Management Needs for Mapping, Monitoring, and Citizen Engagement along the Florida Reef Tract

Report for the
Coordinated Coral and Hardbottom Ecosystem
Mapping, Monitoring and Management Project
(DEP AGREEMENT NO. CM619)

Prepared by the Florida Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute

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The purpose of this report is to provide resource managers with recommendations for improving mapping and monitoring activities throughout the Florida Reef Tract. This report accompanies the Final Report for the 5-year project, *Coordinated Coral and Hardbottom Ecosystem Mapping, Monitoring and Management Program.* This summary was developed from coordinated meetings and feedback from resource managers and mapping partners throughout the 5-year project. Discussions with managers and map end users provided valuable feedback for addressing consistency in mapping scale, methods for new mapping efforts, classification issues, filling data needs (gaps), and acquiring future support for the Unified Reef Map.

1) Mapping, monitoring and research needs

Need: Mapping gaps

- Nearshore bays and estuaries landward of the reef tract in SEFL
- Integrate the benthic URM with intertidal and upland habitats to create a seamless land-to-sea map
- Expand the OFR Marine Planner beyond the SE reef tract to include Biscayne Bay and the Florida Keys.

Need: Monitoring gaps

- Consistent methods for reef monitoring including survey design, sampling frequency, and measured variables
- Coordinated disease-response monitoring throughout the Reef Tract
- Expanded genetic monitoring and consistent reporting of genetic results
- Long term post-restoration monitoring of coral out plants, beach renourishment efforts, artificial reef construction, etc.
- Monitoring of environmental variables which may impact reef communities both at the reef tract as well as associated nearshore waters and contributing watersheds (e.g. temperature, water clarity, CO_2

Need: Additional research

- Assessing upland impacts to the Florida Reef Tract
- Evaluating changes in hardbottom over time
    - Example: Changes in hardbottom and sediment shifts in nearshore Palm Beach County
- Associate reef structure and function with reef-fish distribution and abundance
- Determine coral restoration success and continue to evaluate out plant establishment and recruitment
- Improve understanding of climate change effects on the Florida Reef Tract

Recommendations

- The reef tract, nearshore bays and estuaries, uplands, and human influences make up a social-ecological system (SES). Most simply a SES is the ecological and human components and their interactions of a complex landscape. By complex we are referring to the large number of components and the likelihood of unpredictable system behaviors. In conservation, the landscape can be considered an ideal management unit because they are "easily" encapsulated by often well-defined boundaries, like a watershed for example. For the Florida reef tract, the landscape

extends from Stuart, Florida down through the Florida Keys and includes the nearshore as well as the upland areas that drain into the Atlantic and can influence the health of the reef. While managing the reef track without considerations of the other system components will likely be inefficient at best and futile at worst, it is a very difficult task because of its size, variety of ecosystems, and large number of political jurisdictions, social institutions, and beliefs and values of millions of residents and visitors. With these considerations in mind we recommend the following:

1. Re-conceive the Florida reef tract as a social-ecological system.
    a. Include collaborative management as a major organizing philosophy
    b. Introduce operations management concepts and consider identifying an operations manager to begin organizing the SES for long-term research, management, and collaboration.
        i. Develop operations models and use these as road maps for collaboration and funding.
2. Maintain the Our Florida Reefs initiative and expand it to include nearshore and uplands areas in its sphere. The OFR should serve as a foundation for expanding collaborations across the Florida reef tract SES.
3. Work with state and local government agencies to secure commitments of staff and resources for stabilizing and strengthening the SES to protect the reef tract.
4. Explore new remote sensing technologies and opportunities for leveraging alternative sources for imagery and bathymetric data

- There is a need to understand and articulate how healthy reefs are associated with healthy reef-fish populations and then to apply this knowledge to improve management decision making and stakeholder collaboration. We need to understand how reef fish use different parts of the reef and interact with the reef at various spatial scales, how the spatial arrangement of physical attributes of the reef affect distribution and abundance of reef fish life stages, how reef-fish life stages respond to changes to the reef tract and stressors originating from human uses in and around the reef tract. Addressing this issue is expected to include species-habitat modeling, spatial modeling, and scenario-based simulations. Regulations, the Magnuson-Stevens and National Environmental Policy Acts, have requirements that support this need. Identifying essential fish habitat--mapping and censusing the organisms that use them—and cumulative effects analysis to assess impacts and cause and effect are two relevant examples.
- Work with NOVA Southeastern University to expand the OFR Marine Planner to cover all the reefs in Florida waters.
- Continue to support and expand monitoring efforts through coordination with partners, securing funds for long term monitoring, and exploring unique solutions for multi-agency collaboration. High priority monitoring and research include; genetic research, larval dispersal and population connectivity for species of special concern, post-restoration monitoring, water quality, CO_2 and ocean acidification.
- Work with partners to develop standards for measuring and reporting genetic information.
- Expand coral nursery efforts and post-restoration monitoring.

    Continue support and encourage collaboration between the numerous initiatives and agencies with similar objectives including; FWRI, Nova Southeastern University, Rosenstiel School of Marine and Atmospheric Science of the University of Miami, DEP's Coral Reef Conservation Program (CRCP), FKNMS, Marine Biodiversity Observing Network (MBON), NOAA Office for Coastal Management, etc.

2) Agency coordination needs

Need: Ensure compatibility of maps, minimize negative effects of scale

Recommendations

- Initiate the *Florida Reef Tract Mapping Committee*
    1. Identify 1-2 contacts from the primary mapping partners and agencies throughout the reef tract
    2. Revise and adopt the "Mapping Guide for Partners of the Florida Reef Tract" doc

3) Engaging public participation in reef management

Need: Keeping the public involved

Recommendations

- Maintain, support, and strength the Our Florida Reefs initiative.
- Expand the Our Florida Reefs initiative to include uplands land uses that effect the reef.
- Rethink meeting frequencies, times, and places to increase effectiveness of the meetings if needed.

4) Distributing scientific information to the public

Need: Ensure that the public has access to information concerning the reef tract

Recommendations

- Develop a single web application for distributing mapping, monitoring, and management information throughout the entire Florida Reef Tract
    1. Expand the OFR Marine Planner web viewer and Decision Support tool to include the entire Reef Tract.
- Develop mobile mapping and reporting applications
- Use Our Florida Reefs to keep citizens informed in additional to their other responsibilities.