

Fishing, diving and other uses in the  
Southeast Florida Coral Reef Initiative  
(SEFCRI) region: A characterization study

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# Introduction

- Goal
  - This study describes the findings of a characterization study conducted in the Southeast Coral Reef Initiative (SEFCRI) region
- Area description
  - 1. Martin County
  - 2. Palm Beach County
  - 3. Broward County
  - 4. Miami-Dade County (the section north of Biscayne National Park)

# Introduction



- Study area consists of the northern section of the Florida Reef Tract
- The areas for study include the densely populated Miami-Dade, Broward, and Palm Beach Counties, as well as Martin County

Source: [www.southeastfloridareefs.net/static/assets/map.gif](http://www.southeastfloridareefs.net/static/assets/map.gif)

# Introduction

- Study description
  - Six (6) stakeholder groups were characterized as part of the SEFCRI Fishing, Diving, and Other Uses (FDOU) Project 10 - *Compile and Compare Scientific Data and Social Perceptions on Reef Conditions and Use*
    - Stakeholders were selected based on their uses of and/or interactions with the coral reefs and associated ecosystems in the SEFCRI region

# Introduction

- The project called for:
  - the identification, assembly, and assessment of existing historical use maps
  - fishery data related to coral reef biodiversity
  - data on other fishing and diving impacts
  - the relative importance of reef versus other, offshore fishing (as measured in terms of participation rates and extraction levels)
  - types, quantity, and trends of commercial and recreational extractive and nonconsumptive uses by county
  - stakeholder concerns on the indirect impacts on reefs
  - stakeholder perceptions on artificial reefs

# Introduction

- The six studies, conducted with a variety of survey methodologies, identified and characterized the key stakeholders that utilize and/or rely on the regional coral reefs and associated resources:
  - commercial fishers;
  - charter, for-hire fishing operations;
  - recreational fishers (consisting of recreational anglers and recreational, consumptive divers);
  - dive operations;
  - researchers and managers; and,
  - the surfing community

# Methodology

- Surveys were developed for each stakeholder group in conjunction with the FDOU team and SEFRCI personnel
  - The focus was on characterization of uses by stakeholder group, including shifts in use over time
    - Special attention was paid to spatially representing use patterns
  - Another focus was on sources of impacts on coral reef ecosystems
  - Each group was assessed in terms of the survey approach utilized to characterize the group
    - Methodologies discussed a bit further

# Sample survey instrument

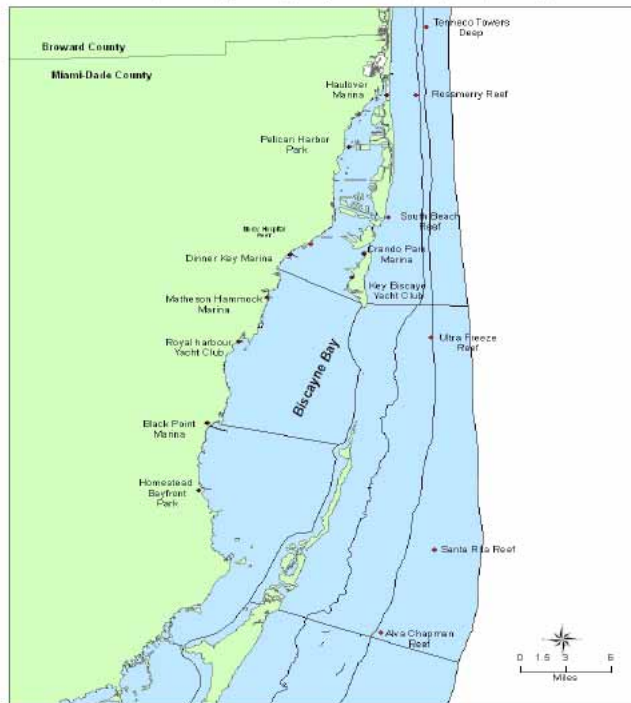
18. In terms of direct impacts on southeast Florida coral reefs, which of the following groups has the greatest impacts/effects?

Recreational fishers  Recreational divers  Recreational boaters  Commercial fishers  For-hire/charter

19. In terms of indirect impacts on southeast Florida coral reefs, which of the following groups has the greatest impacts/effects?

Coastal development  Dredging/filling  Land-based pollution (agriculture, sewage)  Global warming

20. Please draw in the areas where you usually go fishing, and please mark your primary docking area with an X.



21. Have your fishing areas changed since you first started fishing?  YES  NO

- If YES, then how?  I fish closer to shore  I fish further offshore  I fish further north or south

- if YES, then why?  Fewer fish  Too much competition  Pollution  Other \_\_\_\_\_



Department of  
Environmental Protection

Coral Reef Conservation Program  
Biscayne Bay Environmental Center  
1277 NE 79<sup>th</sup> Street  
Miami, Florida 33138

Colleen M. Castille  
Secretary

Jeb Bush  
Governor

October 5, 2006

Dear Recreational Fishing License holder,

The Florida Department of Environmental Protection is conducting a survey of recreational fishers in Southeast Florida. The survey is part of a study to assess coral reef conditions in Southeast Florida.

Recreational fishing is a very important pastime in Florida, and we are asking for your help, as a recreational fishing license holder, in completing the enclosed questionnaire. Your input will help us develop plans to increase awareness and improve protection of coral reefs in our coastal communities.

The survey will take about 10 minutes to complete. A self-addressed stamped envelope is provided. We would appreciate it if you complete the questionnaire and return it promptly. Your responses will be kept strictly confidential. Only summary statistics will be included in the project's final report.

If you have any questions concerning the questionnaire, please contact Mr. Manoj Shivlani whom we have retained to conduct this survey.

Mr. Manoj Shivlani  
DEP Fishing, Diving, and Other Uses Study  
P.O. Box 560580  
Miami, Florida 33156  
Tel: 305-968-7136

Thank you for your cooperation.

Sincerely,

*Chantal Collier*

Chantal Collier  
Coral Reef Program Manager

# Sample survey instrument

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

- 1a. Are you a Southeast Florida Resident?  YES  NO  
 - If NO, then are you a:  non resident seasonal  non resident on vacation
- 1b. What is your zip code? \_\_\_\_\_
2. How many years have you been fishing recreationally in south Florida?  
 One year or less  1-5 years  6-10 years  11-15 years  16-20 years  Over 20 years
3. Which of the following includes your age?  
 Under 18 years  18-30 years  31-40 years  41-50 years  51-60 years  over 60 years
- 4a. Are you Spanish/Hispanic/Latino?  YES  NO
- 4b. Which of the following best describes your race?  
 White  African American  Native American  Asian  Other (\_\_\_\_\_)
5. Which of the following species did you fish last year? Please check all the species that apply.  
 Inshore species (bonefish, tarpon, permit, pompano)  Reef fish (snappers, groupers, grunts, jacks)  
 Pelagics (dolphin, king or Spanish mackerel, wahoo)  Highly migratory species (billfish, sharks, tuna)  
 Other species (please list \_\_\_\_\_)
6. Of the species that you listed in the previous question, which species is the MOST important or that which you target MOST frequently? Please only check ONE of the species from the list.  
 Inshore species (bonefish, tarpon, permit, pompano)  Reef fish (snappers, groupers, grunts, jacks)  
 Pelagics (dolphin, king or Spanish mackerel, wahoo)  Highly migratory species (billfish, sharks, tuna)  
 Other species (please list \_\_\_\_\_)
7. How many fishing trips did you take last year in southeast Florida?  
 1-5 trips  6-10 trips  11-15 trips  16-20 trips  21-25 trips  26-30 trips  Over 30 trips
8. Why do you fish the areas that you do – that is, what is the PRIMARY reason that results in where you fish?  
 Proximity to port  Density of target species/correct bottom or water conditions  
 Lack of competition/conflicts from other users  Other (please list \_\_\_\_\_)
9. Do you fish artificial reefs in southeast Florida?  YES  NO  
 - If YES, then what percentage of your total trips is taken to artificial reefs in a typical year?  
 Less than 10%  11-25%  26-50%  51-75%  76-99%  All trips

For the next four questions, please respond to the statements provided in terms of whether you agree or disagree with the statements.

10. Commercial fishers negatively affect my fishing activities, by either fishing in the same areas, targeting the same species, or by other activities.  
 Strongly agree  Moderately agree  Neutral  Moderately disagree  Strongly disagree  I don't know
11. Other recreational anglers negatively affect my fishing activities, by either fishing in the same areas, targeting the same species, or by other activities.  
 Strongly agree  Moderately agree  Neutral  Moderately disagree  Strongly disagree  I don't know
12. Recreational (both consumptive and nonconsumptive) divers negatively affect my fishing activities, by diving on my gear, targeting the same species, anchoring and diving where I am fishing, or by other activities.  
 Strongly agree  Moderately agree  Neutral  Moderately disagree  Strongly disagree  I don't know
13. Recreational boaters negatively affect my fishing activities, by boating over my fishing gear, scaring my targeted species, or by other activities.  
 Strongly agree  Moderately agree  Neutral  Moderately disagree  Strongly disagree  I don't know
14. What are the coral reef conditions in southeast Florida and the area(s) where you fish, compared to what they were like when you first started fishing?  
 Significantly better  Somewhat better  Same  Somewhat worse  Significantly worse  I don't know
15. What is the condition of water quality since when you first started fishing?  
 Significantly better  Somewhat better  Same  Somewhat worse  Significantly worse  I don't know
16. Please circle the general trend in each of the major activities/resources since when you first started fishing, where 1 is better and 5 is worse.
- |                     | Better ←-----→ Worse |   |   |   |   |
|---------------------|----------------------|---|---|---|---|
| a. Fisheries        | 1                    | 2 | 3 | 4 | 5 |
| b. Coral reefs      | 1                    | 2 | 3 | 4 | 5 |
| c. Artificial reefs | 1                    | 2 | 3 | 4 | 5 |
| d. Water quality    | 1                    | 2 | 3 | 4 | 5 |
| e. Use conflicts    | 1                    | 2 | 3 | 4 | 5 |
17. Which of the following forms of management do you believe needs to be put in place to address resource conditions and trends in southeast Florida to better protect the area and its coastal and marine resources  
 More enforcement  Zoning, marine protected areas  More education  Allow less fishing, limit entry  
 Leave management as it currently  Less management

# Overall results

<i>Group</i>	<i>Population (N)</i>	<i>Sample (n)</i>	<i>Methodology</i>
1. Commercial fishers	1,247	193	Field-based interviews
2. Charter fishing operations	377	59	Field-based interviews
3. Recreational fishing license holders – anglers	10,000*	1,058	Mail-back surveys
3a. Recreational fishing license holders – lobster divers		400	Field intercept surveys
4. Dive operations	166	46	Field-based interviews
5. Researchers and managers		55	Field-based interviews
6. Surfers	900	151	Internet-based surveys

- The study led to the completion of **1,962** surveys
  - 60% were completed via mail or internet surveys, and 40% were conducted in person
    - In-person surveys lasted almost 45 minutes per survey and provide considerable, qualitative information
    - For the in-person surveys, regional (county-level) stratification was used

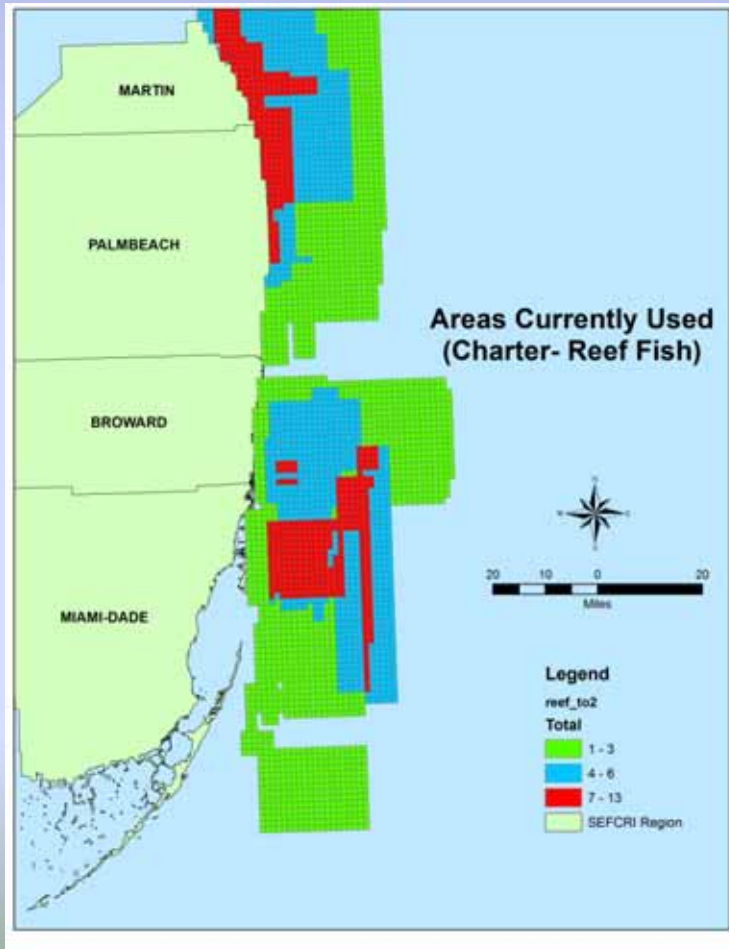
# Results focused upon in this presentation

- The results that will be presented here will be those related to the stakeholders' interactions with and perceptions concerning coral reefs, with a focus on the following themes:
  - 1. Perceptions on resource conditions
  - 2. Perceived threats and stresses to coral reef and associated ecosystems
  - 3. User conflicts
- To address these themes, the following results from the stakeholder surveys will be considered:
  - 1. Use patterns – to demonstrate how stakeholder uses are related to coral reefs and related habitats
  - 2. User perceptions – to assess how stakeholders view coral reef conditions, water quality conditions, views on direct and indirect impacts on coral reefs, and on user conflicts, and each other
  - 3. Solutions to coral reef decline – to evaluate how stakeholders rank current and preferred forms of management and how these may be common to or differ between stakeholders
- Please note that the presentation only briefly addresses the results from the 1,962 surveys, and that those interested should download the final report available at:  
[www.dep.state.fl.us/coastal/programs/coral/reports/FDOU/FDOU\\_Project\\_10\\_Final\\_Nov07.pdf](http://www.dep.state.fl.us/coastal/programs/coral/reports/FDOU/FDOU_Project_10_Final_Nov07.pdf)

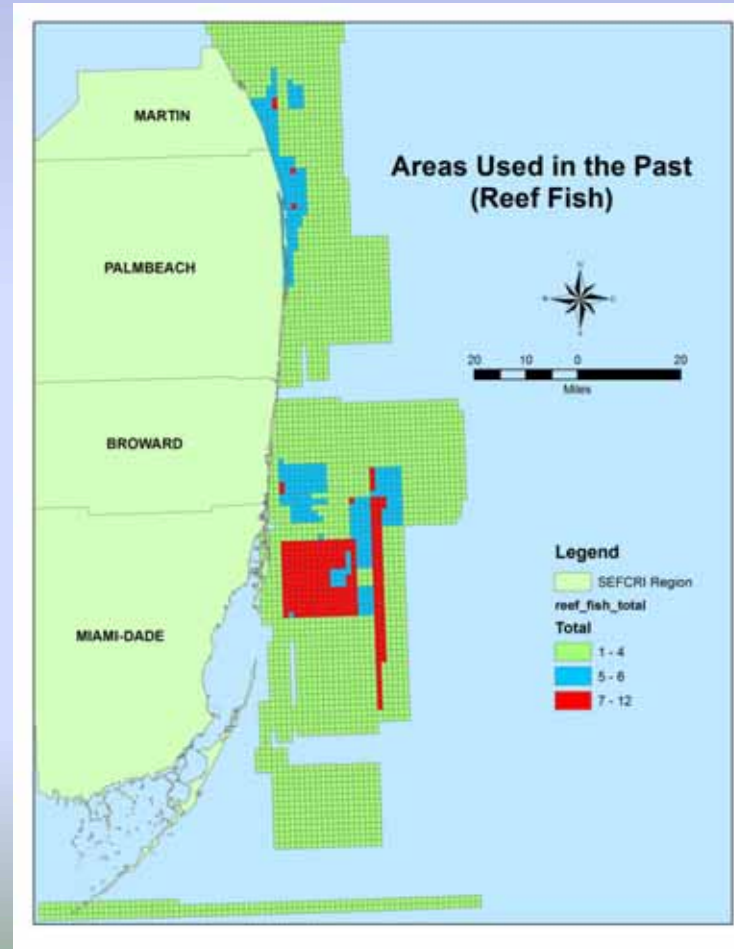
**RESULTS – USE PATTERNS AND  
VIEWS ON RESOURCE CONDITIONS**

# Charter fishing use patterns

Reef fishing areas pushed out further offshore in the present



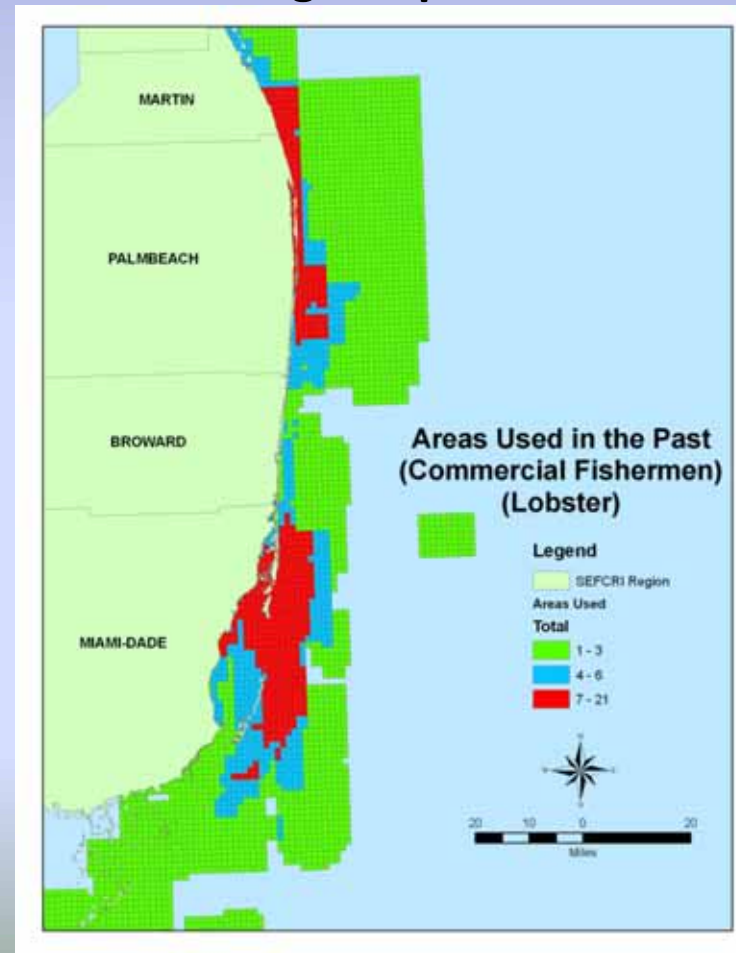
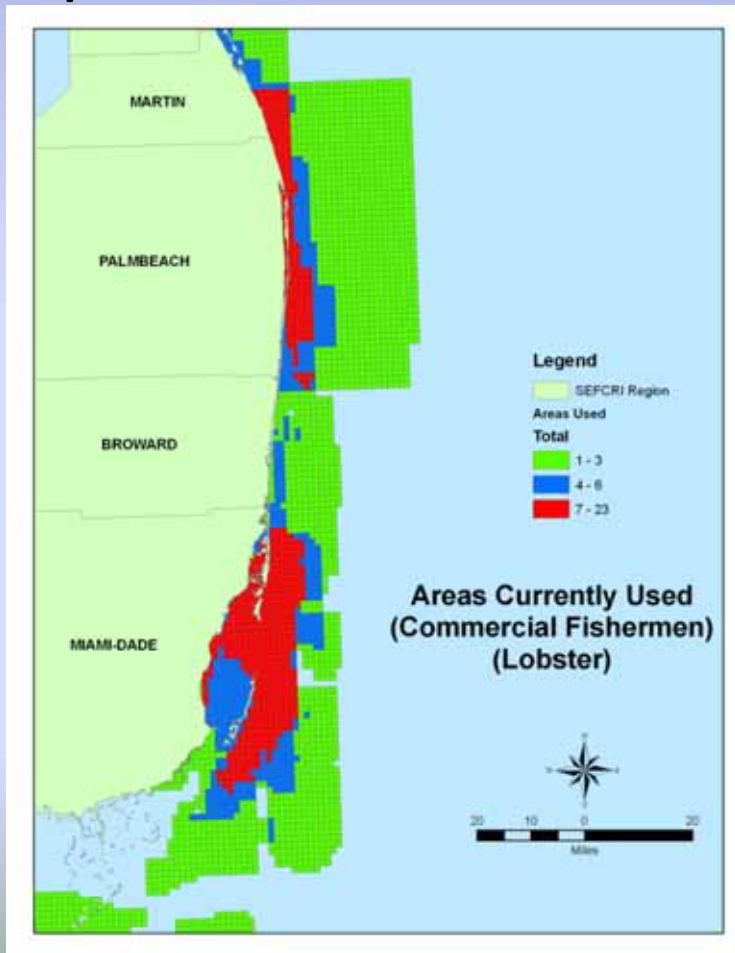
Less reef fishing in nearshore areas in the north in the past



# Commercial lobster fishing use patterns

Lobster fishing in the present as in the past relied on nearshore habitat

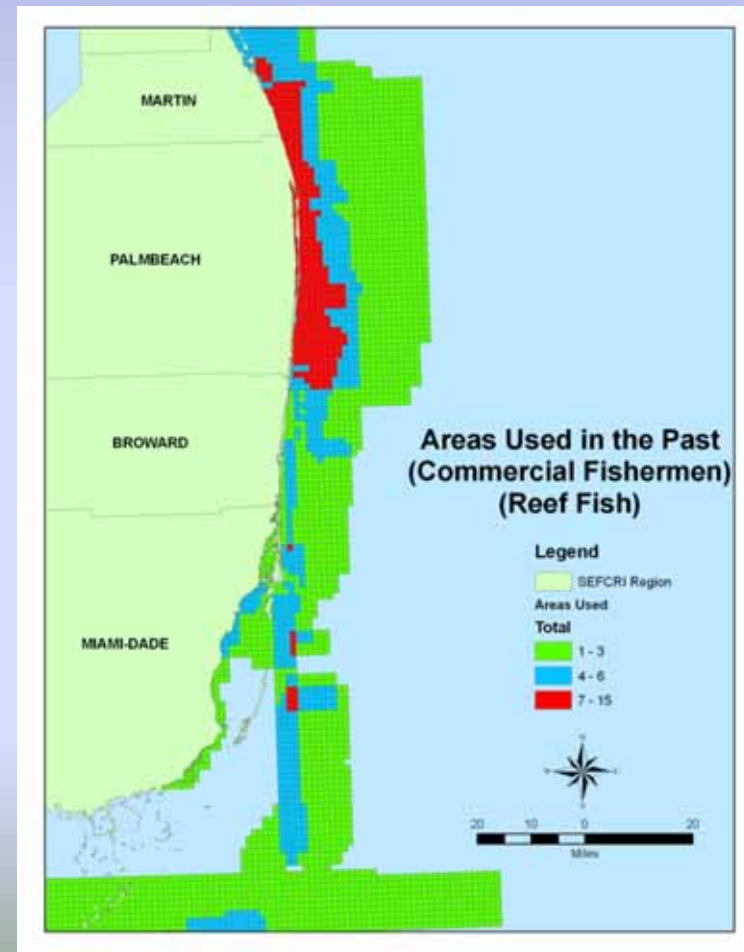
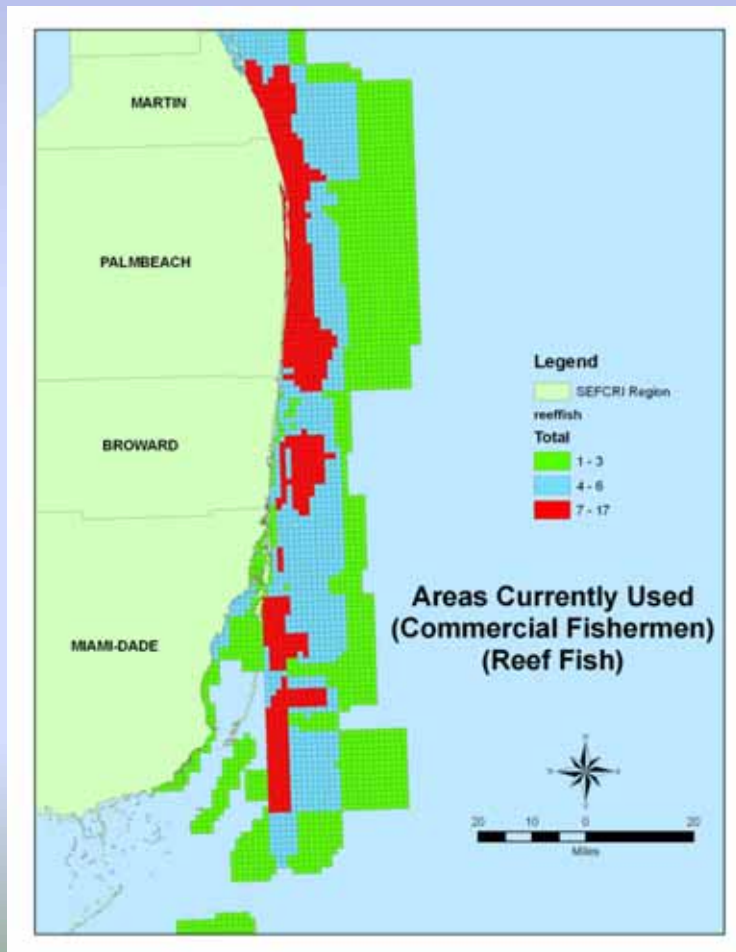
There has been little to no change in lobster fishing use patterns



# Commercial reef fish fishing use patterns

Present day fishing is focused on nearshore habitats

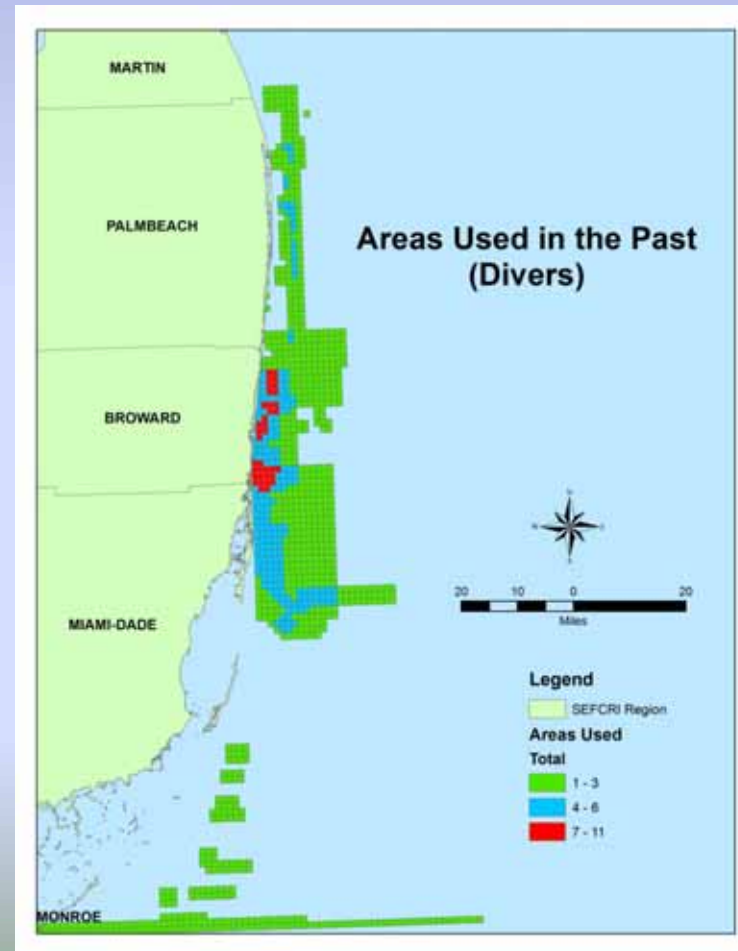
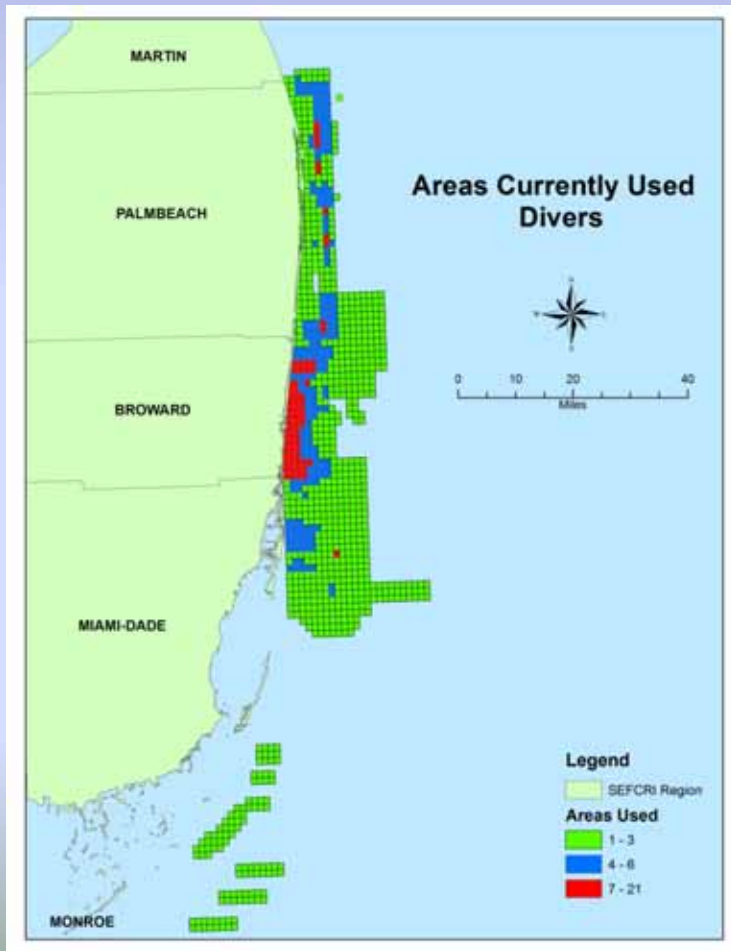
Use appears to have been less intense in the Miami-Dade region in the past



# Dive operator use patterns

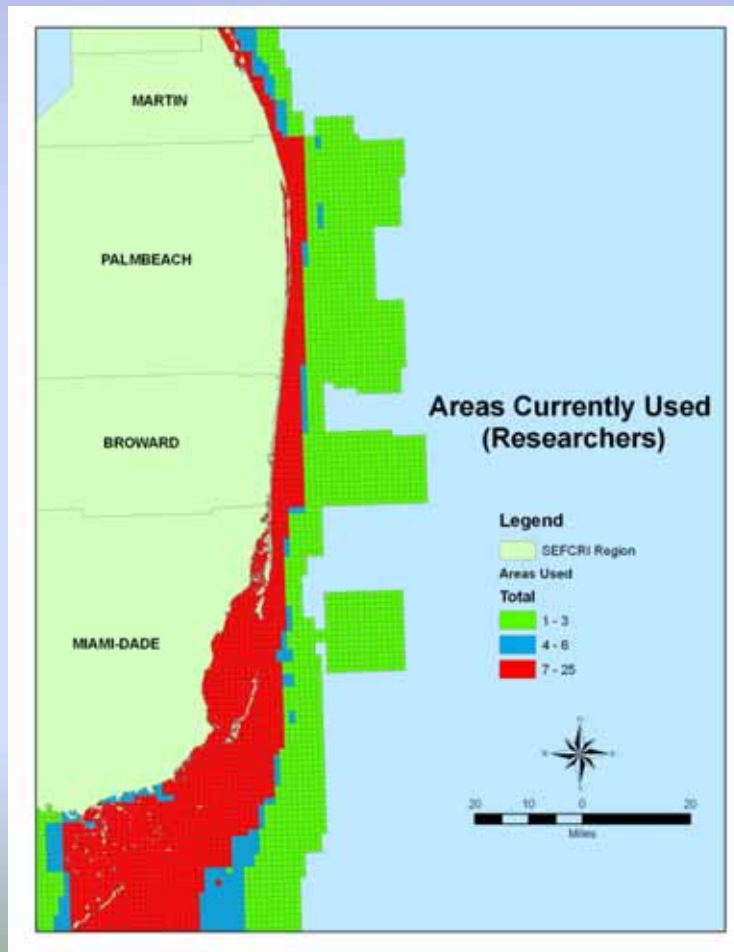
More use of Broward County artificial reefs than in the past

General use profiles remain similar due to depth profiles

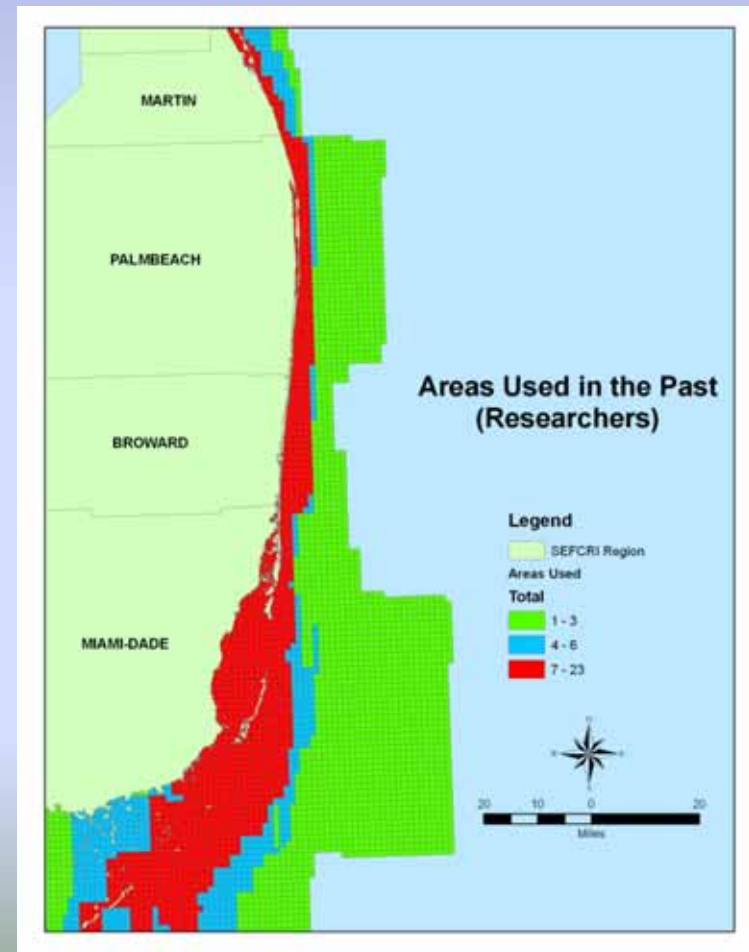


# Researchers and managers use patterns

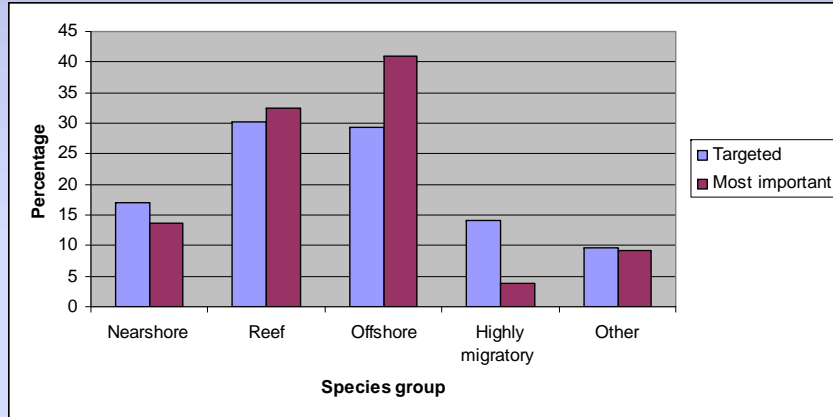
More research and conducted being conducted in the Florida Keys and Florida Bay than in the past



General patterns of research and management similar in the past, with perhaps more focus on Biscayne Bay



# Recreational angler use characteristics

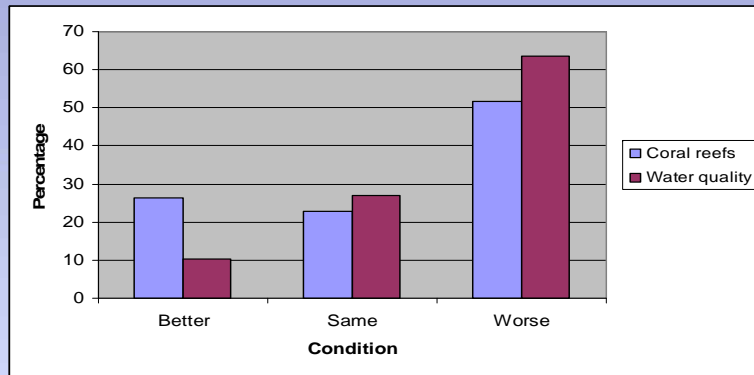


- Among recreational anglers, reef fish represented the most common species targeted (30%)
  - Also, reef species were the second most important species in the sample

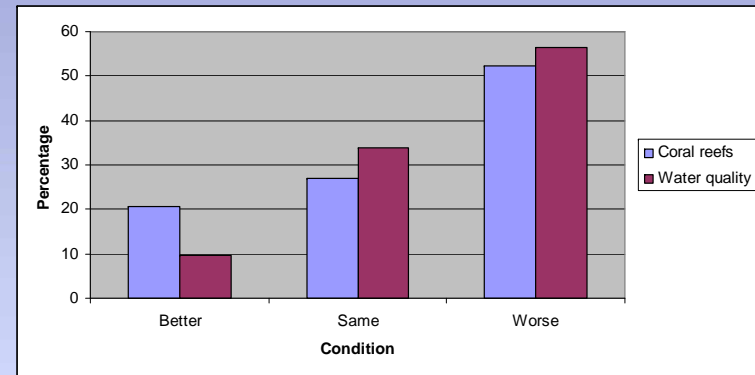
# Use patterns and views on resource conditions

- Charter fishers
  - Reported mostly negative shifts in fishery resources, but it focused mainly on offshore species
- Commercial fishers
  - Reported a decline in almost all species, including all reef-related species
- Dive operators
  - Reported that both artificial and natural dive sites were average in quality, although the latter attracted more trips and were more frequently used for consumptive trips
- Recreational fishers
  - Over 30% stated that they targeted reef fish, although pelagic fin fish were the most important species

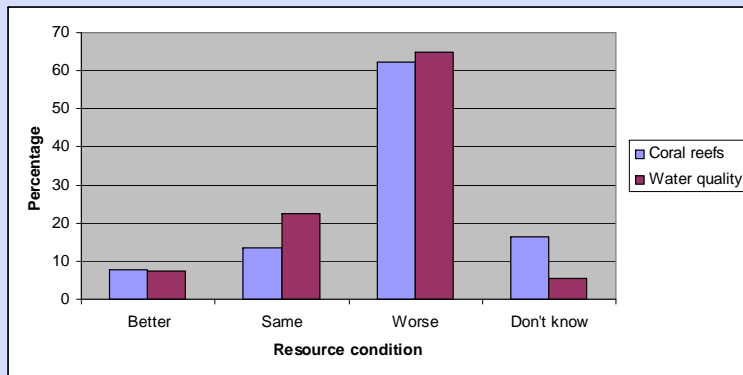
# Views on coral reefs and water quality



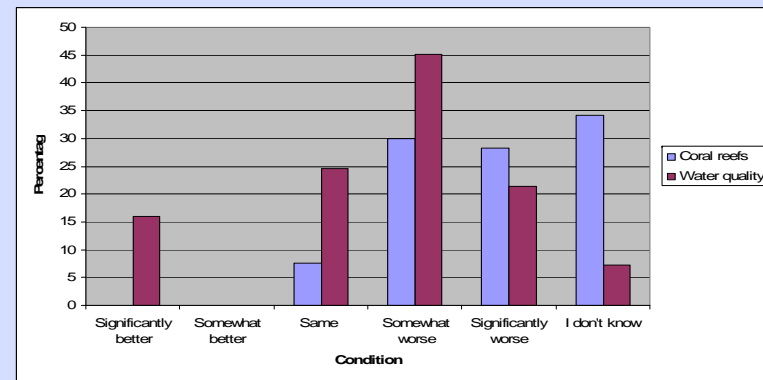
Charter fisher views on coral reefs and water quality



Commercial fisher views on coral reefs and water quality



Recreational fisher views on coral reefs and water quality



Surfer views on coral reefs and water quality

- The results show that across groups there is a strong agreement that coral reef conditions have deteriorated in the SEFCRI region.

# Views on resource conditions

Views on resource and issue trends (where the mean score is based on a scale from 1-5, where 1 = better conditions and 5 = worse conditions)

<i>Stakeholder group</i>	<i>Fisheries</i>	<i>Coral reefs</i>	<i>Artificial reefs</i>	<i>Water quality</i>	<i>Use conflicts</i>
Charter fishing operations	3.12	<b>3.67</b>	2.43	3.78	3.73
Commercial fishers	3.28	<b>3.49</b>	2.51	3.73	3.70
Dive operations	3.68	<b>3.70</b>	2.57	3.78	3.60
Recreational anglers	3.47	<b>3.74</b>	2.68	3.78	3.54
Researchers and managers	3.79	<b>3.98</b>	2.90	3.65	3.31
Surfers	3.53	<b>4.06</b>	3.33	3.42	3.40

- All stakeholder groups agreed that coral reef conditions have worsened since when they first started
- All stakeholder groups also agreed that water quality had worsened
  - As well as fisheries and use conflicts
- Views among nonconsumptive groups were more negative on fisheries than the views of consumptive groups

**RESULTS – PERCEIVED THREATS TO THE  
CORAL REEF ECOSYSTEM IN THE SEFCRI  
REGION AND POTENTIAL SOLUTIONS**

# Stakeholder views on threats to coral reefs

Views on direct impacts by user groups (where the mean score is based on a scale from 1-5, where 1 = least direct impact and 5 = most direct impact)

<i>Stakeholder group</i>	<i>Charter fishers</i>	<i>Commercial fishers</i>	<i>Recreational Boaters</i>	<i>Recreational divers</i>	<i>Consumptive divers</i>	<i>Recreational anglers</i>
Charter fishing operations	2.14	3.10	2.73	2.90	<b>3.75</b>	3.35
Commercial fishers	N/A	2.27	3.10	3.10	<b>3.43</b>	<b>3.43</b>
Dive operations	3.57	<b>3.78</b>	3.13	2.37	3.09	<b>3.78</b>
Researchers and managers	2.98	<b>3.38</b>	2.73	2.00	3.27	3.34

- The groups that were most often identified as having the most impacts on the region's coral reefs were sport, or consumptive, divers, recreational anglers, and commercial fishers
- Each stakeholder group believed that its uses were not among the most impactful

# Stakeholder views on threats to coral reefs

Views on indirect impacts (where the mean score is based on a scale from 1-5, where 1 = least indirect impact and 5 = most indirect impact)

<i>Stakeholder group</i>	<i>LBS</i>	<i>Coastal development</i>	<i>Dredging and filling activities</i>	<i>Global warming</i>
Charter fishing operations	<b>4.61</b>	4.44	4.41	3.13
Commercial fishers	<b>4.60</b>	4.14	4.29	3.45
Dive operations	<b>4.71</b>	4.47	4.64	3.64
Researchers and managers	4.21	<b>4.37</b>	3.96	3.86
Surfers (in percentages)	<b>36</b>	33	19	2

- Stakeholder groups identified land-based sources of pollution as the most significant indirect threat to coral reefs in the region
- The **least** important impact to SEFCRI coral reefs was identified as global warming. This was most likely due to respondents either not fully understanding the effects of climate change on the region (as exhibited by the high numbers of nonresponses to this question) or not accepting global warming as a local impact.

# Stakeholder preference on management

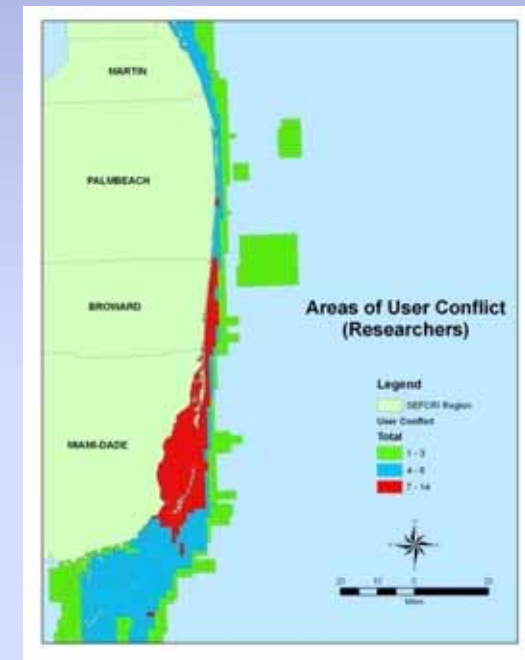
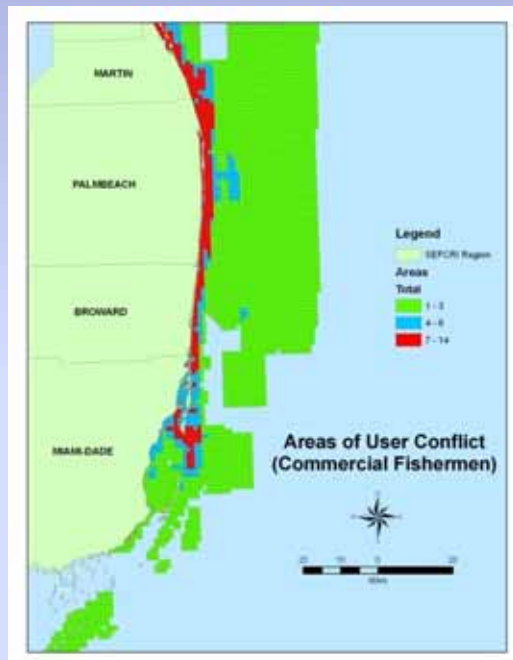
Preferred forms of management (where the mean score is based on a ranking scale from 1-6, where 1 = most preferred form of management and 6 = least preferred form of management)

<i>Stakeholder group</i>	<i>Enforcement</i>	<i>Zoning</i>	<i>Education</i>	<i>Limited entry</i>	<i>Current</i>	<i>Less</i>
Charter fishing operations	<b>2.14</b>	3.81	2.80	3.56	3.97	5.31
Commercial fishers	3.08	4.19	<b>2.56</b>	3.74	3.52	4.99
Dive operations	2.20	2.11	<b>1.72</b>	4.28	3.72	5.37
Recreational Anglers*	26.7	17.2	<b>35.4</b>	6.7	11.5	2.4
Researchers and managers	3.26	<b>1.91</b>	2.72	4.63	5.70	5.98
Surfers*	22	29	<b>30</b>	2		2

- Education led all forms of management as the preferred management for most stakeholder groups
- Consumptive user groups ranked zoning and marine protected areas as a less preferred form of management, whereas (mainly) nonconsumptive groups ranked zoning and marine protected areas highly
- All groups showed a low preference towards less management or the current form of management

**RESULTS – USE CONFLICTS WITHIN  
CORAL REEF ECOSYSTEMS**

# Examples of spatial use conflicts



- These examples of use conflict show that the areas vary by the use type
  - Researchers and managers outlined the most extensive areas of use conflicts among any user group
  - By contrast, dive operators had the fewest conflicts of any of the groups (in terms of spatial use)
  - Commercial fishers had extensive areas of conflict but only a few areas common to many fishers and mostly along populated coastlines

# Stakeholder views on use conflicts

Views on conflicts with other stakeholder groups (where the mean score is based on a scale from 1-5, where 1 = worst conflict and 5 = no conflict)

<i>Stakeholder group</i>	<i>Commercial fishers</i>	<i>Recreational anglers</i>	<i>Recreational boaters</i>	<i>Recreational divers</i>
Charter fishing operations	2.93	<b>2.91</b>	3.09	3.38
Commercial fishers	N/A	3.26	<b>3.16</b>	3.21
Dive operations	2.89	2.51	<b>2.09</b>	3.84
Recreational anglers	<b>2.29</b>	2.97	2.89	3.50
Researchers and managers	4.30	4.06	<b>3.88</b>	4.13
Surfers	3.92	2.86	<b>2.32</b>	4.51

- For groups such as dive operations and surfers, recreational boaters conflicted with their activities
- Commercial fishers presented a conflict to recreational anglers, who were themselves considered a conflict by dive operations
- Certain groups, such as researchers and managers and commercial fishers, did not report any strong conflicts (even though researchers and managers identified large areas of spatial conflict, as seen in the map in the previous slide)

# Conclusions and recommendations

- Conclusions

- A majority of respondents in all six stakeholder groups agrees that coral reefs have declined during their tenure, which represents a decade or more of local knowledge
  - Similar majorities agree that fisheries and water quality have also declined
  - Most stakeholders agree that use conflicts are worsening due to more users
- Stakeholders also clearly reject the current form of management, ranking it as among the least preferred form of management
  - Most agree that there is a need for alternate management strategies, preferably interpretative management
  - Depending on the group, there is greater preference for enforcement or marine protected areas
- There is less consensus on user conflicts, with groups generally taking a position based on their use preferences (ex. consumptive versus nonconsumptive), but there are groups that fail to recognize long-standing conflicts

- Recommendations

- What we have is a “snapshot” of use patterns and perceptions, and there is a need to set up a monitoring program that matches biophysical research with human dimensions monitoring
- Stakeholders can provide important scientific information and identify important management issues, but if such information is only assessed retrospectively in projects such as this one, it may be too little and too late

# Acknowledgements

- I acknowledge the following individuals who did all the hard work
  - Co-principal investigators: Maria Villanueva, Dr. Diego Lirman
  - Field researchers: Flavia Tonioli, Mariane Soare, Mike Lara, Aric Bickel, Wendy Banta, Ayeisha Brinson, Elliott Stark, and many others
- I thank Rob Ruzicka, Fishing and Diving Project Coordinator, and Chantal Collier, Project Manager, of the Department of Environmental Protection's Coral Reef Conservation Program,
  - A special thanks to the FDOU team
- Gratitude to members of all stakeholder groups that put up with the research, which at times was quite onerous, and who made the project possible (maybe even successful)
- The project was funded under award (NA05NOS4191008) from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, and the Florida Department of Environmental Protection