

Data Needs for Fisheries Management Stakeholder Engagement Process

Florida Department of Environmental Protection
Coral Reef Conservation Program
Fishing, Diving, and Other Uses Project 52



Data Needs for Fisheries Management

Stakeholder Engagement Process

Final Report

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LIST OF ACRONYMS

CRCP.....Coral Reef Conservation Program

FDEP.....Florida Department of Environmental Protection

FDOU.....Fishing, Diving, and Other Uses

ECA..... Ecosystem Conservation Area

FWC..... Florida Fish and Wildlife Conservation Commission

LAS.....Local Action Strategy

MPA..... Marine Protected Area

NOAA..... National Oceanic and Atmospheric Administration

OFR..... Our Florida Reefs

RMA.....Recommended Management Action (in OFR)

SEFCRI..... Southeast Florida Coral Reef Initiative

TAC Technical Advisory Committee

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EXECUTIVE SUMMARY

The fisheries community of the Kristin Jacobs Coral Reef Ecosystem Conservation Area (Coral ECA) has been engaged in a stakeholder process from June 2020 to November 2022 (FDOU Project 52). This process was initiated by the Southeast Florida Coral Reef Initiative (SEFCRI), funded by Florida Department of Environmental Protection (FDEP), facilitated by the University of Florida (UF), and had the collaboration of Florida Fish and Wildlife Commission (FWC), National Oceanic and Atmospheric Administration (NOAA) and Florida Sea Grant.

The purpose of this process was to harness the capacity of the fishing community (fishing stakeholders and industry) to advance conservation of the Coral ECA. Previous efforts to engage the fishing community in the Our Florida Reefs (OFR) process had been only partially successful and the fishing community eventually disengaged from the process. The current project aimed to re-engage this community and to help incorporate their knowledge and perspectives into recommendations to be considered in the upcoming development of a management plan for the Coral ECA.

A group of eighteen fishing stakeholder representatives were invited to be part of a fisheries committee to come up with a list of recommended management actions (RMAs) for the Coral ECA, especially fisheries management recommendations, to fill in the knowledge gaps from the previous OFR process. This committee was the main pillar of the stakeholder process, although not the only element. Fifteen committee meetings were complemented by public input through public meetings and a survey, and science webinars, supported the committee in making more informed decisions. The Southeast Florida Coral Reef Initiative (SEFCRI) Team and Technical Advisory Committee (TAC) were also informed about process updates and reviewed the recommendations.

The committee meetings were held online via zoom and a list of fifty-four RMAs was completed by the end of the project. However, some tweaks were made to the project as there needed to be some flexibility to work together with the stakeholder group and have a facilitated and co-created process instead of a directed one. For example, RMAs extended beyond fisheries management alone. The committee's greatest concern was water quality, and there were other concerns relating to habitat and education. Therefore, recommendations regarding all these topics were included in the final list.

Beyond the list of recommendations, some of the intangible achievements were trust building with each other and with the agencies, forming community and developing relationships between Coral ECA stakeholders, and having a group of engaged and committed individuals. This was helped by a flexible and extended process that continued substantially longer than originally intended.

A rich and valuable group has been formed with engaged stakeholders who want to see these recommendations come to fruition and are interested in continuing to be involved in the co-management of the Coral ECA. To maintain the momentum of the project and utilize the

human capital developed, it is crucial that the management agencies are intentional in integrating the stakeholders and the outputs from this process into their plans moving forward.

Acknowledgements

We are grateful to all committee members; Marty Arostegui, Trip Aukeman, Patience Cohn, Chuck Collins, Gary Jennings, Dan Kipnis, Bruce Marx, Jim “Chiefy” Mathie, Ed “Butch” Olsen, George Poveromo, April Price, Randolph “Bouncer” Smith, John Sprague, William Taylor, Tom Twyford, and Harry “Court” Vernon, for their commitment to the process and continued efforts to work together. We also thank Art Sapp and William Parks for their contributions to group discussions even though they did not stay on the committee until the end of the project. We appreciate all stakeholders who participated in public meetings and responded to the survey.

We thank the Fishing, Diving, and Other Uses (FDOU) team for their continued support, time commitment, and expertise. Throughout 2.5 years we said goodbye to some and welcomed new ones and it was a pleasure working with everyone - Jamie Monty (former FDEP); Kristi Kerrigan (FDEP), Mollie Sinnott (FDEP), Katie Lizza (FDEP), Erick Ault (FWC), Derek Cox (FWC), Dana Wusinich-Mendez (NOAA), Kurtis Gregg (former NOAA consultant), and Xaymara Serrano (NOAA).

The eight webinars were possible thanks to the generosity of the presenters. They prepared presentations and gave their time during the evening to bring their expertise to the committee. Thank you.

1. INTRODUCTION

This report describes a stakeholder process aimed at harnessing the capacity of the fishing community to advance conservation of Kristin Jacobs Coral Reef Ecosystem Conservation Area (Coral ECA). The Coral ECA includes the sovereign submerged lands and state waters offshore of Martin, Palm Beach, Broward, and Miami-Dade counties from the northern boundary of the Biscayne National Park to the St. Lucie Inlet. It was officially designated in July 2018 as part of efforts by the Florida Department of Environmental Protection (FDEP) to enhance coral reef conservation Southeast Florida Reef Tract.

The Coral ECA is located off Florida's most densely populated coastal counties and is subject to multiple stressors including poor water quality, coastal habitat degradation, coral disease, and high fishing pressure (Tuff et al. 2020; Ault et al. 2022). As a result, the coral reef ecosystem in the Coral ECA is considered impaired and in substantially worse condition than in the Florida Keys or Dry Tortugas (Tuff et al. 2020).

Following establishment of the United States Coral Reef Task Force in 1998, the Florida Department of Environmental Protection (FDEP) and the Florida Fish and Wildlife Conservation Commission (FWC) formed the Southeast Florida Coral Reef Initiative (SEFCRI) to promote conservation of reef ecosystems in the area now known as the Coral ECA. SEFCRI is a local action strategy for collaborative action among government and non-governmental partners to identify and implement priority actions needed to reduce key threats to coral reef resources in southeast Florida, which includes Miami-Dade, Broward, Palm Beach and Martin counties. Between 2013 and 2016, SEFCRI hosted a community planning process called Our Florida Reefs (OFR) (FDEP, 2018). OFR engaged stakeholders from diving, water sports, research, academia, fishing, county state and federal government, enforcement, and non-governmental organizations, citizens at large, and private business. The process developed 68 Recommended Management Actions (RMAs) focused 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 for the Coral ECA (FDEP, 2018).

Fishing is an important recreational, social, and economic use of coral reef ecosystems in Florida. Reef-related recreational fishing in Florida generates an overall economic impact of nearly \$384 million and supports over 3,700 jobs (Wallmo, 2021). Owing to a high resident population combined with a high fishing participation, the Coral ECA attracts a very high level of reef fishing activity (Allen, et al. 2021). The social and economic importance of this activity implies a great potential for fishing stakeholders to be powerful voices for conservation in the Coral ECA. At the same time, the high level of fishing intensity affects the abundance and size structure of reef fish populations in the Coral ECA (Towle et al. 2020; Ault et al. 2022). 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 OFR 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 (Lorenzen et al, 2019). In light of the fishing sector's importance and the issues surrounding its representation in the OFR process and the resulting RMAs, SEFCRI resolved to undertake a new engagement process focused on fishing stakeholders to enhance their participation and obtain more information on their perceptions and management preferences. A situation analysis showed that stakeholders perceived existence of distinct "angler" and "diver/environmental" stakeholder networks. 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. 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/environmental" 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. However, regardless of the fisheries stakeholders' experience with the OFR, they showed interest in working together to further engage in resource management initiatives. 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 Coral ECA. The process was designed and implemented between 2020 to 2022.

2. ENGAGEMENT PROCESS

2.1. Aims and Objectives

Aim

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.

The objectives of the stakeholder engagement process were the following:

1. Strengthen engagement of fishing stakeholders in SEFCRI coral reef ecosystem conservation initiatives
2. Review broad recommendations from the OFR process, progress with implementation of OFR recommendations, and opportunities for fisheries stakeholders to promote uptake of broad recommendations considered critical by fisheries stakeholders.
3. Develop a set of fisheries-related management recommendations to enhance coral reef ecosystem conservation and fishing quality.
4. Consult with the SEFCRI Team, TAC and FDOU Project #52 Team to obtain feedback on project progress and outputs from diverse stakeholder perspectives.
5. Inform fishing and other stakeholders about project process and outcomes.

2.2. Design considerations

The aim was to design a collaborative stakeholder process that would allow for development of community among diverse fishing stakeholder representatives, building of trust amongst each other and between the stakeholders and SEFCRI, learning, communication, and shared development of management recommendations. The design was informed by insights from other innovative, collaborative approaches to natural resource conservation (Wondollek & Jaffee 2000; Armitage et al. 2009). A key element was promotion of social learning by including diverse participation, constructive conflict, facilitation, democratic structure, open communication, unrestrained thinking, multiple sources of knowledge, and extended engagement (Schusler et al. 2003).

It was decided to center the process around a stakeholder committee with members representing diverse constituencies in the fishing community and diverse views on key issues. The process was designed to build community and trust with the project team, and

create opportunities to nurture and rebuild trust with resource management agencies, other stakeholder groups and participatory decision making processes. Trust is required for successful co-management (Fienup-Riordan, 1999; De Cremer, 2007) but can also be eroded when stakeholders do not view their participation as meaningful or the request to participate as genuine (Crandall, 2019). The situation assessment had already served as an initial trust building phase since many of the committee members had been interviewed. Trust-building can be fostered through early community consultation and is necessary before substantive issues can be addressed collaboratively (Thornton, 2012). Therefore, this process was designed to nurture bonds of trust, build relationships, and develop shared experiences. The process was guided by facilitation professionals, who worked towards exemplifying authenticity, transparency, and flexibility, which inspire trust and confidence (Conley, 1994).

The Covid-19 pandemic coincided with the engagement process and forced the process to rely on virtual meetings and communications. Whereas meeting in person and interacting in informal social settings as well as more formally is often seen as an important element of collaborative processes, this was not an option for much of the project period. Virtual meetings, however, proved broadly effective. Virtual meetings also save time, money and resources and can attract international participants for local events (Rubinger, 2020).

2.3. Process overview and timeline

An overview of the process and the role of the fisheries committee is provided in Figure 1, and the timeline of activities in Figure 2. The committee was assembled from diverse fisheries stakeholders and charged with developing management recommendations. The committee received input from the larger community through public meetings and a survey which helped the committee inform their recommendations. Committee members were also given scientific background on the topics discussed through eight science webinars.

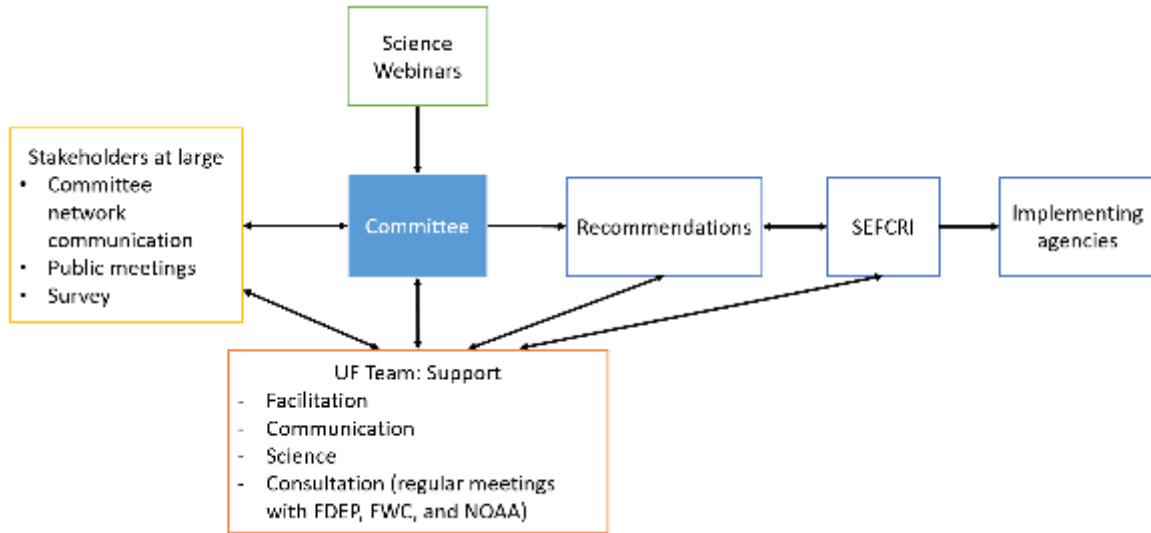


Figure 1. Process and the role of the committee.

The UF team supported the process through meeting facilitation, regular communication with individual committee members, and facilitation of access to scientific information. Regular process planning meetings were held with members from FDEP, FWC and NOAA to provide updates and obtain regular input on next steps. The committee met every 1-3 months to ultimately develop a set of recommendations that will support the improved conservation and management of the Coral ECA. These recommendations were subject to public input through public meetings, committee member engagement with their networks, and a survey. The UF team gave presentations to the SEFCRI team and SEFCRI TAC on project updates and the SEFCRI Team were also asked to provide feedback on the final recommendations. The final recommendations will be provided by the SEFCRI Chair to the appropriate management agencies that will decide what to take forward into their work plans and rule-making processes.

Throughout the process constant communication was maintained between the UF team and the committee members via email, phone calls and text messages. This was to inform of next steps, update the committee and to engage in transparent conversations to clarify concerns and questions.

Several facilitation tools were used to keep the committee engaged during the meetings. During the first meetings, ice breakers were used to get committee and project members acquainted with each other. Breakout rooms in Zoom were frequently used to allowed for small group discussions followed by reporting-out to the full group.

This process was rolled out over 2.5 years and involved a total of 23 online meetings. The meeting designs were adapted to the online format and were also flexible to address the committee's concerns and discussions (Figure 2). **Error! Reference source not found.** The situation analysis (Project #8), which occurred in 2019, was the foundational work that

informed the strategy for the stakeholder engagement process. Committee members were invited from February to June 2020 and the first meeting was held June 4th, 2020.

Initial meetings were held to build trust, understand group dynamics and the range of perspectives within the group. A public meeting was held early in the process to inform the public of the initiative and receive input on their issues of concern related to the Coral ECA. Webinars were held throughout the first year so that the committee members gained knowledge on important science topics related and ongoing management activities related to the Coral ECA. Webinars were presented by subject matter experts from academic and management backgrounds. The UF project team presented at SEFCRI Team and TAC meetings to give updates. A second public meeting and a survey were used to collect information on the perspectives and opinions of the wider fishing community as they related to the draft recommended management actions.

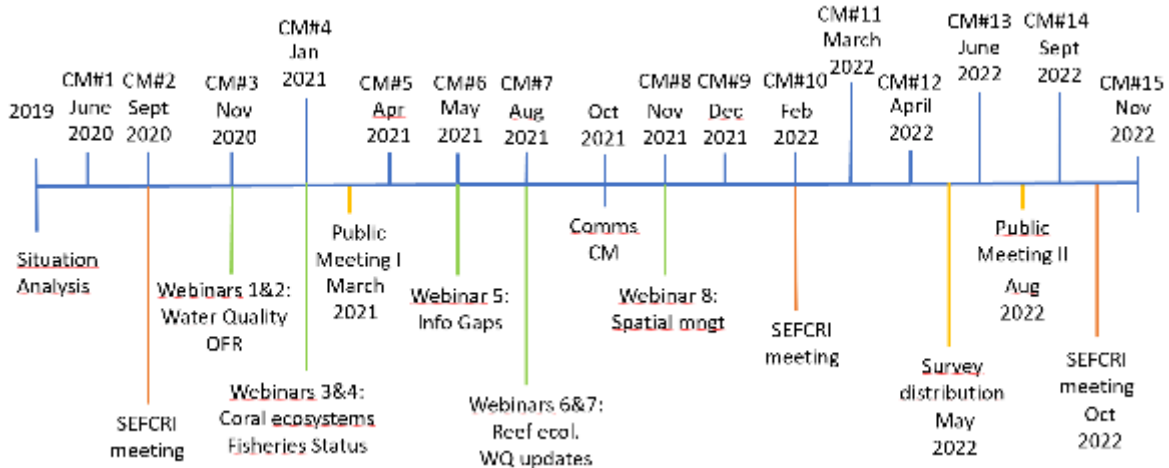


Figure 2. Timeline of the process.

2.4. Creation of the committee

Fisheries stakeholders from different sectors of the fishing community and their social networks were invited to participate in the fisheries stakeholder committee. These individuals acted as representatives for their constituencies. Committee members were also selected to be representative of the geographic range of the Coral ECA and the breadth of the fishing community in terms of sectors and points of view. Committee members represented recreational anglers, commercial fishermen, charter captains, marine industries, tackle shop owners, and spearfishers from four counties: Martin, West Palm Beach, Broward and Miami-Dade. Some of these stakeholders had previously been interviewed for the situation analysis, selected based on their involvement in OFR or identified through ‘snowball sampling’ based

on suggestions from interviewees. Apart from previously interviewed individuals, other committee members were strongly suggested by some of the already invited members. These were important additions to the group considering their additional social networks and even opposition to previous OFR outcomes but willingness to re-engage. Since stakeholders from different networks were interviewed, (both from the angler network and diving/environmental network, as described in Lorenzen et al., 2019) the project team was able to select knowledgeable individuals, some with experience in management, and with large social networks in the fishing community.

Eighteen fisheries stakeholders were interested in joining the project and committed to attend the meetings for the length of the project. Two committee members opted to end their participation in the process. One had no interest in discussing topics other than coral restoration and another one for reasons unknown. The engagement process concluded with a total of 16 committee members, including Martin Arostegui, Trip Aukeman, Patience Cohn, Chuck Collins, Gary Jennings, Dan Kipnis, Bruce Marx, Jim “Chiefy” Mathie, Ed “Butch” Olsen, George Poveromo, April Price, Randolph “Bouncer” Smith, John Sprague, William Taylor, Tom Twyford, and Harry “Court” Vernon.

2.5. Committee Meetings

Committee meetings occurred in the evenings and typically were about two hours long. After the sixth meeting, it was decided to split each scheduled meeting over two days (Tuesdays and Thursdays) to provide more time and advance the conversations substantially. This resulted in twenty-three days of meetings (see meeting reports in Appendix A).

Virtual meetings can pose challenges, for example, there is a lack of human connection, which is vital for building relationships and trust. Conversations are less fluid and rely on technology (e.g. good internet connection, non-muted mics, etc.). Brainstorming also becomes harder, and despite there being virtual tools for this purpose, there are audiences with different levels of technical proficiency and/or access. However, despite the challenges that virtual meetings pose, they proved to be advantageous and were even preferred by most of the members. Virtual meetings were considered convenient to the committee members, which saved them travel time and allowed them to attend more meetings than if they had been in person.

The structure of each meeting varied, but most had these sections in common: i) reminders of group norms and the sunshine law, ii) a summary and discussion of either recent webinars, public meetings or recap of past meetings, and iii) a group activity to be done either in small groups or facilitated in a large group. Meeting minutes, agenda and a recording of the zoom meeting were posted online on the project’s website, which was created and managed by Florida Sea Grant. All meetings were open to the public and part of an adaptive process. Facilitation created a transparent process that supported the committee to create their own

recommendations. This transparency and the continued interactions helped stakeholders build relationships with each other and management agencies.

FDEP and FWC staff were engaged throughout the process and initially served in an observer role. However, as the facilitation process built a sense of community and trust among committee members between the committee and management agencies, participation of DEP and FWC Staff naturally increased. Agency staff contributed clarifications, perspectives, facilitation support, and scientific knowledge as necessary.

2.6. Webinars

Webinars were held to increase knowledge and help committee members make more informed decisions. Their content was planned based on a combination of project goals and committee interests. Live webinar sessions were held in the evenings from 6-7pm. Different experts informed the committee on a variety of topics and allowed for a Q&A session at the end of each of the 45-minute presentations. Topics included OFR, water quality, fisheries, coral ecosystems, reef ecology and spatial management (slides in Appendix B) and descriptions of them can be found below in the process summary section. The Committee members were also ambassadors for the process. This was discussed early in the project to manage expectations and received a positive response to it. Committee members especially reached out to their networks to recruit for public meetings. Some members wrote articles in local magazines, reached out through their social media platforms, via email lists and personal contacts. Florida Sea Grant and American Sportfishing Association created press releases, and FDEP also reached out through their public outreach platform to publicize the meetings.

2.7. Public Input and Engagement

2.7.1. Outreach

The Committee members were also ambassadors for the process. This was discussed early in the project to manage expectations, and received a positive response to it. Committee members especially reached out to their networks to recruit for public meetings. Some members wrote articles in local magazines, reached out through their social media platforms, via email lists and personal contacts. Florida Sea Grant and American Sportfishing Association created press releases, and FDEP also reached out through their public outreach platform to publicize the meetings.

For the first public meeting, the UF Team created communications materials that FDEP also distributed at the Palm Beach Boat Show and at a recreational fishing tradeshow called the International Convention of Allied Sportfishing Trades (ICAST) .

In preparation for the second public meeting, the committee held a stand-alone communications meeting months in advance to discuss the best ways to reach out to their networks; best channels, messaging, and wording. The communications materials were created by the UF Team and distributed by the committee members to their fishing community networks (communications materials can be seen in Appendix D).

Florida Sea Grant hosted the project web page with description of the project, fact sheet, committee members, and meeting agendas and minutes. Video recordings have also been available for both meetings and webinars.

2.7.2. Public Meetings

Two public meetings were held. The first took place earlier in the process and focused on introducing the project, the team, managing expectations, and creating a group setting to learn about the public's opinion on the state of the reef (see public meeting summaries in Appendix C). Fifty-two people attended the meeting which was held in the evening from 6-7:30pm.

The second public meeting was held at the end of the process to obtain feedback on the list of draft recommendations developed by the committee for potential fisheries and environmental management actions to enhance coral reef ecosystem conservation and fishing quality in the Coral ECA. Fifty-four people attended the second public meeting which was held in the evening from 6-8pm. A small group activity was conducted to acquire feedback and ensure that all attendees had a chance to speak in a smaller forum and have their feedback registered. Otherwise, it is possible that a few vocal attendants provided the feedback, and despite the higher number of attendance, their thoughts and ideas could potentially not be on record. Attendees were divided into four groups that each had an individual facilitator and note-taker to stimulate discussion and record feedback.

For both public meetings, input was recorded through meeting minutes and an online form. Committee members also attended these meetings as listeners and the feedback was synthesized by the UF team to share with the committee during the following committee meeting for their consideration. For the first public meeting, a visual synthesis of all the reef issues that were discussed was shared with the committee to ensure that all comments were recorded and reminded to the members – both those who attended and those who could not attend. Since committee meetings were weeks after the public meetings, it was important to synthesize the information to ensure that this would be considered.

So, part of the UF role was to facilitate the process of public input. For the first public meeting, an infographic collecting all the input was classified by topics so that committee members could have a common ground to work on and discuss. For the second public

meeting, potential edits and additions to the draft recommendations were summarized for the committee to discuss and refine.

2.7.3. Survey

A survey was conducted to obtain input from the wider fishing stakeholder community on the perceptions of reef status, factors affecting reef conservation and fishing experience, and support of management ideas that had been discussed in committee meetings related to water quality, fisheries, and habitat. The results informed the fisheries committee of the perceptions and preferences of the wider fishing community

Data from representative samples were obtained from private recreational anglers with reef permits, commercial fishermen, and charter captains. Non-representative data were also obtained by sending separate links to the committee members and SEFCRI team to distribute across their networks. The latter would be a reflection of the reef conservation community. A complete description and analysis of the survey is provided in Hervas & Lorenzen (2023) (Appendix E).

2.8. Process summary

This section summarizes the content of the process elements: committee meeting topics, webinar topics, public meeting objectives, survey distribution, and SEFCRI update meetings. Table 1 shows the list of elements which are elaborated below it.

Table 1. Summary of the process elements

Process element	Date	Topic
CM1	06/04/20	Introductions
CM2	09/03/20	State of the Reef
SEFCRI meeting	Sept 2020	Project introduction to SEFCRI team
Webinars 1&2	Nov 2020	OFR review Water Quality
CM3	11/12/20	OFR and WQ webinar reviews
Webinars 3&4	Jan 2021	Coral Ecosystem Fisheries Status
CM4	01/28/21	Webinar reviews
Public Meeting #1	03/11/21	Process introduction and data gathering on management and conservation issues
CM5	04/01/21	Public Meeting debrief and begin identifying RMAs
Webinar 5	May 2021	Addressing fisheries information gaps

CM6	05/27/21	Fisheries criteria
Webinars 6&7	Aug 2021	Reef Ecology Water Quality (update)
CM7.1	08/31/21	Perceptions of fishing quality
CM7.2	09/02/21	Criteria for artificial reefs
Communications meeting	Oct 2021	Committee meeting to discuss communication plan for public meeting #2
CM8.1	11/02/21	WQ projects and interests and WQ criteria
CM8.2	11/04/21	WQ review and recommendations
Webinar 8	Nov 2021	Spatial management
CM9.1	12/07/21	Spatial management
CM9.2	12/09/21	Spatial mngt – areas of agreement and disagreement
SEFCRI meeting	Feb 2022	Project update to SEFCRI TAC
CM10.1	02/08/22	Review emerging recommendations
CM10.2	02/10/22	Finalizing draft recommendations
CM11.1	03/01/22	Finalizing draft recommendations
CM11.2	03/03/22	Finalizing draft recommendations
CM12.1	04/12/22	Finalizing draft recommendations
CM12.2	04/14/22	Finalizing draft recommendations
Survey distribution	May 2022	Survey distribution
CM13.1	06/14/22	Survey preliminary results + finalizing draft recommendations
CM13.2	06/16/22	Finalizing draft recommendations
Public Meeting #2	Aug 2022	Feedback on draft recommendations
CM14.1	10/04/22	Survey results and input from public meeting #2
CM14.2	10/06/22	Incorporate input from public meeting #2
CM15		

Committee Meeting 1 - Introductions: The UF team and committee members were introduced using ice breakers. The committee was informed about how the process originated based on the situation assessment, and general expectations and objectives were discussed. They were reminded about the ownership they had over the development of the process and being ambassadors of their process through connecting to their networks. A small group activity focused on committee member's vision was for the future of the reef.

Committee Meeting 2 – State of the reef: After a recap about the first meeting, there was a small group activity aimed to understand the perceptions of committee members in relation to the state of the reef. This helped the committee members and facilitators understand the diversity of views in the room. Water quality came up as a concern and topic of discussion from all groups. Shark depredation was also a common and current concern. There were also concerns around coral health, beach renourishment, anchoring and climate change, and there were different points of view regarding fisheries. One group suggested fishing closures in

specific areas because fish abundance has declined significantly, whereas another group shared that fisheries are doing fairly well because of good management by the FWC.

Webinars - Water quality: Water quality was a repeated topic of discussion during meetings and members considered it the most important issue impacting the coral reef ecosystem and fishing quality. Two presenters were invited to talk about the current state of water quality in southeast Florida. Kurtis Gregg (NOAA), FDOU team member at the time, presented on “Everglades to Reefs: Water connects south Florida ecosystems” and Dave Whitall presented about “A water quality assessment of the south Florida reef tract”. They explained that there are many water quality stressors affecting the Coral ECA such as nutrients, wastewater, salinity changes, sedimentation, turbidity, pharmaceuticals, biocides and heavy metals. It is therefore important to monitor these parameters, restore the Everglades, and mitigate the impact of a growing population. Key recommendations for the improvement of water quality include reducing nutrient load, upgrading to advanced wastewater treatment, supporting strategic constructions and technologies, upgrading stormwater and sanitary sewer systems and modifying beach re-nourishment and dredging activities.

Webinar - OFR: Jamie Monty, FDEP Southeast Regional Administrator and FDOU Team member at the time, presented “Our Florida Reefs Community Planning Process: Overview and Results”. The purpose of the presentation was to inform the committee what recommendations had already been developed to avoid duplication and to potentially integrate the committee’s ideas into the existing OFR framework. The OFR stakeholder engagement process was created to bring together Coral ECA stakeholders to develop recommended management actions (RMAs) for coral reef conservation. OFR occurred from 2013 to 2016 and developed 68 RMAs relating to education and outreach; enforcement, fishing, diving, and other uses; land-based sources of pollution; maritime industry and coastal construction impacts; and place-based management strategy.

Committee Meeting 3 – OFR and WQ webinar review: After committee members attended or viewed the recording of the webinars on water quality and OFR, there was a group review about the two webinars and a small group activity discussing OFR RMAs and identify RMAs the group wanted to promote, edit, or further discuss. It was at this point that the stakeholder committee decided to develop their own recommendations on water quality, fishing and habitat issues rather than reviewing the RMAs that had already been created in OFR.

Webinar – Coral Ecology: Three presentations were scheduled for this webinar to inform the committee about the interactive and dependent nature of coral reef ecosystems.

“Coral ECA Reef Monitoring Program,” David Gilliam (NOAA).

The Southeast Florida Coral Reef Evaluation and Monitoring Program uses digital imagery and belt transects to monitor coral, sponges, octocoral and macroalgae in the Coral ECA. Monitoring of benthic cover showed the impacts of stony coral tissue loss disease (SCTL) in changing trends. For example, density of stony coral has decreased, including seven threatened species. Those surfaces have been replaced by “weedy” species. Octocoral species have remained constant, and sponges and macroalgae have increased. SCTL disease had its

largest prevalence in the area in 2016, and hurricane Irma in 2017 could also have an effect on a time specific reduction of density for octocoral and barrel sponges.

“Stony Coral Tissue Loss Disease in Florida” by Maurizio Martinelli (FL Sea Grant).

The Stoney Coral Tissue Loss disease is likely to become the most lethal coral disease ever recorded because of its high prevalence, the high number of susceptible species, its transmissibility, and the high levels of mortality exhibited by affected corals. More than 22 species of coral are susceptible, and it has nearly 100% mortality rate in affected corals. The SCTL disease is also highly transmissible and has spread throughout Florida and the Caribbean. In Florida alone it affects the whole coral reef tract from Martin county to the Florida keys. In the data shown from 2020, it had not yet been reported in the Dry Tortugas. This unprecedented disease requires an unprecedented response.

“Links between Corals and Reef Fishes in the Coral ECA” by Brian Walker (Nova Southeastern University).

The Coral ECA ecosystem is over-stressed and losing its resilience, being disrupted by many anthropogenic impacts. This affects the ecosystem including links between reef fish and corals. There is an intricate relation between the reef fish and corals. Corals create habitat and refuge for fish where they can find safety, and food supply. There are 114 species of corallivorous fish that have the ability to remove skeletal material along with coral tissue, and also planktivorous fish that predate on coral spawn. Fish are also vectors of coral disease. However, fish also bring benefits to the corals. Fish facilitate coral settlement by grazing on hard surfaces and leaving optimal open surfaces for coral to settle on and begin to grow. However, this is also affected by fish diversity in the reef, since foraging fish are more likely to forage when they see others fish foraging and vice versa. Fish are also a supply of nutrients through excreting ammonium, nitrogen, and phosphorus through urine. Studies were cited describing that coral heads with resident fish schools grow faster than those without, and that fishing reduces nutrient capacity almost 50% throughout the Caribbean.

Webinar – Fisheries: Jeremiah Blondeau (NOAA) presented “NOAA Coral Reef Conservation Program - SE Florida Fisheries update” to provide the committee members information on fish trends and coral reef status. Derek Cox (FWC) presented “Fisheries Management” to give an overview of how management action is derived from data collection and stock assessments.

“NOAA Coral Reef Conservation Program - SE Florida Fisheries Update” by Jeremiah Blondeau.

Fish monitoring, conducted by the National Coral Reef Monitoring Program, provided estimated densities of yellowtail snapper, hogfish, mutton snapper, gray triggerfish, and red grouper in the Dry Tortugas, Florida Keys and Coral ECA. Results from NOAA’s most recent status report showed Florida reefs overall are rated as “impaired”. Comparison of the status in the Dry Tortugas, Florida Keys and southeast Florida showed that the latter had the most critical status. The density of ornamental fish species in southeast Florida was rated

“good,” while the status of target species of fisheries, richness and sustainability were rated “critical”.

“Fisheries Management” by Derek Cox

The process of fisheries management begins with the collection of fisheries-dependent and independent data and follows with the development of stock assessments to evaluate the status of a fishery. However, assessments can have limitations such as uncertainty or scale. Fisheries management has different goals, scales, and strategies, and has to deal with numerous challenges such as the interconnectedness of the resource and stakeholders’ polarized views.

Committee Meeting 4 – Coral ecology and fisheries webinar review: Thinking about the two previous webinars, the committee discussed what information was relevant for further committee discussions and furthered the thinking about their issues of concern. The groups brought up some points related to coral ecology and fisheries, but also discussed water quality, shark depredation, dredging, funding, innovative management, artificial structures, nursery habitat, etc. The committee was also introduced to the upcoming public meeting for which they would increase awareness through communication and engagement with their social networks.

Public Meeting #1: The goals of the meeting were to inform the public about the project and the committee and gather input on perceptions of reef ecosystem status and management/conservation issues and options. Public awareness of this meeting occurred through committee member communication with their networks and press releases created by Florida Sea Grant and American Sportfishing Association..

Committee Meeting 5 - Public meeting debrief and begin identifying RMAs: There was an initial brainstorm to narrow down the conversations from the previous four committee meetings, and reflect on content from the webinars as well as input from the public meeting. The public input was synthesized and presented to the committee, and they were also provided with the list of Our Florida Reefs (OFR) final RMAs as reference for the small group activity. They were asked to come up with draft RMAs; two for water quality, two for fisheries, and one of their choice, to eventually discuss commonalities and differences of opinions within the group. Full recommendations were not crafted but their priorities regarding water quality and fisheries were expressed. Some of the issues highlighted for water quality were for example, Lake Okeechobee restoration, septic tanks, dredging, pesticides and herbicides, and supporting the Clean waterways Act. For fisheries, a more robust artificial reef program was suggested, addressing shark depredation, spawning closures, support and opposition for MPAs.

Webinar 5 – Addressing fisheries information gaps: Kai Lorenzen (UF) and Kurtis Gregg (NOAA) presented on “Fish Stock Status: Different Perspectives and Spatial Scales” and Derek Cox (FWC) presented on “Fisheries Management in Southeast Florida”. The previous webinar on fisheries led to misunderstandings about the status of fish stocks and the reef condition in the Coral ECA. Thus, this webinar was scheduled to clarify misunderstandings

and further increase the committee members' knowledge of fisheries stock status and explain how stock status is influenced by perspective (traditional fisheries sustainability vs. ecosystem conservation), by the specific data sources and methods used, and by the spatial scale of assessment. Data was shown to explain how in the coral ECA, the spatial scale of assessment (large scale vs. Coral ECA) has the greatest effect on results, and these are indicative of a very high level of fishing pressure in the Coral ECA. The presentation by Derek Cox was scheduled to inform the committee about the scientific and bureaucratic process of fisheries management to better enable them to develop more realistic recommendations for management integration.

Committee Meeting #6 – Fisheries criteria: Information presented during Webinar 5 was reviewed, and the concept of “criteria” was introduced as a new way of looking at recommendations. The committee members have many concerns and want to bring certain issues forward. At the same time, until this point there had not been any recommendations drafted. It is a complex task to develop a recommendation, even with the support of webinars. So, the project team planned to offer the concept of criteria. This would ask, under what conditions would the committee members want their recommendations to be considered? This might invite the group to more productive discussions. In this meeting, fisheries criteria were discussed during the small group activity with regards to spawning closures, gathering more information on species, and anchoring.

Webinar 6 - Reef ecology: Mark Ladd and Jay Grove presented on “Coral Reef Ecology and fishery targeted species” and described the coral reef ecosystem processes and how some targeted fish interact with their habitat. Coral reef ecosystems are created and maintained by different fundamental processes that happen simultaneously. Calcium carbonate dynamics and bioerosion affect habitat and reef building; herbivore-algae interactions are the basis for coral-algal competition, coral recruitment and benthic community; predator-prey interactions affect the predator-prey population balance, and energy transfer from other systems; and nutrient cycling are a key source of nutrients on oligotrophic reefs, structure patterns of herbivory, promote coral growth, and buffer corals from stress and mortality. Targeted fish species vary in life histories, habitat preferences, behaviors, and their interactions with the ecosystem at different life stages. Ecosystem-based fisheries management can provide a more holistic look at fisheries management by understanding the ecosystem inputs and interactions (e.g., habitat, predators, and prey of the target species).

Webinar 7 – Water quality updates: A second webinar on water quality was held in response to comments from committee members regarding the need for more information and awareness of any ongoing water quality projects and initiatives. This led to presentations by Rhonda Haag (Monroe County) on “Monroe County’s Florida Keys Canal Restoration Program” and by Chad Kennedy (DEP) on HAB assessment of Lake Okeechobee (HALO): Innovative technologies providing insights into sediment nutrient cycling”.

“Monroe County’s Florida Keys Canal Restoration Program” by Rhonda Haag

The detrimental impacts of canal development are impacting water quality and the economy of the Florida Keys. The canal restoration program begins by prioritizing canals, and

proposes corrective measures, technologies, and management practices to improve the water quality in residential canals. Canal management aims to improve water quality, sediment and habitat quality, and public involvement.

“HAB assessment of Lake Okeechobee (HALO): Innovative Technologies Providing Insights into Sediment Nutrient Cycling” by Chad Kennedy.

The HALO (Harmful algal bloom assessment of Lake Okeechobee) monitors harmful algal blooms with advanced technologies and environmental measurements of the water, sediment, and air. HALO activities teach about seasonal progression of blooms, especially regarding the geographical patterns of nutrient sources, utilization, and limitation. The program also seeks to provide improved decision-making and resource planning capabilities for relevant agencies and stakeholder management.

Committee Meeting #7 part 1 - Perceptions of fishing quality: The committee discussed perceptions of the fishing quality in the Coral ECA and the importance of different factors to the quality of bottom reef fishing. Some committee members shared that the fishing quality is poor and in decline. Some other committee members pointed out that the question being asked, “Please rate the quality of fishing compared to when you started fishing in the ECA” was oversimplified, and many felt unable to answer this question due to the nuances of the context. Another question posed to the group was to rate the importance of several factors to the quality of fishing (i.e. water quality, coral disease, fishing pressure, shark depredation, and access”). Water quality, habitat and artificial reefs were mentioned repeatedly, and the option of working on regulations to reduce fishing pressure was also mentioned. Additional discussions on fisheries criteria happened during the meeting activity. Enforcement, tighter regulations, and spatial management were mentioned. However, some of the committee members were vocal about wanting to talk about the reef, not about fisheries specifically, therefore, water quality and habitat restoration came up repeatedly.

Committee Meeting #7 part 2 – Artificial Reefs: A short presentation on artificial reefs by Derek Cox (FWC) was followed by an activity to discuss criteria for artificial reefs. Prompts were given on what the goals of the artificial reefs should be, where would they be located, what would the structure be like and what species would it target? Goals related to tourism enhancement and mitigation, and ideas were shared on materials, design and set up.

Communications meeting: This stand-alone committee meeting was held to discuss ways to reach out to the fishing community for the summer public meeting. The committee discussed the best channels of communication and brainstormed messaging ideas and wording.

Committee Meeting #8 part 1 - WQ projects and interests: The committee were asked prior to this meeting to collect their knowledge on current water quality initiatives in southeast Florida. This information was gathered, presented back to them and discussed as a collection of the committee’s knowledge on water quality and gaps identified in water quality initiatives. This led to an activity that discussed potential criteria for water quality. A broad array of water quality topics was discussed. E.g., sewer to septic infrastructure, fertilizer reduction, ban on spraying, enforcing pump outs on live aboards, filter run-off, and Lake

Okeechobee restoration, and public awareness. A committee member discussed other factors considered a fundamental basis for any recommendations: policy change, funding, and political will and leadership. The committee agreed with these being critical.

Committee Meeting #8 part 2 – water quality recommendations: First, there was a review of the previous day’s themes on water quality (herbicide use, wastewater, fertilizer use, sewer septic conversion, habitat restoration, Lake Okeechobee, public awareness, agency coordination and communication, and stormwater retention). Then, potential recommendations on this topic were refined through small group activities. They mentioned funding, outreach, prioritization, tighter regulation on fertilizers and herbicide, recycling wastewater, etc. During this meeting, clearer actions were put forward by the committee.

Webinar 8 – Spatial management: Derek Cox (FWC) presented on spatial management: “Spatial Management: Defining and Classifying MPAs”. Marine Protected Areas (MPAs) are one type of spatial management with multiple definitions, which can be misused and contentious. The topic of spatial management and MPAs was a challenging topic for the committee to discuss. One of the reasons for this was the different interpretations the terms carry. So, the aim of this webinar was to provide a common definition and explain different classifications and goals, so the committee could have a more unified understanding and a common language to discuss this complex issue. It was an informative and neutral presentation where spatial management was described as a tool used by managers to achieve fisheries and other environmental conservation goals. An example of spatial management is MPAs, Since the term MPA is used as an overarching concept, and is oftentimes used to refer to fishing closures, the definitions, and different classification of MPAs were described and classified so that the committee could have a more nuanced understanding for potential discussions about spatial management in general, and MPAs in particular.

Committee Meeting #9 part 1 – Spatial management: The webinar on spatial management was reviewed and the committee participated in an activity to discuss the conditions under which spatial management would be considered for water standards, habitat, groups of organisms, fisheries status, and access. The committee came up with conditions, especially for water standards and habitat. Some answers included: Spatial management would be considered for water quality water standards if there is dumping of sewage by vessel, for habitat if there is destructive damage by anchors, and for specific species if there are spawning aggregations. For fisheries, FWC were always mentioned as the management agency who have the expertise to place those conditions. Discussion about commonalities and differences followed the activity. The common areas of agreement were: manage dumping of sewage, create mooring fields / no anchor zones, signage for seagrass beds and other sensitive areas, and habitat restoration. The area of large disagreement was identified as complete closures. (A summary table can be found in the meeting minutes in Appendix A).

Committee Meeting #9 part 2 – Spatial management areas of agreement and disagreement: DEP and FWC reminded the committee of their valuable expertise as fisheries experts. A review of last meeting’s discussion was summarized and presented, followed by a lengthy

group discussion on the common areas of agreement and disagreement related to spatial management. To spark conversation, three probes with potential for spatial management were presented: spawning aggregations, special management areas with limitation on use, and more restrictive existing regulations. This led to a productive discussion that resulted in some recommendation ideas.

Committee Meeting #10 part 1 - Review emerging recommendations: The UF team synthesized all the discussions so far to create a list of 60 emerging recommendations. These mostly included water quality, fisheries and boating, and habitat. These were sent to the committee members as a survey prior to this meeting, asking for their level of agreement. The UF Team ranked the results from most to least agreed on and the following several meetings were used to finalize draft recommendations. The top five water quality and top five fisheries recommendations were discussed first. Seven were fully discussed during this meeting.

Committee Meeting #10 part 2 – Finalizing draft recommendations: Another six recommendations from the most agreed on were discussed.

SEFCRI TAC meeting – The UF Team presented to the SEFCRI TAC to give an overview and update of the process.

Committee Meeting #11 part 1 – Finalizing draft recommendations: Draft recommendations were discussed related to living shorelines, habitat, systems and agencies, and lobster traps.

Committee Meeting #11 part 2 – Finalizing draft recommendations: The survey draft was introduced and discussed with the committee, followed by a discussion on draft recommendations about anchoring, information sources and artificial reefs.

Committee Meeting #12 part 1 – Finalizing draft recommendations: Draft recommendations were discussed related to septic-sewer, water treatments, enforcement, fertilizers, bans, herbicides.

Committee Meeting #12 part 2 – Finalizing draft recommendations: Committee revisited points from last meeting and continued to discuss them as a large group but with further information provided by the project team with regards to questions and information gaps that came up during the last meeting.

Survey distribution: The survey was designed considering all the committee's discussions and was shared with them for input during CM #11.2. After piloting, the distribution began by sending it to a sample of anglers from the recreational reef license holders. It was also distributed among a representative sample of commercial fishermen and charter captains. Additional informative survey links were sent out through the committee fishing community networks and through the SEFCRI community. (Please refer to Appendix E for a full description and analysis of the survey).

Committee Meeting #13 part 1 – Finalizing draft recommendations: The committee had an overview of the preliminary survey results of the angler sample. Two draft recommendations on spawning aggregations were also discussed.

Committee Meeting #13 part 2 – Finalizing draft recommendations: The committee discussed the four final recommendations: spatial management, bag limits, shark depredation, and pole and troll areas. Spatial management was considered unresolved and therefore was classified as a “committee consideration” instead of draft recommendation for the upcoming public meeting.

Public Meeting #2: This second public meeting was held to obtain feedback on the draft recommendations developed by the committee. Fifty-four people attended and there was a small group activity with facilitated groups to better capture the attendants’ feedback. Opportunity to provide feedback through an online form was also available.

Committee Meeting #14 part 1 – Finalizing draft recommendations: The committee was presented with the survey results and input from the public meeting. Recommendations for fertilizers, ocean outfalls, bag limits, shark depredation, sedimentation and education were reconsidered and edited.

Committee Meeting #14 part 2 – Finalizing draft recommendations: Continuing from the last meeting, survey results and public meeting input were considered to revisit recommendations about ocean acidification, plastic pollution, artificial reefs, spawning aggregations and marine reserves.

SEFCRI Team Meeting – The UF Team presented to the SEFCRI Team on survey results and provided guidelines for providing their feedback to the recommendations. They had access to an online form where they could carefully study the recommendations and provide feedback for the committee. The committee considered this information and created some edits. The final list was sent back out to the committee and the UF Team contacted each member individually to know their level of support for the final recommendations.

Committee Meeting #15 – Final Recommendations and closing of the project: Two concerns that came up during the individual phone calls were brought back up to the committee, a final review of comments was done and the recommendation list was finalized. The committee was informed of the next steps and future engagement possibilities. A motion was passed to end the project and be out of the sunshine law.

All agendas and meeting summaries can be found in Appendix A.

2.9. Process Evolution

2.9.1. *Broadening the focus to motivate engagement*

The stakeholder process was designed to be flexible, adaptable and responsive to the aspirations and concerns of stakeholders. This affected the scope of the task as well as the process.

The original purpose of LAS Project FDOU 52 included the re-engagement of the fishing community in resource management decisions and the development of fisheries-focused and stakeholder supported management measures that could be used to enhance the conservation of the coral reef ecosystem in the Coral ECA. The absence of the fishing community in the creation of the OFR recommended management actions resulted in a gap in knowledge and feedback, which was part of the basis for this project and the creation of a fishery stakeholder committee in 2020.

The idea for the committee was created with this specific resource management need in mind. However, many fishing stakeholders and committee members did not want to limit their discussions to fishing impacts and fisheries-related management measures, and instead, wanted to address broader issues such as water quality and habitat that they believed were crucial to the conservation of the Coral ECA. In some instances, being able to address broader issues rather than being bound to only speaking about fisheries was a precondition for joining the effort.

A balance between conversations on broader issues and fisheries management was achieved through facilitation to provide space for all considerations and concerns from members of the committee.

2.9.2. *Discussing spatial management and MPAs*

The disagreements and conflict that occurred during the OFR process involving the fishing community were mostly centered on potential spatial management measures and marine protected areas (MPAs). This set of topics has remained controversial and ever present. Committee members had a variety of views on marine protected areas, spatial management and marine reserves. The topic seemed to be important to support and to oppose for some of the committee members, and it came up repeatedly during the meetings even when not on the agenda.

A webinar was held to promote a shared understanding and clear definition of MPAs, marine reserves, and spatial management. This remained a contentious set of topics for the committee. Eventually, a compromise was reached to make a recommendation. The UF Team gathered all the information from discussions on MPAs and marine reserves, and using the

committee's own words, created a set of restrictive conditions and criteria under which spatial restrictions such as marine reserves might be considered. After discussing it and having a few edits, emphasizing the need for credible scientific evidence, the final product was considered an adequate compromise by those in support and opposition of MPAs and marine reserves (recommendation F.M.13).

2.9.3. Using OFR RMAs

One of the objectives of the project was to review broad recommendations from the OFR process and progress with implementation as well as opportunities for fisheries stakeholders to promote uptake of broad recommendations considered critical by fisheries stakeholders. OFR RMAs were reviewed with the committee in the second webinar and further discussed in committee meeting #3. The review of these recommendations was intended to arm the committee with information to reduce duplication of effort, determine shared support for specific recommendations, and take their input to build on and/or modify existing ones. The list of RMAs was provided to the committee before committee meeting #3 and activities were prepared to address these (as described in the process summary). The OFR recommendations were used for a small group activity to understand what they wanted to promote, add or further discuss. After having small group discussions, all members reported on their issues of concern but there was no inclination to build on, or work with, the existing RMAs as they were.

As earlier described, fisheries stakeholders had felt unheard during the OFR process, therefore they used this platform to ensure their ideas and concerns were fully expressed and recorded. So, the committee preferred to discuss the topics they were concerned about and build their recommendations from the bottom up, instead of changing or emphasizing existing OFR recommendations. Many topics of concern overlapped with those from the OFR RMAs, however, the committee wanted to come up with their own ideas and approaches instead of discussing and addressing the nuisances of OFR recommendations. Therefore, despite having reviewed the recommendations, that process did not lead to the promotion of their uptake directly from the fisheries committee.

3. RECOMMENDATIONS

3.1. Recommendation development process

Committee members discussed issues of concern regarding the Coral ECA, brainstormed concepts, and shared ideas for conservation initiatives. They had different points of view on some approaches to conservation which resulted in lengthy conversations about different perspectives to come up with an agreed upon recommendation statement. This, combined with the limitations of virtual meetings as opposed to being in person, led to the idea of synthesizing a list of draft recommendations by the UF Team for the committee to work on and continue molding into their desired outcome.

Thus, before CM#10, a review of meeting minutes and recordings was done to synthesize the committee's discussions in succinct statements that reflected their thoughts. These were verbatim or paraphrased from previous meetings. This created the first list of draft recommendations which was sent to the committee members in the form of a survey (Appendix G) to understand whether they "Like as is," "Needs more discussion" or "No, it's not a recommendation". Every statement is preceded by a code. For example, CM8.2 means that the statement was pulled from committee meeting 8 part 2. The results of this survey were presented in committee meeting #10. They were ranked from most to least agreed with and the process of reviewing draft recommendations began.

For the following committee meetings these were discussed, and draft recommendations were finalized dissecting the wording and coming up with an agreed upon statement that every member present could agree with. These draft recommendations were refined and finalized considering survey results, public meeting input and feedback from the SEFCRI team.

3.2. Criteria vs recommendations

Towards the beginning of the process narrowing down broad concerns and distilling them into a recommendation as an action statement was challenging. Therefore, the project team decided to try the concept of criteria vs recommendations. This meant that the final product could be a set of criteria instead of a recommendation. Activities were prepared in several committee meetings for the members to test this option. For example, when discussing anchoring, we wanted to know what the goal was (e.g., to reduce anchoring) and what the broad recommendation would be (e.g. to establish buoys). So, perhaps it would be more helpful for the group to discuss conditions such as, "establish buoys in X location when Y conditions are met". This could be especially favorable for instances of high disagreement like spatial management. However, the concept of criteria was not adopted since it proved to require more technical and institutional knowledge.

The UF Team therefore pivoted to create a review and synthesis of all emerging recommendations. These were ideas and actions that had been discussed and that could serve as a recommendation or as a basis for one. These were collected verbatim from meeting minutes, presentations, and recordings from meetings 1-9. This way the committee could have all their useful statements collected in one document and have a common starting point to begin the creation of draft recommendations. From then on, the next meetings were focused on reviewing emerging recommendations and refining draft recommendations.

3.3. Fisheries Committee Recommendations

The 56 committee recommendations include 23 for water quality, 13 for FDOU, 7 for habitat, 5 for Agency and Processes, and 8 for education (shown below and in Appendix F).

Committee members agreed that it was not in their scope to be making scientific recommendations or specifying exactly “how” to approach an issue. The committee felt comfortable stating the “what” but thought that the “how” should be left to the entities that have the expertise and are involved with implementation of the recommendations. For example, for recommendation W.L.22. regarding Lake Okeechobee, the committee only wanted to emphasize the importance of continued and accelerated work on Lake Okeechobee’s projects and management.

WATER (23)	
Herbicides	<ol style="list-style-type: none"> 1. W.H.1. Encourage the state and municipalities to continue their exploration of alternative methods of herbicide use in state managed waterbodies. (meeting 10.1) 2. W.H.2. Encourage state to lead by example by reducing herbicide use and adopting best practices. (meeting 10.1) 3. W.H.3. Encourage agencies to transition to mechanical harvest of nuisance vegetation in canals and find uses for the harvested materials. (meeting 10.2) 4. W.H.4. Contracts for sprayers must include the installation of a GPS system on the guns that tracks and records herbicide use to create an interactive map with herbicide type and acreage. (meeting 12.2)
Fertilizers	<ol style="list-style-type: none"> 5. W.F.5. Encourage local governments and municipalities to create or enforce rules that will decrease amount of fertilizer being utilized that ends up in canals and waterways. (meeting 12.1/12.2) 6. W.F.6. Encourage regenerative gardening/landscaping and permaculture to lower fertilizer and pesticide use (meeting 14.1/PM2)
Agricultural Best Management Practices	<ol style="list-style-type: none"> 7. W.A.7. Improve monitoring and enforcement of agricultural industry best management practices. (meeting 10.2)

Septic Sewer	<ul style="list-style-type: none"> 8. W.S.8. Prioritize and incentivize septic to sewer conversion in areas close to water systems, e.g. tax rebate, funding, community efforts (meeting 10.1) 9. W.S.9. Find government financial assistance and/or creative marketing (e.g. lottery) where local municipalities/counties could match the funding for septic to sewer conversion. (meeting 10.2) 10. W.S.10. Encourage municipalities with aging sewer systems to upgrade infrastructure. (meeting 10.2) 11. W.S.11. Compile a database of septic to sewer conversion incentive programs. (meeting 10.2) 12. W.S.12. Encourage full implementation of the Clean Waterways Act. (meeting 12.2)
Water Treatment	<ul style="list-style-type: none"> 13. W.W.13. Explore proven ways of treating wastewater naturally where feasible, e.g. use of wetlands (meeting 10.2) 14. W.W.14. Recycle wastewater for irrigation. (meeting 12.1) 15. W.W.15. Bivalve and seagrass restoration in estuaries for water filtration. (meeting 12.1) 16. W.W.16. Support existing ocean outfall legislation to cease using the southeast Florida outfalls with water discharges as prescribed by law (meeting 14.1/PM2)
Pharmaceuticals	<ul style="list-style-type: none"> 17. W.P.17. Continue to explore and prioritize innovative additional wastewater treatment options to address pharmaceuticals and other contaminants of emerging concern. (meeting 12.2)
Boat waste disposal	<ul style="list-style-type: none"> 18. W.B.18. Increase opportunities for boats to dispose of their waste and increase enforcement for ones who don't. (meeting 12.1)
Runoff	<ul style="list-style-type: none"> 19. W.R.19. Improve run off filtration from roads. (meeting 10.1)
Canals	<ul style="list-style-type: none"> 20. W.C.20. Consider use of triploid carp for vegetation control in canals. (meeting 10.2/12.2) 21. W.C.21. Encourage municipalities to mitigate pollution from canals. (meeting 12.1)
Lake Okeechobee	<ul style="list-style-type: none"> 22. W.L.22. Reemphasize prioritizing cleaning up Lake Okeechobee. (meeting 10.1)
Sedimentation	<ul style="list-style-type: none"> 23. W.S.23. Prioritize and require methodologies that minimize impacts from activities that increase sedimentation, including but not limited to dredging (meeting 14.1)
FISHING, DIVING AND OTHER USES (13)	
Artificial Reefs	<ul style="list-style-type: none"> 24. F.A.1. Deploy more artificial reefs and artificial habitat away from the natural reef, on hardbottom, and nearshore and inshore to enhance the ecosystems and habitats for different life stages and sizes of reef fish, spawning bottom fish and baitfish, and to reduce pressure off the reefs from fishing, diving and other uses. (meeting 10.1/CM14.2/PM2) Use varying cement structures such as tetrahedrons and darts for vertical relief. (meeting 10.1/12.2) 25. F.A.2. Facilitate artificial reef deployment by shortening time to acquire permits (Meeting 10.1), establishing waterfront staging areas for artificial reef deployment (for storage of materials, construction and loading) (Meeting 11.2).

	<p>26. F.A.3. Encourage permitting agencies to incorporate innovative mooring block designs that serve a dual purpose as both a stable mooring for vessels and as artificial reef habitat when permitting new managed mooring fields in locations where invertebrate and fish recruitment is likely to occur. (meeting 11.2)</p> <p>27. F.A.4. Encourage the development and experimentation of innovative artificial reef designs using approved materials that improves the likelihood of coral recruitment, both nearshore and offshore. (meeting 11.2)</p> <p>28. F.A.5. Continue to fund state and local artificial reef programs and pursue further development of artificial reefs. (meeting 11.2/15)</p>
Lobster Traps	<p>29. F.L.6. Shift from longlines to single lines for lobster/crab traps. (meeting 11.1)</p>
Anchoring	<p>30. F.L.7. Help Find ways to provide additional funding to coastal counties that will support the installation and ongoing maintenance of day use mooring buoys. (meeting 11.2)</p> <p>31. F.L.8. Encourage the establishment of mooring fields and the development of additional pump out stations. (meeting 12.2)</p>
Spawning Aggregations	<p>32. F.S.9. Research - find out what reef species are aggregating where on the reef (meeting 13.1)</p> <p>33. F.S.10. Evaluate biological, ecological, oceanographic, and other scientific data to determine potential contributions to conservation that seasonal area protections for spawning aggregations would provide. Identify areas and species to be protected based on stock assessments and best available science (meeting 13.1/14.2)</p> <p>34. F.S.11. If seasonal area protections for spawning aggregations are warranted for consideration as part of a sound conservation strategy with measurable benefits, while also accounting for social and economic factors, consider creating spatial area regulations to protect spawning aggregations. In such areas, restrict fishing, diving and other uses and activities targeting reef fish species but allow pelagic fishing if scientifically appropriate. A research plan to evaluate the benefits of such regulations should also be implemented. (meeting 13.1/14.2)</p>
Shark Depredation	<p>35. F.S.12. Explore and research shark depredation and develop strategies to address it. (meeting 13.2/PM2)</p>
Marine Reserves	<p>36. F.M.13. Consider spatial restrictions (e.g. marine reserves, which would include all user groups - fishing, diving and other use) only when there is credible scientific evidence supporting a need to protect an area, habitat, species, or spawning aggregation. Require public engagement in zoning and rule-making. Where possible use temporary measures rather than permanent (year-round) restrictions. Mandate periodic reviews (e.g. every 5 years) of spatial management measures and a sunset provision to take effect unless measures are extended. Consider effects of fishing effort displacement from restricted areas and opportunities for enhancing fishing opportunities in open areas (e.g. new artificial reefs). (meeting 13.2/14.2)</p>
HABITAT (7)	
Living Shorelines	<p>37. H.L.1. Use flood plain predictions to determine where we use living shorelines. (meeting 11.1)</p> <p>38. H.L.2. Replace seawalls with living seawalls/living shorelines (e.g., mangroves, seagrass, living artificial habitat) as appropriate and add this to the new sea level rise resilience Florida law. (meeting 11.1)</p>

	39. H.L.3. Encourage and incentivize property owners to incorporate living wall/reef on all new and repaired seawalls and docks (e.g. grants, break on permit fee, tax break). (meeting 11.1)
Habitat Restoration	40. H.H.4. Promote environmental policies that will promote the regrowth of seagrass in the Bay and in the flats. (meeting 11) 41. H.H.5. Encourage continued use of creative mitigation strategies to protect and restore seagrass and mangroves. (meeting 11.1) 42. H.H.6. Also encourage use of creative mitigation strategies to protect and restore corals. (meeting 11.1)
Pole and Troll	43. H.P.7. Explore creation of pole and troll areas to reduce damage from boats in sensitive seagrass areas. (meeting 13.2)
AGENCY AND PROCESSES (5)	
Communication	44. A.C.1. Promote communication and collaboration across agencies to reduce bureaucracy and encourage agencies to periodically review together process efficiency. (meeting 11.1) 45. A.C.2. Develop a communication network of key groups, such as fishing clubs, commercial and charter groups, tropical fish collectors, CCA, ASA, IGFA, captains for clean water, and recreational and commercial diving groups, (but not limited to these) to standardize and/or synthesize a process of reporting fishing information and trends to be managed by FWC. (meeting 10.2) 46. A.C.3. Standardize names and definitions for spatial management. (meeting 10.2)
Compile and synthesize information	47. A.C.4. Compile information on all projects from different agencies relating to water quality under one same database. (meeting 11.1) 48. A.C.5. Create a primary clearing house that synthesizes existing fisheries data collection efforts from various research agencies, government entities, NGO's, etc. that will help identify trends and will give resource managers more complete information to make future policy. (meeting 11.2)
EDUCATION (8)	
Herbicides	49. E.H.1. Create an education program led by municipalities for homeowners and homeowner association to reduce herbicide use and adopt herbicide best practices. (meeting 10.1)
Fertilizers	50. E.F.2. Educate homeowners and commercial companies to reduce use of fertilizers, pesticides and herbicides (meeting 10.1/14.1/PM2) 51. E.F.3. Ensure that municipalities and state use education campaigns for fertilizer regulation updates. (meeting 12.1)
Pharmaceuticals	52. E.P.4. Develop a system - involving education and enforcement - for municipalities to implement to avoid medications from being disposed through the sewage system (meeting 12.2)
Anchoring	53. E.A.5. Continue to educate users with the importance of using mooring buoys and not anchoring adjacent to the buoys by using signage at boat ramps and marinas and creating other effective communication channels and technologies (e.g. social media) through agency collaborations. (meeting 10.2)

Living shorelines	54. E.L.5. Also Educate on environmental benefits and advantages to the longevity of the structure. (meeting 11.1)
Climate change	55. E.C.6. Create outreach opportunities to educate the public about effect of climate change on our oceans and nearshore waters, including our coral reefs. (meeting 14.2/PM2)
Plastic pollution	56. E.P.7. Educate citizens and the private sector on the effects of plastic pollution on reef ecosystems and provide guidance on how to reduce use and mitigate impacts. (meeting 14.2/PM2)

3.4. Comparison of OFR and Committee Recommendations

By conducting a comparison of the fishery committee recommendations and OFR recommendations, there are some conclusions that can be drawn in terms of what OFR RMAs are supported, which ones are approached differently, and which ones are not supported. A summary table for this can be found below.

3.4.1. OFR comparison chart

The fisheries committee recommendations are part of FDEP’s wider mission. Through local action strategies, the Our Florida Reefs process and now this fisheries committee, they aim to identify and implement priority actions and recommendations needed for coral reef conservation and, ultimately, develop the Coral ECA’s management plan. As mentioned earlier, the fisheries committee was formed to address a need to gather the fisheries community knowledge and views. These recommendations will become part of a full picture that includes the other initiatives. Therefore, the fisheries committee recommendations will serve as standalone recommendations, and can also emphasize or complement existing OFR recommendations and LAS Projects.

Table 2 contrasts only fisheries committee recommendations that relate to topics that appear in OFR’s RMAs and LAS Projects. This exercise aims to clarify the overlaps existing between the three. The red color refers to recommendations and projects that have not started, yellow refers to ongoing ones, and green to addressed and completed.

Table 2. Overlap chart of fisheries committee recommendations, OFR RMAs and LAS Projects. Green highlight: completed project; yellow highlight: ongoing project; red highlight: project not started.

Fisheries Committee	OFR	LAS projects	Comments
WATER			
<p><u>Herbicides</u></p> <p>W.H.1. Encourage the state and municipalities to continue their exploration of alternative methods of herbicide use in state managed waterbodies. (meeting 10.1)</p> <p>W.H.2. Encourage state to lead by example by reducing herbicide use and adopting best practices. (meeting 10.1)</p> <p>W.H.3. Encourage agencies to transition to mechanical harvest of nuisance vegetation and find uses for the harvested materials. (meeting 10.2)</p> <p>W.H.4. Contracts for sprayers must include the installation of a GPS system on the guns that tracks and records herbicide use to create an interactive map with herbicide type and acreage. (meeting 12.2)</p>	<p>N-68</p> <p>Reduce and regulate fertilizers, herbicides, fungicides, and pesticides and promote BMPs to reduce nutrient and pollutant loading to improve water quality and provide protection to the reefs and promote the use of Florida friendly herbicides and pesticides to eliminate adverse impacts to the coastal environment and its watershed.</p>		<p>OFR describes a clear concern with herbicides and offers broad recommendations. i.e. reduce and regulate them, and promote BMPs and Florida friendly herbicides. They also express more specific “why’s”</p> <p>The fisheries committee has a narrower focus and addresses more specific ideas they believe might work to reduce use of herbicide.</p>
<p><u>Fertilizers</u></p>	<p>N-68</p>		<p>OFR describes what is recommended overall in terms of herbicides and fertilizers. There is a clear “what” and general “why”. The fisheries</p>

<p>W.F.5. Encourage local governments and municipalities to create or enforce rules that will decrease amount of fertilizer being utilized that ends up in canals and waterways. (meeting 12.1/12.2)</p> <p>W.F.6. Encourage regenerative gardening/landscaping and permaculture to lower fertilizer and pesticide use (meeting 14.1/PM2)</p>	<p>Reduce and regulate fertilizers, herbicides, fungicides, and pesticides and promote BMPs to reduce nutrient and pollutant loading to improve water quality and provide protection to the reefs and promote the use of Florida friendly herbicides and pesticides to eliminate adverse impacts to the coastal environment and its watershed.</p>		<p>committee has a narrower focus addressing specific institutions, e.g. local governments.</p>
<p>Agricultural Best Management Practices</p>			
<p><u>Septic Sewer</u></p> <p>W.S.8. Prioritize and incentivize septic to sewer conversion in areas close to water systems, e.g. tax rebate, funding, community efforts (meeting 10.1)</p> <p>W.S.9. Find government financial assistance and/or creative marketing (e.g. lottery) where local municipalities/counties could match the funding for septic to sewer conversion. (meeting 10.2)</p> <p>W.S.10. Encourage municipalities with aging sewer systems to upgrade infrastructure. (meeting 10.2)</p>	<p>N-78</p> <p>Reduce ground water pollution from sources such as septic and storage tank infrastructure to watersheds associated with priority reef areas to improve water quality and reef health.</p>	<p>LAS-34 (LBSP)</p> <p>Identify and categorize by type and size (volume) of major point source inputs/conveyances e.g. storm-water drains and pipes into bays, canals, beaches and estuaries and non-point sources e.g. septic tanks, for identified priority inlets.</p>	<p>The OFR show a common concern with pollution from septic storage. The fisheries committee have five different recommendations within that topic that address the issue from different sides – incentives for conversion, database creation and legislation support. OFR include septic pollution as the main example of their recommendation to reduce ground water pollution.</p> <p>LAS project 34 includes septic tank pollution as one of the pollution sources to identify and categorize by type and volume. These are all different approaches to manage or improve pollution from septic tanks. Therefore, there is an overlap in topic and concern, although the approaches of how to address it remain varied.</p>

<p>W.S.11. Compile a database of septic to sewer conversion incentive programs. (meeting 10.2)</p> <p>W.S.12. Encourage full implementation of the Clean Waterways Act. (meeting 12.2)</p>			
<p><u>Water Treatment</u></p> <p>W.W.13. Explore proven ways of treating wastewater naturally where feasible, e.g. use of wetlands (meeting 10.2)</p> <p>W.W.14 Recycle wastewater for irrigation. (meeting 12.1)</p> <p>W.W.16. Support existing ocean outfall legislation to cease using the southeast Florida outfalls with water discharges (meeting 14.1/PM2)</p>	<p>S-25</p> <p>Strongly encourage elected and regulatory officials to oppose extensions to dates established in existing sewage treatment outfalls legislation to ensure the timely closure (prior to 2025) of all treated wastewater outfall pipes and build/upgrade infrastructure for advanced water treatment and reuse capacity to improve ocean water quality.</p>		<p>OFR and the fisheries committee align on these recommendations. OFR focuses on no time extensions, whereas the fishing committee supports the legislation without specifying dates. They have discussed their disbelief in 2025 being realistic, but still, they want to support that legislation.</p> <p>The fisheries committee has recommended exploring treating wastewater naturally, which could be an example of “advanced water treatment”, but this would be an assumption since this is not specified in the OFR recommendation.</p>
<p>Pharmaceuticals</p>			
<p>Boat waste disposal</p>			
<p>Runoff</p>			
<p><u>Canals</u></p> <p>W.C.21. Encourage municipalities to mitigate pollution from canals.</p>		<p>LAS-34 (LBSP)</p> <p>Identify and categorize by type and size (volume) of major point source inputs/conveyances e.g. storm-water drains and pipes into bays, canals, beaches and estuaries and non-point sources e.g. septic tanks, for identified priority inlets.</p>	<p>LAS-34 is a large project which considers all sources of pollution, and aims to record and monitor pollution data. The fisheries committee recommendations for canals, and other point source inputs do not call for monitoring, rather encourage municipalities to mitigate pollution from canals. In this case, these could be somehow complimentary but do not overlap. In any case, the fisheries committee brings an emphasis to LAS-34 (LBSP), because it will be</p>

			after identification and categorization of canals that agencies will be able to identify priority inlets.
Lake Okeechobee			
<p><u>Sedimentation</u></p> <p>W.S.23. Prioritize methodologies that minimize impacts from activities that increase sedimentation, including but not limited to dredging.</p>		<p>LAS-28, 28b, 28c (MICCI)</p> <p>Identify means of improving the methodology for measuring and monitoring turbidity, suspended sediment concentration, and sedimentation during dredging, beach nourishment and any coastal construction project or activity resulting in altering the sea bed requiring turbidity monitoring. Use information to contribute to efforts to revise the water quality standard for turbidity (Project 29) and support the improvement of turbidity monitoring methods and/or coastal construction practices.</p> <p>Test new or existing turbidity and sedimentation monitoring techniques and technology researched and identified for further study in Project 28.</p> <p>Develop and/or research the use of hydrodynamic models to improve the methodology for measuring and monitoring turbidity and sedimentation during dredging, beach nourishment and any coastal construction project requiring turbidity monitoring. Use information to contribute to efforts to revise the water quality standard</p>	<p>The LAS projects aim to refine methodologies that measure and monitor sedimentation (among other things), whereas the fisheries committee recommend prioritizing methodologies that minimize the impacts from activities such as dredging. So, the fisheries committee looks directly at reducing impacts, but the LAS project sets a procedure to have better monitoring and revise the water quality standard for turbidity.</p> <p>A link between these could exist by taking the fisheries committee as the next step to the LAS project where once impacts of different methodologies are measured and understood, then those could be prioritized to reduce impact.</p>

		for turbidity (Project 29) and support the improvement of turbidity monitoring methods and/or coastal construction practices.	
FISHERIES AND BOATING			
Artificial Reefs			
Lobster Traps			
<p><u>Anchoring</u></p> <p>F.L.7. Help find ways to provide additional funding to coastal counties that will support the installation and ongoing maintenance of day use mooring buoys. (meeting 11.2)</p> <p>F.L.8. Encourage the establishment of mooring fields and the development of additional pump out stations. (meeting 12.2)</p>	<p>S-92, S-100, S-2, N-75</p> <p>S-2: Create and fund one SEFCRI-wide mooring buoy program as a more coordinated and cost-effective way of protecting reefs from anchor damage.</p> <p>N-75: Promote/offer free pump out stations to better water quality and allow boats a better option than dumping off shore.</p> <p>s-92: <i>Protect reefs from anchor damage during beach and coastal events (i.e. festivals, air shows, etc.).</i></p> <p>s-100 <i>Support redefining the Port of Miami anchorage zone to remove four areas with reported coral from the existing anchor zone, reduce anchor damage currently being caused by ships</i></p>	<p>LAS-30</p> <p>Work with the leads of county mooring buoy programs and local stakeholders in the fishing and diving communities to evaluate the effectiveness of current mooring buoy locations and recommend modifications and/or new buoy locations.</p>	<p>Both F.L.7. and OFR S-2 talk about funding – F.L.7. wants to support day use of mooring buoys, which would be addressed within S-2 (depending on the specifics of day vs overnight usage of buoys). These recommendations fit into LAS-30 since that project will evaluate the current mooring program.</p> <p>F.L.8. is addressed in S-2 and N-75.</p> <p>s-92 and s-100 relate to the same topic of anchoring, but they touch on different tangents which were not specified in the fisheries committee.</p>

	<i>anchoring zone which includes some coral reef.</i>		
Spawning Aggregations			
Shark Depredation			
Marine Reserves			
HABITAT			
<u>Living shorelines</u> H.L.1. Use flood plain predictions to determine where we use living shorelines. (meeting 11.1) H.L.2. Replace seawalls with living seawalls/living shorelines as appropriate and add this to the new sea level rise resilience Florida law. (meeting 11.1) H.L.3. Encourage and incentivize property owners to incorporate living wall/reef on all new and repaired seawalls and docks (e.g. grants, break on permit fee, tax break). (meeting 11.1)	N-116 Coordinate and implement regional "living shoreline" objectives to increase the use and protection of natural infrastructure (e.g., coral reefs, native vegetation, mangrove wetlands) to provide natural barriers to storm surge and maintain coastal biodiversity with the agreement of property owners.		The OFR recommendation looks at coordinating and implementing "living shoreline" objectives. The fisheries committee recommendations here are specific ideas with the same goal as N-116. So, the fisheries committee recommendations for living shorelines could begin the brainstorming and research for N-116 which has not yet started.
<u>Habitat Restoration</u> H.H.4. Promote environmental policies that will promote the regrowth of seagrass in the Bay and in the flats. (meeting 11) H.H.5. Encourage continued use of creative mitigation strategies to protect and restore seagrass. (meeting 11.1)	N-70 Protect and restore mangroves, seagrass beds, oyster reefs and other estuarine habitats.		This fisheries committee recommendation seems to provide more specific ideas on how to direct OFR N-70. OFR N-70 asks to "protect and restore" whereas H.H.4. recommends promoting environmental policies and using creative mitigation strategies. These are not a clear "how" but a recommended path to the goal of OFR N-70.

From “Water Treatment”: W.W.15. Bivalve and seagrass restoration in estuaries for water filtration. (meeting 12.1)			These would link back to W.W.15 from the fisheries committee (water treatment) that recommended bivalve and seagrass restoration estuaries (like OFR N-70) in this case for water filtration.
Pole and Troll			
AGENCY AND PROCESSES			
<u>Communication</u> A.C.1. Promote communication and collaboration across agencies to reduce bureaucracy and encourage agencies to periodically review together process efficiency. (meeting 11.1)	S-114 <i>Create and implement a mechanism that allows permitting agencies to apply lessons learned from past projects to future projects to minimize impacts to resources and improve success of mitigation activities.</i>		S-114 wants to apply lessons learned from past projects, and A.C.1. wants to have a periodic review for process efficiency. The aims might be different: To reduce bureaucracy (A.C.1.), vs “to minimize impacts to resources and improve success of mitigation activities (s-114)” But these two recommendations could maybe complement each other. S-114 could be seen as part of “promoting communication and collaboration across agencies” in A.C.1. This is an interpretation, but it might be a commonality with these two recommendations.
Compile and synthesize information			
EDUCATION			
<u>Herbicide</u> E.H.1. Create an education program led by municipalities for homeowners and homeowner associations to reduce herbicide use and adopt herbicide best practices. (meeting 10.1)	N-1 Educate the public on the effects of land-based sources of pollution to reduce the amount of pollutants entering storm drains and waterways.	LAS-40 Create and promote educational materials and presentations to inform local stakeholders about the impacts of discharges on the southeast Florida reef tract. Educate that reducing discharges will benefit overall reef health and functionality.	Overlap exists between the recommendations and LAS project. The fisheries committee focuses on herbicide education, which would be part of the broader terms used in the other two (i.e. land-based sources of pollution, and discharges)
<u>Fertilizer</u> E.F.2. Educate homeowners and commercial companies to reduce use of fertilizers, pesticides and	N-1, N-8 N-1 Educate the public on the effects of land-based sources of	LAS-40 (AA) Create and promote educational materials and presentations to inform local stakeholders about the impacts of discharges on the	E.F.2. and E.F.3. fit into LAS-40. The fisheries recommendations bring a few details, like specifically mentioning educating commercial companies (which could be maybe implied in “local stakeholders” in LAS-40).

<p>herbicides (meeting 10.1/14.1/PM2)</p> <p>E.F.3. Ensure that municipalities and state use education campaigns for fertilizer regulation updates. (meeting 12.1)</p> <p><u>From “Fertilizers”</u> W.F.6. Encourage regenerative gardening/landscaping and permaculture to lower fertilizer and pesticide use (meeting 14.1/PM2)</p>	<p>pollution to reduce the amount of pollutants entering storm drains and waterways.</p> <p>N-8 Promote public education programs like “be Floridian”, “rain gardens”, “nature scape”, and “Florida Yards and Neighborhoods” to encourage eco-friendly yard and garden maintenance to help reduce the amount of nutrients and other pollutants reaching the reefs through residential run-off.</p>	<p>southeast Florida reef tract. Educate that reducing discharges will benefit overall reef health and functionality.</p>	<p>E.F.2. is similar to N-1</p> <p>And eventhough E.F.3. and N-8 address campaigns involving fertilizers, the fisheries committee recommendation focuses on warning the consumer about fertilizer regulations, whereas N-8 aims to encourage eco-friendly gardening.</p> <p>N-8 is also addressed in W.F.6. from “Fertilizers”.</p> <p>Although E.F.3., N-8 and W.F.6. are not the same, they are complementary.</p>
<p><u>Pharmaceuticals</u></p> <p>E.P.4. Develop a system - involving education and enforcement - for municipalities to implement to avoid medications from being disposed through the sewage system (meeting 12.2)</p>		<p>LAS-40 (AA) Create and promote educational materials and presentations to inform local stakeholders about the impacts of discharges on the southeast Florida reef tract. Educate that reducing discharges will benefit overall reef health and functionality.</p>	<p>LAS-40 has been mentioned in other recommendations. This specific fisheries committee recommendation about pharmaceuticals could fit within the LAS-40 (depending on the definition of discharges)</p>
<p>Anchoring</p>			
<p>Living shorelines</p>			
<p>Climate change</p>			
<p><u>Plastic pollution</u></p> <p>E.P.7. Educate citizens and the private sector on the effects of plastic pollution on reef ecosystems and provide guidance on how to reduce use and mitigate impacts. (meeting 14.2/PM2)</p>	<p>N-120 Encourage influential entities to lobby for legislation to overturn current legislation restricting bans on plastic bags to protect marine habitats and wildlife.</p>	<p>LAS-43 (AA) This project will focus on the education of businesses on the issues of plastics in the environment and encourage the reduction of plastic wastes.</p>	<p>There is overlap in these three sections. E.P.7. and LAS-43 are very similar, only that the fisheries committee not only talks about businesses (i.e. the private sector) but also citizens. Then, N-120 although also related to plastic pollution focusses on lobbying.</p>

This chart shows just a few recommendations that overlap in their content substantially, but most overlap occurred in the topic of concern. However, the approach of how to address the concern varies and sometimes is complementary. There are several ways in which LAS projects, fisheries committee and OFR recommendations compare. In a few cases there is true overlap with many commonalities, which could be considered repetitious. For example, plastic pollution (E.P.7. and LAS 43).

Another example of overlap can be seen in education on herbicides (E.H.1). The fisheries committee created a recommendation specifically for education on herbicides where they emphasized municipalities as the lead to educate homeowners and homeowner associations. OFR had a broader recommendation focusing on educating the public on the effects of land-based pollution. Thus, E.H.1 fits into that N-1. These also can be part of the LAS-40 framework which aims to create and promote educational materials and presentations to inform local stakeholders about the impacts of discharges on the southeast Florida reef tract. Therefore, the fisheries committee can be a specific action within LAS-40 and/or combined with N-1 for added detail.

Some complementary recommendations provide a more well-rounded picture of an issue when viewed in combination. For example, in “communications” both the fisheries committee and OFR recommendations aim to improve management and coordination to become more efficient. The approach and goals are different but could be complementary for a process evaluation. Some other comparisons just differ in their approach. For example, in the septic-sewer section LAS, OFR and fisheries committee recommendations all find septic pollution a problem but offer different ways to approach the issue.

3.5. Other meaningful outcomes

Other than the creation of a final list of recommendations, there were other non-tangible outcomes.

Trust building: One of the objectives of the initial meetings was to build trust with the committee members. This process was new, everyone was getting acquainted and trust of the fishing community with management had been eroded. The UF team, through commitment to the process and transparency in the facilitation, communication, and scientific information, worked to address that issue and build trust. The staff from management agencies (FDEP, FWC and NOAA) that attended the meetings acted in accordance with the same values of commitment and transparency, therefore throughout the two and a half years the conversations evolved as relationships also developed. Through committee members sharing their perceptions and voicing their concerns inside a contained environment with group norms and process facilitators, they also had the opportunity to respectfully have difficult conversations and develop relationships.

Forming community: Continuing to show up for two and a half years and having opportunities to connect with each other within the space of the meetings has created a sense of group cohesion. Many of the committee members, being fishing stakeholder representatives, already knew each other from other spaces, however, not everyone was acquainted with each other, and there were occasions when they openly appreciated each other's expertise and experiences.

Engagement and commitment: Some committee members had already been engaged in other stakeholder processes but were open to doing it again by being part of this committee. There has been a sense of helplessness at times, when some at times have expressed a pessimistic view – regarding limiting bureaucracy, or the slow rate at which things are being addressed. Other committee members have been the encouraging person to bring the group's motivation back. They have also been willing to be ambassadors to bring in their networks for public input. Committee members have reached their networks through email, social media, and even magazine articles.

4. EVALUATION

After the final meeting, the committee members were sent an anonymous evaluation form asking for feedback about the process. The survey can be found in Appendix H. Thirteen out of sixteen members responded. They were generally satisfied with the process, though some felt that it took too long. Results are given below.

4.1. Achievement of objectives

Committee members were asked to what degree the following objectives were achieved (Figure 3):

1. Strengthen engagement of fishing stakeholders in SEFCRI coral reef ecosystem conservation initiatives
2. Develop a set of environmental and fishing related management recommendations to enhance coral reef ecosystem conservation and fishing quality in the Coral ECA
3. Communicate with wider fishing and other stakeholders about project process and outcomes

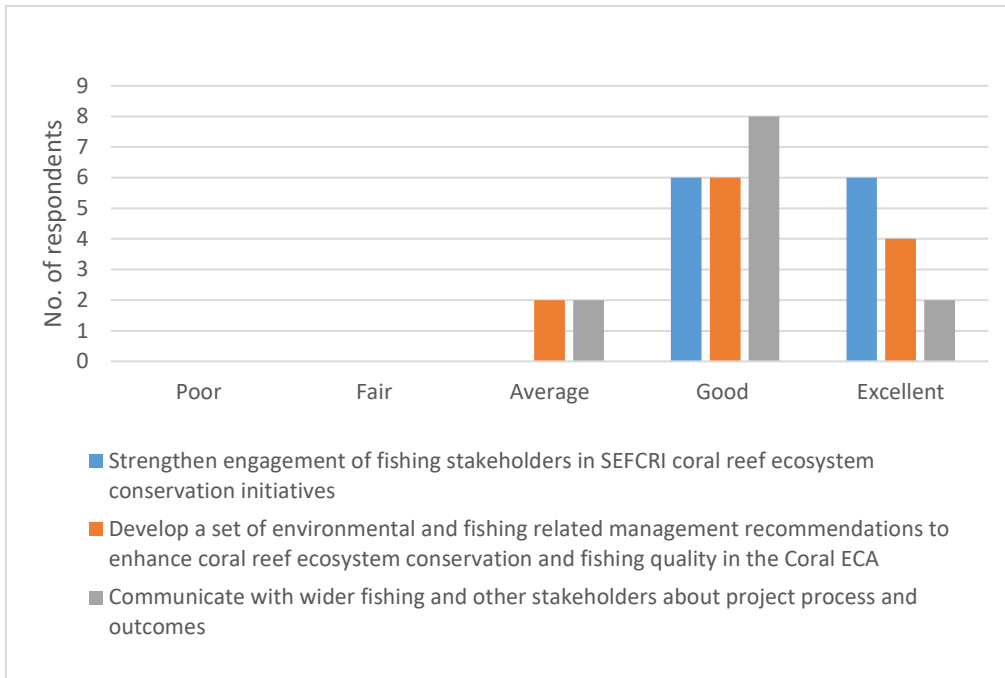


Figure 3. Responses to the question “To what degree did we achieve the stated objectives?”

The aspect that they rated highest was strengthening engagement of the fishing stakeholders, which was rated only as good and excellent. Two people saw the development of the recommendations and the communication with the wider community as average.

4.2. Outcome of the process

When asked about what the most important outcome was, about half the committee members responded mentioned more technical things – such as having the recommendations set or having stressed water quality issues. The other half believe the most important outcome of the process has to do with the human and relational side of the process. Things like, leaders in fishing community working together, or that the fishing stakeholders believed they were a part of the process (Table 3).

Table 3. Respondents’ thoughts on the most important outcome of the process

In your view, what was the most important outcome of the process?
Inshore water quality goals
Leaders in fishing community worked together
Identifying water quality as the important issue affecting our reefs and steps toward improvement in the future.
having conservationist involved in the process. fisherman are one of the best conservationist.
Recommendations sent

That the fishing stakeholders believed they were part of the process
Getting people from different sectors together and recognizing the issues.
Stress on water quality issues
Exchange of new ideas to solve/address problems related to Coral ECA
That regardless of how far apart we may be in our reasoning, that mostly we agree on the stressors to the environment and priorities to achieve a healthy eco system.
That anglers believe that water quality issues must be addressed before anything else will be effective in having a healthy coral reef and that fisheries managers are responsible for fisheries management, not an ad hoc group.
Mutual understanding of each other's individual issues

4.3. Was anything missing?

When asked if there was anything missing from the discussions, about half did not think so. The rest had a variety of responses: concrete steps for implementation, the fact that stocks of many reef fish are at unsustainable levels, that there is no overlay of all Florida, national and county regulations that affect the Coral ECA to assist managers, and conversations with scientists that do oppose the idea of 20-30% reef closures.

Table 4. Respondents' thoughts on whether anything was missing from the discussions

Was anything missing from our discussions?
No
Concrete steps for implementation
not that i can think of
Very thorough
I think we covered many of the fishing community's concerns
No
The fact that stocks of many reef fish are at unsustainable levels.
No
To date, we still do not have an overlay of all the Florida, National and county regulations that affect this region with regards to fishing, boating, outdoor recreational activities, and commercial development permit guidelines. I truly believe this tool would assist all managers of our marine ecosystems and assist greatly when tweaking current regulations and introducing new recommendations.
Yes, conversations with biologists/scientists that had views contrary to those that believe closing 20-30% of the reef is the answer to everything.
No

4.4. Challenging assumptions

Committee members were asked to indicate an assumption they had prior to the start of the process which changed/differed at the end of the process. Less than half of the committee members answered the question. Some respondents did not feel their assumptions were challenged. Others felt their assumptions were challenged when they experienced that the group agreed on management, that the process had an excellent handling of the past proposed MPAs, that they learned a lot about water quality issues and SEFCRI’s comments about the recommendations. (Table 5. Respondents’ thoughts on what challenged their assumptions).

Table 5. Respondents’ thoughts on what challenged their assumptions

Can you share something that challenged your assumptions?
Not really
That the group would agree on management
Excellent handling of the past proposed MPA's and how science will drive the considerations
SEFCRI's comments about our work and recommendations. Typical scientist response.
Nothing
Learned a lot about water quality issues.

4.5. Satisfaction with communication

Committee members were also asked to reflect on the quality of communication, by asking about how satisfied they are with how they have communicated their ideas, how others have heard their ideas and how they have heard others’ ideas (Figure 4). Most were satisfied with their experience, and one person was somewhat dissatisfied with the way others heard their ideas.

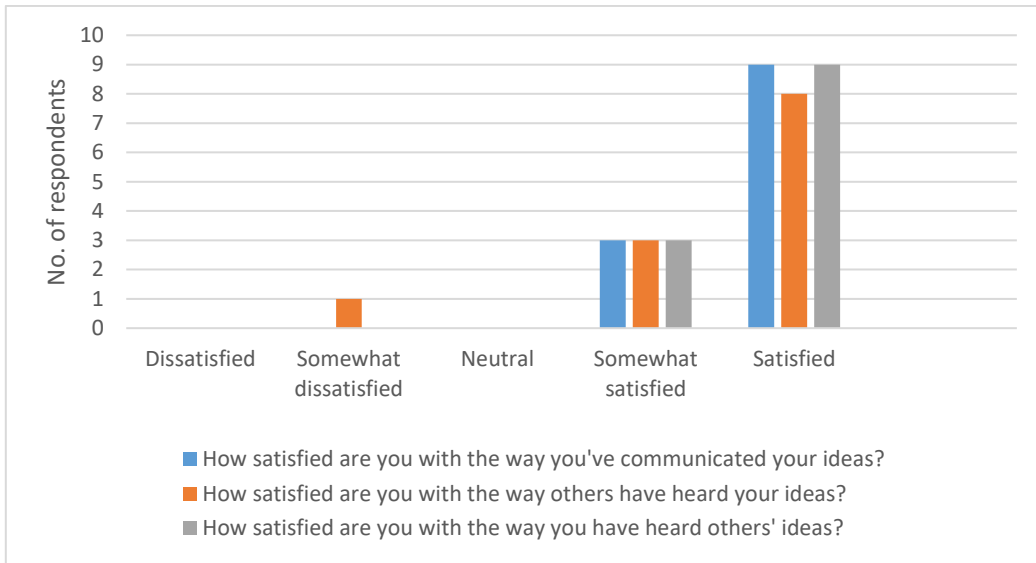


Figure 4. Responses to questions related to level of satisfaction with interpersonal communication.

4.6. Rating of process elements

Committee members were asked about the effectiveness of meeting structures, use of time and clarity of next steps (Figure 5). Effectiveness of meetings and next steps were rated equally, as good, or excellent, whereas use of time received lower ratings. Three out of ten had an experience of neutral or lower.

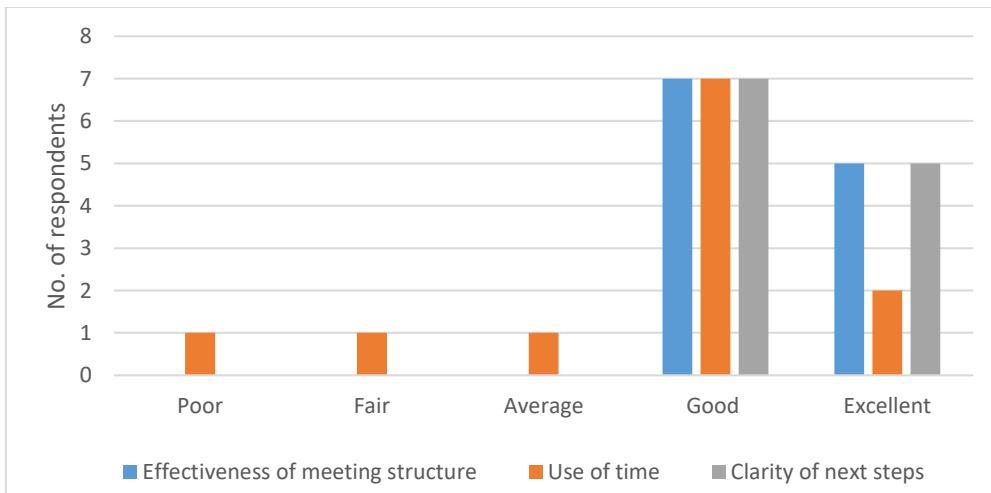


Figure 5. Responses to evaluate aspects of the meetings

4.7. Process facilitation

Committee members were asked to rate how facilitation supported the committee process with specific examples. E.g. brainstorming creative ideas, maintaining a smooth flow, etc.. (Figure 6). Overall these were rated good or excellent, although “thinking from perspectives different than your own” was seen as average by two members, and maintaining interest was seen as average by three members.

Committee members were overall satisfied and ranked the experience positively. The hiccups were mostly with the use of time and maintaining interest. The process was supposed to be shorter (two years instead of two and a half) and consist of nine in person meetings, and instead there were 23 online meetings.

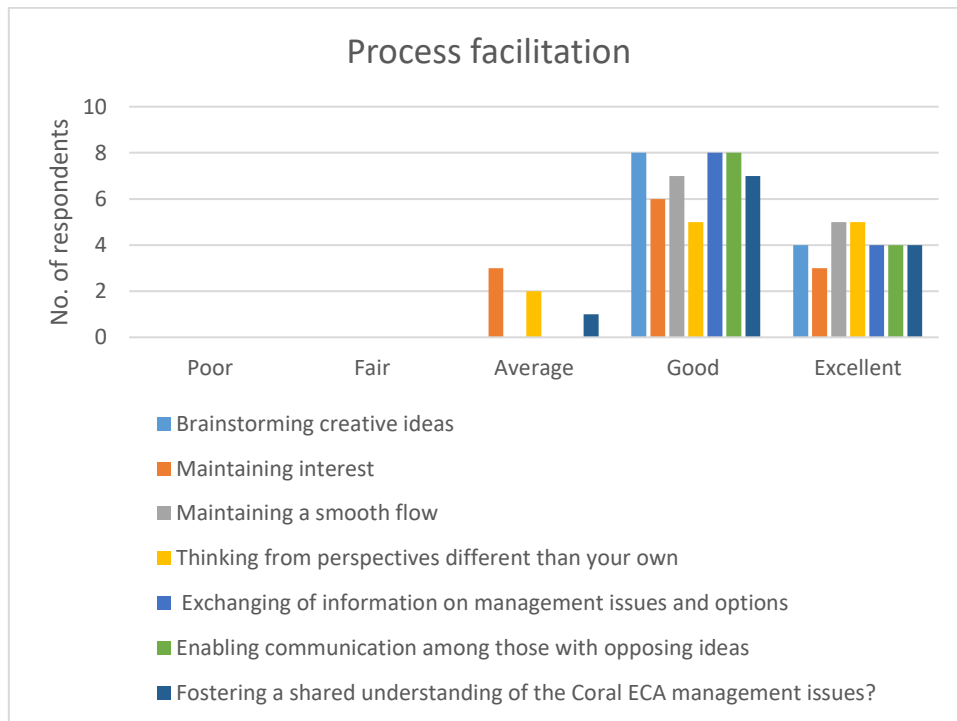


Figure 6. Responses to rate how well the process facilitated different elements

4.8. Other comments

When given the opportunity to tell us or emphasize anything else, apart from some comments of appreciation to the project, a couple of topics that kept being brought up throughout the process came back up. Two members highlighted the importance of supporting MPAs, which had been brought up throughout the 2.5 years by a minority in the group (Table 6. Respondents’ additional comments).

A member mentioned the lengthy process and how some topics were repeated many times, which relate to the issues with time management. Another comment said “a lot of work... long term results?” This reflects some of the conversations during meetings, where some of the committee members felt helpless since they wondered if the recommendations will be seriously considered and if action will be taken.

Table 6. Respondents’ additional comments

Do you have anything else you would like to tell us or emphasize?
Not really
Engagement for me was difficult over the entire process however, I was always updated and kept in the group discussions. Never having a live meeting and relying on zoom meetings is difficult in a volunteer group.
A lot of work...long term results?
Thank you U of F
I don't understand why the opposition to Marine Reserves when the situation is so bad at present. As important as water quality problems are, their solutions are many years away and billions of dollars that we don't have commitment for. Now you know who wrote this review.
The process was too long...no doubt challenged by COVID. Seemed like we repeated many of the same themes over and over.
Suzanna and Joy together, did an amazing job. They are both a true pleasure to work with!
My personal opinions is that marine reserves need more support. It is a tough uphill battle

5. DISCUSSION

The aim of this process was to harness the capacity of the fishing community to advance conservation of the Coral ECA. Specific objectives can be summarized as (1) strengthen engagement of fishing stakeholders in SEFCRI; (2) review broad recommendations from the OFR process and opportunities for fisheries stakeholders to promote uptake of recommendations considered critical by fisheries stakeholders; (3) development of fisheries-related management recommendations to enhance coral reef ecosystem conservation and fishing quality; (4) consultation with the SEFCRI Team, SEFCRI TAC and FDOU 52 team to obtain feedback; and (5) informing fishing and other stakeholders about project process and outcomes.

Sustained engagement of the stakeholder committee over a period of more than two years, the recommendations developed, and feedback from the process evaluation show that the objective of strengthening engagement of fishing stakeholders in SEFCRI has been achieved. When this group began, many stakeholders had not felt heard in OFR, they had an eroded sense of trust with SEFCRI and the OFR stakeholder engagement processes. The fisheries

committee process provided a new platform for fishing stakeholders to voice their views and experiences and provide input to conservation planning for the coral ECA. The process was designed to allow for learning, communication, and shared decision making, important components of collaborative approaches to address complex natural resource conservation issues (Wondollek & Jaffee 2000; Armitage et al. 2009). A key element was promotion of social learning by including diverse participation, constructive conflict, facilitation, democratic structure, open communication, unrestrained thinking, multiple sources of knowledge, and extended engagement (Schusler et al. 2003). Committee members represented diverse fishing stakeholders with diverse views on key issues and facilitated engagement over a period of more than two years. Multiple sources of knowledge were available through the committee membership itself and through science webinars and feedback with the SEFCRI, TAC and FDOU 52 teams. Discussions about issues and potential recommendations were focused but unrestrained and a democratic structure with consensus-based decision making was maintained. As some participants remarked in the evaluation, the process took time and felt unstructured at times. However, these were important and deliberate features of the process aimed at facilitating social learning and development of relationships and trust in order to allow difficult conversations to occur.

The Covid-19 pandemic forced the fishing committee process to rely on virtual meetings. Virtual meetings also save time, money and resources and can attract international participants for local events (Rubinger, 2020). As an anecdote from this project, a participant in the second public meeting joined from France and suggested to include plastic pollution in the recommendations. The committee agreed and plastic pollution entered the list of recommendations. Speaking time also increases during virtual meetings (Alexander, 2012). But online meetings can lead to fatigue and negative engagement (Wiederhold, 2020), especially when the camera is on (Shockley, 2021). Technological issues can result in frustration, lower performance, and reduced action (Alexander, 2012) and non-verbal communication gestures might be difficult or impossible to convey to others thereby reducing decision making quality (Acai, 2018). All of that said, the continued constructive engagement of committee members, the recommendations developed, and the process evaluation show that the virtual meeting mode did not substantially hinder the process. Even after two years of meeting online, when in-person meetings became feasible again, committee members either preferred to remain virtual, or had no preference to meet in person or online. Given the broad geographic range of the project, meeting in-person would have resulted in long travel for most of the participants and possibly lower participation.

The objectives of reviewing broad recommendations from the OFR process and developing fisheries-related management recommendations were combined and modified to allow for development of a broad set of recommendations from a fisheries community perspective, covering water quality, fishing, and habitat management issues. This was done because initially, some committee members questioned the goals of the project and were not sure of how much ownership they would have over the process and outcome. Since there was a need by design to discuss fisheries issues, this resulted in a pushback from many to continue discussing water quality and habitat issues which were perceived by all participants to be the

most urgent and important concerns (a view also shared by the wider fishing and conservation communities as revealed in the survey; Hervas & Lorenzen 2023). Being clear and transparent about the need to fill the fisheries data gap and the flexibility to talk about other issues, resulted in a broad range of discussion topics, meeting activities, and ultimately, recommendations. The committee proceeded to develop a broad set of 56 recommendations addressing water quality, fishing, and habitat issues. The supported recommendations were broadly in line with concerns and preferences of the wider fishing community as evidenced from the survey (Hervas & Lorenzen, 2023). Many of the water quality and habitat-related recommendations also match recommended management actions identified in OFR (FDEP, 2018), but are not necessarily identical.

The picture is more complex with respect to fisheries-related management recommendations. While scientific studies indicate that reef fish populations in the Coral ECA are subject to very high fishing pressure (Towle et al., 2020; Ault et al., 2022), fishing stakeholders including the committee network on average perceive the condition of fisheries resources and fishing quality as neutral to moderately positive (Hervas & Lorenzen 2023). The same stakeholders view reducing fishing pressure as a relatively low priority for improving coral reef ecosystem conservation and fishing quality. Nonetheless, protection of spawning aggregations enjoys good support from fisheries stakeholders and is also most strongly supported by the SEFCRI network. Creating more artificial reefs was a top priority identified by all fishing stakeholder groups but received mixed and on average much lower support from the SEFCRI network. Shortening fishing seasons, limiting fishing in areas of damaged seagrass, and designating some no-fishing areas were the least supported options, often near neutral. Designating some no-fishing areas was the most controversial option. The fishing committee adopted recommendations to deploy more artificial reefs, identify and protect (when warranted for conservation) spawning aggregations, and explore pole and troll zones in sensitive seagrass areas (Hervas et al., 2023). With respect to marine reserves, it opted (after extensive discussion) to set out conditions for considering such measures. MPAs had the least agreement among committee members. Some of the challenges were scientific language and understanding the terminology such as MPA, marine reserve and spatial management. This was addressed with a webinar which led to further and more open discussions on spatial management options which eventually led them to provide conditions for implementation as a recommendation. A key part of this outcome was having the facilitating neutral party draft the recommendation that synthesized the committee's discussions in a way that allowed a compromise from all sides. Brought in as a suggestion to reflect the MPA conversations, the recommendation was supported by the committee. Overall, the fishing-related recommendations of the committee reflected extensive discussions and the level of consensus achievable given very disparate views across the fishing community on some issues such as no-fishing areas.

Supporting the committee through synthesis and review has proven helpful. The UF team has facilitated meetings and communication, but it was important to also facilitate the uptake of new information. An example of this was creating a synthesis of emerging recommendations and a survey to prioritize them. Synthesizing and presenting information like this facilitated

dialogue and created a common starting point for conversations. Similarly, discussions were synthesized and presented back to the committee at the beginning of relevant committee meetings. Flexibility was also important to be able to adapt and serve the group in the best way possible. This flexibility helped the team find ways to continue engagement and dialogue. It also allowed the initial plan of having in person meetings to change to only having them online.

The objective of consultation with the SEFCRI Team, SEFCRI TAC and FDOU 52 team to obtain feedback on process and developing recommendations was achieved through regular zoom calls with the FDOU 52 team, presentations to and discussions with the SEFCRI Team and SEFCRI TAC, and elicitation of feedback on draft recommendations from the same groups. Finally, the objective of informing fishing and other stakeholders about project process and outcomes was achieved through the project web page, public meetings, and various outreach activities by the fisheries committee members and their network as detailed in this report.

5.1. Moving forward

The end of this project is a crucial time that can determine the future direction of FDEP's co-management efforts. This committee has been meeting frequently for the past 2.5 years where they have been working together and having discussions, which at times have been challenging but which have ended with points of compromise and social learning. The continued presence of FDEP and FWC with UF as a mediator has also brought a familiarity with the agencies and staff members.

For instance, in the situation analysis (Project #8) FDEP was seen as part of the environmental network; in opposition to the fishing community. This project has shown the committee that regardless of FDEP staff changing several times in the project's lifespan, there was consistency. There was always at least one FDEP staff present at the committee meetings, FDEP staff were respectful of the committee's process and did not bring their own ideas to the group, they were transparent in their objectives, expectations, and answers, and gave helpful insights to help the conversations move forward. It is important that engagement continues with the same level of transparency and support.

Crandall (2018) describes that to ensure that fisheries engagement opportunities are viewed as meaningful, there needs to be a transparent and effective use of stakeholder input in decision-making. And similarly, the quality of communication between fisheries agencies and the fishing public may challenge management credibility and compliance (Cardona, 2013). As pointed out by one of the committee members, the list of recommendations will not be fruitful if there is no policy change, available funding, and political will and leadership. These are big picture factors, but they are a prerequisite for these recommendations to go into effect. Therefore, it would be most effective to continue the momentum created by the process and for agencies to proactively communicate and engage committee members, and

ensure a fair and transparent process where their input is considered equal as that from other groups, for both the recommendations created in this process as well as any future input moving forward.

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7. Appendices

Appendix A – Meeting summary reports

Appendix B – Webinar presentation slides

Appendix C – Public meeting reports

Appendix D – Communication materials

Appendix E – Survey report

Appendix F – Fisheries committee recommendations

Appendix G – Internal survey to draft recommendations

Appendix H – Evaluation survey