Coral Reef Status Report to Governor on Annual Basis	2	3	2
Group 1	9.3	Target Judges and Legislators for Specific Trainings	2	3	2
Group 2	1.2	Further Grow and Support the Le Tausagi Model	2	1	2
Group 2	1.7	Social Marketing Campaign to Raise Funds For Coral Reefs	3	2	3
Group 3	1.5	Build School Curriculum for Marine Science	2	3	3

Puerto Rico

Group #	Rec #	Recommendation	T	C	$
Group 1	1.2	Complete Recreational Fishing License Program and Invest Proceeds in Coral Conservation Activities	2	2	1
Group 1	1.3A	Create Strategic Plan to Complete A New Regulation for PR Law #147	1	2	1
Group 1	1.3B	Complete New Regulation for PR Law #147	2	2	1
Group 2	2.1C	Tie NOAA CRCP Funding in Puerto Rico to Steps in Management Cycle	1	1	1
Group 3	3.1A	Sustainable Finance Plan	2	3	2
Group 3	3.1B	Re-engage DNER Oversight of the Creation of Ecosystem-based Management Plans	2	2	1
Group 3	3.5B	Coral Celebration To Fit With Local Culture	2	2	3
Group 3	3.5C	Update and Disseminate Revised "Puerto Rico and the Sea"	2	2	3

Hawaii

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1B	Develop a Strategic Plan for DAR	2	2	2
Group 1	4.1F	Explore Pathways of Sustainable Financing through Tourism	1	2	1
Group 1	4.1G	Create a Non-Profit "Friends of DLNR"	1	2	2
Group 1	4.1H	Create a Philanthropy Roundtable on the Topic of Sustainable Financing	1	2	1
Group 1	4.1I	Create and Enforce a Recreational Fishing License	2	2	3
Group 1	4.1N	Increase Engagement between the Tourism Sector and the Legislature	2	2	3
Group 1	4.1O	Enhance DLNR Engagement with the Legislature	2	3	1

Group 2	4.2B	Tie Coral Reef Project Funding in Hawaii to Steps in Management Cycle	2	2	2
Group 2	4.2.2B	Integrating Eco-tourism, Volun-tourism, and Premium Tourism Experiences into Management Plans	2	2	1
Group 2	4.2.3B	Secure Formal Commitment to Institutionalize Key Positions Such as Watershed or Coastal Coordinators	1	2	3
Group 2	4.2.4A	Using Outreach Tools To Influence Behavior of Resource Users	2	1	3
Group 3	4.3A	Make the Business, Political and Common-sense Case for Improved Coral Reef Management within DLNR	2	2	3
Group 3	4.3G	Inventory Effective Mentorship and Public Outreach Programs	1	1	1

Guam

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1B	Work with GVB to Make the Business Case for Improved Coral Reef Management	3	3	3
Group 1	4.1F	Establish "Master Natural Resource Plans" With Updated and Clear Goals Every 5 Years	2	1	2
Group 1	4.1H	Co-develop Briefing Presentations with GVB to Present to the Tourism Industry and other Stakeholders	2	1	1
Group 2	4.2G	Increase Environmental Stewardship in Education Curriculum	3	1	4
Group 3	4.3A	Support Pilot Conservation Demonstration Efforts As Implementation Models	3	2	4

CNMI

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1A	Clarify the Legal Roles, Mandates, Responsibilities, and Jurisdictions of Local and Federal Partners and Identify Obvious Areas of Overlap	1	1	1
Group 1	4.1B	Clarify the Administrative and Criminal Pathways of Enforcement and Identify Where Appropriate Law Enforcement Training is Needed	3	3	3
Group 1	4.1D	Work with MVA and Other Partners to Explore Local Options and Strategies for Sustainable Finance for Natural Resource Management	2	2	1
Group 1	4.1H	Work with MVA to Make the Business Case for Improved Coral Reef Management	2	2	3
Group 1	4.1I	Create Consistency for Public Federal Funds that Support Positions to Define Minimum Qualifications Using CRI as a Model	3	3	1
Group 1	4.1J	Review, Clarify and Update CRI Executive Directive	1	2	1
Group 1	4.1N	Update Guide for Investors in the CNMI	2	3	4
Group 2	4.2E	Create a Coordinated Education and Outreach Program between DEQ, CRM, DFW and potentially other NGO partners for the Priority Sites	1	2	1

Group 2	4.2F	Develop a System of Communication to Increase Quality of Engagement with Local Communities at Priority Sites	3	2	3
Group 2	4.2G	Reach Out to Support Local High School Students to Increase Engagement at Priority Sites	1	1	1
Group 3	4.3B	Support NGO/Civil Society Development	3	3	3
Group 3	4.3F	Connect to Existing Curriculum Standards in Public Schools that are Locally-appropriate in order to Increase Stewardship Message	2	3	2
Group 3	4.3H	Create Goal for Target Number of Attorney Positions at Each of the CRI Agencies	2	2	4

Florida

Group #	Rec #	Recommendation	T	C	$
Group 1	4.1C	Business Case for Improved Coral Reef Management	1	2	1
Group 1	4.1D	Engage Political Leadership via the Coastal Ocean Task Force	3	2	2
Group 2	4.2G	SEFCRI Community Supported Organization (CSO)	1	2	1
Group 2	4.2M	Scenario Planning Exercises	2	2	1
Group 3	4.3O	Establish a Coral Reef Resources Education and Outreach Network for SEFCRI Region	2	2	2

Appendix D: Framework for Assessing Organizational Capacity to Manage Coral reefs

The following table is a DRAFT Framework that was developed after the synthesis was completed and could be edited and applied for future coral reef management capacity assessments. The work is adapted from a paper written by Isabelle Bourgeois and J. Bradley Cousins entitled "*Understanding Dimensions of Organizational Evaluation Capacity*", published in September 2013 in the American Journal of Evaluation.

Human Resources Needed to Manage Coral Reef

Leading Baseline Questions: How many full-time and part-time people work on the program? How many are under contract versus staff? What are the primary knowledge and skills of the program's staff? What is the level of trust with the lead agency and with the current political administration? How is information communicated up the chain and to the Governor's office? How does professional development occur and what are the key leadership functions of the POC?

Level	Exemplary capacity	Intermediate capacity	Developing capacity	Low capacity
Staffing, Compensation and Retention	Lead coral reef management team is optimally staffed (i.e., positions are created and filled based on operational requirements outlined in long-term H/R management plan); Appropriate balance of senior and junior positions, with broad interdisciplinary expertise given organizational requirements (i.e., size of organization, proportion of work done in house, etc.); Career progression process is in place, salaries competitive with other resource agencies (e.g. federal/NGO), promotions possible within team and succession planning based on effective staff retention and attracting best and brightest.	Lead coral reef management team is mostly fully staffed (i.e., all positions are filled and adequate to meet basic operational requirements of annual management plan); Some balance of senior and junior positions, given organizational H/R requirements (e.g., internal hiring vs. contract, proportion of work done in-house); Career progression process is available at some staff levels; levels of compensation uneven and turnover occurs; some succession planning.	Lead coral reef management team is partially staffed (i.e., 70-90% staffed; difficult to meet operational requirements outlined in annual management plan); Few senior positions exist in the team; Career progression occurs in an ad hoc manner (i.e., through the usual competition process when turnover occurs); salary structure is low and turnover is sometimes high. Little or no succession planning is underway.	Lead coral reef management team has several vacant positions (i.e., less than 70%; little to no link between management plan and staffing actions); No senior management staff have coral reef management experience on the team; No career progression process for managers exists due to small number of available positions in organizational chart; salary structure is low and turnover is continually high. No succession planning efforts are underway.
Personnel and Technical Skills	Issues related to staff technical skills are clearly identified and linked to ongoing organizational concerns and priorities; Innovative use of management process and outcome methods and approaches to reporting is employed; Recommendations made in reports are clearly linked to findings of both process and outcomes; Coral reef	Issues related to staff technical skills are clearly identified and reflect the concerns of program managers; Use of management process and outcome methods respects accepted standards and yields defensible findings (e.g., can describe both process and outcomes but not in a shared	Issues related to staff technical skills are sometimes identified; Use of evaluation methods respects accepted standards and yields defensible findings (e.g., some connection to process and/or outcomes); Recommendations made in reports are usually linked	Issues related to staff technical skills are not always identified; Weak process and outcome methods do not always yield defensible findings (e.g., reliance on external data sources with no verification); Recommendations made in reports are not linked to findings of process or outcomes of coral reef

Level	Exemplary capacity	Intermediate capacity	Developing capacity	Low capacity
	management projects are generally well managed and problems are usually identified and resolved quickly by POC or senior staff.	language); Recommendations made in reports are linked to findings; Coral reef management projects are fairly well managed and problems are usually identified and resolved with help from POC or resource management leader.	to management findings; Some coral reef project management issues may arise due to lack of experience or resources and may remain unresolved if POC does not take action.	management; Problems with project management arise often due to lack of experience or resources or other issues.
Communications and Interpersonal Skills	Lead coral reef management team and POC have clearly established trust within the larger organization and political administration; Coral reef management reports are presented to the Governor on a regular basis and other products deliver open, clear and transparent messages; Partners feel that POC understands organizational issues and responds to them appropriately (i.e., informational needs of program managers are met through various activities)	Lead coral reef management team and POC are committed to building and maintaining trust within the larger organization and political administration; Management reports are beginning to deliver open, clear, and transparent messages; Partners feel that POC generally understands organizational issues (i.e., informational needs of program managers are taken into account in program design).	Lead coral reef management team and POC are working toward building trust within the larger organization and political administration; coral reef management reports are generally not written in a clear manner (e.g., senior administrators review reports, suggest edits to the reports or ask clarification questions); Partners feel that POC is somewhat open to learning about issues related to program management.	Lead coral reef management team has not yet been able to develop trust within the larger organization and/or political administration; Infrequent to no contact with the Governor or his/her staff, management reports often raise clarification questions from agency partners (e.g., do not understand or support budget justification, how or why a project was or was not implemented); Partners feel that POC is not open to learning about issues related to program management.
Leadership of POC	Lead coral reef management team headed by individual (POC) with strong coral reef management and interdisciplinary science background; Leader effectively reconciles expectations of senior management with operational requirements and resources of team; Leader (POC) guides, mentors or coaches team members as part of his or her regular duties.	Lead coral reef management team headed by individual (POC) with some coral reef management and interdisciplinary science background; Leader effectively reconciles expectations of senior management with operational requirements and resources of team; Leader (POC) guides team members as often as possible.	Lead coral reef management team headed by individual (POC) who is new to the area of coral reef management and has little science background; Leader is not generally involved in senior management discussions and therefore assigns work based only on operational or budget requirements; Leader (POC) coordinates team activities but is not involved in guiding team members in their work.	Position that leads the coral reef management team (POC) is vacant.

Organizational Resources Needed to Manage Coral Reefs: Budget, Data, Infrastructure

Leading Baseline Question: What is the Annual Budget of the Program? How does this budget fit in to the larger administrative team? How does it fit with the rest of the agencies budgets that manage coral reefs? Describe capacity for grants management and organizational infrastructure to oversee budgets?

Level	Exemplary capacity	Intermediate capacity	Developing capacity	Low capacity
Budget	Resource management budget ensured through continuing funding specifically allocated to coral reef management team (i.e., is not shared with other resource management units); Coral reef management budget is allocated based on management plan and matches the H/R capacity (i.e., specific amount of budget based on supporting staff necessary to implement plan).	Resource management budget is stable but shared with some other resource management groups (i.e., CZM, local EPA); Coral reef management budget is appropriate given the management plan and H/R capacity (i.e., plan does not determine the budget, but it is sufficient to complete planned activities).	Resource management budget provided on a case-by-case basis for each new project proposed; Overarching coral reef management plan strategies either do not exist or are not considered in budget allocation.	Resource management budget does not include funds for coral reef management activities.
Ongoing Grants Management Data Collection	Grants management system fully implemented within lead resource management organization (or across multiple programs in the case of State with several lead organizations); High-quality information is collected by the performance measurement and budget system; Performance data feeds directly into federal grants management tracking system; Few if any problems with new staff fitting into the structure.	Grants management system in place for major programs or activities; Incomplete implementation of performance measurement system (e.g., sporadic data collection, missing variables); Performance and budget data can be adapted to suit the informational requirements of different funders, routine training is needed to keep competent staff in position.	Grants management is done on a project-by-project basis; Ad hoc implementation of performance measures, with uneven quality in overall grants management; Performance data and budget information are difficult to integrate into federal and other state/territorial requirements.	Grants management is conducted outside of management team, by someone with little or no training or connection to resource management plan implementation. Concerns of mismanagement or corruption have surfaced or are expressed.
Organizational Infrastructure	The lead resource management organization has a stable governance structure and clear accountability lines for results; Organizational policies on hiring and procurement have been developed and implemented; Organizational culture ensures that a structured planning and reporting process occurs and links with federal and state/territorial requirements (e.g., grants management, budgeting); Existence of organizational support structure provides needed professional development and training services for resource management staff in a timely manner (e.g., procurement, communications, HR, access to information, orientation for new staff).	The lead resource management organizational infrastructure showing some maturity (e.g., clear governance structure and stability in senior management ranks; Organizational policies on hiring and procurement has been developed and implemented - or in the process of implementation); A structured planning process exists and includes consideration of federal and state/territorial requirements (e.g., grants management, budgeting); Organizational supports do not always provide needed training or services to resource management staff in a timely manner and results in delays for project implementation.	The lead resource management organizational infrastructure is still under development (e.g., governance structure and policies on evaluation are under development, no structured planning process); Organizational supports often fail to provide needed services to resource staff, leading to some gaps in implementation of plans.	The lead resource management organizational infrastructure still under development (e.g., no clear governance structure, no policies on evaluation are in place, no structured planning process); Organizational supports regularly fail to provide needed services to resource staff, leading to major gaps in implementation of plans.

Capacity to Plan and Implement Coral Reef Management Projects/Program

Leading Baseline Questions: Under what time constraints will the coral reef management program be operating (pending major political decisions, elections and changes in government, etc.) How does or will the program seek external interdisciplinary academic expertise? How does the program use scientific information to guide management decisions?

Level	Exemplary capacity	Intermediate capacity	Developing capacity	Low capacity
Management Plans	Comprehensive management plans follow a long-term cycle (three to five year cycle) and are updated annually; process and outcome scorecards developed in consultation with all staff updated annually to inform adjustments to management plans (i.e., integrate emerging needs) based upon issue analysis and capacity needs assessment; Evaluation plan timed for end of cycle includes systematic review of management team (i.e., establishing and measuring service standards for the team, assessing impact on organization).	Comprehensive management plans follow a long-term cycle (three to five year cycle) and include process and outcome scorecards updated annually to inform adjustments to management plans (i.e., integrate emerging needs) based upon issue analysis and capacity needs assessment. Evaluation plan only considered at end of Management Cycle and includes some assessment of service/impact; provisions made for reviewing the plan on an ongoing basis.	Comprehensive management plan exists for one or two years; Evaluation plan developed in consultation with program managers or senior managers, no common language or shared tools such as scorecards; little consideration of service provided by or impact of resource management program.	No comprehensive management plan is developed; Evaluation projects occur only on an ad hoc basis, most likely when demanded by external audit.
Use of Academic Partners	Appropriate balance of social and biophysical science to inform management conducted by interdisciplinary team with diversity of expertise (e.g., economics, political science, behavioral psychology, biophysical); High-quality work produced by academic partners that links with staff and resource users.	Some evidence of a balance of social and biophysical science to inform management conducted by interdisciplinary team with diversity of expertise, but mostly biophysical focus; High-quality work produced by academic partners that does some linkage with staff and resource users when they are involved.	All science is contracted out for the purpose of gaining biophysical knowledge; work produced by academic partners may or may not have connection with staff and have little to no connection with resource users.	Science input into management happens inadvertently with little to no engagement of academic partners. When it does occur it is almost entirely biophysical focus with no substantive input by staff or resource users. Some problems with the quality of work produced by external academic consultants.
Use of Interdisciplinary Science to Inform Management	Resource managers make frequent use of interdisciplinary academic support to guide management decisions. Resource managers broaden their interdisciplinary academic expertise networks by liaising with other jurisdictions, engaging academic experts, and gathering information on the priorities of local, regional and federal resource agencies; POCs responsible for the delivery of federal government programs and for sharing knowledge, encourage training in the use of interdisciplinary science to inform management.	Resource managers make use of interdisciplinary academic support to guide management decisions. Resource managers keep themselves informed of new developments in interdisciplinary research (i.e., from universities, other departments and agencies, federal agencies); POCs share some knowledge and alert others to training opportunities when possible.	Resource managers have little access to basic interdisciplinary academic support to help inform decision-making; resource managers do not generally liaise with academic organizations or experts; POCs do not routinely share information and training is sporadic to nonexistent.	Resource managers do not make use of basic interdisciplinary academic support; no linkages exist with academic associations to help guide management decisions; resource managers do not liaise with external organizations or experts; POCs do not share information; training in the use interdisciplinary science to inform management does not exist.

Capacity to Practice Adaptive Management

Leading Baseline Questions: Have the institutions responsible for a coral reef program implementation demonstrated the ability to practice adaptive management? To what degree is there a value placed on adaptive management? How is information shared to assist with adaptive management decision-making?

Level	Exemplary capacity	Intermediate capacity	Developing capacity	Low capacity
Evaluation Valued as Tool for Adaptation and Change	Organizational staff members generally understand the purpose of evaluation and how it supports adaptations and changes in current or future management efforts (e.g., staff members understand adaptive management principles and practices); Program managers and other staff members are closely involved in the review process to help with adaptation (e.g., identify issues and provide feedback, facilitate data collection opportunities, review draft evaluation reports).	Organizational staff members are familiar with the general principles of adaptive management and how it can help them in their work (e.g., they understand the difference between evaluation and audit); Program managers are involved in evaluation projects (e.g., sit on Evaluation Steering or Advisory Committees) and provide program-related feedback on report drafts;	Little awareness of adaptive management principles or its purpose within larger organizational context; Little involvement from program staff and managers (i.e., brief comments on management evaluation reports).	No discernible awareness of adaptive management or its purpose within larger resource management context; No involvement of program staff and managers to seek input in how to change and adapt their actions.
Adaptive Management Orientation	Resource managers promote an adaptive management orientation for the entire organization and make it a priority by providing time and resources; Organizational members share clear ideas about purpose of an adaptive approach and impact on goals through formal and informal mechanisms (e.g., strategic planning sessions, retreats, regular meetings, brown bag lunch sessions); All programs follow an adaptive framework (i.e., Orders of Outcomes); Program managers take the lead in the development and implementation of adaptive performance measurement strategies that welcome adaptive action; Federal agencies provides technical expertise and external evaluation when needed.	Adaptive management principles are outlined in official documentation but are not included in communications from resource managers; Organizational members share ideas about the need for adaptive management and goals through formal mechanisms such as strategic planning sessions and meetings; Some programs follow an adaptive framework (i.e., Orders of Outcomes); Program managers work with team in the development and implementation of adaptive performance measurement strategies, but with little outside support.	Adaptive management principles are not articulated clearly for all organizational members; most are not aware of adaptive management principles and practices; Some programs engage in developing adaptive framework (i.e., Orders of Outcomes) unclear if it is being used; Program managers not involved in the development or implementation of adaptive performance measurement strategies.	Adaptive management principles have not been developed; Programs do not have adaptive framework (i.e., Orders of Outcomes); The organization does not support the development of adaptive performance measurement strategies.
Information Sharing	Major decisions on changes or adaptations in projects are discussed within the team as a way to benefit from staff members' knowledge and experience; Resource managers actively gather information on new policy and strategic planning developments; Knowledge management issues and processes are discussed regularly and common standards are followed by staff members.	Resource managers share their progress (adaptations and changes) and other information with their colleagues at regular meetings and other forums; Resource managers are generally aware of new developments in policy and strategic planning; Knowledge management standards have been developed and are generally followed within the team.	Resource managers share their progress (adaptations and changes) with their colleagues and supervisors and other staff members in a sporadic, informal manner; Resource managers are not aware of new developments in policy and strategic planning; Knowledge management standards exist but not followed.	Resource managers do not typically share progress with other staff members; Resource managers are not aware of new developments in policy and strategic planning; Knowledge management standards do not exist within the team.

Capacity to Use Process and Outcome Analysis - Integration With Organizational Decision Making

Leading Baseline Questions: Is the program structured to integrate both management process and outcomes? How do the results of management process and outcomes affect decision making? To what degree are the results shared with senior administrators to inform to policy development, strategic planning and performance assessment?

Level	Exemplary capacity	Intermediate capacity	Developing capacity	Low capacity
Integration of Management Processes & Outcomes	Resource management program staff integrate management process and outcome analysis with other teams in the institution (steps in the cycle, Orders of outcome) and into other areas of their work (e.g., they use management processes and outcome thinking language in the preparation of reports to funders and senior administrators, and provide training to new staff).	Resource management team is aware that management process and outcome analysis provides insight into the effectiveness of their implementation of the resource management plan; some program staff aware of the potential contributions of resource management staff.	Resource management team operates separately from program teams within the larger institution and is not generally involved in management processes and outcome analysis; other program staff unaware of the potential contributions of resource management staff.	Resource management team does not integrate management process and outcome analysis or involve or inform other teams of its activities.
Decision Support: Use of Findings & Recommendations	Resource management findings and recommendations considered in budget allocation and other high-level organizational and policy decisions; Demand for evidence of management effectiveness originates from all levels of the organization.	Resource management findings and recommendations usually considered in program management decisions and some policy decisions; Program managers are interested in and use evaluation as a management support tool (i.e., evaluation as provider of ongoing management information).	Little consideration of resource management findings and recommendations in organizational and policy decisions; No specific demand for resource management services other than to meet the requirements of federal agencies.	Resource management findings and recommendations are not used in organizational and policy decisions; No demand for resource management services exists within the organization.
Organizational Linkages: Senior Administration	Senior administrators in regular contact with program managers through formal or informal ties; Ready access to lead administrator on all aspects of resource management; Clear interest in management information demonstrated by lead administrator; Resource management team located in close proximity to organizational areas such as policy development, strategic planning and performance measurement.	Senior administrators communicate with their program managers through ongoing, formal mechanisms; lead administrator receives regular reports about resource management activities but is not directly involved in management; Resource management team located in close proximity to some organizational areas such as policy development, strategic planning and performance measurement.	Senior administrators communicate with program managers on specific issues related to projects; lead administrator is made aware of management findings only through formal requirements (e.g., audit); Resource management team is removed (either physically or structurally) from organizational areas such as policy development, strategic planning, and performance measurement (or they do not exist).	Senior administrators communicate infrequently with program managers; lead administrator tends to delegate responsibility for resource management; Resource management team is removed (either physically or structurally) from key organizational areas such as policy development, strategic planning, and performance measurement (or they do not exist).

Capacity to Learn through The Use of Pilot Demonstration Projects

Leading Baseline Questions: Have important actions and policies been successfully tested at the pilot scales? How are the pilot programs and policies used to inform learning and adaptive management? What evidence of target behavior changes have been documented through pilot scale efforts that could be scaled up?

Level	Exemplary capacity	Intermediate capacity	Developing capacity	Low capacity
Instrumental/ Conceptual Use	Pilot project results are used regularly as a basis for action and change (i.e., recommendations to integrate learning from demonstration projects are appropriate and implemented in a timely manner); Findings from pilot demonstrations have an impact and reports document changes in behaviors of resource users, managers and funders (2nd Order)	Pilot project results are sometimes used as a basis for action and change (i.e., evaluation recommendations are sometimes implemented); Findings from pilot demonstrations can have an impact and reports sometimes document changes in behaviors of resource users, managers and funders (2nd Order)	Pilot project results are rarely used as a basis for action and change (i.e., evaluation recommendations are usually not implemented); Findings from pilot demonstrations rarely have an impact and reports sometimes document changes in behaviors of resource users, managers and funders (2nd Order)	Pilot project results are never used as a basis for action and change (i.e., evaluation recommendations do not usually make their way to those with the ability to act upon them); Findings from pilot demonstrations do not have an impact on changes in behaviors of resource users, managers and funders because pilot demonstrations are never completed or not documented
Process Use	Strong evidence that behavioral or cognitive changes occurring in management team by virtue of their engagement in the pilot demonstration effort; Evidence that colleagues routinely apply management process and outcome to management issues (e.g., by using language of steps, generations, and using systematic inquiry into the evidence of enabling conditions and 2nd order behavior change); Formal or informal processes to share lessons learned regarding management are in place and involve other resource management organizations (e.g., seminars, brown-bag lunch sessions, brochures on recent studies).	Some evidence of behavioral or cognitive changes occurring in management team by virtue of their engagement in the pilot demonstration effort; Evidence that colleagues sometimes apply management process and outcome to management issues (e.g., by using language of steps, generations and using systematic inquiry into the evidence of enabling conditions and 2nd order behavior change); Lessons learned regarding coral reef resource management are shared with other resource management organizations - no formal process in place (e.g., letters, formal presentation of report).	Little evidence of behavioral or cognitive changes occurring in management team by virtue of their engagement in pilot demonstration projects; No evidence that colleagues apply process and outcome management analysis to other management issues; Results of pilot demonstration projects are not shared once completed; reports disseminated only to funders and not more widely.	No evidence of behavioral or cognitive changes occurring in management team by virtue of their engagement in pilot demonstration projects; No evidence that stakeholders apply process and outcome management analysis to other management issues; Results of pilot demonstration projects are not shared once completed; reports either not completed or submitted, even to funders.

Appendix E: Sample of a Section of Scorecard For Routine Assessment of Capacity

INSTITUTIONAL CAPACITY (5 INDICATORS) □KEY QUESTIONS					RANK TIME			
					1	2	3	4
Does the Agencies that support the Coral Initiative possess the human resources to implement its plan of action?	0	1	2	3	2			
	no personnel have been assigned responsibility for Initiative implementation	staffing for Initiative implementation is inadequate	staffing is adequate in some institutions but not in others	sufficient human resources are in place to fully implement the Initiative	Justification for current rank:			
COMMENTS – While staffing - and the bureaucratic process associated with staffing within X agency appears to be a significant barrier to capacity within Y agency - the staffing of the many partners involved from federal partners to civil society (NGO,s, CSO's etc,) seems to be adequate. The challenge remains within X agency and they are...								
Have the Agencies that are responsible for Coral Initiative implementation demonstrated their capacity to implement its plan of action?	0	1	2	3	1			
	institutional capacity necessary to implement Initiative is not present	institutional capacity to implement Initiative is marginal	in some key institutions institutional capacity is adequate but there are important weaknesses in others	sufficient institutional capacity is present in institutions with responsibilities for implementing Initiative	Justification for current rank:			
COMMENTS – Within X Agency, there exists a wide range of strong, committed and very creative staff that are working diligently within a system that has enormous capacity issues (both challenges and opportunities) that limit current capacity in the following ways …								
Have the Agencies as part of the Coral Initiative demonstrated the ability to practice adaptive management?	0	1	2	3	1			
	no evidence of adaptive management	practice of adaptive management is incipient and is being expressed as minor adjustments to operational procedures	important institutions engage in periodic self assessments and have modified their behavior based on experience and learning	Initiative as a whole has demonstrated its ability to learn and adapt by modifying important targets and/or policies	Justification for current rank:			

INSTITUTIONAL CAPACITY (5 INDICATORS) KEY QUESTIONS					RANK TIME			
					1	2	3	4
COMMENTS – There are some good examples of adaptive management but they are largely in response to operational procedures that have the tendency to slow or divert smooth administrative process. Many of the staff within the agencies are doing the best they can to adapt to the culture while remaining progressive in their activities and collaborations. Examples include…								
Is the Coral Initiative structured as a decentralized planning and decision making system?	**0**	**1**	**2**	**3**	**1**			
	power and responsibility are concentrated at one level in governance system	Initiative provides for some responsibility and initiative at various levels	decision making and responsibility is decentralized but there are significant coordination issues	Initiative successfully integrates top-down and bottom-up initiative; it is structured as a decentralized system without sacrificing efficiency	Justification for current rank:			
COMMENTS – Currently, decision making for the coral initiative is to a large degree a cooperative process largely led by X Federal Partner with significant leadership by the POC - the result of this process does create some decentralization as many of the activities are spread across many organizations. The program would benefit from some centralizing and effective integration within Y jurisdictional agency and support by the Commissioner, Senate, Judiciary and most notably the Governor. Examples of how to address this include the following…								
Have important actions and policies been successfully tested at the pilot scale?	**0**	**1**	**2**	**3**	**2**			
	No pilot Initiatives have been initiated	Pilot Initiatives are underway to assess viability of actions and policies	Pilot Initiatives are completed and outcomes have shaped actions and policies	Action plans and policies have been successfully tested at pilot level	Justification for current rank:			
COMMENTS – This is a strong competency of the (X jurisdiction's) Coral Initiative as many projects are first tested at the pilot scale. Unfortunately, many remain there without further formal commitment and financial support to scale up. Examples of this include the following…								