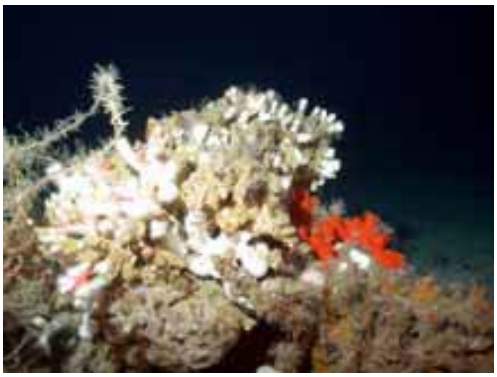
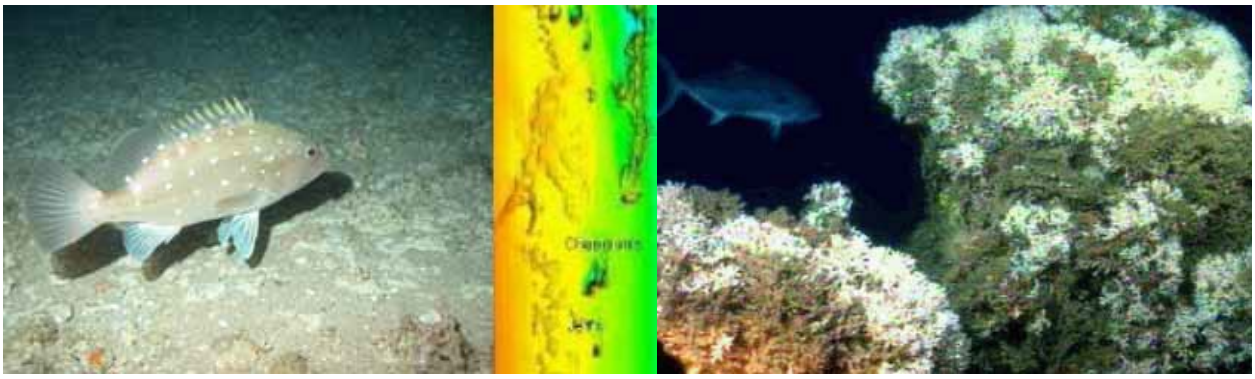


Oculina Evaluation Team Report

(Oculina Experimental Closed Area)



August 2015

Submitted to:
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Executive Summary

The South Atlantic Fishery Management Council (SAFMC) established the *Oculina* Evaluation Team (OET) as part of its Evaluation Plan for the *Oculina* Experimental Closed Area (OECA). The team – comprised of law enforcement representatives, research scientists, resource managers, commercial fishermen, recreational fishermen, outreach experts, and non-governmental organization representatives – was charged with reviewing and providing recommendations for the ongoing outreach and education, law enforcement, and research and monitoring components of the Evaluation Plan. These recommendations will assist the SAFMC in completing a required 10-year evaluation of the OECA.

The OET convened in March and November 2014 to re-evaluate the OECA. This was the first evaluation since the 2007 evaluation. The OET addressed the following topics and questions:

- Evaluate the regulations, size, and configuration of the OECA;
- Track progress to meet the objectives listed in the Evaluation Plan for the *Oculina* Experimental Closed Area (2005); and
- Comment on a 2012 recommendation by the Deepwater Shrimp Advisory Panel to reconfigure the OHAPC and OECA.

The *Oculina* Evaluation Team Report is based on discussions and recommendations obtained through webinars and comments provided by Advisory Panels (AP) to the SAFMC. Members of the team received presentations on outreach, law enforcement, and research and monitoring efforts in March 2014. Following the presentations, break-out sessions were held for each component of the OECA Evaluation Plan: 1) outreach and education, 2) law enforcement, and 3) research and monitoring, to develop the respective sections of this report. A draft report was developed from the March meetings and presented to the OET for review and final recommendations in November 2014 through webinar.

The team did not recommend any changes to the regulations, size, and configuration of the OECA. The OET recommended to continue the information and education efforts with directed outreach at specific areas as this was very beneficial to communicate with the public about the uniqueness and importance of the *Oculina* Banks. The team recommended more personal engagement with fishing clubs and organizations to describe the details of snapper and grouper life histories and the impact of fishing on spawning aggregations. For law enforcement, the team suggested "smarter patrols" utilizing better communication among partner agencies, patrolling on days when fishing activity was likely, and potentially other technology such as acoustic pingers. The team also recommended moving Florida Fish and Wildlife Conservation Commission's (FWC) C/T Randle to Fort Pierce; however, the FWC had already reorganized their offshore patrol vessels to provide better service for patrolling the OECA. For research and monitoring, the team was given an update on research that has been conducted in the OECA since 2007 including continued mapping of the OECA (which is the highest priority), compared species diversity and abundance inside and outside the OECA, and estimated larval dispersal from the OECA. Mapping of the OECA will be completed by 2018.

The OET developed a response for the request of a shrimp access area by the Deepwater Shrimp AP. The requested access area: overlaps the distribution of coral, results in resuspending sediments from the bottom that could suffocate the sensitive *Oculina* coral, could put coral at risk due to lack of a wide enough buffer between the coral and the trawl activity, and would be difficult to enforce and contradict recommendations from the Law Enforcement AP for straight line boundaries. Given these concerns, the OET recommended against a shrimp access area and recommended to keep the current configuration and regulations.

Before the next review is initiated, the OET recommends the SAFMC reconsider the team's membership. Additionally, the OET recommends Council staff consider the format of the plan to make sure it is done in a fashion that works for all groups and addresses the needs of the SAFMC.

Table of Contents

1.0 Introduction

1.1 Background on the Oculina Experimental Closed Area

In April 2004, regulations were implemented through Amendment 13A to the Fishery Management Plan for Snapper Grouper Fishery of the South Atlantic Region that extended the fishing restrictions for the designated 92-square mile *Oculina* Experimental Closed Area (OECA) for an indefinite period (**Figure 1**). The amendment was developed by the South Atlantic Fishery Management Council to address the 10-year sunset provision for the closure of the area to snapper/grouper fishing. Located off the coast of Ft. Pierce, Florida, the area is part of the larger *Oculina* Habitat Area of Particular Concern (HAPC) designed to protect the *Oculina* coral found there. In addition to extending the closure, the amendment requires that the size and configuration of the Experimental Closed Area be reviewed within three years (2007) of the implementation date of Amendment 13A and that a 10-year re-evaluation (2014) be conducted for the area.

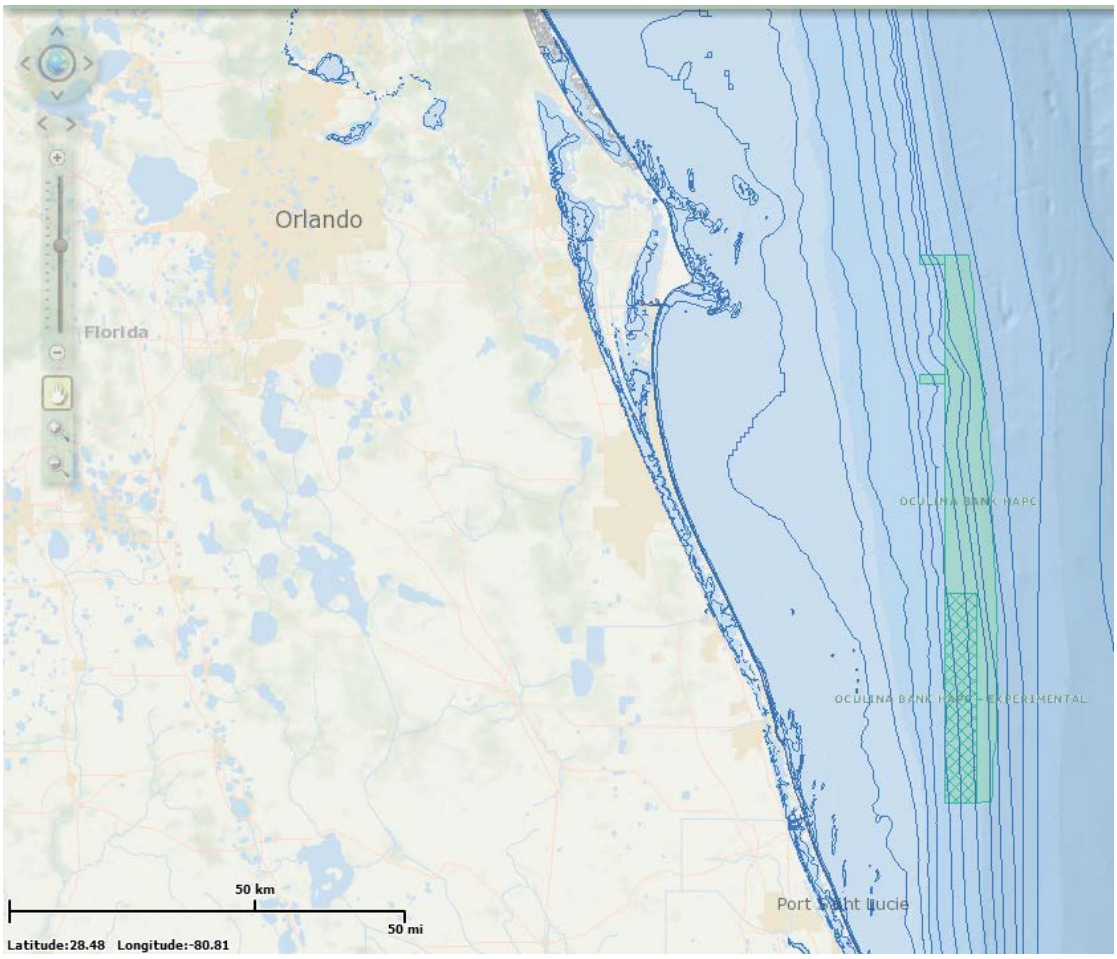

Figure 1. Map of the *Oculina* Experimental Closed Area and the *Oculina* Bank Habitat Area of Particular Concern (OHAPC). Created using SAFMC Habitat and Ecosystem Viewer.

The Evaluation Plan for the OECA was completed in March 22, 2005. The purpose of the

Evaluation Plan for the OECA was to bring together a group of individuals knowledgeable about the OECA who will be presented with and review the most recent information on the effectiveness of the closed area. This group will make recommendations to the Council anytime during the fishery management process, but especially before the Council takes significant action concerning the closed area (i.e., before the 3 year and 10 year re-evaluation periods). The Council stipulated that the OECA have a plan to educate the public, enforce the rules for the closed area, and monitor the benefits of the closed area. The evaluation plan included specific goals to be addressed for the outreach plan, law enforcement plan, and research and monitoring plan as well as future actions. The *Oculina* Evaluation Team completed a size and configuration evaluation of the OECA in 2007 as stipulated by the Council. The Council also required an evaluation of the OECA in 2014 which is being completed with this report. The 2014 evaluation of the OECA reviews and provides recommendations on outreach and education, law enforcement, and research and monitoring.

1.2 The 2005 Evaluation Plan for the Oculina Experimental Closed Area and the 2007 Oculina Evaluation Team Report

The Evaluation Plan for the OECA was designed to set up a framework to evaluate the effectiveness of the closed area to enhance stock stability and increase recruitment by providing an area where deep water species can grow and reproduce without being subjected to fishing mortality. The evaluation plan set up the different sections to evaluate including: outreach and education, law enforcement, and research and monitoring. Goals, objectives, and/or principles were listed in each of the sections.

The first evaluation of the OECA stipulated by the Council was started in 2006. The OET convened to address the following topics and questions:
(1) What has been accomplished so far on research and monitoring, information and education projects, and law enforcement strategies and timelines?
(2) What has been the effectiveness of research and monitoring, outreach, and law enforcement efforts and how do these need to be improved before the Council's deadline to make a decision on whether or not to continue the regulations in their 10-year review (2014)?
(3) Review and evaluate the current size and configuration of the OECA and provide recommendations to the Council.
(4) Provide recommendations to assist the Council in their 10-year evaluation of research and monitoring, law enforcement and outreach efforts supporting fishing regulations. The OECA review is scheduled for 2014.

This *Oculina* Evaluation Team Report was based on discussions and recommendations obtained during their meeting. Members of the team received presentations and updates on research and monitoring activities, outreach projects, and law enforcement efforts. Following the presentations, break-out sessions were held for each of the three components of the OECA Evaluation Plan: 1) research and monitoring, 2) law enforcement, and 3) outreach and education, to develop the respective sections of this report.

The 3-year review was completed in February 2007. The Executive Summary stated:
"The Council established the *Oculina* Evaluation Team (OET) as part of its Evaluation Plan for the *Oculina* Experimental Closed Area (OECA). The team -- comprising law enforcement representatives, research scientists, resource managers, commercial fishermen, recreational

fishermen, outreach experts, and non-governmental organization representatives -- was charged with reviewing and providing recommendations for the ongoing research and monitoring, outreach, and law enforcement components of the Evaluation Plan. These recommendations will assist the Council in completing a required 3-year size and configuration evaluation and a 10-year complete evaluation of the OECA. The report, approved by the Team by consensus on August 23, 2006, is provided to support the South Atlantic Council's review of the size and configuration of the *Oculina* Experimental Closed Area in March 2007. **The overall recommendation from the *Oculina* Evaluation Team regarding the size and configuration of the OECA is that no changes be made at this time.**"

1.3 Review of the *Oculina* Experimental Closed Area in 2014

A ten-year review of the OECA was required by the SAFMC to evaluate the regulations, size, and configuration of the OECA; track progress to meet the objectives listed in the Evaluation Plan for the *Oculina* Experimental Closed Area (2005); and comment on a 2012 recommendation by the Deepwater Shrimp Advisory Panel to reconfigure the OHAPC and OECA. The breakout groups met in March 2014 by webinar to discuss the objectives of the plan after a presentation of accomplishments and developments since the last review of the Evaluation Plan. Information and Education, Law Enforcement, and Research and Monitoring breakout groups evaluated the progress on the objectives listed in the Evaluation Plan and listed additional recommendations. From the breakout group discussions, a draft Evaluation Plan was created. Most of the Information and Education Objectives have been completed (13 out of 18) and it was recommended to develop better methods to evaluate the Information and Education products as well as increase the number of areas where the Information and Education products are available. Most of Law Enforcement Objectives have been completed (8 out of 9) and it was recommended to reformat this section into a project management format. This will enable better tracking of accomplishments, describe lessons learned over the time, and define the current stakeholders in the project. They also recommended better record keeping by the source agency, more timely submission of the reports, more engagement at fishing tournaments, and "smarter" patrolling. The Research and Monitoring Objectives have a low completion percentage (8 out of 33) although almost half of the projects have been started (15 out of 33). The major hindrance for the completion of the Research and Monitoring Objectives has been a lack of funding. The Research and Monitoring Group also recommended that the priority of the stressors affecting *Oculina* be increased (supported by Shrimp AP), the SAFMC seek additional funding to accomplish the objectives of the Evaluation Plan, and the current configuration should not be revised as requested by the Shrimp AP. The group noted that SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat within the OECA and complete acoustic mapping of the OECA, important objectives for the Evaluation Plan. The draft Evaluation Plan was reviewed by the Information and Education, Coral, and Shrimp Advisory Panels.

The Information and Education AP provided additional comments on several objectives in the Outreach and Education Section (**Appendix A**) and supported the overall review of the plan.

The Coral AP's review provided both refined specifics on research accomplished to date or planned, as well as identified their priorities associated with addressing specific objectives of the Plan. In addition, the following statement was provided by the Panel responding to a request provided during the review: " The Coral Advisory Panel reaffirms the Research and Monitoring Team's opinion that a proposal opening areas for trawling in the OHAPC/OECA would be

extremely counterproductive and would put the remaining dense stands of *Oculina varicosa* at risk."

The Shrimp AP provided comments on all sections of the Plan (See **Appendix B** for a complete list). They commended the excellent job on outreach. They recognized the need for more research in the OECA and supported focused research in the area in particularly cooperative research. They also identified potential coral stressors that should be higher priority including: the impact of freshwater discharges on coral, the impact of a thick brown leafy seaweed south of the OECA, and the impacts of the BP oil spill and dispersants.

After receiving comments, the OET reconvened to make final recommendations to the plan on November 12, 2014. The Oculina Evaluation Team did not recommend any changes to the regulations, size, or configuration of the OECA. There is evidence of increased abundance of snapper grouper species in the OECA compared to outside the OECA (Harter et al. 2009), which is a goal of the OECA. The team recognized the need for additional outreach, enforcement, and research while acknowledging that funds are limited to accomplish the objectives.

The OET recommended continuing with the past efforts to meet the Outreach and Education Objectives and updating the information in the flyers. Past efforts to describe the importance of the *Oculina* Banks as essential fish habitat was crucial to gain public support. The OET and SAFMC Staff need to continue to have a presence in the area around the OECA to remind people about the importance of protecting the Oculina habitat and fish spawning aggregations. Fishing on spawning aggregation can have social impacts on fish populations and alter/cease spawning behavior. Additional recommendations were to:

- Conduct more outreach along the coast at bait shops and tackle stores, kiosks at Smithsonian Marine Station and boat ramps, and fishing organization meetings;
- Have the SAFMC Staff create a power point presentation for talks and maintain the presentation on the website;
- Focus outreach and presentations on the unique life histories of snappers and groupers and the importance of the habitat; and
- Continue to engage with the public through social media, webinar, print brochures, digital media, and personal contact, which was recommended as one of the best ways to engage with the public.

The *Oculina* Evaluation Team then discussed issues with law enforcement of the protected area. Law enforcement agencies are receiving few complaints about illegal activity in the OECA. However other team members described observing people fishing in the area, observing fishing gear left in the area, and hearing fishermen state they continually fish in the OECA. The team recommended to:

- Request Florida Fish and Wildlife Conservation Commission (FWC) to move the C/T Randle vessel from Cape Canaveral to Fort Pierce, and
- Use acoustic pingers to monitor the OECA so that enforcement efforts can target efforts when illegal activity is highest.

Although the team requested FWC to move the Randle from Cape Canaveral to Fort Pierce, FWC had already reorganized their offshore patrol assets to provide a better service including patrolling the OECA and OHAPC. Along with this move, FWC has increased the size of the offshore fleet with a total of five high speed offshore vessels on the East Coast. These vessels

range in size from 33' up to 40' in length. FWC has moved a 38' SAFE Boat to Port Canaveral to replace the C/T Randall. This vessel is equipped with the same advanced electronics as the Randall and it is capable of traveling twice as fast. This newer technology allows FWC to cover more water with lower cost and less down time than previously experienced. The soft collar also allows crews to conduct a higher number of inspections in various sea states. A 40' Brunswick Impact Patrol vessel has been moved to New Smyrna which can easily patrol the *Oculina* Banks. A 33' Brunswick Impact has been moved to Jupiter. This vessel can easily patrol the south end of *Oculina* Banks. FWC Law Enforcement will extend an invitation to the *Oculina* Evaluation Team members to join them for an offshore patrol on the bank. Patrol efforts will continue to occur in the OECA and vessels can be sent out to the OECA if a potential violation is called-in from a FWC airplane patrol, NFMS due to vessel location based on VMS, or fishermen/scientist.

The research and monitoring section had the fewest deliverables, which was primarily due to a lack of funding. Despite low funding, there have been fourteen publications addressing a research recommendation since 2007, 24 publications since 2004, and 48 publications since 1996. Since the last review in 2007, research efforts have described the *Oculina* habitat, continued to map the OECA with multibeam sonar (59% of the OECA has been mapped at varying resolutions), compared the fish community assemblage inside and outside OECA, estimated potential larval dispersal from the OECA, described the ethnography of the Fort Pierce fishing community, as well as many other projects. It should be noted that some of the goals listed in the 2005 Evaluation Plan for the OECA were written idealistically and it was not expected that all of the deliverables would be completed. This lack of completion for some deliverables should not be viewed as a negative for the Research and Monitoring efforts. One of the highest ranking recommended deliverables was completion of the mapping of the OECA, this will be completed as part of the SAFMC/NOAA Coral Grant 2014-17 by 2018.

In addition to reviewing efforts to complete the deliverables and updating recommendations for the plan, the OET discussed the format of the overall plan, membership of the *Oculina* Evaluation Team, and a request by the Shrimp AP for a shrimp access area in the OHAPC and OECA. The OET advised Council Staff to use the most appropriate format and ultimately, the format should be left to the judgment of the editor. It was recognized that it might be difficult to match the three different sections into one format. Membership will be addressed when the Oculina Evaluation Team is required to review the next draft.

The Oculina Evaluation Team developed a recommendation against the shrimp access area in the OHAPC and OECA. The full document explaining their reasoning for their recommendation is in Section 6. The reasoning behind their recommendation includes:

- The proposed shrimp access area represents a direct overlap with the coral distribution;
- The coral needs a buffer from fishing to prevent incursions into the protected area;
- Corals are extremely sensitive to suspended sediment which is stirred up by trawling;
- The bycatch from fishing an area that has been closed for up to 30 years would be significant; and
- The Law Enforcement AP has consistently requested straight lines for closed areas based on latitude and longitude.

The following sections of the report consists of sections from the three breakout groups; Outreach and Education, Law Enforcement, and Research and Monitoring and five appendices

including a response to the shrimp access area. The progress to meet the deliverables is tracked from the 2007 Review and the current review as well as recommendations to accomplish the deliverable listed in each breakout group section. Section 5 is a tabular format of the objectives to track the completion of the objectives. Additionally there are five appendices attached: the recommendations from the Information and Education Advisory Panel, the Deepwater Shrimp Advisory Panel, an Overview of *Oculina* Outreach Activities, an Example of Project Management Plan Developed by the Law Enforcement Sub-Group, and the response to the Shrimp AP request. The response to the Shrimp AP request was developed as the reasoning for keeping the current configuration and regulations in the OECA. The response was developed by a sub-group with representatives from Outreach and Education, Law Enforcement, and Research and Monitoring.

2.0 Outreach and Education Breakout Group Report

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Rich Abrams FL Fish and Wildlife Conservation Commission; SAFMC Information & Education Advisory Panel member
Scott Chandler FL Sportfishing Association (recreational)
Laura Diederick Smithsonian Marine Station - Education Specialist
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2.1 Status, Effectiveness, and Recommendations of Outreach Projects in Evaluation Plan and Recommendations

With the understanding that outreach activities would not have a direct influence on the Council's decision regarding the size and configuration of the *Oculina* Experimental Closed Area, Team members involved in outreach efforts focused on the list of outreach projects outlined in the Evaluation Plan. This list of projects resulted from constituent meetings held in 2014, with review by advisory panels and the Council. The projects represent both efforts initiated by Council staff as well as those resulting from partnerships with a number of agencies. Additional information regarding outreach efforts is included in Appendix C. The Outreach and Education Objectives 1 and 2 were initiated by the SAFMC. Outreach and Education Objective 3 was the result of funding opportunities and partnerships involving NOAA's Coral Reef Conservation Program, NOAA Fisheries, NOAA's Undersea Research Program, and the Smithsonian Marine Station, in cooperation with Florida Fish and Wildlife Conservation Commission, NOAA Office for Law Enforcement, Florida Space Port Authority, U.S. Coast Guard, and Harbor Branch Oceanographic Institution.

Outreach Objective 1. Assist in development of the *Oculina* Experimental Closed Area Evaluation Plan.

***Project 1:* Develop an outreach strategy for the Oculina Bank area.**

Status 2007: Completed, 2005 http://www.safmc.net/managed-areas/*Oculina*-bank

Recommendations 2007: None

Status Update 2014: None

Recommendations 2014: Modify the document to update activities and clarify components based on input provided to the Council in 2014.

Outreach Objective 2. Develop a focused campaign targeting recreational/commercial fishermen in the central eastern Florida area.

***Project 1:* Provide SAFMC regulation brochures to area fishermen (40,000 copies)**

Status 2007: Regulation brochures were re-printed in May 2005. Re-print as needed (likely January 2007). Distributed to state and federal agencies and others as requested.

Recommendations 2007: The Team agreed that this is an effective tool for distributing regulation information on the OECA and is used widely by law enforcement officers during boardings in the area.

Status Update 2014: The four-color, 18-page *Fishing Regulations South Atlantic Federal*

Waters brochures were reprinted in 2007 and again in 2010, with 40,000 hard copies delivered to state and federal agencies, fishing-related businesses, and individuals with each printing. In 2009, the Council, in partnership with SC Sea Grant Consortium, produced the four-color brochure *Regulations for Deepwater Marine Protected Areas in the South Atlantic* that also featured a page on the *Oculina* Bank with maps and regulations. Copies of the Deepwater MPA Regulations brochures were distributed in a similar manner.

Because of the frequency of changes to regulations, the Council is no longer printing the four-color regulations brochures. Updated summaries (PDF) of both commercial and recreational regulations for snapper-grouper species are available from the Council's website at www.safmc.net and are designed for easy printing. In 2013, the Council developed a digital media application or "App", *South Atlantic Fishing Regulations*. The free mobile App contains comprehensive, updated fishing regulations including regulations and maps on all protected areas, including the OECA. The App is available for both Android and Apple platforms and is actively promoted to the fishing community.

Recommendations 2014: The team recommends continued promotion of regulations via electronic media, including the *SA Fishing Regulations* mobile App, and the Council's website. Performance can be evaluated by tracking the number of times the App is downloaded and the number of "hits" to the Council's regulations webpage. The team also recommends working with FWC to promote *Oculina*-relevant regulations and information in their recreational and commercial regulation brochures. The recreational Saltwater Regulations booklet is produced biannually (January and July). The commercial regulations booklet is updated and distributed on a less frequent basis. FWC is willing to include a half-page article on OECA in both publications. In addition to printed copies, both the recreational and commercial regulation summaries are maintained on the MyFWC website.

***Project 2:* Work with fishing chart manufacturers and or vendors to improve available information for the Oculina Experimental Closed Area.**

Status 2007: Incomplete. Contacts were made in 2005.

Recommendations 2007: Pursue this objective as a priority in 2006 - 2007. The OHAPC and OECA are poorly represented on paper charts, and information on fishing restrictions is incomplete. Contact manufacturers regarding re-print schedules and possible edits. Create transparent stickers to modify existing paper charts and make available through retail outlets. Include a note in updated regulations brochure regarding sticker availability if timing allows. Check for legal issues regarding the use of stickers with NOAA General Counsel. Contact electronic chart manufacturers 2007 and investigate available information and possible updates.

Status Update 2014: Contacts were made with manufacturers of Home Port Charts, Inc., a regional manufacturer of popular locally printed and laminated fishing charts. Staff worked with manufacturers to improve designation of OECA coordinates and restrictions on printed copies. No contacts have been made with electronic chart manufacturers.

Recommendations 2014: Contact commercial electronic chart manufacturers to inventory information currently used to designate the *Oculina* OECA, HAPC, and the South Atlantic Deepwater MPAs. Work with commercial electronic chart manufacturers to improve

designations if needed. Council staff will work with NOAA's Marine Charting Division to investigate if OECA, HAPC, and MPA boundaries and regulations can be included in a new proposed digital overlay of marine protection boundaries.

***Project 3:* Work with Florida Fish and Wildlife Conservation Commission (FWC) to provide written information regarding the Oculina Experimental Closed Area in (a) their publications targeting both recreational and commercial fishermen and in (b) mailings for fishing licenses and permits.**

Status 2007: An article regarding the OECA and graphics were submitted to FWC for recreational regulations brochure in April 2005. The article ran in January 2007 (900,000 copies total). Copies were available in both English and Spanish.

Recommendations 2007: Follow up with the FWC's commercial permits office for mailing of rack cards with commercial permits in January 2007. Continue to supply FWC outreach staff with updated information as it becomes available.

Status Update 2014: Contact was made with FWC's permit office about a possible mailing of *Oculina* regulations rack cards. It was considered cost prohibitive to print copies for blanket mailing and likely an ineffective way to reach constituents. A decision was made to table the mailing. However, a feature article on the OECA/HAPC contributed by Council staff was featured in the printed copy of the 2007 FWC Recreational Fishing Regulations. Approximately 600,000 copies were printed and distributed.

Recommendations 2014: Council staff will work with FWC to populate a standing page highlighting regulations and information pertaining to OECA in their commercial and recreational FWC Regulations Brochures. The recreational brochure is printed biannually, and the commercial brochure is printed less frequently. The team will generate content for the recreational FWC Regulations brochure for their July 2014 edition, and recommends generating new content in conjunction with the implementation of Coral Amendment 8 and proposed changes to the *Oculina* Bank HAPCs.

The team will explore including OECA content in a June FWC mailing of recreational regulations to approximately 1800 saltwater license vendors. The license vendors in turn provide copies to anglers. Council staff will also draft an article to be included in the FWC publication "*Fishing Line Magazine*". FWC will facilitate including OECA information in regional or national fishing magazines and publications (e.g. Coastal Angler Magazine).

The team will also work with the FWC to incorporate OECA/HAPC information in to the FWC Law Enforcement Training Manual. Officers are provided a waterproof training manual. This will ensure new officers understand the laws and regulations surrounding OECA.

***Project 4:* Develop and distribute news releases to focus on law enforcement activities, research and monitoring projects, and the ecological importance of the area.**

Status 2007: Ongoing

Recommendations 2007: Continue to work directly with state and federal law enforcement agencies to highlight activities. Post recent news releases from NOAA Office for Law Enforcement on the Council's *Oculina* web site page and continue to highlight law enforcement activities in *South Atlantic Update* Newsletter.

Status Update 2014: News releases on research within the OECA were generated following a 2009 media excursion to the R/V *Seward Johnson*. News articles were featured in the Orlando Sentinel, Daytona Beach News Journal, and Charlotte Observer and on the NBC Nightly News. Articles relative to the OECA were included in the Spring and Summer issues of the Council's *South Atlantic Update Newsletter*, including a 2-page feature article on research activities by NOAA Research Scientist Stacey Harter. Staff continues to work with NOAA OLE to highlight enforcement activities as they occur.

Recommendations 2014: Council staff will continue to work with NOAA OLE to highlight enforcement activities. The upcoming SEFSC/FAU research missions in 2014-2016 will provide an opportunity to generate new news content.

***Project 5:* Develop a PowerPoint presentation about the Oculina Experimental Closed Area, distribute on CD, post at Web site, and present to fishing clubs, environmental groups, local governments etc.**

Status 2007: Initial planning completed.

Recommendations 2007: This is not a high priority. Prepare draft for review and complete in 2007. Contact local educational institutions regarding use and distribution *(Note: Grant Gilmore offered to help with identifying these sources).*

Status Update 2014: A PowerPoint presentation specific to the OECA has not been developed.

Recommendations 2014: Council staff and Outreach team partners will develop a "stock" PowerPoint presentation on the *Oculina* Bank and OECA that can be tailored to a wide variety of audiences. FWC has agreed to include OECA information in their standard presentations on marine regulations and in FWC law enforcement training. Council staff and partners could prepare a YouTube video of a PowerPoint presentation with a voiceover for wide distribution and usage (possibly hosted on a South Atlantic Fishery Management Council YouTube channel or on the Council's website).

***Project 6:* Develop and distribute posters and rack cards/brochures at area bait and tackles shops, marinas, fish houses, boating stores, fishing tournaments, boat shows, etc.**

Status 2007: Printing of rack cards and posters was completed in August 2006. 5,000 rack cards and 1,100 posters to be distributed throughout the Treasure Coast both in person and through the mail.

Recommendations 2007: Continue printing of materials for distribution as needed. Work closely with fishing tournament organizers in local areas to include *Oculina* rack cards in tournament packets. Contact FWC Law Enforcement Officers regarding possibility of talking briefly about regulations and rack cards at tournament captain's meetings.

Status Update 2014: The *Oculina* Bank Fishing Regulations rack cards have been reprinted as needed and continue to be distributed as requested. NOAA OLE agents and FWC law enforcement officers have distributed the rack cards at captain's meeting prior to tournaments and other area events and during vessel boardings in the area. Rack cards are also distributed at the Smithsonian Marine Station, and at the *Oculina* Bank financial institution in Ft. Pierce. There is a need to distribute the rack cards to area marinas, bait and tackle stores, etc. on a regular basis

Recommendations 2014: The Council should re-print the popular rack cards once Coral Amendment 8 is implemented and necessary updates to the rack cards have been made. This new version should be distributed to fishing clubs, marinas, fish houses, boating/marine stores, fishing tournaments, boat shows, bait and tackle stores, the Smithsonian Marine Station, FWC networks; and state parks (i.e. Ft. Pierce & Sebastian Inlet fishing museum). Bulk copies should be provided to NOAA OLE, The Smithsonian Marine Station, and FWC for distribution. The team should also interface with local state parks to see if there are opportunities to share information on the OECA (Sebastian Inlet State Park, Ft. Pierce State Park etc.). State and Federal Port samplers may be able to help with distribution as well. Feedback on the poster indicated it was a less useful tool. The team recommends against reissuing the poster and recommends focusing on the rack cards.

Project 7 (NEW): Develop kiosk for target boat ramps/landings

Recommendations 2014: FWC has a successful prototype for an educational kiosk that could be installed at high profile boat ramps or landings sites in the Ft. Pierce area. Council staff should investigate the efficacy of employing this strategy to reach boaters and anglers.

Outreach Objective 3. Coordinate a broader media campaign with partners to reach central Florida residents and visitors using newspaper, radio, TV, Internet, and existing environmental education network (e.g. environmental centers, schools, academia, area businesses).

Project 1: Develop an Oculina Web site or work within the existing site to establish a comprehensive web-based outlet to include access to useful education and outreach products. Publicize availability of information from new site by having links posted on other fishing/Non-Governmental Organizations/tourism related web sites

Status 2007: *Oculina* information was incorporated into the Council's Ecosystem Web site in 2005-2006. Harbor Branch Oceanographic Institution's www.@Sea.org Web site hosted the 2005 research cruise daily log reports and other information.

Recommendations 2007: Continue to incorporate information as it becomes available. Investigate possibility of incorporating daily cruise logs into the Council's Ecosystem site. Add relevant press releases regarding law enforcement activities to the Web site.

Status Update 2014: The Council launched a new and improved Web site in 2013 that includes designated pages on the *Oculina* Bank as part of the "Managed Areas" section. Note that the HBOI Web site www.@Sea.org is no longer active.

Recommendations 2014: The Council's Web site www.safmc.net should be a central portal for information about the *Oculina* Bank in general. The site should cross-link with other entities that have *Oculina* or Deepwater Coral web presences such as Harbor Branch Oceanographic Institute, NOAA's Deep Coral Program, NOAA's Ocean Exploration Program, and The Smithsonian Marine Station. The Council will soon launch blogging capabilities from its website. The Council site will be a clearing house for event-based information during 2014-2016 research missions, including daily web-logs, photographs, etc.

Oculina and OECA content should also be included on FWC's website. The Council will work with FWC to create content, including graphics, maps and photographs.

The team also recommends exploring the use of social media (blogging, Facebook and Twitter amongst others) to relay information or important messages about the OECA. This will be especially useful for event-based outreach during upcoming research missions and implementation of Coral Amendment 8.

<u>Project 2:</u> Develop education products for teachers (K-12) and informal educators, post on Web site, and develop packet for distribution to science teachers.

Status 2007: A 2005 Teacher Workshop was completed in conjunction with research and monitoring cruise.

Recommendations 2007: Continue workshops in conjunctions research and monitoring activities, building on 2005 workshop materials and recommendations. There is strong support for this outreach effort. The NOAA Fisheries Habitat Conservation Division expects funding from the NOAA Office of Education to continue teachers' and excursion workshop activities in 2007.

Status Update 2014: Subsequent teacher workshops were held in 2007, 2008 and 2009 with NOAA funding and Council support. Education products were updated and expanded at each workshop and made available to participants. See Appendix A for additional details.

Recommendations 2014: Work with COSEE Florida, the Smithsonian Marine Station, and other partners to develop teacher materials in conjunction with 2014-2016 *Oculina* research activities. COSEE Florida and/or NOAA may be sources of potential funding. Assuming NOAA vessels are used for 2014-2016 research missions as planned, these missions should include a NOAA Teacher At Sea to further integrate NOAA science into classrooms. A "port day" activity could also be incorporated so students and teachers could tour the NOAA research vessel and interact with scientists. Collaboration with regional partners will be essential for creating these educational opportunities.

<u>Project 3:</u> Create media packet targeting ecological importance of area; packet should include popular news items about Oculina Experimental Closed Area.

Status 2007: Completed for 2005 research and monitoring cruise through contract with HBOI. Future media packets and materials are dependent upon funding.

Recommendations 2007: Utilize currently available materials (photos, B-roll) in future media releases.

Status Update 2014: Media packets were developed in conjunction with the 2009 Media Excursion organized in conjunction with a research cruise conducted onboard the R/V *Seward Johnson*.

Recommendations 2014: Building on past efforts, update media packet in support of a media event related to research activities in 2014-2016.

<u>Project 4:</u> Develop a traveling portable exhibit that can be displayed at fishing tournaments, tradeshows, seafood/maritime festivals, aquariums, science museums, libraries, government centers, etc.

Status 2007: Incomplete. Note: A portable deep water coral outreach exhibit is currently

available through Smithsonian Marine Ecosystems Exhibit.

Recommendations 2007: Creating a new exhibit is a lower priority, contingent funding and staff availability. Network with local educational institutions for possible display of exhibit.

Status Update 2014: Complete. A portable exhibit was developed in 2009 and includes a kiosk featuring the deepwater coral film "Revealing the Deep". This exhibit issued at Council meetings and is available for use by outside organizations.

Recommendations 2014: The existing SAFMC display will need updating upon implementation of Coral Amendment 8. Staff may consider using existing files from the dismantled Smithsonian display to create fabric panels to replace or supplement the SAFMC portable display. The team should ensure the conservation community is aware the portable exhibit is available to resource agencies, marine education, law enforcement and researchers.

***Project 5:* Offer media excursions to the Oculina Experimental Closed Area and HAPC/ tours and interviews regarding enforcement activities onboard the CT Randall law enforcement vessel.**

Status 2007: A media cruise was coordinated with FWC and NOAA OLE in conjunction with a 2005 research and monitoring cruise. Weather prohibited the media cruise. Council staff coordinated the use of the *CT Randall* and crew into 2005 Port Day activities.

Recommendations 2007: Continue to coordinate efforts in conjunction with research and monitoring cruises dependent upon funding.

Status Update 2014: A subsequent media excursion was arranged in Aug 2009 in conjunction with a research mission aboard the R/V *Seward Johnson*. The media excursion was highly successful. Media representatives toured the vessel, witnessed the deployment of the *Johnson SeaLink* submersible, and visited the research labs. The mission received significant local and national coverage, including NBC Nightly News (Kerry Sanders). See Appendix A for additional details.

Recommendations 2014: Continue to coordinate efforts in conjunction with research and monitoring cruises dependent on funding. Explore the use of FWC, CT Randall or other Law Enforcement assets if available.

***Project 6:* Develop TV documentaries working with environmental TV outlets (e.g., Discovery Channel, Public TV.**

Status 2007: A documentary film producer accompanied the 2005 research and monitoring cruise. Film is currently under development.

Recommendations 2007: Continue activities as funding allows.

Status Update 2014: The film developed in conjunction with the 2005 research and monitoring cruise, “Fragile Forests of the Deep”, was produced by George Sibley and had limited distribution. Art Howard produced videos in conjunction with subsequent research cruises – Beneath the Blue Video (http://vimeo.com/5929294) and “Below the Surface” (http://vimeo.com/6221700). A “Coral Forests of the Deep” video was created in support of the Smithsonian’s Oceans Today Kiosk at the Sant Oceans Hall of the Natural History Museum. Kiosk content is available to Kiosks around the country and on the web

(http://oceantoday.noaa.gov/coralforestsofdeep/)

Recommendations 2014: Reach out to film makers who had expressed interest in *Oculina* and Deep Water Corals in the past to see if they want to follow up with future research activities. The team should explore the feasibility of including an *Oculina* story in the "Chevrolet Conservation Minute" – a sponsored public service opportunity for disseminating FWC/conservation information.

***Project 7:* Work within existing program to deploy a real time data buoy in the Oculina Bank area to provide weather and sea-state information for boaters and fishermen and integrate information into web site.**

Status 2007: No activity

Recommendations 2007: The team recommends removal of this project (real time data buoy) from Evaluation Plan as it is cost prohibitive. It was suggested that staff work with existing NOAA data buoy web site and investigate possibility of linking web sites with the Council's current site.

Status Update 2014: Installing a buoy is cost prohibitive. However, in 2009, the Council partnered with the NOAA National Data Buoy Center to include direct links from the NDBC stations at Ft. Pierce (41114) and Cape Canaveral (20009) to the Council's Web site. The direct link accesses regulations information for the OECA.

Recommendations 2014: Continue the partnership with the NOAA Data Buoy Center and update information as necessary.

***Project 8:* Assist with the continued development of an interpretive Oculina coral display at the Smithsonian Marine Station in Ft. Pierce, Florida.**

Status 2007: Complete. The world's only *Oculina* interpretive exhibit was completed in July, 2006. CRCP funds paid for signage. The professionally created exhibit has been well received. Outreach materials, including rack cards, are being distributed through the Marine Station.

Recommendations 2007: Promote and utilize this exhibit more fully. Add a link from the Council's Web site to the Smithsonian Marine Station. Highlight article in newsletter about grand opening/5th year anniversary of Smithsonian Exhibit this year. Assure continued contact and representation of Smithsonian in future Evaluation Team efforts. Provide additional video footage for display and make teacher materials available on SMSFP Web site.

Status Update 2014: A link to the Smithsonian Marine Station has been added to the Council's new website. *Oculina* Bank Regulations rack cards continue to be distributed.

Recommendations 2014: The Smithsonian Ft. Pierce Marine Station receives between 35,000-38,000 visitors per year, and about 25% of those visitors are students. The Council and OET partners will work with the Smithsonian Marine Station to refresh the signage on the *Oculina* Exhibit and provide supporting photography, outreach materials, and information over the next 2 years. The Council will also incorporate information on the *Oculina* Bank in their MPA education modules.

Outreach Objective 4. Evaluation

<u>Project 1:</u> Develop a survey tool to assess the effectiveness of the campaign and widely distribute before, during and after majority of activities underway.

Status 2007: 2004 survey developed in cooperation with FL Sea Grant had limited distribution.

Recommendations 2007: The current survey should be re-evaluated. Explore new sources for survey distribution through the Florida Fish and Wildlife Conservation Commission's Fisheries-Dependent Monitoring Program (check with Michelle Owen) or as a graduate student project (check with local colleges: FIT, FAU, and BCC).

Status Update 2014: No activity

Recommendations 2014: Working with the Council's Information and Education Advisory Panel, assess the effectiveness of the survey approach and ask for recommendations regarding tools to use for Evaluation. The Smithsonian Marine Station will explore options for utilizing the survey approach as part of a graduate studies project through Florida Atlantic University (FAU/HBOI).

<u>Project 2:</u> Continue to receive input from local constituents (through the database established from the June 2004 outreach meetings) regarding the development of materials and level of community awareness.

Status 2007: Ongoing

Recommendations 2007: The group recommends continued outreach efforts with local stakeholder groups on an annual basis. Also, staff should attend local fishing group meetings, including Cape Canaveral Charter Boat Captain's Association, Florida Sportfishing Association, and others. Network with local educational institutions.

Status Update 2014: Ongoing

Recommendations 2014: Maintain and expand communications with constituent groups such as the Smithsonian Marine Station, area fishing clubs and organizations, the *Oculina* Bank financial institution, and other regional businesses and chambers of commerce. Participate in the annual Indian River Lagoon Science Festival co-sponsored by the Smithsonian Marine Station, HBOI, COSEE Florida and others to promote awareness of the *Oculina* Bank OECA and fishing regulations. The Council's Information and Education Advisory Panel may be able to make recommendations here.

3.0 Law Enforcement Breakout Group Report

Richard Chesler*	NOAA Special Agent
Lt. Col. Bruce Buckson	NMFS OLE
Major Percy Griffin	FL Fish and Wildlife Conservation Commission – Division of Law Enforcement
Lt. Morgan Fowler	U.S. Coast Guard and SAFMC Council Member
Col. Chisolm Frampton	SC Department of Natural Resources, Law Enforcement Division and SAFMC Law Enforcement AP Member (Chair)
Karen Antrim Raine	NOAA General Counsel Enforcement Section and SAFMC Law Enforcement AP Member

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3.1 Status of Law Enforcement Projects in Evaluation Plan

The Law Enforcement Evaluation Plan for the OECA included a request to NOAA General Counsel to enhance penalties for violations of the OECA regulations and a five point LE strategy.

3.1.1. Penalties

Status 2007: In June of 2003 a revised penalty schedule was published.

Recommendation: None

Status Update 2014: Since June 2003, the NOAA Office of the General Counsel - Enforcement Section, has issued revised civil administrative penalty policies and schedules for violations of statutes and regulations enforced by NOAA, most recently in 2014. The purpose of the Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions "is to ensure that: (1) civil administrative penalties and permit sanctions are assessed in accordance with the laws that NOAA enforces in a fair and consistent manner; (2) penalties and permit sanctions are appropriate for the gravity of the violation; (3) penalties and permit sanctions are sufficient to deter both individual violators and the regulated community as a whole from committing violations; (4) economic incentives for noncompliance are eliminated; and (5) compliance is expeditiously achieved and maintained to protect natural resources. Under this Policy, NOAA expects to improve consistency at a national level, provide greater predictability for the regulated community and the public, improve transparency in enforcement, and more effectively protect natural resources."

Statutes enforced by NOAA provide for civil administrative and criminal remedies. Civil administrative remedies include fix-it tickets, written warnings, summary settlement, notices of violation and assessment, and notices of permit sanction, in addition to possible forfeiture action against seized property such as fish, gear, and vessels.

Recommendation 2014: None

3.1.2. Law Enforcement Strategy

<u>Enforcement Principle 1:</u> To utilize the VMS to monitor the Oculina Experimental Closed Area for illegal fishing activity.

Status 2007: VMS is being used to monitor OECA.

- Continued monitoring of VMS data by NOAA OLE and alerts sent.
- USCG real time VMS monitoring on vessels not complete. Technology issues have delayed progress. Remains in long term plan.
- FWC direct access to VMS – The reauthorization of the Magnuson-Stevens Act has language which provides VMS access for states participating in a Joint Enforcement Agreement (JEA) with NOAA OLE.

Recommendation 2007:

Status Update 2014: Continue efforts that were developed in 2007.

Recommendation 2014:

<u>Enforcement Principle 2:</u> To utilize cooperative enforcement via intelligence and asset sharing, meetings, and training to maintain a high level of cooperation and coordination of Oculina Experimental Closed Area patrols and investigations.

Status 2007: The partnership between NOAA OLE, USCG and FWC is well established and functioning well.

Recommendation 2007:

Status Update 2014: The partnership between NOAA OLE, USCG and FWC is well established and continues to functioning well.

The current assets available include:

USCG
87' Coastal Patrol Boats (CPB)
45' Response Boat - Medium
Helicopters (HH-65)
Fixed wing aircraft
Medium Endurance Cutters (MEC)

FWC
38' Offshore Patrol Vessel (P/V)
Medium Range Patrol Boats
Covert/Unmarked boats
Aircraft

NOAA OLE
24' Rigid Hull Inflatable Boat (RHIB) available for surge operations.

Nothing here commits agencies to supply any specific resources or creates any financial obligations. This does not change any statutory authority or create any new responsibilities.

The participation of the U.S. Coast Guard in this project is assumed to be a low priority due to competing higher priority mission areas and the lack of Living Marine Resources patrol hours.

Recommendation 2014: Agencies should continue with partnership as it has been working well with minor recommendations.

- Periodic coordination meetings and training sessions amongst NOAA OLE, USCG, and FWC.
- Enforcement partners will conduct a review of enforcement and compliance assistance activities annually during the *Oculina* specific meeting. This review will capture lessons learned and best practices to inform and improve future activities.
- Enforcement personnel will comply with their agency specific policy. FWC will comply with Cooperative Enforcement Program, Joint Enforcement Agreement reporting requirements.

Enforcement Principle 3: ***To provide a deterrent presence within the Oculina Experimental Closed Area through routine aerial and at-sea patrol and dedicated surge operations.***

Status 2007: Routine patrol/missions have been conducted in the OECA.
Coordinated pulse LE operations.
Dedicated patrols by FWC and USCG in conjunction with NOAA OLE.
NOAA OLE will have a 24' RIB available locally.

Recommendation 2007:

Status Update 2014: Since the last *Oculina* Evaluation Team Report, the number of hours and detections/boardings has been reported for the OHAPC and OECA.

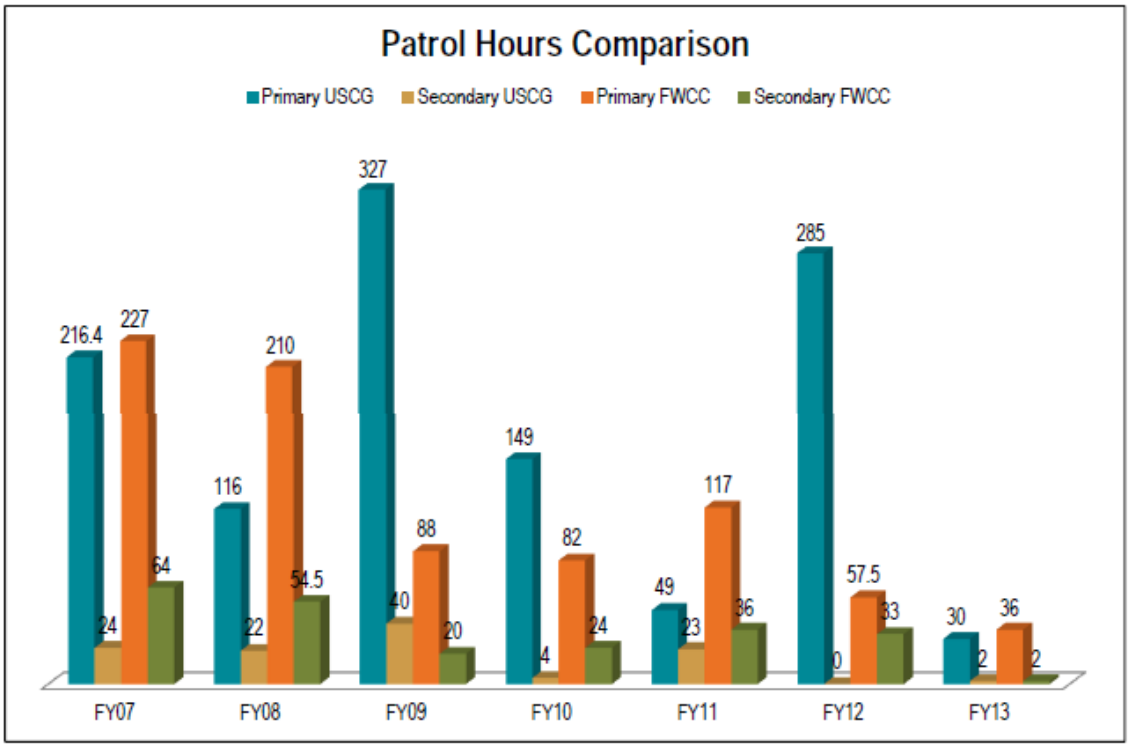

Figure 2. Number of hours (above bar) spent patrolling the OHPAC and OECA. The primary hours are hours spent in patrolling in the area. The secondary hours are hours spent in transit or operating in the OHPAC and OECA on other missions.

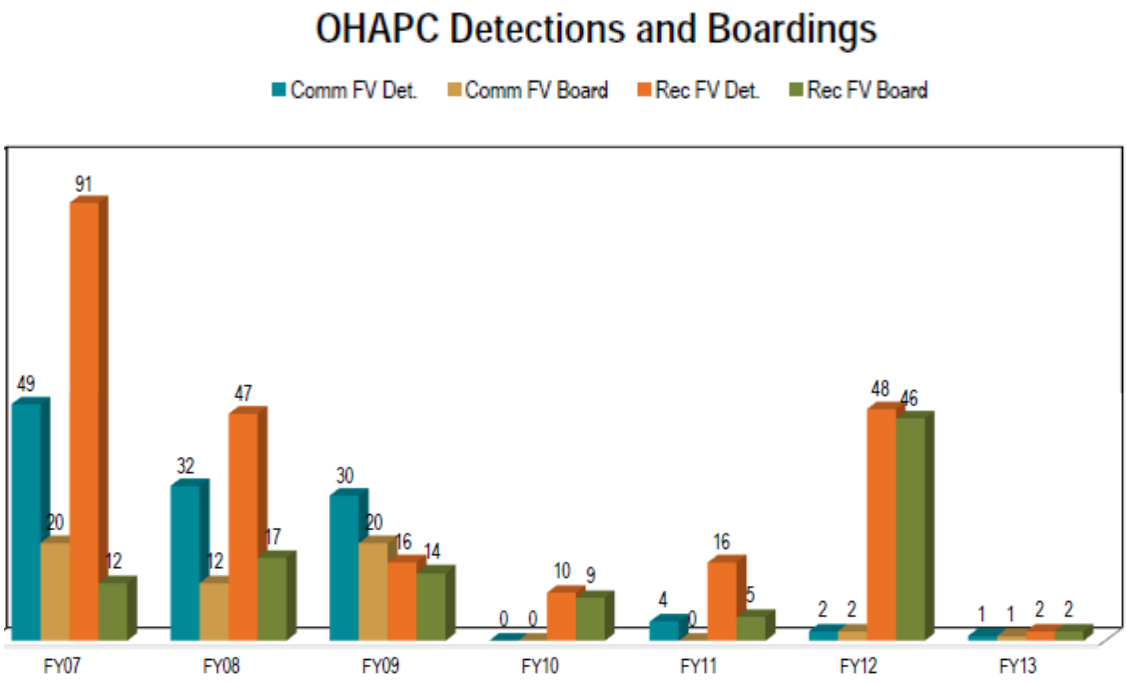

Figure 3. The number of detections and boarding (above bar) in the OHAPC and OECA by the USCG and FWCC.

Recommendation 2014: There were several recommendations for improving the patrolling operations in the OECA including:

- Better coordination between FWC and USCG for monitoring the OECA,
- Establish annual *Oculina* specific meetings,
- Increased enforcement presence utilizing covert patrols,
- Obtain additional USCG patrol hours, and
- Patrolling smarter by conducting ramp and marina checks prior to launching a patrol.

Enforcement Principle 4: ***To report enforcement and compliance activities to the South Atlantic Fishery Management Council***

Status 2007: Data are collected and reports are created by Special Agent Chesler for quarterly presentation to the Council. These reports have reflected an increase in enforcement presence in the OECA.

Recommendation 2007:

Status Update 2014: The OLE liaison continues to collect and provide quarterly reports to the Council.

Recommendation 2014: The OLE liaison agent will conduct quality control checks of USCG and FWC submitted reports prior to drafting the Quarterly Enforcement Report.

The report will include:

- Number of hours in the OECA,
- Average number of hours underway/in transit to patrol areas,
- Number of sorties/patrols,
- Number of vessels sighted (Commercial and Recreational),
- Number of vessels boarded (Commercial and Recreational),
- Enforcement actions,
- Combined operations with aircraft or other enforcement partner, and
- Significant violations summary

In addition, the report will include a summary of *Oculina* specific case dispositions, media stories, outreach activities, and training. The OLE special agent will be the collection point for monthly reports and will draft the quarterly report to be presented to the Council.

The number of hours and detections/boardings for each patrol area should be listed for the OHAPC and OECA to ensure enforcement is covering the OECA.

***Enforcement Principle 5:* To provide compliance assistance to user groups through outreach and education**

Status 2007: Enforcement officers assist in outreach and education projects.

- Distribute OHAPC brochures and Council regulations during patrols and boardings.
- NOAA OLE is providing press releases regarding cases.
- LE partners coordinated with Outreach staff during media event in 2005 and planning to participate in the 2006 event.

Recommendation 2007:

Status Update 2014: Enforcement officers continue to distribute OHAPC brochures and Council regulations, provide press releases on cases, and outreach during schedules outreach activities.

Recommendation 2014: Enforcement officers will continue to support of the outreach by:

- Distributing OHAPC and OECA brochures and SAFMC regulations during boardings and dockside investigations and at scheduled outreach activities,
- Releasing periodic reports on cases and activities in OECA, and
- Communicating through the OLE liaison agent to Council staff on education and outreach activities for the OECA.

3.2 Effectiveness Evaluation of Projects Completed to Date in Meeting OECA Objectives

Status 2007: Overall the implementation of the Law Enforcement strategy has been

successful.

Recommendation 2007: The following are recommendations for improvement:

- To report patrol days along with patrol hours,
- To work toward reporting hours dedicated to *Oculina* patrol as compared to hours available,
- To increase participation at fishing tournament Captain meetings prior to the tournament specifically in Sebastian and Fort Pierce,
- To provide the quarterly enforcement reports on SAFMC website,
- To continue to move toward reporting locations of boardings and violations,
- To consider expanding the use of VMS for other commercial fishers, and
- To use plain clothes operations.

Status Update 2014: Overall the implementation of the Law Enforcement strategy has been successful.

Recommendations 2014: The LE group recommended that the law enforcement plan be adopted using a Project Management format in order to increase performance of the plan. See Appendix D for an example.

Other areas for improvement included:

- Better record keeping by the source agency,
- More timely submission of reports, and
- Increased engagement with recreational tournaments.

3.3 Law Enforcement Recommendations Regarding the Current Size and Configuration of OECA

Recommendation 2007: No changes recommended.

Though there are no changes recommended the discussions included the following potential changes should they be supported by research and monitoring:

- Decrease the size and change to Type I,
- Move OECA north, and
- Make eastern boundary a straight line.

Recommendation 2014: No changes recommended.

3.4 Law Enforcement Recommendations to Assist in 10-Year Re-evaluation of Fishing Regulations.

The current levels of enforcement are at capacity. Should an increase in patrols be desired additional funding and assets would be necessary.

4.0 Research and Monitoring Breakout Group Report

Andy David*	NOAA SE Fisheries Science Center
John Reed*	Harbor Branch Oceanographic Institute at Florida Atlantic University and SAFMC Coral AP Member
Stacey Harter*	NOAA SE Fisheries Science Center
Steve Blair	FL Department of Regulatory and Economic Resources- Environmental Resources Management and SAFMC Coral AP (Chair)
Sandra Brooke	Florida State University- Coastal Marine Lab and SAFMC Coral AP Member
Pat Geer	GA Department of Natural Resources- Marine Fisheries and SAFMC Habitat AP
Grant Gilmore	Estuarine, Coastal and Ocean Science, Inc.
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4.1. Current and Proposed Research and Monitoring in the *Oculina* Experimental Closed Area

4.1.1 Brief Overview of Work Conducted in the OECA since 2007

• Visual surveys by technical divers in March-April 2008 aboard the NASA vessel, Liberty Star provided evidence that two high-relief *Oculina* bioherms (Jeff's Reef and part of Chapman's Reef complex) remain relatively undamaged from trawling within the OECA. However, trawl damage is evident through the center of the intact part of Chapman's Reef where Artificial Reef Blocks have been broken and scattered (C. Koenig, pers. comm.).

• Visual surveys by ROV in 2011 aboard the NOAA Ship Pisces confirmed the integrity of the Jeff's Reef, Chapman's Reef complexes. Partially intact Artificial Reef Blocks were found and while the donor *Oculina* colonies were absent, many newly recruited colonies were present on the structures.

• In 2000 and 2001, a total of 205 reefballs and 900 small modules were deployed (50% with coral transplants) in the Sebastian Pinnacles area of the OECA (PI C. Koenig, FSU). In April-May 2008, a series of restoration modules were surveyed by C. Koenig and S. Brooke using a team of technical divers from UNCW and the NASA ship Liberty Star. Although the NURC divers were excellent; dedicated and professional, it was determined that this was not the most appropriate method of surveying the recruitment modules. They are limited by bottom time and are at the mercy of the often very strong currents in this habitat (even with the assistance of scooters) and therefore have very limited search and survey capacity. The reefballs at Sebastian Pinnacles that were found did not support enhanced coral or fish populations, but definitive conclusions cannot be drawn because of the small sample size and suboptimal location of those that were observed. Chapman's Reef, while still considered a 'live' habitat, appears to have been impacted; coral and reef fish populations were not as prolific as reported in 2001 and recruitment blocks were completely destroyed. There was also a considerable amount of heavy fishing line observed in this area.

• Fourteen publications regarding deep-water *Oculina* reefs since 2007. See Section 4.2 for a complete list.

• Recent visual surveys show increasing numbers of black sea bass within OECA compared to the 2007 Evaluation Report.

Table 1. Summary of fish count and density from ROV surveys in the *Oculina* Experimental Closed Area site.

Common Name	Count	Dive Distance (km)	Density (#/km)
Anthiids	6420	3.659	1754.6
Sea Bass *Centropristis* sp.	124	3.659	33.9
Bank Sea Bass	54	3.659	14.8
Scamp	25	3.659	6.8
Black Sea Bass	23	3.659	6.3
Amberjack	6	3.659	1.6
Tilefish *Caulolatilus* sp.	2	3.659	0.5
Snowy Grouper	2	3.659	0.5
Gag Grouper	1	3.659	0.3
Vermilion Snapper	1	3.659	0.3

• Visual surveys continue to show evidence of fishing line, long line and trawl nets impacting coral habitat within the OHAPC and OECA.

• The consensus of the Research Evaluation Team is the proposal of the Shrimp Advisory Panel to open areas for trawling in the OHAPC/OECA would be extremely counterproductive and would put the few remaining dense stands of *Oculina varicosa* at risk.

• Many of the objectives below have not been meet due to the lack of adequate funding rather than technical limitations. The Review Team strongly recommends the SAFMC seek further funding to address many of these critical issues.

4.1.2. Brief overview of research and monitoring proposed

Researchers are continuing to monitor substrate deployed in 2000 and 2001 for *Oculina* restoration and the natural bioherms for expansion.

The SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat first within the OECA. While there are known concerns about observational bias with ROVs and large fishes, this is a cost effective way to survey large areas. Abundance, distribution, size and habitat associations will be determined and compared with other protected and open-to-fishing areas off the Southeastern U.S. coast. This project should also be able to complete the acoustic mapping of the OECA.

Researchers from Florida Atlantic University have submitted proposals to model the biophysical characteristics of the *Oculina* Banks.

4.2 Publications Concerning the Deep-water *Oculina* Reefs from 2007 to present (in descending order by year)

1) Reed, J.K., C. Messing, B. Walker, S. Brooke, T. Correa, M. Brouwer, T. Udouj, and S. Farrington. 2013. Habitat characterization, distribution, and areal extent of deep-sea coral ecosystem habitat off Florida, southeastern United States. Journal of Caribbean Science 47: 13-30.
2) Helies, F.C., J.L. Jamison, A. Lasseter. 2011. Assessment of the impacts of the Oculina Bank Marine Protected Area and in-depth ethnographic profile of the Fort Pierce, Florida Fishing Community. NOAA/NMFS Grant Number NA09NMF4270086(#110) Final Report. Gulf and South Atlantic Fisheries Foundation, Inc. Tampa, Florida. 108 pp.
3) Maness, A.M. 2011. Acoustic and visual seabed classification of the *Oculina* Habitat Area of Particular Concern (OHAPC), eastern Florida shelf. Master's Thesis, University North Carolina Wilmington, Wilmington, NC. 90 p.
4) Reed, J.K. and S. Farrington. 2010. Distribution of deep-water commercial fisheries species-golden crab, tilefish, royal red shrimp- in deep-water habitats off eastern Florida from submersible and ROV dives. South Atlantic Fishery Management Council and NOAA National Marine Fisheries Service. 163 pp.
5) Eytan, R.I., M. Hayes, P. Arbour-Reily, M. Miller, and M.E. Hellberg. 2009. Nuclear sequences reveal mid-range isolation of an imperiled deep-water coral population. Molecular Ecology 18:2375-2389.
6) Harter, S.L., M.M. Ribera, A.N. Shepard, and J.K. Reed. 2009. Assessment of fish populations and habitat on *Oculina* Bank, a deep-sea coral marine protected areas off eastern Florida. Fish Bull. 107:195-206.
7) Reed, J. K., C. Koenig, A. Shepard, and G. Gilmore. 2008. Long term monitoring of a deep- water coral reef: Effects of bottom trawling. Pages 169-179, in Pollock, N. Godfrey, J. (eds.), Diving for Science 2007. Proceedings of the American Academy of Underwater Sciences 26th Symposium.
8) Messing C.G., J.K. Reed, S.D. Brooke, and S.W. Ross. 2008. Deep-water coral reefs of the United States. In: Riegl B.M. and Dodge R.E. (Eds) Coral reefs of the USA. Springer, New York. 767–792.
9) George, R. Y., T. A. Okey, J. K. Reed, and R. P. Stone. 2007. Ecosystem-based fisheries management of seamount and deep-sea coral reefs in U. S. waters: conceptual models for proactive decisions. In: George, R.Y. and Cairns, S.D. (Eds.) Conservation and adaptive management of seamount and deep-sea coral ecosystems. Rosenstiel School of Marine and Atmospheric Science, University of Miami. Miami, FL. 9-30.
10) Hare, J.A. and H.J. Walsh. 2007. Planktonic linkages among marine protected areas on the south Florida and southeast United States continental shelves. Canadian Journal of Fisheries and Aquatic Sciences 64:1234-1247.
11) Morgan, L.E., C.F. Tsao, and J.M. Guinotte. 2007. Ecosystem-based management as a tool for protecting deep-sea corals in the USA. In: George, R.Y. and Cairns, S.D. (Eds.) Conservation and adaptive management of seamount and deep-sea coral ecosystems. Rosenstiel School of Marine and Atmospheric Science, University of Miami. Miami, FL. 39-48.
12) Reed, J. K., C. C. Koenig, and A. N. Shepard, 2007. Impacts of bottom trawling on a

deep-water *Oculina* coral ecosystem off Florida. Bulletin of Marine Science 81: 481–496.
13) Reed, J.K., C.C. Koenig, A.N. Shepard, and R.G. Gilmore, Jr. 2007. Long Term Monitoring of a Deep-water Coral Reef: Effects of Bottom Trawling. In: Pollock N.W. and Godfrey J.M., (Eds.) Diving for Science 2007. Proceedings of the American Academy of Underwater Sciences 26th Symposium. Dauphin Island, AL. 169-179.
14) Ross, S.W. M.S. Nizinski. 2007. State of deep coral ecosystems in the Southeast region: Cape Hatteras to Southeastern Florida. In: Lumsden S.E., Hourigan T.F., Bruckner A.W., and Door G. (Eds.) The State of Deep Coral Ecosystems of the United States. NOAA Technical Memorandum CRCP-3, Silver Spring, MD: 233–270.
15) Roth, K. 2007. Can the last deep-sea *Oculina* coral reefs be saved?: A management analysis of the *Oculina* Habitat Area of Particular Concern. Master's Thesis, Duke University, Durham, NC. 48 p.

4.3 Status of Research and Monitoring Projects in *Oculina* Evaluation Plan

4.3.1 Current status of some specific objectives and questions delineated in the *Oculina* Evaluation Plan for research and monitoring

Research and Monitoring (RM) Objective 1. Will *Oculina* thicket habitat recover throughout the *Oculina* Experimental Closed Area without human intervention? What time frame will be needed for significant recovery? Will it be necessary to introduce artificial substrate to serve as an initial settlement surface?

Project 1: ***Identify coral/fish recruitment pathways and compare settlement, growth, and survival rates on artificial substrate relative to settlement, growth, and survival rates on nearby unconsolidated coral rubble.***

Status 2007: Reef Balls and smaller modules were deployed in the OECA between 1996 and 2001 as artificial substrate for coral recruitment. In total, 731 concrete experimental modules were deployed in various configurations. Some of these structures had been seeded with donor *Oculina* colonies harvested outside the OHAPC/OECA.

Status Update 2014: Efforts were undertaken in 2008 to evaluate the condition of the Reef Balls and smaller modules. High currents, low visibility and the restricted bottom time of the open-circuit technical divers used to examine the structures combined to degrade the effectiveness of this evaluation. Many of the Reef Balls and other structures had been destroyed or moved since their deployment; the cause of the movement is unknown. A NOAA funded cruise in 2011 aboard NOAA Ship Pisces used an ROV to survey Jeff's and Chapman's Reefs. Two artificial structures were discovered and photographed. The donor *Oculina* colonies were no longer present. However natural recruits were abundant on the structures (pallets of concrete blocks).

Project 2: ***Model biophysical, chemical, and physiological characters. Previous studies have shown the benthic environment of the Oculina reefs to be very dynamic and widely fluctuating due to upwelling events and meandering of the Florida Current.***

Status 2007: No action

Status Update 2014: Newly hired researchers at Florida Atlantic University are actively

submitting grant proposals to model the biophysical characteristics of the *Oculina* Banks.

RM Objective 2. Determine and monitor the effect of the *Oculina* Experimental Closed Area on fish distribution and status?

Project 1: ***Assess spawning aggregations of fishery species.***

Status 2007: Proposed work to identify spawning sites in and around OECA.

Status Update 2014: Because vessel time has not been available during peak spawning periods, aggregations of dominant economically valuable reef fish have not been observed during this evaluation period. Spawning seasonality and lack of funding for *Oculina* research have been two causes of this outcome. For example, spawning season for gag is during the late winter, a period when weather conditions often preclude vessel operations. With the difficulties in acquiring ship time, most researchers do not risk scheduling a mission during this time of year as the entire cruise can be easily lost to weather. Recent advances have provided a potential methodology to address this issue however. A buoyed acoustic device could be located on likely spawning aggregation sites and collect data year round for a reasonable cost.

Project 2: ***Track fish movement***

Status 2007: Proposed to tag gag inside and outside of the OECA to identify movement patterns and spill over.

Status Update 2014: No progress has been made on this objective since 2007. Active telemetry is an option to address this objective. This would require capture and surgical implantation of transmitters in target fishes as well as deployment and recovery of acoustic sensors to monitor fish movements. This procedure has been done in other areas of similar depth, but remains a logistically challenging undertaking.

Project 3: ***Identify Oculina Experimental Closed Area fish population demographics***

Status 2007: Transects were set up inside and outside of the OECA to provide reef fish assessment and percent cover from digital photographs.

Status Update 2014: Work continues on transects to provide information on reef fish assessment and percent cover from digital photographs (See Table 1). The SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat first within the OECA. While there are known concerns about observational bias with ROVs and large fishes, this is a cost effective way to survey large areas. Abundance, distribution, size and habitat associations will be determined and compared with other protected and open-to-fishing areas off the Southeastern U.S. coast.

Project 4: ***Determine pre-closure distribution of dominant harvested species in and outside the reserve areas, in order to provide historical context for subsequent assessments. Review landings; spillover effects (i.e., identify benthic and juvenile pathways, upwelling events, spill-over between deep and shallow reefs).***

Status 2007: Re-examinations of submersible dives conducted during the 1980s may lead to better understanding of pre-closure distributions of dominant fish species, however the 2007 Evaluation team determined the potential information to be gained would not justify the cost and difficulty of this exercise.

Status Update 2014: [Helies, F.C., J.L. Jamison, A. Lasseter (2011) Assessment of the impacts of the Oculina Bank Marine Protected Area and in-depth ethnographic profile of the Fort Pierce, Florida Fishing Community. NOAA/NMFS Grant Number NA09NMF 4270086(#110) Final Report. Gulf and South Atlantic Fisheries Foundation, Inc. Tampa, Florida. 108 pp.] Helies et al. (2011) reported on the biological and social impacts of the OECA closed area in Fort Pierce FL which included a description of past fishing in the area and the impacts and perceptions the current OECA is having on the community.

[Hare, J.A. and H.J. Walsh (2007) Planktonic linkages among marine protected areas on the south Florida and southeast United States continental shelves. Canadian Journal of Fisheries and Aquatic Sciences 64:1234-1247.] Hare and Walsh 2007 used drifters to describe potential pathways for larval dispersal from the OECA. Recruitment was possible along the South Atlantic coast as well as potential for high number of recruits being advected from the South Atlantic.

Project 5: ***Determine age distribution, nursery grounds, migratory patterns, and mortality rates for dominant harvested fish stocks.***

Status 2007: This is an important question from a fisheries perspective, but it may not have direct implications for the OHAPC and the evaluation of the OECA. Some of the nursery grounds for snapper grouper species are outside of the OECA. The recruitment to and survivorship in the nursery grounds may be impacted by water quality or other factors.

Status Update 2014: This objective has not been addressed due to lack of funding. An appropriate examination of these questions would require very significant funding levels, a major logistical commitment and would require destructive sampling of many of the remaining reef fish in the OECA.

RM Objective 3. Determine the population structure of corals?

Project 1: ***Research population genetics of Oculina varicosa***

Status 2007: Taxonomic work has been started and the group recommends this work to determine eligibility of ESA. Population level work is needed as well to determine if large scale recovery is possible. This work might be cost prohibitive, especially using microsatellites.

Status Update 2014: [Eytan, R.I., M. Hayes, P. Arbour--Reily, M. Miller, and M.E. Hellberg (2009) Nuclear sequences reveal mid-range isolation of an imperiled deep-water coral population. Molecular Ecology 18:2375-2389.] Nuclear genetic sequences were used to test for population structure in *Oculina* coral off the southeastern U.S. sampled at 10 locations form North Carolina to the Florida Panhandle. *Oculina varicosa* from the deepwater *Oculina* coral banks (>70 m depth) off central Florida showed that this was a single population and a strong genetic outlier from the other populations, despite close proximity (<36 km) to other sites. Genetic isolation of the *Oculina* Banks population suggests that focused efforts will be needed to conserve the foundation species of these monotypic reefs and that depth may play a role in isolating these populations and perhaps facilitating initial steps towards speciation. Although the deepwater *Oculina* is not considered a separate species, it may be time to push to make these a threatened sub-set of the species.

Project 2: ***Identify cross-shelf relationships between shallow and deep Oculina varicosa populations.***

Status 2007: This work could be addressed using similar methods in RM Objective 3 Project 1. A range of shallow *O. varicosa* samples would be needed also.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

Project 3: ***Biogeography***

Status 2007: This work could be addressed using similar methods in RM Objective 3 Project 1. A range of shallow *O. varicosa* samples would be needed also.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

RM Objective 4. Identify the stressors affecting the *Oculina* Experimental Closed Area?

Project 1: ***Identify natural and anthropogenic stressors (i.e., disease, gear impacts, poaching, enforcement)***

Status 2007: Downgrade this objective to low priority considering the other research needs present in the OECA. Considerable research on coral stressors have been conducted in other locations. It is highly likely corals in the OECA respond similarly and the limited research funds available would be better allocated to other objectives.

Status Update 2014: [S. Edge, T. Shearer, M. Morgan, T. Snell (2013) Sub-lethal stress: detecting molecular responses of coral populations to environmental conditions over space and time. Aquatic Toxicology 128-129: 135-146.] In order for sessile organisms to survive environmental fluctuations and exposures to pollutants and stressors, molecular mechanisms (i.e., stress responses) are elicited. Previously, detrimental effects of natural and anthropogenic stressors on coral health could not be ascertained until significant physiological responses resulted in visible signs of stress (e.g., tissue necrosis, bleaching. In this study, changes in gene expression patterns were used to detect early and sub-lethal effects in scleractinian corals on south Florida reefs. Although all the coral appeared healthy the corals were physiologically compensating for exposure to stressors. This is the first study to detect specific sub-lethal physiological responses to specific environmental conditions that are not visually detectable.

Project 2: ***Determine the frequency and severity of sedimentation induced by benthic storms.***

Status 2007: Not listed separately in 2007 Report.

Status Update 2014: A researcher at HBOI/FAU has examined the effect of sedimentation on coral reproductive capacity. Continuous monitoring of environmental conditions, as would be possible with a buoyed instrument, would be able to address this objective.

[Brooke S, Holmes M, Young CM (2009) Effects of sediment on two morphotypes of *Lopheliapertusa* from the Gulf of Mexico. Marine Ecology Progress Series 390: 137–144.] Brooke et al. (2009) investigated sedimentation effects on another deep-sea coral, *Lophelia pertusa*, in the Gulf of Mexico. Impacts on *Oculina* may be similar.

Project 3: ***Identify physiological tolerances of the coral to environmental stressors.***

Status 2007: Not listed separately in 2007 Report.

Status Update 2014: This objective has not been addressed since the 2007 Evaluation Report. This objective could be easily addressed using small colonies or fragments of *Oculina varicosa*, which is easily obtained from nearshore ledges off central and southern Florida using SCUBA. The Evaluation team recommends increasing the priority of this objective.

RM Objective 5. Define the key trophodynamic functional groups?

Project 1: Identify food web structure and dynamics.

Status 2007: [George, R., T. Okey, J. Reed, R. Stone (2005) Ecosystem based fisheries management: Food chain models for a northeast Pacific gorgonian forest, the mid-Atlantic Corner Rise Seamount, and the Florida *Oculina* reefs. 3rd International Symposium on Deep-Sea Corals Science and Management, Miami, Florida, Abstract Book, p. 139.] A rudimentary model of food webs in the OHAPC/OECA was described shortly before the 2007 Evaluation Report.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

RM Objective 6. Develop index of physical and chemical parameters that characterize a healthy *Oculina* coral ecosystem.

Project 1: Develop index for coral health (including structural damage, recruitment, genetics, physiology, life history)

Status 2007: This was determined to be too expensive and logistically unfeasible to be pursued.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

Project 2: Develop index of community health for entire biota incl. coral (biodiversity, richness, biocomplexity).

Status 2007: This objective was determined to be too expensive and logistically unfeasible to be pursued.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

Project 3: Determine indicator species that are intimately tied with Oculina (invertebrates or vertebrates).

Status 2007: Description of fauna associated with live *Oculina* colonies has been studied and status of current knowledge was published by Reed et al. (2005 review paper). However the other habitats in the OECA and HAPC have not been studied.

Status Update 2014: The SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat within the OECA. This multi-year project will directly address this objective.

Project 4: What is the age of the coral substrate, and geological formations (last 15,000 years) (Death rates)? Also look at associated mollusks and other biota and their changes.

Status 2007: Although a complete core of an *Oculina* bioherm has never been taken, a short core taken during a lockout dive (J. Reed) on the flank of Jeff's Reef revealed a date of approximately 850 years providing an estimated age of several thousand years for the bioherm.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

Project 5: ***Are paleo-data (age) associated with past climate and oceanographic conditions?***

Status 2007: Although a complete core of an *Oculina* bioherm has never been taken, a short core taken during a lockout dive (J. Reed) on the flank of Jeff's Reef revealed a date of approximately 850 years providing an estimated age of several thousand years for the bioherm.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

Project 6: ***Are there other paleo-data from elsewhere in the world that will give perspective on Oculina growth? (ice cores, deep-water sediment cores)?***

Status 2007: Although a complete core of an *Oculina* bioherm has never been taken, a short core taken during a lockout dive (J. Reed) on the flank of Jeff's Reef revealed a date of approximately 850 years providing an estimated age of several thousand years for the bioherm.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

RM Objective 7. Conduct research on coral feeding ecology.

Project 1: ***Define feeding dynamics.***

Status 2007: [Brooke SD (2002) Chapter 3: Growth, energy allocation and respiration. Ph.D. Dissertation. Southampton Oceanographic Center, University of Southampton UK. 160pp.] Brooke partially addressed in the dissertation but has not been expanded upon since.

Status Update 2014: This has not been addressed since the 2007 Evaluation Report.

4.3.2. Assessment Planning Projects in Research and Monitoring

RM Assessment Objective 1. Characterize the effect of management measures in the *Oculina* Experimental Closed Area on the status of fishery stocks?

Project 1: ***Characterize (including distribution and abundance patterns, size and age distribution, spawning aggregation presence, sex ratios, etc.) major fishery species within the Oculina Experimental Closed Area compared to reference sites.***

NOAA Fisheries has preliminary data on fish density in the OECA (Table 1). The SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat within the OHAPC/OECA. This multi-year project will begin to directly address this objective.

Project 2: ***Characterize fish communities, inside and out, including habitat utilization patterns, trophic interactions, ontogenetic changes, predator-prey relationships, etc.***

The SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat within the OHAPC/OECA. This multi-year project will directly address this objective.

Project 3: ***Connectivity to the broader seascape (larval sources and sinks, spill-over effects).***

[Brooke SD (2002) Chapter 6: Larval dispersal and recruitment. Ph.D. Dissertation. Southampton Oceanographic Center, University of Southampton UK. 160pp.]Brooke partially addressed the project in the her dissertation but has not been expanded upon since.

RM Assessment Objective 2. Identify the major habitat types in the *Oculina* Experimental Closed Area, the *Oculina* Bank Habitat Area of Particular Concern and adjacent hardbottom areas?

Project 1: ***Complete high definition bathymetric mapping 1) within the Oculina Experimental Closed Area; 2) coral areas adjacent to the Habitat Area of Particular Concern; 3) in Habitat Area of Particular Concern within coral zone 50-100 m; 4) soft bottom habitat east of the coral zone within the Habitat Area of Particular Concern; and 5) suspected and known hard coral areas north and south of the Habitat Area of Particular Concern, specifically from Cape Canaveral to the north and from St. Lucie mound and Jupiter Inlet to the south.***

A significant portion of the OECA has been mapped (Figure 4). The SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat within the OHAPC/OECA. This multi-year project will directly address this objective.

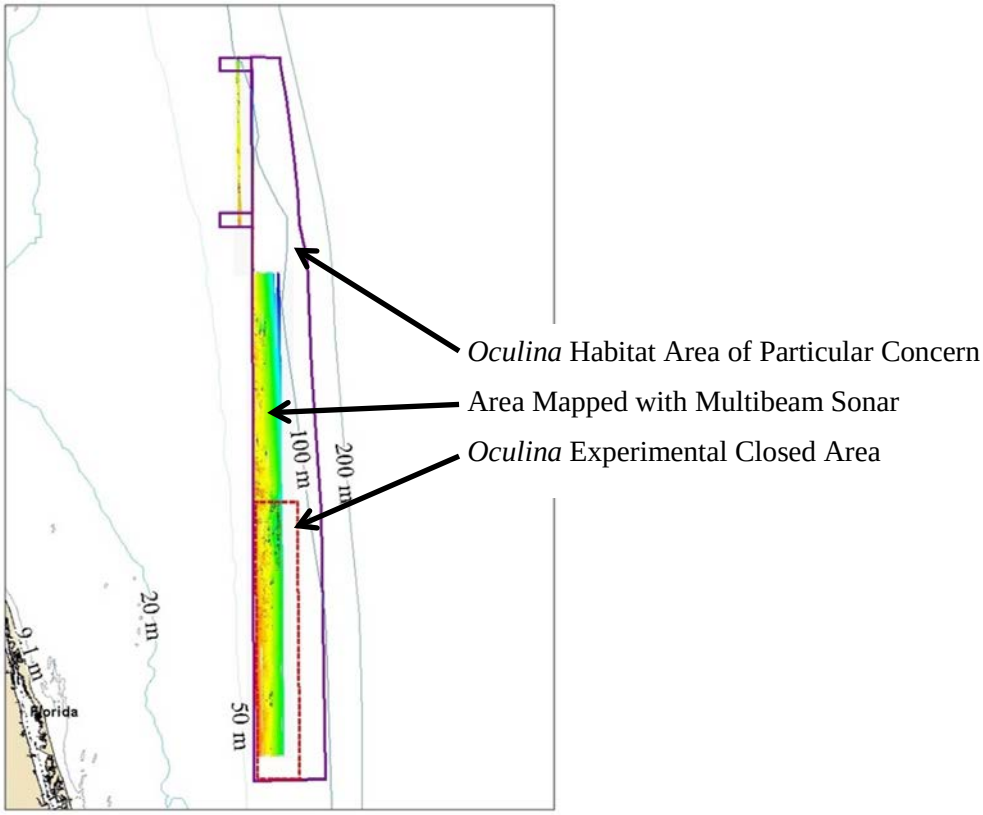

Figure 4. Map of the *Oculina* Habitat Area of Particular Concern (OHAPC) and the *Oculina* Experimental Closed Area (OECA) with areas mapped using multibeam sonar completed prior to 2014.

Project 2: ***Complete habitat characterization 1) within the Oculina Experimental Closed Area; 2) coral areas adjacent to the Habitat Area of Particular Concern; 3) in Habitat Area of Particular Concern within coral zone 50-100 m; 4) soft bottom habitat east of the coral zone within the Habitat Area of Particular Concern and 5) suspected and known hard coral areas north and south of the Habitat Area of Particular Concern, specifically from Cape Canaveral to the north and from St. Lucie mound and Jupiter Inlet to the south.***

[Harter, S.L., M.M. Ribera, A.N. Shepard, and J.K. Reed (2009) Assessment of fish populations and habitat on *Oculina* Bank, a deep-sea coral marine protected areas off eastern Florida. Fish Bull. 107:195-206.] The SAFMC's Coral Grant to NOAA for FY2014-2016 will utilize ROV surveys to evaluate fishes and habitat within the OHAPC/OECA. This multi-year project will directly address section 1, 2, and 3 of this objective and addressed in Harter et al. (2009).

RM Assessment Objective 3. Determine the magnitude and causes of changes in habitat structure and functionality over time?

Project 1: ***Determine causes and timing of coral death.***

This objective has not been addressed since the 2007 Evaluation Report. The 2007 Evaluation Report downgraded this objective to low priority considering the other research needs present in the OHAPC/OECA.

Project 2: ***What is the origin and functional characterization of rubble zone***

This objective has not been addressed since the 2007 Evaluation Report. The 2007 Evaluation Report downgraded this objective to low priority considering the other research needs present in the OHAPC/OECA.

RM Assessment Objective 4. Describe how oceanographic conditions and episodic events affect production, coral condition, reproduction and growth?

Project 1: ***Quantify the extent, intensity and frequency of episodic events (upwelling, storms, etc.).***

This objective has not been addressed since the 2007 Evaluation Report. A benthic lander or mooring with a current meter and Seabird SBE 19 or similar could easily capture these events. The Evaluation Team believes this objective should move up in priority.

Project 2: ***Assess the impact of episodic events (upwelling, storms, etc.).***

This objective has not been addressed since the 2007 Evaluation Report.

Project 3: ***Optimize design of restoration efforts.***

This objective has not been addressed since the 2007 Evaluation Report.

Project 4: ***Characterize impacts from anthropogenic sources of pollution nutrients/sedimentation).***

This objective has not been addressed since the 2007 Evaluation Report.

4.3.3 RM Recommended for Priority Research Projects

2007 Report Recommended Priority Research Project. See 2007 report for specific details.

- Complete characterization of major fishery species within the OECA and OHAPC.
- Complete multibeam and habitat maps of OHAPC and adjacent areas.
- Complete assessment of restoration experimental modules
- Model physical-chemical characteristics of OHAPC
- Determine the magnitude and causes of changes in coral habitat structure.
- Determine the population structure and genetics of the deep-water *Oculina*.

2014 Update Report Recommended Priority Research Projects.

- Complete habitat characterization in the OECA.
- Complete high resolution bathymetric mapping in OECA.
- Characterize (including distribution and abundance patterns, size and age distribution, spawning aggregation presence, sex ratios, etc.) major fishery species within the *Oculina* Experimental Closed Area compared to reference sites.
- Characterize fish communities, inside and out, including habitat utilization patterns, trophic interactions, ontogenetic changes, predator-prey relationships, etc.
- Connectivity to the broader seascape (larval sources and sinks, spill-over effects).
- Determine indicator species that are intimately tied with *Oculina* (invertebrates or vertebrates).
- Identify *Oculina* Experimental Closed Area fish population demographics
- Quantify the extent, intensity and frequency of episodic events (upwelling, storms, etc.)

4.4 Research and Monitoring Effectiveness Evaluation of Projects Completed to Date in Meeting the OECA Objectives

Status 2007: Almost without exception, the projects completed to date have addressed the highest priority research objectives and therefore have been effective at meeting those objectives.

Status Update 2014: The projects completed to date have addressed mostly high priority research objectives. Many of the objectives in the OECA Evaluation Plan have not been met due to a lack of funding. The SAFMC should make efforts to secure more funding for research and monitoring in the OECA.

4.5 Research and Monitoring Recommendation Regarding the Current Size and Configuration of the OECA and the 10 Year Evaluation of Fishing Regulations

Status 2007: Based on the best available scientific data and the research and monitoring accomplishments listed above, the Research and Monitoring Panel recommends that no changes be made to the size, configuration or fishing regulations within the current OECA. The current OECA contains all the various habitat types that are found within the entire OHAPC. Current restrictions on bottom fishing have been beneficial to both coral habitat

and fish populations within the OECA.

Status Update 2014: Opening areas for trawling in the CHAPC/OECA would be extremely counterproductive and would put the remaining dense stands of *Oculina varicosa* at risk.

5.0 *Oculina* Evaluation Plan Deliverables

The following tables track the progress of the objectives, projects, and principles from 2005 Evaluation Plan for the *Oculina* Experimental Closed Area. The values selected for the Status Report 2007 and Status Report 2014 were chosen based on comments during the breakout groups. If a project or principle has 0 then no progress has been made on the subject, 0.5 indicates work has started but the project is incomplete, and 1 indicates the work has been completed. An * beside a project or a principle indicates this is a continuing project.

5.1 Outreach and Education

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
Objective 1: Assist in development of the OECA Plan.					
Project 1: Develop an outreach strategy for the Oculina Bank area.	**1**	Project completed	Modify to update activities and clarify components		1
Objective 2. Develop a focused campaign targeting recreational/commercial fishermen in the central-eastern Florida area.					
Project 1. Provide SAFMC regulation brochures to area fishermen (40,000 copies)	**1**	Have been printed, 40K re-printed in 2007 and distributed.	Reprint as necessary. 2013 SAFMC Regulations App	Track App download stats on both platforms; FWC recreational and commercial brochures publication inclusion (POC: Alan Pierce)	1
Project 2. Work with fishing chart manufacturers and or vendors to improve available information for the OECA.	**0.5**	Contacts were made in 2005. Needs follow-up.		Jen Schull to follow-up with NOS - supplier of info for chart manuf.	0.5

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
Project 3. Work with Florida FWC to provide written information regarding the OECA in (a) their publications targeting both recreational and commercial fishermen and in (b) mailings for fishing licenses and permits.	**1**	Article in 2007 FWC Saltwater Fishing Regs; mailing of rack cards to FWC commercial permits office. Needs follow up		FWC can include information in recreational and commercial FWC Regulation Brochures, also can mail to commercial permit holders. Include articles in FWC Fishing Line Magazine (POC: Alan Pierce/Dan Ellinor)	1
* Project 4. Develop and distribute news releases to focus on law enforcement activities, research and monitoring projects, and the ecological importance of the area.	**1**	Occurring, continue to follow-up on this project deliverable.		Continue to locate hook news stories; coordinate with Research for upcoming field work FY14-16 and LE pulse operations	1
Project 5. Develop a PowerPoint presentation about the OECA, distribute on CD, post at Web site, and present to fishing clubs, environmental groups, local governments etc.	**0**	Incomplete		Develop stock PowerPoint for OECA; state contacts use for inclusion into existing ppts and talks	0
* Project 6. Develop and distribute posters and rack cards/brochures at area bait and tackles shops, marinas, fish houses, boating stores, fishing tournaments, boat shows, etc.	**1**	Posters and rack cards printed 2006. Over 10,000 have been distributed. Distribution ongoing.		Re-print/update rack cards for distribution include fishing clubs, Smithsonian Marine Station teacher kits, FWC distribution networks (POC: Alan Pierce/Rich Abrams); state parks (i.e. Ft. Pierce & Sebastian Inlet fishing museum)	1
Project 7 (NEW): Develop kiosk for target boat ramps/landings / FWC has prototype				This is a new project identified in 2014	0

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
Objective 3: Coordinate a broader media campaign with partners to reach central Florida residents and visitors using newspaper, radio, TV, Internet, and existing environmental education network (e.g. environmental centers, schools, academia, area businesses). (PARTNERSHIP PROJECTS)					
* Project 1. Develop an Oculina Web site or work within the existing site to establish a comprehensive web-based outlet to include access to useful education and outreach products. Publicize availability of information from new site by having links posted on other fishing/Non-Governmental Organizations/tourism related web sites	**1**	Information housed on the SAFMC Ecosystem site; HBOI hosted 2005 research cruise's daily log reports; NOAA Teacher at Sea; project is ongoing.	New SAFMC website launched in 2013 and includes Oculina information	Coordinate web site meeting prior to SEFSC/FAU ROV research trips FY14-16 for hosting scientists' daily logs on SAFMC site; link to other agencies/sites;	1
Project 2. Develop education products for teachers (K-12) and informal educators, post on Web site and develop packet for distribution to science teachers.	**1**	2005 Teacher Workshop held with partners; 2007 DW Coral Teacher Workshop held - led by NOAA	2008 Teacher Workshop held	Continue to hold Teacher Workshops; Funding available through COSEE FL in short-term for such a project (POC: Laura Dieterick)	1
Project 3. Create media packet targeting ecological importance of area; packet should include popular news items about OECA.	**1**	Completed for 2005 research cruise.			1

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
Project 4. Develop a traveling portable exhibit that can be displayed at fishing tournaments, tradeshows, seafood/maritime festivals, aquariums, science museums, libraries, government centers, etc.	**0**	Incomplete in 2007	The portable exhibit was developed in 2009 - includes kiosk, "Revealing the Deep" film featured; this is used at SAFMC meetings, limited use by outside organizations. Needs updating.		0.5
* Project 5. Offer media excursions to the OECA and HAPC/ tours and interviews regarding enforcement activities onboard the CT Randall law enforcement vessel.	**1**	Media cruise coordinated with FWC and NOAA OLE in 2005, cxld bc of weather. Follow up with additional activity.	Media excursion held in Aug 2009. Deployed submersible; received local and national coverage, including NBC Nightly News.		1
Project 6. Develop TV documentaries working with environmental TVoutlets (e.g., Discovery Channel, Public TV.	**0.5**	Documentary producer accompanied 2005 research cruise; film under development. Status?			0.5
Project 7. Work within existing program to deploy a real time data buoy in the Oculina Bank area to provide weather and sea-state information for boaters and fishermen and integrate information into web site.	**0**	Incomplete	Information added to NOAA National Data Buoy Center Station at Ft. Pierce; directly links to SAFMC web site and Oculina Bank		0

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
			regulations		
Project 8. Assist with the continued development of an interpretive Oculina coral display at the Smithsonian Marine Station in Ft. Pierce, Florida.	**1**	Exhibit housed at Smithsonian Marine Station			1
Objective 4: Evaluation.					
Project 1: Develop a survey tool to assess the effectiveness of the campaign and widely distribute before, during and after majority of activities underway.	**1**	2005 survey developed in conjunction with FL SeaGrant.			1
* Project 2: Continue to receive input from local constituents (through the database established from the June 2004 outreach meetings) regarding the development of materials and level of community awareness.	**1**	Ongoing.	Continue contact with Smithsonian Marine Station; contact w/ Canaveral Charter Captain's Assoc.; Oculina Bank business collaboration; need to better utilize community contacts.		1
TOTAL of Completion Level	**13**				13.5
Total of Information and Education Deliverables	**17**				**18**

5.2 Law Enforcement

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
Council motion March 2003: (1) It is the Council's position/policy that enforcement of the Oculina Closure is an utmost priority, (2) violation of the Oculina Experimental Closed Area is egregious and of a high and aggravated nature, and (3) that we request NOAA General Counsel revise the penalty schedule to be commensurate with the above classification.					
Project 1. Penalty Schedule Revised	**1**	Penalty schedule revised in June 2003	Penalty schedule revised again in 2011; this schedule was updated in an effort to develop a national schedule, currently out for comment until April 28, 2014 *will modify the classification and range of penalties according to matrix		**1**

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
Council motion June 2003: Develop updated law enforcement plan within 1 year of implementation of SG Am 13A.					
Project 1. Updated law enforcement plan	**1**	Completed within 1 year of Snapper Grouper Amendment 13A	Current Enforcement Plan to be redeveloped using a Project Management Format		1
Principle I. VMS – real-time access to VMS (coordination by USCG and FWC access to VMS)	**0.5**	Continued monitoring; USCG real-time on vessels not complete; FWC direct access to VMS?	Monitoring; Intelligence operations; Planning patrol operations; and Investigations - follow-up inspections/interviews ongoing. FWC now has a mirrored access to VMS; USCG has access to VMS data through their command center only (have to call in for this information because no direct access on cutter vessels)		1

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
*** Principle II. Cooperative Enforcement (USCG, FWC, OLE): patrols, investigations, intelligence sharing, meetings**	**1**	Functioning	Patrols (USCG & FWC); Investigations (NOAA OLE); Intelligence (VMS, other contacts); Training operations functioning		1
*** Principle III. Increase Enforcement Presence (patrols, 24' rigid hull inflatable boat for surge operations)**	**0.5**	Coordinated pulse operations, dedicated patrols by FWC, NOAA OLE vessel?	USCG, FWC, OLE surge operations - cooperative enforcement is utilizing each agency's assets; Patrol activity undertaken by USCG and FWC (vessels, boats, aircraft)		0.5
*** Principle IV. Quarterly Enforcement Reports**	**1**	Completed, ongoing	Quarterly reports presented at SAFMC meetings; OLE prepares report	Better recordkeeping by agency; timely submission of reports. Inquire with outreach/research team if enforcement report data is useful. These reports are not used within agency, but prepared solely for SAFMC. If not useful, reconsider principle.	1
Principle V. Support of Outreach and Education Plan specific projects					

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	New Recommendations	Status Report 2014
* Objective 2. Project #1. LE support of distribution of SAFMC regulations	**1**	Completed, ongoing	Ongoing at Outreach Events (fishing shows and tournament meetings); and on patrol (recreational anglers in or near OECA; commercial fishermen)	Engage in tournaments in Sebastien and Ft. Pierce (incl. Oculina rack card in captain's bags)	1
* Objective 2. Project #4. LE support of news releases	**1**	Ongoing			1
* Objective 2. Project #6. LE support of distribution of Oculina HAPC brochures	**1**	Ongoing			1
TOTAL of Completion Level	**8**				**8**
Total of Enforcement Deliverables	**9**				**9**

5.3 Research and Monitoring

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
I. Develop a research, monitoring and evaluation component for the Oculina Evaluation Plan	**1**	Completed		1
1. Will Oculina thicket habitat recover throughout the Oculina Experimental Closed Area without human intervention? What time frame will be needed for significant recovery? Will it be necessary to introduce artificial substrate to serve as an initial settlement surface? (TO BE COMPLETED BY YEAR 3)				
Objective 1: Identify coral/fish recruitment pathways and compare settlement, growth, and survival rates on artificial substrate relative to settlement, growth, and survival rates on nearby unconsolidated coral rubble.	**0.5**	225 large concrete reefballs deployed in 2000-2001 to measure coral settlement, growth, survival. Keonig submitted proposal in 2004 to use divers to survey equipment. Sufficient resources not available.	2008 field research was conducted to attempt to dive and assess transplant module growth/success. Divers sent down over 5-6 day period. Structures had moved. Some reef balls and blocks were moved or crushed presumably by trawls. / 2011 Pisces fieldwork, during an ROV survey, scientists observed one module within the OECA (Chapman's Reef), transplanted corals had not survived, but new recruits to corals were there. The project remains incomplete.	0.5

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
			Requires significant ROVor submersible time to complete. Currently no funding for this.	
Objective 2: Model biophysical, chemical, and physiological characters. Previous studies have shown the benthic environment of the Oculina reefs to be very dynamic and widely fluctuating due to upwelling events and meandering of the Florida Current.	**0**	No projects on table, no funding.	Florida Atlantic University has hired 2 physical oceanographers with this research focus. Researchers are seeking grants and funding opportunities.	0
2. Determine and monitor the effect of the Oculina Experimental Closed Area on fish distribution and status? (TO BE COMPLETED BY YEAR 10)				
Objective 1: Assess spawning aggregations of fishery species.	**0**	Incomplete	Should remain a high-priority. Need to assess year-round and during known spawning events. Currently not funded.	0
Objective 2: Track fish movement	**0**	Incomplete	Currently not funded	0
Objective 3: Identify Oculina Experimental Closed Area fish population demographics	**0.5**	Reef fish characterization surveys 80% complete (Harter et.al)	Continuing work. Consider temporal appropriateness of surveys	0.5

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
Objective 4: Determine pre-closure distribution of dominant harvested species in and outside the reserve areas, in order to provide historical context for subsequent assessments. Review landings; spillover effects (i.e., identify benthic and juvenile pathways, upwelling events, spill-over between deep and shallow reefs)	**0**	Group consensus (from 2007 report) was this objective may not be worthwhile; well-established that fisheries were once there, objective could be met through fishermen interviews	Helies et al. 2011 report: Assessment of the Impacts of the Oculina Bank MPA and In-Depth Ethnographic Profile of the Fort Pierce, Florida Fishing Community; Hare and Walsh 2007 report on larval transport. Currently not funded.	0.5
Objective 5: Determine age distribution, nursery grounds, migratory patterns, and mortality rates for dominant harvested fish stocks.	**0**	Nothing completed	Very costly to complete.	0
3. What is the population structure of corals? (TO BE COMPLETED BY YEAR 10)				
Objective 1: Research population genetics of Oculina varicosa	**0**	Incomplete	Eytan et al. 2009 report on deepwater coral genetics	0.5
Objective 2: Identify cross-shelf relationships between shallow and deep Oculina varicosa populations.	**0**	Incomplete		0
Objective 3: Biogeography	**0**			0
4. What are the stressors affecting the Oculina Experimental Closed Area? (TO BE COMPLETED BY YEAR 10)			Consider this objective as high priority. Since Evaluation Team last met, some research on sedimentation, temperature and other stressors and their detrimental effects to corals is being done./ John Reed paper on sub-lethal effects	

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
Objective 1: Identify natural and anthropogenic stressors (i.e., disease, gear impacts, poaching, enforcement)	**0**	Low priority considering other research needs	Edge et al. 2013 report on sublethal stress in coral populations but did not include *Oculina.*	0.5
Objective 2: Determine the frequency and severity of sedimentation induced by benthic storms.	**0**	Low priority considering other research needs	Brooke et al. 2009 report on sedimentation effects	0.5
Objective 3: Identify physiological tolerances of the coral to environmental stressors	**0**	Low priority considering other research needs	Recommended to increase this priority. Currently not funded.	0
5. What are the key trophodynamic functional groups? (TO BE COMPLETED BY YEAR 5)				
Objective 1: Identify food web structure and dynamics	**0.5**	George et al. (2006) created a rudimentary model, further information is needed.		0.5
6. Develop index of physical and chemical parameters that characterize a healthy Oculina coral ecosystem. (TO BE COMPLETED BY YEAR 10)				
Objective 1: Develop index for coral health (including structural damage, recruitment, genetics, physiology, life history)	**0**	Prohibitively expensive and logistically unfeasible.		0
Objective 2: Develop index of community health for entire biota incl. coral (biodiversity, richness, biocomplexity).	**0**	Prohibitively expensive and logistically unfeasible.		0

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
Objective 3: Determine indicator species that are intimately tied with Oculina (invertebrates or vertebrates)	**0.5**	Description of fauna associated with live *Oculina* colonies has been studied and status of current knowledge was published by Reed et al. (2005). Other habitats within OECA haven't been studied.	Coral Grant FY 2014-2016 will conduct research on this topic	0.5
Objective 4: What is the age of the coral substrate, and geological formations (last 15,000 years) (Death rates)? Also look at associated mollusks and other biota and their changes.	**0.5**	Information on bioherm age was determined using a single core of an *Oculina* mound (Reed 1980). Further info needed, but low priority.		0.5
Objective 5: Are paleo-data (age) associated with past climate and oceanographic conditions?	**0**	Incomplete		0
Objective 6: Are there other paleo-data from elsewhere in the world that will give perspective on Oculina growth? (ice cores, deep-water sediment cores)?	**0**	Incomplete		0
7. Conduct research on coral feeding ecology (TO BE COMPLETED BY YEAR 10)				
Objective 1: Define feeding dynamics	**0.5**	Brooke, unpublished study. Field sampling and lab experiments are needed to complete this objective. Low priority.		0.5
Assessment Planning Projects				

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
1. What is the effect of management measures in the Oculina Experimental Closed Area on the status of fishery stocks? (HIGHEST PRIORITY TO BE COMPLETED BY YEAR 10)				
Objective 1: Characterize (including distribution and abundance patterns, size and age distribution, spawning aggregation presence, sex ratios, etc) major fishery species within the Oculina Experimental Closed Area compared to reference sites.	**0.5**	Reef fish characterization surveys 80% complete; 2005 transect data collected at 4 stations in OECA, 4 stations in HAPC, and 4 stations outside (inshore) of closed areas. SEADESC dive summaries being created.	S. Harter pointed out that SEFSC hasn't received funding to study the *Oculina* Bank since 2005. However, 5 ROV dives were made in 2011 on a deep coral cruise. *Pisces* Cruise report from July 2011 results need to be incorporated into the Research Team's report; include images from species inside of OECA; also species composition table	0.5
Objective 2: Characterize fish communities, inside and out, including habitat utilization patterns, trophic interactions, ontogenetic changes, predator-prey relationships, etc.	**0.5**	Reef fish characterization surveys 80% complete; 2005 transect data collected at 4 stations in OECA, 4 stations in HAPC, and 4 stations outside (inshore) of closed areas. SEADESC dive summaries being created.	FY 14-16 CRCP coral grant objectives: conduct ROV dives inside OECA to continue species and habitat characterization of the area.	0.5
Objective 3: Connectivity to the broader seascape (larval sources and sinks, spill-over effects)	**0**		Hare and Walsh 2007 used larval drifters to look at OECA connectivity	0.5

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
2. What and where are the major habitat types in the Oculina Experimental Closed Area, the Oculina Bank Habitat Area of Particular Concern and adjacent hardbottom areas? (HIGHEST PRIORITY TO BE COMPLETED BY YEAR 3)				
Objective 1: Complete high definition bathymetric mapping 1) within the Oculina Experimental Closed Area; 2) coral areas adjacent to the Habitat Area of Particular Concern; 3) in Habitat Area of Particular Concern within coral zone 50-100 m; 4) soft bottom habitat east of the coral zone within the Habitat Area of Particular Concern and 5) suspected and known hard coral areas north and south of the Habitat Area of Particular Concern, specifically from Cape Canaveral to the north and from St. Lucie mound and Jupiter Inlet to the south	**0.5**	See above; 2005 field survey (Harter et.al)	Same as above. Some of the objectives are repetitive.	0.5

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
Objective 2: Complete habitat characterization 1) within the Oculina Experimental Closed Area; 2) coral areas adjacent to the Habitat Area of Particular Concern; 3) in Habitat Area of Particular Concern within coral zone 50-100 m; 4) soft bottom habitat east of the coral zone within the Habitat Area of Particular Concern and 5) suspected and known hard coral areas north and south of the Habitat Area of Particular Concern, specifically from Cape Canaveral to the north and from St. Lucie mound and Jupiter Inlet to the south	**0.5**	See above		0.5
3. What are the magnitude and causes of changes in habitat structure and functionality over time? (TO BE COMPLETED BY YEAR 3)				
Objective 1: Determine causes and timing of coral death	**0**	No funding. Low priority.		0
Objective 2: Origin and functional characterization of rubble zone	**0**	Incomplete. Low priority.		0
4. How do oceanographic conditions and episodic events affect production, coral condition, reproduction and growth? (TO BE COMPLETED BY YEAR 10)				
Objective 1: Quantify the extent, intensity and frequency of episodic events (upwelling, storms, etc)	**0**	Could be a long-term proposal with NSF IOOS funding entities.		0
Objective 2: Assess the impact of episodic events (upwelling, storms, etc)	**0**	Incomplete		0

Objective and Project Description	Status Report 2007	Notes from 2007 Report	Developments Since 2007	Status Report 2014
Objective 3: Optimize design of restoration efforts	**0**	Proposed a summary (literature review) of oceanographic characters unique to Canaveral and the HAPC; proposed array of echosounders to measure Gulf Stream fluctuations and also fixed buoys with bottom mounted at Jeff's Reef; a proposal submitted but not funded.		0
Objective 4: Characterize impacts from anthropogenic sources of pollution (nutrients/sedimentation)	**0**	Not logistically tractable.		0
TOTAL of Completion Level	**6**			**8**
Total Number of Projects Started	11			15
Total of Research and Monitoring Deliverables	**33**			**33**

Appendix A. Recommendations from the Information and Education Advisory Panel

Objective 2. Develop a focused campaign targeting recreational/commercial fishermen in the central
eastern Florida area.

Project 1. Provide SAFMC regulation brochures to area fishermen
Recommendations from the AP:
• Include USFWC Wildlife Refuges in the area for distribution of materials.
• Recommend purchasing advertising space on fishing forums.
• Work with other NGOs, e.g., CCA to provide information on regulations.
• Support the recommendations of the Evaluation Team.

Project 2. Work with fishing chart manufacturers and or vendors to improve available information for
the *Oculina* Experimental Closed Area.
Recommendations from the AP:
• Support the recommendations of the Evaluation Team.

Project 3. Work with Florida Fish and Wildlife Conservation Commission (FWC) to provide written information regarding the *Oculina* Experimental Closed Area in (a) their publications targeting both recreational and commercial fishermen and in (b) mailings for fishing licenses and permits. Recommendations from the AP:
• Support the recommendations of the Evaluation Team.

Project 4. Develop and distribute news releases to focus on law enforcement activities, research and monitoring projects, and the ecological importance of the area.
Recommendations from the AP:
• Capitalize on the 20-year anniversary of the OECA for media purposes.
• Support the recommendations of the Evaluation Team.

Project 5. Develop a PowerPoint presentation about the *Oculina* Experimental Closed Area, distribute on CD, post at Web site, and present to fishing clubs, environmental groups, local governments etc. Recommendations from the AP:
• Support the recommendations of the Evaluation Team.

Project 6. Develop and distribute posters and rack cards/brochures at area bait and tackles shops, marinas, fish houses, boating stores, fishing tournaments, boat shows, etc.
Recommendations from the AP:
• Develop a current list of boating/fishing stores and tournaments to target for future distribution.
• Support the recommendations of the Evaluation Team.

Project 7 (NEW): **Develop kiosk for target boat ramps/landings.**
Recommendations from the AP:
• Work with marinas that participate in the Clean Marina program to display/place kiosks and/or signage.
• Work with USFWS wildlife refuges as well to develop and place new or existing kiosks/signage within refuge boat landings/ramps.

• Support the recommendations of the Evaluation Team.

PARTNERSHIP PROJECTS

Objective 3: Coordinate a broader media campaign with partners to reach central Florida residents and visitors using newspaper, radio, TV, Internet, and existing environmental education network (e.g. environmental centers, schools, academia, area businesses).

Project 1: Develop an *Oculina* Web site or work within the existing site to establish a comprehensive web-based outlet to include access to useful education and outreach products. Publicize availability of information from new site by having links posted on other fishing/Non-Governmental Organizations/tourism related web sites.

Recommendations from the AP:

• Use FWC "Gone Coastal" for distribution of information on OECA.

• Partner with University of Miami RASMAS for student production of videos – Beneath the Waves Film Festival.

Project 2: Develop education products for teachers (K-12) and informal educators, post on Web site, and develop packet for distribution to science teachers.

Recommendations from the AP:

• Identify *Oculina* scientist or researcher spokesperson to do Skype interviews with current or past NOAA Teacher at Sea participants. Work with NOAA Fisheries on getting contacts and help facilitate the exchange.

• Florida Marine Science Educators Association may be a target audience to help distribute education products for teachers and informal educators (www.fmsea.org). Also ask them to post information on OECA on their website.

• Support the recommendations of the Evaluation Team.

Project 3: Create media packet targeting ecological importance of area; packet should include popular news items about *Oculina* Experimental Closed Area.

Recommendations from the AP:

• Support the recommendations of the Evaluation Team.

Project 4: Develop a traveling portable exhibit that can be displayed at fishing tournaments, tradeshows, seafood/maritime festivals, aquariums, science museums, libraries, government centers, etc.

Recommendations from the AP:

• Consider the USFWS wildlife refuges for use of the portable exhibit (especially Merritt Island, FL). Jennifer Koches, AP member, offered to help make connections.

• Consider creating panel style, pop-up displays that could be shared among partners; low cost, easy to travel, and can be changed out more frequently.

• Support the recommendations of the Evaluation Team.

Project 5: Offer media excursions to the *Oculina* Experimental Closed Area and HAPC/ tours and interviews regarding enforcement activities onboard the *CT Randall* law enforcement vessel. Recommendations from the AP:

• Science Online blogging events may be a good outlet for reaching a wider audience during media excursions.

• June 27, 1994 was when the rule was implemented. Upcoming 20th anniversary could be good time to push a social media campaign highlighting the OECA; Collaborate with NOAA Fisheries,

FL FWC and other partners to coordinate a social media campaign the week of June 27th, 2014.
• Include an agenda item during the Habitat Committee at the upcoming June 2014 SAFMC meeting to highlight the 20th anniversary of OECA. (Recommendation from Council staff, Gregg Waugh.)
• Support the recommendations of the Evaluation Team.

Project 6: Develop TV documentaries working with environmental TV outlets (e.g., Discovery Channel, Public TV.
Recommendations from the AP:
• Support the recommendations of the Evaluation Team.

Project 7: Work within existing program to deploy a real time data buoy in the *Oculina* Bank area to provide weather and sea-state information for boaters and fishermen and integrate information into web site.
Recommendations from the AP:
• Support the recommendations of the Evaluation Team.

Project 8: Assist with the continued development of an interpretive *Oculina* coral display at the Smithsonian Marine Station in Ft. Pierce, Florida.
Recommendations from the AP:
• Support the recommendations of the Evaluation Team.

Objective 4: Evaluation
Project 1: Develop a survey tool to assess the effectiveness of the campaign and widely distribute before, during and after majority of activities underway.
Recommendations from the AP:
• Consider using pre and post surveys (web-based or print) with teach workshop participants.
• Use social media posts and measure the "likes" and comments received as a measure of the effectiveness of using social media for outreach on OECA; also consider using Q&A type social media posts to gauge stakeholder knowledge about OECA and outreach efforts.
• Use electronic survey – GoDelivery, Survey Monkey, and other survey software – as a mechanism to evaluate education projects for OECA.
• Send an evaluation survey to participating teacher workshop participants.
• Consider using law enforcement violations as a measure of effectiveness of the outreach campaign. (Work with law enforcement to calculate the number of violations since the OECA was implemented to see if violations have declined; make linkages with outreach campaigns and law enforcement.)
• Support the recommendations of the Evaluation Team.

****NOTE:** Kim will send a copy of the survey that was previously used so that the AP can provide further recommendations about the survey and use of a survey as an evaluation tool.

Project 2: Continue to receive input from local constituents (through the database established from the June 2004 outreach meetings) regarding the development of materials and level of community awareness.
Recommendations from the AP:
• Develop a list of area constituent groups for targeting outreach campaigns.
• Develop a list of area festivals, fishing tournaments, etc. for targeting outreach campaigns.

• _Consider use of a survey that asks questions of fishermen about their offshore fishing activities (general locations, types of fishing, etc.) that may coincide with areas around the OECA and other types of survey questions designed at targeting an audience for outreach efforts.
• Support the recommendations of the Evaluation Team.

Appendix B. Recommendations and Comments from the Deepwater Shrimp Advisory Team

The Deepwater Shrimp Advisory Panel reviewed the draft report at their May 6-7, 2014 meeting.

- The transit provision is important to the industry and since this is new and was highlighted in the LE Report, they are concerned about how transit will be enforced with the VMS and increased ping rate. The AP worked with LE to develop the proposed method and they support the transit provision. They would like to see an Implementation Plan for exactly what needs to happen for this to be implemented.
- Clarify that if want to transit a closed area, you need the VMS with the increased ping rate but if not interested in transiting, then the existing VMS unit is ok. Industry will need a period of time after the regulations are approved to purchase and install the new capability so a delayed effective date would be helpful.
- Very interested in cooperative research to meet the research/monitoring needs
- Completion of 6 of 33 projects in 10 years is kind of rough information-wise
- NMFS should use the shrimp vessels to carry instruments similar to what the Navy is doing
- Use citizen scientists similar to what has been done in the avian world
- Research & Monitoring report states that shrimp trawls moved the artificial reef blocks but no evidence to document this
- Coral is important to the industry as habitat for rock shrimp. There are more impacts beyond any from trawls. Many factors are contributing to changes in coral health and the distribution of rock shrimp and studying the impacts from these stressors needs to be a higher priority:
    - Freshwater discharges from Lake Okeechobee
    - Dade County is putting millions of gallons of treated sewer water into the ocean everyday
    - Last year shrimpers caught a thick brown leafy seaweed that was so thick it loaded the nets; took days to clean nets; this occurs in the southern end near the nutrient discharges; nothing living down on the southern end of the OECA (no bat fish or lizard fish and crabs)
    - Oil and chemical dispersants from the BP oil spill
- Closed area was put there to study snapper and grouper and the work is not being done
- Work examining the stressors on coral is not being done
- The industry has requested trawling be allowed in the offshore portion of the OECA, deeper than 100 m which is all soft substrate without any coral; don't feel this would harm any *Oculina*; question the science used to close and keep closed when there is no coral there.
- *The Deepwater Shrimp AP requests a specific response on what information or science justified the initial closure and justifies this area remain closed.*
- Research on spawning fish – reports state it is difficult to get ship time but the industry can provide the platforms to do research during the spawning season
- Research & Monitoring report should summarize work done and not just provide a reference; the AP requests this be added in the final report

- Funding is limited and you should take the little funding available and complete the projects in the OECA before moving to areas outside. Let's try to figure out really what is in the experimental closed area, which was set aside over 20 years ago and almost no research has been done inside that.
- Research on commercially harvested fish needs to be included in the highest priorities
- Number 4, Objective 4 (stressors affecting the OECA) needs to be elevated
- Rock shrimp industry can provide lots of knowledge of the changes over time; oral interviews with captains or written reports; scientists need to work with the industry
- Hard to continue outreach with all the lost funding/research/outreach activities:
    - Andy Shepherd's program at the University of North Carolina-Wilmington gone
    - Harbor Branch gone
    - Deep equipment from Harbor Branch gone
    - Funding gone
- The industry is very willing to work with the education efforts of the Smithsonian Marine Center
- The AP questioned what outreach would be done if Coral Amendment 8 is approved and how would this impact the outreach effort in the OECA?
- The AP noted that the impact of monofilament line on corals needs to be examined
- Should publicize what the penalties are for fishing in the OECA
- The AP expressed thanks for the excellent job done on outreach

Appendix C. Overview of *Oculina* Outreach Activities

Activities 2004 - 2007

Partnering has played a major role in recent outreach efforts associated with the *Oculina* Bank Experimental Closed Area and the *Oculina* Habitat Area of Particular Concern. As part of a larger outreach initiative focusing on Deepwater Corals through NOAA's Coral Reef Conservation Program (CRCP), partners from Harbor Branch Oceanographic Institution, The South Atlantic Fishery Management Council, The Smithsonian, NASA, and NOAA-National Undersea Research Center, joined NOAA Fisheries-Southeast Fishery Science Center in implementing a broad outreach and education initiative, using the *Oculina* HAPC and Experimental Closed Area as a focus. Beginning in 2004, CRCP provided funding for a series of local constituent meetings that proved valuable to the development of the Outreach component of the Evaluation Plan for the *Oculina* Experimental Closed Area. Details are included in the Evaluation Plan.

In October 2005, the cooperative efforts capitalized on event-based outreach and education activities associated with the NOAA CRCP sponsored research expedition to the *Oculina* Bank. Details regarding these activities are listed below. Additional outreach and education activities were conducted in conjunction with a 2009 research cruise.

Partnerships through the CRCP project have increased awareness of and involvement with deep water coral resources of the Southeast region by producing teacher workshops, daily web-logs during the *Oculina* research and monitoring cruises, a port day for students and teachers, multi-media resources for news media and educators, posters and rack cards, and web-based resources. The Council's website was updated in 2013 and continues to feature an entire section on deepwater corals, including information specifically developed cooperatively with NOAA/NURC regarding *Oculina varicosa* and the *Oculina* Bank HAPC and Experimental Closed Area.
http://www.safmc.net/managed-areas/*Oculina*-bank

Beginning in 2005, the Council produced printed copies of the *2005 Fishing Regulations for the U.S. South Atlantic* that included an entire page on regulatory information for the *Oculina* Bank HAPC and Experimental Closed Area. The popular regulations brochures were distributed to state and federal law enforcement agencies as well as to the general public, with 40,000 copies distributed in 2005, and updated versions distributed in 2007 and again in 2010. Due to frequent changes in regulations, the printed brochures are no longer produced. In 2009, the Council, in conjunction with the S.C. Sea Grant Consortium, developed and distributed 40,000 copies of a new regulations brochure, *Regulations for Deepwater MPAs in the South Atlantic* that also included information on the OECA. In 2013, the Council released a mobile application "App" as noted in the report. The App includes regulation information on managed areas, including the OECA. In addition, the *South Atlantic Update*, a quarterly publication of the Council, has featured numerous articles regarding the *Oculina* Bank. Copies of both the *Regulations for Deepwater MPAs for the South Atlantic* and the *South Atlantic Update* are available online at www.safmc.net.

Cooperative project accomplishments are highlighted below:

Teacher Workshops
August 2005: NOAA, the Council, and HBOI sponsored a one-day teacher workshop entitled *"Treasures of the Deep – Deep Water Corals of the South Atlantic and Oculina Bank: A Local Resource Workshop for Teachers."* Twenty one secondary school educators from three counties along the central eastern coast of Florida attended the workshop held August 17, 2005. Participants learned about DSC ecosystems, the OECA and HAPC, research and monitoring efforts, resource management, and received educational materials for classroom use. Participants received new curriculum and multi-media educational resources, conducted activities related to oceanographic exploration, and gained further understanding of the importance of this unique deep water habitat.

September 2007: A Deepwater Coral Teacher Workshop was held September 15, 2007 in Ft. Pierce, FL. The NOAA-led workshop was held at HBOI and included an afternoon tour of the Smithsonian Marine Station, also located in Ft. Pierce. Nineteen teachers participated in the one-day workshop. The workshop included lectures, lesson plans and the field trip to the marine station. Supplemental educational materials were also distributed to workshop participants.

April 2008: A Deepwater Coral Teacher Workshop was held on April 19, 2008 at HBOI with a field trip to the Smithsonian Marine Station. The workshop, coordinated by the Council, included presentations by NOAA Fisheries, NOAA Office of Law Enforcement, NOAA Undersea Research Center at UNC-W, HBOI staff, and coral scientists. A total of 21 area teachers and educators attended the workshop. Participants received a workshop notebook that included lesson plans and additional resources, including DVDs from John Reed, Coral Reef Scientist, with HBOI that included background information on *Oculina* corals and research conducted within the OECA/HAPCs.

November 2009: A one-day teacher workshop was held November 7, 2009 at the North Carolina Museum of Natural Sciences. This workshop included lecture, lesson plan development, and laboratory components. Participants included NOAA, USGS, HBOI, UNCW, SAFMC, Temple University, MCBI, the North Carolina Museum of Natural Sciences, and the NOAA Teacher at Sea program. Twenty nine teachers from the region attended.

Port Day
On 10/12/05, prior to the departure of the NASA M/V *Liberty Star*, ~90 students from 3 Brevard County schools joined expedition scientists and crew at the Port for an educational event. Students rotated among 6 stations learning about *O. varicosa* and deep water reefs, the OHAPC, science and research, enforcement, and management.

Daily Web Logs
Through HBOI's @Sea website (www.at-sea.org), researchers posted daily research journal entries, photographs, and data logs (e.g., ROV temperature, depth, and geographic position) during the 2005 Expedition. Regional students posed questions for the scientists and crew, which were answered in the daily journal entries. Although the @Sea website is no longer active,

copies of daily log postings from cruises were archived on the Council website and may be available at a later date.

Daily web logs were also generated during the 2009 cruise aboard the *RV Seward Johnson* and posted to the USGS DISCOVRE web site. The educator on board (Liz Baird, NCMNS) mediated a question/answer session with schools and the public.

Press Kits & News Releases
Media were invited to the 2005 Port Day and excursion activities. Media received press kits containing background information, high-resolution images, b-roll film footage, and other materials for developing news stories. The resulting media coverage included several print and on-line articles in local, regional, and national news outlets, including the Daytona Beach News Journal, Florida Today Newspaper, and ScienceDaily.com.

Media kits were also available for the 2009 media excursion held in conjunction with a research cruise on the R/V *Seaward Johnson*, resulting in several news stories (see additional details below).

Media Excursions
In October 2005, the FWC Law Enforcement vessel, the *C.T. Randall*, was scheduled to shuttle media and teachers to the *M/V Liberty Star* for a day-at-sea experience. A tropical depression caused unsafe sea conditions on both excursion days. Despite the weather issues, several news services picked up the story.

On August 12, 2009, two charter vessels (supported by the Council) brought invited guests to the *R/V Seward Johnson* during a research cruise within the OECA/HAPC. Representatives from NBC News, the Associated Press, Orlando Sentinel, Daytona Beach News Journal, Florida Times Union, the South Atlantic Fishery Management Council, FWC Law Enforcement, and NOAA Coral and Habitat Programs participated in the media excursion. Visitors were provided lunch, given a tour of the ship and *Johnson SeaLink* submersible, and were allowed access to scientists for interviews. They were provided video and still imagery for use in print articles, on-line media stories, and television. This event generated a substantial amount of generally positive media exposure (see below for a list of media generated by this activity).

Media Stories Generated from 2009 Media Day Activities
NBC Nightly News featured a story on 13 Aug. Later in the week, articles followed in newspapers all over the country. Although there was some misinterpretation by NBC News which created a minor controversy concerning fishery damage to habitats (this was later mitigated), the press was generally positive and well received. School participation was low because of the timing of the cruise (during summer). A Facebook presence was created for the cruise on Art Howard's Facebook page, and video and photos were posted there as well.

Cruise video posted at http://vimeo.com/6221700.

NBC Nightly News: http://dailynightly.msnbc.msn.com/archive/2009/08/13/2030740.aspx

Associated Press:
http://news.yahoo.com/s/ap/20090818/ap_on_sc/us_deep_sea_reefs;_ylt=Au.q8msq_y93dGedBssAGjOs0NUE;_ylu=X3oDMTFldXBucG0xBHBvcwMxMTgEc2VjA2FjY29yZGlvbl9zY2llbmNlBHNsawNwcm90ZWN0aW9ucGw

ABC News: http://abcnews.go.com/Technology/wireStory?id=8351163

Washington Post: http://www.washingtonpost.com/wp-dyn/content/article/2009/08/18/AR2009081800578.html.

Cape Fear's Going Green: see http://www.goinggreenpublications.com/currentissue.html

G-Online - Sydney, New South Wales, Australia:
<http://www.gmagazine.com.au/news/1516/scientists-explore-deep-sea-coral-reefs>

Orlando Sentinel: http://www.orlandosentinel.com/news/local/orl-coral-reefs-081309,0,1457862.story

Daytona Beach News Journal: http://www.news-journalonline.com/NewsJournalOnline/News/Headlines/frtHEAD01081909.htm

Coastal Heritage (vol. 23, no. 3, publication of SC Sea Grant), UNCW Research magazine, and. Atlantic Fishery Management Council Newsletter

Posters & Rack Cards
An educational poster and Fishing Regulations for the *Oculina* Bank rack cards were produced in July 2006 and provide information about the regulations and importance of the OHAPC/OECA. The posters and rack cards were distributed to a variety of recipients including partner organizations, bait and tackle shops, marinas, charter boat captains, fishers, restaurants, and educators including the Smithsonian Marine Station. The Council has reprinted the rack cards as needed and copies of both the rack card and poster are available from the Council's website at: http://www.safmc.net/managed-areas/*Oculina*-bank.

Other Outreach Activities
A poster specific to outreach efforts for the OECA was presented at the 2005 International Deep Water Coral Symposium held in November 2005 in Miami, FL.

Council staff participated in the 2008 FWC Law Enforcement "Big Boat" enforcement vessel annual meeting in Ocala, FL and provided updated information on regulations and management measures within the OECA and *Oculina* Bank HAPCs.

A joint paper highlighting deepwater corals, including the OECA and HAPCs was presented at the 2008 Annual National Marine Educator's Association meeting in Savannah, GA. The paper, "Shedding Light on Deepwater Coral Reefs" was presented jointly by staff from the Smithsonian Marine Station and the Council.

In 2011, a multi-agency Surveillance and Enforcement of Remote Maritime Areas Workshop was held in Orlando, FL. The workshop was part of a project looking at the application of surveillance technologies to protected areas in the South Atlantic region. A grant was awarded to the Marine Conservation Institute through the Coral Reef Conservation Program to review the surveillance and enforcement capacity for the SA Region. The workshop included Council staff, staff from both Gray's Reef and the Florida Keys National Marine Sanctuary, state LE agencies, NOAA Office for Law Enforcement and USCG. The workshop included discussions on the OECA as well as the Deepwater MPAs in the region, and resulted in a list of outreach recommendations.

Appendix D. Example Project Management Plan Developed by the Law Enforcement Sub-Group

Title:
Oculina Evaluation Team – Law Enforcement Sub-Group
Oculina Closed Area Evaluation Plan – Enforcement Update
Background/Context:
At their March 3-6, 2003 meeting, the Council had an in-depth discussion about the issue of law enforcement in the Experimental Closed Area and made the following motion: (1) It is the Council's position/policy that enforcement of the *Oculina* Closure is an utmost priority, (2) violation of the *Oculina* Experimental Closed Area (OECA) is egregious and of a high and aggravated nature, and (3) that we request NOAA General Counsel revise the penalty schedule to be commensurate with the above classification. In response NOAA Fisheries assigned a special agent to the area which should improve Enforcement.

At its June 2003 meeting, the Council also approved a motion to develop an updated enforcement plan within one year of the implementation of Snapper Grouper Amendment 13 A.

A revision of the Southeast Region Magnuson-Stevens Act penalty schedule was published in June 2003. The schedule provides ranges for civil administrative monetary penalty amounts and permit sanctions for violations such as illegally fishing or possessing fish within the *Oculina* Habitat Area of Particular Concern or *Oculina* Experimental Closed Area as follows: First violation - $500 to $50,000, and a permit sanction up to 45 days; Second violation - $2,500 to $90,000, and a permit sanction of 30 – 90 days; and Third violation - $5,000 – statutory maximum, and a permit sanction of 60 days to revocation. Aggravating or mitigating circumstances may be considered in determining the proper penalty level within, above, or below the penalty ranges.

At their November 22 – 23, 2004 meeting, the Council's Joint Law Enforcement Advisory Panel and Law Enforcement Committee established five enforcement principles for the *Oculina* Bank: (1) use of the Vessel Monitoring System (VMS) in certain fisheries (e.g., Rock Shrimp) or all fisheries, regardless of sector (commercial and recreational); (2) enforcement of the boundaries of the Bank is not a single agency event, but rather a cooperative effort between the Coast Guard, the Florida Fish and Wildlife Conservation Commission, and NOAA Fisheries; (3) increase enforcement presence at the Bank; (4) a report documenting fisheries violations should be given at every Council meeting and possibly posted on the Council's website; and (5) all concurred that outreach is less costly in the long run than enforcement efforts, and that better knowledge leads to better compliance.

On December 13, 2004, an *Oculina* Bank Enforcement Meeting was held, bringing together enforcement partners from the Coast Guard (USCG), Florida Fish and Wildlife Conservation Commission and NOAA Fisheries Office for Law Enforcement. The previously mentioned enforcement principles were discussed and an enforcement strategy was created for the *Oculina* Bank Habitat Area of Particular Concern and the Closed Area.

In March, 2005, the *Oculina* Experimental Closed Area Evaluation Plan was released. Section 3.0 of the Plan covered law enforcement and established the strategy for enforcement of *Oculina* Experimental Closed Area regulations. The strategy was based upon five principles:

1. VMS
2. Cooperative Enforcement
3. Increase Enforcement Presence
4. Enforcement Reports
5. Outreach and Education

On August 21 – 23, 2006, the *Oculina* Evaluation Team met in Port Canaveral, Florida to address: what had been accomplished to date, determine the effectiveness of various efforts and needed improvements, review and evaluate the current size and configuration of the OECA, and provide recommendations to the SAFMC for the OECA review in 2014. In February 2007, the final *Oculina* Evaluation Team Report was released. The Law Enforcement Breakout Group report updated the status of the law enforcement strategy:

1. VMS – Continued monitoring of VMS; no USCG real time access; FWC access pending re-authorization of the MSFCMA
2. Cooperative Enforcement – Partnership between NOAA OLE, USCG, and FWC was well established and functioning well
3. Increase Enforcement Presence – Coordinated pulse operations; dedicated patrols by FWC and USCG in conjunction with NOAA OLE; NOAA OLE availability of a 24' RIB
4. Enforcement Reports – Data collected and reports created by NOAA OLE liaison agent; reports reflected increase in enforcement presence
5. Outreach and Education- Distribution of OHAPC brochures and council regulations during patrols and boardings; NOAA OLE providing press releases regarding cases; LE partners coordinated with Outreach staff during 2005 and 2006 media events.

The effectiveness of the projects were evaluated which found that the overall implementation of the law enforcement strategy had been successful. There were several recommendation for improvements primarily focused on patrol reporting, but also including increased engagement with fishing tournaments in Sebastian and Fort Pierce, expansion of VMS to other commercial fishers, and the use of plain clothes operations to detect violations. No changes to the size and configuration of the OECA were recommended at that time. At that time, the current levels of enforcement were at capacity and that any increase in patrol effort required additional funding and assets.

In October 2013, the SAFMC executive director requested a presentation by NOAA OLE to summarize *Oculina* Bank enforcement activities and to update the *Oculina* Evaluation Team.

On December 4, 2013, a NOAA OLE agent provided an enforcement activities update. This update reviewed the *Oculina* Evaluation Plan, Law Enforcement Plan, presented updated enforcement data from 2007 – 2013, and highlighted areas of improvement and recommendations to the *Oculina* Closed Area Evaluation Team. The areas for improvement included: increased patrol coordination between FWC and USCG, establishing semi-annual *Oculina* specific meeting, increased enforcement presence utilizing covert patrols, obtaining additional USCG patrol hours, and patrolling smarter by conducting ramp and marina checks prior to launching a patrol. The presentation also identified additional areas for improvement

including better recordkeeping by the source agency, more timely submission of reports, and increased engagement with recreational tournaments. Finally, the update recommended that the law enforcement plan be adopted using a Project Management format in order to increase performance of the plan.

On March 5, 2014, NOAA was seeking public comment on revisions to its Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions. The draft revisions to the Penalty Policy are intended to provide updated guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The deadline to submit comments is April 28, 2014. The NOAA Office of the General Counsel – Enforcement Section, has issued civil administrative penalty policies and schedules for violations of statutes and regulations enforced by NOAA. These may be found at the Office's website, http://www.gc.noaa.gov/enforce-office3.html. The purpose of the Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions "is to ensure that: (1) civil administrative penalties and permit sanctions are assessed in accordance with the laws that NOAA enforces in a fair and consistent manner; (2) penalties and permit sanctions are appropriate for the gravity of the violation; (3) penalties and permit sanctions are sufficient to deter both individual violators and the regulated community as a whole from committing violations; (4) economic incentives for noncompliance are eliminated; and (5) compliance is expeditiously achieved and maintained to protect natural resources. Under this Policy, NOAA expects to improve consistency at a national level, provide greater predictability for the regulated community and the public, improve transparency in enforcement, and more effectively protect natural resources."

On March 12, 2014 the *Oculina* Evaluation Team participated in a webinar which provided updates on all components of the plan including: research and monitoring, outreach and education, and law enforcement. On March 14, 2014, there were additional breakout group webinars specific to each part of the plan.

Statutes enforced by NOAA provide for civil administrative and criminal remedies. Civil administrative remedies include fix-it tickets, written warnings, summary settlement, notices of violation and assessment, and notices of permit sanction, in addition to possible forfeiture action against seized property such as fish, gear, and vessels.

Objectives:

- To utilize the Vessel Monitoring System to monitor the *Oculina* Experimental Closed Area for illegal fishing activity
- To utilize cooperative enforcement via intelligence and asset sharing, meetings, and training to maintain a high level of cooperation and coordination of *Oculina* Experimental Closed Area patrols and investigations.
- To provide a deterrent presence within the *Oculina* Experimental Closed Area through routine aerial and at-sea patrol and dedicated surge operations
- To report enforcement and compliance activities to the South Atlantic Fishery Management Council
- To provide compliance assistance to user groups through outreach and education

Scope:

The *Oculina* Experimental Closed Area is a 92 square nautical mile area bounded on the north by 27°53' N. latitude., on the south by 27°30 ' N. latitude, on the east by 79°56 ' W. longitude, and on the west by 80°00 ' W. longitude. Several commercial and recreational fisheries are conducted in and around the area to include rock shrimp, snapper-grouper, coastal migratory pelagics, dolphin/wahoo, and Highly Migratory Species.

Target Outcomes:
Increased voluntary and observed compliance with *Oculina* Bank Experimental Closed Area regulations.

Success Measurement:
100% observed compliance during patrols and boardings.

Outputs:
VMS monitoring of the OECA and alerts for suspected illegal incursions and fishing activity.

Periodic coordination meetings and training sessions amongst NOAA OLE, USCG, and FWC

Aerial and at-sea patrols of the OECA, boardings of commercial and recreational vessels operating in the area.

Quarterly enforcement and compliance activity reports to the SAFMC

Compliance assistance at Captain's Meetings during recreational tournaments held in Sebastian and Fort Pierce

Management:
Existing management chains will be maintained for the duration of the project. OLE SA Richard Chesler will serve as the Focal Point/Project Liaison to coordinate resources, stakeholders, and reporting.

Reporting Requirements:
The following statistics will be collected for the quarterly report:
1. Number of hours in the OECA,
2. Average number of hours underway/in transit to patrol areas,
3. Number of sorties/patrols,
4. Number of vessels sighted (Commercial and Recreational),
5. Number of vessels boarded (Commercial and Recreational),
6. Enforcement actions,
7. Combined operations with aircraft or other enforcement partner, and
8. Significant violations summary

In addition, the report will include a summary of *Oculina* specific case dispositions, media stories, outreach activities, and training. The OLE special agent will be the collection point for monthly reports and will draft the quarterly report to be presented to the Council.

Resources:

If available, the following assets will be utilized for *Oculina* Experimental Closed Area patrols:

USCG
87' Coastal Patrol Boats (CPB)
45' Response Boat - Medium
Helicopters (HH-65)
Fixed wing aircraft
Medium Endurance Cutters (MEC)

FWC
38' Offshore Patrol Vessel (P/V)
Medium Range Patrol Boats
Covert/Unmarked boats
Aircraft

NOAA OLE
24' Rigid Hull Inflatable Boat (RHIB) available for surge operations.

Stakeholders:
Enforcement: NOAA OLE, USCG, FWC
Management: SAFMC, *Oculina* Evaluation Team
User Groups: Commercial, for hire, and recreational fishers

Assumptions and Constraints:
Nothing here commits agencies to supply any specific resources or creates any financial obligations. This does not change any statutory authority or create any new responsibilities.

The participation of the U.S. Coast Guard in this project is assumed to be a low priority due to competing higher priority mission areas and the lack of Living Marine Resources patrol hours.

Major Risks and Minimization Strategies:
Lack of coordination and reporting amongst enforcement partners, and stakeholders can be minimized through effective and consistent communications. Maintaining a single focal point/project manager will also effectively minimize this threat.

Related Projects:
An outreach plan was required by Amendment 13A to the Snapper Grouper Fishery Management Plan. This outreach plan is the primary responsibility of the Council's Information and Education Committee and Advisory Panel. The enforcement partners are important supporters of this plan. The enforcement partners can support Objective 1, Project 4 (distribution of OHAPC brochures) and Project 6 (distribution of SAFMC regulations) during law enforcement activities (boardings, dockside inspections) and scheduled outreach activities (fishing tournaments, fishing association meetings, boat shows). Project 7 (news releases) is also a vital component to the goal of increasing compliance with OECA regulations Enforcement news releases regarding activities and cases will be issued periodically. The

enforcement partners, through the OLE liaison agent, will liaison with the Council staff on all outreach and education activities.

Guidelines and Standards:
Enforcement personnel will comply with their agency specific policy. FWC will comply with Cooperative Enforcement Program, Joint Enforcement Agreement reporting requirements.

Quality Control:
The OLE liaison agent will conduct quality control checks of USCG and FWC submitted reports prior to drafting the Quarterly Enforcement Report.

Lessons Learned:
Enforcement partners will conduct a review of enforcement and compliance assistance activities annually during the *Oculina* specific meeting. This review will capture lessons learned and best practices to inform and improve future activities.

Appendix E. *Oculina* Evaluation Team Response to Shrimp Access Area Request

On April 20, 2012, the Deepwater Shrimp AP requested the Council "develop a Shrimp Fishery Access Area from the north end of the Oculina HAPC, following the 90-100 meter contour to the west and the 140 meter contour to the east, to the south end of the Oculina HAPC. This would connect highly productive rock shrimp bottom south of the Oculina HAPC to that which exists to the north of the CHAPC. This would restore the contiguous rock shrimp fishing area that existed prior to creation of the Oculina HAPC and still protect the coral and structured habitat bottom that exists within the Oculina HAPC for which it was intended." The potential access area is displayed in **Figure 5**. The Council requested that the Coral AP give their opinion on this request. Previously on May 7-8, 2014, the research committee of the Coral AP voted unanimously to deny this request. The Shrimp AP further requested the *Oculina* Evaluation Team respond to their request. This document is the reply from the *Oculina* Evaluation Team regarding this request and is broken out into different sections: Summary of Arguments, Background, Management Actions and Reasoning, Research and Monitoring, Law Enforcement, and Mapping.

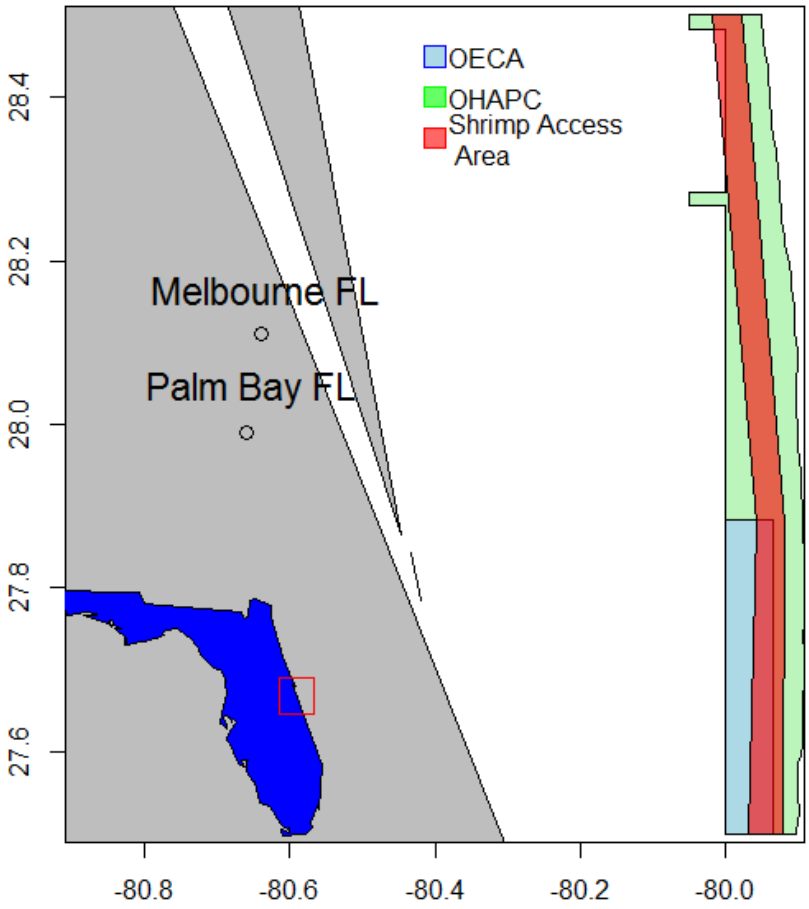

Figure 5. Map of the Oculina Experimental Closed Area (OECA) and Oculina Habitat Area of Particular Concern (OHAPC) overlaid with the requested shrimp access area.

E.1 Summary of arguments

The 90-100 m contour overlaps with the lower end of the coral depth range. **This represents a direct overlap with the coral distribution and is therefore not an acceptable option**.

The VMS data show incursions inside the protected area; whether these are accidental or not is immaterial; the point is that they happen. **The coral needs a buffer from fishing**. If that eastern corridor is opened it will make the eastern edge of the banks highly vulnerable to incursions by trawlers, especially since they will be hugging the banks to attain the best depth for fishing.

Corals are extremely sensitive to suspended sediment; it blocks their feeding structures and suffocates the tissues. Trawling causes significant sediment re-suspension particularly in soft sediment habitats. Opening that corridor would expose the corals to chronic sediment re-suspension, which would cause stress at the very least and potentially result in mortality of corals.

Bycatch from the rock shrimp fishery is approximately 62% of total catch (NMFS 2014). The eastern OHAPC area has been closed since 1984 or 2001, depending on the location. **The bycatch from fishing an area that has been closed for up to 30 years would be considerably higher than an unfished area and is likely to reduce profitability below the break-even level**. The absence of fishing in this area has allowed biodiversity to rebound, a return to fishing would not only impact corals, but also the other species which have returned to the area.

The Law Enforcement AP has consistently requested to have straight line boundaries for closed areas based on latitude and longitude. This request would add a large number of irregularly shaped boundary lines which are more difficult to comply with and enforce. The curved line path would also leave some pinnacles vulnerable since the trawl does not take the same track as the vessel especially with the amount of scope between the vessel and the trawl used at these depths.

The request would bisect the current closed area and need additional law enforcement effort to adequately enforce it. Unfortunately law enforcement budgets are stretched very thin and no additional funds are expected to help monitor this area.

E.2 Background

The *Oculina* Banks are a unique and productive habitat off the coast of Florida. Dense thickets and coral mounds made by this delicate coral, as described by Reed (1980) are not known to occur anywhere else on Earth and provide important habitat for:

- spawning of gag and scamp groupers (Gilmore and Jones 1992, Koenig et al. 2000) whose larvae are distributed broadly throughout the South Atlantic Bight (Hare and Walsh 2007);
- juvenile and adult speckled hind, a grouper considered critically endangered by the International Union for the Conservation of Nature (IUCN) and a Species of Concern by NMFS in 2004 (http://www.nmfs.noaa.gov/pr/species/concern/). It has been vastly overfished and is currently undergoing overfishing (NMFS), primarily via incidental catch from the snapper and grouper fisheries; and

- myriad other reef-associated species contribute to the extremely high biological diversity of the coral thickets (Reed et al. 1982, Harter et al. 2009).

Loss of *Oculina* thickets means loss of high diversity and loss of abundant reef fish, including the groupers and other reef fish which were observed and videotaped by Gilmore and his colleagues during the 1970s and early 1980s. The dramatic losses that have been described since then (Koenig et al. 2000, Koenig et al 2005, Reed et al. 2007) are coincident with regional overfishing and habitat loss. Also within the *Oculina* Habitat Area of Particular Concern (OHAPC) habitat east of the coral mounds is soft bottom habitat for blueline and golden tilefish, golden crab, and other speciesNOAA DEM charts indicate features within the eastern portion of the current OHAPC that are indicative of hardbottom coral habitat.

The original OHAPC, now the *Oculina* Experimental Closed Area (OECA), was first established by the SAFMC in 1984. The use of gears that impacted the bottom, such as longlines, bottom trawls, dredges, fish traps and pots, was prohibited to protect the coral habitat. Boundaries of the closed area were designed by the SAFMC to prevent the newly developing roller-rig and bottom longline fisheries for snapper and grouper species from damaging the sensitive coral habitats (SAFMC 1982). The design of the closed area considered the shrimp trawl fishery, so that shrimping could continue around the OECA—the report indicated that the configuration of the closed area was minimized to have little impact on trawl fisheries that operated in the area, based on public testimony. It should be noted that the original proposed area for the OHAPC that was submitted to the Council in 1982 included the region of known *Oculina* at that time which was from Fort Pierce to Cape Canaveral (Reed 1981). After deliberations with the Shrimp AP during the 1980s, the final area for the OHAPC was greatly reduced to only include the 90 nmi^2 area from Ft. Pierce to Sebastian. The entire northern 2/3 of the known *Oculina* habitat was excluded from the original OHAPC. Also note that in 2011, it was discovered that the *Oculina* mound habitat actually extends to St. Augustine which was recommended as a closed area in Amendment 8 to the Coral, Coral Reefs, and Live/Hard Bottom Habitat Fishery Management Plan (SAFMC 2014).

In 1994, the SAFMC closed the OECA to all bottom fishing though Snapper Grouper Amendment 6 in response to documentation of gag and scamp spawning in the OECA and stock assessments that indicated several stocks were overfished and overfishing was occurring (SAFMC 1993). Then in 1995 Amendment 3 to the Coral FMP prohibited the use of anchors by fishing vessels in the OECA to further reduce impacts on the coral (SAFMC 1995).

Shrimp FMP Amendment 1, added in 1996, closed the area from 27° 30’ N to 28° 30’ N from the 80° W line out to 100 fathoms after discussions with the rock shrimping industry to protect *Oculina* habitat from trawl damage (SAFMC 1996). There was some indication that large spawning rock shrimp were associated with *Oculina* live/hard bottom habitat and protection of the habitat would also protect a portion of the shrimp stock as well as protecting juvenile rock shrimp. Public testimony indicated rock shrimp nursery grounds are southeast of Cape Canaveral in depths greater than 180 feet. The Ad Hoc Rock Shrimp Advisory Panel proposed this option as acceptable to the industry while at the same time protecting 90% of the essential habitat in the area. Fishermen indicated 25% of their harvest in 1994 came from this area (SAFMC 1996).

In 1998, the SAFMC passed the Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic (SAFMC 1998). This plan extended the *Oculina* Habitat Area of Particular Concern and defined the OHAPC, including the OECA, as essential fish habitat for snapper grouper species. The purpose of the OHAPC extension was to reduce the impact of rock shrimp and calico scallop fisheries on live/hard bottom and coral habitat by prohibiting the use of trawl gear in the area. This area was closed to rock shrimp trawl gear in Shrimp Amendment 1 (SAFMC 1996) and became effective in 2000. The plan also designated the entire OHAPC and OECA as essential fish habitat for snapper grouper species (SAFMC 1998).

Shrimp Amendment 5 required the use of VMS on vessels fishing for rock shrimp in the South Atlantic EEZ and created a limited access permit for the rock shrimp off Georgia and east coast of Florida (SAFMC 2002). The limited access permit was created to protect the resource and the fishery. The fishery operated in a restricted geographic area (mostly off the east coast of Florida) and could only accommodate a limited number of vessels. The limited access permit was developed only for the area off the east coast of Florida and Georgia and excluded fishermen fishing in waters off North and South Carolina for rock shrimp from the limited access permit. The use of VMS was required to protect essential fish habitat and essential fish habitat areas of particular concern, especially *Oculina* coral (SAFMC 2002).

E.3 Research and Monitoring

Dense stands of *Oculina* thickets and high relief coral banks were observed and mapped from Fort Pierce to Cape Canaveral in the 1970s and 1980s (Reed 1980). Isolated individual colonies of coral and hard bottom habitat were also documented on low relief flat bottom away from the high relief banks (Reed 1980). Also documented were high densities of grouper and seabass that appeared to be in spawning condition (Gilmore and Jones 1992). The diversity of organisms in the *Oculina* thickets rivals that of tropical coral reef systems (Koenig 2001 report to the SAFMC). By the 1990s, both the coral habitat and fish populations had been decimated over much of the Oculina habitat and especially in areas outside of the protected HAPC region (Koenig et al. 2005, Reed et al. 2005, Reed et al. 2007). The reason for concern about opening up the OHAPC to trawling is that worldwide, bottom trawling has severely impacted deep-sea coral reef habitat and continues to be a major concern and threat (Rogers 1999, Butler and Gass 2001, Barnes and Thomas 2005, Morgan et al. 2005, Mortensen et al. 2005). Bottom trawling causes severe mechanical damage as evident on deep-water coral reefs in the northeast Atlantic (Rogers 1999, Fosså et al. 2002), and deep-water seamounts off New Zealand and Tasmania (Jones 1992, Koslow et al. 2001). Bottom trawling has been shown to cause damage to low-relief hard bottom habitats off the southeastern United States (Van Dolah et al. 1987). In a research experiment, a single pass of a bottom trawl removed 1000 kg of *Primnoa* seafans off Alaska and resulted in the detachment of 27% of the soft corals (Krieger 2001). ROV surveys of extensive deep-water coral reefs off Norway found that 30%-50% of the reefs were damaged from fishing gear; at some sites almost all corals were crushed or dead (Fosså et al., 2002). Heavily fished seamounts off Tasmania have up to 90% coral loss and 83% less biomass than unfished sites (Koslow et al. 2001). In areas of the North Sea, it was estimated to take as long as five years for macrofauna to recover from

one trawl pass (Dinmore et al. 2003). The impact of one trawl pass in the OECA and OHAPC could have an even longer effect where the *Oculina* mounds around Jeff's Reef were estimated to be 850 to 1,000 years old (SAFMC 2007).

Despite efforts to protect *Oculina* coral, damage to coral in the area still occurred within the OECA. Between 1977 and 2001, six of the coral reef transects in Reed et al. (2007) had nearly 100% loss of live coral cover (range 98.4%-100%) and two of these were within the OECA. The remainder was in the northern area of the *Oculina* habitat up to Cape Canaveral which had remained unprotected and open to bottom trawling during that time period. Since 2000, when the boundaries of the OHAPC were expanded northward to Cape Canaveral, poaching within the boundaries of the OECA has been documented in the vicinity of Chapman's Reef and Jeff's Reef, the healthiest remaining live, high-relief reefs (Koenig et al. 2005, Reed et al. 2005, Koenig 2009). Also throughout the OHAPC, dives with ROVs and submersibles have documented reefs wrapped with fishing lines, piles of bottom longlines, discarded trawl nets, and anchor lines (Reed et al. 2005) all of which have been illegal since 1984 in the OECA and illegal in the OHAPC since 2000. Fishing gear impacts continues to be the primary threat to the ecosystem as evident from recent photographs of trawl nets found on the bottom, destroyed reefball modules at Chapman's Reef, the documented destruction of the Cape Canaveral *Oculina* bioherm, and evidence of trawl scars in the rubble (Reed et al. 2005, Koenig 2009).

Although poaching does occur, the current regulations reduce impacts of fishing gear on *Oculina* coral because most fishermen abide by the regulations and the area has reduced fishing pressure for snapper grouper species. Mapping of effort based on VMS indicates the vast majority of the shrimping VMS points are outside the OHAPC and OECA (**Figure 6**). However the figure clearly shows the intense trawling fishing effort over the entire region off central Florida and even some potentially illegal incursions into the OHAPC.
Harter et al. (2009) documented that there was higher diversity and grouper densities inside the OECA compared to outside the OECA. Both gag and scamp have been documented in spawning condition in the OECA (Gilmore and Jones 1982, Koenig et al. 2000) and juvenile speckled hind have been observed in the OECA (Koenig et al. 2005, Harter et al. 2009). The potential for the OECA to function as a source for other areas was tested by Hare and Walsh (2007). Based on drifter patterns, some larvae would be advected from the OECA into other areas of the South Atlantic for potential settlement.

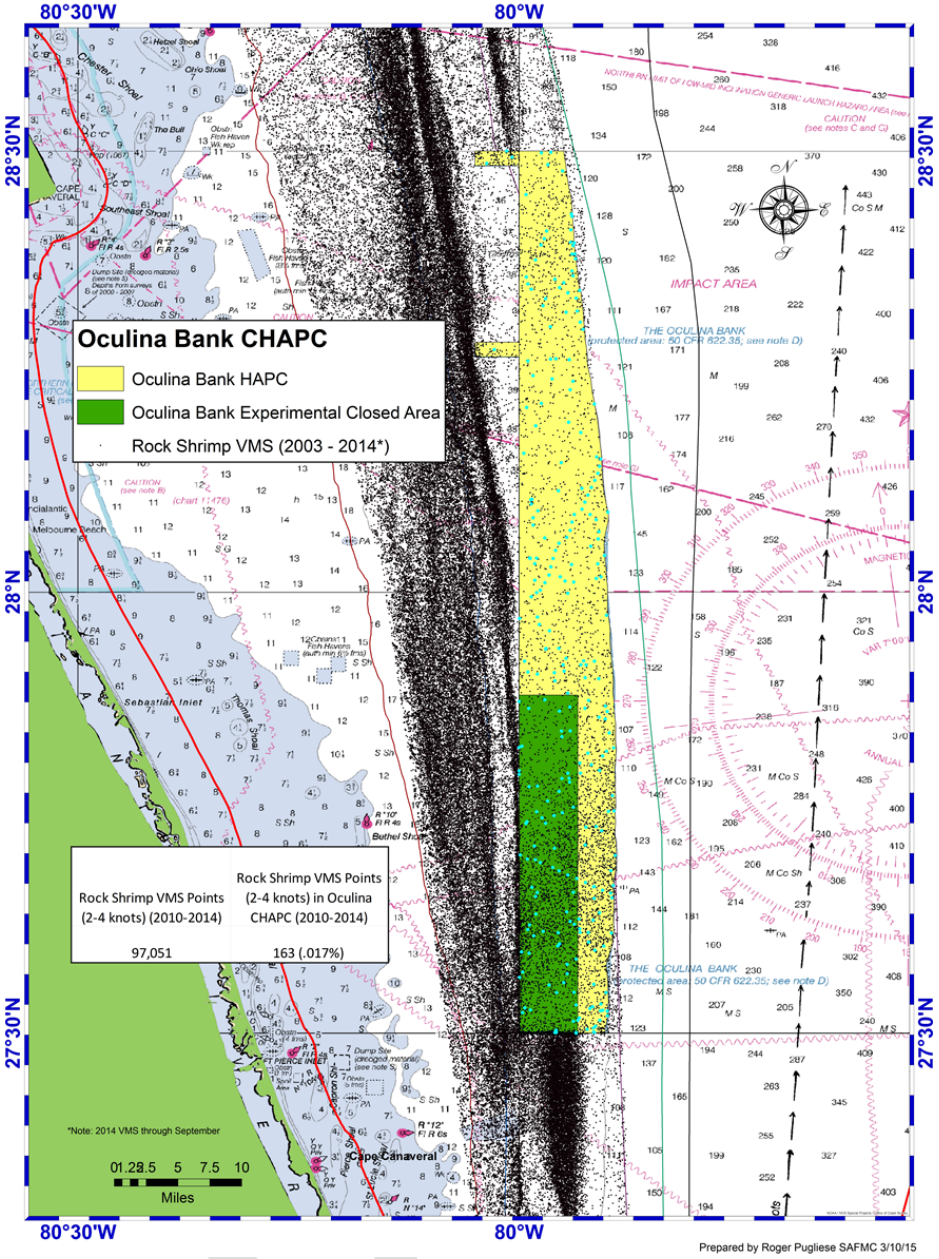

Figure 6. Map of the VMS data points from the shrimp vessels operating off Florida from January 2003 to September 2014 with the Oculina Bank HAPC and Oculina Experimental Closed Areas delineated. Black dots are VMS locations and blue dots are potentially illegal trawl locations (vessel speed 2-4 knots) inside closed areas.

The above information clearly demonstrates the negative impact trawling has on *Oculina* and how important the *Oculina* habitat is for species managed by the SAFMC. Allowing rock shrimp trawling would be devastating to the coral habitat and coral rubble habitat that provide habitat, spawning grounds, and essential fish habitat for various grouper species as well as for the rock shrimp. Also, trawling would be potentially damaging to the surrounding flat bottom communities that provide habitat for tilefish and other species as well. The impact of repeated bottom trawling on the surrounding habitat, benthic species, and demersal fish species is unknown. It should be noted that the bottom surrounding the *Oculina* bank habitat is very

muddy and trawling would send up sediment plumes that could drift over the reefs and coral. Long term persistence of sedimentation may cause a tipping point in the health and survivability of the coral (Babcock and Davies 1991, Rogers 1990, Reigl and Branch 1995, Brooke et al. 2009). If trawling remains closed, the habitat and dependent communities should recover over time to a productive state. In terms of user groups, it is important to recognize that a positive benefit to the shrimping industry now translates to a negative impact to the reef fish fishing industry in the future because a source habitat for groupers would remain in a non-productive state. Basically, by allowing trawling, the habitat would be kept in a state of diminished diversity and productivity—with shrimp being the only useful product. Allowing an ecosystem to descend to a state of lower diversity and productivity should be unacceptable to any management agency entrusted with the responsibility to practice conservation (wise use) of resources. It is suggested that NOAA Fisheries require the placement of observers on the trawl vessels fishing outside the OHAPC to document the by-catch.

E.4 Enforcement

The current boundaries of the OECA and OHAPC were drawn with input from the Law Enforcement Committee. The preferred configuration of a closed or managed area has clearly defined geographical breaks (such as those for the OECA based on 80° W and 27° 30’ N and 28° 30’ N). Additionally these points have been in place for many years and the fishermen know the closed areas. The expanded OHAPC area has an eastern boundary of 100 fathoms (~180 m), but newer technologies and the introduction on VMS has allowed law enforcement and the fishing industry to work with boundaries that are not defined by straight lines. Only very recently has compliance appeared to be good and no reports of illegal activity were reported in the area from 2011 to 2014. However, there have been failings of surveillance and enforcement agencies in the past with respect to enforcing the laws protecting *Oculina* habitat and reef fish due to a lack of funding ranging from virtually no enforcement from 1984 to 1994 and little and variable enforcement from 1994 to 2008. Loss of reefball experiments from the ‘Sebastian Cones’ area and a clear trawl track through ‘Chapman's Reef’, one of two remaining intact coral stands in the OECA, were documented in a 2008 survey (Koenig 2009). Effective surveillance and enforcement are essential to the recovery of destroyed habitat and a return to a viable state of resource production.

The proposed configuration for the shrimp access area would essentially bisect the closed area, with a newly opened fishing area down the middle of the current closed area. Increased enforcement presence would be needed to ensure fishermen remain in the depth profiles and current enforcement budgets are extremely limited and not likely to be increased in the future.

E.5 Mapping of OHAPC and OECA

One objective of the current NOAA-SAFMC MPA Grant is to complete mapping of the OECA (not the entire OHAPC) and to re-map as much of the remaining OECA as time allows at a higher resolution. Even with higher resolution mapping, fathometers and multibeam sonar cannot differentiate among the different substrates or among the benthic species. It must be

made clear that the 5 m resolution mapping which currently exists will miss all low relief and moderate relief habitat. Low relief live-bottom habitat was shown to be productive within the OHAPC and adjacent areas in the publication by Harter et al. (2009). Visual observations must be used to verify the substrate and benthic species. The estimates of areas listed below were derived from ArcGIS which list how much has been mapped and remains to be mapped. It is important to note that the new MPA grant is to map various shelf-edge MPA sites from Florida to North Carolina in addition to the OECA. It did not include time to map the OHAPC outside the OECA. Also, NOAA DEM charts clearly indicate features within the region of the eastern region of the OHAPC that are indicative of hardbottom coral habitat.

There have been various multibeam maps made in addition to individual maps of Chapman's and Jeff's Reefs.

1. The Oculina main geotiff (5 m resolution) covers most of OECA and some of OHAPC. Total AREA= 327 km^2 (126 mi^2). Within this are missing pieces (MB holidays)= 10 km^2 missing
2. 2005 Multibeam and Add-on geotiff (5 m resolution)- this was at the northern end of the HAPC and areas outside and west of the HAPC (Harter et al. 2009).

TOTAL AREA OF OECA= 238 km^2 (92 mi^2)
TOTAL AREA OF OECA WITH MULTIBEAM= 165 km^2 (66 mi^2)
TOTAL AREA OF OECA WITHOUT MB= 114 km^2 (44 mi^2)
TOTAL AREA OF OHAPC (INCLUDING OECA)= 1028 km^2 (397 mi^2)
TOTAL AREA OF OHAPC WITH MULTIBEAM= 348 km^2 (134 mi^2)
TOTAL AREA OF OHAPC WITHOUT MULTIBEAM= 680 km^2 (262 mi^2)

To map the remaining OHAPC would take approximately 43 days (based on work done by the NOAA Ship *Nancy Foster* MPA cruise in 2014; averaged 16 km^2 per night / 680 km^2 = 43 days). To complete the mapping for the OECA (~114 km^2) would take approximately 7 nights (16 km^2/night) during the NOAA cruises.

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