FDOU Project 26B Task 4 – Our Florida Reefs Community Working Group Scenario Planning Results

Florida Department of Environmental Protection
Coral Reef Conservation Program
Project 26B

FDOU Project 26B Task 4 – Our Florida Reefs (OFR) Community Working Group Scenario Planning Results

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Project 26B Task 4

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Executive Summary

This report contains a summary of all results to date from the Our Florida Reefs (OFR) community planning process and specifically how tools that were delivered by Point 97 were used to generate those results. Decision support tools (DSTs) added to the marine planner during the spring of 2015 took many months of planning, and were driven by a 200 x 200 m grid that was used to summarize 60 critical datasets for use in a filtering and a drawing tool.

To date, the DSTs have been used to generate a total of 44 designs that, so far, address two distinct Place-Based management actions, one of which is to establish and implement a marine protected area zoning framework for the southeast Florida region. .

Point 97 offered technical support throughout the year through emails, phone calls, and most recently a webinar to train OFR staff on use of the decision support tools (DSTs). Defects (bugs) in the code were dealt with via triage, and were most recently identified and resolved in August 2015.

Table of Contents

List of Figures

List of Tables

List of Acronyms

CWG - Community Working Group
DST - Decision Support Tool
NCWG - North Community Working Group
OFR - Our Florida Reefs
SEFCRI – Southeast Florida Coral Reef Initiative
SCWG – South Community Working Group

Introduction

In 2014, Point 97 was contracted to build and deliver a marine planner, decision support tool, and consult on technical and process issues to support the *Our Florida Reefs* (OFR) community planning process. Data was collected, summarized, and processed by Point 97 and OFR staff, and has been used to inform and support decision making during 2015 by the North and South Community Working Groups (CWGs) on coastal and ocean uses.

Point 97 served as technical and process experts to guide the OFR Decision Support Tool (DST) Support Team and Tool Project Teams to develop the survey and marine planner, but all decisions were made collaboratively over many conference calls, emails, and webinars. This report describes the essential components and results of the community planning process, the marine planner, and recommendations for management actions. This report also describes the nature of common technical support requests, important defects (bugs) found in the tools during development, and resolutions for these issues.

1. OFR COMMUNITY PLANNING PROCESS

Marine planner is a web-based data visualization mapping platform that houses the DSTs used in the OFR community planning process by the community working groups (CWGs). The CWG used the marine planner and DST to understand spatial options and identify areas of interest as they related to specific recommended management actions. The beta version of the decision support tools were unveiled early spring 2015, and the tool was first used to generate recommendations at a CWG meeting in May 2015.

1.1. Community Working Groups

The OFR process had two community working groups. The North and South CWGs (NCWG or SCWG) represent the northern counties (Martin and Palm Beach) or southern counties (Broward and Miami-Dade), respectively, within the southeast Florida region. Both the NCWG and SCWG are comprised of reef resource stakeholders, ocean users, and planners in coastal counties of southeast Florida. The CWGs met twice in the spring of 2015 and once in the fall of 2015 to use the decision support tools within the marine planner that helped facilitate spatial analysis, and identify areas of interest.

1.2. Recommended Management Actions

The recommended management actions were developed by OFR CWG members and binned according to themes including: coral reef habitat ecosystem; land based sources of pollution; education, outreach, awareness, and appreciation; fishing, diving, boating, and other uses; maritime industry, coastal construction, and coastal management; place based; enforcement; and direct impacts to coral reef systems. Each management action developed by the OFR CWGs was given a code, (e.g. “S-2” for the south CWG), and title. The codes were used to name the areas of interest identified using the decision support tool filtering capabilities. For two recommendations that were place-based, the DST was used by the CWG. The decision support tools and functionality were made available to those directly participating in the OFR process, as well as the OFR staff, to understand which areas within the south Florida region met certain objectives within those place-based recommended management actions.

1.3. Meeting Process

The marine planner was a focal point for spatial analysis of management actions during the CWG meetings. The CWG members were encouraged to use the marine planner individually outside of meetings to better understand the datasets and tradeoffs of various scenarios; however, at the meetings OFR facilitators guided the entire group in using the tool and identifying areas of interest based on the objectives within their recommendation. As indicated above with management actions, facilitators labeled each recommendation with the code for the recommended management action, the date of the meeting, CWG name, tool facilitator name, and individual shape/filter number.

2. MARINE PLANNER DECISION SUPPORT TOOLS

The OFR marine planner decision support tool suite includes both an on-the-fly drawing tool to compare various spatial criteria and a criteria-based filtering tool. Both tools are housed under a tab labeled "Designs" within the marine planner. This tab is accessible to users of the marine planner that are logged in and have been provided permission to have access. Access has been provided to all CWG members as well as OFR support staff.

After designs are filtered or drawn, users can view and share reports about their areas. Within the program there is the ability to create groups of users, so that those groups can work collaboratively by sharing their filtered designs or drawings. The Tool Support Team has control over membership of groups and who can share shapes. This feature has been useful for the OFR process, where the NCWG and SCWG have shared and discussed recommendations amongst each other. Designs can also be exported with associated data, to be analyzed further in ArcGIS (or similar program), and potentially later stored on the ArcREST for public display as final recommendations.

2.1. Planning Grid

Critical to all designs and analyses was the 200 x 200 m planning grid and summarized data. The resolution of this grid was debated at length during development. A higher resolution grid was desired for more detailed spatial patterns of use on the reefs, but technical considerations, specifically the speed and performance of the tools, dictated that the number of cells in the grid be limited. After testing on various machines and internet browsers, a 200 x 200 m grid that comprised approximately 40,000 grid cells and extended from shore to the 5 nautical mile line (or where all coral reefs were included) was chosen.

The data summarized to the planning grid formed the basis of how scenarios and reports were generated in both design types (filtering and drawing), and were selected carefully given their utility to the planning process. For example the percent cover of corals is a critical layer for planning in the region, and this value was calculated for each planning unit in the planning grid based on the available data. That is, some cells had no data for coral cover and therefore would show a 0 value even though in reality there was no data. The OFR DST Support Team summarized approximately 60 layers to the grid, each with specific summary statistics or metrics.

2.2. Drawing Designs

Adding a new drawing is easy to use, and the user can use their mouse or computer trackpad to create a polygon by clicking on the map to start drawing, and then click again to add vertices. When the drawing is to the users liking they can double click to finish (Figure 1). After the drawing step, the rough shape of the polygon automatically clips to the planning grid, which creates a report of all of the data that was summarized to the grid within that area (Figure 2). For instance, the average of average depths is calculated for all grid cells in the drawing clipped shape. Summary reports for drawings are generated for the clipped shape and available for the user to see by clicking on the shape in the map.

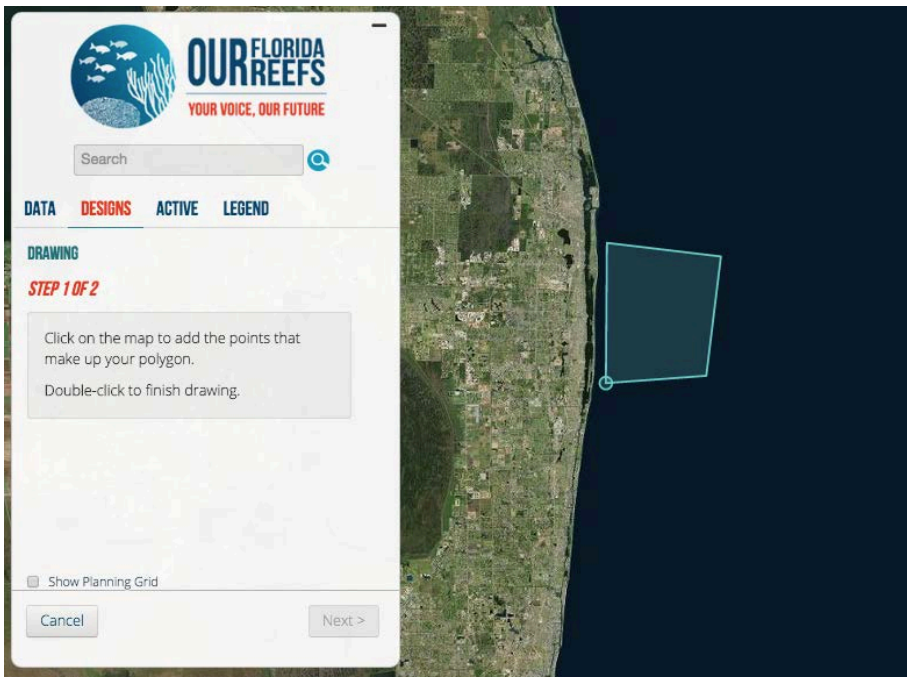

Figure 1. Example of the drawing tool during use, where the blue polygon will be finished with a double click in the southwest corner. After the double click, the shape will be used to clip the planning grid, and a summary report will be generated.

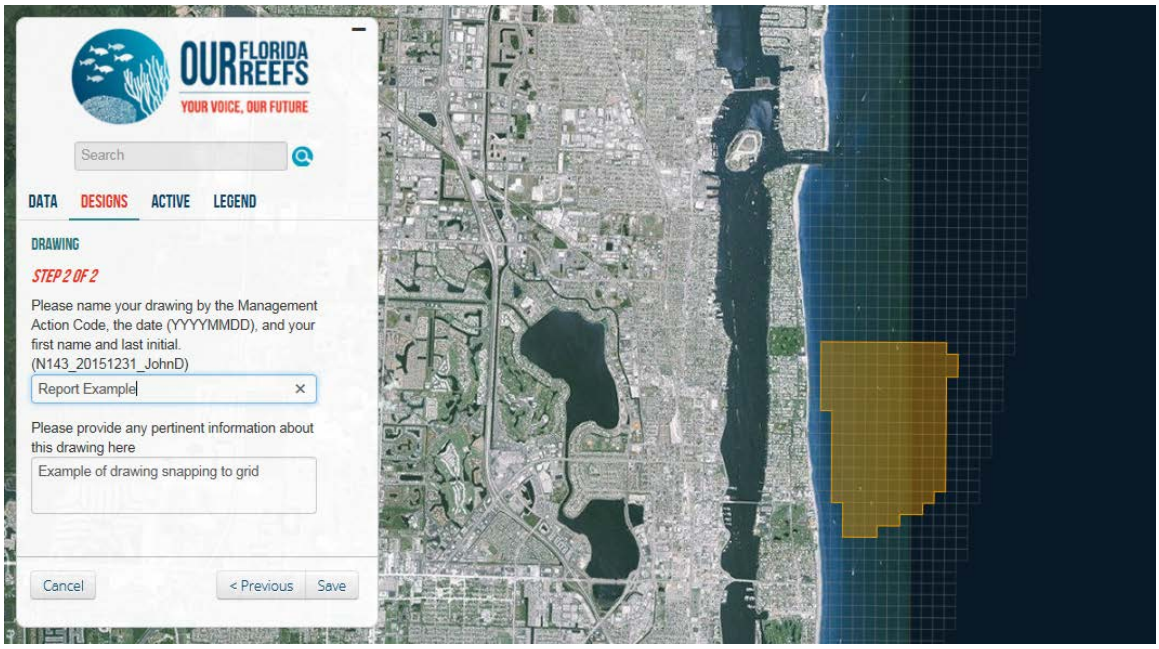

Figure 2. Example of a drawing clipping to the underlying 200 m x 200 m grid after a user has completed their drawing.

2.1. Reports

Drawings that are active in the marine planner can be compared against each other in what are termed reports. The reports graphically show difference between the drawings on specific criteria. The reports are based on nine different criteria including percent reef (in shape), percent reef (relative to entire planning area), maximum number of fish species, maximum number of coral species, diving activity days, fishing activity days, total activity days, depth range and percent sand. These comparison reports give users the ability to assess tradeoffs of different areas given these metrics, and against the management objectives they will are planning for. The reports are accessed by selecting the drawings to be compared, then clicking on view comparison reports, and then selecting the criteria to compare (Figure 3). The OFR Tool Support Team made a strong recommendation for next steps in development of the tool, and requested that a user could draw multiple polygons as a part of one shape or recommendation. One could see the utility of this in creating a system of areas along the coast, and generating the summary reports on cumulative impact of those polygons. However, this new feature was not part of the current contract and would take up to 60 additional developer hours to implement.

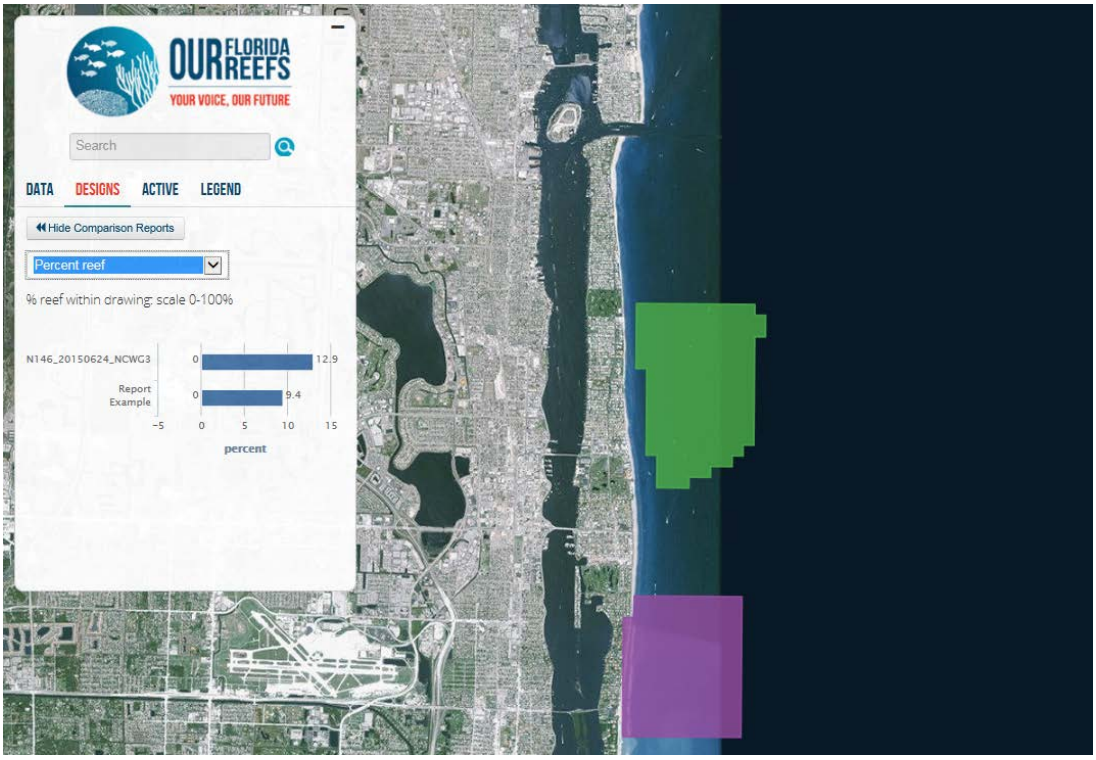

Figure 3. Example of two drawings being compared using the report function of the decision support tool. The two areas are being compared on percent reef that falls within each drawing and the results are shown in a bar graph.

2.2. Filtered Designs

Again, the filtering designs are driven by the planning grid and summarized data, which consists of 37 of the total layers in the marine planner. As a filtering design is created, the user is stepped through five pages of filtering criteria organized by data theme: Habitat, Coral, Fish, People, and Management. Each filterable layer has its own filtering widget (double slider bar allow the user to set a maximum and minimum), number entry boxes, or drop down menus to create filters on the dataset (Figure 4). The units, information boxes, layer toggles, and language surrounding each filter was discussed at length between Point 97 and the OFR Tool Support Team. From the perspective of the Point 97 team, the number of layers should have been limited to approximately 10 to avoid overwhelming users. However, prior use cases for marine planner focused on one management objective of the tool, and the OFR process intends to be as inclusive and flexible in planning with regard to planning goals. Having the greater number of filters in the tool allows for this flexibility when locating areas of interest.

Figure 4. Example of one filtering page with list of filters that can be set by the user. In this example the Average Depth filter is expanded, and the user is filtering to include only those grid cells with an average depth between 115 and 139 feet, which yields 642 grid cells.

3. DESIGN RESULTS

In the past ten months of use, the decision support tools have been used in public meetings in May and June for the NCWG and SCWG, and in October for the joint Community Working Group meeting which brought both groups together. At the time of this writing (December 14), the tool has been used to generate a total of 44 designs or recommendations; 6 filtered and 38 drawn (Table 1).

Table 1. Total number of designs developed from May to October 2015 by design type.

Design Type	# of Designs
Filter	6
Drawing	38
TOTAL	44

3.1. Filtered Designs

Of the six final filtered designs, three were generated at the NCWG May meeting, and three were developed at the SCWG May meeting (Table 2). There were no filtered designs generated at the June working group meetings or in the joint community working group meeting in October.

Table 2. Number of filtered designs developed by CWG and management action.

CWG Filtered Designs	# of Designs	Recommended Management Action
North	3	N-146
South	3	S-2

3.1.1. NCWG Filtered Designs

The NCWG filtered designs were to address the Place-Based management actions to establish and implement a zoning framework in the southeast Florida region. According to the descriptions included in these filtered designs the groups were spatially exploring what various coral densities, coral cover, and soft coral cover would look like in the planning area to address this management action. Consideration was also given to current use of the areas by fishers, divers, etc.

3.1.2. SCWG Filtered Designs

The SCWG filtered designs were all labeled with the code S-2 and addressed the Coral Reef Habitat Ecosystem management actions, specifically to "Create and fund one SEFCRI-wide mooring buoy program as a more coordinated and cost effective way of protecting reefs from anchor damage" action. All three of the filtered designs focused on avoiding existing anchorage or buoy areas, as well as avoiding areas with high coral cover and critical coral species, i.e. *Acropora* species.

3.2. Drawing Designs

Of the 38 final drawn designs, 28 were generated for the N-146 management action, and 10 were developed for the S-2 management action (Table 3).

Table 3. Number of drawn designs developed or updated by CWG and by management action.

Meeting Month	CWG	# of Designs	Recommended Management Action
May	North	4	N-146
	South	10	S-2
June	North	18	N-146
	South	6	N-146
October	North	-	S-2
	South	-	S-2
	Joint	4	N-146
		1	S-2

3.2.1. NCWG Drawn Designs

During the May and June NCWG meeting, many drawings, 22 total (4 in May and 18 in June), were created for the Place-Based management action N-146, to "Establish and implement a zoning framework". These drawings were distributed along the coast and varied in both along shore length and offshore distance. Each drawing includes a brief description that indicated a nearby place name or special reason for drawing at that point.

3.2.2. SCWG Drawn Designs

During the May and June SCWG meeting, many drawings, 16 total (10 in May and 6 in June) were created for both the N-146 Place-Based management action (6 designs created) and the S-2 Coral Reef Habitat Ecosystem management action (10 designs created). Like the NCWG, participants here labelled the drawings with nearby reef names or notable Place-Based reasons for creating the drawing.

3.2.3. Joint Community Working Group Designs

In October 2015 both the NCWG and SCWG jointly met to review and modify the drawn designs created in the separate May and June. Four (4) designs for management action N-146 were modified and one (1) design for management action S-2 were modified. In total a final count of 38 designs were finalized—28 for the N-146 management action and 10 for the S-2 management action.

4. TECHNICAL SUPPORT

Throughout the contract period, Point 97 offered technical expertise and support, both during development and as products were pushed to production servers and users began to use the systems. The bulk of technical support was accomplished through email requests and exchange; however, some issues were resolved during conference calls and webinars. During a webinar on March 31, 2015, Point 97 staff trained OFR staff on use of the tool and discussed outstanding feature development objectives.

During the busiest development periods for the survey and the marine planner, many defects that were identified had to be prioritized against, and scheduled with, outstanding features that were still under development. The Point 97 team worked very closely with OFR partners during these critical periods to ensure minimum amount of functionality in the tool and survey were met, but always strived to improve the tool.

4.1. Marine Planner Defects

At the time of this report, the marine planner and decision support tools have been used in meetings, and the public process of creating management recommendations has begun. The OFR Support Team and Point 97 have discovered many of the defects in the marine planner during development. One significant issue was found early on the Surface Tablets that were purchased by the OFR Support Team for survey outreach activities and demonstration of the marine planner. The open-source code on which marine planner is built became unsupported with certain Windows Operating System updates, as well as with updates the Internet Explorer. Solutions to this issue were explored over a four month period, but finally deemed to great to overcome, and the tablets were agreed to be left unsupported for some features, such as the DSTs; however basic navigation of the marine planner data was still an option.

Another significant defect was found in the endpoint server that was used to package the survey data for use in the marine planner early in May 2015, just before the first public meetings at which the data would be used. The endpoint server contained a script that was intended to summarize the data to the planning grid, where each mapped area would be counted in every grid cell it overlapped, thereby overestimating the intensity but providing strong patterns of use. It was decided that the overestimate acceptable for the visualized layers, but for the planning grid summary that the intensity should be proportionately assigned, or distributed in proportion to the amount of overlap with planning grid cells. The raw data was given to the OFR Support Team, and during quality assurance checks, they noted instances where data was double counted. After a week of troubleshooting, the endpoint had to be abandoned, and the survey data was summarized to the grid by hand. This delay caused the May CWG meetings to miss out on use of the most recent survey information.

Several additional defects in the designs tab were found in July 2015 and resolved in August. First, the sliding scale bars in the filtering tool were found to have incorrect minimum and maximum values compared to what was in the specific datasets. A query was run to identify those values in the current summarized data, and the appropriate adjustments were made. The sliding scale bars also have text entry boxes where users

can manually enter a value, and through use of this feature it was found that the three digit box was not large enough for some datasets. The size of that text box was changed to five digits, so all numbers were visible by user. Finally, when a user entered values in the text box and clicked enter, nothing happened on screen. The solution for this was to direct the analysis to run whether the sliding scale bar was used, or when a user entered a number in the text box and hit enter.