

**Title:** Testing management strategies through a FWC Red Snapper Full-Retention Study Fleet off NE Florida to reduce red snapper/other snapper grouper discards and improve angler satisfaction

**Principal Investigators:** Jessica McCawley, Christopher Sweetman, Kristin Foss, Chelsey Crandall, Beverly Sauls, Matthew Bunting, and Luiz Barbieri. CVs for each team member are attached at the end of the application.

**Funding Opportunity Title:** Innovative Strategies to Reduce Red Snapper Discards in the South Atlantic

**Funding Opportunity Number:** NOAA-NMFS-SE-2024-2008104

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**Project Duration:** 24-months. FWC proposes this project to begin on April 1, 2024 to allow funding to be available to start the Study Fleet in July 2024. FWC staff will need time to purchase supplies and set up the program once the award is given. During Year 2, FWC will work with NOAA Fisheries to consider any additional changes or improvements to this program, including potential funding opportunities and any updates needed for the EFP. See timeline section below for additional details.

### Project Synopsis

Red snapper is an iconic and popular fishery in Florida's waters. While overfished for decades, the most recent assessment indicates record levels of abundance. High levels of recreational fishing effort combined with short seasons have increased red snapper discard mortality, which is further exacerbated by the multi-species nature of the South Atlantic snapper grouper fishery. To this point, discard mortality is estimated to comprise a significant percentage of the total removals for red snapper. However, the magnitude of discards is poorly understood, and estimates tend to fluctuate greatly from one time period to the next. Clearly there is a need for alternative management strategies and for better catch and discard data to inform fisheries managers.

To better understand the catch and discard rates of red snapper and other snapper grouper species and test alternative management strategies in the center of abundance of the Atlantic red snapper fishery, from the FL/GA line south to Cape Canaveral, FWC aims to accomplish the following goals: 1) Collaborate with recreational vessel operators and anglers to collect catch and discard information within the snapper grouper fishery; 2) Recruit vessel operators to test a snapper grouper aggregate bag limit and its impact on reducing the magnitude of regulatory discards; 3) Allow vessel operators recruited for this study to harvest red snapper outside of the federal season, accompanied by a mandatory reporting requirement and provisions for validation; 4) Develop a unique app to record information from participants; 5) Develop an education course required for all participants; and 6) Evaluate angler satisfaction through pre- and post-participation surveys.

To accomplish these goals, FWC will solicit applications from captains of for-hire and private recreational vessels and will select 5 of each per quarter to participate in FWC's Study Fleet. All vessels will test a 15-fish snapper grouper aggregate bag limit and be allowed a vessel limit of 60 red snapper under an EFP. All captains selected will ensure that they and guests/customers fishing during a Study Fleet trip have completed the required educational course prior to fishing. During a Study Fleet trip, captains will be required to hail out/hail in, report catch and discard data, and fish a maximum of 3 Study Fleet Trips per quarter. A FWC observer is required on all for-hire Study Fleet trips. As each angler meets the 15-fish snapper

grouper aggregate bag limit, they must stop bottom fishing and the entire vessel must stop fishing if the red snapper vessel limit is reached. While fishing, the captain will track the catch and discards of each angler on their vessel, validated through use of GoPros on private recreational vessels and through FWC observer on for hire vessels. Upon return to port, boat captains will be required to submit all catch and discard data through the FWC app, and allow FWC biologists to collect biological samples from harvested fish. Specific to measuring angler satisfaction, FWC social scientists will conduct pre- and post-participation surveys to evaluate their satisfaction in the proposed program and gather feedback on project components.

FWC anticipates the results of this study to simultaneously test a management strategy aimed at reducing snapper grouper discards by directly involving recreational captains and anglers, collecting catch and discard data from the recreational sector, and evaluating methods to improve angler satisfaction. Expected results will provide critical information needed for the management of red snapper and other South Atlantic snapper grouper species. The lead PI for this project is Jessica McCawley, and the project team includes a suite of qualified fisheries scientists and managers with decades of research and management experience in the South Atlantic region.

## **Project Narrative**

### **Background**

Red snapper is an iconic fishery in the southeastern U.S. and one of the most well-known and popular fisheries in Florida's waters. South Atlantic red snapper has been classified as overfished and undergoing overfishing for decades (SEDAR-15 2008, SEDAR-24 2010, SEDAR-41 2017). This fishery has been in a rebuilding plan since 2011, and the stock is expected to be rebuilt by 2044. The most recent stock assessment completed in 2021 (SEDAR-73 2021) also indicates that the South Atlantic red snapper fishery continues to be overfished and experiencing overfishing. This status is primarily driven by the age composition of the stock and high recreational discards. While the assessment indicates record increased abundance of red snapper, the high levels of fishing recreational effort combined with short fishing seasons have increased discard mortality.

Discard mortality is a pervasive issue that impacts stock assessments and management of the South Atlantic snapper grouper complex, including red snapper. The snapper grouper complex includes 55 bottom- and reef-dwelling fish species, including some species that are neither snappers nor groupers (e.g., triggerfish and several jack species). In some cases, (e.g., red snapper) discard mortality is estimated to comprise a significant percentage of the total (discarded fish plus landed fish) removals. During a harvest closure for a species, that species must be released even if it is caught when fishing for a different, co-occurring species that can be harvested. Discard mortality is currently estimated to range between 28.75% to 31.07% (SEDAR-73 2021) for Atlantic red snapper; however, the magnitude of the number of discards is poorly understood.

Limited age or length information is available to characterize dead discards, which is problematic because that information is critical for stock assessment models to function reliably. Since discard data are self-reported by the vast majority of commercial and recreational fishermen, and discarded fish are not available for length or age sampling, estimates of the

magnitude and types of fish discarded are unvalidated and highly uncertain. Fisheries managers and scientists who have reviewed the stock assessment agree that the overfishing status of Atlantic red snapper is driven primarily by high recreational discards. Despite these projected high numbers of dead discards, red snapper abundance and biomass are at record high levels and Atlantic red snapper has experienced strong recruitment over the last six years.

To reduce discards and help rebuild the red snapper fishery, all parties involved in red snapper management have taken management actions. First, in 2019, the Council approved Snapper Grouper Regulatory Amendment 29 that requires anglers fishing in South Atlantic federal waters to have a descending device rigged and ready when fishing for snapper grouper species. The purpose of this rule was to help increase the survival of released reef fish. Second, the Council has started a management strategy evaluation (MSE), scheduled to be completed in 2024, for the snapper grouper fishery to find possible management options to reduce the number of released fish. The MSE is a conceptual model that will evaluate multiple strategies to determine which management options are best suited to benefit the collective snapper grouper fishery and accomplish the goals of the Council (e.g., decreasing discards, increasing harvest). Third, in 2023, the Florida Fish and Wildlife Conservation Commission (FWC) implemented a requirement for private recreational anglers fishing for reef fish off a private vessel in state waters to possess a descending device or venting tool. Additionally, this regulation requires the appropriate use of such a tool/device only if releasing a reef fish that is exhibiting symptoms of barotrauma. Many fishers remain unaware of federal gear requirements and lack confidence in properly using descending devices and venting tools. Therefore, outreach and education are critical for generating fisher buy-in, proper use of barotrauma mitigation tools, and increased regulatory compliance.

Maintaining sustainable fish populations while also ensuring public access to Florida's vital marine resources is a top priority of the FWC. Thus, FWC has taken measures to improve recreational data collection in Florida through heavy investment in Reef Fish Surveys. South Atlantic red snapper effort and discards in Florida are currently monitored through the federal Marine Recreational Information Program (MRIP). Since 2012, FWC has conducted a targeted survey that is used to closely monitor landings from Florida during the short harvest season for red snapper in the South Atlantic (Sauls et al. 2017a). In 2020, FWC implemented a larger-scale survey called the State Reef Fish Survey (SRFS) as a supplement to the federal MRIP survey, with the goal of improving year-round data collection specifically for the private boat segment of the recreational fishery off Florida's Atlantic and Gulf. Through the SRFS, FWC directly contacts known participants that target snapper grouper species from private recreational boats in Florida to collect detailed information about their fishing activity each month and provides year-round, monthly estimates of effort, landings, and discards for 13 reef fish species, including red snapper. The SRFS provides more precise and accurate estimates than MRIP and builds upon the success of FWC's Gulf Reef Fish Survey (GRFS) that was implemented in 2015 and ultimately led to the delegation of authority from NOAA Fisheries to FWC to manage the Gulf red snapper private recreational fishery in Florida's state and federal waters. Substantial investment has also been made to collect enhanced data on recreational discards in Florida. Through cooperative research with for-hire vessel operators, FWC biologists have been riding along with recreational anglers on large-party headboat fishing trips on the Atlantic coast since 2005, and the program has expanded in recent years to include the charter for-hire fishing fleet. Through this work,

FWC is collecting vital statistics on the snapper grouper fishery, including the types of fish that are released in the recreational hook-and-line fishery; methods used to capture, handle and release fish that are undersized or caught out-of-season; and the size, condition, and survival of regulatory discards (Sauls et al. 2017b).

The current management system for red snapper in the South Atlantic utilizes traditional tools such as single-species bag limits, size limits, and short fishing seasons to remain within the allowable catch levels, and to achieve the other goals and objectives outlined in the fishery management plan. However, the current management framework is not working as the fishery remains in a Catch-22 of too few fishing opportunities and too many discards. Our proposal aims to obtain information about red snapper recreational discards while testing an innovative management strategy of an overall snapper grouper bag limit. This project will use study fleets in the hot spot area off Florida to obtain information in all four seasons of the year from private vessels and for hire vessels. Angler satisfaction with the current management system and the snapper grouper bag limit will be ascertained as part of this project.

## Purpose and Goals

Understanding the magnitude of recreational catch and discards within the snapper grouper fishery, especially for red snapper, remains one of the more challenging data collection and management issues within the southeastern U.S. The snapper grouper fishery is essentially a multi-species fishery, with anglers routinely interacting with multiple snapper grouper species as they “bottom fish”. As recreational fishing effort continues to increase, placing added pressure on fish stocks, it is critical that we have a clear understanding of how this multi-species fishery operates to better inform the management of the snapper grouper complex. This is especially true for the Atlantic red snapper fishery, which remains overfished and undergoing overfishing based on the most recent stock assessment and routinely experiences high levels of regulatory discards due to extremely short fishing seasons. However, much uncertainty lies within the magnitude of discard mortality for red snapper and other snapper grouper species and there is a clear need for more and better data for use in fisheries management and another clear need to evaluate alternative management strategies that reduce discards. To better understand the catch and discard rates of red snapper and other snapper grouper species and test alternative management strategies, FWC aims to accomplish the following goals:

- 1) Directly collaborate with the recreational vessel operators and anglers to collect catch and discard information at a representative scale within the snapper grouper fishery;
- 2) Recruit private and for-hire vessel operators to test a snapper grouper aggregate bag limit;
- 3) Allow a select number of vessel operators recruited for this study to have anglers onboard the operator’s vessel to harvest red snapper outside of the federal season, accompanied by a mandatory reporting requirement and provisions for validation;
- 4) Develop a unique app to collect detailed information from participants in this study on the types of fish released as they are caught at-sea while attempting to reach the snapper grouper aggregate bag limit in both the private boat and for-hire Study Fleets to

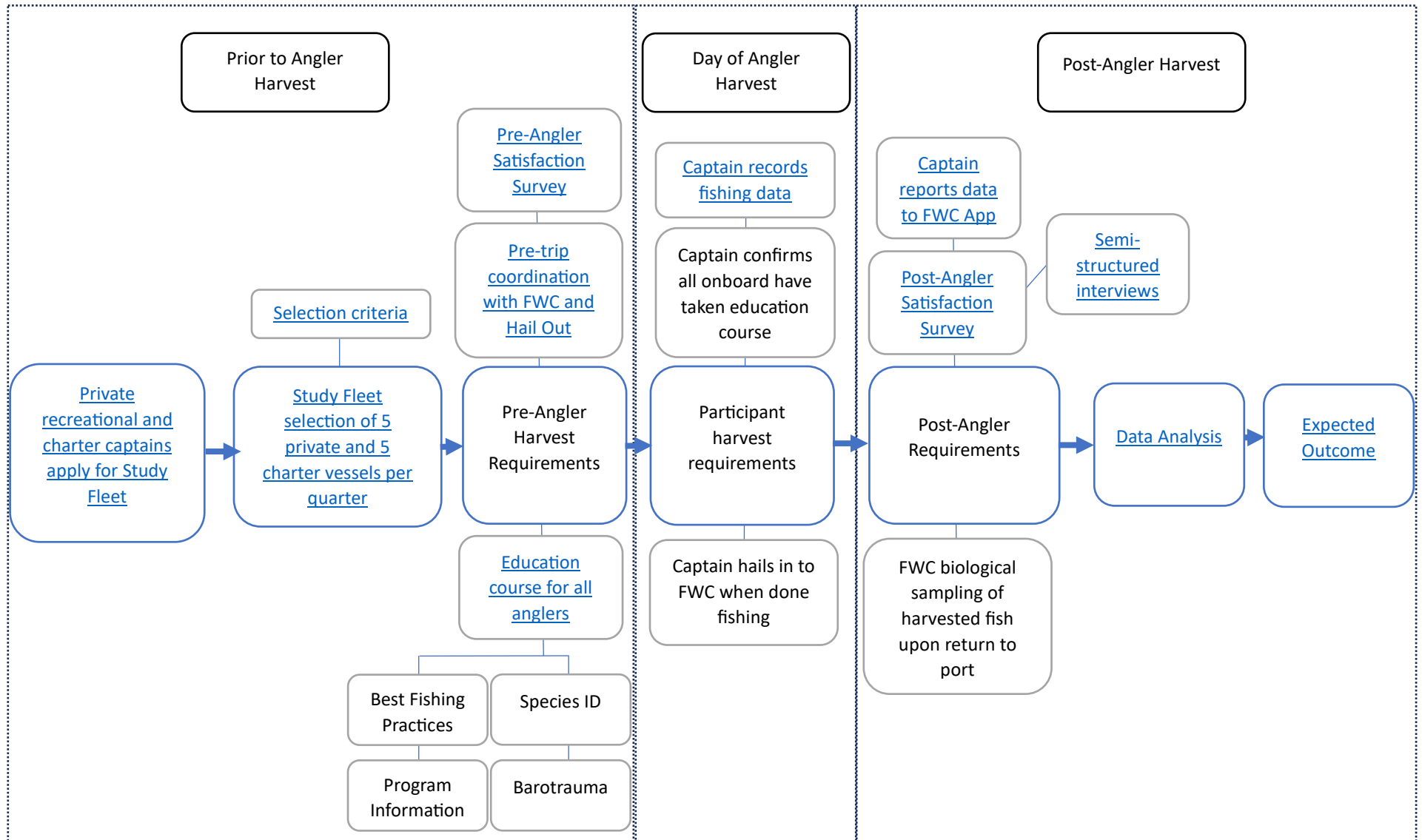
collect better recreational data and evaluate the effectiveness of the alternative management strategy tested as part of this study,

- 5) Develop an education course required for all participants that highlights fish identification, best fishing practices, species identification, and methods to safely descend fish experiencing barotrauma; and
- 6) Evaluate angler satisfaction through pre- and post-participation surveys and semi-structured interviews.

This proposal outlines FWC's plan to ensure adequate compliance tracking and fishery-dependent monitoring measures are in place and that harvest limits approved under this proposal and exempted fishing permit are not exceeded.

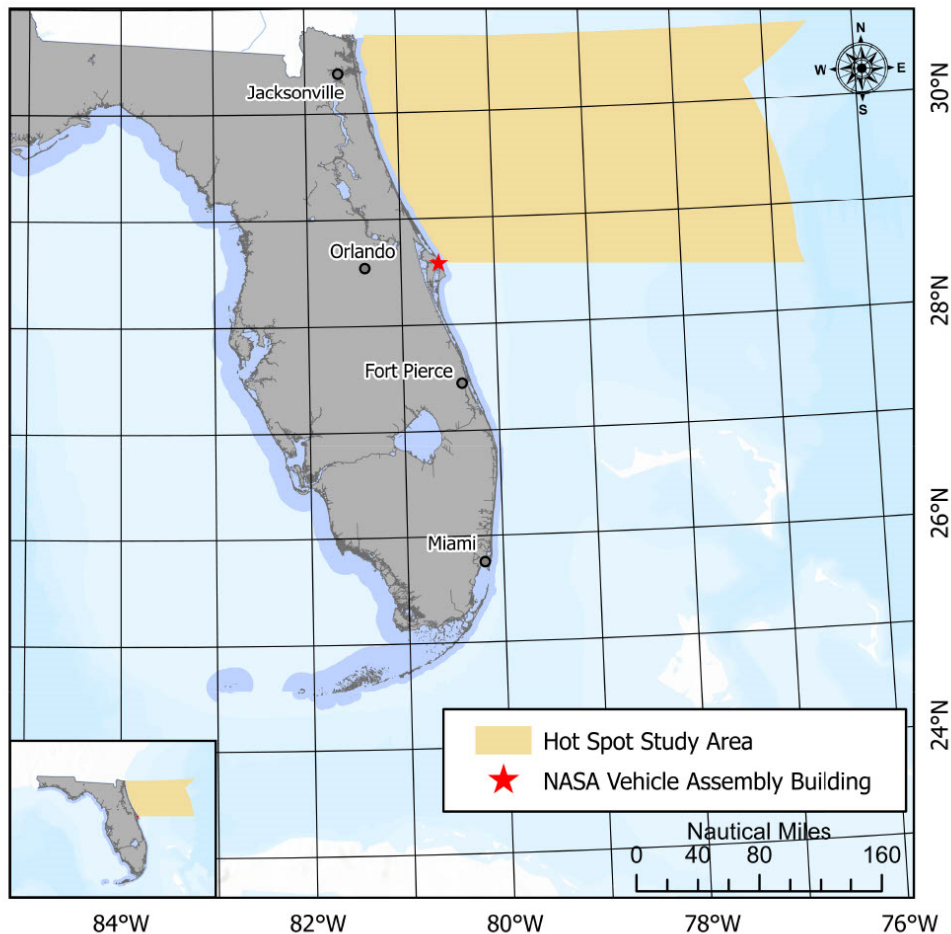
# Project Methodology

## Project Flow Chart



### *Project Location*

The proposed study fleet project will take place in the center of the Atlantic red snapper fishery off east Florida. Specifically, the area fished by the study fleet will include the state and federal waters from the Florida/Georgia state line south to a line running east from NASA General Assembly Building in Cape Canaveral, as illustrated in the map below. In 2022, 88% of red snapper harvested recreationally from the Atlantic coast of Florida were caught in this area (Sauls and Corbett 2023). Further, preliminary discard analyses conducted by the SEFSC indicated this area to be the ‘hotspot’ for red snapper fishing effort and discard mortality (SAFMC Regulatory Amendment 35 Data Report, September 2022). Because of this, additional data on catch and discards of red snapper and other snapper grouper species are clearly warranted in this ‘hotspot’ location. Additionally, an evaluation of alternative management strategies that simultaneously aims to reduce discards while also turning discards into landings within the ‘hotspot’ location would be most impactful to the Atlantic red snapper stock. FWC field offices are located throughout the region and are able to support the proposed project as needed for all data collection purposes.





## Snapper Grouper Aggregate Bag Limit Management Strategy

Current federal regulations in the South Atlantic provide anglers with an incentive to continue bottom fishing in order to catch daily bag limits for multiple species and groups within the snapper grouper complex. For example, anglers may harvest a maximum of 43-47 fish per day per person, depending on the time of year (Table 1). Under the alternative management strategy that FWC proposes to test during this study, anglers onboard selected vessels would be permitted to harvest no more than 15 fish under a snapper grouper aggregate bag limit (see below) per person in state and federal waters. Aggregate bag limits are utilized as a management tool in the South Atlantic to spread out harvest among the recreational sector, achieve target levels of spawning stock recruitment, and provide protection from overfishing. The proposed snapper grouper aggregate limit ideally will cause anglers to hit their daily bag limit quicker, thus changing their behavior by forcing them to stop bottom fishing and potentially target other species. The proposed 15-fish snapper grouper aggregate is considerate of current stock status and catch limits for each species and is intended to test its effect on reducing discards and enhancing angler satisfaction across the entire snapper grouper fishery through a FWC Study Fleet described below.

During the Study Fleet fishing trip, each person on board the designated vessel will fish for the 15-fish snapper grouper aggregate bag limit and will be able to retain red snapper outside the federal season. As further detailed in the 'FWC Study Fleet' section below, once a retention vessel limit of 60 red snapper per vessel is met or each angler on board reach the snapper grouper aggregate limit, whichever occurs first, **they must stop bottom fishing**. Participants may target other species such as coastal migratory pelagics and dolphinfish, but they will not be allowed to bottom fish for the remainder of the trip; therefore, minimizing their interaction with snapper grouper species. The expected outcome from such a management strategy would be a reduction in discards across many snapper grouper species, including red snapper.

The 15-fish snapper grouper aggregate proposed by FWC is as follows:

- Only 1 fish can be a gag, black, or scamp grouper
- Up to 2 fish can be red, yellowfin, yellowmouth, coney, graysby, red hind, or rock hind grouper
- Only 1 fish can be a red porgy, blueline tilefish, or golden tilefish
- Only 1 fish can be greater amberjack
- Up to 3 fish can be lesser amberjack, almaco jack, or banded rudderfish
- Up to 5 fish can be black sea bass
- Up to 5 fish can be gray triggerfish
- Up to 10 fish can be grunts
- Up to 10 fish can be Atlantic spadefish or bar jack
- Up to 10 fish can be porgies (red porgy excluded)
- Up to 10 can be schoolmaster, gray, lane, yellowtail, queen, silk, or blackfin snapper

- Up to 5 can be vermilion, cubera, or mutton snapper

*Note: FWC is willing to modify the proposed aggregate bag limit in discussions with NOAA Fisheries.*

Table 1. Maximum allowable recreational catch under current federal regulations as of November 17, 2023 and FWC's proposed snapper grouper aggregate bag limit.

Bag limit per person	Jan-Mar	Apr	May-Jun	Jul-Aug	Sept	Oct-Dec
Current	<b>44 fish</b> , including: 1 golden tilefish 1 gr. amberjack 20 "other sp." 10 snapper 5 vermilion 7 black seabass	<b>43 fish</b> , including: 1 golden tilefish 20 "other sp." 10 snapper 5 vermilion 7 black seabass	<b>47 fish</b> , including: 3 grouper/tilefish 1 gr. Amberjack 1 red porgy 20 "other sp." 10 snapper 5 vermilion 7 black seabass	<b>46 fish</b> , including: 3 grouper/tilefish 1 gr. amberjack 20 "other sp." 10 snapper 5 vermilion 7 black seabass		
Proposed	<b>15 fish</b> , excluding: Any grouper Blueline tilefish Red porgy	<b>15 fish</b> , excluding: Any grouper Blueline tilefish Gr. amberjack Red porgy	<b>15 fish</b>	<b>15 fish</b> , excluding: Snowy grouper Red porgy	<b>15 fish</b> , excluding: Snowy grouper Blueline tilefish Red porgy	<b>15 fish</b> , excluding: Snowy grouper Blueline tilefish Red porgy
<b><u>15 fish aggregate bag limit:</u></b> Only 1 fish can be a gag, black, or scamp grouper Up to 2 fish can be red, yellowfin, yellowmouth, coney, graysby, red hind, or rock hind Only 1 fish can be a red porgy, blueline tilefish, or golden tilefish Only 1 fish can be greater amberjack Up to 3 fish can be lesser amberjack, almaco jack, or banded rudderfish Up to 5 fish can be black sea bass Up to 5 fish can be gray triggerfish Up to 10 fish can be grunts Up to 10 fish can be Atlantic spadefish or bar jack						

	Up to 10 fish can be porgies (red porgy excluded) Up to 10 can be schoolmaster, gray, lane, yellowtail, queen, silk, or blackfin snapper Up to 5 can be vermilion, cubera, or mutton snapper
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## FWC Study Fleet

FWC proposes to create a ‘Study Fleet’ to allow full retention of red snapper (up to a vessel limit of 60) for a limited number of vessels, while fishing for the 15-fish snapper grouper aggregate (outlined above). All anglers on board the selected vessels will also be required to keep all snapper grouper species that meet legal requirements and will retain all red snapper caught while trying to obtain the 15-fish snapper grouper aggregate bag limit (outlined above). Each angler on a Study Fleet vessel trip will be required to stop bottom fishing once the snapper grouper aggregate bag limit of 15-fish has been met or the vessel limit of 60 red snapper has been met, whichever occurs first.

The captain will record information on how many red snapper are harvested per angler, the species composition of all regulatory discards, and the length of time it takes to reach the snapper grouper aggregate bag limit (per angler). This information from the full retention study fleet will give concrete and verifiable data about how many red snapper and other snapper grouper species would otherwise be discarded under current regulations while trying to obtain the snapper grouper aggregate bag limit. The time it took for an angler to obtain the snapper grouper aggregate bag limit is important in determining if this strategy is a viable option for the future management of red snapper and other snapper grouper fisheries. The Study Fleet will include five private vessels and five charter vessels that will fish up to three trips each per quarter (i.e., three-month time period) (Table 2). All participating study fleet vessels and anglers onboard will be required to fish with a single hook rig with a circle hook and abide by the requirements listed in this proposal. If selected, each captain will be required to coordinate closely with FWC staff and report required data (detailed below) for continued eligibility in the program.

*Table 2. Outline of FWC’s Study Fleet design*

Quarter	Month	Private Vessels	Charter Vessels	Total # of Trips per quarter
1	July- Sept.	5	5	30
2	Oct.- Dec.	5	5	30
3	Jan.- March	5	5	30
4	April – June	5	5	30
	<i>Potential Total</i>	<i>20 vessels</i>	<i>20 vessels</i>	<i>120 trips across all vessel types</i>

## Eligibility

Captains/owners of private vessels and captains of for-hire vessels that fish within the proposal hot spot area off Florida are eligible to apply to participate in the study fleet. Private recreational captains are defined as someone who will be responsible for safe operation of the vessel during FWC Study Fleet trips and, if born after Jan. 1, 1988, has successfully completed an approved boating safety course and obtained a Boating Safety Education Identification Card issued by FWC. A captain may be exempt from these requirements if they are licensed by the U.S. Coast Guard as master of a vessel or are a nonresident that has completed a NASBLA-approved boater safety course or equivalent examination from another state. For-hire captains are defined as someone who will be responsible for safe operation of the vessel during FWC Study Fleet trips and is licensed by the United States Coast Guard pursuant to Section 379.45(7), F.S. to carry passengers for hire and has one more passengers onboard who are paying a fee (directly or indirectly) to take or pursue an organism regulated by Division 68B, F.A.C. All for-hire charter vessels are required to have the Federal Charter Vessel Permit for South Atlantic Snapper-Grouper species and a FWC Saltwater Charter License prior to participating in the study fleet. This proposal is not intended for headboats. Further, to be eligible to participate in this program, private vessels and for-hire vessels are limited to a maximum of 6 anglers (excluding the captain and crew) per designated fishing trip.

All anglers fishing from private vessels must have a Florida recreational fishing license (or be exempt as per Chapter 379.353 F.S.) and be signed up for Florida's State Reef Fish Survey (SRFS) prior to fishing aboard a trip as part of the study fleet. All for-hire charter vessels are required to have the Federal Charter Vessel Permit for South Atlantic Snapper-Grouper species and a Florida Saltwater Charter License prior to participating in the study fleet. All captains will undergo a resource violation check. Any captain that does not have a resource violation would be eligible to participate in the FWC Study Fleet.

## Study Fleet Application and Selection

The study fleet will be selected by FWC staff following an application period prior to each quarter. Captains of private vessels and for hire vessels will apply online via a form on FWC's website. The application will include the following type of information:

- Name of captain of for hire vessel or owner/captain of private vessel
- Description of vessel
- List of captain's licenses and certifications for for-hire captain
- Listing of types of permits for for-hire vessel
- Homeport of vessel
- Description of area typically fished
- General description of areas where intending to bottom fish within the hot spot area
- Typical number of days spent bottom fishing per year
- Preferred months to bottom fish
- How many passengers/anglers are usually taken on a typically trip
- For for-hire captains, do you intend to captain the vessel?
- Who will do the data recording in the logbook on the fishing trips?

- Listing of items the captain must adhere to/do as part of the study fleet:
  - Obtain contact information for all anglers on board the trip,
  - Willingness to go through a resource violation check,
  - Willingness to fill out a logbook of data (e.g., depth, location, species caught, species discarded, length of species caught and discarded, release method if applicable, etc.) for the trip and then transferring this information to an app, within 48 hours of the conclusion of the trip,
  - Ascertain the skill level of anglers on board the vessel using the 3-point scale detailed in this proposal,
  - Retain a copy of the EFP on-board the vessel during an FWC study fleet trip,
  - Ensure all anglers on private vessels have a valid Florida saltwater recreational fishing license (or be exempt) with a SRFS designation,
  - Willingness to take the educational course and ensure all anglers on-board have also had the educational training course before fishing,
  - Willingness to take a pre-survey relative to the program to get at angler satisfaction before your trip
  - Willingness to take a post-trip survey and be interviewed by FWC staff after the trip and help anglers understand that they may be contacted for an interview by FWC staff after the trip to ask more detailed questions on angler satisfaction,
  - Willingness to fish with a single-hook rig with a circle hook,
  - For private vessel captains, willingness to meet FWC staff prior to trip to obtain materials and put a GoPro camera on board the vessel during Study Fleet trips if selected to validate your trip,
  - For for-hire captains, willingness to have a FWC observer on board the vessel during the Study Fleet trips,
  - Willingness to work with FWC to determine which days will be fished during the quarter,
  - Willingness to do a hail out and hail in on those days in order for FWC staff to meet the vessel at the dock for sampling, and
  - Willingness to have the fish you bring in as part of the study fleet sampled by FWC biologists at the dock and return any equipment.
- Description of safety equipment on the vessel

The application will go to and be reviewed by FWC staff for quarterly selection of the five private vessels and five charter vessels. FWC staff will select vessels for this fleet partly based on the area intended to be fished, vessel type, and the homeport of these vessels with the intent of covering a comprehensive area throughout the 'hot spot' zone, which is representative of a typical private vessel or for-hire vessel fishing activity.

The skill level of all anglers participating in this program will be characterized based on a scale of 1 through 3, with 1 being novice (rarely bottom fish), 2 being weekend warrior (occasionally bottom fish), 3 being experienced bottom fishermen (routinely fish on weekdays and/or weekends) and recorded in the logbook by the captain.

## Pre-trip coordination with FWC and Hail Out/Hail In Requirement

Prior to taking a FWC Study Fleet fishing trip, the selected captain must coordinate the date/dates of the trip with FWC staff to determine what works best for both entities. This coordination is essential as private vessels may need to obtain a GoPro camera from FWC staff and other materials prior to taking a study fleet trip. Also, coordination is needed for FWC observers to be aboard some or all of the for-hire trips. In addition, all fish harvested during Study Fleet trips will be sampled when the vessels arrive at the dock and this must be coordinated in advance via a hail in notification to FWC staff. Captains must notify FWC staff 24 hours prior to a planned trip and report the date and state registration number of the vessel they intend to fish from in order to receive an authorization, which must be available to present to law enforcement if requested at-sea or at the dock. As the Study Fleet vessel is returning to port, the captain must hail in and let FWC know the estimated time and location of arrival. Upon return to port, the captain and anglers are required to allow FWC staff to collect biological samples from harvested fish and conduct interviews, as needed.

## Participant Reporting Requirements and Data Validation

Prior to departing for a Study Fleet trip, an FWC biologist will arrange to meet the vessel operator to provide equipment (e.g., measuring board, GoPros for private vessel operators, etc.) and demonstrate how to record data at each fishing station and for each fish as they are caught at-sea. If the vessel is U.S. Coast Guard inspected charter for-hire vessel, the FWC biologist may arrange to ride along with the passengers and can assist with collecting data from all fish harvested and released during the trip, but this information will need to be uploaded by the captain via the app within 48 hours of conclusion of the trip. At each location where bottom fishing takes place, the vessel operator will record the bottom depth and approximate coordinates (degrees and minutes). At each fishing location, the following information will be collected per angler for each fish as it is caught and brought on board: species, length, disposition (harvested or released), and release method (if applicable). When the vessel returns to the dock, FWC staff will collect the equipment. The participant will also be required to remove all harvested snapper grouper species taken on the trip from the vessel and allow the FWC biologist to collect biological samples (e.g., length, weight, otoliths, and other biological data). DNA samples will be taken from all red snapper harvested for a separate Close Kin Mark Recapture project aimed at characterizing the absolute abundance of Atlantic red snapper and future work planned to employ genetic tagging to better quantify Atlantic red snapper discard mortality and the magnitude of red snapper discards. Following completion of sampling by FWC, all fish harvested will be returned to the participating anglers. FWC will develop a customized, dedicated mobile smartphone/tablet app (for both iOS and Android mobile operational systems) designed specifically to address vessel-based data collection for this project that will be submitted by the captain. All captains will be required to report data about their recent fishing trip within 48 hours of returning to port after their FWC Study Fleet fishing trip. This reporting will occur after each one of the participating Study Fleet trips. Each vessel operator will receive an FWC-supplied logbook to record information while fishing, but will need to submit their catch and discard information through the FWC App. If there is a technological error, participants may mail their logbooks to FWC.

Post-trip reporting requirements may include:

- Trip start date and time
- Trip end date and time
- Weather
- Location(s) and depth of fishing
- Fishing time at each location
- How many anglers on board and their skill level (characterized based on a 3-point scale described in this proposal)
- How long it takes each participant to reach the snapper grouper aggregate bag limit
- How many red snapper were taken by each angler before the snapper grouper aggregate bag limit was reached (or vessel maximum reached first)
- Species composition of discarded fish
  - Number released alive
  - Number released dead or floating
  - Sizes of released fish
- Other observations from the trip, such as other species encountered and if fishing other than bottom fishing continued after the SG bag limit was met or the vessel limited out on the 60 red snapper maximum.

To validate the data reported by private vessels in the FWC Study Fleet, FWC will place GoPro cameras onboard selected private recreational vessels and will evaluate video footage to ensure that all fish caught were measured and recorded. Additionally, video footage will allow FWC staff to determine if directions about how to conduct the FWC Study Fleet trip were clear. If footage shows that directions were not followed precisely, then FWC will consider modifications to the messaging about how to conduct the trip.

In order to validate the for-hire vessels in the FWC Study Fleet, FWC already has many experienced fishery observers and they will directly observe fishing activities onboard for-hire vessels for this proposed project. They will be observing all aspects of the trip, and like the private vessel component, will determine if the directions were clear or need to be modified.

## Education Requirement Description

Education is a vital component of the overall strategy to increase the survival of released reef fish and encourage best fishing practices for snapper grouper species. Outreach by the FWC and partners has been ongoing for many years, and FWC has experience implementing several required online training courses for anglers, including FWC's Shore-Based Shark Fishing and Skyway Fishing Pier educational courses. A required course for those participating in the FWC Study Fleet would help ensure the understanding of best fishing practices, species-identification, and proper use of descending devices. FWC staff will develop the education course with input from experienced anglers and conservation partners. The course will be available online through the FWC website. Course content will promote best fishing practices, educate anglers on strategies to reduce discard release mortality, and teach species identification, as well as any needed information about the proposal. After being selected and

before the first fishing trip for the Study Fleet all captains of private vessels and for-hire vessels, as well as all anglers fishing in the Study Fleet program, will be required to view and complete the online educational course. Anglers will be required to have proof of course completion prior to fishing to provide to the captain during their assigned quarter and group.

Implementation of this educational course will provide valuable information for partners across the Gulf and South Atlantic and will be helpful in the development of any future required trainings, such as potential mandatory use for all SRFS participants in the future, as well as for South Atlantic Council's Amendment 46.

## Angler Satisfaction

One of the primary goals of this proposal is to explore how to improve angler satisfaction amongst the private recreational fishing community participating in the snapper grouper fishery. Specifically, two of the proposal's objectives focus on 1) directly involving private recreational anglers and 2) evaluating their satisfaction with the program and current management structure, which align with NOAA Fisheries' Program Priorities for this funding opportunity. It is essential to understand anglers' satisfaction with current red snapper populations and management compared to the alternative management strategies presented in this proposal. As such, FWC's Conservation Social Science Program, with a team of dedicated social scientists, will lead this part of the proposal.

### *Pre- and Post-Participation Survey*

One the main objectives of this proposal and a top priority for NOAA's Notice of Federal Funding is to evaluate angler satisfaction when fishing for red snapper. This proposal aims to evaluate angler satisfaction through multiple ways including satisfaction questionnaires for captains and semi-structured interviews of captains and anglers.

A survey questionnaire will be developed to capture angler satisfaction prior to and after participation in the project. This survey will be required of all captains in this study at the start of and at the end of the quarter. The pre-survey will include questions to characterize participants (captain and anglers) (e.g., demographics, past fishing experience, etc.) and their satisfaction with the red snapper fishery (e.g., regulations, stock health, etc.). The post-survey will include questions about their experiences in the program to gather feedback on project components, such as how the snapper grouper aggregate bag limit compared to current management strategies, how effective the aggregate bag limit was at reducing discards, and how it impacted the fishing experience on their vessel. Additionally, feedback will be gathered on other project components, such as the educational training course and FWC app. Satisfaction questions will be repeated in the pre- and post-surveys, which will allow us to quantify any changes in satisfaction over time.

### *Semi-Structured Interviews*

In addition, a randomly selected subset of captains and anglers who participated in a Study Fleet trip will be invited to participate in semi-structured interviews. This will allow an in-depth understanding of their fishing experiences and gather additional feedback about



components of the project. There are many factors that contribute to angler satisfaction or dissatisfaction (e.g., Birdsong et al. 2021); the interviews will complement the survey to help in understanding participants' satisfaction with their fishing experiences and with management.

Selected participants will be invited to participate in an in-person or telephone interview, to be scheduled at their convenience. The semi-structured interview questions will cover details about their experience in the program, their satisfaction with their fishing and with management, and request any feedback about the program and its components. Interviews will be recorded when possible (with permission of participants) and transcribed; when recording is not possible, in-depth notes will be taken.

### *Participant Engagement*

Contributing to science and conservation have been found to be important motivations for voluntary angler data collection program participants (Crandall et al. 2018), and the clearest factor associated with voluntary angler data program success is the frequency of contact between program staff and participants (Cooke et al. 2001), with regular contact and feedback/reports associated with volunteer scientist retention (e.g., Lewandowski and Specht 2015). Throughout the program, FWC staff plans to engage with participants as described in the Outreach Strategy below, to not only ensure they are following the program's requirements, but to help the participants understand they are critical part of this research project. The information provided by participants will provide valuable insight into snapper grouper catch and discard composition, anglers' fishing behavior, and angler's overall satisfaction with the fishery and current/proposed management measures. All participants will receive a shirt commemorating their participation in the Study Fleet program and receive a copy of the final study.

## Data Analysis

The data provided from this study will give a complete record of the numbers and species of fishes caught and either harvested or released on each Study Fleet trip. Included in this data will be vital information on the areas fished, the bottom depth each fish is caught from, discard rates by species, the size distribution of released fish, and temporal trends within. As such, catch composition and discard data will be analyzed relative to location, depth, and time of year. Across the duration of the study, the time it takes an angler to meet the 15-fish snapper grouper aggregate bag limit relative to the number of red snapper they land will provide valuable insight into the efficacy of such a management strategy to reduce discards of red snapper and other snapper grouper species.

By allowing anglers to retain up to the first 60 red snapper caught over the course of their Study Fleet fishing trip, we can also collect important biological information from those fish, which would have otherwise been discarded to help further ongoing regional analyses aimed at a better understanding of the fishery. From each red snapper harvested under the EFP, FWC will collect otoliths for ageing. Currently, fishery-dependent age samples can only be collected from harvested fish, and this study will allow us to also evaluate the age distribution of discards within the recreational sector. Fin clips will also be collected from each red snapper for

inclusion in a separate, ongoing close-kin mark-recapture study and for use in future studies. All ages, genetic samples and associated data for red snapper will be shared with researchers at the University of Florida and Texas A&M for use in their estimation of the absolute abundance of the stock in the South Atlantic.

Further, assessment analysts assume that data collected through Florida's for-hire at-sea observer survey are representative of the private boat fishery, since no such data currently exists for the private boat segment of the recreational fishery. The private boat fishery represents the largest portion of recreational discards in Florida, and data collected through this study will provide us with a valuable opportunity to evaluate whether there are meaningful differences in fishing methods, the types of fish caught, and methods used to release fish from private recreational trips that should be accounted for in future stock assessments and management.

#### *Angler Satisfaction Analysis*

The software SPSS will be used to analyze the quantitative pre- and post-survey data, which will include generating descriptive statistics and testing for significant differences between the pre-and post-survey satisfaction measures.

An inductive thematic analysis will be used to analyze the interview data using the software MaxQDA. Codes will be generated from the data and then grouped into broader themes. Trustworthiness (the qualitative equivalent of validity and reliability) measures will include using a second coder in the dataset and, if possible, member checks with participants.

### Description of Species to be Harvested

All species within the snapper grouper fishery, except those with regulatory closures, may be harvested by anglers that are selected to participate on the selected vessels under the selected captains. However, an exemption will be made for red snapper to allow for harvest outside of the federal fishing season. Harvest of red snapper outside of the federal season would require an Exempted Fishing Permit (see section below). The federal snapper grouper complex includes the following harvestable species: Greater amberjack, lesser amberjack, black grouper, coney grouper, gag grouper, graysby grouper, misty grouper, red grouper, red hind grouper, rock hind grouper, scamp grouper, snowy grouper, wreckfish, yellowedge grouper, yellowfin grouper, yellowmouth grouper, cottonwick grunt, margate grunt, sailors choice grunt, tomtate grunt, white grunt, hogfish, almaco jack, bar jack, jolthead porgy, knobbed porgy, longspine porgy, red porgy, saucereye porgy, scup porgy, whitebone porgy, banded rudderfish, bank sea bass, black sea bass, rock sea bass, blackfin snapper, cubera snapper, gray snapper, lane snapper, mutton snapper, queen snapper, red snapper, silk snapper, vermillion snapper, yellowtail snapper, blueline tilefish, golden tilefish, sand tilefish, gray triggerfish, and ocean triggerfish. Within the proposed program and in addition to the snapper grouper species listed above, anglers would also be able to harvest other species (e.g., Coastal Migratory Pelagics, dolphinfish, etc.) within the current South Atlantic regulatory limits. Should a regulatory closure occur for any species (other than red snapper), participants will be prohibited to harvest those species. No additional impacts on the environment, including impacts on fisheries, marine mammals, threatened or endangered species, and essential fish habitat is expected.

As highlighted above, up to 5 private and 5 charter vessels will be able to participate in the Study Fleet per quarter (i.e., 3-month time period), with up to 3 trips per quarter. During each Study Fleet trip, anglers will be able to retain the vessel limit of up to 60 red snapper per vessel while anglers are trying to obtain the 15-fish snapper grouper aggregated bag limit. Based on the possible 5 private vessels fishing each quarter taking up to three trips per quarter, a maximum of 900 red snapper may be taken each quarter. Therefore, up to 3600 red snapper may be taken annually by the private recreational Study Fleet. Likewise, the maximum number of red snapper that could be taken by the possible 5 for-hire vessels fishing each quarter is a maximum of 900. Similarly, up to 3600 red snapper may be taken annually across the for-hire Study Fleet. Thus, this project may result in a maximum of 7200 red snapper taken per year from these two study fleets (Table 3). However, it is also likely that not all fishing trips will result in each vessel landing 60 red snapper.

Table 3. Maximum allowable red snapper harvest during the proposed 12-month study period.

<b>Quarter</b>	<b>Maximum # of RS from Private Vessels per Quarter</b> <i>(@ 3 trips per quarter)</i>	<b>Maximum # of RS from For-hire Vessels per Quarter</b> <i>(@ 3 trips per quarter)</i>
1	900	900
2	900	900
3	900	900
4	900	900
<i>Total</i>	<i>3600</i>	<i>3600</i>
<i>Annual Total</i>	<i>7200 red snapper per year</i>	

## Timeline

The figure below (Figure 2) outlines the proposed timeline over a 12-month sampling period (July 2024-June 2025).

	2024									2025						
<i>Task</i>	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
Program set up & implementation																
Application period and selection																
Study Fleet sampling																
Video and observer catch validation																
Biological data collection																
Education course																
Pre-Angler Satisfaction Survey																
Post-Angler Satisfaction Survey																
Analyses and report preparation																
<i>12-month sampling period</i>																

*Figure 2. FWC's Study Fleet Proposal Timeline. The different colors represent the Study Fleet quarters over a 12-month period. For example, 1<sup>st</sup> blue color = 1<sup>st</sup> quarter fleet, 2<sup>nd</sup> blue = 2<sup>nd</sup> quarter fleet, etc.*

## Expected Outcome

As this project will provide seasonal data throughout the year to characterize red snapper discards, test the snapper grouper aggregate bag limit management option and determine angler satisfaction, the intent of the principal investigators is to conduct this project over a two-year time period in order to obtain two full years' worth of data. The project investigators intend to work with NOAA to consider modifications to this proposal and submit an updated EFP following the completion of year one in order to make improvements before embarking on the second year of data collection. The expected outcomes of the comprehensive full retention FWC Study Fleet proposal are to: 1) obtain more precise and accurate recreational catch and discard data of red snapper and other snapper grouper species to inform management, 2) determine the effectiveness of a 15-fish snapper grouper aggregate bag limit in reducing discards of red snapper and other snapper grouper species while also evaluating angler satisfaction on the proposed management strategy, 3) test effectiveness of an App developed by FWC for recreational data reporting that could potentially be expanded to a larger group of anglers in the future, and 4) develop an educational requirement to help reduce discard mortality of snapper grouper species that could potentially be expanded to all Florida State Reef Fish Survey anglers.

## Exempted Fishing Permit

This proposal will require an Exempted Fishing Permit (EFP) to allow recreational harvest of red snapper outside the current bag and season limits in Atlantic federal waters. Specifically, captains/vessels selected for the proposed Study Fleet would be allowed to harvest a vessel limit of 60 red snapper outside of the federal red snapper recreational fishing season during designated FWC Study Fleet fishing trips. The 60 red snapper vessel limit was chosen based on SRFS data indicating that 99% of anglers discard 10 red snapper or less on a fishing trip. The purpose of this EFP is to allow FWC to collect recreational data through a red snapper full retention Study Fleet while testing alternative management strategies that may potentially reduce waste from discarding red snapper and other managed snapper grouper species. The goals of the proposed activities are as follows: 1) Directly collaborate with the recreational vessel operators and anglers to collect catch and discard information at a representative scale within the snapper grouper fishery; 2) Recruit private and for-hire vessel operators to test a snapper grouper aggregate bag limit; 3) Allow a select number of vessel operators recruited for this study to have anglers onboard the operator's vessel to harvest red snapper outside of the federal season, accompanied by a mandatory reporting requirement and provisions for validation; 4) Develop a unique app to collect detailed information from participants in this study on the types of fish released as they are caught at-sea while attempting to reach the snapper grouper aggregate bag limit in both the private boat and for-hire Study Fleets to collect better recreational data and evaluate the effectiveness of the alternative management strategy tested as part of this study; 5) Develop an education course required for all participants

(captains and anglers) that highlights fish identification, best fishing practices, species identification, and methods to safely descend fish experiencing barotrauma; and 6) Evaluate angler satisfaction through pre- and post-participation surveys and semi-structured interviews. In order to carry out the goals of the described project, which are aimed at obtaining better recreational catch and discard data and reducing discards through testing of an alternative management approach, an EFP is needed. Across the entire duration of the proposed study, a maximum of 7,200 Atlantic red snapper would be harvested on designated Study Fleet trips by single hook rigs with a circle hook. This EFP would exempt anglers participating in FWC's Study Fleet from the following regulations:

- Recreational bag limit for red snapper at 50 CFR §622.187(b)(9)
- Recreational season closure for red snapper at 50 CFR §622.183(b)(5)(i)

FWC will require all participants of the Study Fleet fishing on a private recreational vessel to hold a valid saltwater recreational fishing license issued by the State of Florida (or are exempt) and have declared themselves a State Reef Fish Survey angler. Additionally, FWC will require the participating for-hire charter vessel to hold a valid Federal Charter Vessel Permit for South Atlantic Snapper-Grouper species and a FWC Saltwater Charter License, and to provide FWC a list of all passengers during the Study Fleet trips. This EFP will only apply to recreational captains/vessels who apply and are selected to be a part of the FWC Study Fleet. Therefore, FWC will be able to account for and provide NOAA Fisheries with a list of participants (e.g., state license, registration of each vessel and vessel name during designated fishing trips, name of participants and contact information, etc.) to be covered under the EFP as soon as the information is available and before operations begin under the EFP. Additionally, FWC will be able to provide other required information like approximate time and places fishing will occur. Once the proposed project is complete, FWC can provide the exact number of red snapper that were harvested and exempt from current regulations, but 7,200 would be the maximum number.

Contact information for the Principal Investigator, who is also the point of contact for this EFP application, are as follows: Jessica McCawley, Florida Fish and Wildlife Conservation Commission, 1875 Orange Avenue East, Tallahassee, FL 32311; phone: (850) 617-9635; email: Jessica.McCawley@MyFWC.com



## Outreach Strategy

FWC has a dedicated Outreach and Education Team who will develop and implement a comprehensive outreach strategy to help ensure the effectiveness of this proposal in its entirety. Stakeholder understanding and support is essential to the success of this program. An initial outreach campaign will be conducted to raise awareness about the study's purpose and goals, and to invite stakeholders to apply to participate. This initial campaign may include emails

to State Reef Fish Anglers who reside on the Atlantic coast, social media posts that will be specifically targeted to the east coast of Florida, a press release to media outlets, and direct communications with FWC partners, including nonprofits and fishing clubs. This strategy will help create a large, diverse pool of applicants.

Once the program participants have been selected, FWC staff will directly engage with the participants to ensure compliance with program requirements and to emphasize the importance of their efforts and the valuable contributions they are providing to the study. This will be accomplished through several engagement approaches. Participants will be notified they have been selected to participate through email. Upon accepting the opportunity to participate, a welcome packet may be mailed to each participant that will include a brief introduction to the study including the proposal's requirements, such as harvest opportunities, restrictions, and data reporting requirements, in addition to FWC contact information, guidelines for best fishing practices, a program decal, and information on participation incentives. The welcome packet may also be provided electronically through email with an accompanying video introducing the topics in the packet. FWC staff will record a welcome video that will introduce participants to the study, review data recording procedures, and study protocols that will be emailed to participants and posted online so participants can review at their convenience. Additionally, the required Online Education Training, outlined previously, will ensure the understanding of best fishing practices, species-identification, and proper use of descending devices for this proposal. The FWC Outreach and Education Team will develop the education course with input from experienced anglers and conservation partners.

Participants may also be emailed periodically during their selected quarter, reminding them to submit their catch reports after each trip. These emails may include select photos of participants and their catches, recognizing individuals who have been actively participating. The FWC may also develop a webpage to provide program updates to participants and frequently asked questions.

Once the project concludes, a second outreach campaign may be implemented, mirroring the strategy of the initial campaign by utilizing email listservs, social media platforms, press releases, and partners to disseminate the results of the study. The FWC will also provide an electronic final report to all participants and will mail a signed thank you letter and recognition certificate from FWC's Division of Marine Fisheries Management Director.

## Data Management Plan

### *Overview*

All data will be managed in accordance with the FWC Technology Blueprint and standards for applications developed or maintained by vendors, staff, or consultants employed by or contracted with FWC.

### *Application System*

The Florida Fish and Wildlife Conservation Commission presently maintains a licensing application system and lottery system related to limited-harvest programs, such as FWC's statewide alligator hunt permit and goliath grouper limited harvest program. Upon request, FWC can provide a file to NOAA Fisheries with all applications submitted for this Study Fleet.

#### *Recreational catch and discard data*

Data collected from fisheries observers on for-hire trips will be stored electronically using existing data entry programs utilized for angler interviews and biological samples throughout the state. Video data and other data collected from participants will be stored on a central server for Structured Query Language and backed up at regular intervals. Prior to data entry, the field coordinator will review all field forms and communicate with field staff regarding any recording errors or missing fields the need to be completed. Field staff will manually enter their own data and once completed the coordinator will work with field staff to proof the electronic data for errors. Once proofing is completed, data will be corrected as needed and final QA/QC checks will be performed by the field coordinator and marked as complete. Once this is done the data will be marked as final and locked down for posterior analysis.

Data reported by participating captains through the FWC app developed for this project will be uploaded to a central database stored on a central server and backed up daily at regular intervals. Relational data tables will be used to link participant profiles, declared trips, and self-reported trip and catch data. Dockside validation data will include unique identifiers that will allow data to be matched to individual trips reported through the app.

#### *Pre- and Post-Season Survey Data*

The survey data will be collected using the SurveyMonkey software. Once downloaded, the data will be stored in a database on FWC state computers and in the FWC cloud, as will all interview recordings, transcriptions, and codes/themes. All respondents will be assigned a code number, and any personal identifiers will be removed from each dataset.

#### *Biological Data*

Data collected from biological samples will be stored on a central server for Structured Query Language and backed up at regular intervals. Field staff will manually enter their own data and once completed the coordinator will work with field staff to proof the electronic data for errors. Once proofing is completed, data will be corrected as needed and final QA/QC checks will be performed by the field coordinator and marked as complete. Once this is done the data will be marked as final and locked down for posterior analysis.

#### *Performance Reports and Data Sharing*

Performance and financial reports will be submitted semi-annually and will include progress made on identified goals. Reports will be submitted no later than 30 days following the end of each 6-month period from the start date of the reward. Also, FWC will submit a final performance report no later than 120 days after the project end date.

As a state institution, FWC abides by Florida Sunshine Law. This law provides that any records made or received by any public agency in the course of its official business are available for inspection unless specifically exempted by the Florida Legislature.



## Enforcement

Captains will be required to carry certain materials during the designated FWC Study Fleet fishing trips to aid with enforcement. In addition to having their recreational fishing license and State Reef Fish Designation (on private vessels), captains and their anglers will be required to have a copy of their certificate for completing the educational course, documents showing they are a part of the Study Fleet, and any required EFP documents (captains only). FWC staff may provide educational materials and regular updates for FWC Law Enforcement to ensure they are familiar with the program's requirements and exemptions from current federal regulations. Additionally, program materials, including a list of participants per quarter, may be available to FWC Law Enforcement and enforcement partners.

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