Development of Management Alternatives for the Southeast Florida Region According to Stakeholder Working Panels

Southeast Florida Coral Reef Initiative
Fishing, Diving, and Other Uses
Local Action Strategy Project 18 & 20B

Southeast Florida Coral Reef Initiative
Acting above to protect what's below.

Development of Management Alternatives for the Southeast Florida Region According to Stakeholder Working Panels

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September 2011

Completed in Fulfillment of Contract RM089 for:

Southeast Florida Coral Reef Initiative
Fishing, Diving, and Other Uses
Local Action Strategy Project 18 & 20B

and

Florida Department of Environmental Protection
Coral Reef Conservation Program
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This Document should be cited as follows:
Shivlani, M., and M. Estevanez. 2011. FDOU Project 18 & 20B: Development of Management Alternatives for the Southeast Florida Region According to Stakeholder Working Panels. Florida Department of Environmental Protection. Miami Beach, FL. Pp. 202.

This project and the preparation of this report was funded in part by a Coastal Zone Management grant from the National Oceanic and Atmospheric Administration through an agreement/contract with the Office of Coastal and Aquatic Managed Areas of the Florida Department of Environmental Protection. The total cost of the project was $113,088, of which 100% was provided by the National Oceanic and Atmospheric Administration.

Acknowledgements:

Many thanks to the FDOU 18 & 20B Project Team, the various stakeholders who took the time to review the background material and to participate in the study, and the FDEP CRCP.

Cover Photo: Florida Department of Environmental Protection

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Executive Summary

The primary goal of Fishing, Diving, and Other Uses (FDOU) Project 18 & 20B was to identify the management alternatives preferred by a series of coastal and marine stakeholders in the southeast Florida region, especially as related to the coral reef ecosystem and associated resources. The project sought to determine stakeholders' views on current status and trends of coral reefs and threats to these ecosystems; intra- and inter-group stakeholder group conflicts; stakeholders' levels of understanding of the existing types of marine managed areas, marine rules and regulations, and marine management tools; stakeholders' knowledge of gaps in marine capacity and regulatory authority; stakeholders' attitudes towards management options, including novel approaches to marine managed areas marine rules and regulations, and marine management tools; and stakeholders' degree of preference for a suite of potential management alternatives.

FDOU Project 18 & 20B called for the completion of nine (9) tasks within each of the four counties in southeast Florida, including the establishment of independent working panels, the development of presentation materials for the independent working panels, the development of a methodology and content for information to be collected from the working panels, the implementation of approved methodology and information gathering, analysis of stakeholder information across themes and regions, identification and assessment of potential alternative management options for coral reef resources in southeast Florida, identification of outstanding research needs and knowledge gaps to improve stakeholder understanding of coastal and marine resource issues and management alternatives, the generation of a final report detailing findings, and the generation of a presentation and collation of supporting documentation.

To address the project goal and objectives the project research team identified a total of 15 stakeholder groups for the region that it determined it would interview or survey. The groups identified were divided into six panels and one group: four, county-based working panels; a local interest group working panel; a regional interest group working panel; and recreational stakeholder group members.

County-based working panels consisted of commercial fishing operations, charter fishing operations, dive and snorkel operations, and research institutions, research management agencies, and educators. Local interest group working panels were made up of the coastal construction industry, county-based tourism industry groups (mainly Chambers of Commerce), and ports, marinas, and boatyards. Regional interest group working panels comprised conservation groups and nongovernmental organizations, recreation and sport fishing organizations, commercial dive industry, recreational boating industry,

commercial vessel industry, and surfers. Recreational stakeholder groups were fishing and diving clubs whose members represented the following three groups: Recreational anglers, recreational divers and spearfishers, and recreating residents and visitors.

The project research team, in consultation with the Florida Department of Environmental Protection (FDEP) Coral Reef Conservation Program (CRCP) and FDOU Project Team, developed a short (23-minute) video that stakeholders would be requested to watch prior to participating in an interview/survey. The video was divided into five sections: an introduction to the coastal and marine ecosystem in southeast Florida; stakeholder and other uses; local and regional stressors; present management approaches; and future management options. The video consisted of a combination of pre-existing footage (e.g., from Southeast Florida Coral Reef Initiative (SEFCRI) Public Service Announcements (PSAs)), photos, figures, and maps. Another approach to educate stakeholders on the project was the development of a project website (www.seflreefstudy.com) from which stakeholders could learn about the project and its goals and objectives, and via which they could access and view the video.

The project research team used a mixed methodology to sample the various stakeholder groups. All working group panel members were interviewed using an in-person or phone-based open-ended interview questionnaire, and the stakeholder group members were provided a self-administered survey or instructions on accessing an online version of the survey. The sampling approach adopted was to first contact working group panel members and stakeholder group clubs. Certain groups, such as commercial fishers, charter fishers, and dive operators, were contacted by mail as well as email to introduce the study and to request participation. Others, such as researchers, managers, and educators, local interest groups, regional interest groups, and stakeholder group clubs were contacted primarily by email and less so by phone (where email addresses were not available). Follow-up phone calls were made to all group members to secure participation. The interview questionnaire and stakeholder survey were both developed to address the major project themes, and maps were used in the effort to have the member identify each area of concern by name and to mark the area on the maps.

To ensure that the interview questionnaire provided the information required to address data analysis (Tasks 5, 6, and 7), the project research team conducted a pilot session consisting of two interviews (with a research scientist and recreational fishing organization representative). Results from the pilot session were summarized in a pilot session report, and changes were made to the interview questionnaire and stakeholder survey to improve the information that each would provide.

The interview and stakeholder survey sessions lasted for three months, from the beginning of March 2011 through the end of May 2011. The project research team completed a total of 191 interviews and 79 stakeholder surveys over that period.

In terms of the working group panels, because several members of the coastal and marine researchers, managers, and educators panel and local interest group panel stated that they represented the entire region, these were considered as separate observations for each county; similarly, because the regional interest groups working panel pertained to the entire region, each interview was considered as a separate observation for each county. When the interviews were considered as separate observations for each county, the total number of observations increased to 290. Over 30% of the total observations pertained to Miami-Dade County, followed by Broward County (26.6%), Palm Beach County (23.4%), and Martin County (19.6%).

The project research team completed a total of 79 stakeholder group surveys from six survey sessions that it organized with regional dive and fishing clubs and from an online survey that it developed and posted in April 2011. The survey location was linked to the project website, from which those interested in participating were provided with instructions on how to first access the online video and then complete the online survey. Of the 79 stakeholder surveys completed, 40.5% were completed by dive group members, 36.7% by fishing club members, and 22.8% by members of groups who did not identify their affiliation. Over 96% were residents of southeast Florida, with respondents representing all four counties.

Key findings by working panels included the following:

- Respondents reported that overall resource conditions and coral reef conditions in the region were in fair to moderately poor condition;
- There was a concern across working group panels that changes in resource conditions trended towards a moderate decline;
- Use conflicts among various working groups were very high, with between 50-60% of charters, fishers, and dive operators reporting resource and space-based use conflicts;
- A majority of the stakeholders interviewed favored continuing with the present form of management but many argued that the enforcement needs to be improved;
- Management gaps focused on the lack of effective enforcement across all working panels and stakeholder-specific issues within working panels;
- There was support across panels for improving education and outreach such that more groups are aware of their activities' impacts on other groups, on fostering a conservation ethic via outreach and school

programs, and informing the general public on the natural resources and their conditions in the region;
- Over 38% of those interviewed preferred statewide, or regulatory, management over place-based management except when those who would accept place-based management in a hybrid form that included statewide management were considered, in which case over 60% favored some type of place-based management;
- Zoning multiple areas for different activities was the preferred marine managed area alternative, and there was varying support for marine reserves and other fishery-based restrictive zones, but there was greater support of no-discharge and no-anchoring areas;
- Working panel group members who identified potential locations for marine managed areas in the region selected areas with one of the following criteria: areas with unique biophysical attributes, such as locations with high coral cover or rare coral species; dive and other sites that experience high visitor loads and/or competing uses; or existing marine managed areas where the boundaries could be extended and/or modified to accommodate management objectives;

Key findings by stakeholder group surveys included the following:

- Stakeholders believed that while corals were in fair health, changes in coral health averaged between stable and a moderate decline;
- Fisheries were identified as the least healthy resource in the region and the resource that had most declined;
- Over 45% of the stakeholders surveyed selected the present management approach over curtailing use or limited access to areas;
- The most frequently cited management gap or failure across stakeholders was the absence of an integrated approach to address land-based sources of pollution;
- Over two-thirds of the stakeholders favored place-based management, which 32.9% felt should be managed as local or county protected area;
- In-water pollution, land-based sources of pollution, anchor damage, and overfishing were ranked as the most important issues that marine managed areas should address, although extractive use restrictions were more important to divers than recreational fishers;
- Stakeholders preferred multiple zones as a means by which to establish place-based management, and no-discharge, multiple use, no anchoring, and no personal watercraft were the most frequently listed zone types, and there was more support for marine reserves among divers than recreational fishers;
- The most commonly selected areas that should be prioritized for protection were high-use sites located near inlets and ports and areas that

already benefit from some level of protection as state and federal protected areas in southeast Florida.

Based on a series of inter-regional and inter-stakeholder comparisons, the project developed the following recommendations:

- There is a shared concern across stakeholders that overall resource conditions have not improved over their time in southeast Florida, and this key finding should promote meaningful dialogue between stakeholders and management agencies to adopt measures to improve resource conditions;
- Place-based management enjoys considerable support among a diverse set of stakeholders, but it is also a "non-starter" for extractive use groups who perceive any form of place-based management leading to reduced access for their uses; these groups need to be engaged more frequently and in a manner that can make the groups aware that alternate management mechanisms (place-based or others) do not need to result in reduced access or resource availability;
- Enforcement is a key concern among all stakeholders, who argue that without the effective enforcement of existing regulations (i.e., the present management mode), adding or modifying management in the region will only increase the enforcement workload and may in fact weaken the enforcement of existing regulations; any discussion on improving management must demonstrate how alternate management approaches will improve enforcement (e.g., reducing the burden on surveillance, increasing stakeholder cooperation, etc.) rather than necessarily requiring additional enforcement;
- Use conflicts are very high among certain stakeholder groups in areas that are either very popular for different uses or where there are limited options for water-based activities; stakeholders would benefit greatly if these conflicts were alleviated, and management solutions should be prioritized for such locations, especially as use may in fact grow in these areas (or spill over into adjacent locations, where space is available);
- Statewide management is perceived as underfunded, fragmented, and overextended, and an effort in outreach and education is needed to demonstrate that management does involve inter-agency coordination and private-public partnerships, and that there are a number of important, ongoing programs;
- Development of management alternatives should be a public process starting with a so-called empty slate, where stakeholders are invited to participate with others in the identification of management successes, failures, options, and recommendations that build toward more effective protection of the region's coral reef ecosystem and associated resources;

- A coastal and marine spatial planning framework is required in evaluating competing and compatible stakeholder interests and uses, as well as comparing agency missions that may otherwise lead to conflicts over acceptable management strategies.

1. Introduction

1.1. Project Goals and Objectives

The primary goal of Fishing, Diving, and Other Uses (FDOU) Project 18 & 20B was to identify the management alternatives preferred by a series of coastal and marine stakeholders in the southeast Florida region, especially as related to the coral reef ecosystem and associated resources. In terms of objectives, the project sought to determine stakeholders' views on current status and trends of coral reefs and threats to these ecosystems; intra- and inter-group stakeholder group conflicts; stakeholders' levels of understanding of the existing types of marine managed areas, marine rules and regulations, and marine management tools; stakeholders' knowledge of gaps in marine capacity and regulatory authority; stakeholders' attitudes towards management options, including novel approaches to marine managed areas marine rules and regulations, and marine management tools; and stakeholders' degree of preference for a suite of potential management alternatives, including areas needing/not needing protection in the southeast Florida region.

The project built on a series of previous FDOU and related projects, and it represented an in-depth approach to determine stakeholder preferences, especially the reasons for stakeholder stated preferences. The project also represented a broad approach to identify the areas and preferences in which there exist inter-stakeholder agreements, as well as those that are less tractable. Finally, the project represented a step between conducting large-scale, socioeconomic studies with multiple stakeholder groups (e.g., FDOU Project 10 (Shivlani and Villanueva, 2007)) towards the identification and ranking of management options that could be used for future management activities.

1.2. Project Background

Southeast Florida, home to a variety of important and unique ecosystems including the upper part of the Florida Reef Tract, is also a highly urbanized and developed zone that is home to over 5.5 million residents and millions of annual visitors (U.S. Census, 2009). The region consists of four counties – Miami-Dade, Broward, Palm Beach, and Martin counties – that abut part of the continental United States' largest, continuous coral reef ecosystem (Collier *et al.*, 2008). Also part of the coastal and marine environment and connected to the larger coral reef ecosystem are a variety of fragile and productive habitats, including a coastal mangrove fringe, extensive beaches, seagrass meadows, and a combination of soft and hardbottom marine habitats. The coral reef ecosystem and associated habitats serve as nursery, juvenile, and adult grounds for many species, including important commercial and recreational fisheries, protected species such as corals, manatees, and American crocodiles, and other organisms vital for the integrity and function of their respective habitats.

Along much of the southeast Florida coast, the region's coral reefs lie just 1.5 kilometers (1 mile) from an increasingly urbanized shoreline, where coastal development and construction, commercial and recreational uses, and land-based sources of pollution present a combined, major threat to the survival of the coral reefs and associated habitats.

Coastal construction, consisting of dredging for navigation, construction of marinas, beach nourishment, geotechnical drilling, and the installation of pipelines and cables, results in a multitude of impacts on coral reefs and associated habitats. These include landscape changes via coastal development where coastal environments are transformed into commercial and residential units, fragmentation of coastal and marine habitats from development activities, and increased sedimentation from construction, nourishment, and dredging events leading to the smothering of benthic organisms and reducing the amount of sunlight that penetrates the water column. Coastal construction can also have the effect of increasing population pressure on coastal and marine habitats by providing access to previously inaccessible or undeveloped coastlines. Much of the southeast Florida coastal environment has been developed extensively over the past century, but continued redevelopment, port maintenance and dredging, and beach nourishment, among others, represent persistent impacts (Shivlani *et al.,* 2011).

Commercial and recreational uses, comprised of commercial and recreational fishing, diving, boating, and other shore and water-based activities, affect the quantity and condition of coastal and marine resources. Commercial fisheries in southeast Florida target a wide variety of sub-tropical fin fish and invertebrates, including inshore and nearshore fin fish, a snapper-grouper reef fish complex, spiny lobster, stone crab, shrimp, coastal migratory pelagics, and highly migratory species. While the regional commercial fisher population has declined by 38% from 1994 to 2009, landings have remained stable, averaging almost seven million pounds over that period; in 2010, 1,800 commercial fishers in southeast Florida accounted for over eight million pounds in landings from just under 25,000 fishing trips (FWC, 2011). The region's charter fishing fleet is another important sector and also targets many of the same fin fish species harvested by commercial fishers. Many of these operations also hold commercial fishing licenses and thus harvest some of the species targeted during charter fishing trips. Shivlani and Villanueva (2007) determined that there were a maximum of 377 charter fishing operations in the southeast Florida region that catered to nearshore, reef, and offshore fishing trips. Recreational fishing, as measured by participants and effort, represents the most significant fishery sector in southeast Florida. In 2001, residents and visitors spent over 12 million days fishing on southeast Florida reefs (Johns *et al.,* 2001). By 2006, an estimated 87,000 residents held recreational fishing licenses in Miami-Dade, Broward, Palm

Beach and Martin counties; that total did not include those fishers who fished from the shoreline (and thus did not require a license) or those were exempt from having a license (Shivlani and Villanueva, 2007). Coupled with recreational angling, there exists a specialized recreational harvest of spiny lobster, consisting mainly of SCUBA and free divers. Divided into a two-day "mini" season and an eight-month regular season, the fishery attracted almost 48,000 participants over the entire state during the mini-season and sold over 110,000 lobster permits in 2007 (T. Matthews, personal communication).

Recreational diving (including snorkeling) is another important water-based activity in southeast Florida, and it is especially prevalent on and around the region's natural and artificial reefs. Johns *et al.* (2001) conducted a reef use study from Palm Beach to Monroe counties that determined that visitors spent a total of 28.30 million person-days on natural and artificial reefs; of that total, 13.42 million person-days were spent snorkeling or diving, and an additional 0.15 million on glass-bottom boats. A later study on Martin County reefs determined that residents and visitors spent a total of 529,000 person-days on the county's natural and artificial reefs, of which 14% were spent diving or snorkeling (Hazen and Sawyer, 2004). The region also supports a widespread dive operation industry, which in 2006 consisted of 166 operations (Shivlani and Villanueva, 2007). Most dive operations in the region allow consumptive trips (i.e., spearfishing and lobster diving), and almost half of the trips taken to natural reefs and over a third of trips taken to artificial reefs involve consumptive activities. Diving and snorkeling, especially as practiced by novice participants and in areas of high congestion, can result in habitat damage (e.g., from fins making contact with corals, users standing on corals and other sensitive biota, etc.), and consumptive activities such as spearfishing and fish collecting can result in reef resource depletion.

Recreational boating is a very popular pastime in southeast Florida, and there were over 159,441 vessels registered in the four counties in 2010 (FDHSMV, 2011). Of that total, recreational vessels (151,109) comprised 97.2% of all registration, while commercial vessels (4,332) accounted for less than 3%. Since the mid-1960s, the number of registered vessels has increased by 350%, greatly outpacing commercial vessel registration over the same time period. Recreational and commercial vessels can impact the region's coral reefs and associated habitats directly from anchoring, anchor dragging, groundings, propeller damage, pollution and emissions, and large-scale collisions (resulting from large vessels that can eliminate entire swaths of habitat); vessels can also serve as an indirect source of impacts, in that increased vessels in a region may result in resource overuse and user conflicts. Lutz (2006) reported of persistent and extensive coral damage in the Upper Florida Keys from small boat groundings, and Collier *et al.* (2007) described six cases of large anchors being dragged over coral reef habitat in Broward County from 1994-2006.

Finally, land-based sources of pollution (LBSP) present a continuous threat to southeast Florida coastal and marine resources. Consisting of point sources like outfalls and nonpoint sources such as runoff, LBSP introduce a variety of nutrients and toxins to the already stressed coral reefs and associated resources. While one of the six outfalls in the region was decommissioned in 2009 and the others are to be phased out by 2025, demands on infrastructure and uses that engender LBSP remain in place. This is in part due to the increased population in the region. The overall population of southeast Florida has increased considerably. Miami-Dade County, which was already heavily populated and developed, increased 140% from 1960-2000 (U.S. Census, 2011). During the same 40-year period, Broward County's population increased 386%, Palm Beach County's increased 224%, and Martin County grew an astounding 648%. With the population pressure and the aforementioned suite of uses and stressors, southeast Florida coral reefs and associated resources, there is an immediate need to better understand the biophysical and socioeconomic dimensions of the resources. Priorities include determining how stakeholders access and use the resources and the stakeholders' attitudes, perceptions, and beliefs on resource conditions and trends, stressors, management effectiveness, and management preferences.

Since 2002, when the U.S. Coral Reef Task Force adopted the "Puerto Rico Resolution" which called for the development of Local Action Strategies (LAS) for southeast Florida (among six other regions), the FDEP and the Florida Fish and Wildlife Conservation Commission (FWC) have coordinated the SEFCRI to address the threat areas as the focus for immediate local action. Led by the FDEP CRCP, SEFCRI targets four focus areas that address: (1) Land-Based Sources of Pollution (LBSP), (2) Maritime Industry and Coastal Construction Impacts (MICCI), (3) Fishing, Diving, and Other Uses (FDOU), and (4) Awareness and Appreciation (AA). The FDOU focus is on impacts to the southeast Florida coral reef ecosystem associated with fishing, diving, boating, and other uses. Projects related to the FDOU have been created to concentrate on five issues, consisting of stakeholder conservation ethics, the effects of direct extractive activities on reef communities, the effects of indirect extractive activities on reef communities, development of effective planning and procedures for the deployment of artificial reefs, and the identification of funding to ensure the completion of FDOU projects and goals.

Previous FDOU projects that have addressed stakeholder uses, impacts, and conservation ethics have been FDOU Projects 10 (Shivlani and Villanueva, 2007), 19 (Shivlani, 2007), and 23 (Berry *et al*., 2011), among others, and this project builds on past findings by addressing stakeholder preferences for management alternatives. The project relies considerably on FDOU Project 10, in that it utilizes the previous project's findings on stakeholder types, uses, and attitudes,

perceptions, and beliefs to determine regional and stakeholder specific preferences.

1.3. Project Tasks

The overall approach for FDOU Project 18 & 20B called for the establishment of stakeholder working panels within each of the four counties in the four county region to address each of the following nine tasks:

Task 1: Establishment of independent working panels
Task 2: Development of presentation materials for the independent working panels
Task 3: Development of a methodology and content for information to be collected from the working panels
Task 4: Implementation of approved methodology and information gathering
Task 5: Analysis of stakeholder information across themes and regions
Task 6: Identification and assessment of potential alternative management options for coral reef resources in southeast Florida
Task 7: Identification of outstanding research needs and knowledge gaps to improve stakeholder understanding of coastal and marine resource issues and management alternatives
Task 8: Generation of a final report detailing findings from Tasks 1-7
Task 9: Generation of a presentation and collation of supporting documentation from Tasks 1-7

Within Task 1, the approach required the development of a selection process to identify potential candidates to form a working panel from the following (but not limited to) universe of stakeholders: charter fishing industry; commercial fishing industry; recreational fishing community; recreational dive businesses and operators; recreational snorkelers, SCUBA divers, and free divers; research institutions and resource management and regulatory agencies; full-time southeast Florida residents; environmental groups and local and national nongovernmental organizations; surfers; recreational boating industry; commercial boating industry; commercial shipping industry; visitors; tourism industry; and coastal construction industry. Criteria for panel member selection included the length of time the individual/group had participated in their activity, participation in past FDOU stakeholder studies, and the ability of the member to represent their group/constituency. Finally, the total number of participants was to be based on achieving a suitable balance to cover diversity and regional representation within the stakeholder group.

Task 2 called for the development of presentation material that would ensure that all stakeholder groups received the same information on the status of coral reef and associated resources in the region, uses and stressors, present

management approaches, and future management options. As part of the task, stakeholders needed to be made aware of descriptions of existing marine managed areas (MMAs), marine rules and regulations, marine resource management tools, and gaps in management capacity and regulatory authority.

Task 3 focused on the development of the content, questions, format, and methodology, including the use of geographic information systems (GIS)-based maps to identify the perceived current resource conditions of the southeast Florida coral reef ecosystem and associated resources; perceived causes leading to the aforementioned conditions; major user conflicts or issues; stakeholder goals for the region's protection; stakeholder understanding of existing MMAs, marine rules and regulations, and marine resource management tools; stakeholder knowledge of gaps in management capacity and regulatory authority to protect coral reef resources in southeast Florida; stakeholder views on novel management approaches; stakeholder preferences for a suite of potential coral reef management options including MMAs; and the use of maps to identify and describe areas of concern. The methodology adopted under Task 3 was not predetermined but left as a suite of options, including facilitated workshops, interviews, and/or surveys; the methodology could also vary according to working panels as long as it resulted in a comparable set of outcomes across panels and regions.

Task 4 called for the implementation of the approved presentation material and methodology and content in order to collect stakeholder information. The task did not identify a preferred approach for information gathering and instead identified Task 3 as a means by which to finalize the methodology.

Tasks 5, 6, and 7 addressed the data analysis and findings, as collected from Task 4 and as identified and finalized under Tasks 2 and 3. Of particular importance was that the results would be summarized by stakeholder group and by region (Task 5), a determination on the extent of stakeholder knowledge of current management approaches and future management options (Task 6), and the identification of research needs and information gaps to enable stakeholders to gain a better understanding of marine resource issues, including the information type and delivery system required to assist stakeholders in making more informed decisions on MMAs, marine rules and regulations, marine resource management tools, and gaps in management capacity and regulatory authority (Task 7).

Finally, Tasks 8 and 9 called for the development of a final report and presentation, respectively, that addressed all previous tasks and which provided the results and recommendations in both narrative and multi-media formats that would be shared across the agency and stakeholder communities, as well as the general public.

2. Methods

2.1. Overall approach to addressing project tasks

The overall approach taken to address the goal and objectives of the project, "Development of Management Alternatives for the Southeast Florida Region According to Stakeholder Working Panels" was the identification and development of stakeholder panels; creation of a video to educate stakeholders on the condition of resources, uses and stressors, management approaches, and management options; finalization of a methodology to effectively reach and interview different stakeholders; the development of an interview questionnaire and stakeholder survey; the generation of an interview database and narrative reports based on interviews; and a final report and presentation (as well as GIS maps) based on study results.

The overall approach emphasized flexibility as a means by which to maximize data collection using established sampling procedures yet maintaining the ability to surmount unforeseen challenges (e.g., changes in the level of participation in certain groups, the availability of certain stakeholders, etc.). This allowed for the project to meet its data collection requirements without affecting the project goal and objectives. The overall approach also standardized data collection while utilizing a largely qualitative sampling procedure (i.e., key informant interviews); this allowed for in-depth interviews which could potentially yield a rich dataset that could then be transformed for quantitative (inter-group and regional) comparisons and mined for detailed stakeholder opinions on key issues concerning gaps in management capacity and management preferences, among others.

2.1.1. Identification and development of stakeholder panels

The project research team, with support from the FDEP CRCP team and the FDOU Project Team, identified a total of 15 stakeholder groups for the region that it determined it would interview or survey. The groups identified were divided into four, broad groups: county-based working panels; local interest group working panels; regional interest group working panels; and recreational stakeholder group members.

County-based working panels consisted of commercial fishing operations, charter fishing operations, dive and snorkel operations, and research institutions, research management agencies, and educators. Local interest group working panels were made up of the coastal construction industry, county-based tourism industry groups (mainly Chambers of Commerce), and ports, marinas, and boatyards. Regional interest group working panels comprised conservation groups and nongovernmental organizations, recreation and sport fishing organizations, commercial dive industry, recreational boating industry, commercial vessel industry, and surfers. Recreational stakeholder groups were

fishing and diving clubs whose members represented three groups identified in Task 1: recreational anglers, recreational divers and spearfishers, and recreating residents and visitors.

2.1.2. Project video development

The project research team first embarked on the development of a PowerPoint presentation, as called for under Task 2, but it determined during that process that such a presentation would not be the best way to provide stakeholders with the information required to conduct stakeholder interviews and stakeholder group surveys. This was because a presentation would require a project team member to meet with a stakeholder first and present the material, and then re-establish contact to conduct the interview; this was considered to create too much of a burden on the stakeholder, and the project research team believed that this would dampen participation rates. Also, using a PowerPoint presentation would require presentation skills and a standardized approach that the project research team felt would require extensive training of data collectors (and would not necessarily guarantee that all material would be presented). Finally, the project research team determined that even a well-executed presentation would require too much time, based on the amount of material. Thus, the project research team, in consultation with the FDEP CRCP and FDOU Project Team, changed the approach to develop a short video that stakeholders would be requested to watch prior to participating in an interview/survey.

The teams worked extensively on the development of the video, commencing with a presentation that was accompanied by a script. The presentation and later video were divided into five sections: an introduction to the coastal and marine ecosystem in southeast Florida; stakeholder and other uses; local and regional stressors; present management approaches; and future management options. The video consisted of a combination of pre-existing footage (e.g., from SEFCRI PSAs), photos, figures, and maps. An outside agency was used to produce and edit the final version, which after several drafts, was reduced to 23 minutes.

Another approach not listed under the task was the development of a project website (www.seflreefstudy.com) from which stakeholders could learn about the project and its goals and objectives, and via which they could access and view the video. Apart from the website, the project research team also made the video available via DVD to interested stakeholders (see below).

2.1.3. Methodology to interview working panels and survey stakeholder group members

The project research team used a mixed methodology to sample the various stakeholder groups. All working panel members were interviewed using an in-person or phone-based open-ended interview questionnaire, and the stakeholder

group members were provided a self-administered survey or instructions on accessing an online version of the survey.

The sampling approach adopted was to first contact working panel members and stakeholder group clubs. Certain groups, such as commercial fishers, charter fishers, and dive operators, were contacted by mail[1] as well as email to introduce the study and to request participation. Others, such as researchers, managers, and educators, local interest groups, regional interest groups, and stakeholder group clubs were contacted primarily by email and less so by phone (where email addresses were not available). Follow-up phone calls were made to all group members to secure participation. The approach for each working panel and the stakeholder groups follows in greater detail.

a. County-based working panels

County-based working panels were comprised partly of those stakeholder groups that were individually interviewed via survey questionnaires in the FDOU Project 10 study, and the panels will follow the format established under a similar approach used by Shivlani in monitoring commercial fishing in the Florida Keys National Marine Sanctuary (Thomas J. Murray and Associates, 2007). In the Sanctuary study, commercial fishing panels were established based on criteria such as regional coverage, tenure, and species/gear representation.

The working panels to be established as part of the present study largely followed the Sanctuary study approach, in identifying key informants from the FDOU Project 10 study who represented regional coverage across the four counties, had sufficient experience to provide a long-term view on resource conditions and other issues concerning local coral reefs, and fully represented the different types of activities engaged in by their respective groups. The only working group panels that were expanded to include members that were not part of FDOU Project 10 were the research institutions, research management agencies, and educators. In that case, academic and related institution researchers and research management agency representatives were selected to cover the entire region, unlike in the previous exercise where certain institutions may have been over-represented (as the emphasis there was experience with coral reef science over all other criteria). Also, within this last working group panel, a group of educators who participate with SEFCRI in developing school programs were identified and included for interviews, based on regional coverage.

[1] The project research team and FDEP CRCP worked to develop an introductory letter sent to commercial fishers, charter fishers, and dive operators in the region that described the study, solicited participation, and provided information on how to access the video online. The mailing also contained a mail-back postcard that allowed respondents to request a DVD of the video, which was subsequently mailed to them.

The total number of participants in each working panel were mostly determined by the percentage of participants in each stakeholder group who were surveyed in the FDOU Project 10 study that meets the selection criteria; however, based on tenure/experience as a primary criterion, it was determined that a majority of respondents from each aforementioned stakeholder group did qualify to participate in the working panels.

i. Charter fishing operations working panels

A total of 59 operations were interviewed in the FDOU Project 10 study, of which 32% were located in Palm Beach County, 29% in Miami-Dade County, 17% in Broward County, and 12% in Martin County. Importantly, 78% of those operations interviewed held 11-15 years or greater of experience taking charter fishing trips in their respective regions. Working panels of a minimum of five (5) charter fishing operations from Martin County, eight (8) each in Broward and Miami-Dade counties, and 12 in Palm Beach County were determined to provide the best representation across the four-county areas. The totals selected for each county in part represented the fishing operation types (e.g., nearshore, reef, and offshore), the geographical location of the operations within the county on a north-south axis (e.g., where Palm Beach and Miami-Dade counties have the greatest such coverage), and the overall population of fishing operations in each county. The project research team felt that there might have been changes to the overall population of charter fishing operations since the 2008-09 recession. A study conducted in Monroe County (Shivlani, 2009) with charter fishers, among other user groups, determined that high fuel prices followed by declining demand had negatively affected charter fishing operations. It was expected that due to a similar circumstances in southeast Florida, the actual number of operations might have declined since the previous study.

The targeted totals for charter fishing operations were 8 in Miami-Dade County, 8 in Broward County, 12 in Palm Beach County, and 5 in Martin County.

ii. Commercial fisher working panels

A total of 193 commercial fishers out of a population of 1,247 Saltwater Products License holders were interviewed in the FDOU Project 10 study (Shivlani and Villanueva, 2007). The largest population of commercial fishers was located in Miami-Dade County (43%), followed by Palm Beach County (28%), Broward County (17%), and Martin County (11%). Over 61% of those interviewed held 20 years or more of fishing experience. Using that sample, the project research team decided to develop working panels of a minimum of six (6) commercial fishers from Martin County, six (6) commercial fishers from Broward County, 10 commercial fishers from Palm Beach County, and 15 commercial fishers from Miami-Dade County. The totals selected for each county represented the diversity of fishing gear and species (highest in Miami-Dade County, which has

trap, trawl, line, and dive gear and which targets most finfish and all crustacean species), as well as the geographical location of commercial fishing operations. It was however also understood that the effective population of commercial fishers – like that of charter fishing operations – may have declined since the 2008-09 recession. Anecdotal information from conversations with key informants suggested that fishers in certain parts of the region (e.g., Broward County) may have exited the industry.

The targeted totals for commercial fishing operations were 15 in Miami-Dade County, 6 in Broward County, 10 in Palm Beach County, and 6 in Martin County.

iii. Dive operations working panels

A total of 166 dive operations were initially identified in the FDOU Project 10 study; however, as the operations were contacted, it was determined that perhaps only a third of the operations were dedicated dive and snorkel operations. Of the 46 operations interviewed, the results indicated that 65% of the operations had been operating in the area for between 11-20 years. Using the sample of 46 operations, the research team determined that it would develop working panels of a minimum of four (4) dive operations from Martin County (which has considerable overlap in dive area use with northern Palm Beach County operations), six (6) dive operations from Palm Beach County, six (6) dive operations from Miami-Dade County, and 10 dive operations from Broward County. Of particular importance in developing working panels of dive operations was the need to include the different operations that specialize in artificial reef dive trips and those that take trips to natural reefs, as well as to fully cover the southeast Florida region (e.g. to ensure that central and southern Palm Beach County dive operations, which target different areas than their northern counterparts and which share areas more in common with Martin County dive operations, are included in the panels). As with other commercial operations, it was determined early in the study that several operations were no longer offering trips. This was particularly acute in Martin County (D. Gentile, personal communication), and the project research team decided that it would adjust the regional totals as the actual situation demanded.

The targeted totals for dive operations were 6 in Miami-Dade County, 10 in Broward County, 6 in Palm Beach County, and 4 in Martin County.

iv. Research institutions, research management agencies, and educators

As part of the FDOU Project 10 study, a total of 55 research scientists and managers were interviewed. The list of respondents was developed based more on respondents' expertise than regional coverage. As previously stated, the research team employed a similar approach in developing research institution and research management agency working group panels, but it also added educators (who represented elementary, middle, and high school levels, as well

as university professors and lecturers) to the working group panels. The working group panel was separated into three sub-group working panels, to best represent research scientists, resource managers, and educators. Also, the project research team adopted a county-based approach to include local county management agency personnel, regional institution scientists, and educators, such that the panels represented regional, if not county, level expertise. As such, a minimum of nine (9) representatives (three from each sub-group), based on county-level and/or regional expertise population, were to be interviewed. Additionally, panel participation was prioritized for those members who have either direct responsibility over and/or research experience with the resources in question; tenure, while important, was not used as rigidly as a selection criterion for the other working panels.

The targeted totals for county were at least 3 research scientists, 3 resource managers, and 3 educators.

b. Interest group working panels

Of the 15 stakeholder groups identified in Task 1, there were various groups that were identified as local interest group working panels, or panels comprised of interest groups that had a distinct local, or county-level, presence. Other groups were identified as being better organized as regional interest group working panels, where the representatives did not have a definitive local presence and more closely represented that interest across the entire region.

The approach that the research team adopted in developing interest group working panels was to (1) identify all interest groups under each particular interest (under Task 1), (2) utilize the FDEP CRCP and FDOU Project Team to assist in developing (county level or regional) lists of interest group representatives (under Task 1), and (3) conduct a representative survey of the population of interest group representatives via key informant interviews.

i. Local interest group working panels

The interest groups identified as local interest group working panels were (1) the coastal construction industry, (2) county-based tourism industry groups (comprised mainly of local and county chambers of commerce), and (3) ports, marinas, and boatyards. A total of 12 representatives of each group were to be included, and the focus was on incorporating local coverage (i.e., to include three representatives for each group from each county) wherever possible.

The targeted total was a maximum of 36 interviews, depending on the population of local interest group representatives and on response rates, was determined as the target for the interest group working panels.

ii. Regional interest group working panels

The interest groups that were developed as regional interest group working panels were (1) nongovernmental organizations (NGOs), environmental, and conservation groups, (2) recreational or sport fishing industry and organizations, (3) commercial diving industry, (4) recreational boating industry, (5) commercial boating industry, and (6) surfers. Unlike the aforementioned local interest groups whose participation was based on county-level coverage, the regional interest group working panels were comprised based on key informants that could provide information for the southeast Florida region. Where representatives from their respective interest groups who have a greater local focus were identified, these representatives were seated following consultation with the FDEP CRCP and FDOU Project Team. A maximum of 42 representatives from all groups were identified to be included, and this consisted of 13 conservation groups, seven (7) recreational fishing groups, six (6) commercial dive organizations, 62 recreational boating organizations (of which 12 would be targeted), three (3) commercial boating organizations, and one (1) surfer organization. Apart from maximizing participation rate, the focus was on obtaining panel members that represented the entire region.

The targeted total was a maximum of 42 interviews, depending on the actual population of regional interest group representatives, to be completed as part of the regional interest group working panels' effort.

c. Stakeholder group meeting/workshop participant surveys

The third and final approach in the proposed mixed methodology was the implementation of participant surveys at stakeholder group meetings. Stakeholder groups, such as recreational fishers and divers, that could otherwise not be targeted directly (especially considering the need to present material prior to information gathering) could however be reached when segments of their population attend club or organization meetings. It was conceded that the participants at such meetings likely represented the most active members of their stakeholder groups, but the meetings provided a cost effective means by which to conduct well-conceived participant surveys and, importantly, a defensible way by which to reach a proportion of the stakeholder population. Finally, the approach added considerable information on the views held by stakeholder group members compared to their organizational representatives, thereby providing an excellent source of comparable user and organizational level results.

The research team worked with the CRCP and FDOU project teams to identify those stakeholder groups who membership could be targeted for participant surveys during periodic meetings. These included surfers from the local chapters of national surfing organizations such as Surfrider, recreational anglers at fishing clubs across the four counties, and recreational extractive and non-extractive divers from dive clubs and spear fishing clubs, respectively.

A maximum of 20 stakeholder group meetings/workshops participant survey sessions were to be targeted throughout the three-month field session, with the emphasis being given to cover each county for each stakeholder group, when feasible (e.g., the completion of at least one recreational fishing club meeting/workshop participant survey session in each county).

A total of 42 dive and 22 recreational fishing and free diving (including spearfishing) clubs were identified, and the project research team decided that it would contact each group first via email and follow up by phone. Project team members would encourage group representatives to all the team members to join an upcoming group meeting where the team members could show the project video and administer surveys. Unlike the working group panels, where interviews were the format used to collect data, the project team decided to develop self-administered stakeholder surveys that meeting participants would be handed out and which they would complete after having viewed the video. Also, as a means by which to maximize participation, the project research team decided to create an online version of the survey that stakeholder group members could complete outside their monthly meetings. This was done because the project research team concluded that certain groups may not want to show the video (either due to the setting, other commitments, or because meetings were mostly recreational/social in nature). When informed that the video could not be accommodated at a meeting, project team members would suggest providing business cards to members with the following instructions:

1. Navigate to www.seflreefstudy.com
2. Watch the online video
3. Access and complete the online survey

The project website was modified to include similar instructions and allowed users to watch the video and return to the website to fill out a survey.

2.1.4. Interview questionnaire and stakeholder survey development

The interview questionnaire and stakeholder survey were both developed to address the major project themes, but because of the different approaches that each utilized in being administered, there were several differences in the contents of each. First, the interview questionnaire was much longer than the stakeholder survey; the former allowed for a lengthy discussion whereas the latter was to be self-administered in less than 10 minutes. Second, the interview questionnaire allowed for in-depth, open-ended answers, but the stakeholder survey only provided set answers from which to select; this was done as the latter did not allow for interpretation. Finally, the interview questionnaire had more questions on each theme than did the stakeholder survey, due to the fact

that it was expected that key informants would have more information and could discuss in more detail the various themes.

The interview approach involved speaking to a working group panel member one-on-one. This was done for a variety of reasons, including:

- To allow for more open-ended answers and follow-up questions that can only be accomplished via in-person interviews and not in group settings;
- To devote sufficient time to obtain spatial information such that it is accurate and clearly identifies areas of concern, as well as receiving input on why such areas are considered to be of concern;
- To accommodate participants, especially charter and commercial fishers, who are otherwise unable to and often do not show for group workshops.

The interview questionnaire consisted of each of the nine themes identified in Task 3 elaborated on each theme, allowing for considerable open-ended input from each respondent. Thus, in asking about the perceived causes of resource conditions, working panel members would be asked when the causes had occurred (i.e., timeframe and duration), how the causes had permeated (i.e., pathways), and whether the causes were reversible (i.e., persistence); moreover, respondents would also be asked if there were synergistic or exacerbating, secondary causes, and how these were related to the current resource condition. As such, the survey questionnaires would record answers that could be compared across groups and counties, while the interview narrative would capture the detailed explanation. The charts used in this effort were first to be segments of existing National Oceanic and Atmospheric Administration (NOAA) nautical charts for the southeast Florida region, and these were to be presented to each working panel member to have the member identify each area of concern by name and to mark the area on the chart. However, the project research team developed southeast Florida maps made available on GIS by the CRCP team that depicted benthic features, including coral reefs, and identification features like cities and inlets. These were the maps used in the project.

To ensure that the interview questionnaire provided the information required to address Tasks 5, 6, and 7, the project research team conducted a pilot session consisting of two interviews (with a research scientist and recreational fishing organization representative). Results from the pilot session were summarized in a pilot session report, and changes were made to the interview questionnaire and stakeholder survey to improve the information that each would provide.

3. Results

3.1. Overall fieldwork approach

The overall project approach adopted by the research team can be summarized in Figure 1, which shows the timeline and activities for each group (county-based working panels, local and regional interest group panels, and stakeholder groups). The fieldwork commenced in February 2011 with introductory material being mailed out to each group, followed by requests for participation, and the implementation of interview and survey sessions.

Figure 1. Project fieldwork timeline and activities.

3.1.1. Pre-fieldwork organization

The fieldwork to conduct the working panel interviews and stakeholder surveys commenced in February 2011, when the project research team began pre-fieldwork activities to inform the stakeholder community on the project details and to solicit participation from interested stakeholders. Pre-fieldwork activities consisted of the following: the development of a project website and posting of the video online; an introductory letter mailer to participants; and fieldwork assignments and training.

The project research team created a website, www.seflreefstudy.com, which introduced the project on its homepage (see Figure 2 for screenshot). The website also contained information on how to access the video (see Figure 3 for screenshot), links on studies used in the video and for further reading, and an email address and phone number on how to reach the project research team. From April 2011 onwards, the website contained information on how to access the online survey that the project research team generated to boost stakeholder group member survey response rates (see below).

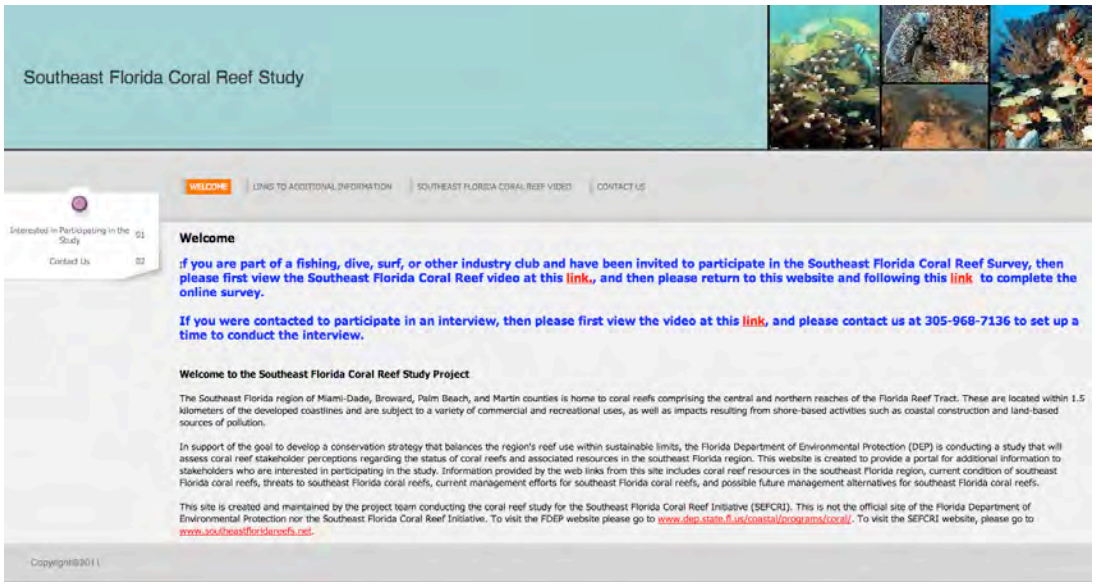

Figure 2. Project website.

Letters sent via regular mail or electronic mail describing the project and project objectives and requesting participation were sent out in February 2011. Respondents were encouraged to either view the video directly on the project website or to contact the project research team via the enclosed, stamped postcard, by telephone, or by email to obtain a copy of the video on DVD.

The final aspect of pre-fieldwork organization included several meetings and training sessions held with project research team leaders and team members recruited to conduct interviews and oversee stakeholder group survey sessions. Team members' responsibilities were divided first by the group(s) that team members preferred to interview/survey, and then by the region in which the team members would focus their efforts. Apart from this division of effort, team members were also required to read the pilot session report, practice using the interview questionnaire, and gain competence in conducting field interviews by first accompanying a project research team leader for one or more interviews. Team members conducting field interviews were required to take extensive notes that they could later summarize as narrative reports, as well as identify use, conflict, priority areas, and areas in good and fair condition in interview maps.

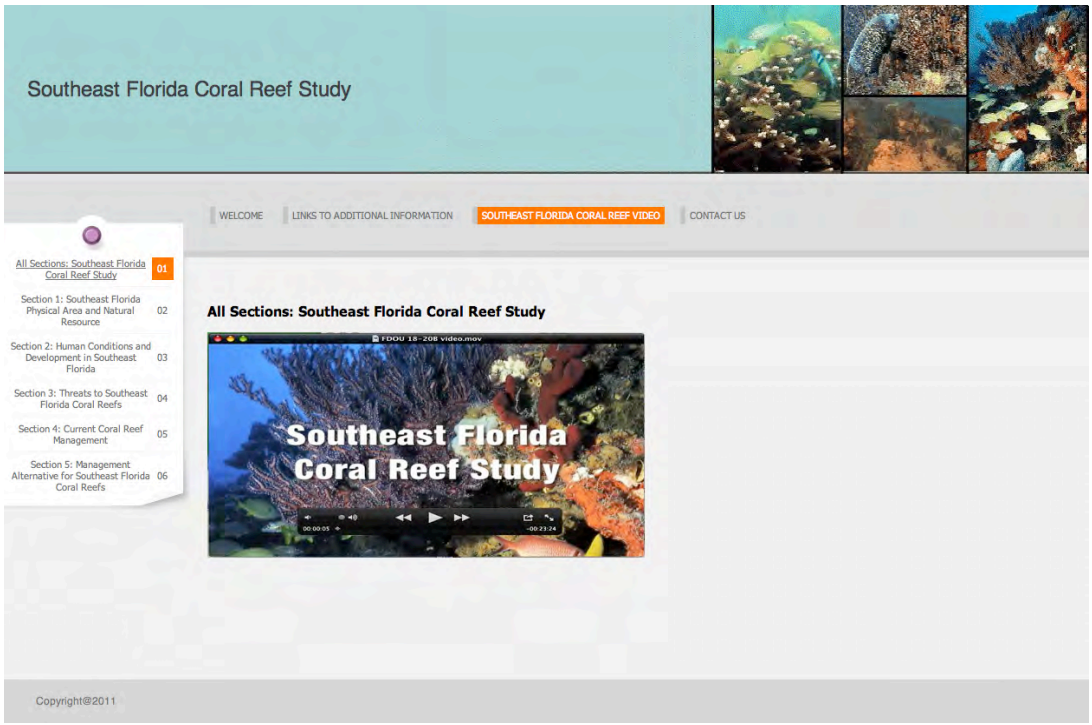

Figure 3: Video access webpage on project website.

3.1.2. Working panels fieldwork

Starting in February 2011, the project research team contacted working panels, comprised of the county-based panels and the interest group panels, either via an introductory letter mailed to the panel members or by electronic mail. The only working panels that were targeted by mail were all commercial fishers and a proportion of charter and dive operations. Using the mailing address information available from FDOU Project 10, the project research team identified 150 commercial fishers (of whom several were also charter fishers; i.e., those persons who held both a commercial Saltwater Products License (SPL) and ran charter fishing trips) and 45 dive operations, and it mailed out 195 introductory letters in February 2011. The project research team also obtained email addresses or phone numbers for the 59 charter fishing operations and 45 dive operations interviewed as part of FDOU Project 10, and team members utilized the information to contact the operators. Of the 195 letters, 50 were undeliverable. From the remainder, 14 respondents (representing a 9.6% response rate) sent back postcards, emailed, or called to request a DVD and/or to confirm participation.

While the fieldwork approach sought to maximize regional/county-level coverage, the project research team prioritized the interviews of those participants it recognized from FDOU Project 10 as having experience working in the region and/or who could be expected to represent their respective groups as key informants.

Also in February 2011, the project research team sent emails to members of the research institutions, research management agencies, and the education community, regional interest group panels, and local group panels. Members of research institutions, research management agencies, and the education community were selected in coordination with the CRCP team to ensure that a reasonable combination of expertise and regional coverage could be attained. Thus, research institutions and management agencies located outside the Southeast Florida region but which conducted research or managed resources in the region were included for interviews. Also, the participants selected were based either on their research and/or management activities within counties or across the entire region.

Members for the local interest group panels were selected in two ways, based on the number of representatives available for their respective group: The first approach was to randomize local lists of those groups for which sufficient numbers of representatives were available for each county; and the second approach was to target all representatives of those groups where only a limited number of representatives were unavailable for regional coverage. For example, a randomized list of ports and marinas was used to target that group in each county, whereas all coastal construction firms for the four-county region were contacted to participate in the interviews. In March 2011, the project research team commenced contacting local interest group panel representatives by email to introduce the study (the email content closely matched that of the introductory letter and contained information on the project website and on-line video) and follow up by email or telephone to conduct the interview. In cases where email contact information was not available or could not be obtained via the Internet, the primary approach to contact the representatives was by telephone.

Regional interest group panels were mostly selected by contacting all representatives from their respective groups, with the exception of the recreational boating industry for which a minimum of one representative was randomly selected from each county. As with the local interest group panels, the project research team contacted regional interest group panels in March 2011 with information on the project first via email and followed up via email and/or telephone.

3.1.3. Stakeholder groups fieldwork

The project research team contacted all dive and fishing clubs, first by email and then following up by telephone. An introductory email sent out in February 2011 requested that club representatives allow project research team members to attend upcoming meetings, in March, April, or May 2011, to show the video and then to disseminate the self-administered stakeholder surveys. Following a very poor response to the initial call for participation, the project research team decided in coordination with the CRCP team to develop an online version of the

survey and to promote participation by having club members first view the video online and then to complete the online survey. To further promote participation, project research team members attended various club meetings and passed out business cards that contained information on how to access the online video and survey.

3.1.4. Data analysis

The project research team finished all data collection at the end of May 2011 (see Figure 1), completing a total of 191 working panel interviews and 79 stakeholder group surveys (discussed in the next session). Team members conducted the working panel interviews using an open-ended questionnaire (see Appendix 1), which resulted in narrative reports consisting of a variety of answers across the various interview themes. Stakeholder surveys, which were self-administered (see Appendix 2), had bounded responses and thus did not require narrative reports.

The key step in data analysis concerning working panel interviews involved transforming the qualitative data provided by the participants into ordinal data to be used to compare respondents' answers within and across panels. To accomplish this, the project research team leader read over all narrative reports, perused accompanying notes and related audio files, and discussed the tenor of particular groups with team members who conducted these interviews. Once all the information had been reviewed, the project team leader created a database encompassing the various interview questions, the answers for which were encoded using a conservative approach to data transformation. For example, if a respondent believed that certain conditions had deteriorated, the rating provided to that answer was a 4, on a scale where 1 represented excellent improvement and 5 represented complete deterioration. Only in those cases where the narrative report and other notes demonstrated an extreme response was such a response encoded. This approach ensured that unless there were evidence to show that respondents' views were in completely alignment or completely against a given scenario, the data that were transformed would not be shifted to either extreme. Also, as previously stated, an important aspect of data analysis from narrative reports was to learn *why* respondents felt the way they did about resource conditions, management effectiveness, and management alternatives, among a host of other topics. Thus, it was important to both transform the qualitative information *and* to ascertain why that information was provided and its relevance to the panel.

Another important aspect of data analysis was the generation of working panel maps concerning areas of use, areas preferred as marine managed areas, and areas of high and low priority. The project research team used the maps completed with all working panel members interviewed and created a series of GIS maps specific to each panel and for each county. The maps identified (by

percentage of respondents that identified areas) the areas that were important across different uses and regions, as well as showing those locations that respondents stated would make the best marine managed areas.

The other database created was for the stakeholder group surveys, which consisted of bounded questions and which, although less data rich than the working panel interview database, provided detailed information on recreational fishers and divers concerning their views on resource conditions, use conflicts, management preferences, and marine managed areas.

3.2. Interview and survey totals

As shown in Figure 1, the interview and stakeholder survey sessions lasted for three months, from the beginning of March 2011 through the end of May 2011. The project research team completed a total of 191 interviews and 79 stakeholder surveys over the period.

In terms of the working panels, because several members of the coastal and marine researchers, managers, and educators panel and local interest group panel stated that they represented the entire region, these interviews were considered as separate observations for each county; similarly, because the regional interest groups working panel pertained to the entire region, each interview was considered as a separate observation for each county[2]. When the interviews were considered as separate observations for each county, the total number of observations increased to 290. Over 30% of the total observations pertained to Miami-Dade County, followed by Broward County (26.6%), Palm Beach County (23.4%), and Martin County (19.6%) (Table 1).

Of the 79 stakeholder surveys completed, 40.5% were completed by dive group members, 36.7% by fishing club members, and 22.8% by members of groups who did not identify their affiliation. Over 96% were residents of southeast Florida, with respondents representing all four counties. Over half of those who completed surveys did not provide a location, but divers and recreational fishers from all four southeast Florida counties participated in the project.

[2] The approach of including such observations for each county was applied *solely* in the inter-county interviews analysis and not for individual working group panels; thus, only the total number of completed interviews was used in describing the findings for each working group panel, regardless of whether a respondent stated expertise over more than one county or for the entire region.

Table 1. Working panels' interview totals.

Working group panel	Total	Miami-Dade County	Broward County	Palm Beach County	Martin County
Charter fishing operations	36 (36)[3]	22.2% n = 8	30.6% n = 11	30.6% n = 11	16.7% n = 6
Commercial fishers	47 (47)	42.6% n = 20	17.0% n = 8	23.4% n = 11	17.0% n = 8
Dive operations	27 (27)	22.2% n = 6	39.3% n = 11	25.0% n = 7	10.7% n = 3
Coastal and marine science researchers, managers, and educators	74 (38)	35.1% n = 26	25.7% n = 19	18.9% n =14	20.3% n = 15
Local interest groups	30 (24)	30.0% n = 9	30.0% n = 9	20.0% n = 6	20.8% n =6
Regional interest groups[4]	76 (19)	25.0% n = 19	25.0% n = 19	25.0% n = 19	25.0% n = 19
Total	290 (191)	30.3% n = 88	26.6% n = 77	23.4% n = 68	19.6% n = 57

3.3. Inter-county working panel interviews[5]

The project research team completed 191 interviews covering six working panels across the four-county region; these interviews related to 290 observations. Miami-Dade County panel members represented the most observations (30.3%), due in part to the greater number of commercial fishers and coastal and marine science researchers, managers, and educators interviewed in the county. Apart from being the most populated county in southeast Florida, Miami-Dade County also had the highest proportion (and most diverse, in terms of gears and species) commercial fishers in the region. The county also contained a number of institutions from which researchers, managers, and educators were selected, such as the NOAA laboratories and Southeast Fishery Science Center in Virginia Key, several major research universities, and the regional Sea Grant office. Broward County accounted for the second highest number of observations (26.6%), assisted in part by the large charter fishing and dive operator populations in the county. The county, which is second to Miami-Dade County in total population in the region, also contained several universities and local, state, and federal agency offices. Palm Beach County represented 23.4% of the

[3] The parenthetical totals represent the actual number of interviews completed per working group panel, which when tallied equal the 191 interviews completed as part of the project.

[4] Regional interest group panels were not selected on the basis of their location or to maximize county or regional coverage as it was assumed that regardless of location, the members represented their particular group; indeed, certain regional interest groups did not have representatives in more than a single count in the region.

[5] Nonparametric tests used to compare means across groups.

total observations, due in part to the county's charter fishing, commercial fishing, and dive operations. Finally, Martin County, which is the smallest county both in terms of size and population, accounted for under a fifth (19.6%) of all observations.

3.3.1. Inter-county comparison of working panels' views on resource conditions and trends

Panel members across the four counties generally agreed that overall resource conditions were between fair and moderately poor (mean between 3.00 and 4.00, where 1 = excellent and 5 = very poor) (Table 2). Broward County panel members held the least favorable views concerning overall conditions. Corals were considered to be among the least healthy of all resources, with the entire sample ranking them as moderately poor. When compared to overall conditions, the total sample, Miami-Dade County panel members, and Broward County panel members considered corals as being in significantly worse condition. Across counties, Broward County respondents rated corals as significantly worse, compared to the entire sample and Palm Beach County panel members. The Broward County groups in fact rated all resource conditions as in worse condition compared to the rest of the counties and the total sample, suggesting that participants from this county considered their resources as being more degraded than their counterparts across the region.

Panel members also agreed that overall conditions had degraded somewhat (mean between 3.00 and 4.00, where 1 = greatly improved and 5 = greatly declined), with Broward County respondents reporting the greatest decline. Corals were considered to have degraded more than overall conditions but the differences were not significant; differences in the level of degradation across counties was significant, as Broward County panel members rated coral conditions as having declined more than did Palm Beach County panel members. Respondents from the two counties also rated the changes in the beaches and wetlands differently, with Broward County participants rating their beaches as having declined more than Palm Beach County participants did.

In comparing all resource conditions and changes in resource conditions, it was determined that panel members from the northern counties (Palm Beach and Martin counties) held more favorable views than did Miami-Dade or Broward counties' panel members. This may have been in part due to the overall condition of certain resources such as fisheries, for which landings had increased in the north, whereas participation and harvest in fisheries had declined in Broward and Miami-Dade counties. Also, factors such as water quality, which was rated as significantly worse in Broward County compared to Miami-Dade and Palm Beach counties, may have been a result of a combination of population pressures and management activities (e.g., the Segment III beach nourishment project in Broward County). Finally, it is important to note that *none* of the

resources in any county was considered to be in better than fair condition or was perceived to have improved; instead, all resources were considered between fair to moderately poor condition, and all trends were between neutral and negative. These findings are important because they demonstrate that panel members were largely dissatisfied with present resource conditions and believed that efforts in improving those conditions had been at best able to stave off drastic decline and at worse were ineffective.

Table 2. Working panels' views on resource conditions.

RESOURCE CONDITIONS (1 = excellent; 5 = very poor)	All counties	Miami-Dade County	Broward County	Palm Beach County	Martin County
1. Overall	3.38 (0.83)* n = 239	3.33 (0.82)* n = 81	3.52 (0.83)* n = 64	3.31 (0.83) n = 52	3.37 (0.88) n = 42
2. Corals	3.66 (0.79)*^{A} n = 182	3.67 (0.72)* n = 53	3.91 (0.77)*^{AB} n = 55	3.39 (0.80)^{B} n = 42	3.59 (0.80) n = 34
3. Seagrasses	3.26 (0.90) n = 102	3.41 (0.90) n = 34	3.24 (1.01) n = 19	3.09 (0.91) n = 29	3.28 (0.82) n = 20
4. Mangroves	3.77 (0.92) n = 74	3.45 (0.91) n = 22	3.95 (1.00) n = 22	3.88 (0.93) n = 17	3.85 (0.69) n = 13
5. Beaches and wetlands	3.58 (0.97) n = 133	3.60 (0.92) n = 36	3.92 (1.10)^{A} n = 22	3.25 (1.03)^{AB} n = 42	3.76 (0.72)^{B} n = 31
6. Water quality	3.59 (0.96)^{A} n = 164	3.50 (0.94)^{A} n = 49	3.96 (0.94)^{A} n = 65	3.29 (0.96)^{A} n = 42	3.66 (0.88) n = 32
7. Fisheries	3.44 (1.13) n = 156	3.58 (1.11) n = 42	3.66 (1.17) n = 34	3.27 (1.12) n = 44	3.25 (1.09) n = 36
CHANGE IN RESOURCE CONDITIONS (1 = greatly improved; 5 = greatly declined					
1. Overall	3.49 (0.80) n = 242	3.45 (0.82) n = 82	3.59 (0.82) n = 65	3.42 (0.81) n = 52	3.50 (0.79) n = 43
2. Corals	3.61 (0.73) n = 185	3.67 (0.64) n = 54	3.78 (0.73)^{A} n = 54	3.39 (0.82)^{A} n = 42	3.56 (0.69) n = 35
3. Seagrasses	3.37 (0.87) n = 94	3.42 (0.83) n = 22	3.53 (0.80) n = 15	3.12 (1.07) n = 26	3.47 (0.68) n = 19
4. Mangroves	3.68 (0.85) n = 69	3.25 (0.85) n = 0.85	3.86 (0.91) n = 21	4.00 (0.78) n = 14	3.71 (0.61) n = 14
5. Beaches and wetlands	3.59 (0.92) n = 128	3.60 (0.89) n = 34	3.90 (0.98)^{A} n = 22	3.33 (1.02)^{A} n = 40	3.70 (0.70) n = 30
6. Water quality	3.56 (0.97) n = 169	3.52 (0.96) n = 51	3.69 (1.01) n = 43	3.40 (1.02) n = 32	3.66 (0.87) n = 32
7. Fisheries	3.40 (1.10) n = 148	3.53 (1.11) n = 39	3.61 (1.17) n = 31	3.27 (1.06) n = 44	3.24 (1.07) n = 34

*refers to significant differences in means between overall and coral conditions ($p < 0.05$)
^{AB}refers to significant differences in means across counties in resource conditions ($p < 0.05$)

In terms of factors affecting overall conditions, there were both shared concerns across counties and county-specific concerns (Table 3). The most pressing

concern, as a percentage of all respondents who raised the issue, was water quality (26.8%); this was followed by overfishing and fishery issues, such as ghost nets, trap damage, and gear fouling (23.5%), development (21.5%), and land-based sources of pollution (20.3%). Some factors or stressors need to be considered together, especially those related to population and growth. That is, population, development, and use were often identified as co-factors, as well as the various types of water quality factors. Climate change, though raised by several panel members, was not considered as immediate a threat as those associated with water quality, development, and use. Also, a few respondents felt that invasive species were a concern, especially exotic flora and tropical fish (e.g., Indo-Pacific lionfish).

There were several differences across counties in factors affecting overall conditions. Over 16% of Martin County panel members, for example, identified freshwater discharges as a stressor, compared to only 1.2% of Miami-Dade panel members. Population (in terms of population growth and associated stressors) was considered more of a factor in Miami-Dade and Broward counties than in the less populated, northern counties (especially Martin County, where only 2.3% of the respondents identified population as a stressor). Overfishing was a major concern among the two counties with the largest commercial fishing populations (Miami-Dade and Palm Beach counties) and least so in Broward County, which reported the lowest landings in the four-county region. Finally, climate change was more often identified by Miami-Dade County panel members than by those interviewed in the other three counties.

Table 3. Working panels' views on resource condition stressors.

OVERALL CONDITIONS	All counties (n = 242)	Miami-Dade County (n = 82)	Broward County (n =65)	Palm Beach County (n = 52)	Martin County (n = 43)
1. Water quality	26.8%	22.0%	30.8%	28.8%	27.9%
2. Land-based sources of pollution	20.3%	17.1%	24.6%	17.3%	23.3%
3. Outfalls	7.4%	2.4%	10.8%	9.6%	9.3%
4. Freshwater discharges	4.6%	1.2%	1.5%	3.8%	16.3%
5. Pollution (general)	6.6%	7.3%	9.2%	3.8%	4.7%
6. Beach nourishment	9.9%	7.3%	10.8%	13.5%	9.3%
7. Development	21.5%	19.5%	20.0%	23.1%	25.6%
8. Population	5.8%	6.1%	9.2%	3.8%	2.3%
9. Use	18.2%	18.3%	18.5%	19.2%	16.3%
10. Habitat damage	2.5%	3.7%	3.1%	1.9%	0.0%
11. Anchor damage	0.0%	0.0%	0.0%	0.0%	0.0%
12. Overfishing and fishery issues	23.5%	24.4%	15.4%	38.4%	16.3%
13. Invasive species	2.9%	3.7%	1.5%	5.8%	0.0%
14. Climate change	4.1%	7.3%	1.5%	3.8%	2.3%

When asked about stressors affecting corals, a majority of those who identified stressors pointed to land-based sources of pollution (27.5%) as the primary stressor, followed by water quality (24.2%), and use (20.3%). Other important stressors included anchor damage (13.7%), beach nourishment (13.7%), climate change (11.8%), and overfishing and fisheries issues (10.5%) (Table 4). Several of the panel members interviewed felt that corals had been decimated a few decades ago with development (which ranked low, at 10.5%, among stressors), use, and fishing, and that more recent management actions had actually helped to slow down coral decline. Similarly, other respondents argued that corals were very healthy in their respective regions, and that there were few, if any, stressors affecting corals.

There were important regional differences in perceptions concerning coral stressors, especially as related to sources of pollution, beach nourishment, and physical damage. Broward County respondents were the most likely to identify outfalls as a significant source of coral degradation (10.4%), compared to their counterparts in other counties. Martin County panel members identified freshwater discharges, mainly from the St. Lucie Inlet, as a major stressor (11.1%); Palm Beach County panel members also felt that freshwater discharges affected corals (13.2%) in their region. By contrast, only 2.5% of Miami-Dade County respondents considered discharges a stressor. Beach nourishment (5.0%) was also not of major concern to Miami-Dade County respondents, compared to over 18% of both Palm Beach and Martin county panel members. Several Martin County participants blamed beach nourishment for the deterioration of Bathtub Beach, stating that sand had eroded from a recent project and smothered the nearshore reef. Palm Beach County respondents who identified beach nourishment as a stressor agreed that nearshore communities suffered from higher levels of turbidity and, in some cases, "live coral is dying because it is being smothered by sand". Broward County panel members believed that anchor damage was an especially acute problem in their county, with almost a quarter of the county respondents (22.9%) identifying it as a major stressor to corals. All types of uses were considered to have significant impacts across the region (20.3%), but anchor damage was not identified as frequently in other counties as it was in Broward County. This may in part be due to the case of major anchor damage in the county from 1994-2006 (Collier *et al.*, 2007), which may have raised awareness of the issue among the county's panel members.

Table 4. Working panels' views on coral resource conditions stressors.

CORAL CONDITIONS	All counties (n = 153)	Miami-Dade County (n = 40)	Broward County (n =48)	Palm Beach County (n = 38)	Martin County (n = 27)
1. Water quality	24.2%	30.0%	25.0%	18.4%	22.2%
2. Land-based sources of pollution	27.5%	30.0%	27.1%	26.3%	25.9%
3. Outfalls	5.2%	0.0%	10.4%	2.6%	7.4%
4. Freshwater discharges	7.2%	2.5%	4.2%	13.2%	11.1%
5. Pollution (general)	9.8%	12.5%	12.5%	5.3%	7.4%
6. Nutrients	9.8%	5.0%	8.3%	18.4%	11.1%
7. Beach nourishment	13.7%	5.0%	14.6%	18.4%	18.5%
8. Development	10.5%	10.0%	14.6%	5.3%	11.1%
9. Use	20.3%	27.5%	18.8%	18.4%	14.8%
10. Vessel groundings	5.9%	7.5%	8.3%	2.6%	3.7%
11. Anchor damage	13.7%	12.5%	22.9%	7.9%	7.4%
12. Overfishing and fishery issues	10.5%	7.5%	6.2%	18.4%	11.1%
13. Diving and snorkeling	5.2%	5.0%	4.2%	5.3%	7.4%
14. Climate change	11.8%	17.5%	10.4%	5.3%	14.8%

3.3.2. Inter-county comparison of working panels' views on uses and use conflicts

The stakeholder groups reported using much of the southeast Florida region, from the shoreline to offshore areas, depending on the activity type (Figure 4). Nearshore areas were more commonly used in Miami-Dade and Broward counties, but use was concentrated further offshore in the Palm Beach and Martin counties. Discrete areas were used for particular activities, such as shrimp and trap fishing in Biscayne Bay (Miami-Dade County), SCUBA diving off Jupiter (Palm Beach County), surfing on many beaches in southeast Florida, and offshore (federal) waters for most charter fishing in the entire region. Also, several working group panels, especially researchers, managers, and educators, regional interest groups, and local interest groups, often did not identify specific use areas, as respondents often did not use the region as part of their group's activities (e.g., educators who did not have field courses, conservation groups, etc.).

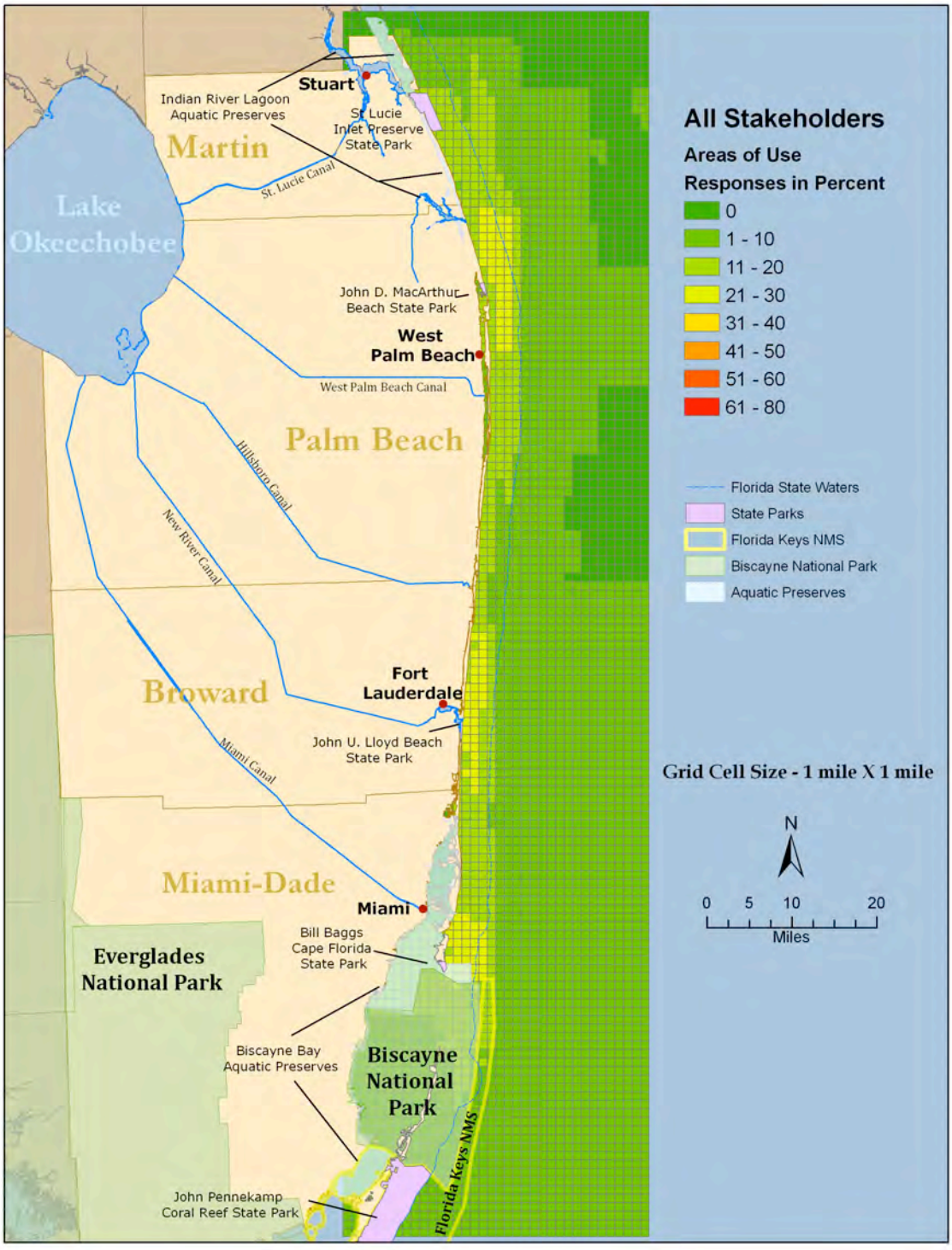

Figure 4. Working panels' areas of use. Note: area of grid cells used on this and all subsequent maps (1 X 1 square miles [2.59 X 2.59 square kilometers])[6].

[6] Areas of use here shown in terms of percentage of users that identified the area, which are not statistically relevant for areas used by different users groups and are instead relative percentages

The panel members interviewed reported on a variety of conflicts, ranging from resource use conflicts related to two or more stakeholder groups competing over the same resource base (e.g., commercial and recreational fishers targeting the same fisheries), spatial conflicts with different stakeholder groups competing for the same areas but for different purposes (e.g., recreational divers and anglers using the same location, where the anglers' use of hooks in the water and vessel proximity impacts diver safety, and where divers in the water scare away the fish), impact conflicts related to one stakeholder group's activities negatively affecting another stakeholder group's ability to access the resource (e.g., where a conservation group may argue that a development may result in habitat destruction, lack of access, etc.), and inter-agency/agency-group conflicts related to differences in resource management views between agencies or agencies and other stakeholder groups (e.g., different agencies may disagree on whether an action should be permitted, or a permitting agency and permitted groups may disagree on the need for permitting requirements). Conflicts were widespread across the region and tended to be concentrated in the nearshore environment (Figure 5).

based on (a) total users interviewed per county/region and (b) respondents who agreed to provide use information.

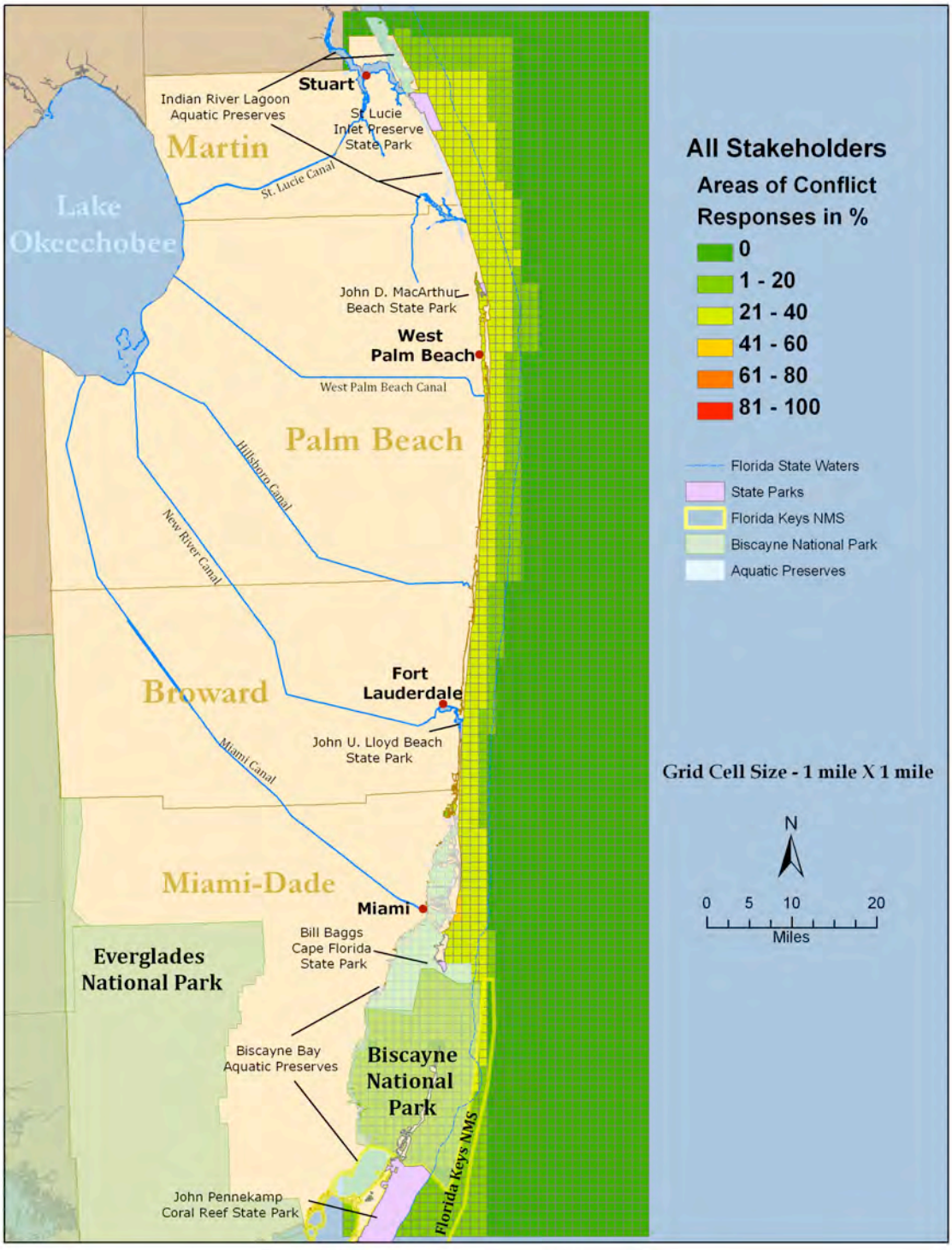

Figure 5: Working panels' areas of use conflicts.

The incidence of use conflicts varied considerably across counties, but at least half of all panels or more reported at least one conflict; the overall incidence rate was 56% (Table 5). Almost two-thirds of Palm Beach County panel members reported one or more conflicts, which was the highest rate of any county. The

higher rates of use conflicts in Palm Beach and Martin counties, compared to the southern counties, may have been due in part to the limited availability of habitat and the types of uses. Several dive operators in Palm Beach County complained that their divers who practiced spearfishing were often in conflict with recreational anglers. Similarly, charter fishing operations and commercial fishers in Palm Beach and Martin counties often argued that extractive diving (spearfishing and lobster diving) was responsible for the use conflicts, both in terms of the resources targeted and areas fished. Fewer dive operations in Broward (especially in the central and south Broward areas) and Miami-Dade counties reported allowing extractive uses; thus, the rates of use conflicts were lower in those two counties.

In terms of the different conflict types, Palm Beach and Martin counties' panel members reported that a third or more of their conflicts were related to resource use (as discussed above). By contrast, just over a fifth and less than 19% of use conflicts among Broward and Miami-Dade counties' panel members, respectively, were resource use-based. Broward County respondents were the most likely to identify spatial conflicts, which many elaborated were related to the recreational boating industry. Others in Broward County identified artificial reefs as a primary location where many different user groups congregated, resulting in spatial conflicts. Spatial conflicts were less common in Martin County, although it should be noted that many panel members in the region believed that resource use and spatial conflicts in the county were often the same; that is, due to the relative paucity of suitable, shallow habitats, panel members argued that resource use conflicts in fact comprised competition for both resource and space. Impact conflicts were most frequently reported in Martin and Miami-Dade counties. In Martin County, the most common impact conflict was related to coastal development, which panel members believed led to unacceptable impacts in the coastal and marine environment and represented a significant impact conflict. In Miami-Dade County, impact conflicts consisted of a series of activities that were considered to impact the environment, including trap use affecting coral reefs, boating activities over the county's remaining seagrass meadows, and coastal construction impacts on nearshore habitats. Inter-agency or agency-group conflicts were most commonly reported in Miami-Dade and Broward counties, which are the more built-out counties in the region. Many respondents in both counties pointed to conservation groups having conflicts with permitting agencies, and certain agency personnel interviewed identified conflicts between agencies over resource management and permitting decisions.

In most cases, panel members could not provide use conflict resolutions, instead pointing to the need for greater enforcement and stricter penalties. In the case of certain spatial conflicts, 13.9% of those who reported conflicts (n = 153) suggested that some type of spatial zoning solution would be required. This ranged from setting up marine protected areas that would disallow extractive uses, exclusion

zones to separate uses, boundaries that would separate gear use, and seasonal closures. Most respondents, however, felt that even with greater enforcement, better education, and changes in zoning, the conflicts mostly could not be resolved.

Table 5. Working panels' views on use conflicts.

USE CONFLICTS	All counties	Miami-Dade County	Broward County	Palm Beach County	Martin County
Incidence of use conflicts	56.0% (n = 243)	53.6% (n = 82)	50.0% (n = 66)	65.3% (n = 52)	58.1% (n = 43)
Conflict types	(n = 153)	(n = 59)	(n =39)	(n = 42)	(n = 34)
1. Resource use	25.9%	18.6%	20.5%	33.3%	35.3%
2. Spatial	44.2%	44.1%	51.3%	45.2%	35.3%
3. Impact	19.0%	22.0%	15.4%	14.3%	23.5%
4. Inter-agency or agency-group	10.9%	15.3%	12.8%	7.2%	5.9%

Panel members identified a number of areas that they considered in good condition[7] (Figure 6). Most of the areas were located in the nearshore areas, with the exception of Miami-Dade areas, where respondents identified coral reefs located east of the barrier islands as areas in good condition. Along Broward County, stakeholders pointed to discrete areas along the nearshore reef terrace that they perceived as being in the best condition. In Palm Beach County, panel members pointed to areas off less populated parts of the county and especially adjacent to north Palm Beach County as the areas in the best condition.

[7] It should be noted that no attempt was made to define what was meant by "good" condition; instead, the objective was to have the respondents determine what they considered as "good" or "poor". Initially, the interview asked respondents to identify areas in excellent, good, fair, poor, and very poor condition, but that was changed to identify only those areas in good or poor condition, as most respondents could not categorize areas into more than two states/conditions.

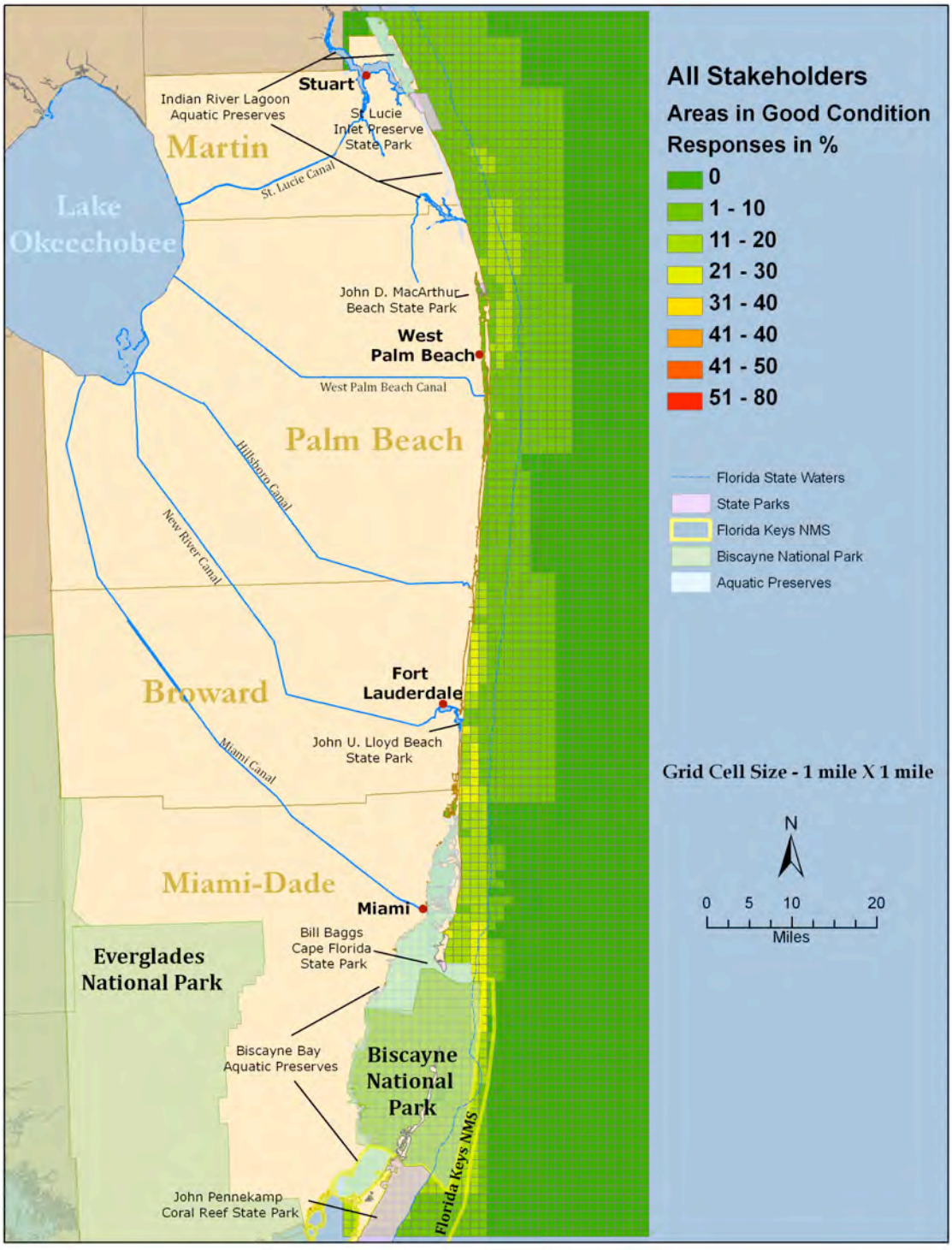

Figure 6: Working panels' identification of areas in good condition.

3.3.3. Inter-county comparison of working panels' goals on coral reef protection

Panel members were asked about their vision for coral reef ecosystem protection for the region and in their respective counties, and 46.5% were in favor of allowing the continued use and protection as present with existing regulations (Table 6). However, several respondents who were in favor of the existing approach qualified their answers, with most calling for the *effective* enforcement of existing regulations; others felt that the present approach would work if education and outreach efforts were expanded such that panel members understood the regulatory framework. While support for the existing management approach was above 45% in each county, Broward County respondents favored the approach slight more (48.1%) than did other counties' panel members. Reducing use among certain groups with modified or expanded regulations was the most popular of the options that called for a different vision than the status quo, with 15.7% of those interviewed favoring the approach. It was most popular in Miami-Dade County and least popular in Palm Beach County. Fewer respondents favored reducing use among certain groups only within certain areas (14.3%), and this approach was especially unpopular among stakeholder groups that participated in extractive activities (e.g., charter fishing operations, commercial fishers). Panel members were not in favor of the elimination of certain groups with expanded regulations (4.2%), and none of those interviewed suggested eliminating all uses with strictest regulations for protection. Among other approaches presented, several panel members believed that regulations should in fact be relaxed to allow an expansion of uses (e.g., elimination of seasonal closures, lifting of moratoria on certain protected species, such as goliath grouper, etc.), while others felt that certain uses should be curtailed but not via changes in regulations but by improving education and awareness. Finally, many of the agency managers who were interviewed provided their agency missions as their visions for management, and these were recorded under "agency approach".

Panel members also provided their views on priorities for resource protection. When asked to rank five priority categories, the most highly rated was sustainable use (mean = 2.99, where 1 = strongly agree and 5 = strong disagree), which respondents ranked higher than prioritizing the protection of stressed resources (mean = 3.04), key resources (mean = 3.15), or by enhancing and improving enforcement (mean = 3.20) (Table 7). That is, panel members believed that maintaining use at a level where uses can be satisfied and where resources can be conserved for future generations was the best priority option. Conversely, the sample was opposed to prioritizing the protection of a percentage of all resources (mean = 3.90). Two, opposing sets of panel members rejected this approach for very different reasons. The first set, comprised of mainly extractive use panel members, perceived this approach as a proxy for marine zoning and therefore were against it. The second set of panel members who rejected

prioritizing the protection of a percentage of all resources were in favor of strong protection measures and felt that the approach would lead to the abandonment (or downgrading) of other, needed protective measures. The latter set of opponents argued that although protecting a percentage of all resources should be an objective, it should not be prioritized above other approaches.

Table 6. Working panels views' on preferred forms of management.

PREFERRED FORM OF MANAGEMENT	All counties (n = 286)	Miami-Dade County (n = 86)	Broward County (n =77)	Palm Beach County (n = 38)	Martin County (n = 56)
1. Continued use and protection as present	46.5%	45.4%	48.1%	46.3%	46.4%
2. Reduced use with modified or expanded regulations	15.7%	20.9%	13.0%	11.9%	16.1%
3. Reduced use among certain groups within certain areas	14.3%	11.6%	18.2%	16.4%	10.7%
4. Elimination of some groups with expanded regulations	4.2%	5.8%	2.6%	4.5%	3.6%
5. Elimination of almost all uses with strictest regulations	0.0%	0.0%	0.0%	0.0%	0.0%
6. Other approach	5.9%	4.6%	6.5%	6.0%	7.1%
7. Agency approach	13.3%	11.6%	11.7%	14.9%	16.1%

Table 7. Working panels' views on resource protection priorities.

RESOURCE PROTECTION PRIORITY (1 = strongly agree; 5 = strongly disagree)	All counties	Miami-Dade County	Broward County	Palm Beach County	Martin County
1. Stressed resources	3.04 (1.70) n = 272	3.19 (1.75) n = 88	2.96 (1.65) n = 75	3.00 (1.69) n = 61	2.94 (1.71) n = 48
2. Key resources	3.15 (1.66) n = 272	3.38 (1.69) n = 88	2.96 (1.67) n = 75	3.11 (1.62) n = 61	3.08 (1.66) n = 48
3. Percentage of all resources	3.90 (1.53)* n = 271	3.95 (1.55)* n = 88	3.96 (1.55)* n = 75	3.80 (1.54)* n = 60	3.88 (1.51)* n = 48
4. Sustainable use	2.99 (1.75) n = 272	3.07 (1.82) n = 88	3.07 (1.80) n = 75	2.93 (1.67) n = 61	2.77 (1.68) n = 48
5. Enhanced enforcement	3.20 (1.60) n = 270	3.41 (1.61) n = 87	3.13 (1.56) n = 74	3.05 (1.63) n = 61	3.08 (1.62) n = 48

*refers to significant differences in means between percentage of all resources and all other options ($p < 0.05$)

Stakeholder groups in all counties were most interested in improvements in fishery resource conditions (33.7%) as an indicator of management effectiveness, and this was particularly important to panel members in Palm Beach and Martin counties (Table 8). It should be noted that while extractive groups were

particularly in favor of having fisheries abundances increase so that they may harvest higher totals, other groups also identified fisheries abundance because they felt that this would result in functional ecosystems (especially with the return of higher tropic level predators, such as groupers). Improved coral reef health was identified by less than a fifth of the total sample, although another 10.2% that identified overall resource health as a desired indicator likely included corals as part of those resources. Improvements in management conditions, although important to many panel members, were not readily identified as desired indicators; this may be because respondents were mostly concerned about natural resource conditions than management changes. Nevertheless, over 6% noted that protected areas or zones, including seasonal closures and spawning aggregation closures, would comprise expected changes; another 9.7% identified changes in regulations and management, such as more effective and frequent monitoring, stock assessments, and baseline studies to better assess the coastal and marine environment.

Table 8. Working panels' expectations for management effectiveness.

EXPECTED OR DESIRED CHANGES IN RESOURCE CONDITIONS	All counties (n = 371)	Miami-Dade County (n = 99)	Broward County (n =111)	Palm Beach County (n =84)	Martin County (n = 77)
1. Fish abundance, landings	33.7%	30.3%	31.5%	35.7%	39.0%
2. Coral ecosystem health	19.1%	19.2%	18.9%	21.4%	16.9%
3. Overall resource health	10.2%	13.1%	10.8%	6.0%	10.4%
4. Increased awareness and education	5.9%	5.1%	6.3%	7.1%	5.2%
5. Improved enforcement	1.4%	1.0%	1.8%	1.2%	2.6%
6. Improved water quality	11.7%	13.1%	11.7%	13.1%	9.2%
7. Protected areas, zones	6.2%	7.1%	6.3%	6.0%	5.2%
8. Improvement regulations, management	9.7%	9.1%	9.9%	9.5%	10.4%

3.3.4. Inter-county comparison of working panels' understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

Panel members were asked to provide information on any major gaps in management capacity or authority needed to effectively protect reef resources by first identifying such gaps and then by providing management options to address these gaps. Almost a quarter (24.9%) believed that there was either inadequate or ineffective enforcement, and that enforcement needed to be upgraded to improve management (Table 9). Over a fifth of the respondents in each county agreed, making enforcement the primary gap identified across the counties. While the lack of enforcement of existing laws was a recurring complaint, several respondents pointed to other issues concerning enforcement, including the lack of funding to render enforcement effective, the lack of training

for enforcement officers to effectively enforce fishery regulations, and the need for stricter enforcement of recreational users (e.g., anglers and divers). Another significant gap identified by panel members consisted of what might be best described as management failure, as perceived by the lack of coordination across and within agencies (including what many panel members described as conflicting objectives within single agencies), approaches that focus more on single species or areas instead of using an ecosystem and regional frameworks, and the lack of integrated management, especially between upland and coastal and marine management agencies. Almost a fifth of the total sample pointed out these gaps, with respondents from Broward and Martin counties identifying agency approaches more so than their counterparts in the other counties. Over 14% of the panel members described gaps in fisheries management, including what many described as the failure of management to address pressing needs, such as the need for ecosystem management, greater urgency in managing reef fish fisheries, reassessing the condition of certain fisheries that may have recovered, and better data collection and stock assessment programs (where respondents did not agree with official statistics and decisions). Finally, 9% of those who described a management gap stated that the lack of marine managed areas in the region represented a significant gap; within this group, many respondents identified marine managed areas as seasonal and spawning aggregation closures, which they believed would assist in protecting fisheries during their most vulnerable stages and would produce sustainable yields.

Table 9. Working panels' identification of management gaps.

MANAGEMENT GAPS IN CAPACITY AND AUTHORITY	All counties (n =402)	Miami-Dade County (n = 122)	Broward County (n =108)	Palm Beach County (n = 94)	Martin County (n = 78)
1. Adequate and/or effective enforcement	24.9%	29.5%	23.1%	24.5%	20.5%
2. Lack of education and awareness programs	5.7%	4.9%	6.5%	6.4%	5.1%
3. Poor approach to water quality management or protection	7.0%	4.9%	5.6%	9.6%	9.0%
4. Ineffective approaches to address anchoring impacts on coral reefs	5.2%	4.1%	9.3%	3.2%	3.8%
5. No marine managed or protected area management	9.0%	7.4%	10.2%	9.6%	9.0%
6. Poor fisheries management	14.4%	12.3%	20.4%	12.8%	11.5%
7. Agency approaches lacking coordination or integration to be effective	19.7%	15.6%	23.1%	17.0%	23.1%

Apart from the gaps listed in the general categories, there were several others (many of which are discussed under individual stakeholder group sections) related to permitting, in which agencies were blamed for promoting a "culture of permitting" and for permitting without considering long-term and cumulative impacts, perceived inertia on the part of management agencies to change approaches, the overall lack of funding to manage resources, and the paucity of research and monitoring to support effective management.

In terms of proposed management approaches that the different stakeholders preferred, most fell into the category of marine managed areas, which 21.5% of those who listed a preferred approach supported (Table 10). These included marine managed areas that respondents identified as marine protected areas with restrictions on a variety of uses with or without zoning, time-area closures that could be used to protect fishery resources for part of the year, and spawning aggregation closures to protect fish spawning sites, among others (such as no-access zones or privileged access zones that restricted only certain types of boating of fishing activities). The marine managed area approach was the most popular option across all counties, with a fifth or more of the panel members in each county supporting some type of closure[8]. Over 18% of the respondents also favored changing fishery management measures, of which the most popular were to provide for more stakeholder input in fishery management, make regulations more responsive to fishery conditions, and to change fisheries management from a single-species to ecosystem management. Interesting, some themes that were identified as significant management gaps were not considered as important, proposed management approaches. The best example of this was enforcement, which almost a quarter of the respondents identified as a management gap or failure, but which only 10.7% suggested should be made more effective. This may be because panel members did not consider this a 'novel' approach, in that enforcement being made effective should instead be part of fully implementing existing approaches. Similarly, while almost 20% of the sample believed that the lack of agency coordination or integration was a management gap, less than 9% proposed integrated, coordinated, or adaptive management as a management approach. Finally, there was limited support for approaches such as user fees and stakeholder advisory councils, both of which were supported by 6% or less of the respondents. Several panel members who were in favor of one or both of these approaches suggested that lessons learned from past management efforts, such as the Florida Keys National Marine Sanctuary (FKNMS) or the Bonaire diver user fee system, among others, could be

[8] As an aside, it should be noted here that place-based management was the most controversial/divisive of management options for at least a majority of two stakeholder groups, charter fishing operations and commercial fishers, as well as subsets of other groups; thus, while marine managed areas were the most popular option across counties, the support should not be taken as a *majority* support for place-based management).

applied in the management of the southeast Florida coral reef ecosystem. But the majority of the participants did not perceive benefits from either approach and thus did not support any kind of user fees (although 2.1% did support boating fees for education, enforcement, or management activities) or the development of stakeholder advisory panels.

Table 10. Working panels' identification of preferred management options.

PROPOSED MANAGEMENT APPROACHES	All counties (n =402)	Miami-Dade County (n = 122)	Broward County (n =120)	Palm Beach County (n = 94)	Martin County (n = 84)
1. Integrated, coordinated, or adaptive management	8.8%	11.7%	10.8%	8.3%	7.0%
2. Awareness and education of stakeholder groups	8.8%	6.3%	14.2%	7.1%	7.0%
3. Improved enforcement	10.7%	15.6%	7.5%	7.1%	11.0%
4. Changes to fishery management	18.1%	16.4%	18.3%	20.2%	18.0%
5. Better water quality and pollution management	6.3%	4.7%	6.7%	8.3%	6.0%
6. User fees	4.6%	7.0%	1.7%	4.8%	5.0%
7. Marine managed areas, including fishery seasonal closures and spawning aggregation closures	21.5%	20.3%	20.0%	23.8%	23.0%
8. Planning and placement of mooring buoy fields	4.4%	3.1%	5.0%	3.6%	3.0%
9. Stakeholder advisory group	6.0%	3.9%	4.2%	6.0%	11.0%

3.3.5. Inter-county comparison of working panels' degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem

Under this theme, panel members provided their views on management tools, statewide management, and place-based management. Based on their preference for statewide or place-based management, respondents answered a series of questions related to either preferred option.

Panel members rated five management tools, in terms of their overall effectiveness. The view held among the sample and across the counties was that enforcement was the least effective (mean = 3.68, where 1 = very effective and 5 = very ineffective), while outreach and education and community involvement were among the most effective (Table 11). As discussed previously, panel members shared the concern that enforcement was not effectively administered

for existing regulations, and these ratings further demonstrated stakeholder dissatisfaction. Scientific research and resource monitoring were rated highest in Miami-Dade County, where several panel members identified institutional knowledge (e.g., University of Miami, NOAA centers) as evidence, but participants from the northern two counties were less likely to rate either tool as highly as did their Miami-Dade County counterparts. Also, it should be noted that in rating outreach and education, many respondents identified the SEFCRI as having played an essential role in improving general public and stakeholder awareness and participation. While many of these respondents also added that more was needed in terms of outreach and education, their views were that SEFCRI represents a positive step in promoting coral reef awareness in the region.

Table 11. Working panels' views on management tools.

MANAGEMENT TOOL (1 = very effective; 5 = very ineffective)	All counties	Miami-Dade County	Broward County	Palm Beach County	Martin County
1. Outreach and education	2.96 (1.18)^{ABC} n = 247	2.87 (1.13)^{A} n = 81	2.89 (1.12)^{ABC} n = 66	3.09 (1.26)^{AEF} n = 57	3.09 (1.25)^{ABC} n = 43
2. Community involvement	2.98 (1.15)^{DEF} n = 249	2.76 (1.13)^{B} n = 82	3.03 (1.10)^{D} n = 65	3.26 (1.16)^{B} n = 58	2.93 (1.23)^{DEF} n = 44
3. Scientific research	3.39 (0.98)^{AD} n = 231	3.13 (1.04)^{C} n = 72	3.35 (1.03)^{A} n = 65	3.54 (0.87)^{CE} n = 53	3.71 (0.81)^{AD} n = 41
4. Resource monitoring	3.46 (1.05)^{BE} n = 224	3.17 (1.12) n = 69	3.40 (1.08)^{B} n = 62	3.66 (0.94)^{DF} n = 53	3.75 (0.90)^{BE} n = 40
5. Enforcement	3.68 (1.02)^{CF} n = 243	3.54 (1.08)^{ABC} n = 78	3.51 (0.99)^{CD} n = 69	4.05 (0.99)^{ABCD} n = 55	3.77 (0.89)^{CF} n = 41

^{ABCDEF} refers to significant differences in means ($p < 0.05$)

Panel members were asked to select their preferred management type, in terms of place-based or statewide management. The former prioritized the use of marine managed areas whereas the latter focused on a regulatory approach, as is presently used in most of the southeast Florida region (with the notable exception of state managed areas, such as state parks and aquatic preserves). Over a quarter of those interviewed who provided their preference stated that they did not believe that either place-based or statewide management could be used independently of each other, and that a hybrid approach utilizing both management types should be employed (Table 12). Since the predominant option that already exists in the region is statewide management, this suggests that there was considerably more support for place-based management than the 35.9% who selected it as their preferred option. That is, almost 62% of the

respondents supported some type of place-based management, either as the primary approach or in combination with statewide management.

Support for place-based management varied across the region. In Broward County, for example, almost half of the respondents were in favor of the approach, but support dropped to less than a third of the respondents in each of the other three counties. However, as discussed above for all counties, when the support for place-based management was considered with the support for a combination of place-based and statewide management in individual counties, a majority in each county favored some form of place-based management. Also, it is important to note that many of those in favor of the hybrid approach elaborated that the need for both place-based and statewide management approaches was to ensure that the former were not implemented to weaken or at the expense of the statewide approach.

Support for place-based management was lowest among extractive stakeholder groups, such as charter fishing operations, commercial fishers, and certain dive operations (see the details for the groups' views in their respective sections). This in part explained the difference between place-based management support between Miami-Dade, Palm Beach, and Broward counties, where over 32% of the interviews in the former two counties were with extractive panel members, compared to 24% with the same groups in Broward County. But, this does not explain the lower support in Martin County, where the percentage of extractive panel members interviewed was similar to that of Broward County. Two reasons best explained the difference in place-based management in Martin County. The first reason that many panel members interviewed in the county argued that the region, due to its size and the northern extent of the Florida Reef Tract that effectively terminates in Martin County, was too small to accommodate place-based management, and that the approach would further exacerbate use conflicts. The second reason for the lower support was likely because of St. Lucie Inlet Preserve State Park, a 2.7 mile-long, coastal and marine managed area in existence in Martin County since 1969 (FDEP, 2011). The park boundaries extend one mile from the shoreline, and its rules do not allow any spearfishing. Several members of Miami-Dade County extractive groups, especially commercial fishers, similarly pointed to Biscayne National Park, which covers much of southern Biscayne Bay and which contains a spiny lobster sanctuary, as an existing marine managed area that satisfied the need for place-based management in the county.

Table 12. Working panels' preference for management type.

PREFERRED MANAGEMENT TYPE	All counties (n =281)	Miami-Dade County (n = 86)	Broward County (n =76)	Palm Beach County (n = 64)	Martin County (n = 55)
1. Place-based management	35.9%	31.4%	48.7%	31.2%	30.9%
2. Statewide management	38.1%	39.5%	27.6%	43.8%	43.6%
3. A combination of place-based and statewide management	26.0%	29.1%	23.7%	25.0%	25.5%

Those respondents who were not in favor of place-based management or who stated support for a hybrid approach consisting of both place-based and statewide management were asked to rate potential statewide management alternatives. These included strengthening existing regulations, developing new protective legislation, modifying access, and increasing funding. The most highly rated statewide approaches were increasing funding for coral reef protection, which many qualified as increased enforcement, and strengthening existing regulations. There was less support for establishing new protective legislations, and modified access was the least popular of all options (Table 13). Many respondents perceived modified access as an ulterior means by which to establish place-based management, and it was in part because of this concern that the option was rated as the least preferred. Miami-Dade County respondents rated most approaches more favorably than did their counterparts in the other counties. The level of support for modified access was lowest in Broward and Martin counties, where panel members rated it as not preferred.

Table 13. Working panels' preference for statewide management approaches.

STATEWIDE MANAGEMENT APPROACHES (1 = highly preferred; 5 = not preferred at all)	All counties	Miami-Dade County	Broward County	Palm Beach County	Martin County
1. Strengthening existing regulations	3.03 (1.79) n = 158	2.98 (1.83) n = 48	3.11 (1.86)* n = 35	3.24 (1.73) n = 41	2.76 (1.79)* n = 34
2. Establishing new legislation	3.17 (1.68) n = 160	2.04 (1.74) n = 49	3.11 (1.73) n = 35	3.29 (1.59) n = 41	3.26 (1.70) n = 35
3. Modified access	3.61 (1.46)* n = 160	3.37 (1.63) n = 49	4.00 (1.31)* n = 35	3.44 (1.43)* n = 41	3.74 (1.36)* n = 35
4. Increasing funding	2.94 (1.69)* n = 158	2.96 (1.72) n = 47	3.14 (1.67) n = 35	2.63 (1.71)* n = 41	3.06 (1.68) n = 35

*refers to significant differences in means ($p < 0.05$)

Panel members were asked which level of government they would trust to designate and implement placed-based management in southeast Florida, and 41.8% (n = 153) stated that they would prefer that all three layers of government – local, state, and federal branches – be involved in place-based management. For many of the panel members, the reason to include all governmental layers was both as a means by which build support and to promote integrated management via which upland and coastal and marine issues could be considered together. Of those in favor of a strictly local management approach (17.0%), such respondents felt that they did not want to relinquish management authority to governmental agencies that were not knowledgeable about local conditions, and in other cases panel members were wary of state and federal layers. Fewer participants were in favor of the State of Florida (12.4%) or the federal government (9.8%) leading place-based management in southeast Florida, but if all partnerships were considered, then the State of Florida was part of 69.2% of the preferred governmental configurations. This was likely due to the panel members' understanding that a majority of the coral reef and associated resources are located within state waters, and that management framework would require state participation.

Over 70% (n = 107) of the respondents who were not in favor of place-based management provided input on the type of zones that they would be willing to accept (Table 14). There was overwhelming support for marine managed areas that incorporated zoning (82.7%) over single zone types. The most often listed zone that marine managed areas should contain were multiple use areas (17.4%), although no discharge and no anchoring zones were most popular among Miami-Dade County respondents. The level of support for marine reserves and related zones that would not allow extractive or even non-extractive uses was almost 20%, suggesting that while these panel members would not prefer place-based management, a subset would favor zoning that included strict extractive restrictions. There was also considerable support for zones that would restrict vessel access or activities, as in the aforementioned no anchoring provisions, and also by not allowing combustion or personal watercraft.

Panel members willing to discuss marine managed areas who were not in favor of the approach felt that non-extractive panel members would gain most from place-based management (similar to findings from a restudy of Florida Keys commercial fishers (Shivlani *et al.,* 2008), who determined that recreational divers had benefited the most from FKNMS no-take zones). Certain respondents believed that the long-term effects of marine managed areas would be positive for all panel members, and that divers would benefit in the short and medium terms, but others were less positive, arguing that zoning would increase user conflicts, that marine managed areas would not benefit any of the user groups and would instead entrench a management agency, and that marine managed areas would lead to redundant regulations that would be ineffectively enforced.

Table 14. Working panel members against place-based management and their views on zoning and type of zones.

TYPE OF ZONE AND ACTITIVITES TO BE ACCEPTED IF ZONING WERE INEVITABLE	All counties (n = 75)	Miami-Dade County (n = 26)	Broward County (n = 11)	Palm Beach County (n = 20)	Martin County (n = 18)
Zoning type					
1. Single zone	17.3%	15.4%	18.2%	20.0%	16.7%
2. Multiple zones	82.7%	84.6%	81.8%	80.0%	83.3%
Activity types to be allowed	(n = 132)	(n = 47)	(n = 24)	(n = 36)	(n = 25)
1. Multiple use	17.4%	6.4%	20.8%	25.0%	24.0%
2. No anchoring	14.4%	19.1%	12.5%	11.1%	12.0%
3. No discharge	13.6%	21.3%	12.5%	8.3%	8.0%
4. No combustion engines	6.1%	4.3%	8.3%	5.6%	8.0%
5. No personal watercraft	12.9%	17.0%	12.5%	8.3%	12.0%
6. No lobstering	4.5%	4.3%	4.2%	5.6%	4.0%
7. No spearfishing	9.8%	10.6%	8.3%	11.1%	8.0%
8. Research only	6.1%	4.3%	8.3%	5.6%	8.0%
9. Marine reserve	12.1%	18.0%	12.5%	13.9%	12.0%
10. Seasonal closure	0.8%	0.0%	0.0%	2.8%	0.0%
11. Transit only	0.8%	2.1%	0.0%	0.0%	0.0%

Those panel members in favor of place-based management provided their views on the types of zones and activities they would support, and the majority view was in favor of marine managed areas that incorporated zoning (90.6%) (Table 15). Most of those not in favor of zoning either supported single zones that would allow multiple uses or restrict anchoring. Those panel members who supported zoning identified a number of activities that marine managed areas should restrict or prohibit. The most popular of these activities was some type of prohibition on extractive uses, either in the form of marine reserve (30.7%) that would restrict all extractive uses, or as even more restrictive zones that would allow only research activities (4.5%) or accommodate transit only through the marine managed area (2.8%). Controlling vessel access and activities were not as important to this group as these were to panel members who were against place-based management, but both groups agreed on the need to restrict or even prohibit anchoring in marine managed areas (15.9%). There were several differences in zone types supported across counties, such that Palm Beach and Martin counties' respondents were more in favor of marine reserves than their counterparts in Miami-Dade and Broward counties.

Most of the panel members in favor of place-based management believed that all users would gain from marine managed areas (54.7%; n = 86), while others felt that the environment would gain and pass those benefits in the form of larger and more abundant fishery resources and a healthier ecosystem to panel members (16.2%). A smaller subset of this group was unwilling to define benefits

that could accrue from marine managed areas, arguing that the process should define the expected benefits. Consisting of a variety of different working panels, these participants argued in favor of a stakeholder driven strategy ("a bottom-up approach"), which would first define the goals and objectives of a marine managed area and then utilize a working group of various panel members who could work on the geographic and management framework. Many of these panel members warned against "drawing lines on the map" before the start of a stakeholder-driven process, and instead to all the process participants to develop boundaries and regulations.

Table 15. Working panel members in favor of place-based management and their views on zoning and type of zones.

TYPE OF ZONE AND ACTITIVITES PREFERRED	All counties (n = 146)	Miami-Dade County (n = 43)	Broward County (n = 48)	Palm Beach County (n = 31)	Martin County (n = 24)
Zoning type					
1. Single zone	9.4%	11.6%	6.2%	12.9%	8.3%
2. Multiple zones	90.6%	88.4%	93.8%	87.1%	91.7%
Activity types to be allowed	(n = 290)	(n = 68)	(n = 108)	(n = 68)	(n = 46)
1. Multiple use	14.1%	14.7%	12.0%	14.7%	17.3%
2. No anchoring	15.9%	16.2%	19.4%	11.8%	13.0%
3. No discharge	10.0%	5.9%	13.9%	7.4%	10.9%
4. No combustion engines	1.4%	0.0%	2.8%	1.5%	0.0%
5. No personal watercraft	2.1%	1.5%	2.8%	1.5%	2.2%
6. No lobstering	6.2%	4.4%	6.5%	8.8%	4.3%
7. No spearfishing	6.9%	4.4%	6.5%	11.8%	4.3%
8. Research only	4.5%	4.4%	3.7%	4.4%	6.5%
9. Marine reserve	30.7%	29.4%	25.9%	33.8%	39.1%
10. Seasonal closure	1.7%	5.9%	0.9%	0.0%	0.0%
11. Transit only	2.8%	8.8%	1.9%	0.0%	0.0%

In comparing the support for zone types between those panel members who were in favor of place-based (and the hybrid form of place-based and statewide) management and those who preferred statewide management, the results showed that the former supported marine reserves and related types of non-extractive zones more so than the statewide management proponents (Figure 7). By contrast, respondents who favored statewide management were more likely to support vessel restrictions, such as non-motorized zones and no personal watercraft access.

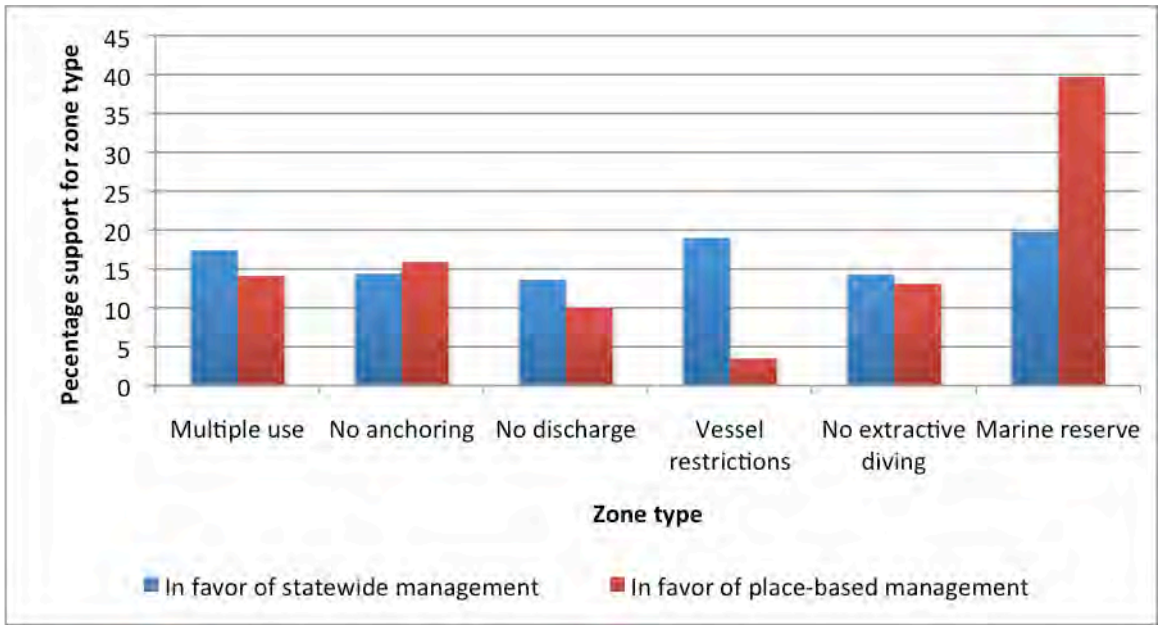

Figure 7. Working panels views on zone types based on preference for management approach.

Finally, panel members across the four-county region identified various different areas that they believed should be protected as marine managed areas (Figure 8). In some cases, the areas identified were specific locations that respondents believed should be afforded protection immediately; in other cases, respondents provided habitat characteristics that could be used in identifying areas that met those criteria. Among the areas identified were:

a. Miami-Dade County

Panel members in favor of marine managed areas in Miami-Dade County identified locations such as the nearshore habitats around the barrier islands in central Miami-Dade County, the offshore reefs from north of Fowey Rocks to Key Biscayne, the seagrass meadows and other nearshore habitats in southern Miami-Dade County, artificial and natural reefs located windward of Virginia Key and Key Biscayne, and any hardbottom communities south of Government Cut. Others called for the strengthening of fisheries regulations in Biscayne National Park, which they argued provides for place-based management for much of the county already, while others believed that the regulations for the Biscayne Bay Aquatic Preserves should be strengthened to accommodate greater protection.

b. Broward County

The most commonly identified area in Broward County was the *Acropora cervicornis* patch/thicket off Fort Lauderdale, which several panel members believed should be protected against overuse and anchor damage. Others selected the artificial reefs in the county and called on having more such

structures to relieve pressure off the region's natural reefs. Some of those interviewed believed that the first terrace of Broward County reefs was already too degraded and that an effort should be placed instead of deeper terraces. Others argued the opposite point, calling for the immediate protection of degraded reefs, such as the communities south of Port Everglades and from the shoreline out to various depths off John U. Lloyd State Park. Finally, some panel members suggested using an inlet-to-inlet approach, where resources located in between inlets should be prioritized for protection rather than those found adjacent to the inlets.

c. Palm Beach County

Several Palm Beach County panel members called for the protection of reefs that they felt were heavily used, especially Breakers Reef. Others felt that reefs located off the more heavily populated and used areas should be prioritized for protection, such as the areas between major inlets (e.g., Horseshoe Reef). Some respondents used criteria such as coral cover, identifying areas such as Paul's Reef off Lake Worth. Others, like their counterparts in Broward County, were in favor of protecting all nearshore reefs located away from major stressors. Both proponents and opponents of place-based management, however, pointed out that Palm Beach County has a much narrower reef and hardbottom tract than do the southern counties, and that the designation of marine managed areas would need to take use conflicts and alternate sites into consideration.

d. Martin County

Martin County panel members identified a number of potential marine managed area locations, including Saint Lucie Inlet Preserve State Park, the coastal and marine habitats off Hutchinson Island, Bathtub Reef Beach, and Peck Lake Park. Among these locations, several panel members argued that the state park was already protected and included much of the county's best hardbottom communities. Others, however, felt that this and all other state park boundaries could be extended to the three nautical mile state boundary, thereby encompassing contiguous habitats from the shoreline to the offshore areas (like the Sambos Ecological Reserve off Boca Chica Key in the Lower Florida Keys (NOAA, 1996)).

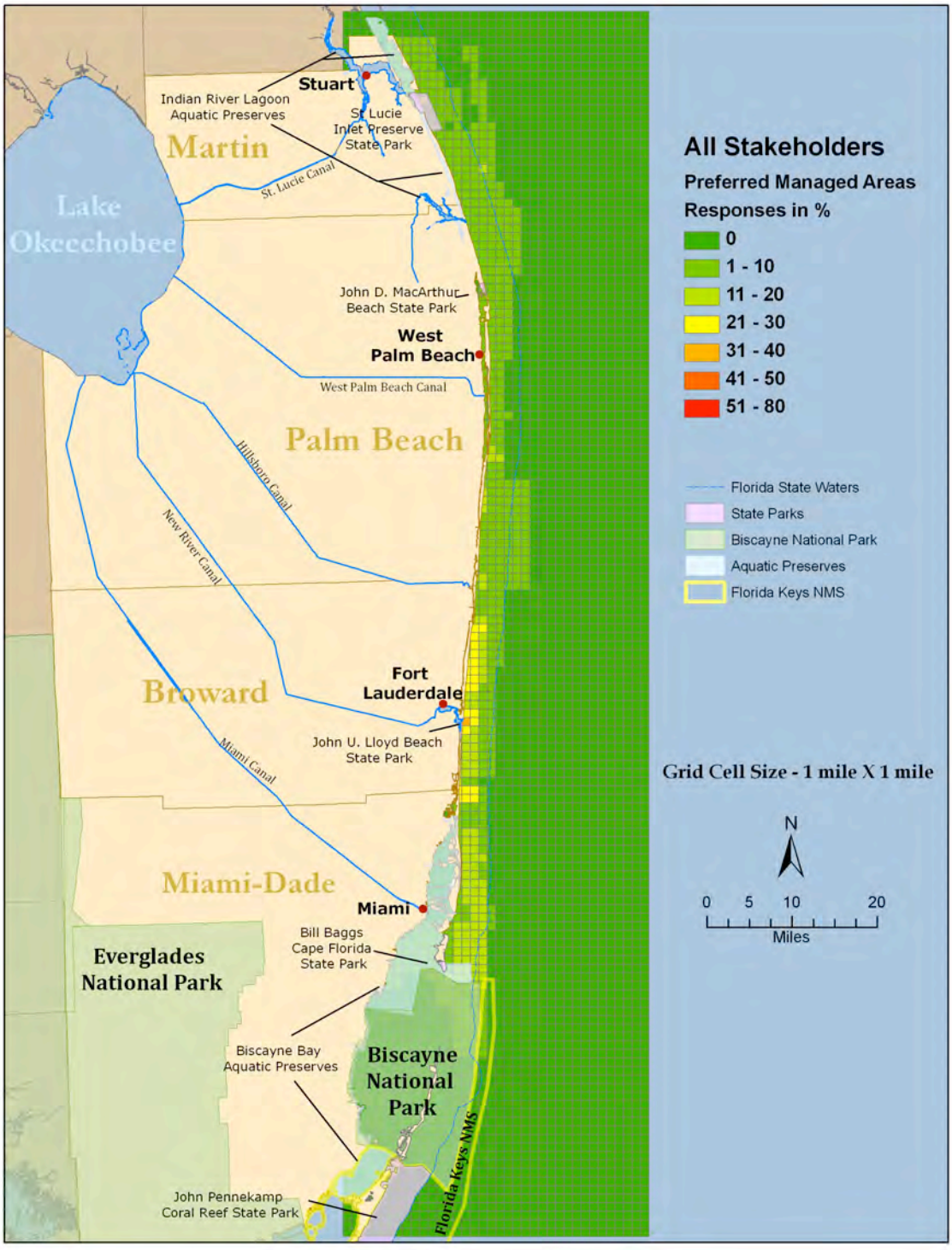

Figure 8: Working panels' preference for marine managed areas.

3.4. Charter fishing operations

The project research team completed a total of 36 interviews with charter fishers, of which 30.6% each were conducted in Broward and Palm Beach counties, 22.2% in Miami-Dade County, and 16.7% in Martin County. In terms of areas utilized, charter fishing operations that were located close to the boundaries of adjacent counties often listed fishing in both counties; otherwise, respondents identified fishing areas within the counties in which they docked their vessels.

The charter fishers interviewed represented considerable experience in the region, and the average time spent fishing in one's county was 26 years (SD = 14.3; n = 29). Experience ranged from as little as three years fishing in the county to over 60 years, and the median was 25 years.

3.4.1. Charter fishing operations' views on resource conditions and trends

Charter fishers' views on resource conditions, changes in resource conditions, and main stressors to resource conditions varied based on the various coastal and marine resources (Table 16). The group believed that overall resource conditions were less than fair (mean = 3.29, where 1 = excellent and 5 = very poor) and their views on four resources, corals, mangroves, beaches and wetlands, and water quality – were less favorable than their views on all other resources. In fact, charter fishers rated coral conditions as poor (mean = 3.76), and they rated mangrove conditions as very poor (mean = 4.67). By contrast, charter fishers believed that fisheries and water quality were in better condition. It should be noted however that the group did not rank any of the resources in better than fair condition.

When asked about changes in resource conditions, the trend among charter fishers was that resources overall had not changed much (mean = 3.33, where 1 = greatly improved and 5 = greatly declined). But, their views varied depending on the resource in question, and corals (mean = 3.78) and mangroves (mean = 4.33) were the two resources that had worsened the most.

Comparing across counties, Miami-Dade charter fishers were the least likely to report a decline in overall resources (mean = 2.88), compared to Palm Beach charter fishers who were most likely to report a decline in overall resources (mean = 3.55). Miami-Dade charters were also the least likely to report problems with water quality, a complaint that was prevalent among Broward, Palm Beach and Martin County charters. Also, among Miami-Dade and Martin counties' charters, only one captain in each county interviewed actually commented on reasons for the present reef conditions in their respective counties, with each pointing to changes in water quality (the Miami-Dade County charter pointed to runoff, whereas the Martin County charter identified freshwater discharges). Respondents from the other two counties were more willing to discuss coral reef

stressors. Broward County charters felt that direct uses, especially anchoring and recreational fishers, were responsible for coral reef impacts. Palm Beach County charters felt that water quality, as discharges or as affected by nourishment, had a significant impact of coral reef conditions. Many of the charters interviewed added that their views on coral reefs were gleaned from related conditions, such as fishery landings, water color, and water clarity.

Table 16. Charter fishers' views on resource conditions.

	Mean	Standard deviation	Number of observations
RESOURCE CONDITIONS	1 = excellent; 5 = very poor		
1. Overall	3.29	0.83	34
2. Corals	3.76	0.78	23
3. Seagrasses	3.06	0.85	14
4. Mangroves	4.67	0.50	9
5. Beaches and wetlands	3.56	1.09	16
6. Water quality	3.33	1.06	29
7. Fisheries	3.07	0.89	28
CHANGE IN RESOURCE CONDITIONS	1 = greatly improved; 5 = greatly declined		
1. Overall	3.33	0.74	36
2. Corals	3.78	0.58	23
3. Seagrasses	3.42	0.90	15
4. Mangroves	4.33	0.50	9
5. Beaches and wetlands	3.32	1.04	17
6. Water quality	3.18	1.05	30
7. Fisheries	3.14	0.84	28

All of the charters who provided their views on mangroves agreed that development was the primary driver for the state of mangroves, although it should be noted that a majority of these respondents were from Broward County. Those from Martin County generally felt that mangroves had not been a dominant coastal resource, whereas Miami-Dade and Palm Beach counties' charters believed that mangroves were doing well in their respective counties. Similarly, few charters commented on the status of seagrasses, which most believed were otherwise absent in their counties (e.g., Palm Beach and Martin counties) or were relatively healthy (Miami-Dade County).

Over 72% of the Palm Beach charters felt that their county's beaches had been affected by nourishment, and that beach restoration had negative effects on the coastline in Palm Beach County. Beach nourishment was not an issue for charters from any of the other three counties. Similarly, four out of six (67%) of Martin County charters believed that water quality had been affected negatively by freshwater discharges from Lake Okeechobee through the Saint Lucie Inlet. While land-based source of pollution was cited as a source of deteriorated water

quality by charters from the entire region, a majority of the aforementioned Martin County charters and 36% of Palm Beach charters listed freshwater discharges as a stressor.

A common theme among those who provided information on fishery conditions was that recreational anglers and (in the north) spearfishers were negatively affecting the resource. Miami-Dade charters were least likely to identify other users as affecting fishery conditions, in part due to the smaller number of that county's charter fleet that reported regularly selling their catch. By contrast, Palm Beach and Martin County charters were most likely to sell their catch[9] and more of them argued that competing user groups were responsible for any decline in landings. Charters from all counties, but especially those from Palm Beach County, felt that fishery regulations, such as the snapper/grouper seasonal closure and the goliath grouper moratorium, needed to be reconsidered. In the first case, the fishers argued that the seasonal closure was unnecessary and resulted in a shift in allocation from landings in southeast Florida to northern counties and other states represented in the South Atlantic Fishery Management Council (SAFMC). In the second case, several charters felt that the goliath grouper moratorium (FAC 68B-14.0036(2) (g)) had been a resounding success and had resulted in an overpopulation of the species, which was now responsible for depleting stocks of smaller fish; these charters argued in favor of reopening the fishery.

3.4.2. Areas of use and use conflicts concerning charter fishing operations

Charter operations used a variety of habitats but focused mainly on offshore areas (Figure 9). Thus, the areas they used ranged from as close as a mile from the shoreline to ten or more miles offshore, depending on weather conditions and fishery seasons. Charters along the southern part of southeast Florida (south Broward and Miami-Dade counties) tended to fish further offshore than did other charters.

[9] Almost all of the charter fishing operations interviewed in Broward and Palm Beach counties reported having a commercial fishery license (Saltwater Products License), and they often sold their catch at the dock/marina or at local fish markets (D. Gentile, personal communication; R. Koeneke, personal communication). Also, Shivlani (2007) reported that 67.8% of 78 charter fishing operations surveyed sold their catch in 2005.

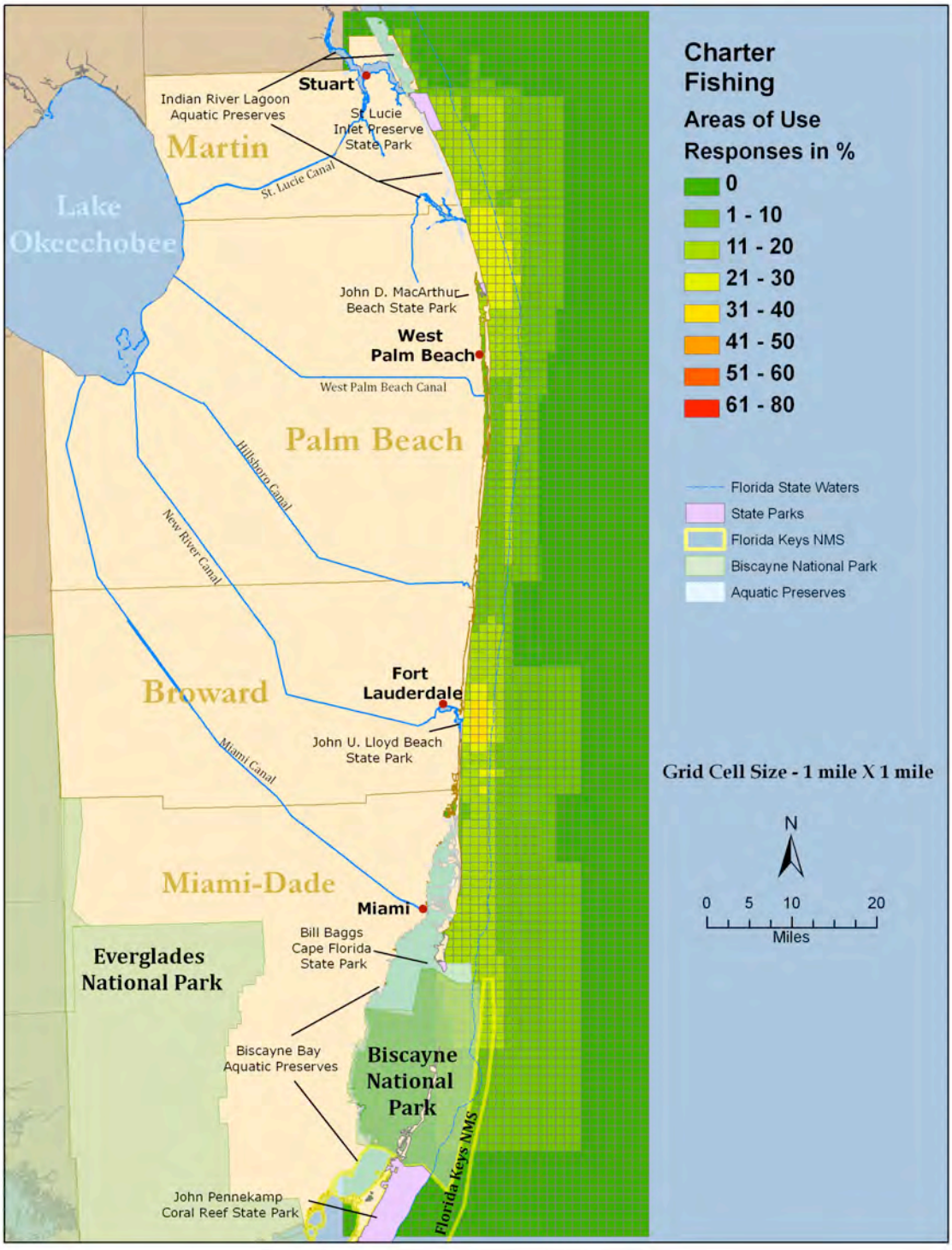

Figure 9. Charter fishers' areas of use.

Use conflicts were a commonly reported problem among those interviewed, and over 55% of the charters reported having a conflict with another user group (Figure 10). Use conflicts were least common in Miami-Dade County, where only 38% of the charters stated that they have conflicts with either commercial or

recreational fishers. Half of the Martin County and 55% of Broward County charters reported use conflicts with divers or recreational fishers. Almost three quarters of the Palm Beach County charters interviewed, or 73%, had use conflicts, of which many were with more than user group, including diver, dive operations, commercial fishers, and recreational fishers and boaters. Unlike as in Miami-Dade County, where charters seldom reported having to share fishing grounds with divers, charters (and divers, see section on dive operators) from Palm Beach County identified conflicts where extractive diving activities occur in the same location as angling. Solutions for ending the use conflicts varied among respondents, but most were not optimistic. Less than ten percent of those interviewed believed that dive use at least should be separated from charter fishing, such that divers should either not be allowed to spearfish in depths of less than 70 feet (for cobia) or that extractive diving should not be permitted in certain areas. It is interesting to note that while charters were largely against zoning as a management strategy (discussed later in this section), some at least were in favor of using zoning as a means of separating uses, as has been done in the Sanctuary Preservation Areas (SPAs) in the FKNMS (NOAA, 1996).

Use conflicts were also spread out across the entire fishing areas or counties of the respondents. In some cases, charters reported use conflicts solely on artificial reefs or in depths that could be reached by free divers and SCUBA divers, but otherwise, the charters identified large areas that encompassed several habitat types and different reef terraces. Also, use conflicts appeared to be concentrated off areas with high population densities (e.g., Miami-Dade County, central and north Broward County and north Palm Beach County). Generally, however, use conflicts tended to decrease the further offshore that charter fishers operated; perhaps this was due to there being few other stakeholder groups that routinely operated in the offshore areas (with the exception of recreational anglers).

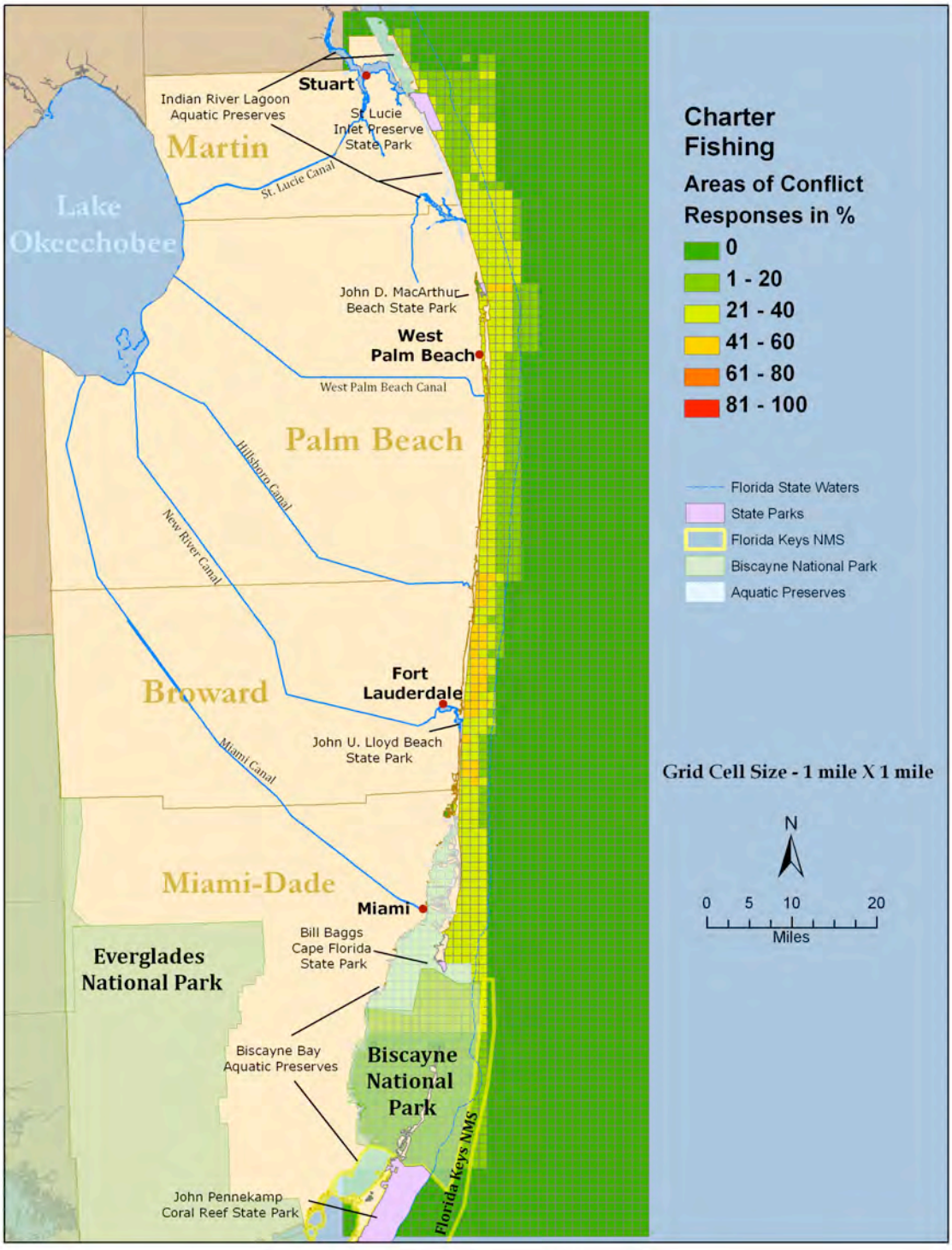

Figure 10. Charter fishers' areas of use conflict.

Charters identified a number of areas that they considered in good condition (Figure 11). For most Miami-Dade County charters, these areas were located primarily in southern Biscayne Bay and in and around Biscayne National Park in particular, as well as the reefs in northern Miami-Dade County. Broward charters

felt that the area around Port Everglades was in very poor condition, but that the area located south of the inlet along Dania Beach was in good condition. Broward Charters also agreed that the stretch of habitat north of Port Everglades to Boca Inlet was in good condition. Palm Beach charters identified mainly areas north of the Lake Worth Inlet as in good condition, off North Palm Beach to Jupiter.

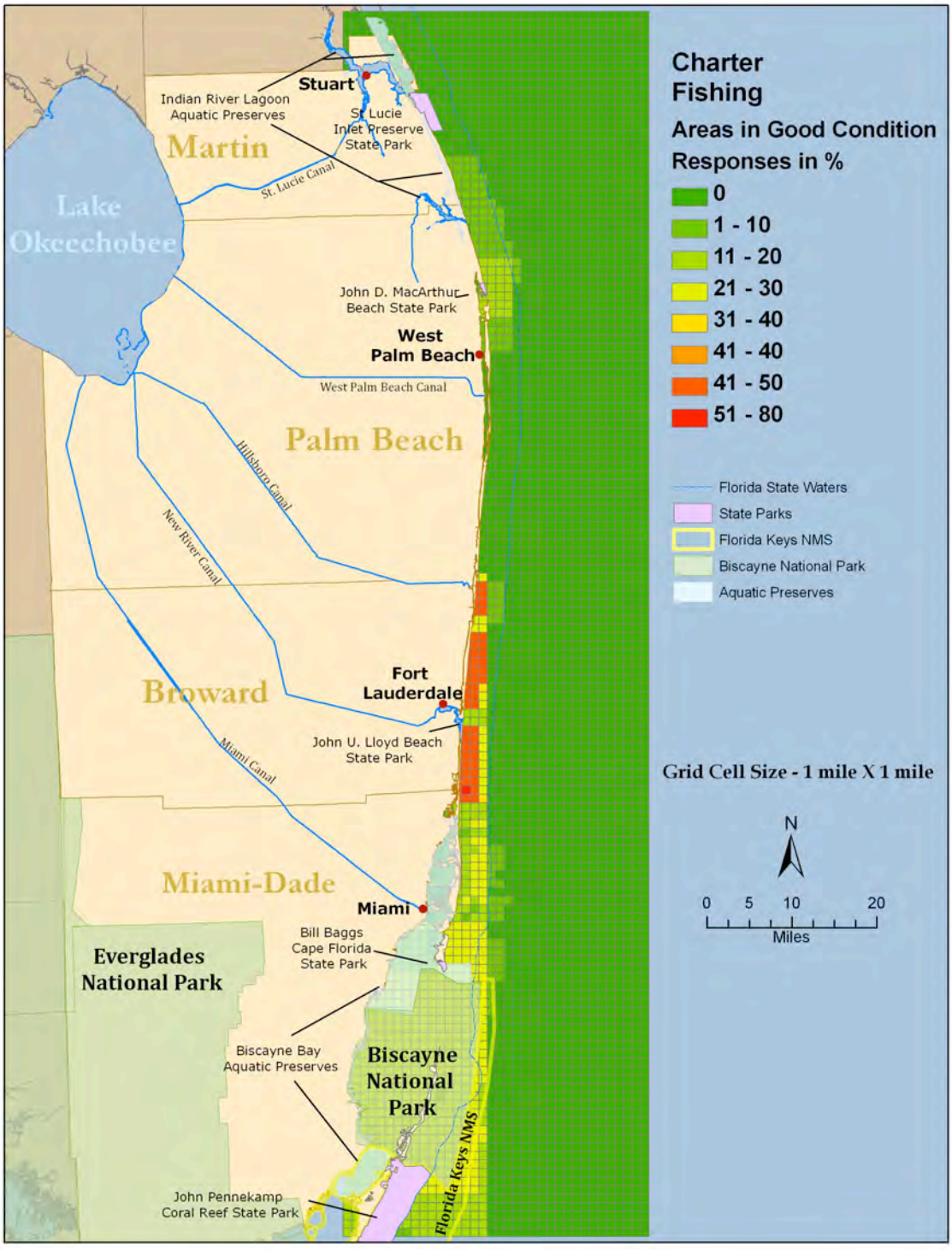

Figure 11. Charter fishers' identification of areas in good condition.

3.4.3. Charter fishing operations goals for coral reef ecosystem protection

Charters were asked about their vision for coral reef ecosystem protection in the region and within their counties, and a majority, or 77.9%, believed that the

present approach of continued use and protection under existing regulations was the best option. Among the respondents who preferred this option, there were several charters who believed that the present approach should in fact be relaxed to allow greater levels of harvest, species that are presently protected, and species under moratoria, as well as provide privileged access to the charter fishing stakeholder group to species and areas. Another subset of those who favored the existing approach to management argued that the approach should be strengthened by enforcement.

Less popular approaches to management were reducing use among certain groups with modified or expanded regulations for increased protection (supported by 11%), reduced use among certain groups only within certain areas (5.6%), and the elimination of some groups with expanded protective regulations.

No particular county or region supported an approach rather than the existing regulatory framework, as 27% or fewer respondents in each of the four counties preferred reduced use among certain groups or the outright elimination of certain groups. As previously stated, the preferred approach was in fact in favor of relaxing present regulations to access fisheries resources.

When asked about their resource protection priorities, or those actions they believed should be ranked highest to support resource protection, charter fishers generally favored enhanced and improved enforcement over other options; this is likely to be anticipated due to the overwhelming percentage of the group that selected the existing management framework as its preferred option (Table 17). Charters were less in favor of prioritizing sustainable use, stressed resource management, or the protection of key resources; but, the least preferred option was protecting a certain percentage of all resources, which several respondents identified as zoning and thus would not support.

Table 17. Charter fishers' views on resource protection priorities.

	Mean	Standard deviation	Number of observations
RESOURCE PROTECTION PRIORITY	1 =strongly agree; 5 = strongly disagree		
1. Stressed resources	3.59	1.72	32
2. Key resources	3.31	1.77	32
3. Percentage of all resources	4.19	1.45	29
4. Sustainable use	3.63	1.81	32
5. Enhanced enforcement	3.13	1.77	29

Charter fishers were asked whether they would be willing to yield access if that resulted in the region being protected in its current condition and if that resulted in an improvement in the current condition. A majority of the respondents

(53.1%; n = 32) was willing to yield some access (mean = 25.8%; SD = 26.5; n = 32) if that resulted in the region being protected in its current condition; however, the group was unwilling to yield much more access if that resulted in an improvement in the current condition (27.6%; SD = 29.9; n = 32). Across counties, charters in the southern counties (Miami-Dade and Broward) were unwilling to yield more than 15%, whereas charters in Martin and Palm Beach counties were willing to yield 35% and 45%, respectively, to achieve an improved and restored resource. This may have been in part related to the differences in the charters' opinions on resource conditions across counties, where respondents in the northern counties, especially Palm Beach County, regarded their resource conditions as having been degraded more than did their counterparts in Miami-Dade County.

The main result shared across a majority of charters across that the region that they would expect improved management to achieve is the availability of more fisheries resources, as related to increased landings (72%; n = 43). Fewer were interested in having more education (4.7%) or enforcement (2.3%), and only 4.7% felt that their preferred improvement management measure was resource protection or water quality improvement.

3.4.4. Charter fishing operations understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

Charters were asked to provide information on any major gaps in management capacity or authority needed to effectively protect reef resources by first identifying such gaps and then by providing management options to address these gaps. Respondents generally focused on fishery issues, which they felt were related to the health and sustainability of the coral reef ecosystem (and to their use of those resources). Over a quarter listed the lack of effective enforcement as the major gap, followed by 21% who felt that the regulations were either too restrictive or did not address improving fishery conditions, 15.8% who believed that fishery and other agencies did not possess the necessary knowledge or authority to manage the region's resources, 13.2% who argued that there was a lack of recreational user (mainly boater) group education, and 13.2% who concluded that water quality had not been effectively addressed.

When asked to expand their views on enforcement, several respondents stated that it is not the lack of effort that existing enforcement officials expend but that there is an underfunding of enforcement personnel, an inadequate enforcement presence, and an incomplete application of existing laws. That is, charters (and indeed other user groups) believed that because of funding and personnel shortcomings, enforcement cannot effectively enforce existing laws. In other cases, especially those charters from the northern counties argued that enforcement is often directed at charter and commercial fishers but that it is less

available for recreational boaters, divers, and fishers, which represent the largest user groups in the region. Finally, several respondents elaborated that their views on enforcement were also related to their concerns that on-water personnel were often not competent (i.e., well trained) to identify protected species or know seasonal closures, and that this lack of understanding undermined existing management efforts.

Among those charters who believed that the regulations were too restrictive or did not address fishery conditions, their major complaint was that regulatory agencies were too slow in opening up fisheries that had since improved (e.g., goliath grouper) or that the agencies did not have accurate scientific information in making fishery management decisions. In both cases, charters felt that their local ecological knowledge of the species and regions in which they operate was undervalued.

Interestingly, only 13.2% of the respondents argued that water quality issues or user group education (related to user conflicts), respectively, represented management gaps. None of the Miami-Dade charters considered water quality as a management gap, and only a few others in each of the remaining counties identified it as such either. This is likely due to the areas in which charters fish, which are offshore and less affected by changes in water quality (except for bait fish, which are usually caught using cast nets in nearshore waters). Among the charters who felt that user group education was lacking, the main concern was regarding recreational boaters and fishers, who several charters believed did not practice safe and ethical boating and/or know fishery size and species regulations.

Charters believed that best management approach to support the management of the region's coral reef resources was through a change in fisheries regulations (28.6%; n = 42). Most of the measures listed under this approach were related to increasing charter fisheries' access to fishery resources, making fishery regulations more uniform across species and seasons, and reassessing mackerel allocation across sectors. Almost 17% promoted stakeholder participation in fishery management processes, where charter, commercial, and recreational fishers could work together and with agencies to address fishery management and resource protection. Just under a fifth of those interviewed, or 19.1%, favored the establishment of marine protected areas, with the provision among a majority of these respondents that the areas be set aside only for reef fish. While a majority of charters identified enforcement as a major management gap, only 11.9% listed it as a best management approach. This was due to the respondents' view that enforcement was not necessarily a new type of approach and that it was needed as a means of more effectively implementing existing management approaches. Similarly, only 7.1% identified pollution control as a management approach, due likely to the aforementioned offshore fishing areas utilized by

most charters and because several charters perceived water quality management as an existing, underperforming approach.

3.4.5. Charter fishing operations degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem

Under this theme, charter fisheries were asked of their views on management tools, statewide management, and place-based management. Based on their preference for statewide or place-based management, respondents answered a series of questions related to either preferred option.

Among management tools, the most effective tool rated by the charters was resource monitoring, which had an average rating of 3.13 (where 1 = very effective and 5 = very ineffective) (Table 18). The respondents did not rate any management tool as better than neither effective nor ineffective (mean = 3), although the average rating for enforcement was the lowest among all management tools. This was likely due to the charters' views on how current regulations needed to be enforced more effectively. Many charters interviewed also felt that scientific research and resource monitoring, while used prevalently in the region, were not as effective as these tools should be, especially due to how much the charters' observations on resource conditions varied from those resulting from scientific research and resource monitoring. Many charters did not perceive outreach and involvement efforts as having been effective; several discussed the SEFCRI, but others felt that their group was not included in such efforts.

Table 18. Charter fishers' views on management tools.

	Mean	Standard deviation	Number of observations
MANAGEMENT TOOL	1 =very effective; 5 = very ineffective		
1. Outreach and education	3.19	1.30	31
2. Community involvement	3.47	1.24	32
3. Scientific research	3.26	1.12	31
4. Resource monitoring	3.13	1.18	31
5. Enforcement	3.57	1.31	35

Views on management tools varied across the regions. Broward County charters were generally in neutral in their views on almost all management tools, whereas Palm Beach and Martin counties' charters held negative views on almost all management tools. Palm Beach charters felt on average that enforcement was ineffective (mean = 4.1; SD = 1.29; n = 10) and had more negative views on all other tools compared to the overall group. By contrast, Miami-Dade charters held the most positive views on management tools, rating outreach and

education (mean = 2.28; SD = 1.38; n = 7), scientific research (mean = 2.17; SD = 0.98) and resource monitoring (mean = 2.17; SD = 0.98) as effective. This may in part have been related to the visibility of institutional research, the presence of various NGOs and related organizations, as well as SEFCRI, in Miami-Dade County.

Of the 34 charters who provided a preference on management approaches, 24 (70.6%) favored statewide management. Only six (17.6%) favored place-based management, and another four (11.8%) preferred a mix of both statewide and place-based management. Support for place-based management varied across counties, such that 27% (n = 11) of Broward County and 25% (n = 8) Miami-Dade County charters favored place-based management over statewide management. One 11% (n = 9) of Palm Beach County charters and none of the Martin County charters preferred place-based management; however, another 22% of Palm Beach charters also favored a mix of place-based and statewide management.

Charters (and indeed, other extractive user groups) held very strong opinions on place-based management, although many conceded that their operations would not be affected by closures. Also, while charters understood that place-based management did not equate to no-fishing zones, those opposing place-based management believed that any zoning would result in a loss of access. Views varied across counties, in terms of why charters preferred one management type over another. In Miami-Dade County, several charters pointed out that they have place-based management in the form of Biscayne National Park, which while it is not within the project area nevertheless represents a large marine managed area in the southern half of the county. Also, charters in the other counties identified the various state parks as fulfilling place-based management objectives, and Martin County charters argued that the Saint Lucie Inlet Preserve State Park fulfills the objectives of place-based management by protecting much of the region's nearshore hardbottom communities.

Among those who favored statewide management, approaches that were most favored were increasing funding (mean = 3.33, where 1 = highly preferred, and 5 = not preferred at all), followed by strengthening existing legislation (mean = 3.69), establishing new protective legislation (mean = 3.92), and modified access (mean = 4.33) (Table 19). Respondents were least likely to support modifying access, which many charters perceived as a type of zoning. Also, charters favored funding mainly for enforcement activities, which several stated was severely underfunded to meet present management objectives; in fact, 55.6% (n = 9) who discussed which regulations should be strengthened pointed to the need for more enforcement.

Table 19. Charter fishers' views on statewide management approaches.

	Mean	Standard deviation	Number of observations
STATEWIDE MANAGEMENT APPROACHES	1 = highly preferred; 5 = not preferred at all		
1. Strengthening existing regulations	3.69	1.64	26
2. Establishing new legislation	3.92	1.52	27
3. Modified access	4.33	1.24	27
4. Increasing funding	3.33	1.84	27

Charters who were not in favor of place-based management were asked to provide their preference for the type of marine managed area if there were going to be marine managed areas anyway. Over 61% (n = 25) preferred that any marine managed area that would be implemented should be based on the principles of zoning. The remainder, or 38.9%, preferred a single type of zone. A majority of the charters who supported zoning were in favor of a multiple use, marine managed area (27.3%; n = 22), and 22.7% preferred that there be no anchoring allowed, 13.6% each were in favor of no discharge and no spearfishing, respectively, and 9.1% stated that there should be marine reserves. Charters did not perceive themselves as the beneficiaries of place-based management and the marine reserve zoning strategies they provided; several noted that extractive uses will be negatively impacted by any marine managed area, and that the likely beneficiaries would be recreational uses. Only those charters who listed multiple use zones with no use restrictions were optimistic that their group would share in the benefits of marine managed areas.

Almost half of the charters interviewed provided alternatives to marine managed areas, and the most popular of the alternatives was changes in fishery regulations (29.4%; n = 17). Such changes included changes in size and bag limits of particular species that were determined to be overfished or vulnerable to overfishing, regional fishery management approaches, and adaptive fishery management (where rules could be changed based on conditions). Another 11.8% suggested incorporating seasonal closures for fisheries and to identify fishery spawning aggregations as an alternative to marine managed areas. Another popular option was enhanced and improved enforcement of existing regulations, which 23.5% listed as an alternative. Finally, 17.6% each listed addressing pollution to protect resources or to continue with existing regulations.

A total of 12, or 33.3%, of the respondents identified the level of government that they would prefer to head a marine managed areas, and most supported the

State of Florida (58.3%; n = 12) acting alone or in concert with the local and/of federal government. The least popular option was a federally protected area (16.7%), and most respondents preferred that if either the local or federal branch is to be involved, it be a co-management approach that includes the state. Many charters pointed out that the local government would have no jurisdiction, and that if a marine managed area were to include coral reefs, it would likely need to be in state waters.

Of the 36 charters interviewed, only eight (22.2%) were in favor of establishing a marine managed area. Of these eight, 87.5% stated a preference for a zoning strategy. No use zones, comprised of marine reserves (21%), no spearfishing zones (15%), multiple use areas (10.6%), no discharge zones (10.6%), and no lobstering zones (10.6%), were among the most popular options. Also, 21% stated that a marine managed area in the region should not allow anchoring (Figure 12). However, marine managed areas did not enjoy majority support in any region, and only 27.2% of charters supported the management approach in Broward and Palm Beach counties, 16.7% in Martin County, and 12.5% in Miami-Dade County.

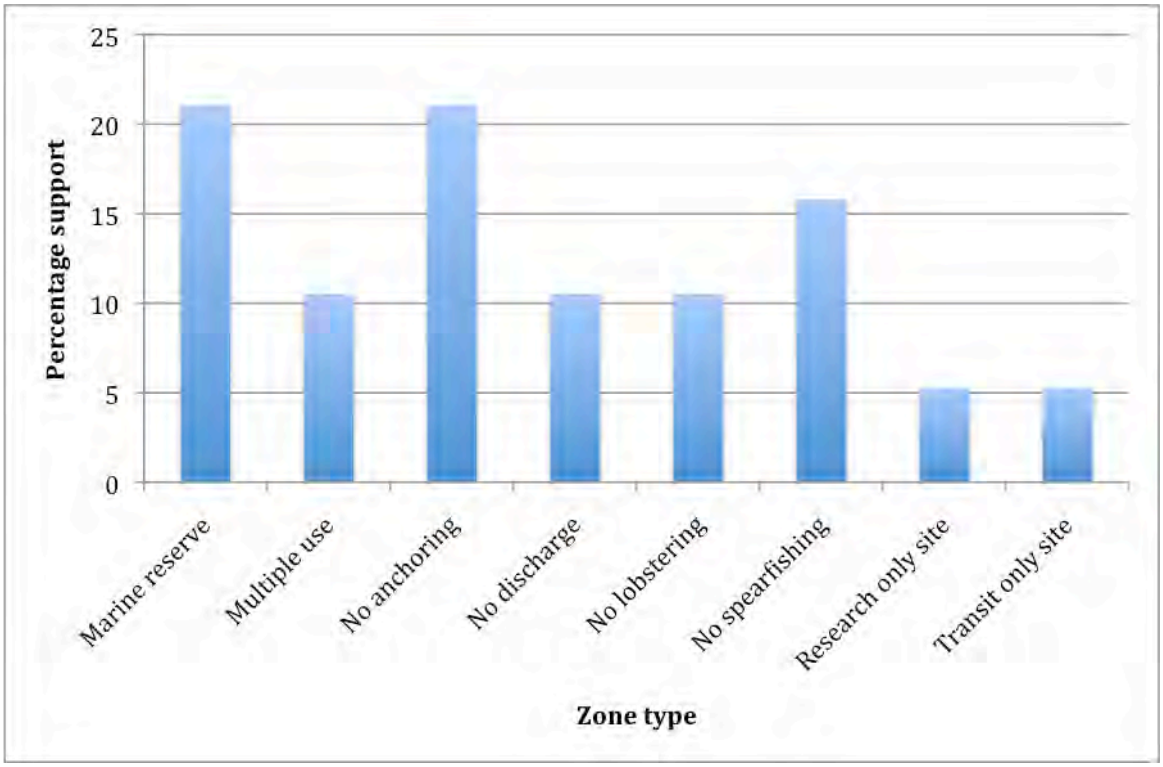

Figure 12. Charter fishers' views on zone types.

Among the areas identified by charters that could be designated as marine managed areas, these were located either in the nearshore areas off southern Broward County (in the Dania Beach area, off John U. Lloyd State Park) or in northern Palm Beach and southern Martin counties (off Jupiter north to Saint Lucie Inlet Preserve State Park). Miami-Dade charters were unwilling to identify

any areas that they would like to see protected, although a small percentage of those interviewed did support place-based management.

Finally, charter fishing operations were asked to identify areas that they believed would qualify as high priority areas[10]. Many argued that their entire fishing grounds, from the nearshore habitats where they caught bait to their offshore fishing areas, constituted high priority areas. Others however did identify high priority areas, and these mainly consisted of the Miami-Dade County offshore reefs, from Biscayne National Park north to Key Biscayne, parts of northern Biscayne Bay, the nearshore area off John U. Lloyd State Park in Broward, and the hardbottom communities located in northern Palm Beach County (Figure 13).

[10] The interviews determined that charters provided information on high priority areas based on (a) areas they knew in their areas of use that required immediate attention or (b) areas that had characteristics that were worth prioritizing irrespective of their importance to the respondents' activities. Thus, many charter fishers in Miami Dade County felt that the area east of the barrier islands had excellent reefs and reef fauna that should be prioritized, whereas their Palm Beach County counterparts pointed to nearshore hardbottom communities. It may have been because the emphasis (and indeed, title) of the study was on reefs that these got the most attention.

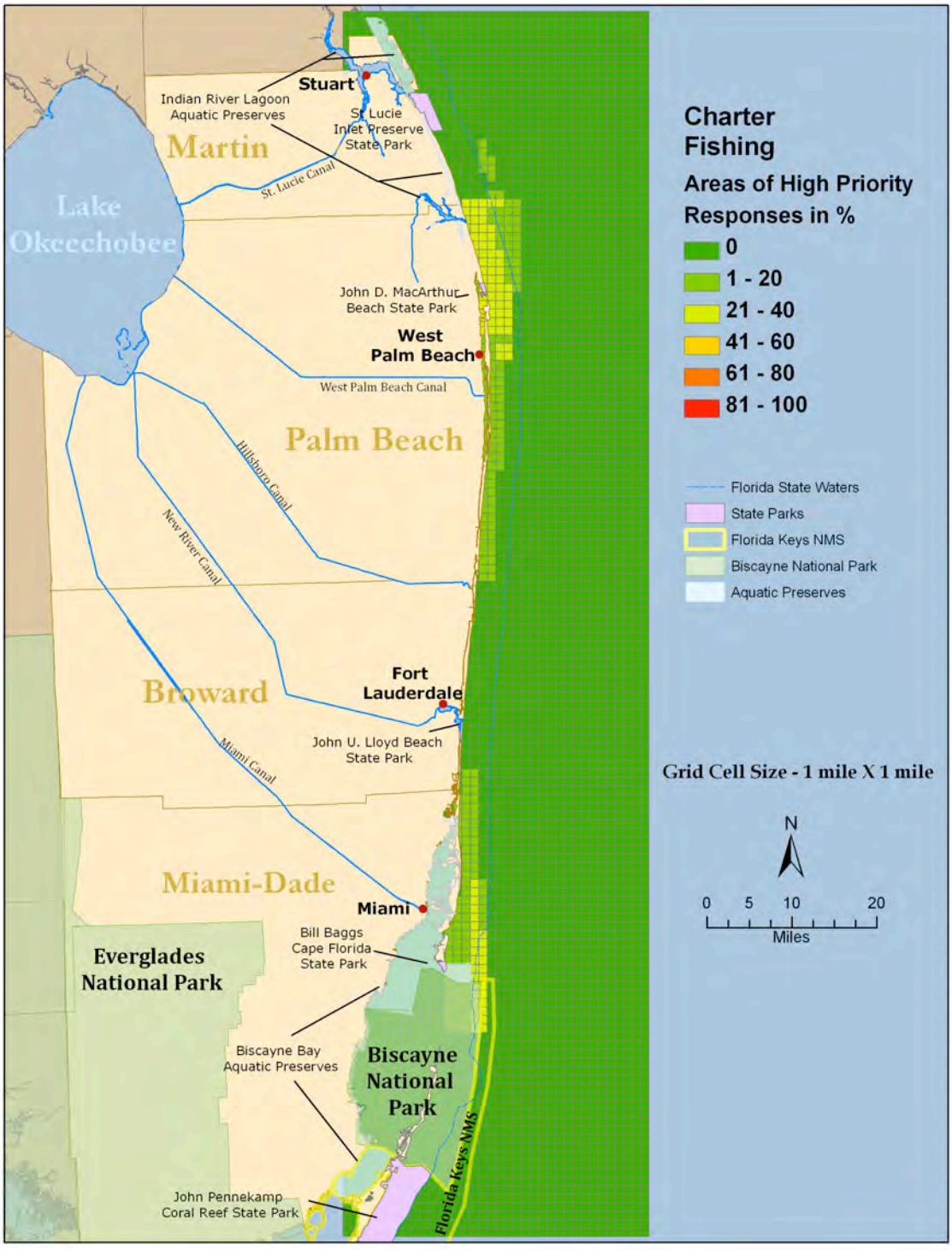

Figure 13. Charter fishers' assessment of high priority areas.

3.5. Commercial fishing operations

The project research team interviewed a total of 47 commercial fishers in the southeast Florida region, of which 42.6% were conducted in Miami-Dade County, 17% in Broward County, 23.4% in Palm County, and 17% in Martin County. It should be noted that, as with charter fishing operations, commercial fishers often fished across county lines. This was especially the case for commercial fishers who fished in northern Broward and southern Palm Beach counties, and those who fished in Martin County. Martin County commercial fishers often fished in Palm Beach County. Thus, the views of fishers were considered from a fishing ground, rather than county, perspective.

The commercial fishers interviewed represented a variety of gears, especially in Miami-Dade County. According, the fisher perspectives were based on the gear they used and species they targeted, and the latter varied considerably across the region. Hook and line fishers comprised more than half the fishers interviewed (53.2%; n = 47), followed by trap fishers (21.3%), bait shrimp trawlers (4.3%), and spongers (4.3%) from Miami-Dade County, as well as one dedicated fish collector and one lobster diver. The bait shrimp fishery is centralized in southern Biscayne Bay in Miami Dade County with the dominant effort originating from the ports of Dinner Key and Black Point Marinas (EDAW Inc., 2005; Ault *et al.*, 1997). Sponging also occurs mainly in southern Miami-Dade County (EDAW Inc., 2005). There are three main trap fisheries in the southeast Florida region, targeting blue crab, spiny lobster, and stone crab, and the traps are largely deployed from central Miami-Dade County through southern Biscayne Bay (Shivlani and Villanueva, 2007; EDAW Inc., 2005). The rest of the region, especially Palm Beach and Martin counties, support hook and line fin fisheries, for a variety of reef fish, offshore pelagics, and, increasingly, coastal migratory pelagics.

The commercial fishing fleet participants had been fishing in their respective regions for an average of 32.6 years (SD = 16.4; n = 37), ranging from five to 63 years of experience. While most focused on a single gear, several fishers reported fishing two, related gears (e.g., spiny lobster and stone crab traps) or landed a variety of species.

3.5.1. Commercial fishers' views on resource conditions and trends

Commercial fishers were generally in agreement that most resources were in fair condition, with the exception of mangroves (mean = 3.63, where 1 = excellent and 5 = very poor), which many respondents felt had been destroyed via development (see below) (Table 20). Also, it should be noted that many fishers did not report on resource conditions, as they felt that they did not have enough information on especially benthic resources to determine their condition. Also, respondents in the northern counties felt that certain resources, such as seagrasses and mangroves, had not existed there in any appreciable quantity

over their tenure to judge their condition. Fisheries was the only resource that the group felt was in better than fair condition (mean = 2.50).

When asked to consider changes in resource conditions over time, commercial fishers felt that conditions had remained stable, but that most resources trended towards decline, especially mangroves (mean = 3.86) and corals (mean = 3.50). However, as with their views on resource conditions, less than half of those who were interviewed felt that they could comment on these resources. By contrast, 30 fishers, or 63.8% of the interviewees, believed that on average fisheries had improved over their tenure.

From a county perspective, there were no major differences in terms of perceived resource conditions or resource trends. Commercial fishers in all counties felt that overall conditions and fisheries were fair to good, and those who commented on other resources tended to agree that their conditions were between fair to somewhat poor. Commercial fisher views on trends in resource conditions across counties matched their views on resource conditions, in that fishers across all counties felt that the trend in resource conditions and most resource conditions was fair; however, Martin County fishers rated changes in fishery conditions more favorably than their counterparts in Miami-Dade County. This could in part be due to the high catches of coastal migratory pelagics in the northern counties and the decline in overall landings in Miami-Dade County over the end of the first decade of the 2000s (FWC, 2011).

Table 20. Commercial fishers' views on resource conditions.

	Mean	Standard deviation	Number of observations
RESOURCE CONDITIONS	1 = excellent; 5 = very poor		
1. Overall	3.07	0.83	47
2. Corals	3.33	0.98	23
3. Seagrasses	3.21	1.08	19
4. Mangroves	3.63	1.21	11
5. Beaches and wetlands	3.21	0.87	21
6. Water quality	3.38	0.91	30
7. Fisheries	2.50	1.07	30
CHANGE IN RESOURCE CONDITIONS	1 = greatly improved; 5 = greatly declined		
1. Overall	2.97	0.88	46
2. Corals	3.50	0.90	22
3. Seagrasses	3.32	1.11	19
4. Mangroves	3.86	1.00	9
5. Beaches and wetlands	3.20	0.95	20
6. Water quality	3.38	0.93	30
7. Fisheries	2.43	1.04	30

Many commercial fishers felt that the overall resource conditions, which they rated as fair, had been assisted in part by management measures in fishery and natural resource management. Others believed that natural cycles controlled fishery production (which for these respondents was a proxy for resource conditions), and that resources have remained stable over their tenure. There were, however, considerable regional differences on overall resource conditions. In Miami-Dade County, 40% of the fishers believed that land-based sources of pollution and debris contributed to the general condition of resources in Biscayne Bay and environs. Similarly, half of the Broward County fishers felt that water quality – either as a result of land-based sources of pollution or freshwater discharges – had negatively impacted overall resource conditions. Fewer fishers in Palm Beach (27.2%) and Martin counties (37.5%) believed that water quality had impacted general resource conditions; instead, many of the fishers interviewed argued that water quality had improved since the past and had assisted in improving resource conditions. While a few respondents from the two counties complained about freshwater discharge, most were satisfied with overall resource conditions.

All but one of the Miami-Dade County fishers did not comment on the drivers affecting coral reefs (where the respondent listed pollution as the primary cause for coral reef decline), but 50% of Broward County fishers blamed pollution as the main reason for coral decline in their region. Over 54% of the fishers in Palm Beach County identified algal growth, sedimentation resulting from nourishment, and pollution as impacting coral reefs, but most of these respondents felt that the impacts were surmountable or were being managed. Similarly, fishers were equivocal on impacts concerning seagrasses. While a few believed that seagrasses had been negatively affected by a myriad of impacts, including pollution, boating, siltation, and gear damage, others argued that seagrass coverage and health had improved considerably in their respective counties. Only 8.7% of the fishers interviewed identified beach renourishment as a negative impact on the region's beaches, compared to an identical percentage that stated that beach renourishment had positive effects on the region's beaches (all respondents who commented on beach nourishment were from Palm Beach and Martin counties). In terms of water quality, 23.4% of commercial fishers pointed to land based sources of pollution having degraded water quality. Fewer fishers, from all counties, believed that water quality management, fewer freshwater discharges, and less pollution emanating from outfalls had all greatly improved water quality in their respective regions. Finally, commercial fishers' views on fisheries were mostly positive, in that most of those who commented on fishery conditions felt that (a) fishery conditions had improved, due in part to management and/or the cyclical nature of fish populations, (b) fishery regulations, while successful, needed to be relaxed to accommodate greater effort, and (c) while certain fisheries were stressed (especially reef fish fisheries),

the source of the stress were recreational fishers and part-time commercial fishers.

3.5.2. Areas of use and use conflicts concerning commercial fishers

Commercial fishers reported using a variety of habitats across southeast Florida, including nearshore habitats and offshore areas, depending on the species targeted (Figure 14). Bait shrimp trawlers interviewed focused their entire effort in southern Biscayne Bay, whereas blue crab and stone crab trap fishers fished closer to shorelines in southern Miami-Dade County and much of Biscayne National Park, respectively. In other parts of the region, use was more diffuse in nearshore and offshore habitats, due mainly to the dependence of commercial fishers from Broward to Martin counties on a combination of fin fish ranging from coastal migratory pelagics to offshore pelagics (FWC, 2011; Johnson *et al.*, 2007).

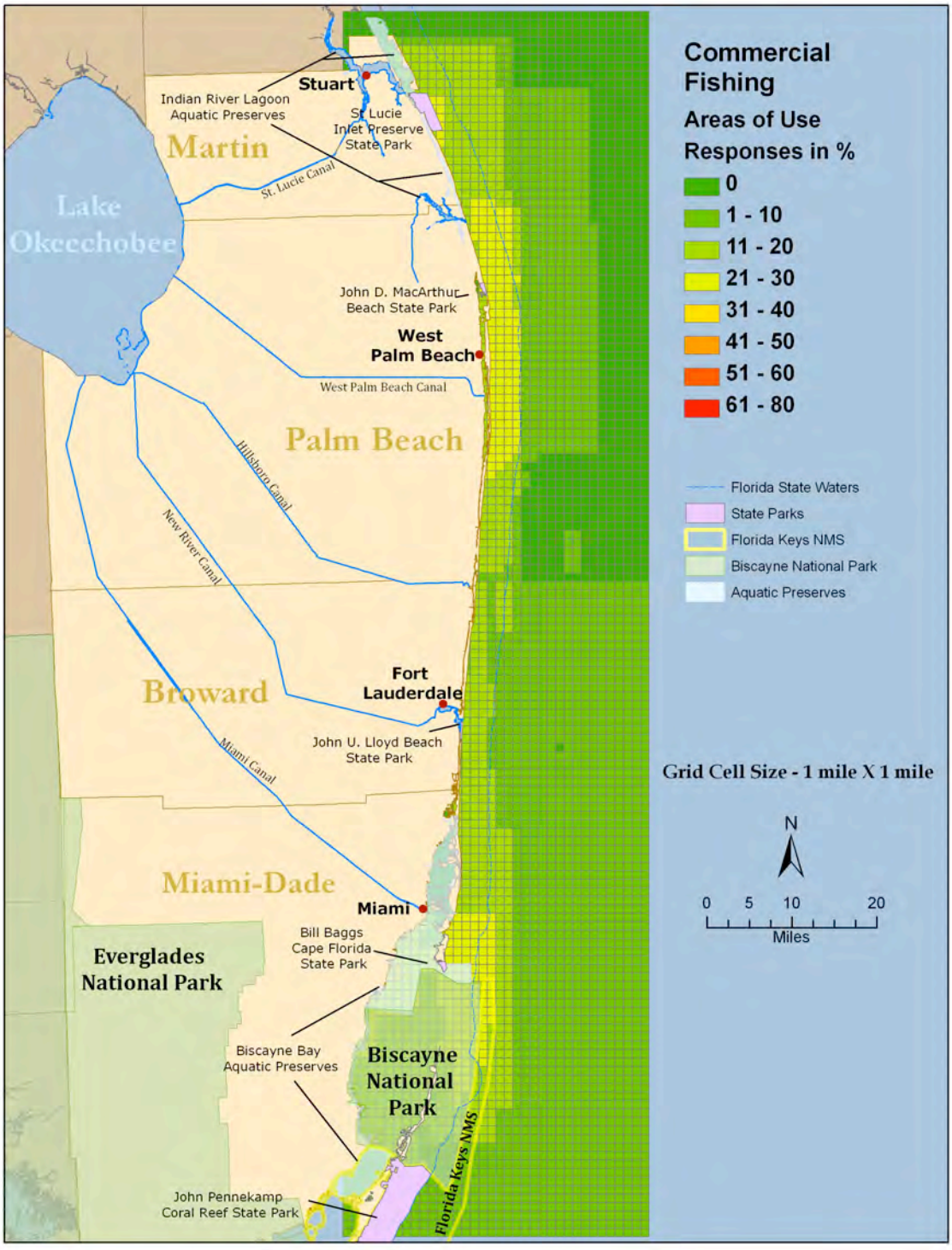

Figure 14: Commercial fishers' areas of use.

A majority of commercial fishers (61.7%; n = 47) reported use conflicts with another stakeholder group, and 10.6% of the total reported use conflicts with multiple stakeholder groups. Over a quarter of the fishers who experienced use conflicts, or 28.6%, identified conflicts with dive groups, including spearfishers,

lobster divers, and recreational divers. In Miami-Dade County, trap fishers complained that divers poached crustacean traps, especially spiny lobster traps, whereas in Palm Beach and Martin counties, hook and line fishers argued that extractive divers overfished areas, used powerheads, or deliberately fished in the same areas as commercial fishers, and that recreational divers were careless and scared away the fish in commercial fishing grounds. Also, 25.7% of the commercial fishers had conflicts with recreational fishers, and 5.7% with recreational boaters; with the former group, the conflict was mainly over resource use, where several respondents stated that recreational fishers would deliberately tail and fish next to them. In Martin County, 37.5% (n = 8) of the commercial fishers identified part-time fishers as presenting a use conflict, explaining that since the snapper/grouper seasonal closure, several part-time commercial fishers had entered the king mackerel fishery and were taking a considerable share of the landings from full-time participants. Another regional conflict, reported by 30% of Miami-Dade fishers, was between stone crab trap fishers and bait shrimp trawlers (reported also in EDAW Inc., 2005). Trap fishers blamed the trawlers for running over their trap lines and buoys, costing them their haul and their traps, and called for the creation of a trap-trawl line in southern Biscayne Bay as exists for the shrimp fishery in southwest Florida.

Solutions offered by commercial fishers to limit conflicts ranged from the aforementioned zoning strategy to create geographical lines of gear separation, educating mainly recreational divers and boaters to respect commercial fishing operations, stronger enforcement, and the outright elimination of certain uses. Most fishers agreed however that use conflicts could not be completely avoided.

A majority of the conflicts reported by commercial fishers were spread across their areas of use and, in many cases, across entire counties (Figure 15). In certain cases, such as with divers, conflicts were limited by depth, especially in Biscayne Bay in Miami-Dade County; but in the northern counties, conflicts with divers took place in open water. The aforementioned conflict between bait shrimpers and stone crab trap fishers was particularly acute in southern Miami-Dade County, where almost all participants in both fisheries reported conflict conditions.

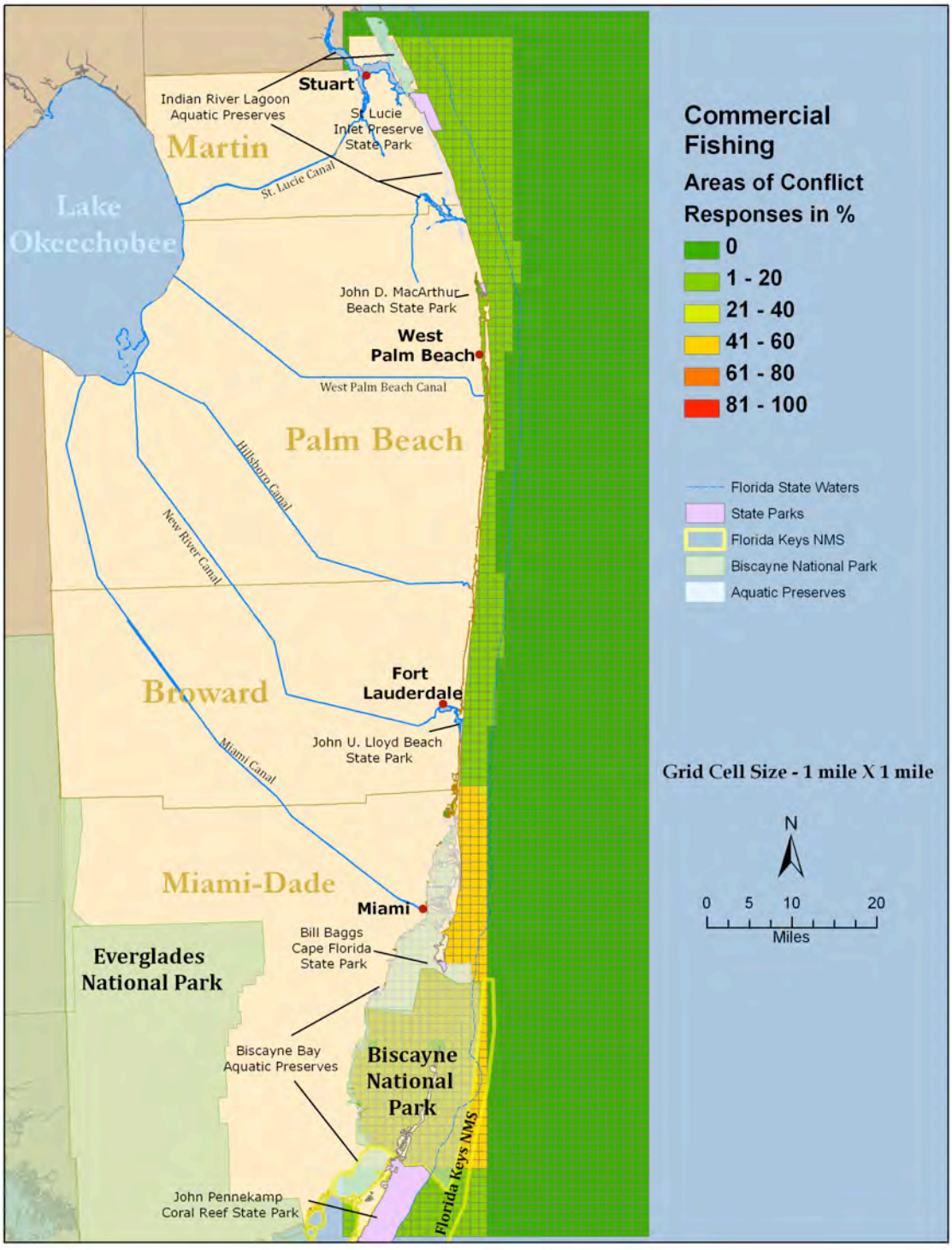

Figure 15. Commercial fishers' areas of use conflicts.

Commercial fishers identified a number of areas that they considered in good condition (Figure 16). Commercial fishers in Miami-Dade County pointed to areas in and around Biscayne Bay, whereas respondents from Palm Beach

County identified areas along nearshore areas and especially in the northern section of that county.

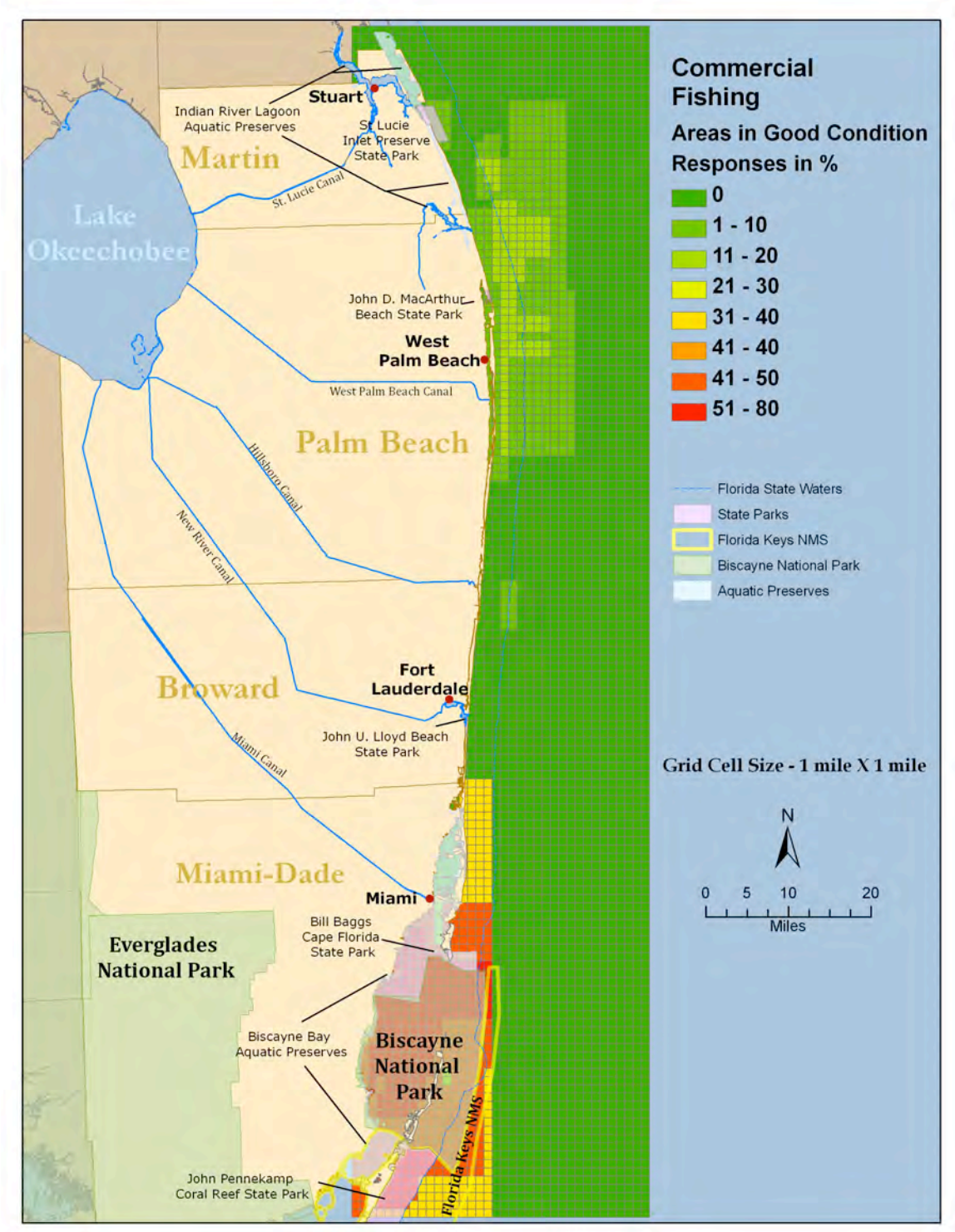

Figure 16: Commercial fishers' identification of areas in good condition.

3.5.3. Commercial fishers' goals for coral reef ecosystem protection

A majority of the commercial fishers (82.2%; n = 45) argued in favor of continuing with the present approach to aid in coral reef ecosystem protection in the region and their counties. Like charter fishing operations, many commercial fishers favored the relaxation of fishery regulations. Less than 10% believed that use should be curtailed for certain groups with modified or expanded regulations. Regional views were consistent across Broward and Martin counties, where all the commercial fishers interviewed preferred the present approach. By contrast, 30% of Miami Dade commercial fishers believed that use should be curtailed for certain groups (namely trap fishers who were against shrimping and called for shrimp trawling to be reduced or eliminated from Biscayne Bay) or that there should be changes in regulations but not in use to improve management.

In terms of resource protection priorities, commercial fishers moderately disagreed with all options, and the least favored was that of protecting a percentage of all resources (mean = 4.47) (Table 21). The main reason for the levels of disagreement was because most fishers felt that existing management strategies were working well and no further management was required. Views on resource protection priorities were most entrenched among Martin County commercial fishers, who on average more strongly disagreed on all resource priorities than their counterparts in the other counties.

Table 21. Commercial fishers' views on resource protection priorities.

	Mean	Standard deviation	Number of observations
RESOURCE PROTECTION PRIORITY	1 =strongly agree; 5 = strongly disagree		
1. Stressed resources	4.02	1.69	45
2. Key resources	4.42	1.16	45
3. Percentage of all resources	4.47	1.29	45
4. Sustainable use	4.04	1.54	45
5. Enhanced enforcement	4.00	1.51	44

Just over 40.5% (n= 37) of the respondents were willing to yield access to an average of 22.9% (SD = 32.4; n = 37) of their resources where this would result in the region being protected in its current condition, and the group was willing to yield slightly more access on average, or 24.9% (SD = 35.0; n = 37), in the case where the region would be improved and restored. There were considerable county-level differences in the percentage that commercial fishers were willing to yield. While in Broward, Martin, and Palm Beach counties, respondents were willing to reduce use by between 30-38%, Miami-Dade County fishers were willing to reduce use by only 13%. While none of the Miami-Dade interviewees stated that the following, it is probable that these fishers felt that they could not give up more areas because they already cannot harvest spiny lobster in the

Biscayne Bay-Card Sound Sanctuary, are restricted in terms of the bait shrimp trawling habitat available in southern Biscayne Bay, and need to contend with large vessel traffic in the Port of Miami area.

Over 44% (n = 24) of the fishers interviewed stated that the most important management improvement that they would like to have achieved is the availability of greater fishery resources and landings. Another 24% felt that improved water quality would be the most important improvement. Less important improvements were the elimination of part-time commercial fishers (8.3%) and effective enforcement (8.3%).

3.5.4. Commercial fishers' understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

When asked about gaps in management capacity and regulatory authority, 29.1% (n = 55) of the gaps offered by commercial fishers were related to fishery issues, and most of these concerned the need to relax fishery regulations, the impacts of fishery regulations on the commercial fishing industry, the need to curtail imports, and the removal of part-time fishers, among others. The lack of enforcement (27.2%) was also cited as a significant management gap, and commercial fishers qualified their answers by arguing that enforcement does not address recreational users who are (in the respondents' view) responsible for most safety and fishery violations in the region. Moreover, the commercial fishers felt that the existing laws are not well enforced. Enforcement was particularly important to fishers from Miami-Dade and Martin counties. Miami-Dade fishers, especially trap fishers, felt victimized by the lack of enforcement to prevent trap poaching, whereas Martin County fishers believed that part-time fishers were illegally harvesting commercial species, particularly king mackerel. Several fishers (10.9%) also complained about being unable to participate in the management process, stating that the process was too one-sided and did not allow for their suggestions. The lack of effective water quality management was also a management gap identified by fishers, and 10.9% of the respondents believed that land-based sources of pollution were not being addressed.

Fishers' views on management approaches to support the region's coral reef ecosystem were driven mainly by their interest in fishery management. Almost 37% of the 49 management options provided by those interviewed focused on fishery matters, including recommendations to relax fishery laws, decrease imports to increase local production, protect commercial fisheries from recreational competition, and the need to maintain rules and regulations constant (i.e., keep quotas, bag limits, size limits, etc. consistent across seasons). A small segment of the fishers interviewed (12%) felt that marine managed areas should be implemented, especially for reef fish species. Over 10% of the respondents also felt that enforcement should be applied more evenly and that enforcement of existing rules should be prioritized, and equal percentages of fishers also

favored greater input in the management process and called for the inclusion of fisher ecological knowledge in advisory panels or similar decision-making bodies and the prioritization of water quality management measures. Fewer suggested education (4%) and user fees (2%).

3.5.5. Commercial fishers' degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem

Under this theme, commercial fishers were asked of their views on management tools, statewide management, and place-based management. Based on their preference for statewide or place-based management, respondents answered a series of questions related to either preferred option.

Views on management tools showed that commercial fishers were concerned mainly about enforcement. All tools were rated as slightly better than neither effective or ineffective (mean < 3.00, where 1 = very effective and 5 = very ineffective), but the mean rating for enforcement was 3.75, or moderately ineffective (Table 22). Fishers perceived enforcement as having largely failed in protecting their interests, and that it was the single management tool that needed to be addressed to improve overall management. Part of this view was derived from the various use conflicts reported by commercial fishers, including fishers' views on poaching and resource allocation, but several respondents also believed that enforcement had failed to implement existing regulations due to lack of funding and support. As one fisher remarked, "they (enforcement officers) do the best that they can, but they don't have the personnel or boats to patrol such a large area".

Table 22. Commercial fishers' views on management tools.

	Mean	Standard deviation	Number of observations
MANAGEMENT TOOL	1 =very effective; 5 = very ineffective		
1. Outreach and education	2.85	1.25	40
2. Community involvement	2.95	1.31	40
3. Scientific research	2.84	1.13	38
4. Resource monitoring	2.72	1.16	36
5. Enforcement	3.75	1.21	40

Respondents from different counties varied in their views on the effectiveness of the management tools they perceived as being slightly effective; generally, Martin County interviewees ranked all management tools as moderately ineffective, whereas Miami-Dade County respondents tended to rate most management tools as moderately effective. This difference is best exemplified in the regional differences in opinions on enforcement effectiveness. All the Palm Beach County commercial fishers and a majority of Broward County and Martin

County commercial fishers felt that enforcement was not effective, whereas Miami-Dade commercial fishers had a neutral view on the enforcement effectiveness (mean = 2.88; SD = 0.99; n = 17). In fact, fishers from all counties except Miami-Dade County rated enforcement as moderately ineffective, suggesting that while Miami-Dade fishers complained about poaching and use conflicts, they were less likely to blame those on the enforcement effectiveness.

Commercial fishers overwhelming supported statewide management (74.5%; n = 47) over place-based management (8.5%). Another 17% favored a hybrid form of management that incorporated both statewide and place-based management approaches. Support for place-based management varied across counties, such that 37.5% (n = 7) of Broward County commercial fishers supported the approach, compared to 12.5% (n = 8) of Martin County commercial fishers. By contrast, none of the Miami-Dade County or Palm Beach County respondents favored place-based management, although 35.2% (n = 17) of Miami-Dade County commercial fishers and 18.2% (n = 11) of Palm Beach County commercial fishers stated a preference for the hybrid approach. Many of these fishers argued that neither form of management could be implemented without the other, and that place-based management may be used to enhance statewide measures.

Commercial fishers, like charter fishers, held very strong views on place-based management. Many participants would commence the interview by stating their dislike of place-based management, and several (see this section) refused to provide any information on marine managed areas, considering that as a "non-starter". Even those who provided their views on place-based management did so stating that they knew that their group would not benefit from the approach (similar to as determined by Suman *et al.*, 1999 among Florida Keys commercial fishers prior to the implementation of no-take zones in the FKNMS in 1997).

Although most fishers stated a preference for statewide management approaches, they rejected most of the options provided, rating strengthening existing regulations (mean = 3.97, where 1 = highly preferred and 5 = not preferred at all), establishing new protective legislation (mean = 4.58), modified access (mean = 4.00), and increasing funding (mean = 4.24) as undesirable management options (Table 23). Fishers were least likely to prefer the establishment of new protective legislation, which many perceived as potentially having negative effects on their operations (they held similar views on strengthening existing legislation). Similarly, they did not favor modifying access, and several fishers saw this as a means by which to implement place-based management. While only a few respondents followed up on alternate options, these were invariably related to increasing enforcement as means by which to implement existing regulations.

Table 23. Commercial fishers' views on statewide management approaches.

	Mean	Standard deviation	Number of observations
STATEWIDE MANAGEMENT APPROACHES	1 = highly preferred; 5 = not preferred at all		
1. Strengthening existing regulations	3.97	1.72	34
2. Establishing new legislation	4.58	1.03	31
3. Modified access	4.00	1.55	31
4. Increasing funding	4.24	1.38	29

Commercial fishers who were not in favor of place-based management were asked to provide their preference for the type of marine managed area if there were going to be marine managed areas anyway. While only 44.6% of those interviewed provided a preference, 67% (n = 21) of these fishers stated that they would rather have zoning than single use zones. In terms of uses to be restricted within marine managed areas, 25% (n = 24) supported no discharge, 16.7% supported multiple-use areas, 16.7% supported no spearfishing, and 8.3% supported no lobstering. A small percentage of fishers (12.5%) also supported having no personal watercraft in marine managed areas, and fewer were in favor of no anchoring (8.3%) or time-area closures (8.3%). It appears the views of commercial fishers who were not in favor of marine managed areas were in part shaped by their experience with state parks. That is, these fishers supported gear use restrictions such as no spearfishing but were in favor of a broad use of activities, both approaches that are used in state parks. Respondents did not perceive themselves as the primary beneficiaries of marine managed areas, arguing instead that their group would be the most impacted, regardless of the uses excluded.

Just over a quarter of the fishers interviewed provided alternatives to marine managed areas, and the most were these were related to fishery regulations (44.6%; n = 13). Recommendations included establishing seasonal closures during spawning seasons, setting up rotating marine managed areas, and resetting size and bag limits. Others felt that a combination of enforcement and education were suitable alternative to marine managed areas.

Only 19% of all fishers identified the level of government they favored to head marine managed areas, and most supported a state-federal partnership (44.4%; n = 9), followed by a local-state partnership (22.2%). The state led all combination, accounting for 77.8% of the preferred governmental agencies.

Eight out of the 47 commercial fishers interviewed (17%) were in favor of establishing a marine managed area. Among these fishers, zoning (62.5%) enjoyed greater support than a single zone. Respondents took a very strong position on uses that should not be allowed in the marine managed area, with several fishers adding that in order for a marine managed area to be effective, most uses would need to be curtailed. As such, 83.3% agreed that the marine managed area should be a marine reserve, accommodate seasonal (or rotational) closures, or allow only transit through the area (Figure 17). In terms of support across counties, 29.5% of Miami-Dade County fishers supported marine managed areas, followed by Palm Beach County fishers (18.8%). Only one commercial fisher each in Broward and Martin counties supported marine managed areas.

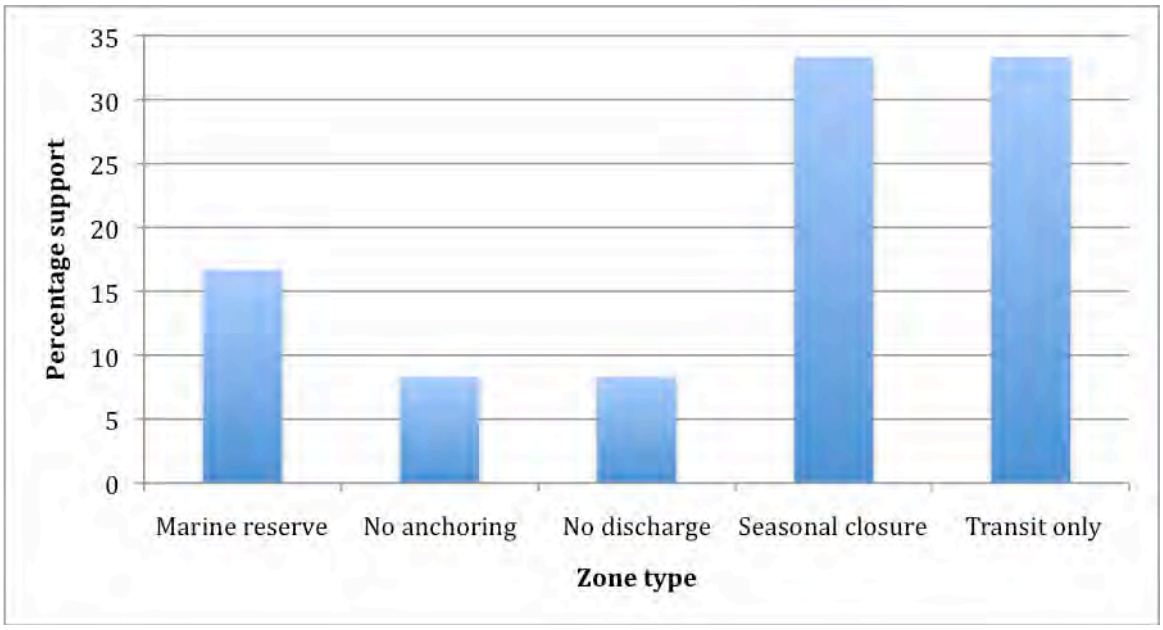

Figure 17. Commercial fishers' views on zone types.

In terms of areas that they supported as a marine managed area, most commercial fishers were against providing any information concerning the location of an area that they would accept or support. Fishers from Miami-Dade County argued that they already had to contend with the northwestern boundary of the FKNMS that straddled the western boundary of Biscayne National Park and the park itself that encompassed much of southern Biscayne Bay. Thus, these fishers were unwilling to provided information concerning any other areas that they would accept; instead, some of the fishers interviewed suggested retaining the Biscayne Bay-Card Sound Lobster Sanctuary (EDAW, 2005) as closed to lobster fishing. Certain commercial fishers in Broward and Palm Beach were in favor of protecting some locations as marine managed areas, including the Broward County *Arcopora cervicornis* patch and the nearshore reefs from Broward County to Martin County.

When asked about areas that they considered as high priority, most fishers were unwilling to provide such information for specific locations. A few of those interviewed felt that by relinquishing this information, they would provide information on areas that would be put off limits to fishery uses. Thus, most agreed that there were areas that were likely high priority (and many of the fishers acknowledged the need to protect coral reefs), but they did not provide much information on which of the resources should be prioritized. Only a few fishers in Palm Beach County provided information on areas of high priority, which they identified (vaguely) as areas in northern Palm Beach in offshore (federal) waters.

3.6. Dive operations

The project research team completed a total of 27 interviews with dive operations, of which 39.3% each were conducted in Broward County, 25% each in Miami-Dade and Palm Beach counties, and 10.1% in Martin County. Most of the Martin County dive operations that had been interviewed in a previous effort (Shivlani and Villanueva, 2007) were no longer in operation (D. Gentile, personal communication); thus, the project research team worked with local operators and the CRCP team to substitute operators. Due to the use patterns identified in the aforementioned Shivlani and Villanueva study (2007), in which it was determined that there was considerable overlap in areas used by north Palm Beach and Martin County dive operations, the research team focused on targeting these areas' dive shops to compensate for the decline in Martin County dive operations.

The dive operations interviewed represented an average of almost two decades of experience diving in their respective regions (mean = 18.1 years; SD = 9.99; n = 23). Experience ranged from one year[11] to more than 37 years diving in the county.

3.6.1. Dive operations' views on resource conditions and trends

Dive operators' views on resource conditions, changes in resource conditions, and main stressors to resource conditions varied based on the various coastal and marine resources, but response rates to questions suggested that dive operators were most familiar with coral reef conditions; for example, all but one of the 27 operators interviewed provided their views on coral reef conditions, compared to just over half who rated fisheries conditions, and ten or fewer operators who stated an opinion on the condition of other resources (Table 24). The group believed that overall conditions were slightly less than fair (mean =

[11] The dive operator who represented one year of diving in the county in which the operator was interviewed nevertheless had experience diving in the region.

3.25, where 1 = excellent and 5 = very poor). Corals (mean = 3.46), water quality (mean = 3.50), fisheries (mean = 3.50), and mangroves (mean = 4.67) were among the resources that were in worse than fair condition (although it is noted that no resource received a mean good rating, i.e., mean < 3.0). Views on resource conditions varied across regions, with Broward County dive operators providing the least favorable views on overall resource conditions and coral reef conditions and Palm Beach County dive operators providing the most favorable views on both conditions.

In terms of resource trends, dive operators believed that on average all resource conditions had declined. While only a few operators commented on mangroves, other resources for which more operators provided their view, such as corals, beaches, water quality, and fisheries, all had means near or over 3.50 (where 1 = greatly improved and 5 = greatly declined). As with regional views on resource conditions, Broward County dive operators rated overall trends and coral reef trends as declining, whereas Palm Beach County dive operators considered both trends to be stable. Importantly, none of the counties' operators' average ratings suggested that resource conditions, especially those related to coral reefs, had improved.

Table 24. Dive operators' views on resource conditions.

	Mean	Standard deviation	Number of observations
RESOURCE CONDITIONS	1 = excellent; 5 = very poor		
1. Overall	3.25	0.94	27
2. Corals	3.46	0.94	26
3. Seagrasses	3.22	1.09	9
4. Mangroves	4.67	0.58	3
5. Beaches and wetlands	3.10	1.29	10
6. Water quality	3.50	1.01	19
7. Fisheries	3.50	1.22	14
CHANGE IN RESOURCE CONDITIONS	1 = greatly improved; 5 = greatly declined		
1. Overall	3.56	0.88	27
2. Corals	3.52	0.92	27
3. Seagrasses	3.56	1.18	8
4. Mangroves	4.67	0.58	3
5. Beaches and wetlands	3.45	1.04	11
6. Water quality	3.68	0.95	19
7. Fisheries	3.64	1.21	14

Dive operators were split in their views on the drivers affecting the resource trends. That is, those who believed that conditions had deteriorated pointed to a multitude of factors, ranging from water quality decline to increased use pressure, as well as invasive species (e.g., Indo-Pacific lionfish). The dive

operators who believed that conditions had not deteriorated (or at least not to an extreme extent) were more likely to point out that resources had remained stable over their tenure, and that management had been successful in at least protecting mid-shore to offshore resources.

Corals had been impacted by a myriad of factors, as according to the dive operators interviewed. The most commonly stated impacts were overuse (29.7%; n = 37) that resulted in anchor damage and groundings, debris on coral reefs, and overfishing, and land-based sources of pollution that resulted in algal overgrowth on reefs (24.3%). Fewer respondents pointed to nourishment (8.1%), especially in the northern counties, invasive species (8.1%), and water quality (5.4%) resulting from sources other than land based ones (e.g., outfalls).

In terms of other resources for which several operators provided their views, half of those who commented on beaches (n = 8) believed that beaches had deteriorated in the region and had in fact led to poor conditions in the immediate nearshore environment, including the first reef terrace. This was particularly the case in Martin County, where two of the three dive operators interviewed stated that beaches had been eroded or damaged in the long-term due to poor beach restoration practices (e.g., incorrect grain size, beach sand being too tightly compacted). Others who commented on beach conditions argued that nourishment had assisted beaches and had in fact prevented erosion. Operators from Palm Beach and Martin County also had multiple views on water quality, which several felt had been impacted by freshwater discharges. Four out of the 11 operators from these two counties pointed to freshwater, often nutrient-rich, that affected water clarity and quality and had impacts on most coastal and marine resources in the northern Palm Beach and Martin counties' area. By contrast, Miami-Dade and Broward County operators commented on water quality from the perspective of land-based sources of pollution, emanating as a result of their burgeoning metropolitan populations. Finally, a majority (64.4%; n = 154) of the dive operators who provided their views on fishery conditions felt that overfishing was the main driver for the depleted state of fisheries in their respective regions. Another 21.4%, all located in Palm Beach County, identified invasive species, namely lionfish, as the main reason for the fisheries decline in the region.

3.6.2. Areas of use and use conflicts concerning dive operations

Dive operators used a majority of the nearshore habitats suitable for diving in the southeast Florida region (Figure 18). In Miami-Dade County, most of the use was concentrated on the windward side of barrier islands, while in the other three counties, dive trips took place along the reef tract. Dive use was particularly concentrated in Broward County, which has the highest total of dive operators in the region and where use was focused on the nearshore reefs.

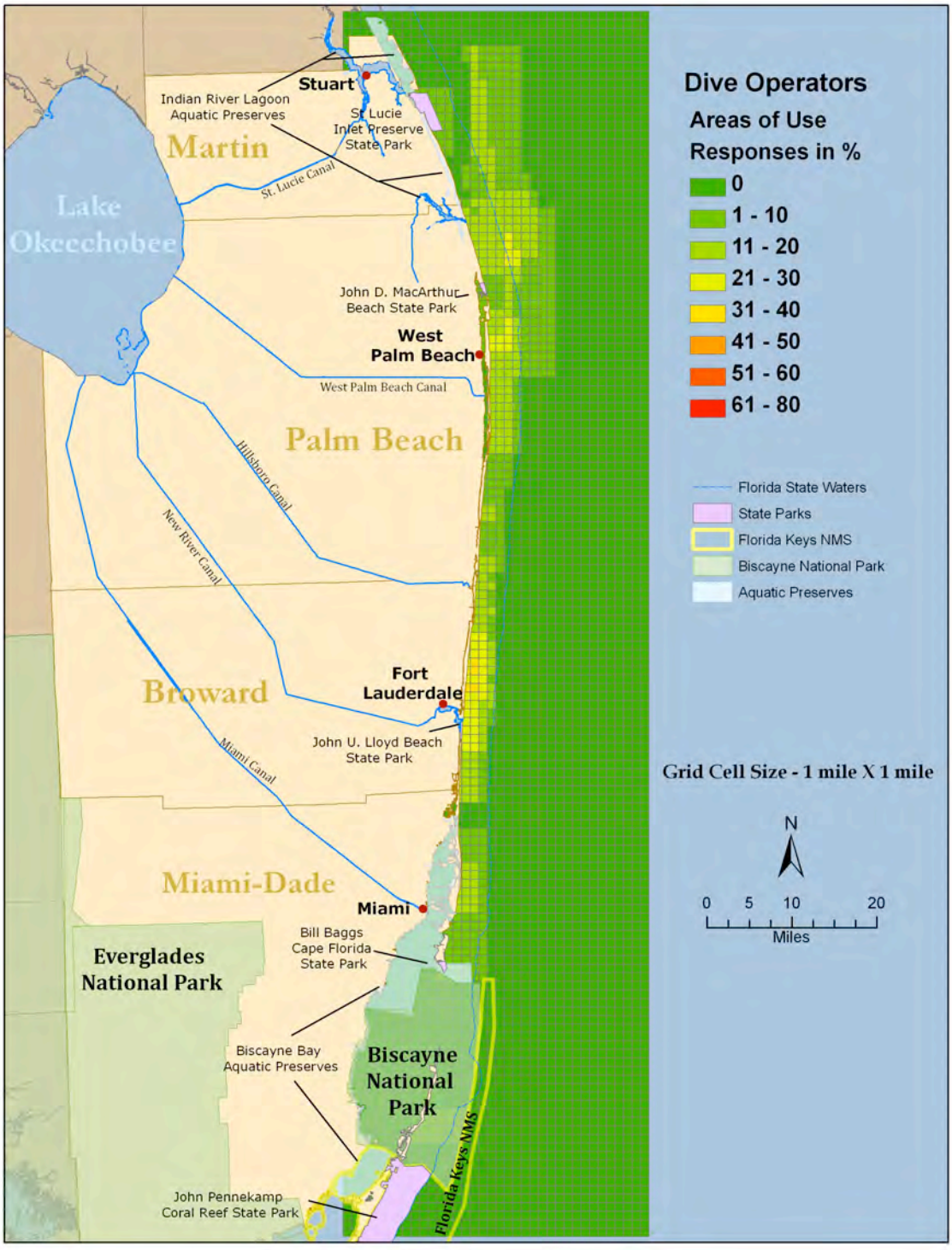

Figure 18. Dive operators' areas of use.

Dive operators reported a multitude of use conflicts, and a majority of those interviewed (59.2%) stated that they had experienced or continued to experience use conflicts in their respective regions (Figure 19). Recreational anglers (37.5%; n = 16) represented the most common conflict, and the most common complaint

was anglers putting their hooks in the water when there were divers in the water. This problem was especially acute in Palm Beach County, where 57.1% (n = 7) reported fishing lines in the water where they took their dive trips. Related to anglers, 18.8% of the dive operators also reported conflicts with recreational boaters, who they claimed had no understanding and/or respect of dive flags and represented a safety hazard to divers. Another 25% of the respondents blamed all fishers (commercial and recreational) for conflicts, ranging from boating ethics to using the same sites. Overall, conflicts were most commonly reported in Martin County (100% of dive operators; n = 3), Palm Beach County (78%; n = 7), and Broward County (55%; n = 11). Fewer Miami-Dade County dive operators (33%; n = 6), and the use conflicts reported in the county were related to recreational boaters transiting through an area than with sharing an area. Miami-Dade County operators reported having more "space" in offshore areas, especially on the windward side of the county's barrier islands, whereas the dive operators in the other counties often had to share resources either in artificial reefs or the narrow bands of coral reefs.

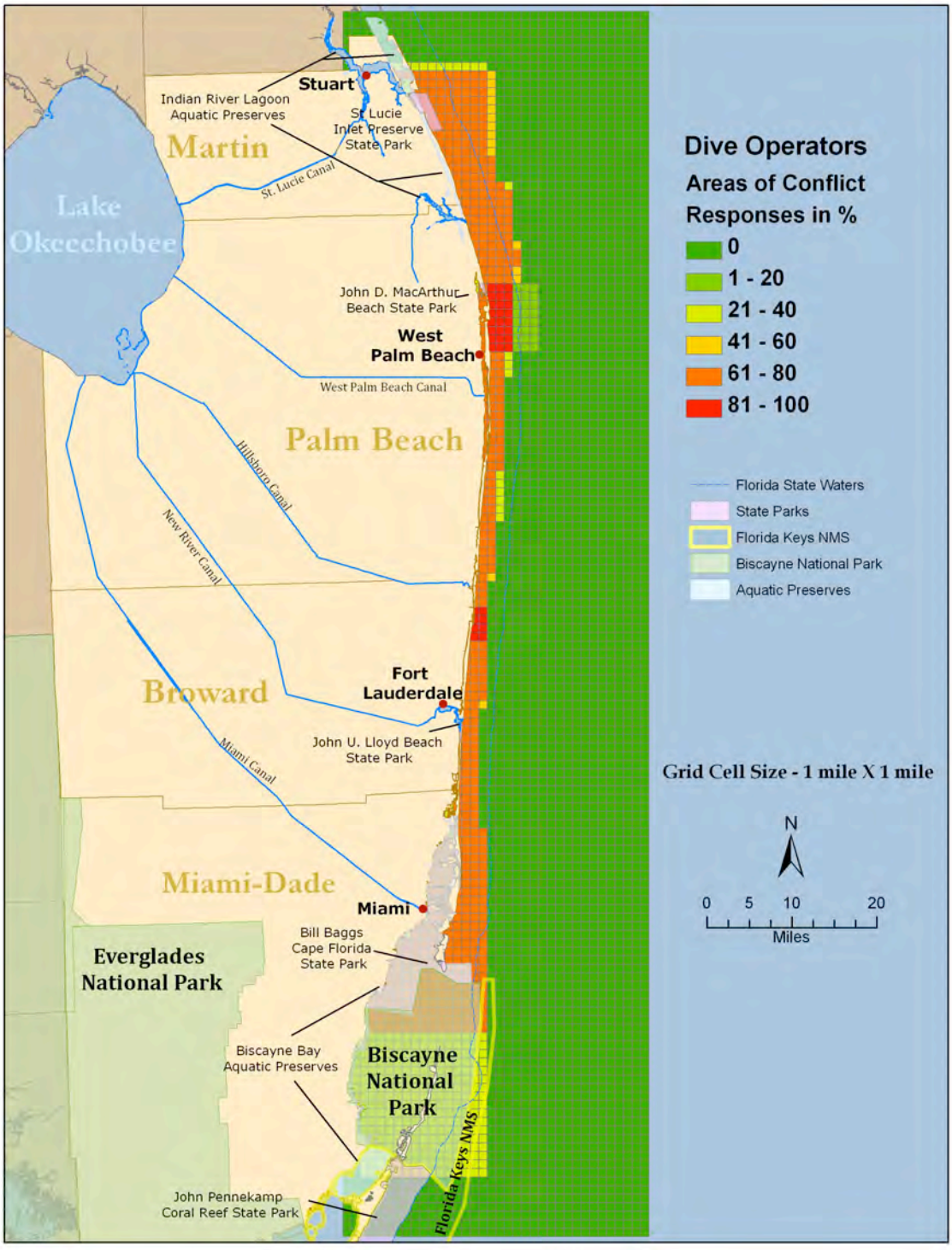

Figure 19: Dive operators' areas of use conflicts.

The most common solution offered by dive operators from all counties was to increase recreational user awareness via augmented or mandatory safety courses (for boaters), signage, or even stricter penalties, and two operators suggested using zoning as a primary strategy to prevent use conflicts. Use conflicts were

not confined to particular locations, and most dive operators stated that conflicts occur all over the areas that they use; as stated previously, this may be because of the high density of users in particular sites which are used for multiple, extractive and non-extractive activities.

Dive operators identified a number of areas that they considered in good condition (Figure 20), and these were spread across the entire region. In particular, areas located seaward of the Miami-Dade County barrier islands were identified as in good condition (and containing coral reefs), as were many of the areas located in the nearshore reef terraces in Broward County. Dive operators in Palm Beach County identified areas off the less populated parts of the county along its northern third, which they believed had suffered less impacts from use and population growth than had areas from central Palm Beach County to the southern county line.

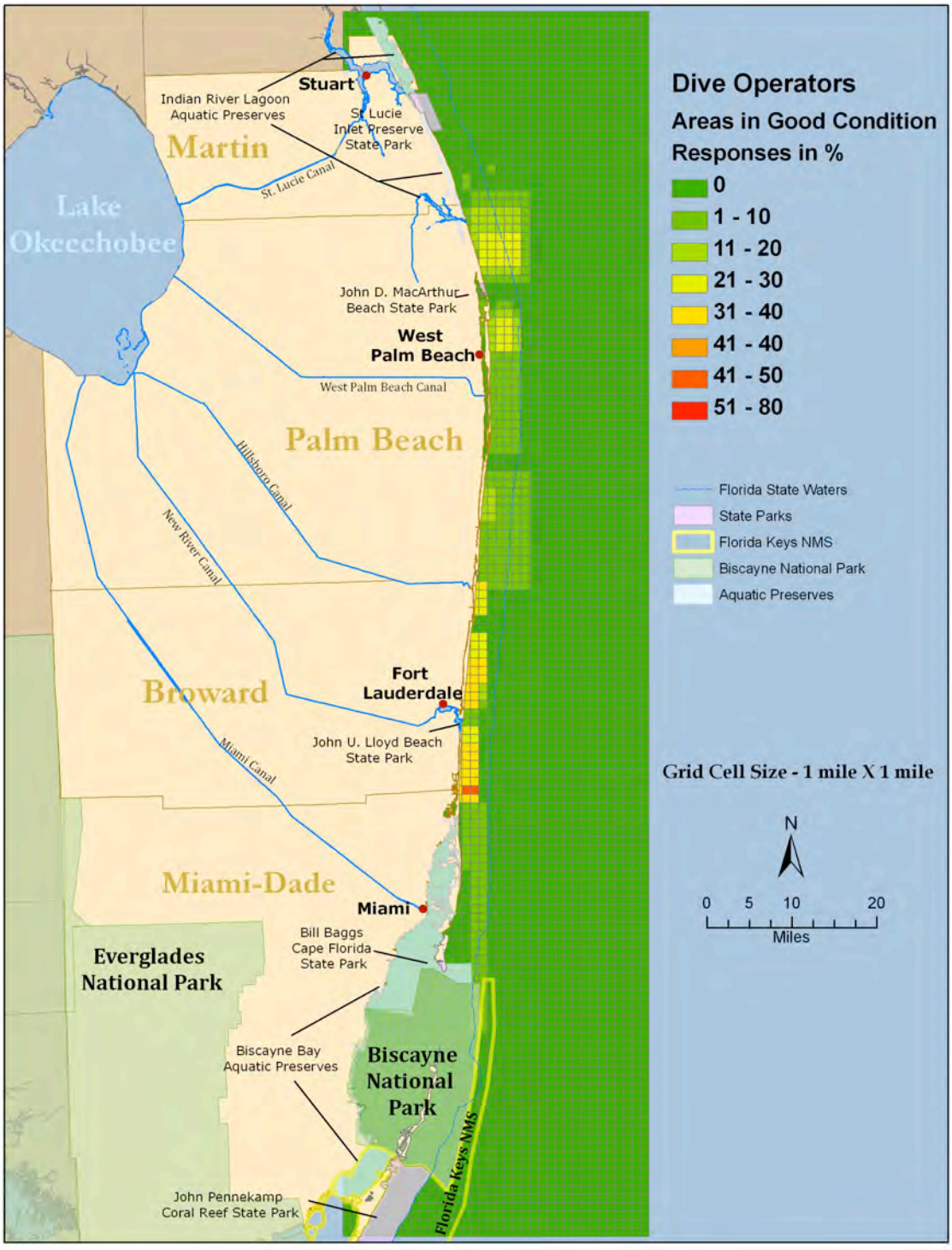

Figure 20: Dive operators' identification of areas in good condition.

3.6.3. Dive operations goals for coral reef ecosystem protection

When asked about their vision for coral reef ecosystem protection in the region and within their counties, a plurality, or 48.2% (n = 27), of dive operators believed that the present approach of continued use and protection under

existing regulations was the best option. However, several respondents qualified their support for this option by adding that enforcement must be strengthened if the present approach is to be made effective. As stated by other stakeholder groups, dive operators were concerned that the lack of enforcement of existing regulations had weakened the present management approach, and that correcting that problem may obviate the need for additional measures (which many argued could go unfunded and under-implemented as well). Other options that enjoyed support were reduction in use among certain groups with modified/expanded regulations for increased protection (29.6%) and reduced use among certain groups only within certain areas to allow for increased protection in those areas (22.2%). Across the region, Palm Beach County dive operators were most in favor of a vision other than continuing with present management, and 71.4% (n = 7) agreed that there needs to be either reduced use among certain groups with modified/expanded regulations or reduced user for among certain groups only in certain areas. This would appear to be a result of high use conflicts reported by Palm Beach dive operators. By contrast, dive operators in Miami-Dade County, who reported the least conflicts, were mostly in favor of continuing with the present management approach (83.3%; n = 6).

In terms of resource protection priorities, or those actions they believed should be ranked highest to support resource protection, dive operators favored prioritizing stressed resources (mean = 2.35, where 1 = strongly agree and 5 = strongly disagree) above other priorities and moderately agreed with this option (Table 25). Conversely, they moderately disagreed that protecting a certain percentage of all resources (mean = 4.23) was the best way forward. It is also interesting to note that while several operators felt that enforcement needed to be improved, it received a rating below neutral. This suggests that while dive operators were in favor in increased enforcement, they did not want to have that occur at the expense of protecting stressed resources (e.g., coral reefs and associated fauna).

Table 25. Dive operators' views on resource protection priorities.

	Mean	Standard deviation	Number of observations
RESOURCE PROTECTION PRIORITY	1 =strongly agree; 5 = strongly disagree		
1. Stressed resources	2.35	1.36	26
2. Key resources	3.00	1.62	26
3. Percentage of all resources	4.23	1.27	26
4. Sustainable use	3.00	1.72	26
5. Enhanced enforcement	2.92	1.49	26

Like fishing charters and commercial fishers, many dive operators (51.8%; n = 27) were willing to yield access to a considerable percentage of resources on average in their region (mean = 29.6%; SD = 30.2; n = 27) if that resulted in the region

being protected in its current condition; also, as determined for the aforementioned groups, dive operators were unwilling to yield much more access on average (mean = 34.3%; SD = 33.4; n = 27) even if that resulted in the region's resources being restored or improved. Operators in Palm Beach and Martin counties were willing to yield more than half the areas they used to better protect or restore the resources in the regions, while support in Miami-Dade and Broward counties was less than 20%.

The main result that a plurality of dive operators across that the region stated they would expect improved management to achieve is a healthier coral reef ecosystem, defined as a functional ecosystem with an abundance of associate species (41.2%; n = 34)). This was followed by a related result, consisting of more reef fish (20.6%), either for viewing or for consumption. Over 11% also felt that an important result would be improved water quality.

3.6.4. Dive operations understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

Like other stakeholder groups, dive operators were asked to provide information on any major gaps in management capacity or authority needed to effectively protect reef resources by first identifying such gaps and then by providing management options to address these gaps. Almost 40% (n = 36) of the dive operators felt the most important management gap in the region was the lack of enforcement of existing regulations, especially as this related to fishery management and safety. As discussed earlier under dive operator conflicts, the group felt strongly that other stakeholders, especially recreational fishers and boaters, were not well enforced and their actions led to conflicts. Also, like charter fishers, dive operators felt that unless existing management strategies – which they favored above all other management options – were effectively enforced, new approaches would only provide an additional burden. Over 11% felt that a significant management gap in the region was the lack of marine managed areas. Two of the 11 dive operators (18%) in Broward County expressed the concern that there were no marine managed areas in that county, as did two of the 7 dive operators (28.5%) in Palm Beach County, and one dive operator in Martin County. Other management gaps identified by individual dive operators included a gap in integrated management that can consider the effects of land-based development on coastal and marine resources, the lack of a regional mooring buoy plan that could use a coordinated strategy to reduce use pressure on coral reefs, no long-term assessment of beach restoration activities on coral reef health, and inadequate recreational boater and fishery education programs.

According to dive operators, the best management approach to protect the region's coral reef resources would be the implementation of marine managed areas, which 19.1% (n = 47) of the respondents supported. Another 4.5%

supported the use of seasonal closures. Also, 19.1% of the dive operators supported educational efforts and programs as a best management approach, arguing often that mandatory education for boaters and fishers would greatly assist in boater safety and responsible fishery behavior. Several operators added that education programs and other management measures should be funded by boater registration and boater use fees (12.8%). Other novel approaches recommended included setting up stakeholder advisory groups (8.3%), establishing county and/or region-wide mooring buoy programs (6.4%), and enhanced enforcement (6.4%). Dive operators also suggested setting up diver-specific management strategies, including the establishment of dive trip carrying capacity (e.g., 30 divers per dive site), creating a Bonaire (Netherlands Antilles) type, mandatory dive buoyancy course[12] that could be funded by diver use fees or medallions, and increasing funding via governmental budgets and user fees dedicated to coral reef protection.

3.6.5. Dive operations degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem

Under this theme, dive operators were asked of their views on management tools, statewide management, and place-based management. Based on their preference for statewide or place-based management, respondents answered a series of questions related to either preferred option.

The most effective management tool, as perceived by dive operators was scientific research (mean = 2.91, where 1 = very effective and 5 = very ineffective), which was rated ahead of resource monitoring (mean = 3.05), outreach and education (mean = 3.16), and community involvement (mean = 3.26) (Table 26). As could be expected due to their views on management gaps and approaches, dive operators felt that enforcement had underperformed and thus ranked it as between neither effective nor ineffective and moderately ineffective (mean = 3.50). Generally, dive operators from Broward County rated these management tools more favorably. By contrast, respondents from Palm Beach and Martin counties did not find outreach and education, community involvement, or enforcement very effective. It could be that Broward dive operators were more involved with education and outreach activities and may have been more knowledgeable about research and monitoring activities than the counterparts in the northern two counties.

[12] According to the Bonaire National Marine Park website, all scuba divers visiting the park must first complete an orientation consisting of a briefing and a check-out dive with their dive operator prior to diving in the park (www.bmp.org/rulesandregulations.html).

Table 26. Dive operators' views on management tools.

	Mean	Standard deviation	Number of observations
MANAGEMENT TOOL	1 =very effective; 5 = very ineffective		
1. Outreach and education	3.16	0.92	26
2. Community involvement	3.26	0.98	27
3. Scientific research	2.91	0.81	21
4. Resource monitoring	3.05	0.86	21
5. Enforcement	3.50	0.95	26

Over 70% of the 27 dive operators interviewed stated a preference for place-based management, and another 11.1% supported a hybrid form for place-based and statewide management. Only 18.5% supported statewide management. Of the 11 dive operations in Broward County, 91% favored place-based management, and 9% favored both place-based and statewide management; thus, all Broward County operators effectively supported place-based management. Similarly, a majority of Palm Beach County (71%; n = 7), Martin County (67%; n = 3), and Miami-Dade County (67%; n = 6) supported place-based and the hybrid form of place-based and statewide management. Those dive operators who preferred the hybrid form of management did so because they believed that place-based management alone could not surmount the region's challenges, especially as related to the lack of enforcement. One operator pointed out that a marine managed area by itself would not promote compliance, and that any place-based strategy must thus either advance statewide approaches or be placed adjacent to a well-patrolled coastline. Another stated that place-based management by itself would require that any marine managed area be a transit-only zone, and that would be more difficult to implement using stakeholder participation.

Among those dive operators favored statewide management, approaches that were most favored for coral reef management were increasing funding for coral reef protection (mean = 2.00, where 1 = highly preferred and 5 = not preferred at all) followed by modifying access (mean = 2.73), and strengthening existing regulations (mean = 2.90) (Table 27). Dive operators were less in favor of establishing new protective legislation (mean = 3.64), likely due to their views on agencies' limited ability to enforce existing legislation. Of the five respondents who provided an answer to which regulations they would strengthen, 60% suggested that user fees be implemented as a means by which to strengthen enforcement and via which to collect revenues to implement management actions (e.g., mooring buoys). Others who discussed strengthening regulations believed that boater education be made mandatory and stricter regulations (i.e., higher penalties, fines) be passed to prevent anchoring on coral reefs.

Table 27. Dive operators' views on statewide management approaches.

	Mean	Standard deviation	Number of observations
STATEWIDE MANAGEMENT APPROACHES	1 = highly preferred; 5 = not preferred at all		
1. Strengthening existing regulations	2.90	2.02	11
2. Establishing new legislation	3.64	1.21	11
3. Modified access	2.73	1.27	11
4. Increasing funding	2.00	1.34	11

Dive operators who were not in favor of place-based management were asked to provide their preference for the type of marine managed area if there were going to be marine managed areas anyway. Over 83% (n = 6) preferred that any marine managed area that would be implemented should be based on the principles of zoning. Zone types that these operators most favored were marine reserves (22.2%; n = 9), no anchoring (22.2%), and no spearfishing or lobstering (22.2%). Most of the respondents who selected these zones did not perceive direct benefits to the dive operations industry and instead argued that the zones would result in lost revenues, that the coral reef tract was too small to accommodate closures, and that the lack of enforcement would render these zones ineffective.

A majority of the dive operators interviewed (85.2%; n = 27) identified the level of government that they most favor to administer a marine managed area. There was less support for any single level of government, with the State of Florida garnering the most support (21.7%) but with much less support for any local government (13.0%) or the federal government (4.3%). Instead, dive operators most favored a local, state, and federal partnership (30.4%), 17.4% supported a state and federal partnership, and 13.0% supported a local and state partnership. The State of Florida was thus viewed as the most important partner, as it figured in 82.7% of the preferred governmental configurations. As pointed out by other stakeholders, several dive operators stated that a majority of the region's coral reefs were located within state waters and would require state cooperation in the establishment of marine managed areas.

Among those dive operators who supported place-based management (n = 22), 95.5% preferred that any marine managed area be established using zoning rather than as a single zone type. There was considerable support for a number of zones that the marine managed area should contain, including marine reserves (20.3%; n = 64) and other no fishing activities, including no lobstering (9.4%), no spearfishing (7.8%), and no hook and line fishing (1.6%) (Figure 21). Dive

operators also favored having minimal impacts within a marine managed areas, supporting no discharge (20.3%), no anchoring (18.8%) and no combustion (6.2%).

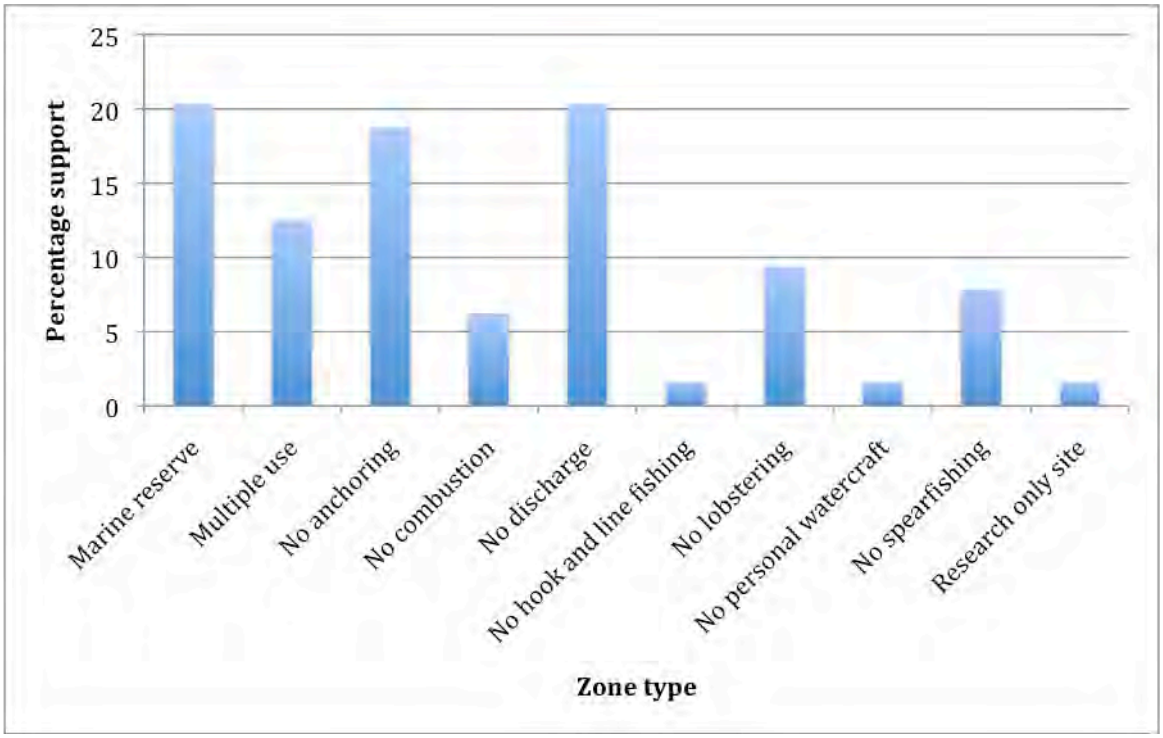

Figure 21. Dive operators' views on zone types.

When asked about which groups would benefit from the implementation of a marine managed area, 60% of respondents (n = 10) argued that all users would benefit in the long-term. Among these, several dive operators warned that while they favored restricting uses, any marine managed area designation process must involve stakeholder participation. Others, who favored greater restrictions, felt that marine managed areas should protect the coastal and marine environment, and that stakeholder benefits should be of a secondary concern. However, it is also clear from the responses that dive operators generally did not favor no-dive zones; while one respondent called for a research only site, the other operators were largely in favor of non-extractive zones.

Dive operators who favored marine managed areas provided their opinions on the top priorities that marine managed areas should address, and they ranked water quality (mean = 2.63, where 1 = top priority and 5 = bottom priority) slightly ahead of overfishing (mean = 2.65), in-water pollution (mean = 2.68), and anchor damage (mean = 2.79) as top priorities (Table 28). The lowest priority among dive operators was diving/snorkeling impacts (mean = 4.53), which along with coastal construction (mean = 4.11) and ship groundings (mean = 4.05), were not perceived as significant as the aforementioned impact categories.

Table 28. Dive operators' views on marine managed area priorities.

	Mean	Standard deviation	Number of observations
TOP PRIORITIES FOR MARINE MANAGED AREAS	1 = top priority; 5 = bottom priority		
1. Overfishing	2.65	1.98	20
2. Anchor damage	2.79	1.96	19
3. Ship groundings	4.05	1.68	19
4. Land-based sources of pollution	2.84	1.95	19
5. Water quality	2.63	1.92	19
6. Diving/snorkeling impacts	4.53	1.26	19
7. Coastal construction	4.11	1.66	19
8. In-water pollution	2.68	2.03	19

Dive operators identified areas that they would like to see protected as marine managed areas (Figure 22). Broward County dive operators selected areas such as the area north and south of Port Everglades Inlet, the first reef terrace off John U. Lloyd State Park, all reef terraces south of Commercial Pier, areas between Commercial Pier and Pompano Pier, Pompano Beach to the third reef terrace, a rotation of one mile zones with five mile buffers along the reef tract, and all reefs in Broward County. Areas in Broward County were selected largely in areas that dive operators recognized as having existing protective designation (e.g., John U. Lloyd State Park) or where there is considerable enforcement (e.g., Port Everglades), as well as areas certain dive operators believed would serve to determine the viability of marine managed areas in high density area (e.g., marine managed areas off central Broward County).

Miami-Dade County dive operators identified areas off Central Miami-Dade County, such as Key Biscayne and other reefs north of Biscayne National Park, which they suggested contained the best habitats and least amount of traffic. One dive operator suggested an option raised by a Broward County dive operator, that all Miami-Dade County reefs be protected on a rotational basis.

In Palm Beach, areas that were often listed were Breakers Reef, which operators identified as the best area in the region and which receives very high use from various users. Other respondents felt that Delray Ledges and Boynton Ledges from 65 feet deeper should be designated as marine managed areas. There was also support for protecting hardbottom and reef communities along the Martin County-Palm Beach County line, which one operator described as the area with the best remaining resources.

Finally, Martin County dive operators focused on three areas: Peck Lake Park, Bathtub Reef Beach Park, and Saint Lucie Inlet Preserve State Park. Respondents felt that all three areas already enjoyed protection under county or state designation, have important resources (especially the state park), and could be afforded additional protection, including no-discharge areas, no-anchoring zones, and better enforcement of existing regulations.

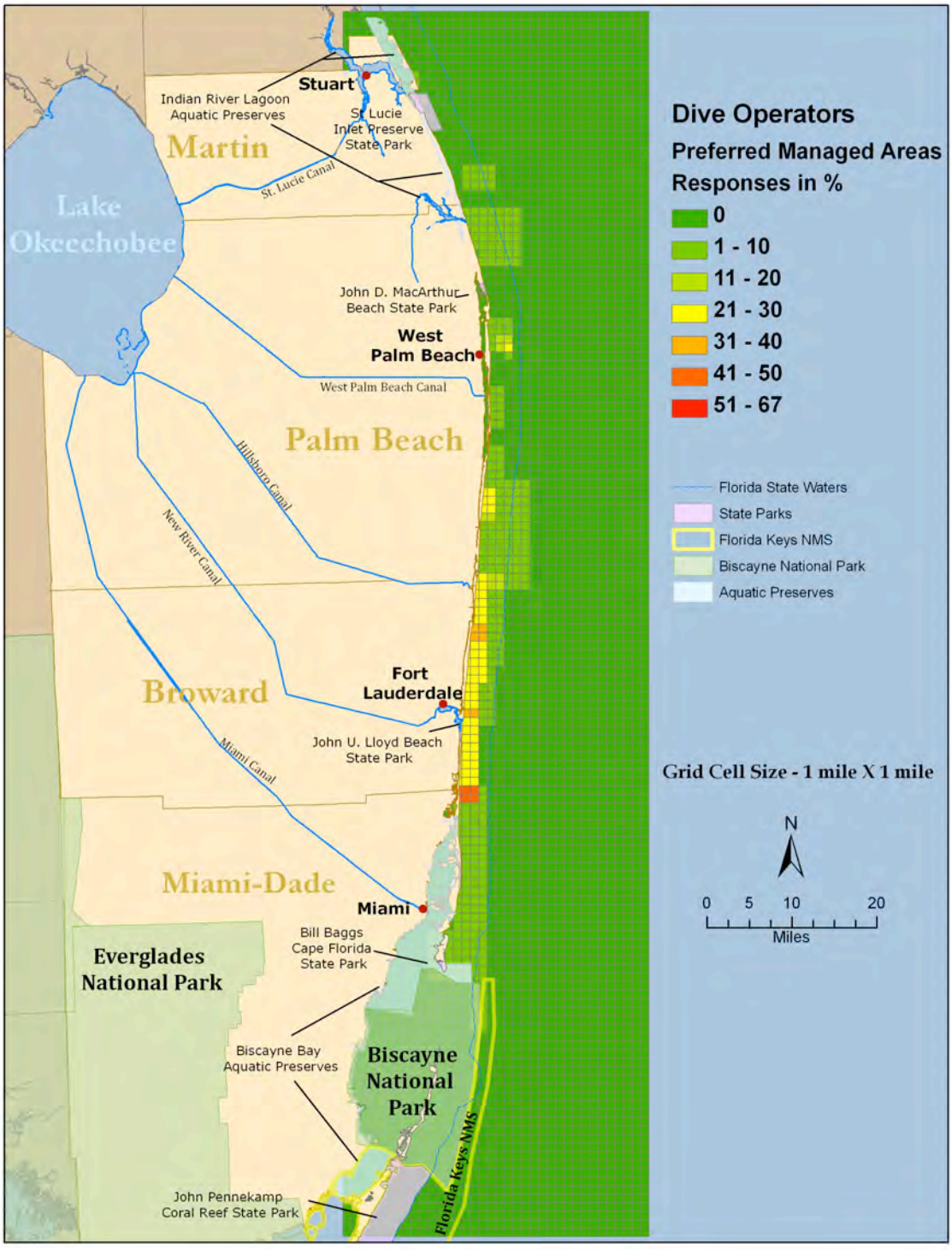

Figure 22. Dive operators' preference for marine managed areas.

When asked about areas that they would consider high priority in their respective regions or across southeast Florida, the dive operators interviewed identified many of the same areas that they wanted to have protected as marine managed areas (Figure 23). Much of the nearshore Broward County reef tract,

areas north of Lake Worth and much of Jupiter in Palm Beach County, and Saint Lucie Inlet Preserve State Park were all identified as high priority areas.

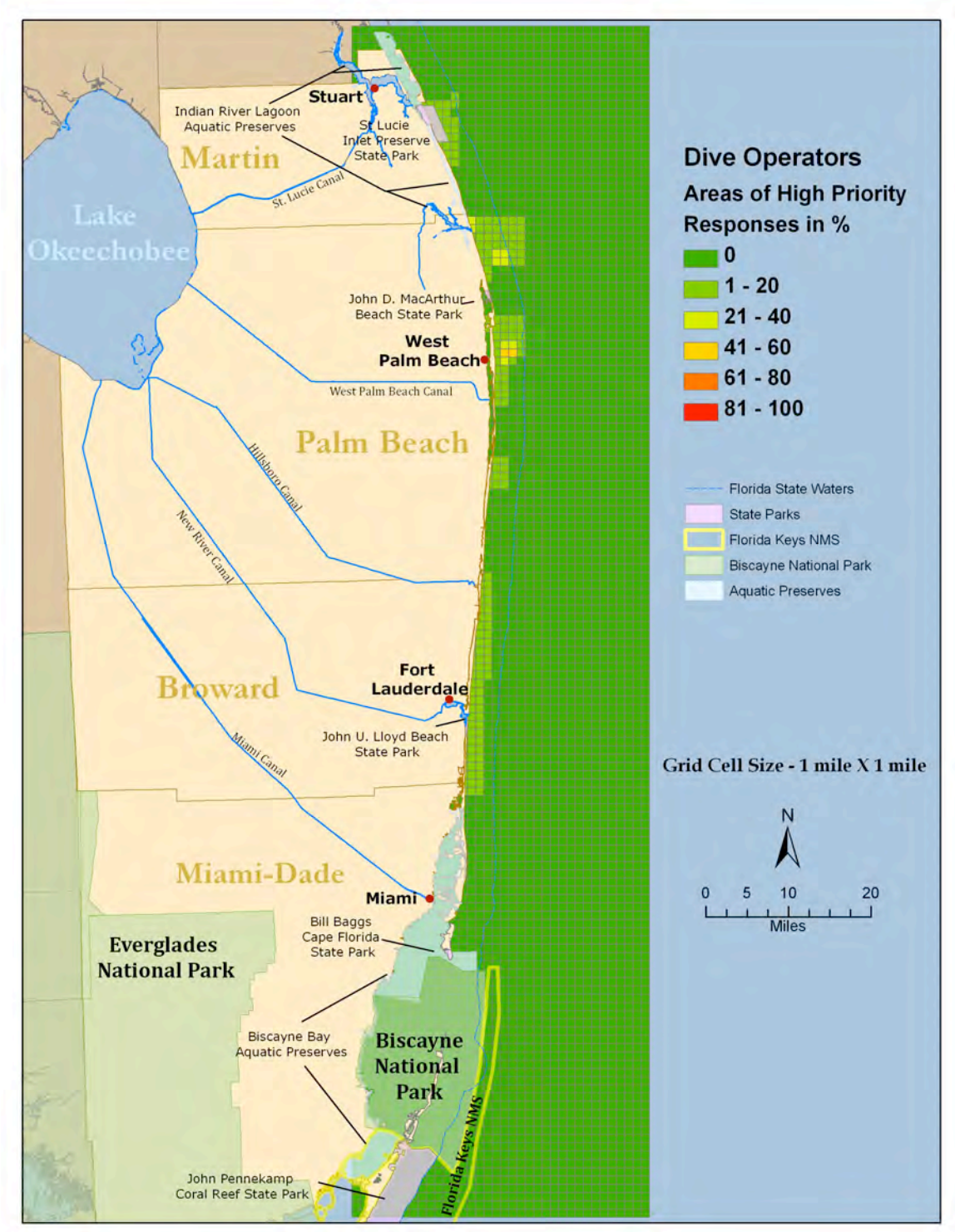

Figure 23. Dive operators' assessment of high priority areas.

3.7. Research institutions, research management agencies, and education community (hereafter 'researcher, manager, and educator group')

The project research team completed a total of 38 interviews with a variety of researchers, managers, and educators, of whom 24 interviewees were categorized as 'managers', nine as 'educators', and five as 'researchers'. However, the categorization did not fully consider the role that the so-called managers played within their respective management institutions; that is, nine of the 24 managers interviewed were involved in active research on coral reefs and associated resources in the region. The only sub-group that did not overlap with the others in this stakeholder group was that of the educators, although several of these respondents did also conduct coastal and marine research (as part of a curriculum/course or via grants/contracts). Thus, all three sub-groups were considered as part of a larger coastal and marine science research and education community.

Another difference between this group and other, more traditional stakeholder groups was that interviewees frequently were knowledgeable about counties other than the one in which they resided. Indeed, part of the strategy in selecting participants was more to cover different agency types than to ensure county-based slots. Therefore, managers or scientists even from outside the region were selected to provide input on certain aspects of scientific research or resource management.

Of the 38 participants, 42% (n = 16) stated that they had knowledge of coastal and marine resources for the entire southeast Florida region, 23.7% had knowledge of Miami-Dade County, 18.4% of Broward County, 10.5% of Martin County, and 5.3% of Palm Beach County[13]. Educators comprised 23.7% of the sample (n = 9), of which 44.5% were from Miami-Dade County, 33.3% from Broward County, and 22.2% were from Martin County. An additional six researchers and managers who actively taught at the university level were not included as educators but were interviewed in their other capacities. The project research team worked closely with the CRCP team to identify suitable educators to include in the sample, starting in March 2011. All but two of the educators decided to participate in the interviews, with most citing insufficient knowledge, lack of time, or not having institutional permission. In May 2011, the project research team again worked with the CRCP team to generate interest in the interviews. While several educators did participate in the interviews, efforts at recruiting Palm Beach County educators were not successful. The educators who

[13] It should be noted that four participants (10.5%) who listed knowledge of coastal and marine resources for the entire region were either located and/or had projects in Palm Beach County, but these individuals elected not to be associated with a single county. Also, as discussed above, the project research team could not secure the participation of Palm Beach County educators, and that also reduced the overall participation rate for the county.

participated include elementary school teachers, middle school marine science teachers and program coordinators, high school science teachers, and university professors.

Apart from the educators, the researchers and managers who participated represented a wide variety of regional institutions and fields of interest. These included universities such as the University of Miami, Nova Southeastern University, and Florida Institute of Technology, local environmental agencies from the four county region, State of Florida agencies such as the Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission (research and enforcement personnel), and federal agencies pertaining to the National Oceanic and Atmospheric Administration (National Marine Fisheries Service, South Atlantic Fishery Management Council, Sea Grant) and the U.S. Army Corps of Engineers.

The group of researchers, managers, and educators represented an average of 15.4 years (SD = 9.26; n = 35) of working in the region, and the range was between three to 40 years.

3.7.1. Researcher, manager, and educator group's views on resource conditions and trends

The group's views on resource conditions and changes in resource conditions were generally unfavorable, and the mean ratings showed that from the group's perspective, most resources were in decline. The group rated overall conditions as between fair to moderately poor (mean = 3.75, where 1 = excellent and 5 = very poor), with fisheries receiving the lowest rating (between moderately poor to very poor) (Table 29). Educators tended to rank most resources worse off than did researchers and managers, but all subgroups agreed that none of the resources were in fair to good condition. In terms of changes in resource conditions, the group believed that all resources had declined over the time they had spent/worked in southeast Florida. Corals were among the resources that were rated to have degraded, as the mean rating trended towards moderate decline (mean = 3.73, where 1 = greatly improved and 5 = greatly declined). Coral reef ecologists who participated in the study disagreed somewhat in terms of changes in coral conditions, where some of the respondents argued that coral cover had been stable for the past decade in the region (pointing to, for instance, findings from Southeast Florida Coral Reef Evaluation and Monitoring Project (SECREMP) data (Gilliam (2010)); however, there was general consensus between the coral reef ecologists and others that corals and other coastal and marine resources had been greatly stressed by a number of anthropogenic and climate change factors (see below). The resource that respondents rated as having declined the most was the region's fisheries (mean = 4.24).

Table 29. Researcher, manager, and educator group's views on resource conditions.

	Mean	Standard deviation	Number of observations
RESOURCE CONDITIONS	1 = excellent; 5 = very poor		
1. Overall	3.75	0.72	36
2. Corals	3.81	0.71	35
3. Seagrasses	3.71	0.83	14
4. Mangroves	3.91	0.70	11
5. Beaches and wetlands	3.96	0.89	25
6. Water quality	3.94	0.94	25
7. Fisheries	4.20	0.91	22
CHANGE IN RESOURCE CONDITIONS	1 = greatly improved; 5 = greatly declined		
1. Overall	3.86	0.63	38
2. Corals	3.73	0.66	35
3. Seagrasses	3.64	0.93	14
4. Mangroves	3.64	0.92	11
5. Beaches and wetlands	3.96	0.96	24
6. Water quality	3.92	1.09	26
7. Fisheries	4.24	0.89	21

In terms of stressors, only two respondents (6.4%; n = 31) listed a single, major stressor for the region's overall resource conditions (water quality and debris), but the rest of the group, or 93.6%, provided a list of impacts that many argued had synergistically weakened the coastal and marine environment. As stated by one respondent, "it is death by a thousand cuts, from use impacts to water quality impacts to climate change". Depending on the region, respondents listed freshwater discharges (Martin and Palm Beach counties), land-based sources of pollution and overuse (Broward and Miami-Dade counties), and overfishing and climate change (all counties) as stressors.

The group believed that the region's coral reefs had been impacted by water quality (21.1%; n = 52), followed by land-based sources of pollution (19.2%), direct impacts (19.2%), climate change (13.5%), and overuse, including overfishing (11.5%); however, several of those interviewed listed two or more stressors, pointing again to the multitude of (mainly anthropogenic) factors that had affected coral conditions in southeast Florida. The condition of seagrasses, which were also considered having been degraded, was largely blamed on water quality (60%; n = 10) and vessel impacts, including propeller scarring (40%). Just under 20% of the respondents listed reasons for mangrove conditions, and most of these were related to development, although a few respondents stated that mangrove coverage had actually improved in recent years due to protection (e.g., The Mangrove Trimming and Preservation Act of 1996 (Florida Statutes 403.9321-403.9333), better mitigation measures). While some group members felt

that beaches had improved as well, most who provided information on beach conditions believed that beaches had been negatively affected by two factors: coastal construction (50%; n = 22) and nourishment (40.9%). Water quality, which the interviewees ranked as being degraded, was blamed on a multitude of factors, including "sludge coming down from the Saint Lucie River", in water pollution, and outfalls, but land-based sources of pollution comprised the most commonly cited source of deteriorated water quality (34.1%; n = 44). Finally, 67% (n = 24) of those who provided information on fisheries blamed overfishing as the main reason for the present status of the region's fisheries. Some of the research (mainly fisheries) scientists and managers interviewed qualified their answers, stating that it was the reef fish complex that had been overfished and not other species.

3.7.2. Use conflicts concerning researcher, manager, and educator group

The researcher, manager, and educator group, unlike the direct use groups (e.g., charter fishers, commercial fishers, dive operators), generally did not report use or resource-based conflicts; instead, (mostly) managers listed a series of inter-agency, agency-interest group, and agency-permittee conflicts[14]. The first type of conflict was related to cases where agencies differed on proposed management actions, especially those concerning potential environmental impacts. The second type of conflict, between agency and interest group, occurred usually between a management or permitting agency and a national, regional, or local interest group that was against the planned action. These types of conflicts could be related actions that interest groups could argue would negatively affect their members/constituents (e.g., fishery regulations) or which will harm the environment (e.g., beach nourishment). The final type of conflict, between a permitting agency and a person seeking a permit, occurred where the latter was dissatisfied with the permit conditions, costs, or monitoring requirements. In all conflict types, respondents stated that the solutions are similar, in that the agency allows for the process to go forward and allows for the administrative/legal system to decide on whether an action can be taken.

When asked about area conditions, many members of the researcher, manager, and educator group identified discrete areas as being in good condition across the entire region (Figure 24). Along the southern reef tract, the respondents identified areas east of Key Biscayne and Biscayne National Park as good coral reef areas and nearshore reefs off central and northern Broward County. Others

[14] Several researchers and managers described third party conflicts, for example, between commercial fishers and large vessels, recreational surfers and developers, etc. However, these are not described here because these are not conflicts relevant to this group and also because many of these conflicts are discussed in greater detail in other sections pertaining to the other groups in question.

identified hardbottom areas off central Palm Beach County and offshore areas off northern Palm Beach and Martin counties.

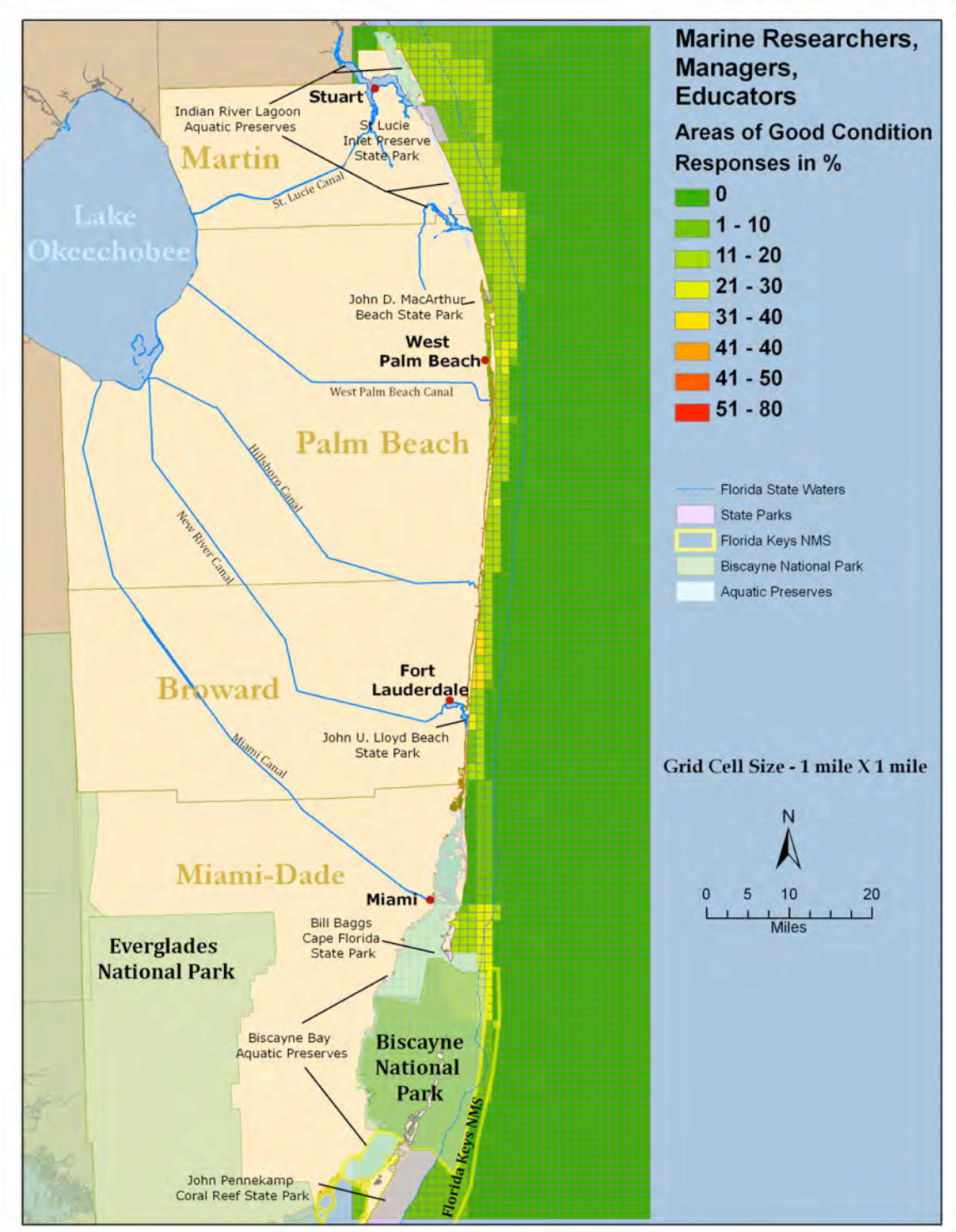

Figure 24: Researcher, manager, and educator group's identification of areas in good condition.

3.7.3. Researcher, manager, and educator group's goals for coral reef ecosystem protection

Unlike other groups in which individuals within the group could espouse and expand on their vision for management, each respondent from the manager subgroup within this group had to provide his/her agency's position or mission in terms of coral reef management and protection. Thus, the interview results for this section for managers are presented separately than those of researchers and educators.

County managers stated that while their respective counties did not have the jurisdiction to manage coral reef resources, counties do conduct monitoring studies on natural and artificial reefs, as well as collaborate with other state and federal agencies on coral reef protection. Thus, the vision for most of the county agencies is to collaborate in the protection and maintenance of a healthy coral reef ecosystem. Some county managers also stated that vision was to control use to the extent that it does not damage the coral reef ecosystem and to protect the coastal and marine environment from land-based sources of pollution. The state agency managers interviewed in FWC and FDEP stated that their agencies' vision is to promote sustainable use to the extent compatible with the agency's mission, whether that is to promote the sustainable utilization of the state's fishery resources for present and future generations or to maintain and enhance recreational opportunities while protecting endangered species; where the use presented a threat to the sustainable management of a resource, e.g., where a fishery were shown to be undergoing overfishing, the agency in question would adopt a new approach towards that fishery. Federal agency officials, especially those involved with fishery management, presented a similar mission for their agencies (i.e., in the case of the National Marine Fisheries Service, to protect threatened and endangered species that fall under the agency's jurisdiction, and to manage federal fishery resources in a sustainable manner as articulated in the Magnuson-Stevens Act). In each case across jurisdictional boundaries, managers related that their twin goals are to promote the conservation of coastal marine resources and accommodate use. Where the latter impacts the former goal, use can be curtailed, but not otherwise and not beyond what is the purview of the agency.

Educators and researchers had a less rigid vision for the management of the coral reef ecosystem than their manager counterparts, and most (85.7%; n = 14) preferred a different vision than the continued use and protection as present in existing regulations. An equal percentage (28.6%) called for reduced use among certain groups with modified/expanded regulation for increased protection, reduced use among certain groups only with certain areas to allow for increased protection in those areas only, and the elimination of some groups with expanded regulations for protection.

In terms of resource protection priorities, or those actions they believed should be ranked highest to support resource protection, the group favored prioritizing sustainable use (mean = 2.19, where 1 = strongly agree and 5 = strongly disagree) above other priorities and moderately agreed with this option (Table 30). Other options that were favored were the protection of key resources (mean = 2.49) and stressed resources (mean = 2.51). Because the agencies interviewed did not have in their missions the call to set aside a percentage of all resources, this option was not popular (mean = 3.70). Also, the group generally felt that while enforcement was important, it should not be prioritized over the other options (mean = 3.38).

Table 30. Researcher, manager, and educator group's views on resource protection priorities.

	Mean	Standard deviation	Number of observations
RESOURCE PROTECTION PRIORITY	1 =strongly agree; 5 = strongly disagree		
1. Stressed resources	2.51	1.63	37
2. Key resources	2.49	1.52	37
3. Percentage of all resources	3.70	1.51	37
4. Sustainable use	2.19	1.61	37
5. Enhanced enforcement	3.38	1.42	27

Also, while most group members did not utilize the region's resources for the same purposes as do other stakeholder groups, all respondents who provided a percentage were nevertheless willing to yield access to a considerable percentage of resources in their region (mean = 81.2%; SD = 25.8; n = 8) if that resulted in the region being protected in its current condition; by contrast, group members were not willing to yield more access on average (mean = 80.0%; SD = 32.6; n = 5) if that resulted in the region's resources being restored or improved.

Among the most important resource quality improvements they would expect to see as a result to better management, the group members listed improvements in fishery resources (26.7%; n = 60), followed by coral health (23.3%). Other metrics included an overall improvement in coastal resources (11.7%), the implementation of sound scientific research and monitoring studies to establish guidelines and evaluate changes (11.7%), improved water quality (10%), and the establishment of marine managed areas (6.7%).

3.7.4. Researcher, manager, and educator group's understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

Like other stakeholder groups, researchers, managers, and educators were asked to provide information on any major gaps in management capacity or authority needed to effectively protect reef resources by first identifying such gaps and then by providing management options to address these gaps. Exactly a quarter

(25.0%) of the management gaps provided (n = 64) were concerned with the lack of effective enforcement of existing resource protection regulations, especially as related to fishery management, direct use impacts, and permitting conditions. Another 15.6% of the gaps were related to the lack of inter-agency coordination, conflicting mandates across or within agencies, and the lack of meaningful review of permit or project proposals at the agency level. Almost 10% of the gaps identified the lack of integrated management in the region, whether that was related to horizontal integration across agency interests of upland and coastal management or the vertical integration within agencies charged with coastal and marine management (Cicin-Sain and Knecht, 1998). Also, 12.5% of the gaps were related to the lack of ecosystem management, which is akin to the lack of integrated management, had led to a suboptimal, species approach. Another 10% of the gaps were related to the lack or ineffectiveness of meaningful outreach and education, which several respondents felt is often used as an add-on to other programs and should instead be developed to reach specific audiences (e.g., primary school students, middle school students, and higher). Finally, 12.5% of the gaps identified related to lack of marine managed areas in the region, especially a network of marine managed areas based on the concepts of source-sink connectivity (Sale *et al.*, 2005).

The most frequently listed approach was the use of a single marine managed area or a regional network of marine managed areas to protect the southeast Florida coral reef ecosystem (23%; n = 74). Certain respondents stated that an integrated approach to marine managed areas would be essential and proposed that any approach using spatial use and protection consider the NOAA framework on coastal and marine spatial planning (CMSP) (CEQ, 2010) as a model for developing such management alternatives. Enforcement remained an important management option (17.6%), and proponents of enforcement suggested that enforcement of existing laws be more effectively administered, that enforcement be fully funded such that it can fulfill its objectives in providing effective management. Another 13.5% of the options argued in favor of a regional approach to fishery management, the reconsideration of size into slot limits, and better data collection in fisheries to aid in accurate management decisions. A related management alternative, ecosystem management (8.2%) also called for a regional approach to management, with the need to consider multiple habitats as a continuous, connected ecosystem which must be managed comprehensively and cohesively. The need for greater and more meaningful community involvement and stakeholder outreach and education was identified by 13.5% of the recommendations, with respondents calling for tailoring information for specific stakeholder groups, developing a strong (and mandatory) marine science curriculum in the regional school systems to promote a coral reef knowledge base and conservation ethic, to showcase the most recent research and management findings to a broad group of stakeholders, and to develop advisory groups/councils that can assist in management decisions. Management

alternatives related to agencies (10.8%) focused on the need to have greater intra- and inter-agency coordination (in the case of FDEP and FWC, one respondent suggested combining the two agencies such that the resulting agency has unified goals and objectives), and others (8.2%) called for increased funding (via mainly user fees) to implement existing regulations.

3.7.5. Researchers, managers, and educators degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem

Under this theme, the group provided its views on management tools, statewide management, and place-based management. Based on their preference for statewide or place-based management, respondents answered a series of questions related to either preferred option.

Among management tools, the most effective tool rated by the group was community involvement, which had an average rating of 2.68 (where 1 = very effective and 5 = very ineffective) (Table 31). Education and outreach was rated as fair (mean = 2.99), but all other management tools were rated as between fair and moderately ineffective. That is, the group felt that scientific research and resource monitoring were not effective, and that enforcement was not working as well as it should in protecting coral reef and related resources. Educators were generally satisfied with scientific research and monitoring, holding more positive views than their researcher and manager counterparts. Several participants in the latter two subgroups related that scientific research had been less than effective in conducting applied research useful to make management decisions; by contrast, others (in the research wing of the management community and researchers) countered that research was often too applied and thus could not anticipate unforeseen changes (e.g., invasive species) and provide meaningful advice. Both subgroups were even less satisfied with resource monitoring, which respondents described as inadequate, short-term (especially in terms of permit monitoring), and not integrated into long-term decision making. The latter concern was related to the perception that results from monitoring (and research) were not effectively used in refining the management process.

Almost 42% (n = 36) of those interviewed stated a preference for place-based management, and only 22.2% supported statewide management. Another 36.1% supported a hybrid form of management that incorporated both place-based and statewide management, increasing the overall support for place-based management to 87.8%. There was more support for statewide management among the educators (33.3%; n = 9) than among researchers and managers (18.1%; n = 27), and the hybrid approach was the most popular option among researchers (60%; n = 5). Like dive operators, several researchers, managers, and educators believed that place-based management could only work if there were a strong, statewide management approach in place. As remarked by one researcher, "you cannot think of regulations and marine managed areas

separately". Others were concerned that if place-based management were prioritized over statewide management, it may result in lesser protection of resources outside of marine managed areas.

Table 31. Researcher, manager, and educator group's views on management tools.

	Mean	Standard deviation	Number of observations
MANAGEMENT TOOL	1 =very effective; 5 = very ineffective		
1. Outreach and education	2.99	1.18	34
2. Community involvement	2.68	1.04	33
3. Scientific research	3.59	0.91	32
4. Resource monitoring	3.69	0.86	32
5. Enforcement	3.81	0.91	31

Among those who favored statewide management (either by itself or in a hybrid management system), approaches that were most favored were strengthening existing regulations (mean = 2.33, where 1 = highly preferred, and 5 = not preferred at all), followed by establishing new protective legislation (mean = 2.47) (Table 32). Respondents were willing to use the regulatory/legal approach to improve management and less so by modifying access (mean = 3.42). Increasing funding for coral reef protection was not ranked as highly as the other regulatory/legal approaches because many respondents did not perceive this as a viable option; many argued that under the present budgetary climate, it is unlikely that funding could be increased. Therefore, they preferred to rate the regulatory/legal approaches more favorably.

Table 32. Researcher, manager, and educator group's views on statewide management approaches.

	Mean	Standard deviation	Number of observations
STATEWIDE MANAGEMENT APPROACHES	1 = highly preferred; 5 = not preferred at all		
1. Strengthening existing regulations	2.33	1.85	18
2. Establishing new legislation	2.47	1.68	19
3. Modified access	3.42	1.57	19
4. Increasing funding	3.05	1.68	19

Those group members who were not in favor of place-based management were asked to provide their preference for the type of marine managed area if there were going to be marine managed areas anyway. Over 78% (n = 14) stated a

preference for zoning in marine managed areas. In terms of zoned uses, marine reserves comprised 47.8% (n = 23) of the preferred zones, followed by 8.7% support for restrictions on spearfishing and lobstering. Research only zones, which would allow no access to all except sanctioned scientific research, represented 8.7% of the zones selected, resulting in almost two thirds of preferred zones restricting many extractive uses. The other popular zone type was no anchoring, which represented 13.0% of the zones. It should be noted that while these groups members did not (or could not, in the case of an agency position) support place-based management, many of the respondents believed that the place-based management, especially that which incorporates the principles of zoning, would have long-term positive effects for all users and the coastal and marine environment.

Over half (57.8%) of the group members provided their preferred level of government that they believed should lead the designation and management process of marine managed areas in southeast Florida. The State of Florida, either on its own (13.6%), in partnership with the federal government (4.5%), or in a partnership with local/county and federal governments (54.5%), was perceived as the level of government best suited to implement marine managed areas in the region. The participants often stated that if the goal is to include coral reefs in a marine managed area, the State of Florida has to be a partner; most of the southeast Florida coral reef tract is located within three nautical miles of the shore, or inside state waters. Moreover, respondents also argued that while local and even stakeholder partnerships would be essential in getting buy-in for place-based management, local governments did not have the jurisdiction to be the sole management level. Finally, it should be noted that there were several respondents (mainly researchers and managers) who were in favor of place-based management but were unwilling to identify both their preferred level of government or the type of zoning strategy that any marine managed area should adopt. Several of these interviewees stated that a bottom-up process that engaged stakeholders from the very beginning would require that no a priori decisions be made on which groups would be included (or excluded), which areas and uses would be delineated and allowed/prohibited (e.g., "no lines on a map"), or which agency and/or level of government would be charged with managing the area that is finally designated (akin to the Dry Tortugas Ecological Reserve designation processed used by NOAA from 1999-2001 (NOAA, 2000)). Such an approach, according to the respondents, had been shown to provide a better success rate than a deliberative, top down approach where zones and regulations were handed down to stakeholders from agencies (Suman *et al.*, 1999).

Of the 23 group members who supported the establishment of a marine managed area, 91.3% were in favor of a zoning strategy. Among the zones that were most preferred were marine reserves (39.3%; n = 28), followed by no anchoring

(28.6%), research only sites (10.7%), multiple use zones (10.7%), and transit only sites (7.1%). Respondents were generally in favor of restrictive measures that limited extractive uses, as well as those prevented resource damage, i.e., anchoring (Figure 25).

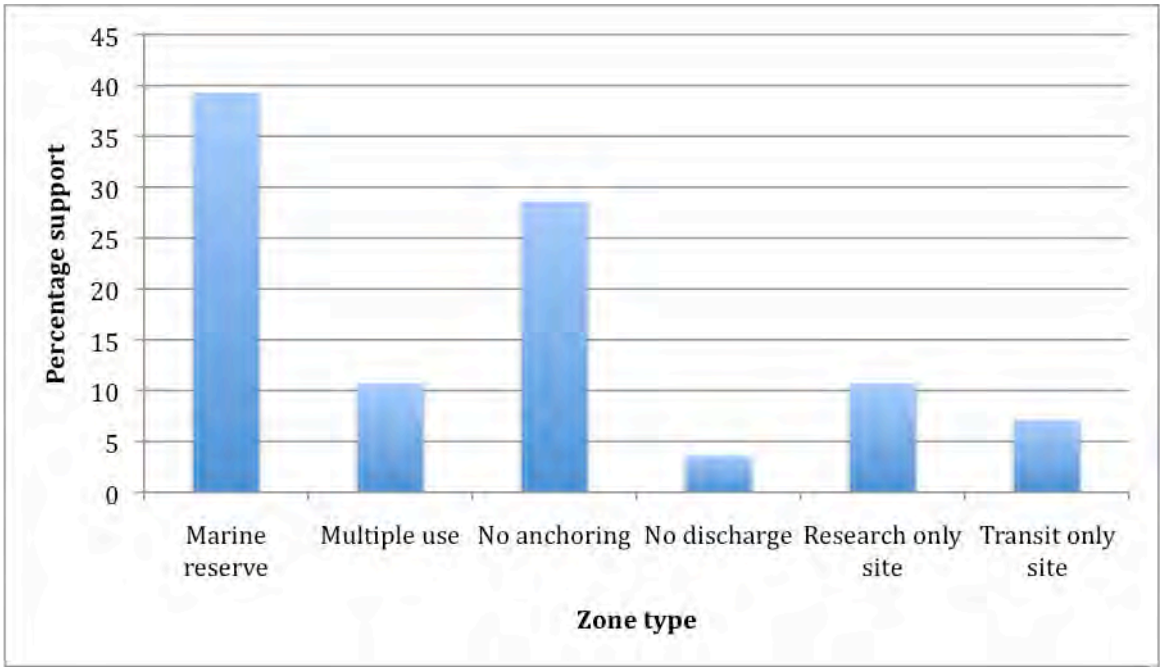

Figure 25. Researcher, manager, and educator group's views on zone types.

Group members who favored place-based management were asked to provide their views on top priorities that marine managed areas should address to be effective (Table 33). Respondents felt that the primary priority of marine managed areas should be to address overfishing (mean = 1.86, where 1 = top priority and 5 = bottom priority), followed by land-based sources of pollution (mean = 2.36), anchor damage (mean = 2.67), and coastal construction (mean = 2.76). Less important were issues such as ship groundings (mean = 3.67), in-water pollution (mean = 3.73), and diving and snorkeling impacts (mean = 4.38). As could be determined by the high level of support for marine reserves, the respondents in favor of place-based management felt that marine managed areas should be set primarily to address overfishing (especially reef fish fisheries, as elaborated by several participants).

Table 33. Researcher, manager, and educator group's views on marine managed area priorities.

	Mean	Standard deviation	Number of observations
TOP PRIORITIES FOR MARINE MANAGED AREAS	1 = top priority; 5 = bottom priority		
1. Overfishing	1.86	1.58	22
2. Anchor damage	2.67	1.98	21
3. Ship groundings	3.67	1.83	21
4. Land-based sources of pollution	2.36	1.89	22
5. Water quality	3.00	1.93	22
6. Diving/snorkeling impacts	4.38	1.28	21
7. Coastal construction	2.76	1.95	21
8. In-water pollution	3.73	1.80	22

Group members provided information on areas that they believe should be protected (or were willing to have protected, if they did not agree with place-based management) (Figure 26). The suggestions included the following (organized by county from south to north):

- Protecting all Miami-Dade County reefs;
- Protecting only those reef terraces located south of Government Cut in Miami-Dade County, as these contain the best reefs in the county;
- Creating a protective zone that encircles Virginia Key and Key Biscayne to a depth of 30 feet, due to the excellent condition of nearshore habitats off the islands;
- Protecting an area from the shoreline off Bill Baggs State Park in southern Key Biscayne south to Elliot Key in Biscayne National Park, from the shoreline to the outer reefs;
- Protecting Emerald Reef, a shallow patch reef located a mile east of Key Biscayne, which still has good coral cover and diversity;
- Protecting the second and third terraces of reef in Miami-Dade County, from 40-120 feet;
- Protecting the Broward County *Acropora cervicornis* site, which enjoys decent water quality and has excellent coral cover (recommended by 15.7% of the group);
- Protecting the reef habitat from Dania Beach to Everglades, to the 45 foot contour, as the area is under threat from vessel traffic and use and could gain from being protected;
- Protecting John U. Lloyd State Park to a depth of 120 feet from the shoreline, as the area is already protected and could be expanded;
- Protecting the second and third terraces of Broward County reefs, which have decent coral cover;

- Protecting Pompano Ledges off Pompano Beach, which is heavily used and could use protective measures;
- Protecting all nearshore reefs in Palm Beach County from extractive uses;
- Protecting Palm Beach County reefs with the best coral cover, especially those off Phipps Park (Ajax Reef, Paul's Reef);
- Protecting Breakers Reef in Palm Beach County, which is among the most used site in the county;
- Protecting Horseshoe Reef, halfway between Palm Beach Inlet and Boynton Beach Inlet, which is in decent condition and has low visitation rates due to its relative remote location;
- Protecting southern Martin County hardbottom communities and a spawning aggregation site at the LORAN Tower Ledge;
- Designating a line of protection from south of St. Lucie Inlet to Hobe Sound, which is heavily used;
- Improving protection in St. Lucie Inlet Preserve State Park (or extending its boundaries), as it is a recognized area and has important hardbottom habitats;
- Extension of all state park boundaries from the shoreline to a depth of 120 feet, as these are already protected and could be easily identified, and the increased protection would encompass entire habitats;
- Setting up representative areas in the entire region and focusing on areas between inlets and ports to take the best remaining habitats.

As is clear from this list, group members had many locations that they would like to see protected, and there were three general categories: The first of these were areas that represented the best habitats that the respondents believed should be prioritized for protection (before they are degraded further); the second type consisted of areas that were in fair to good condition but were experiencing heavy use and thus warranted further protection; and the third type was comprised of existing managed areas, especially state parks, which are already protected from the shoreline (and would thus be somewhat buffered against shore-based impacts) and which the state can extend further under its own jurisdiction (but, as discussed earlier and many respondents agree, not without public and stakeholder participation).

In terms of high priority areas that required the most attention, researchers, managers, and educators often identified the entire reef tract, suggesting that it should be the focus of attention (Figure 27). In Miami-Dade County, the respondents expressed the most concern about the resources located on the windward side of the barrier islands, whereas in Broward County, several respondents suggested that the *Acropora cervicornis* patch and other areas with acroporids should be considered as highest priority due to the acroporids' designation as threatened species under the U.S. Endangered Species Act (50 CFR 223.208).

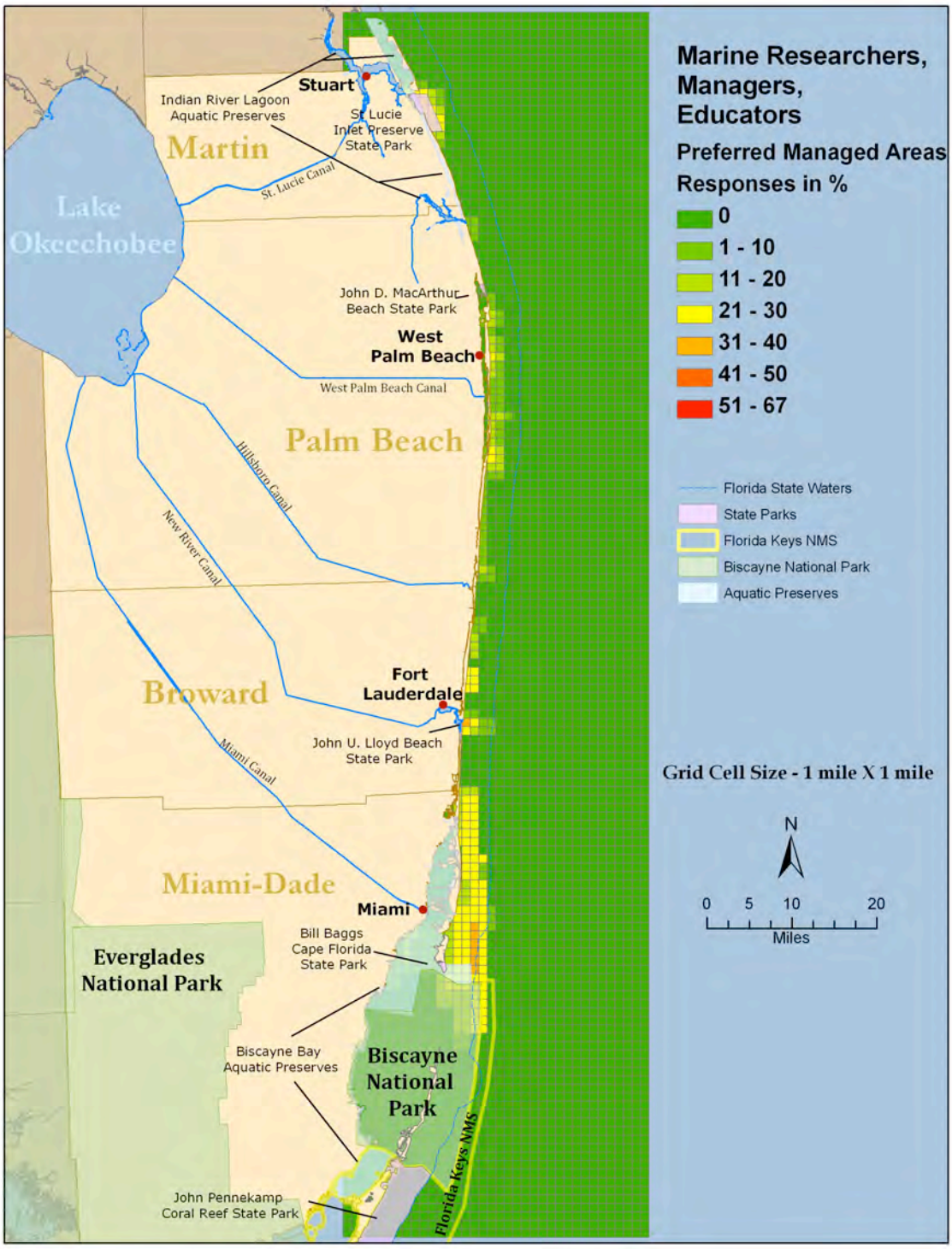

Figure 26. Researcher, manager, and educator group's preference for marine managed areas.

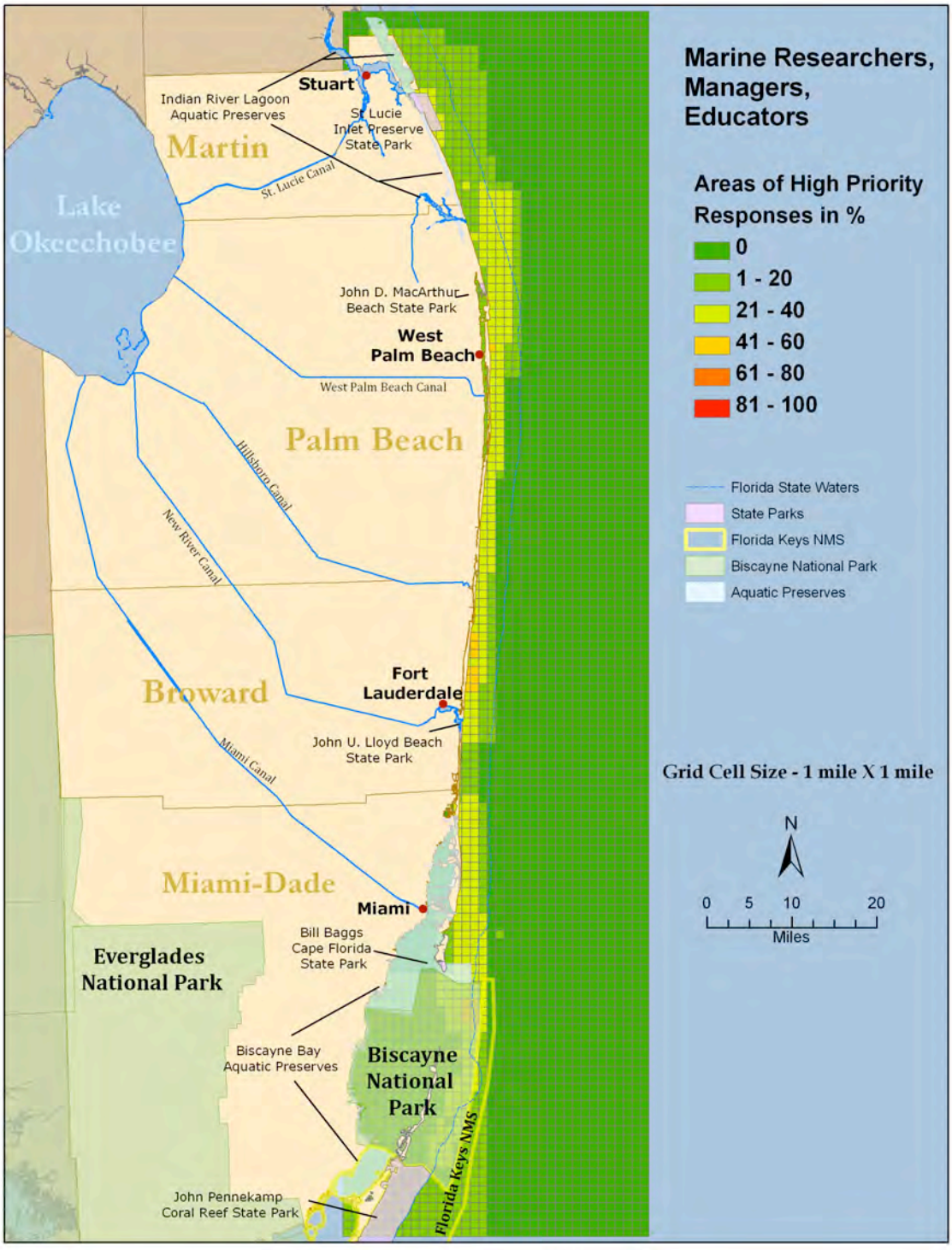

Figure 27. Researcher, manager, and educator group's assessment of high priority areas.

3.8. Local interest groups

The project research team completed a total of 24 interviews with local interest groups, consisting of ports, marinas, and boatyards, coastal construction firms, and boating clubs. Boating clubs were initially considered regional interest groups but were shifted to the local interest groups working panel due to the county-level nature of their operations and knowledge base. The local interest groups were also to have included the county-based tourism industry group (comprised of chambers of commerce and tourism interest groups), but this group did not participate in the project.

The FDEP CRCP and FDOU Project Teams assisted the project research team under Task 2 to develop stakeholder lists, and the county-based tourism industry group list consisted of 79 organizations, consisting mainly of chambers of commerce. The project research team selected those organizations that pertained to coastal communities and randomly selected 24 organizations. Team members contacted the 18 of these organizations, and only three stated an interest in participating. Most of the others stated no interest in the project, adding that the organization staff did not have expertise to participate in the interview. When team members followed up with two of the organizations that stated an interest, both suggested that the interviews be conducted with their members, and that the organizations themselves could not represent the diverse interests of their respective membership base. The third organization that expressed an interest in participating requested that the project research team identify how its participation would benefit its membership base and assist in promoting future business growth in its region. In April 2011, the project research team related these findings to the CRCP Team, and it was mutually agreed that county-based tourism industry groups would not be include as local interest groups.

There were two main reasons why county-based tourism industry groups did not participate in the project. The first is as was stated by several of the chambers contacted, which claimed that their staff did not have the expertise to conduct the interviews. The second reason is likely because of the membership base of many of these chambers of commerce, which can include businesses that may not hold uniform views on coastal and marine resource protection and management. Thus, it would not be in the groups' interests to put forth a view that may not represent the consensus opinion of their membership base. That is likely why many of the groups contacted suggested that the project research team contact its members directly.

A majority of the interviews with local interest groups were conducted with ports and marinas (54.2%), 25.0% were conducted with boating clubs, and 27.8% were conducted with coastal construction firms. Three marinas each in Martin, Palm Beach, and Broward counties participated in the study, and one port, two marinas, and the county marina system were represented in Miami-Dade

County. Two boating clubs each participated from Palm Beach and Broward counties, and one each from Martin and Miami-Dade counties. All coastal construction firms identified as part of Task 2 were contacted, and five firms agreed to participate. The coastal construction firms, while physically located in Miami-Dade, Broward, and Martin counties, nevertheless represented all four counties due to the areas in which some of the firms operated. Respondents had been operating in their respective regions for an average of 10.4 years (SD = 11.4; n = 10), ranging from two to 41 years, although in many cases, their parent groups had been in operation much longer.

3.8.1. Local interest groups' views on resource conditions and trends

Unlike other groups that either directly relied on resource conditions as part of their occupation (e.g., charter fishers) or who were involved in research in and management of the resources (e.g., coastal and marine resource managers), many local interest group members did not *directly* rely on or frequently interact with most of the resources in question; nevertheless, local interest group representatives, such as marinas and boating clubs, clearly did depend on resource conditions for their clients and were thus aware of resource conditions.

The average overall resource conditions as determined by local interest groups were fair (mean = 3.02, where 1 = excellent and 5 = very poor) (Table 34). Corals (mean = 3.29) were perceived as trending between fair and moderately poor, but most other resources were considered to be in fair condition. It should be noted that many respondents could not comment on submerged resources, such as corals and seagrasses, and others relied on anecdotal information that they trusted. In terms of changes in resource conditions, respondents felt that with the exception of the trend in corals (mean = 3.42, where 1 = greatly improved and 5 = greatly declined) and beaches and wetlands (mean = 3.32), resources had remained fair. Marina operators and boating clubs especially were mostly satisfied with seagrasses, which they felt had improved in the nearshore environment, and the general consensus among these groups was that nearshore water quality was in part responsible for that improvement.

Over 70% (n = 24) of local interest group members believed that overall conditions had remained stable or had improved over their time in their respective counties. Some respondents from the two northern counties did report periodic problems with freshwater discharges, but Miami-Dade and Broward counties' participants were generally satisfied with overall conditions. Reef conditions, among the very few group members who commented on them, were perceived to be degraded mainly due to land-based sources of pollution (67%; n = 6), and the remainder blamed overuse, vessel traffic, and physical impacts. Similarly, although only nine interviewees discussed beach conditions, 67% of these respondents blamed nourishment for what they considered the eroded condition of their county's beaches. Group members from Palm Beach and

Martin counties complained about the periodic decline in water quality, blaming freshwater input emanating from the Saint Lucie Inlet; others argued that water quality has improved in most areas, although it remains a chronic problem near inlets.

Table 34. Local interest group views on resource conditions.

	Mean	Standard deviation	Number of observations
RESOURCE CONDITIONS	1 = excellent; 5 = very poor		
1. Overall	3.02	0.80	24
2. Corals	3.29	0.58	12
3. Seagrasses	2.89	0.65	9
4. Mangroves	3.00	0.93	8
5. Beaches and wetlands	3.03	0.94	17
6. Water quality	3.03	0.75	19
7. Fisheries	2.96	0.80	13
CHANGE IN RESOURCE CONDITIONS	1 = greatly improved; 5 = greatly declined		
1. Overall	3.06	0.63	24
2. Corals	3.42	0.47	12
3. Seagrasses	2.83	0.71	9
4. Mangroves	3.00	0.86	9
5. Beaches and wetlands	3.32	0.68	17
6. Water quality	2.95	0.67	20
7. Fisheries	3.11	0.65	13

3.8.2. Areas of use and use conflicts concerning local interest groups

Areas of use identified by local interest groups were generally located very close to the interest group's physical location, with the exception of coastal construction firms, which did not have set locations and instead shifted operations based on their project locations. Conversely, ports and marinas and boat clubs relied on the same area, either for their operations or based on the general use patterns of their clients. Areas of use for local interest groups were mostly concentrated in nearshore areas across the southeast Florida region, with the exception of activities located windward of the barrier islands in Miami-Dade County (a result of the marina interviewed in that county). Use was also concentrated around Port Everglades, resulting mostly to local marinas and coastal construction firm projects in southern Broward County (Figure 28).

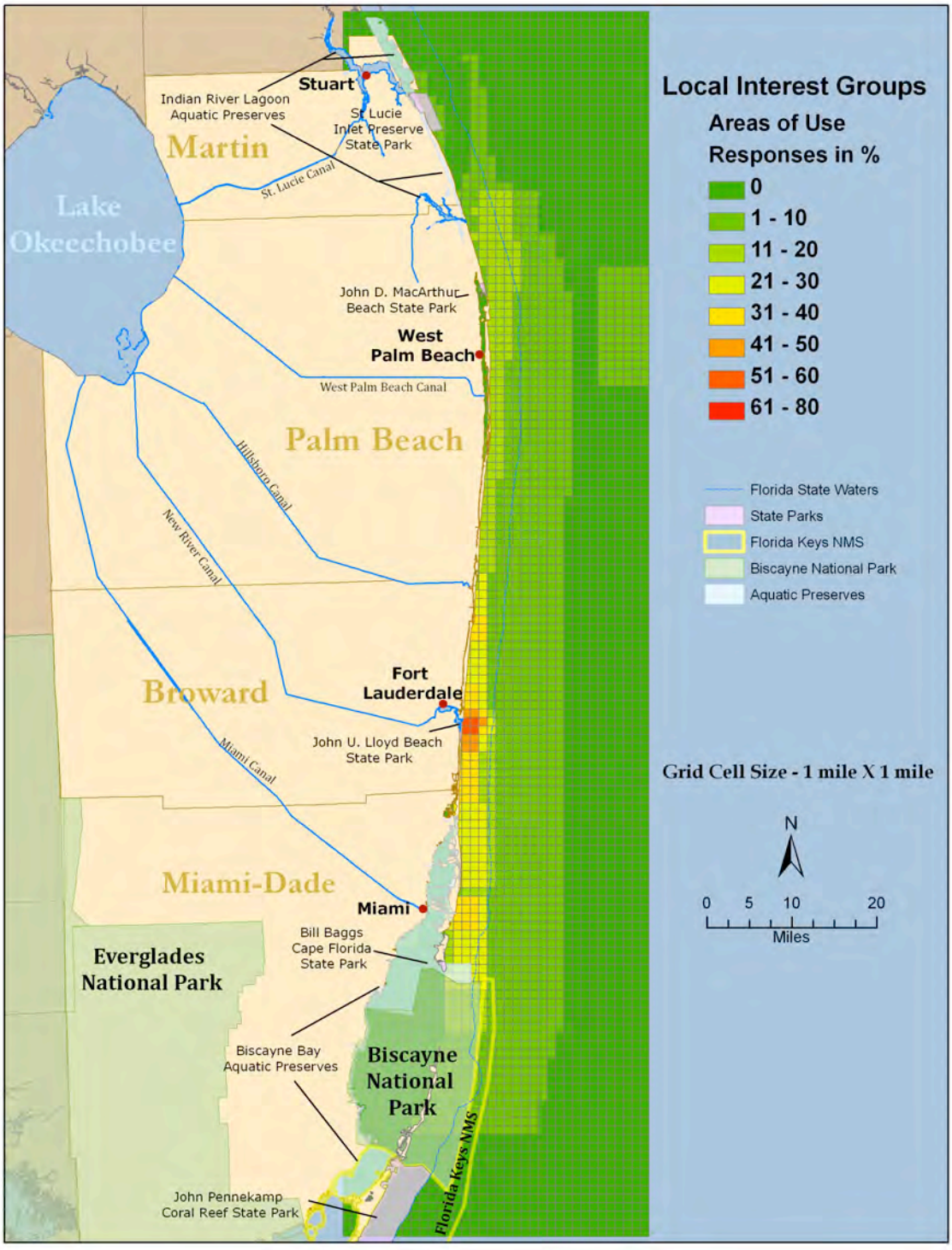

Figure 28. Local interest groups' area of use.

Due in part to the diverse nature of this group, where the subgroups were likely more related to each other across than within counties, respondents reported a wide variety of conflicts. Ports and marinas identified boater-related conflicts, ranging from boater traffic in and around marinas, boaters not observing no-

wake zones, personal watercraft disrupting other boaters, and boaters not using best management practices in cleaning and painting their vessels. Coastal construction firms, like researchers, managers, and educators, related third-party conflicts, identifying resource use conflicts, conflicts concerning development versus preservation, and even treasure salvors disrupting benthic habitats. For the boater conflicts, the solution most often provided was a combination of education and enforcement, although one marina suggested implementing use zones. For marinas, most of the conflicts were concentrated in the intracoastal waterway or other nearshore areas in their respective counties, although several respondents attested to the region-wide nature of such conflicts (Figure 29). As with areas of use, areas of use conflict were concentrated in the locations where local interest groups operated or had projects.

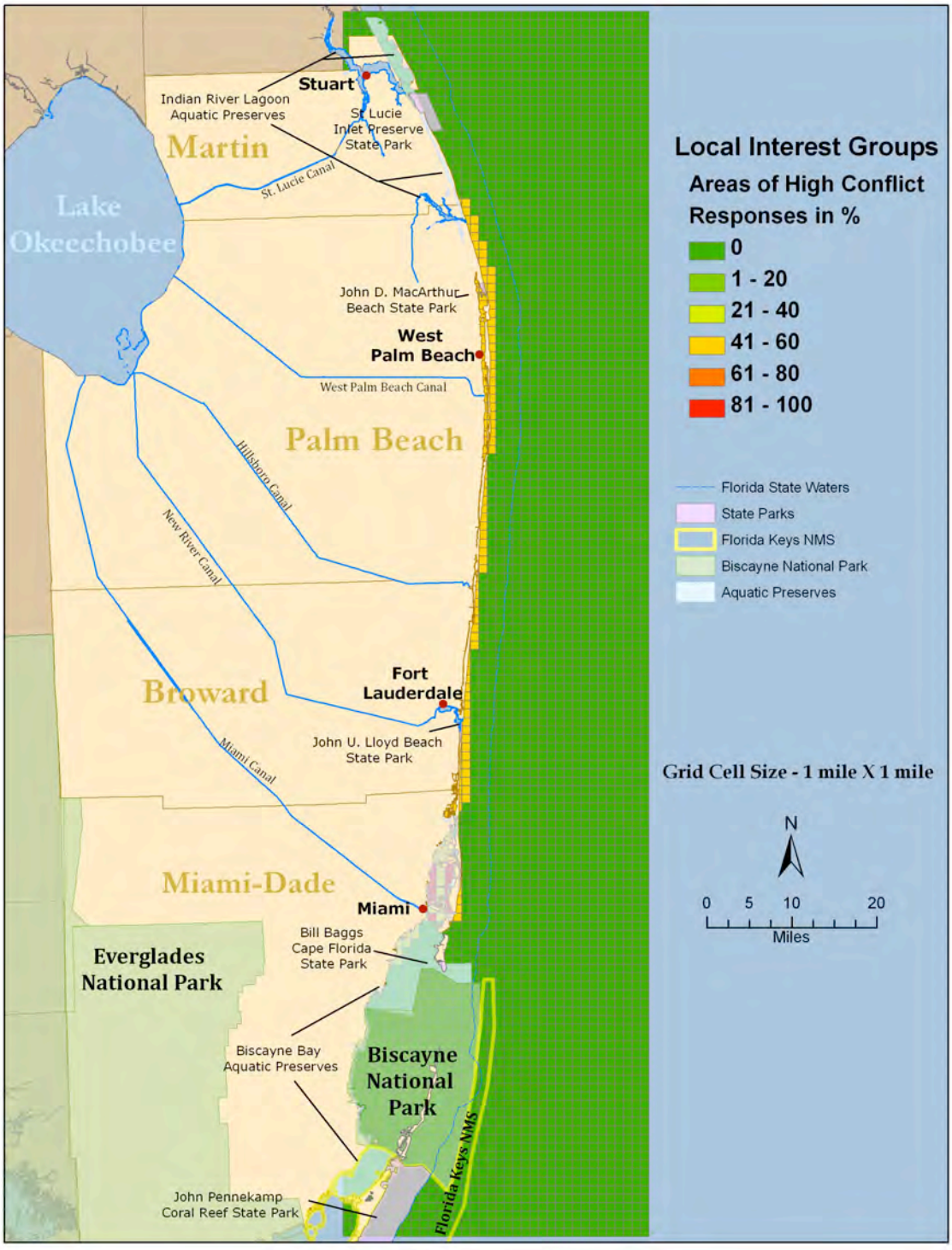

Figure 29. Local interest groups' areas of use conflict.

3.8.3. Local interest groups' goals for coral reef ecosystem protection

A majority (86.4%; n = 22) of the local interest groups were in favor of continuing with the present management with existing regulations, although 27.2% added that such management must address issues such as water quality and direct use

impacts and must improve outreach and education efforts in showing users why management is necessary in these areas. Out of the three subgroups, coastal construction firms were the most likely to propose alternate management visions, and 40% (n = 5) favored reduced use among certain groups with modified or expanded regulations for increased protection.

In terms of resource protection priorities, or those actions they believed should be ranked highest to support resource protection, the group preferred prioritizing enforcement (mean = 3.29, where 1 = strongly agree and 5 = strongly disagree) above other priorities but did not approve of any priority (Table 35). The least preferred of all options was protecting a percentage of all resources, and priority with which the respondents moderately disagreed (mean = 4.42). Coastal construction firms tended to favor protecting stressed or key resources whereas boating clubs did not, but there was general agreement in the entire group on the other options.

Table 35. Local interest groups' views on resource protection priorities.

	Mean	Standard deviation	Number of observations
RESOURCE PROTECTION PRIORITY	1 =strongly agree; 5 = strongly disagree		
1. Stressed resources	3.36	1.98	14
2. Key resources	3.64	1.78	14
3. Percentage of all resources	4.42	1.45	14
4. Sustainable use	3.57	1.87	14
5. Enhanced enforcement	3.29	1.86	14

Only 30% (n = 10) of respondents who provided their views on access were willing to limit their use and were, on average, not willing to give up much access to resources in their regions to either protect them in their current condition (mean = 12.5%; SD = 21.2; n = 10) or restore or improve the current condition (mean = 19.4%; SD = 24.3; n = 9). When asked about which resource quality improvements they would expect to see as a result of better management, the respondents identified water quality and related improvements (40%; n = 10); by contrast, only one interviewee identified coral health as an indicator.

3.8.4. Local interest groups' understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

Like other stakeholder groups, local interest groups were asked to provide information on any major gaps in management capacity or authority needed to effectively protect reef resources by first identifying such gaps and then by providing management options to address these gaps. The most important gap pertained to a lack of enforcement (35%; n = 20), and respondents were most likely to complain about there being ineffective enforcement of existing laws.

Another 20% felt that water quality had not been addressed, and 15% pointed to the lack of education programs for boaters and fishers.

The best management approach for the region for local interest groups was an integrated, regional management strategy, which 27.8% (n = 18) of those who discussed this question favored. There was also support for water quality management (22.2%) and some limited type of zoning (e.g., mooring buoy zones, hotspot identification for marine managed areas, and artificial reefs to be zoned for specific activities); however, several respondents (25% of those interviewed) did not provide management alternatives, stating that they were uninformed to suggest how better to protect the region's coral reef ecosystem and associated resources.

3.8.5. Local interest groups' degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem

Under this theme, the group provided its views on management tools, statewide management, and place-based management. Based on their preference for statewide or place-based management, respondents answered a series of questions related to either preferred option.

Local interest group members rated outreach and education as the most effective management tool (mean = 2.00, where 1 = very effective and 5 = very ineffective), and they felt that all the management tools except enforcement were somewhat effective (Table 36). Enforcement was a major concern for the respondents, which they believed was inadequate in addressing a number of issues, ranging from user conflict resolution to implementing existing regulations.

Table 36. Local interest groups' views on management tools.

	Mean	Standard deviation	Number of observations
MANAGEMENT TOOL	1 =very effective; 5 = very ineffective		
1. Outreach and education	2.00	0.71	13
2. Community involvement	2.80	0.79	14
3. Scientific research	2.72	0.97	9
4. Resource monitoring	3.00	1.00	9
5. Enforcement	3.21	1.25	14

Just over a fifth (n = 5) of those interviewed chose to provide their views on statewide management approaches (Table 37). Most who declined felt that they did not know enough to answer how effective statewide management approaches had been. The highest ranked statewide management approach was increased funding for coral reef protection measures, (mean = 2.80, where 1 =

highly preferred and 5 = not preferred at all), but none of the proposed measures were ranked favorably (i.e., where the mean was 2.5 or lower).

Table 37. Local interest groups' views on statewide management approaches.

	Mean	Standard deviation	Number of observations
STATEWIDE MANAGEMENT APPROACHES	1 = highly preferred; 5 = not preferred at all		
1. Strengthening existing regulations	3.60	1.95	5
2. Establishing new legislation	3.80	1.79	5
3. Modified access	3.60	1.34	5
4. Increasing funding	2.80	1.79	5

Almost one third of the group members (31.6%; n = 19) who provided their views on management preferences favored place-based management, compared to 36.8% who favored statewide management; however, 31.6% also favored a hybrid form that incorporated both approaches, showing that there was considerable support (greater than 62%) for some form of place-based management. Coastal construction firms had the highest support for the hybrid form of management (80%), whereas ports and marinas were split between support for place-based and statewide management (41% for each; n = 12). Support for one management type over another did not vary much over the region, with local interest groups in all counties being divided between place-based and statewide management.

Those group members who were not in favor of place-based management were asked to provide their preference for the type of marine managed area if there were going to be marine managed areas anyway. Of the five local interest group members who provided information on this question, all of them stated a preference for any marine managed area to incorporate zoning. The zones that were listed by the respondents varied from multiple use zones that respondents argued would minimize the impacts of a marine managed area to zones that would restrict activities, such as no anchoring and no discharge zones. Some of the group members were willing to accept zones that would prohibit certain uses, such as personal watercraft, private vessels, all extractive activities, and even those would disallow all access except scientific research. Primary beneficiaries were identified as those users who would gain the most by privileged access, but these respondents also warned that marine managed areas should be well-marked and should employed the simplest measures to promote compliance.

When asked about the preferred level of government that should lead the effort in the designation and management of marine managed areas in southeast Florida, those local interest group members who supported the approach (or the hybrid approach) favored the State of Florida (50%; n = 8) as a sole management entity or in partnership with local and/or federal agencies. Among the uses that a marine managed area should allow or restrict, the most popular options were in favor of limited restrictions, such as no anchoring (29.4%; n = 17), no discharge (23.5%), and multiple use (23.5%), and there was less support for an area that restricted all extraction, as well as research only and transit only sites (17.6%), or one that did not allow personal watercraft (5.9%) (Figure 30). The respondents generally were against picking beneficiaries from the designation of marine managed areas and believed instead that the outcome would depend on where marine managed areas were located and the stakeholder process used to designate them. As one group member stated, "All zoning approaches sound reasonable but need to be worked out in terms of scientific benefits and stakeholder views".

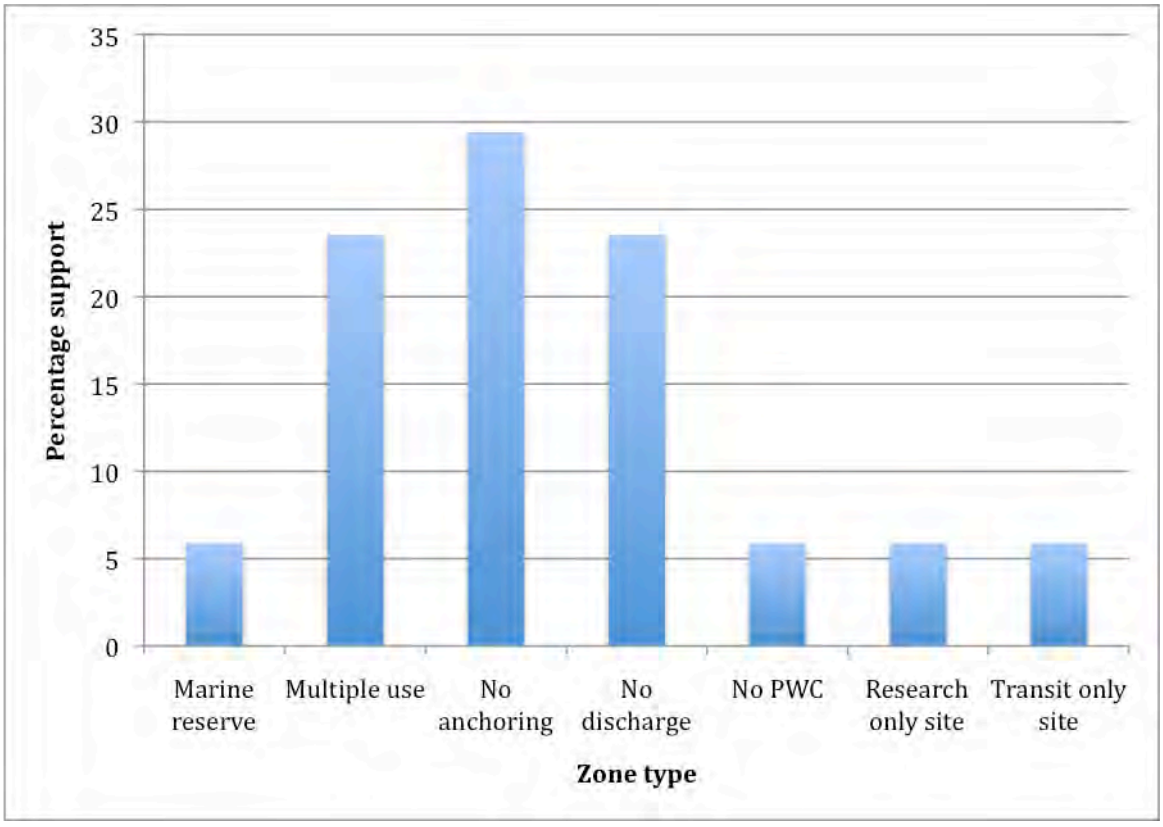

Figure 30. Local interest groups' views on zone types.

Finally, several local interest group members identified locations that they agreed would make good marine managed areas (Figure 31). One location was the Broward County *Acropora cervicornis* patch, which the participant considered one of the best locations in the region. Another nominated the entire Broward

County reef tract, arguing that the reefs in the county need to be protected against anchor damage. Respondents from Palm Beach and Martin counties identified areas like Peanut Island and its inshore habitats, the nearshore reef in Jupiter, and Peck Lake. Peanut Island was identified due to its having been restored and increasing use (especially on weekends), so that it could be afforded additional protection. The nearshore reef in Jupiter was identified as being heavily used by a number of different stakeholder groups, and a marine managed area in that location could assist in reducing use conflicts and protect the reef. Finally, the respondent who identified Peck Lake in Martin County argued that there are already a number of marine managed areas in southeast Florida, and if locations like Peck Lake and others are not protected fully, then there is no reason to find other areas to designate. The latter was a common theme even among local interest group members and other stakeholders, where the concern was that management and, more importantly, enforcement would become too diffuse with new managed areas and become less effective than both are at present.

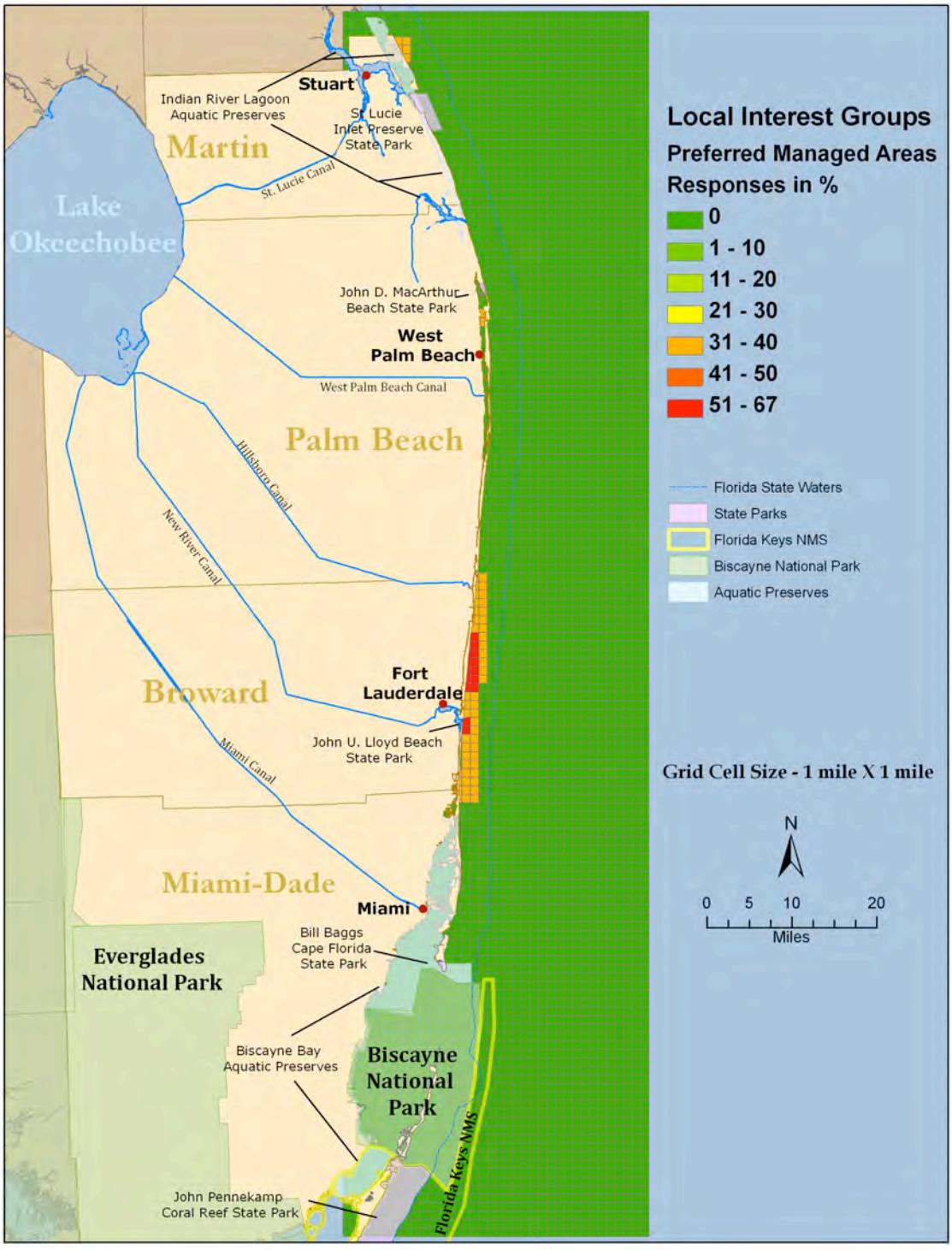

Figure 31. Local interest groups' preference for marine managed areas.

3.9. Regional interest groups

The project research team identified a total of 42 regional interest group members during Task 1, but it was determined over the field session that many of these group members were no longer available. In several cases, the persons no longer represented the organizations for which they were listed, and in other cases, the persons were not reachable. Thus, the project research team decided in late March 2011 after attempting to contact every group member that it would seek substitutes for those groups for which no group member was available, and that it would conduct surveys with as many of the members from the subgroups as would be available.

Out of the 13 conservation groups identified under Task 1, five declined and one was unreachable. Three out of the five recreational fishing groups had changed representatives and were unreachable. None of the three commercial boating organizations was available. Also, after conducting several interviews with recreational boating organizations, the project research team decided that the group more closely matched local interests (from the interview information gathered, it was clear that boating clubs did not have a regional perspective and those interviewed stated that the respondents would not like to be considered as representing the entire region); thus, the recreational boating organizations were reclassified as local interest groups.

The project research team obtained several substitutes for the conservation and recreational fishing groups, it interviewed an alternate commercial vessel organization representative, and it completed all other interviews with group representatives under Task 2. The project research team completed a total of 19 interviews, of which 57.9% were conducted with conservation groups, 21.1% with recreational fishing organizations, 10.6% with commercial divers, and 5.2% (representing one interview) each with the commercial boating organization and a surfing organization.

3.9.1. Regional interest groups' views on resource conditions and trends

Like many of other groups interviewed, regional interest groups held a less than favorable view on most resource conditions (Table 38). The respondents believed that overall resource conditions were between fair and poor (mean = 3.76, where 1 = excellent and 5 = very poor), and that all resource conditions, with the exception of seagrasses, were in poor condition. Corals (mean = 4.17) were considered to be in the worst condition of all resources. The views on trends in resource conditions were less positive than those for present conditions, in that regional interest group members rated declines in all resource conditions (mean = 3.93, where 1 = greatly improved and 5 = greatly declined) and especially so for corals (mean = 4.14).

Table 38. Regional interest groups' views on resource conditions.

	Mean	Standard deviation	Number of observations
RESOURCE CONDITIONS	1 = excellent; 5 = very poor		
1. Overall	3.76	0.75	19
2. Corals	4.17	0.71	18
3. Seagrasses	3.27	0.90	11
4. Mangroves	3.78	0.83	9
5. Beaches and wetlands	3.95	0.85	8
6. Water quality	3.97	0.97	15
7. Fisheries	3.96	1.10	12
CHANGE IN RESOURCE CONDITIONS	1 = greatly improved; 5 = greatly declined		
1. Overall	3.93	0.59	19
2. Corals	4.14	0.64	18
3. Seagrasses	3.38	0.74	8
4. Mangroves	4.00	0.76	8
5. Beaches and wetlands	3.89	0.93	9
6. Water quality	3.93	0.92	14
7. Fisheries	3.90	1.10	10

A majority (57.3%; n = 19) interviewed believed that overall conditions in southeast Florida had deteriorated due to a multitude of factors, dominated by increased development (20%; n = 35) and overuse (20%). Water quality was also considered a stressor (14.3%), and certain aspects of water quality, including land-based source of pollution (8.6%) and sewage outfalls (5.7%), were identified separately as contributing factors. Water quality (25.7%; n = 35) was also the main reason given for the decline in coral reefs, with related stressors such as nutrient input/eutrophication effects (14.2%) resulting from land-based sources of pollution (11.2%), outfall effluents (8.5%), and beach nourishment (5.7%). Development (11.4%), which served as a proxy for use and water quality impacts, was listed as a stressor. Thus, regional interest group members blamed local and regional factors, especially those that degraded water quality, as the primary reason for the decline in southeast Florida coral reefs. Similarly, a majority of the respondents who discussed other resources, such as seagrasses, mangroves, and beaches, pointed to dominant causes for their decline. Seagrasses were perceived to have degraded due to direct uses, leading to physical damage and stress (57.1%; n = 7). Development was considered the main reason (80%; n = 5) for mangrove decline, and nourishment (60.0%; n = 5) was listed as the primary driver in poor beach conditions. Over 61% of the 13 respondents also felt that land-based sources of pollution had worsened over their time in southeast Florida, and group members from the northern counties blamed nourishment whereas those from Miami-Dade County blamed input from the Miami River and canals that drain into Biscayne Bay. Finally, most regional interest groups members (including recreational fishery organizations)

agreed that overfishing (80%; n = 8) was largely responsible for fishery conditions in the region; several qualified their responses, adding that habitat loss and other non-fishery factors had depressed abundance and landings, and that certain species (especially nearshore species) had been disproportionately impacted.

3.9.2. Area of use and use conflicts concerning regional interest groups

Regional interest group representatives reported on the areas used by their respective groups (Figure 32). For certain groups, use was bounded by habitat requirements (e.g., bonefish angling on south Miami-Dade County flats), but for others, use extended along the entire reef tract and indeed most of the southeast Florida coastal and marine habitats.

Regional interest group members reported several conflicts in the region (Figure 33). In the case of the boating industry, the group member stated that conservation groups tended to vilify recreational boaters, who were mostly responsible and cared about the environment. By contrast, conservation group members argued that many boaters presented a conflict because they were often not well-trained and caused physical damage to seagrasses and corals. Recreational fishing organizations also singled out boaters, explaining that boaters often did not respect anglers who often used the same areas. Recreational fishing organizations also identified fishing group conflicts, where commercial and recreational fishers competed for the same species and targeted the same areas (especially in Palm Beach and Martin counties). Commercial divers complained about recreational anglers much the same way that dive operators did, in that they felt that recreational anglers did not respect dive flags and endangered divers by going over them at high speeds. Use conflicts were spread along the areas that respondents identified as areas that their groups used. However, conflicts were most often concentrated along nearshore habitats and adjacent to highly populated centers, such as central and northern Miami-Dade County and along the nearshore habitats from Broward to Martin counties.

Most of the use conflicts reported were considered to be manageable and would require a stronger combination of education of enforcement, but a few regional interest groups members, especially recreational fishing organizations, proposed having separate zones or changes in resource allocation to minimize such conflicts. Their argument was that the conflicts are pervasive, extending the entire region, and that traditional modes of enforcement had not been effective. In fact, most regional interest group members interviewed agreed that most conflicts were either countywide or across the entire region (based on their knowledge).

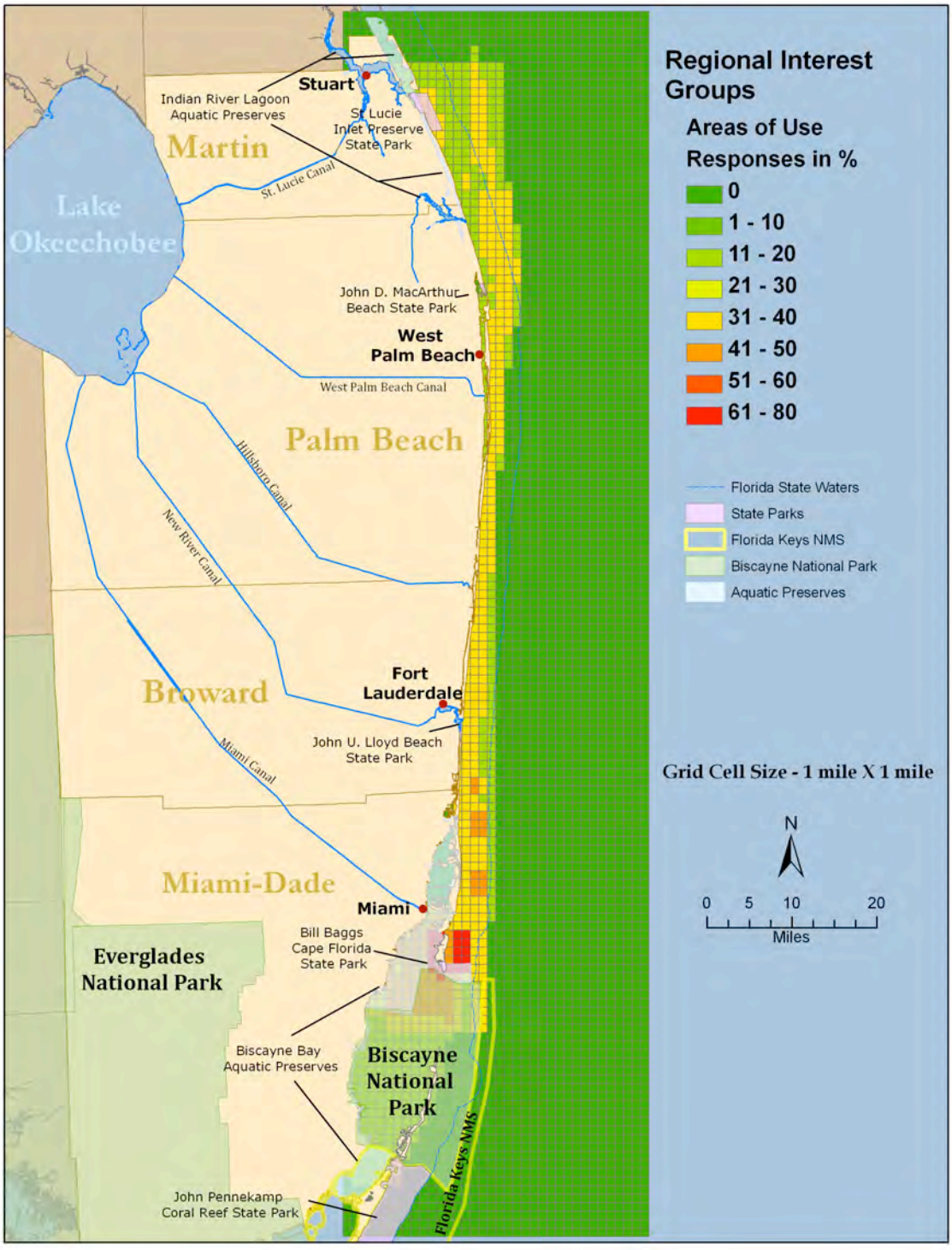

Figure 32. Regional interest groups' areas of use.

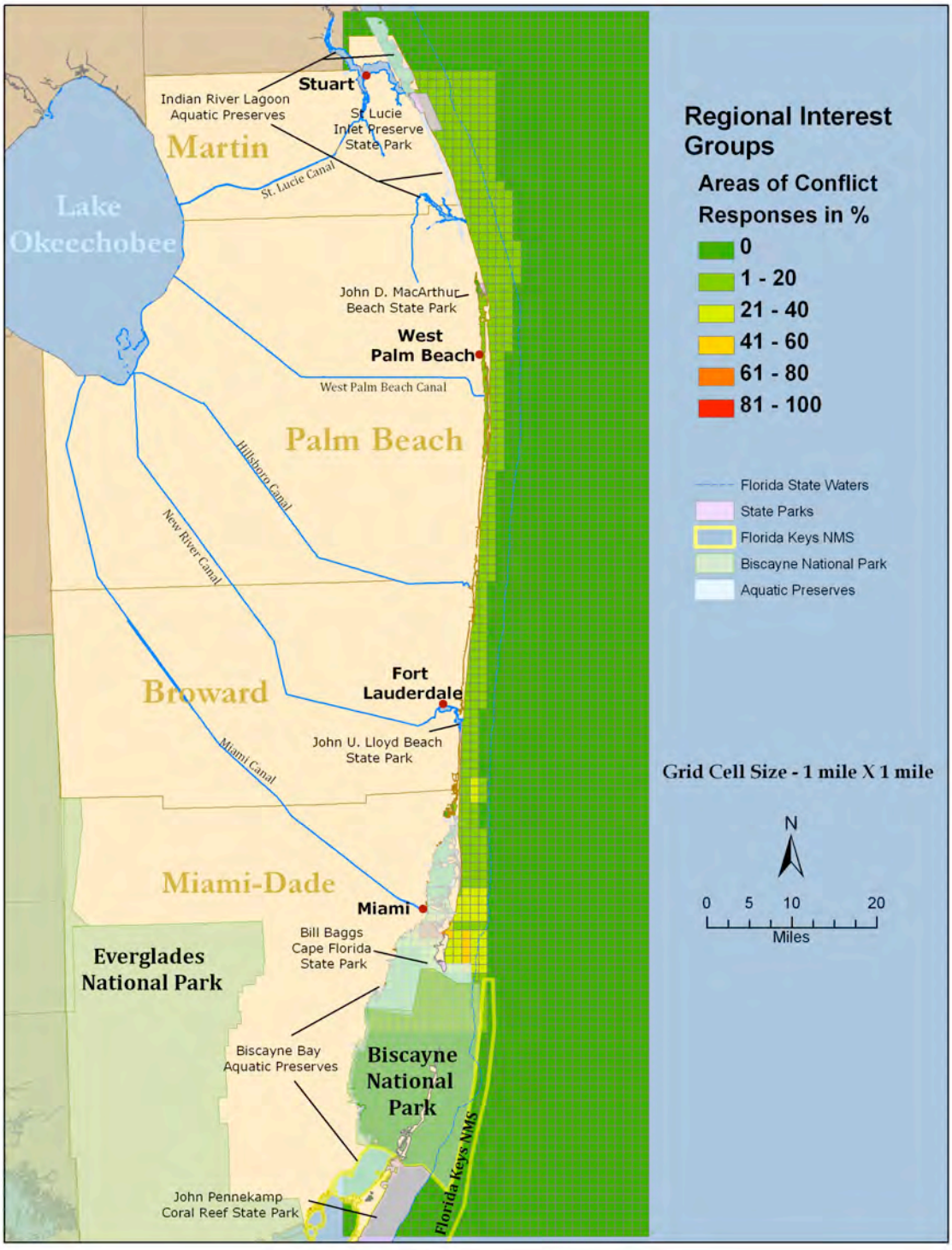

Figure 33. Regional interest groups' areas of use conflicts.

Regional interest group members also provided their views areas they perceived as being in good condition (Figure 34). These included most nearshore habitats, including Biscayne Bay and the waters around Miami Beach in Miami-Dade County, several parts of southern Broward County (including the nearshore area

off John U. Lloyd State Park), most of the nearshore areas off Palm Beach County, and both nearshore and offshore areas off Martin County.

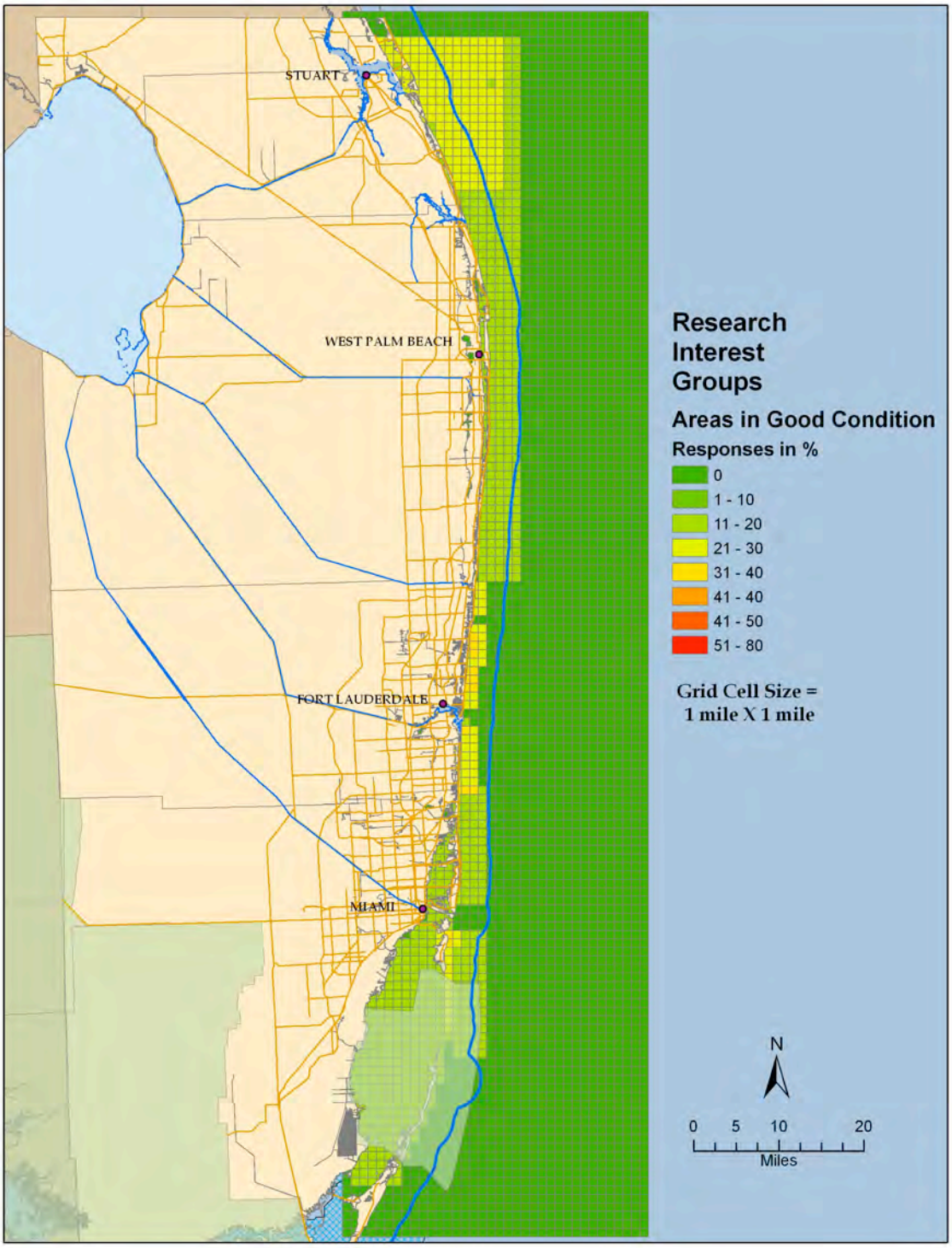

Figure 34: Regional interest groups' identification of areas in good condition.

3.9.3. Regional interest groups' goals for coral reef ecosystem protection

While almost half of the regional interest group members (47.4%; n = 19) believed that continuing the present approach was the best way forward, 26.3% felt that there was a need to reduce use among certain groups with modified/expanded regulations for increased protection, and 21.1% preferred that use be reduced among certain groups only within certain areas; only one respondent from the group suggested that the best approach was to eliminate some groups by expanding regulations. But, even among those who were in favor of retaining the present approach to management, there was considerable support to supplement the approach with enhanced awareness and enforcement programs or increased inter-agency coordination.

Respondents rated improved enforcement (mean = 2.58, where 1 = strong agree and 5 = strongly disagree) as the most effective resource protection priority, with protection of stressed resources, key resources, and sustainable use being rated as neutral (Table 39). Regional interest group members agreed least with setting aside a percentage of all resources (mean = 3.58), which many described as not addressing the issues. As stated by other groups, the respondents felt that enforcement was deficient and should be prioritized to support existing regulations.

Table 39. Regional interest groups' views on resource protection priorities.

	Mean	Standard deviation	Number of observations
RESOURCE PROTECTION PRIORITY	1 =strongly agree; 5 = strongly disagree		
1. Stressed resources	3.00	1.60	19
2. Key resources	3.26	1.52	19
3. Percentage of all resources	3.58	1.74	19
4. Sustainable use	3.05	1.62	19
5. Enhanced enforcement	2.58	1.57	19

When asked about the percentage of the resources that they would be willing to yield such that the resources were protected, 90.9% (n = 11) of the respondents agreed to almost half the region's resources (mean = 49.3%; SD = 35.7; n = 11). Even if resources were to be improved and restored in the region, regional interest group members agreed to yield an equal percentage (mean = 49.4%; SD = 35.7; n = 11). The percentage that the regional interest group members were willing to yield however was the highest among all stakeholder groups interviewed.

In terms of the improvements that they would expect to gain from improvement in management, regional interest group members identified coral health (27.6%; n = 29) and improvements in fishery conditions (27.6%) as the two main

indicators. Another 10.6% stated that they would expect to see improvement in water quality conditions, and 6.9% wanted to have a greater public awareness and appreciation of coastal and marine resources.

3.9.4. Regional interest groups' understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

Like other stakeholder groups, regional interest groups were asked to provide information on any major gaps in management capacity or authority needed to effectively protect reef resources by first identifying such gaps and then by providing management options to address these gaps. The most important gap pertained to a lack of enforcement of existing laws (25.9%; n = 27), issues related to agency coordination (18.5%), and problems with water quality (14.8%). The concerns that respondents shared concerning agency coordination were that agencies did not work well together and had conflicting objectives or that the various levels of local, state, and federal management placed additional burdens on stakeholders. Several group members agreed that a regional approach using a single agency was lacking in southeast Florida. In terms of fishery management, the main complaints with water quality were that general water quality was unacceptable, that land-based sources of pollution remained unchecked, and that water quality impacts were affecting coral reef health in nearshore waters.

The best management approach for the region as proposed by regional interest groups was a focus on marine managed areas (20.7%; n = 29), followed by the need for integrated agency management (13.8%), enhanced enforcement (10.3%) and increased awareness and education (10.3%). Other suggestions included using the FKNMS as a model to implement place-based management in southeast Florida, modifying the coastal construction permitting system to better assess the cumulative impacts of coastal construction, and to establish a more useful baseline by using historical data sources.

3.9.5. Regional interest groups' degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem

Under this theme, regional interest group members provided their views on management tools, statewide management, and place-based management. Based on their preference for statewide or place-based management, respondents answered a series of questions related to either preferred option.

Regional interest group members rated community involvement as the most effective management tool (mean = 3.24, where 1 = very effective and 5 = very ineffective), but they did not consider community involvement or any of the other management tools as particularly effective (Table 40). Instead, the respondents ranked each of the management tools as between neither effective or

ineffective and moderately ineffective, suggesting that the group was not satisfied with any of the approaches. Enforcement was rated as the least effective management tool, which matched the group members' views on enforcement effectiveness from earlier questions on management gaps and options.

Table 40. Regional interest groups' views on management tools.

	Mean	Standard deviation	Number of observations
MANAGEMENT TOOL	1 =very effective; 5 = very ineffective		
1. Outreach and education	3.31	1.01	16
2. Community involvement	3.24	1.03	17
3. Scientific research	3.73	0.70	15
4. Resource monitoring	3.71	1.07	14
5. Enforcement	3.88	0.98	16

While only 50% of those regional interest group members interviewed provided their preferred statewide management approaches, their views on most approaches were favorable (Table 41). Respondents preferred establishing new protective legislation and increasing funding for coral reef protection (mean = 2.11, where 1 = highly preferred and 5 = not preferred at all) above other measures but were not opposed to strengthening existing legislation (mean = 2.22) or modified access (mean = 2.78).

Table 41. Regional interest groups' views on statewide management approaches.

	Mean	Standard deviation	Number of observations
STATEWIDE MANAGEMENT APPROACHES	1 = highly preferred; 5 = not preferred at all		
1. Strengthening existing regulations	2.22	1.20	9
2. Establishing new legislation	2.11	1.05	9
3. Modified access	2.78	1.30	9
4. Increasing funding	2.11	1.17	9

Almost half of those interviewed, or 47.4% (n = 19) were in favor of place-based management, compared to just over the fifth (21.1%) that favored statewide management. The remainder, or 31.6%, favored a hybrid form of management including both place-based and statewide management, suggesting much higher support for some type of place-based management (78.9%) among regional interest group members. Support for place-based or the hybrid form of management was highest among conservation groups, of which 81.8% supported one of the two forms of place-based management.

The group members who were not in favor of place-based management were asked to provide their preference for the type of marine managed area if there were going to be marine managed areas anyway. Of the six regional interest group members who were in favor statewide management, 84% stated a willingness to accept marine managed areas that including a zoning strategy. The zones that the respondents would favor included multiple uses zones (33%; n = 12), marine reserves (33%), and no anchoring (16.7%). Other restrictions listed by the group members included no spearfishing, no discharge zones, and personal watercraft restrictions.

When asked about the preferred level of government that should lead the effort in the designation and management of marine managed areas in southeast Florida, those regional interest group members who supported the approach (or the hybrid approach favored a local, state, and federal partnership (40.0%; n = 15), with 26.1% in favor of a completely local approach. All respondents were in favor of zoning in the marine managed areas, in which 37% (n = 27) agreed should have marine reserves or other no-use/no-access zones, 18.5% supported multiple use areas, and 11.1% were in favor of no anchoring areas (Figure 35). Fewer than 10% supported other fishery or boating restrictions. Respondents believed that zone beneficiaries would include all user groups over time or that the groups to benefit from the zoning strategy adopted would depend on the process adopted.

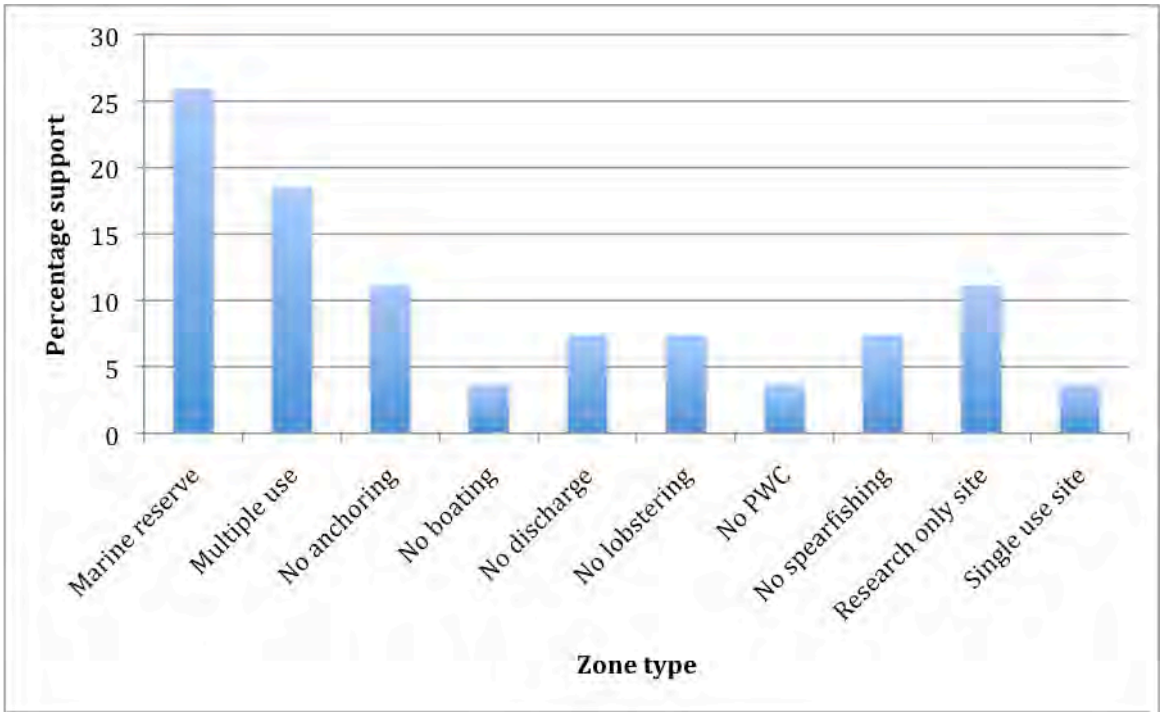

Figure 35. Regional interest groups' views on zone types.

Regional interest group members identified locations that they agreed would make good marine managed areas (Figure 36). The most popular areas selected were in Broward County, including the *Acropora cervicornis* patch off Fort Lauderdale but also the nearshore reef tract along the central and northern sections of the county. Other stakeholders also identified the nearshore resources and reef tract off Key Biscayne in central Miami-Dade County, which respondents stated contained among the best seagrass meadows and hardbottom communities in the county. Also, many of the respondents felt that the areas identified as good marine management area sites were also the areas that deserved the highest priority.

Finally, regional interest group members identified locations that they considered should be designated as high priority areas (Figure 37). Respondents identified mainly coral reef and hardbottom areas along the region's nearshore habitats, with several regional interest group members identifying sites off central and northern Broward County. Others suggested that presently protected areas, such as Biscayne National Park in Miami-Dade County and SLIPSP in Martin County, represented high priority areas.

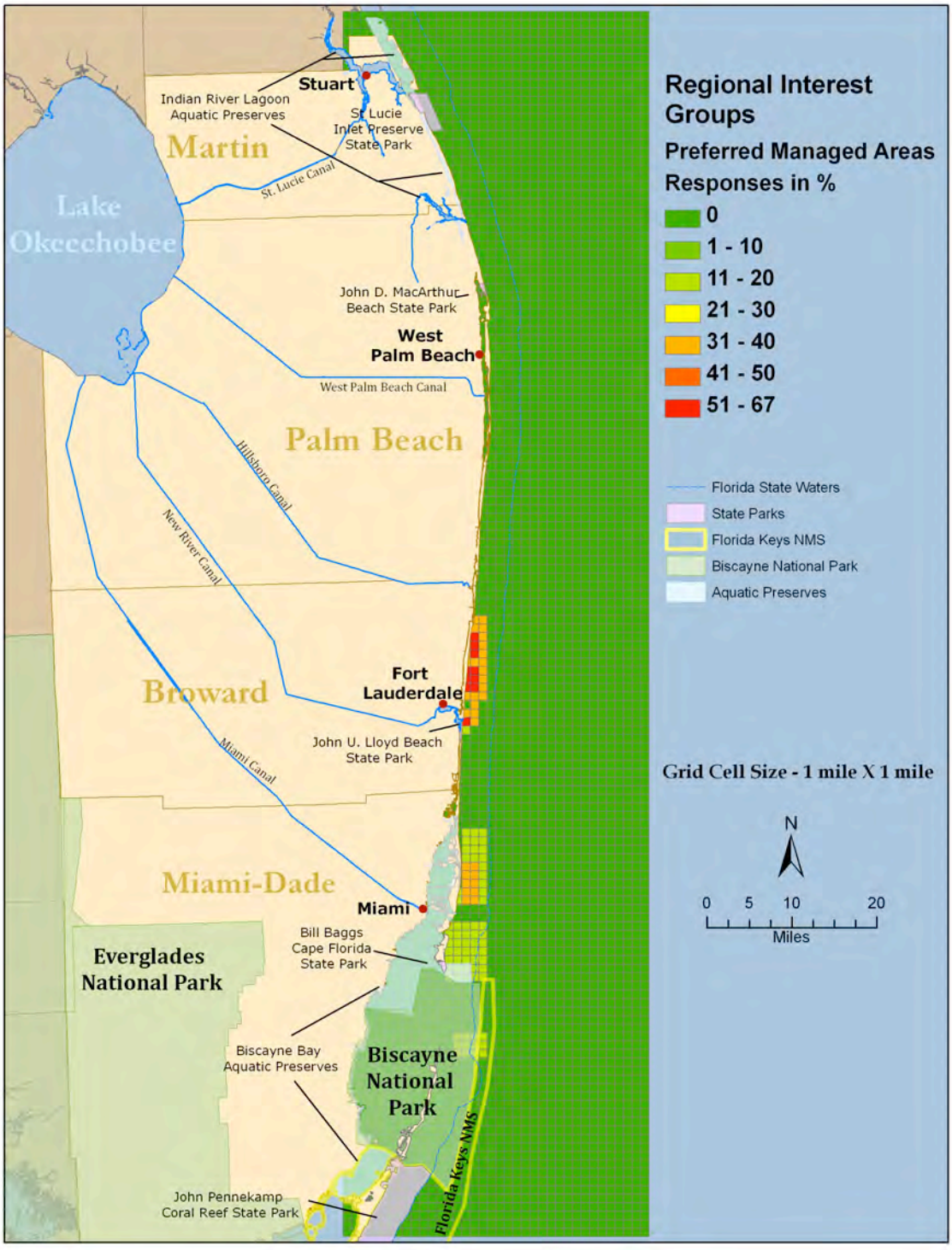

Figure 36. Regional interest groups' preference for marine managed areas.

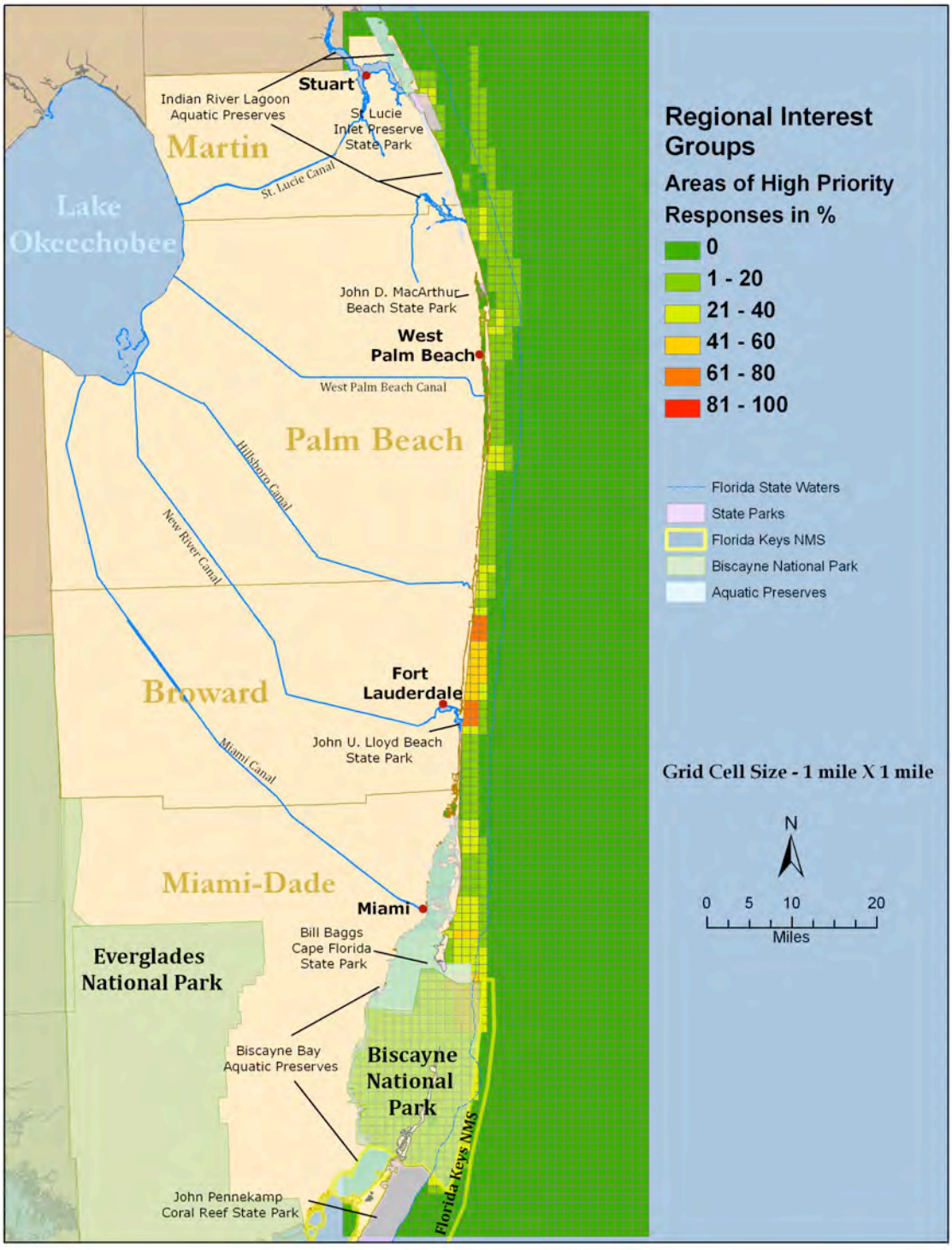

Figure 37: Regional interest groups' assessment of high priority areas.

3.10. Stakeholder group surveys

The project research team completed a total of 79 stakeholder group surveys from six survey sessions that it organized with area dive and fishing clubs and from an online survey that it developed and posted in April 2011 (and kept posted through the end of June 2011). The survey location was linked to the project website, from which those interested in participating were provided with instructions on how to first access the online video and then complete the online survey.

Participation rates over the three-month field session were much lower than expected, although the project research team utilized a number of different approaches to maximize participation. In February 2011, team members obtained phone numbers for all of the 65 clubs that could not be reached by email by conducting online searches for each club. Team members first sent an introductory email describing the project and extended an invitation to participate by having their members view the project video and completing self-administered stakeholder surveys. From the initial round of contacting clubs, three clubs wrote back stating an interest in the project. Of these, two clubs were not interested after learning that members would need to watch the video and complete a survey during their monthly meetings. Throughout March 2011, the project research team called all clubs that could be reached and secured two more clubs' participation. However, neither club elected to participate when the research team member showed up to show the video and administer the surveys.

Because of the low response rates, the project research team and CRCP team discussed developing alternate approaches to maximize participation, which would be used in conjunction with the original methodology. The teams agreed that two approaches could be used, and both would involve stakeholders conducting online surveys. The first approach was to work with club representatives to have them email the online video and survey information and to encourage their members to participate in the project on their own time, rather than at club meetings. The second approach was to attend as the monthly meetings and to drop off business cards that contained instructions on how to access the online video and complete the online survey.

The project research team developed an online survey identical to that used in the stakeholder meetings, and it modified the project website to contain detailed information on how to access the video and survey. The online survey was completed in April 2011, after which team members executed the various approaches to maximize participation. Finally, in mid-May 2011, the project research team contacted all clubs again to promote participation in the online survey.

Participation rates, both as measured by the number of clubs willing to accommodate the viewing of the video and administration of the stakeholder surveys and the number of members who watched the online video and completed an online survey, were lower than had been expected. Based on discussions among team members who attended several stakeholder group meetings and who contacted stakeholder group representatives on several occasions, the main reasons for the low participation rates were due in part to the incompatibility of many of the stakeholder group meeting formats and the length of the video. Team members reported that many of the meetings they attended were held in eating and drinking establishments, where it was difficult to get most club members into watching a video and completing a survey. In terms of video length, the total commitment for completing a survey exceeded 30 minutes (the time it would take to access and watch the video and to complete the survey), which likely dampened response rates. Previous, online surveys completed by southeast Florida stakeholder groups (Shivlani and Villanueva, 2007) showed much higher response rates, so it is clear that the medium did not represent the main hurdle to having more stakeholders complete the survey.

3.10.1. Stakeholder group demographics

Of the 79 stakeholder surveys completed, 40.5% were completed by dive group members, 36.7% by fishing club members, and 22.8% by members of groups who did not identify their affiliation. Over 96% were residents of southeast Florida, with respondents representing all four counties. Participants had been living in the region for an average of almost 16-20 years (mean = 4.77; SD = 1.59), and their average age was just over 41-50 years (mean = 4.29; SD = 1.26); this suggested that the sample had extensive experience participating in fishing, diving, or other uses in southeast Florida. In terms of race, respondents were almost all Caucasian (91.4%), and 25.3% identified themselves ethnically as Hispanic.

3.10.2. Stakeholder group views on resource status and conditions and use conflicts

Stakeholders believed that the condition of most resources was slightly better than or fair (mean > 3.00, where 1 = excellent and 5 = very poor) (Table 42). Resources such as beaches and wetlands were rated more highly than all other resources. However, fisheries were rated as less than fair (mean > 3.00), suggesting a concern over fishery resources in the region. When asked to considered changes in resource conditions over their time in southeast Florida, stakeholders were less favorable than they were in considering present resource conditions. That is, the average rating for all resource conditions was between stable and moderately declined (mean > 3.00, where 1 = greatly improved and 5 = greatly declined), and respondents felt that fisheries, water quality, and corals were among the resources that had declined the most.

Table 42. Stakeholder group views on resource conditions.

	Mean	Standard deviation	Number of observations
RESOURCE CONDITIONS	1 = excellent; 5 = very poor		
1. Corals	2.96	0.83	75
2. Wetlands	2.72	0.83	72
3. Beaches	2.77	1.04	77
4. Seagrasses	2.84	0.99	74
5. Water quality	2.97	0.93	78
6. Fisheries	3.27	0.97	74
CHANGE IN RESOURCE CONDITIONS	1 = greatly improved; 5 = greatly declined		
1. Corals	3.47	1.19	68
2. Wetlands	3.27	1.01	64
3. Beaches	3.21	1.04	67
4. Seagrasses	3.36	1.11	65
5. Water quality	3.51	1.01	68
6. Fisheries	3.64	1.20	65

In terms of use conflicts, the total sample of stakeholders did not identify any particular group which they singled out as presenting a significant conflict (mean > 3.00, where 1 = least conflict and 5 = most conflict). However, both divers (mean = 3.40; SD = 1.12; n = 30) and recreational fishers (mean = 3.04; SD = 1.23; n = 28) reported more conflicts with the commercial fishing industry than did the total sample.

3.10.3. Stakeholder group management preferences

Stakeholders were asked to select their primary goal for the management of the southeast Florida coral reef ecosystem, and 45.1% (n = 71) selected the continued use and protection as present with existing regulations. Over 28% believed that the use of certain groups should be reduced with modified or expanded regulations, but fewer (15.5%) favored reducing use among certain groups in certain areas (i.e., limiting access). Less than 12% agreed with eliminating some uses, and none of the respondents supported eliminating almost all uses. In comparing divers with recreational fishers, the former were more in favor of reducing use among certain groups in certain areas (26.7%; n = 30) than the total sample, whereas recreational fishers overwhelmingly favored the continued form of management (62.5%; n = 24).

In terms of management options to be adopted to manage the region's coastal and marine resources, stakeholders favored the protection of the most stressed resources (37.1%; n = 70) above other options, including the protection of a certain percentage of all resources (21.4%), focus on sustainable use (20.0%), and protection of certain key resources (10.0%). The view among the sample was that

focus should be placed on resources that require the most attention rather than prioritizing the protection of key species (e.g., keystone, indicator, or other iconic species).

The most often cited management failure by stakeholders was the lack of an integrated management approach to address land-based sources of pollution (43.0%; n = 79), while 39.2% pointed to the lack of effective enforcement, and 38.9% identified the lack of improvements in fishery management measures. While only 35.4% believed that the lack of marine management areas around coral reefs was an indication of management failure, almost half of the divers (46.9%) agreed with that statement; by contrast, only 17.2% (n = 29) of recreational fishers cited the lack of marine managed areas as a management failure. The most important management failure for recreational fishers was the lack of authority to enforce anchoring on coral reefs, which almost 45% of the respondents identified.

Over two-thirds of those surveyed (69.6%) favored place-based management, and only 10.1% supported statewide management. A higher percentage of divers (15.1%; n = 32) favored statewide management compared to recreational fishers (10.3%; n = 29), but fewer recreational fishers (58.6%) stated that they were in favor of place-based management; over 31% did not pick either option (and in fact, several recreational fishers did not complete the survey, arguing that they were not provided with less restrictive options). Conversely, 75.1% of the divers surveyed favored place-based management, and only 9.4% did not complete their surveys, suggesting both strong support for place-based management and for changes in management approaches in general.

The stakeholders did not favor a statewide approach over another, rating the establishment of new protective legislation (mean = 3.01; SD = 1.44; n = 72; where 1 = least favored and 5 = most favored) slightly ahead of increasing funding for coral reefs (mean = 3.12; SD = 1.55), modifying access (mean = 3.10; SD = 1.38), and strengthening existing regulations (mean = 3.01; SD = 72). Divers tended to favor funding over the approaches, whereas recreational fishers preferred strengthening existing regulations.

Respondents were offered five management arrangement alternatives, based on the lead governmental or nongovernmental entity that should be charged with place-based management. Almost a third (32.9%; n = 73) believed that place-based management should be implemented as local or county protected areas, and there was less support for either state (16.4%) or federal (11.0%) protected areas. Almost 22%, however, agreed that an integrated approach, in which all layers of government are involved in protected areas, would be a reasonable option. Finally, there was limited support for co-managed protected areas (17.8%), which would be managed by governmental agencies with stakeholder

consultation. Across different groups, recreational fishers (n = 29) were most in favor of local or county protected areas, which 44.6% of them supported; divers were less in favor of local zones (22.5%), and they did not overwhelmingly support any arrangement.

Stakeholders were most concerned with in-water pollution (74.6%; n = 79) and land-based sources of pollution (72.2%) as the two main issues that marine managed areas should address. Over 70% also felt that anchor damage should be limited in coral reefs, and 69.6% identified overfishing as a pressing issue. In-water pollution and overfishing were the two most important issues (8.12%%; n = 32) among divers, followed by land-based sources of pollution (78.1%) and anchor damage on coral reefs (75.0%). By contrast, 65.5% (n = 29) of recreational fishers believed that anchor damage was the most significant issue, followed by in-water pollution (62.2%) and land-based sources of pollution (58.6%). Overfishing was considered a major issue by less than half of the recreational fishers surveyed (48.2%).

Almost 71% (n =72) of those surveyed supported the use of two or more different zones (i.e., zoning) over a single zone in any place-based management to be used in southeast Florida. Among the different zones, four types garnered supported from over 40% (n= 79) of the respondents: no discharge zones (51.9%); multiple use zones (50.6%); no anchoring zones (48.1%), and no personal watercraft zones (44.3%). While 36.7% of the stakeholders favored marine reserves, only 16% of the respondents supported a ban on spearfishing, a specific type of fishery restriction. The three zone types most favored by recreational fishers were no anchoring zones (51.7%; n = 29), multiple use areas (51.7%), and no discharge zones (48.2%); by contrast, only 27.8% supported marine reserves. Multiple use zones (56.2%; n = 32) and no discharge areas (53.1%) were also popular among divers, and there was greater support for marine reserves (43.8%) among divers than recreational fishers. Conversely, zones limiting activities in which divers participated, such as lobster diving and spearfishing, were supported by 12.5% or fewer of the divers surveyed.

Finally, in terms of the areas that the stakeholders identified that they would prioritize for protection (Figure 38), the most commonly selected areas (45.6%; n = 125) were those located near inlets; respondents believed that such areas were in sensitive areas that incurred a lot of vessel traffic and use and should thus be protected above all others. Another 12.8% identified existing managed areas, such as state parks, aquatic preserves, and Biscayne National Park, as areas that are already managed and can be further protected, as needed. A small group of respondents (4.8%) preferred that areas outside the region be prioritized, especially areas in the Florida Keys such as John Pennekamp Coral Reef State Park in the Upper Florida Keys, Florida Bay, and the Dry Tortugas Ecological Reserve. Less than 10% of those surveyed identified specific habitats, species, or

depths that should be used to prioritize protect; among these, respondents listed mangroves, seagrasses, nearshore reefs, and deepwater corals, among others. Finally, it should be noted that while several respondents provided more than one area, most of the stakeholders surveyed (52.9%; n = 79) did not list any areas; several stated that they did not have enough knowledge to identify areas; fewer recreational fishers (37.9%; n = 29) provided information of priority areas than did divers (65.5%; n = 32), demonstrating again that, in the sample, divers were more likely than recreational fishers to address place-based management.

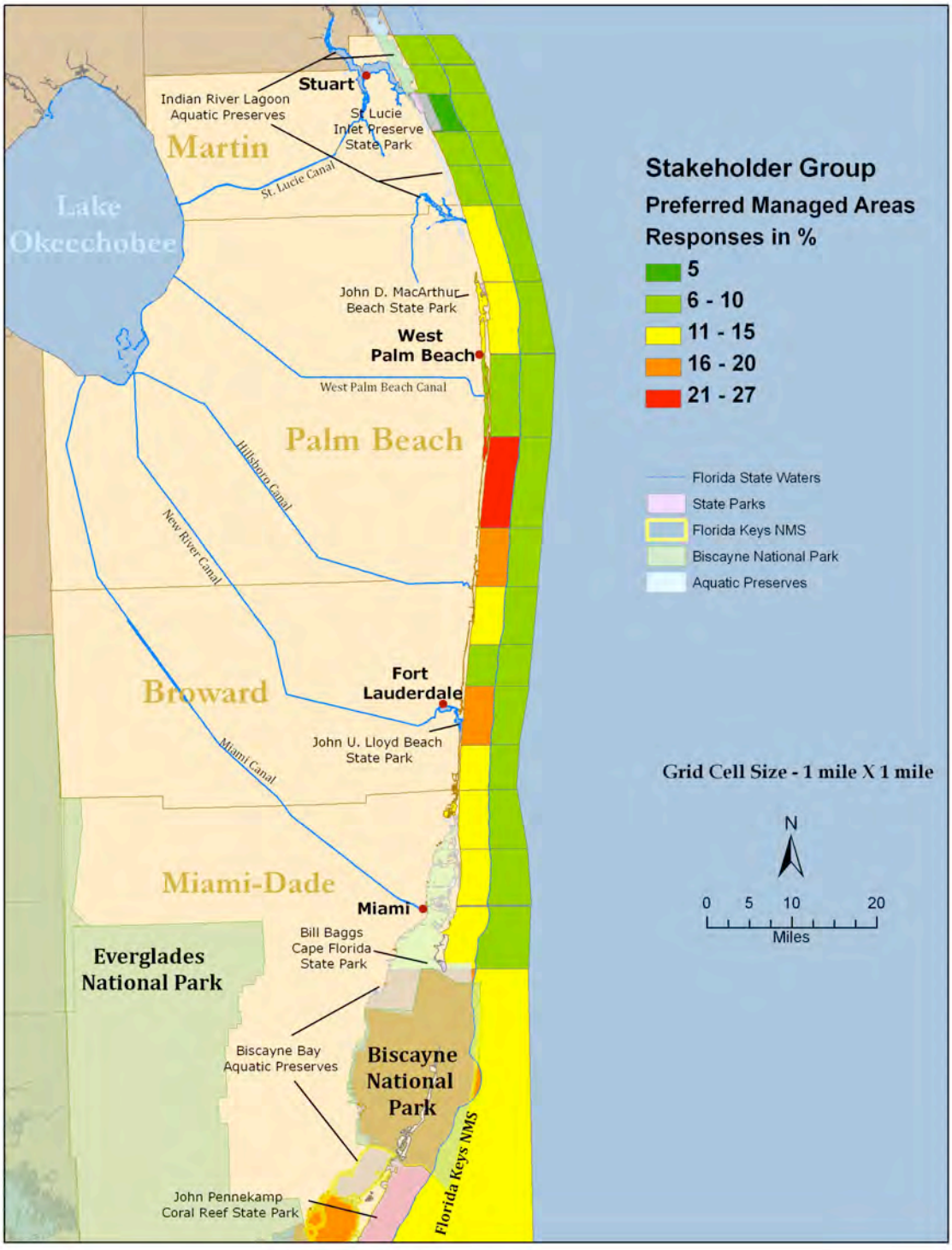

Figure 38: Stakeholder group preferences for marine managed areas.

4. Discussion

The discussion on FDOU Project 18 & 20B focuses on three main topics, concerning the methodology, similarities and differences across stakeholder types, and recurring themes across stakeholder types and regions, as developed from the stakeholder interviews and surveys. The topics show the relevance of the approach adopted to interview key informants from a broad group of stakeholders across the 170 kilometer long region (Collier *et al.,* 2008), present the key differences within and across stakeholder groups in their knowledge of and support for existing and alternate management strategies, and engage themes concerning stakeholder views on resources and resource management that are relevant to coastal and marine management in southeast Florida and other coastal zones.

4.1. Efficacy of the project approach

FDOU Project 18 & 20B utilized a key informant approach that sought to interview experienced and knowledgeable stakeholders from a series of working panels (e.g., Bunce and Pomeroy (2003) describe the use of key informant interviews in coastal stakeholder studies). The approach's success depended on the ability to identify those individuals who could be considered key informants and who could provide information that extended beyond the superficial status of resources or views on management into the reasons *why* resources were in their present status, *which* management strategies were inefficient, and *how* management alternatives could be developed.

To obtain this information, the approach adopted an open-ended (or at least semi-bounded) inquiry process, developing guiding questions rather than bounded ones would be used to promote discussion and identify results. The approach did not assume that all options were known, and the stakeholders would need to select from one of the options; that approach, of utilizing structured survey instruments, had already been applied as part of a previous project, FDOU Project 10 (Shivlani and Villanueva, 2007). Instead the current approach expected that stakeholders would provide answers that were not known and could not be bounded. This was of paramount importance because the project solicited a meaningful dialogue with stakeholders where the respondents knew much more about their respective regions and the prevailing conditions than the interviewer, whether this was in the form of local ecological knowledge, via scientific inquiry, or even by their work with other stakeholders. Thus, the approach used with commercial operators, scientific and managerial personnel, and local and regional interests was identical, in that no group was elevated to a position where it was considered to hold more or better knowledge.

While the open-ended approach provided the aforementioned advantages, it also presented challenges in terms of interview length (i.e., the amount of time that

stakeholders were available to answer questions), interpreting answers, and comparing interviews across different stakeholders. Interviews lasted no less than a half hour, while some extended over several hours and others were not completed in a single session (there were a few instances of interviews that lasted several hours and were conducted over multiple sessions). The nature of the questions and anticipated length of the interview dissuaded some stakeholders, who were unwilling to spend 23 minutes to watch a video and then to participate in an interview that would last a minimum of 30 minutes. Others who did not want to participate were concerned that their interviews would not be representative of their groups, or that they were not sufficiently qualified to address the project objectives. For example, almost all chambers of commerce, many marinas and boating clubs, and several educators contacted believed that they were not qualified to participate in the project because of their lack of direct knowledge of the coastal and marine environment. In terms of data interpretation and qualitative data transformation, the project research team utilized interview narratives that were written organized according to project themes, as well as accompanying written and audio transcripts, to encode data and highlight patterns in and the diversity of answers. The other approach that greatly assisted the data interpretation process was that data interpretation, encoding, and highlighting were all conducted by the project principal investigator, who worked closely with all data collectors to discuss individual interviews, emerging patterns, and inconsistent responses during the data entry, analysis, and reporting stages.

The interview process was successful in that it resulted in the completion of 191 interviews with different stakeholder groups in an open-ended format that encouraged extensive input; however, the stakeholder survey process was much less successful because it was unable to secure the participation of many fishing and dive clubs. While the project research team added alternate means by which fishing and dive club members could access the project video and survey, participation rates did not approach anticipated totals. However, as with certain stakeholder groups who were unwilling to participate, the reasons behind lack of participation from fishing and dive club members provided important information that could be used in future endeavors to engage these groups. Many of the fishing and dive clubs were unwilling to view a video and fill out a survey in a group session. Also, the length and content of the survey (as well as the video) likely decreased response rates, as determined by the number of mainly fishing club members who argued that the survey did not provide less restrictive management options. Finally, while 79 respondents did participate in the project, the answers they provided showed the limitations of using a survey format for complex issues concerning management effectiveness, alternatives, and preference, namely where respondents could mostly provide a bounded answer. Future studies that address such topics should consider alternate formats and different means by which to obtain information, especially where

pre-interview requirements (e.g., mandatory viewing or reading) are part of the study design.

4.2. Comparison of stakeholder groups

As part of the project, four working panels and two interest group panels provided their views on a number of resource and management related topics, including resource conditions and trends, use pattern and use conflicts, management gaps and management approaches, management effectiveness, and alternate management strategies, including statewide and place-based management. Certain differences were readily attributable to the nature of the relationship that panels had with the region's natural resources, but others were not as easily explained by how much stakeholders stood to gain (or lose) by changes in resource management and protection.

Resource conditions and trends

There was a general consensus across panels that overall resource conditions were either fair (mean = 3.00, where 1 = excellent and 5 = very poor) or between fair and moderately poor. It would have been expected that panels that relied on natural resource availability would be biased in reporting natural resource conditions (i.e., unwilling to provide negative information in the case where that information would result in reduced access), but the results showed instead that many extractive users were as concerned about resource conditions as were the non-extractive ones. Also, while it is certain that commercial fishers rated the condition of fisheries as better than fair, compared to researchers, managers, and educators and regional interest groups, both panels that rated fisheries as moderately poor, the reason for this difference was largely due to the *types* of fisheries in question. Commercial fishing landings, especially in Palm Beach and Martin counties, but also in Miami-Dade County, had increased or remained stable over the past few years, and fewer commercial fishers were targeting reef fish due to the seasonal closures of certain snapper and grouper species. So, in the context of commercial landings, commercial fishers perceived landings as between good and excellent. Marine fishery biologists and conservation group members, from their respective panels, referred mainly to the condition of reef fish, which are landed mainly by the recreational fishery sector (Johnson *et al.*, 2007) and which remain in poor condition.

Almost all panels reported that corals were in less than fair condition, with researchers, managers, and educators and regional interest groups ranking them as in moderately poor condition. The prevailing view across stakeholder types was that corals were stressed and suffered from a series of inter-related and synergistic impacts, a finding that was similar to that reported in Project FDOU 10 (Shivlani and Villanueva, 2007). The other resource condition that was rated as between fair and moderately poor was water quality, which was perceived by all groups except local interest groups to be between fair and poor. The two

resources were often considered together, where stakeholders (with the exception of the local interest group panel) believed that water quality conditions, impacted by land-based sources of pollution, outfalls, and in-water pollution, affected the benthic environment and especially corals. Finally, it should be noted that almost all resources were considered in fair and fair to moderately poor condition across stakeholder groups; there were panels that held negative views on almost all resource conditions (i.e., researchers, managers, and educators) and panels that rated several resources between fair to good (i.e., such as the local interest groups), but the prevailing consensus was that resource conditions in southeast Florida were neither excellent nor good.

Similarly, the stakeholders were not convinced that resource conditions had improved over their tenure in the region (Table 43). Only commercial fishers rated overall changes in resource conditions as fair; all other panels felt that overall conditions were between fair and moderately poor, with researchers, managers, and educators and regional interest groups rating them as moderately poor. Interestingly, while groups such as charter and commercial fishers rated water quality as between fair and moderately poor, and there were panel level differences in the perceived changes in most other resources, all panels believed that coral reef conditions had deteriorated further than water quality (mean > 3.50). This finding is particularly important because it demonstrates both that there is a shared understanding across groups that among all resources, corals are the ones that have been impacted the most and which have among the least favorable trend; the finding is also of note because it shows that although studies in coral cover over the past decade (Gilliam, 2010) have shown little change, stakeholders likely perceive corals as a composite of various resources, including coral reef fish (especially those stakeholders who do not directly access the resource), water clarity, perceived or actual anchor damage, and that they likely use a longer term comparison (e.g., stakeholders had been in the region for an average of 19.1 years (SD = 13.8; n = 199) in assessing coral reef conditions.

Table 43. Working panels' views on resource conditions.

	Charter fishers	Commercial fishers	Dive operators	Researchers, managers, and educators	Local interest groups	Regional interest groups
RESOURCE CONDITIONS						
1. Overall	3.29	3.07	3.25	3.75	2.96	3.76
2. Corals	3.76	3.33	3.46	3.81	2.72	4.17
3. Seagrasses	3.06	3.21	3.22	3.71	2.77	3.27
4. Mangroves	4.67	3.63	4.67	3.91	2.84	3.78
5. Beaches and wetlands	3.56	3.21	3.10	3.96	2.97	3.95
6. Water quality	3.33	3.38	3.50	3.94	3.27	3.97
7. Fisheries	3.07	2.50	3.50	4.20	2.96	3.96
CHANGE IN RESOURCE CONDITIONS						
1. Overall	3.33	2.97	3.56	3.86	3.47	3.93
2. Corals	3.78	3.50	3.52	3.73	3.27	4.14
3. Seagrasses	3.42	3.32	3.56	3.64	3.21	3.38
4. Mangroves	4.33	3.86	4.67	3.64	3.36	4.00
5. Beaches and wetlands	3.32	3.20	3.45	3.96	3.51	3.89
6. Water quality	3.18	3.38	3.68	3.92	3.64	3.93
7. Fisheries	3.14	2.43	3.64	4.24	3.11	3.90

Uses and use conflicts

In a crowded southeast Florida, where there are over five million residents and millions of annual visitors, almost 160,000 vessels and thousands of access points, and a diversity of commercial and recreational uses, use conflicts are almost an inevitable result of intra- and inter-stakeholder competition for resources, space, and expectations. Thus, it was not unexpected that groups that utilize the regional resources on a regular basis were those that reported the highest rates of conflict. Over 62% of commercial fishers reported having one or more use conflicts in their respective fishing grounds, compared to 59% of dive operators, and 55% of charter fishing operations. Even those groups that did not have direct use conflicts over resource use or space themselves still reported such problems for third parties or for their constituent groups.

Solutions that were most commonly offered to resolve use conflicts, which would in some cases persist over whole counties or the entire reef tract, consisted of a combination of enforcement and/or education. In other cases, respondents

argued that the conflicts had no resolution ("It is like the Israeli-Palestine situation", according to one respondent), and these stakeholders generally practiced informal arrangements where they would avoid heavily congested areas or organize in accordance with other members of their stakeholder group to spread out use. Interestingly, however, few (13.9%) of those interviewed across the panels suggested using zoning via which to separate uses and relieve conflicts. Some respondents readily identified SPAs in the FKNMS as a model for separating uses (NOAA (1996) reported that the no-fishing SPAs captured 80-85% of all diving and snorkeling in the Florida Keys), but others were either wary of zoning (as a first step in eliminating uses), felt that any zoning would in fact exacerbate crowding in the remaining general access areas, or were unaware of the SPAs model.

Use conflicts were a very important component to this project, building on the previous effort from FDOU Project 10 (Shivlani and Villanueva, 2007), which focused mainly on the identification and quantification of user conflict groups and which measured the stakeholder perceptions of use conflicts. This effort determined that use conflicts are pervasive and can present significant management challenges, especially if such conflicts result in an actual or perceived management failure. That is, the perceived level of conflict may impact stakeholders' views on the how well management is achieving its objectives, and if the stakeholders do not perceive that the conflicts can be resolved, then their views on present management efforts tend to center on issues such as the lack of enforcement and/or education and their expectations on future management options focus on improved enforcement.

Stakeholder views on present management and management alternatives

There was a wide divergence in the vision that different stakeholders shared for the region, but most panels supported some version of the existing management approach (Figure 39). Among local interest groups and commercial fishers, the support for existing management was over 80%, and it garnered majority support among charter fishers as well. While dive operators and regional interest groups stated support for increased management for certain groups and curtailed use in certain areas for specific groups, a relative majority favored the existing management approach. These findings show that while there was concern over the existing management approach, as measured by the views on resource conditions and trends and on use conflicts, stakeholders were mostly unwilling to adopt different management approaches than the one presently in place.

There were two main reasons why stakeholders preferred to persist with what most acknowledged was a less than effective approach: concern over impacts of an alternate approach on their activities, and perception that the present approach could be improved to be more effective. Panel members who

participated in extractive uses were concerned with how alternate management approaches would impact their activities. The overwhelming perception among commercial fishers, for example, was that management would scapegoat their group to advance more restrictive measures while not addressing related fishery concerns, namely recreational fishing effort. Moreover, the group, along with charter fishers, believed that both had yielded many concessions that amounted to restricted use (e.g., closed seasons, fishery size limits, species off limits to commercial fisheries, gear bans, etc.), and that their groups stood the most to lose with support for alternate approaches. Local interest groups, which were largely removed from daily activities but many of which had clients/members that relied on access to the coastal and marine environment, believed that it was in their self-interest to promote the continued management approach; that is, this panel did not perceive any benefits from changing the regulatory or access regimes. The other reason why stakeholders in several panels supported the present management approach was because they believed that it was the best one and could be greatly improved with changes at the margins rather than a complete shift to alternate approaches. The concern (described in greater detail in the next discussion topic) that most of these stakeholders shared was that the present approach could be improved if it required stricter, consistent, and region-wide enforcement.

Panels that favored existing management approaches also tended to favor enhanced enforcement as a management priority. Thus, charter fishers, commercial fishers, and local interest groups all rated enforcement as the top priority, and it was considered as an important priority by dive operators and regional interest groups.

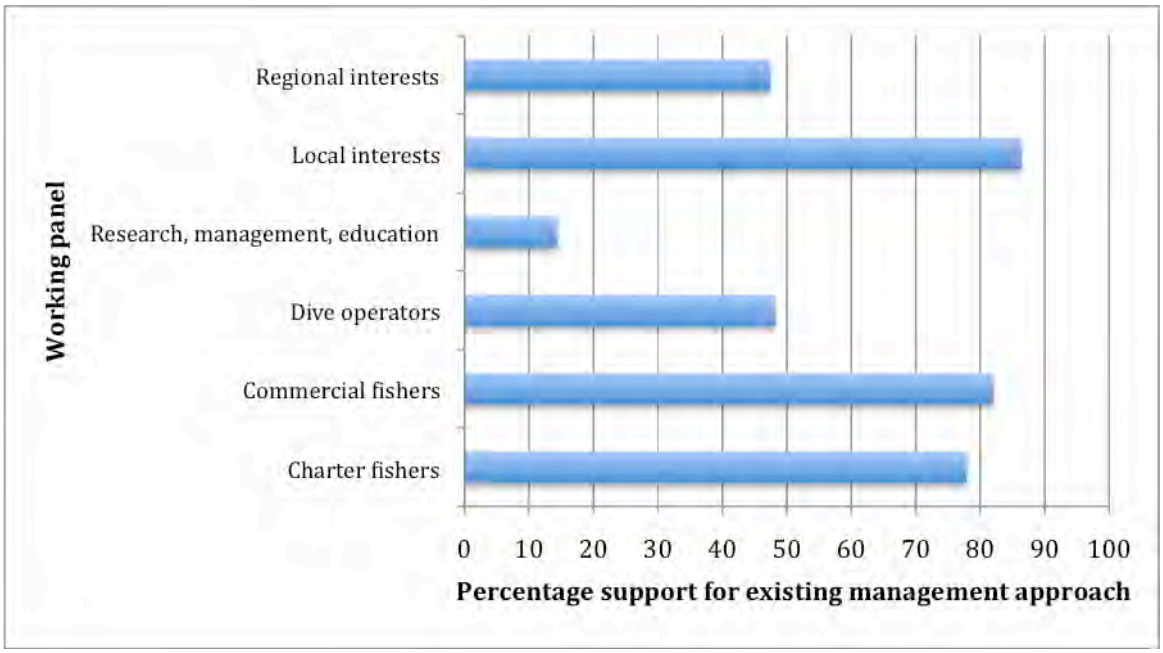

Figure 39. Working panels' preference for existing management approach.

In terms of management gaps, all stakeholders except commercial fishers identified the lack of effective enforcement as the greatest management gap in southeast Florida; commercial fishers ranked the lack of enforcement as a close second to the fishery regulatory and management failure (Figure 40). At least a fifth or higher of the total management gaps identified in each group related to enforcement. Interestingly, however, enforcement did not rank among the more popular management alternatives. Instead, most panels considered several other management alternatives over enforcement that should be implemented to improve resource conditions in the region. Many of these alternatives were specific to the group's interaction with the coastal and marine environment or objectives, such that charter fishing and commercial fishing operations prioritized changes in fishery regulations, dive operators called for greater boater and stakeholder safety courses and the implementation of marine managed areas, researchers, managers, and educators identified the need for place-based management and regional/ecosystem management, local interest groups (with their clients' interests in consideration) favored water quality management improvements, and regional interest groups called for the designation of marine managed areas, integrated, regional management, and more stakeholder group education.

The reason why enforcement likely was not listed as an alternative was because stakeholders did not perceive it as an alternative that needed to implemented; instead, most considered enforcement as already in place in the region, and they felt that enforcement needed to be made more effective (and not installed). In fact, when most of the alternatives are examined in greater detail, it is clear that stakeholders differentiated between existing, albeit – in their views – flawed, management approaches and those that represented alternate approaches. Thus, when charter and fishers called for alternate fishery regulations, they often referred to the closure of spawning aggregation sites, improvements in fishery data collection and stock assessment methods, reconsideration of size limits, etc. Similarly, when dive operators, researchers, managers, and educators, and regional interest groups called for marine managed areas, the respondents felt that these would either compliment existing approaches and/or protect vulnerable habitats and species.

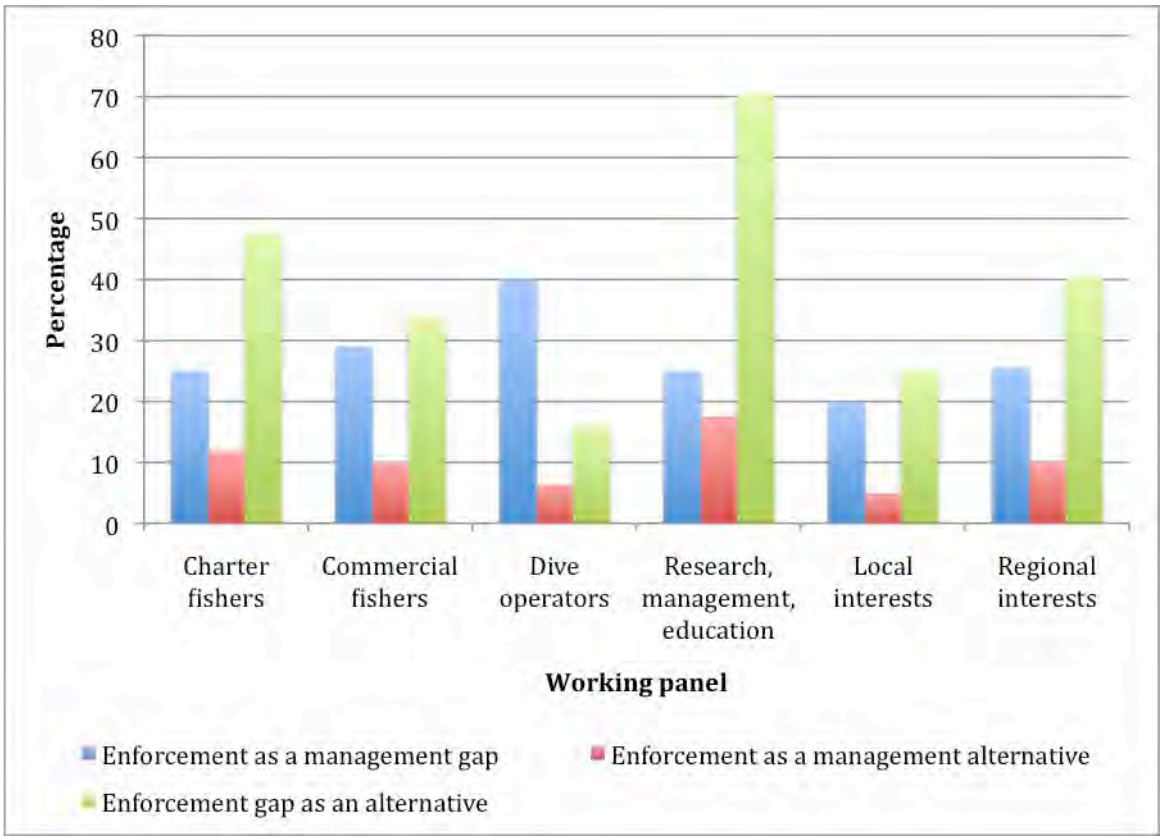

Figure 40. Working panels' views on enforcement as a management gap and management alternative.

Stakeholder views on statewide and place-based management

A final issue to consider under this topic is the differences in views across (and even within) panels on statewide and place-based management. Groups involved in extractive activities (or with clients who participated in extractive activities, such as marinas) were mostly in favor of statewide management. Over 70% of charter fishers and almost three-quarters of the commercial fishers interviewed reported that they would not support place-based management. While concern over access did represent a major reason for the low support for place-based management, access was one of several factors that several of these stakeholders identified that made place-based management the least preferred option.

The factors included existing marine managed areas, concerns over place-based management benefits, and the space available for place-based management. Several charter and commercial fishers in Miami-Dade and Martin counties argued that there is no need for "additional" place-based management, as both counties contain existing marine managed areas. Miami-Dade County respondents pointed to Biscayne National Park, which covered much of southern Biscayne Bay and which was undergoing a fishery management plan process. Lobster trap fishers in the region also identified the Biscayne Bay-Card Sound

Lobster Sanctuary in southern Miami-Dade County that was a permanent, no-take area for spiny lobster. Similarly, commercial and charter fishers in Martin County identified Saint Lucie Inlet Preserve State Park as an existing marine managed area that excluded certain activities within its mile-wide, marine boundary, including spearfishing. These stakeholders believed that place-based management was already part of the suite of management approaches in their respective counties/fishing grounds and no further marine managed areas were warranted.

Another factor raised by fishers from all counties was which group(s) stood to benefit from marine managed areas. The prevailing perception among these respondents was that their group would be the first one to be excluded from marine managed areas, most likely to the benefit of more influential groups (especially recreational anglers). Elsewhere, commercial fishers have accused management agencies for singling them out for exclusion (e.g., the Florida gill net ban (Barnes, 1995); the closure of Everglades National Park to commercial fishing in 1986 (Shivlani *et al.,* 2008)), and many of the fishers in their respective panels believed that place-based management would result in their elimination from the region.

Many fishers, both in FDOU Project 10 (Shivlani and Villanueva, 2007) and this project, claimed that there was simply insufficient space to implement marine managed areas in southeast Florida. If closed or restricted areas were to be placed in the region, it would result in higher levels of conflict in general use areas. Fishers from Broward County to the north most often used this argument, stating that fishing areas diminished northwards, and that zones would effectively ruin commercial fishing. Charter fishers were less concerned about space, as most of them fished well offshore and over open (federal) water, but their concern was mainly that nearshore closures would push other fishers further offshore and in direct competition with their activities.

Although a majority of dive operators and a relative majority of researchers, managers, and educators and regional interest groups supported place-based management, 38.1% of the total sample favored statewide management, over 35.9% that supported place-based management and 26.0% that preferred a hybrid of both statewide and place-based management (Figure 41). However, the reason why over a quarter of those interviewed favored a hybrid form of management was usually to strengthen place-based management. That is, when stakeholders were against any form of marine managed areas, they selected statewide management. Stakeholders mostly selected the hybrid form of management when they felt that place-based management on its own would be incapable of protecting the region's coral reef ecosystem and associated resources. Therefore, it is more appropriate to state that 61.9% of the total sample favored some form of place-based management, especially where place-based

management represented one part of an overall (regulatory-spatial-interpretation) management approach.

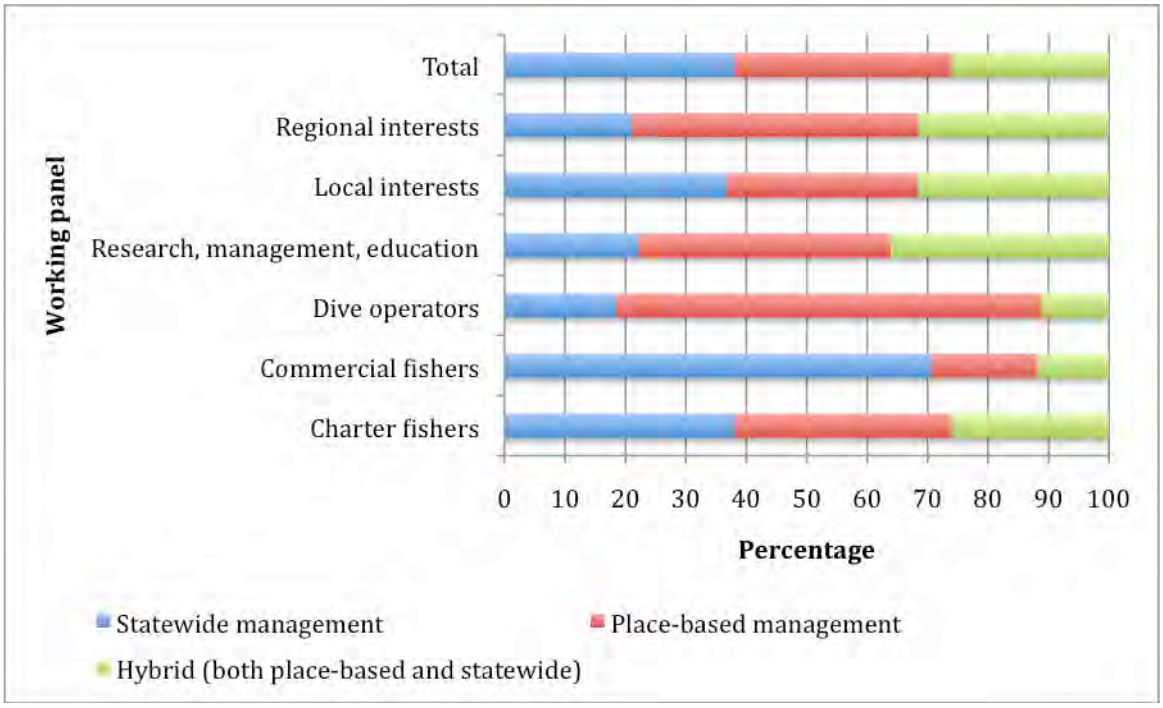

Figure 41. Working panels' views on statewide, place-based, and hybrid forms of management.

Finally, stakeholder groups preferred different types of zones. While very few commercial fishers were in favor of place-based management, those who provided their preferences on zone types to be implemented overwhelmingly favored marine reserves; their rationale was that if there are to be zones in a marine managed area, no group should be benefit from having preferential, extractive rights or access. Charter fishers were less in favor of marine reserves than commercial fishers but a quarter of those who were in favor of zoning suggested that no-takes zones should be implemented. Dive operators, researchers, managers, and educators, and regional interest groups preferred a suite of several different zones, including no anchoring zones and no discharge zones, in combination with marine reserves. Local interest group members were also in favor of a suite of zones, but less than 20% of those who described their zone preference selected marine reserves as one of the options.

Thus, at least a dedicated minority in the extractive working group panels and large majorities in the most of the working group panels are in favor of adapting a multi-faceted approach to management in the southeast Florida region, part of which may involve place-based management, which in part may consider a variety of use and gear-specific zones.

4.3. Recurring themes across stakeholder interviews

There were three main recurring themes that have in part already been discussed elsewhere in this report but are raised to highlight their importance both in the context of this project and for future activities. First, stakeholders are in agreement that the present management mode is incomplete and does not effectively address declining resource conditions and use conflicts. Second, enforcement is part of the problem in the present management mode. Third, marine managed areas are part of a suite of available options but which must be implemented with the support of the stakeholder community.

Present management mode and declining resource conditions

A majority of the 191 stakeholders interviewed (52.3%) agreed that resource conditions were in moderately poor condition, and 55% agreed that resource conditions had declined over their time in southeast Florida. While there were certain resources that were considered better or worse off, the concern shared across the region was that management had not been successful in addressing either the status of the resource or the resource trends. This is an important finding in that it shows that stakeholders are dissatisfied with the present mode of management, at least in terms of its overall performance.

Concerns under this theme varied across stakeholder groups, with stakeholders arguing that the present management approach was incomplete, inconsistent, or inefficient (or a combination of all three). In terms of incompleteness, many stakeholders repeated the concern that management did all could be done for the coastal and marine environment, but the more immediate and significant issues facing the southeast Florida coral reef system were located landward of the shoreline. Thus, a disjointed system which separated landside development and actions that resulted in greater runoff, land-based sources of pollution, access, and recreation could not provide comprehensive protection. The concern here was that there remains a lack of integrated coastal management in southeast Florida, and it is what is most needed (both across and within agencies) to address landside and coastal and marine issues.

Inconsistency in the management approach was another common theme, whether it was identified in terms of applying rules across stakeholder groups, coastal and related permitting, and research and monitoring. One concern often raised by commercial stakeholders was the inconsistency over how their groups were regulated, compared to their recreational counterparts, even though the latter were equally if not more responsible for changes in resource conditions. Thus, many dive operators stated that while commercial operators have to meet certain regulatory requirements, recreational boaters do not need licenses. Similarly, charter and commercial fishers argued that while both recreational anglers and their groups compete for the same species, the penalty structure is different across groups. Several researchers commented that coastal permitting is

often issued without consideration for long-term impacts, and that post-permitting requirements are inconsistently monitored.

Finally, there was the concern over inefficiency. Stakeholders did not blame management for being structurally inefficient but argued that the lack of resources and integration making agencies inefficient and their efforts often redundant and at times in conflict. Solutions suggested included greater inter-agency coordination, regional integration, and even coastal and marine spatial planning, all of which would create cohesion and assist in joint planning.

Enforcement as a problem in the present management mode

Many of the stakeholders who were in favor of retaining the present management approach nevertheless stated that it should be continued only with so-called "effective enforcement". This term, used by stakeholders across all working panels, was not synonymous. That is, while it did concern the efficient and complete enforcement of existing regulations across stakeholders, it held relevance in the different areas, as per the stakeholder group in question. Thus, effective enforcement for many trap fishers referred to the apprehension of those who poached their traps, the strict and observed delineation of a trap-trawl boundary, and a dedicated policing effort to monitor recreational fishery catches. Dive operators' view of effective enforcement was driven more by their concern over the safety of their divers, and thus, these respondents called for penalties to those who speed over diver-down flags, warnings to recreational anglers fishing when divers are in the water, and mandatory remedial classes for reckless boaters, among others.

However, the overall intent of the term, "effective enforcement", was consistent across stakeholders, and it held particular relevance to the failure of the present management mode. When asked to consider their vision for management in the region, to identify management gaps, and even to consider place-based management, many stakeholders argued that they would not consider an alternate management options or address place-based management until the present management approach were enforced effectively. The concern was that if management cannot even enforce what it is charged to protect presently (i.e., the declining resource conditions), then it should not be made to take on further responsibilities that it will be unlikely to enforce either. In a worst-case scenario, additional protection may in fact weaken further present management. Unless the case can be made to demonstrate that additional management will make enforcement either less relevant as a strictly policing tool (i.e., improve compliance) or more effective, then the present perception on enforcement ineffectiveness (shared by 20% or more of each working panel's participants) may prove a considerable impediment to building support for alternate management approaches.

Marine managed areas and the stakeholder community

Many stakeholders who agreed with place-based management and called for it to be implemented warned against developing marine managed areas without complete stakeholder support. While some argued in favor of the Dry Tortugas model (Delaney, 2003; Cowie-Haskell and Delaney, 2002; NOAA, 2000), which involved the use of a working group panel comprised of various stakeholders in the development of marine managed areas and regulations in the western Florida Keys, others were mostly concerned about stakeholder participation and input. Several of the respondents also felt that SEFCRI had laid the groundwork for future stakeholder participation in a marine managed area or other alternate management development process, by engaging the stakeholder community, conducting extensive outreach and awareness programs, and building a general appreciation for the region's coral reef ecosystem and related resources in the four counties; however, these respondents also argued in favor of a more comprehensive and far-reaching strategy to build greater community, public, and visitor awareness and support, which in turn would promote an increased understanding of the regional resources and lead to support for a bottom-up approach to address resource management issues.

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6. Appendix I: Interview Questionnaire

Project FDOU 18 & 20B Stakeholder Interview Questions

NAME OF PERSON:
COUNTY REPRESENTED:
TYPE OF OPERATION:
YEARS IN COUNTY OR REGION;
AREAS USED ON A REGULAR BASIS (PUT ON MAP, SEE QUESTION 8 AS WELL):

1. What is the current condition of coastal and marine resources in the southeast Florida region where your group operates/recreates? Please consider specific resources such as:
    a. Coral reefs
    b. Wetlands
    c. Beaches
    d. Sea grasses
    e. Water quality
    f. Fisheries
        i. Does your group share your concerns or views on the current conditions? If not, what is the prevailing view of your group on these resources? Why is it different?

2. Has the condition of coastal and marine resources in the southeast Florida region changed?
    a. If improved, then which resources?
    b. If declined, then which resources?
        i. Does your group share your concerns or views on the current conditions? If not, what is the prevailing view of your group on these resources? Why is it different?

3. Within those resources you identified as having improved, which factors have influenced their improvement?
    a. What groups are responsible for the improvement?
    b. What activities by the groups are responsible for the improvement?
    c. Which major reason has been responsible for the improvement?
        i. Local suite of reasons/decisions
        ii. County suite of reasons/decisions
        iii. Southeast Florida suite of reasons/decisions
        iv. Federal/national suite of reasons/decisions

4. Within those resources you identified as having declined, which factors have influenced their decline?
    a. What groups are responsible for the decline
    b. What activities by the groups are responsible for the decline?
    c. Which major reason has been responsible for the decline?

i. Local suite of reasons/decisions
ii. County suite of reasons/decisions
iii. Southeast Florida suite of reasons/decisions
iv. Federal/national suite of reasons/decisions

5. How has your group made up for any changes in resource conditions?
    a. Has your group stopped using or accessing the resource?
    b. Has your group moved its activities further offshore?

6. Please identify and rank all stakeholder groups (including your own) in terms of the conflict these represent in your group's activities. Are the conflicts over:
    a. Similar or same resources?
    b. Same area?
    c. Indirect impacts that the group may have?
    d. Another issue?
    e. Is the conflict temporal or year round or during special event? If so, then please identify peak conflict periods.
    f. Is the conflict a result of poor management, lack of compliance, or lack of enforcement?
    g. What is the long-term impact of the conflict on your group?

7. How should use conflicts be resolved?
    a. Should certain groups not be allowed to use the region or parts of it?

8. Using the following map, please identify:
    a. Areas that are important to your stakeholder group and which are used by your group on a regular basis
        i. If your group uses one area for one type of activity and another area for another type of activity, the please identify them separately

9. Now, within the map, please point out the areas that are in:
    a. Excellent condition/showing excellent improvement
    b. Good condition/showing moderate improvement
    c. Average condition/showing minimal to no improvement
    d. Fair condition/showing moderate decline
    e. Poor condition/showing severe decline
        i. Please identify the resource(s) in the area that you pointed out

10. Finally, within the map, please identify areas of resource conflict, where:
    a. H – high use conflict
    b. M – moderate use conflict
    c. L – low use conflict
    d. N- no use conflict
        i. Please identify the group(s) with the area of conflict

11. What is your group's vision on how the southeast Florida coral reef ecosystem should be managed?
    a. Continued use and protection as present with existing regulations

b. Reduced use among certain groups with modified/expanded regulations for increased protection
c. Reduced use among certain groups only within certain areas to allow for increased protection within those areas only
d. Elimination of some groups with expanded regulations for protection
e. Elimination of almost all uses with strictest regulations for protection
f. Other (please specify)

12. Considering the present status of resources in southeast Florida, what goal(s) should be adopted to better manage the resources? Please rank the goals in terms of their importance. Please list which resource you refer to:
    a. ___ Protection of stressed resources (e.g., coral that is bleaching)
    b. ___Protection of certain key resources (e.g., a particular species or special area)
    c. ___Protection of a percentage of all resources
        i. What percentage would you group recommend?
    d. ___ Moderate levels of protection but with a focus on sustainable use
    e. ___ Enhanced and improved enforcement
    f. ___ Other (Please specify)

13. How important is it in your group's view that the resources in the region be protected in its current condition as a primary goal?
    a. 100% - my group's uses should be curtailed to the extent possible to ensure full resource protection
    b. 75% - a greater balance towards resource protection with certain allowances to my group's uses
    c. 50% - an equal approach on protection and use by all groups
    d. 25% - some protection but mainly a focus on use/access
    e. 0% - use should be prioritized over all protection

14. How important it is in your group's view that the resources in the region be not just protected in their current condition, but also improved or restored to a better state as a primary goal?
    a. 100% - my group's uses should be curtailed to the extent possible to ensure full resource protection
    b. 75% - a greater balance towards resource protection with certain allowances to my group's uses
    c. 50% - an equal approach on protection and use by all groups
    d. 25% - some protection but mainly a focus on use/access
    e. 0% - use should be prioritized over all protection

15. What result would your group most like to see occur as a result of increased protection or resource improvement?
    a. Can you group help achieve this result and if so then how?

16. What are the major management gaps in capacity and authority to protect southeast Florida resources; that is, where does management fail in providing effective protection? (NOTE: We can again provide a suite of options and have them ranked

and allow for original responses) (NOTE 2: While these are merely examples below, we can have them separated into the three main management types – e.g., regulatory management, MMA management, and outreach and education – and have the respondents rank each suite of options based on management types). Please provide suggestions for how managers can fill these gaps or manage more effectively.

a. Lack of marine managed areas in and around coral reefs
b. Lack of statutory authority to enforce no anchoring on reefs
c. Need for better enforcement to patrol existing regulations
d. Need to integrate land-based and coastal management to address LBSP
e. Improvements in fishery management
f. Need for stronger rules and regulations in existing marine managed areas

17. Please identify any new/unique management approaches, regulations, protected area types, or management tools that your group would support the use of to improve management of southeast Florida coral reef resources. Some examples of these could include the use of marine zoning (to separate uses to minimize conflicts), implement user-based advisory groups (to guide management decisions), or others identified in the video. You can use more than one option as well, but please provide your group's highest ranked option, if possible.
    a. In which region would you implement your preferred option(s)?
    b. What coastal or marine resources would be prioritized?
    c. How would the option be funded? User fees, partnerships, government funding?
    d. Who would be in charge of implementing the preferred option? Which agency or what level of government (or NGO)?

18. Do you prefer statewide management or place-based management as your preferred form of management to protect southeast Florida coral reefs and associated resources?
    a. Statewide management approaches
    b. Pace-based management

19. Within statewide management approaches, please rank the following options based on your preference:
    a. Strengthening existing regulations
    b. Establishing new protective legislation
    c. Modifying access
    d. Increasing funding to support coral reef protection
    e. Other (please specify)

20. Within place-based management approaches, please rank the following options based on your preference:
    a. Local (county) protected areas
    b. State protected areas
    c. Federal protected areas
    d. Other (please specify)

21. Please rate the following management tools in terms of their effectiveness in

protecting southeast Florida coral reefs

a. Education and outreach
b. Stakeholder and community involvement
c. Scientific research
d. Resource monitoring
e. Enforcement
f. Other (please specify)

- Why did you rank the lowest tools the way you did and what can be done to improve these tools?

22. If you prefer statewide management approaches to place-based management, please identify the specific regulation you would like to see strengthened, established, etc. How would you propose access by modified? What sources should pay for increased coral reef funding (e.g., taxes, user fee, etc.)?

23. If you prefer place-based management to statewide management approaches, please state if the entire southeast Florida region should be managed as a single zone or whether different zones should be established within the region.
    a. If you believe that different zones should be established, then which ones?
        i. Multiple use (multiple user groups/activities allowed)
        ii. Single use (only one user group/activity allowed)
        iii. Research only (only permitted researchers allowed)
        iv. No discharge
        v. No anchoring/Mooring buoy only
        vi. Transit only (no in-water activity allowed)
        vii. No combustion (pole or electric motor only)
        viii. No personal watercraft
        ix. No diving/snorkeling
        x. No spearfishing
        xi. No lobstering
        xii. Marine reserve (no take)
        xiii. Other (please specify)
    b. Why did you select the zones that you did? What are the benefits to these zones? Are there any negative impacts?
    c. Which groups would you expect to most benefit from these zones? Which ones would be most impacted?

24. If you prefer place-based management to statewide management approaches, which issue(s) should a marine managed area in southeast Florida address? Of the issues listed, which should take the top priority?

    a. Overfishing
    b. Anchor damage
    c. Ship groundings
    d. Land-based sources of pollution
    e. Water quality
    f. Diving/snorkeling impacts
    g. Coastal construction

h. In water pollution/waste dumping
i. Other (please specify)

- What should the goal of the marine managed area be in relation to each issue identified (e.g., increase juvenile fish, end overfishing, etc.)?
- How do you propose addressing each issue/goal (e.g., stricter fish size regulations, closed areas to all users, permitted use areas, no anchor zones, more enforcement, etc.)?

25. If you prefer statewide management approaches, but there are going to be marine managed areas anyway, please state if your group would be more in favor that the entire southeast Florida region should be managed as a single zone or whether different zones should be established within the region.
    a. If zones were to be established, which zoning types would your group most oppose and why?
        i. Multiple use (multiple user groups/activities allowed)
        ii. Single use (only one user group/activity allowed)
        iii. Research only (only permitted researchers allowed)
        iv. No discharge
        v. No anchoring/Mooring buoy only
        vi. Transit only (no in-water activity allowed)
        vii. No combustion (pole or electric motor only)
        viii. No personal watercraft
        ix. No diving/snorkeling
        x. No spearfishing
        xi. No lobstering
        xii. Marine reserve (no take)
        xiii. Other (please specify)
    b. Why did you select the zones that you did? What are the benefits to these zones? Are there any negative impacts?
    c. Which groups would you expect to most benefit from these zones? Which ones would be most impacted?

26. If you are not in favor of the establishment of place-based management, how do you propose addressing the issues in the region?
    a. Are there other management activities should be done, in addition to (or instead of) establishment of a marine managed area, to address these issues? If so, what?

27. If you did not identify place-based as a preferred management approach, please identify specific areas on the map provided that your group would be most willing to accept where such management could be applied and please identify areas that your group would be most opposed to place-based management being applied. Please identify reasons for selecting areas not to be protected by such management (e.g., popular fishing site, popular diving/snorkel site, etc.).

28. Using the benthic habitat map provided, (NOTE: We should decide whether to include existing management areas such as state parks) please identify which areas

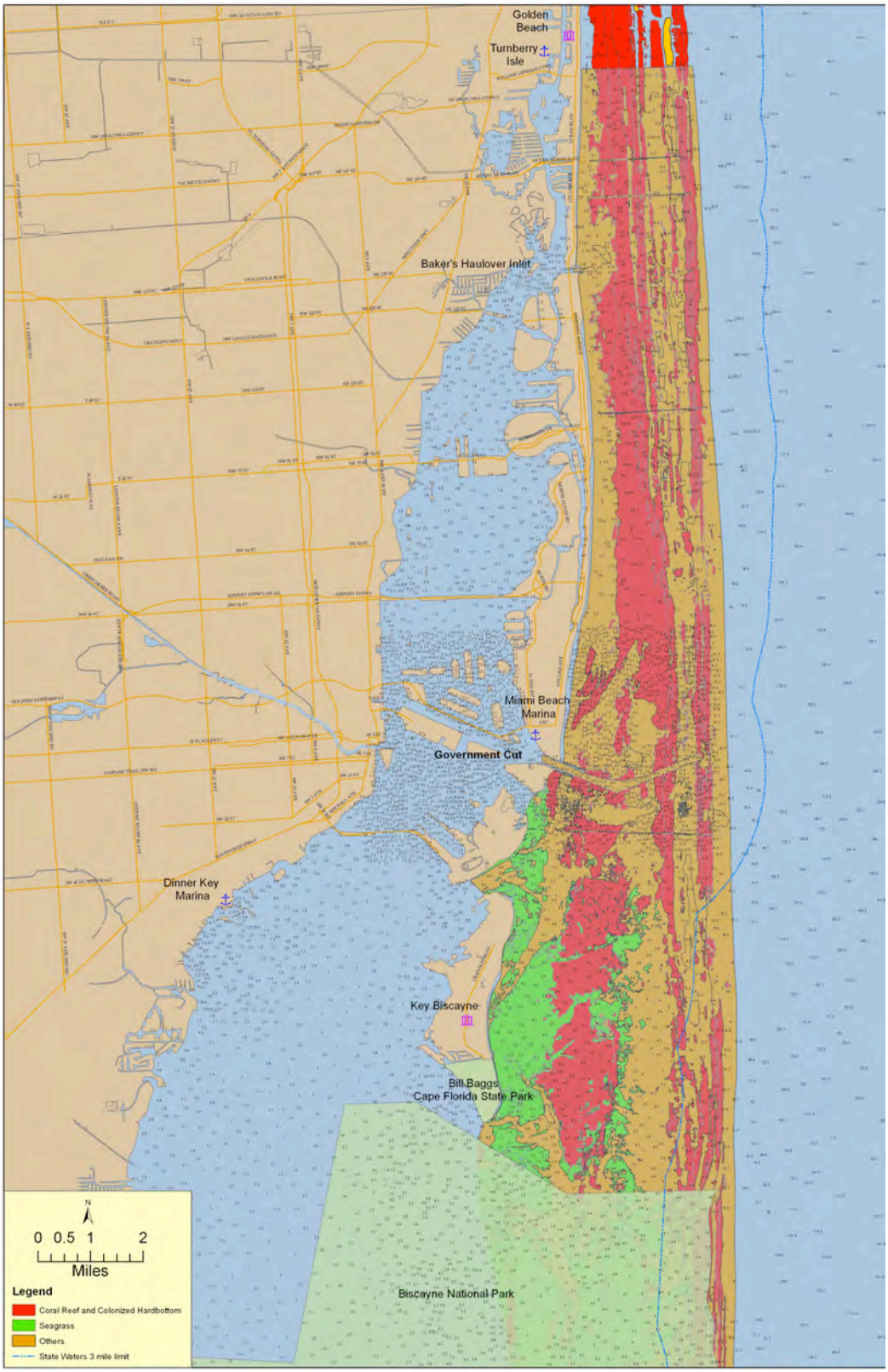
and resources need:

a. Highest level of protection, i.e., where uses should be curtailed to the extent possible to protect the resources
b. Moderate level of protection, i.e., where uses should be prioritized to the extent where they are compatible with resource protection objectives
c. Minimal level of protection, i.e., where most uses should be allowed as they are presently
d. No increased level of protection, i.e.,, status quo

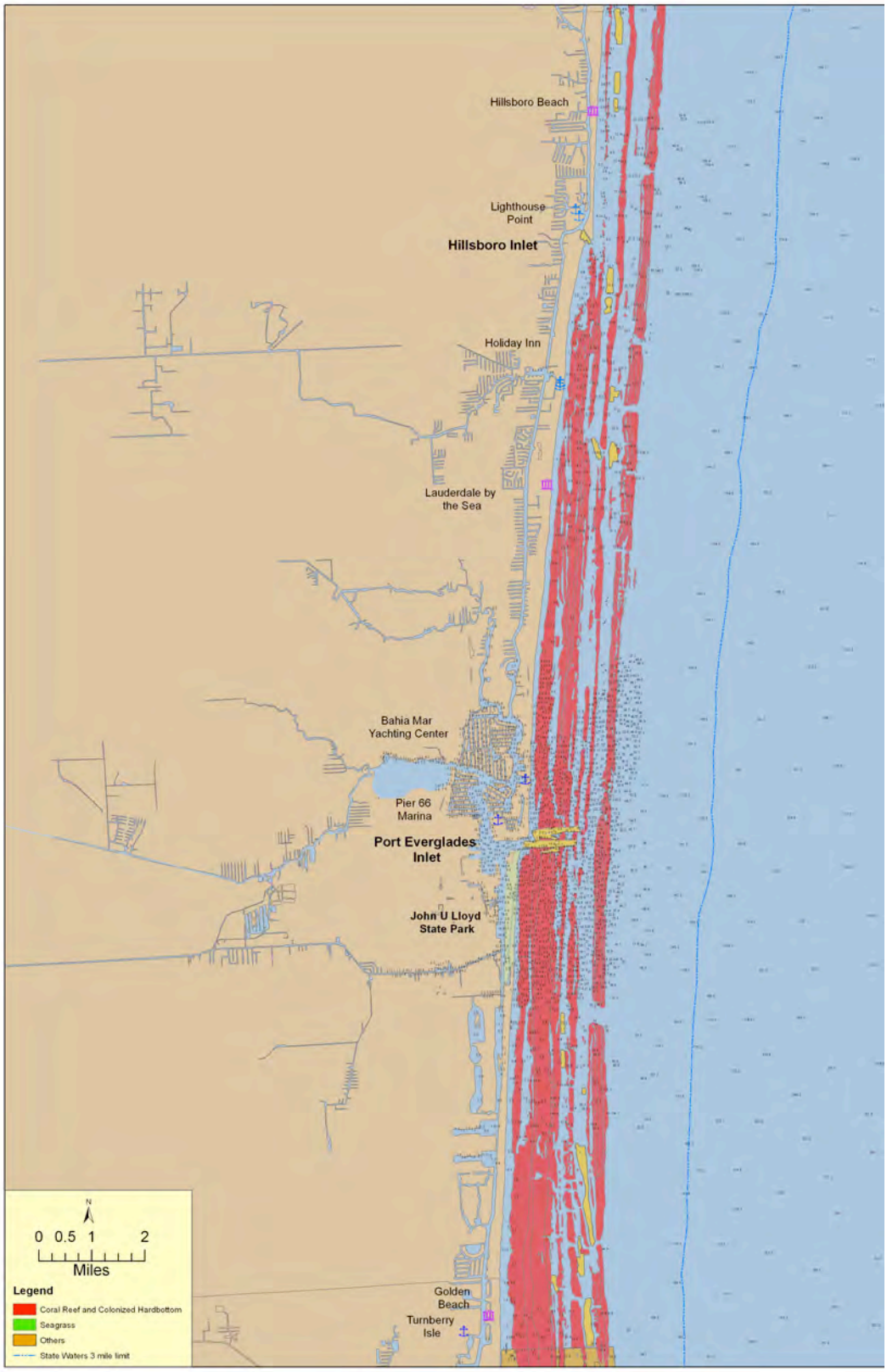
- Please identify reasons to justify the locations you selected (e.g., fish spawning aggregation, nursery area, Breaker's Reef, etc.).

29. If you identified place-based as a preferred management approach, please identify specific areas on the map provided where you would like to see that management be applied. Please be as specific as possible with the boundaries for the area, and reasons for selecting that area (e.g., nursery area, better water quality, etc.). Please also identify what type of place-based management you would like to see in each area you identify (e.g., all mixed use zone, combination of no-take zone and mixed use zone, no anchor zone, etc.)

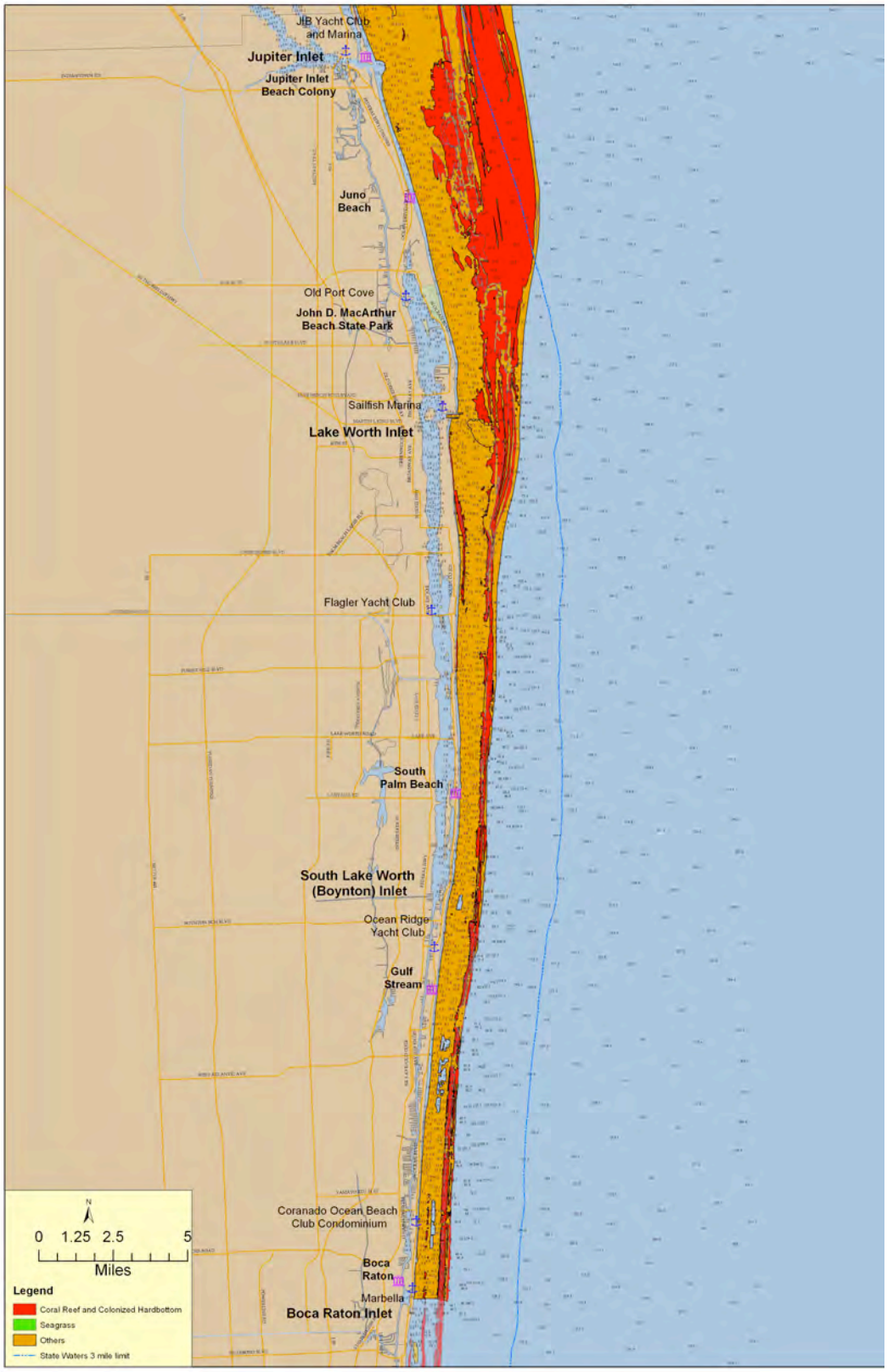
END OF QUESTIONNAIRE



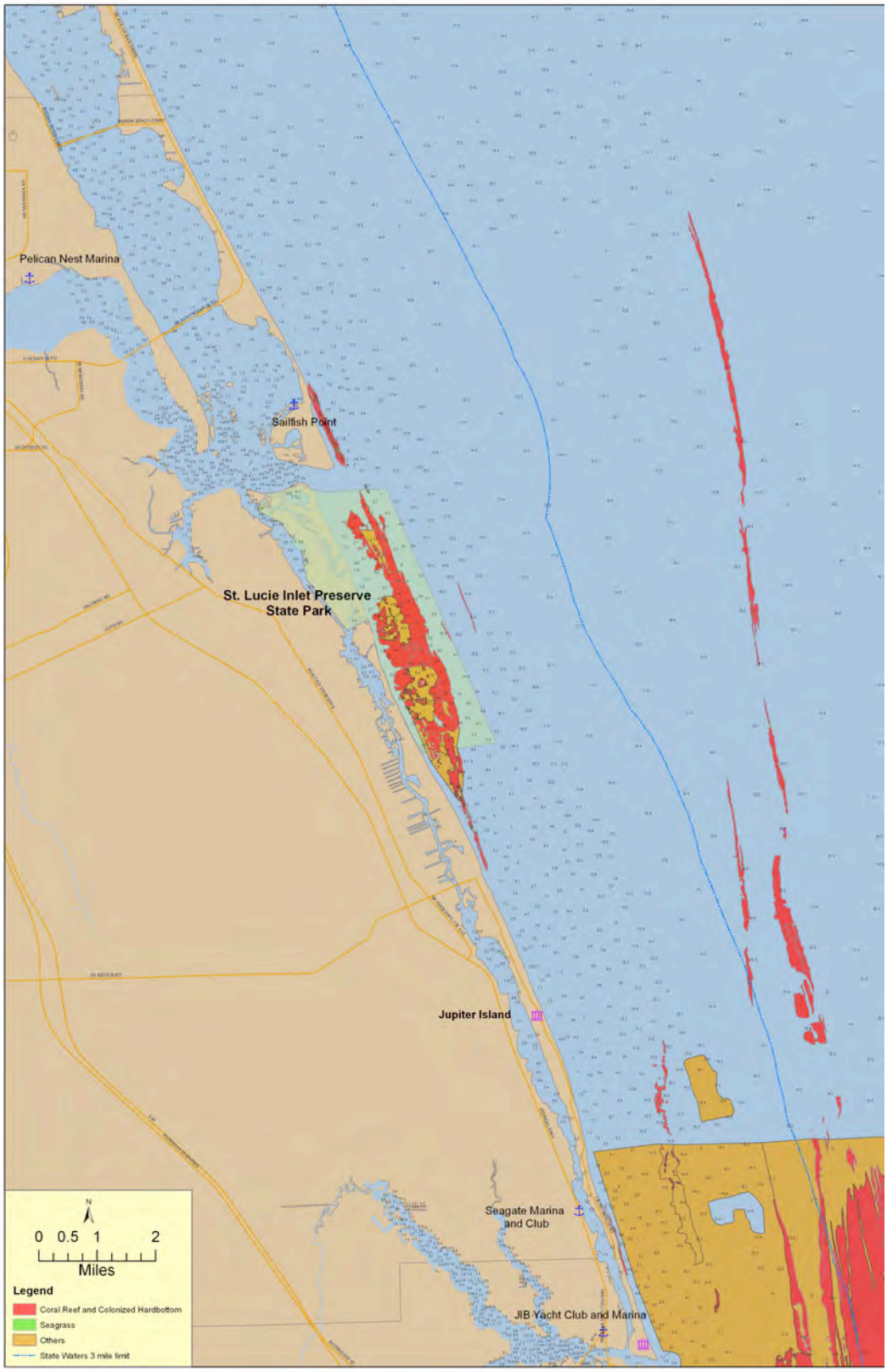
Appendix map 1. Interview map, Miami .



Appendix map 2. Interview map, Broward.



Appendix map 3. Interview map, Palm Beach.



Appendix map 4. Interview map, Martin.

7. Appendix II: Stakeholder Survey

Check (X) the appropriate items or fill in the blanks. Please write an answer that cannot be adequately expressed by checking or filling in the blanks.

1a. Are you a Southeast Florida Resident? [ ] YES [ ] NO

- If NO, then are you a: [ ] non resident seasonal [ ] non resident on vacation

1b. What is your zip code? ___ ___ ___ ___ ___

2. How many years have you been fishing recreationally in south Florida?

[ ] One year or less [ ] 1-5 years [ ] 6-10 years [ ] 11-15 years [ ] 16-20 years [ ] Over 20 years

3. Which of the following includes your age?

[ ] Under 18 years [ ] 18-30 years [ ] 31-40 years [ ] 41-50 years [ ] 51-60 years [ ] over 60 years

4a. Are you Spanish/Hispanic/Latino? [ ] YES [ ] NO

4b. Which of the following best describes your race?

[ ] White [ ] African American [ ] Native American [ ] Asian [ ] Other (_____)

5. For the next question, please circle the condition of each resource in its present condition in southeast Florida and whether it has gotten better or worse since when you first started fishing here.

	Excellent ←----------→ Poor					Better ←----------→ Worse				
a. Coral reefs	1	2	3	4	5	1	2	3	4	5
b. Wetlands	1	2	3	4	5	1	2	3	4	5
c. Beaches	1	2	3	4	5	1	2	3	4	5
d. Sea grasses	1	2	3	4	5	1	2	3	4	5
e. Water quality	1	2	3	4	5	1	2	3	4	5
f. Fisheries	1	2	3	4	5	1	2	3	4	5

6. Please rate the level of conflict that your group has with the following groups, where 1 is the least conflict and 5 the most.

	Least ←----------→ Most				
a. Other anglers	1	2	3	4	5
b. Commercial fishers	1	2	3	4	5
c. Recreational divers	1	2	3	4	5
d. Recreational boaters	1	2	3	4	5
e. Researchers and managers	1	2	3	4	5
f. Coastal construction industry	1	2	3	4	5
g. Environmental groups	1	2	3	4	5
h. Ports and marinas	1	2	3	4	5
i. Surfers	1	2	3	4	5

7. What is your primary goal for the management of the southeast Florida coral reef ecosystem?

[ ] Continued use and protection as present with existing regulations
[ ] Reduced use among certain groups with modified/expanded regulations for increased protection
[ ] Reduced use among certain groups only within certain areas to allow for increased protection in those areas
[ ] Elimination of some uses with expanded regulations for protection
[ ] Elimination of almost all uses with strictest regulations for protection

8. Considering the status of coastal and marine resources in southeast Florida, what option would you believe should be adopted above other to manage the resources.

[ ] Protection of the resources that are most stressed or in the most trouble above all other resources
[ ] Protection of certain key resources, such as an important species or a special area
[ ] Protection of a certain percentage of all resources; if so, then what percentage would you favor? _____%
[ ] Moderate levels of protection with a focus on sustainable use
[ ] Greater and improved enforcement

9. Has management in the region failed in providing effective protection in the following areas? Mark all those that apply, and please add any others that are not listed.

[ ] Lack of marine managed areas around coral reefs and other coastal and marine habitats
[ ] Lack of effective enforcement to patrol existing regulations
[ ] Lack of authority to enforce anchoring on coral reefs
[ ] Lack of integrated management from both the land and ocean to address land-based sources of pollution
[ ] Lack of improvements in fishery management measures
[ ] Other_____

10. Do you prefer statewide management or place-based management approaches to protect southeast Florida coral reefs and associated resources?

[ ] Statewide management, i.e, existing regulations or new legislation that is applied the same throughout the entire state

[ ] Place-based management, i.e., applies a regulation to a specific area in order to achieve a specific objective in that area

11. Within statewide management approaches, please rate (from 1-5) the following options based on your preference, where 1 is least preferred and 5 is most preferred:

	Least ←----------→ Most				
a. Strengthening existing regulations	1	2	3	4	5
b. Establishing new protective legislation	1	2	3	4	5
c. Modifying access	1	2	3	4	5
d. Increasing funding to support protection	1	2	3	4	5

12. Within place-based management in southeast Florida, which type of management arrangement do you most prefer?

[ ] Local or county protected areas
[ ] State protected areas
[ ] Federal protected areas
[ ] Integrated protected areas, managed jointly by local, state, and federal agencies
[ ] Co-managed protected areas, managed by governmental agencies with stakeholder consultation and input

13. Within place-based management, which of the following issue(s) should a marine managed area address? Check all those that apply.

[ ] Overfishing

[ ] Anchor damage to coral reefs and other sensitive habitats

[ ] Vessel groundings

[ ] Land-based sources of pollution

[ ] Water quality impacts

[ ] Diving, snorkeling, and related use impacts

[ ] Coastal construction

[ ] In-water pollution/discharge

- Of these issues, which is the most important? _____

14. If place-based management were to be used, would you favor that the entire southeast Florida coastal and marine environment be managed as:

[ ] A single zone, where all management is the same in the zone

[ ] Two or more different zones, where there are different types and levels of uses allowed within the region

15. If different zones were established under place-based management in southeast Florida's coastal and marine environment, which ones should be established (or which would you be least opposed to)? Check as many as apply.

[ ] Multiple use zones in which multiple users and uses are allowed

[ ] Single use zones in which only a single use is allowed

[ ] Research only zones in which only research is allowed

[ ] Transit only zones in which no activities except transit are allowed

[ ] No anchoring zones

[ ] No discharge zones

[ ] No personal watercraft or jet-ski zones

[ ] No diving/snorkeling

[ ] No spearfishing or lobster diving

[ ] No fishing in which a marine reserve or no-take zone is established

- Of these zones, which is the one zone that you would be most in favor or least opposed to? _____

Finally, using the map on the opposite side on this page, please circle the FIVE (5) areas that you would prioritize for protection above all others. Please try to identify the areas themselves by name below and the resources they contain that make them important to protect.

Area 1_____; Resources_____

Area 2_____; Resources_____

Area 3_____; Resources_____

Area 4_____; Resources_____

Area 5_____; Resources_____

8. Appendix III: Pilot Session Report

FDOU 18 & 20B: Development of Management Alternatives for the Southeast Florida Region According to Stakeholder Working Panels

Findings and recommendations from pilot interviews with stakeholders

Marine & Coastal Research, Corp.

February 22, 2011

Introduction

The goal of this report is to present pilot interview findings as conducted with stakeholders in the Southeast Florida Coral Reef Initiative (SEFCRI) region as a means by which to improve the content and flow of the interview process. Pilot interview sessions (see Alreck and Settle, 2004) can provide important information on how the respondent perceives particular questions, whether the respondent is willing to answer certain questions, and how questions can be clustered or separated to allow for a more coherent and successful interview. Moreover, in the approach as adopted for this project (Marine & Coastal Research, Corp., 2009), pilot testing is essential in determining whether the questions used can address the nine themes of inquiry with the various stakeholders in reaching an understanding of stakeholder knowledge of and attitudes towards management approaches in southeast Florida.

Methodology

The methodology adopted as part of the pilot session included (a) contacting knowledgeable stakeholders to participate in the interview, (b) discussing the project objectives and approach with the respondents, and (c) conducting the interview while allowing for content-based and project-based feedback throughout the interview process. Respondents were encouraged to critically evaluate each theme and questions therein and to provide suggestions on improving questions, the flow of the interview, and the length and applicability of the questionnaire.

The interview questions were asked in order by theme, commencing with questions related to the perceived resource conditions, causes leading to current resource conditions, and major conflicts in the coastal and marine environment in the region; these were followed by stakeholder goals for coastal and marine management in southeast Florida, their views on present management approaches, and their identification of gaps in those approaches; novel ideas to address the aforementioned gaps, preferred options across a suite of approaches, and the identification of potential areas of concern that should be prioritized for management.

Two stakeholders – a researcher who has had extensive experience in management issues in the region and is an educator as well, and a recreational fishery group

representative with a background in coastal management – were selected for the interview. Interviews took place over the week of February 14th and were conducted in person and via Skype (video conferencing). Respondents viewed the video, which was provided ahead of time of the interview.

Results

The results are provided both in terms of the overall observation, comments, and suggestions provided by the interviews conducted with the stakeholders, and as a series of comments under each question. Thus, the results are both general and pertain to the entire questionnaire (and approach). Moreover they are specific and provide direct suggestions on how to improve the content and flow of the questionnaire.

Overall observations, comments, and suggestions

The stakeholders interviewed felt that the language used in the questionnaire is too unwieldy and academic, and this may affect stakeholder responses. The suggestion provided by both respondents was to replace formal terms with colloquialisms and to ensure that technical language is replaced to provide an informal setting.

The other, related suggestion from the respondents was to change and/or collapse certain questions and to change the order of particular types of questions so that there is more of a flow within the questionnaire. This was particularly the case with respect to the questions that required maps, which the respondents felt could be asked together such that maps were not being introduce more than twice (i.e.,, at the beginning and end of the interview session).

Also, the interviewees felt that it might be difficult to have stakeholders speak for their communities or groups, especially for those groups where there exist a variety of interests. Thus, the recreational fishery group representative believed that while he cold provide his group's views on resource conditions, it would have to be clear that his group represents a particular type of recreational angle (in this case, anglers interested in game and trophy fish). Similarly, the other respondent also felt that those groups that have an individual, commercial nature (such as the commercial fishing industry, dive operations, etc.) could mostly represent their activities and views in their particular regions, where there is a convergence of use and interests; however, these views could not be extrapolated to the entire region for that stakeholder group.

The respondents also felt that questions related to management approaches were at times confusing and contradictory, and that these should either be reworded or removed altogether to generate simpler, more directed questions. The overall view was that many stakeholders would not understand how to address capacity gaps and other such management jargon, but that if these questions were reworded to ask for 'what is missing in management, or what is not being done right, or where is management failing?', it may greatly assist response rates and stakeholders' willingness to elaborate on their views.

Finally, the respondents felt that the questionnaire, particularly towards the final three sections, is too long and at times repetitive. They suggested changing the language to

shorten the questions and to allow for more feedback using fewer questions. While some questions were considered dispensable (see below), respondents generally agreed that the themes were important and should be retained.

Specific comments by theme and question (comments in italics)

a. Perceived current resource condition of the southeast Florida coral reef ecosystem

1. What is the current condition of coastal and marine resources in the Southeast Florida ecosystem in which you operate/recreate or have knowledge?
    a. Consider specific resources, such as wetlands (mangroves), beaches, seagrasses, coral reefs
    b. Consider water quality
    c. Consider any other aspects

NOTE: Not all stakeholder groups can answer this question. How fair is it to ask the question? Should the key informant's view be taken to be that of the group?

Are your concerns or views on the current conditions shared by your group? If not, what is the prevailing view of your group on these resources? Why is it different?

NOTE: This question works to bring the group's view in with that of the respondent.

2. Using the benthic habitat map provided, please circle the resource and label using the following letters where you have observed each resource at it's current condition, referred to in the previous question. Please provide landmarks/reef/area names, if available:
    E = excellent
    G = good
    A = average
    F = fair
    P = poor

NOTE: Is there some way to combine questions 2 and 4 from section a and question 2 from section c such that it reads as follows?

Using the benthic map provided, please circle the area that your group uses/relies on. Next, please identify within the area the condition of the resources by using a scale from Excellent to Poor, and also please note whether the condition of the resources have improved (1) or declined (5). Finally, on the same map, identify areas of conflict that your group has with other groups, from high (H) to no conflict (NC).

3. Has the condition of the aforementioned resources changed since you have been here in Southeast Florida? If so, then how?
    i. Are your views shared by others in your group? If not, then why?

4. Using the benthic habitat map provided, and based on the time you have spent in the region, please circle the resource and label using the following letters and numbers the areas that you would rank as:
   1 = Severe decline
   2 = Moderate decline
   3 = Minimal decline
   4 = No change
   5 = Minimal improvement
   6 = Moderate improvement
   7 = Excellent improvement

b. Perceived causes leading to current resource condition of the southeast Florida coral reef ecosystem

1. Since your time in Southeast Florida, would you agree that resource conditions have improved or declined?

NOTE: Questions 1-3 from section b are closely related to Question 4 from section a. It would be best to move Question 4 to section b and to ask the questions together.

2. If you believe that resource conditions have improved/declined, to what cause(s) do you attribute that improvement/decline? (NOTE 1: Here, we can have a suite of options or a blank question, NOTE 2: Groups include general public, government, NGO, fishermen, divers, boaters)
   a. What groups are responsible for the improvement/decline of the resources? Please rank the groups in terms of their impacts.
   b. What specific activities practiced by the groups that you ranked are most responsible for the improvement/decline in southeast Florida resource?
   c. Are the groups' activities that you describe a result of compatible/incompatible uses or poor management practices, enforcement, etc.? The enforcement in any resource protection regulation is lacking here in Florida.

3. If you believe that there has been an improvement/decline in resource conditions, please identify the major local/county/region/global reasons for the improvement/decline (NOTE: Ranking may be provided such that local, county, region, and global options are prioritized, and then the 5 most important options are ranked)
   a. Local (city/municipality) suite of reasons
   b. County suite of reasons
   c. Southeast Florida region suite of reasons
   d. Global suite of reasons

4. How has the change in resource condition (decline or improvement) that you identified affected how you use the resource (e.g., go to different area, go less often, etc.)?
    a. When did you start changing how you use the resource, and for how long? Although there was an improvement in swordfish stock, I did not increase my fishing activities.
    b. Has your use change been exacerbated by changing economy? If so, how?

c. Major conflicts or issues that impede stakeholder use of the southeast Florida coral reef ecosystem

1. In terms of conflicts, please rank the various stakeholder groups in terms of the conflicts they represent to your activities. Please include your own group if that represents a conflict within the overall group itself. In terms of the conflict(s), are these over:
    a. the same resources?
    b. the same area used?
    c. indirect impacts on the resources/area used?
    d. some other issue?
    e. Is the conflict is temporal (e.g., year-round versus seasonal, special events, etc.) and if so, then please identify the time periods of highest conflict?
    f. Is the conflict a result of poor management (e.g., lack of rules), lack of compliance, or lack of enforcement?
    g. If the conflicts were to continue as they are presently, what are the long-term impacts of these conflicts?

2. Using the benthic habitat map provided, please 1) circle areas that you use, and 2) circle and label areas of high (H), moderate (M), low (L), and no conflict (NC) by the five highest ranked groups. Please label which group(s) presents conflicts for high, moderate, and low conflict levels. Also, please identify any areas of intra-group conflicts with an "IG".

3. How should use conflicts be resolved? Should certain groups be not allowed to use the region or parts of the region? If so, then which one(s)?

NOTE: A lot of the questions should be left open ended such that stakeholders should be allowed to provide answers. Also, a lot of the questions may result in only one answer if the group is a single-issue group or where the group has little knowledge of the issues due to the amount of time spent on the water.

d. Stakeholder goals for southeast Florida coral reef ecosystem protection

1. In terms of overall goals for southeast Florida ecosystem management, what is your group's vision? (Use options ONLY if one of these is not provided)
    a. Continued use and protection as present with existing regulations
    b. Reduced use among certain groups with modified/expanded regulations for increased protection
    c. Reduced use among certain groups only within certain areas to allow for increased protection within those areas only
    d. Elimination of some groups with expanded regulations for protection
    e. Elimination of almost all uses with strictest regulations for protection
    f. Other (please specify)

2. Considering the present status of resources in southeast Florida, what goal(s) should be adopted to better manage the resources? Please rank the goals in terms of their importance. Please list which resource you refer to:
    a. ___ Protection of stressed resources (e.g., coral that is bleaching)
    b. ___Protection of certain key resources (e.g., a particular species or special area)
    c. ___Protection of a percentage of all resources
        i. What percentage would you group recommend?
    d. ___ Moderate levels of protection but with a focus on sustainable use
    e. ___ Enhanced and improved enforcement
    f. ___ Other (Please specify)

3. How important is it in your group's view that the resources in the region be protected in its current condition as a primary goal?
    a. 100% - my group's uses should be curtailed to the extent possible to ensure full resource protection
    b. 75% - a greater balance towards resource protection with certain allowances to my group's uses
    c. 50% - an equal approach on protection and use by all groups
    d. 25% - some protection but mainly a focus on use/access
    e. 0% - use should be prioritized over all protection

4. How important it is in your group's view that the resources in the region be not just protected in their current condition, but also improved or restored to a better state as a primary goal?
    a. 100% - my group's uses should be curtailed to the extent possible to ensure full resource protection
    b. 75% - a greater balance towards resource protection with certain allowances to my group's uses
    c. 50% - an equal approach on protection and use by all groups
    d. 25% - some protection but mainly a focus on use/access
    e. 0% - use should be prioritized over all protection

5. What result would your group most like to see occur as a result of increased protection or resource improvement?

6. Which groups most share your views/vision for the region's resources; i.e.,, which groups are most allied with your goals?

7. Which groups least share your views/vision for the region's resources; i.e.,, which groups are most opposed to your goals?

NOTE: A lot of groups may not answer this question, and these responses may be obtained from the conflicts section; the suggestion would be to remove questions 6 and 7.

e. Stakeholder understanding of existing (within and external to Florida) types of marine managed areas, marine rules and regulations, and marine resource management tools used to balance marine resource conservation and sustainable use

1. Within your group, how familiar would you say that members are with the following issues that you saw in the Coral Reef Management in Southeast Florida video:
    a. The different types of coastal and marine resources
    b. Existing management approaches
    c. Existing statewide regulatory approaches
    d. Existing place-based management approaches
    e. Existing marine managed areas along the Florida Reef Tract

2. How would you rank the video in helping your group in understanding how Southeast Florida coral reefs and associated resources are managed?
    a. Excellent
    b. Good
    c. Average
    d. Poor
    e. Very poor
    - why did you provide the ranking you did for this question?

3. Was there information in the video that could have been explained better?

4. Was there information in the video with which your group would not agree in terms of its scientific validity?
    - If so, then which information?

NOTE: Is there any particular reason to have the stakeholders answer these questions? Could they not perhaps fill out a questionnaire separately to rate the videos?

5. Does your group believe that the following management approaches are successful?
    a. Statewide management approaches
    b. Place-based management approaches
    c. Management tools

    - If so, then which one(s)?

NOTE: This question is asked in a few different ways in the next sections so it is best to remove it.

f. Stakeholder understanding of major gaps in management capacity and regulatory authority needed to protect reef resources

1. What are the major management gaps in capacity and authority to protect southeast Florida resources; that is, where does management fail in providing effective protection? (NOTE: We can again provide a suite of options and have them ranked and allow for original responses) (NOTE 2: While these are merely examples below, we can have them separated into the three main management types – e.g., regulatory management, MMA management, and outreach and education – and have the respondents rank each suite of options based on management types). Please provide suggestions for how managers can fill these gaps or manage more effectively.
    a. Lack of marine managed areas in and around coral reefs
    b. Lack of statutory authority to enforce no anchoring on reefs
    c. Need for better enforcement to patrol existing regulations
    d. Need to integrate land-based and coastal management to address LBSP
    e. Improvements in fishery management
    f. Need for stronger rules and regulations in existing marine managed areas

g. Stakeholder development of novel types of marine managed areas, marine rules and regulations, and marine resource management tools designed to minimize or eliminate major gaps in management capacity and regulatory authority needed to protect reef resources

1. Please identify any new/unique management approaches, regulations, protected area types, or management tools that your group would support the use of to improve management of southeast Florida coral reef resources. Some examples of these could include the use of marine zoning (to separate uses to minimize conflicts), implement user-based advisory groups (to guide management decisions), or others identified in the video. You can use more than one option as well, but please provide your group's highest ranked option, if possible.
    a. Where is the region would implement your preferred option(s)?
    b. What coastal or marine resources would be prioritized?
    c. How would the option be funded? User fees, partnerships, government funding?
    d. Who would be in charge of implementing the preferred option? Which agency or what level of government (or NGO)?

h. Degree of preference for a suite of potential coral reef management options, including marine zoning, for the southeast Florida coral reef ecosystem.

NOTE: Maps in this and earlier sections should perhaps be limited to those groups that are most likely to be familiar with the coastal and marine resources and who use these resources frequently and can provide well-informed answers. Also, this section is confusing at times when it switches back and forth from place based and statewide management.

2. Please rank your preferred management approach (statewide management or place-based management) for the southeast Florida coral reefs FIRST and select the five most preferred modes of management regardless of management approach SECOND (NOTE: The options here will be fleshed out to a degree where the respondent can select from a few options by mode or rank the highest from a wide variety of options; also, stakeholders will be allowed to add options):
    a. ____Statewide Management Approaches
        i. Strengthen existing regulations
        ii. Establish new protective legislation
        iii. Modify access
        iv. Increase funding to support coral reef protection
        v. Other (please specify)
    b. ____Place-based Management Approaches
        i. Local (county) protected areas
        ii. State protected areas
        iii. Federal protected areas
        iv. Other (please specify)

3. If you identified statewide as a preferred management approach, please identify the specific regulation you would like to see strengthened, established, etc. How would you propose access by modified? What sources should pay for increased coral reef funding (e.g., taxes, user fee, etc.)?

4. If you identified place-based as a preferred management approach, please identify whether the entire southeast Florida region should be managed as one type, or if zoning should be used.
    a. If you feel that zoning should be used, please list which of the following zone types (or the purpose of the zones) should be used and explain why.
        i. Multiple use (multiple user groups/activities allowed)
        ii. Single use (only one user group/activity allowed)
        iii. Research only (only permitted researchers allowed)
        iv. No discharge
        v. No anchoring/Mooring buoy only
        vi. Transit only (no in-water activity allowed)
        vii. No combustion (pole or electric motor only)
        viii. No personal watercraft
        ix. No diving/snorkeling
        x. No spearfishing
        xi. No lobstering
        xii. Marine reserve (no take)

xiii. Other (please specify)

b. Please identify the potential benefits and negative consequences of the zones you ranked.
c. Which group(s) would most benefit from the zones? Which group(s) would most be impacted?
d. What could be done to distribute benefits more equally?

5. If you did not identify place-based management as a preferred management approach, please identify whether your group would be more opposed to the entire southeast Florida region managed as one type, or more opposed to zoning applied to the region.
    a. Please rank which zone types your group would most oppose and explain why.
        i. Multiple use (multiple user groups/activities allowed)
        ii. Single use (only one user group/activity allowed)
        iii. Research only (only permitted researchers allowed)
        iv. No discharge
        v. No anchoring/Mooring buoy only
        vi. Transit only (no in-water activity allowed)
        vii. No combustion (pole or electric motor only)
        viii. No personal watercraft
        ix. No diving/snorkeling
        x. No spearfishing
        xi. No lobstering
        xii. Marine reserve (no take)
        xiii. Other (please specify)
    b. Please identify the potential benefits and negative consequences of the zones you ranked.
    c. Please list the user groups you see as beneficiaries of each zone type you ranked
    d. What could be done to distribute benefits more equally?

6. If you identified place-based as a preferred management approach, please identify specific areas on the map provided where you would like to see that management be applied. Please be as specific as possible with the boundaries for the area, and reasons for selecting that area (e.g., nursery area, better water quality, etc.). Please also identify what type of place-based management you would like to see in each area you identify (e.g., all mixed use zone, combination of no-take zone and mixed use zone, no anchor zone, etc.)
    a. If you did not identify place-based as a preferred management approach, please identify specific areas on the map provided that you would be most willing to accept where such management could be applied, and/or please identify areas that you would be most opposed to place-based management being applied. Please identify reasons for selecting areas not to be protected by such management (e.g., popular fishing site, popular diving/snorkel site, etc.).

7. Please identify criteria or considerations that should be used in establishing a new

management approach for the southeast Florida region (e.g., financing, displaced user groups, habitat or species protection, enforcement, connectivity to other protected areas, etc.).

NOTE: Question 6 is out of place and should be eliminated. The question is too in-depth and would require another section.

8. If you identified place-based as a preferred mode of management, which issue(s) should a marine managed area in southeast Florida address? Of the issues listed, which should take the top priority?

    a. Overfishing
    b. Anchor damage
    c. Ship groundings
    d. Land-based sources of pollution
    e. Water quality
    f. Diving/snorkeling impacts
    g. Coastal construction
    h. In water pollution/waste dumping
    i. Other (please specify)

    - What should the goal of the marine managed area be in relation to each issue identified (e.g., increase juvenile fish, end overfishing, etc.)?
    - How do you propose addressing each issue/goal (e.g., stricter fish size regulations, closed areas to all users, permitted use areas, no anchor zones, more enforcement, etc.)?

9. If you are not in favor of the establishment of a marine managed area, how do you propose addressing the issues in the region?
    a. Are there other management activities should be done, in addition to (or instead of) establishment of a marine managed area, to address these issues? If so, what?

10. Please rank your preferred management tools for the southeast Florida coral reefs.
    a. Education and outreach
    b. Stakeholder and community involvement
    c. Scientific research
    d. Resource monitoring
    e. Enforcement
    f. Other (please specify)

11. If you identified stakeholder and community involvement as your preferred management tool, please rank your preferences for your group's participation in coral reef management processes:
    a. Working group
    b. Advisory panel
    c. Public Meeting
    d. Other (please specify)

NOTE: Questions 10 and 11 seem out of place here. If the objective is to learn on the type/level of management required and whether co-management is an option, then a suite of questions should be developed to address that. Otherwise, these questions do not address the issue fully.

i. Using GIS-based maps, identify both specific (e.g., Breakers Reef) and characteristic (e.g., nursery areas) perceived areas of concern (e.g., access, sensitivity, etc.) within the SEFCRI region, types of protection needed/not needed for such areas, and specific reasons why.

2. Using the benthic habitat map provided, (NOTE: We should decide whether to include existing management areas such as state parks) please identify which areas and resources need:
    a. Highest level of protection, i.e.,, where uses should be curtailed to the extent possible to protect the resources
    b. Moderate level of protection, i.e.,, where uses should be prioritized to the extent where they are compatible with resource protection objectives
    c. Minimal level of protection, i.e.,, where most uses should be allowed as they are presently
    d. No increased level of protection, i.e.,, status quo
    - Please identify reasons to justify the locations you selected (e.x., fish spawning aggregation, nursery area, Breaker's Reef, etc.).

NOTE: The language used for the questions sound at times too academic and can be very confusing. Also, the questionnaire is very long, unless the questions are not all relevant to all groups.

Conclusions and Recommendations

The pilot session determined that the questions developed for the interviews can be used for the full session but with a few revisions. The revisions identified during the session include the grouping of questions in a way that the interview can flow better than it did during the pilot interviews, the clustering of questions involving maps, the elimination of questions that are either repetitive or do not fit within the overall objectives of the project, the clustering of questions that are based on a specific preference (rather than alternating questions on different preferences), and the allowance of providing options *only* when the respondent cannot (or does not) provide an answer. As part of the pilot session, the interview questions were revised and are attached as Appendix I.

The pilot session also concluded that the efficacy of the questions depends on the quality of the interviewer. Interviewers must be willing to ask drill down questions that address the reasons behind respondents' answers on issues related to management preferences in particular. Because of the ethnographic approach utilized by the interviews, interviewers will need to engage stakeholders but not to guide their responses.

Finally, the pilot session found that many of the questions may not be related to the stakeholders who are least frequently in the coastal and marine environments. These

groups would likely be the least informed on issues related to resource conditions, resource trends, and use conflicts. However, interviewers will ask all stakeholders the full suite of questions, with the understanding that several such respondents may not be able to answer certain questions.

References

Alreck, P. L, and R. B. Settle. 2004. The Survey Research Handbook. Third Edition. McGraw-Hill/Irwin: New York, NY.

Marine & Coastal Research, Corp. 2009. Proposal for the Development of Management Alternatives for the Southeast Florida Region According to Stakeholder Working Panels. Internal Document.

Appendix I: Project FDOU 18 & 20B Stakeholder Interview Questions

1. What is the current condition of coastal and marine resources in the southeast Florida region where your group operates/recreates? Please consider specific resources such as:
    a. Coral reefs
    b. Wetlands
    c. Beaches
    d. Sea grasses
    e. Water quality
    f. Fisheries
        i. Does your group share your concerns or views on the current conditions? If not, what is the prevailing view of your group on these resources? Why is it different?

2. Has the condition of coastal and marine resources in the southeast Florida region changed?
    a. If improved, then which resources?
    b. If declined, then which resources?
        i. Does your group share your concerns or views on the current conditions? If not, what is the prevailing view of your group on these resources? Why is it different?

3. Within those resources you identified as having improved, which factors have influenced their improvement?
    a. What groups are responsible for the improvement?
    b. What activities by the groups are responsible for the improvement?
    c. Which major reason has been responsible for the improvement?
        i. Local suite of reasons/decisions
        ii. County suite of reasons/decisions
        iii. Southeast Florida suite of reasons/decisions
        iv. Federal/national suite of reasons/decisions

4. Within those resources you identified as having declined, which factors have influenced their decline?
    a. What groups are responsible for the decline
    b. What activities by the groups are responsible for the decline?
    c. Which major reason has been responsible for the decline?
        i. Local suite of reasons/decisions
        ii. County suite of reasons/decisions
        iii. Southeast Florida suite of reasons/decisions
        iv. Federal/national suite of reasons/decisions

5. How has your group made up for any changes in resource conditions?
    a. Has your group stopped using or accessing the resource?
    b. Has your group moved its activities further offshore?

6. Please identify and rank all stakeholder groups (including your own) in terms of the conflict these represent in your group's activities. Are the conflicts over:
    a. Similar or same resources?
    b. Same area?
    c. Indirect impacts that the group may have?
    d. Another issue?
    e. Is the conflict temporal or year round or during special event? If so, then please identify peak conflict periods.
    f. Is the conflict a result of poor management, lack of compliance, or lack of enforcement?
    g. What is the long-term impact of the conflict on your group?
7. How should use conflict s be resolved?
    a. Should certain groups not be allowed to use the region or parts of it?

8. Using the following map, please identify:
    a. Areas that are important to your stakeholder group and which are used by your group on a regular basis
        i. If your group uses one area for one type of activity and another area for another type of activity, the please identify them separately

9. Now, within the map, please point out the areas that are in:
    a. Excellent condition/showing excellent improvement
    b. Good condition/showing moderate improvement
    c. Average condition/showing minimal to no improvement
    d. Fair condition/showing moderate decline
    e. Poor condition/showing severe decline
        i. Please identify the resource(s) in the area that you pointed out

10. Finally, within the map, please identify areas of resource conflict, where:
    a. H – high use conflict
    b. M – moderate use conflict
    c. L – low use conflict
    d. N- no use conflict
        i. Please identify the group(s) with the area of conflict

11. What is your group's vision on how the southeast Florida coral reef ecosystem should be managed?
    a. Continued use and protection as present with existing regulations
    b. Reduced use among certain groups with modified/expanded regulations for increased protection
    c. Reduced use among certain groups only within certain areas to allow for increased protection within those areas only
    d. Elimination of some groups with expanded regulations for protection
    e. Elimination of almost all uses with strictest regulations for protection
    f. Other (please specify)

12. Considering the present status of resources in southeast Florida, what goal(s) should be adopted to better manage the resources? Please rank the goals in terms of their

importance. Please list which resource you refer to:

a. ___ Protection of stressed resources (e.g., coral that is bleaching)
b. ___Protection of certain key resources (e.g., a particular species or special area)
c. ___Protection of a percentage of all resources
    i. What percentage would you group recommend?
d. ___ Moderate levels of protection but with a focus on sustainable use
e. ___ Enhanced and improved enforcement
f. ___ Other (Please specify)

13. How important is it in your group's view that the resources in the region be protected in its current condition as a primary goal?
    a. 100% - my group's uses should be curtailed to the extent possible to ensure full resource protection
    b. 75% - a greater balance towards resource protection with certain allowances to my group's uses
    c. 50% - an equal approach on protection and use by all groups
    d. 25% - some protection but mainly a focus on use/access
    e. 0% - use should be prioritized over all protection

14. How important it is in your group's view that the resources in the region be not just protected in their current condition, but also improved or restored to a better state as a primary goal?
    a. 100% - my group's uses should be curtailed to the extent possible to ensure full resource protection
    b. 75% - a greater balance towards resource protection with certain allowances to my group's uses
    c. 50% - an equal approach on protection and use by all groups
    d. 25% - some protection but mainly a focus on use/access
    e. 0% - use should be prioritized over all protection

15. What result would your group most like to see occur as a result of increased protection or resource improvement?
    a. Can you group help achieve this result and if so then how?

16. What are the major management gaps in capacity and authority to protect southeast Florida resources; that is, where does management fail in providing effective protection? (NOTE: We can again provide a suite of options and have them ranked and allow for original responses) (NOTE 2: While these are merely examples below, we can have them separated into the three main management types – e.g., regulatory management, MMA management, and outreach and education – and have the respondents rank each suite of options based on management types). Please provide suggestions for how managers can fill these gaps or manage more effectively.
    a. Lack of marine managed areas in and around coral reefs
    b. Lack of statutory authority to enforce no anchoring on reefs
    c. Need for better enforcement to patrol existing regulations
    d. Need to integrate land-based and coastal management to address LBSP
    e. Improvements in fishery management

f. Need for stronger rules and regulations in existing marine managed areas

17. Please identify any new/unique management approaches, regulations, protected area types, or management tools that your group would support the use of to improve management of southeast Florida coral reef resources. Some examples of these could include the use of marine zoning (to separate uses to minimize conflicts), implement user-based advisory groups (to guide management decisions), or others identified in the video. You can use more than one option as well, but please provide your group's highest ranked option, if possible.
    a. Where is the region would implement your preferred option(s)?
    b. What coastal or marine resources would be prioritized?
    c. How would the option be funded? User fees, partnerships, government funding?
    d. Who would be in charge of implementing the preferred option? Which agency or what level of government (or NGO)?
18. Do you prefer statewide management or place-based management as your preferred form of management to protect southeast Florida coral reefs and associated resources?
    a. Statewide management approaches
    b. Pace-based management

19. Within statewide management approaches, please rank the following options based on your preference:
    a. Strengthening existing regulations
    b. Establishing new protective legislation
    c. Modifying access
    d. Increasing funding to support coral reef protection
    e. Other (please specify)

20. Within place-based management approaches, please rank the following options based on your preference:
    a. Local (county) protected areas
    b. State protected areas
    c. Federal protected areas
    d. Other (please specify)

21. If you prefer statewide management approaches to place-based management, please identify the specific regulation you would like to see strengthened, established, etc. How would you propose access by modified? What sources should pay for increased coral reef funding (e.g., taxes, user fee, etc.)?

22. If you prefer place-based management to statewide management approaches, please state if the entire southeast Florida region should be managed as a single zone or whether different zones should be established within the region.
    a. If you believe that different zones should be established, then which ones?
        i. Multiple use (multiple user groups/activities allowed)
        ii. Single use (only one user group/activity allowed)
        iii. Research only (only permitted researchers allowed)

iv. No discharge
v. No anchoring/Mooring buoy only
vi. Transit only (no in-water activity allowed)
vii. No combustion (pole or electric motor only)
viii. No personal watercraft
ix. No diving/snorkeling
x. No spearfishing
xi. No lobstering
xii. Marine reserve (no take)
xiii. Other (please specify)

b. Why did you select the zones that you did? What are the benefits to these zones? Are there any negative impacts?
c. Which groups would you expect to most benefit from these zones? Which ones would be most impacted?

23. If you prefer place-based management to statewide management approaches, which issue(s) should a marine managed area in southeast Florida address? Of the issues listed, which should take the top priority?

e. Overfishing
f. Anchor damage
g. Ship groundings
h. Land-based sources of pollution
i. Water quality
j. Diving/snorkeling impacts
k. Coastal construction
l. In water pollution/waste dumping
m. Other (please specify)

- What should the goal of the marine managed area be in relation to each issue identified (e.g., increase juvenile fish, end overfishing, etc.)?
- How do you propose addressing each issue/goal (e.g., stricter fish size regulations, closed areas to all users, permitted use areas, no anchor zones, more enforcement, etc.)?

24. If you prefer statewide management approaches, please state if your group would be more in favor that the entire southeast Florida region should be managed as a single zone or whether different zones should be established within the region.
    a. If zones were to be established, which zoning types would your group most oppose and why?
        i. Multiple use (multiple user groups/activities allowed)
        ii. Single use (only one user group/activity allowed)
        iii. Research only (only permitted researchers allowed)
        iv. No discharge
        v. No anchoring/Mooring buoy only
        vi. Transit only (no in-water activity allowed)
        vii. No combustion (pole or electric motor only)
        viii. No personal watercraft

ix. No diving/snorkeling
x. No spearfishing
xi. No lobstering
xii. Marine reserve (no take)
xiii. Other (please specify)

b. Why did you select the zones that you did? What are the benefits to these zones? Are there any negative impacts?
c. Which groups would you expect to most benefit from these zones? Which ones would be most impacted?

25. If you are not in favor of the establishment of place-based management, how do you propose addressing the issues in the region?
    a. Are there other management activities should be done, in addition to (or instead of) establishment of a marine managed area, to address these issues? If so, what?

26. If you did not identify place-based as a preferred management approach, please identify specific areas on the map provided that your group would be most willing to accept where such management could be applied and please identify areas that your group would be most opposed to place-based management being applied. Please identify reasons for selecting areas not to be protected by such management (e.g., popular fishing site, popular diving/snorkel site, etc.).

27. Using the benthic habitat map provided, (NOTE: We should decide whether to include existing management areas such as state parks) please identify which areas and resources need:
    e. Highest level of protection, i.e., where uses should be curtailed to the extent possible to protect the resources
    f. Moderate level of protection, i.e., where uses should be prioritized to the extent where they are compatible with resource protection objectives
    g. Minimal level of protection, i.e., where most uses should be allowed as they are presently
    h. No increased level of protection, i.e.,, status quo
    - Please identify reasons to justify the locations you selected (e.g., fish spawning aggregation, nursery area, Breaker's Reef, etc.).

28. If you identified place-based as a preferred management approach, please identify specific areas on the map provided where you would like to see that management be applied. Please be as specific as possible with the boundaries for the area, and reasons for selecting that area (e.g., nursery area, better water quality, etc.). Please also identify what type of place-based management you would like to see in each area you identify (e.g.,all mixed use zone, combination of no-take zone and mixed use zone, no anchor zone, etc.)