



Coral Ecosystem Science Evaluation

Coral Reef Conservation Program Panel Response



Chair Summary Recommendations and Responses

1. The National Coral Reef Monitoring Program represents a substantial effort and expense to the CRCP. The program is not however currently being fully used to achieve conservation outcomes and address management objectives, in part because of the lack of data analysis and data availability. The national program should have stronger alignment with jurisdictional and other important monitoring programs, including database integration.

The CRCP appreciates this recommendation, and it echoes similar recommendations in recent ecosystem science reviews of the Pacific Islands and Southeast Fisheries Science Centers which house two of the NCRMP implementation teams. We believe that a successful NCRMP includes data collection, a clear reporting structure, development of useful data products, and tracking of data utility through regular communication with managers. CRCP is embarking on a strategic planning process over the next year, and these recommendations will be considered as the Program works to refine the appropriate scale and scope for NCRMP and to streamline the process of data collection, analysis, and reporting.

NCRMP was originally designed to monitor and report on key indicators of coral reef ecosystem health across jurisdictions, and support national objectives using this approach. The jurisdictional scale at which NCRMP sampling occurs is useful for local managers to put local observations in context with other reefs, to utilize in population-level assessments, and to inform adaptive management. We are now developing a process to better communicate the value of this type of data. As part of the strategic planning process, we will also evaluate NCRMP data streams with respect to jurisdictionally specific management objectives. Any modifications to NCRMP monitoring schemes will be done in close consultation with the scientists to ensure the long-term continuity of time-series data which have increased value. Because NCRMP represents a significant CRCP investment, NCRMP will continue to support national management objectives and work closely with the jurisdictions to better address local management priorities.

The CRCP agrees that NCRMP data is not being fully utilized, in part, due to lack of data availability. The Program is starting to take more proactive steps to get data publicly available within a year of collection as per the guidance of NOAA's Plan for increasing Public Access to Research Results (PARR). NCRMP data and metadata are migrating to the National Centers for Environmental Information (NCEI) and Coral Reef Information System (CoRIS), respectively, for long-term archiving and access. Additionally, we are exploring the development of a web portal to serve the data in a more user-friendly format based on input from jurisdictional partners and the user community. Finally, we are in the process of developing jurisdictional-level reports with input from state and territorial managers to quickly report on the NCRMP data and findings. Integration with other CRCP-funded state and territorial monitoring programs is complicated by the differences in methods and the lack of a centralized database for serving data, but we are looking into incorporating these data into the jurisdictional reports.

2. Develop a business planning process and plan for CRCP to balance existing and emerging investment priorities that optimize reef conservation outcomes, provide opportunities for CRCP team members to participate in program design, and facilitate program evaluation and improvement.

The CRCP concurs with this recommendation and is including this as a desired outcome of our 2017 strategic planning process. As the panelists are aware, the CRCP assessed the outcomes of the last 5 years of funding since realigning the program in 2010 in response to an external review. Recent assessment activities include: an internal assessment (of both the domestic and international investments) to analyze past program performance, a coastal/coral manager's survey with partners to understand the availability, use and utility of CRCP data products for management actions, and this evaluation of the program's science investments. The CRCP will use the information from these assessment and evaluation efforts in the upcoming strategic planning process to refine the program goals and objectives. As additional outcomes of the strategic planning, the CRCP will identify priority coral reef conservation actions, increase coordination of program activities to better meet management needs, strengthen evaluation of progress toward goals, and develop investment strategies that recognize the myriad challenges facing coral reefs. The CRCP will be transparent in decision-making, and offer opportunities for the CRCP community including NOAA staff and external partners to engage in the development of a holistic NOAA Coral Reef Conservation Strategy. This new strategy will incorporate implementation plans reflective of on-the-ground conservation needs in the short, mid, and long term; maximize internal and external capabilities; and act as a catalyst for implementing coral reef conservation actions by NOAA and external partners. The CRCP will review and learn from efforts by the Great Barrier Reef Marine Park Authority and others who are undertaking similar strategic planning processes and look into developing a business plan for NOAA's CRCP.

3. Create a regular collaborative communication process to promote two-way discussions and exchanges between scientists and managers in each location, potentially involving annual forums and webinars, along with regular, rapid reporting of monitoring and research findings.

The CRCP concurs that collaborative communication with our partners is vital to achieving our shared coral conservation goals. Because the science evaluation focused on our research and other data collection efforts, the panelists may not be fully aware that CRCP liaisons in each jurisdiction coordinate annual and ad-hoc calls with NOAA PIs and state/territory staff to discuss proposed project ideas. In-person collaboration meetings facilitated by CRCP liaisons have occurred recently in both Florida and Hawaii and were particularly well received by the participating jurisdictional coral managers and NOAA staff. As a part of the new strategic planning process, the CRCP will examine how to effectively continue meetings and calls to get the most benefit for all parties involved in each jurisdiction.

The CRCP also plans to require that project managers include outreach and communication elements in the planning and execution of individual projects. Finally, as a part of our strategic planning process we will look to engage local managers in the states and territories to

understand how we can better plan together at a program level to align our priorities and the most efficient application of our respective resources. While we have made strides on this front, the program recognizes that building trust and a collaborative approach to better understand managers needs is a long-term investment of time and resources.

4. Develop a reporting template that includes outputs and outcomes (or benchmarks along the way), and whether or not data have been analyzed, shared with partners and uploaded to CoRIS (or another portal). Data accountability should be required within each PI's and each program's granting process, and within Performance Evaluation Plans.

The CRCP agrees that improvements are needed to current reporting requirements and is already working to implement them. For example, CRCP has an internal project database to track activities, deliverables, and accomplishments and the Program recently made improvements to performance measure tracking. CoRIS is currently developing a project viewer that will use information from the project database to allow the public to view a short summary of CRCP projects (ongoing or past) and see all products that have come from them. The program will work to make sure that information submitted to CoRIS is easily found by jurisdictional partners and managers. NOAA's recent plan to increase PARR is being implemented across NOAA and the CRCP is making sure all funded researchers are aware of the new requirements and looking for ways to streamline the process for meeting those requirements, such as using common templates. The strategic planning process will address ways to tie these reporting requirements more closely with project manager accountability.

5. Ensure, through the grant approval or budgeting process, that all research and monitoring programs upload data to a dedicated, easily accessible platform, and produce brief summarized results and recommendations targeted to managers in a timely manner (~ a year).

The PARR requirements state that all data is required to be publicly available within a year if collected internally by NOAA and within 2 years, if collected by external funding recipients. In addition to assuring that data is archived and publicly available, we will explore options within the major CRCP offices (NCCOS, OCM, etc.) to develop geospatial tools for managers. This will be identified as a priority need in our strategic planning as we work to leverage the capabilities of other NOAA offices heavily involved in coral reef conservation.

6. For the long term, and particularly for the more remote reef areas, NOAA should begin exploring alternative reef monitoring technologies that might supplement and potentially replace ship-based studies, thereby improving efficiency and reducing cost.

As a conservation program, the CRCP focuses our limited resources on achieving conservation goals by strengthening partnerships with state and territorial coral managers and supporting long-term, on-the-ground management capacity and needs. The CRCP also recognizes the importance of developing and deploying new observing technologies to provide data and will

continue to explore opportunities through internal and external partners to leverage funding achieve our priorities. While CRCP already utilizes alternative technologies such as satellites, ROVs, acoustics, etc., the Program has yet to be able to completely eliminate the need for diver-based surveys. Other NOAA programs, such as OAR's Technology Partnerships Office, are more focused on research and development of technological solutions, which CRCP can learn and benefit from. A similar recommendation was made to the Pacific Islands Fisheries Science Center during their recent ecosystem science evaluation. These recommendations may create enhanced partnership opportunities for CRCP.

7. Leveraging funds from and partnerships with other government departments, international agencies, and private funds is critical to maintaining or increasing core program support. The CR Task Force meetings could serve as the basis for more collaborative interactions between jurisdictions, NOAA PIs and other key partners (potentially combined with the annual CRTF meeting in DC for example).

The CRCP agrees with the panelists that leveraging funds is critical to advancing coral reef conservation, and continues to have conversations within NOAA and with external partners around forming topical partnerships. For example, the CRCP is collaborating with federal and territorial agencies, municipal governments, local stakeholder groups, and NGOs to improve habitat resilience, coral recovery, fisheries management, sustainable recreation, and community stewardship for three NOAA Habitat Focus Areas in Guam, Hawaii, and Puerto Rico. As mentioned in other responses, NCRMP relies heavily on partnerships both within NOAA and with our jurisdictional partners and will continue to look for ways to enhance them. As the Co-Chair to the U.S. Coral Reef Task Force, NOAA fosters coordination, partnerships, and contributions of federal agencies' resources and expertise to implement activities to reduce LBSP loads across watershed partnership initiative sites in Puerto Rico, Hawaii, and American Samoa. As part of our international portfolio, CRCP continue to work with partners such as USAID to support our work in the Coral Triangle. We continue to develop relationships with international organizations such as the Global Environment Facility and Inter-American Development Bank (IDB) to explore opportunities for leveraging funding.

Recognizing the need to scale up conservation efforts to overcome the challenges of a changing climate, strengthening partnerships to leverage additional resources within NOAA and with external partners is primary objective of CRCP's upcoming strategic planning process. The Program plans to identify potential synergies, such as through forums like the U.S. Coral Reef Task Force, and develop strategies for capitalizing on them.

8. Use existing staff, and NOAA line offices, to improve communications among NOAA PIs, jurisdictions and stakeholders. Panel members were surprised to learn that there are liaison officers in each of the jurisdictions who could be enhancing such communications. The liaisons' job descriptions and skills should be reviewed to ensure they have the needed capabilities and mandates to serve this communication and collaboration purpose.

The CRCP has placed staff in each jurisdiction to serve as liaisons between NOAA's Coral Reef Conservation Program and Coastal Zone Management Program, and their jurisdiction's respective coral and coastal zone programs. In addition, CRCP Fishery Liaisons are located in the jurisdictions to improve fisheries management and conserve reef habitat. Each liaison facilitates dialogue between state and territory partners, CRCP program staff, and NOAA PIs to collect information on coral and fishery management priorities and share these for potential project ideas. Similarly, liaisons also disseminate NOAA project accomplishments and products to ensure they are shared with their colleagues and CRCP management partners in the states and territories. Although staff and mechanisms are in place for such information sharing, CRCP concurs with the panelists' recommendation that the program's liaisons job descriptions and skills should be reviewed to ensure they have the capabilities and capacity to serve this communication and collaboration purpose. Staffing needs and avenues for collaboration across NOAA and with the states'/territories' coral, coastal zone, and fisheries management programs will be considered in the upcoming CRCP strategic planning process.

9. The Social Science component seems under-budgeted and undervalued. One way of ensuring that local communities take a more active role in sustaining the natural resources on which they depend is to provide them with meaningful data that reflect their social, economic, and cultural values. There is no better way to obtain these data than through socio-economic studies, which should be increased, possibly by better capitalizing on NOAA social science expertise outside of CRCP, and linked to the database housing ecological data.

The CRCP recognizes the importance of socio-economic data and social science research. The program agrees with the panelists' observation that social science studies provide important data on social, economic, and cultural information for coral reefs that can help with engaging local communities (and managers) in their conservation and should receive greater utilization. As a core theme within NCRMP, the program supports ~1.5 program-dedicated social science staff and leverages, through funding, the expertise of several other social scientists and economists throughout NMFS and NOS. Additionally, CRCP funds socioeconomic studies through grants and cooperative agreements, in each of the 7 U.S. coral reef jurisdictions, in an effort to be responsive to local management needs and requests. The need for additional social science capacity was acknowledged by NOAA's Southeast Fisheries Science Center in response to their recent ecosystem science review, and could create enhanced leveraging opportunities.

In order to address emerging social science needs, the CRCP has recently updated its social science strategy (2016-2021). This new strategy outlines future priorities for increasing social science capacity and collaboration across NOAA, as well as better integration of social science and biophysical data. As with the previous (2010-2015) strategy, this new document was developed with significant input from jurisdictional partners. The ultimate goal of the social science portfolio is to provide CRCP management partners with comprehensive social science information, including ecosystem services, economic valuation, sociology, participatory GIS and social behavioral change, etc. The new social science strategy coupled with the results of recent

evaluative efforts, including this review, will be used to inform, through the program's strategic planning process, a funding strategy for socioeconomic studies that produce meaningful data to stakeholders, managers, other partners, and policy makers. The CRCP will also look to better utilize other existing sources of socioeconomic data, such as NOAA's Economics: National Ocean Watch Explorer.

Other Panel Recommendations and Responses

Overall Program

Develop clear monitoring objectives that are aligned with management objectives and partners to leverage resources and assess whether fisheries science is meeting stated objectives.

CRCP agrees with the panelists' recommendations to better align monitoring and management objectives in order to achieve adaptive management. This applies to a variety of monitoring, such as baseline and performance monitoring of threat abatement (LBSP, fishing impacts and climate change) and status and trends (NCRMP). This will ensure that the data collected and analyzed will be used by NOAA and state/territory managers to inform their decision-making. The upcoming strategic planning process will align these objectives and help CRCP leverage resources, while taking careful consideration of the implications of modifying long-term monitoring schemes.

Mapping

Reassess the mapping priorities at different scales within the different jurisdictions and federally managed areas.

It has been over five years since the CRCP produced, "Coral Reef Conservation Program Mapping Achievements and Unmet Needs," which summarizes mapping priorities by geography. CRCP agrees it is time to review accomplishments since then and reassess future priorities as part of the upcoming strategic planning process. This review may include adding new criteria for mapping priorities, as well as incorporating new and improved mapping technologies developed since earlier mapping products were completed. This is also a good opportunity to coordinate, communicate with, and reengage management partners as well as parts of NOAA and other agencies with mapping capabilities that could be better leveraged.

Climate

Continue the Coral Reef Watch program in all its capacity. CRW should be institutionalized with a dedicated line item budget (non-competitive) similar to the monitoring program

CRCP appreciates the positive feedback on long-standing programs like Coral Reef Watch. Stable funding for core programmatic efforts, while working with the program to better meet our goals, is a primary objective of the upcoming strategic planning process.

Put effort into identifying resilient refuges and understanding the applications and effectiveness of resilience-based methods (validate variables and resilience scores in areas experiencing disturbance and how this differs from past management).

The CRCP has recently focused on the completion of resilience assessments in all jurisdictions as one tool to implement resilience-based management. The CRCP will work with partners to evaluate how this information is integrated into management, validate outcomes based on disturbance events, and determine whether management efficacy increases when using the resilience-based management approach.

Establish a global coral bleaching database, or leverage an existing database.

The CRCP has put forth a NOAA budget initiative to collect and store data in response to reef disasters (bleaching, cyclones, etc.). This is also a priority of the International Coral Reef Initiative, working through external partners, to link large data sets together (Global Coral Reef Monitoring Network, Marine Biodiversity Observing Network, Ocean Biogeographic Information System, etc.) and NOAA will be playing a significant role in these efforts.

LBSP

Remain focused on priority land-based pollution sites to make sure management is actually working and quantify effects of management on the coral reefs, to see if targets are being met and to demonstrate the adaptive management process.

The CRCP recognizes the need to see watershed management efforts through within the existing priority sites to demonstrate the outcomes; however, the program will be more strategic in the future when deciding where and for what duration to invest funding and technical assistance. The spatial scale of watersheds and the types of LBSP threats impacting nearshore corals were not determinant factors in selecting the jurisdictional priority areas in 2010, which led to selecting priority areas that are comprised of multiple watersheds, ranging in size from a few square miles to over a 160 square miles, are hydrologically complex, and are impacted by threats that fall outside of NOAA's purview. A refined approach for selecting priority watersheds is found in the Watershed Partnership Initiative Strategy that was recently developed by the Coral Program in partnership with the U.S. Coral Reef Task Force (USCRTF). The Task Force also produced a guidance document on priority ecosystem indicators to include in watershed management monitoring plans. The strategy and other tools recently developed for the Task Force will serve as a guiding framework for implementing management actions, documenting change as a result of these actions, graduating existing priority watersheds, and informing the selection of new priority watersheds. As quantifying the effects of watershed management actions requires costly, long-term monitoring, CRCP will be selective what sites to do comprehensive monitoring in, which will be a subset priority sites where conservation activities take place.

Strengthen linkages to and collaboration with CZM programs.

The CRCP will search for opportunities that strengthen synergistic linkages with CZM programs in each of the seven jurisdictions including leveraging management planning efforts under both programs (e.g., the development of watershed management plans for existing and new priority watersheds). Additionally, NOAA will explore the potential for amending 306A of the CZMA if and when it is reauthorized in order to allow federal monies to support implementing erosion and sediment control practices and stormwater management projects.

Biodiversity and Organismal Response

Continue stable funding to population biology and response research, consider including genomics and organismal response under foundational theme as they are not directly in one of the three threat-based categories.

The CRCP agrees with the panelists' observation that coral population biology and response research is foundational to coral reef conservation. The organization of the CRCP's national goals and objectives, which are focused on the three main threats to coral reefs, has made it challenging to formulate funding priorities and evaluate the performance of this work. With this recognition, the program will incorporate this body of work into the upcoming strategic planning process to ensure that it is considered as a priority for funding allocation.

Determine the value of Autonomous Reef Monitoring Structures (ARMS) in reef conservation; redeployment should only occur with full justification and validation of utility. Given that resources are limited, best if other partners (besides NOAA) contributed more to this initiative.

As part of the strategic planning process, NCRMP will be evaluated with respect to meeting both national and jurisdictional management objectives. While biodiversity is frequently identified by managers as a useful indicator, the link between management and cryptofauna diversity is less well understood. All this will be taken into consideration, including the level of partner involvement as we evaluate the appropriate role of ARMS within NCRMP going forward.

Fishing Impacts

Implement better long term tracking of related management actions (through fisheries councils, MPAs Jurisdictions, etc.).

The CRCP appreciates this recommendation, as it echoes an observation from the internal assessment report that project reporting needs to be improved and should include collecting more information on management utility and outcomes. The program plans to review and update its reporting requirements through the strategic planning process and will determine how best to track relevant management actions. The results of these activities should facilitate better communication of program successes and improve future evaluations.