



US National Oceanic and Atmospheric Administration
Coral Reef Conservation Program
Social Science Strategy: 2010-2015

**U.S. National Oceanic and Atmospheric Administration
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 Social Science Strategy: 2010-2015
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Cover photo: Village elders in Sawasawaga, Papua New Guinea. Photo Credit: Christy Loper

Executive Summary

This document lays out the strategic priorities for the NOAA Coral Reef Conservation Program's social science program over the next five years, 2010-2015. Priorities identified in this document will receive preference for funding and technical support from the CRCP. Although the priorities are defined as discreet projects, they form a cohesive whole that will provide greater benefit to the CRCP if implemented as a set.

At the national level, 11 priorities have been identified for the CRCP to undertake by 2015:

1. Increase regional capacity to use social science to answer key management questions.
2. Develop a survey question bank and template survey examples to assist jurisdictions in designing socioeconomic assessment and monitoring programs (to support recommendation #3, below).
3. Develop a long-term national social science monitoring program that includes territory-wide surveys in each of the jurisdictions to track CRCP performance measures and progress on CRCP Goals & Objectives.
4. Support jurisdictions in local socioeconomic assessment and monitoring of priority sites and management activities.
5. 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).
6. Identify, compile, and provide access to social science studies that have been conducted in all US jurisdictions.
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.
8. Strengthen existing community-based management efforts and develop additional capacity for community participation in place-based management activities in the jurisdictions.
9. Support efforts to better understand the socioeconomic implications of climate change in coral reef jurisdictions.
10. Assist jurisdictions in making use of information obtained through previously completed jurisdictional economic valuation studies.
11. Develop a standard approach for undertaking feasibility studies of alternative livelihoods for priority sites.

In addition, each of the seven U.S. states and jurisdictions containing coral reefs have identified priorities are laid out by social science information type as well as by priority site. These priorities are found in this document in the section titled, "Jurisdictional-level social science priorities."

Commonalities include supporting coastal use studies for priority sites as well as documentation of traditional knowledge and support for specifically identified social marketing campaigns. The CRCP will place most emphasis on those jurisdictional social science priorities that most clearly support the jurisdictionally identified management priorities (notated with an asterisk in the each jurisdictional table).

Introduction

Background

In 2007, the NOAA Coral Reef Conservation Program (CRCP) underwent an external review by an expert panel to provide an independent assessment of the CRCP's effectiveness in meeting its mandates and to suggest recommendations for future improvement. One of the major recommendations of the external review was the need to increase the CRCP's social science portfolio and use social science strategically to improve coral reef management by engaging local communities and better assessing the social and economic consequences of management policies, interventions and activities on local communities. In response, the CRCP has developed this Social Science Strategy (Strategy) to identify and prioritize those social science projects that should be facilitated by the CRCP to further coral reef management in the U.S. coral reef jurisdictions. This Strategy was developed by NOAA social scientists and partners in consultation with local coral reef managers from each of the US coral reef jurisdictions. This document will inform the CRCP's social science activities from 2010-2015 and is intended for use by CRCP staff, partners, and grantees.

Priorities

This Strategy is focused on increasing the strategic use of social science tools in US coral reef jurisdictions. The objective of this Strategy is to prioritize those social science activities and information needs that should be facilitated by the CRCP to further coral reef management in the jurisdictions.

This Strategy prioritizes provision of additional social science capacity within the jurisdictions as well as collecting critical baseline data, including socioeconomic assessments and coastal use mapping, for priority management sites. Incorporating socioeconomic factors into National Coral Reef Monitoring Plan is another priority recommendation at the national level. Understanding the social and economic implications of new and existing management policies, interventions and activities is also an important element of this Strategy.

Finally, the CRCP will provide support for socioeconomic monitoring of priority coral reef management sites as identified by the jurisdictions. This includes both socioeconomic analysis following implementation of new management measures, as well as ongoing jurisdictional or site-based monitoring to measure changes over time in:

- knowledge, attitudes and perceptions relating to coral reef resources
- demographics of human populations that influence coral reef resources;
- patterns of coastal, marine, and watershed use; and
- effectiveness of CRCP and jurisdictional education and management initiatives designed to influence human attitudes and behavior

Connecting jurisdictional, national, and international priorities and activities

Provided within this document are national and jurisdictional priorities. Although they are presented in separate sections, synergies exist between the two. In particular, activities that were prioritized by a majority of jurisdictions were elevated to national level priorities to provide coordinated support.

While this document focuses on national and jurisdictional social science priorities of the CRCP, 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 in Pacific Island Countries, SEM-Pasifika).

Process

The CRCP Social Science Strategy coordinates with four major strategic planning efforts that are part of the CRCP:

1. NOAA Coral Reef Conservation Program Goals & Objectives 2010-2015 (CRCP Goals & Objectives), published June 2009. Final social science related goals and objectives are provided at the end of this document in Appendix 2.
2. Management priorities being identified by each jurisdiction, also part of larger CRCP effort to identify coral reef management priorities. This process occurred June 2009-April 2010.
3. Development of a National Coral Reef Monitoring Plan, to include socioeconomic factors. This process will take place June 2010-June 2011.
4. CRCP Communications, Education and Outreach Strategy: 2010-2015. To be published simultaneously with this Social Science Strategy.

Social science programs will be integrated, to the extent possible, with other management-relevant information collected through biological and other monitoring programs within CRCP. For instance, climate resiliency planning activities coordinate with sea-level rise and climate models which are based on the most appropriate climate change modeling scenarios. Social science information collected for MPA planning will be integrated with biological and physical data obtained for each site. We expect that the jurisdictional management priorities and National Coral Reef Monitoring Plan will help to coordinate CRCP research, monitoring, and management activities for different disciplines.

National-level priorities were developed in consultation with an advisory board of social scientists who have experience working with NOAA and CRCP partners in multiple coral reef jurisdictions. Jurisdictional priorities were developed in consultation with representatives from local partner agencies¹. The authors also reviewed the strategic planning documents listed above to ensure coordination of the Strategy with CRCP program and jurisdictional goals, objectives, plans, and priorities.

¹ The advisory board was consulted through a series of conference calls and via email to review Strategy drafts. Representatives from jurisdictional partner agencies were presented with a list of social science information types offered through CRCP (similar to Appendix 1), as well as a worksheet designed to assist them in laying out local social science information needs, priority sites, and previous or ongoing studies. The authors met with jurisdictional partners individually, in groups, or via phone conference to explain the Strategy and receive jurisdictional input and feedback.

National-level social science priorities

These recommendations were developed by NOAA social scientists and partners to respond to national-level social science needs as well as to implement the CRCP Goals and Objectives. Refer to Appendix 1 for explanations and definitions of the social science information types referenced below. The recommendations are listed in order of priority.

Recommendation #NP-1: Increase regional capacity to use social science to answer key management questions.

Short term: Hire one to two regional social scientists to provide support to the Caribbean and Pacific island regions. Working through partnerships with local universities, government agencies and non-governmental organizations, these regional social scientists would assist in building local capacity through providing trainings and mentoring opportunities, assisting in design and implementation of sociocultural and socioeconomic assessment and monitoring programs, and ensuring timely delivery of useful and understandable social science information to local managers.

Long term: As regional capacity is built, regional social scientists will transition from training and mentoring roles to coordination and strategic planning roles. Technical assistance and assistance with methodological design and data analysis will continue to be provided to the jurisdictions as needed.

Responding to: jurisdictional capacity needs and each of the social science-related CRCP National Objectives, all of which require additional capacity to undertake.

Recommendation #NP-2 In preparation for recommendation #NP-3, below, develop a survey question bank and template survey examples to assist jurisdictions in designing socioeconomic assessment and monitoring programs.

Work with the Office of Management and Budget to obtain generic clearance for certain sampling strategies and commonly used questions to streamline survey implementation. This would include questions regarding socioeconomic aspects of issues such as climate change, fishing impacts, land-based sources of pollution, MPAs and other conservation measures, compliance, and enforcement issues. Create an online resource that will house the social science question bank, as well as example surveys used in different jurisdictions for various socioeconomic assessment and monitoring programs. Provide updated contact information of people who are willing to serve as resources to assist with socioeconomic efforts, review surveys and sampling strategies, and share suggestions and experiences.

Responding to: Fishing Impacts Objective F3.4 on enforcement and compliance, Climate Change Objective 2.3 on understanding human impacts from climate change, Land-Based Sources of Pollution Objective L3.5 on increased public and political awareness

Recommendation #NP-3 Develop a long-term national social science monitoring program that includes territory-wide surveys in each of the jurisdictions to track CRCP performance measures and progress on CRCP Goals & Objectives.

Coordinate social science monitoring as part of the CRCP National Coral Reef Monitoring Program. Survey each jurisdiction every three years to track changes over time in 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 nation-wide survey of the US population. Coordinate CRCP social science monitoring with biological and other monitoring efforts.

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

Recommendation #NP-4: Support jurisdictions in local socioeconomic assessment and monitoring of priority sites and management activities.

Short term: Work with partners including the NOAA Coastal Services Center and NOAA MPA Center to gather baseline information for at least two priority management sites or areas per jurisdiction that will be affected by new management measures. This should include human use information and coastal use mapping, demographic profiles, economic valuation, and knowledge, attitudes, and perceptions of relevant user groups. This information can be used to help predict and model impacts of potential management interventions (such as MPAs, catch shares, new regulations) and inform the development of optimal strategies. The information will serve as an important baseline against which to measure future change and determine management effectiveness.

Long term: Assist jurisdictions in ongoing socioeconomic monitoring of local priority management sites (3-5 year frequency). These surveys will be site-specific to measure impacts of management interventions and engage in adaptive management strategies. Work with partners (eg. National Centers for Coastal and Ocean Science, Coral Reef Ecosystem Division, jurisdictional scientists) to integrate biophysical and socioeconomic monitoring activities at priority sites.

Responding to: CRCP Fishing Impacts Objective F2.5 to assess performance of MPAs and Fishing Impacts Objective 2.3 to adaptively manage MPAs; specific priority objectives from the CRCP Jurisdictional Management Priorities (e.g. Guam Objective B3: Increase socioeconomic monitoring and research to better understand the interactions of users with the resources)

Recommendation #NP-5: 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 SocMon and SEM-Pasifika initiatives have successfully demonstrated NOAA leadership in provision of guidelines, training, funding and technical assistance for community-based socioeconomic monitoring. While these initiatives primarily operate internationally, SocMon and SEM-Pasifika projects have occurred in 6 of 7 US Coral Jurisdictions, providing bridges between domestic and international social science work.

Recommendation #NP-6: Identify, compile, and provide access to social science studies that have been conducted in all US jurisdictions.

- a. Conduct jurisdiction-by-jurisdiction assessment of information that has been collected to date on fisheries effort and make recommendations on gaps to inform the development of comprehensive fishing effort monitoring programs. Coordinating with larger NOAA efforts to engage the recreational fisher community, this assessment would be done in partnership with Marine Recreational Fisheries Statistics Survey (MRFSS), Western Pacific Fisheries Information Network (WPacFIN), NMFS, and local fisheries agencies.
- b. Compile an annotated bibliography of all social science studies conducted and information collected to date in each jurisdiction. This would include, for example, economic valuation of coral reef resources, knowledge, attitudes, and perceptions relating to coral reef ecosystems and management policies, traditional and local ecological knowledge, etc. This bibliography would augment the references provided in the jurisdictional sections of this document, and be accessible through bibliographic software. Continue to assess data gaps to inform comprehensive long-term monitoring programs.
- c. Update this list on an ongoing basis or as needed.

Responding to: 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).

Recommendation #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. Provide guidance to the jurisdictions on obtaining additional resources for social marketing. In the future, work with partners to develop training programs and standard approaches for implementing a social marketing campaign.

Need: 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. Social marketing is also a goal of the CRCP Communications, Education and Outreach Strategy. As such, there is a need to develop a concerted approach to this tool at the national level.

Recommendation #NP-8: Strengthen existing community-based management efforts and develop additional capacity for community participation in place-based management activities in the jurisdictions. Incorporate the cultural and traditional knowledge of local communities into management. This can be achieved through direct involvement of community-based management groups in socioeconomic assessment and monitoring programs, including local citizen and stakeholder groups in CRCP-sponsored training and capacity building activities, participatory mapping, and providing opportunities for networking and learning exchanges for community groups. Collection of socioeconomic information can also be oriented towards information that will inform efforts to strengthen community capacity for participation in management, as well as gain a better

understanding of local cultural and traditional knowledge regarding marine resources.

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

Recommendation #NP-9: Support efforts to better understand the socioeconomic implications of climate change in coral reef jurisdictions. Build on recent pilot studies in the Florida Keys (Hoegh-Guldberg, in press) and American Samoa (Wongbusarakum, et al., 2009; Levine, Fletcher, and Sauafea-Leau, in prep.) to develop appropriate tools to assess human vulnerability and resilience to climate impacts. Work with local communities and jurisdictional agencies to develop place-based strategies to better plan for resiliency and adaptation to climate impacts.

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.

Recommendation #NP-10: Assist jurisdictions in making use of information obtained through previously completed jurisdictional economic valuation studies. By December 2010, each of the US jurisdictions will have completed economic valuation studies of the jurisdictions' coral reefs. Coral reef managers in several jurisdictions have requested assistance in ensuring that recommendations set forth in the studies be implemented and that the studies are used for outreach and policy change as appropriate.

Responding to: jurisdictional requests for follow-up technical assistance on previously completed economic valuation studies.

Recommendation #NP-11: Develop a standard approach for undertaking feasibility studies of alternative livelihoods for priority sites. The CRCP Goals & Objectives include the need for an economic alternative study. Although this falls within the purview of social science, the CRCP does not currently have capacity to address this objective. In the absence of additional capacity, addressing this objective will be slated for the 2026-2020 time frame.

Responding to: Fishing Impacts Objective F3.3 on economic alternatives.

Jurisdictional-level social science priorities

NOAA CRCP's Social Science Program works through strong partnerships with each of the seven coral reef jurisdictions in the U.S. Pacific and Atlantic/Caribbean regions. In developing this Strategy, CRCP's Social Science program consulted with multiple representatives from each jurisdiction to determine jurisdictional-level priority social science needs, as well as priority sites for management activities for 2010-2015. These priority sites were determined through the CRCP Jurisdictional Management Priority-Setting Process, and priorities were cross-checked with the Jurisdictional Management Priority documents to ensure coordination. The jurisdictional social science priorities are intended to be complementary to the national-level social science priorities while also taking into account the place-specific needs of each jurisdiction.

The following sections provide an overview of social science activities and priorities in each jurisdiction. These sections are intended to serve both as a reference for existing information, as well as a resource to guide future activities planned at the jurisdictional level. It is not expected that each priority will be met during the timeframe of this Strategy, rather that the prioritization of activities will assist in jurisdictional-level management planning and in directing CRCP and other resources to the jurisdictions to accomplish management objectives.

Each section includes a table listing priority social science needs for each jurisdiction at the state/territorial level, as well as social science information needs for priority management sites that were prioritized during the jurisdictional management planning process. The program will continue to collaborate with other agencies to support socioeconomic research and monitoring some non-priority sites, but the focus of program efforts for the duration of this Strategy will be supporting priority management sites, as well as jurisdiction-wide efforts.

Social science needs have been ranked by each jurisdiction and are presented in the tables according to level of priority (low, medium, high, and highest). The CRCP also crosswalked these projects with the jurisdictions' management priority setting documents (<http://coralreef.noaa.gov/aboutcrp/strategy/reprioritization/managementpriorities/>). Projects with asterisks are those prioritized by both the CRCP and the jurisdiction and references to management priorities (MPs) are provided in parentheses. Also presented is a list of previous studies that are ongoing or that have been completed in each jurisdiction. The numbers cited following the heading "Previous studies" in the table correspond to the reference numbers provided in the list of references section for each jurisdiction. The list of references will continue to be updated as new information is located or becomes available. Finally, following the table is a listing of the jurisdictions' foremost social science needs for 2010-2015, as well as available references to existing studies.

American Samoa

| 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: Low | Previous studies: none Priority: Low | Previous studies: none Priority: Low |
| Sustainable financing | Previous studies: none Priority: Low <i>Need: strategy to allow villages to do their own patrolling or watershed management without relying on government funding</i> | Previous studies: none Priority: Low | Previous studies: none Priority: Low |
| Knowledge, attitudes and perceptions | Previous studies: [5, 6, 7, 8, 9, 12, 15] Priority: High* (MP 3C, 4A, AB) <i>Need: Template to guide future site specific studies, understand perceived threats (current and future), perceived health of resource, etc.</i> | Previous studies: [9] Priority: Highest* (MP 3C) <i>Need: site specific information regarding KAPs of Vatia residents</i> | Previous studies: none Priority: Highest* (MP 3C) <i>Need: site specific information regarding KAPs of Faga’alu residents</i> |
| Social Marketing | Previous studies: [13] Priority: Low (MP 4B, 2F) <i>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</i> | Previous studies: none Priority: low <i>Need: potential future campaign for watershed management</i> | Previous studies: none Priority: medium <i>Need: Target certain behaviors to improve watershed management, use KAP information to inform campaign</i> |
| Socioeconomic impact analysis | Previous studies: none Priority: low <i>Need: Impacts of MPAs. If cannery closes, look on how this affects fisheries.</i> | Previous studies: none Priority: low <i>Need: examine impact of CFMP, CBWMP, and/or NPS programs</i> | Previous studies: none Priority: low |
| Livelihood assessments | Previous studies: [5, 7, 15] Priority: low <i>Need: Reliance on marine resources for food/\$ in new priority management sites</i> | Previous studies: [10] Priority: High* (MP 4A/B) <i>Need: What are most important livelihood sources and options?</i> | Previous studies: none Priority: High* (MP 4A/B) <i>Need: What are primary livelihood sources and options?</i> |
| 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: medium (MP 1E) <i>Need: would be helpful if this was improved/expanded (no information available for North, limited for Manu'a)</i> | Previous studies: none Priority: High <i>Need: More specific information regarding fish catch in VMPA</i> | Previous studies: none Priority: medium <i>Need: More detailed assessment of catch in Faga'alu</i> |
| Coastal use studies | Previous studies: planned by MPA Center for 2011 Priority: High* (MP 1B) <i>Need: Site-specific detailed information for potential MPA and watershed management sites (not information collected at a territory-wide scale)</i> | Previous studies: none Priority: low <i>Need: Detailed use patterns – this would need to be conducted later as Vatia recently went through a PLA (avoid village fatigue).</i> | Previous studies: none Priority: medium <i>Need: Detailed marine/coastal use patterns for Faga'alu; useful for planned watershed PLA</i> |
| Traditional knowledge | Previous studies: [1, 9] Priority: High* (MP 3C) <i>Need: Information has already been collected at the territorial level, but need site-specific information for MPA potential sites and watershed management areas.</i> | Previous studies: none Priority: High* (MP 3C) <i>Need: Traditional knowledge and resource management methods specific to Vatia</i> | Previous studies: none Priority: High* (MP 3C) <i>Need: Traditional knowledge and resource management methods specific to Faga'alu</i> |
| Historical analysis | Previous studies: [1, 9, 14] Priority: medium <i>Need: Analysis of aerial photography for land use change for watershed management and climate impacts; information regarding "shifting baselines," Fisheries LAS calls for collection of archeological information</i> | Previous studies: none Priority: medium <i>Need: Aerial photography analysis for land-use and coastal change</i> | Previous studies: none Priority: medium <i>Need: Aerial photography analysis for land-use and coastal change</i> |

*represents project prioritized by both jurisdiction and CRCP. MP= jurisdictional management priority

Top American Samoa Social Science Priorities

AS-1: Knowledge, attitudes, and perceptions (KAPs) for priority sites and potential MPA and watershed management sites. Site-specific information is critical for management relevance and needs to be collected in collaboration with local agencies to assure management-relevant information is collected and avoid village survey fatigue. The goal should be to monitor MPA sites every 2-3 years.

AS-2: Develop a survey template for use by local agencies when conducting surveys in MPA, watershed, and climate action sites. This would provide a list of common survey questions, sampling strategies, and example surveys that can be adapted for use in multiple sites to facilitate survey development and gathering of information that is comparable across sites.

AS-3: Coastal use studies to better understand use-types and use-intensity of new/potential management sites (MPA and watershed). This needs to be conducted at the village/watershed level rather than territorial level due to village-based and localized nature of use patterns.

AS-4: Site-specific traditional ecological knowledge (TEK) regarding priority management sites.

Previous Studies

- 1 Armstrong, K., D. Herdrich, and A. Levine. (in press) Historic Fishing in American Samoa. NOAA Technical Memorandum.
- 2 Craig, P., B. Ponwith, F. Aitaoto, and D. Hamm. 1993. The Commercial, Subsistence, and Recreational Fisheries of American Samoa. *Marine Fisheries Review*. 55(2)
- 3 Craig, P., A. Green, and F. Tuilagi. 2008. Subsistence harvest of coral reef resources in the outer islands of American Samoa: Modern, historic, and prehistoric catches. *Fisheries Research*. 89 pp. 230-240.
- 4 Crossett, K.M., C.G. Clement, S.O. Rohmann. 2008. Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats. Silver Spring, MD: NOAA, National Ocean Service, Special Projects. 65 pp.
http://coris.noaa.gov/activities/coral_demographics/
- 5 Kilarski, S., et. al. 2006. Decision Support for Coral Reef Fisheries Management: Community input as a means of informing policy in American Samoa. A Group Project submitted in partial satisfaction of the requirements for the degree of Master's in Environmental Science and Management for the Donald Bren School of Environmental Science & Management. <http://www.bren.ucsb.edu/research/documents/SamoaThesis.pdf>
- 6 Fagatele Bay National Marine Sanctuary. 2009. Socioeconomic Trends in Communities Near Fagatele Bay.
<http://fagatelebay.noaa.gov/html/docs/socioeconomic.pdf>
- 7 Jacob, Lucy. 2009. An Investigation Into Marine Resource Use and Management in Aunu'u, American Samoa: A household survey. DMWR Biological Report Series 10-01.
- 8 Levine, A. and S. Allen. 2009. American Samoa as a fishing community. U.S. Dep. Commer., NOAA Tech Memo., NOAA-TM-NMFS-PIFSC-19, 74p. http://www.pifsc.noaa.gov/tech/NOAA_Tech_Memo_PIFSC_19.pdf
- 9 Levine, A. and F. Sauafea-Leau. In prep. Traditional Knowledge of Marine Use and Management in American Samoa. Abstract available at: <http://www.botany.hawaii.edu/basch/uhnpscesu/pdfs/sam/Levine2008AS.pdf>
- 10 *Sauafea-Leau, F. PLA report for Vatia (and other?) villages?*
- 11 Spurgeon, J., T. Roxburgh, S. O'Gorman, R. Lindley, D. Ramsay, N. Polunin. November 2004. Economic Valuation of Coral Reefs and Adjacent Habitats in American Samoa: Final Report. Produced for the US Department of Commerce, Job No. J24062A. http://coralreef.gov/meeting18/ascoralvaluation_samoa_2007.pdf
- 12 Tuilagi, F. and A. Green. Community Perceptions of Changes in Coral Reef Fisheries in American Samoa. 1995. Report prepared for the FFA/SPC Workshop on the Management of South Pacific Inshore Fisheries, New Caledonia.
- 13 Tuitele, Christianera A. 200X. Rare Pride Campaign final report for American Samoa (reference needed).
- 14 Tilberg, Hans. 2007. American Samoa Maritime Heritage Inventory. Report submitted to Pacific Islands Regional Office, NOAA ONMS. pp64
- 15 Wongbusarakum, S. 2009. Report on Project and Research Results Climate-Related Socioeconomic Assessment in American Samoa.
- 16 Wongbusarakum, S. 2010. Final Project Report (September 1, 2008 – February 28, 2010) to NOAA's GCRCGP Program. SEM Pasifika Training Program, NOAA Award No. NA08NMF4630453.
- 17 WPacFIN. (yearly report) Shore-based creel survey.

Underway/full references needed:

X1 Levine, A. , C. Fletcher and F. Sauafea-Leau. In prep. Building Climate Resilient Communities in American Samoa – Sea-level rise modeling and vulnerability to coastal change.

Commonwealth of the Northern Mariana Islands

**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: [8] Priority: low <i>Need: info is needed for Rota and Tinian; market value and composition of reef species</i> | Previous studies: [8] Priority: Medium <i>Need: Feed into social marketing strategy</i> | Previous studies: none Priority: low | Previous studies: [8] Priority: low |
| Sustainable financing | Previous studies: [X3] Priority: low (draft TNC/MCT plan under review) | Previous studies: [X3] Priority: low <i>Need: Sustainable financing plan for Laolao could be helpful, but implementation is challenging</i> | Previous studies: [X3] Priority: low | Previous studies: [X3] Priority: low |
| Knowledge, attitudes and perceptions | Previous studies: [5] Priority: High* <i>Need: KAPs regarding moratorium issues (gillnet, scuba-spear, sea cucumber); Monument (proposed funds to DLNR)</i> | Previous studies: [4] Priority: done | Previous studies: none Priority: High* (MP A3) <i>Need: Regarding watershed management issues, fire prevention</i> | Previous studies: none Priority: High* (MP A3) <i>Need: For planned CAP and education and outreach activities</i> |
| Social Marketing | Previous studies: [5, 6] Priority: Highest (planned 2010)* (MP A1/B1) <i>Need: Data by ethnicity and location; fishing regs; expand to look at watershed issues</i> | Previous studies: [4] Priority: Highest* (MP A1) <i>Need: Planning to begin 2010</i> | Previous studies: none Priority: High* (MP A3) <i>Need: Planned for fire prevention, hunting</i> | Previous studies: none Priority: High* (MP A2) <i>Need: May be necessary for watershed management plan</i> |
| Socio-economic impact analysis | Previous studies: none Priority: High <i>Need: For all CRCP programs to evaluate effectiveness, outcomes; look at outcome of increased military use</i> | Previous studies: none Priority: High <i>Need: To monitor outcomes of management programs</i> | Previous studies: none Priority: medium <i>Need: After management actions to monitor impacts</i> | Previous studies: none Priority: medium <i>Need: After management actions to monitor impacts</i> |
| Basic demographic information | Previous studies: [3] Priority: High* <i>Need: Current info to reflect recent changes (2010 census)</i> | Previous studies: none Priority: High* <i>Need: Should be available after 2010 census</i> | Previous studies: none Priority: High* <i>Need: Should be available after 2010 census</i> | Previous studies: none Priority: High* <i>Need: Should be available after 2010 census</i> |
| Creel surveys | Previous studies: [7, X5] Priority: low (MP B2) <i>Need: Expand range of current survey (all of Saipan, Rota, Tinian), analyze nearshore reef species specifically</i> | Previous studies: none Priority: medium low (MP B2) <i>Need: identified as CAP priority; current creel survey does not cover Laolao</i> | Previous studies: none Priority: low low (MP B2) <i>Need: data for Rota</i> | Previous studies: [7, X5] Priority: low low (MP B2) |

| | | | | |
|------------------------------|--|---|---|---|
| Coastal use studies | Previous studies: [X1, X5] Priority: Medium <i>Need: Cover areas that the creel survey does not cover</i> | Previous studies: [4] Priority: Medium | Previous studies: none Priority: Medium | Previous studies: [X5] Priority: Medium |
| Traditional knowledge | Previous studies: [1, 2, X1, X2] Priority: planned for 2010 <i>Need: Chamorro/Carolinian knowledge re: fishing and applied info for mgmt, social marketing</i> | Previous studies: None Priority: low | Previous studies: [X2] Priority: underway for all islands, includes Rota | Previous studies: [X2] Priority: underway for all islands, includes Garapan area |

*represents project prioritized by both jurisdiction and CRCP. MP= jurisdictional management priority

Top CNMI Social Science Priorities

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 reinventing the wheel when collecting social science information.

CNMI-2: Collection of information that will feed into a social marketing campaign for the priority areas (Laolao, Talakhaya, and Garapan). This includes more detailed information regarding resource users and demographic trends, KAPs for target issues in priority sites.

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 towards fishing regulations.

CNMI-4: KAPs regarding the Northern Marianas Marine Monument. Need island-wide study by unbiased entity.

CNMI-5: Collection of socioeconomic information on Rota and Tinian (current information is almost exclusively for Saipan).

Previous Studies

- 1 Amesbury, J. R., and R.L. Hunter-Anderson. 2003. Review of Archaeological and Historical Data Concerning Reef Fishing in the U.S. Flag Islands of Micronesia: Guam and the Northern Mariana Islands. Prepared for Western Pacific Regional Fishery Management Council, Honolulu. Micronesian Archaeological Research Services, Guam.
<http://www.wpcouncil.org/coralreef/Documents/Mariana%20Archeological%20Review%20FINAL.pdf>
- 2 Aimsbury, Judith. 2008. An Analysis of Archaeological and Historical Data on Fisheries for Pelagic Species in Guam and the Northern Mariana Islands <http://www.soest.hawaii.edu/PFRP/socio/amesbury.html>
- 3 Crossett, K.M., C.G. Clement, S.O. Rohmann. 2008. Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats. Silver Spring, MD: NOAA, National Ocean Service, Special Projects. 65 pp.
http://coris.noaa.gov/activities/coral_demographics/
- 4 Eller, L.H., Nevitt, B. and Castro, J.A. (eds) 2009. Coastal use and management at Laolao Bay: A SEM-Pasifika (socioeconomic survey) study of resource users at Laolao Bay on Saipan, Commonwealth of the Northern Mariana Island. CNMI Division of Environmental Quality and CNMI Coastal Resources Management Office.
- 5 MR&D (July 2007) Pre-Public Education Survey: Threats to the CNMI's Coral Reefs. Final powerpoint presentation available from DEQ.
- 6 Nevitt, Brooke. /Healthy Reefs Healthy Fish: CNMI Pride Campaign Final Report,2009./ Print.
- 7 Pacific Marine Resources Institute. Taking Measure of Saipan's Fish Stocks.
http://www.pacmares.com/resources/PMRI_Market_2009.pdf
- 8 Van Beukering, P. (ed.), W. Haider, E. Wolfs, Y. Liu, K. van der Leeuw, M. Longland, J. Sablan, B. Beardmore, S. di Prima, E. Massey, H. Cesar, Z. Hausfather, and J. Gourley. February 2006. The economic value of the coral reefs of Saipan, Commonwealth of the Northern Marianas Islands. Prepared by Cesar Environmental Economics Consulting under awards CRI-3, 4, and 5 from the US Department of the Interior and the National Oceanic and Atmospheric Administration.

Underway/full references needed:

- X1 Aimesbury, Judith, Arielle Levine, and Stewart Allen (in prep): Fishing Community Profile for the Commonwealth of the Northern Mariana Islands
- X2 Levine, Arielle. (underway) Traditional Knowledge of Marine Resource Use and Management in the Mariana Archipelago. (interview data being analyzed)
- X3 Draft Sustainable financing study (TNC/MCT) – draft under review
- X4 Rota damage report – get from Fran **[Need more info here]**
- X5 This information is available from DFW but not in published form regarding nearshore reef species (checking with CRED to see if analyzed data is published in Marianas Monitoring Report)

Florida

| 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 (FKNMS) |
| Economic valuation | Previous studies: [3, 4] Priority: HIGHEST* (MP A2-1) <i>Need: HEA, damage assessment fees</i> | Previous studies: [4] Priority: HIGHEST* (MP A2-1) <i>Need: value of RNA areas, damage assessment fees</i> | Previous studies: [4, 6, 7] Priority: high* (MP A2-1) <i>Need: damage assessment, value of mooring buoys, enforcement</i> |
| Sustainable financing | Previous studies: none Priority: high | Previous studies: none? Priority: high <i>Need: business plan for ENP and DTNP, sustainable funds for research activities</i> | Previous studies: none? Priority: medium Potential priority |
| Knowledge, attitudes and perceptions | Previous studies: [21] underway- baseline attitudes toward zoning Priority: high* (MP A3-2) <i>Need: post-zoning follow up</i> | Previous studies: none underway- for RNAs Priority: high <i>Need: for law enforcement and compliance</i> | Previous studies: [10, 17] Priority: medium <i>Need: expansion to additional user groups</i> |
| Social Marketing | Previous studies: none? Priority: high* (MP A2-1) <i>Need: for implementation of FL Coral Reef Protection Act</i> | Previous studies: none? Priority: high <i>Need: for ENP- related to boaters and seagrass scarring</i> | Previous studies: none Priority: |
| Socioeconomic impact analysis | Previous studies: none Priority: high <i>Need: post zoning to assess impacts</i> | Previous studies: none Priority: | Previous studies: [6, 8, 12, 18] Priority: high <i>Need: assess impacts of no-take areas</i> |
| Livelihood assessments | Previous studies: none Priority: low | Previous studies: none Priority: low | Previous studies: [19, 18] Priority: low |
| 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 <i>Need: follow up to access existing data</i> | Previous studies: none Priority: high | Previous studies: [16] Priority: high |
| Coastal use studies | Previous studies: [22] Priority: medium <i>Need: post-zoning to assess compliance, also assess change over time</i> | Previous studies: none Priority: | Previous studies: [2, 7, 9, 10, 11] Priority: HIGHEST <i>Need: understand changing uses with new activities (e.g. kite surfing)</i> |
| Traditional knowledge | Previous studies: none Priority: low | Previous studies: none Priority: low | Previous studies: none Priority: low |
| Other | Previous studies: none Priority: | Interest in understanding socioeconomic impacts of bluegreen algae outbreaks | Cumulative impact of small vessel groundings, how do scientific data match with perceptions |

*represents project prioritized by both jurisdiction and CRCP. MP= jurisdictional management priority

Top Florida Social Science Priorities

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 (eg. FKNMS, BNP, ENP, DTNP, SE Florida, etc). 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 Florida Keys National Marine Sanctuary to understand changing uses with new activities in the Sanctuary, including cruise ship traffic, jet skies, 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 NPS sites and the Florida keys National Marine Sanctuary.

Previous Studies

1 Crossett, K.M., C.G. Clement, S.O. Rohmann. 2008. Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats. Silver Spring, MD: NOAA, National Ocean Service, Special Projects. 65 pp.
http://coris.noaa.gov/activities/coral_demographics/

2 English, D. B. K., W. Kriesel, V. R. Leeworthy, and P. C. Wiley, 1996 (draft). "Economic Contribution of Recreating Visitors to the Florida Keys/Key West." Athens, GA: USDA, Forest Service, Southern Forest Research Station; Athens, GA: The University of Georgia, Department of Agricultural and Applied Economics; and Silver Spring, MD: National Oceanic and Atmospheric Administration. 22 pp. <http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/visecon9596.pdf>

3 Hazen and Sawyer Environmental Engineers and Scientists. July 21, 2004. Socioeconomic Study of Reefs in Martin County, Florida. Prepared for Martin County, Florida.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/martincounty2004.pdf>

4 Johns, G.M., V.R. Leeworthy, F.W. Bell, M.A. Bonn. April 18, 2003. Socioeconomic study of reefs in Southeast Florida. Prepared for Broward County, Palm Beach County, Miami-Dade County, Monroe County, Florida Fish and Wildlife Conservation Commission, and the National Oceanic and Atmospheric Administration.
http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/recreation/sf_reefstudy_report.html

5 Johnson, D.R., D.E. Harper, G.T. Kellison, and J.A. Bohnsack. 2007. Description and Discussion of Southeast Florida Fishery Landings 1990-2000. NOAA Technical Memorandum NMFS-SEFSC-550. Miami, FL: National Oceanic and Atmospheric Administration. http://www.dep.state.fl.us/coastal/programs/coral/reports/FDOU/TM-550_SEFCRI.pdf

6 Leeworthy, V.R. 2002. Lobster Survey Fact Sheet: Economic Valuation of Alternative Recreational Bag Limits for Spiny Lobsters in the Florida Keys National Marine Sanctuary. Silver Spring, Maryland: National Oceanic and Atmospheric Administration and Marathon, Florida: Florida Fish & Wildlife Conservation Commission.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/baglimitfactsheet.pdf>

7 Leeworthy, V. R. and J. M. Bowker. 1997. Nonmarket Economic User Values of the Florida Keys/Key West. Silver Spring, MD: National Oceanic and Atmospheric Administration and Athens, GA: U.S. Forest Service.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/visnonmarket9596.pdf>

- 8 Leeworthy, V. R., T. Maher, and E.A. Stone. 2006. Can Artificial Reefs Alter User Pressure on Adjacent Natural Reefs? *Bulletin of Marine Science*, 78 (1): 29-37. <http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/bms.pdf>
- 9 Leeworthy, V. R. and P. C. Wiley. 1996. "Visitor Profiles: Florida Keys/Key West." Silver Spring, MD: National Oceanic and Atmospheric Administration. 159 pp.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/visprof9596.pdf>
- 10 Leeworthy, V. R. and P.C. Wiley. 1996. Importance and Satisfaction Ratings by Recreating Visitors to the Florida Keys/Key West. Silver Spring, Maryland: National Oceanic and Atmospheric Administration.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/visimpsat9596.pdf>
- 11 Leeworthy, V. R. and P. C. Wiley. 1997. "A Socioeconomic Analysis of the Recreation Activities of Monroe County Residents in the Florida Keys/Key West." Silver Spring, Maryland: National Oceanic and Atmospheric Administration.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/resident9596.pdf>
- 12 Leeworthy, V.R. and P.C. Wiley. 2000. Proposed Tortugas 2000 Ecological Reserve: Final Socioeconomic Impact Analysis of Alternatives. Silver Spring, Maryland: National Oceanic and Atmospheric Administration.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/tortugasinitassess.pdf>
- 13 Leeworthy, V. R. and P. C. Wiley. 2002. Profiles and Economic Contribution: General Visitors to Monroe County, Florida 2000-2001. Silver Spring, MD: National Oceanic and Atmospheric Administration.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/monroeprof.pdf>
- 14 Leeworthy, V.R., P.C. Wiley, and J. D. Hospital. February 2004. Importance-satisfaction ratings five-year comparison, SPA and ER use, and socioeconomic and ecological monitoring comparison of results 1995-6 to 2000-01.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/impsat.pdf>
- 15 Murray, T. 2005. Tortugas 2000- A post mortem: Evaluation of actual versus projected socioeconomic impacts of the Dry Tortugas Ecological Reserve. <http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/tortugasmarfin.pdf>
- 16 Sharp, W.C., R.D. Bertelsen, and V.R. Leeworthy. 2004. Long-term Trends in the Recreational Lobster Fishery, United States: Landings, Effort, and Implications for Management. *New Zealand Journal of Marine and Freshwater Research*, 2005, Vol. 39: 733-747.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/sharpleeworthy.pdf>
- 17 Shivilani, M., Leeworthy V.R., Murray, T.J., Suman, D.O., and F. Tonioli. 2008. Knowledge, Attitudes and Perceptions of Management Strategies and Regulations of the Florida Keys National Marine Sanctuary by Commercial Fishers, Dive Operators, and Environmental Group Members: A Baseline Characterization and 10-year Comparison. *Marine Sanctuaries Conservation Series ONMS-08-06*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 170 pp.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/kap2.pdf>
- 18 Shivilani, M. and F. Tonioli. April 4, 2007. 2003-04 and 2004-05 Florida Keys National Marine Sanctuary Commercial Fishing Panels' Spatial Fishery Profiles.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/commfishpan7and8gis.pdf>
- 19 Thomas J. Murray and Associates. June 30, 2007. Socio-economic baseline development: Florida Keys National Marine Sanctuary: Fishing years 1998-2006.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/commfishpan7and8.pdf>
- 20 Wiley, P.C. and V.R. Leeworthy. 1998. Visitor Profiles: Everglades National Park. Silver Spring, Maryland: National Oceanic and Atmospheric Administration.
<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/visprofeverg9596.pdf>

21 Shivilani, M. and M. Villanueva. 2007. A Compilation and Comparison of Social Perceptions on Reef Conditions and Use in Southeast Florida. Final Report on Local Action Strategy Project 10 of the Southeast Florida Coral Reef Initiative. Miami, FL: Florida Department of Environmental Protection.

http://www.dep.state.fl.us/coastal/programs/coral/reports/FDOU/FDOU_Project_10_Final_Nov07.pdf

22 Shivilani, M. 2007. A Literature Review of Sources and effects of Non-extractive Stressors to Coral Reef Ecosystems. Final Report on Local Action Strategy 19, Phase I to the Southeast Florida Coral Reef Initiative. Miami, FL: Florida Department of Environmental Protection.

http://www.dep.state.fl.us/coastal/programs/coral/reports/FDOU/FDOU_Project_19_PhaseI.pdf

23 Florida Fish & Wildlife Conservation Commission, Florida Marine Research Institute. 2002. A Summary of Recreational Spiny Lobster Landings and Effort in Florida, 1993-2001.

<http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/fmrilobsterfact.pdf>

Underway:

Leeworthy, V.R. 10-year Replication of the Study on Recreation and Tourism in the Florida Keys.

C. Jeffrey and V.R. Leeworthy Tortugas Integrated Assessment: A five-year Pre-post Assessment of the Tortugas Ecological Reserve in the Florida Keys National Marine Sanctuary

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

**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: low | Previous studies: none Priority: low | Previous studies: none Priority: low | Previous studies: none Priority: low |
| Sustainable financing | Previous studies: none Priority: high* (MP D4) <i>Need: Examine mechanisms such as user fees for recreational use, endowments, etc.</i> | Previous studies: none Priority: medium <i>Need: mechanism to fund enforcement</i> | Previous studies: none Priority: low | Previous studies: none Priority: low |
| Knowledge, attitudes and perceptions | Previous studies: [9, 14, X2] Priority: high* (MP A3) <i>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)</i> | Previous studies: [4, 9] Priority: medium <i>Need: Knowledge, attitudes, and perceptions regarding MPAs</i> | Previous studies: none Priority: low | Previous studies: none Priority: medium <i>Need: improved understanding of local perceptions for social marketing campaign?</i> |
| Social Marketing | Previous studies: [12] Priority: HIGHEST* (MP A3) <i>Need: Focus on local attitudes towards MPAs and reefs; tourist understanding of MPAs and reduce recreational impacts; new methods for southern village outreach</i> | Previous studies: none Priority: high* (MP A3) <i>Need: improve perceptions regarding MPAs</i> | Previous studies: none Priority: low <i>Need:</i> | Previous studies: none Priority: Medium* (MP A3) <i>Need: focus on arson issues</i> |
| Socioeconomic impact analysis | Previous studies: none? Priority: high MP B3, B7) <i>Need: impacts of military buildup; impacts of indigenous fishing rights regulations</i> | Previous studies: none Priority: medium <i>Need: impacts of indigenous fishing rights regulations</i> | Previous studies: none Priority: medium <i>Need: understanding of impact of proposed changes</i> | Previous studies: none Priority: low |
| Livelihood assessments | Previous studies: [1] Priority: medium (MP B3) <i>Need: how reliant are people on fisheries resources</i> | Previous studies: none Priority: low? | Previous studies: none Priority: low <i>Need: how reliant are people on harbor area</i> | Previous studies: none Priority: low |

| | | | | |
|--------------------------------------|--|---|--|---|
| Basic demographic information | Previous studies: [3] Priority: medium <i>Need: change (present and future) with military buildup?</i> | Previous studies: none Priority: low | Previous studies: none Priority: medium <i>Need: demographic profile of harbor users</i> | Previous studies: none Priority: low |
| Creel surveys | Previous studies: [11] Priority: medium * (MP B3) <i>Need: expand data collection and improve analysis of collected information to assess socioeconomic characteristics of fishermen(identified in JMP)</i> | 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* (MP B3) <i>Need: Recreational use; fishing extent, importance, and impact; accessibility; development</i> | Previous studies: [7] Priority: HIGHEST* (MP B3) <i>Need: Completed for recreational use; needed for non-recreational, accessibility issues, development</i> | Previous studies: none? Priority: HIGHEST* (MP B3) <i>Need: Fishing, recreational use (commercial and local), marine lab research, military and non-military use, yacht club, other</i> | Previous studies: none Priority: HIGHEST* (MP B3) <i>Need: Recreational use; fishing extent, importance, and impacts; accessibility; development</i> |
| Traditional knowledge | Previous studies: [2, 8, X1] Priority: high* (MP B7) <i>Need: elder fisher surveys on fishing methods, resource status and change over time, and management strategies to improve management initiatives and gain local support</i> | Previous studies: none Priority: low | Previous studies: none Priority: low | Previous studies: none Priority: low |

*represents project prioritized by both jurisdiction and CRCP. MP= jurisdictional management priority

Top Guam Social Science Priorities

GU-1: Coastal Use Surveys - to determine levels and types of uses, cultural importance of fishing methods, and 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 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

Previous Studies

- 1 Allen, Stewart and Paul Bartram. February 2008. Guam as a Fishing Community. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-08-01, 70 p. http://www.pifsc.noaa.gov/adminrpts/2000-present/PIFSC_Admin_Rep_08-01.pdf
- 2 Amesbury, J. R., and R.L. Hunter-Anderson. 2003. Review of Archaeological and Historical Data Concerning Reef Fishing in the U.S. Flag Islands of Micronesia: Guam and the Northern Mariana Islands. Prepared for Western Pacific Regional Fishery Management Council, Honolulu. Micronesian Archaeological Research Services, Guam. <http://www.wpcouncil.org/coralreef/Documents/Mariana%20Archeological%20Review%20FINAL.pdf>
- 3 Crossett, K.M., C.G. Clement, S.O. Rohmann. 2008. Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats. Silver Spring, MD: NOAA, National Ocean Service, Special Projects. 65 pp. http://coris.noaa.gov/activities/coral_demographics/
- 4 Gutierrez, Jay. 200X. Limits of Acceptable Change for Piti and Tumon Marine Preserves. DAWR (need full ref)
- 5 Hensley, R. A., and T. S. Sherwood. 1993. An overview of Guam's inshore fisheries. Marine Fisheries Review 55(2):129–138.
- 6 Jennison-Nolan, J. 1979a. "Guam: changing patterns of coastal marine exploitation." Sea Grant Publication UGSG 79-12.
- 7 Jennison-Nolan, J. 1979b. Land and lagoon use in prewar Guam: Agat, Piti, and Asan. MARC Working Papers #15, Micronesian Area Research Center, University of Guam.
- 8 Jennison-Nolan, J., C. O'Meara, D. Bradley, Jr., J. Guest, and D. Moore. 1979. Cultural resources within the Guam Seashore Study Area and the War in the Pacific National Historical Park. Submitted to National Park Service. Dept. of Anthropology and Geography. University of Guam.
- 9 King, Romina. 2009(?). Measuring Perceptions and Attitudes of Guam's Micronesian Immigrant Community with regard to Guam's Network of Marine Preserves. http://intellagence.eu.com/psi2009/output_directory/cd1/Data/articles/000353.pdf (need full ref.)
- 10 Knudson, K. E. 1987. Non-commercial production and distribution in the Guam fishery. Contract WPC-0983. Micronesian Area Research Center, University of Guam. 116 p.
- 11 NOAA sponsored creel surveys (appropriate citation?)
- 12 Todd, Elaina. 200X. Rare Pride Campaign final report for Guam (reference needed)
- 13 Van Beukering, P., W. Haider, M. Longland, H. Cesar, J. Sablan, S. Shjegstad, B. Beardmore, Y. Liu, G.O. Garces. 2007. The economic value of Guam's coral reefs. University of Guam Marine Laboratory Technical Report No. 116.
- 14 Vaughn, S. M. 1999. Perceptions of marine tenure and fishing site selection on Guam. M.A.Thesis (Geography), California State University, Northridge. 142 p.

Underway/full references needed:

- X1 Levine, A., R. Steffy. (underway) Traditional Knowledge of Marine Resource Use and Management in the Mariana Archipelago. (interviews underway in Guam)
- X2 Planned KAP study - Qmark

Hawaii

| 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, 13] Studies underway: [16] Priority: low <i>Need: for planning, EIS work</i> | Previous studies: none Priority: low <i>Need: useful but low priority now</i> | Previous studies: none Priority: low <i>Need: useful but low priority now</i> |
| Sustainable financing | Previous studies: [3] Priority: medium <i>Need: info on sustainable financing for state MLCDs and Makai Watch programs</i> | Previous studies: none Priority: medium <i>Need: for sustaining conservation work</i> | Previous studies: none Priority: medium <i>Need: for sustaining conservation work</i> |
| Knowledge, attitudes and perceptions | Previous studies: [8,9,10, 11, 14] Priority: low? <i>Need:</i> | Previous studies: [X3, X4] Priority: HIGHEST* (MP G2) <i>Need: for MLCD potential, baseline to compare after LAS work</i> | Previous studies: none Priority: HIGHEST* <i>Need: for herbivore enhancement effectiveness, baseline to compare after LAS work</i> |
| Social Marketing | Previous studies: none Priority: medium (MP G4) <i>Need: target certain behavior (e.g. acceptance of rec fishing permit)</i> | Previous studies: none Priority: medium (MP G4) <i>Need: after baseline assessments to target certain behavior</i> | Previous studies: none Priority: medium (MP G4) <i>Need: after baseline assessments to target certain behavior</i> |
| Socioeconomic impact analysis | Previous studies: [5,6,12] Priority: medium <i>Need: should follow management actions and rec fishing permit</i> | Previous studies: none? Priority: low (short-term)/ high (long-term) <i>Need: will be high priority after management actions</i> | Previous studies: none Priority: low (short-term)/ high (long-term) <i>Need: will be high priority after management actions</i> |
| Livelihood assessments | Previous studies: [5] Underway in Haena, Kauai Priority: high (MP G2) | Previous studies: none Priority: high(MP G2) | Previous studies: none Priority: high(MP G2) |
| Basic demographic information | Previous studies: [4] Priority: low <i>Need:2010 Census upcoming</i> | Previous studies: none Priority: high* | Previous studies: none Priority: high* |
| Creel surveys | Previous studies: done for Hanea, Hookena, Mauanalua, Kaneohe Priority: Medium | Previous studies: [X1] Priority: high | Previous studies: none Priority: high |
| Coastal use studies | Previous studies: [8,9, 10] Priority: high (MP G1) <i>Need: should include watershed use as well</i> | Previous studies: [X1, X2] Priority: HIGHEST* (MP G1) <i>Need: in detail to serve as baseline for priority sites (planned 2010 = X2)</i> | Previous studies: none Priority: HIGHEST* (MP G1) <i>Need: in detail to serve as baseline for priority sites (planned for 2011)</i> |
| Traditional knowledge | Previous studies: [12] Priority: medium (MP G4) | Previous studies: none Priority: medium (MP G4) <i>Need: should be part of other studies</i> | Previous studies: none Priority: medium (MP G4) <i>Need: should be part of other studies</i> |

*represents project prioritized by both jurisdiction and CRCP. MP= jurisdictional management priority

Top Hawaii Social Science Priorities

H-1: Knowledge, attitudes, and perceptions studies for priority sites of Puako/Pelekane, Big Island and Kahekeili, Maui

H-2: Coastal use studies for priority management sites

H-3: Social impact analysis following implementation of management measures for local priority sites

H-4: Local capacity-building and training so that local community groups and agencies have the capacity to conduct socioeconomic surveys and assessments

Previous Studies

1 Cesar, H., P. van Beukering, S. Pintz, and J. Dierking. December 23, 2002. *Economic valuation of the coral reefs of Hawaii*. Submitted to the University of Hawaii for the Hawaii Coral Reef Initiative Research Program under National Oceanic and Atmospheric Administration awards NA870A0381, NA960P0187, NA060A0388, and NA160A1449.

2 Cesar, H. 2004. Background Information on the Institutional and Regulatory Framework of Marine Managed Areas in the Main Hawaiian Islands. Report to the University of Hawaii, Hawaii Coral Reef Initiative. National Oceanic and Atmospheric Administration, Coastal Ocean Program award NA 160A2412. <http://marineeconomics.noaa.gov/reefs/institutionalbackgro.pdf>

3 Cesar, H. and P. van Beukering. 2004. Sustainable Financing of Marine Managed Areas: experiences from around the World. Report to the University of Hawaii, Hawaii Coral Reef Initiative. National Oceanic and Atmospheric Administration, Coastal Ocean program award NA 160A2412. <http://marineeconomics.noaa.gov/reefs/sustainablefinancing.pdf>

4 Crossett, K.M., C.G. Clement, S.O. Rohmann. 2008. *Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats*. Silver Spring, MD: NOAA, National Ocean Service, Special Projects. 65 pp. http://coris.noaa.gov/activities/coral_demographics/

5 Ehler, Rod. 2004. *Socio-Economic Assessment of Commercial Bottomfishing in the Northwestern Hawaiian Islands (Draft)*. U.S. Department of Commerce, NOAA-NOS, National Marine Sanctuary Program, Silver Spring, MD. **[need ref and copy of final]**

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Underway:

15 SEM-Pasifika in Hookena, Big Island (Poster available from Hawaii Community Stewardship Network)

16 Stratus Consulting Hawaii Coral Reef Valuation Study

X1 TNC Coastal Use Survey for Puako

X2 Coastal Use Mapping project for Puako-Pelekane (underway)

X3 TNC Conservation Action Planning for Kawaihai/Keahole region (planned 2010)

X4 Fishermen Information Networks Study (planned for Puako-Pelekane, 2011)

Puerto Rico

| 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 | <p>Previous studies: [5] (for eastern reefs)</p> <p>Priority: HIGHEST*</p> <p><i>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 Bioluminescent Bay in Fajardo.</i></p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies: [5]</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> |
| Sustainable financing | <p>Previous studies: none</p> <p>Priority: HIGH</p> <p><i>Need: sustainable financing plan for natural reserve sites, including alternatives to fee collection by DNER</i></p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> |
| Knowledge, attitudes and perceptions | <p>Previous studies [11, 13, 14]</p> <p>Priority: HIGH*</p> <p><i>Need: information jurisdiction wide, as well as for Tres Palmas area, also would be good to expand Diaz et al survey.</i></p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> |
| Social Marketing | <p>Previous studies: [15]</p> <p>Priority: HIGHEST</p> <p><i>Need: 1. campaign to increase catch of lionfish (and use by chefs, etc). 2. campaign targeting the judiciary sector (lower priority)*</i></p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> |
| Socioeconomic impact analysis | <p>Previous studies: [7, 8, 9, 11, 12]</p> <p>Priority: HIGHEST</p> <p><i>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)*</i></p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> |

| | | | | | |
|---|---|---|---|---|---|
| Community-level anthropological studies and livelihood assessments | <p>Previous studies: [7, 8, 9]</p> <p>Priority: HIGH</p> <p><i>Need: Replication of study, #7 (ref below) to understand changes since fieldwork was conducted in 2003-4.</i></p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> |
| Basic demographic information | <p>Previous studies: Has been done by U. Puerto Rico and DNER for some sites, including Boqueron, Tortuguera, and Jobos Bay. Also, Census 2010</p> <p>Priority: low; medium for Tres Palmas</p> <p><i>Need: collection of demographic information for Tres Palmas</i></p> | <p>Previous studies:</p> <p>Priority: medium</p> <p>Need:</p> | <p>Previous studies:</p> <p>Priority: medium</p> <p>Need:</p> | <p>Previous studies:</p> <p>Priority: medium</p> <p>Need:</p> | <p>Previous studies:</p> <p>Priority: medium</p> <p>Need:</p> |
| Creel surveys | <p>Previous studies: [1,2,3, 6]</p> <p>Priority: medium</p> <p><i>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 through MFRSS from 2000-2009.</i></p> | <p>Previous studies:</p> <p>Priority:</p> <p>Need:</p> | <p>Previous studies:</p> <p>Priority:</p> <p>Need:</p> | <p>Previous studies:</p> <p>Priority:</p> <p>Need:</p> | <p>Previous studies:</p> <p>Priority:</p> <p>Need:</p> |
| Traditional knowledge | <p>Previous studies: some previous work (need references)</p> <p>Priority: medium</p> <p><i>Need: understanding of knowledge held by recreational fishermen</i></p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> |
| Historical assessment | <p>Previous studies: none</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies:</p> <p>Priority: low</p> | <p>Previous studies: none</p> <p>Priority: medium</p> <p><i>Need: Photo documentation of landscape transformation</i></p> |

*represents project prioritized by both jurisdiction and CRCP. MP= jurisdictional management priority

Top Puerto Rico Social Science Priorities

OF HIGHEST PRIORITY:

PR-1. Economic valuation study for areas of Puerto Rico not covered by the 2007 Estudios Technicos study, which only covered 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.

OF HIGH PRIORITY:

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. Puerto Rico-wide study of knowledge, attitudes, and perceptions related to coral reef management .

PR-7. Sustainable financing plan for entire natural reserves system

Previous Studies:

1. Agar, Juan, and James Kirkley. 2008. Harvesting Capacity in the Fish Trap Fisheries of Puerto Rico and the U.S. Virgin Islands: A Comparative Assessment. Unpublished staff report, NOAA/NMFS/SEFSC Social Science Research Group, 75 Virginia Beach Drive, Miami, FL 33149, 14p.
2. Agar, J.J., M. Shvllani, J.R. Waters, M. Valdés-Pizzini, T. Murray, J. Kirkley, and D. Suman. 2005. U.S. Caribbean Fish Trap Fishery Costs and Earnings Study. NOAA Technical Memorandum NMFS-SEFSC-534, 127p.
3. Agar, J., J. Waters, M. Valdés-Pizzini, M. Shvllani, T. Murray, J. Kirkley, and D. Suman, 2008./U.S. Caribbean Fish Trap Fishery Socioeconomic Study. *Bulletin of Marine Science* 82(3):315-331.
4. Crossett, K.M., C.G. Clement, S.O. Rohmann. 2008. Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats. Silver Spring, MD: NOAA, National Ocean Service, Special Projects. 65 pp.http://coris.noaa.gov/activities/coral_demographics/
5. Estudios Tecnicos Inc. December 27, 2007. Valoracion economica de los arrecifes de coral y ambientes asociados en el Este de Puerto Rico: Farjado, Arrecifes La Cordillera, Vieques y Culebra. Prepared for the Puerto Rico Department of Natural and Environmental Resources.
6. Gentner Consulting Group. 2010. Expenditure and Demographic Profiles of Anglers in the Commonwealth of Puerto Rico with Special Attention on Coral Reef Related Activities. Final report prepared for NOAA National Marine Fisheries Service Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149, 31p.
7. Griffith, D., M. Valdés-Pizzini and C. García Quijano. 2007. Entangled Communities: Socioeconomic Profiles of Fishers, their Communities, and their Responses to Marine Protective Measures in Puerto Rico. NOAA Series on U.S. Caribbean Fishing Communities. NOAA Technical Memorandum NMFS-SEFSC-556 (Volume 1: Overview), 142p. Agar, J. J. and B. Stoffle (editors).
8. Griffith, D., M. Valdés-Pizzini and C. García Quijano. 2007. Entangled Communities: Socioeconomic Profiles of Fishers, their Communities, and their Responses to Marine Protective Measures in Puerto Rico. NOAA Series on U.S. Caribbean Fishing Communities. NOAA Technical Memorandum NMFS-SEFSC-556 (Volume 2: Regional Profiles), 340p. Agar, J. J. and B. Stoffle (editors).
9. Griffith, D., M. Valdés-Pizzini and C. García Quijano. 2007. Entangled Communities: Socioeconomic Profiles of Fishers, their Communities, and their Responses to Marine Protective Measures in Puerto Rico. NOAA Series on U.S. Caribbean Fishing Communities. NOAA Technical Memorandum NMFS-SEFSC-556 (Volume 3: Regional Profiles, Appendices and References), 524p. Agar, J. J. and B. Stoffle (editors).
10. Kirkley, James. 2008. A User’s Guide to the Fisheries I-O Model for Puerto Rico. Report prepared for NOAA National Marine Fisheries Service Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149, 37p.
11. MRAG Americas, Inc. 2004. Workshops to assess fishers’ attitudes toward potential capacity and effort reduction programs in the US Caribbean. Final report submitted to the Cooperative Research Program, National Marine

Fisheries Service Southeast Regional Office, 263 13th Avenue South Saint Petersburg, FL 33701, Grant No. NA03NMF4540419, 89p.

12. Tonioli, F., and J. Agar. 2009. Extending the Bajo de Sico, Puerto Rico, Seasonal Closure: An Examination of Small-scale Fishermen's Perceptions of Possible Socio- economic Impacts on Fishing Practices, Families and Community. *Marine Fisheries Review* 71(2):15-23.
13. Velazco studies (need reference)

Underway/ full references needed:

Diaz et al: Perceptions of climate change hazards in 8 communities on West Coast

Urban arts social marketing campaign

Velazco, Aileen. Targeted surveys of coral reef users. 2005-2010?

US Virgin Islands

**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, 9] (for fishers) Priority: low | Previous studies: [15] Priority: low <i>Need: completion and dissemination of [15]</i> | Previous studies: ?? Priority: high as part of coastal use study <i>Need: understand users of Coral Bay and Fish Bay</i> | Previous studies: none Priority: high as part of coastal use study <i>Need: understanding of socioeconomic characteristics of STEER residents and users</i> |
| Coastal use studies | Previous studies: none Priority: low | Previous studies: [15] Priority: low <i>Need: completion and dissemination of [15]</i> | Previous studies Priority: high for 2012 <i>Need: understand levels of use of Coral Bay and Fish Bay</i> | Previous studies: none; aerial photography exists that could be digitized Priority: HIGHEST <i>Need: understanding of usage levels</i> |
| Knowledge, attitudes and perceptions | Previous studies: [10, 8, 18] Priority: low in 2010; high in 2013 or 2014 <i>Need: measure change in attitudes and perceptions; track CRCP performance measures</i> | Previous studies: [15] Priority: low in 2010; perhaps high in 2013 or 2014 <i>Need: track changes since 2009-10</i> | Previous studies:?? Priority: high for 2012 as part of coastal use study <i>Need: Need: understanding of stakeholders</i> | Previous studies: ?? Priority: high as part of coastal use study <i>Need: understanding of stakeholders</i> |
| Social Marketing | Previous studies: [5] (also: The Reef is Closer than you Think; Leave Paradise in its Place: Respect your Elders) Priority: medium for mid-level policy makers, High for enforcement * (MP 2-1) <i>Need: raise awareness of policy makers of coral reef value, importance of management</i> | Previous studies Priority: medium <i>Need: community engagement strategy; messaging to build pride in EEMP</i> | Previous studies: none Priority: low | Previous studies: none Priority: low |
| Economic valuation/ follow up | Previous studies: [18] Priority: high for follow up* (MP 2-1) <i>Need: cost benefit analysis of management measures, follow up with damage assessment</i> | Previous studies Priority: low | Previous studies: none? Priority: low | Previous studies: none Priority: medium <i>Need: cost-benefit analysis for development within STEER</i> |

| | | | | |
|--------------------------------------|--|--|--|--|
| Sustainable financing | Previous studies: Priority: low- more appropriate at site level | Previous studies: [13] Priority: low <i>Need: implementation</i> | Previous studies: none Priority: low | Previous studies: [14] Priority: low <i>Need: implementation</i> |
| Livelihood assessments | Previous studies: [7, 12, 15] 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, 6, 7, 8, 10] Priority: low | Previous studies: Priority: will be high after no-take area is enforced <i>Need: understanding of impacts from no take</i> | Previous studies: Priority: Low | Previous studies Priority: low |
| Creel surveys | Previous studies: [3, 13] Priority: high for rec fishing (MP 4-8/4-3) <i>Need: capacity to analyze and synthesize previously collected data</i> | Previous studies: Priority: high for back reef area (MP 4-8/4-3) <i>Need: understanding of level of use and targeted species, overall impact to ecosystem</i> | Previous studies: Priority: high for rec fishing(MP 4-8/4-3) <i>Need: understanding of level of use and targeted species, overall impact to ecosystem</i> | Previous studies: Priority: high for rec fishing(MP 4-8/4-3) <i>Need: understanding of level of use and targeted species, overall impact to ecosystem</i> |
| Traditional knowledge | Previous studies:[16, 17] Priority: low | Previous studies: Priority: low | Previous studies: Priority: low | Previous studies: Priority: low |
| Governance assessments | Previous studies Priority: high , but planned as part of CRCP funded capacity assessment | Previous studies Priority: low | Previous studies Priority: low | Previous studies Priority: low |

*represents project prioritized by both jurisdiction and CRCP. MP= jurisdictional management priority

Top US Virgin Islands Social Science Priorities

VI-1. Coastal Use Study for STEER, to include demographic information of STEER residents and users. An understanding of the types and level of use of the area, through participatory mapping and other mechanisms, is needed to inform the STEER management plan and watershed activities.

VI-2. 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 is needed for this area.

VI-3. Follow up to 2010 economic valuation study to evaluate cost effectiveness of various management strategies to protect coral reefs.

VI-4. Understanding of recreational fishing, including level of use, targeted species, landings, and impacts to the ecosystem relative to commercial fishing

VI-5. Social marketing and training project to engage the enforcement chain (from enforcement officers to the judicial system) to increase effectiveness of enforcement actions.

Previous Studies

1. Agar, J. J., M. Shivilani, J. R. Waters, M. Valdés-Pizzini, T. Murray, J. Kirkley and D. Suman, 2005. U.S. Caribbean Fish Trap Fishery Costs and Earnings Study. NOAA Technical Memorandum NMFS-SEFSC- 534, 127 p.
http://www.sefsc.noaa.gov/PDFdocs/Trap_May2006.pdf
2. Agar, J., J. Waters, M. Valdés-Pizzini, M. Shivilani, T. Murray, J. Kirkley, and D. Suman, 2008./ /U.S. Caribbean Fish Trap Fishery Socioeconomic Study./ Bulletin of Marine Science/ 82(3):315-331.
3. Agar, Juan, and James Kirkley. 2008. Harvesting Capacity in the Fish Trap Fisheries of Puerto Rico and the U.S. Virgin Islands: A Comparative Assessment. Unpublished staff report, NOAA/NMFS/SEFSC Social Science Research Group, 75 Virginia Beach Drive, Miami, FL 33149, 14p.
4. Crossett, K.M., C.G. Clement, S.O. Rohmann. 2008. Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats. Silver Spring, MD: NOAA, National Ocean Service, Special Projects. 65 pp.
http://coris.noaa.gov/activities/coral_demographics/
5. Elien, Karisma. Report on St. Croix Rare Pride Campaign. (reference needed).
6. Hinds, Unlimited, in collaboration with University of the Virgin Islands. 2003. Socio-economic assessment of the marine resource utilization in the US Virgin Islands. Prepared for Department of Planning and Natural Resources, Division of Coastal Management.
7. Impact Assessment, Inc., 2007. Community Profiles and Socioeconomic Evaluations of Marine Conservation Districts: St. Thomas and St. John, U.S. Virgin Islands. NOAA Series on U.S. Caribbean Fishing Communities. NOAA Technical Memorandum NMFS-SEFSC-557, 123 p. Agar, J. J. and B. Stoffle (editors).
8. Karras, C., and J.J. Agar. 2009. Cruzan fishers' perspectives on the performance of the Buck Island Reef National Monument and the red hind seasonal closure. /*Ocean and Coastal Management*/ 52(11):578-585.
9. Kojis, Barbara. 2004. Census of the Marine Commercial Fishers of the U. S. Virgin Islands. Final report submitted to the Caribbean Fishery Management Council, 268 MuZoz Rivera Ave., Suite 1108 San Juan, Puerto Rico 00918-1920, 83p.
10. MRAG Americas, Inc. 2004. Workshops to assess fishers' attitudes toward potential capacity and effort reduction programs in the US Caribbean. Final report submitted to the Cooperative Research Program, National Marine Fisheries Service Southeast Regional Office, 263 13th Avenue South Saint Petersburg, FL 33701, Grant No. NA03NMF4540419, 89p.
11. Settar, Christine. 2009. Coral Reefs and Residents of the U.S. Virgin Islands: A Relationship of Knowledge, Outdoor Activities and Stewardship. A Thesis Submitted to The Graduate Studies Council In Partial Fulfillment of the Requirement for the Degree of Master of Marine and Environmental Science. University of the Virgin Islands.
12. Stoffle, Brent, James R. Waters, Susan Abbott-Jamieson, Shawn Kelley, David Grasso, Joy Freibaum, Susanne Koestner, Nate O'Meara, Sita Davis, Marissa Stekedee, and Juan Agar. 2009. Can an Island be a Fishing Community: An Examination of St. Croix and its Fisheries. NOAA Technical Memorandum NMFS-SEFSC-593, 57p.
13. The Nature Conservancy. 2010 (or 2009?). St. Croix East End Marine Park Sustainable Finance Plan.
14. The Nature Conservancy. 2010 (or 2009?). St. Thomas East End Reserves Sustainable Finance Plan.

15. Valdés-Pizzini, M., J. J. Agar, K. Kitner, C. García Quijano, M. Tust, and F. Forrestal. 2010. Cruzan Fisheries: A rapid assessment of the historical, social, cultural and economic processes that shaped coastal communities' dependence and engagement in fishing in the island of St. Croix, U.S. Virgin Islands. NOAA Series on U.S. Caribbean Fishing Communities. NOAA Technical Memorandum NMFS-SEFSC-597, 144p.

Underway:

15. Ishida, Kim. Socioeconomic assessment of the St. Croix East End Marine Park. Expected completion late 2010.

16 Carr, Liam. Dissertation work underway on traditional fishing in St. Croix.

17. Aquatic Heritage Project currently underway. Pls include David Olsen, Kostas Alexandridas, and Simon Pittman. Expected completion 2011?

18. Van Buekering, Pieter and Luke Brander. Economic Valuation of Coral Reefs in the US Virgin Islands. Expected completion: late 2010.

Appendices

Appendix 1: Types of social science information collected by the CRCP

The following list provides a list of social science methods and approaches used by CRCP, with examples of management questions that may be informed or answered through the use of these approaches.

Basic demographic information: *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?* 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 |

Coastal use studies: *Who is using marine resources? Where do different activities take place, and what is the intensity of use? How do people interact with the marine environment?* This information can be assessed through household surveys or targeted surveys of coastal users. Also can apply participatory mapping techniques. These studies can provide useful baseline information to management sites, as well as be used to monitor changes over time.

Community-level anthropological studies and livelihood assessments: *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.

Creel Surveys: *How much fish is caught in my jurisdiction? What types of fish? Where? When? What gear types are used?* Named after the “creel” basket where fishermen used to place their catch before the days of coolers, creel surveys 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.

Economic valuation: *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).

Economic valuation technical assistance and follow up: *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?)* 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.

Historical Studies: *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)?* 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.

Knowledge, attitudes, and perceptions (KAP): *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? What are non-economic values (such as mental health, cultural importance) of marine resources? How do stakeholders perceive resource condition, management, use, equity issues, etc.?* Knowledge, attitudes, and perceptions (KAPs) is a general term for a study that is usually achieved through a survey. Helps to determine understanding of and support for various management strategies, including new or existing regulations, as well as perceptions of resource conditions and threats. Can also be used to determine effectiveness of educational and outreach strategies, particularly when implemented both before and after the intervention. Data may be collected to more fully understand the KAPs of the general public or sub-groups, such as tourists, fishers, or local residents. Data may be collected for a particular site or jurisdiction-wide. Attitudes, beliefs, values (ABV) is another term that is similar to KAP, but generally refers more to 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.

Sustainable financing: *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.

Social marketing: *How can we get people to stop doing X and start doing Y?* 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).

Social impact analysis: *What impact are management regulations having on local populations and stakeholder groups? How has behavior changed in response to new policies?* Social impact analysis is 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.

Traditional Knowledge: *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?* 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

Appendix 2: 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.*

Appendix 3: Acronyms and Abbreviations Used in this Document

CRCP – Coral Reef Conservation Program
CZM – Coastal Zone Management
DLNR – Department of Land and Natural Resources
DNER – Department of Natural and Environmental Resources (Puerto Rico)
EEMP – East End Marine Park (St. Croix, US Virgin Islands)
ENP - Everglades National Park
FKNMS – Florida Keys National Marine Sanctuary
HEA – Habitat Equivalency Analysis
JMP – Jurisdictional Management Plan
KAPs – Knowledge, attitudes, and perceptions
LAS – Local Action Strategy
MCT – Micronesia Conservation Trust
MLCD – Marine Life Conservation District
MPA – Marine Protected Area
MRFSS – Marine Recreational Fisheries Statistics Survey
NMFS – National Marine Fisheries Service (NOAA)
PIMPAC – Pacific Islands Managed and Protected Areas Community
PLA – Participatory Learning and Action
RNA – Research Natural Area (Florida)
SEM – Pasifika – Socioeconomic Monitoring Initiative for the Pacific Islands Region
SocMon - Global Socioeconomic Monitoring Initiative for Coastal Management
STEER – Saint Thomas East End Reserve
TEK – Traditional Ecological Knowledge
TNC – The Nature Conservancy
USVI – US Virgin Islands
WPacFIN – Western Pacific Fisheries Information Network