

Data Needs for Fisheries Management Situation Analysis

Florida Department of Environmental Protection
Coral Reef Conservation Program
Project 8



Data Needs for Fisheries Management

Situation Analysis

Final Report

Prepared By:

Kai Lorenzen, Susana Hervas, Chelsey Crandall and Joy Hazell
Fisheries and Aquatic Science Program
School of Forest Resources and Conservation
University of Florida

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List of Acronyms

ASA..... American Sportfishing Association
CCA.....Coastal Conservation Association
CRCP.....Coral Reef Conservation Program
CWG.....Community Working Groups
FDEP.....Florida Department of Environmental Protection
ECA..... Ecosystem Conservation Area
ENGO..... Environmental Non-Governmental Organization
FWC..... Florida Fish and Wildlife Conservation Commission
MPA..... Marine Protected Area
NOAA..... National Oceanic and Atmospheric Administration
OFR..... Our Florida Reefs
RMA.....Recommended Management Action (in OFR)
SAFMC.....South Atlantic Fishery Management Council
SEFCRI..... Southeast Florida Coral Reef Initiative
TAC Technical Advisory Committee

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Executive Summary

Fishing is an important recreational, social, and economic use of coral reef ecosystems in Florida. Fishing affects reef-associated fisheries resources and the wider coral reef ecosystem; however, fishing stakeholders can also be powerful voices for reef conservation. Effective engagement of fishers in the conservation of coral reef ecosystems is crucial to ensure coral reef resources are managed in a sustainable manner that ensures their values will persist in the future.

Fishing stakeholders were included in the Our Florida Reefs (OFR) Community Planning Process but their participation proved difficult to sustain and several fisheries-related recommended management actions (RMAs) were subsequently opposed by fishing interests at the state and federal levels. The Southeast Florida Coral Reef Initiative (SEFCRI) therefore resolved to undertake a situation analysis in order to evaluate past issues with engagement of the fisheries sector and develop a new engagement process aimed at filling this gap.

The objectives of the situation analysis were to: (1) Identify and characterize stakeholders in relation to fisheries management in the Florida Reef Tract, known as Southeast Florida Coral Reef Ecosystem Conservation Area (ECA), (2) Characterize stakeholders' experiences and attitudes related to engagement in fisheries and conservation management efforts, and (3) Develop a stakeholder engagement plan and process that will be used in a subsequent project to inform fisheries management approaches in the ECA. The situation analysis was based on forty-five stakeholder interviews and review of additional information.

Results showed the perceived existence of distinct “angler” and “diver/environmental” networks. The groups involved in these networks are by no means homogeneous, but they engage in information exchange, building of advocacy alliances, and facilitation of access to influential actors. The “angler” network includes marine industries, recreational fishers, fishing charter operators, and commercial fishers. The “diver/environmental” network encompasses dive operators, divers, and environmental non-government organizations (ENGOs). Stakeholders also perceived the two Florida state agencies most involved with coral reef ecosystem conservation to be effectively associated with different networks, despite them striving to be “fair arbiters” of stakeholder interest and concerns. The Florida Fish and Wildlife Conservation Commission (FWC) was perceived by many interviewees to be associated with the “angler” network, while the Florida Department of Environmental Protection (FDEP) was perceived to be associated with the “diver/environmental” network. The “angler” network also perceived the “diver/environmental” network to be the driving force behind OFR (an FDEP project) and in control of the process.

Fishing stakeholders see overfishing as an important threat to coral reef ecosystems, but perceive several other threats to be more important and therefore a higher priority for management to address. Nonetheless, about two-thirds of fishing stakeholders (e.g., anglers, spearfishers, and charter captains) perceived the impacts of fishing to be important or very important. Environmentalists and divers perceived fishing to be the most or equally

most important threat to coral reef ecosystems and therefore attach a higher priority to fisheries-related conservation measures than do fishing stakeholders.

All interviewees supported fishing regulations (size, bag, and seasonal limits for harvest of fish) in principle. Many also mentioned support for gear (e.g., lobster trap) or anchoring restrictions. By contrast, attitudes towards spatial management and to MPAs in particular were complex and conflicted.

The most fundamental issue with the OFR process from the perspective of fishing stakeholders was the perception that that OFR and the lead agency FDEP are part of the “diver/environment” network. The fishing stakeholders therefore felt marginalized and disempowered from the start. Lack of understanding and consideration of the perception and dynamics of the two networks among users of the ECA prevented the process from adequately addressing fisheries-related issues and recommendations.

Creating a more balanced environment and process was seen as crucial to more constructive engagement by multiple interviewees from the “angler” network. Other ideas to improve future engagement of the fisheries sector focused on logistical aspects of meetings that could promote greater participation from the sector.

Based on the findings of this situation analysis and in consultation with FDEP, CRCP 8 Project Team developed a set of recommendations for a new engagement approach and process for fisheries stakeholders of the ECA. The aim of this process is to harness the capacity of the fishing community (i.e., fishing stakeholders and industry) to advance conservation of the ECA. This capacity includes knowledge/experience, outreach/advocacy, and standing and commitment to achieving conservation outcomes for fisheries resources and the coral reef ecosystem.

I. Introduction

This report sets out the results of a situation analysis aimed at understanding the characteristics of fisheries stakeholders in the portion of the Florida Reef Tract off southeast Florida, their experiences with participating in the Our Florida Reefs (OFR) Community Planning Process, and the scope for engaging them in related initiatives in the future. Based on this analysis, suggestions are made for the design of a project to engage fishing stakeholders more effectively in forthcoming coral reef ecosystem conservation initiatives.

The Florida Reef Tract extends from west of Dry Tortugas in Monroe County to offshore of St. Lucie Inlet in Martin County. Our study focuses on the reef area stretching from the northern boundary of Biscayne National Park to the St. Lucie Inlet in Martin County, known as the Southeast Florida Coral Reef Ecosystem Conservation Area (ECA).

The State of Florida has recognized the importance of protecting and preserving reefs since the formation of the United States Coral Reef Task Force in 1998. This initiative guided the Florida Department of Environmental Protection (FDEP) and the Florida Fish and Wildlife Conservation Commission (FWC) in forming the Southeast Florida Coral Reef Initiative (SEFCRI). SEFCRI is a collaborative effort between government agencies, non-governmental organizations, universities, and private partners that identifies priorities and develops strategies to preserve the Florida's coral reef ecosystem.

SEFCRI hosted a community planning process between 2013 and 2016 called Our Florida Reefs. According to *The Our Florida Reefs Community Planning Process* report (FDEP, 2018), the OFR community planning process was a multi-year, four step, participatory process for stakeholder identification of management strategies for Southeast Florida's coral reefs. OFR Community Working Group (CWG) members from diving, water sports, research, academia, fishing, county state and federal government, enforcement, non-government and non-governmental organizations, citizens at large, and private business refined over 400 proposed management actions addressing all known threats to coral reef resources to 68 Recommended Management Actions (RMAs) described in the final report. In the course of the process, the CWGs took further input from more than 500 stakeholders who attended the public meetings and thousands of comments received online and via letters and petitions. RMAs are proposed approaches to improving coral reef conservation and management. These actions focus on education and outreach; enforcement; fishing, diving, boating, and other uses/restoration; land-based sources of pollution; maritime industry and coastal construction impacts; and place-based management strategies that benefit this unique Florida resource.

Fishing is an important recreational, social, and economic use of coral reef ecosystems in Florida. Fishing affects reef-associated fisheries resources and the wider coral reef ecosystem; however, fishing stakeholders can also be powerful voices for reef conservation. Effective engagement of fishers in the conservation of coral reef ecosystems is crucial to ensure coral reef resources are managed in a sustainable manner that ensures their values will

persist in the future. SEFCRI acknowledged this importance and supported multiple studies on fisher perceptions and attitudes, fisheries resource status, and potential fisheries management options for the ECA (Shivlani & Villanueva 2007; Ault and Franklin 2011; Berry *et al.* 2011). Fishing stakeholders were included in the OFR process and were represented on the CWGs (FDEP 2018). However, participation of fishing stakeholders in OFR proved difficult to sustain and while OFR did develop a set of fisheries-related RMAs, several of those were subsequently opposed by fishing interests. Weak engagement from the fishing community in the OFR process meant that the process lost out on knowledge, specific recommended management actions, and the fishing community's capacity to promote reef ecosystem conservation through outreach and advocacy. It also left a bad taste about the nature of interactions among OFR participants from both the fishing community and the other communities represented. However, effective engagement of fishers in the conservation of coral reef ecosystems is crucial to effective natural resource management in the ECA. Fishing is a key use of the ECA. Fishing adversely impacts reef-associated fisheries resources and the wider coral reef ecosystem, but fishing stakeholders can also be powerful voices for coral reef conservation. FDEP Coral Reef Conservation Program (CRCP) therefore resolved to undertake a situation analysis in order to evaluate past issues with engagement of the fisheries sector and chart a course for more effective engagement moving forward.

The situation analysis aimed to provide a broad characterization of stakeholders and their experiences and attitudes with respect to management issues and processes, and to aid in the design of a new engagement process for reef conservation.

1.1 Objectives

The objectives of the situation analysis were the following:

1. Identify and characterize stakeholders in relation to fisheries management in the SEFCRI area, this region also represents the recently established Southeast Florida Coral Reef Ecosystem Conservation Area (ECA).
2. Characterize stakeholders' experiences and attitudes related to engagement in fisheries and conservation management efforts.
3. Develop a stakeholder engagement plan and process that will be used in the subsequent project to inform fisheries management approaches in the SEFCRI area.
4. Inform stakeholders about the situation analysis and plan for subsequent engagement.

1.2 Outline of Methodology

The situation analysis was conducted using review of existing information, interviews with a wide range of fisheries and management agency stakeholders, and supplementary analyses of pertinent responses to a previous survey conducted by the research team.

Review of existing information

Existing information on the fisheries management in the ECA was reviewed, with an emphasis on previous SEFCRI projects.

Interviews

Interviews followed a semi-structured, general interview guide approach (Weiss 1995). Topics explored during interviews included: connections to the southeast Florida reef; observed changes to the coral reef ecosystem and fisheries; concerns they would like to see addressed; impacts of fishing, ideas for reducing impacts of fishing, sources of information about the reef; views on coral reef management and stakeholder engagement; perceived stakeholder identities, positions and interests; interactions with other stakeholders; and preferences for future engagement (see Appendices A and B for more details).

A total of forty-five interviews were completed with stakeholders in southeast Florida. Thirty-two of these were arranged with key informants (i.e., stakeholders selected for their in-depth knowledge and/or previous engagement). These interviewees were found through secondary data research about southeast Florida reef engagement processes and a subsequent snowball sampling, where the initially identified interviewees provided the name of other potential participants. This expanded the web of contacts available. Thirteen of these interviews were over the phone and the remaining nineteen were in person. The length of the interviews ranged from 30 to 90 minutes.

An additional thirteen interviewees were encountered through intercept sampling and interviewed in person. These were not arranged meetings and were held at an angling tournament event, piers, boat ramps, and tackle shops. These ranged between 10 and 15 minutes in duration. Table 1 shows a summary of the interviewees’ primary self-identifications (note that many interviewees identified with several groups).

Table 1. Summary of interviewees’ primary identity. Interviews with key informants (white rows) and with informants intercepted at boat ramps, tackle shops etc. (shaded rows).

Stakeholder	Number
Recreational angler/charter	6
Recreational angler	2
Recreational diver	1
Commercial representative	1
Dive operator	2
Spearfisher	2
Marine Industry members	3
Associations (CCA/ASA)	2
Environmentalist	2
Management	6
County Marina	2
Fishing club	1
Marine life collector	1

Stakeholder	Number
Tackle shop owner/charter	1
Tackle shop owner	1
Lobster mini season angler	3
Tournament anglers	5
Pier fishers	2
Pier and reef boat fishers	2
TOTAL	45

Survey

Additional insights into stakeholder perceptions of threats to reef ecosystems were derived from a stakeholder survey carried out by the authors in 2013 (Lorenzen *et al.*, 2013). While the survey focused on issues surrounding the recovery of goliath grouper under a harvest moratorium, it included questions to gauge perceptions of threats to reef ecosystems in general that are pertinent to the situation analysis. Respondents were approached through two different pathways to ensure representation of diverse stakeholder groups. Representative samples of Florida recreational saltwater, commercial, and charter fishing license holders were contacted by email and invited to complete the survey. Email lists, websites, forums, and personal contacts were used to alert and invite stakeholders from the recreational dive community (e.g., dive shops and their customer contacts, dive clubs, PADI Facebook page); marine conservation organizations not primarily focusing on fishing (e.g., Ocean Conservancy Florida members eEmail list); recreational fishing organizations (e.g., Coastal Conservation Association, Fishing Rights Alliance), the Florida Sea Grant network of contacts, and the project and FWC websites. The survey was open from May 3rd to June 5th, 2013. During this period, just short of 6000 responses were received, with good representation of all major stakeholder groups. More information on the survey can be found in Lorenzen *et al.* 2013.

II. Results

Results are arranged in sections on: Review of prior information, stakeholder characterization, perceptions and management concerns, lessons from the Our Florida Reefs (OFR) community planning process, and future proposed stakeholder engagement process.

2.1. Review of Prior Information Related to Fisheries Management in the ECA

The ECA forms part of Florida's state waters and borders the federal waters of the North Atlantic. By default, therefore, fisheries management in the ECA forms part of the statewide management process implemented by the Florida Fish and Wildlife Conservation Commission (FWC). It is also influenced, for example through shared resources, by the

federal fisheries management processes implemented by the South Atlantic Fishery Management Council (SAFMC) and NOAA Fisheries. State and federal fisheries management processes and regulations in general are not specific to the ECA but apply to much larger geographical areas. The management systems are well documented by the respective agencies and summarized in (FDEP 2018).

Since its inception, SEFCRI has supported several fisheries management-related projects specific to the ECA. These are reviewed briefly below.

SEFCRI FDOU Project 10 used a variety of surveys to map different uses and collect data on observations and perceptions of coral reef biodiversity, other fishing and diving impacts; types, quantity, and trends of commercial and recreational extractive and non-consumptive uses by county; and stakeholder concerns on the indirect impacts on reefs (Shivlani & Villanueva 2007). The studies also identified and characterized the key, user groups that utilize and/or rely on the regional coral reefs and associated resources: commercial fishers; charter, for-hire fishing operations; recreational fishers (consisting of recreational anglers and recreational, consumptive divers); dive operations; researchers and managers; and the surfing community. Stakeholders perceived that resource conditions were deteriorating with coral reefs, fisheries, and water quality. Stakeholders from all groups felt that new management measures were needed to stem the decline, but disagreed about the best approach(es). Some groups called for a greater focus on interpretative management, while certain groups favored enforcement and others preferred zoning and marine protected areas. Overall, the results “revealed a base of concerned users who have witnessed a pervasive decline in their local resources and who are willing to support changes in management direction to rectify current resource conditions”.

Fish population trends and indicators of exploitation status for 16 species of reef fish were derived from data collected in the ECA in SEFCRI FDOU Projects 18 and 20 (Ault & Franklin 2011). Since the ECA represents only a small part of the distribution area of the reef fish stocks, results are not indicative of the status of stocks overall all provide some indication of the impacts of exploitation in this near-shore, heavily used reef area. The study found the majority of species to be very heavily exploited and experiencing signs of (at least) local overfishing such as declining catch rates and low mean length. The study therefore supported the stakeholder perception of fisheries decline documented by (Shivlani & Villanueva 2007) and suggested that restrictive regulations could increase catch rates and the mean size of fish caught. Such regulations could include conventional fisheries regulations such as bag or size limits, as well as temporal or spatial restrictions.

FDOU Project 23 conducted a broad-based evaluation of the potential for a marine zoning area for Southeast Florida (Berry *et al.* 2011). It encompassed a literature review of the effectiveness of zoning as a marine conservation measure and extensive surveys of marine resource users in the ECA to assess their attitudes to marine zoning. The review concluded that appropriately designed zoning would likely be effective in promoting conservation of reef resources, but cautioned that no-take or exclusionary areas may be warranted only in certain circumstances. Stakeholder surveys showed that almost 60% of stakeholders

supported zoning in principle. However, support varied among groups and in general, stakeholders did not want their access to marine resources to be restricted.

The above studies and many other sources of information were available to the CWGs during the OFR process (FDEP 2018). It is therefore clear that substantial, specific information on the status of fisheries in the ECA and on stakeholder perceptions of resource status and attitudes to various management measures were available to the CWGs. This suggests that lack of information *per se* was not a primary factor in the events that led to several of the fisheries-related RMAs being opposed by fishing interests at the end of the process. Rather, it is important to consider the characteristics, influence and power of the stakeholder groups, their networks, and their interaction with the OFR process.

2.2. Stakeholder Characterization

2.2.1. Stakeholder Identities, Positions and Interests

Stakeholder groups were self-identified and characterized by interviewees. Among the users of the reef, the most common broad distinction was made between “anglers” (essentially all fishing people and supply industries) and “divers” (mostly non-fishing divers seen as closely aligned with environmentalists). Both these super-groups were subdivided into multiple sub-groups that often shared some positions and interests but differed in others. The groups also differed, often substantially, in their power and their history of involvement in an OFR CWG. An overview of stakeholder groups and characteristics identified during the situation analysis is given in Table 2.

Table 2. Stakeholder matrix.

Stakeholder	Position	Interests	Power	History with OFR CWG
Private anglers – reef boaters (non-competitive)	Fishery access Diverse opinions on regulations, spatial management	Fish recreationally Conserve reef fish for fishing	Large group but not strongly represented or well-organized	Invited to attend through representatives – low participation
Private anglers – tournament	Fishery access Oppose no-take zones (some exceptions)	Fish competitively Conserve reef fish for fishing Complex spatial rules would make tournament fishing more difficult	Influencers have following on social media Can mobilize effectively	Included but felt attacked and under-represented, mobilized from outside
Charter captains	Fishery access Diverse opinions on regulations, spatial management	Provide good fishing experience to customers Limit costs	Well connected, can identify as recreational anglers and as a business	Included but not engaged, felt attacked, mobilized from outside

Stakeholder	Position	Interests	Power	History with OFR CWG
		Conserve reef fish for fishing	Can create allies depending on context	
Commercial fishermen	Fishery access Harvest	Fishing for profit Conserve reef fish for fishing/harvest	Moderate, but can increase power by aligning with rec. sector on some issues Strong association	Included but not engaged, felt attacked, mobilized from outside, united with recreational sector in opposition to certain OFR CWG RMAs
Marine supply industry and related associations	Fishery access Strongly opposed to spatial restrictions	Maximize sales of boats, tackle, bait, retail, etc. Conserve reef fish as basis for recreational fishing	Strong lobby and political influence Access to Governor and other key political figures	Used political influence to stop uptake of certain OFR recommendations
Tackle shop owners	Fishery access Strongly opposed to spatial restrictions near their locations	Maximize sales of tackle, bait, etc. Conserve reef fish as basis for recreational fishing Vulnerable to effects of local fishing restrictions	Somewhat represented by marine industry Strong connections with local anglers	Not included (because not direct users)
Spearfisher	Spearfishing access to reef	Spearfishing access to reef Conserve reef fish as basis for recreational fishing	Part of both “Networks” of anglers (extractive) and divers (non-extractive)	Moderately engaged in OFR CWG
Dive shops and charter operators	Dive access to the reef with minimal restrictions Diverse opinions on fishing regulations, spatial management	Dive access to the reef Conserve reef ecosystem as basis for dive sector Minimize interactions with boat-based fishing	Have support of environmental NGOs – large organizations with influence and political networks	Strongly engaged through continual participation in OFR CWG Feel that lack of engagement from fishing sector and use of political power has upended some of their efforts

Stakeholder	Position	Interests	Power	History with OFR CWG
Divers (non-spearfishing)	Dive access to the reef	Want to protect the reef	Team up with dive operators	Strongly engaged in OFR CWG Feel that lack of engagement from fishing sector and use of political power has upended some of their efforts
Marine life collectors	Access to the reef for harvesting of marine life for aquaria and research	Protect the reef and have a thriving diverse community	Small sector but has good relations with FWC	Proactive about regulation of their own industry They were the first group to be proactive about their fishery and bring it to the forefront.

Among the perceived “angler” super-group, the most numerous are boat-based anglers who fish in the ECA while not being involved in a tournament. This group is likely diverse in attitudes and positions but is not powerful or well-organized. Tournament anglers were seen as a separate group with more specific positions and the ability to mobilize followers on social media.

Charter captains play an interesting role in that they serve, and to some extent, represent recreational anglers, yet are also a marine business and, like commercial fishermen, make a living from fishing albeit in a very different way. Charter captains frequently participate in management processes and also have the capacity to influence their customers.

Interviewees saw commercial fishermen as a small and not strongly influential stakeholder group in the ECA. Some interviewees included the charter boat industry within the commercial fishery sector, given that charter operators take anglers out for profit, but others included charters as part of the recreational sector.

A distinction was made by interviewees between anglers and the marine (recreational fishing supply) industry. The marine industry and its associations were seen as powerful and well-organized entities that often represent the recreational fishing sector in management and political processes. However, marine industry representatives were perceived by some interviewees as having different interests from those of individual anglers. Marine industry representatives were identified as the Marine Industries Association of Palm Beach County (MIAPBC), Marine Industries Association of South Florida (MIASF), American Sportfishing Association (ASA). The Coastal Conservation Association (CCA), a membership organization for anglers, was also viewed as a marine industry organization by several interviewees due to its close industry linkages through sponsorship.

Tackle shops are technically part of the marine industries and some of the larger chains (e.g., Bass Pro Shops) are highly engaged in industry activities at all levels. Many smaller,

independent tackle shops are highly connected with local anglers and play an important role in local information exchange and advocacy.

Spearfishers are part of both the “angler” and “diver” super-groups but tend to be closer to anglers in terms of their positions on management issues. Spearfishers also tend to be moderately involved in management and policy initiatives including OFR.

Dive shops and dive charter operators often cater to both sightseeing divers (non-spearfishing divers) and spearfishers, but many associate more with the diver/environmentalist perceived super-group than with the anglers. Sightseeing divers tend to be closely aligned with dive shops and dive charter operators in their positions. The dive sector also connects with environmental NGOs, large organizations with political influence.

Marine life collectors were mentioned by some interviewees and are seen as a group separate from the other extractive users (the “angler” super-group). Many appear to be most closely associated with the dive sector. The marine life industry is made up of a relatively small number of operators (hundreds) and collaborates closely with FWC in regulatory matters.

2.2.2. Networks

Interview results showed that the perceived “angler” and “diver” super-groups identified above are not merely convenient ways of categorizing a diversity of smaller groups. Rather, they act as networks for information exchange, building of advocacy alliances, and facilitation of access to influential actors. The networks extend beyond the immediate user groups and support industries to political actors and non-governmental organizations.

One network perceived by the interviewees with respect to OFR and other reef management initiatives is the “angler” network, which includes marine industries, recreational fishers, fishing charter operators, and commercial fishers. Many interviewees also perceived the FWC to be associated with this network. The constituents of this network are by no means homogeneous with respect to interests, power, etc., but they do share information and align for advocacy purposes around certain issues. Indeed, several interviewees mentioned how stakeholders who are often in conflict, such as recreational and commercial fishing industry groups, found common ground and “community” in opposing the two OFR place-based RMAs. It must be remembered, though, that influence and power of the actors in this network vary widely. Many perceived the marine industries to be the dominant force in this network due to their economic importance, level of organization, and access to influential actors such as state and federal lawmakers.

The other network perceived by interviewees is the “diver/environmental” network which encompasses dive operators, divers, environmental NGOs (ENGOS). Many interviewees from the “angler” network also perceived FDEP to be associated with the “diver/environmental” network. Participants in this network appear less heterogeneous with respect to interests than those in the “angler” network, and many have strong and consistent ties. The “diver/environmental” network was perceived by members of the “angler” network to be the driving force behind OFR and in control of the process.

Of course, the networks are not entirely separate and some actors participate in both. For example, charter captains and spearfishing divers often had one foot in each network but advocated predominantly with one (the “anglers” in this case). While there is some overlap and communication between the networks, that has not been a strong factor in the dynamics of OFR or other marine conservation initiatives.

It is noteworthy that some stakeholders perceived the two Florida state agencies most involved with coral reef ecosystem conservation, FDEP and FWC, to be effectively associated with different stakeholder groups and issues networks. Both state agencies strive to be “fair arbiters” of stakeholder interest and concerns. However, they differ somewhat in their remits and naturally form the “go to” agencies for different stakeholder groups.

2.2.3. Influence and Power

The concepts of influence and power came up during all interviews. Key informants (interviewees selected for their knowledge and history of engagement) had a general understanding of political power and influence and how to navigate these. On the other hand, anglers interviewed at piers, events, and tackle shops conveyed feelings of powerlessness and being dependent on those who have the power to decide for them. This reinforces the notion that anglers at large are not well engaged and represented in management processes, but rely on other actors in the “angler” network to represent them. This can be problematic because the interests of influential actors such as the marine industries need not be the same as those of anglers at large.

Virtually all key informants perceived that marine industry and their associations are highly influential and have the ability to “tweak” management. Industry groups contract lobbyists, work through legislators and have access to the Florida Governor and other key political figures such as the Secretaries of Commerce and Interior. Marine industry groups were perceived as influential not only due to their direct connection to rule makers, but due to their power to influence (fishing and other marine) magazine narratives and editors notes, given that these magazines are kept in business by the advertisements of the marine industry. Another group that was perceived to be influenced strongly by the marine industry is CCA, a membership organization that relies heavily on industry donations of prizes for tournaments etc. CCA was also perceived as “powerful and well-organized.”

It is due to the broad power and influence of the marine industry actors that “angler” network can afford stay on the sidelines of processes perceived to be driven by the “diver/environmental” network, knowing that they can effectively oppose unwanted outcomes after the event.

2.3 Perceptions and Management Concerns

2.3.1. Perceived Impacts on the Reef Ecosystem and Fishery

All interviewees perceived “water quality” as the most pressing issue and highest impact on the reef ecosystem. “Water quality” is an overarching term that subsumes many different

issues from nutrient loading to harmful algal blooms, ocean acidification, and coral bleaching. The impact of water quality on the reef-associated fishery was seen as an indirect ecosystem effect rather than a direct effect (e.g., fish kills due to water pollution).

Climate change was also mentioned as an impact on the reef, being a stressor on the coral and the health of the reef. The coral disease outbreak expanding through the Florida Reef Tract was also viewed as an urgent matter. Some respondents perceived water quality and dredging to be causally linked to the outbreak. Habitat loss was likewise seen as a consequence of water quality decline and coastal development. Damage to reefs from anchoring, fishing gear such as lobster traps, vessel groundings and artificial reefs (e.g., tires and sunken wrecks – especially during hurricanes) were also mentioned.

While deteriorating conditions were perceived by a majority of respondents, some respondents had not noticed much change in the status of the reefs over time. These respondents were predominantly new users who had experienced the reefs for less than ten years. This is indicative of “shifting baseline syndrome” where conditions that are considered “good” now would not have been perceived that way years ago.

Analysis of the stakeholder survey conducted in 2013 provides a more detailed and quantitative perspective on perceptions of threats to Florida coral reef ecosystems (Figure 1). Results show that even then, all fishing stakeholders consistently ranked water quality as the most important threat, followed by habitat loss, coastal development, invasive species, overfishing, ocean acidification, climate change, and marine debris. By contrast, members of environmentally-oriented marine conservation organizations rated all threats as about equally high, with overfishing being the highest by a small margin. Rankings by sightseeing (non-spearfishing) divers were intermediate between those of fishing stakeholders and conservation organization members. There are two important conclusions from these results. First, fishers see overfishing as an important threat to coral reef ecosystems, but perceive several other threats to be more important and therefore a higher priority for management to address. Secondly, environmentalists and divers perceive fishing to be the most or equally most important threat to reef ecosystems and therefore attach a higher priority to fisheries-related conservation measures than do fishing stakeholders.

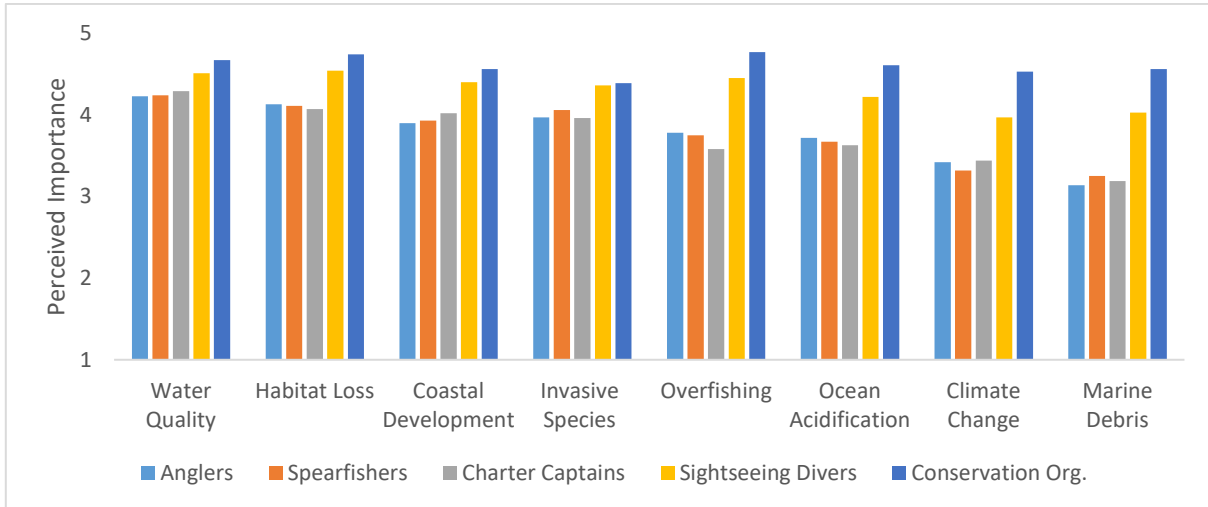


Figure 1. Perceived importance of threats on coral reefs. (Scale: 1=very unimportant, 2=unimportant, 3=neutral, 4=important and 5=very important).

Further analysis of the survey data showed that fishing stakeholders (anglers, spearfishers, and charter captains) are heterogeneous with respect to the importance they attach to fishing as a threat to reefs, but about two-thirds perceive the impacts of fishing to be important (4) or very important (5) (Figure 2). This suggests fertile ground for consideration of fishing impacts among fisheries stakeholders when conditions for open discussion and social learning are created.

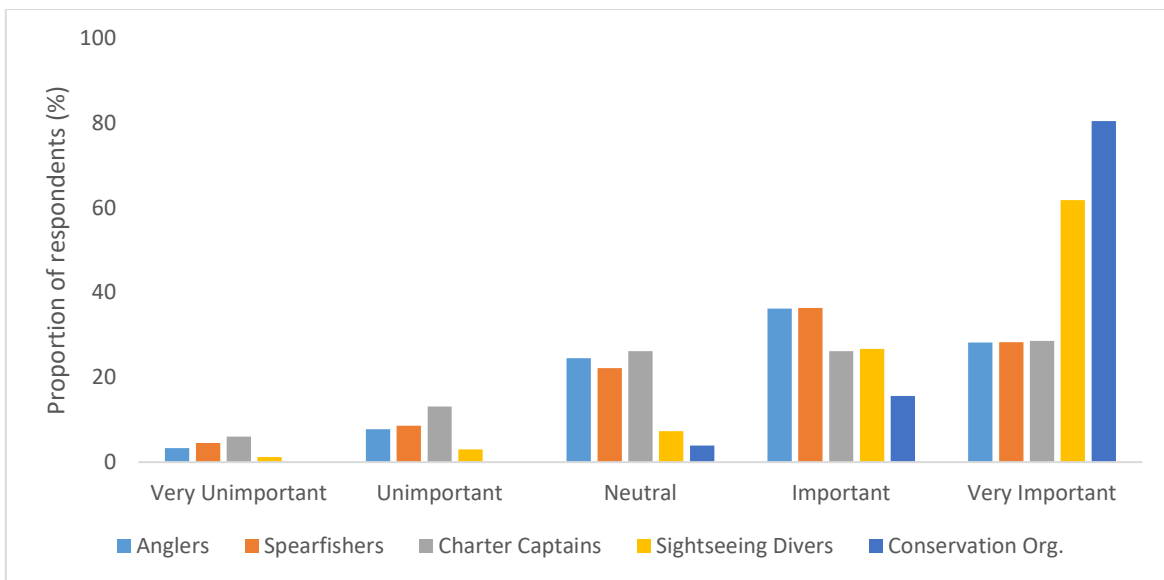


Figure 2. Level of importance fishing stakeholders attach to fishing as a threat to coral reefs.

In the current interviews, overfishing was mentioned as a source of impact on the reef by all stakeholder groups, but not by all interviewees. There was a sense that fishing regulations

are necessary and largely effective, but that some problems remain. Among the reasons perceived for negative impacts of fishing were the very high level of recreational fishing activity in southeast Florida, uneducated anglers who “give the rest a bad name” and either do not know the regulations that are in place or simply ignore them, and lack of enforcement. The impacts of fishing perceived by interviewees were i) reduced fish abundance, ii) reduced fish size, and iii) reduced diversity (not seeing as many species, probably due to the lower abundance as well).

Diver pressure was also perceived by some as a moderate impact on the reef. There was a concern that poorly trained divers cause damage to the reef by holding onto corals or hitting them with their fins, particularly in the parts of the ECA where currents can be strong. Likewise, anchoring for both fishing and diving was perceived as a moderate source of impact. There was a general understanding that disruptions to the reef can have an effect on fish populations. This showed an ecosystem frame of thought.

Something both anglers and divers mentioned was that they interfered with each other’s activities. For example, when anglers arrive at a spot on the reef where divers are active, divers see this as a safety hazard. Flags and buoys are not always seen, and anglers can approach at high speed. On the other hand, anglers mentioned that as soon as divers arrive at their spot, they have to leave because their fishing opportunities decrease when divers are in the water.

2.3.2. Perceptions of Management Agencies: FWC and FDEP

Interviewees considered FWC and FDEP as key management agencies for the ECA, with responsibilities for fisheries and other living marine resources (FWC) and for the marine environment and habitats (FDEP). As mentioned above, many interviewees considered the agencies to be part of different networks. FWC was perceived to be part of the “angler” network by interviewees from that network, but also by those from the “diver/environment” network who felt that FWC was unduly influenced by the recreational fishing industry and viewed anglers as their only customers. Conversely, some interviewees from the “angler” network perceived FDEP to be part of the “diver/environment” network and to be biased towards the diving and environmental groups. The perceived biases of the two state agencies can pose challenges for the development of integrated and balanced management plans. Coordination and collaboration between the agencies is necessary so that, as one interviewee put it, “there is no chance for stakeholders to run to their favorite agency.”

2.3.3. Attitudes Towards Management Measures

All interviewees supported fishing regulations (e.g., size, bag, and seasonal limits for harvest of fish) in principle. Many also mentioned support for gear (e.g., lobster trap) or anchoring restrictions.

Interviewees in all stakeholder groups felt that there was a need for more enforcement and related education. This included the desire for enforcement to check on anglers more frequently, and education so that all anglers are acquainted with the rules.

Attitudes towards spatial management and to MPAs in particular were complex and conflicted. Interviewees from the “angler” network were generally opposed to MPAs as no-take zones. However, individuals from all stakeholder groups were open to creating protected areas with stricter fishing regulations if that was scientifically sound and if they agreed with the purpose of such delineation. For example, many stakeholders expressed support for temporary closures of fishing in areas with spawning aggregations. Stakeholders from outside the “angler” network considered that protected areas are an effective way to reduce impacts of fishing. They were also often open to no-take zones.

Some charter captains and anglers supported MPAs including no-take zones to reduce fishing impacts. These stakeholders felt that anglers could modify their experience and that adapting to new regulations was important to conserve and rebuild resources. The charter captains felt that their business model already incorporated fishing as an experience and a conservation practice, rather than a focusing on the amount and size of harvest, and that therefore, they could adapt to further protection measures.

Spatial fisheries management in a broad sense is the use of spatially differentiated regulations. Spatial management can take many forms and serve many purposes including protection of vulnerable habitats, resources, or life stages; restricting overall impacts of activities by restricting the areas over which they can occur; separation of incompatible activities; making enforcement of regulations easier and more effective; etc. (Lorenzen *et al.* 2010). Marine protected areas (MPAs) are a subset of spatial management measures involving restrictions in one or more uses that are more protective than those in surrounding areas. With regards to fishing, the severity of such restrictions can range from minor, (e.g., gear restrictions), to major restrictions such as no-take or no-fishing areas. This is important to note because the perceptions of what protected areas meant for fisheries differed between interviewees.

Controversy surrounding MPAs is perhaps the most important source of disagreement about fisheries management in the ECA that prevented an inclusively accepted set fisheries-related RMAs to be developed. Opposition to MPAs became a unifying force for the “angler” network in the OFR process. Interview responses suggest that the reasons for opposition to MPAs were substantive, procedural, and emotional.

Substantive concerns about MPAs include the fact that strongly restrictive spatial regulations such as no-fishing zones are more restrictive to recreational fishing activities than most other measures which predominantly restrict harvest (take) but not the activity of fishing *per se* (fishing is still allowed as long as caught fish are released). Fishing stakeholders perceived that restrictions to all fishing access were the immediate or medium-term goal of designating MPAs and opposition to MPAs thus became a cornerstone of their advocacy. Support for lesser restrictions such as temporal closures of spawning areas varies among fishing stakeholders, but many expressed a willingness to consider specific and well-reasoned spatial management measures that did not lead to loss of access to large areas or very complex spatial regulations. Such nuances were lost among fisheries stakeholders in the OFR process. The

eventual proposal to create 20-30% of pockets of MPAs throughout the ECA was viewed as something difficult to monitor and enforce, as well as a nuisance for anglers.

Procedural concerns stemmed from a sense of feeling marginalized in the OFR process which was seen as driven by the “diver/environment” network. Fishing stakeholders felt that their concerns about MPAs would not receive adequate consideration. It was also believed by some interviewees that areas for MPA designation were chosen capriciously and with no foundational reason for their design.

In addition to the above procedural concerns, fishing stakeholders felt a sense of unfairness. While MPAs (which they interpreted as no fishing zones) were proposed for anglers, stakeholders in the angler network perceived that no commensurate restrictions were being proposed for diving. As one interviewee put it, “if I can’t fish, then you can’t dive”. This illustrates how emotional needs of participants enter into the spatial management conflict.

2.4 Engagement Process: Lessons from OFR

Interviewees who had been involved in the management of OFR, in the CWGs, and who attended meetings gave their impressions on the engagement process.

2.4.1. Perceptions of What Went Wrong

Perhaps the most fundamental issue perceived with the OFR process among fishing stakeholders was the sense that OFR and the lead agency FDEP are part of the “diver/environment” network. The fishing stakeholders therefore felt marginalized and disempowered from the start. Even though they had been invited to the table, they felt little ownership of the process which was seen as driven by the divers and environmentalists and biased towards their interests. A common interpretation was that OFR had the agenda of setting up no fishing zones and they were trying to force it upon them. In the words of one participant, “It felt like a bunch of scientists and government officials stuffing that stuff down the recreational fishing communities’ throat.”

As a consequence of perceived marginalization, some of the fisheries stakeholders felt they were being attacked rather than being asked to lend their knowledge and capacity for conservation action and advocacy to the protection of the coral reef ecosystem. A CWG participant from the fisheries sector described how he “shut down” and did not speak up because he felt that he was being attacked (not personally, but as a fisherperson), that his voice would not be heard, and that he did not belong to that group.

In addition to the fundamental concerns detailed above, there were many logistical aspects that fishers perceived to work against their full engagement in the OFR process. The OFR was perceived as too long and time consuming. The whole-day CWG meetings were felt to be lengthy and difficult to attend by people who could not or would not easily take substantial time off work. In addition, interviewees mentioned that they were given homework after the meetings and that this led to further conflicts with work or other activities. For many people

who fish (for their livelihood or for recreation), a whole day spent at a meeting is too long. Marine industry representatives, on the other hand, may have chosen to stay away, knowing that they could pursue other avenues to stop any proposals they did not support. Informative webinars were made available for those who did not attend the meetings. These were two hours long, shorter than a whole day, but still a lengthy video to watch.

Interviewees expressed mixed views about the facilitated OFR process. Some participants saw value in breaking up into groups and using various facilitation techniques. However, others perceived such techniques as being “treated like children” and would prefer roundtables where they can have a conversation over the structured activities.

As a result of the perceived marginalization and logistical constraints felt by fishing stakeholders, their participation in the OFR process was limited. CWG members from the sector often did not attend the meetings. Therefore, representation of the fishing sector was essentially lacking over long periods of the process. Some fishing representatives appeared towards the end of the OFR process to oppose measures that had been developed throughout the engagement process with the other stakeholders. Perhaps as a result of limited fisheries participation in the CWGs many fishing stakeholders at large remained unaware of the OFR process and its fisheries-related components until late in the process.

Awareness of OFR among fishing stakeholders at large only increased towards the end of the process when CWG members from the sector attended the group more frequently and used personal communications and social media to alert others in the “angler” network to the emerging recommendations. The network responded quickly and mobilized through social media to gather support against the MPA recommendation. A marine industry interviewee shared that at this point, ASA successfully recruited people to attend OFR meetings and oppose the proposed measures in public comment.

Interviewees from the fishing sector shared that, despite their frustrations with the OFR process, they are committed to goal of coral reef ecosystem and fisheries conservation. Many said that they are eager to engage in a new process, particularly one that centers around the fishing community and empowers its actors to play a more proactive role in reef conservation and associate fisheries management.

Needless to say, the pattern of engagement of fisheries stakeholders in OFR resulted in frustrations among other participants and the leadership of the process. Several interviewees from the “diver/environment” network shared the view that fishers were invited to the table but chose not to participate, only to eventually return and upend recommendations that other participants had worked hard to accomplish.

Looking back over the OFR process through the eyes of those involved, it appears that lack of understanding and consideration of the existence and dynamics of two largely separate networks among users of the ECA prevented the process from adequately addressing fisheries-related issues and recommendations.

2.4.2. Interviewees' Ideas to Improve Future Engagement Processes

Creating a process that seems fair to participants was mentioned as a key to more constructive engagement of fishing stakeholders by multiple interviewees from the “angler” network. Fair to them means that engagement happens in a friendly or at least a neutral space, one where the process is not perceived to be driven by the opposing “diver/environmental” network. However, interviewees also acknowledged that even under those conditions, key stakeholders could strategically choose not to participate if they have the power to modify or block recommendations after the event. (It is also important to bear in mind that ultimately, the process should be fair to all stakeholder groups and to be perceived as such).

Other ideas to improve future engagement of the fisheries sector focused on logistical aspects of meetings that could promote greater participation from the sector. They suggested that meetings should be shorter and information condensed. Also, breaking the working groups into two (North and South) was mentioned as an obstacle by some participants since they felt they were not exchanging ideas since the beginning of the process. Nonetheless, the ECA is a large and diverse area and measures will have to be taken to ensure that this diversity is represented in the process. To make meetings more accessible, some interviewees mentioned that they could be held in the evenings and also allow (occasional) remote participation.

III. Recommendations for a New Process to Better Engage Fisheries Stakeholders

Weak engagement from the fishing community in the OFR process meant that the process lost out on knowledge, specific RMAs, and the fishing community’s capacity to promote coral reef ecosystem conservation through outreach and advocacy. However, effective engagement of fishers in the conservation of coral reef ecosystems is crucial. Therefore, based on the findings of this situation analysis and in consultation with DEP, the Project Team developed a set of recommendations for a new engagement approach and process moving forward to capture those gaps.

3.1. Process Goal and Relationship to OFR and SEFCRI

The process goal is:

To harness the capacity of the fishing community (fishing stakeholders and industry) to advance conservation of the Southeast Florida Coral Reef Ecosystem Conservation Area (ECA). This capacity includes knowledge/experience, outreach/advocacy, and standing and commitment to achieving conservation outcomes for resources and the coral reef ecosystem.

Fishing is a key use of coral reef ecosystems and resources. Fishing depends on an intact reef ecosystem and accounts for a significant share of ecosystem services provided by the reef. Therefore, fishing stakeholders can be powerful voices for reef conservation. At the same time, fishing impacts the reef-associated fisheries resources and the wider coral reef

ecosystem. Effective engagement of fishers in the conservation of coral reef ecosystems is therefore crucial to effective management of coral reef resources.

The new process will be fisheries stakeholder and topic-centered and it will address the gap left in OFR outputs due to low engagement from fishing stakeholders and the subsequent opposition to multiple fishing-related RMAs. The SEFCRI Technical Advisory Committee (TAC) and SEFCRI Team will review the design, progress, and outputs of the fisheries-centric process with a view to integration of outputs with OFR recommendations. In addition to addressing the gap in fisheries-related OFR outputs and their uptake, the new process is intended to prepare the ground for future conservation and management initiatives in which participants from both perceived networks will be fully engaged.

3.2. Foundations: Placing the Fishing Community at the Center of the Process

Perhaps the most important foundational principle of the new process is to place the fishing community (or “angler” network) at the center of the process. This should create a new dynamic and culture in which fishing stakeholders and industry groups have a sense of belonging, and meaningful action which is conducive to higher management satisfaction (Crandall et al. 2019). This new approach will be an opportunity to work with the recreational fishing and industry sector and include them in the processes in a more proactive manner and fair process.

Previous experience, for example with Florida snook regulations or the FishSmart process for king mackerel management (Miller et al. 2010) shows that fishing stakeholders can devise and support conservation-minded restrictions on their own activities. Such conservation measures may be regulatory or voluntary in nature. Opportunities for shared problem solving and social learning, such as may be provided by this proposed process, can also strengthen social norms for conservation (Lorenzen et al. 2010).

3.3. Overall Process Outline

The suggested process is centered around a committee of fishing stakeholders whose role it will be to develop a more detailed operational procedure; to identify key issues and possible recommendations for enhanced fisheries management efforts; engage with the fishing community at large by co-creating surveys and public workshops; request science inputs when needed; and develop a set of fisheries-specific RMAs. The overall process strategy is illustrated in Figure 3.

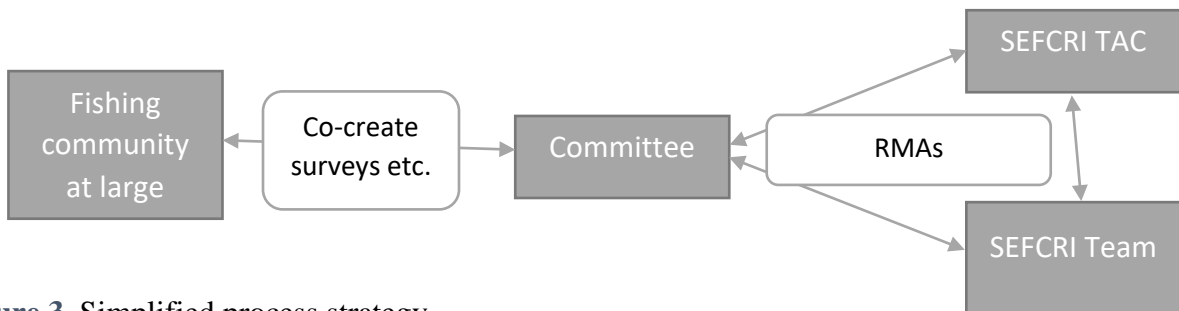


Figure 3. Simplified process strategy.

The process will be facilitated by a trans-disciplinary fisheries management research and extension team. The role of the team is to provide guidance for the overall process, facilitation and logistic support for the committee meetings, to co-develop surveys and other public engagement tools and opportunities, and to help the committee access scientific information as needed.

3.4. Committee Composition and Operation

The committee for this fishing-centered process should aim to bring balanced representation of fishing interests in the ECA including recreational anglers, charter captains, commercial fishers, and marine industry representatives to the table. This could be done by creating a committee of representatives while also engaging the wider fishing community by using tools such as surveys. In creating the committee, it will be important to represent not only different stakeholder groups from within the “angler” network, but different views on issues and management measures within those groups.

The committee will be broad in scope and the members will co-create their own decision-making process and agenda. Similarly, they will co-determine the make-up of the committee through a facilitated process of stakeholder identification. This allows for a high degree of autonomy and sense of ownership. However, there are parts of the process and structure that will be pre-determined given the bureaucratic context in which the committee will exist.

The committee’s remit will be, broadly speaking, to answer the question: “What can our fishing community do to help conserve the coral reef ecosystem and associated fisheries in the ECA?” Actions may include supporting and advocating for wider OFR recommendations that address key environmental threats such as water quality, adding to some of these wider recommendations, and developing specific RMAs for the fisheries sector itself. The latter may include recommendations for voluntary or regulatory actions regarding e.g. anchoring, boating pressure, fishing pressure, diving stressors, lobster traps, discard mortality, size and bag limits, or spatial management measures. It is important that the committee engages with both the wider environmentally-related OFR RMAs and with the fisheries specific issues because environmental issues are viewed as key threats to reef ecosystems and fisheries that the fishing community can help address through information and advocacy.

The process will be of broad scope within the context of the fisheries sector, but much narrower than OFR CWGs overall in that it will be focused on fisheries concerns from fishers. Several interviewees during the situation analysis felt that OFR was too broad in scope and suggested a more narrowly focused process would be more manageable in scope and objectives for the participants.

Recommendations emerging from the committee will be communicated to the SEFCRI Team, and Technical Advisory Committee to review the outputs including RMAs for technical merit and potential overlap or interactions with existing OFR RMAs.

It is anticipated that the committee's operation will move from a "talk-listen-talk" to a "listen-talk-listen" format. This means that the committee will start by identifying issues of concern to stakeholders, then identify any knowledge gaps that science can speak to, bring in scientists to talk about the questions they have, and go back to creating a space of discussion for solutions to develop. This philosophy will address a concern expressed by multiple stakeholders of managers and scientists being experts and having a top-down dynamic, which was perceived as not conducive to co-creation of knowledge and recommendations.

Creating an environment of trust is crucial for the formation of the committee, therefore a "Transparency Manifesto" will be developed to set out the process philosophy and to manage participant expectations. All process documents including meeting reports, presentations, scientific documents, etc. will be made available through a web portal, email and mail for committee members and the public.

3.5. Engaging the Wider Fishing Public

The situation analysis revealed a wide range of engagement styles and preferences among stakeholders in the fisheries sector. For example, many who participated in person in the OFR CWGs and other input processes were older, often retired people who had the time and confidence to engage personally. These stakeholders also participated in surveys, listened to radio programs, and read magazines. By contrast, many younger people did not want to engage in person or felt they did not have the time or confidence to do so. However, they responded to technology, apps, and social media. Instagram was specifically mentioned by six people as the source of fishing related information. Social media was also the way for charter captains to connect with clients. A comprehensive outreach strategy will be co-developed by the project team, the stakeholder committee and the SEFCRI team.

IV. References

Ault, J.S. & Franklin, E.C. 2011. Fisheries Resource Status and Management Alternatives for the Southeast Florida Region. Report to Florida DEP. Miami Beach, FL. Pp 105.

Berry, L., Boukerrou, L., Mehallis, M., Lirman, D., Grecsek, C. & Lambright, D. 2011. FDOU Project 23: Evaluation of the Potential for a Marine Zoning Area for Southeast Florida. Florida Department of Environmental Protection. Miami, FL. 209 pp.

Crandall, C. A., Monroe, M., Dutka-Gianelli, J., & Lorenzen, K. 2019. Meaningful action gives satisfaction: Stakeholder perspectives on participation in the management of marine recreational fisheries. *Ocean & Coastal Management* 179: 104872.

FDEP (Florida Department of Environmental Protection) 2018. *Our Florida Reefs Community Planning Process*. Miami, FL: 2018. X and 333 pages.

Lorenzen, K., Steneck, R. S., Warner, R. R., Parma, A. M., Coleman, F. C., & Leber, K. M. 2010. The spatial dimensions of fisheries: putting it all in place. *Bulletin of Marine Science* 86: 169-177.

Lorenzen, K., Sutt, J., Hazell, J., Fluech, B., Monroe, M. 2013 Stakeholder perspectives on goliath grouper management: summary report. University of Florida/Florida Sea Grant.

Miller, T. J., Blair, J. A., Ihde, T. F., Jones, R. M., Secor, D. H., & Wilberg, M. J. (2010). FishSmart: an innovative role for science in stakeholder-centered approaches to fisheries management. *Fisheries* 35: 424-433.

Shivlani, M. & Villanueva, M. 2007. FDOU Project 10: A Compilation and Comparison of Social Perceptions on Reef Conditions and Use in Southeast Florida. Florida Department of Environmental Protection. Miami, FL. 199 pp.

Weiss, R. S. 1995. *Learning from strangers: The art and method of qualitative interview studies*. Simon and Schuster.

V. Appendices

Appendix A

Consent form for interviews

Informed Consent: Please read this consent page carefully before you decide to participate in this interview.

Purpose of this interview: The purpose of these interviews is to learn from your experiences in the Florida Reef Tract.

Time required: 30-60 minutes

Risks and benefits: There is no risk to you from participating in this study. There is no direct benefit to you in participating in this interview, other than the opportunity to make your experiences and views known to researchers and management agencies.

Compensation: There is no compensation for participating in this study.

Confidentiality: Your identity will be kept confidential to the extent provided by law. Your information will be assigned a code number not connected with any identifying information. Your name will not be used in any report. If quotes or paraphrases are used in subsequent reports, your name will not be used and we will strive to avoid including anything that could identify you or others.

Voluntary participation: Your participation in this study is completely voluntary. There is no penalty for not participating, and you may withdraw your consent to participate at any time without penalty.

Whom to contact if you have questions about this project (IRB Study no. IRB201901247): Susana Hervas, Ph.D., School of Forest Resources and Conservation, University of Florida, Gainesville, FL 32653, Phone: (352) 283-1147 E-mail: shervas@ufl.edu

OR

Kai Lorenzen, Fisheries and Aquatic Sciences Program, University of Florida, 7922 NW 71st Street, Gainesville, FL 32653, E-mail: klorenzen@ufl.edu

Whom to contact about your rights as a research participant in this study: IRB2 Office, Box 112250, University of Florida, Gainesville, FL 32611-2250, Phone: (352) 392-0433.

WOULD YOU LIKE TO PARTICIPATE IN THIS STUDY?

ARE YOU 18 YEARS OLD OR OLDER?

IF YES: Thank you! We'll continue on to the interview.

IF NO: Thank you for your time!

Appendix B

Interview Guide

Opener (I.D. Positions, interests, knowledge of change and causes, concerns) (Talk about your experiences on the reef)

How are you connected to the Florida reef?

Resource users and community members asked:

What do you like most about the reef?

How do you use the reef?

What areas do you visit for these purposes? (show map – how far North and South in the tract)

Have you heard of the term “Florida Reef Tract” before?

How long have you lived/visited/fished/dived/spearfished/boated by the reef?

Everyone asked:

What changes have you seen to the Florida reef in that time?

What do you think has caused these changes?

What concerns would you like to see addressed on the Florida reef?

How would you like to see those changes come about?

What does your ideal reef look like?

Prompts: fish abundance, fish size, fish diversity, coral health, biodiversity, water clarity, access

What would an unacceptable reef look like to you?

Anything in between? Range you feel is acceptable?

How do you feel about the reef right now?

Are you happy with the current coral health/biodiversity (variety of fish, corals, etc)/water clarity/etc.?

To your understanding, what are the impacts of fishing in the Florida reef?

Can you think of any ideas to reduce this impact?

Resource users and community members asked:

What is your source of information about the reef/Where do you go to find out about what is going on in the Florida reef?

Everyone asked:

Are there any management approaches that you would like to see changed?

Views on Management and Engagement (Talk about your experiences with management)

Resource users and community members asked:

How well do you feel you understand the Florida reef management process?

Do you feel you understand how decisions are made for the Florida reef?

How would you interact if you had an issue?

What agencies or informal groups are you aware of that are involved in managing the Florida reef?

Have you been involved in decision-making around the Florida reef?

How?

(If yes) how successful did you feel when you engaged?

Did you feel able to influence the management decisions? (expand prompts)

How much control do you feel you have over management decisions?

Everyone asked:

In general, how much do you think management incorporates public input into their decisions?

Are you aware of the priorities that came out from OFR?

(If yes) What do you think about these priorities?

How involved were you in that process?

Identifying Stakeholders/Positions/Interests (Fill out table)

Group	Reef Use	Most Important Issues	Past Interactions	Management Role

Everyone asked:

Table Q1: In your experience, what are the different groups who care about the Florida Reef Tract?

Table Q2: How do they use the Florida reef?

Table Q3: What are the most important issues for each group?

Table Q4: How have you interacted with each group?

Prompt: describe the interactions you have had

Prompt: were they negative/positive?

Looking at the groups identified:

Table Q5: which groups are involved/influence/have a role in decision-making for Florida reef management?

Table Q6: do any of them have stronger influence on management decisions?

Who?

Why do you think that is?

Table Q7: Are any of them left out of the decision-making process?

Who?

Why do you think that is?

Table Q8: are there any who shouldn't be involved in decision-making?

Who?

Why?

Closing

Everyone asked:

Are there any objectives common to all groups? What do you think everyone wants?

What would a successful management process look like to you?

How would you prefer to be engaged?

What can your group do to make it better?

How optimistic do you feel about the future of the Florida reef and Florida reef management?