Assessment of the Impacts of the Oculina Bank Marine Protected Area and In-Depth Ethnographic Profile of the Fort Pierce, Florida Fishing Community

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FINAL REPORT

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I. Abstract

This project addressed the problems related to examining the impacts of marine protected areas (MPAs) on the community of Fort Pierce, Florida, in particular the recreational, charter and commercial fishermen. Further, the report provides an in-depth description of the fishing community and the various networks that exist between and among the various fishing sectors: commercial, recreational and charter. Commercial, charter for-hire, and private recreational fishermen participated in a collection of oral histories focused around their experiences regarding the Oculina Bank. In total, 45 oral histories were collected; 15 interviews were completed with each of the three identified fishing sectors under study: commercial, charter/headboat, and recreational fishermen. The interviews were digitally recorded and uploaded to a website from which the recordings were downloaded for transcription by the University of South Florida’s Oral History Program. The audio recordings and transcripts are available to the public at [http://guides.lib.usf.edu/content.php?pid=49131&sid=1429723], where USF has generously agreed to house the collection. Using the 45 interview responses for analysis, the social networks of these fishermen were examined for transmission of information about fishing regulations. The results of the study rely heavily on the texts from participating fishermen. It is from their perspective and narratives that effects are assessed. The effects from the regulations implementing the Oculina Bank HAPC have been described qualitatively. These impacts were generalized as (a) positive or negative according to the goals of the impacted user group; and (b) direct or indirect correlating roughly with short-term, immediate impacts or long-term, future impacts. This study raises the issue that more data are needed to document the impacts and benefits of MPAs on both the biological and socio-cultural environment.
II. Executive Summary

As concern over the health of marine ecosystems grows, various management agencies in the United States are considering Marine Protected Areas (MPAs) to provide protection for and conservation of valued marine habitats and resources. MPAs can be a valuable tool to balance sustainable use with long-term conservation of the ocean, especially when they are planned, managed and evaluated using reliable natural and social science. While MPAs come in many sizes, shapes and purposes, they share a fundamental characteristic and challenge: providing a higher level of protection to specific places in the ocean (Wahle et al., 2003).

There has been relatively little social impact assessment of the impact of MPAs, at least comprehensively within the United States. In fact, the evaluation plan for the Oculina Bank Experimental Closed Area includes no mention of an assessment of the impacts of the MPA on the community or humans. Yet, an understanding of the human use of natural resources is recognized as a critical component of any ecosystems approach, including the use of MPAs (Curran, 2002). Christie (2004), in a review of MPA social and biological success, points out that: “… a strong linkage exists between social and biological success, with social considerations determining long-term biological success. This finding implies that standards for measuring both biological and social success should be applied equally and that MPAs should be designed to meet multiple social and biological goals” (Christie, 2004:132). While there has been no attempt to understand the social impacts of the Oculina Bank, there have been some studies that examine the impacts of other MPAs in the region. Murray (2005) finds that the original projections of the economic impacts of the Dry Tortugas Ecological Reserve were generally accurate in terms of predicting changes in catch, effort and overall economic activity. Generally, there was consolidation of fishing effort with a landings increase while participation declined. Current perceptions of fishermen seemed to correspond with earlier projections as they perceived the impacts of the reserve to positively affect stocks, but saw no positive effects for themselves.

This study examined the effects of the Oculina Bank HAPC closure and regulations on the fishermen of Fort Pierce, Florida. Commercial, charter for-hire, and private recreational fishermen participated in a collection of oral histories focused around their experiences regarding the Oculina Bank. The results of the study rely heavily on the texts from participating fishermen. It is from their perspective and narratives that effects are assessed. The data collected from field notes, data requests to NOAA’s Southeast Science Center, the South Atlantic Fishery Management Council and Florida State agencies, museum archives, academic literature, and news articles were compiled and used to form the ethnographic profile of Fort Pierce. This profile provides descriptive characteristics of the community through time. Data were collected at as fine a scale as possible and the geographic range for landings and trip data are presented below.

Changes in behavior are imposed on fishermen when certain regulations are implemented and these regulations affect fishermen in different ways. Commercial and recreational fishermen may be impacted differently, and perceive the same regulation differently, as well. But even within one sector, there is variation in fishing preferences and activity and thus differential impacts. The effects from the regulations implementing the Oculina Bank HAPC have been described qualitatively. These impacts were generalized as (a) positive or negative according to
the goals of the impacted user group; and (b) direct or indirect correlating roughly with short-
term, immediate impacts or long-term, future impacts.

As with many fishery regulations that restrict effort, there were winners and losers as a result of
the closure of the Oculina Bank HAPC. An important result of this study found that those who
benefited or were negatively impacted cannot be identified by sector alone. Some attest that the
closure saved the Port Canaveral area rock shrimp fishery. On the other hand, the commercial
bottom fishermen of Fort Pierce were negatively impacted. Today, commercial fishing in Fort
Pierce is primarily directed at king mackerel (kingfish) and the actual number of commercial
bottom fishers who were impacted by the Oculina Bank closure remains unknown. Although the
majority of commercial landings by Fort Pierce fishermen now consist of king mackerel, there
are local commercial fishermen with diversified strategies who target snapper grouper outside of
the Oculina Bank, as well as tilefish and pelagics.

An important idea that arose frequently during the ethnographic and oral history components of
the study concerns fishermen’s support for effort-restricting regulations that make sense to the
fishermen. For example, fishermen’s observations support the need for certain effort restrictions.
The need for fish to be able to reproduce is a common theme among effort restrictions fishermen
find necessary. Fishermen generally support closed seasons or areas during times of spawning,
but resist areas closed as complete no-take zones. There is also broad support for minimum size
limits, as fishermen understand the need for fish to grow to reproductive maturity, but the
observation of dead discards from throwing back undersized fish is perceived as wasteful. The
lesson for fishery managers is to recognize the need to design effort restrictions around fishing
behavior, knowledge, and perceptions rather than based on an assemblage of restrictions that will
meet a total allowable catch.

Finally, this study raises the issue that more data are needed to document the impacts and
benefits of MPAs on both the biological and socio-cultural environment. It is not only important
to consider whether potential biological benefits outweigh negative socio-cultural and economic
impacts, but to test such assumptions and expectations. If evidence supports such closures,
fishery managers should be more pro-active in communicating this information with fishermen
in order to help shape an understanding and acceptance of such management measures. If
evidence does not provide measurable benefits to the biological or physical environments to
support ongoing negative socio-cultural and economic impacts, then such restrictions should be
relaxed.

This report summarizes a long-term study of the fishing community of Fort Pierce, Florida to
provide a better understanding of the various social and economic networks within a community
that pertain to fishing and how they may have changed over time as a result of varying fishing
regulations, including the establishment of the Oculina Bank MPA and other socio-economic and
demographic transformations.
III. Purpose

Description of Problem:

As concern over the health of the marine ecosystems grows, various management agencies in the United States are considering Marine Protected Areas (MPAs) to provide protection for and conservation of valued marine habitats and resources. MPAs can be a valuable tool to balance sustainable use with long-term conservation of the ocean, especially when they are planned, managed and evaluated using reliable natural and social science. While MPAs come in many sizes, shapes and purposes, they share a fundamental characteristic and challenge: providing a higher level of protection to specific places in the ocean (Wahle et al., 2003).

The official definition of an MPA is “any area of the marine environment that has been reserved by federal, state, tribal, territorial, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.” (Executive Order 13158, May 2000). Practically all of the federal mandates pertinent to MPAs refer to the important role of social and economic factors in policy development and management decisions concerning MPAs (e.g. Sustainable Fisheries Act, National Marine Sanctuaries Act, Coastal Zone Management Act, Presidential Proclamations and Executive Orders). Similar requirements exist in national environmental legislation, such as the National Environmental Policy Act (NEPA) and Executive Order 12044 on improving government regulations. Overall, these mandates refer to the need for interdisciplinary assessment in support of policy and management decisions, including both formal social scientific data and the inclusion of public and stakeholder input (Wahle et al., 2003).

Although there is considerable support for the use of MPAs among fishery management agencies, there have been important differences expressed by stakeholders. One investigation into perceptions of fishermen concerning MPAs found that although these protected areas are promoted as providing increased protection for certain species of fish or crustaceans and/or increased abundance, fishermen may not agree with such estimates of expected results and see little utility in establishing an MPA (Milon et al., 1997). Others have found that predicted results of establishing MPAs will at times be overstated because researchers wrongly predicted harvesting behavior.

These results suggest a need for continued exploration of the social and economic impacts of MPAs. There has been a historic lack of funding for social science research in coastal and marine affairs; furthermore, the network of social scientists outside of the government, working on issues related to MPAs is similarly underdeveloped (NRC, 2001). With this in mind, Wahle et al. (2003) have developed, “The Social Science Research Strategy for Marine Protected Areas.” The strategy document identifies high priority needs for social science information that are fundamental to the planning, management and evaluation of MPAs. Among these is the growing need to collect, analyze, synthesize, store and manage social science data of all types. Additionally, the need for baseline data, monitoring programs and evaluation methods are also called for. The national social science strategy identifies the following six priority themes for social science research on MPAs:

• Governance, Institutions and Processes;
• Use Patterns;
Blount and Pitchon (2007) have called for an increased role for anthropology within the multi-disciplinary research on MPAs. They note that issues of social and economic equity are most often at the forefront of concern for stakeholders and the discipline of anthropology is especially suited to document those concerns (Blount and Pitchon, 2007:109).

The following description of management action regarding the Oculina Bank comes from the “Oculina Experimental Closed Area Evaluation Plan” (SAFMC, 2005):

The Oculina Bank is a 90-mile strip of coral reefs, located near the continental shelf edge off central eastern Florida that gets its name from the presence of banks, thickets, and rubble zones of *Oculina varicosa*. The depth of the western edge of the Oculina Bank is about 180 ft and the eastern boundary, located less than 3 miles east, is 400 ft. The bank narrows at the northern end, towards Cape Canaveral, to less than 2 miles wide. In 1984, the Council designated a 92-nm² portion of the Oculina Bank as the Oculina Habitat Area of Particular Concern (HAPC). Additionally, the Council prohibited the use of bottom trawls, bottom longlines, dredges, fish traps, and fish pots within the HAPC to mitigate the threat of fishing gear to Oculina coral. In January of 1996, regulations in Amendment 3 to the Coral FMP (SAFMC, 1995) became effective, which prohibited all fishing vessels from anchoring within the HAPC. Also in 1996, to minimize the impacts of the rock shrimp fishery on essential fish habitat, including the fragile coral species existing in the Oculina Bank, the Council prohibited trawling for rock shrimp east of 80°W longitude, between 27°30’N and 28°30’N latitude, in depths less than 100 fathoms. This action was taken through Amendment 1 to the Shrimp FMP (SAFMC, 1996). The area to which the prohibition applied became known as the rock shrimp closed area. In Amendment 6/Environmental Assessment to the Snapper Grouper FMP (SAFMC, 1993), implemented in 1994, the Council prohibited fishing for and retention of snapper grouper species within the HAPC and prohibited anchoring by vessels fishing for snapper grouper species. The area to which these prohibitions applied became known as the Oculina Experimental Closed Area. The intent of these prohibitions was 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” (SAFMC, 1993). In 1998, the Council expanded the Oculina HAPC to include the rock shrimp closed area and added two Oculina HAPC satellite areas. This action was accomplished through Amendment 4 to the Coral FMP included in the Council’s Comprehensive Habitat Amendment (SAFMC, 1998).

As evidenced by the passage above, over time there have been numerous management actions that may have had significant impacts upon the community and various fishing sectors. Over time, the accumulated effects of this management have undoubtedly influenced fishing behavior and other aspects of the fishing public and perceptions. Indeed, further restrictions may be imposed without any assessment on the cumulative social and economic impacts.
This project addressed many of the priority themes discussed earlier from the strategy for MPA social science assessment by incorporating an analysis of the impacts of the Oculina Bank MPA on the fishing community of Fort Pierce, Florida (with a focus on the three sectors of recreational, charter and commercial fishermen). This was accomplished by developing an in-depth ethnography of the fishing community including an examination of the social networks that exist among the fishing sectors and how they relate to the current MPA and its historical use.

![Oculina Bank Habitat Area of Particular Concern](image_url)

**Figure 1**: Oculina Bank Experimental Closed Area. (SAFMC, 2005)

**Overview of National Standard 8 and the Study of Fishing Communities**

Since the reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act in 1996, federal fishery management agencies have begun to provide funding in a number of regions to identify fishing communities in order to address National Standard 8 (McCay and Cieri, 2000; Hall-Arber et al., 2001; Jacob et al., 2002). These studies addressed, to varying degrees, the problem of identifying fishing communities and their dependence upon fishing. In each case the number of fishing communities studied covered entire states or regions of the country. These were very large areas which limited the amount of time spent in any particular fishing community. Another factor that makes this research relevant is that definitional
guidelines for identifying fishing communities and their dependence upon fishing have not yet been finalized. That makes this research particularly useful in providing insight into development of future guidelines for meeting National Standard 8.

Recently, efforts to identify fishing communities in the South Atlantic and Gulf of Mexico have been undertaken using secondary data sources, rapid assessment, and a Geographic Information System (GIS) (Impact Assessment, 2004; Jepson et al., 2005); yet this research has addressed only a portion of National Standard 8, the identification of fishing communities. Problems in defining community boundaries, the linkages between the fishing industry and the community, issues of growth and development from other economic activities and the accumulated impacts of regulation over time are just a few of the important problems that have emerged from the previous work in the Gulf of Mexico, South Atlantic region and elsewhere. The problem stems, in part, from the inability to ascertain such information from secondary data analysis and rapid assessment. These previous studies have encompassed large regions and many communities which make it difficult to explore the complex networks, both social and economic, that exist.

To truly understand the importance of fishing to a community, one must understand how the occupation of fishing is woven into the social and cultural fabric of a community through interaction over time. Like many natural resource communities, fishing communities have suffered over the years as they have endured many of the ills affecting so many extractive industries. As there have been declines in extractive and manufacturing employment, many communities have struggled to make the transition to service oriented work and other types of economic endeavors (Jacob et al., 2002). Measuring the strains of such transition requires a closer look at how communities have adapted and changed. This may be especially important in communities which have been affected by MPAs established nearby. Merely noting the change in economic sectors does not explain who struggles or why or how people adapt to such transitions in employment. This is important for fishery managers, as fishermen often switch to other fisheries or change fishing behavior. Furthermore, though often treated as firms, the fishing enterprise is most likely carried out at the household level. Many studies have pointed to the important role that wives and children have in providing support to the father’s role as fisherman (Davis, 1986; Binkley, 2000; Smith et al., 2003). Therefore, to fully understand the relationship of the household and how it adapts to the larger socio-economic environment requires more intimate study. In order to answer many of these questions it has become obvious that to do so requires investigation over a longer period of time in a localized area. This report summarizes a long-term study of the fishing community of Fort Pierce, Florida to provide a better understanding of the various social and economic networks within a community that pertain to fishing and how they may have changed over time as a result of varying fishing regulations, including the establishment of the Oculina Bank MPA and other socio-economic and demographic transformations.

Using Ethnography in the Study of Fishing Communities

With the addition of National Standard 8 to the Magnuson-Stevens Act, a new focus on the study of the community and awareness of the need for more comprehensive study of the “fishing community” has been revived. Recent attempts to identify fishing communities and their dependence have had varied success in determining community boundaries, how a community relates to fishing or depends upon it and in some cases have been unable to accurately describe
certain sectors and their involvement within the fishing enterprise or the impact of regulations. Therefore to answer such questions a different methodology is needed.

Ethnography is not a methodology in and of itself. It encompasses the use of many different methodologies. Some of these methods include: participant observation, unobtrusive observation, oral history, unstructured interviews, semi-structured interviews, structured interviews, local archival research, folk taxonomies, cognitive mapping and others. This research utilizes many of these methodologies. The use of several different methods is necessary in conducting qualitative work to provide for validation of data collected. Often times through a process of triangulation, data collected through several methods will be compared to confirm the reliability of information gathered which will enhance its validity and comparability later.

This research is intended to show the interrelationship between reliance upon natural resources (fishing) and community. It provides an understanding of how people determine the boundaries of their community and provide an overview of the social and economic networks that are important to fishing within those boundaries. Furthermore, it provides an indication of how those networks have changed as a result of the historical events within the community, including fishing regulation, demographic and socio-economic transformations. In particular, the impact of situating the Oculina Bank Habitat Area of Particular Concern just offshore Fort Pierce, Florida is the focus.

Coastal communities are subject to many types of change that may include rapidly growing populations, increasing regulations, degradation of local ecosystems and in some cases the decline of important marine resources. Because natural resources are in a continuous state of fluctuation, residents of natural resource-dependent communities are often adapting to resource availability and seasonal variations which make adapting to change part of their daily lives. Through the use of ethnography this research attempts to provide an understanding of how fishermen cope with such transitions and how that affects their perception of their community and work. Because the Oculina Bank was a key fishing location for many fishermen in the area, their past history and present fishing practices are examined to understand how they have changed and what the fishermen perceive the impact to have been on their community. Other secondary quantitative data was also collected to compare to the qualitative discussion of change.

Overview of Fishing Communities Studies

As mentioned above, since the addition of National Standard 8 to the Magnuson Stevens Fishery Management and Conservation Act, there has been a concerted effort by the National Marine Fisheries Service to identify fishing communities throughout all regions of the U.S. including its territories. Initially, research focused on how to identify a fishing community and how to determine its dependence upon fishing (McCay and Cieri, 2000; Hall-Arber et al., 2001; Jacob et al., 2002). Determining boundaries of a fishing community and various criteria for determining dependence were key topics as was the focus on the complexity of fishing infrastructure and the degree of gentrification for individual communities.

Follow-up research, used rapid appraisal as a method to provide cursory indices of dependence as a means of identification for management purposes (Impact Assessment, 2004, 2005a, 2005b, 2006; Langdon-Pollack, 2004; Jepson et al., 2005; Agar and Stoffle, 2006; Griffith et al., 2006). Field visits to conduct key informant interviews and windshield surveys in coastal communities
provided rudimentary descriptions of fishing infrastructure and in some cases provided a ranking of coastal communities in terms of their fishing dependence. Unfortunately, as acknowledged by Griffith et al. (2006:1) “our research suggests that it is difficult to find many communities so heavily dependent on fishing that a decline in fishery resources would result in the entire community’s collapse, yet the communities we designate highly dependent on fishing certainly would experience widespread economic dislocation with a substantial decline in fishing resources or activity.”

Problems in defining community boundaries, the links to the fishing industry that pertain to the community, issues of growth and development from other economic activities and the accumulated impacts of regulation over time are just a few of the important difficulties that have emerged. Coastal communities are affected by numerous challenges that affect them whether they are heavily fishing dependent or not (Jepson, 2006). This makes it difficult to ascertain specific social impacts that might accrue from changes in fishing regulations and other factors. With communities so embedded in a coastal economy that is often tied to recreational tourism and development, isolating the impacts on the fishing population is complicated.

Under mandates to conduct social impact assessments, Regional Fishery Management Councils and the National Marine Fisheries Service (NMFS) have proceeded to incorporate fishing community profiles into management plans in order to provide some indication of the impacts of fishing regulations. Recent management actions have included summaries of impacts based upon the identification of fishing communities in all regions among most fisheries (NEFMC, 2003; PFMC, 2003; GMFMC, 2005; NOAA, 2006; SAFMC, 2006; WPFMC, 2006). Unfortunately, the collection of information on fishing communities is often not detailed enough to ascertain specific social impacts (Hanna, 2004; Kaplan, 2004). The baseline information that is collected provides the basis for building a social impact assessment, but further data and analysis are required, especially when attempting to ascertain cumulative impacts within an ecosystems approach (Cheuvront et al., 2005).

Although previous guidelines for conducting social impact assessment are available and have provided direction for much of the Social Impact Assessment (SIA) work to date (Bright et al., 2003; IOCGP, 2003), there remain certain issues that require elaboration for definitional and analytical consistency within Fishery Management Plans. Recent attempts to construct indices of vulnerability and resilience have borne out the difficulty in choosing consistent valid and reliable variables to measure such concepts across regional boundaries and research (Hall-Arber et al., 2001; GMFMC, 2004, 2005). Nevertheless, there remains a need to collect baseline information on fishing communities to build valid measures for social impact assessment that can apply to all regions and fisheries.

Fishing communities in the South Atlantic have been profiled (Jepson et al., 2005) using the standard tools of rapid assessment. Like the previous studies, this research covers a broad geographic area and includes numerous communities in each state along the South Atlantic coast. Description is limited to secondary data analysis and rapid appraisal, which as stated before, limits the ability of researchers to describe the complex networks that exist or linkages to other communities, regions and global markets. Furthermore, the effect of long-term changes in regulation and other socio-economic and demographic change is difficult to establish.
This research addresses several of the problems identified in previous research to enhance the assessment of impacts on the community of a MPA closure. Each of the above studies have had some success in attempting to identify communities that have an association with the fishing industry and in some cases were successful in providing some measure of dependence. However, the nature of how the fishing industry is connected to the larger social and economic region has not been accomplished for fishing communities in many areas. It is difficult to establish how certain occupations and industry are connected with the larger community through the “snapshot” approach. It has been difficult to rectify inconsistencies between different data sources which often present conflicting results, i.e., census employment data compared to permit data. With a more in-depth look at how the fishing infrastructure and enterprise intermingle into the larger community and economy, the social impacts of fishery regulation, like MPAs can be better assessed.

Overview of Social Assessment of MPAs

Although Blount and Pitchon (2007) see an important role for anthropology in the development of MPAs, there has been relatively little social impact assessment of the impact of MPAs, at least comprehensively within the United States. In fact, the evaluation plan for the Oculina Bank Experimental Closed Area includes no mention of an assessment of the impacts of the MPA on the community or humans. Yet, an understanding of the human use of natural resources is recognized as a critical component of any ecosystems approach, including the use of MPAs (Curran, 2002). Interestingly, an understanding of the migration of humans and the ensuing impact upon the coastal environment seems to bring together several theoretical approaches that suggest a variety of research methods. Curran (2002) states that understanding social networks of migrants to coastal areas can provide insight into their embeddedness within the community and thereby is essential to an understanding of their attitudes and perceptions regarding resource use. Social networks of established residents should provide similar insights as well.

Christie (2004), in a review of MPA social and biological success, points out that: “… a strong linkage exists between social and biological success, with social considerations determining long-term biological success. This finding implies that standards for measuring both biological and social success should be applied equally and that MPAs should be designed to meet multiple social and biological goals” (Christie, 2004:132). While there has been no attempt to understand the social impacts of the Oculina Bank, there have been some studies that examine the impacts of other MPAs in the region. Murray (2005) finds that the original projections of the economic impacts of the Dry Tortugas Ecological Reserve were generally accurate in terms of predicting changes in catch, effort and overall economic activity. Generally, there was consolidation of fishing effort with a landings increase while participation declined. Current perceptions of fishermen seemed to correspond with earlier projections as they perceived the impacts of the reserve to positively affect stocks, but saw no positive effects for themselves. This finding is similar to Milon et al.’s (1997) findings in their assessment of Florida Keys fishermen’s perceptions of the Keys National Marine Sanctuary. Fishermen in their survey saw few benefits accruing outside the sanctuary with no long term benefit to the economy of the Keys.

These previous studies of the impacts of MPAs have pointed to some important consequences, some beneficial and others not so beneficial. It is important to continue to evaluate the impacts of this management policy as the use of MPAs continues to be promoted as a key component of Ecosystems Management.
Objectives:

**Goal I:** Conduct in-depth ethnography of the fishing-dependent community of Fort Pierce, FL and implement protocol for examining the impact of the Oculina Bank Marine Protected Area

1. Collect data through various ethnographic methods to determine social and economic networks that will help establish criteria for determining dependence upon fishing and the impacts of the establishment of the Oculina Bank and accumulated regulations upon the community of Fort Pierce, Florida;

2. Train local fishermen to conduct oral histories and collect historical information on their fishing community with a focus on the historical use of the Oculina Bank and surrounding area;

3. Ascertain the historical and current use of the MPA and surrounding area through the examination of social and economic networks for recreational, charter and commercial fishermen and others involved in the fishing enterprise. In some cases, cognitive mapping will be used to determine in as fine a scale as possible the use of the MPA and other fishing areas; and

4. Conduct a series of oral histories with key informants from Ft. Pierce to document changes in natural resource patterns and use to understand the impacts of the MPA over time and changes to the community and resource. In addition, certain historical information pertaining to the Oculina Bank and the fishing community will be sought out for the ethnographic profile of the community.

**Goal II:** Analyze data collected through the ethnographic fieldwork, in-depth oral histories and compilation of historical data to conduct an assessment of impacts of the MPA and complete report writing

IV. Approach

Statement of Work:

Planning Meeting:

A planning meeting was held in Tampa, FL on November 17, 2009. Foundation Executive Director Ms. Judy Jamison, Program Director Mr. Frank Helies and Program Specialist Ms. Gwen Hughes attended along with Dr. Ava Lasseter, Dr. Mark Greenberg and Technical Monitor Dr. Michael Jepson. Prior to the meeting, Dr. Lasseter traveled to Fort Pierce and met with several fishermen, eventually selecting two to participate in the project as research assistants. It was decided that Dr. Lasseter and Dr. Greenberg would collaboratively develop the interview instrument to ensure the proper questions were being asked.

Ethnographic Fieldwork:

Data collection began with initial trips to the community to recruit research assistants and to begin ethnographic fieldwork. Monthly visits were made to continue data collection and monitor
the progress of the research assistants. In addition to working with the research assistants Dr. Lasseter collected data from other sources during these monthly trips to Fort Pierce. Using participant observation, she met with fishermen at the fish houses, attended fishing tournaments and fishing club meetings, and interviewed charterboat captains at local marinas. These experiences and interactions provided extensive qualitative data about socio-cultural characteristics of fishing in the community.

Dr. Lasseter also collected historical data from the St. Lucie County Historical Museum archives with the assistance of museum staff. Permit data were acquired from the Florida Fish and Wildlife Institute and landings data from the NOAA Southeast Science Center.

Two research assistants were identified and contracted with for their in-depth knowledge of local fishing and the history of fishing in Fort Pierce. Both are Fort Pierce residents and commercial fishermen. Because both men reside in the community and actively fish, they did not need proper introduction into the community and were already familiar with industry leaders. Thus, their participation in community functions is a normal part of their daily routine.

In attempting to address the impacts of the Oculina Bank MPA, one of the more difficult impacts to ascertain was the long term impacts of the MPA and other influences upon the community. Part of that description came from analyzing changes in the number of fishing permits over time, the enumeration of fishing infrastructure and any alterations and fluctuations in landings for the community prior to and after establishment of the Oculina Bank MPA. Some information on impacts may not be demonstrable through secondary data sources; therefore oral histories with key informants were utilized to reconstruct past use and ensuing changes.

Oral Histories:

The research assistants were trained by Dr. Lasseter in the collection of oral histories and in the use of the digital recording equipment (protocol outlined in Appendix A). She met monthly with each research assistant to review progress on the oral history collection. The utilization of fishermen to interview other fishermen provided a participatory framework to the project.

In contrast to a more traditional form of oral history that collects the life history of the interviewee, the oral histories collected for this study were essentially semi-structured interviews that focused on the interviewee’s fishing history, familiarity and experiences with the Oculina Bank. In total, 45 oral histories were collected; 15 interviews were completed with each of the three identified fishing sectors under study: commercial, charter/headboat, and recreational fishermen. The oral history participants were not selected at random, but rather, were selected with the assistance of the research assistants for their recognized experience as fishermen in the community, and familiarity with the Oculina Bank. The oral history participants were presented with the visual reinforcement of a nautical map during their interview in order to prompt further insight about important changes in resource availability for certain areas.

Using key informants as primary data sources is a time honored tradition in ethnography. While oral histories are valuable in their own right, they also constitute one manner with which to link historic events to their causes and consequences. The oral histories focus on changes in marine resources and the ecosystem and expand upon the participant’s perception of how those changes occurred. As a result of those changes, participants were be asked to recount whether the MPA
may have changed fishing behavior or how it may have affected stocks and how they reacted to these changes. Finally informants were asked to recount how the community overall may have changed as a result.

The interviews were digitally recorded and uploaded to a website from which the recordings were downloaded for transcription by the University of South Florida’s Oral History Program. Dr. Greenberg was responsible for hire students to do the interview transcribing. The interviews were transcribed verbatim, with minor editing. Release forms were filled out by the interviewees, informing them that their interviews were published on the internet. The audio recordings and transcripts are available to the public at [http://guides.lib.usf.edu/content.php?pid=49131&sid=1429723], where USF has generously agreed to house the collection.

Social Network Data:

With the help of the research assistants, data on the social networks among fishermen living and working in Fort Pierce was also collected. Social network analysis identifies key nodes of social relationships within a group and facilitates the identification of important geographical and political orientations within a region. Network analysis can also reaffirm established contacts as key informants and help establish others who may reside on the fringes of the network, thereby establishing theirs as an alternate view from outside a network. Through an examination of the network and enhanced with other data, the historical and present day use of the MPA can be further explored.

Using the 45 interview responses for analysis, the social networks of these fishermen were examined for transmission of information about fishing regulations. Each of the participants was asked to name five individuals with whom they talk about fishing regulations. These data were used to create a relational, binary matrix for analysis within the social network analysis software, UCINet (Borgatti et al., 2002).

Data Analysis:

Qualitative Data Analysis

The oral history transcripts were first entered into the text analysis software, MaxQDA. The transcripts were next sorted according to the interviewee’s sector (commercial, recreational, charter/headboat). A codebook was developed to guide the analysis.

A codebook assists in managing a large volume of qualitative data. There are two principal types of coding: structural and thematic. Structural coding is used to identify and isolate components of a text. For example, structural codes were created for each of the individual questions in the oral history interviews, irrespective of the answers. Thematic codes isolate text that shares a common idea, or theme. For example, a thematic code was created for “travel further distances to fish.” Any time an interviewee mentioned this idea, irrespective of which question he had been asked, the text was coded for this thematic code.

With these two types of codes, the segments of the texts where they were mentioned can be retrieved and analyzed further. With the interviews categorized according to sector in which the
interviewee participates, these codes can also be compared and contrasted for cross-sector themes.

In interpreting and analyzing the texts, it is important to recognize that it is common for an interviewee to not remember correct dates of regulations; rather, they would recall other significant details that served as temporal bookmarks. For example, a fisherman is not as likely to remember that it was the year 1994 when snapper grouper fishing was prohibited within the Oculina Bank, as it was that he would recall that the closure occurred shortly before the net ban (1995). In this way, qualitative analysis is the most appropriate analytically. At this stage, the purpose is to identify impacts; description is a critical step before a more quantitative analysis could be possible.

**Compiling Ethnographic Portrait**

The data collected from field notes, data requests to NOAA’s Southeast Science Center, the South Atlantic Fishery Management Council and Florida State agencies, museum archives, academic literature, and news articles were compiled and used to form the ethnographic profile of Fort Pierce. This profile provides descriptive characteristics of the community through time. Data were collected at as fine a scale as possible and the geographic range for landings and trip data are presented below.

**Social Network Analysis**

A social network analysis was conducted on data collected, as described above. Data entry and matrix creation necessary for the analysis were accomplished by one of the research assistants after training. The objective of the analysis was to examine the flow of information regarding management regulations within and among the community of fishermen. The analysis and results are detailed under the Findings section.

**Project Management:**

Principal Investigator:

Ms. Judy L. Jamison  
Executive Director

Foundation Staff:

Dr. Michael Jepson  
Program Director (former)

Mr. Frank C. Helies  
Program Director (current)

Ms. Gwen Hughes  
Program Specialist

Ms. Charlotte Irsch  
Grants/Contracts Specialist

Administrative Assistant

Independent Contractors:

Dr. Ava Lasseter  
Social Scientist

Dr. Mark Greenberg  
Dir. of the FL Studies Center, University of South Florida

Research Assistants:

Mr. Robert Cardin  
Fort Pierce, FL

Mr. Terry Howard  
Fort Pierce, FL

Mr. Cody Cardin  
Fort Pierce, FL
Overall project quality control and assurance was assumed by the Gulf & South Atlantic Fisheries Foundation, Inc. through its office in Tampa, FL. The Foundation’s Executive Director had ultimate responsibility for all Foundation administrative and programmatic activities, with oversight by the Foundation’s Board of Trustees. She ensured timely progress of activities to meet project objectives and confirmed compliance of all activities with NOAA/NMFS. The Foundation’s Program Directors had overall responsibility for all technical aspects of Foundation projects and coordinated performance activities of all project personnel, including contractors. The Program Directors prepared all progress reports concerning project performance.

It was the responsibility of the Foundation’s Executive and Program Directors to ensure that quality control and assurance were maintained for all aspects of this program. This was accomplished through regular phone and email communications with project Contractors.

The Program Specialist was responsible for tracking programmatic activities, including generating supporting documentation to assist in any and all programmatic audits. She was responsible for auditing and paying all program related invoices. She processed requests for reimbursement to conform with federal guidelines and prepared and maintained all subcontracts and amendments.

The Grant/Contracts Specialist was responsible for maintaining general financial accounting of all Foundation funds including all Cooperative Agreements and contracts, as well as communicating with NOAA Grants Management personnel, and assisting fiscal auditors in their reviews. She conducted/documented internal and program (single and desk) audits, prepared backup documentation for fiscal audits, and drafted award extension requests (as applicable). She provided the Executive and Program Directors with projected budgets concerning program performance and ensured that these budgets adhered to the proposed budget. Finally, she prepared the annual administrative budget, NOAA Financial Reports, and confirmed compliance of all activities with NOAA/NMFS and OMB guidelines.

The Administrative Assistant was responsible for receptionist/clerical duties, word processing, filing correspondence, dissemination of materials to industry (final reports, press releases, newsletters). She was also responsible for creating and organizing meeting files, processing invoices and maintaining cooperative program files.

Dr. Ava Lasseter served as the Ethnographer and conducted the overall project management including monitoring of the research assistants and coordination between the research assistants and the transcription process at the University of South Florida. She conducted the text analysis and writing of the final report.

Mr. Robert Cardin was born in Fort Pierce and is a life-long commercial fisherman. He conducted the oral histories with the commercial fishermen. Mr. Cardin also served as Dr. Lasseter’s key informant, introducing her to fishermen at the fishing dock and their homes. His extensive, in-depth knowledge of local fisheries and history of the area was provided over countless hours of interviews and touring Fort Pierce.
Since retiring as a high school geography teacher, Mr. Terry Howard fishes for king mackerel full-time. With a grant from the St. Lucie Historical Society, he independently conducted oral histories with local Fort Pierce king mackerel fishermen, ultimately publishing excerpts in his book, *Great Kingfish Captains of Fort Pierce, Florida, Tell Their Stories* (Howard, 2007). For this project, Mr. Howard conducted the oral histories with charter boat captains and private recreational fishermen.

Mr. Cody Cardin is the son of a commercial fisherman, with whom he occasionally fishes when not in school. Mr. Cardin assisted with data collection on community characteristics, fishing infrastructure, and social network data.

Dr. Mark Greenberg is the Director of the Florida Studies Center at the University of South Florida, also directs the Library’s Oral History Program. Dr. Greenberg oversaw the transcription and storage of the oral history interviews. Digital copies of the interviews are now held on their servers and are available for public use through their website.

V. Findings

Actual Accomplishments and Findings:

This section presents the results of the research project including the ethnographic profile of Fort Pierce as a fishing community and the social network analysis. Additionally, themes that arose during analysis of the oral history texts are discussed in terms of the socio-economic impacts on the community’s fishermen resulting from the closure of the Oculina Bank HAPC.

**Ethnographic Profile of Fort Pierce, FL**

*History of Fort Pierce, Florida*

One of the first sites occupied by Europeans in the area occurred when, in 1565, the Spanish built Fort Santa Lucia on the Jupiter Inlet. It is from here that St Lucie county takes its name. Much later, the brother of US President Pierce, US Army Lt. Col. Benjamin Kendrick Pierce, built a fort in 1837 for use as the Army’s headquarters. The area was occupied principally by Native Americans until the Armed Occupation Act of 1842, which ended the Seminole War. The act permitted “any able bodied man or head of a family [to] apply for 160 acres of hitherto unoccupied land lying south of Palatka or Gainesville for which a patent would be issued, provided the land was held continuously for seven years against the Indians” (Hellier, 1965). As the land had yet to be surveyed, this was essentially a way for the federal government to both survey the land and populate the area won from the Native Americans. Hellier (1965) cites one of the founders of Canaveral, shipping turtles and oranges from local groves surrounding the area in 1856. Enormous sawfish were caught and displayed as trophy catches. It was also common for people to eat manatees, green turtles and their eggs (Hellier, 1965).

During the second half of the 19th century, Fort Pierce developed industries for the export of fishery products. There were several wholesale fish companies operating where the City Marina is situated today. The town was first known as “Cantown” for the canning factory that processed and packaged locally caught fish. Only later was the official name made Fort Pierce (Hellier, 1965).

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1 [www.rootsweb.com/~flstluci/slchistory.htm](http://www.rootsweb.com/~flstluci/slchistory.htm)
By 1894, Fort Pierce was connected by Flagler’s railroad to Jacksonville, facilitating export of canned fish to the Eastern Seaboard (Hellier, 1965).

Figure 2: St. Lucie County map showing Fort Pierce on the Indian River Estuary and the constructed inlet permitting the only ocean access in the county.

Fort Pierce was incorporated February 2, 1901 with 66 legal voters in residence. H.B. Summerlin, whose grandson is a fisherman today and is one of the oral history participants in this study, was among the signers of the original documents incorporating the city (Miley, 1980). Fort Pierce’s population remained low until World War II when a Navy base was built which served as one of two original training stations (the other in California) for the Navy SEAL program. James “Patches” Watson was a graduate of the first class of Navy SEALS from Fort Pierce. He returned to the area after the war, settled down, and eventually helped start the local National Navy SEAL Museum.

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2 www.cityoffortpierce.com/fp000.html
Demographics

Although Fort Pierce has seen moderate population growth over the past three decades, the percent of the population in the labor force has remained around 55 percent. Unemployment has dropped from 12.4 percent in 1990 to 8.8 percent in 2000. Average wages and salaries have grown slowly over the past ten years while the number of persons living under the poverty level has risen significantly. The number of people working in farm, fish and forestry has remained
relatively high for both occupation and industry over the years with both categories having over 1000 persons in each sector (Jepson et al., 2005, Pp263). At the time of writing this report, the unemployment rate for St. Lucie County stands at 15.2%, compared with 12% for the state of Florida.³

Table 1: Sources for demographic data include St. Lucie County Almanac (1850) and Bureau of Economic and Business Research (1910-2005). Of the 139 people residing in St. Lucie County in 1850, 27 of these were slaves.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fort Pierce</th>
<th>St Lucie County</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>139</td>
<td>139</td>
</tr>
<tr>
<td>1910</td>
<td>1,333</td>
<td>4,750</td>
</tr>
<tr>
<td>1920</td>
<td>2,115</td>
<td>7,886</td>
</tr>
<tr>
<td>1930</td>
<td>4,803</td>
<td>7,057</td>
</tr>
<tr>
<td>1940</td>
<td>8,040</td>
<td>11,871</td>
</tr>
<tr>
<td>1950</td>
<td>13,502</td>
<td>20,180</td>
</tr>
<tr>
<td>1960</td>
<td>25,256</td>
<td>39,294</td>
</tr>
<tr>
<td>1970</td>
<td>29,721</td>
<td>50,836</td>
</tr>
<tr>
<td>1980</td>
<td>33,802</td>
<td>87,182</td>
</tr>
<tr>
<td>1990</td>
<td>36,830</td>
<td>151,880</td>
</tr>
<tr>
<td>2000</td>
<td>37,516</td>
<td>192,695</td>
</tr>
<tr>
<td>2005</td>
<td>38,569</td>
<td>240,039</td>
</tr>
</tbody>
</table>

Table 2: Community Demographics for Ft. Pierce. Snapper-Grouper Amendment 13A and the U.S. Census Bureau (2010).

<table>
<thead>
<tr>
<th>Community Demographics for Fort Pierce, Florida</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population</td>
<td>36,830</td>
<td>37,516</td>
<td>41,394</td>
</tr>
<tr>
<td>Gender Ratio M/F</td>
<td>92/100</td>
<td>97.4/100</td>
<td>96.1/100</td>
</tr>
</tbody>
</table>

**Age (Percent of total population)**

<table>
<thead>
<tr>
<th>Age Category</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 18 years of age</td>
<td>26.2</td>
<td>27.2</td>
<td>26.5</td>
</tr>
<tr>
<td>18 to 64 years of age</td>
<td>55.0</td>
<td>55.4</td>
<td>57.4</td>
</tr>
<tr>
<td>65 years and over</td>
<td>19.1</td>
<td>17.5</td>
<td>16.1</td>
</tr>
</tbody>
</table>

**Ethnicity or Race (Percent)**

<table>
<thead>
<tr>
<th>Ethnicity or Race</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>53.7</td>
<td>49.5</td>
<td>51.8</td>
</tr>
<tr>
<td>Black or African American</td>
<td>42.3</td>
<td>40.9</td>
<td>40.3</td>
</tr>
<tr>
<td>American Indian and Alaskan Native</td>
<td>0.3</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Asian</td>
<td>0.5</td>
<td>0.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Native Hawaiian and other Pacific Islander*</td>
<td>n/a</td>
<td>0.08</td>
<td>0.0</td>
</tr>
<tr>
<td>Some other race</td>
<td>3.0</td>
<td>0.56</td>
<td>4.8</td>
</tr>
<tr>
<td>Two or more races*</td>
<td>n/a</td>
<td>0.03</td>
<td>0.9</td>
</tr>
<tr>
<td>Hispanic or Latino (any race)</td>
<td>6.4</td>
<td>15.0</td>
<td>18.7</td>
</tr>
</tbody>
</table>

**Educational Attainment (Population 25 and over)**

<table>
<thead>
<tr>
<th>Educational Attainment</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent with less than 9th grade</td>
<td>18.3</td>
<td>17.8</td>
<td>13.8</td>
</tr>
<tr>
<td>Percent high school graduate or higher</td>
<td>56.9</td>
<td>59.7</td>
<td>66.0</td>
</tr>
<tr>
<td>Percent with a Bachelor’s degree or higher</td>
<td>11.3</td>
<td>12.7</td>
<td>14.5</td>
</tr>
</tbody>
</table>

**Language Spoken at Home (Population 5 years and over)**

<table>
<thead>
<tr>
<th>Language Spoken at Home</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent who speak a language other than English at home</td>
<td>11.6</td>
<td>24.8</td>
<td>24.8</td>
</tr>
<tr>
<td>Percent who speak English less than very well</td>
<td>77.1</td>
<td>14.8</td>
<td>15.2</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>18913</td>
<td>25121</td>
<td>33501</td>
</tr>
<tr>
<td>Poverty Status (Percent of population with income below poverty line)</td>
<td>29.2</td>
<td>30.9</td>
<td>26.7</td>
</tr>
<tr>
<td>Percent Female Headed Household</td>
<td>6.87</td>
<td>19.3</td>
<td>19.1</td>
</tr>
</tbody>
</table>

**Home Ownership**

<table>
<thead>
<tr>
<th>Home Ownership</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner occupied</td>
<td>53.3</td>
<td>53.2</td>
<td>55.7</td>
</tr>
<tr>
<td>Renter occupied</td>
<td>46.7</td>
<td>46.8</td>
<td>44.3</td>
</tr>
<tr>
<td>Value Owner-occupied Housing (Median $)</td>
<td>56900</td>
<td>62800</td>
<td>139000</td>
</tr>
<tr>
<td>Monthly Rent (Median $)</td>
<td>401</td>
<td>517</td>
<td>864</td>
</tr>
</tbody>
</table>

**Employment Status (Population 16 yrs and over)**

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent in the Labor Force</td>
<td>54.9</td>
<td>55.1</td>
<td>58.7</td>
</tr>
<tr>
<td>Percent of Civilian Labor Force Unemployed</td>
<td>12.4</td>
<td>8.8</td>
<td>14.1</td>
</tr>
</tbody>
</table>

**Occupation**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management, professional, and related occupations</td>
<td>n/a</td>
<td>19.9</td>
<td>19.5</td>
</tr>
<tr>
<td>Service occupations</td>
<td>15.6</td>
<td>19.3</td>
<td>22.1</td>
</tr>
<tr>
<td>Sales and office occupations</td>
<td>n/a</td>
<td>20.5</td>
<td>24.7</td>
</tr>
<tr>
<td>Farming, fishing, and forestry occupations</td>
<td>9.4</td>
<td>9</td>
<td>4.3</td>
</tr>
<tr>
<td>Construction, extraction, and maintenance occupations*</td>
<td>n/a</td>
<td>15.8</td>
<td>16.5</td>
</tr>
<tr>
<td>Production, transportation, and material moving occupations*</td>
<td>n/a</td>
<td>15.5</td>
<td>13.0</td>
</tr>
</tbody>
</table>

**Industry**

<table>
<thead>
<tr>
<th>Industry</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry, fishing and hunting</td>
<td>9.8</td>
<td>7.8</td>
<td>4.5</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>7.14</td>
<td>8</td>
<td>5.7</td>
</tr>
<tr>
<td>Percent government workers</td>
<td>17.7</td>
<td>11.4</td>
<td>12.2</td>
</tr>
</tbody>
</table>
Table 3: Number of people employed by Industry for Fort Pierce, Florida 1970-2000. (Source: Jepson et al., 2005) The number of people employed in the fishing industry has declined each decade while the overall population of the city has continued to increase.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Fishing, Mining</td>
<td>2460</td>
<td>1838</td>
<td>1324</td>
<td>1119</td>
</tr>
<tr>
<td>Construction</td>
<td>885</td>
<td>1258</td>
<td>1100</td>
<td>1803</td>
</tr>
<tr>
<td>Business Services</td>
<td>260</td>
<td>467</td>
<td>521</td>
<td>388</td>
</tr>
<tr>
<td>Communication/Utilities</td>
<td>315</td>
<td>693</td>
<td>463</td>
<td>365</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>846</td>
<td>1149</td>
<td>962</td>
<td>1139</td>
</tr>
<tr>
<td>Financial, Insurance &amp; Real Estate</td>
<td>342</td>
<td>485</td>
<td>593</td>
<td>625</td>
</tr>
<tr>
<td>Services</td>
<td>440</td>
<td>693</td>
<td>661</td>
<td>6453</td>
</tr>
<tr>
<td>Wholesale/Retail Trade</td>
<td>3110</td>
<td>1916</td>
<td>4277</td>
<td>3822</td>
</tr>
<tr>
<td>Transportation</td>
<td>2405</td>
<td>3005</td>
<td>3387</td>
<td>433</td>
</tr>
</tbody>
</table>

Hurricanes

As is true in many communities around the southeast U.S. coast, hurricanes have had a serious impact on the community of Fort Pierce. According to Pilkey et al. (1984), 17 hurricanes passed within a 50-mile radius of Fort Pierce between the years of 1900 and 1962 with no additional hurricanes passing nearby between 1962 and 1984. In 1928, two storms severely impacted Fort Pierce, and a third passed further to the south, missing the city. There were an estimated 2,500 fatalities from the storm known as the Okeechobee Hurricane, which made landfall between Jupiter and Boca Raton on September 17. Although this storm is beyond the memory of most active fishermen today, several multi-generation members of the community mentioned the storm in relating stories of their ancestors. The 1949 hurricane is another one that still exists in the memory of local residents, as mentioned by Bud Tillman in his oral history.

More recently, Fort Pierce was severely damaged when two hurricanes struck during the devastating 2004 season. Overall impacts to the state’s physical infrastructure were estimated to be in the 20 billion dollar range, not including impacts that the season had on the Florida tourist trade. That year, Hurricane Frances virtually ripped apart Fort Pierce, FL, and Hurricane Jeanne followed close on Frances’ heels to send the community reeling from the physical and economic impacts of these two storms. One estimate had bookings for hotels in the area down by as far as 20%. Other impacts to the Fort Pierce area included overwash damage and damage to small boats in the area. Overwash damage pushed beach sand inland, covering or destroying sections of ornamental landscaping as well as depositing the sand in several houses near the beach section of the community. The City Marina was completely destroyed and had to be rebuilt, as were the docks of Inlet Fisheries, the only commercial fish house in operation at the time.

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4 http://news.bbc.co.uk/2/hi/americas/3695518.stm
5 http://news.bbc.co.uk/2/hi/americas/3695518.stm
Figure 5: Residential storm damage inflicted by Hurricane Frances in 2004.6

Figure 6: Overwash deposits near Ft. Pierce. Here waves and storm surge overtopped the crest of the beach and drove sand landward covering vegetation and the road. Overwash deposits like this developed sporadically along the coast.7

7 http://coastal.er.usgs.gov/hurricanes/frances/
Fishing in Fort Pierce

Fort Pierce’s location on the south east coast of Florida provides opportune geography for fishing. Fort Pierce is on the west side of the 155 mile long Indian River Estuary which has only two small natural inlets. The estuary serves as a natural barrier from the Atlantic Ocean, as well as a nursery habitat for many important marine species. The inlet at Fort Pierce was actually constructed early in the 20th century by local residents. Approximately six miles from downtown, Interstate 95 and the Florida Turnpike have exits less than one mile apart. The proximity of these two highways has turned the junction into a popular travel layover spot. There are several hotels and restaurants, representing major national chains that provide additional tourist infrastructure.

Downtown Fort Pierce was the site of many early fish houses that packed fish into barrels and shipped them north by rail. Over time, the importance of commercial fishing has slowly given way to the charter and private recreational sectors. This is apparent at the City Marina, the focal point of downtown Fort Pierce. There are frequent weekend events including boat shows, a weekly farmer’s market, and live music.

Commercial fishing was one of the earliest industries in Fort Pierce. In the late 1800s, a man from Titusville helped to create the commercial fishing sector in Ft. Pierce. He would bring fish caught in Fort Pierce to Titusville for shipping to the rest of the east coast. The first icehouse for packaging fish was built in 1900 (Newman, 1953). At this time, several fish houses occupied spots along the waterfront.

After World War II, tourism became more important, and the charterboat industry began in earnest. As private boat ownership became feasible to more people, the private recreational industry also grew. From Fort Pierce’s beginnings, however, the line separating commercial, charter, and recreational fishing was never rigid. White’s Tackle, a local recreational fishing favorite, has been serving the fishing population in Fort Pierce since 1925. Local commercial fishermen also worked as guides for visiting sportsmen.

In addition to its economic importance, the culture of fishing has been central to the area since its inception. Anecdotes passed down from one generation to the next of Ft. Pierce residents describe the abundance of fish in the area in the late 1800s and early 1900s. One such story, told by Newman (1953) in her book, *Early Life Along the Beautiful Indian River*, tells of a man who bound his shirt at the sleeves and waist and cut a plunging neckline. He would then stand in the water until the shirt was full of fish and then empty it out into a bucket on the shore.
In 1914, there were already fish houses where the City Marina sits today, as a new arrival is described by Miley (1980): “There was a little “tramline” along Avenue A from the railway tracks down Cobb’s dock at the foot of the avenue and along over the dock to the several fish houses out over the river along its sides. Hand-pushed carts were propelled along the tramline between the fish houses and the railway tracks to carry the boatloads of fish that were daily brought in by the many fishermen; and to transport the ice from the ice plant to the fish house to ice down the fish in barrels. There was a barrel factory out over the river, too—two of them for some years, in fact.”

“Fish were shipped out by the carload daily; some days when the run was heavy, several carloads. It was the same all up and down the river and sometimes when the run was heavy there might be a solid trainload of fish by the time the train reached Cocoa or Titusville.” (Miley, 1980).

Figure 7: An advertisement for White’s Marine and Tackle Shop, used throughout the 1950s in the Chamber of Commerce’s Fishing and Visitor’s Guides. Buck White, shown in the photo, was the original owner of the still popular bait and tackle store.
Figure 8: Early photos of Fort Pierce’s commercial fishing industry. The top photos show the “tramline”, described above. Photos courtesy of the St. Lucie County Regional History Center archives.

Figure 9: Early fishermen of Fort Pierce with their catches. Photos courtesy of the St. Lucie County Regional History Center archives.
The presence of Spanish galleons sunk off the St. Lucie and Martin Counties coastline has given this area the nickname, the Treasure Coast. These artificial reefs have created excellent fishing and diving spots, thereby stimulating a local tourist economy. The reefs attract spiny lobsters, marlin, snook, flounder, and grouper. Some of the more popular fish in the St. Lucie River include channel bass, snook, ladyfish, jack crevalle, and trout. Black bass is another popular catch in the area. There are many charter fishing boats in the area which offer half, three-quarter, and full-day trips for dolphin, sailfish, wahoo, amberjack, tuna, kingfish, snapper, and grouper (Jepson et al., 2005). Fishing in Fort Pierce is diverse and includes shore and bridge fishing, fishing in the river, and offshore. Each requires different gear and access, and targets different species.

The Fort Pierce Chamber of Commerce has produced a *Fishing and Visitors’ Guide* since the early 1950s. These publications include information on local charter boats and fishing species, including descriptions of where and how the most popular species can be caught.

![Figure 10: Map of fishing areas that was an advertisement in the Chamber of Commerce’s annual Fishing and Visitor’s Guide.](image)

One of the most important commercial fisheries in Fort Pierce, historically and remains true today, is mackerel. While the shrimp processors are located in the Cape Canaveral area, Fort Pierce fish houses have mostly processed mackerel. King mackerel, pelagic and migratory, often feed over live reefs so there is a possible relationship between the deep water Oculina coral reefs and where king mackerel are caught. However, mackerel are mid-water to surface fish and the fishing of mackerel has not been impacted by the closures of the Oculina Bank.

The larger impact to the king mackerel fishery came from gill nets (banned in the 1980s) and the Florida net ban, implemented in 1995. Although some Fort Pierce fishermen did use large nets to land huge catches of king mackerel (with the assistance of spotter planes to locate schools of fish), most local fishermen trolled for kingfish using hook and line, even when nets were legal. In fact, one local fisherman noted in his interview that netted mackerel were valued less on the
market than were line caught mackerel, as the nets often damaged the fish. Ultimately, local fishermen targeting king mackerel were not as directly impacted by the net ban as were other net fishers who targeted mullet and other species inshore. However, the net ban caused indirect impacts as netters were forced to shift effort into other fisheries in which they were not engaged previously.

Because king mackerel are pelagic and migratory, the fishery does not interact directly with the Oculina Bank, which is the focus of this study. However, the timing of the net ban (implemented in 1995) occurred immediately after bottom fishing within the Oculina Bank HAPC was prohibited in 1994. The temporal proximity of these events, each of which implemented dramatic changes to fishing behavior, make it more difficult to identify and isolate socio-economic impacts on fishermen.

Fishing Oculina Bank

The early fishing in Fort Pierce was principally done in the estuary or inshore. Due to a lack of motorization, vessels did not venture to the offshore areas, and the gear used at the time would not have allowed fishermen to reach the depths of the Oculina Bank. It was not until the motorization of fishing fleets, and the encouragement by the Federal government to expand fishing production, that fisherman began targeting the offshore fishing grounds and deeper depths for bottomfish.

During the second half of the 20th century, however, multiple user groups have targeted multiple species in the area of the Oculina Bank. Fort Pierce, at the southern end of the closed area of the Oculina Bank HAPC, was not as involved in the scallop and rock shrimp trawling fisheries, as were fishermen further north. Thus, much of this history of fishing was centered outside of Fort Pierce, in Cape Canaveral and Titusville, where the rock shrimp and calico scallop processors were based. It is also from this area that the original push for the closure of the Oculina Bank and designation of the HAPC originated.

Calico Scallops and Rock Shrimp

In the oral history transcripts, rock shrimp trawlers receive most of the blame for the damages to the Oculina Bank pinnacles and coral. However, it was actually at the Federal government’s direction, and instruction, that trawling began in the area. In 1960, the Federal Bureau of Commercial Fisheries published an account of the calico scallop beds located in the vicinity of the then unidentified Oculina Bank:

“A total of 252 dredging stations were made during the cruise using 8- and 10- foot modified Georges Bank scallop dredges with 2” rings and 1 ½” mesh liners. A total of 177 drags within the confines of the bed yielded approximately 664 bushels of scallops (an average of 3 ¾ bushels per half-hour tow), and 126 of these drags were within the apparent areas of heaviest concentration (15 to 25 fathoms) and accounted for 659 bushels of the catch (average of 5.2 bushels per tow).”

“During the week of May 30 to June 5 the Silver Bay conducted daily trips to the Cape Canaveral scallop bed off the Florida Atlantic Coast to demonstrate use of commercial scallop dredges to interested fishermen.”

27
The industry, with the backing of the federal government, was encouraged to grow and to take full advantage of the available resource. This speaks to the perspective on fishery management at the time. Management was not about controlling or restricting access to abundant resources. Rather, federal policy aimed to expand domestic fisheries. This expansion was not only designed to maximize economic growth, but also make a national claim to resources in offshore waters, in the face of extensive foreign fishing near US coastlines. This early management paradigm is discussed further in the section below.

**Figure 11:** The Bureau of Commercial Fisheries published the above map in 1960 showing the recently identified calico scallop beds. Fort Pierce is at the southern end of the range shown in the map. Scallop beds were in depths of 10-32 fathoms.
Figure 12: History of calico scallop landings for the entire east coast of Florida. The Oculina Bank HAPC was closed to trawling in 1984. Data source: http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html

Rock shrimp are still an important resource to the east coast of Florida, but it was the heavy trawling pressure from this fleet that initiated the implementation of the Oculina Bank closure. As neither the fishermen nor processors of rock shrimp and calico scallops were based in Fort Pierce, these fisheries are largely outside the purview of this report. Nevertheless, a summary of this history is important as it was in response to the impacts from these fisheries that the movement to implement the Oculina Bank closure occurred. Both the rock shrimp fishery and the calico scallop fishery were of far greater socio-economic importance to the Cape Canaveral area, where the processors have been based throughout the history of the fishery.

According to Rodney Thompson, the rock shrimp fishery began in 1969 when he built a boat to begin harvesting brown shrimp out of Titusville. At that time, rock shrimp “couldn’t even be given away, never mind eaten.” 8 Not having luck with brown shrimp, Captain Barrett of the NOAA research vessel, Oregon II, directed Rodney to an area 20 miles east of Melbourne. There, dropping nets to trawl at sun down, they landed over 1,000 pounds of rock shrimp, locally known as “peanuts,” “trash” or “hardheads,” in under an hour.

There was no market for rock shrimp as their hard shells made them extremely difficult to clean. It was Rodney’s daughter, Laurilee Thompson (a captain and fisherman, herself), who figured out how to split the hard shells like a lobster. Together, they invented a machine to split open the shells, permitting removal of the large sand vein, as well. With the ease of opening them, a new market quickly developed for rock shrimp. Rodney Thompson established a processing plant at Port Canaveral, and opened a restaurant, Dixie Crossroads, in 1983 in Titusville, Florida. Captain Sam Vona and his sons operated a fleet of shrimp-boats that produced nearly all of the rock shrimp processed at Thompson’s plant, Ponce Seafood, Inc.

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8 http://www.dixiecrossroads.com/ShrimpLore/Index.asp
With the new market for rock shrimp, demand increased, as did the number of trawlers targeting offshore in the Oculina Bank.\(^9\) Many of these boats came from the Gulf of Mexico and were much larger than the east coast trawlers. Some were quite large, 110 feet long and capable of dragging four 60’ flat nets at one time. According to Laurilee Thompson, the nets were weighted with heavy chains which when dragged, created paths the fishermen called “goat trails.” The bigger boats could catch and freeze more than 7,000 pounds of shrimp per night. The industry peaked in 1991, when more than 40 million pounds of rock shrimp landed at Florida’s docks. In 2000, less than three million pounds of rock shrimp were offloaded in Florida.

By that time, Rodney Thompson had already begun a campaign to stop bottom-trawling in the Oculina coral reefs, recognizing the area as an important nursery ground for rock shrimp. Initially, he was met with major resistance from captains, boat-owners and owners of fish-houses. As catch rates crashed at an alarming rate, the people who depend on rock shrimp became more supportive. His campaign led to the implementation of a management plan for rock shrimp, in 1984, which closed a 92-nm\(^2\) area of abundant Oculina pinnacles as the Oculina Habitat Area of Particular Concern (HAPC). Within this area, the use of bottom trawls, bottom longlines, dredges, fish traps, and fish pots were prohibited (SAFMC and GMFMC, Coral Fishery Management Plan, 1982).

Many of these boats came from the Gulf of Mexico and were much larger than the east coast trawlers. Some were quite large, 110 feet long and capable of dragging four 60’ flat nets at one time. According to Laurilee Thompson, the nets were weighted with heavy chains which when dragged, created paths the fishermen called “goat trails.” The bigger boats could catch and freeze more than 7,000 pounds of shrimp per night. The industry peaked in 1991, when more than 40 million pounds of rock shrimp landed at Florida’s docks. In 2000, less than three million pounds of rock shrimp were offloaded in Florida.

Through the series of regulations detailed below, the rock shrimp trawlers were prohibited from trawling in a larger area between Cape Canaveral and Fort Pierce. Since October, 2003, rock shrimp boats are now required to use a vessel monitoring system on their boats. Their movements are tracked by the NOAA Office of Law Enforcement, in the Southeast Regional Office. Visualizations of the movements of the trawlers, today, show the trawlers heavily working the western edge of the Oculina Bank HAPC.

What is important to note about Rodney Thompson’s movement to close the Oculina Bank to rock shrimp trawling, is that while it saved the local rock shrimp fishery, other fisheries along the coast were also impacted. Ultimately, all bottom fishing would be prohibited within the large protected area, although the closure was originally designed to prevent the trawling for scallops and rock shrimp. Thus, the specific goals of the closure were realized and rock shrimp remains a viable industry for the Cape Canaveral-Titusville area, located at the northern end of the Oculina Bank HAPC. However, fishermen from the southern end of the Oculina Bank, specifically Fort Pierce, have incurred unintentional consequences when the area was closed to all bottom fishing in 1994.

*Shark and Bottom Fishing*

Another fishery that was initially instigated with Federal government support was the shark longlining fishery. During the early 1980s, the government was encouraging growth of the fishery, leading many fishermen to invest in the capital needed to target sharks. “But scientists soon realized that sharks were too slow to mature and reproduce to sustain heavy harvesting. So federal laws changed and squeezed most local commercial shark fishermen, including Colket, out of the business by the mid-1990s” (Kirley, 2010). Later, the restrictions became so strict and

\(^9\) The area was not known then as the Oculina Bank. Rather, local names included the Cones, Steeples, and Humps.
ultimately, shark fishing became largely stigmatized. This relatively rapid shift in government policy and public perceptions is difficult for fishermen, who view themselves as food providers, to understand.

![Image of a person holding a large shark](image)

**Figure 13:** Tris Colket, shown in this 1985 photo, is one of the oral history participants in this study.10

Bottom fishing for snapper and grouper species was also an important fishery in the Oculina Bank area prior to its closure. This was the only fishery in that area in which all three sectors, commercial, charter for-hire, and private recreational fishermen participated. This is also the group whose stories and experiences are detailed in the section on Impacts from the closure of the Oculina Bank, below.

**Participation and Effort**

The number of charter boat operations at a given time is difficult to determine. Many operations open and close within a short time, and many operate on a part-time basis only. There are many small operations that conduct fishing trips in the river, while fewer venture offshore. Nevertheless, the 15 oral histories conducted with charter boat captains represent the majority of

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the active charter fishing operators and include all of those that operate offshore trips. The sample includes a small number of captains that restrict their operations to the river.

In order to examine the importance of fishing to Fort Pierce, currently, two principal types of data are available: fishing permits and landings. With these data, we can consider the relationship local fishing has with the area designated as the Oculina Bank HAPC. It is important to note, however, that permits and landings data cannot inform as to the causes of effort shifts. Also, it is not possible to determine the reason for a decrease in the number of commercial permits, or to locate those individuals who no longer hold a particular permit. Without this information, it is difficult to make conclusions about whether the various regulations implementing closures in the Oculina Bank impacted fishermen directly or indirectly.

Permits

Fishing permits are one way to examine the number of people participating in commercial and recreational fishing. However, it is difficult to make conclusions about fishing effort from permit data alone. For example, permits are sorted according to the address given by the permit holder. A permit holder may have a permanent address outside of Fort Pierce, and thus not be counted in the tallies below, even if he departs and lands fish locally. The opposite may also be true, where a resident permit holder of Fort Pierce travels to Sebastian or elsewhere to fish.

Commercial Permits:

Thus, it is important to note that the tallies of permits given below reflect those with a Fort Pierce address. There are over 100 vessels with federal permits home ported in Fort Pierce and most of those have coastal pelagic permits (Table 4). The majority of these target mackerels, principally. Since 2001, the permit system has become more complex. The number of permits listed for 2011 reflects new categories of permits. It is also important to note that the number of permits is listed for permit holders with a Fort Pierce address.

<table>
<thead>
<tr>
<th>Type of Permit</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Permitted Vessels</td>
<td>88</td>
<td>64</td>
<td>81</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Commercial King Mackerel</td>
<td>54</td>
<td>52</td>
<td>62</td>
<td>71</td>
<td>46</td>
</tr>
<tr>
<td>Commercial Spanish Mackerel</td>
<td>63</td>
<td>59</td>
<td>72</td>
<td>73</td>
<td>59</td>
</tr>
<tr>
<td>Commercial Spiny Lobster</td>
<td>10</td>
<td>8</td>
<td>9</td>
<td>11</td>
<td>3/6(^1)</td>
</tr>
<tr>
<td>Charter/Headboat for Coastal Pelagics</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Charter/Headboat for Snapper-Grouper</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Snapper Grouper Class 1</td>
<td>5</td>
<td>13</td>
<td>17</td>
<td>18</td>
<td>4(^2)</td>
</tr>
<tr>
<td>Snapper Grouper Class 2</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>4(^2)</td>
</tr>
<tr>
<td>Swordfish</td>
<td>18</td>
<td>8</td>
<td>8</td>
<td>11</td>
<td>5/0/1(^3)</td>
</tr>
<tr>
<td>Shark</td>
<td>46</td>
<td>18</td>
<td>18</td>
<td>24</td>
<td>6/5(^4)</td>
</tr>
<tr>
<td>Rock Shrimp</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Federal Dealers</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

\(^1\) Whole Commercial Spiny Lobster: 3; Spiny Lobster tailing: 6.

\(^2\) Snapper Grouper unlimited trip limit and 225 pound trip limit, respectively.

\(^3\) Swordfish: Directed (5); Handgear (0); Incidental (1).

\(^4\) Shark Directed: 6; Shark Incidental: 5.
Recreational Permits:

It is difficult to determine the size of the local recreational fishing population. According to permit data provided by the Fish and Wildlife Research Institute, approximately 2,700 residents of Fort Pierce currently hold a Florida saltwater recreational fishing license. The frequency with which permit holders fish and their target species is unknown. However, recreational fishing is extremely popular in Fort Pierce (see Fishing Infrastructure section below).

Table 5: State Recreational Fishing Licenses (2010). Data source: Joe Ohop, Research Scientist, Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission.

<table>
<thead>
<tr>
<th>City</th>
<th>#SFL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Pierce</td>
<td>2,687</td>
</tr>
<tr>
<td>Hutchinson Island</td>
<td>7</td>
</tr>
<tr>
<td>Port St Lucie</td>
<td>6,219</td>
</tr>
<tr>
<td>St Lucie West</td>
<td>1</td>
</tr>
<tr>
<td>County Total</td>
<td>8,914</td>
</tr>
</tbody>
</table>
Landings

Landings are a way to look at fishing activity. However, variations in landings may not accurately reflect species abundance. Other factors often contribute to changes in effort including fuel prices, environmental phenomenon such as hurricanes, and implementation of new fishery regulations.

Commercial Landings:

There are more data for commercial landings than for recreational landings. The following figure (Figure 15) shows recent landings trends for Fort Pierce, for the years 2000 – 2008. Due to the small number of dealers in the community, the actual weight in pounds is considered confidential and not included. Rather, the figure shows how local landings have varied in relation to each other in recent years. Following the landings trend graph is another representation of the most important commercial species (Figure 16), defined according to a “local quotient” (lq). The local quotient is derived from the overall value of local commercial landings divided by the value of each particular species. This is a measure of determining the relative importance of landed species to the community. As seen in the graph, king and Spanish mackerels are the most important commercial species landed in St. Lucie County. The figure is based on landings data from 2008.

![Ft. Pierce Landings by Species 2000-2008](image)

**Figure 15:** Landings trend for the community of Fort Pierce, Florida. (SERO 2011)
Figure 16: Landings and Value Local Quotient for Top Fifteen Species in Fort Pierce, Florida (SERO 2011)

The following Figure 17 shows the historical landings for grouper species in St. Lucie County. There is a dramatic decline in landings evident for snowy grouper, a deep water species, which coincides with the 1994 closure of the Oculina Bank HAPC to all bottom fishing. Scamp also decreased at the same time. Again, it is difficult to draw conclusions from landings data alone. Furthermore, because data were not available as far back as the original closure in 1984 to bottom longlining, it remains unknown how the closure affected the total weight of bottom fish landings in the area.

Figure 17: Commercial Landings of Groupers, for St. Lucie County, during the period of 1986 thru 2010. Data provided by the NOAA Southeast Science Center.
Charterboat and Private Recreational Landings Estimates:

The recreational fishing population is even more difficult to define. Fort Pierce offers diverse fishing opportunities and those that venture offshore to the Oculina Bank area likely represent a small minority of the total recreational fishing population. It is equally difficult to estimate landings for the recreational sector. The following figures are based on data provided by the NOAA Southeast Science Center, from MRFSS estimates. The data are given in number of individual fish, not weight of fish, as are the data from commercial landings. The data were also only available for the entire east coast of Florida, making it even more difficult to interpret fluctuations in landings. The figures provide three data series: estimates for charter/for hire operations, private recreational vessel landings, and landings from shore based fishing.

Headboat data are collected and displayed separately from the private recreational and charter/for hire boats, by the NOAA through MRFSS estimates. The following figures display the number of trips for the region between Fort Pierce and Miami, Florida, plus the estimated landings for several important species.

![Estimated Headboat Trips From Ft. Pierce to Miami, FL 1998-2009](image)

**Figure 18:** Estimated number of headboat trips from Fort Pierce to Miami, Florida, during the period 1998 to 2009. Data were not available for the local area alone making it difficult to identify trends that may have occurred in Fort Pierce. Data from MRFSS estimates, the NOAA Southeast Science Center.

Fishing Infrastructure

In addition to permits and landings, fishing infrastructure can assist with describing the importance of fishing to a community. This section provides data on the current context of the local fishing economy, infrastructure, and available fishing activities in the Fort Pierce area. Many people claim that the fishing infrastructure has been severely impacted by excessive Federal regulations. However, it is difficult to determine (a) to what extent such regulatory impacts have affected local businesses, and (b) that regulations are the direct cause. Without
baseline data as to the number of marine related businesses in the past, it is hard to track down those who have been put out of business. Also, it is difficult to determine singular causality in the current economic decline which has affected all sectors and industries across the country. Nevertheless, the following data help describe the importance of fishing to the local community.

Employment in the fishing industry, shown in the following tables and graphs, provides socio-economic data on the importance of fishing to the local economy. For example, there are over 260 persons employed in the boat building sector of fishing related employment (Table 6).

**Table 6:** Number of people employed in different sectors of the fishing industry for the year 2008. Data source: US Census Bureau, St. Lucie Employment County Business Patterns.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish harvesters</td>
<td>136</td>
</tr>
<tr>
<td>Seafood Retail</td>
<td>2</td>
</tr>
<tr>
<td>Marina</td>
<td>49</td>
</tr>
<tr>
<td>Scenic Water</td>
<td>9</td>
</tr>
<tr>
<td>Boat Building</td>
<td>502</td>
</tr>
<tr>
<td>Shipping Support</td>
<td>7</td>
</tr>
<tr>
<td>Shipping</td>
<td>38</td>
</tr>
<tr>
<td>Total Fishing Employment</td>
<td>743</td>
</tr>
</tbody>
</table>

**Marinas:**

The public spaces occupied by the commercial and recreational fishing sectors have changed over time. In the early days of Fort Pierce’s history, when commercial fishing was a cornerstone of the community’s economy, the fish houses occupied the central part of town. Today, the City Marina occupies that central space. The public space is now very different compared to the original commercial fishing dock. Today, recreational fishing, both private and for-hire charters, occupy the central space and play a larger part in the local economy.

The marinas listed in the table and figure below are used by private recreational and charter/headboat vessels. Commercial boats principally dock at the two fish houses (Inlet Fisheries and Dayboat) which are located next door to one another on the northwest side of the North Bridge, a couple of miles from the city center. Some commercial fishermen dock at their personal residence. At Inlet Fisheries, there are approximately 20 boats that are homed at the fish house dock.
Figure 19: Fort Pierce has numerous marinas available for vessel storage. The figure shows the number of total slips available and the number that were full as of winter 2010-2011. Data source: rapid appraisal and key informant interviews.

Table 7: Marinas of Fort Pierce. Data source: rapid appraisal and key informant interviews.

<table>
<thead>
<tr>
<th>Marinas of Fort Pierce</th>
<th>Year Opened</th>
<th>Number of Slips</th>
<th>Number of Slips Occupied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Pierce City Marina</td>
<td>1938</td>
<td>150</td>
<td>120</td>
</tr>
<tr>
<td>Harbortown Marina</td>
<td>1988</td>
<td>342</td>
<td>205</td>
</tr>
<tr>
<td>Little Jim's Marina &amp; Fishing Bridge</td>
<td>1940s</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Riverside Marina</td>
<td>1940</td>
<td>70</td>
<td>52</td>
</tr>
<tr>
<td>Fort Pierce Inlet Marina</td>
<td>1987</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Pelican Yacht Club</td>
<td>1946</td>
<td>95</td>
<td>81</td>
</tr>
<tr>
<td>Taylor Creek Marina</td>
<td>1979</td>
<td>306*</td>
<td>230</td>
</tr>
<tr>
<td>Dockside-Harborlight Resort**</td>
<td>?</td>
<td>44</td>
<td>16</td>
</tr>
</tbody>
</table>

*only six are wet slips. **principally a hotel.
Bait & Tackle Shops:

Fort Pierce has numerous bait and tackle shops. These shops are social places for fishermen and provide space for the exchange of information about regulations.

**Figure 20**: Fort Pierce has numerous bait and tackle shops. The figure shows the number of full and part-time employees at each of the local bait and tackle shops as of winter 2010-2011. Data source: rapid appraisal and key informant interviews.
Restaurants:

Fort Pierce also has numerous restaurants that designate seafood as a focal point of their business. The names of the restaurants reflect this focus. Through informal conversations with wait staff in these restaurants, the origin of marine-based items on the menu is not necessarily local. At least two restaurants buy from local fishermen (who have dealer permits) or local dealers, and others buy from regional dealers who operate along the south eastern Florida coast. However for the most part, restaurants profit more from the image of fishing and the desire of tourists to eat fish and seafood when visiting coastal communities, rather than being directly engaged with the fishing community.

Employment at Fort Pierce Seafood Restaurants

Figure 21: The figure shows the number of full and part-time employees at each of the local restaurants as of winter 2010-2011. Data source: rapid appraisal and key informant interviews.
Fishing Tournaments:

Fort Pierce is an important center for recreational fishing tournaments. Private recreational vessels and charter for-hire boats with paying customers participate in the tournaments. Numerous tournaments are held throughout the year for different target species. Each tournament charges an entry fee and participants include local and regional residents.

Table 8: A list of many of the recreational fishing tournaments that are held in Fort Pierce. Data source: rapid appraisal and key informant interviews.

<table>
<thead>
<tr>
<th>Fishing Tournaments in Fort Pierce</th>
<th>Years in Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ft. Pierce Pink Ladies Tournament</td>
<td>4</td>
</tr>
<tr>
<td>Pelican Yacht Club Billfish Tournament</td>
<td>31</td>
</tr>
<tr>
<td>FLW Outdoors Professional Kingfish Tour</td>
<td>2</td>
</tr>
<tr>
<td>SKA Tournament/Yellowfin Boats Kingfish Classic</td>
<td>14</td>
</tr>
<tr>
<td>Florida Gators Club Fishing Tournament</td>
<td>3</td>
</tr>
<tr>
<td>Offshore Big 3 (OB3) Fishing Tournament, Hibiscus Children's Center</td>
<td>9</td>
</tr>
<tr>
<td>Fort Pierce Open</td>
<td>26</td>
</tr>
<tr>
<td>Bluewater Open Dolphin Mania</td>
<td>14</td>
</tr>
<tr>
<td>St Lucie County Chamber of Commerce, Fishing Frenzy</td>
<td>16</td>
</tr>
<tr>
<td>Boldwater Wahoo &amp; Dolphin Slamathon</td>
<td>5</td>
</tr>
<tr>
<td>St. Lucie County Sheriffs Explorers Tournament</td>
<td>14</td>
</tr>
<tr>
<td>Fort Pierce Sportfishing Club Tournament</td>
<td>24</td>
</tr>
<tr>
<td>Fort Pierce Saltwater Classic</td>
<td>?</td>
</tr>
<tr>
<td>4-H Club Fishing Tournament</td>
<td>?</td>
</tr>
</tbody>
</table>

*Number of years in operation as of 2010.

Table 9: Number of entrants for each given year and participants’ residence. Data were not available for all years in operation, but the following table shows the origin of participants for one of Fort Pierce’s most popular tournaments, the Fishing Frenzy. Data source: rapid appraisal and key informant interviews.

<table>
<thead>
<tr>
<th>Year*</th>
<th>Total #Entrants</th>
<th>Port St Lucie</th>
<th>Fort Pierce</th>
<th>Martin County</th>
<th>Vero / Sebastian</th>
<th>Orlando</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>71</td>
<td>20</td>
<td>20</td>
<td>9</td>
<td>9</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>2009</td>
<td>99</td>
<td>21</td>
<td>29</td>
<td>11</td>
<td>21</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>2008</td>
<td>102</td>
<td>29</td>
<td>35</td>
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*Data available only for the years listed. Tournament has been in operation for 16 years.
Figure 22: A fishing tournament participant showing off his prize dolphin for the crowd.

Figure 23: A crowd waiting for the next tournament entrant to return for weigh-in.
**Figure 24:** Map of City Marina, in downtown Fort Pierce and location of the longest running charterboat operations along with many private recreational vessels. The City Marina is near the South Bridge. At the North Bridge are found the two commercial fish houses and docks.

**Figure 25:** View of City Marina. (City of Fort Pierce website)
Figure 26: View of Inlet Fisheries fish house from the commercial dock.

Figure 27, 28: Commercial fishing boats docked at Inlet Fisheries, Fort Pierce. Commercial fishing boat of one of the oral history participants, at Inlet Fisheries (right).
Social Network Analysis

Social network data were collected with the 45 oral history participants in order to examine social relationships around the exchange of fishing information. Each of the oral history participants was asked the following question: “Please name five people with whom you talk about fishing regulations.” The aim is to look at the movement of information concerning fishing. With the answers to this question, a relational data matrix was created and imported into UCINet, a social network analysis software (Borgatti et al., 2002).

The matrix was symmetrized and centrality measures were calculated using Freeman’s degree. This is a simple measure of centrality which examines the number of mentions, or ties, indicated from all other actors in a network. One fisherman, in the commercial sector, clearly stood out as the most central in this particular network: CM1 in the figures below.

Next, the data were visualized using NetDraw, a program within UCINet. In order to interpret the figure, some background definitions are required. Each of the squares in the visualization represents an individual and is called a ‘node.’ The lines between nodes are ‘ties’ and represent an actor’s, represented by the node, mention of another actor’s node. Each node is identified with a code. If a code is represented by a pair of letters and a number, the node represents one of the oral history participants. These nodes were also color coded according to the participant’s fishing sector: RC for Recreational, CM for commercial, and CH for charter/beatboat. The numbers following the letter codes are a unique identifier for each interviewee. There are an additional 88 nodes that are coded by a number only. These nodes represent individuals mentioned by the oral history participants who were not, themselves, interviewed. Their nodes remain uncolored.

The size of the nodes is coded for Freeman’s degree centrality. The larger a node, the more often that actor was mentioned by other interviewees as someone who is consulted about fishing regulations. Again, the node CM1 clearly stands out as the most important individual that the other actors in this network consult for information on fishing regulations.

Locally, the commercial fishermen population is a relatively small group. There are only two fish houses now, one of which is relatively new to its location. The recreational community, on the other hand, is quite large based on the number of recreational fishing licenses (Table 5), and tournament participants (Tables 7 and 8). This makes it difficult to identify boundaries of the community, and posed sampling problems as well. For the network represented, the commercial and charterboat interviewees represent a far larger proportion of the total population of their sector, locally, than those recreational fishermen interviewed. Thus, the likelihood that the commercial and charterboat individuals know each other is higher than for the recreational fishermen. However, many of the recreational fishermen know each other, as many are members of the Fort Pierce Sportfishing Club, or are owners of local marine related businesses, so are prominent in the local recreational fishing community.

Based on the ethnographic research collected prior to the network analysis, it was hypothesized that charterboat captains were most likely to be the social brokers between the commercial and recreational sectors. Upon analysis, however, a single recreational fisherman (among the interviewees) appeared as the only direct link between the sectors, thereby providing a link between the commercial and recreational sectors (RC3). This individual is the owner of a local
bait and tackle store, a favored place for informal discussion of fishing and fishery management. Another individual who was not interviewed (17) was the only other connection between the commercial and charter sectors.

Figure 29: The social network of the 45 oral history participants for the question “Who do you talk to about fishery regulations?” All individuals mentioned by interviewees are included; those not interviewed are represented by colorless squares.
Figure 30: The social network of the 45 oral history participants for the question “Who do you talk to about fishery regulations?” Those individuals named by oral history participants who were not themselves interviewed, have been removed for ease of viewing.

For the most part, the social spaces of the commercial and recreational sectors do not overlap. The two groups do not share the same docks. The vessels of charterboat captains, on the other hand, are mostly docked in marinas which are also occupied by private recreational vessels. These two groups, then, have a greater chance of social interaction.

Bait and tackle shops, as mentioned above, are another social space that can provide for inter-sector interaction. From ethnographic observations, however, these social spaces are used mostly by recreational fishermen. The lack of social interaction likely contributes to perceptions and misconceptions that individuals of different sectors have about one another. In the oral histories, frequent comments were made by commercial and recreational fishermen about members of the other sector, and vice versa. This is akin to stereotypes that are commonly held by all human social groups about “the other.”

Although the three sectors are identified as distinct, in reality, these groups are not delineated with such precision. One of the charterboat captains interviewed was formerly a full-time commercial fisherman. He ultimately moved into the charter business as the fishery regulations became ever more difficult for him to make a living in commercial fishing. A local comment made by many commercial fishermen is: “that the only difference between a recreational and commercial fisherman is that the recreational fisherman takes a picture of his fish before he sells
"Well, it’s bad enough like it is. If they make any more closures, it’s gonna be to the point where you’re gonna have forty charter boats to thirty to twenty to ten to just a handful. And they bring tourists that stay in the hotels that eat in the restaurants. There’s a — it used to be major, you know, and it’s not as big as it was already because of the regulation change. And, I mean, you’re gonna lose the few party boats. There
used to be three party boats, to two, to one, then there’ll be no party boats. It affects commercial boats. The amount of commercial boats is way down from the heyday. Hudgins and North Bridge and all that had docks full all the way to the end. Now, it's like a ghost town. There’s boats there, but they’re not leaving that much. Only the true George Kauls¹¹ and the hardcores are still doing it, and they’re still, you know, the ones that are still doing it are doing okay. But, I mean, there’s a definite impact if you do any more closures.”

¹¹ George Kaul is locally known as one of the best commercial king mackerel fishermen.
In 1984, a 92-nm² area of *Oculina* pinnacles was designated as the Oculina Bank Habitat Area of Particular Concern (HAPC). Regulations were implemented that prohibited the use of bottom trawls, bottom longlines, dredges, fish traps, and fish pots within the HAPC to mitigate the threat of fishing gear to *Oculina* coral (SAFMC and GMFMC, Coral Fishery Management Plan, 1982).

**Figure 31:** Original Oculina Bank HAPC. SAFMC Snapper-Grouper Amendment 13A. (SAFMC, 2005)
Impacts from the 1984 closure

The original implementation of the protected area affected the effort of bottom trawlers, both scallopers and shrimpers. Because this industry was based out of Port Canaveral, the principal impacts from the regulation occurred there. In Fort Pierce, the restriction on bottom longlines impacted commercial longline fishermen, especially those who targeted sharks. The number of longline fishermen based out of Fort Pierce at that time remains unknown, thus it is difficult to assess the full social impact of this regulation over 25 years after implementation. It is also difficult to isolate impacts from the closure, alone, as separate regulations further restricted the shark fishery.

Few interviewees cited negative impacts from this closure and all of those were commercial fishermen. Again, because the initial closure occurred so long ago, most of the interviewed fishermen would have been quite young at the time. Shark fishers were impacted, as detailed in the following passages:

Commercial Fisherman: Well, yeah, because that’s when everybody went to shark fishing, where we had the best catches of our sandbar sharks, which were our money making sharks, was like 400 feet out. And that’s right there in the Bank.
Interviewer: So, you got your legs clipped on the sharks in eighty-four?
Commercial Fisherman: No doubt about that.

Another commercial fisherman owned a fish house at the time. He cited an indirect economic impact on his fish house from the closure, due to the restriction on catches. Additionally, impacts were realized in a spatial effort shift due to the closure, resulting in additional fuel costs and travel time to fishing grounds.

Commercial Fisherman: I had to go fish other areas. I had to fish further south or further north or further inshore or further offshore to adjust for it.

Among the charterboat and recreational interviewees, most stated that they were either not in the area or did not fish the Oculina Bank area at that time, or that this particular closure did not affect them. Some were not aware of the particular restrictions put in place when the Oculina Bank HAPC was implemented. Because this closure did not prohibit all bottom fishing, only bottom fishing with a longline, it would follow that non-commercial groups would not be impacted as were commercial fishermen.

In fact, a couple of fishermen claimed to notice positive impacts from the closure to bottom trawling. A charterboat captain stated, “actually, I felt like the fishing actually got better on the Oculina Bank for a number of years once they stopped that [shrimp trawling].” His sentiments were echoed by a recreational fisherman who said, “I didn't see too many draggers other than the rock shrimp fishermen, but when they quit doing that, I think it helped the Oculina Bank's fishing.” One recreational fisherman who did fish there, recalls the fishing as the best bottom fishing in the area. Although he did not anchor there because of the depth (“It was a pain in the butt.”), he continued to bottom fish there until the next regulation put an end to the practice for fishermen of all sectors.
1994: Bottom fishing prohibited within Oculina Bank HAPC

This regulation prohibited fishing for and retention of snapper-grouper species within the HAPC and prohibited anchoring by vessels fishing for snapper-grouper species. The area to which these prohibitions applied became known as the Oculina Experimental Closed Area and occupied the same 92-nm² area of the HAPC. The intent of the regulation was 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” (SAFMC, Snapper-Grouper Amendment 6A, 1993).

Impacts from the 1994 closure

This regulation had the greatest impact on the fishermen of Fort Pierce of all the Oculina Bank closures. Commercial, charterboat, and private recreational fishermen were all affected. Although the Oculina Bank was initially implemented under the Coral FMP for the purpose of protecting the deep water Oculina coral, this regulation was implemented under a Snapper-Grouper Amendment, with the intention of protecting deepwater bottom fish stocks. Fishermen questioned this change in the intent of the closure after the initial closure was put in place. Some have also questioned the efficacy of the closure and whether studies are being done to assess the stated goal of the closure, given the regulation’s impact on their livelihood and recreational opportunities.

Commercial fishermen expressed that they were greatly impacted economically by this regulation. Several fishermen made statements about the closure such as:

“That put me totally out of business.”

“That shut me down totally. It took away at least 60 percent of my income.”

“I couldn't go in there and catch my amberjacks, which was a new fishery for me. It looked like a good fishery until they did that.”

Other fishermen noted that the closure forced them to travel further to avoid the boundaries of the Oculina Bank HAPC. Even if snapper grouper complex species were caught outside the boundaries of the Oculina Bank closed area, transit through the closed area was not permitted. The closed area is narrow but long, meaning that fishermen often had to travel long distances to go avoid the closed area.

“That’s messed up the tilefish and messed up the transit—messed up having to drive around it, took away the snowy grouper and the yellowedge grouper fishery.”

“If you had a mixed catch from somewhere else, or if you’re fishing somewhere else you can’t—you either got to go around it, you know, but you can’t cross over.”

12 Snapper-grouper species refer to those managed by the Snapper Grouper Fishery Management Plan of the South Atlantic Fishery Management Council.
Fishermen noted that the closure forced an effort shift away from bottom fishing and toward king mackerel trolling. Fishing for kingfish has a long established history in Fort Pierce and the greatest number of participants. Thus, the effort shift added to the fishing population that targets the species.

For example, “now, I’m pretty much 90 percent a kingfisherman; do very little bottom fishing.”

Another impact was expressed by a couple of fishermen, noting that the closure affected their ability to keep particular commercial permits. The prohibition on bottom fishing in the highest producing local fishing grounds affected the ability of local fishermen to obtain the amount of landings required for the snapper grouper permit renewal requirement. This affects fishermen’s flexibility later as they are restricted from reentering the fishery once other stocks, to which they switched after the closure, experienced pressure and catch declines or increased regulations.

“I probably would have kept my unlimited [snapper grouper permit] if that was open.”

“I had an unlimited snapper-grouper permit, and then I was demoted down to a 225, the non-transferrable permit that I still have. ... I would obviously have been fishing in the Oculina Bank and got the thousand pounds that I needed to qualify for the unlimited permit [if the Oculina Bank had not been closed].”

A commercial fisherman noted that the closure affected capital investment, explaining that, “you can’t put your gear in there inside of 600 feet. So, it did take away some grouper fishery, cut back on my golden tilefishing, cut back on me going bigger. Me and Donny had bought a bigger boat.”

The charterboat industry experienced economic impacts from the bottom closure. As one charterboat captain expressed, “how it impacted me was it shut me out of 98 percent of my deeper water bottom fishing capability. Yes, it impacted me horribly.” Another charterboat captain concurred, “we couldn’t go do bottom fishing anymore, and again, that’s a tremendous part of my business or every charter boat’s business.”

As a result of economic impacts, charterboat captains reported an effort shift into other areas.

“We just had to adapt. I would say it affected some of our customers that only wanted pure grouper, but I had to learn how to catch other fish to supplement the difference, because yeah, it did [affect us]. There was an effect on it. We had to completely change our style of fishing: we had to go to a shallower fishing technique, which took a different — you know, you don’t drift on the shallow like you do, you had to anchor when you fish inshore. Just because there wasn’t as much current, you didn’t move as much. So I started anchoring more inshore after I had to leave the Bank. They closed the Bank, literally.”
The closure of the Oculina Bank to bottom fishing was perceived as unfairly restrictive on local fishermen. While the closed area was offshore of Fort Pierce, other communities to the north and south were not prohibited from fishing in their local waters.

“It was a big part of our fishery at the time, and it basically took us out of the — took that fishery out of us and left it for the guys on either end of us to fish that same waters above and below us. ... So, basically, what they did is they took the Fort Pierce fishermen off the map as far as the fishing in forty fathoms.”

Fishermen frequently expressed frustration at the change in goals of the regulations, from protecting the Oculina coral to protecting fish stocks. A recreational fisherman explained this as, “see, they’re saying they closed it because of the fish [in 1994]. That’s changed. Isn’t that correct? They closed it [originally] because they want to protect the coral, not the fish. Now they’re all into shutting everything down because of the fish.” The frustration with changing goals was often expressed in tandem with the feeling that regulations were being forced on local fishermen unfairly. This was a common theme among all fishing sectors, but is expressed well in the words of the following charterboat captain.

“You know, we had to suffer through the original MPA. When I was going to the [Council] meetings, I never heard one good thing said about it. Nobody was for it, but yet, it was still shoved down our throat. I felt like when we went to the meeting, they already had their mind made up and they were going through the motions of listening to us plead our case. So, basically, when they made that, they took the Fort Pierce fishermen and took them off the map for fishing in forty fathoms for what they said was a decade, which, obviously, became more than that. We were the guinea pigs.”

As mentioned by commercial fishermen above, the prohibition on transit through the closed area when in possession of snapper grouper species impacted charterboat and private recreational fishermen as well. They expressed an impact felt through an increase in fuel costs, operating expenses, and fishing practices. Because the shape of the closure consisted of a long narrow stretch of ocean, it affected the spatial fishing patterns of fishermen. The prohibition on transit through the area with fish caught outside its boundaries was especially frustrating to fishermen. As one charterboat captain stated:

“I had to go around the Oculina Bank and not have a single bottom fish on it. And the fact is, it covers—I can’t even catch a grouper or snapper on my way out on a legal rock and then continue off to catch dolphin, which I can, because I have to cross the Oculina Bank. So, it costs—it’s extremely—it costs me fuel and it costs me how I would normally fish. I can’t catch a legal grouper in the morning, when they would bite, for fear of being caught on the Oculina Bank looking for dolphin later. That’s how it affects me now.”

Another recreational fisherman echoed the issue of management goals not making sense to local fishermen. “It really took our best grouper spots away that we really liked to fish. And I really got to say this: the grouper fishery continued to decline anyway, even though they shut it off.”
Economic impacts were felt by those whose business catered to the recreational fishing community. One of the interviewed recreational fishermen who previously owned a tackle store noted, “we saw the sales of bottom fishing tackle changing slowly, you know, not selling as much tackle. ... Our sales were impacted even further at that point [the 1994 closure], because there were smaller areas for people to go bottom fishing. And that was a popular spot for bottom fishing.”

Of all the interviewed fishermen, the only support for the 1994 closure came from the private recreational sector, as seen in the following passage. “We fished there many, many times and the fishing was always good. But, I approve of what they did. I like what they’ve done out there. It is what keeps our reef populated.”

In addition to the comments made by fishermen recalling how they were impacted by the 1994 bottom closure, impacts are also suggested by the area’s landings. Table 10 and Figure 32 show the catches from the years before and after the 1994 closure for several species. It is difficult to determine how the Oculina Bank closure affected landings on its own, as other factors certainly contribute to fluctuations in landings. Also, no data are available to determine landings before and after the closure for Fort Pierce alone. It is further unknown how many fishermen targeted bottom fish within the protected area’s boundaries prior to the closure, and where these fishermen were homeported. Nevertheless, for bottom fish species listed in the table, and aggregated into grouper and snappers in Figure 32, landings dropped dramatically after 1994.
Table 10: Landings (pounds) for the years just before and after the 1994 closure of the Oculina Bank to all bottom fishing and possession of snapper-grouper species within the boundaries of the HAPC. Data source: SAFMC Snapper-Grouper Amendment 13A, Table 13b; NOAA Fisheries, Southeast Science Center. (SAFMC, 2005)

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<tr>
<th>Species Name</th>
<th>South Atlantic Average of Years</th>
<th>FL East Coast (excluding Keys) Average of Years</th>
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*Unclassified species
Figure 32: Change in landings for the years prior to and after the closure of Oculina Bank for bottom fishing. The landings are in pounds for the entire east coast of Florida, excluding the Florida Keys. The categories include multiple species of each fish family. Data source: SAFMC Snapper-Grouper Amendment 13A, Table 13b; NOAA Fisheries, Southeast Science Center. (SAFMC, 2005)
1996: All anchoring within Oculina Bank HAPC prohibited

The regulation implemented in 1996 prohibited all fishing vessels from anchoring within the boundaries of the original HAPC, now designated as the Experimental Closed Area (ECA) (SAFMC, Coral Amendment 3, 1995). The regulation also expanded the area of the HAPC north and eastward, and trawling was prohibited east of 80°W longitude, between 27°30’N and 28°30’N latitude, in depths less than 100 fathoms (SAFMC, Shrimp Amendment 1, 1996).

Figure 33: Map from SAFMC Snapper-Grouper Amendment 13A. (SAFMC, 2005)
Impacts from the 1996 regulation

This regulation created further logistic impacts in banning all anchoring within the Oculina Bank Experimental Closed Area (the former Oculina Bank HAPC). Because bottom fishing was already prohibited in this area, however, it did not create direct economic impacts on fishermen as they had already been pushed out of the area. The expansion of the closed area to the north and east under this regulation directly affected commercial trawlers only. As mentioned previously, this population of fishermen was largely based out of Cape Canaveral, north of Fort Pierce. Thus, commercial fishermen of Fort Pierce, for the most part, were not impacted.

Some local fishermen on multi-day trips incurred a logistical impact from the prohibition on anchoring within the marine protected area. Many stated they never anchored at those depths, even when bottom fishing was permitted; rather, they powerfished by using the boat’s motor power to maintain position over fishing spots. But there were also some who had anchored within the area while on multi-day fishing trips east of the Oculina Bank HAPC. This practice served to conserve fuel costs which were already increased when fishing east of the Oculina Bank since transit through the protected area was prohibited while in possession of snapper-grouper species, including tilefish. The prohibition on transit necessitated longer travel distances to avoid the closed area. A commercial fisherman described his reasons for anchoring in the area. “I used to anchor up at about 160. I’d be anchored up out there a tilefish day or a grouper day you usually go in there and get out of the tide.” While the Oculina Bank pinnacles are concentrated in the closed area, there are large spaces with no pinnacles, within the closed boundary. Those fishermen who anchored or bottom fished within the area noted the care they took to avoid anchoring on the pinnacles, recognizing the damage that the coral would in turn cause to their gear.

This also points to the multiple groups of resource users of the Oculina Bank area who are affected by each regulation: shrimp trawlers whose effort was directly impacted by the regulation, and commercial fishermen who could no longer anchor to get out of the tide. Recreational fishermen also consisted of those who powerfished and those who anchored. There was variation in the regulatory effects both within a sector (shrimp trawlers and displaced longline anchorers) and across sectors, such as when a recreational fisherman perceives an improved fish stock following the curbing of commercial shrimper’s access to resources within a newly protected area. This variation points to the complexity of impacts from the regulations which have both direct and indirect effects. Fishermen of different sectors or using different gear types may be affected directly but differently; one may benefit by seeing improvements in the stock and another bears the cost of through the loss of fishing grounds. An indirect impact resulted with the prohibition on transit through the area as fishermen incurred additional fuel and time expenses as they had to go around the protected area. Yet others were impacted since the closure shut them out of a zone that could be used for safety and comfort at sea.

Further indirect effects were reported as fishermen perceived that the regulations were going to continue expanding, rather than providing relief once management goals were realized. One commercial fisherman expressed this when asked about the 1996 closure. “Yeah, it impacted [me] because I knew some more laws were coming out and I was hoping they’d give us some transit provisions. ... Then that basically—it didn’t directly impact my fishing, but it made me give up any hope of keeping up any deepwater fishery. So, I changed the way I fished a little bit more.” Many fishermen expressed this frustration, feeling that the regulations were presented to
them as ways to improve the fishery, but they never receive benefits from their reduced effort; instead, additional regulations continue to be implemented.

Overall, fishermen reiterated that the previous set of regulations in 1994 had had the greatest impact on their fishing. This was expressed by commercial fishermen (“Well, by then, we’re done. We’re done in ninety-four, so whatever they do after that, no, it didn’t affect us at all. Once you’re done, you’re done.”); charterboat captains (“Well, as of eighty-four — ninety-four — we couldn’t anchor anyhow. So, there wasn’t really much of a difference there.); and recreational fishermen, alike (“Well, we were already out of there, so.”).

Thus, the succession of regulations of increasing restrictions on fishermen, without relieving some of the hardships created by previous regulations, contributed to frustration among fishermen. Regulations that do not make sense to fishermen do not foster compliance. As one commercial fisherman put it:

“generally speaking, we pretty much were done with this grouper fishing. We still tilefished and we always pushed the limit crossing the zone with product on the boat. I mean we did it. There’s no question about it. I mean over, and over, and over, but you can’t hardly fish out here and expect us to run [around the protected area boundary].”
1998: Expansion of Oculina Bank

In 1998, the HAPC was expanded to include the rock shrimp closed area that was established in 1996. Within the expanded HAPC, fishing with a bottom longline, bottom trawl, dredge, fish pot, or fish trap was prohibited, as well as anchoring by a fishing vessel (SAFMC, Coral Amendment 4, included in Comprehensive Habitat Amendment, 1998).

**Figure 34**: Map from SAFMC Snapper-Grouper Amendment 13A. (SAFMC, 2005)
Impacts from the 1998 regulation

The 1996 regulation that expanded the area in which trawling was prohibited was now officially integrated into the Oculina Bank HAPC. Within this larger area, bottom longlining was now prohibited as well. The expansion under the 1998 regulation extended the protected area north and east from Fort Pierce, stretching away from the local area which likely helped mitigate negative perceptions and impacts from this closure. As explained by a charterboat captain:

“Oh, they went north. That didn’t affect me because that was north of the area that I fished, and I didn’t really fish deeper than that. So personally, with my charter boat, that ruling didn’t affect me ’cause I didn’t really — once they closed it, I didn’t go out there. I couldn’t anchor, I couldn’t fish it. It became a closed zone. It was a no-no, so we kind of quit going there. So being east and north of it didn’t affect me, personally.”

Recreational fishermen made similar statements.

“I rarely fish north of Sebastian, yeah north of Sebastian or on the outside; it’s just too deep on the outside edge of that Oculina Bank.”

“Right. So, it really didn’t impact me because I don’t travel that far to fish, that’s all.”

“I remember that. Doesn’t go all the way up to Sebastian now, which the reef does go that far. But that new closed area, no, that didn’t affect us at all. We don’t go that far north.”

“No. I was already out of the fishery, and I wasn’t gonna run that far north, anyway.”

Because the area was closed to gear principally used by commercial fishermen, negative impacts were largely limited to this sector. For commercial fishermen, direct negative impacts were incurred.

“It just decreased the amount of deepwater groupers that I caught, and sharks.”

“Yeah. Further, it reduced the availability of snowy grouper.”

One charterboat captain cited a perceived impact on the restaurant industry; however, this might have been a short-term impact. He said, “What really was impacted was Dixie Crossroads up in Titusville. Rock shrimp became very expensive. … They used to be delicious and cheap.” Laurilee Thompson, co-owner of Dixie Crossroads in Titusville, was interviewed for this project. Ms. Thompson feels that the series of regulations closing the Oculina Bank actually helped save the local rock shrimp fishery. Her father, Rodney Thompson, was one of the early proponents of the closure and, according to Ms. Thompson, felt that the immediate economic impacts on restricting the rock shrimpers were necessary to make the fishery sustainable in the long-term. She feels that the closure helped steer away rock shrimp trawlers from the Gulf of Mexico region. The rock shrimp trawler fleet is now a mostly local fleet. This adds to the point in the previous section about the multiple user groups, targeting different species with different gear types, from home ports up and down the coast, all of whom may experience impacts differently:
positive or negative; direct or indirect; short-term or long-term. Thus, fishermen were impacted in complex ways by the assemblage of regulations and closures that were often coupled with other regulations not related to the Oculina Bank, i.e., the 1995 net ban. Some groups perceived benefits while others experienced severe economic hardships.

Summary of Impacts

Table 11 summarizes the regulations that pertain to the Oculina Bank and the effects on the three fishing groups who participated in this study. What becomes apparent is that there were multiple groups who used the spatial area designated as the Oculina Bank in different ways. These user groups were affected differently, in both direct and indirect ways. Also, each subsequent regulation was implemented within a different management unit of the South Atlantic Fishery Management Council. Although the regulations involved restrictions on effort within the same marine space, they were implemented for the conservation of different managed species and thus, had different purposes and goals, i.e., protection of the coral followed by protection and enhancement of reef fish stock stability and recruitment. Within each regulatory action, a different process of analysis was carried out on the impacts of the proposed regulation, focused around the goals at hand. This might have been a contributing factor to the unintended consequences on user groups whose effort was not directly impacted.

Another impact arises from the design of policy to assist enforcement. The prohibition on transit through the ECA with snapper-grouper species aboard is not permitted, even if gear is stowed. Transit does not directly affect the protected environment. Rather, the prohibition on transit serves to make legible a difficult area to enforce. The HAPC is far from shore and there are no physical markers of its coordinates, i.e. an island or buoy.

For the recreational fishing community, the original closure was widely seen as a positive thing; curtailing commercial shrimp trawlers and longliners. The regulation that impacted them the greatest was the prohibition on snapper grouper fishing, in 1994. Over time, the Oculina Bank peaks had become known locally for really good bottom fishing. The prohibition was, obviously, very unpopular. It was also regarded widely as unnecessary and unfair. Recreational fishermen generally do not see their fishing as more than minimally damaging. They often questioned whether there is evidence or results of studies that can attribute their fishing to negative impacts on the Oculina coral or grouper stocks. There was general agreement that regulations were warranted for trawlers, which they identified as utilizing destructive practices. But each angler in his own boat strongly objected to no longer being able to fish in the best local snapper grouper spot.
Table 11: Comparison of regulations and impacts managing the Oculina Banks. Some of the impacts reported by the commercial, charter for-hire, and private recreational fishermen are coded by highlighted color according to their positive or negative, direct or indirect effects from each of the implemented regulation.

<table>
<thead>
<tr>
<th>Year (Document)</th>
<th>Regulatory Action</th>
<th>Type of Action</th>
<th>Commercial Fishing Impacts</th>
<th>Charter Fishing Impacts</th>
<th>Recreational Fishing Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1984</strong> (Coral Fishery Management Plan)</td>
<td>Designated 92-nm² area of <em>Oculina</em> pinnacles a Habitat Area of Particular Concern (HAPC) and prohibited bottom trawlers, dredges, longlines.</td>
<td>Spatial closure to select gear types</td>
<td>Fort Pierce longliners</td>
<td>Port Canaveral rock shrimpers (Long-term Positive and short-term negative).</td>
<td>Perceived positive results from closure to other (sector) gear types.</td>
</tr>
<tr>
<td><strong>1994</strong> (Snapper Grouper Amendment 6A)</td>
<td>Prohibited possession of bottom fish within closed area, renamed Experimental Closed Area (ECA).</td>
<td>Spatial closure to particular species.</td>
<td>Eliminated all bottom fishing in best fishing spot.</td>
<td>Eliminated all bottom fishing in best fishing spot.</td>
<td>Eliminated all bottom fishing in best fishing spot.</td>
</tr>
<tr>
<td><strong>1996</strong> (Shrimp Amendment 1)</td>
<td>Prohibit anchoring in ECA; expanded area where trawling prohibited to north and east.</td>
<td>Expand spatial closure to select gear types; Spatial closure to anchors.</td>
<td>Some who anchored for safety and rest; not for fishing.</td>
<td>None (targeting species for which anchor is necessary was already prohibited)</td>
<td>None (targeting species for which anchor is necessary was already prohibited)</td>
</tr>
<tr>
<td><strong>1998</strong> (Coral Amendment 4)</td>
<td>HAPC incorporates areas closed to trawling under 1996 regulation. Bottom longlining now prohibited.</td>
<td>Spatial closure to particular gear types within expanded area.</td>
<td>Further reduced fishing grounds for longliners.</td>
<td>Expanded away from their fishing areas, so no impact.</td>
<td>Expanded away from their fishing areas, so no impact.</td>
</tr>
</tbody>
</table>

Summary of Impacts reported by Fort Pierce fishermen

<table>
<thead>
<tr>
<th>Summary of Impacts reported by Fort Pierce fishermen</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No Impact</td>
<td></td>
</tr>
<tr>
<td>Direct Impacts</td>
<td>Positive</td>
</tr>
<tr>
<td>Indirect Impacts</td>
<td>Positive</td>
</tr>
<tr>
<td>Impacts on other places</td>
<td></td>
</tr>
</tbody>
</table>
Additionally, some themes arose from the texts provided by the fishermen. Two of these will be addressed here, cross-sector blame and the issue of trust.

**Cross-sector blame:**

For the most part, support for the regulations and closure of the Oculina Bank, when offered, primarily came from the charter and private recreational fishermen. This support, however, was usually offered in tandem with assigning blame for benthic damage to participants of other fishing sectors. For example, a recreational fisherman said, “I certainly support limiting the trawlers and that kind of thing. Just from what I’ve read, they can be fairly destructive on that bottom habitat, not to mention the by-catch and everything else.” Negative cross-sector comments appeared as a common theme in the oral histories and occurred among all three sectors.

One charterboat captain who earlier in the interview, stated that their business does not involve offshore fishing, said, “I remember when they did that [closed the area to trawlers and longliners], and all I could think of was, “This is a good thing.” A recreational fisherman who uses vertical line for bottom fishing specifically cited longlines as creating negative impacts. "The longline was probably—it impacted the grouper fishing more than anything else. And even though we did very well with our fishery, there would be a handful of boats that would go out maybe twice a month that caught that kind of fish—fifteen to twenty fish a day. Well, twelve to fifteen a day on an average. But the longliners were thousands of pounds, and they were laying down two, three miles of longline, right on the—typically on the twenty-seven fathom line, because that would be just inside the current from the Bank—and then they would pick it back up. That’s when you noticeably—I mean, absolutely noticed that the fishing changed, and became worse.”

Commercial fishermen also have their views on the private recreational sector, as expressed by this man.

“I don’t believe there’ll be any [future of fishing], unless they help the commercial fishermen out in some type of way, which I don’t have an answer for that one. But the sport boats are still catching the fish in that area that we’ve been talking about, and nobody’s checking ’em. So, if there’s a decline in fish, in my opinion, it’s from the sport boats. It has nothing to do with the commercial boats.”

Had the regulations targeted stakeholder’s preferred fishing grounds, gear type, or target species, a different opinion was usually the result. Fishermen readily recalled statements of support for their own fishing activities that were shut down, such as anchoring. For example, a recreational fisherman said, “the guy [scientist] from Harbor Branch said that anchoring in the Oculina Bank by recreational fisherman was of little impact, and that expanding it for recreational fishing anchoring was really sort of useless and just an exercise in trying to police the area, because it was just not of any value to their studies.” However, when other user groups were impacted, the regulations were likely necessary. As mentioned, this was generally expressed by all groups.
toward others, but the strongest language was used by recreational fishermen against commercial fishermen. However, this was not true for all charter and private recreational fishermen by any means, many of whom value the commercial sector. A charterboat captain expressed well this pattern of blaming other groups and his hesitancy to do so, saying “I mean, I don’t want to put somebody else out of business, you know. It’s always easy to kick the can down the road.”

Fishery Management and Trust:

Another theme that arose throughout the oral histories concerned the relationship between the fishing population and those who are involved in making regulations. This latter group was generally lumped together under a category called “them”, and included scientists, regional Council staff and members, and NMFS employees at the regional and national level. This section provides many of the participants’ responses about marine protected areas with closures on fishing, and the relationship between those who make the rules and those who must comply with those rules. Components of this theme are reflected in the problems of enforcement, changing goals of regulations, and suspicion of a misunderstood relationship between science and policy. This suspicion of how data (as information) translates into policy was prominent among the texts from all sectors. As a commercial fisherman explained:

“I mean, I’ve seen scientists say, “Well, golly gee, look! The catch ratio’s gone way down.” Well, yeah, you’ve closed our fishery! What the hell did you expect it to do?! You expect it to go up? I mean, so many times they come up with — I hate to say they’re just asinine theories, but they’re asinine theories, you know? They look at this data and they’ve done something major to change the data and then they say, “Oh, this fishery’s in trouble. Look, the catches just went down to nothing.”

This passage reflects the man’s belief that fishery dependent data (landings data) is the basis for managers’ determination of the health of a fish stock, and thus, subsequent management restrictions. As he points out, he feels that decreases in landings are not a result of overfishing, but rather the effort restrictions themselves. Essentially, the fish are still there. This reveals not only the gap between managers and fishers, but the understanding (and disconnect) of how landings data is used in the management process. Stock assessments conducted by biologists do not rely principally on fisheries dependent data, including landings, in determining stock abundance; rather, fishery independent data plays a far larger role. The fisherman also recognizes this difference between fishery dependent and independent data, and knows that landings reflect effort and include factors that influence effort such as fuel prices, environmental conditions, and effort restricting regulations. Rather, what is important from the passage is the fisherman’s underlying perspective. He is frustrated at being prohibited from fishing where he previously could fish. As an individual, he has not been able to fish there for many years (his effort was restricted), yet the regulations have continued to expand. However, at a broader scale, other factors have continued to affect and change the fishery. His personal fishing effort restrictions should ultimately be rewarded through a future benefit, such as the relaxation of effort restrictions. When this does not happen, he perceives management to be targeted against him.

Generally, fishermen objected to spatial areas that are off limits to fishing. There was broad acceptance of the need for effort reducing regulations, and fishermen supported effort restrictions perceived as partial, i.e. closed seasons or minimum size limits. These management tools were
temporary or still allowed you to fish and maybe fish longer. The complete closure of an area at all times, however, was not only frustrating; it just did not make sense to fishermen. The negative impacts of being completely, and indefinitely, prohibited from any bottom fishing within the area of the best nearby bottom fishing spots was not reciprocated with any apparent positive benefits. On the other hand, fishermen understood that closed seasons allow fish stocks to rest or spawn. Minimum sizes allow small fish to grow and be caught later. But a closed area did not permit fishermen to realize a future positive benefit from their compliance. Fishermen from all sectors expressed their preference for closed seasons and minimum catch sizes over closed areas. For example, one commercial fisherman said, “I think quotas and closed seasons are much better. Closed areas are — they’re running crazy with these closed areas, and pretty soon we’re going have nowhere else fish.”

Charterboat fishermen expressed similar sentiments about closing marine areas to fishing.

“I don’t agree with closed areas. I don’t believe that any part of the ocean should be closed to any kind of hook and line fishing. That does nothing to the fish stock. And because the scientist say so, that doesn’t hold any water with me. I mean scientists are wrong all the time.”

“MPAs don’t work; they haven’t worked. As an example, Oculina was supposed to help the snapper and grouper populations. I’ve seen no difference in the snapper-grouper catches for the time that we’ve been here. So, if it was gonna work, it would’ve worked in eleven years. In my opinion, the best management is quotas, size, and bag limits, no closed area. When you reach your quota, you stop fishing.”

And recreational fishermen expressed this, too.

“The Oculina Bank, to me, has proven that a closed area doesn’t work. The kingfishery in this state was dead, out of control, overfished by net fishermen. You didn’t close an area, but you managed the fishing stock. And today, the fishing stock is as healthy as it can be, and it’s not in danger in any way. Not by closed fishing, but by managing the breeding stock, we have a strong kingfishery.”

Fishermen are generally suspicious of the purpose behind entirely closing an area to fishing. According to the following commercial fisherman,

“To me, the scientists say, “Oh, well, let’s close this area because great things will happen.” The main thing that happens is that the scientists just create their own little private fishing area, ’cause they’re the only ones who get to fish it after that. They go out and get the fish, they can say, “Oh, this is what’s happening,” and nobody else gets to fish it, so we don’t know what’s happening. And I can guarantee a scientist doesn’t know whether there’s enough out there to sell, or anything else, you know?”

A recreational fisherman expressed the same concept of a closed area being like a garden from which they do not benefit. He then connects this to the issue of enforcement.
“Well, first of all, closing an area to fishing and calling it a tool is a misnomer. It’s not a tool. It’s an avoidance of addressing the real problem. By closing it off to everybody, all you’re doing is trying to make a garden out there, one that’s not gonna have any kind of stewardship whatsoever. If there is a problem, then you’re not gonna have anybody out there keeping an eye on it. But the main thing is that it’s not a tool at all. All it does is prohibit people from being able to do anything. It’s punishing the wrong people that didn’t have anything to do anything for the wrong reason.”

This issue of enforcement and compliance is crucial as fishery management is essentially about managing people, not fish. A charterboat captain pointed out a commonly expressed frustration that is at the root of the open access resource problem, the tragedy of the commons. Just as in an Hardin’s parable of the open access scenario (1968), everyone will act in self-interest until a resource is overexploited, in an area where people are accustomed to using a resource, compliance may not come easily especially in a place one is not likely to get caught, such as the Oculina Bank which is far from shore and not bounded by physical markers. The captain explained,

“MPAs are too hard to enforce. And then you also — you take that, you take the honest person will not fish that, and you’ll take another fisherman, will use that as his private fishery. It’s because it’s an enforcement nightmare. These people get away with fishing like a pirate in a closed area, because they know that it’s unenforceable.”

Issue of compliance affects commercial fishermen, too, as this one put it.

“The problem is you have winners and losers with that because there’s not much law enforcement. You got people that are gonna follow the law and those that don’t. And you’re gonna have aggressive fishermen that cross the lines and you’re gonna have honest fishermen that don’t. Now, you’re coming into a thing where you’re talking about IFQs and catch histories and stuff like that. The people who cross the lines and do fish illegal are gonna be the ones rewarded in perpetuity through these IFQ systems and stuff. So from that aspect, closed areas without enforcement don’t sound very good, no.”

This issue of enforcement was expressed by the recreational sector as well,

“Another part of this thing that I’ve always wondered about is, you know, the actual enforcement of the closed area, and how well they actually work on the enforcement. They keep adding regulations in closed areas rather than working on the enforcement. I know that’s an issue that’s been brought up before.”
“I’m not in favor of closing areas because I think it’s a little difficult for them to police those areas in the first place, and expanding it even further is gonna make it even more impossible to do that.”

Charterboat captains expressed similar sentiments.

“I feel that they’re setting themselves up for failure, because they’ve created an enforcement nightmare. They’ve taken hundreds of square miles of ocean that has to be patrolled in order to manage that fishery, which they — it’s not economically feasible to enforce the rules that they’re creating. I feel that the bag limits and quotas far exceed any kind of MPA management, especially on the basis of enforcement. I feel that the quotas and bag limits have worked in the past, and are very much more enforceable than an MPA.”

The protected area where snapper grouper fishing was prohibited was supposed to incur benefits over the long-term as fish stocks strengthened from the reduction in effort among fishermen. However, after almost two decades, the fishermen do not see benefits realized from their sacrifice in fishing areas. A commercial fisherman pointed out his feelings of unfulfilled promises of management, saying “that was gonna be the sanctuary and if there were gonna be so many fish, they were gonna come inshore.” Another said, “there was a hope that once things got better there that we would be able to fish in a limited ability in that area. And it just remains closed, period, the end.”

Once a closure is in place, despite suggestions at the time of a temporary term, fishermen feel that benefits will never return. One commercial fisherman said, “it started out as a ten year closure, and how many years is it now? Sixteen years now, it's been.” And another said “well, it seems like once the area’s closed, it’s a done deal. You’re just not going back there anymore in your future fishing.”

And a charterboat captain complained about the failure to assess the goals of the closure, feeling that goals must be achieved or the closure should be rescinded.

“I would like to see a check on the abundance of fish on this closed Oculina Bank to see if it’s noticeably more fish there than it was before the closure fifteen or sixteen years ago. If they can’t show that this area is spawning an awful lot of fish and sending them to other places, I say open the thing back up to sport and commercial fishing. I agree with no anchoring henceforth and forever more, because that could damage the coral. But I don’t believe that sport fishermen dropping a jig or a twenty ounce lead down there are gonna destroy this coral that is two hundred and thirty feet down.”

Another aspect of the closed area can be examined in terms of the fishing behaviors affected. In order to address a management goal, such as to protect the grouper stock of the Oculina Bank, the actual behavior that is affected by the regulatory action may be broader, or indirectly affected. Not only was there a prohibition on using the space to catch desired stocks, the
protection extended to fishermen transiting through the area with those species aboard. Due to its distance from shore, enforcement of the Oculina Bank prohibition on bottom fishing is difficult to enforce. While this was the reason for transit of any grouper aboard a vessel to be prohibited through the Oculina Bank, the impact this had on fishermen was extreme. When fishermen complied and ceased fishing within the boundaries, not only were they forced to move into deeper waters, they had to add distance to their travel time to circumnavigate and avoid the long, narrow protected area. While the transit prohibition is a tool to assist enforcement, a focus on how to promote compliance is missing. Fishermen were left feeling that those that make the regulations were unaware of the reality of what compliance entails. As two commercial fishermen said,

“They make these laws, and zones, and rules, and stuff, and they don’t ever take into consideration the effects—that kind of effect on it, you know? I mean it’s easy for somebody to sit there and draw these lines all over this chart and say you can’t fish there. It’s another thing entirely to have to deal with it.”

“There’s a lot of things that they got to take into consideration when they make these laws, and I don’t think they do a very good job of it.”

Changes in the Fishery Management Paradigms:

An important component of the trust theme requires an understanding of the historical process of change within fishery management. The changes in the goals and perspective of management over time have contributed to disengagement between resource users and policymakers. An underlying component of the trust theme concerns changes in the federal approach to management. That is, the historical perspective of fishery management is important to understand the origin of mistrust. There have been changes in priorities over time, yet the history of the damage to the Bank is viewed through the lens of the present paradigm: that past fishing was destructive and thus, fishers are, by nature, destroyers of the resource. We must remember that just as the management paradigm changes, so do fishermen’s perceptions.

Prior to the 1950s, fisheries in the U.S. focused on development rather than conservation and management, owing to the perception of limitless quantities of marine resources (Abbott-Jamieson and Clay, 2010). Social impacts were not a focus of research. This is seen in how people talk about the damage done to the Oculina Bank: in Fort Pierce, which did not have a rock shrimp industry, trawlers are blamed. That is the narrative they get from Harbor Branch. But, there was more to the history. Early on, fishing development was encouraged and it is only under the new conservation paradigm, where megafauna such as sea turtles and manatees get sympathy, are trawlers and other fishery producers cast as villains.

The fact that it was a government initiative that encouraged the entry of fishermen into the practice of dredging is important. Federal fisheries management has undergone multiple paradigm shifts. Prior to the 1990s, Federal policy encouraged the growth and development of fisheries and it was within this paradigm that the early fisheries in and around the Oculina Bank took part. A paradigm shift occurred from one of growth and development, where fishery maximization was emphasized, to the next phase of sustainability, to the current paradigm of conservation.
Figure 35: Map of the Oculina Bank provided by the Senior Fishery Biologist/Habitat Coordinator of the South Atlantic Fishery Management Council, showing the boundaries of the HAPC and respective depth contours. However, the map inaccurately shows the eastern boundary of the Oculina Bank as extending well beyond the 100 fathom curve line. In the oral histories, several fishermen complained about the arbitrariness of lines being drawn across the ocean and the difficulty in accurately identifying its boundaries. This map provides a good example for their frustrations.

Future of fishing in Fort Pierce

The Oculina Bank Experimental Closed Area has been closed to bottom fishing for over 15 years. Looking to the future, some fishermen believe that the fishing must get better due to the restrictions that restrict their effort. Others are less confident. This section describes the sector responses to the question, “what do you think fishing in Fort Pierce will be like in 10 years?” The responses are divided between a positive and negative view of the future, including some other relevant issues that were raised.

Although a positive view was often expressed, such outlooks for the future of fishing was often underscored by the restrictions under which fishermen currently operate. This was expressed by all sectors including these commercial fishermen.
“I think it’s gonna keep getting better. I mean, we’re putting more and more restrictions on people that aren’t necessary. The fishing is already improving due to the restrictions already in force right now. So it should be getting better and better, even though the science doesn’t say so.”

Well, I’m optimistic. A lot of these management measures that are really cutting our throats and are hurting a lot of us, if people follow some of these limits and some of these closures we have, I’m optimistic. I don’t see how it can do anything but get better.”

A charterboat captain (“If they stick with the size limits, the amount, the trip catch, you know, what you’re allowed to catch per person — we’re speaking recreational part now — I think it’ll be great.”) and a private recreational fisherman (“In Ft. Pierce—I think it’s so regulated now, that I don’t think there’s gonna be a problem in ten years. I just think it’s just regulated to the point where it’s hard to catch fish, so I don’t see a problem. I think fishing will be fine.”) expressed similar views.

A negative view of the future of fishing was also expressed in relation to the management regulations. These statements came from commercial fishermen.

“Well, if they keep passing more laws against us, we’ll be totally out of business; which right now, only the strongest survive, which is a very few.”

“There won’t be any. ... The laws will be closing it down. They keep limiting and regulating it and regulating it and regulating it more all the time. They can only stand that much. You can’t just keep closing down.”

Charterboat captains also see the regulations as contributing to a negative future for fishing in Fort Pierce.

“The cost of the license and permits will increase dramatically. What you’re able to keep will decrease dramatically, and there’s gonna be a loss of money in the sport from the license and permits to the tackle to the hotels and motels that fishing brings to this area. It’s gonna affect this area in a negative way as the cost of fishing goes up and what you can keep goes down. Financially, we’re gonna have a negative effect in this area because of that.”

“There won’t be any if the regulations go the way they are.”

“I think charter businesses won’t be alive in ten years, because there’s nothing you can keep and catch.”

“Well, I’m afraid that the — I think the fishing will be okay, but the regulations are gonna be more and more imposing on us. I hope I’m wrong, but if it goes to an extreme, I can see where they outlaw fishing almost altogether. I really don’t think
that that should happen, but if you look at history, it’s been creeping up and up and up, and becoming more and more difficult.”

Recreational fishermen also express their feelings that the future of fishing in Fort Pierce will not be good due to excessive regulations.

“I didn’t think I’d see the kind of closures that we’re having now ten years ago. So, if there’s an agenda, I certainly don’t know where we’re gonna go from here, other than more restrictions. More restrictions are gonna make it more difficult for people to earn their living here in Florida, especially here, which this is a fishing community.”

An impact on the process of continually implementing tighter regulations is expressed by the following commercial fisherman who is concerned that regulations merely shift effort, and thus pressure, onto less regulated species.

“I think the king and Spanish mackerel fishery will be strong, it's just the matter of — the amount of permit holders in it. Like, as you well know, they've shut down snapper; they've got so many restrictions on tilefish now; the shark fishery's like nonexistent, almost. Every time one of these fisheries goes downhill, here come some more people into the king mackerel and Spanish mackerel fishery. So, there's more pressure, more fish on the market, lower prices. The more fisheries they shut down — the people are going to find a job somewhere catching something.”

There was also a negative view of the future of fishing expressed by commercial fishermen who see the process of increasing regulations as contributing to the end of their livelihood.

“I do not think there will be any commercial fishing at all. It’ll all be sport fishing.”

“At the rate we’re going, I don’t think we’re going to have much fishing in ten years. With the National Marine Fisheries proposals that are on the plate right now, and everything that’s going, I just don’t see it. I don’t know where we are going with this. ... The commercial fishery takes the blunt of the blow for both sides, where the recreational sector is left to fish unregulated, basically, is what it boils down to.”

Problems Encountered:

The objective of this study was to examine the impacts from the implementation of a marine protected area on a fishing community. However, the particular context of this MPA needs to be considered in terms of its location and history. The fishing conditions within the closed area are regarded as tough even by experienced fishermen; this was never a target area for the average recreational angler. Furthermore, king mackerel fishing is currently the most important commercial fishery to the community and trolling for king mackerel within the Oculina Bank HAPC is permitted. Thus, at present the closure does not impact this important fishery. However, without baseline data on the number of bottom fishermen at the time of the closure, it
is not possible to determine the size of the population impacted by the closure, nor quantify how the closure contributed toward shaping the future of the fishery, including the increase in effort and importance of king mackerel.

Second, the initial closure to longlining took place 36 years ago, meaning that identification of many of the social impacts have been lost. A significant result, then, is that the impacts of any regulation will be directly related to the resources existent within such a closure. Bottom fishers were negatively impacted by the closure of the HAPC, but those fishermen who were put out of business are now retired or have moved on to other fisheries. Baseline data on these fishers is not available.

Logistically, this project faced the following obstacles. Fishermen are busy and despite the economic recession and high local unemployment rate, it was difficult to find people who had the time and skills necessary to assist in the data collection tasks of the study. As far as the project managers are aware, this is the first time fishermen have been hired to conduct interviews with other fishermen, making it an example of true participatory research. However, fishermen do not approach the systematic collection of data from the same perspective and with the experience of a trained social scientist and this becomes evident at times in the interviews. For example, the interviewer may not realize when an issue is raised by a participant relevant to the objectives of the study, and know to probe for further information. Or, the interviewer’s personal interests in talking about fishing in general become apparent, at the expense of the purpose of the interviews, which were meant to focus on the impacts and benefits of the closure of the Oculina Bank to fishing. Nevertheless, the end product became not only a collection of oral history interviews, but recorded dialogues between fishermen, which are interesting for further analysis.

Finally, the process of transcribing the oral histories was more lengthy than expected. The corrections for proper name spellings and consistency of industry terms and vocabulary consumed a large proportion of the project. Analysis began prior to the completion of the final edits of the audio recordings, making the already time-intensive process of data coding even more demanding.

**Further Research:**

In order to better understand local level impacts from federal regulations, this study could be replicated in other communities. The budget and scope of this project was limited and did not allow for the time needed to more thoroughly analyze the oral history texts. These texts are now publicly available for further qualitative analysis.

Another future direction for this research would be to expand the social network analysis to incorporate and code for sub-groups of fishermen. For example, the research design of this project did not entailing crew as a group of interviewees, but their social role became apparent during ethnographic research and analysis of social network data. A potential research question could investigate the role of crew in the exchange of information between the commercial and recreational sectors. The results of the social network analysis presented above showed the charter boat captains to be the brokers between the commercial and recreational sectors. It would be interesting to understand the social position of crew and mates, many of whom any of them experiment with different marine-based livelihoods, play in the broader network.
VI. Conclusions

This study examined the effects of the Oculina Bank HAPC closure and regulations on the fishermen of Fort Pierce, Florida. Commercial, charter for-hire, and private recreational fishermen participated in a collection of oral histories focused around their experiences regarding the Oculina Bank. The results of the study rely heavily on the texts from participating fishermen. It is from their perspective and narratives that effects are assessed. Changes in behavior are imposed on fishermen when certain regulations are implemented and these regulations affect fishermen in different ways. Commercial and recreational fishermen may be impacted differently, and perceive the same regulation differently, as well. But even within one sector, there is variation in fishing preferences and activity and thus differential impacts. In fact, sometimes, fishermen of different sectors may have more in common than those within the same sector, as far as sharing an impact from a regulation is concerned.

The effects from the regulations implementing the Oculina Bank HAPC have been described qualitatively. These impacts were generalized as (a) positive or negative according to the goals of the impacted user group; and (b) direct or indirect correlating roughly with short-term, immediate impacts or long-term, future impacts. This is an important first step: through description, patterns can be identified and generalized, and ultimately tested systematically for reliability. Thus, qualitative analysis is the most appropriate analytically.

Although it is now accepted as a truism that fishery management is about managing people, not fish (Jentoft, 1999), fishery management continues to emphasize a bioeconomic approach at the expense of community social concerns. There is more to managing people than implementing ever tightening restrictions. What is needed, as Jentoft pointed out over ten years ago, is to shift the starting point of management from the species to the people. As the idea of ecosystem management moves forward, this may be an opportunity to refocus management around people.

This issue can be evidenced in the frustration expressed by fishermen over the changing regulations governing the Oculina Bank HAPC. The current regulations of the Oculina Bank are the result of a series of changes implemented over several years. The current protected area is not the result of a cohesive original plan, implemented over time for the purpose of mitigating socio-economic and cultural impacts. Rather, the closure was implemented piece by piece, as amendments to fishery management plans for separate management units (coral in 1984, snapper grouper in 1994, shrimp in 1996). With each one of these rules, a new justification for management was written. To fishermen, this type of management appears to be a moving target. Coupled with the lack of studies being undertaken to assess whether the goals of management were being achieved, fishermen’s frustrations are understandable. To fishermen, it appears that an agenda was in place since the first closure to trawling which aimed to incrementally restrict them from accessing favorite fishing grounds.

This does not mean that some fishermen do not see positive results from the closure. Indeed, individuals from the rock shrimp industry were both the most impacted by the initial closure to trawling, and the ones who pushed for said closure. Many other fishermen believe in the need to protect spawning grounds of important species and trust that the closure is serving that purpose. However, the underlying issue remains fishermen’s feelings of marginalization from the management process. To many, the changing goals of the closed area under the different management plans appear to be a conspiracy to keep them from fishing. Those in fishery
management should interpret this as a need for improved outreach and involvement of fishermen in the management process.

As with many fishery regulations that restrict effort, there were winners and losers as a result of the closure of the Oculina Bank HAPC. An important result of this study found that those who benefited or were negatively impacted cannot be identified by sector alone. Laurilee Thompson, whose father was one of the champions for the closure, attests that the closure saved the Port Canaveral area rock shrimp fishery. On the other hand, the commercial bottom fishermen of Fort Pierce were negatively impacted. Not only were their principal fishing grounds closed, but the closure necessitated longer travel times in order to avoid the boundaries of the HAPC, as possession of any snapper grouper species is prohibited within the area. Thus, impacts on commercial fishermen varied by geography and gear type. Today, commercial fishing in Fort Pierce is primarily directed at king mackerel (kingfish) and the actual number of commercial bottom fishers who were impacted by the Oculina Bank closure remains unknown. Although the majority of commercial landings by Fort Pierce fishermen now consist of king mackerel, there are local commercial fishermen with diversified strategies who target snapper grouper outside of the Oculina Bank, as well as tilefish and pelagics.

Each subsequent regulation also impacted different fishermen in multiple ways. The original closure in 1984 prohibited certain types of commercial gear (primarily trawlers and bottom longliners), thus only commercial fishermen experienced negative impacts. As one recreational fisherman explained, their sector saw this closure as a good thing. However, the subsequent closure to all bottom fishing in 1994 impacted commercial and recreational fishermen alike. In hindsight, this same fisherman felt that the 1994 regulatory expansion was easier to implement since the earlier closure and corresponding gear restrictions were already in place. He noted the irony that inter-sector conflict may have facilitated the closure which ultimately prohibited commercial and recreational fishermen alike from bottom fishing within the Oculina Bank. Each sector primarily occupies different social spaces in the community (e.g. separate marinas, tackle stores). This may contribute to inter-sector tensions as different user groups do not encounter, and so do not interact, frequently with one another in social places. The example above reinforces that the sectors may have common interests that could foster cooperation, rather than competition.

Impacts also vary according to temporal scale where negative impacts incurred in the immediate, short term are mitigated by (assumed) long-term positive benefits. This temporal variance of impacts is exemplified in the negative impacts incurred by fishermen upon implementation of the Oculina Bank closure to bottom fishermen, while long-term benefits are expected to result from the protection of the Oculina Bank HAPC. This is a common rationalization of regulatory impacts, where short-term cuts are justified for long-term growth. What is missing, however, are data that document biological benefits predicted to occur from restricting fishing effort. MPAs are increasingly being used for marine management based on assumptions about their effectiveness. Fishermen expressed frustration with the lack of evidence showing that their restricted effort has realized any benefits to the stocks of bottom fish.

An important idea that arose frequently during the ethnographic and oral history components of the study concerns fishermen’s support for effort-restricting regulations that make sense to the fishermen. For example, fishermen’s observations support the need for certain effort restrictions. The need for fish to be able to reproduce is a common theme among effort restrictions fishermen
Fishermen generally support closed seasons or areas during times of spawning, but resist areas closed as complete no-take zones. There is also broad support for minimum size limits, as fishermen understand the need for fish to grow to reproductive maturity, but the observation of dead discards from throwing back undersized fish is perceived as wasteful. The lesson for fishery managers is to recognize the need to design effort restrictions around fishing behavior, knowledge, and perceptions rather than based on an assemblage of restrictions that will meet a total allowable catch.

Finally, this study raises the issue that more data are needed to document the impacts and benefits of MPAs on both the biological and socio-cultural environment. It is not only important to consider whether potential biological benefits outweigh negative socio-cultural and economic impacts, but to test such assumptions and expectations. If evidence supports such closures, fishery managers should be more pro-active in communicating this information with fishermen in order to help shape an understanding and acceptance of such management measures. If evidence does not provide measurable benefits to the biological or physical environments to support ongoing negative socio-cultural and economic impacts, then such restrictions should be relaxed.

**Dissemination of project results:**

Copies of this project’s Final Report will be published and distributed to various federal and state fishery agencies, university extension/Sea Grant offices, and industry associations. In addition, PDF copies of the Final Report will be made available for download from the Foundation’s website under Foundation Research.

Summary reports of the project’s findings were published as part of the “Foundation Project Update” section of the “Gulf and South Atlantic News,” a publication of the Gulf & South Atlantic Fisheries Foundation, Inc. This newsletter was distributed to over 700 organizations and individuals throughout the region. An electronic version of this newsletter (PDF) was also included in the regular updates to the Foundation’s website ([www.gulfsouthfoundation.org](http://www.gulfsouthfoundation.org)).

**VII. Literature Cited**


Agar, Juan and Brent Stoffle. 2006. Profiling Fishing Communities in St. Croix and the U.S. Virgin Islands. NOAA/NMFS Miami Science Center, Miami, Florida.


Gulf of Mexico Fishery Management Council (GMFMC).  2004. Draft Final Environmental Impact Statement for the Generic Essential Fish Habitat Amendment to the following fishery management plans of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, Tampa, Florida.


Appendix A

Oral History Protocol
Training Guide

1. Explain project goals, work, supervision, timeline, etc.
2. Listen to some sample oral histories at USF: ohp.lib.usf.edu
3. Our agreement: Getting paid, invoices, sending me the files, etc.
   - W-9
   - Letter of Agreement
4. Review protocol questions. Edit language as appropriate.
5. Practice with equipment:
   - File type; emailing files (create gmail accounts or usendit)
   - Load program software on their computers and organize a directory
6. Using the maps: distance from shore, direction, depths.
   - Relation to Oculina Bank. (Numbering history of area fishing, in order).
7. Practice interviewing each other with protocol.
   - Go slow, prompting, changing tense of questions, asking more questions.
   - Keeping interviewee on topic!
   - Want consistent interviews!
   - Maintaining (approx) 60 minute interviews!
8. Review recordings; edit interview protocol accordingly.
9. Create list of fishers to be interviewed and assigning other data collection tasks.
   - Collect data on history of fish houses in Fort Pierce from city records, etc.
     - Name of fish house – Years of operation (19xx-19xx) – Owner, species processed, location, any other information you can gather about the operation.
   - Interviews with Jim Busse, rock shrimper and calico shrimper.
   - Find and digitize old photos of fish houses, fishing equipment, etc.
Procedural Guide for Conducting Oral Histories

1. Before the Interview:
   - Prepare equipment including recorder, batteries, and microphone. Make sure the recorder is set at LCPM (p29 of instruction manual) to create .wav files. (These are large files that will store approximately 90 minutes of recording.)
   - Have copies of: Release Form, Interview, Map, and Survey.
   - Camera
   - If you have any problems, call Dr. Lasseter at (xxx-xxx-xxxx).

2. Conduct interview in quiet setting with minimum of noise.

3. Go over release forms for interviews. (Let interviewee know that the recording will be made available via the internet. The recordings get cleaned up a bit; pauses and mistakes will be edited out.)

4. Take photograph of interviewee for archive purposes.

5. Begin Recording: Make sure microphone is ON and attached. Keep interview to approximately ONE HOUR.
   - Use interview protocol to guide interview. Take notes while listening to remember points to clarify or return to.
   - Make sure interviewee speaks in the first person. (e.g. I saw…) and try to avoid their recollections that are not first hand observations.
   - Try to promote neutrality in the way you suggest questions.
   - Use map as tool to ask about where they used to fish and where fish now. Let them write on the map.
   - At end of interview, thank the participant and turn OFF the recorder.

6. Ask participant to complete the one page survey.

7. After each interview:
   - Download interview from the recorder to your computer, save the file in .wav format, and name the file with the LAST NAME of the interviewee. Make sure that you can play the interview on your computer!
   - Send digital file to Dr. Lasseter via gmail or usendit.com.
   - Remember to keep track of your time and mileage to the interviews, and send invoice to Dr. Lasseter.
**Oral History Protocol: Commercial**

Photograph of participant.
Oral history signed release form.

[Turn on recorder.]
What is your full name?
When and where were you born?
[If not born in Fort Pierce:] When did you move to Fort Pierce?
What brought you to Fort Pierce?
Are you married? [If yes:] How old were you when you got married?
Do you have children? How many? How old are they?
How much schooling do you have?
Do you have another job besides fishing? Have you had other jobs besides fishing? What jobs?
Do you currently own a boat? What kind(s)? [length]

Now, I’d like to talk about your history and experiences with fishing. First, I’m going to ask some general questions about fishing in this area, then I will ask about your specific experiences.
How familiar are you with the Oculina Bank?
Why was the Oculina Bank designated as an area to protect?
Is there anything else you can tell me about the Oculina Bank? [What do you know about it?]
What do you think about the closure of the Oculina Bank to bottom fishing?
Has the closure of the Oculina Bank affected your fishing? How?
If the Oculina Bank was not closed to fishing, would you fish there? How/For what?
Overall, how has fishing changed since you began fishing in the Fort Pierce area?

Now I want to talk about your fishing history specifically.
What is your earliest memory of fishing and how old were you?
How did you learn how to fish? (Who taught you?)
How did you decide to become a fisherman?

When did you start to work as a fisherman in the Fort Pierce area? [age, year]
Where were you living then?
What did you fish for?  How did you fish for _____? [gear, bait]
Who did you fish with? Who owned the boat? How were you related to this person?
   [If his boat] What kind of boat [length]?
Where did you go to fish when you began fishing? Can you show me on this map? [note beginning of their fishing, depth]
During what months of the year did you fish for _____?
How long did a fishing trip last?
How much was an average trip’s catch?
For how many years did you fish for _____?
Why did you stop fishing for ___________?
What did you do next?

So you fished for ___________ from _____ to ______. [clarify previous experience]
What did you do next? [If not fishing, let him talk. Then, repeat question until returns to fishing.]
[Repeat above questions]
Where were you living then?
How did you fish for _____? [gear, bait]
Who did you fish with? Who owned the boat? How were you related to this person?
[If his boat] What kind of boat [length]?
Where did you go to fish for ______________? [use map, note next place for fishing, depth]
During what months of the year did you fish for _____?
How long did a fishing trip last?
How much was an average trip’s catch?
For how many years did you fish for ______?
Why did you stop fishing for ________________?
What did you do next? [If not fishing, let him talk. Then, repeat question until returns to fishing.]

[Repeat above questions]
Where were you living then?
How did you fish for _____? [gear, bait]
Who did you fish with? Who owned the boat? How were you related to this person?
[If his boat] What kind of boat [length]?
Where did you go to fish for ______________? [use map, note next place for fishing, depth]
During what months of the year did you fish for _____?
How long did a fishing trip last?
How much was an average trip’s catch?
For how many years did you fish for ______?
Why did you stop fishing for ________________?
What did you do next? [If not fishing, let him talk. Then, repeat question until returns to fishing.]

[Repeat above questions]
Where were you living then?
How did you fish for _____? [gear, bait]
Who did you fish with? Who owned the boat? How were you related to this person?
[If his boat] What kind of boat [length]?
Where did you go to fish for ______________? [use map, note next place for fishing, depth]
During what months of the year did you fish for _____?
How long did a fishing trip last?
How much was an average trip’s catch?
For how many years did you fish for ______?
Why did you stop fishing for ________________?
What did you do next?

What are you fishing for now?
How do you fish for _____? [gear, bait]
[If his boat] What kind of boat [length]?
Who do you fish with? Who owns the boat? How are you related to this person?
Where do you go to fish for ______________? [use map, note next place for fishing, depth]
On average, how far do you go offshore to fish?
During what months of the year do you fish for ______?
How long did a fishing trip last?
How much was an average trip’s catch?
For how many years have you fished for ______?

Finally, I would like to talk about how your fishing has changed over time. [use map to review where they have fished over time and the changes in species and gear, bait, depth]
In what ways does your livelihood depend on fishing?
How has that changed over time?
[If he fished prior to 1984] Has the initial closure of the Oculina Bank to shrimping affected your fishing? How?

[If he fished prior to 1994] In 1994, the Oculina Bank area was closed to bottom fishing and anchoring. Has this affected your fishing or livelihood? How?

In 2000, the Oculina Bank closed area was expanded to the north. Have you been affected by this closure? How?

The closure of marine areas to fishing is being used more frequently as a fishery management tool. What do you think about the implementation of closed areas to fishing compared to other types of management regulations?

What do you think fishing in Fort Pierce will be like in 10 years?

Thank you very much for sharing your fishing history with us.
[Turn off recorder.]
Oral History Protocol: Charterboat

Photograph of participant.
Oral history signed release form.

[Turn on recorder.]
What is your full name?
When and where were you born?
[If not born in Fort Pierce:] When did you move to Fort Pierce?
What brought you to Fort Pierce?
Are you married? [If yes:] How old were you when you got married?
Do you have children? How many? How old are they?
How much schooling do you have?
Do you have another job besides the charterboat? What other jobs have you had?
Do you currently own a boat(s)? What kind(s)?

Now, I’d like to talk about your history and experiences with fishing. First, I’m going to ask some general questions about fishing in this area, then I will ask about your specific experiences.

How familiar are you with the Oculina Bank?
Why was the Oculina Bank designated as an area to protect?
Is there anything else you can tell me about the Oculina Bank? [What do you know about it?]
What do you think about the closure of the Oculina Bank to bottom fishing?
Has the closure of the Oculina Bank affected your fishing? How?
If the Oculina Bank was not closed to fishing, would you fish there? How/For what?
Overall, how has fishing changed since you began fishing in the Fort Pierce area?

Now I want to talk about your fishing history specifically.
What is your earliest memory of fishing and how old were you?
How did you learn how to fish? (Who taught you?)
How did you decide to become a charterboat captain?

When did you start fishing in the Fort Pierce area? [age, year]
Where were you living then?
Were you fishing commercially, recreationally, or working in the charterboat sector?
What did you fish for? How did you fish for _____? [gear, bait]
Who did you fish with? Who owned the boat? How were you related to this person?
Where did you go to fish when you began fishing? Can you show me on this map? [note beginning of their fishing, depth]
During what months of the year did you fish for _____?
How long did a fishing trip last?
How much was an average trip’s catch?
For how many years did you fish for ________?
Why did you stop fishing for ____________?
What did you do next?

[If above was not about being a charterboat captain: Repeat above questions]
When did you start working as a charterboat captain in the Fort Pierce area? [age, year]
Where were you living then?
What do you fish for and how? [gear, bait]
Who do you work with? Who owns the boat? [If not self:] How are you related to this person?
Where do you go to fish for _________? [use map, note area for fishing, depth]
On average, how far do you go offshore to fish?
How do you decide where you will fish?
During what months of the year do you fish for ________?
How long does a fishing trip last?
How much is an average trip’s catch?
For how many years have you been a charterboat captain?

Finally, I would like to talk about how your fishing has changed over time. [use map to review
where they have fished over time and the changes in species and gear, bait, depth]
In what ways does your livelihood depend on fishing?
How has that changed over time?

[If he fished prior to 1984] Has the initial closure of the Oculina Bank to shrimping affected your
fishing? How?

[If he fished prior to 1994] In 1994, the Oculina Bank area was closed to bottom fishing and
anchoring. Has this affected your fishing or livelihood? How?

In 2000, the Oculina Bank closed area was expanded to the north. Have you been affected by this
closure? How?

The closure of marine areas to fishing is being used more frequently as a fishery management
tool. What do you think about the implementation of closed areas to fishing compared to other
types of management regulations?

What do you think fishing in Fort Pierce will be like in 10 years?

Thank you very much for sharing your fishing history with us.
[Turn off recorder.]
Oral History Protocol: Recreational

Photograph of participant.
Oral history signed release form.

[Turn on recorder.]
What is your full name?
When and where were you born?
[If not born in Fort Pierce:] When did you move to Fort Pierce?
What brought you to Fort Pierce?
Are you married? [If yes:] How old were you when you got married?
Do you have children? How many? How old are they?
How much schooling do you have?
What do you do for a living?
What other jobs have you had?
Have you worked in the fishing industry? [How? Commercial, charter industry?]
Do you currently own a boat? What kind(s)? [length]

Now, I’d like to talk about your history and experiences with fishing. First, I’m going to ask some general questions about fishing in this area, then I will ask about your specific experiences. How familiar are you with the Oculina Bank?
Why was the Oculina Bank designated as an area to protect?
Is there anything else you can tell me about the Oculina Bank? [What do you know about it?]
What do you think about the closure of the Oculina Bank to bottom fishing?
Has the closure of the Oculina Bank affected your fishing? How?
If the Oculina Bank was not closed to fishing, would you fish there? How/For what?
Overall, how has fishing changed since you began fishing in the Fort Pierce area?

Now I want to talk about your fishing history specifically.
What is your earliest memory of fishing and how old were you?
How did you learn how to fish? Who taught you?

When did you start fishing in the Fort Pierce area? [age, year]
Where were you living then?
What did you fish for? How did you fish for _____? [gear, bait]
Where did you go to fish when you began fishing? Can you show me on this map? [note beginning of their fishing, depth]
Did you mostly go fishing in your own boat or the boats of others?
Who did you fish with?
During what months of the year did you fish for _____?
How long did a fishing trip last?
How much would you catch on an average trip?
For how many years did you/have you fish for ______? 
Are you still fishing for ______________? [If not] Why?

Where else do you go fishing in the Fort Pierce area? [on map, depths]
What do you fish for? What gear, bait do you use?  
Do you usually go in your own boat or the boats of others?  
Who do you usually fish with?  
During what months of the year do you fish there?  
How much would you catch on an average trip?  
For how many years did you/have you fish for ____?  
Are you still fishing for ____? [If not] Why?  
[Repeat as necessary for all offshore fishing]  

Now, how often do you go offshore fishing?  

   How many times a week? How many times a month?  
   Are there some months you go fishing more frequently?  
   Are there some months you never or rarely go fishing?  

On average, how far do you go offshore to fish?  
What do you fish for and how? [gear, bait]  
Who do you fish with? Who owns the boat? [If not self:] How are you related to this person?  
Where do you go to fish for ___________? [use map, note area for fishing, depth]  
How do you decide where you will fish?  
During what months of the year do you fish for ____?  
How long does a fishing trip last?  
How much do you catch on an average trip?  

Finally, I would like to talk about how your fishing has changed over time. [use map to review where they have fished over time and the changes in species and gear, bait, depth]  
In what ways does your livelihood depend on fishing?  
How has that changed over time?  

[If he fished prior to 1984] Has the initial closure of the Oculina Bank to shrimping affected your fishing? How?  

[If he fished prior to 1994] In 1994, the Oculina Bank area was closed to bottom fishing and anchoring. Has this affected your fishing or livelihood? How?  

In 2000, the Oculina Bank closed area was expanded to the north. Have you been affected by this closure? How?  

The closure of marine areas to fishing is being used more frequently as a fishery management tool. What do you think about the implementation of closed areas to fishing compared to other types of management regulations?  

What do you think fishing in Fort Pierce will be like in 10 years?  

Thank you very much for sharing your fishing history with us.  
[Turn off recorder.]
Written Survey for each Oral History Participant

Name: ___________________

1. Could you describe the history of the boats you have owned?

<table>
<thead>
<tr>
<th>Name of Boat</th>
<th>Year bought</th>
<th>Year Sold</th>
<th>Type</th>
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(Use back of sheet for additional boats)

Where do you currently keep your boat? __________________

Where do you get your information about fishing regulations? __________________

Are you a member of any fishing organizations? __________________

Who do you talk to about fishing regulations? [Please name 5 people and describe their relationship to you.]

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

On average, how many days and during what months do you fish? (or last fished)

What species do you target each month? How far do you travel from shore?


Appendix B

Commercial Fishery Landings

The following tables provide data on commercial fishery landings for St. Lucie County, for locally important species. Because Fort Pierce has the only inlet for the entire county, it is likely that the majority of landings occurred in Fort Pierce. However, dealers in other parts of the county may also have dealer permits and thus their landings are included as well. Data were not available for years prior to 1986, thus the landings at the time of the original Oculina Bank HAPC closure to bottom longlining remain unknown.

Figure B-6 shows that virtually no landings for shrimp species occur in St. Lucie County. However, for two species, there is one year for which landings not only occur, they are abundant: brown shrimp in 1994, and rock shrimp in 1995. As there was no local processor in Fort Pierce, and these are the only years for which there are landings, it is possible that this reflects an error in the data.
**Figure B-1**: Commercial Landings of Cobia and Greater Amberjack, for St. Lucie County, during the period of 1986 thru 2010. Data provided by the NOAA Southeast Science Center.

**Figure B-2**: Commercial Landings of Mackerels, for St. Lucie County, during the period of 1986 thru 2010. Data provided by the NOAA Southeast Science Center.
Figure B-3: Commercial Landings of Snappers, for St. Lucie County, during the period of 1986 thru 2009. Data provided by the NOAA Southeast Science Center.

Figure B-4: Commercial Landings of four species of shark, for St. Lucie County, during the period of 1986 thru 2009. Data provided by the NOAA Southeast Science Center.
Figure B-5: Commercial Landings of unclassified species of shark, for St. Lucie County, during the period of 1986 thru 2009. Data provided by the NOAA Southeast Science Center.

Figure B-6: Commercial Landings of Shrimp, for St. Lucie County, during the period of 1986 thru 2009. Data provided by the NOAA Southeast Science Center.
Appendix C

Charterboat and Private Recreational Fishery Landings Estimates

Landings data are much less precise for the recreational sector. First, the estimates are given in number of fish caught, rather than in weight, as the commercial landings are measured. Second, the system for estimating recreational landings is currently undergoing an extensive redesign in order to address the problems identified in the data collection method. The following graphs show the data that are available for the recreational sector for species recognized as important to Fort Pierce fishermen. Although headboats are required to report landings, these data were not available owing to confidentiality laws due to the small number of vessels.
Figure C-1: Number of Black Grouper caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.

Figure C-2: Number of Gag caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.
**Figure C-3:** Number of Red Grouper caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.

*Graph showing the number of Red Grouper caught from 1986 to 2009.*

**Figure C-4:** Number of Scamp caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.

*Graph showing the number of Scamp caught from 1986 to 2009.*
Figure C-5: Number of Red Snapper caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.

Figure C-6: Number of Yellowtail Snapper caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.
**Figure C-7:** Number of Lane Snapper caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.

**Figure C-8:** Number of Mutton Snapper caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.
Figure C-9: Number of Red Porgy caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.

Figure C-10: Number of King Mackerel caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.
Figure C-11: Number of Cobia caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.

Figure C-12: Number of Greater Amberjack caught during the period 1986 thru 2009 for the east coast of Florida. Data from MRFSS estimates, the NOAA Southeast Science Center.
Figure C-13: Estimated Headboat Landings for Grouper from Fort Pierce to Miami, Florida, during the period of 1981 thru 2009. Data were not available for the local area alone making it difficult to identify trends that may have occurred in Fort Pierce. Data from MRFSS estimates, the NOAA Southeast Science Center.

Figure C-14: Estimated Headboat Landings for Red Snapper from Fort Pierce to Miami, Florida, during the period of 1981 thru 2009. Data were not available for the local area alone making it difficult to identify trends that may have occurred in Fort Pierce. Data from MRFSS estimates, the NOAA Southeast Science Center.
Figure C-15: Estimated Headboat Landings for Yellowtail Snapper, Lane Snapper, Mutton Snapper, and Red Porgy from Fort Pierce to Miami, Florida, during the period of 1981 thru 2009. Data were not available for the local area alone making it difficult to identify trends that may have occurred in Fort Pierce. Data from MRFSS estimates, the NOAA Southeast Science Center.

Figure C-16: Estimated Headboat Landings for King Mackerel from Fort Pierce to Miami, Florida, during the period of 1981 thru 2009. Data were not available for the local area alone making it difficult to identify trends that may have occurred in Fort Pierce. Data from the NOAA Southeast Science Center.
Figure C-17: Estimated Headboat Landings for Amberjack and Cobia from Fort Pierce to Miami, Florida, during the period of 1981 thru 2009. Data were not available for the local area alone making it difficult to identify trends that may have occurred in Fort Pierce. Data from the NOAA Southeast Science Center.