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Data Needs for Fisheries Management:

Fishing Stakeholder Survey

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

Data Needs for Fisheries Management:

Fishing Stakeholder Survey

Survey Report

Prepared By:

Susana Hervas

Kai Lorenzen

School of Forest, Fisheries, and Geomatics Sciences

University of Florida

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TABLE OF CONTENTS

LIST OF ACRONYMS

Coral ECA…………………………..Kristin Jacobs Coral Reef Ecosystem Conservation Area
CRCP…………………………………………………….……Coral Reef Conservation Program
FDEP………………………………………...Florida Department of Environmental Protection
FWC…………………………..………...… Florida Fish and Wildlife Conservation Commission
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
UF …………………………………………………..……........................... University of Florida

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

A fishing stakeholder survey was conducted to provide information on stakeholder perceptions of current conditions of marine resources, factors impacting the coral reef ecosystem, importance of measures to improve conservation and fishing quality, and support for specific management actions in the Kristin Jacobs Coral Reef Ecosystem Conservation Area (Coral ECA). The online survey was designed to inform a stakeholder committee process aimed at developing fishing community recommendations for enhancing coral reef ecosystem conservation in the Coral ECA. The survey was distributed to representative samples of private recreational, charter, and commercial fishing license holders. Survey links were also distributed through the networks of the fisheries committee and the Southeast Florida Coral Reef Initiative (SEFCRI), resulting in purposive samples of stakeholders involved with these networks.

The survey revealed broad similarities of perceptions and preferences among different groups of fishing stakeholders. Perceptions and preferences were most aligned among groups with respect to water quality issues and related management options, but more variable among and within groups with respect to fisheries management and habitat issues. Overall, responses from the fisheries committee network aligned well with those from the representative samples of fishing stakeholders.

The survey revealed broad similarities but some important differences between the fishing community groups and the SEFCRI network. Broad similarities are evident with respect to water quality and habitat issues, while some differences are evident with respect to perceptions of the impact of fishing on the coral reef ecosystem and on fishing quality, and with respect to support for fisheries-related management options. The SEFCRI network perceived fishing pressure as a more important factor impacting the coral reef ecosystem and reducing fishing pressure as a more important measure to improve coral reef conservation and fishing quality than did the fishing community groups. However, the SEFCRI network respondents on average judged fishing pressure to be a concern of intermediate importance with water quality, coastal development and climate change being judged as more important.

There was broad, shared support among all groups for many water quality and habitat management actions. With respect to fisheries management actions, protection of spawning aggregations emerged as a high priority for both the fisheries community groups and the SEFCRI network. Creation of more artificial reefs is a high priority for fishing community groups that also enjoys some support from the SEFCRI network. Establishment of some no-fishing areas is the management option that is subject to broad disagreement among private recreational anglers, while the fisheries committee network is more strongly opposed and the majority of the SEFCRI network strongly in favor.

Acknowledgements

We are grateful to all survey respondents for sharing their knowledge, perceptions, and preferences.

We thank the Fishing, Diving, and Other Uses (FDOU) team for their support. Comments from Kristi Kerrigan (FDEP), Mollie Sinnott (FDEP), Katie Lizza (FDEP), Rachel Skubel (FDEP) and Derek Cox (FWC) helped improve the report.

INTRODUCTION

This report sets out the results of a survey of fishing stakeholders aimed at assessing their perceptions of current conditions of marine resources, factors impacting the coral reef ecosystem, importance of measures to improve conservation and fishing quality, and support for specific management actions in the 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 established on July 2018 and the Florida Department of Environmental Protection (FDEP) is creating a management plan for its future sustainability and conservation which includes input from stakeholders.

Previous studies on stakeholder perceptions and preferences with respect to the Coral ECA have shown that stakeholders viewed the reef to be in continual decline (Shivlani & Villanueva, 2006; Allen, *et al.* 2021). Acknowledging the complexity of the system, stakeholders perceived multiple factors including water quality, land-based sources of pollution, and climate change as important factors in the decline. Stakeholders were receptive to management strategies specifically to improve water quality and restore corals. Whereas a 2006 survey found limited awareness of the threats to coral reef ecosystems among residents of counties bordering the Coral ECA (Shivlani & Villanueva, 2006), rapid changes in the coral reef ecosystem (i.e. stony coral tissue loss disease; Towle et al. 2020) and a changing stakeholder and political landscape may have led to greater awareness and changing attitudes and perceptions.

Stakeholders have been invited since 2013 to participate in stakeholder engagement processes and provide their input related to the conservation and management of the Coral ECA. Between 2013 and 2016, the Our Florida Reefs (OFR) process engaged with a wide variety of stakeholders from southeast Florida to provide recommendations on how to balance the use and protection of the reef resources. Stakeholder representatives brought their expertise together in Community Working Groups (CWGs) representing fishing, diving, water sports, research, academia, local, state, and federal government, environmental non-government organizations, private business and local citizens at large (FDEP, 2018).

The OFR process began as a Local Action Strategy of the Southeast Florida Coral Reef Initiative (SEFCRI), which was hosted by FDEP and ultimately aimed to develop a co-management initiative directed by the stakeholders. Sixty-eight Recommended Management Actions (RMAs) were developed during the process. 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).

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). Florida's three most populated counties (Miami-Dade, Broward and Palm Beach) border the Coral ECA and the state's population is increasing steadily (U.S. Census Bureau, 2015). The high and increasing local population coupled with a significant increase in residents' participation in fishing (Allen, *et al.* 2021) hints at both, the importance of the recreational fishing sector and the pressure it may bring to reef-associated fisheries resources in the Coral ECA (Towle et al. 2020; Ault et al. 2022). Fishing stakeholders can also be powerful voices for reef conservation. However, fishing also affects reef-associated fisheries resources and the wider coral reef ecosystem. 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.

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 further engagement process focused specifically on fishing stakeholders to enhance their participation and obtain more information on their perceptions and management preferences. FDEP contracted the University of Florida (UF), specializing in fisheries stakeholder process design and facilitation, and fisheries research, to facilitate the process. Following a situation analysis (Lorenzen et al, 2019), the project team designed an engagement process centered around a fishing stakeholder committee tasked with developing recommendations. The 16-member stakeholder committee met every 1-2 months between June 2020 and November 2022. The committee discussed environmental and fisheries issues of concern and worked towards the creation of a list of recommended management actions. Input from the wider fishing public was sought through public meetings and through the survey described in this report. Surveys play an important role in informing the committee and management agencies because they can provide quantitative and representative information about the perceptions and preferences of fishing stakeholder groups at large (Cardona, 2013; Garlock & Lorenzen, 2017).

METHODOLOGY

Survey design

The survey aimed to gain information on the perceptions and preferences of fishing stakeholders with regards to the Coral ECA and specific management ideas that had been discussed by the fishing stakeholder committee. Therefore, the survey included broad general questions regarding perceptions of the condition of the coral reef ecosystem, important factors impacting that condition, and importance of different conservation measures. It further included feedback on specific management ideas and potential recommendations under consideration by the committee. Additionally, some data were collected on self-reported fishing experience and activity, and on the value of fishing gear owned in order to characterize respondents in terms of fishing experience and activity (Garlock & Lorenzen, 2017).

We specifically asked about the following issues with regards to the Coral ECA:

- Current conditions of marine resources
- Importance of factors impacting coral reef ecosystem
- Importance of measures to improve conservation
- Importance of measures to improve fishing quality
- Level of support for water quality management options
- Level of support for fisheries management options
- Level of support for habitat management options

The survey was developed using Qualtrics software (version 2022 of Qualtrics. Copyright © 2022, Provo, UT, USA. Available at https://www.qualtrics.com) and the full survey can be found in Appendix 1. Questions on fishing experience/activity and on the value of fishing gear owned were followed by perception and attitude questions with five-point Likert scale responses. Most topics were addressed multiple times in different questions which allows for some cross-checking and triangulation to enhance the validity of conclusions drawn from the responses.

Sampling methodology

The survey was distributed to representative samples of private recreational, charter, and commercial fishing license holder's resident in the Florida counties from which the majority of fishing trips in the Coral ECA originate. Survey links were also distributed through the networks of the fisheries committee and the Southeast Florida Coral Reef Initiative (SEFCRI), resulting in purposive samples of stakeholders involved with these networks.

The focal geographical area for survey distribution was identified from analyses of charter and private angler travel and targeting behavior regularly reported UF IFAS and Florida Sea Grant (Camp, 2021a,b; Camp & Encomio, 2021a,b,c,d; Camp & Zangroniz, 2021a,b). These reports show that between 93% and 97% of anglers undertaking fishing trips from the counties bordering the Coral ECA (Martin, Broward, Palm Beach and Miami-Dade) travel from within these counties or from St. Lucie County (which borders Martin County to the north). Therefore, anglers resident in these five counties were targeted for the survey.

The representative samples were obtained as follows from license databases held by the Florida Fish and Wildlife Conservation Commission (access to these databases can be requested from the Florida FWC). A random probability sample of private recreational reef fish anglers resident in the area as defined above was obtained from Florida Reef Fish Survey database. This database contains verified records of all holders of the Florida State Reef Fish Designation which is required for all anglers aged 16 or over who fish for reef fish from private vessels. A complete sample of recreational charter license holders resident in the area as defined above was obtained from the Saltwater Recreational Fishing License Database. A complete sample of commercial fishing license holders resident in the area as defined above was obtained from the Saltwater Products License Database.

Prior to sampling, the databases were filtered to include only those individuals with valid emails. Survey distribution included a personalized email request, and reminder emails were sent one week after the initial email (Dillman et al., 2009).

In addition to the representative samples of fishing stakeholders, purposive samples were obtained from the networks of the fisheries committee and the Southeast Florida Coral Reef Initiative (SEFCRI). In representative, random probability samples, the universe of potential respondents is known (e.g., the license holders) and all have the same probability of being sampled. This minimizes sampling bias and allows for quantitative inferences. By contrast, in purposive samples, respondents are self-selected or targeted in a non-random manner, thereby increasing the potential for bias and making strict quantitative inferences difficult. Bearing these caveats in mind, the purposive samples nonetheless provide useful insights into the degree to which members of the fisheries committee and SEFCRI networks hold perceptions and preferences that are similar to or different from those held by representative samples of fishing stakeholders. Two separate survey links were created and sent to fisheries committee and SEFCRI members, respectively, for forwarding through their networks. Whereas the fishing committee was assembled to represent the fishing community, the SEFCRI network is thought to represent the broader coral reef conservation community (see Lorenzen et al. 2019 for further discussion).

All procedures were approved by the University of Florida Institutional Review Board (IRB project number IRB202200172).

Analysis

Descriptive statistics were run on responses to calculate frequencies and means. Confidence intervals (95% CI) were calculated and plotted for the Likert-scale responses to allow easy visual exploration of significant differences between responses. Responses are significantly different when the confidence intervals do not overlap. The use of confidence intervals is a conservative test since responses may still be significantly different when confidence intervals overlap marginally (Schenker & Gentleman 2001). The advantage of comparing confidence intervals over multiple comparison significance tests is that different comparisons can be easily made, for example a response can be visually tested against responses to a different question or against responses to the same question by other stakeholders. Nonresponse bias was assessed by testing for significant differences between responses of early and late respondents (using a t-test with $p < 0.05$, Vaske 2008, Ch. 14). Testing for differences between early and late respondents is a commonly used assessment of non-response bias, assuming that late respondents may be more representative of non-respondents (Armstrong and Overton, 1977; Zheng et al., 2021). Medians were reported in addition to means for variables with potentially skewed distributions, such as length of fishing experience (Table 3) or value of fishing/boating equipment (Table 5). The median is preferred to the mean as a measure of central tendency when distributions are skewed because it is less sensitive to outliers (Vaske 2008, Ch. 11).

RESULTS

Response rates

Response rates are measured to understand the level of engagement with the survey and determine level of bias of the respondents who chose to complete the survey. Non-response bias is discussed in the following section. In this section, Table 1 shows the response rates from the mailing lists the survey was sent to. The response rates were low (1.3-5.6%), but not incomparable to other online surveys of fishing stakeholders (Garlock & Lorenzen, 2017; Crandall et al. 2019). Low response rates are a potential for non-response bias, however no such bias was detected (see below). The non-response bias analysis was conducted only for the sample of private recreational anglers because it was the only sample large enough to permit meaningful comparison of early and late respondents (n=384).

Between 27% and 38% of respondents did not complete the survey. This meant that the recreational representative sample began with 547 responses but ended at 384 (16 vs. 11 and 22 vs. 16 for the charter and commercial samples, respectively).

Table 1 . *Response rates for the representative samples*

	Private Recreational	Charter	Commercial
Sample size	29,977	212	690
Failed emails	1	0	1
Bounced emails	1,028	10	33
Duplicate emails	17	7	5
Real sample size	28,931	195	651
No. of responses	547	16	22
Incomplete resp.	167	6	6
Usable responses	384	11	16
Dropout rate	31%	38%	27%
Response rate	1.3% (n=384)	5.6% (n=11)	2.5% (n=16)

The survey allowed respondents to self-identify as stakeholders in a variety of categories regardless of the sample they were in. There were twenty-one potential categories including private recreational angler, charter captain and commercial fishermen, but also for instance recreational spearfisher, boater, marine industries, or environmentalist. This also meant that if a private recreational angler from the license database is also a charter captain or crew, then they can identify as both. This reflects the complexity of resource use and stakeholder identity within the Coral ECA.

A small number of respondents self-identified with another primary stakeholder group (recreational angler, charter captain or commercial fisher) in addition to the one they were sampled from, leading to slightly higher samples in all three self-identified groups (Table 2) compared to the samples in Table 1.

Table 2 . Number of responses from individuals identifying as private recreational, charter, and commercial and number of responses from individuals completing the survey via link provided to the committee members or SEFCRI (wider conservation community)

Responder identity	Number of responses
Private recreational	395
Charter	31
Commercial	20
Responder links	**Number of responses**
Committee network	60
SEFCRI network	64

Checking for non-response bias

To check for possible non-response bias, responses by the last respondents were compared to those of the first. This is a common practice and based on the idea that respondents filling out the survey late and after multiple reminders are more representative of non-respondents than those who responded early on. The first and last 10% of respondents in the private recreational angler representative sample were used for this test. (Numbers of commercial and charter respondents were too low to conduct a meaningful test). Given representative private recreational angler sample of n=395, using 10% of respondents led to a comparison of the first and last 40 respondents. No significant differences were detected using p-values between the first and last respondents in any of the survey scores, and any differences were generally less than 10% of the average scores. Therefore, no evidence was found for significant non-response bias in the representative angler survey. Scores are based on Likert scale responses that relate to respondent opinions.

Demographics

Respondent identities

The distribution of self-identified respondent identities by sample is shown in Figure 1. Most respondents considered themselves recreational anglers, followed by boaters and snorkeler. As expected from the large recreational angler sample, identities of a recreational nature predominated overall and far fewer individuals identified as charter captains/crew, commercial fishermen, or representatives of other marine industries. Respondents from most samples self-identified with a broad range of identities (Figure 1). SEFCRI network respondents had a majority of recreational divers, snorkelers, and environmentalists, although there were also private recreational anglers among them. The committee network respondents were mostly private recreational anglers and harvesters as well as boaters. Both groups had a similar number of self-identified snorkelers.
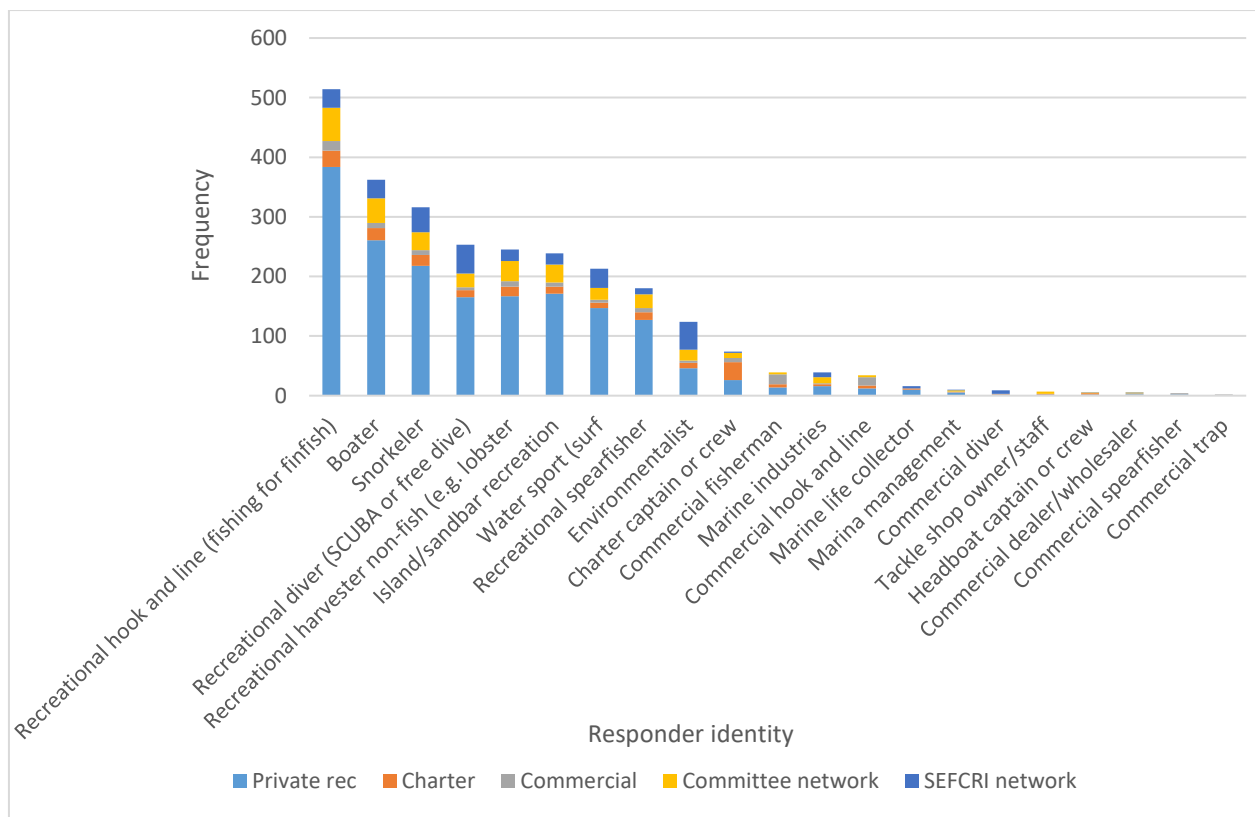
Figure 1 . Self-identified respondent identities (respondents were allowed to check all that apply) for the different samples.

Counties represented

Respondents fished or otherwise used marine resources from all four counties bordering the Coral ECA (Figure **2**). Most came from Miami-Dade County, with a close second from Palm Beach County, followed by Broward, and lastly Martin County. When considering the different respondent groups, they followed the same pattern, with two noticeable differences: i) Most private recreational anglers came from Palm Beach County, and ii) SECFRI network respondents frequented Broward County the most.
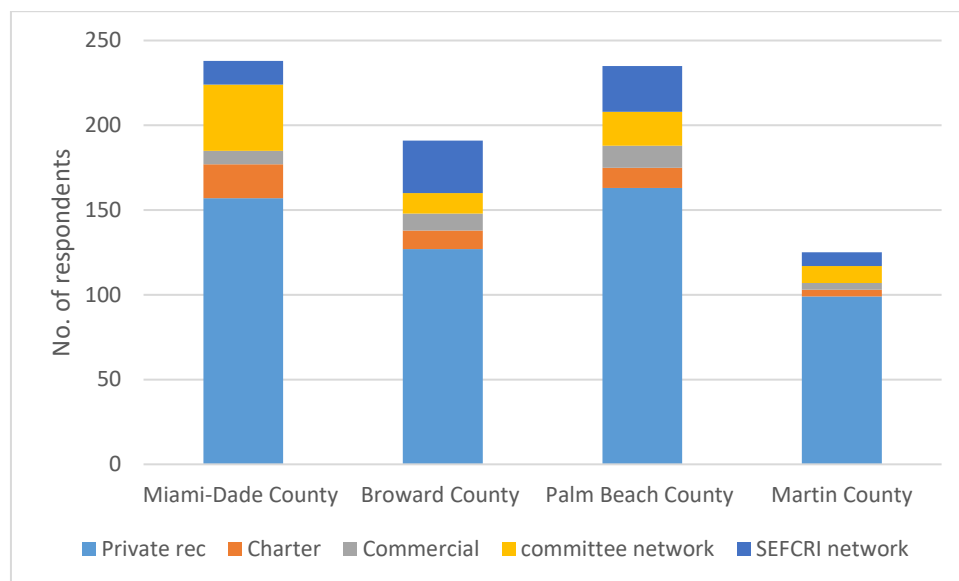
Figure 2 . *Counties bordering the Coral ECA frequented the most for fishing or other marine activities.*

Length of fishing experience

Respondents' length of fishing experience varied from 0 to 77 years, but most respondents were very experienced overall and within Florida (Table **3**). The median length of fishing experience overall ranged from 27 to 55 years, while median experience in Florida ranged from 33 to 51 years. Respondents from the committee network had the longest Florida fishing experience on average (median 51 years) while respondents from the SEFCRI network had the shortest (median 33 years).

Table 3. *Fishing experience of respondents.*

	Total years fishing					Years fishing in Florida				
	Mean	Standard deviation	Min.	Max.	Median	Mean	Standard Deviation	Min.	Max.	Median
Anglers	43.4	+-16.2	0.0	75.0	46.0	33.4	+-18.4	0.0	69.0	37.0
Charter	41.1	+-16.1	3.0	68.0	41.5	35.7	+-16.6	3.0	68.0	34.0
Commercial	38.1	+-15.6	4.0	66.0	36.5	32.2	+-16.5	3.0	65.0	31.5
Committee	48.7	+-12.3	16.0	77.0	54.5	45.5	+-14.9	5.0	77.0	51.0
SEFCRI	35.5	+-17.3	4.0	67.0	27.0	30.8	+-17.8	1.0	62.0	32.5

Frequency of fishing in different habitats

A majority (53%-68%) of fishing community respondents from all groups reported that they fished reef habitats once a month or more, and so did a third (33%) of respondents from the SEFCRI network (Figure 4). All groups also reported regular use of other marine habitats and to a lesser extent, freshwater habitats.

Table 4. *Proportion of respondents that fish different habitats once a month or more frequently*

	Proportion of respondents that fish these habitats once a month or more			
	Reef (includes natural reefs, artificial reefs, and wrecks)	Inshore (other than reef) or Backcountry (includes fishing from shore or pier)	Offshore (other than reef) or Pelagic	Freshwater
Private rec	53%	38%	48%	17%
Charter	87%	61%	82%	28%
Commercial	70%	67%	71%	26%
Committee network	68%	62%	78%	33%
SEFCRI network	33%	34%	38%	21%

Reefs and offshore are the habitats mostly utilized by private recreational anglers, charter captains, commercial fishermen and committee network respondents. Since the charter and commercial samples had a low response sample size, and the committee network respondents were not representative, the only figures that can represent the population are the private recreational angler responses.

Value of fishing equipment owned

Many respondents from all groups reported owning valuable fishing and boating equipment (Table 5. Reported total value of fishing/boating equipment (boat and engine, electronics, fishing tackle and spearfishing gear) by respondent group. The median value of fishing and boating equipment (boat & engine, electronics, fishing tackle and spearfishing gear) owned was $ 43,250 for private recreational anglers, $ 125,000 for charter captains, $ 72,500 for commercial fishermen. Respondents from the committee network reported the highest median value for equipment ($ 142,500) while those from the SEFCRI network reported the lowest ($ 8,400).

Table 5. *Reported total value of fishing/boating equipment (boat and engine, electronics, fishing tackle and spearfishing gear) by respondent group.*

	Mean	Minimum	Maximum	SD	Median
Private recreational	$111,000	$0	$6,360,000	$366,661	$43,250
Charter	$186,693	$21,000	$640,000	$157,241	$125,000
Commercial	$129,018	$2,000	$525,000	$145,934	$72,500
Committee network	$445,420	$1,000	$6,200,000	$1,086,247	$142,500
SEFCRI network	$52,570	$0	$350,250	$91,950	$8,400

	Mean	Minimum	Maximum	SD	Median
Private recreational	$111,000	$0	$6,360,000	$366,661	$43,250
Charter	$186,693	$21,000	$640,000	$157,241	$125,000
Commercial	$129,018	$2,000	$525,000	$145,934	$72,500
Committee network	$445,420	$1,000	$6,200,000	$1,086,247	$142,500
SEFCRI network	$52,570	$0	$350,250	$91,950	$8,400

Stakeholder Perceptions

Perceptions of the current condition of marine resources

Perceptions of the current condition of various marine resources in the Coral ECA were remarkably similar among respondents from different groups (Figure 3). Seagrass, corals and inshore water quality were perceived to be in bad condition. Reef fish and fishing-related attributes were perceived as neither good nor bad or moderately positive on average, as was reef water quality. Responses from the committee network were often near the center of the fishing groups, while SEFCRI network responses tended to be at the lower end of expressed perceptions of resource condition. The range of average responses within each question did not vary more than one point on the Likert scale. For instance, the responses with regards to the perception of the current

condition of seagrass, which had the broadest range, goes from 1.5 (commercial) to 2.5 (private recreational). Difference in perceptions among members of different groups were small enough to not be opposing views. Confidence intervals for most items overlapped among stakeholder groups, again reflecting small differences in the perceived condition of the reef (responses are significantly different when the confidence intervals do not overlap). Note that the very narrow confidence intervals typically associated with the private recreational angler responses reflect the very high number of responses received from this group, not lower variance of responses compared to other groups. Private recreational anglers typically perceived the conditions most positively while the SEFCRI network perceived them most negatively, and the difference between these two groups was significant except for their views on abundance of reef fish and overall fishing experience which private recreational respondents viewed as more positive, but not significantly so compared to SEFCRI network respondents.

Other instances when opinions varied significantly are between private recreational and committee network respondents with relation to the amount of coral and health of coral. Private recreational respondents viewed their state as less critical. Likewise, commercial fishing respondents viewed the amount of coral to be significantly better than did SEFCRI network respondents.

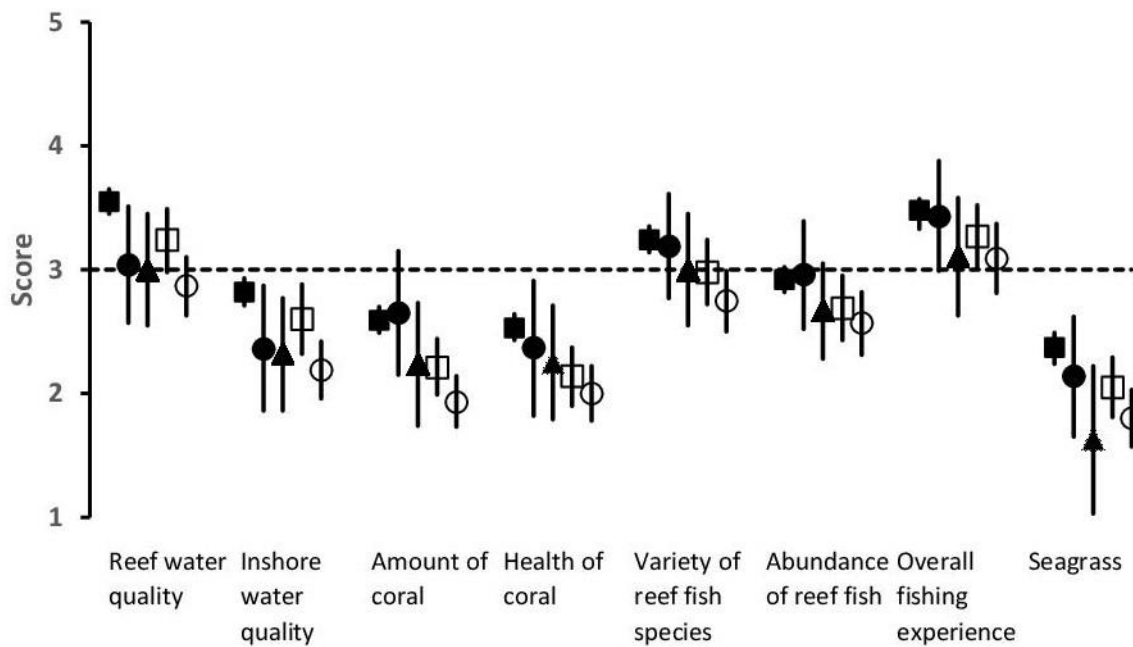*Figure 3*. *Responses to: "In your opinion, how would you rate the current condition of each of the following marine resources in the area you most frequently visit in Coral ECA?" Scale – 1: Very bad, 2: Bad, 3: Neither good nor bad, 4: Good, and 5: Very good. Respondent group – ■: private recreational, ●: charter, ▲: commercial, □: fisheries committee network, ○: SEFCRI network. Vertical bars indicate 95% confidence intervals.*

Perceived importance of different factors impacting the coral reef ecosystem

The perceived importance of different factors impacting the coral reef ecosystem was remarkably similar among respondent groups with all scoring almost all factors as being important to very important (Figure 4). Within this broad similarity, respondents from the SEFCRI network scored most factors as more important than respondents from the fishing community groups and a difference is particularly evident in the perceived importance of climate change, significant between SEFCRI link respondents and private recreational anglers and committee link respondents. There is also a significant difference in responses between private recreational anglers and SEFCRI link respondents in their view of the importance of water quality, and coastal development impacts on the coral reef ecosystem. However, the differences lie within "important" and "very important" levels. A significant difference between groups, but again, not showing conflicting views. The views on climate change were also significantly different between SEFCRI network and private recreational respondents. This was also the case between SEFCRI network and fisheries committee network respondents. The significant difference of approximately one point on the Likert scale shows how differently these groups view climate change as a factor impacting coral reefs.
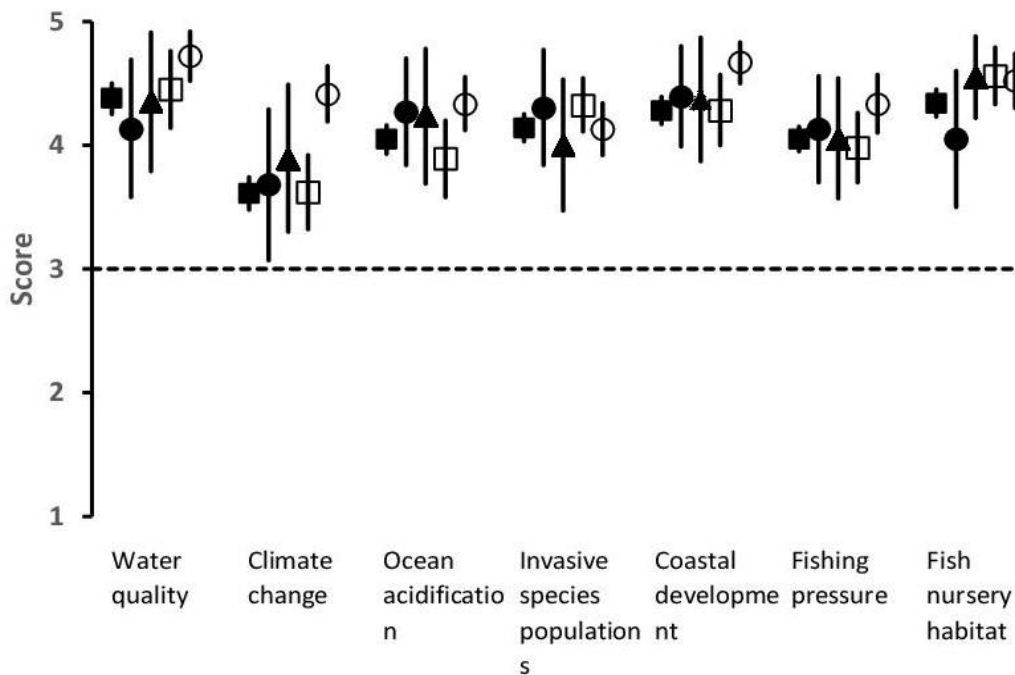
Figure 4. *Responses to: "Based on your knowledge, please rate how important you think each one of the following factors is in impacting the coral reef ecosystem within the Coral ECA?" Scale - 1: Very unimportant, 2: Unimportant, 3: Neutral, 4: Important, and 5: Very important. Respondent group – ■: private recreational, ●: charter, ▲: commercial, □: fisheries committee network, ○: SEFCRI network. Vertical bars indicate 95% confidence intervals.*

Perceived importance of measures to improve conservation of the coral reef ecosystem

A broad range of measures were considered important to improve conservation of the coral reef ecosystem by respondents from all groups (Figure 5). Perceived importance was very similar for most measures but reducing fishing pressure and combating climate change were seen as less important than other measures by the fishing community groups. In both cases, the SEFCRI network respondents viewed those measures as significantly more important than the private recreational angler group. Interestingly, even the SEFCRI network attached lower importance to reducing fishing pressure than to most other measures, but not significantly. Respondents from the SEFCRI network perceived most measures as more important than respondents from other groups, but this pattern was reversed with respect to placement of more artificial reefs, which they viewed as neutral in importance to improving conservation, while the private recreational group and the committee network respondents viewed that measure as significantly more important than the SEFCRI network respondents.

Figure 5. *Responses to: "Based on your knowledge, please rate how important you think the following broad measures are to <u>improve conservation </u>of the coral reef ecosystem within the Coral ECA?" Scale - 1: Very unimportant, 2: Unimportant, 3: Neutral, 4: Important, and 5: Very important. Respondent group – ■: private recreational, ●: charter, ▲: commercial, □: fisheries committee network, ○: SEFCRI network. Vertical bars indicate 95% confidence intervals.*

Perceived importance of measures to improve fishing quality

Perceptions of the importance of broad measures to improve fishing quality in the Coral ECA (Figure 6) largely mirrored those expressed in relation to ecosystem conservation (Figure 5). There was a consistent response from all groups in their consideration of most measures as important to very important in improving fishing quality. Again, reducing fishing pressure and combating climate change were seen as less important than other measures by the fishing community groups. Both measures were rated as more important (but not among the most important) by the SEFCRI network. SEFCRI network respondents viewed reducing fishing pressure as significantly more important than did fishing community groups. They also viewed combating climate change as significantly more important than did private recreational and committee network respondents. In contrast, SEFCRI network respondents rated the importance of placing more artificial reefs to improve fishing quality significantly lower than did private recreational and committee network respondents.
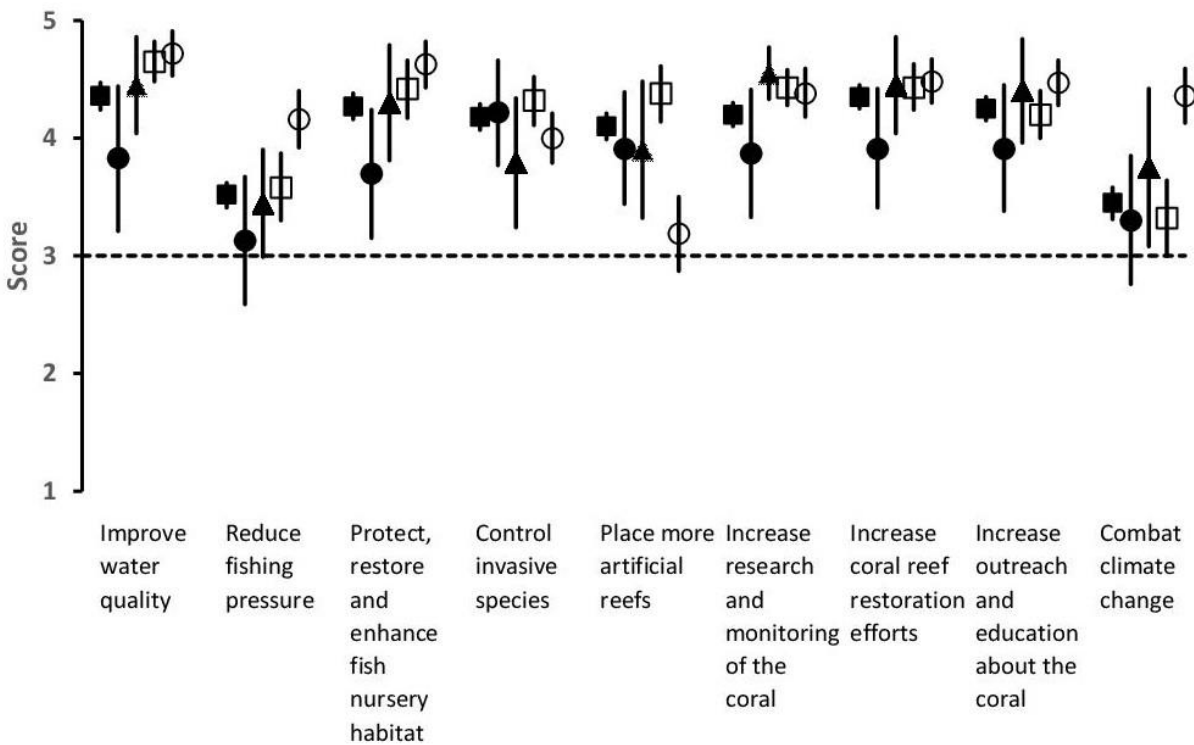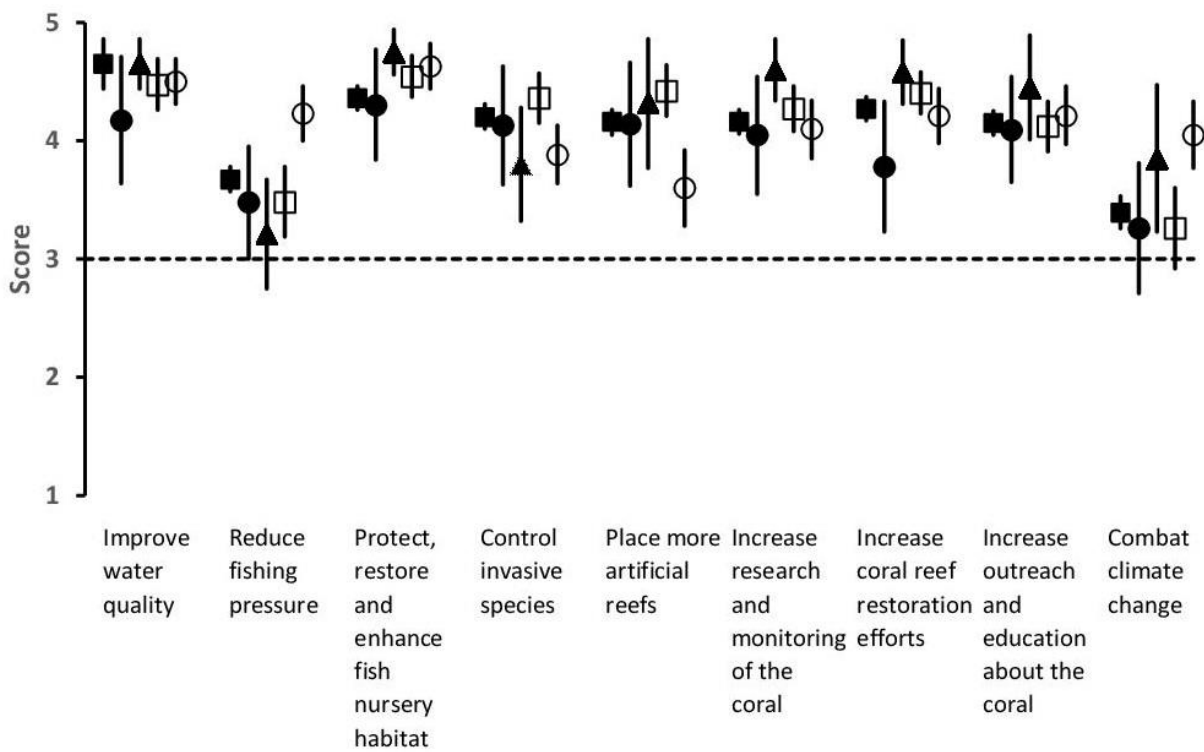

Figure 6. *Responses to: "Based on your knowledge, please rate how important you think the following broad measures are to <u>improve fishing quality</u> in the Coral ECA?" Scale - 1: Very unimportant, 2: Unimportant, 3: Neutral, 4: Important, and 5: Very important. Respondent group – ■: private recreational, ●: charter, ▲: commercial, □: fisheries committee network, ○: SEFCRI network. Vertical bars indicate 95% confidence intervals.*

Support for specific management ideas

Survey respondents were asked about their level of support for specific management ideas that were being considered as possible recommendations by the fisheries committee. Management ideas were grouped into categories related to water quality, fisheries, and habitat. Respondents were asked to rate their support for each option and also to pick their 'top 2' priorities for each category.

Support for water quality options

Support for water quality options was high among all groups (Figure 7). All management options, except one (septic to sewer conversion), were consistently supported to strongly supported. Restoring the Everglades and Lake Okeechobee consistently received the highest levels of support from all groups and was distinctly the most agreed on among groups. The top priorities identified by the representative samples and the committee and SEFCRI networks are broadly similar (Figures 8, 9 and 10). Restoring the Everglades and Lake Okeechobee tops the list for all, with very narrow confidence limits and by a wide margin, often significant, compared to other options. The strong and consistent support for the top option of restoring the Everglades and Lake Okeechobee is also evident when looking at the distribution of responses among key groups: the representative sample of private recreational anglers and the committee and SEFCRI networks (Figure 11).

Figure 7. *Responses to: "Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for these water quality options." Scale - 1: Strongly oppose, 2: Oppose, 3: Neutral, 4: Support, and 5: Strongly support. Respondent group – ■: private recreational, ●: charter, ▲: commercial, □: fisheries committee network, ○: SEFCRI network. Vertical bars indicate 95% confidence intervals.*
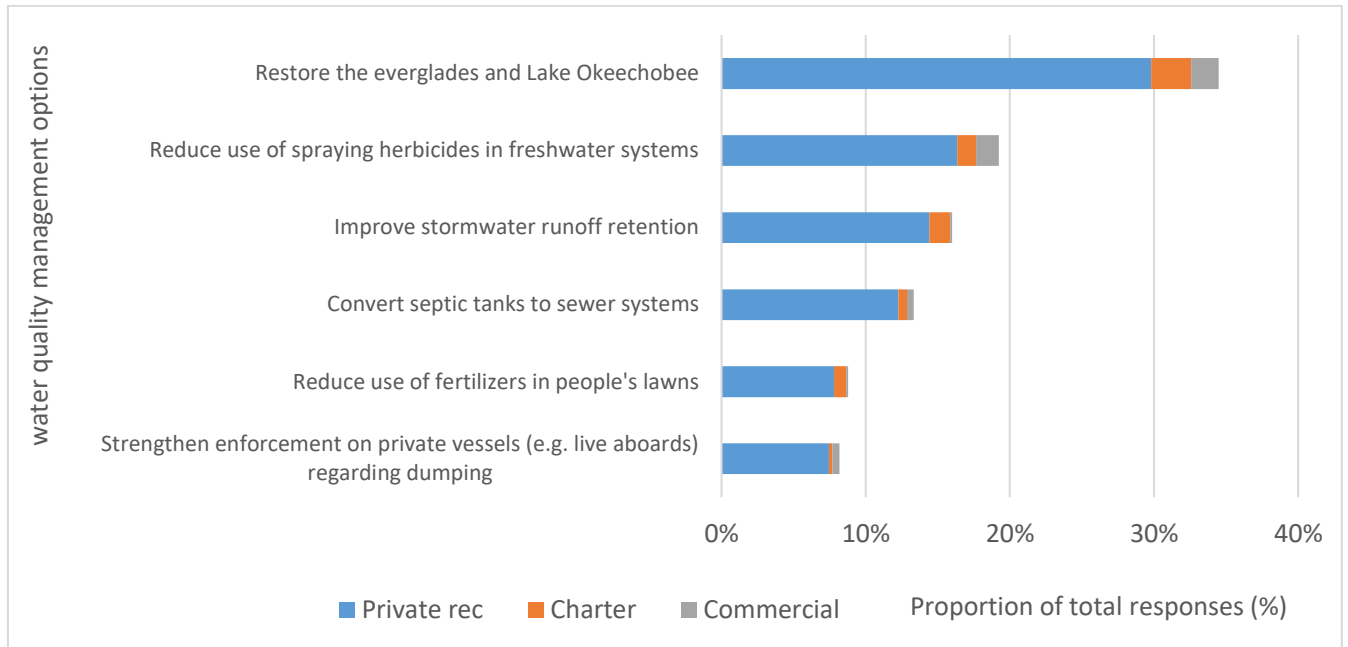
Figure 8. *Top water quality management priorities (proportion of respondents ranking each option among their 'top 2') from the representative samples (private recreational, charter and commercial).*
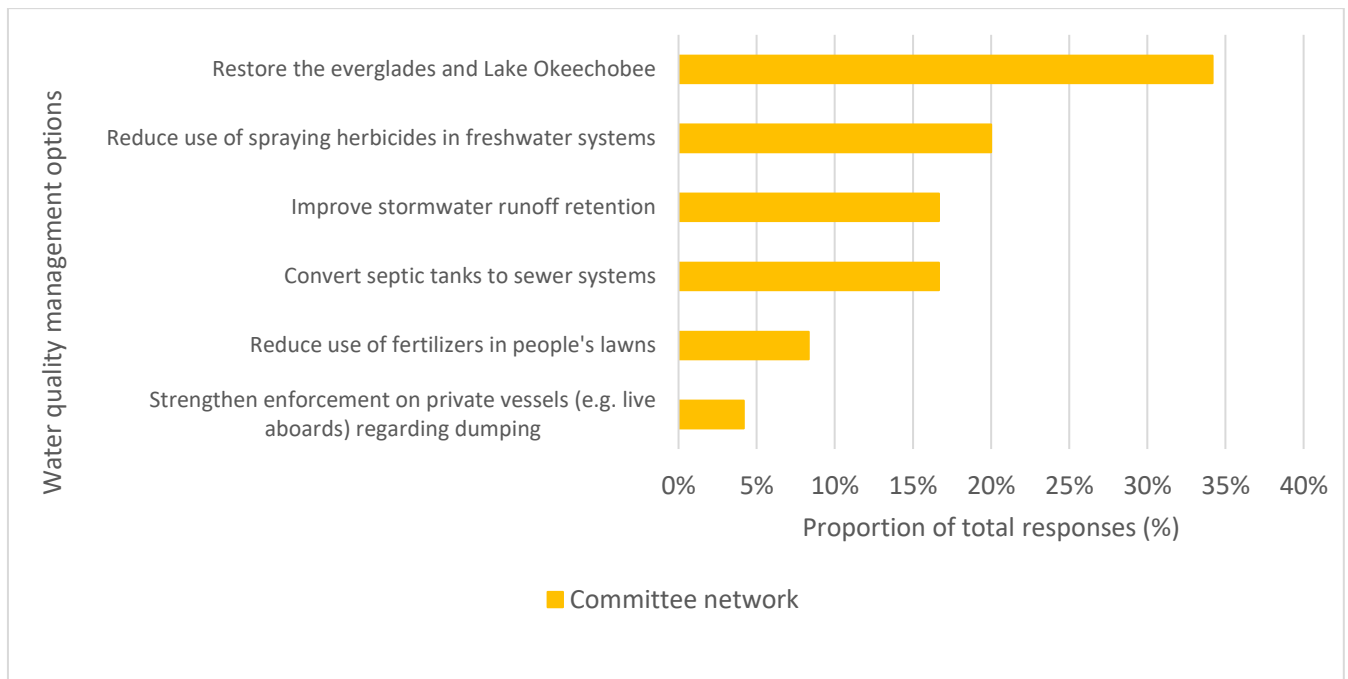
Figure 9. *Top water quality management priorities (proportion of respondents ranking each option among their 'top 2') from the committee network sample.*
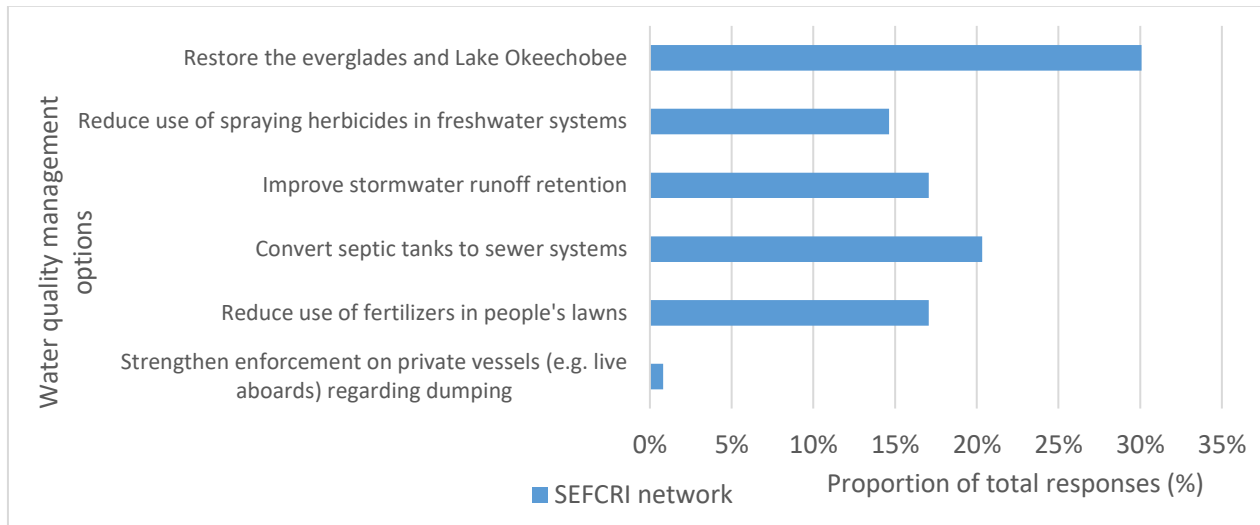
Figure 10. *Top water quality management priorities (proportion of respondents ranking each option among their 'top 2') from the SEFCRI network sample.*
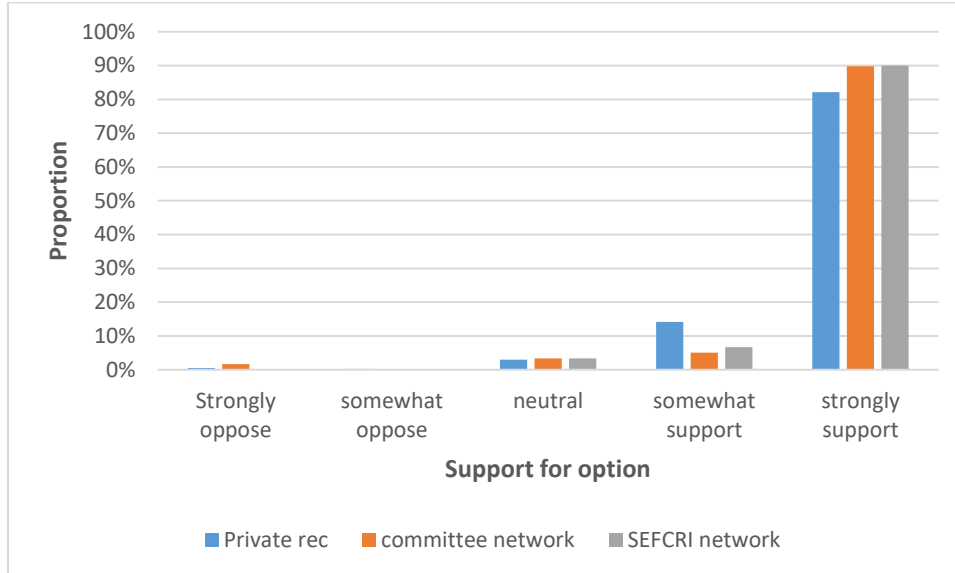
Figure 11. *Distribution of opinions for restoration of the Everglades and Lake Okeechobee. Level of support to the question: "Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for this option: Restore the everglades and Lake Okeechobee." Shown as percentages of respondents.*

Support for fisheries management options

Support for fisheries management options was substantially more varied (Figure 12) than that for water quality-related options. Among the fishing community groups, creating more artificial reefs was the most strongly supported option, followed by protecting spawning aggregations and single rope lobster traps. Support for more restrictive size and bag limits was weak while the stance on shortening seasons or designating some no-fishing areas was neutral or moderately negative on average among the fishing community respondents. SEFCRI network respondents were supportive of shorter seasons and strongly supportive of designating some no-fishing areas.

Respondents from the representative private recreational sample and the fishing committee network typically responded similarly, except for designating some no fishing areas, and prohibiting fishing at spawning aggregations. For these two, private recreational respondents showed significantly more support than did those from the committee network. Private recreational respondents supported prohibiting fishing on spawning aggregations while the committee network respondents' score was just above average.

 The SEFCRI network was supportive to strongly supportive of all fisheries management options with the exception of creating more artificial reefs, which was supported only weakly. Protecting spawning aggregations was most strongly supported by the SEFCRI network – this is an area of strong agreement with the fishing community groups. The greatest average disagreement and significant difference between fishing community groups and the SEFCRI network was registered on the topic of designating some no fishing areas. Other examples where the SEFCRI network respondents support measures significantly more than do the fishing community groups are: increase minimum size limits, shorten open season, enact seasonal closures in spawning aggregations, and prohibit fishing in spawning aggregations.
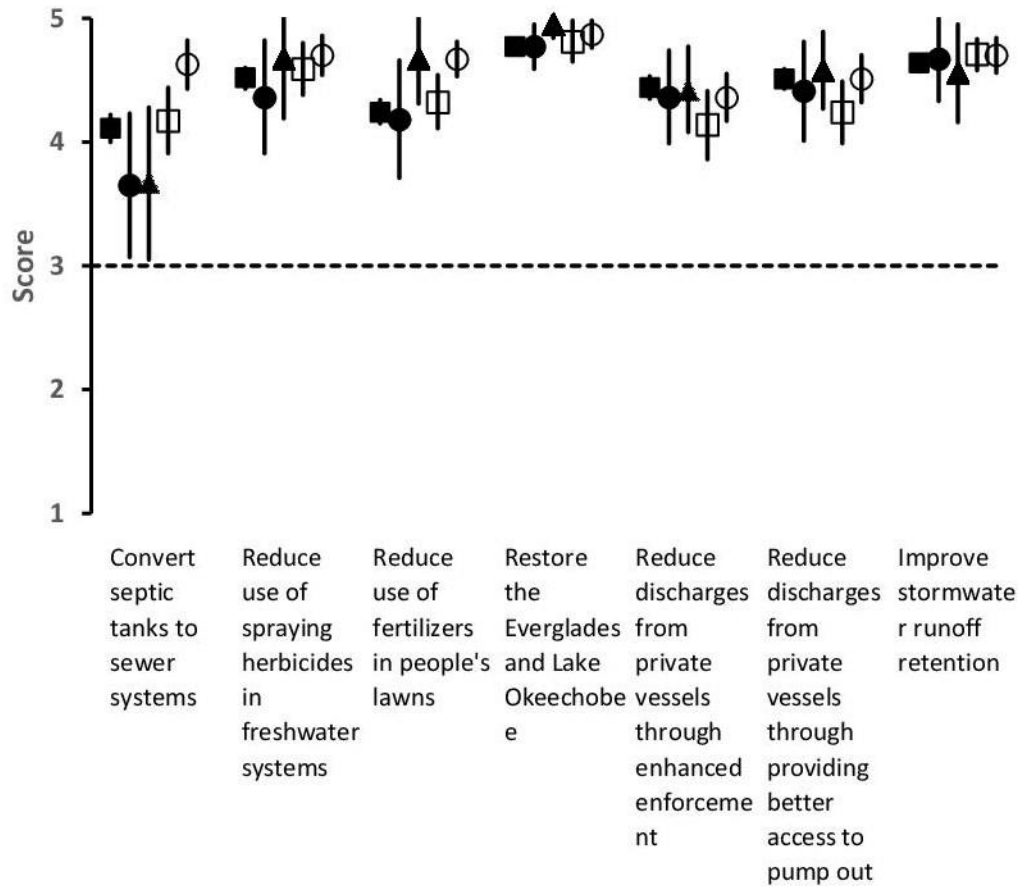
Figure 12. Responses to: "Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for these fisheries options." Scale - 1: Strongly oppose, 2: Oppose, 3: Neutral, 4: Support, and 5: Strongly support. Respondent group – ■: private recreational, ●: charter, ▲: commercial, □: fisheries committee network, ○: SEFCRI network. Vertical bars indicate 95% confidence intervals.

Creating more artificial reefs was the top priority identified by all fisheries community groups when asked for their 'top 2', followed by measures to protect spawning aggregations. The SEFCRI network identified measures to protect spawning aggregations as top priorities, along with designating some no fishing areas, but assigned low priority to creating more artificial reefs (Figures 13, 14 and 15).

Further insight into the more controversial options can be obtained from looking at the distributions of responses. The highly controversial option of designating some no fishing areas attracted very diverse responses from the representative sample of private recreational anglers with essentially

similar proportions of responses in all categories from 'strongly oppose' to 'strongly support' (Figure 16). The committee network was also divided but with 37% 'strongly opposed' and proportionally fewer respondents 'supporting' or 'strongly supporting' this option than those among the representative sample of private recreational anglers. On the other hand, a large majority (70%) of respondents from the SEFCRI network were strongly supportive of this option with the remainder split across categories. There is broad disagreement about this option among private recreational anglers, while the fisheries committee network was more strongly opposed to no fishing areas and the SEFCRI network strongly in favor.

As for creating more artificial reefs (Figure 17), the representative sample of private recreational anglers and the fisheries committee and SEFCRI networks were overall supportive but the SEFCRI network substantially less so than the other groups. The more even distribution of responses for the SEFCRI network reflects a more precautionary stance but not widespread opposition.
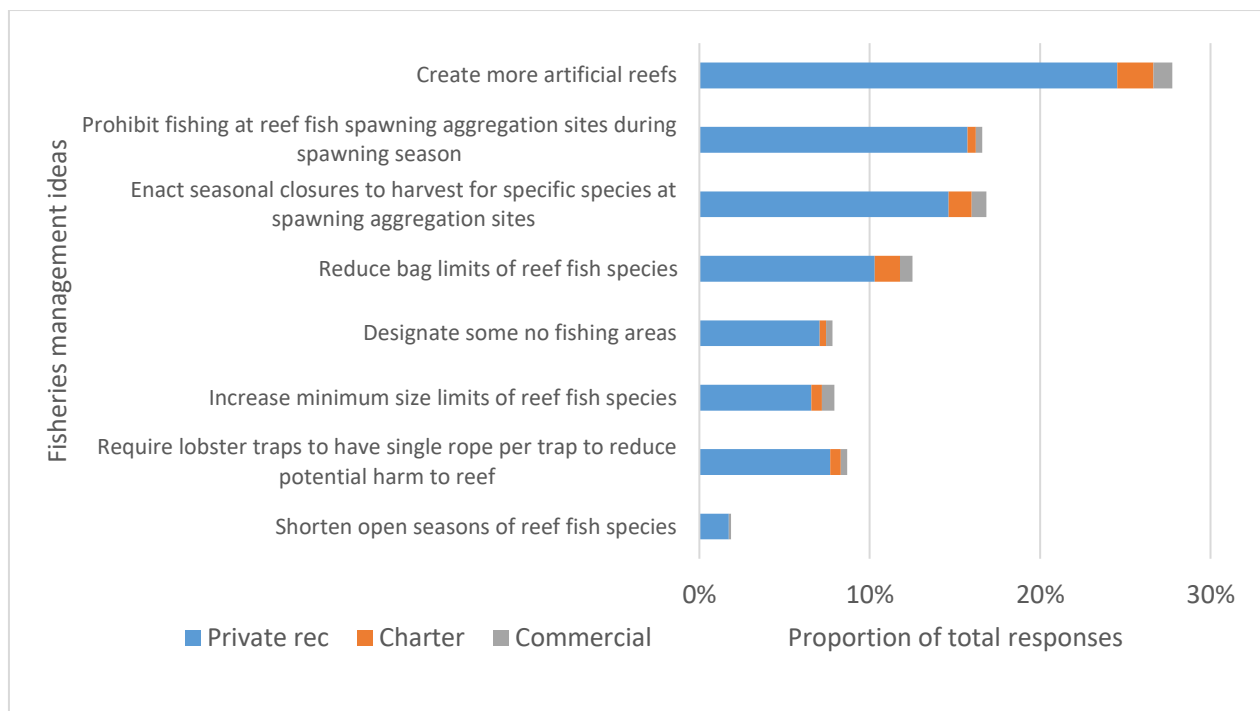
Figure 13*. Top fisheries management priorities (proportion of respondents ranking each option among their 'top 2') from the representative samples (private recreational, charter and commercial).*

Figure 14. Top fisheries management priorities (proportion of respondents ranking each option among their 'top 2') from the committee network sample.

Figure 15. Top fisheries management priorities (proportion of respondents ranking each option among their 'top 2') from the SEFCRI network sample.
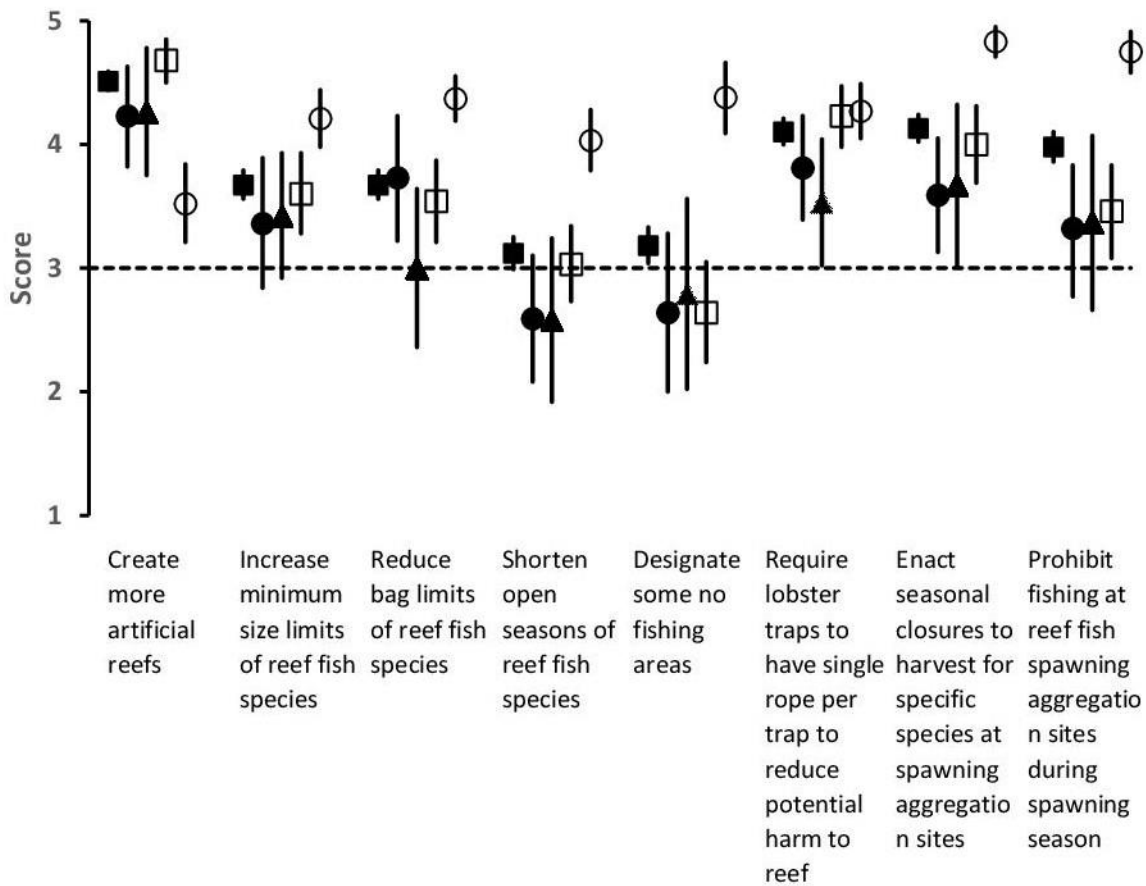
"Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for this option: Designate some no fishing areas."
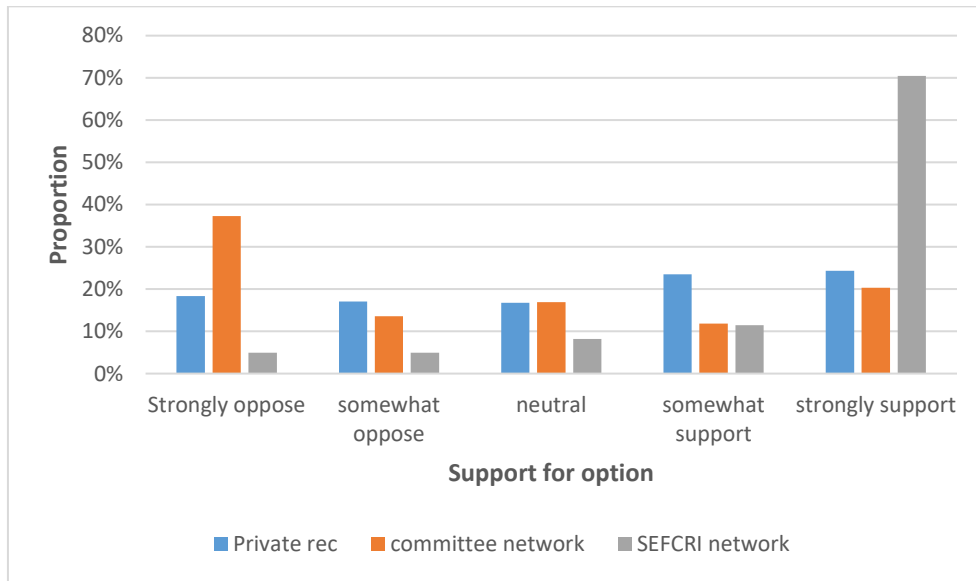
Figure 16. *Distribution of opinions for marine reserves. Level of support to the question: "Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for this option: Designate some no fishing areas." Shown as percentages of respondents.*

"Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for this option: Create more artificial reefs"
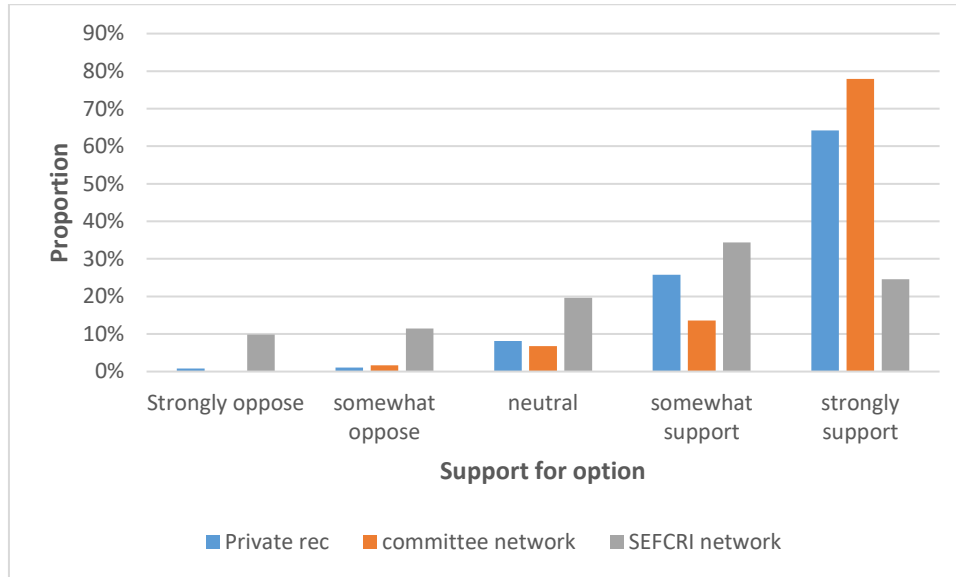
Figure 17. *Distribution of opinions for artificial reefs. Level of support to the question: "Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for this option: Create more artificial reefs." Shown as percentages of respondents.*

Support for habitat options

Support for habitat-related management recommendations varied among options and respondent groups (Figure 18). Replanting seagrass received strong and universal support as did, to a slightly lesser extent, installing signs and limiting anchoring in seagrass beds and living shoreline/living reefs initiatives. Options that involve limiting fishing and other uses in damaged sea grass beds received only limited and variable support from the fishing community groups. Committee network respondents were on average neutral on this topic and significantly different from private anglers who had somewhat greater support for these options. SEFCRI network respondents were the most supportive of these measures, and their responses were significantly different to the committee network but not the fishing community groups.

Creating more pole and troll zones in seagrass beds, no-anchoring zones and mooring fields received weak support from the fishing community groups. The SEFCRI network was more supportive of most options but diverged substantially only in the case of its much stronger support

for no-anchoring zones. However, the differences between the SEFCRI network respondents and the representative sample of private recreational anglers are only significant for six options: limiting fishing and other uses in areas with damaged seagrass, limit anchoring in areas with damaged seagrass, encourage living shoreline, require elements on living reefs in new construction, create more pole and troll, and have more no anchor zones.
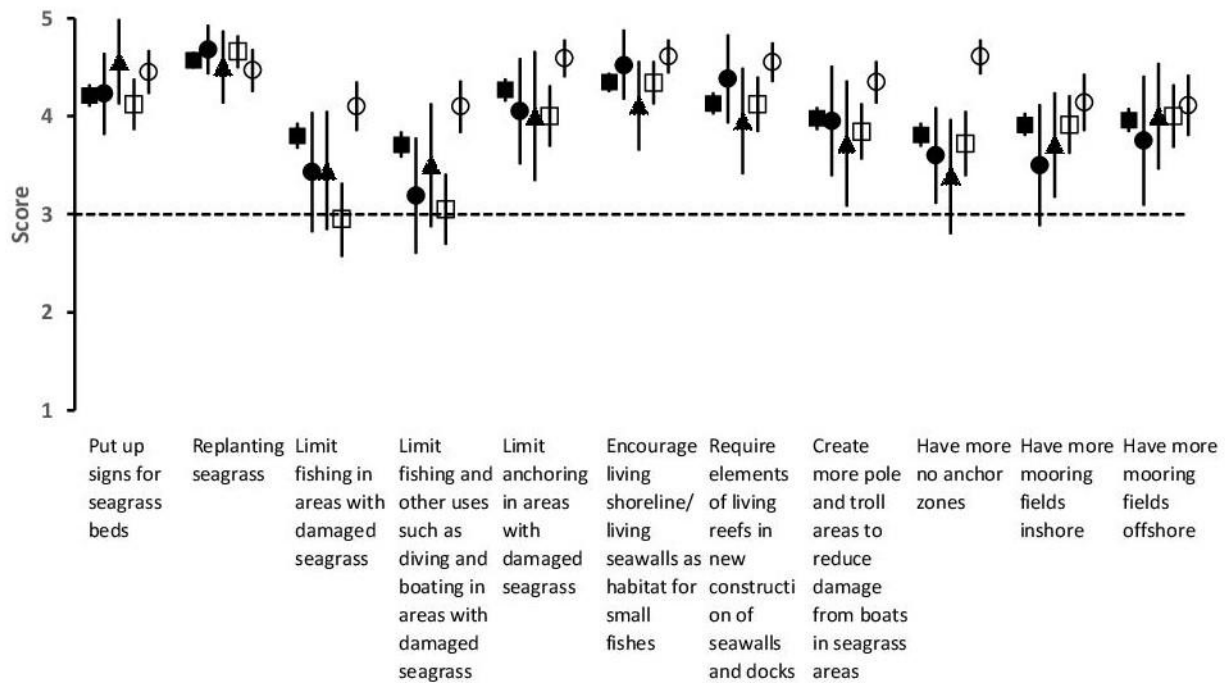
Figure 18. *Responses to: "Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for these habitat options." Scale - 1: Strongly oppose, 2: Oppose, 3: Neutral, 4: Support, and 5: Strongly support. Respondent group – ■: private recreational, ●: charter, ▲: commercial, □: fisheries committee network, ○: SEFCRI network. Vertical bars indicate 95% confidence intervals.*

The top priorities for the representative samples of fishing stakeholders and the committee network were closely aligned, with replating seagrass and limit anchoring in areas with damaged seagrass at the top (Figures 19 and 20). The top priorities for the SEFCRI network were more evenly spread and included more no-anchoring zones while putting less emphasis on replanting seagrass (Figure 21). However, despite some differences, there were no major areas of disagreement.
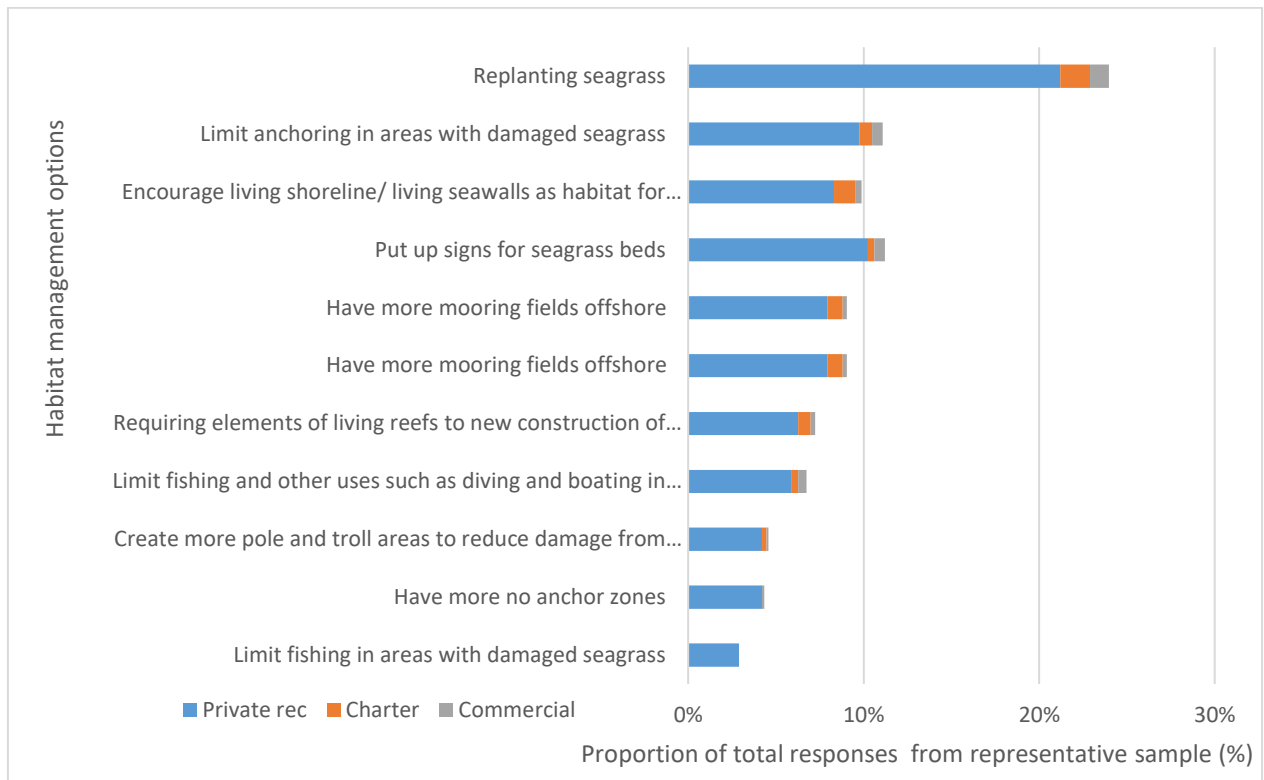
Figure 19. Top habitat management priorities (proportion of respondents ranking each option among their 'top 2') from the representative samples (private recreational, charter and commercial).
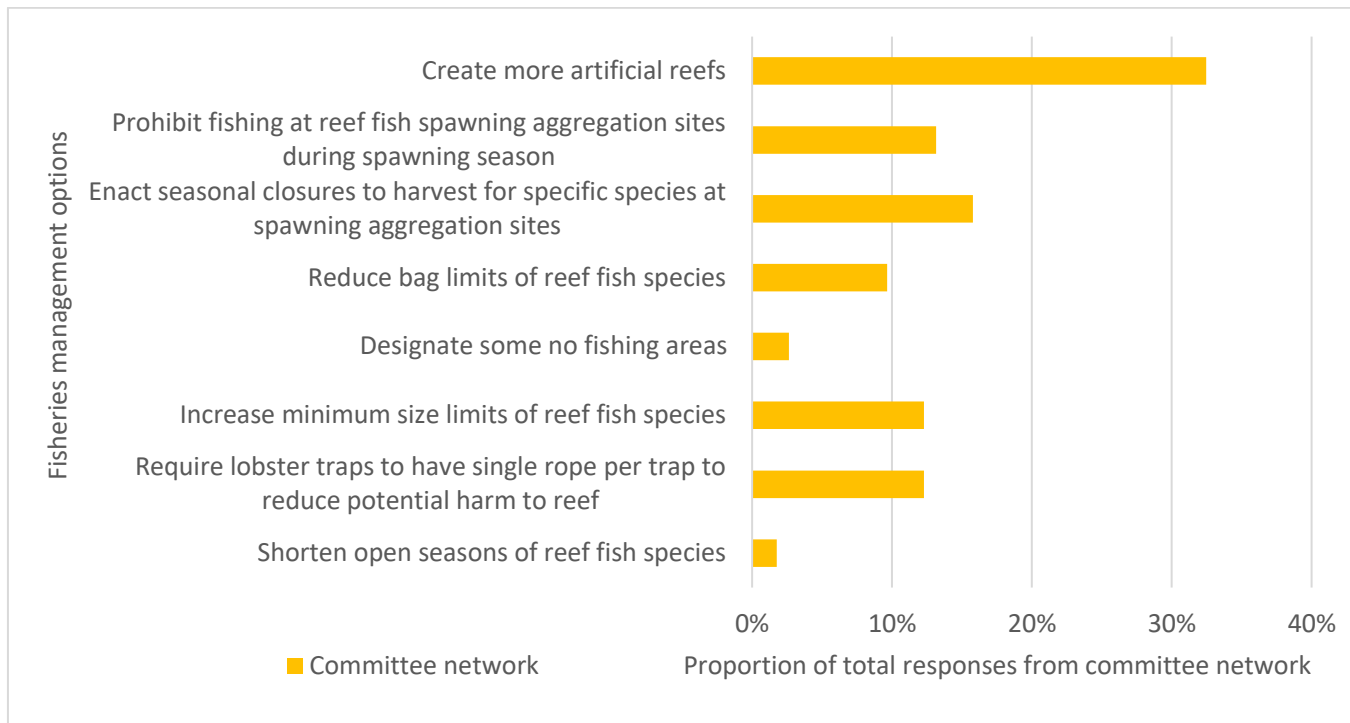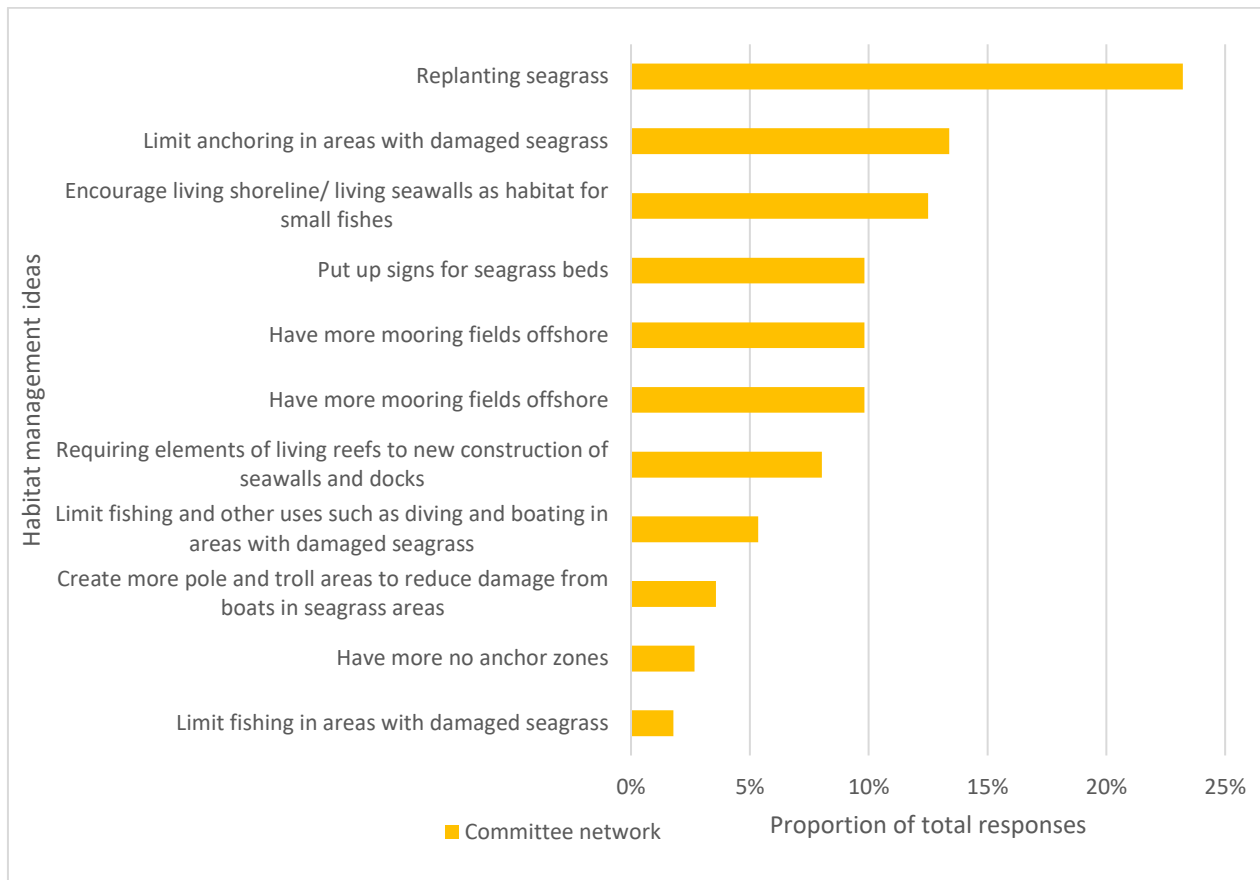
Figure 20. Top habitat management priorities (proportion of respondents ranking each option among their 'top 2') from the committee network sample.
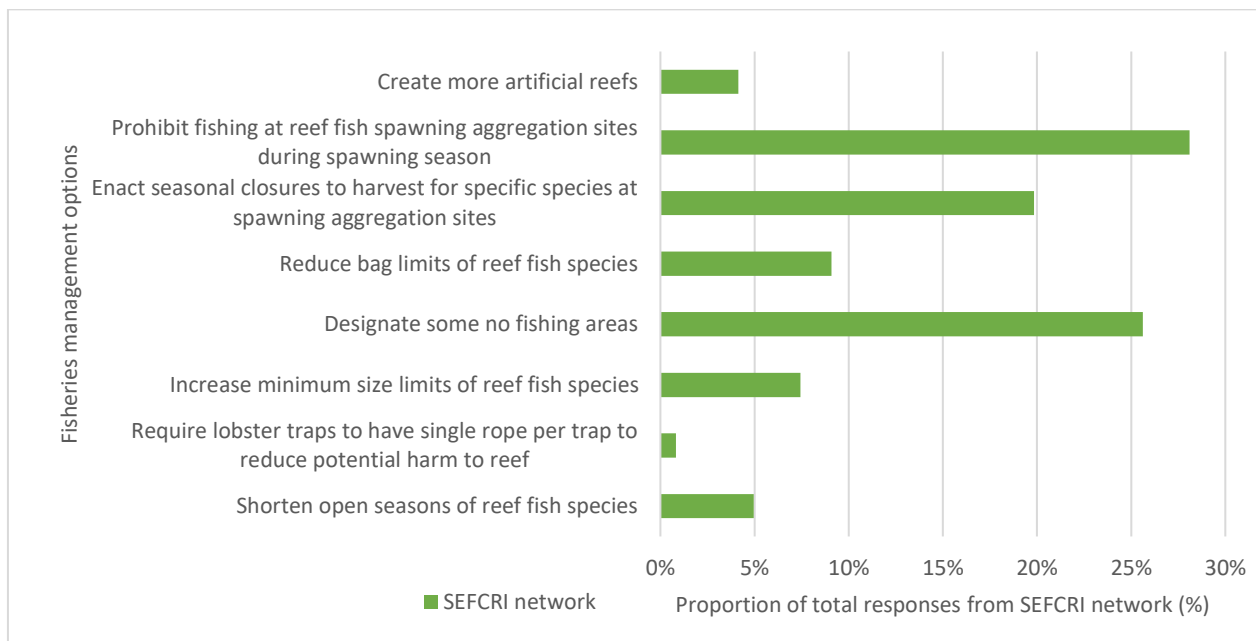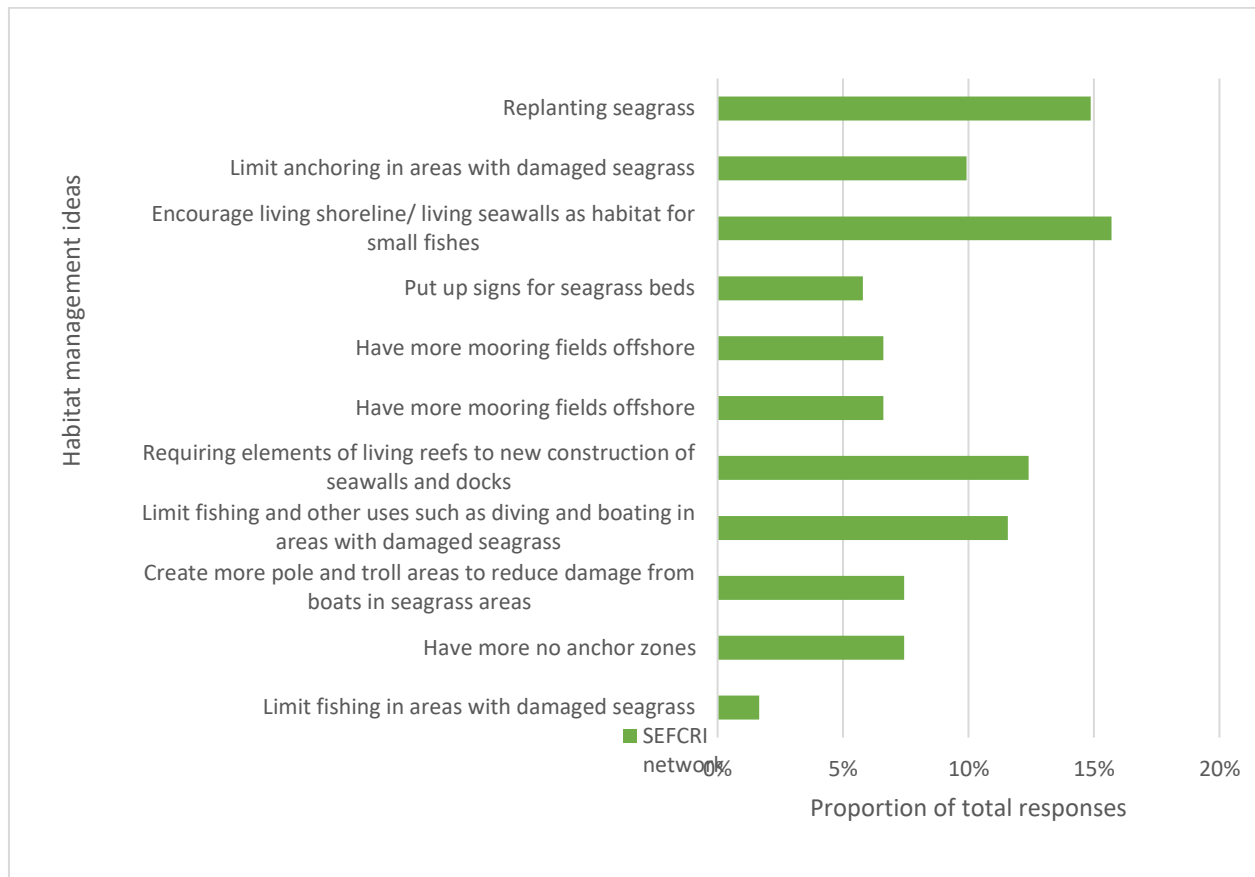
Figure 21. *Top habitat management priorities (proportion of respondents ranking each option among their 'top 2') from the SEFCRI network sample.*

Discussion

The survey combined representative samples of private recreational, charter, and commercial fishing stakeholders with purposive (non-representative) samples of the fishing committee and SEFCRI networks. Even though the response rate to the representative samples was relatively low (1.3-5.6%), indicating a potential for non-response bias, and the validity of purposive samples cannot be rigorously assessed, the survey provided consistent and valuable information. The confidence intervals and significance tests reported in this study should be regarded as approximate, given the low sample sizes and response rates and inclusion of non-representative samples for the fishing committee and SEFCRI networks. Furthermore, parametric confidence intervals and tests are not strictly valid for Likert items but tend to perform similarly to non-

parametric approaches (Murray 2013; Mircioiu & Atkinson 2017). These caveats notwithstanding, the approximate confidence intervals are useful to help the reader make visual comparisons.

Judging from respondents' fishing experience, activity, and investment in fishing gear, respondents represented on average avid and experienced users of marine resources. No evidence of non-response bias was detected when comparing the responses of early and late respondents (the latter considered proxied for non-respondents). Survey results were highly consistent when comparing among fishing stakeholder groups and among questions addressing the same or similar issues (triangulation). This indicates that many insights derived from the survey are robust despite limitations related to response rate, sample size and use of purposive sampling to characterize the perceptions and preferences of the fisheries committee and SEFCRI networks. Low response rates and responses representing predominantly avid resource users are common in internet surveys of fishing stakeholders (e.g., Garlock & Lorenzen 2017; Crandall et al. 2019). The response rates achieved here (1.3-5.6%) are moderately lower than those achieved previously with comparable survey methodology (5.2% in Garlock & Lorenzen 2017; 7% in Crandall et al. 2019). This slight decline may be indicative of increasing survey fatigue, given increasingly frequent use of fishing-related surveys by both management agencies and researchers (Porter et al 2004). Mail surveys now tend to achieve substantially higher response rates than internet surveys, particularly when combined with a monetary incentive (NASEM, 2021; Anderson *et al.*, 2021; Sauls 2022). However, mail surveys are also substantially more time-consuming and costly than internet surveys and the benefits of greater response rates must be weighed against these substantially greater costs.

Perceptions of the condition of marine resources and impacting factors were broadly consistent with findings from previous surveys of fishing stakeholders (Shivlani & Villanueva, 2007) and residents (Allen et al., 2021) in South Florida. However, some differences are notable between fishing stakeholders and residents in general. The recent study by Allen et al. (2021) revealed that South Florida residents were particularly concerned about water quality, coral abundance, and climate change. Fishing stakeholders in our survey also identified water quality and coral abundance as key concerns but viewed climate change as being of low concern compared to other factors. The perceived importance of climate change was also an area of discrepancy between fishing stakeholders and the SEFCRI network. Fishing stakeholders and the SEFCRI network perceived variety and abundance of reef fish and overall fishing experience as neither good nor bad or moderately positive, among the highest scores for different aspects of coral ecosystem condition. Fishing pressure was perceived as among the less important factors impacting the reef ecosystem. Reducing fishing pressure was scored among the least important measures to improve conservation of the coral reef ecosystem and fishing quality by fishing stakeholders but was viewed as more important by the SEFCRI network. In the earlier study by Shivlani (2006), most Coral ECA stakeholders also did not identify fisheries as negatively impacting coral reefs. Stakeholder perceptions of the condition of marine resources and impacting factors were broadly reflective of key scientifically documented issues including poor inshore water quality (Lirman et al., 2021; Towle et al. 2020), decline in coral cover and health (Towle et al., 2020), and decline in seagrass (Lapointe et al. 2020; James et al., 2022). Scientific assessments also point to a high level of fishing

pressure in the Coral ECA compared to other areas of the Florida reef tract, which is reflected in the abundance and size structure of reef fish resources (Towle et al. 2020; Ault et al. 2022). However, the condition of fisheries resources was viewed more positively than most other indicators of coral reef ecosystem condition by all stakeholder groups in the survey, and fishing stakeholders in particular perceived reducing fishing pressure as a comparatively unimportant conservation measure.

The specific water quality and habitat-related management options under consideration by the fisheries committee at the time of the survey were, for the most part, strongly supported by both fisheries stakeholders and the SEFCRI network. The supported recommendations were subsequently adopted by the fisheries committee (Hervas et al., 2023). Many of the water quality and habitat-related recommendations match recommended management actions identified in OFR, but are not necessarily identical (FDEP, 2018; Hervas et al., 2023). The picture is more complex with respect to fisheries-related management options and the habitat options that involve restrictions on fishing. 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, attracting very diverse responses from the representative sample of private recreational anglers with essentially similar proportions of responses in all categories from 'strongly oppose' to 'strongly support'. The committee network was also divided but with 37% 'strongly opposed' and proportionally fewer respondents 'supporting' or 'strongly supporting' this option than those among the representative sample of private recreational anglers. On the other hand, a large majority (70%) of respondents from the SEFCRI network were strongly supportive of this option with the remainder split across categories. There is broad disagreement about this option among private recreational anglers, while the fisheries committee network was more strongly opposed to no fishing areas and the SEFCRI network strongly in favor. 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 (Hervas et al., 2023). Survey results for fishing-related management options were broadly consistent with results from an earlier survey of Florida saltwater anglers which also showed preferences for protecting natural and providing artificial habitats over fishing restrictions, with the most constraining restrictions receiving the lowest overall level of support (Garlock & Lorenzen 2017). Within those strong restrictions, however, designating some marine protected areas received greater support than seasonal closures.

Conclusions

The survey revealed broad similarities of perceptions and preferences among different groups of fishing stakeholders. Perceptions and preferences were most aligned among groups with respect to water quality issues and related management options, but more variable among and within groups with respect to fisheries management and habitat issues. Overall, responses from the fisheries committee network aligned well with those from the representative samples.

The survey also revealed broad similarities of perceptions and preferences, but some important differences between the fishing community groups and the SEFCRI network. Broad similarities are evident with respect to water quality and habitat issues, while some differences are evident with respect to perceptions of the impact of fishing on the coral reef ecosystem and on fishing quality, and with respect to support for fisheries-related management options. The SEFCRI network perceived fishing pressure as a more important factor impacting the coral reef ecosystem and reducing fishing pressure as a more important measure to improve coral reef conservation and fishing quality than did the fishing community groups. However, the SEFCRI network respondents on average judged fishing pressure to be a concern of intermediate importance with water quality, coastal development and climate change being judged as more important.

There was broad, shared support among all groups for many water quality and habitat management actions. With respect to fisheries management actions, protection of spawning aggregations has emerged as a high priority shared between fisheries community groups and the SEFCRI network. Creation of more artificial reefs is a high priority for fishing community groups that also enjoy some, more qualified support from the SEFCRI network. Establishment of some no-fishing areas is the most controversial option. The option is subject to broad disagreement among private recreational anglers, while the fisheries committee network is more strongly opposed and the SEFCRI network strongly in favor.

Survey results appear overall robust despite limitations related to low response rates and purposive (potentially non-representative) sampling of the fishing committee and SEFCRI networks. Results provide a good basis for identifying management options that enjoy widespread support as well as detailed information to better understand the controversies surrounding the most contested options such as those related to marine reserves. As such, the survey has informed deliberations of the fisheries committee (Hervas et al. 2023) and can further inform the impending management planning process for the Coral ECA.

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Appendices

Appendix A

Consent form for survey

Consent for Survey

Please read this consent page carefully before you decide to participate in this survey.

Purpose of this survey: The purpose of this survey is to understand your perspectives on southeast Florida's reefs and acceptability of management ideas for the Kristin Jacob´s Coral Reef Ecosystem Conservation Area (Coral ECA).

Time required: 15-20 minutes

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

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

Confidentiality: Your identity will be kept confidential to the extent provided by law. Your information will be assigned a code number. Your name will not be used in any report.

Voluntary participation: Your participation in this study is completely voluntary. There is no penalty for not participating.

Whom to contact if you have questions about this survey: Kai Lorenzen, Ph.D., Professor, Fisheries and Aquatic Sciences Program, School of Forest, Fisheries and Geomatics Sciences,

University of Florida, Gainesville, FL 32653, Phone: (352) 273-3646 E-mail: klorenzen@ufl.edu

Whom to contact about your rights as a research participant in this study: IRB2 Office, P.O. Box 100173 Gainesville, FL 32610, Phone: (352) 392-0433.

I have read the information on the survey description above. I voluntarily agree to participate in the survey and I am at least 18 years of age.

YES: please select the "next" arrow and continue with the survey

NO: thank you for your time

Appendix B

Survey

Background

Please tell us a bit about yourself

1. **What category do you identify with? Check all that apply.**

   □ Recreational hook and line (fishing for finfish)
   □ Recreational spearfisher
   □ Recreational diver (SCUBA or free dive)
   □ Recreational harvester non-fish (e.g. lobster)
   □ Marine life collector
   □ Charter captain or crew
   □ Headboat captain or crew
   □ Commercial fisherman
   □ Commercial hook and line
   □ Commercial spearfisher
   □ Commercial diver
   □ Commercial trap
   □ Commercial Dealer/Wholesaler
   □ Tackle shop owner/staff
   □ Marina management
   □ Marine industries
   □ Environmentalist
   □ Boater
   □ Snorkeler
   □ Water sport (surf, kayaking, paddle boarding, kite surfing)
   □ Island/sandbar recreation

2. Over the last 12 months, how often did you go fishing to these habitats/areas?

	Never	Once	A few times	Once a month	A few times a month	Once a week	A few times a week	Daily
Reef (includes natural reefs, artificial reefs, and wrecks)								
Inshore (other than reef) or Backcountry (includes fishing from shore or pier)								
Offshore (other than reef) or Pelagic								
Freshwater								

3. In what year did you start fishing?_____

4. In what year did you start fishing in Florida?_____

5. May I ask to please share an estimate of how much your fishing equipment is worth in dollars?
- Fishing tackle:
- Electronics:
- Boat and engine:
- Spearfishing gear:

6. **Over the past 12 months, in which region(s) do you mostly fish? Please check all that apply.**

(MAP)

- □ Martin
    - o Any specific area(s)?
- □ Palm Beach
    - o Any specific area(s)?
- □ Broward
    - o Any specific area(s)?
- □ Miami – Dade
    - o Any specific area(s)?

7. **What is your zip code? _____**

Reef Perceptions

8. **In your opinion, how would you rate the current condition of each of the following marine resources in the area you most frequently visit in Coral ECA?**

	Very bad	Bad	Neither Bad nor Good	Good	Very good	Not sure
Reef Water Quality						
Inshore water quality						
Amount of Coral						
Health of coral						
Variety of reef fish species						

Abundance of reef fish**						
Size of reef fish						
Overall fishing experience						
Seagrasses						

**as defined by FWC: mutton snapper, yellowtail snapper, hogfish, red snapper, vermilion snapper, gag grouper, red grouper, black grouper, greater amberjack, lesser amberjack, banded rudderfish, almaco jack, gray triggerfish.

9. Based on your knowledge, please rate how important you think each one of the following **factors is in <u>impacting the coral reef ecosystem</u>** within the Coral ECA.

	Very unimportant	Unimportant	Neutral	Important	Very important		Not sure
Water quality							
Climate change							
Ocean acidification							
Invasive species populations							
Coastal development							
Fishing pressure							
Fish nursery habitat							

10. Based on your knowledge, please rate how important you think the following **broad measures are to <u>improve conservation of the coral reef ecosystem</u>** within the Coral ECA.

	Very unimportant	Unimportant	Neutral	Important	Very important		Not sure
Improve water quality							
Reduce fishing pressure							
Protect, restore and enhance fish nursery habitat							
Control invasive species							
Place more artificial reefs							
Increase research and monitoring of the coral reef ecosystem							
Increase coral reef restoration efforts							
Increase outreach and education about the coral reef ecosystem							
Combat climate change							

11. Based on your knowledge, please rate how important you think the following **broad measures are to <u>improve fishing quality</u>** in the Coral ECA**.**

	Very unimportant	Unimportant	Neutral	Important	Very important		Not sure
Improve water quality							
Reduce fishing pressure							
Protect, restore and enhance fish nursery habitat							
Control invasive species							
Place more artificial reefs							
Increase research and monitoring of the coral reef ecosystem							
Increase coral restoration efforts							
Increase outreach and education about the coral reef ecosystem							
Combat climate change							

Management Ideas

The below options may provide additional protection and improve the status of the reef ecosystem within the Coral ECA. Thinking about the reef ecosystem in your area / reef you have most experience at, please indicate your level of support for these options.

12. WATER QUALITY

	Strongly oppose	Somewhat oppose	Neutral	Somewhat favor	Strongly favor		No opinion
Convert septic tanks to sewer systems							
Reduce use of spraying herbicides in freshwater systems							
Reduce use of fertilizers in people's lawns							
Restore the Everglades and Lake Okeechobee							
Reduce discharges from private vessels (e.g., liveaboards) through enhanced enforcement							
Reduce discharges from private vessels (e.g., liveaboards) through providing better access to pump out facilities							
Improve stormwater runoff retention							

13. What are your top 2 choices, if any (multiple choice)

14. FISHERIES RELATED

	Strongly oppose	Somewhat oppose	Neutral	Somewhat favor	Strongly favor		No opinion
Create more artificial reefs							
Increase minimum size limits for harvest of reef fish species							
Reduce bag limits of reef fish species							
Shorten open seasons of reef fish species							
Designate some no fishing areas							
Require lobster traps to have single rope per trap to reduce potential harm to reef							
Enact seasonal closures to harvest for specific species at spawning aggregation sites							
Prohibit fishing at reef fish spawning aggregation sites during spawning season							

15. What are your top 2 choices, if any (multiple choice)

16. HABITAT

	Strongly oppose	Somewhat oppose	Neutral	Somewhat favor	Strongly favor		No opinion
Put up signs for seagrass beds							
Replanting seagrass							
Limit fishing in areas with damaged seagrass							
Limit fishing, diving and boating in areas with damaged seagrass							
Limit anchoring in areas with damaged seagrass							
Encourage living shoreline/ living seawalls as habitat for small fishes							
Requiring elements of living reefs in new construction of seawalls and docks							
Create more pole and troll areas to reduce damage from boats in seagrass areas							
Have more no anchor zones							
Have more mooring fields inshore							
Have more mooring fields offshore							

17. What are your top 2 choices, if any (multiple choice)

THANK YOU