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NOAA Coral Reef Conservation Program

Social Science Strategy: 2016-2021

August 2016

This document represents the final version of the CRCP Social Science Strategy for circulation to CRCP partners including state, jurisdictional representatives and other interested parties.

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Executive Summary

The Coral Reef Conservation Program (CRCP) 2016 – 2021 Social Science Strategy builds on the previous (2010-2015) strategy. The new strategy document reviews recent outcomes from the previous social science work plan and then provides recommendations to CRCP in order to address emerging trends, social science and human dimensions needs. In particular, this revised Social Science Strategy will present recommendations and new priorities to guide social science activities supported by the CRCP and its key partners (domestic and international).

This Social Science Strategy document is organized into three sections. It first addresses National level priorities for climate, fishing impacts and land based pollution impacts. Secondly, U.S. State and Territorial Jurisdictional social science needs are presented. Finally, it reviews recent CRCP International social science activities and uses the (currently under review) *CRCP International Strategy (2009*) as a guide, and provides guidance for future work with our international partners.

The recommendations within this document address a broad range of focus areas, as well as highlight emerging trends and future research needs. In order to be relevant to other parts of the National Ocean Service (NOS) and the wider National Oceanic and Atmospheric Administration (NOAA), this strategy should be considered along with NOS and the Office for Coastal Management (OCM) social science programs of work. Ultimately, some of the activities and plans are linked to the *NOAA Social Science Strategy 2015,* which seeks to "Integrate social, behavioral, and economic science end-to-end in NOAA's mission and priorities."

The CRCP Social Science Priorities for 2016-2021 are as follows;

- NP-1 Improve and enhance social science capacity to answer key CRCP management questions
- NP-2 Continue National Coral Reef Monitoring Program (NCRMP) socioeconomic monitoring implementation, data dissemination and integration
- NP-3 Increase cross-NOAA collaboration in socioeconomic research, data sharing and monitoring for improved jurisdictional capacity building, local management and decision making
- NP-4 Improve dissemination of social science information to support national and jurisdictional needs
- NP-5 Strengthen existing community-based management efforts and develop additional capacity for community participation in place-based managed activities in the jurisdictions
- NP-6 Develop and apply advanced social science applications to CRCP's management and conservation activities
- NP-7 Support efforts to better understand the socioeconomic implications of climate change in coral reef jurisdictions
- NP-8 Continue CRCP's global leadership role in facilitating socioeconomic monitoring by continuing to fund and coordinate the Global Socioeconomic Monitoring Initiative for Coastal Management (SocMon, and in the Pacific Region, SEM-Pasifika)

The implementation of these priority recommendations will be influenced by the results of a CRCP Science Assessment and Program Evaluation process. Implementing these new and advanced social science approaches will require coordination with CRCP leadership, SEA Team (Staff Evaluation and Assessment Team) and jurisdictional partners. The application of advanced social science approaches and in particular the combination of biophysical and human dimensions (social and economic) research should lead to results and outcomes that can better inform decision-making and policy for coral reef conservation. These recommendations will also necessitate collaboration with CRCP partners (internal and external to NOAA) with the necessary skills and core competencies to achieve these activities.

There continues to be a need for increasing the level of coordination and collaboration across the major CRCP programs (International, Climate, Land Based Sources of Pollution (LBSP) and Fish) to include human dimensions elements in their respective activities. This strategic document establishes broad guidelines for future research that meets management needs at national and local levels and supports our international capacity building efforts. Integrated research and monitoring is a key area of emerging interest that will benefit from the incorporation of socioeconomic research with areas of traditional focus such as biophysical and climate research.

Contents

Glossary of Selected Acronyms used in this document

BNP – Biscayne National Park
CFMP – Community-based Fisheries Management Program
CNMI – Commonwealth of Northern Mariana Islands
CORDIO – Coastal Oceans Research and Development – Indian Ocean
CoRIS – Coral Reef Information System
CRCP – Coral Reef Conservation Program
CREP – Coral Reef Ecosystem Program
CSD – Central Statistics Division
CTI – Coral Triangle Initiative
CZM – Coastal Zone Management
CZMP – Coastal Zone Management Program
DLNR – Department of Land and Natural Resources
DNER – Department of Natural and Environmental Resources (Puerto Rico)
DTNP – Dry Tortugas National Park
EEMP – East End Marine Park (St. Croix, US Virgin Islands)
ENOW – Economics National Ocean Watch
ENP - Everglades National Park
FKNMS – Florida Keys National Marine Sanctuary
GEF – Global Environment Facility
GCFI – Gulf and Caribbean Research Institute
GCRMN – Global Coral Reef Monitoring Network
GIS – Geographic Information System
HEA – Habitat Equivalency Analysis
HFA – Habitat Focus Area
HML – Hollings Marine Laboratory
IADB – Inter-American Development Bank
ICRI – International Coral Reef Initiative
IGO – Intergovernmental Organization
JMP – Jurisdictional Management Plan
KAPs – Knowledge, attitudes, and perceptions
LAS – Local Action Strategy
LBSP – Land Based Sources of Pollution
LME – Large Marine Ecosystem
MCT – Micronesia Conservation Trust
MLCD – Marine Life Conservation District
MOES – Marine Outreach and Education Study
MOU – Memorandum of Understanding
MPA – Marine Protected Area
MRFSS – Marine Recreational Fisheries Statistics Survey
NCCOS – National Coastal Centers for Ocean Science
NCRMP – National Coral Reef Monitoring Program
NERRS – National Estuarine Research Reserve System
NMFS – National Marine Fisheries Service

NOAA – National Oceanic and Atmospheric Administration
NOS – National Ocean Service
NPA – National Park Service
OCM – Office for Coastal Management
OMB – Office of Management and Budget
PIFSC – Pacific Island Fisheries Science Center
PIMPAC – Pacific Islands Managed and Protected Areas Community
PIRO – Pacific Islands Regional Office
PLA – Participatory Learning and Action
PPI – Office of Program Planning and Integration
RFP – Request for Proposals
RNA – Research Natural Area (Florida)
SEA Team – Staff Evaluation and Assessment Team
SEFSC - Southeast Fisheries Science Center
SEM – Pasifika – Socioeconomic Monitoring Initiative for the Pacific Islands Region
SocMon – Global Socioeconomic Monitoring Initiative for Coastal Management
SSC – NOAA's Social Science Strategy
STEER – Saint Thomas East End Reserve
TEK – Traditional Ecological Knowledge
TNC – The Nature Conservancy
UNEP – United Nations Environment Programme
US – United States
USAID – United States Agency for International Development
USVI – United States Virgin Islands
WPacFIN – Western Pacific Fisheries Information Network

Introduction

Background

Building on recommendations from a 2007 external review of the Coral Reef Conservation Program (CRCP) for various areas of improvement, the CRCP socioeconomic team developed a social science strategy, finalized in 2010, to increase the strategic use of social science tools in US coral reef jurisdictions. The objective of the *Social Science Strategy: 2010-2015* was to prioritize those social science activities and information needs that should be facilitated by the NOAA CRCP to further coral reef management in the jurisdictions.

The original strategy was developed by CRCP social scientists and an advisory group of NOAA and non-NOAA social scientists with expertise in the use of social science in coral reef ecosystems. Social scientists from CRCP also consulted with coral reef managers in each of the US coral reef jurisdictions to determine jurisdiction-level priorities. The Strategy was used to inform the CRCP's social science activities from 2010-2015 and was used to guide implementation of related activities by CRCP staff, partners, and grantees.

This new 2016-2020 Social Science Strategy builds on the previous 2010-2015 strategy. It provides a brief evaluation of the expected outcomes based on the eleven (11) recommendations outlined the original strategy document. The new Strategy will present recommendations and new priorities to guide social science activities supported by the CRCP and its key partners (domestic and international). The strategy is designed to address social science and human dimensions needs of CRCP and NOAA as the office responds to emerging trends in research and management.

This Social Science Strategy document is organized into three key sections; 1) National level priorities, including climate, fishing impacts and land based pollution impacts, 2) U.S. State and Territorial Jurisdictional needs and 3) International program activities (*CRCP International Strategy, 2009*). Therefore, the recommendations address a broad range of focus areas, as well as highlight emerging trends and future research needs. This strategy should be considered along with, or nested under, other related NOAA social science strategies and plans including the NOS Office for Coastal Management OCM which is currently under development. It should be noted that the NOAA Social Science Strategy explicitly seeks to "Integrate social, behavioral, and economic science end-to-end in NOAA's mission and priorities" (page 2, NOAA SSC 2015). The strategy outlined herein was developed with NOAA's social science goals in mind.

National Level Priorities

Social science indicators are now being developed as part of the National Coral Reef Monitoring Program (NCRMP) which represents a key component of this Strategy's national priorities. The NCRMP data collection effort is expected to improve CRCP's ability to monitor socioeconomic changes in U.S. coral reef jurisdictions, improve the ability to assess the public's knowledge, attitudes, and perceptions (KAPs) regarding coral reef resources and management practices, and improve the program's understanding of the social and economic implications of new and existing management measures. The NCRMP effort seeks to develop guidelines for future integrated research that meets management needs at the national and local levels. The

integration of socioeconomic research and data with biophysical coral reef science is an emerging area of need for the NCRMP; the application of Ecosystem Based Management practices is an example that addresses this need.

Jurisdictional Level Priorities
This strategy prioritizes the provision of additional social science capacity within the jurisdictions and expands on baseline data already collected via the NCRMP process. Targeted socioeconomic assessments and coastal use mapping of priority management sites will be required for the effective use of human dimensions information in order to improve the management of coral reef resources. This document outlines jurisdiction specific priorities of socioeconomic research which will improve coral reef management at priority sites. The priorities identified by the jurisdictions include both post-implementation socioeconomic analyses of new management measures as well as information for ongoing jurisdictional or site-based monitoring. In the end, the collected data will be used to monitor changes in areas such as knowledge, attitudes and perceptions; demographics; human use patterns; and, if applicable, effectiveness of initiatives designed to influence human behavior over time.

International Priorities
While this document focuses on national and jurisdictional social science priorities, it should be noted that the CRCP is a leader in facilitating socioeconomic monitoring in international coral reef regions through funding and coordination of the Global Socioeconomic Monitoring Initiative for Coastal Management (SocMon), or, as it is known in the Pacific, SEM-Pasifika (Socio-Economic-Monitoring). The social science activities under this portfolio are linked to the priority goals in the CRCP International Strategy as well as the recently developed *SocMon Strategic Plan*. The activities that are highlighted in the respective sections of this document demonstrates NOAA and CRCP's continued role in supporting capacity development, data housing and dissemination of information.

Approach

Human activities play a significant role in driving each of the CRCP focal threats of land based sources of pollution, climate change, and unsustainable fishing. However, management activities to address these threats are directly linked to societal responses and outcomes. Therefore, to be most effective, social science approaches must play a role.

In 2008 the CRCP conducted an external program review in order to prioritize its activities. Based on this review, the CRCP narrowed its focus to address three global threats to coral reefs: *Climate Change Impacts*, *Fishing Impacts* and *Land Based Sources of Pollution Impacts*. The result was the document *NOAA Coral Reef Conservation Program Goals & Objectives 2010-2015* (Goals and Objectives, 2009). As such, our approaches are guided by that document, which makes clear that incorporating social science research and data, coupled with bio-physical monitoring, will lead to improved coral reef conservation and management.

Process
The CRCP Social Science Strategy builds on past CRCP wide strategic planning efforts, beginning with the Goals and Objectives document. The document included social science

related goals and objectives (Appendix 2). Following the early CRCP program-wide planning process, management priorities were identified by each jurisdiction. This process occurred from June 2009 and continued through April 2010. These jurisdictional management priorities outlined therein expressed a need for incorporating social science activities. Thereafter, the 2010-2015 Social Science Strategy document was produced and one of the major recommendations was the development of a National Coral Reef Monitoring Plan that would, for the first time, include socioeconomic data collection as a key component. The NCRMP plan was developed from June 2010 to June 2011 and implemented in the years following.

(Photo/Peter Edwards)

Previous National Priorities: Outcomes and Challenges (2010-2015)

The previous CRCP Social Science Strategy outlined eleven (11) recommendations for 2010-2015, which are listed below in order of priority (Table 1). Table 1 presents a summary of these recommended priorities and original rationale (see Appendix 3 for corresponding national objectives). Table 1 also provides feedback on outcomes and challenges resulting from activities aimed at addressing these priorities.

Table1 2010-2015 National priorities (NP)

Priority Recommendations	Rationale/Addressing	Outcome/Challenge
NP-1:Increase regional capacity to use social science to answer key management questions	Jurisdictional capacity needs and each of the social science-related CRCP National Objectives, all of which require additional capacity to undertake	A Pacific Regional Social Scientist was hired. No Caribbean Regional Social Scientist has been assigned. National Centers for Coastal Ocean Science (NCCOS) Social Science team is now formally working with CRCP to increase overall program capacity.
NP-2: In preparation for recommendation #NP3, below, develop a survey question bank and template survey examples to assist jurisdictions in designing socioeconomic assessment and monitoring programs	Fishing Impacts Objective F3.4 on enforcement and compliance, C2.3 on understanding human impacts from climate change, LBSP Objective L3.5	Successful Office of Management and Budget (OMB) approval for over 120 questions. The question bank is currently used in NCRMP Social Science monitoring and is available for other monitoring uses.
NP-3: Develop a long-term monitoring program that includes territory-wide surveys in each of the jurisdictions to track CRCP performance measures and progress on CRCP National Goals and Objectives	Various CRCP performance measures; tracking of National Goals and Objectives, particularly for education and outreach	A socioeconomic component was officially added to the NCRMP, and a budget secured for implementation. Four jurisdictional household surveys were successfully completed as of 2015 (American Samoa, Florida, Hawai'i & Puerto Rico). Secondary data collection is ongoing across all jurisdictions
NP-4: Support jurisdictions in socioeconomic assessment and monitoring of priority sites and management activities	Fishing Impacts Objective F2.5 to assess performance of marine protected areas (MPAs) and Fishing Impacts Objective 2.3 to adaptively manage marine protected areas (MPAs)	Through partnerships with other NOAA offices, successful funding support for research efforts: 1) United States Virgin Island (USVI) Recreational Fishing, 2) Diving Use surveys 3) American Samoa socio-ecological and coastal use mapping studies 4) Hawaii coastal use mapping in high priority sites 5) Socioeconomic Survey for Manell-Geus Habitat Focus Area (HFA) (2016)
NP-5: Continue CRCP's global leadership role in facilitating socioeconomic monitoring by continuing to fund and coordinate	Capacity building needs of international partners.	Renewed CRCP Funding support for Regional Coordinators planning meeting (Silver Spring) and support to repeat monitoring activities.

Priority Recommendations	Rationale/Addressing	Outcome/Challenge
the Global Socioeconomic Monitoring Initiative for Coastal Management (SocMon, and in the Pacific Region, SEM-Pasifika)		(FY15/16). Implementation of repeat monitoring/ training ongoing due to recent CRCP funded grant
NP-6: Identify, compile and provide access to social science studies and information that have been collected in all United States (US)jurisdictions	CRCP Fishing Objective F1.4 to assess fishing effort, specific priority objectives from the CRCP Jurisdictional Management Priorities (e.g. USVI Objective 4.8: Obtain the necessary information to understand the impacts of recreational fisheries in the USVI)	Summary of CRCP funded Economic Valuation Studies and Meta-Analysis completed. *Challenge*: Additional staff support required (intern/fellow) for creating a central repository of information.
NP-7: Develop appropriate social science approaches to support jurisdictional social marketing campaigns. This includes baseline socioeconomic assessments, assessing public knowledge, attitudes, and perceptions, testing public receptivity to marketing messages, and monitoring campaign effectiveness	Social marketing has emerged as a priority in each of the jurisdictions, both within Jurisdictional Management Priority documents, as well as through consultation with local managers regarding social science priorities.	Results unclear. Not enough data to indicate success Some completed efforts in the Commonwealth of Northern Mariana Islands (CNMI), for targeted issues. Scope may need to be widened in the future
NP-8: Strengthen existing community-based management efforts and develop additional capacity for community participation in place-based management activities in the jurisdictions.	Fishing Impacts Objective F3.1 on community participation	Village surveys conducted in American Samoa in collaboration with the Community-based Fisheries Management Program (CFMP). Institutional Analysis of Hawaii's Community-based Subsistence Fishing Area program (very useful for local managers) and American Samoa CFMP published with recommendations to inform managers. USVI Marine Outreach and Education project received some socioeconomic support. The Hawaii document resulted in the passage of a community riles package.
NP-9: Support efforts to better understand the socioeconomic implications of climate change in coral reef jurisdictions	Climate change objective C2.3 to better understand how climate change impacts human communities.	Climate resiliency plan developed for the village of Amouli (American Samoa). Incorporation of related questions into the CRCP Socioeconomic Question Bank. Required closer cooperation with Climate Program and funding.
NP-10: Assist jurisdictions in making use of information obtained through previously completed jurisdictional economic valuation studies.	Requests for follow-up technical assistance on previously completed economic valuation studies	Limited number of requests. Some demand expressed by Florida.
NP-11: Develop a standard approach for undertaking feasibility studies of alternative livelihoods for priority sites	Fishing Impacts Objective F3.3 on economic alternatives	No evidence of progress. Lack of existing capacity continues to present a challenge.

Observations – 2010 – 2015 Strategy

A few overall observations can be made from examining Table 1. During the period of 2010 to 2015, eight of the eleven priorities were addressed at some level. Completed projects include the production of an OMB-approved set of questions that can be re-used, as well as the establishment of a socio-economic component of NCRMP. Additionally, new social science studies were funded based on 2010-2015 CRCP Social Science priorities (for example studies conducted in the USVI and American Samoa).

To address NP-1 (increased regional capacity), funding support for a Pacific Regional Social Scientist as well as support for social science personnel from NCCOS (specifically, the Hollings Marine Laboratory (HML)) increased the capacity of the Program to deliver key social science elements; in particular, staff support for the socioeconomic component of NCRMP. However, some challenges led to missed targets for other priorities. For example, support for social marketing (NP-7) was a priority, but limited technical capacity hampered the development of campaigns in most jurisdictions during this period.

Charting new course and next steps (Photo/M. Sanchez)

National CRCP Social Priorities: 2016 -2021

As with the previous strategy, social science priorities were developed in consultation with an advisory board of social scientists that had experience working with NOAA and CRCP partners in multiple coral reef jurisdictions. Jurisdictional priorities were developed in consultation with representatives from local partner agencies. The relevant CRCP planning documents were reviewed to ensure coordination of the updated social science strategy with CRCP program and jurisdictional goals, objectives, plans, and priorities.

Taking into consideration the outcomes and challenges as presented in Table 1, the following priorities are proposed for the next five year period. Some priorities remain the same as the 2010-2015 strategy while other new priorities have been added. Some priorities that were either achieved or no longer viewed as a high priority for CRCP and its partners were removed and replaced with new and more relevant recommendations for the 2016-2021 timeframe. As was the case for the previous strategy document, the recommendations presented here were developed by NOAA CRCP social scientists and partners for the purpose of responding to the new and emerging social science needs for the period 2016-2021.

These priorities are to be viewed as national level goals and thus their relevance may vary in each jurisdiction. The recommendations below are listed in order of priority.

*(*NP = National Priority)*

Recommendation NP-1: Improve and enhance social science capacity to answer key CRCP management questions

Responding to: Jurisdictional capacity needs and each of the social science-related CRCP National Objectives, all of which require additional capacity in order to implement

Working through partnerships with local universities, government agencies and non-governmental organizations, CRCP will continue to assist in building local capacity by providing training and mentoring opportunities, assisting in design and implementation of socioeconomic assessment and monitoring programs, and ensuring timely delivery of useful and understandable social science information to local managers. This will also entail coordination and collaboration with other NOAA offices that are engaged in coral reef relevant social science work such as the NOAA Marine Fisheries Service (NMFS) Pacific Island Fisheries Science Center (PIFSC), the NOAA NMFS South East Fisheries Science Center (SEFSC) including other offices within OCM.

Short term: Strengthen relationships with partner social scientists in each region to develop relevant research and monitoring as well as improve data sharing. These partnerships can also be used to provide mentorship and individual training opportunities for non-social science trained jurisdictional partners with coral reef management responsibilities. For example, whenever feasible the Pacific Regional Social Science coordinator will collaborate with other social

science research data sharing efforts across NOAA offices with key partners including the PIFSC, and wider OCM regional social science efforts. For the Atlantic and Caribbean, similar relationships will be developed between the SEFSC and the CRCP Social Science Coordinator. Collaboration with the NCCOS social science personnel team based in Hollings Marine Laboratory is expected to continue.

Long term: Appoint an **Atlantic Regional Social Scientist** for the Southeast and Caribbean. There is a need for a dedicated social scientist in the Caribbean/Atlantic region for supporting the efforts of partners and key stakeholders (NOAA, Universities, other). This includes providing guidance for targeted research needs from the territories and state as well as supporting local management, public education needs and supporting increased demand for NCRMP related social science data products. This role could be filled using existing capacity (such as social science staff in NCCOS at the Hollings Marine Laboratory) or an additional hire similar to the Pacific Regional Social Scientist.

Recommendation NP-2: Continue NCRMP Socioeconomic Monitoring: implementation, data dissemination and integration.

Responding to: CRCP performance measures; tracking of National Goals and Objectives, particularly for education and outreach

A socioeconomic component of the NCRMP was developed in 2012, and implementation of jurisdictional surveys began in 2013. Supporting the socioeconomic component of the NCRMP remains a high priority for CRCP's Social Science program.

Short term:

- Complete the first round of NCRMP jurisdictional surveys (expected completion in 2017).
- Conduct comparative analysis of the socioeconomic data for all seven jurisdictions and produce informational material and collaborate with jurisdictions on the application of this information for management.
- Continue to refine questions contained within the survey instrument to better meet jurisdictional and analytical needs.
- Develop a database that will house all survey data collected from the jurisdictions as well as secondary data sources of jurisdictional data and prepare the data for transfer and storage within a centralized NCRMP database.
- Submit data to the NCRMP main database.
- Prepare for the next 6-7 year monitoring cycle.

It should be noted that the NCRMP social science monitoring component will require continued funding commitment from the CRCP.

Long term:

- In conjunction with the other NCRMP focus areas (benthic and climate), integrate all three data streams.
- Produce report cards for other states and territories and develop a combined national NCRMP Report Card.
- Continue to track changes over time on themes such as public awareness of the importance of coral reefs, threats to coral reefs, support for coral reef management strategies, perceived compliance with management activities, and other factors.
- Consider undertaking a national survey, representative of the entire US population that includes knowledge, attitudes, and awareness of coral reefs. This survey would be focused on the economic values people hold for U.S. coral reefs along with other emerging questions such as ocean acidification or attitudes towards ecosystem restoration.
- Consider undertaking a tourism business survey to assess economic impacts of dive/snorkel tourism and fishing in coral jurisdictions, as was recommended by participants of the NCRMP Workshop in 2012. (http://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/626_Loper/Social_and_Economic_Indicators_for_Monitoring_the_U.S._Coral_Reef_Jurisdictions_Workshop_Report_2012.pdf).

Recommendation NP-3: **Increase cross-NOAA collaboration in socioeconomic research, data sharing and monitoring for improved jurisdictional capacity building, local management and decision making**

Given the recent integration of OCM post-merger of the Coastal Services Center with the Office for Coastal Resource Management, there is a need for CRCP social science priorities to be better aligned with OCM strategies. CRCP will have to be more purposeful in cross-collaboration and engagement within OCM, NOS and across other NOAA line offices on social science efforts. Leveraging cross office skills, data and information will increase the overall capacity needed to successfully accomplish this recommendation. This should in turn lead to a reduction in duplicative efforts and competition for limited funds.

Short term:

- CRCP Social Science team will work with NOAA partners in NOS (OCM, National Estuarine Research Reserves (NERRS), NCCOS, National Marine Sanctuaries, etc.), NMFS (Science & Technology, PIFSC, and SEFSC), NOAA Chief Economist's Performance, Risk, and Social Science Office, and other relevant partners with social science capacity across NOAA.
- Leveraging capacities that reside in these offices could support mutually beneficial research efforts. Participation on OCM social science working groups is essential.
- These collaborations should include: human use information, demographic profiles, economic valuation, as well as knowledge, attitudes, and perceptions of relevant user groups.
- Other data such as resource exploitation rates (such as landings, recreation use) will provide information that can help predict and model impacts of potential management

interventions (such as MPAs, catch shares, new regulations) and inform the development of optimal strategies.
- Data products from Economics Ocean Watch (ENOW) and the NCRMP Socioeconomics database can support improved used of social science data across NOAA.

Long term:
- Develop integrated coral reef research priorities with NOAA partners that combine social, biophysical and other sciences to apply to research and management questions. Social sciences along with the other disciplines should be integrated for the purposes of measuring the impacts of management interventions. Understanding the human dimensions component is critical for adaptive management strategies.
- Cross-office integrated research approaches should be applied at priority conservation sites.

Key Reminder: All CRCP funded projects with significant social science components are currently REQUIRED to provide copies of final products (reports, data and other materials) to the Coral Program/Coral Reef Information System (CoRIS) for storage and dissemination.

Recommendation NP-4 Improve dissemination of social science information to support national and jurisdictional needs

Responding to jurisdictional requests for access to information on previously completed fishing effort, recreational fishing and economic valuation studies

It is expected that there will be an increase in information and data generated from NCRMP socioeconomic monitoring as well as more recent CRCP supported research efforts. I changed this from ENOW to Digital Coast to expand to include a broader range of OCM social science web products, including ENOW.. Improving the storage and dissemination of relevant coral reef social science information will also enhance CRCP communications and outreach efforts.

Long Term
Create a dedicated CRCP social science web portal that will serve as a clearinghouse of coral reef specific, human dimensions information, tools and other resources is a key activity. The data and information will be organized by jurisdiction or by other relevant thematic areas such as NCRMP or SocMon to allow for easy location and use for management and public educational needs. This activity could be supported via regular student internships or incorporated into duties of a future Sea Grant Fellow. CoRIS will be a key partner in supporting the upload of technical documents and other forms of information for dissemination.

Recommendation NP-5: Strengthen existing community-based management efforts and develop additional capacity for community participation in place-based management activities in the jurisdictions

Responding to: Fishing Impacts Objective F3.1 on community participation

Social science approaches can provide important contributions to assessing and improving community-based management efforts. Targeted trainings, with community members and community based-management institutions, can increase local capacity to conduct socioeconomic assessments and monitoring. Participatory mapping, focus groups and other techniques can also be used to facilitate the incorporation of cultural and traditional knowledge of local communities into management. In collaboration with other management capacity building efforts such as the Pacific Islands Marine Protected Areas Community (PIMPAC), networking and learning exchanges for community groups can expand community capacity to use social science tools and methods. Institutional analyses of community-based conservation programs can also be used to inform program design and adaptation, improve local agency capacity to support management efforts, and strengthen community capacity for participation in management. CRCP will continue to support research and monitoring efforts that utilize this approach as needed.

Recommendation NP-6: Develop and apply advanced social science applications to CRCP's management and conservation activities

In addition to baseline human dimensions data collection efforts such as NCRMP and SocMon, there is a need for the use of advanced social science applications that can help address emerging coral reef management challenges. This recommendation is meant to provide overall guidance of future research and information collection for coral reef management. This will include sociological, economic and geographic/spatial applications as well as integrated research approaches (socio-ecological and bio-economic).

These recommendations can be considered primarily to be Long Term. Some possible activities are:

1) Support new economic valuation studies in different jurisdictions based on specific need. These studies may utilize various economic valuation approaches as required.
2) Promote integrated research topics and approaches such as Geographic Information Systems (GIS), sociological, anthropological, economic, bio-socio modeling etc. that focus on the social and economic impacts of ocean acidification and sea level rise on coral reef jurisdictions. For example these applications could incorporate spatial approaches to gathering and depicting human dimensions information related to coral

reef resources, using tools such as participatory mapping and GIS, with a focus on priority sites and pressing management needs.[1]

3) Related to the previous recommendation conduct new efforts on integrated coral reef research that combines social science research (and data) with biophysical research. This will require increased collaboration on the development of requests for proposals, and general research questions. The outcome of these efforts may lead to improvements in terms of data compatibility and usefulness in decision making.

Implementing these new or advanced social science approaches will require coordination with CRCP leadership, CRCP SEA Team and jurisdiction partners. It will be informed by a program internal assessment and science evaluation process that is currently underway. This recommendation should be included in the development of future requests for proposals and grants in order to signal the need for these types of research approaches. The application of advanced social science approaches and particularly the combination of biophysical and human dimensions (social and economic) research, should lead to results and outcomes that can better inform decision-making and policy for coral reef conservation. These recommendations will also necessitate collaboration with partners (internal and external to NOAA) with the necessary skills and core competencies to achieve these activities.

Recommendation NP-7: Support efforts to better understand the socioeconomic implications of climate change in coral reef jurisdictions

Responding to: Climate change objective C2.3: To better understand how climate change impacts human communities. (Very few jurisdictions have undertaken studies on human impacts of climate change; there exists opportunities to build on those existing studies that have been done).

In 2011, a tool was developed to assess human vulnerability and resilience to climate impacts. It was prepared as an addendum to the SocMon and SEM-Pasifika regional socioeconomic monitoring guidelines. The purpose of this addendum was to provide a minimum set of socioeconomic indicators related to climate change. These could then be included into a socioeconomic assessment of any site for which climate change impacts are an important issue. The resulting information can then inform coastal management needs and adaptive management. This activity was an outcome from recommendation NP-9 in the previous social science strategy. Building on this effort, the Social Science Program Coordinator will engage more closely with the CRCP Climate Program Coordinator to ensure that integrated work includes human and social dimensions as part of research and conservation activities.

<u>Short Term</u>

[1] *Prioritizing Sites for Coral Reef Conservation in the U.S. Virgin Islands* – NCCOS Project that uses existing and new data, including local expert knowledge, to develop a map-based decision support tool to identify and prioritize the most important coral reefs for conservation consideration in the U.S. Virgin Islands, as well as to determine the relative resiliency of particular coral reefs. https://coastalscience.noaa.gov/projects/detail?key=187

The CRCP Social Scientist will work with the designated CRCP Climate Program Coordinator in the development of research agendas or to provide supporting information and data (such as NCRMP) that can be used as part of climate related decision-making outputs.[2]

Long Term

The CRCP Social Science Team will work through the CRCP designated Climate Program lead along with local communities and jurisdictional agencies to develop place-based strategies to build climate resiliency that include social science elements.

Recommendation NP-8: Continue CRCP's global leadership role in facilitating socioeconomic monitoring by continuing to fund and coordinate the Global Socioeconomic Monitoring Initiative for Coastal Management (SocMon, and in the Pacific Region, SEM-Pasifika)

The Global SocMon works through regional and local partners to facilitate community-based socioeconomic monitoring. SocMon/SEM-Pasifika is linked to the Global Coral Reef Monitoring Network (GCRMN) and the International Coral Reef Initiative (ICRI). CRCP has provided leadership through coordination and support including providing funding and personnel. Outputs include development of manuals and training guidelines, capacity building, and technical assistance for community-based socioeconomic monitoring. While these initiatives primarily operate internationally, SocMon and SEM-Pasifika projects have occurred in six of seven US coral jurisdictions, providing bridges between domestic and international social science work. The global coordination of the initiative has traditionally been led by the CRCP social science coordinator assisted by one regional partner (Caribbean SocMon). The SocMon network recently developed a five-year strategic plan that will guide activities (Edwards 2014). Continued support through in-kind time and technical assistance, as well as funding is required to achieve major elements of the strategic plan.

Summary of National Priorities

The national priorities highlighted above address jurisdictional needs for information and capacity building. The priorities are also aimed at addressing the three main threat areas as per the CRCP Goals and Objectives: *Fishing Impacts*, *Climate* and *Land Based Sources of Pollution*. Improving coral reef conservation requires the successful application of social science to address the aforementioned threats.

The recently implemented NCRMP social science component was an important activity that has resulted in the institutionalization of coral reef-linked human dimensions data collection. This process will guide the development of indicators that can inform management and decision making.

[2] Progress on climate related CRCP research and activities can be tracked using some NCRMP questions currently designed to collect this type of information.

Since the recent integration of OCM (merger of Coastal Services Center & Office for Coastal Resource Management), there is a need for CRCP social science priorities to be more closely linked to the new office as well as to wider NOAA social science strategies. Closer alignment to the recent Social Science Vision and Strategy released by NOAA's Office of Program Planning and Integration (PPI) is recommended (NOAA SSC, 2015). The human dimensions component needs to be better integrated across CRCP program activities. This will require increased collaboration between the social science program and the other major CRCP programs (e.g., International, Climate, LBSP, and Fish).

CRCP Jurisdictional Social Science Priorities

Honolulu, HI as viewed from Diamond Head (P. Edwards)

NOAA CRCP's Social Science Program works through strong partnerships with each of the seven inhabited coral reef jurisdictions in the U.S. Pacific and Atlantic/Caribbean regions. The preparation of this social science strategy document involved consultations with jurisdictional partners and coral reef liaisons as well as cross checking the list of previous (2010-2015) priorities. The recommended priorities presented in this document have also been developed using information and input from recent interactions with jurisdictions as a part of the implementation of NCRMP social science monitoring other research efforts during this time period. The jurisdictional priorities presented in this document are intended to complement the national-level priorities while also taking into account the site and context-specific needs of each jurisdiction.

Summary of Jurisdictional Social Science Priorities

A summary of the top social science needs and priorities are listed in each jurisdiction. All of the activities associated with each priority may not necessarily be achieved in the time frame (2016-2021). However, the list of priorities and complementary activities should provide a guide to each jurisdiction for planning and management strategies that link human dimensions parameters to CRCP goals and objectives.

Each section below includes a summary list of the most pressing social science needs for 2016-2021. These priorities are based on input from jurisdictional partners as well information gleaned from a list of priority social science needs for each jurisdiction at the state/territorial level. These more detailed lists can be found in Appendix 1 and have in most cases been updated based on input from jurisdictional partners. The tables in Appendix 1 were adapted from the 2010-2015 social science strategy. Jurisdiction priority needs are outlined below.

American Samoa (AS)

American Samoa NCRMP in-person survey (Stacey Kilarski)

- AS-1: Knowledge, Attitudes, and Perceptions for priority sites and potential MPA and watershed management sites. Local managers suggested that it would also be useful to include wetland management sites since the Wetland Community-based Program under the Coastal Zone Management Program (CZMP) are working with wetland villages (such as Vatia) to integrate wetlands in existing management plans and to conduct socio-eco surveys on wetlands in these communities. NCRMP data should supplement site-specific information which will be critical for management relevance. Caution must be taken to avoid village survey fatigue.

- AS-2: Encourage use of the NCRMP survey template for use by local agencies when conducting surveys in MPAs, watersheds, wetlands and climate action sites. Common survey questions, sampling strategies will facilitate gathering information that is comparable across sites.
- AS-3: Coastal use studies to better understand use-types and use-intensity of new/potential management sites (MPAs, watersheds and wetlands). This needs to be conducted at the village/watershed level rather than territorial level due to the village-based and localized nature of use patterns.

Commonwealth of the Northern Marianas (CNMI)

- CNMI-1: Compile previously conducted studies and results into an accessible format that is widely available jurisdiction-wide. This will allow for improved information dissemination within the jurisdiction and avoid repitition when collecting social science information. This is still a priority. Having an almanac of survey efforts for the jurisdiction can be very helpful. Future efforts to move this priority forward should now include coordination with the CNMI Central Statistics Division (CSD).
- CNMI-2: Collection of information that will inform a social marketing campaign for remaining priority area (Talakhaya). This was completed for Laolao and Garapan. There is currently a need for information on resource users, demographic trends and KAP surveys for target issues. Rare (Conservation Organization) has been a critical partner for this. These efforts should be revisited and the possibility of new campaigns should be considered. Garapan needs a campaign that is broader than the 'Blue Starfish' effort. Tourism trends are changing in the CNMI and this changing climate should be included in future campaigns. The success of these priorities is dependent on the leadership of the CNMI Fisheries management agency.
- CNMI-3: Collection of information to assist in the development of a community-driven standard for fishing practices (Tasi Watch program) to encourage local compliance with regulations and local enforcement. This includes more detailed information regarding resource users (demographic trends and socioeconomic status) and KAPs concerning fishing regulations. PIMIPAC and The Nature Conservancy (TNC) are currently working on some enforcement efforts in the region including recent 2012 and 2014 KAP studies conducted at Managaha (by and Kodep Ogomuro-Uludong).
- CNMI-4: KAPs regarding the Northern Marianas Marine Monument. There is a need for an island-wide study by an unbiased entity. The Monument is still a politically charged issue and NOAA has a Monument program at the Pacific Islands Regional Office (PIRO), which should reduce this as a priority for CRCP.
- CNMI-5: Collection of socioeconomic information on Tinian (2014 assessment was conducted in Rota). The 2016 CNMI NCRMP socioeconomic survey is likely to provide some of this information.

Florida (FL)

- FL-1: Updated economic valuation study focusing on entire Florida Reef Tract and providing detailed information for setting damage assessment fees. Value of entire reef tract is needed as well as data organized (1) by county and (2) by managed areas (e.g. Florida Keys National Marine Sanctuary (FKNMS), Biscayne National Park (BNP), Everglades National Park (ENP), Dry Tortugas National Park (DTNP), Southeast Florida, etc.).[3] Florida is also very interested in how these values change with implementation of various management strategies or lack thereof.
- FL-2: Coastal use study for the FKNMS to understand changing uses with new activities in the Sanctuary, including cruise ship traffic, jet skis, and kite surfing.
- FL-3: Social marketing campaign focusing on implementation of the Florida Coral Reef Protection Act, including certain provisions such as those relating to anchoring.
- FL-4: Creel studies for National Park Service (NPS) sites and the FKNMS.

Guam (GU)

- GU-1: Coastal Use Surveys to determine levels and types of uses, cultural importance of methods, socioeconomic characteristics of fishers
- GU-2: Understand perceptions of marine/coastal resources and desired and acceptable management actions (KAP)
- GU-3: Social marketing information to develop island-wide social marketing campaign, particularly regarding the issues relating to sedimentation, marine recreational impacts, MPAs, and fishing impacts. Need strategies that are aimed at both local residents and tourists (for different topics).
- GU-4: Understanding traditional knowledge and historical fishing to inform strategies to further marine management

[3] An economic impact and valuation study is currently under way (FY16-17) and should provide information on coral reef related contributions to local economies and user benefits.

Hawai'i (HI)

Ala Moana Beach Park, Oahu (Peter Edwards)

- H-1: Knowledge, attitudes, perceptions studies for priority sites of Puako/Pelekane, Big Island and Kahekeili, Maui
- H-2: Coastal use studies
- H-3: Social impact analysis following implementation of management measures for Local Action Strategy sites.

Note: An overarching priority is training local people so that local groups have capacity to conduct surveys and assessments (similar to work done in Ho'okena and the planned training through PIMPAC)

Puerto Rico (PR)

- PR-1: Economic valuation study for areas of Puerto Rico not covered by the 2007 Estudios Technicos study, which only included reefs in eastern Puerto Rico.
- PR-2: Social marketing campaign to increase catch and use of lionfish
- PR-3: Associated socioeconomic impact assessment of the social and economic impacts of the lionfish invasion.
- PR-4: Socioeconomic impact analysis for potential mitigation measures included in Puerto Rico Coral Bleaching Response Plan
- PR-5: Replication of study, "*Entangled Communities: Socioeconomic Profiles of Fishers, their Communities, and their Responses to Marine Protective Measures in Puerto Rico*" to understand changes since fieldwork was conducted in 2003-4.
- PR-6: Socioeconomic studies to support Puerto Rico Habitat Focus Area (HFA) management plans.
- PR-7: Sustainable financing plan for entire natural reserves system

United States Virgin Islands (USVI)

- VI-1: Coastal Use Study for Coral Bay and Fish Bay, to include demographic information. An understanding of the types and level of use of the area was needed for this area since 2012.
- VI-2: Follow up to 2010 economic valuation study to evaluate cost effectiveness of various management strategies to protect coral reefs.
- VI-3: Understanding of recreational fishing, including level of use, targeted species, landings, and impacts to the ecosystem relative to commercial fishing. Build on completed St. Croix recreational fishing study and apply to St. John and St. Thomas in collaboration with ongoing efforts by NMFS.
- VI-4: Social marketing and training project to engage the enforcement chain (from enforcement officers to the judicial system) to increase effectiveness of enforcement actions. Include information from the Marine Outreach and Education Study (MOES) Virgin Islands Style project.

St. Croix Shoreline Recreational Fisher Survey Data Collection (Peter Edwards)

CRCP International Social Science Priorities

A large component of CRCP's International Social Science priorities is linked to the Global SocMon Initiative. As stated previously, a recent five year strategy was developed for the initiative which will guide activities. However, the success of SocMon is dependent upon the coordination role played by CRCP. In addition to coordination, additional support such as information dissemination via web sites and financial support through CRCP funding mechanisms will continue to be required. Collaboration with other key funding agencies (international) is critical to the sustainability of SocMon related activities globally.

In addition to SocMon (and SEM Pasifika), the CRCP Social Science Program supports other International activities. Social Science can play a greater role in CRCP International Program activities as determined by the priorities of the portfolio.

A list of current and potential areas for Social Science input into CRCP International activities is provided below:

- **SocMon Global** (Current Activity- CRCP SocSci Lead)
  - SocMon Strategic Plan completed
  - Ongoing assessment and monitoring activities in 6 global regions
- **GCRMN** (Current Activity- CRCP SocSci Lead)[4]
  - Caribbean – Since 2014, there has been concerted effort to revitalize the activities of the regional network. CRCP through the social science coordinator is participating on the steering committee. Other activities include conducting SocMon training as part of a combined Biophysical and Social Science methods harmonization workshop. NCCOS and NMFS personnel are also involved in the discussions and activities.
  - Global – ICRI related renewal/reorganization discussions continue. David Obura of Coastal Oceans Research and Development Indian Ocean CORDIO is one of the persons leading the global conversation.

GCRMN Caribbean (2014)

[4] There are other CRCP staff engaged in ICRI and GCRMN International related support (e.g. Britt Parker).

- **USAID** (CTI and Caribbean)
  - CTI – There is a need more direct engagement on social science support from CRCP headquarters and other partners (HML, NCCOS etc.). Current social science activity seems to be primarily focused on Ecosystem Based Approaches to Fisheries Management. Other useful social science applications can be used from other OCM and CRCP personnel.
  - Caribbean – There is a new USAID agreement for the Caribbean largely implemented through TNC as the lead partner. NOAA and CRCP should seek to be more engaged including social science related activities.
- **OCM**
  - Coordinate with other OCM units that provide capacity building, facilitation, publication and other services to CRCP Social Science International activities.
  - Manual updates, web page upgrades etc.
- **MPA Center** (Global)
  - Support NOAA (re-organized) MPA Center in their international capacity building activities
  - Coordinate capacity building efforts with NOAA MPA Center including SocMon and "How's your MPA Doing?" training modules.
- **Inter-American Development Bank** (IADB) – MOU
  - Some time ago, a MOU was either signed or there were initial discussions about signing an MOU with the IADB. CRCP Leadership should follow up on these discussions. The IADB are working on a variety of projects in the Latin American and Caribbean region on a variety of topics that overlap with CRCP focus areas (e.g. marine biodiversity, climate http://www.iadb.org/en/topics/climate-change/climate-change,19086.html, coastal protection and natural capital http://www.iadb.org/en/topics/environment/biodiversity-platform/the-idbs-biodiversity-platform,6825.html). CRCP brings leverage with the significant contribution through its previous work in the region (MPA effectiveness and SocMon for example)
- **Pacific**
  - Continued work with PIMPAC and Micronesia Partners (SEM-Pasifika)
  - Re-engage the former Pacific SEM Pasifika Coordinator to expand/resume socioeconomic work beyond Micronesia.
- **Caribbean (GCFI, other)**
  - Continue to support social science support to GCFI activities
  - Continue to strengthen the connection to Caribbean SocMon activities
- **Climate- International Activities**
  - Ocean Acidification (Support to data and information concerning Knowledge Attitude and Awareness. Other science needs)
  - Other areas where social science support needs to be including as part of integrated research planning
- **Other partnerships**
  - The World Bank funds through its GEF facility a number of Large Marine Ecosystem (LME) Projects. These project focus on these large basins and marine ecosystems in partnership with other International IGOs, United Nations Environment Programme (UNEP) etc.). One current CRCP related entry point in

the reliance on SocMon which is currently used in the Bay of Bengal LME project to support the human dimensions and socio economic monitoring components of this effort.

- **Request for Proposals and New Grants**
  - Need Social Science input into the development of future Request for Proposals (RFPs).
  - Topics for inclusion: social science and economic applications to ecosystem services and their valuation, other socioeconomic approaches to natural resource management, marine protected/managed areas, coral reef based fisheries management, other integrated approaches, capacity building etc.

SEM Pasifika Trainers and Trainees, Kosrae FSM (Peter Edwards)

Summary

Hanauma Bay, HI (Peter Edwards)

National level

There continues to be a need for the application of social sciences across the three main threat areas (Fishing Impacts, Climate and Land Based Sources of Pollution) as identified by the CRCP Goals and Objectives. The recently implemented NCRMP social science component is an important first step towards the institutionalization of collecting coral reef-relevant human dimensions data. Using this information can inform the development of indicators that can inform management and decision making.

There is an ongoing need for CRCP social science priorities to be more closely aligned to OCM/NOS as well as wider NOAA social science strategies (i.e. the recent NOAA Social Science Vision and Strategy). There continues to be a need for increasing the level of coordination and collaboration across the major CRCP programs (International, Climate, LBSP and Fish) to include human dimensions elements in their respective activities.

Internal Capacity

In addition to the ability of the CRCP Social Science Coordinator and Pacific Regional Coordinator to address the growing demand for social science data, products and support, the CRCP Social Science program will continue to rely on partners such as NCCOS to provide social science capacity through staff support. Continued funding support (staff time and services) beyond NCRMP is needed. The Pacific Regional Coordinator will need to coordinate research efforts with regional NOAA partners such as those based in PIRO and other offices to avoid overlap and duplication of effort. However, there is a need for a dedicated Atlantic Regional Social Science Coordinator to function in a comparable way for the Atlantic/Caribbean region (NCRMP and other social science support). This individual could address the capacity needs of this region while providing both domestic and international support. CRCP could draw from other NOAA offices (NCCOS), as has been done previously for additional program capacity, but this would require dedicated budget for salary and benefits for a half (1/2) or a full time position. In the short term, this staffing need could be addressed via a Sea Grant Fellow or some other term-limited position.

Jurisdictional

Implementation of NCRMP socioeconomic monitoring contributes significantly to jurisdictional data and management needs. Gaps still remain regarding local capacity building and ability to use the information obtained from these studies for effective on-the-ground conservation and management. Closer collaboration with key CRCP social science partners including NOAA's Performance, Risk, and Social Science Office, NCCOS, NMFS S&T Science Centers, and Regional Offices (e.g. PIRO (Coral Reef Ecosystem Program; CREP), Southeast Fisheries Science Center), and others should continue. The creation of a clearinghouse or website with updated tools and products is expected to assist the informational needs of the jurisdictions.

International

Advances in SocMon and SEM-Pasifika continue. These include increased funding support to regions, as well as the addition of Brazil and Micronesia. Other activities include tool development and updates to training materials key to the implementation of the SocMon Global Strategic Plan (2015-2019). It should be noted that SocMon/SEM Pasifika is not the only area of social science contribution to international capacity building and support. Other economic and social science research applications will be included as part of the current support CRCP can provide to its international partners.

Improved leveraging of CRCP Social Science skills to achieve coral reef conservation outcomes can be achieved through building new international relationships with Intergovernmental Agencies such as UNEP, GEF, IADB and the World Bank. This includes USAID-CTI and GCRMN Caribbean partnerships.

This should include working with other NOAA partners including the MPA center and OCM training centers. The strategy includes steps to build closer partnerships with these entities.

International social science applications need to be aligned with the Climate and Ocean Acidification elements of the CRCP International and Climate programs.

New Applications

Apply advanced social science approaches and promote integrated research (biophysical and social science). Social Science approaches should be integrated into new Requests for Proposals and other Grants and Cooperative Agreements. Development of integrated socio-ecological models with predictive applications should lead to improvements in decision making and forecasting of human behavior response to environmental changes.

Data and Dissemination

This strategy recognizes the need to improve data collection and storage in response to NCRMP and other data emanating from research and monitoring activities. Additionally, the integration, interpretation and dissemination of components of these streams of information will require improvements in information technology support. Central to this is improving the capability of the social science program to house, share and disseminate information via a functional web site. Better coordination with CoRIS may be able to achieve some of these dissemination goals. This applies to domestic as well as international aspects of the CRCP social science portfolio.

General Coordination

There are several social science related research and monitoring efforts that the Coral Program supports through its various funding mechanisms. As a result of the matrixed nature of the program, cross line office and within line office collaboration is not as effective as it could be. This strategy recommends setting protocols in place that **requires** exchange of information between project investigators and researchers in order to reduce duplication of effort and promote collaboration, thus leading to more efficient use of CRCP resources. Suggestions include requirements to share draft proposals with the CRCP social science community, requirements that future *Requests for Proposals* should contain provisions that the final data for projects be submitted to CoRIS, and the promotion of best practices for data sharing and the use of results in peer reviewed publications (in order to ensure full team members are consulted prior). This process could be linked to the existing CRCP Project Database reporting system. Sharing and collaboration of coral reef-related social science work can be improved with regular conference calls and webinars to foster information exchange and communication within the coral social science community.

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Appendices

Appendix 1: Jurisdictional social science priorities and needs

The information presented in the following tables is in part supported by input from the jurisdictions and is as up to date as best as possible based on responses from key partners.

American Samoa

The table below ranks the jurisdiction's social science needs according to level of priority (low, medium, high, and highest) and reference social science studies that are ongoing or have been completed in the jurisdictions. Information presented below may not be fully up to date but represents the best available information up to the time of preparing this document.

Table 1: Social science information for American Samoa — completed studies and priority needs

Info Type	American Samoa Territory-wide	Priority site 1: Vatia	Priority site 2: Faga'alu
Economic valuation	Previous studies: 11 Priority: High	Previous studies: none Priority: Medium	Previous studies: none Priority: Medium
Sustainable financing	Previous studies: none Priority: High *Need: strategy to allow villages to do their own patrolling or watershed management without relying on government funding*	Previous studies: none Priority: High	Previous studies: none Priority: High
Knowledge, attitudes and perceptions	Previous studies: 5, 6, 7, 8, 9, 12, 15 Priority: High *Need: Template to guide future site specific studies, understand perceived threats (current and future), perceived health of resource, etc.*	Previous studies: 9 **Priority: Highest** *Need: site specific information regarding KAPs of Vatia residents*	Previous studies: none **Priority: Highest** *Need: site specific information regarding KAPs of Faga'alu residents*
Social Marketing	Previous studies: 13 Priority: High *Need: Support for gathering information relevant to designing a territorial social marketing campaign – need someone who is familiar with AS social customs and norms for effective campaign*	Previous studies: none Priority: High *Need: potential future campaign for watershed management (Sea Grant)*	Previous studies: none Priority: Medium *Need: Target certain behaviors to improve watershed management, use KAP information to inform campaign*

Socioeconomic impact analysis	Previous studies: none Priority: High *Need: Impacts of MPAs. If cannery closes, look on how this affects fisheries.*	Previous studies: none Priority: low *Need: examine impact of CFMP, CBWMP, and/or NPS programs*	Previous studies: none Priority: low
Livelihood assessments	Previous studies: 5, 7, 15 Priority: low *Need: Reliance on marine resources for food/$ in new priority management sites. Note: This is different from census information.*	Previous studies: 10(?) Priority: High *Need: What are most important livelihood sources and options?*	Previous studies: none Priority: High *Need: What are primary livelihood sources and options?*
Basic demographic information	Previous studies: 4, 8 Priority: low (census coming)	Previous studies: none Priority: low	Previous studies: none Priority: low
Creel surveys	Previous studies: 2, 3, 17 Priority: High *Need: Need to include non-boat based catches, especially night time fish catches and gleaning")*	Previous studies: none Priority: High *Need: More specific information regarding fish catch in VMPA*	Previous studies: none Priority: medium *Need: More detailed assessment of catch in Faga'alu*
Coastal use studies	Previous studies: Yes Priority: Low *Need: Site-specific detailed information for potential MPA and watershed management sites (Faga'alu)*	Previous studies: none Priority: low *Need: Detailed use patterns –.*	Previous studies: Yes Priority: Low *(Holst-Rice et al 2016)*
Traditional knowledge	Previous studies: 1, 9 Priority: Medium *Need: Information has already been collected at the territorial level*	Previous studies: none Priority: Medium *Need: Traditional knowledge and resource management methods specific to Vatia*	Previous studies: none Priority: Medium *Need: Traditional knowledge and resource management methods specific to Faga'alu*
Historical analysis	Previous studies: 1, 9, 14 Priority: medium *Need: Analysis of aerial photography for land use change for watershed management and climate impacts; information regarding "shifting baselines."*	Previous studies: none Priority: medium *Need: Aerial photography analysis for land-use and coastal change*	Previous studies: none Priority: medium *Need: Aerial photography analysis for land-use and coastal change*

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Commonwealth of the Northern Mariana Islands

The tables rank social science needs according to level of priority (low, medium, high, and highest) and reference social science studies that are ongoing or have been completed in the jurisdictions. Information presented below may not be fully up to date but represents the best available information up to the time of preparing this document.

Table 2: Social science information for Commonwealth of the Northern Mariana Islands—completed studies and priority needs

Info type	Jurisdiction-wide	Priority site 1: Laolao Bay	Priority site 2: Talakhaya (Rota)	Priority site 3: Garapan
Economic valuation	Previous studies: Priority: Medium *Need: info is needed for Rota and Tinian; market value and composition of reef species. Nothing new has been done between 2010-2015*	Previous studies: Priority: Medium *Need: Feed into social marketing strategy*	Previous studies: none Priority: low	Previous studies: Priority: low
Sustainable financing	Previous studies: X3 Priority: low	Previous studies: Priority: low *Need: Sustainable financing plan for Laolao could be helpful, but implementation is challenging*	Previous studies: Priority: low	Previous studies: Priority: low
Knowledge, attitudes and perceptions	Previous studies: Priority: Medium *Need:) NCRMP Socio will provide data*	Previous studies: Priority: Done RARE was a key partner	Previous studies: none Priority: High *Need: Regarding watershed management issues, fire prevention*	Previous studies: none Priority: High *Need: For planned CAP and education and outreach activities*
Social Marketing	Previous studies: **Priority: Highest (planned 2010)** *Need: Data by ethnicity and location; fishing regs; expand to look at watershed issues*	Previous studies: **Priority: Medium** *Need: SEAWEB effort and RARE*	Previous studies: none Priority: High *Need: Planned for fire prevention, hunting. Need to follow up on Schafer's work on Rota*	Previous studies: none Priority: High *Need: May be necessary for watershed management plan*
Socio-economic impact analysis	Previous studies: none Priority: High *Need: For all CRCP programs to evaluate effectiveness, outcomes; look at outcome of increased military use*	Previous studies: none Priority: High *Need: To monitor outcomes of management programs*	Previous studies: none Priority: medium *Need: After management actions to monitor impacts*	Previous studies: none Priority: medium *Need: After management actions to monitor impacts*

Basic demographic information	Previous studies: Priority: High *Need: Current info to reflect recent changes (2010 census)*	Previous studies: none Priority: High *Need: Should be available after 2010 census*	Previous studies: none Priority: High *Need: Should be available after 2010 census*	Previous studies: none Priority: High *Need: Should be available after 2010 census*
Creel surveys	Previous studies:, Priority: low *Need: Expand range of current survey (all of Saipan, Rota, Tinian), analyze nearshore reef species specifically*	Previous studies: none Priority: Low *Note: Laolao is now surveyed periodically as part of the Saipan creel survey effort.*	Previous studies: none Priority: Low *Note: Creel data for 2014-2015 collected. The pilot project is now completed*	Previous studies: Priority: low
Coastal use studies	Previous studies: 5 Priority: Medium *Note: Additional studies that could contribute to references related to Coastal Use Studies include the Climate Vulnerability Assessment and Reef Resilience and Management Recommendations Study*	Previous studies: Priority: Medium	Previous studies: none Priority: Medium	Previous studies: Priority: Medium
Traditional knowledge	Previous studies: *Note: 2013 Fisheries Workshop included quite a bit of fisheries information and surveys of traditional knowledge*	Previous studies: None Priority: low	Previous studies: Priority: underway for all islands, includes Rota	Previous studies: Priority: underway for all islands, includes Garapan area

Related Literature

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Florida

The tables rank social science needs according to level of priority (low, medium, high, and highest) and reference social science studies that are ongoing or have been completed in the jurisdictions. Information presented below may not be fully up to date but represents the best available information up to the time of preparing this document.

Table 3: Social science information for the State of Florida—completed studies and priority needs

Info Type	Southeast Florida	Dry Tortugas, Biscayne, and Everglades National Parks	Florida Keys National Marine Sanctuary
Economic valuation	Previous studies: 3, 4 **Priority: HIGHEST** *Need: HEA, damage assessment fees, conservation budget justification. Note: Economic Impact and Valuation project underway (2016)*	Previous studies: 4 **Priority: Medium** *Need: value of RNA areas, damage assessment fees*	Previous studies: 4, 6, 7 Priority: Low *Need: Not a priority at the moment. (damage assessment, value of mooring buoys, enforcement)*
Sustainable financing	Previous studies: none Priority: Meduim	Previous studies: none? PriorityMedium *Need: business plan for ENP and DTNP, sustainable funds for research activities*	Previous studies: none? Priority: Medium Potential priority
Knowledge, attitudes and perceptions	Previous studies: Priority: Medium. NCRMP Study completed. Waiting technical memorandum	Previous studies: completed- none Priority: Medium *Need: for law enforcement and compliance*	Previous studies: 10, 17 Priority: Medium *Need: expansion to additional user groups*
Social Marketing	Previous studies: none? Priority: Medium	Previous studies: none? Priority: High *Need: for ENP- related to boaters and seagrass scarring*	Previous studies: N/A Priority: Low
Socioeconomic impact analysis	Previous studies: ??? Priority: Medium *Need: NCRMP and Econ Impact Study should provide data*	Previous studies: ??? Priority:	Previous studies: 6, 8, 12, 18 Priority: High *Need: assess impacts of no-take areas*
Basic demographic information	Previous studies: 1, 21 Priority: low	Previous studies: 20 Priority: Low	Previous studies: 1, 9, 19 Priority: low
Creel surveys	Previous studies: 5, 23 Priority: low *Need: follow up to access existing data(NMFS Data)*	Previous studies: none? Priority: Medium	Previous studies: 16 Priority: High
Coastal use studies	Previous studies: 22 Priority: medium *Need: post-zoning to assess compliance, also assess change over time*	Previous studies: ??? Priority:	Previous studies: 2, 7, 9, 10, 11 **Priority: High** *Note: NCCOS Biogeo Study*

Traditional knowledge	Previous studies: ??? Priority: low	Previous studies: ??? Priority: Low	Previous studies: ??? Priority: Low
Other	Previous studies: ??? Priority:	Interest in understanding socioeconomic impacts of blue-green algae outbreaks	Cumulative impact of small vessel groundings, how do scientific data match with perceptions

Related Literature

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Leeworthy, V.R. U.S.S. Vandenberg introduced as an artificial reef in the Florida Keys. Do artificial reefs reduce pressure on surrounding natural reefs and increase local business in the community?

Study of socioeconomic effects of climate change in the Florida Keys currently underway by Hans Hoegh-Guldberg: scoping document available here: http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/hansbleachscoping.pdf

Guam

The tables rank social science needs according to level of priority (low, medium, high, and highest) and reference social science studies that are ongoing or have been completed in the jurisdictions. Information presented below may not be fully up to date but represents the best available information up to the time of preparing this document.

Table 4: Social science information for the Territory of Guam—completed studies and priority needs

Info Type	Guam-wide	Priority site 1: Piti	Priority site 2: Apra Harbor	Priority site 3: Manell Geus (Achang)
Economic valuation	Previous studies: 13 Priority: Medium	Previous studies: none Priority: low	Previous studies: none Priority: low	Previous studies: none Priority: low
Sustainable financing	Previous studies: none Priority: high *Need: Examine mechanisms such as user fees for recreational use, endowments, etc.*	Previous studies: none Priority: medium *Need: mechanism to fund enforcement*	Previous studies: none Priority: low	Previous studies: none Priority: low
Knowledge, attitudes and perceptions	Previous studies: 9, 14, X2 Priority: high *Need: understanding of perceptions regarding fisheries management, MPAs, recreational management, military buildup, tourist understanding of MPAs (Planned CZM-sponsored phone survey on attitudes towards natural resources and natural resource management)*	Previous studies: 4, 9 Priority: medium? *Need: Knowledge, attitudes, and perceptions regarding MPAs*	Previous studies: none Priority: low	Previous studies: none Priority: High *Need: improved understanding of local perceptions for social marketing campaign?- Current Socio-monitoring underway*
Social Marketing	Previous studies: 12 **Priority: HIGHEST** *Need: Focus on local attitudes towards MPAs and reefs; tourist understanding of MPAs and reduce recreational impacts; new methods for southern village outreach*	Previous studies: none Priority: high *Need: improve perceptions regarding MPAs*	Previous studies: none Priority: low (?) *Need: ?*	Previous studies: none Priority: Medium *Need: focus on arson issues*

Socioeconomic impact analysis	Previous studies: none? Priority: high *Need: impacts of military buildup; impacts of indigenous fishing rights regulations. 2016 NCRMP Survey will capture some information*	Previous studies: none Priority: medium? *Need: impacts of indigenous fishing rights regulations?*	Previous studies: none? Priority: medium *Need: understanding of impact of proposed changes*	Previous studies: none Priority: low
Livelihood assessments	Previous studies: 1 Priority: medium *Need: how reliant are people on fisheries resources*	Previous studies: none Priority: low?	Previous studies: none Priority: low? *Need: how reliant are people on harbor area*	Previous studies: none Priority: low?
Basic demographic information	Previous studies: 3 Priority: medium *Need: change (present and future). Pending NCRMP survey*	Previous studies: none Priority: low	Previous studies: none Priority: medium *Need: demographic profile of harbor users*	Previous studies: none Priority: low
Creel surveys	Previous studies: 11 Priority: medium *Need: expand data collection and improve analysis of collected information to assess socioeconomic characteristics of fishermen*	Previous studies: none? Priority: low?	Previous studies: 11 Priority: low (good data for this area from current creel survey)	Previous studies: none? Priority: low
Coastal use studies	Previous studies: 5, 6, 10 Priority: high *Need: Recreational use; fishing extent, importance, and impact;, accessibility; development*	Previous studies: 7 **Priority: HIGHEST**? *Need: Completed for recreational use; needed for non-recreational, accessibility issues, development*	Previous studies: none? **Priority: HIGHEST**? *Need: Fishing, recreational use (commercial and local), marine lab research, military and non-military use, yacht club, other*	Previous studies: none **Priority: HIGHEST**? *Need: Recreational use; fishing extent, importance, and impacts; accessibility; development*
Traditional knowledge	Previous studies: 2, 8, X1 Priority: high *Need: elder fisher surveys on fishing methods, resource status and change over time, and management strategies to improve management initiatives and gain local support*	Previous studies: none Priority: low	Previous studies: none Priority: low	Previous studies: none Priority: low

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Hawaii

The tables rank social science needs according to level of priority (low, medium, high, and highest) and reference social science studies that are ongoing or have been completed in the jurisdictions. Information presented below may not be fully up to date but represents the best available information up to the time of preparing this document.

Table 5: Social science information for the State of Hawaii— completed studies and priority needs

Info Type	Hawaii-wide (including Northwest Hawaiian Islands)	Priority site 1: Puako/Pelekane, Big Island	Priority site 2: Kahekeili, Maui
Economic valuation	Previous studies: 1, 12 Studies underway: 15 Priority: low *Need: for planning, EIS work*	Previous studies: none Priority: low *Need: useful but low priority now*	Previous studies: none Priority: low *Need: useful but low priority now*
Sustainable financing	Previous studies: 3 Priority: medium *Need: info on sustainable financing for state MLCDs and Makai Watch programs*	Previous studies: none Priority: medium *Need: for sustaining conservation work*	Previous studies: none Priority: medium *Need: for sustaining conservation work*
Knowledge, attitudes and perceptions	Previous studies: 7,8,9,10,13 Priority: Medium *Need: NCRMP Survey Completed.*	Previous studies: X3, X4 **Priority: High** *Need: for MLCD potential, baseline to compare after LAS work*	Previous studies: none **Priority: High** *Need: for herbivore enhancement effectiveness, baseline to compare after LAS work*
Social Marketing	Previous studies: ? Priority: medium *Need: target certain behavior (e.g. acceptance of rec fishing permit)*	Previous studies: none Priority: medium *Need: after baseline assessments to target certain behavior*	Previous studies: none Priority: medium *Need: after baseline assessments to target certain behavior*
Socioeconomic impact analysis	Previous studies: 5,6,11 Priority: medium *Need: should follow management actions and rec fishing permit*	Previous studies: none? Priority: low (short-term)/ high (long-term) *Need: will be high priority after management actions*	Previous studies: none? Priority: low (short-term)/ high (long-term) *Need: will be high priority after management actions*
Livelihood assessments	Previous studies: 5 Completed-??? Underway- yes, in Haena, Kauai Priority: high	Previous studies: none Priority: high *Need:*	Previous studies: none Priority: high *Need:*
Basic demographic information	Previous studies: 4 Priority: low *Need:*	Previous studies: none? Priority: high *Need: possible through census?*	Previous studies: none? Priority: high *Need: possible through census?*
Creel surveys	Previous studies: done for Hanea, Hookena, Mauanalua, Kaneohe Priority:	Previous studies: X1 Priority: high *Need:*	Previous studies: none Priority: high *Need:*

Coastal use studies	Previous studies: 7,8,9 Priority: high *Need: should include watershed use as well*	Previous studies: X1, X2 **Priority: High** *Need: in detail to serve as baseline for priority sites*	Previous studies: none **Priority: High** *Need: in detail to serve as baseline for priority sites*
Traditional knowledge	Previous studies: 11 Priority: medium	Previous studies: none? Priority: medium *Need: should be part of other studies*	Previous studies: none? Priority: medium *Need: should be part of other studies*

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Unknown Status
SEM-Pasifika in Hookena, Big Island

TNC Coastal Use Survey for Puako

Coastal Use Mapping project for Puako-Pelekane

TNC Conservation Action Planning for Kawaihai/Keahole region

Fishermen Information Networks Study

Puerto Rico

The tables rank social science needs according to level of priority (low, medium, high, and highest) and reference social science studies that are ongoing or have been completed in the jurisdictions. Information presented below may not be fully up to date but represents the best available information up to the time of preparing this document.

Table 6: Social science information for the Puerto Rico—completed studies and priority needs

Type of social science information needed	Puerto Rico-wide	Priority site 1: Culebra	Priority site 2: North East Reserves	Priority site 3: Cabo Rojo	Priority site 4: Guanica
Economic valuation	Previous studies: 5 (for eastern reefs) Priority: **High** *Need: expand economic valuation study to rest of Puerto Rico to provide one value for entire jurisdiction. Needs to relate to management action. Other potential priorities: Economic valuation study of recreational fishing, economic valuation of Laguna Grande Biolumenescent Bay in Fajardo. EPA/NOAA study underway*	Previous studies: Priority: low	Previous studies: 5 Priority: low	Previous studies: Priority: low	Previous studies: Priority: low
Sustainable financing	Previous studies: none? Priority: **HIGH** *Need: sustainable financing plan for natural reserve sites, including alternatives to fee collection by DNER*	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low
Knowledge, attitudes and perceptions	Previous studies 11, 13, 14 Priority: **Medium** *Need: NCRMP Survey completed (2015)*	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low
Social Marketing	Previous studies: 15 Priority: **HIGHEST** *Need: 1. campaign to increase catch of lionfish (and use by chefs, etc).* *2. campaign targeting the judiciary sector (lower priority)*	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low

Socioeconomic impact analysis	Previous studies: 7, 8, 9 , 11, 12 Priority: **HIGHEST** *Need: 1. determine current and future impacts of lionfish invasion (highest priority)* *2. to determine potential impacts of coral bleaching mitigation measures in Bleaching Response Plan* *3. to determine impacts of fishing restrictions (eg. conch, grouper, snapper)*	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low
Community-level anthropological studies and livelihood assessments	Previous studies: 7, 8, 9 Priority: **HIGH** *Need: Replication of study, #7 (ref below) to understand changes since fieldwork was conducted in 2003-04.*	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low
Basic demographic information	Previous studies: Has been done by U. Puerto Rico and DNER for some sites, including Boqueron, Tortuguera, and Jobos Bay. Also, Census 2010 Priority: low; medium for Tres Palmas *Need: collection of demographic information for Tres Palmas NCRMP Survey completed (2015)*	Previous studies: Priority: medium Need:	Previous studies: Priority: medium Need:	Previous studies: Priority: medium Need:	Previous studies: Priority: medium Need:
Creel surveys	Previous studies: 1,2,3, 6 Priority: medium *Need: understanding of subsistence fishing (ie. What % of local food supply comes from subsistence fishing). Also need to analyze and report on all creel survey data collected by MFRSS. MRIP Regional Implementation Plan for the U.S. Caribbean Region in development (2016-17).*	Previous studies: Priority: Need:	Previous studies: Priority: Need:	Previous studies: Priority: Need:	Previous studies: Priority: Need:
Traditional knowledge	Previous studies: some previous work (need references) Priority: medium *Need: understanding of knowledge held by recreational fishermen*	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low
Historical assessment	Previous studies: none Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: none Priority: medium *Need: Photo documentation of landscape transformation*

Related Literature

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US Virgin Islands

The tables rank social science needs according to level of priority (low, medium, high, and highest) and reference social science studies that are ongoing or have been completed in the jurisdictions. Information presented below may not be fully up to date but represents the best available information up to the time of preparing this document.

Table 7: Social science information for the US Virgin Islands—completed studies and priority needs

Info Type	USVI-wide	Priority site 1: St. Croix East End Marine Park (EEMP)	Priority site 2: St. John: Coral Bay & Fish Bay	Priority Site 3: St. Thomas East End Reserve (STEER)
Basic demographic information	Previous studies: 4, 11 (for fishers) Priority: low	Previous studies: 17 Priority: low *Need: completion and dissemination of 15*	Previous studies: Priority: high as part of coastal use study *Need: understand users of Coral Bay and Fish Bay*	Previous studies: none Priority: high as part of coastal use study *Need: understanding of socioeconomic characteristics of STEER residents and users* *Completed as part of STEER Coastal Use Mapping Study (2012) and STEER Watershed Assessment (2013)*
Coastal use studies	Previous studies: none Priority: low	Previous studies: Priority: low *Need: understanding of usage levels* *Initially completed in 2011, repeated by partners (2013)*	Previous studies: Priority: high for 2012 *Need: understand levels of use of Coral Bay and Fish Bay*	Previous studies: 5; aerial photography exists that could be digitized Priority: HIGHEST *Need: understanding of usage levels* *Coastal Use Mapping Study completed (2012)*
Knowledge, attitudes and perceptions	Previous studies: 10, 12 Priority: High; *Need: measure change in attitudes and perceptions; NCRMP Survey pending 2017*	Previous studies: 15 Priority: low *Need: track changes since 2009-10*	Previous studies: Priority: high *Need: Need: understanding of stakeholders*	Previous studies: Priority: High *Need: understanding of stakeholders* *Completed as part of STEER Coastal Use Mapping Study (2012) and STEER Watershed Assessment (2013)*

Social Marketing	Previous studies: 13 Priority: medium for mid-level policy makers, Medium *Need: raise awareness of policy makers of coral reef value, importance of management. MOES VI project completed 2014*	Previous studies Priority: medium *Need: community engagement strategy; messaging to build pride in EEMP*	Previous studies: none Priority: low	Previous studies: none Priority: low
Economic valuation/ follow up	Previous studies: Priority: Medium *Need: cost benefit analysis of management measures, follow up with damage assessment(van Beukering et al study completed)*	Previous studies: Priority: low	Previous studies: none Priority: low	Previous studies: none Priority: medium *Need:* cost-benefit analysis for development within STEER
Sustainable financing	Previous studies: Priority: low- more appropriate at site level	Previous studies: 15 Priority: low *Need: implementation*	Previous studies: none Priority: low	Previous studies: 16 Priority: low *Need: implementation*
Livelihood assessments	Previous studies: 9, 14, 17 Priority: low	Previous studies: none Priority: low	Previous studies: none Priority: low	Previous studies: none Priority: low
Socioeconomic impact analysis	Previous studies: 1,2,3,7,9,10, 11, 12 Priority: low	Previous studies: Priority: High (after no-take area is enforced) *Need: understanding of impacts from no take*	Previous studies: Priority: Low	Previous studies Priority: low
Creel surveys	Previous studies: 3, 6, 15 Priority: high for recreational fishing *Need: MRIP Regional Implementation Plan for the U.S. Caribbean Region in development (2016-17).*	Previous studies: Priority: Medium *Need: understanding of level of use and targeted species, overall impact to ecosystem.* ***Study completed Aug 2015***	Previous studies: Priority: Medium *Need: understanding of level of use and targeted species, overall impact to ecosystem (lessons from St Croix Study)*	Previous studies: Priority: Medium *Need: understanding of level of use and targeted species, overall impact to ecosystem*
Traditional knowledge	Previous studies: 17, 18 Priority: low	Previous studies: Priority: low	Previous studies: Priority: low	Previous studies: Priority: low

Governance assessments	Previous studies Priority: Medium Linked to CRCP funded capacity assessment	Previous studies Priority: low	Previous studies Priority: low	Previous studies Priority: low

Related Literature

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Appendix 2: Types of social science information collected by the CRCP

The following list provides a selection of different management question that may be answered using various social science tools.

How much are coral reef resources in my jurisdiction worth? Will this value change due to implementation (or lack of implementation) of various management strategies? What is the replacement value for a given area of coral reef?

Economic valuation- involves assigning a dollar amount on resources that are not normally bought or sold (e.g. coral reefs, clean air, etc.). Can be used in cases of damage assessment (e.g. ship groundings). Can also be used to model changes in resource value due to changes in the resource (e.g. improvements in coral reef health due to reduction in land-based sources of pollution).

How can I implement the strategies recommended in the economic valuation study that was completed for my jurisdiction? How might economic values change under different management strategies (when conditions change, how will economic values change?)

Economic valuation technical assistance and follow up- once an economic valuation study has been done a jurisdiction may have a need for follow-up assistance to better incorporate the findings of the report into management. Specific targeted studies may also be needed once the original report is outdated or is not specific enough to meet management goals.

How can we identify a permanent source of funding to staff a new MPA and enforce its regulations?

Sustainable financing- usually refers to a protected area or system of protected areas. Involves developing a business plan to identify financing mechanisms from various sources including users, governments, corporations, private donors, foundations, and NGOs to meet the financial goals of that site or network. Can include collection of user fees to pay for management actions such as hiring of enforcement officers

Do local residents understand the new fishing regulations that have been put in place? Do they support the regulations? Why or why not? Do they feel the regulations are working?

Knowledge, attitudes, and perceptions (KAP)- General term for a study that is usually achieved through a survey. Determine understanding of and support for various management strategies, including new or existing regulations. Determine perceptions of resource conditions and threats. Can be used to determine effectiveness of educational and outreach strategies, particularly when implemented both before and after the strategy. Can be applied to tourists, local residents living near or using a particular site, or jurisdiction-wide.

What are non-economic values (such as mental health, cultural importance) of marine resources? How to stakeholders perceive resource condition, management, use, equity issues, etc.?

Attitudes, beliefs, values (ABV) – These are similar to KAP above, but have more to do with a population's subjective perception of issues relating to marine resource such as resource condition, people's behavior, existence value of resources, and other public attitudes or beliefs that might affect public actions and response to management policies.

How can we get people to stop doing X and start doing Y?

Social marketing – use of social science and marketing techniques to bring about specific changes in behavior. Can be used to design more effective outreach strategies to effect behavior change (e.g. stop damaging activities such as littering; start positive activities such as recycling).

What impact are management regulations having on local populations and stakeholder groups? How has behavior changed in response to new policies?

Social impact analysis – an analytical technique that identifies and assesses demographic, local government and community concerns. Can be used to analyze the social impacts of policy measures or to consider trade-offs between various measures and their distributional impacts on different stakeholder groups. Social impact analysis can also inform managers as to ways to enhance the positive impacts of management activities and minimize their adverse impacts.

How are marine resources used and distributed? What social factors drive (and control) resource use? How reliant are communities on coral reef resources for their livelihoods?

Community-level anthropological studies and livelihood assessments – provide in-depth analysis of local level resource use and social, cultural, and institutional factors that affect human resource use. This can include community studies, analysis of fish distribution, fishing patterns, community-based management practices and customs, community dependence on marine resources for livelihood purposes, in-depth information regarding the use (who, what, where, when why) of coral reef and other marine resources. Can also assist in assessing alternative livelihood options for resource users affected by management decisions.

Who are my constituents? What is the ethnic and/or gender make-up of coastal resource users? How has the population distribution of the region changed over time? How might poverty affect resource use?

Basic demographic information – this is the type of information that is collected via the census or other regularly scheduled government efforts. Because census data is in aggregate form for the population at large, and only collected at 10 year intervals, it can be of limited use when trying to characterize a smaller defined population of resource users (e.g., fishing-dependent households, residents of a coastal community, etc.). Basic demographic information can be collected in a smaller-scale or targeted way to look at trends for a population of interest and monitor changes over time.

Examples of demographic information:

Total population	Gender ratio	Age structure
Occupation	Education level	Poverty
Ethnicity	Language	Household income

How much fish is caught in my jurisdiction? What types of fish? Where? When? What gear types are used?

Creel Surveys – (named after the "creel" basket where fishermen used to place their catch before the days of coolers) are a type of intercept survey, usually conducted with fishermen at access or landing sites. A sample of fishermen are interviewed regarding their catch (species, number, length or weight), time spent fishing, and location of fishing effort. The sample is then projected to determine total harvest

by species, catch per unit effort (CPUE), and fishing location trends. The interview can also provide an opportunity to obtain additional information from fishermen (including demographics, knowledge, attitudes, etc.). Creel surveys provide valuable data regarding the state of the fishery and changes over time, but they are time and labor intensive, require consistent long-term data collection (often throughout the year to capture different seasons), and require significant technical expertise in sampling design and data analysis.

Who is using marine resources? Where do different activities take place? How do people interact with the marine environment?

Coastal use studies – this information can be assessed through household surveys or targeted surveys of coastal users. Participatory mapping techniques can also be applied.

What are traditional local beliefs regarding marine resources? Are there traditional methods of managing marine resources that are more socially acceptable? Is there information regarding marine species and changes in condition in a region where biological data collection has been poor? Do certain species or places have particular local cultural significance that could help strengthen my management programs?

Traditional Knowledge – documenting "traditional knowledge" regarding coral reef ecosystems involves a more qualitative approach to data gathering. Information is generally collected via in-depth interviews or focus groups rather than surveys to understand local and historical practices, values, beliefs, and understandings of ecological processes. This information is often under-documented and can be important in gaining an understanding of local practices, perceptions, and changes over time, particularly when long-term or historical information is sparse or absent. Traditional knowledge is also useful in designing programs to engage local communities in resource management and monitoring, understanding the local social, cultural, and economic implications of policies and regulations, and designing effective education and outreach programs. Documenting traditional knowledge can be time and labor intensive and requires specialized methods and local expertise to document, analyze correctly, and present in an accessible format. Information collection can be conducted during a single time period rather than establishing a long-term data gathering program.

Examples of types of traditional knowledge:
Local and traditional methods of marine management
Local and cultural values of marine resources
Changes in resource use and/or condition over time
Local implications of management practices
Beliefs and legends regarding natural resources

How were marine resources used or valued in the distant past (before living memory)? What was the past condition of marine and coastal resources (before records were kept)?

Historical Studies – getting at information regarding the condition, use, or value of marine and coastal resources when records are not available is useful to better understand shifting baselines, as well as past influences on current resource use and condition. Archival documents, such as old newspapers, explorer/missionary accounts, naval and government records, etc., can provide insight into resource use and condition before living memory. Archeological records, including fish bone assemblages and fish hooks, can also provide information regarding prehistoric fishing methods and fish catch. Examination of historic aerial photographs might provide insight into historic resource condition, coastal erosion rates, and historic patterns of development or watershed uses.

Appendix 3: Social science-related CRCP National Objectives

CLIMATE CHANGE IMPACTS OBJECTIVES

Objective C2.3: Characterize socioeconomic effects of climate change impacts on coral reef ecosystems to identify vulnerable reef-dependent human communities and understand the impacts to these communities.

We will both develop our ability to forecast impacts of climate change on human systems and to monitor impacts as they occur. By understanding how climate change impacts influence human systems, we will better understand the cost of action and inaction to mitigate greenhouse gases and adapt to impacts.

Potential Activities:

Identify vulnerable human communities in order to communicate levels of risk [5 year]
Establish socioeconomic baselines at key sites against which to measure future change [5 year]
Establish socioeconomic indicators (behavior, resilience, adaptation and maladaptation) of human responses to coral climate impacts on coral reef [5-10 year]
Identify socioeconomic impacts or costs associated with climate change (e.g., sea level rise) impacts on coastal communities [5 year]
Gap analysis of existing socioeconomic programs within the context of climate change [5 year]
Define criteria and identify priority sites [5 year]
Coordinate with existing socioeconomic monitoring programs [long term]

Objective C2.5: Provide and communicate regular national comprehensive risk assessments regarding the threat of climate change and ocean acidification to coral reefs and dependent human communities through relevant, existing reports such as local, national, and global reef status reports and IPCC assessments.

Information on climate change and ocean acidification and their impacts will identify reef areas most at risk and communicate the need to mitigate climate change. Assessments of risk to coral reefs are needed in such reports (e.g., *State of Coral Reef Ecosystems of the US*, *Status of Coral Reefs of the World*, and *IPCC Assessment Reports*, etc.) to support local actions to enhance reef resilience and to engender support for local, national, and global efforts to reduce greenhouse gases.

Potential Activities:

Greater representation of risk to coral reefs in IPCC Working Group II Assessments [5 year]
Provide climate change risk assessments to the US State of the Reef Report and Global Coral Reef Status Report, and global socio-economic status report [5 year]
Use risk assessments to communicate to the public and policy makers the need to mitigate climate change and reduce impacts [5 year]
Encourage and facilitate regular communications between local managers and federal experts to address critical questions, influence coral reef grant funding, and assess effectiveness of local management actions and resource conditions [5 year]

Objective C3.3: Forecast and project climate change and ocean acidification related impacts on reef-dependent social and economic systems. Coupling of physical, chemical, ecosystem, and socioeconomic models will be required to project future impacts.

Potential Activities:

Work with social science portion of CRCP to better understand and communicate human dependence on coral reefs [5 year]
Determine the economic value of predicted coral reef loss due to climate change and ocean acidification [5 year]
Project future vulnerability of reef dependent human communities in order to communicate levels of risk [5 year]

FISHING IMPACTS OBJECTIVES

One of the fundamental needs to help local jurisdictions (as well as NOAA) better understand and address the impacts of fishing on coral reef ecosystems is the **development of more rigorous and statistically reliable data collection programs for estimating coral reef fishery catch and effort.**

Objective F1.1: Support the creation or improvement of coral reef fisheries management plans that address ecological, social, and economic considerations.
Suggested plan for implementation:
1. Conduct gap analyses
2. Create timeline-driven plans to address gaps
3. Implement plans
4. Refine regulatory frameworks
• Begin process by asking managers what they feel fishing issues are, existing management strategies, and what measures are being used to measure their effectiveness, and whether management strategies have been found ineffective in order to determine whether and what changes need to be made.

Objective F1.4: Obtain necessary information on fishing effort in U.S. coral reef ecosystems by measuring fishing intensity, fishing mortality, frequency, area coverage, community dependence, etc. to inform management activities.
• Synthesize recreational and commercial fishing effort data from coral reef ecosystems where it exists
• Determine recreational and commercial effort on key species or functional groups to fill gaps;
• Characterize reef fisheries to understand community dependence and total fishing effort
• 1.3 is a high priority. This is important and necessary. However, in order to achieve this, NOAA Fisheries needs to change the way they collect fishery data. Currently, coral reefs are not separate entities for which data is collected, and they need to be. For federal waters, NOAA and the FMC's need to **identify coral reefs within their jurisdictions and set them up as separate areas for which information is obtained.**
• Need commercial, recreational, and subsistence fishing information in order to get an accurate picture of fishing effort and impacts to habitat, including through fishing species that have not been well studied such as octopus as this fishing involves trampling on reef and catching even juvenile animals. **Should work with fishers to obtain realistic estimates of fishery species** (see Objective 3.1) similar to work being done by Dr. Richard Nemeth in USVI.

Objective 1.6: Conduct applied biological, social, and economic research and monitoring to evaluate effectiveness of coral reef ecosystem management actions on key species or groups including (but not limited to):
• spawning sites, nursery habitats, or other areas critical to particular life-history stages
• biodiversity hotspots
• areas with greatest resilience or potential for restoring resilience
• areas facing greatest threats

• Compare fished with un-fished reefs and measure spatial and temporal responses to changes and differences in fishing effort and gear types;
• Increase NOAA and local capacity to collect and analyze socioeconomic and human dimensions information relevant to assessing the impacts of fishing and management activities on coral reef ecosystems
• Need to **include metrics on biodiversity in key functional groups** across major taxa (fish, corals, invertebrates, algae). Otherwise you will not be able to evaluate the effectiveness of the goal to conserve or restore biodiversity.

• FYI - EPA's Ecosystem Services Research Program in Coral Reefs is conducting research on this topic and uses a DPSIR organizing framework to link the biological, social, and economic research components. This is a prime opportunity for collaboration!

Objective F2.3: Using outputs of Objective 2.1 and 2.2, appropriate models, and socioeconomic considerations, identify MPAs that require increased protections or improved management, and areas to be considered for siting of new MPAs that protect key coral reef ecosystem components and functions.
• Develop a management needs and effectiveness index for existing MPA sites.
• Research, analysis, and modeling for network development should be taking place simultaneously as capacity building for existing individual sites.

Objective F2.5: Conduct biological and socioeconomic research and monitoring to assess the performance of MPAs with respect to protection and restoration of key coral reef ecosystem components and functions.

Objective F3.1: Increase participation of stakeholder or citizen groups in fisheries management planning, decision-making, and monitoring activities that improve conservation of coral reef ecosystems.

Note – care must be taken that these activities serve to advance coral reef ecosystem conservation, not just increase participation.
• Support the creation and/or strengthening of stakeholder/citizen groups to participate in fisheries management, planning, and monitoring to improve public input into and buy-in for decision making.
• Establish a body and/or positions within existing management agencies to liaise with fishers, other affected stakeholder groups, and indigenous communities;
• Support incorporation of locally appropriate mechanisms (including the use of traditional knowledge) for public participation in management action/priority setting initiatives
• Support implementation of community-based coral reef ecosystem fishery management plans (see Objective 1.1)
• Work with existing or new community-based programs to **include the public in resource or socioeconomic monitoring** activities (see Objectives 1.6, 2.5, 3.4 and 4.4)
• Ensure that local needs, concerns, and **issues of equity** are considered in fisheries regulations

Objective F3.3: Work with partners to identify economic alternatives that reduce effects of non-traditional extractive livelihoods on coral reef ecosystems and provide options for communities impacted by coral reef fisheries management actions.
• Facilitate regional and/or local discussions on development and implementation of ecotourism opportunities, appropriate aquaculture development, or other non-extractive sources of income
• Educate users on the importance of reducing or optimizing fishing pressure to achieve long-term sustainability of fishery;
• Understand and balance coral reef fisheries with non-extractive activities

Objective F3.4: Conduct biological and socioeconomic research and monitoring necessary to assess the effectiveness of compliance and enforcement activities, understand community concerns, flag roadblocks to implementation, and incorporate into management efforts.

There is a need for research to **understand values and motivations driving individual fisheries and components**. This is particularly important in management design where a stock or area is targeted by a number of groups with significantly different motivational drivers, or constraints on effort - subsistence, local market/extended family, commercial market income generation, global market big red fish.

Objective F4.3: Develop targeted, locally-relevant outreach and communication strategies to increase community understanding and support for regulations to protect key coral reef ecosystem species/functional groups and expanded use of marine protected areas.
• Develop multi-leveled approach (resource users, community leaders, policy makers, future generations, etc.)
• Utilize social marketing approaches
• Help jurisdictions deal with liability issues (school children, public in-water programs, etc.)
• Link to needs of local coral reef fisheries management plans.
• Many people go to the Keys to dive, however many have little understanding of coral ecosystems. The dive operators have a vested interest in the ecosystem and should be encouraged to **incorporate reef education into their dive classes and trips**. Most of the dive sites are offshore so transit time would provide opportunity to educate. This is a good practice to instill, even in those areas where tourism is not a currently causing significant damage.

Objective F4.4: Obtain socioeconomic and human dimension data to inform jurisdiction-specific education and communication strategies and initiatives and monitor program outcomes.

LAND BASED SOURCES OF POLLUTION IMPACTS OBJECTIVES
Objective L3.5: Increase public and political awareness and understanding of the ecological and socioeconomic impacts of land-based pollution on coral reef resources to promote better stewardship and informed decisions regarding activities in watersheds that may adversely impact coral reef ecosystems.
Potential activities include:
• Identify and value services (ecological, economic, and social) of coral reefs to local and regional communities and provide information regarding the cost of the loss of such services due to the impact of land based sources of pollution.
• Conduct attitude/perception surveys to help guide awareness programs and measure their effectiveness
• Develop targeted education and outreach materials at the coral reef watershed ecosystem level.
• Support education of elected officials, key constituent groups, and the public regarding matters related to the impacts of land-based sources of pollution on coral reefs, including: beneficial management actions, BMPs for stormwater, individual action, wetland/mangrove/dune protection, etc.

Oahu, HI (Photo-Peter Edwards)