Gulf & South Atlantic
Fisheries Foundation, Inc.

August 14, 2014

Dr. Roy E. Crabtree
Regional Administrator
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

RE: Request for Exempted Fishing Permit

Dear Dr. Crabtree:

There are large variance and error estimates surrounding the stock assessment results for various South Atlantic snapper and grouper species. To augment the current pool of data available to stock assessment scientists for "data poor" species, the Foundation has been approved for a project to continue the placement of fishery observers aboard commercial bandit rig fishing vessels (vertical hook-and-line) to characterize catch and discard mortality within the South Atlantic snapper-grouper fishery. While aboard a cooperating vessel, the fishery observer will collect data outlined within the Protocols for Bandit Reel Characterization (Southeast Fisheries Science Center, Galveston Laboratory).

To allow adequate time for the fishery observer to collect, enumerate, weigh, and identify all samples/species brought aboard a cooperating fishing vessel, the Foundation is requesting an Exempted Fishing Permit from the National Marine Fisheries Service (NMFS). After all necessary data are collected and recorded, legal-sized fish will become part of the commercial catch and regulatory discard will be returned to the water. However, to verify that species are correctly identified, we request authorization to retain limited numbers of marine species (vertebrates and invertebrates) until further processing can be conducted (e.g., until more accurate/extensive literature can be referenced or experts can be successfully contacted). The number of specimens that may be acquired on any given trip is highly variable, however, we anticipate approximately 500 sub-legal and legal fish could be retained for continued onboard examination or returned to shore for lab analysis throughout the course of the study. No species retained for scientific purposes will be sold commercially.

The Foundation's award is effective July 1, 2014. Three hundred (300) at-sea days have been

anticipated for this study. Current Foundation contracted observers, Regional Coordinators and authorized personnel include: Matt Gaylord, Dylan Ewing, John O'Hern, Gary Graham, Frank Helies, Lindsey Parker, and Daniel Parshley. Additional observers may be contracted during the course of this project.

Please note that contracted personnel may handle threatened and endangered sea turtles encountered during normal fishing operations. Foundation observers are considered NMFS-designated agents while conducting work under a NMFS funded research grant and as such, are authorized to handle sea turtles encountered during the course of this study. There would not be any impacts to marine mammals or endangered species that have not been considered in the Biological Opinions for the South Atlantic Fishery Management Council's Snapper Grouper Fishery Management Plan.

Results of tests conducted will be provided in the final report for the awarded project and through a public presentation to the SAFMC during a TBD meeting.

Thanks for your assistance. Should you need any further information, please don't hesitate to contact us.

Regards,

Judy L Jamison
Executive Director

Attachments: Proposal - Statement of Work

Cc: Robert Mahood (w/attachments)
Board of Trustees

SALTONSTALL KENNEDY PROGRAM PROJECT SUMMARY

Project Title: Examination of Catch and Discards within the Commercial Snapper-Grouper Vertical Hook-and-Line Sector in the South Atlantic United States

Project Status/Duration: Jan. 1, 2014 – Dec. 31, 2014 New X Con't _ Project Period: 12 Months

Name, Address. and Telephone Number of Applicant:

Gulf & South Atlantic Fisheries Foundation, Inc
Lincoln Center, Suite 740
5401 W. Kennedy Blvd.
Tampa, Florida 33609-2447
(813) 286-8390

Principal Investigator(s) and Brief Statement of Qualifications:

Ms. Judy Jamison; Over 33 years administrative and grants management experience.
Mr. Frank Helies; Experience in biological and oceanographic research.

Project Objective:

(1) Reinitiate the previous Foundation pilot observer program within the commercial vertical hook-and-line sector of snapper-grouper fishery in the South Atlantic United States; (2) Utilize previously trained, or contract and train fishery observers to collect critical stock assessment data to quantify total catch, effort, and discards within a subset of the fishery; (3) Compare trends in bycatch across time, area, and depth with a statistical model to identify when and where bycatch is greatest and least for select species; (4) Demonstrate proof of concept for an algorithm that would allow the estimation of effort for the expanded bandit reel fishery within time-area strata based on the results of this observer program and corresponding landings records; and (5) Compare these effort based bycatch estimates to those derived from commercial logbooks to identify potential biases.

Specific Priorities in Solicitation to Which Project Responds:

Section 2. Optimum Utilization of Harvested Resources under Federal Management; Collect data on population dynamics of fish for the Regional Fishery Management Councils. 4. Conservation Engineering; Projects that reduce or eliminate adverse interactions between fishing operations and non-targeted, protected, or prohibited species, including the inadvertent take, capture, or destruction of such species.

Summary of Work:

Many species within the snapper-grouper fishery management unit are data poor. As a result, many of the species specific stock assessments have a high level of uncertainty associated with the models, including catch characterization, effort, and quantity of discards. To enhance the universe of data that are available to stock assessment scientists, we propose to reinitiate a fishery observer program within the vertical hook-and-line (bandit rig) sector of the snapper-grouper fishery of the South Atlantic United States. Through cooperation of Foundation Coordinators and Industry Cooperators, we will solicit the participation of the commercial fishing industry to voluntarily assist in the performance of this project. An observer will be placed onboard cooperating vessels to collect a variety of data quantifying the participation, gear, effort, catch, and discards within the fishery. The intent of this project is not to form a standalone dataset, but to augment currently available datasets. As such, most data analyses will be descriptive (proportional catch, discards, etc.). With the information derived from this project, the South Atlantic Fishery Management Council and NOAA Fisheries can better assess the impact of current effort and discards on the data-poor snapper-grouper fishery.

Project Funding:		
	Federal	$ 329,869
	Non-Federal	$ 0
	Total	**$ 329,869**

Project Title:

Examination of Catch and Discards within the Commercial Snapper-Grouper Vertical Hook-and-Line Sector in the South Atlantic United States

Applicants Name:

Gulf & South Atlantic Fisheries Foundation, Inc. (Foundation)
Ms. Judy Jamison, Executive Director
Mr. Frank Helies, Program Director

Lincoln Center, Suite 740
5401 W. Kennedy Blvd.
Tampa, Florida 33609-2447
(813) 286-8390

Proposed Budget period:

January 1, 2014 – December 31, 2014

Project Goals and Objectives:

1. Reinitiate the previous Foundation pilot observer program within the commercial vertical hook-and-line sector of snapper-grouper fishery in the South Atlantic United States;

2. Utilize previously trained, or contract and train fishery observers to collect critical stock assessment data to quantify total catch, effort, and discards within a subset of the fishery;

3. Compare trends in bycatch across time, area, and depth with a statistical model to identify when and where bycatch is greatest and least for select species;

4. Demonstrate proof of concept for an algorithm that would allow the estimation of effort for the expanded bandit reel fishery within time-area strata based on the results of this observer program and corresponding landings records; and

5. Compare these effort based bycatch estimates to those derived from commercial logbooks to identify potential biases.

Identification of the Problem:

The snapper-grouper fishery within the South Atlantic United States is comprised of 60 different species, including fishes within the Lutjanidae, Serranidae, Malacanthidae, Carangidae, and Sparidae families (SAFMC, 2006; 2011). Many of the species are data poor. Lacking accurate inputs for catch characterization, effort, and quantity of discards, some species-specific stock assessment models have a high level of uncertainty.

This fishery is managed by the South Atlantic Fishery Management Council (SAFMC) under the Snapper-Grouper Fishery Management Plan (FMP), a multi-species plan. The first FMP for the fishery of the South Atlantic Region was prepared by the SAFMC in 1983 (SAFMC, 2006). Since the drafting and implementation of the original FMP, subsequent amendments have increased size limits, decreased the total allowable catch, limited commercial fishing gear, required logbooks, and limited fisher access to prevent overfishing and help rebuild stocks (SAFMC, 2006; 2010; 2011a; 2011b). Collection of discard rates was a priority research item identified in recent stock assessments (SEDAR, 2007; 2008; 2009). In fact, fishery dependent observer data collection was identified as a crucial program for collecting important information on discards and other fishery characteristics, and was recommended to be continued and expanded throughout the South Atlantic (SEDAR, 2008).

Discards and bycatch are sometimes used synonymously and both terms are inconsistent throughout the scientific literature and across regulatory agencies. The most agreed upon definitions are as follows: bycatch = discarded catch plus incidental catch; discarded catch = portion of catch returned as a result of economic, legal, or personal considerations; incidental catch = retained catch of non-targeted species. We will refer mostly to discards throughout this proposal.

Generally, the mathematical approach to discard estimation is to (1) assume discards are a fixed proportion of the landed catch or (2) estimate discards as catch-per-unit-effort (CPUE) in more refined time-area strata from observer data and expand these estimates to the total effort by the entire fishery. The latter is almost always less biased and more precise, as the correlation of discards with catch is not always linear and sometimes negative. However, the per-unit-effort method requires rigorous estimates of total fishery effort.

Central to any stock assessment is catch and effort data. The most important information collected during this project will be catch and effort data regarding discards. Data needed to quantify discards for this fishery is lacking.[1,2] Only twenty percent of the fleet is currently required to annually fill out discard logbooks, and detailed data on discard catch and effort are not typically recorded by fishermen (Perot Systems, 2006). Some information can be gained through trip ticket and landings information (gathered through dealer invoices, and other data collection programs administered through state and federal agencies), but again detailed information required for the per-unit-effort method of discard estimation does not exist. The data collected in this project will serve as a benchmark to compare and contrast the accuracy of historic data collection methods. The most important information collected during this project will be catch and effort data regarding discards. The methodology currently used by NMFS to estimate total annual discards by this fishery is described in more detail by NMFS (2011), but is summarized as follows: (1) in 2005 and 2006, 20% of vessels were required to fill out discard logbooks and report estimates during a given year, (2) all vessels reported effort, (3) the annual discards reported by 20% were divided by the proportion of annual effort they represented to arrive at fishery-wide estimates of discards, (4) average estimates of discards, total effort, and the

[1] Perot Systems implemented a limited one year program to test electronic logbooks on 7 snapper grouper vessels in the South Atlantic (Perot, 2006).

[2] North Carolina Sea Grant conducted a pilot program in the fishery, testing electronic video monitoring in conjunction with limited observer coverage (~30 days).

resulting average estimate of fishery-wide discards across years 2005 and 2006 are applied to every year, and (5) the coefficient of variability for these estimates across these two years is assumed to reflect annual variability. Self-reporting of discards is notoriously biased and annual variability in fleet effort and discard CPUE is currently fixed to the 2005-2006 levels such that annual deviations from this average will cause further unknown bias.

Stock assessments are a critical tool for evaluating and monitoring the status of fish stocks. Like all models, stock assessments have an associated level of uncertainty resulting from the use of inaccurate catch statistics, natural and anthropogenic variability, along with failed assumptions associated with individual model types (NMFS, 1999). This uncertainty was evident following the assessments of South Atlantic vermilion snapper stocks (SAFMC, 2006) and more recent update assessments on red snapper (SEDAR, 2009). Inaccurate estimates of discard mortality can lead to an over- or under-estimate of fishing impacts on the population by misinforming the stock assessment models, which then render false outputs. This biased decision support upon which management regulations are constructed can lead to reduced opportunity for resource users within the fishery or overfishing. The data collected in this project will serve as a benchmark to compare and contrast the accuracy of current estimation methods used during the stock assessments.

Project Impacts/Results or Benefits Expected:

As outlined in the current Saltonstall Kennedy (SK) Program solicitation, a primary directive is "...address the needs of fishing communities in optimizing economic benefits within the context of rebuilding and maintaining sustainable fisheries and practices, and in dealing with the impacts of conservation and management measures". For the South Atlantic snapper-grouper fishery, the most threatening issue is bycatch. With the national programmatic goal of reducing bycatch mortality, an increase in the accuracy of reported discards can allow for a better analysis of management strategies. This project will also address the Program Priority of Conservation Engineering, "Projects that reduce or eliminate adverse interactions between fishing operations and non-targeted, protected, or prohibited species, including the inadvertent take, capture, or destruction of such species." As fish stocks increase under new and sustained management regulations, there is an increased need to assess the effectiveness of these projects. In order to do so, we must first be aware of the intensity across time and areas of these adverse interactions. Directly estimating discard magnitude for important time-area strata in this fishery is directly in line with the current mission of the SK Program.

Any associated ecosystem impact on the snapper-grouper complex must consider cascading effects within top-down and bottom-up controlled systems that impact both population and food web dynamics (Goni, 1998). By attempting to compute trends in bycatch based on species assemblages, there is the potential to gain a better understanding of when and where bycatch has the greatest impact on this faunal assemblage. Any ecosystem approach requires inclusion of all major environmental and anthropogenic forcings on population dynamics and community structure and losses to bycatch certainly falls within the scope of the SK Ecosystem Studies Priority.

In 2006, the Foundation was funded to conduct a pilot study to characterize the catch and fate of discards within the commercial vertical hook-and-line sector of the snapper-grouper fishery in the U.S. South Atlantic (NA06NMF4540059). The project proved highly successful with cooperation from the snapper-grouper fleet throughout the South Atlantic. A total of 200 sea days were logged on-board 24 different vessels from North Carolina, South Carolina, Georgia and Florida's northeast coast. A presentation of the results was made to the SAFMC at their June 2008 meeting. In addition, data from the project were reviewed during the data workshop for vermilion snapper in SEDAR-17 (SEDAR, 2008).

A continuation of that project was funded at a reduced rate through the Cooperative Research Program in 2008, allowing for an additional 100 sea days for data collection (NA08NMF4540399), and a third year of funding was received in 2010 for an additional 100 sea days (NA10NMF4540102). The results of these projects were also presented to the SAFMC. Most recently, the data were used by the South Atlantic Marine Protected Area Working Group in an effort to improve management of the deepwater species, Warsaw grouper and speckled hind.

In order to meet the need for increased data in the snapper-grouper fishery, the Foundation is submitting this proposal for funding to reinitiate this important data collection project to ensure more inclusive coverage of the South Atlantic vertical hook–and–line sector. While the data collected through this observer program will improve stock assessment inputs, particularly those related to discards in the fishery, it is not meant to serve as a full scale observer program. Rather, we intend to research and develop a proof of concept for how these data can be used to directly estimate discards for the expanded fishery. As well, we intend to increase our sample size for selected time and area strata to assist with this endeavor.

This program has been successful in identifying discard species and magnitude of catch for various time-area combinations throughout the fishery. However, we currently have no way of utilizing this information to estimate discards for the entire bandit reel fishery in the South Atlantic. Based on data collected in recent years, we have developed a way to quantify effort (measured as hook hours) for the observed trips on a set by set basis (before this study no estimates of accurate effort and corresponding variability existed). However, the information needed to estimate hook hours for the entire fishery is not available from the data recorded on trip tickets.

The next step will be to develop a model based on the observed trips that estimates hook hours from some proxy of effort that is recorded and available for the entire fishery (e.g., total trip days). Hook hours for all vessels will be estimated for all sampled strata circumscribed by month (or perhaps quarter) and statistical area. Once effort is estimated, it can be multiplied by corresponding observer CPUE estimates to arrive at direct discard estimates for each species of interest for the fishery at large. These effort based bycatch estimates will be compared to those derived from commercial logbooks to identify potential biases in the data currently being used in stock assessments.

An ancillary benefit of this research will be stakeholder involvement. Commercial fishermen are typically dubious of assisting in the collection of fisheries related data because they believe this

information will be used to further restrict harvest within their fishery. Due to the limited amount of data available within the snapper-grouper complex, fishermen are becoming more aware that management regulations based on insufficient and incomplete datasets can have serious effects (e.g., stocks being considered overfished when they are healthy). As a result, industry members want to become more involved in cooperative research and fisheries management. By increasing industry participation, fishermen are cognizant of the methods used to collect data and are more trusting of the stock assessment results that utilized the data they help collect. If fishermen are aware of the specific use of the data they help collect and the effect of this data on management regulations, this increases their support of additional cooperative research and data collection projects both within the snapper-grouper and other fisheries.

Need for Federal Support:

This project will address several national priorities set forth by the Magnuson-Stevens Act, in addition to priorities outlined within the FY2013 Saltonstall Kennedy solicitation (e.g. Section 2. Optimum Utilization of Harvested Resources under Federal Management: Collect data on population dynamics of fish for the Regional Fishery Management Councils; 4. Conservation Engineering: Projects that reduce or eliminate adverse interactions between fishing operations and non-targeted, protected, or prohibited species, including the inadvertent take, capture, or destruction of such species). Data collected in this study also coincides with the priorities outlined within the Cooperative Bycatch Plan for the Southeast United States (NOAA, 2004). Further, U.S. fisheries resources and marine ecosystems are a public commodity and, as such, are managed by the United States Government. The research outlined within this proposal has the potential of impacting the commercial fishing industry, state and federal fisheries management agencies, seafood consumers, recreational anglers and the public-at-large. Given the extent of the benefits gained from this project by interest groups, it is fair and reasonable to ask for federal assistance to conduct this study.

Statement of Work:

The Fishery, Vessel Selection, and Vessel Compensation

The average fishing vessel within the snapper-grouper fishery is between 20 and 44 feet in length and utilizes a variety of gears to harvest snapper-groupers, with 81% landed by vertical hook-and-line (SAFMC, 2008). From 2003-2007, an average of 890 out of 944 permitted vessels landed at least 1 pound of snapper-grouper species in the states of Florida, North Carolina, South Carolina and Georgia (SAFMC, 2009). The limited entry program (2 for 1) has steadily reduced the number of snapper-grouper permits from 1059 in 2003, to 877 in 2007, to 734 in 2010 (SAFMC, 2011).

The vertical hook-and-line gear most used by snapper-grouper fishermen are 'bandit rigs'. These devices are mounted on the gunwale of the vessel and consist of a davit and mechanically operated reel (electric or hydraulic), which sets and retrieves the fishing line. Vessels participating within the snapper-grouper fishery average 2-4 bandit reels per vessel (SAFMC, 2006). Anecdotal information relayed by industry indicates that approximately 40 boats account for the majority of commercial hook-and-line landings within the snapper-grouper fishery. This

is supported by data from 2003-2007; on average only 27 boats landed more than 50,000 pounds of reef fish (SAFMC, 2009). Through the outreach efforts from past Foundation observer projects, the current list of participating vessels is thirty-eight, and includes a number of the aforementioned 'high liners'.

Previous observer trips have shown that trip length is variable, however, the average trip from data collected so far is 7 days, therefore an "average" vessel will likely conduct ~29 trips per year. This equates to ~200 days fished per vessel per year (29 trips/year x 7 days/trip = 203 days/year). Observers will be deployed for 300 at-sea days (~42 trips) of data collection. Using a standard sample size estimator (assuming normality) based on data collected thus far in the program, an average of approximately 5 trips (averaged across time-area strata; range=1-16 trips) are required to be 80% confident of being within 20% of the true population parameter for red porgy discards. Therefore, while this study is still considered a continuation of a pilot program, rigorous estimates of discards will be generated for some time-area strata.

The Foundation's South Atlantic Regional, Observer/Vessel, and Industry Cooperators will again actively solicit the cooperation of fishing vessels and captains willing to participate in the observer program. Only vessels with valid snapper-grouper permits (Permit 1 only, unlimited permit), exclusively fishing bandit reels, will be asked to participate in this program. Although vessel selection will be non-random (e.g., voluntary participation solicited by Coordinators), all efforts will be made to increase the total number of vessels cooperating in the project, and the universe of vessels to which an observer can be assigned. Previously, random vessel selection was attempted under the pilot program, it quickly became obvious because the list of cooperating vessels grew over time that each vessel did not have the same probability of being selected each time. In fact, by soliciting participation in the project and not mandating participation, the process cannot be random. Furthermore, to efficiently utilize observer and observer coordinator time, the selection of vessels will not be random but focus on ensuring adequate coverage of all areas and as many different vessels as possible. An *ad hoc* selection of vessels from the total list, with full compliance, may cause no more error than a random selection with poor compliance (Volstad and Fogarty, 2006). Cooperating vessels carrying an observer will be asked to fish under "normal" conditions and will not be instructed on when, where, or how to fish. Previous projects have shown that by asking the vessel to fish "normally", the problem of "observer bias", which is a change in fishing behavior when an observer is aboard, is minimized or removed (Volstad and Fogarty, 2006).

Carrying an observer is not currently mandatory in the South Atlantic snapper-grouper fishery. In order to increase participation and assistance with this project, cooperating fishing vessels will be compensated $100/day for each day a set is made and $50/day for travel while not actively fishing. Because we have received positive feedback and participation in the past, this amount is greatly reduced from the pilot program and is in line with the rate for our other observer programs. Additionally, vessel liability insurance will be secured and funded by the Foundation to protect the vessel in the event of a catastrophic incident resulting in injury.

Fishery Observers

All contracted fishery observers will have undergone specific and detailed training prior to their deployment on any commercial fishing vessel. It is the responsibility of the Observer/Vessel Coordinator to schedule and train all fishery observers. Training details all administrative and programmatic procedures necessary to conduct the proposed research and includes (but is not limited to): overview of the data collection protocols, review and identification of all fauna harvested during hook-and-line fishing, proper handling of sea turtles, description and measurements of fishing gear, and best practices while aboard a commercial fishing vessel (classroom and at-sea education). Contracted observers will complete sea turtle training at a NMFS facility. In addition, all observers will undergo marine safety training that outlines procedures on how to respond properly and promptly to a variety of situations that could be encountered during fishing operations (e.g., man overboard drills, firefighting, radio communication, etc.). Each observer is also required to complete a First-Aid and CPR course. At the conclusion of observer training, individual observers will be outfitted with the necessary sampling (baskets, fish boards, etc.) and safety (personal EPIRBs, lifejackets, etc.) gears, and will be officially certified by the NMFS. Observers will be responsible for collecting and verifying all data collected during fishing operations and following all NMFS Observer Guidelines.

Data Collection

The purpose of this project is to quantify effort, total catch, and discards within the vertical hook-and-line sector of the snapper-grouper fishery of the South Atlantic United States. Sampling will occur year-round with effort proportionately distributed by season (weather dependent). Sampling methodologies are borrowed and modified from protocols already in existence (Gitschlag and Renaud, 1994; MRAG Americas, 1999; NMFS Observer Manual, 2012), and have been fine tuned through the previous project periods. Only one fishery observer will be deployed per cooperating vessel to collect data.

Prior to the collection of catch data, the observer will complete a Vessel Characterization / Trip Report form that will outline the specifics of the vessel and dates fished. This will include information such as vessel name, vessel length, vessel identification number, year of construction, hull material, gross tonnage, horsepower and number of engines, crew size (number of individuals fishing), vessel owner's name and address, captain's name and address, trip dates (departure and return), number of at-sea days, port of departure, and home port.

After this information has been collected, the observer will then number each of the bandit reel stations, starting with the forward starboard side and continuing clockwise, until all rigs have been numbered. These positions will remain constant for the entirety of the fishing trip. The observer will then fill out a Gear Specification form for each rig fished, and will include: means of line retrieval (manual, electric, hydraulic), mainline length and strength, leader length and strength, the number of hooks per rig, size and type of hook used (e.g., 5/0 circle hook, 2/0 J-hook, etc.), and amount and number of weights per line. This information will be assumed constant for the entire fishing trip or unless a variable is altered (e.g., new hook, line, or weight is

added), at which time the observer will then fill out a new form specifying the time, date, and the alteration made to the fishing gear.

At each station that is fished (specifically every anchored spot), the observer will fill out a Station sheet. This will record information about the time spent on station (measured from the time the first rig is set to the last rig retrieved), latitude and longitude of station, depth fished, structure fished, approximate speed of line retrieval (measured in m/s), number of sets sampled / not sampled, number of hooks sampled / not sampled, time of day, sea state, gear type, bait type, and presence of predators.

While on-site and actively fishing, the observer will complete a Catch Characterization form. This form will record the total catch brought aboard the vessel and general information regarding fishing practices. Sets are defined as one deployment and retrieval of a reel. Each set may consist of more than one fish due to the particular rig utilized (i.e. multiple hooks per rig). The reel will be randomly chosen by the observer to decrease the likelihood of side or gear bias. After a set is sampled, a new reel will be randomly selected. The next random reel could be a repeat of the previous set. For each reel/set that is sampled, the following information will be recorded: station number, reel number, gear type, species identification (genus and species), length of fish sampled (TL, FL,SL, measured in mm), weight of fish sampled (if possible), retention (harvested or bait) or discard of individuals, and discard condition.

The condition of fish brought onboard or released will be categorized as follows: Live–normal appearance; Live–stomach protruding; Live–eyes protruding; Live–combination of stomach and eyes protruding; Dead on arrival; Not Determined. To quantify discard fate, the observer will be tasked with recording the fate of all sampled fish. An extra column on the datasheet will allow fate of individual fish to be recorded as: Fish kept; Fish kept as bait; Discarded alive or Discarded dead. Also, a note will be made if the stomach is punctured or vented prior to release. All animals brought aboard at a sampled reel will be quickly de-hooked, measured, and released (if under-sized or out of season per fishermen discretion). Efforts will be made to minimize the physical impact to the harvested fish while collecting all necessary data in a timely manner. If a reel comes up empty, the set will be labeled as "no catch" and counts as a sampled set.

Because commercial fishing practices on individual vessels are variable, in the event that an observer cannot sample the total catch brought aboard by all bandit reels (e.g., too many reels per vessel to allow the observer to accurately record all necessary data), the observer will subsample the total catch by focusing efforts on individual reels chosen at random. Even if a reel is not "sampled" (data collected on caught fish), all sets will be accounted for as effort data and will be labeled as an "unsampled" set. This becomes necessary when a vessel encounters a big bite and all of the reels are catching multiple fish.

Data Review, Entry and Analysis

As stated above, the Observer will be tasked with collecting all data. At the end of each fished station, the observer and vessel captain will verify the accuracy of the collected data by signature. At the conclusion of a fishing trip, the observer will thoroughly review all data sheets and verify that all data are legible and accurate. The Observer/Vessel Coordinator will then

debrief the observer and verify that all data sheets are legible and accurately/completely filled out. At this time, the Observer/Vessel Coordinator will also inquire into any problems encountered during the trip that could have increased variance within the collected data. If any abnormal problems were encountered, the Observer/Vessel Coordinator will consult with the Foundation's Program Director to discuss the experimental design and proper procedures necessary to alleviate the problem.

After the Observer/Vessel Coordinator has thoroughly reviewed the data, he will make copies of the original data. He will keep all photocopies and forward the original data to the contracted Data Manager. The Data Manager will then review the data and enter it into a relational database that will be easily accessible to Foundation Contractors and NMFS. After all data have been entered and backed-up, the data (both electronic and hard copies) will be archived at the Foundation's office in Tampa, FL where it will be available for use by interested parties.

The dataset created during the performance of this award is not intended to be considered a standalone, but is meant to augment existing datasets and assist scientists in the development of formal stock assessments for the snapper-grouper complex. As a result, the majority of data analyses for this project will be descriptive and include, but not limited to: number of trips sampled, number of vessels sampled, average number of sets per station, species specific CPUE, species specific length-frequency distribution, mean depth per trip and station, the ratio of retained vs. discarded catch, distribution of effort, proportional discard mortality rate, and proportional condition of catch by depth.

Quantifying effort - Estimating effort associated with this fishery is somewhat tedious. The issue stems from how bandit reels are fished at each set and the information capable of being recorded by the observer. A single reel may be baited, retrieved, the catch removed and reset many times during the total fishing time at a station. Most reels fish two or more hooks and these hooks may be sampled multiple times from one reel per station. The nature of this fishing routine can be accounted for if we can assume that time to fishing depth and time for retrieval for each set will be consistent as it will not be recorded. Hook hours (HH) will be estimated from the following information recorded by the observers:

$$HH = \frac{FT}{TS} \times HS \tag{1}$$

$$TS = \frac{SS}{RS} \tag{2}$$

where, FT=total fishing time (or the difference between the time fishing ended and started at a station or location), TS=estimated number of times during the FT an average reel was set, HS=total number of hooks sampled at a station (note the same hook was usually sampled more than once per station owing to the multiple sets), SS=sets sampled, and RS=number of reels being sampled.

Statistical modeling of catch - Catch-per-unit-effort for kept and discarded catch will be reported as individuals per 100 HH, which will be estimated for each set and averaged for each species

over the entire season. For the five most frequently caught bycatch species, CPUE will be predicted for each quarter of the year (e.g., Jan-Mar = Quarter 1) and statistical zone combination. Some quarter-statistical zone combinations will not be sampled or sampled minimally and generalized linear modeling is typically used for estimating CPUE of missing cells.

The raw counts of individuals will be Poisson distributed and may be overdispersed with numerous zeroes. In addition, the effort that produced each sample (i.e., HH) will vary and must be accounted for. Often researchers will divide the count of individuals by the corresponding effort for a given sample to render counts per effort. Though this metric appears to be on the continuous scale because decimal values are present, this designation is artificial and the data should not be treated as such (Power and Moser, 1999). Varying effort is more appropriately incorporated as an offset (termed varying element size by Power and Moser, 1999) to the λ parameter that defines the Poisson distribution from which the data were produced.

If the data were generated from a compounded Poisson (i.e., the data came from several Poisson distributions unbeknownst to the sampler) then overdispersion will occur, as is often the case with catch data. The negative binomial is a discreet probability distribution that is recognized as a suitable descriptor of catch count data (Power and Moser, 1999). We will portray the predicted CPUE (i.e., the λ parameter) of select individual species through a global linear log link function to the negative binomial distribution. All computations will be conducted using the GLIMMIX procedure in SAS Version 9.1.3 Software (SAS Institute Inc., 2003). The GLIMMIX procedure estimates the regression parameters to maximize the negative binomial log-likelihood.

Either total length or fork length will be recorded for individuals from randomly selected reels. As minimum length regulations are given in total length, fork lengths will be converted to total lengths with species specific equations taken from the literature. We will then summarize the percent of individuals below the minimum length regulation for all fates of catch (kept, kept for bait, and discarded) and generate length frequency distributions for the most frequent bycatch species. For length regulated discards, the probability that a fish will be legal or sublegal will be modeled with logistic regression using GLIMMIX as well. This analysis will investigate discards as a function of depth due to differing benthic distributions across fish sizes.

Estimating effort and discards for the entire fishery - Estimating CPUE with an accurate metric for effort is paramount. The observer program has and will measure the variables necessary to estimate effort in high resolution (i.e., *HH*; see Equations 1 and 2 above). Based on data collected thus far, *HH* varies substantially across fishing locations (Figure 1). However, these variables will not be available for the fleet at large. Unless *HH* can be estimated for the fleet, then our model predicted CPUE estimates cannot be used to quantify discards by the entire fishery. A preliminary analysis of the observer data collected thus far suggest that *total trip days* by each boat may index effort reasonably well (Figure 2, top graph) and is available from the trip tickets. The plot of *HH* versus trip length shows a tighter relationship (at least for the top graph) than *HH* versus time per station. The reason is because station errors cancel each other when summed by trip. However, notable deviations occur at trip lengths of around 8 days for Statistical Zones 30-31 (Figure 2, top graph) and at trip lengths of around 5-6 days for Statistical

Zones 32-34 (Figure 2, top graph). Thus, a better fitting model that explains these deviations with additional terms needs to be specified.

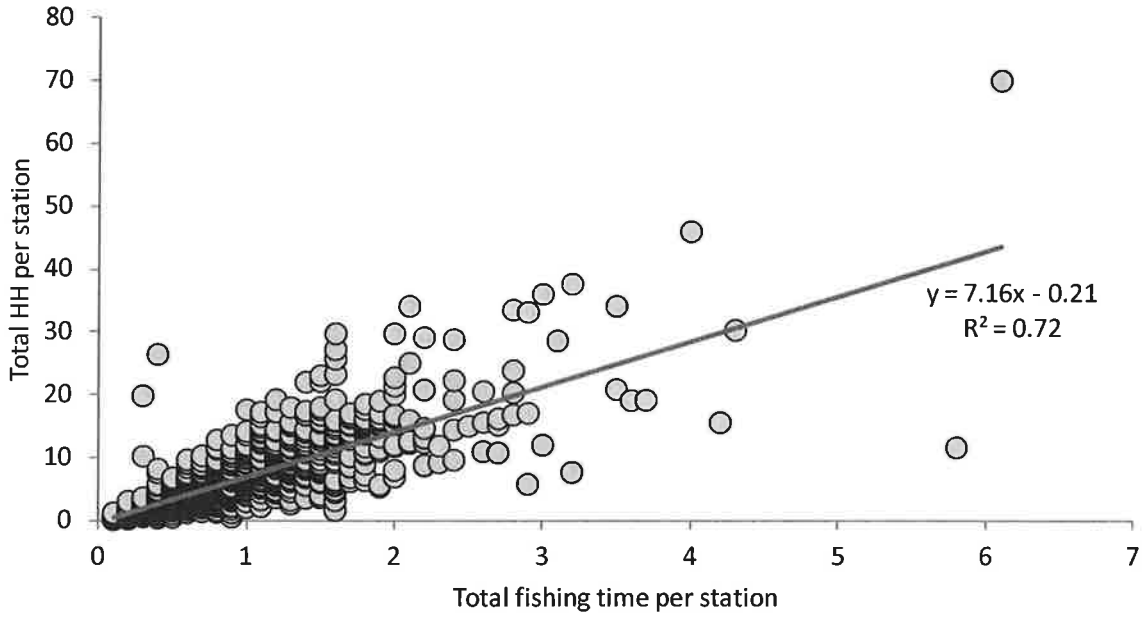

Figure 1. Estimated hook hours as a function of total fishing time per station observed for the South Atlantic bandit reel fishery from 2007 to 2011.

We will create statistical models that estimate effort in *HH* from trip days for sampled time-area strata and apply our corresponding CPUE estimates to generate fishery-wide estimates of bycatch for select species. Given this is a pilot study, sampling will be insufficient to allow coverage of all strata. Effort for the entire fleet should be available from the logbook program, but some discard CPUE estimates will be missing. Generalized linear models may be able to fill these missing cells and allow fishery-wide annual estimates of discards.

Comparing observer versus logbook estimates of discards - Fishery-wide annual estimates of discards based on the observer program and algorithms described in this proposal will be compared to NMFS' estimates to verify or identify biases in the current methodology used to arrive at discards for the South Atlantic bandit-reel fishery. These comparisons will be made for the five most frequently discarded species.

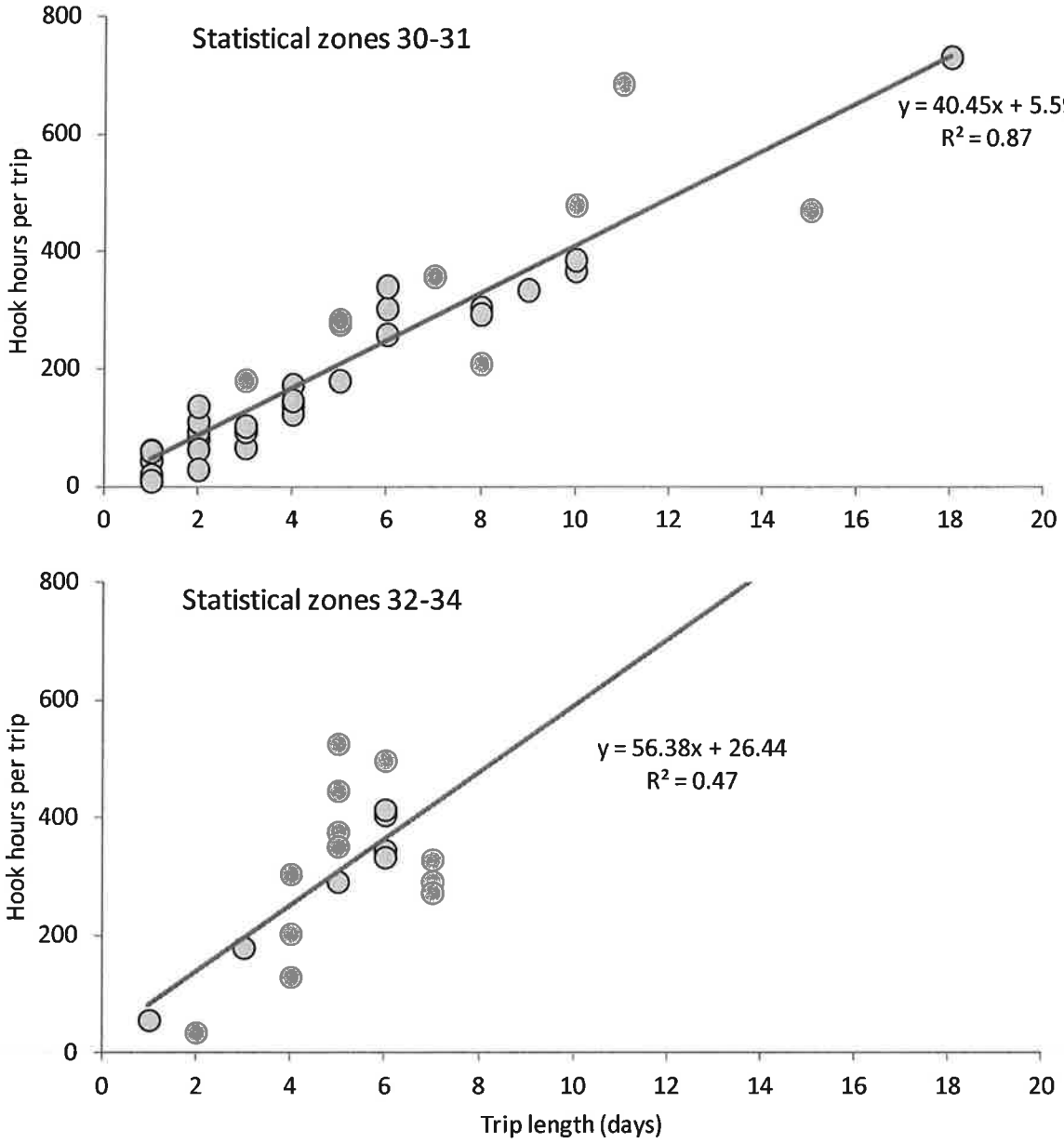

Figure 2. Estimated hook hours as a function of total trip length observed for the South Atlantic bandit reel fishery from 2007 to 2011. Statistical Zones 30-31 roughly comprise the upper Florida and Georgia coastline, whereas samples from Zones 32-34 mostly occurred off South Carolina and southern North Carolina.

Participation by Persons or Groups Other Than Applicant:

A project of this magnitude and importance requires the cooperation and active participation of many organizations and individuals. The Foundation has chosen to sole-source contract with

several persons in conjunction with this project. The essential personnel needed to complete the project objects are:

Mr. Lindsey Parker, South Atlantic Regional Coordinator, UGA Marine Extension
Mr. Daniel Parshley, Observer/Vessel Coordinator
Data Manager (TBA)
LGL Ecological Research Associates, Dr. Scott Raborn, Data Analyst
2 Fishery Observers (To be contracted from those below or TBA)
Mr. Matt Gaylord
Mr. Ben Hartig, Industry Cooperator; Commercial Fisherman
Mr. Robert Jones, Industry Cooperator; Executive Director of Southeastern Fisheries Association, Inc.
Dr. Jack McGovern, Fishery Biologist, NMFS Partner; NMFS Southeast Regional Office

Many of the above individuals have been associated with other, similar Foundation research programs and projects. Their continued involvement will provide stability and allow for a smooth progression into this project from both a management and performance perspective.

Through years of experience, the Foundation has found that working closely with Marine Extension Service personnel (Mr. Lindsey Parker) is an efficient way to achieve rapid communication and cooperation with local fishermen. The Regional Coordinator will act, in cooperation with the Industry and Observer/Vessel Coordinators, as a liaison between the Foundation and vessel owners, relaying information about the project goals and securing vessel participation.

The Observer/Vessel Coordinator will assist the Program Director, Program Specialist, Regional Coordinator, and Industry Coordinator in their day-to-day activities and will coordinate all field efforts through constant communication with Foundation staff and contractors. The Observer/Vessel Coordinator will recruit and train an observer and coordinate field sampling efforts. He will also contact and establish a good working relationship with various cooperating vessel owners, captains and crew, and provide this information to fishery observers. Prior to the deployment of a fishery observer, the Observer/Vessel Coordinator will review with each observer all established protocols on how and what data to collect while onboard a participating vessel. He will also provide all necessary sampling and safety equipment and is responsible for reviewing all data for completeness prior to data entry.

Observer collected data for this project will be electronically entered by a Foundation contracted Data Manager. The Data Manager is responsible for checking and transferring all raw data into a manageable computer database for data archive. A copy of all observer collected data will be made available to the respective NOAA Fisheries division for archive. Once the data are ready, they will then be forwarded to the Data Analyst (LGL Ecological Research Associates, Inc.).

The contracted Data Analyst will conduct all statistical tests on observer-collected data with overview and direction from the Foundation's Program Director. Statistical tests will be varied, but will mostly focus on describing the fishery to include fishing effort, total catch characterization, and discard fate. The Foundation will rely on the analytical and scientific skills

of the Data Analyst to assist in any ancillary statistical tests (i.e., descriptive statistics, spatiotemporal effort, Bayesian tests, etc.) that could be completed during the performance of this award.

Only observers that have undergone rigorous NMFS certification training will be contracted by the Foundation. This training will include safety training, sea turtle handling training, onboard practices to avoid interference with the participating vessel captain and crew, data collection protocols (both classroom and at-sea training), and administrative protocols. It is the job of the Observers to collect and proof all collected data for completeness and accuracy before being debriefed by the Foundation Observer/Vessel Coordinator. The Foundation currently has a contracted observer working on complementary projects. Because this individual possesses the skills needed to fulfill the position and has proved himself under field conditions, one of the contracted observer positions will be offered to this individual. A competitive solicitation process will be conducted by the Foundation to contract the second observer.

The Industry Cooperators will work with the Regional and Observer/Vessel Coordinators to assist in securing and increasing vessel participation for this project. Mr. Ben Hartig is the owner and operator of a commercial fishing vessel within the South Atlantic and has agreed to be an Industry Cooperator on this project. He is well respected within the fishery, holds a seat on the South Atlantic Fishery Management Council, and is widely known. His history within the fishery and knowledge of the management process will increase the universe of vessels participating in the performance of this award. Mr. Robert Jones, Executive Director of Southeastern Fisheries Association, represents an organization with a broad constituency that includes a significant number of industry members.

All data will be gathered through the cooperation and direct participation of the commercial snapper-grouper fishing industry of the South Atlantic region. Without the cooperation of industry, this project would not be possible. The use of fishing vessels as research platforms, not only reduces the costs associated with this project, but ensures that industry is aware of the research and allows them to be involved in all steps of the scientific and management process. By allowing fishermen to actively participate in the collection of data, they will be more trusting of the results generated from this research and will be more willing to assist in future research.

The Foundation has historically worked cooperatively with NOAA/NMFS staff and personnel in the performance of research projects. Dr. Jack McGovern (NMFS Southeast Regional Office) has agreed to be this project's NOAA Fisheries Cooperator. Dr. McGovern will confirm that all data are collected in a scientifically rigorous manor and will provide feedback on the performance of this project. He will also provide limited input on data analyses conducted by the Data Analyst. The Program Director will keep Dr. McGovern apprised of the performance of this project and provide regular updates on any and all progress and/or problems that may occur.

Project Personnel and Management:

Principal Investigators:

Ms. Judy Jamison, Executive Director
Mr. Frank Helies, Program Director

Foundation Staff:

Ms. Gwen Hughes, Program Specialist
Ms. Charlotte Irsch, Grants/Contracts Specialist
Administrative Assistant

Overall project quality control and assurance will be assumed by the Gulf & South Atlantic Fisheries Foundation, Inc. through its office in Tampa, FL. Foundation personnel will each spend 15% of their time over the course of the 12-month project period in the performance of this award. A project of this magnitude is time consuming and requires the direct and constant attention of each Foundation employee. Qualifications of the Principal Investigators are highlighted in the attached resumes.

The Foundation's Executive Director, Ms. Judy Jamison, has ultimate responsibility for all Foundation administrative and programmatic activities, with oversight by the Foundation's Board of Trustees. She ensures timely progress of activities to meet project objectives and confirms compliance of all activities with NOAA/NMFS.

The Foundation's Program Director, Mr. Frank Helies, has overall responsibility for all technical aspects of Foundation projects and coordinates performance activities of all project personnel, including contractors. He confirms and evaluates the effectiveness of projects and subcontracts and ascertains timeframe and funding limitations for the project. Should alterations to the described experimental design or data collection protocols be necessary, he confirms that all data are collected in a scientifically rigorous manner to ensure the usefulness of all collected data. Additionally, he coordinates all analytical efforts, prepares all progress and final reports concerning project performance, and drafts the Foundation's quarterly newsletter.

The Grant/Contracts Specialist, Ms. Charlotte Irsch, is 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 auditors in their reviews. She conducts/documents internal and program (single and desk) audits, prepares backup documentation for fiscal audits, and drafts award extension requests (if applicable). Ms. Irsch provides the Executive and Program Directors with projected budgets concerning program performance and ensures that these budgets adhere to the proposed project budget. Finally, she prepares the annual administrative budget, NOAA Financial Reports, and confirms compliance of all activities with NOAA/NMFS and OMB guidelines.

The Program Specialist, Ms. Gwen Hughes, is responsible for tracking programmatic activities, securing federal and state collection and experimental permits, exempted fishing permits, monitoring funding and distribution of funds. She is also responsible for generating supporting documentation to assist in any and all programmatic audits. Ms. Hughes is responsible for the coordination of all program related workshops and auditing and paying program related invoices. She processes requests for reimbursement to conform with federal guidelines and prepares and maintains all contracts, subcontracts, agreements and amendments. Additionally, she is responsible for securing vessel insurance and securing workers compensation certificates on all cooperators, if applicable.

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

Monitoring of Project Performance:

Given the current controversies and conflicts among various interest groups related to the programmatic concepts outlined here, there is a possibility that one (or more) of these groups will question the validity of the Foundation's findings. For internally conducted studies, Principal Investigators (PIs) will regularly communicate with Observer and Foundation Observer and Regional Coordinators concerning fieldwork. PIs also review data for completeness and accuracy. The Program Director will monitor the data management procedure to ensure that all data entry and analyses meet objectives outlined within the proposal. Additionally, the quality of data collected, and the procedures used to collect those data, will be assured through the use of highly qualified and knowledgeable observers who are experienced in this line of work.

Internal and external monitors will oversee the PIs' activities and responsibilities. The Foundation Board of Trustees (attachment), representing various commercial fishing and seafood interests throughout the southeastern United States, oversee the PIs' tasks and are kept aware of and critically review interim and final project reports. This program will be conducted as an award with NMFS and the timely completion of project objectives will be externally monitored by the Program Office of the NMFS Southeast Regional Office, NOAA Grants Management, and a NMFS Technical Monitor. Interim and final progress and financial reports concerning the program will be submitted to NOAA/NMFS, as required, to help the agency track the successful implementation, performance, and completion of the various tasks outlined in this proposal. During the period when analysis of the data is being conducted, the PIs and peer reviewers will discuss data, data analyses, and data interpretation. Only after the analyses have undergone rigorous evaluation will the final report be accepted and printed.

Data Sharing:

Data from this project will be made available in a variety of formal and informal ways. All collected data is entered directly into the reef fish database housed on servers in the NMFS Galveston Laboratory. Since our team includes members from the fishing industry and NOAA Fisheries, they will have direct access to our results, which can be disseminated through existing and appropriate channels. In addition, annual reports will be made available on the Gulf and South Atlantic Fisheries Foundation Website. Since the fishing industry will be directly involved with the research project, fisheries dependent data (length, weight, etc) will be synthesized and be made available to the SEDAR process in order to improve stock assessments. Data will be made available to the South Atlantic Fishery Management Council, for use in the planning and management of snapper-grouper regulations. Data collected through the pilot program have been provided to NMFS for specific management analyses when requested.

Dissemination of Results / Outreach and Education:

Information and results of this project will be disseminated through a public presentation convened in conjunction with a South Atlantic Fishery Management Council meeting (to be announced at a later date). By coordinating the public presentation in conjunction with the Council Meeting, we will maximize participation by commercial fishermen, fishery managers, and the concerned public. This public presentation will highlight the data collection methods for the project and the results derived from the analyses, with implications for data use during stock assessment. Not only will this presentation act as a forum to discuss the relevance of the project, but will also provide insight into fisheries management and the science behind stock assessment analyses.

Additionally, cooperating fishing vessels will be provided with regular updates and a copy of the Foundation's final project report. Summary reports of the project's findings will also be 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 is distributed to over 700 organizations and individuals throughout the region. An electronic version of this newsletter (PDF) is also included in the regular updates to the Foundation's website (www.gulfsouthfoundation.org).

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. Copies of the final report will be made available for download from the Foundation's website.

Literature Cited:

Boardman, C. and D. Weiler. 1979. Aspects of the life history of three deepwater snapper around Puerto Rico. Gulf & Caribbean Fisheries Institute. 32:158-172.

Burns, K. M., N.J. Brown-Peterson, R.M. Overstreet, J. Gannon, P. Simmons, J. Sprinkle and C. Weaver. 2008. Evaluation of the Efficacy of the Current Minimum Size Regulation for Selected Reef Fish Based on Release Mortality and Fish Physiology. Mote Marine Laboratory Technical Report No. 1176.

Claro, R. and K.C. Lindeman. 2003. Spawning aggregation sites of snapper and grouper species (Lutjanidae and Serranidae) on the insular shelf of Cuba. Gulf and Caribbean Research. 14(2): 91-106.

Cuellar, N., G.R. Sedberry, and D.M. Wyanski. 1996. Reproductive seasonality, maturation, fecundity, and spawning frequency of the vermilion snapper, *Rhomboplites aurorubens*, off the southeastern United States. Fishery Bulletin. 94:635-653.

Federal Register. 2006. 71(183):55096-55106. September 21, 2006. Government Printing Office. Washington, D.C.

Federal Register. 2009a. 74(123):30964-30973. September 21, 2006. Government Printing Office. Washington, D.C.

Federal Register. 2009b. 74(124):31225-31235. September 21, 2006. Government Printing Office. Washington, D.C.

Federal Register. 2010. 75(95):27658-27659. May 18, 2010. Government Printing Office. Washington, D.C.

Gitschlag, G.R. and M.L. Renaud. 1994. Field experiments on survival rates of caged and released red snapper. North American Journal of Fisheries Management. 14:131-136.

Goni, R. 1998. Ecosystem effects of marine fisheries: an overview. Ocean and Coastal Management. 40: 37-64.

MRAG Americas. 1999. NMFS response to the 1997 peer review of red snapper (*Lutjanus campechanus*) research and management in the Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, FL. 146.

National Marine Fisheries Service (NMFS). 1999. Ecosystem-based fishery management. A report to Congress by the Ecosystems Principles Advisory Panel. U.S. Department of Commerce, Silver Spring, M.D.

National Marine Fisheries Service (NMFS). 2011. U.S. National Bycatch Report [W. A. Karp, L. L. Desfosse, S. G. Brooke, Editors]. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-117E, 508 p.

National Oceanic and Atmospheric Administration (NOAA). 2004. Evaluating bycatch: A national approach to standardized bycatch monitoring programs. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-F/SPO-66. October, 2004. 108p.

Perot Systems. 2006. Assessing the Use of Electronic Logbook Reporting For the South Atlantic Snapper Grouper Fishery.

Rielinger, D.M. 1999. Spawning Aggregations in the Gulf of Mexico, South Atlantic and Caribbean: A Source Document for Fisheries Management.

Robins, C.R. and G.C. Ray. 1987. A field guide to Atlantic coast fishes of North America. Haughton Mifflin Co. Boston, MA. 354p.

South Atlantic Fishery Management Council (SAFMC). 2006. Final Snapper Grouper Amendment 13C. South Atlantic Fishery Management Council, North Charleston, SC 29405.

South Atlantic Fishery Management Council (SAFMC). 2007. Final Snapper Grouper Amendment 15B. South Atlantic Fishery Management Council, North Charleston, SC 29405.

South Atlantic Fishery Management Council (SAFMC). 2008. Final Snapper Grouper Amendment 16 (Gag and Vermilion snapper) including a final environmental impact statement, initial regulatory flexibility analysis, final regulatory impact review, and final social impact assessment/fishery impact statement. South Atlantic Fishery Management Council, North Charleston, SC 29405.

South Atlantic Fishery Management Council (SAFMC). 2010. Amendment 17A to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Impact Statement, Initial Regulatory Flexibility Act Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, North Charleston, SC 29405.

South Atlantic Fishery Management Council (SAFMC). 2011. Comprehensive Annual Catch Limit Amendment for the South Atlantic Region with Final Environmental Impact Statement, Initial Regulatory Flexibility Act Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, North Charleston, SC 29405.

Southeast Data, Assessment, and Review (SEDAR). 2007. Report of Stock Assessment. Vermilion Snapper. SEDAR Update Process #3. Assessment Workshop of April 2-4, 2007. NOAA Center for Coastal Fisheries and Habitat Research, Beaufort, North Carolina.

Southeast Data, Assessment, and Review (SEDAR). 2008. Report of Stock Assessment. Vermilion Snapper. SEDAR 17. Data Workshop of May 19-23, 2008. South Atlantic Fishery Management Council, North Charleston, SC 29405.

Southeast Data, Assessment, and Review (SEDAR). 2009. SEDAR 15 Stock Assessment Report 1 (SAR 1) South Atlantic Red Snapper. February 2008, Revised March 2009. South Atlantic Fishery Management Council, North Charleston, SC 29405.

Volstad, J.H. and M. Fogarty. 2006. Report on the National Observer Program Vessel Selection Bias Workshop. Woods Hole, MA. May 17-19, 2006.

Williams, E.H. and J. Carmichael (editors). 2009. South Atlantic Fishery Independent Monitoring Program Workshop final report. NMFS Southeast Fisheries Science Center. 85p.

Wilson, R.R. and K.M. Burns. 1996. Potential survival of released groupers caught deeper than 40 m based on shipboard and in-situ observations, and tag-recapture data. Bulletin of Marine Science. 58(1): 234-247.

Milestone Table:

Project Activities	2014												2015		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Project Start-up Activities / Contract Negotiations	xx														
Project Coordination / Monitoring	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx			
Observer Training	xx	xx	xx												
Solicit Industry for Participation	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx					
Permit Applications	xx	xx	xx												
Selection of Participating Vessels		xx	xx	xx	xx	xx	xx	xx	xx	xx					
Observer Data Collection			xx	xx	xx	xx	xx	xx	xx	xx					
Evaluation of Test Results / Data Analysis										xx	xx	xx			
Progress Report Submission							xx						xx		
Financial Report Submission				xx						xx					xx
Dissemination of Results / Final Public Presentation											xx	xx			
Project Closeout & Final Report Preparation													xx	xx	xx