

Wreckfish ITQ Review

South Atlantic Fishery Management Council

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Abbreviations

Council	South Atlantic Fishery Management Council
ITQ	Individual Transferable Quota
FMP	Fishery Management Plan
LAPP	Limited Access Privilege Program
NMFS	National Marine Fisheries Service
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office

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Executive Summary

1.0 Introduction and Background

Amendment 5 to the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) established an Individual Transferable Quota (ITQ) program for wreckfish in 1992 (SAFMC 1992). The first official review of the wreckfish ITQ program was completed in 2009 (SAFMC 2009). In 2011, Amendment 25 to the Snapper Grouper FMP (Amendment 25) implemented annual catch limits (ACL) to the commercial (95%) and recreational (5%) sectors and reduced the total allowable catch from 2 million pounds (lbs) to 223,250 lbs. Amendment 20A to the Snapper Grouper FMP (Amendment 20A) reduced the number of vessels that could potentially harvest wreckfish and established a cap on the number of wreckfish (SAFMC 2012). In 2015, Regulatory Amendment 22 to the Snapper Grouper FMP (Regulatory Amendment 22; SAFMC 2015) revised the commercial recreational ACLs based on the latest stock assessment (Rademeyer and Butterworth 2014).

This review is intended to evaluate progress made in meeting the goals of the ITQ program. The review does not attempt to comprehensively evaluate management of the snapper-grouper fishery. The South Atlantic Fishery Management Council (Council) is required by law to review the ITQ program every five to seven years. This review is the first subsequent review of the program. This review examines how the wreckfish ITQ program has changed between the baseline time period (2009/2010 – 2011/2012 fishing years) and the review time period (2012/2013 – 2016/2017 fishing years) with respect to various social, economic, biological and administrative factors, and offers conclusions and recommended changes to the program based on the findings. The baseline time period corresponds to the 3 years following the first program review while the review time period generally corresponds to the 5 year time period after the allowable catch was significantly reduced and Amendment 20A was implemented. Data and information contained in this report were obtained from a variety of sources, including, but not limited to peer-reviewed literature, the Southeast Fisheries Science Center (SEFSC) coastal logbook program, SEFSC accumulated landings system, and National Institute of Occupational Safety and Health. This review constitutes the findings of the Council.

1.1 Legal requirements for the review

The National Marine Fisheries Service (NMFS) established Guidance for Conducting Reviews of Catch Share Programs (Guidance) in 2017 (NMFS 2017).¹ This Guidance is based on the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as well as other agency guidance in NOAA's Catch Share Policy (CS Policy)² and The Design and Use of Limited Access Privilege Programs (LAPPs) (Holliday and Anderson 2007).³ The goals of the Guidance are to ensure these reviews meet statutory requirements, are generally consistent across the country, and are carried out in a transparent, efficient, and effective manner. The objectives of the Guidance are to specify the process that should be followed, the elements a review should contain, and the program components that should be addressed when completing a review. The Guidance applies to all U.S. catch share programs regardless of whether they were established under the provisions of Section 303A of the Magnuson-Stevens Act, with the exception of the Western Alaska (AK) Community Development Program as it is subject to separate statutory requirements for review.

The Magnuson-Stevens Act specifies that fishing privileges established under LAPPs are not permanent and may be revoked, limited, or modified at any time. If a program is meeting its stated objectives, then it will likely be continued. However, the Council reserves the right to terminate or modify a program for cause, including if the system is found to have jeopardized the sustainability of the stock or the safety of

¹ <http://www.nmfs.noaa.gov/op/pds/index.html>

² http://www.nmfs.noaa.gov/sfa/management/catch_shares/about/documents/noaa_cs_policy.pdf

³ <http://spo.nmfs.noaa.gov/tm/tm86.pdf>

fishermen. The review provision specified by the Magnuson-Stevens Act requires the Council to evaluate the effectiveness of the program and determine whether it should be modified, extended, or terminated. More specifically, the Magnuson-Stevens Act 303A(c)(1)(G) requires the Council and Secretary of Commerce (Secretary) to:

“include provisions for the regular monitoring and review by the Council and the Secretary of the operations of the program, including determining progress in meeting the goals of the program and this Act, and any necessary modification of the program to meet these goals, with a formal and detailed review 5 years after the implementation of the program and thereafter to coincide with scheduled Council review of the relevant fishery management plan (but not less frequently than once every 7 years);”

For programs established prior to January 12, 2007, the initial review should commence no later than 5 years after the program was implemented. For CSPs established prior to January 12, 2007, the requirement to initiate the first review 5 years after implementation does not apply. The South Atlantic Council completed an initial review of the Wreckfish ITQ program in 2009.⁴ Because the CS Policy indicates that periodic reviews are expected of all Catch Share programs (CSPs), reviews for CSPs established prior to January 12, 2007, should be initiated no later than 7 years after the CS Policy went into effect in 2010 (i.e., no later than the end of calendar year 2017), consistent with Magnuson Stevens Act’s (MSA) requirement for subsequent reviews. Subsequent reviews should coincide with scheduled Council review of the relevant FMP, but no less frequently than once every 7 years. This review is the first subsequent review of the Wreckfish ITQ program. Although the Councils and NMFS should also follow any timelines for additional program reviews specified by the FMP or FMP amendments (hereinafter collectively referred to as “FMP”) that created or modified the program, no additional timelines for reviewing the wreckfish program are currently specified in the Snapper-Grouper FMP.

The review is considered a Council document. Once a review is completed, the results are to be submitted to the Council for approval and NMFS for concurrence that the review meets the requirements of the Magnuson-Stevens Act and is consistent with the Guidance.

Best available scientific information should be used for the review. If quantitative analyses are not available, qualitative assessments may suffice. The review of a Catch Share Program (CSP) is a retrospective evaluation of an established program. Thus, rather than analyzing the program’s expected effects, as is done in the implementing FMP, the task in a review is to describe and analyze the effects that have actually taken place since the “baseline” time period. Therefore, Councils need to consider an appropriate baseline for comparison. A baseline period of at least 3 years is preferable, but this may be modified depending on the circumstances. For subsequent program reviews, such as this review, analyses should discuss changes since the last review and need not evaluate the program’s performance in years prior to the last review.

The review should contain the following eight elements. If a Council determines that one or more of these elements is not applicable to a specific review, the Council should document its rationale for not conducting a more formal analysis of that element. The eight elements are:

- 1) purpose and need of the review (discuss legal/policy requirements),
- 2) goals and objectives of the program, the FMP, and the MSA,
- 3) history of management, including a description of management prior to the program’s implementation, a description of the program at the time of implementation (including enforcement, data collection, and monitoring), and any changes made since the program’s

⁴ SAFMC. 2009. Wreckfish Individual Transferable Quota (ITQ) Program Review. 39 pp.

- implementation or the previous review (including an explanation of why those changes were made)
- 4) a description of biological, ecological, economic, social, and administrative environments before and since the program’s implementation,
 - 5) an analysis of the program’s biological, ecological/environmental, economic, social, and administrative effects,
 - 6) an evaluation of those effects with respect to meeting the goals and objectives (i.e., program performance), including a summary of the conclusions arising from the evaluation,
 - 7) a summary of any unexpected effects (positive or negative) which do not fall under the program’s goals and objectives, and
 - 8) identification of issues associated with the program’s structure or function and the potential need for additional data collection and/or research.

In general, the review should use as holistic an approach as possible given available data and resources. Interdependencies between related fisheries and programs can generate spillover effects that may be unexpected or unintended. When this occurs, and it is difficult to separate the effects of the CSP under review from the effects of other programs or management measures in other fisheries, these programs or fisheries should be considered together. Councils should determine if analyzing the CSP under review without considering other fisheries will likely mischaracterize the program’s performance, and the program’s effects on human communities, fish stocks, and the ecological communities/environment.

1.2 Pre-ITQ management

Wreckfish was not managed under the FMP) originally, but was added to the FMP in Amendment 3 to the Snapper Grouper FMP (Amendment 3; SAFMC 1990). The stock on the Charleston Bump was discovered accidentally in the mid-1980s by swordfish fishermen recovering lost longline gear in the area (Gauvin, Ward, and Burgess 1994). Harvest grew very quickly, as noted in Table 1.2.1 below from Amendment 3:

Table 1.2.1. Wreckfish catch and effort, 1987-1990.

Wreckfish Catch & Effort over Time		
Year	Number Vessels	Landings (lbs)
1987	2	28,849
1988	6	307,607
1989	25	2,017,000
1990 (Jan.-Mar.)	40	3,000,000

Entrance into the fishery was relatively easy due to the lack of regulations (e.g., no permit requirements) and the low cost of converting boats with mechanized hydraulic gear from the swordfish, shark, snapper-grouper, and deepwater shrimp fisheries. The wreckfish were larger (~30 lbs.) than local grouper species and trips were correspondingly lucrative. Fearing a biological collapse, the Council passed Amendment 3 at its February/March 1990 meeting, which included the following management actions:

1. Added wreckfish to the management unit
2. Defined optimum yield (OY)
3. Defined overfishing
4. Required a permit to fish for, land, or sell wreckfish.
5. Established a data collection system for management
6. Established a control date of March 28, 1990, for a limited-entry program.

7. Established a fishing year beginning April 1.
8. Established a total allowable catch (initially set at 2 million lbs).
9. Established a 10,000 lbs trip limit.
10. Established a spawning season closure from January 15 through April 15.

The initial management measures were quickly found to be insufficient for restricting landings to the total allowable catch (TAC), as the newly permitted fishermen caught the entire 2M lb TAC in the first four months of the 1991-1992 season. Amendment 4 to the Snapper Grouper FMP (1991) was not primarily directed at regulating wreckfish, but did add one significant restriction with the banning of bottom longline gear in the wreckfish fishery. Before that longline ban went into effect in October 1991, however, the Council passed Amendment 5 (1991), which introduced the ITQ program that is still in place.

1.3 ITQ program description

As noted in Section 1.2, the wreckfish ITQ was created when the Council passed Amendment 5 at the end of 1991. Landings peaked in 1989/1990 at approximately four million lbs and were forced to decline to the new two million lbs TAC the subsequent year while the Council worked on new restrictions.

The wreckfish ITQ is the oldest finfish ITQ in the United States and the second oldest ITQ overall (after ocean quahog/surf clam). Amendment 5 introduced a regulatory system of transferable and divisible privileges to catch and sell wreckfish in the area under the Council's jurisdiction. On the first page of Amendment 5, the ITQs are defined in two separate but related ways. Percentage shares are an individual "fisherman's permanent holding in the fishery based on the initial allocation of shares that can be modified by trading." Individual quotas are "the quantity of wreckfish that a percentage share translates into in a particular year." Amendment 5 introduced a system for tracking and monitoring both percentage share and individual quota transactions, and these systems are still in use. The ITQ program did not replace the wreckfish vessel permit requirement established in Amendment 3, and so wreckfish fishermen are still required to have this permit in order to harvest wreckfish. Wreckfish dealers have also been required to be permitted since Amendment 5. Fishermen and dealers must comply with the data reporting requirements of the wreckfish ITQ as outlined in Amendment 5.

1.3.1 ITQ Goals and Objectives

According to Section 303A(c)(1)(G) of the MSA, a primary goal of the review is to assess progress in meeting the goals of the program and the MSA. NOAA's CS Policy indicates it is necessary to examine objectives as well, including those of the FMP. Thus, the goals and objectives in this case include those identified in the implementing Amendment, the FMP, the CS Policy, and the Magnuson-Stevens Act, particularly those specific to LAPPs, though the primary focus should be on those identified in the implementing Amendment and any subsequent Amendments that modified the program's goals and objectives. The goals and objectives of the Amendment(s) and FMP should be evaluated with respect to whether they are clear, measurable (at least qualitatively), achievable (i.e., are two or more objectives mutually exclusive?), and still appropriate under the current circumstances. Fishery performance changes over time, and for other reasons than the effects of the program or other management measures. Such changes should be taken into account when evaluating the efficacy of the original goals and objectives. If certain goals and objectives are found not to be clear, measurable, achievable, and/or still appropriate, the review should note deficiencies for the Council to address. Thus, one specific purpose of the reviews is to encourage Councils and NMFS to clearly identify specific performance standards that can be used in assessing whether, or to what extent, the goals and objectives have been met.

If the program is performing as expected at the time of implementation, then the various goals and objectives either should have been achieved or substantial progress should have been made towards achieving them. If the analysis concludes otherwise, such conclusions may serve as the basis for future changes to the program.

In addition to the specific goals of the wreckfish ITQ program, Section 303A(c)(1) of the Magnuson-Stevens Act established goals specific to LAPPs, which include:

- assist in rebuilding if established for one or more species that are subject to overfishing or are overfished,
- contribute to reducing overcapacity if established in a fishery where overcapacity exists,
- promote fishing safety,
- promote fishery conservation and management, and
- promote social and economic benefits.

As noted in Amendment 4, the rapid escalation of effort and vessels in the wreckfish fishery threatened the species with overfishing. Amendment 4 attempted to deal with that issue through the introduction of a significantly reduced TAC. Amendment 5 noted that a number of new problems had since surfaced as a result of that new TAC, which are listed below in abbreviated form:

1. “The size and capacity of the wreckfish fleet exceeds that needed for the present TAC” as well as any likely future TACs.
2. Inefficiency. The effort to control harvest would require a number of new measures that would raise fishing costs and hence decrease net benefits.
3. Low conservation and compliance incentives, as voluntary attempts to conserve the resource “may be appropriated by other fishermen or new entrants.”
4. Potential conflicts between competing vessels over the fishing area.
5. High regulatory costs.
6. Low marketing incentives because of a “short run oversupply and lack of product continuity.”

Amendment 5 listed a number of objectives to address these problems. Prior to the ITQ, the wreckfish fishery required a permit, but was still an open-access fishery. Amendment 5 moved the fishery from open- to closed-access and did this through the mechanism of an ITQ. The goals and objectives listed below from Amendment 5 justify both closing access to the fishery and doing it through an ITQ regulatory system:

1. “Develop a mechanism to vest fishermen in the wreckfish fishery and create incentives for conservation and regulatory compliance whereby fishermen can realize potential long-run benefit ...”
2. “Provide a management regime which promotes stability and facilitates long-range planning and investment by harvesters and fish dealers while avoiding, where possible, the necessity for more stringent management measures and increasing management costs over time.”
3. “Develop a mechanism that allows the marketplace to drive harvest strategies...”
4. “Promote management regimes that minimize gear and area conflicts...”
5. “Minimize the tendency for over-capitalization in the harvesting and processing/distribution sectors.”
6. “Provide a reasonable opportunity for fishermen to make adequate returns from commercial fishing by controlling entry so that returns are not regularly dissipated by open access, while also providing avenues for fishermen not initially included in the limited entry program to enter the program.”

Amendment 20A (SAFMC 2012) revised the wreckfish individual transferable quota (ITQ) program with the following actions:

1. Define and revert inactive wreckfish shares. Inactive shares were defined as shares belonging to any ITQ shareholder who had not reported wreckfish landings between April 16, 2006, and January 14, 2011, and reverted inactive shares for redistribution among active shareholders.
2. Redistribute reverted quota shares to remaining shareholders. This was based on landings history using total wreckfish landings from April 16, 2006, through January 14, 2011.
3. Establish a share cap of 49% of the total shares of wreckfish quota a single entity may own, and
4. Establish an appeals process for redistribution of reverted wreckfish quota shares. Five percent of the wreckfish shares for fishing year 2012/2013 were set aside to resolve appeals for a period of 90-days starting on the effective date of the final rule, October 26, 2012 (77 FR 59129).

The goals and objectives of Amendment 20A (SAFMC 2012) were to help achieve OY from the wreckfish commercial sector in accordance with the Magnuson-Stevens Act.

Given that the program has been in place for more than two decades, but was also modified in 2012 (Amendment 20A; SAFMC 2012), the Council should use this review to evaluate:

1. whether the goals of the program have been met or if further progress is needed toward achieving the goals, and
2. should the goals be modified to address changes in the fishery that have come about as a result of the ITQ program.

1.3.2 ITQ Design and Structure

The wreckfish program is an ITQ program, which allows the privileges to be transferred subsequent to initial allocations. Under the wreckfish ITQ program, a fisherman holds a share (percentage) of the quota and receives quota pounds annually that correspond to that percentage.

The Wreckfish ITQ program is a paper-based catch share program that utilizes share certificates to verify the shares held and ITQ coupons to represent quota pounds allocated to each shareholder. The share holdings and distribution of coupons are administered by the Southeast Regional Office (SERO). Share certificates identify the number of shares held by each entity. All or a portion of an entity's shares may be transferable. Transfers are conducted by completing the form on the back on the share certificate and mailing the certificate to NMFS. NMFS will then create new certificates with the appropriate number of shares for the transferor (if applicable) and the transferee.

The pounds allocated to each shareholder (i.e., ITQ) are calculated by multiplying the share percentage by the wreckfish commercial ACL in gutted weight. Prior to the start of the fishing year, the quota share are provided in the form of coupons to the wreckfish shareholders in 100 lb or 500 lb denominations. All coupons expire at the end of year fishing year and are clearly marked with the fishing year. Each coupon has a specific barcode that can be traced to the original wreckfish permit holder. ITQ coupons are transferable from one wreckfish shareholder to another through the completion of the form on the back of the coupon. All transferred coupons must be signed and contain the shareholder's certificate number. ITQ coupons can only be possessed by a shareholder or the shareholder's employee, contractor, or agent.

A two-part coupon system that is included in both the logbook program and the dealer reporting system provides additional verification of the data, as well as serving as an enforcement aid, and providing additional management data, not available from the other two systems. The coupon system also records annual catch quota transfers, if any occur.

The program restricts the possession of wreckfish on board a fishing vessel if the weight of the fish exceeds the total of ITQ coupons aboard the vessel. Upon harvesting wreckfish, wreckfish fishermen must land the species at an approved dealer. Vessel owners participating in the fishery are required to fill out a logbook for each month that the fishery is open. A “no fishing” report is required if no fishing is done for an entire month that the fishery is open. ITQ coupons are used to count quota pounds that are used for each trip. Prior to the trip’s end, the coupons equal to the amount of wreckfish on board, must be signed and dated by the fishermen. The coupons are sent in along with the logbook form for each trip that is taken.

Dealers purchasing wreckfish are also required to submit a dealer report each month that the fishery is open. Upon receipt of the wreckfish, the fisherman must also submit the “Fish House” portion of the ITQ coupon(s) to the dealer in an amount sufficient to cover the amount of fish landed. The dealer must complete the corresponding form on the back of the coupon, which includes the vessel’s identification number (U.S. Coast Guard or state registration), the dealer’s permit number, and the date the fish were received. Coupons are submitted along with the dealer logbook.

In addition, the program limits offloading of wreckfish between daylight hours, 8 am – 5 pm EST and only at fixed dealer facilities. Landing at other locations may be approved if the vessel captain or shareholder notifies Law Enforcement at least 24 hours prior to offloading.

1.3.3 Conclusions and Recommendations from Initial Review

The initial review of the wreckfish ITQ fishery completed by Quigley et al. (SAFMC 2009) stated its conclusions and recommendations in terms of the original “goals and objectives” from Amendment 5 that established the ITQ program. The findings are presented here:

Overall Goal for the program:

Manage the wreckfish sector of the snapper grouper fishery so that its longterm economic viability will be preserved.

Conclusion: Unable to analyze until indicators of “longterm economic viability” are given.

Recommendations:

- 1) Redefine overall goal or define what appropriate indicators of “longterm economic viability” and direct staff to analyze these indicators so that this goal can be analyzed or change overall goal to something measurable;
- 2) Consider implementation of an economic cost data collection program for the wreckfish fishery so that profitability can be measured; and
- 3) Consider holding a wreckfish shareholder meeting to discuss changes to the program to more accurately meet these or revised objectives.

Objective 1: Develop a mechanism to vest fishermen and create incentives for conservation and regulatory compliance whereby fishermen can realize potential longrun benefits from efforts to conserve and manage the wreckfish resource.

Conclusion: Objective has been achieved.

Recommendations:

- 1) Consideration of assistance in development of the market for wreckfish; and
- 2) Consider holding a wreckfish shareholder meeting to discuss changes to the program to more accurately meet these or revised objectives.

Objective 2: Provide a management regime which promotes stability and facilitates longrange planning and investment by harvesters and fish dealers while avoiding, where possible, the necessity for more stringent management measures and increasing management costs over time.

Conclusion: Unable to analyze until indicators of “investment” are given.

Recommendations:

- 1) Redefine objective or define what indicators could be used to measure “investment” and direct staff analyze these indicators; and
- 2) Consider holding a wreckfish shareholder meeting to discuss changes to the program to more accurately meet these or revised objectives.

Objective 3: Develop a mechanism that allows the marketplace to drive harvest strategies and product forms in order to maintain product continuity and increase total producer and consumer benefits from the fishery.

Conclusion: Unable to analyze if objective has been met due to lack of data.

Recommendations:

- 1) Create mechanisms for increased participation by interested parties without decreasing the current value of the fishery to active fishermen and shareholders (obtained from ownership of shares) such as:
 - a) A use or lose provision that has a requirement for use or sale of coupons over 25 years or the associated quota share is available to be sold to interested parties;
 - b) Redistribution of shares belonging to deceased quota shareholders or holders that are not able to be contacted over a long period of time; and
- 2) Revise coupons to be available in pound increments instead of 100 and 500 pound increments so fishermen can avoid forfeiting their allocated annually poundage.

Objective 4: Promote management regimes that minimize gear and area conflicts among fishermen.

Conclusion: Objective has been achieved with implementation of the ITQ program.

Recommendations: None.

Objective 5: Minimize the tendency for overcapitalization in the harvesting and processing/distribution sectors.

Conclusion: An analysis of overcapitalization was not able to be conducted. However, it is unlikely that the fishery is overcapitalized.

Recommendations: None.

Objective 6: Provide a reasonable opportunity for fishermen to make adequate returns from commercial fishing by controlling entry so that returns are not regularly dissipated by open access, while also providing avenues for fishermen not initially included in the limited entry program to enter the program.

Conclusion: Providing ways for new people to enter the fishery could be expanded upon. Monetary returns might be increased with recommendations. Administration of controlled entry could be improved with identification of what is an “excessive share”.

Recommendations:

- 1) Increase the potential for increased participation by allowing for fishermen to fish for wreckfish with ownership of a wreckfish permit and annual pounds only;
- 2) Provide a venue for sellers and interested buyers to post quantities and prices for available shares and coupons such as a Council, NMFS, or contracted website similar to Craigslist which allows monitored postings of wanted or sale of quota share and coupons with associated contact info;
- 3) Identify what would be considered excessive shares for the fishery. Direct staff to make a presentation to the Council on how to identify excessive shares based on published NMFS guidance in “The Design and Use of Limited Access Privilege Programs” (Anderson and Holliday 2007) and provide suggestions;
- 4) Require reregistration for continued issuance of quota share or implement a use or lose type rule so that quota shares attributed to deceased or uninterested shareholders can be released for others to use; and
- 5) Analyze the potential impact of various percentage allocations of the ACL to the recreational sector and use that allocation to grant a bycatch allowance and/or a bag limit for recreational fishermen.

2.0 Data Collection and Reporting within the Wreckfish ITQ Program

According to Section 303A(c)(1)(H) of the MSA, each LAPP must include “an effective system for enforcement, monitoring, and management of the program, including the use of observers or electronic monitoring systems.” This review should highlight any important data gaps or deficiencies, including gaps in the ability to validate collected data and any cost estimates for filling any gaps or deficiencies as some data improvements may be cost-prohibitive given current resources and other factors. This review should document the reporting burden on participants, evaluate if current data collection programs are redundant, and identify any potential means to reduce reporting burden.

In the wreckfish program, quota shares and quota pounds are monitored using share certificates and coupons, respectively. Quota shares are the long-term catch privileges denominated as a percentage of the commercial annual catch limit (ACL). A shareholder’s quota pounds are the annual form of quota that results from the multiplication of quota shares and the commercial ACL for a specific fishing year. For e.g., if entity shareholder possesses 2% of the quota shares and the commercial ACL is 400,000 lbs in a particular fishing year, then the shareholder’s quota pounds for that year is 8,000 lbs. Changes in the commercial ACL will lead to changes in each shareholder’s quota pounds, but will not affect a shareholder’s quota shares. SERO issues share certificates and coupons, and also processes transfers of quota shares.

Since the beginning of the 1992-1993 wreckfish season, four separate but related data collection forms have been used by the SEFSC to monitor the wreckfish fishery:

- 1) wreckfish vessel logbooks;
- 2) monthly wreckfish dealer reports;
- 3) vessel coupons; and
- 4) dealer coupons.

Landings, effort, and participation data are primarily collected by the wreckfish vessel logbook. A monthly wreckfish dealer reporting system provides partial verification for the landings, effort, and participation data as well as the ex-vessel price and ex-vessel revenue data.

The vessel logbook records landings of wreckfish in pounds, numbers of wreckfish, dates of departure and return, duration of trip, and vessel and dealer identifiers for each trip. In a less accurate and complete way, it also records incidental landings of other species, gear, fishing time, fishing location, and fishing depth data for each trip. There may be some missing (not reported) data for some of these "secondary" trip characteristics, but records with blank or missing data are excluded from the analysis of that particular fish parameter. Vessel owners participating in the fishery are required to fill out a logbook for each month the fishery is open. The fishing year begins on April 16 and runs through April 15 of the next calendar year, although harvest is prohibited during the wreckfish spawning-season closure from January 15 – April 15 of each year. A "no fishing" report is required if no fishing is done for an entire month that the fishery is open. No fish reports can be submitted on the same form as the fishing reports. Corresponding coupons are sent in with the logbook form for each trip that is taken. Coupons are used to count quota pounds that are used for each trip.

Because of the separate but related data sources, for the analyses in this review, the SEFSC joined the vessel logbook and dealer report datasets. This derived data set contains a small number of "orphan" records from the dealer reports and vessel logbook datasets in cases where records from the two data sets could not be matched. Also, there are multiple dealer reports for a vessel logbook trip report when the landings were sold to multiple dealers. When two dealer reports have been identified for the same trip, total pounds for the trip are estimated and the proportion of each dealer report toward the total is calculated. Dealers purchasing wreckfish are also required to submit a dealer report, along with the corresponding coupons for wreckfish purchases, for each month that the fishery is open.

The monitoring program is a paper-based system that is managed through two different line offices: SERO and SEFSC. This creates a division in the management of the program, and thus all the information regarding activity in the program is not retained within a single database. Maintaining data across multiple datasets that are not part of a single database creates a challenge for monitoring the program in its entirety. While each line office effectively manages the components of the monitoring program for which it is responsible at present, this structure prevents NMFS from monitoring activity on a real-time basis, and increases the costs of monitoring the program and evaluating its performance. Costs could be decreased and benefits could be increased by managing the entire system through one office or in one system. To that end, program performance could be improved by moving to an electronic system that is managed completely by the regional office. The current structure of the Wreckfish program lends itself well to the electronic reporting system already in place for other Catch Share programs managed by the regional office (e.g., Gulf of Mexico IFQ programs, Highly Migratory Species' Bluefin Tuna Individual Bycatch Quota (IBQ) program, pilot catch share program for the Gulf Headboat Collaborative, etc.). Benefits of moving to an electronic system could result from the following:

- One database containing all program activity (e.g., landings, effort, and participation; transfers of quota shares and quota pounds; ex-vessel, share, and quota pound prices, etc.).
- More timely and accurate data reporting and real-time monitoring.
- Improved method and reduced time to transfer shares and quota pounds.
- Automated share cap calculations.
- Ability to more accurately match shareholder agents/contractors from permit records with shareholder accounts.
- Participants able to view their transfer and landings history.
- Elimination of coupons, which would:

- Allow quota pounds to be transferred or landed in one pound increments rather than 100 and 500 lbs increments, which would eliminate loss of quota pounds due to denominational restrictions.
- Eliminate the need to print coupons and mail coupons to the shareholders.
- Eliminate the need to mail in coupons to the SEFSC.

3.0 Environment

3.1 Biological

Stock Status and Assessment Issues

In the 2018 2nd quarter report of status of stocks to U.S. Congress, wreckfish in the South Atlantic is listed as not undergoing overfishing and is not overfished (<https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2018-quarterly-updates>).

A statistical catch-at-age assessment of the wreckfish stock in the South Atlantic was initially conducted in 2012 (Butterworth and Rademeyer 2012) and determined that wreckfish in the South Atlantic was not undergoing overfishing and was not overfished. Following the November 2012 Council’s Scientific and Statistical Committee (SSC) meeting, and based on the recommendations of the SSC, the Council adopted a new third-party peer review process in 2013, and determined that this assessment should be subject to that process. The SSC reviewed the revised assessment at their April/May 2014 meeting (Rademeyer and Butterworth 2014), accepted it as representing the best scientific information available on the current status of wreckfish in South Atlantic waters, and recommended it as appropriate for management decisions.

Catch Levels

During fishing years 2009/2010-2016/2017, an average of 269,785 lbs whole weight (ww) wreckfish were landed with an average weight of 32 lbs ww (Table 3.1.1; Figures 3.1.1 and 3.1.2).

Table 3.1.1. Wreckfish landings, average weight (lbs ww), and percent (%) quota/ACL caught during fishing years 2009/2010-2016-2017.

Fishing Year	Landings (lbs ww)	Quota/ACL (lbs ww)	Average Weight (lbs ww)	% Quota/ACL caught
2009/2010	217,229	2,000,000	35.8	11%
2010/2011	266,270	2,000,000	36.8	13%
2011/2012	318,809	2,000,000	38.6	16%
2012/2013	213,701	223,250	36.7	96%
2013/2014	216,542	223,250	34.5	97%
2014/2015	190,639	223,250	35.9	85%
2015/2016	359,081	433,000	27.5	83%
2016/2017	376,013	423,700	29.9	89%
Average	269,785		34.5	

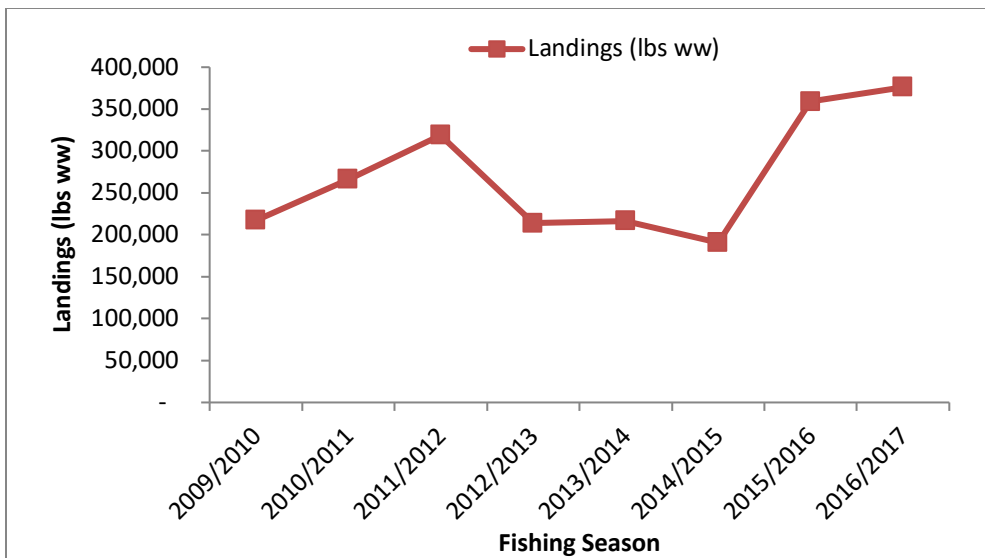


Figure 3.1.1. Wreckfish landings (lbs ww) during fishing years 2009/2010-2016-2017.

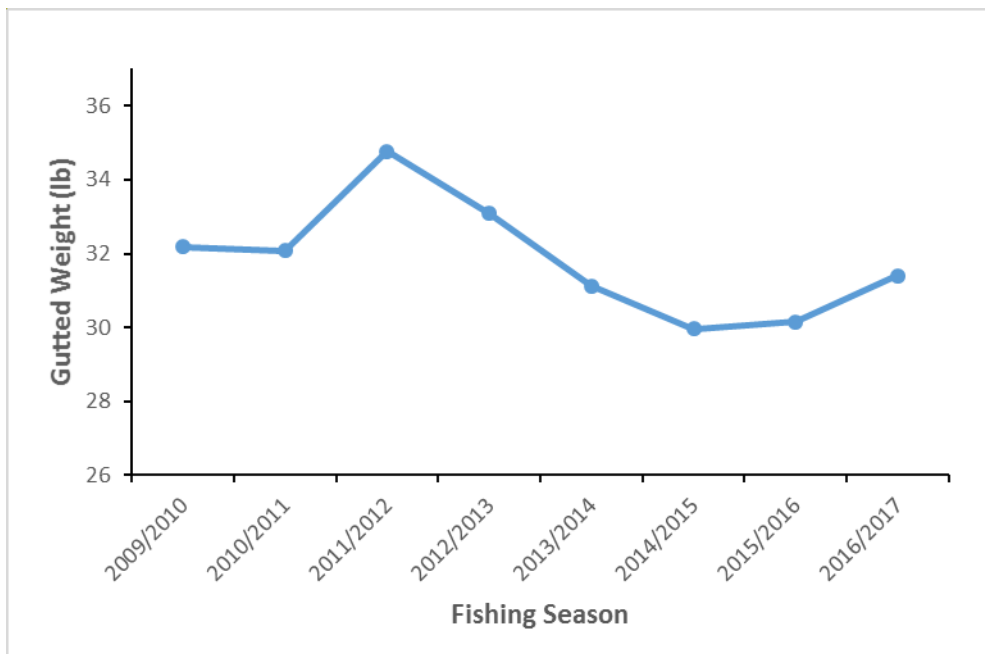


Figure 3.1.2. Average weight (lbs ww) of wreckfish harvested during fishing years 2009/2010-2016-2017.

Regulatory Amendment 22 (SAFMC 2015) implemented the following catch levels for wreckfish (**Table 3.1.2**) based on the results of the assessment described above.

Table 3.1.2. Acceptable biological catch (ABC) and ACLs for wreckfish specified under Regulatory Amendment 22 (SAFMC 2015) where ACL = optimum yield (OY) = ABC. The ACL for 2020/2021 would remain in place until modified.

Fishing Year	New ABC lbs ww	ACL	Commercial ACL (95%)	Recreational ACL (5%)
2015/2016	433,000	433,000	411,350	21,650
2016/2017	423,700	423,700	402,515	21,185

Fishing Year	New ABC lbs ww	ACL	Commercial ACL (95%)	Recreational ACL (5%)
2017/2018	414,200	414,200	393,490	20,710
2018/2019	406,300	406,300	385,985	20,315
2019/2020	396,800	396,800	376,960	19,840
2020/2021	389,100	389,100	369,645	19,455

The commercial and recreational ACLs have not been exceeded during fishing years 2009/2010-2016-2017.

Wreckfish Mortality (Natural vs Discards) and Bycatch

Very little is known outside of the fishery dependent data available from the fishery conducted at the Charleston Bump off South Carolina. Available life history data reflect data from older and bigger fish, with low sample sizes for smaller, younger fish. Rademeyer and Butterworth (2014) estimated natural mortality (M) for wreckfish at 0.037 per year. Lytton et al. (2016) recommends using M at 0.09 for wreckfish stock assessment.

In the wreckfish commercial sector, barrelfish (*Hyperoglyphe perciformes*) and red bream (*Beryx decadactylus*) are caught as bycatch (Goldman and Sedberry 2011) and are likely sold or used for personal consumption. Other species collected by Goldman and Sedberry (2011) on vertical lines with baited hooks from 400 to 800 m depth, on and around Charleston Bump were: splendid alfonsino (*Beryx splendens*), conger eel (*Conger oceanicus*), gulper shark (*Centrophorus granulosus*), roughskin dogfish (*Cirrhigaleus asper*), and shortspine dogfish (*Squalus mitsukurii*). Fishermen could harvest one of these species and return co-occurring species to the water as “regulatory discards” (e.g., if the fish are under the size limit) or if undesirable; however, a portion of the discarded fish would not survive due to the depths at which these fish are caught. Wreckfish are rarely encountered by recreational fishermen and discard mortality would be 100% due to the depths at which they are captured.

3.2 Economic Environment

The Wreckfish ITQ program is one component of the Snapper-Grouper Fishery Management Plan. As such, wreckfish harvesters are a small portion of the larger group of commercial fishing operations under the SAFMC’s and NMFS’s jurisdiction. Additional economic information on the commercial sector of the snapper-grouper fishery can be found in Amendment 41 (SAFMC 2017), Amendment 37 (SAFMC 2016), Amendment 36 (SAFMC 2016), Regulatory Amendment 25 (SAFMC 2016), and Amendment 35 (SAFMC 2015) to the FMP. This section will concentrate on components of the economic environment that are relevant to the wreckfish ITQ Program.

3.2.1 Shareholders

The primary purpose of Amendment 20A (SAFMC 2012) was to eliminate “inactive” shareholders (i.e., those who had not harvested the quota pounds derived from their shares in many years) and redistribute the “inactive” shares they possessed to entities that had been harvesting the quota pounds associated with their shares. The desire to reduce the number of shareholders was driven by a significant decrease (approximately 89%) in the commercial ACL for wreckfish beginning in the 2012/2013 fishing year, which in turn could not economically sustain a higher number of harvesters than those participating in

the fishery at the time. Inactive shareholders held a significant percentage of the shares and thus of the coupons/quota pounds. Further, the limited number of share and coupon transfers suggested that the share and quota pound markets were not operating as intended to correct the problem, which in turn did not allow those quota pounds to be harvested. As Table 3.2.1.1 illustrates, Amendment 20A (SAFMC 2012) was successful in significantly reducing the number of shareholders. The number of shareholders in this table reflect the total number of shareholders that held shares at any time during the fishing year.

Table 3.2.1.1. Number of wreckfish ITQ shareholders, 2009-2016.

Year	Number of Shareholders
2009	27
2010	26
2011	33
2012	11
2013	7
2014	6
2015	6
2016	6

Most of Amendment 20A's (SAFMC 2012) intended effects actually occurred prior to the effective date of the final rule (October 26, 2012) as numerous share transfers occurred in the preceding months. The high number of share transfers is reflected by the relatively large number of shareholders in 2011/2012. Inactive shareholders had an incentive to sell their shares prior to the effective date of the final rule as their shares would have been revoked after that date and thus they would not have received any economic compensation for those shares. Although the inactive shareholders may not have received as much as they would have liked, they were economically better off by selling their shares to active shareholders who intended to remain in the program. In addition, Amendment 20A (SAFMC 2012) provided information to active shareholders regarding what percentage of additional shares they could expect to receive as a result of inactive shares being revoked and redistributed. Although no entity would be allowed to acquire more than 49% of the total shares as a result of the new share cap established under Amendment 20A (SAFMC 2012), some active shareholders wanted to increase their shares by more than what they were likely to get as a result of redistribution, and so those shareholders had an incentive to buy more shares than what they would have acquired as a result of redistribution.

Statistics regarding the distribution of shares across shareholders from 2009/2010 through 2016/2017 are provided in Table 3.2.2.2. These statistics only include shareholders that possessed shares at the end of each fishing year, and thus the number of shareholders is not always the same as in Table 3.2.2.1. These statistics also do not account for affiliations between shareholders (e.g., where a particular entity may have an ownership interest in multiple share certificates). Table 3.2.2.1 demonstrates that, as the number of shareholders decreased directly or indirectly as a result of Amendment 20A (SAFMC 2012), the minimum, maximum, and average (median and mean) percentage of shares held by each shareholder increased. Table 3.2.2.1 also demonstrates the redistribution that occurred in 2011/2012 prior to the effective date of the final rule that implemented Amendment 20A (SAFMC 2012). Table 3.2.2.1 also demonstrates that the distribution of shares across shareholders has remained constant since the end of 2012/2013 (i.e., after Amendment 20A (SAFMC 2012) took effect). Finally, Table 3.2.2.1 illustrates the share cap of 49% that was established under Amendment 20A (SAFMC 2012).

Table 3.2.1.2. Quota Share Statistics, 2009/2010-2016/2017. Shares are in percentages.

Statistic	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Number of Shareholders	26	25	11	6	6	6	6	6
Minimum Shares	0.06	0.06	0.06	2.99	2.99	2.99	2.99	2.99
Maximum Shares	16.43	16.43	44.61	49.00	49.00	49.00	49.00	49.00
Median Shares	1.89	2.18	6.17	10.23	10.23	10.23	10.23	10.23
Mean Shares	3.85	4.00	9.09	16.67	16.67	16.67	16.67	16.67

3.2.2 Permits

Wreckfish shareholders must possess a valid South Atlantic snapper grouper permit in order to harvest wreckfish. A vessel with an SG1 permit can harvest up to the full commercial trip limits for all snapper grouper species. A vessel with an SG2 permit is limited to 225 lbs total of snapper grouper species per trip. The snapper grouper permits are limited access permits, meaning that no new permits can be issued. Snapper grouper permits expire approximately one year from renewal and will terminate if not renewed within one year of the expiration date.

In 2008, the number of SG1 and SG2 permits was 664 and 151, respectively. According to the information in **Table 3.2.2.1**, the number of SG1 permits has decreased steadily over time, in large part due to the requirement, in most circumstances, to exchange two such permits for one new permit when requesting a permit transfer.⁵ SG2 permits are not transferable except to a different vessel under the same owner or to an immediate family member. Although the decrease in SG1 permits has been greater in absolute numbers than the decrease in SG2 permits from 2008 to 2016 (99 vs 35), the percentage decrease in SG2 permits has been greater than the percentage decrease in SG1 permits (23% vs 15%). Given that the 2 for 1 requirement only applies to SG1 permits, it is likely that other regulatory and economic factors have contributed to these declines, particularly for the SG2 permits.

Table 3.2.2.1. Number of valid and renewable South Atlantic commercial snapper grouper permits, 2009-2016.⁶

Year	Number of permits		Change		% Change	
	SG1	SG2	SG1	SG2	SG1	SG2
2009	639	144	-25	-7	-3.76%	-4.64%
2010	624	139	-15	-5	-2.35%	-3.47%
2011	615	138	-9	-1	-1.44%	-0.72%
2012	604	132	-11	-6	-1.79%	-4.35%
2013	592	129	-8	-3	-1.32%	-2.27%

⁵ Exceptions to this requirement are specified in CFR Section 622.171, paragraphs (b)(1)(i) and (ii).

⁶ Counts of SG permits are on a calendar year basis.

Year	Number of permits		Change		% Change	
	SG1	SG2	SG1	SG2	SG1	SG2
2014	584	125	-8	-4	-1.35%	-3.10%
2015	571	121	-13	-4	-2.23%	-3.20%
2016	565	116	-6	-5	-1.05%	-4.13%

Source: SERO SF-Permits Database, accessed 6/21/2018.

According to MacLauchlin (2018), the average price of an SG1 permit was about \$40,000 in 2011. As of early 2018, the average price had increased to around \$70,000, or by 75% since 2011. Also, temporary use of an SG1 permit has become common. Although leasing of permits is not allowed under the regulations, fishermen have found ways around this restriction, such as by entering contracts indicating that a vessel that has an SG1 permit is being leased. Current data is insufficient to determine exactly how many permits are being “leased” under this and other types of private arrangements. However, MacLauchlin (2018) estimates that the average price of a 1-year “lease” associated with an SG1 permit was about \$7,000 in early 2018.⁷

Snapper grouper permits do not allow harvest of wreckfish. To commercially land wreckfish, a vessel must also have a commercial wreckfish permit. Commercial wreckfish permits have open access as well as limited access characteristics. Commercial wreckfish permits are only issued to vessels owned by entities with shares in the wreckfish ITQ program, and thus are limited to a large extent by the number of shareholders in the program (see Section 3.2.4). However, shareholders that own multiple vessels can have permits on each vessel they own, and thus the number of permits can be larger than the number of shareholders. Also, commercial wreckfish permits are only issued for a single fishing year and thus do not terminate, unlike limited access permits. Table 3.2.2.2 illustrates how the number of commercial wreckfish permits has changed from 2009 through 2016.

The number of permits has declined from about 15 permits to 8 permits per year on average between the 2009-2011 time period to the 2012-2016 time period, or by almost 50%. The decline in permits is directly related to the decrease in shareholders discussed in Section 3.2.1, and thus directly and indirectly to the action to revoke and redistribute “inactive” shares in Amendment 20A. The number of issued permits is still typically higher than the number of active vessels in each year (see Section 3.2.3), indicating shareholders apply for permits but sometimes do not actually use them for harvesting wreckfish in a particular year. However, the number of “unused” permits in a given year has decreased significantly as a result of the decrease in shareholders. Also, although the number of shareholders was significantly greater than the number of permits from 2009-2011, the number of shareholders has been about the same as the number of permits in subsequent years and was actually greater in 2014 and 2016, as some shareholders own multiple vessels and chose to put permits on more than one vessel. Also, when compared to the number of active vessels, the number of permits was more than double the number of active vessels in each year from 2009-2011. And though this was still the case in 2012, the number of permits and active vessels have largely been about the same in subsequent years, in large part due to the removal of “inactive” shareholders and thus permit holders as a result of Amendment 20A.

⁷ Depending on the nature of the agreement, this price may not only reflect the cost of the SG1 permit.

Table 3.2.2.2. Number of commercial wreckfish permits by fishing year, 2009-2016.⁸

Year	Number of Permits
2009	15
2010	14
2011	17
2012	12
2013	7
2014	7
2015	5
2016	8

Source: SERO SF-Permits Database, accessed 6/22/2018.

3.2.3 Vessels

The information in Table 3.2.3.1 describe the activity of all 14 vessels that were active in the Wreckfish IFQ program from calendar years 2009 to 2016, including their activities in South Atlantic and Gulf non-IFQ fisheries. The maximum annual gross revenue earned by a single vessel during this time was \$1,403,065 (2016 dollars), though the median gross revenue was lower at about \$260,000 and the mean was lower still at around \$205,000. Although a majority of these vessels' gross revenue came from harvesting wreckfish, nearly as much came from harvesting non-IFQ species in the South Atlantic, and in 2009 one of the active wreckfish vessels also harvested species in the Gulf of Mexico.

Table 3.2.3.1. Revenue per vessel statistics for the 14 vessels active in the Wreckfish IFQ Program from 2009-2016. All dollar estimates are in 2016 dollars.

Statistic	IFQ Revenue	Other Logbook Revenue	Total Gross Revenue
Maximum	\$1,067,472	\$1,403,065	\$1,403,065
Median	\$103,877	\$122,624	\$259,067
Mean	\$174,343	\$248,940	\$204,947
Total	\$8,019,790	\$7,966,083	\$15,985,873

Source: Wreckfish Program Logbooks and Dealer Records, SEFSC Logbooks.

Vessel participation was fluid for a small fishery and not all of these vessels were active in the wreckfish IFQ fishery or any other fishery covered by the Southeast Coastal logbooks in every year during this time. The number of vessels that were active in the IFQ programs in each year varied between 5 and 7 vessels, as can be seen in Table 3.2.3.2 below. Note that participation in and revenue from the wreckfish IFQ program dipped when the ACL was lowered for the 2012-2014 seasons. The vessels were much more likely to participate in other South Atlantic fisheries during those years (primarily other species in the snapper grouper fishery) and revenue from those other species outstripped wreckfish revenue until the commercial wreckfish ACL was increased in 2015.

⁸ Counts of wreckfish permits are on a calendar year basis.

Table 3.2.3.2. Total revenue and revenue per vessel statistics for the 14 vessels active in the Wreckfish IFQ Program from 2009-2016 by year. All dollar estimates are in 2016 dollars.

Year	Number of Vessels	Statistic	IFQ Revenue	Other Logbook Revenue	Total Gross Revenue
2009	7	Max	\$395,479	\$228,537	\$395,479
		Median	\$21,334	\$67,721	\$78,276
		Mean	\$82,643	\$92,345	\$135,411
		Total	\$578,501	\$369,378	\$947,879
2010	7	Max	\$511,844	\$516,137	\$521,988
		Median	\$18,144	\$122,939	\$155,971
		Mean	\$114,031	\$163,661	\$230,931
		Total	\$798,214	\$818,305	\$1,616,519
2011	7	Max	\$443,837	\$662,625	\$717,351
		Median	\$112,925	\$58,414	\$159,716
		Mean	\$138,171	\$199,476	\$252,157
		Total	\$967,197	\$797,904	\$1,765,101
2012	5	Max	\$327,690	\$984,218	\$1,071,621
		Median	\$98,938	\$90,788	\$314,370
		Mean	\$152,451	\$294,592	\$388,124
		Total	\$762,255	\$1,178,367	\$1,940,622
2013	5	Max	\$394,853	\$891,247	\$957,481
		Median	\$84,227	\$176,680	\$394,853
		Mean	\$153,701	\$334,684	\$421,448
		Total	\$768,505	\$1,338,734	\$2,107,239
2014	7	Max	\$441,936	\$1,403,065	\$1,452,030
		Median	\$119,678	\$163,936	\$396,758
		Mean	\$103,910	\$561,936	\$344,739
		Total	\$727,367	\$1,685,809	\$2,413,176
2015	7	Max	\$945,197	\$590,276	\$945,197
		Median	\$210,288	\$163,916	\$450,684
		Mean	\$231,403	\$299,727	\$359,857
		Total	\$1,619,819	\$899,182	\$2,519,001
2016	7	Max	\$1,067,472	\$541,026	\$1,067,472
		Median	\$168,816	\$109,578	\$331,265
		Mean	\$295,236	\$175,681	\$394,443
		Total	\$1,882,699	\$878,404	\$2,761,103

Source: Wreckfish Program Logbooks and Dealer Records, SEFSC Logbook Series.

3.2.4 Dealers

Ten dealers purchased wreckfish from shareholders from 2009 to 2016. Just as the number of active shareholders has fluctuated during this time period, so has the number of purchasing dealers, with between three and six dealers active in the wreckfish markets in any given year. There is no clear trend

of increases or decreases in the number of active wreckfish dealers over the time period. The dealers are geographically dispersed, generally located near to one of the active shareholders.

The dealer who handled the most wreckfish combined during these years bought \$5,010,009 of that species during this time, while the largest combined harvest of all species handled by a dealer was \$10,584,656. There was a substantial range in purchases per dealer as evidenced by the spread between the median and mean purchases of both wreckfish (\$36,045 and \$810,456) and all species combined (\$454,247 and \$3,219,059). Half of the dealers purchased less than \$20,000 apiece during this eight year period, and many only purchased in one or two years. Three dealers were responsible for 98% of the purchases of wreckfish during this time, but even for them wreckfish did not constitute the majority of their seafood purchases. Table 3.2.4.1 summarizes the per-year information on wreckfish and non-wreckfish purchases by the ten dealers active in the program.

Table 3.2.4.1. Annual purchases per dealer statistics for the 10 dealers active in the Wreckfish IFQ Program from 2009-2016. All dollar estimates are in 2016 dollars.

Year	Number of Active Dealers	Statistic	IFQ Purchases	Other Purchases	Total Gross Revenue
2009	4	Max	\$513,852	\$994,182	\$1,041,590
		Median	\$31,658	\$806,856	\$567,358
		Mean	\$144,625	\$806,856	\$548,054
		Total	\$578,501	\$1,613,713	\$2,192,214
2010	6	Max	\$660,198	\$1,249,723	\$1,639,498
		Median	\$4,188	\$885,754	\$603,342
		Mean	\$133,036	\$826,659	\$684,141
		Total	\$798,214	\$3,306,634	\$4,104,848
2011	5	Max	\$580,355	\$2,818,979	\$2,819,440
		Median	\$54,791	\$1,183,805	\$1,250,116
		Mean	\$193,439	\$1,497,973	\$1,391,818
		Total	\$967,197	\$5,991,892	\$6,959,089
2012	3	Max	\$383,575	\$1,149,562	\$1,237,029
		Median	\$291,214	\$936,075	\$1,227,288
		Mean	\$254,085	\$972,494	\$1,226,579
		Total	\$762,255	\$2,917,482	\$3,679,738
2013	4	Max	\$393,943	\$1,061,643	\$1,293,383
		Median	\$187,104	\$938,245	\$1,187,049
		Mean	\$192,126	\$966,443	\$916,958
		Total	\$768,505	\$2,899,329	\$3,667,833
2014	3	Max	\$440,186	\$1,096,708	\$1,335,118
		Median	\$238,410	\$954,064	\$1,002,836
		Mean	\$242,456	\$845,169	\$1,087,625
		Total	\$727,367	\$2,535,508	\$3,262,875
2015	4	Max	\$908,718	\$987,183	\$1,846,513
		Median	\$338,785	\$951,283	\$1,314,762
		Mean	\$404,955	\$736,657	\$1,141,612
		Total	\$1,619,819	\$2,946,628	\$4,566,447
2016	5	Max	\$1,129,182	\$778,120	\$1,402,532
		Median	\$55,010	\$269,246	\$789,810

Year	Number of Active Dealers	Statistic	IFQ Purchases	Other Purchases	Total Gross Revenue
		Mean	\$376,540	\$374,969	\$751,509
		Total	\$1,882,699	\$1,874,844	\$3,757,544

Source: Wreckfish Dealer Records, Southeast Fisheries Science Center Accumulated Landings System (ALS).

3.2.5 Economic Performance Indicators

Systematically measuring the economic performance of U.S. catch share programs has been difficult historically because the programs are so diverse in terms of target species, location, size, duration, management objectives, program design features, etc. However, in 2011, NMFS developed a set of standard economic performance indicators that measure the economic performance of catch share programs regardless of their design (Brinson and Thunberg 2016).

The approach adopted in the implementation and use of these indicators is to compare the “baseline” estimate for each indicator to its performance following implementation of the program. The baseline is generally the three-year average of the metric prior to implementing the catch shares program. Metrics included in this group of indicators covered six areas: management context (e.g., whether quota increased); management performance (e.g., whether quota was exceeded and whether season length increased); economic benefits (e.g., whether landings revenue increased, whether quota utilization increased, and whether average prices increased); economic efficiency (e.g., whether revenue per vessel increased); capacity (e.g., whether the number of fishing vessels decreased); and distributional effects (e.g., has the distribution of shares, landings, and revenue become more or less unequal). The metrics used to measure these estimators have been refined and enhanced in specific programs.

When the economic performance indicators program was implemented in 2011, the wreckfish ITQ program was not included in the program because the metrics discussed above could not be publicly released. For fishing years 2001 through 2008, annual landings and revenue were confidential because the number of dealers purchasing wreckfish in each year was less than three. However, as annual landings and revenue data for more recent years are not confidential, NMFS should reassess whether economic performance indicators should be reported for the wreckfish ITQ program.

3.2.6 Economic Returns

Economic return measures for the wreckfish ITQ fishery have been estimated twice throughout the program’s history, once in the first season of the ITQ program (Richardson 1994) and later by Yandle and Crosson (2015) for the 2012-2013 season. Both analyses are based on a combination of wreckfish logbook data, wreckfish dealer data, and an economic survey at the vessel level. The economic surveys collect data on gross revenue, variable costs, fixed costs, as well as some auxiliary economic variables (e.g., market value of the vessel) (Table 3.2.6.1).

Table 3.2.6.1. Variable costs collected by economic surveys.

Crew	\$166,860
Fuel	\$112,115
Bait	\$32,027
Ice	\$12,780
Unloading	\$31,800
Gear repair/replace	\$28,809
Trip repairs	\$19,667
Groceries	\$22,672
Other variable costs	\$29,500
Total variable costs	\$456,230

The analysis was modeled on those done in other SEFSC-monitored fisheries (e.g. Liese 2013, Overstreet et al. 2017). Trip net revenue is trip revenue minus the costs for fuel, bait, ice, groceries, miscellaneous, and hired crew. Trip net revenue was positive in both Richardson (1994) and Yandle and Crosson (2015), generally indicating that “profits” were being earned on wreckfish trips, though some trips earned much greater profits than others. Wreckfish-related fixed costs for each vessel were multiplied by the percentage of boat revenues accounted for by wreckfish. Because the fleet is so small, only summary information is provided. Landings information is from the wreckfish logbook data set. Price data was derived from the wreckfish dealer reports and broken down by vessel and area to give a more accurate basis for estimating each boat’s profits. Economic return on asset value was calculated by dividing the net revenue from operations by the reported vessel value (Table 3.2.6.2).

Table 3.2.6.2. Economic return from vessel operations.

Total pounds landed (whole)	203,019
Total pounds landed (gutted)	192,523
Average value/lb (gutted)	\$3.64
Total landings revenue	\$701,005
Total variable costs	\$456,230
Total fixed costs	\$126,257
Fleet profit (net revenue)	\$118,518
Total fleet assets	\$1,375,000
Net return (net revenue/landings revenue)	17%
Economic annual return (wreckfish net revenue/assets)	9%

Yandle and Crosson (2015) also provided a comparison of their survey results to those of Richardson, as shown below. Net returns were very similar, although the return on assets was much lower, due to the drastically reduced volume of landings and vessels during the 20-year time span between surveys.

Table 3.2.6.3. Economic return from vessel operations (Yandle and Crosson, 2015).

	<u>1992-1993</u>	<u>1992-1993</u> <u>adjusted</u>	<u>2012-2013</u>
Active Vessels	17	17	5
Total Landing Revenue	\$1,952,766	\$3,104,898	\$701,005
Total Costs	\$1,598,092	\$2,540,966	\$581,487
Fleet Net Revenues	\$354,674	\$563,932	\$118,518
(Profit)			

	<u>1992-1993</u>	<u>1992-1993</u> <u>adjusted</u>	<u>2012-2013</u>
Net Return	18% ⁹	18%	17%
Fleet Assets	\$1,737,536	\$2,762,682	\$1,375,000
Fleet Return on Assets	20%	20%	9%

3.2.7 Imports

Imports of seafood products compete in the domestic seafood market and have in fact dominated many segments of the seafood market. Imports aid in determining the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for wreckfish, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to domestic production of wreckfish, imports tend to cushion the adverse economic effects on consumers resulting from a reduction in domestic landings. The following describes the imports of snapper and grouper products which are thought to directly compete with domestic landings of wreckfish.¹⁰

Imports of fresh snapper increased from 21.4 mp product weight (pw) in 2009 to 22.7 mp pw in 2010, but then decreased to 21.7 mp pw in 2011. Total revenue from fresh snapper imports increased from \$55 million (2016 dollars) in 2009 to \$66 million in 2011 due to a significant increase in the per pound price of fresh snapper imports in 2010 and 2011. Imports of frozen snapper were substantially less than imports of fresh snapper from 2009 through 2011. Frozen snapper imports increased from 8.1 mp pw in 2009 to 11 mp pw in 2010, decreasing to 8.5 mp pw in 2011. Total revenue from these imports increased from \$17.7 million (2016 dollars) in 2009 to \$26.2 million in 2010, decreasing to \$21.4 million in 2011.

Imports of fresh grouper ranged from 8.3 mp pw in 2009 to 9.4 mp pw in 2010, but decreased to 8.2 mp pw in 2011. Total revenue from fresh grouper imports increased from \$24.3 million (2016 dollars) to \$29.8 million in 2010, but decreased to \$28.3 million in 2011. Imports of frozen grouper were minimal, increasing from 1.2 mp pw in 2009 to 2 mp pw in 2011. Similarly, total revenue from frozen grouper increased from \$2.1 million to \$3.7 million (2016 dollars) from 2009 to 2011.

From 2012 to 2016, imports of fresh snapper increased steadily from 22.7 mp pw to 30.6 mp pw. Total revenue from fresh snapper imports increased from \$69.4 million (2016 dollars) in 2012 to an all-time high of \$90.2 million in 2016. Imports of frozen snapper were substantially less than imports of fresh snapper from 2012 through 2016. Frozen snapper imports ranged from 11.4 mp pw worth \$30.8 million (2016 dollars) in 2012 to 14.4 mp pw worth \$38 million in 2016.

Imports of fresh snappers primarily originated in Mexico, Central America, or South America, and entered the U.S. through the port of Miami. Imports of fresh snapper were highest on average during the months of March through August. Imports of frozen snapper primarily originated in South America (especially Brazil), Indonesia, and Mexico. The majority of frozen snapper imports entered the U.S.

⁹ Richardson (1994), Table 7

¹⁰ Import estimates were derived from <https://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/index#>

through the ports of Miami and New York. Imports of frozen snappers tended to be lowest during March through June when fresh snapper imports were strong.

Imports of fresh grouper ranged from 9.2 mp pw in 2012 to 11.5 mp pw in 2016. Total revenue from fresh grouper imports ranged from \$33.1 million (2016 dollars) to \$47.2 million during this time period. Imports of frozen grouper were minimal, increasing from 1.3 mp pw in 2012 to 1.8 mp pw in 2014, but then decreasing significantly to only .81 mp pw in 2016. Similarly, total revenue from frozen grouper increased from \$2.6 million to \$3.7 million (2016 dollars) from 2012 to 2014, but then declined to \$1.5 million in 2016.

Based on the above information, imports of snapper and grouper products increased significantly in terms of pounds and particularly in terms of value from 2009 through 2016. Although imports of frozen grouper in pounds and value decreased during this time, imports of other snapper and grouper products far outweighed this decrease. Increases in the volume and prices of fresh grouper and particularly fresh snapper drove the overall increase, which is important as imports of fresh snapper and grouper products likely compete with domestic landings of wreckfish more directly than frozen product.

The bulk of fresh grouper imports originated in Mexico and entered the U.S. through Miami and Tampa. From 2012 through 2016, fresh grouper imports were lowest on average during the month of March and higher the rest of the year, with a peak in July. Frozen grouper imports generally originated in Mexico and, to a lesser extent, Asia and entered the U.S. through Miami and Tampa. There was an inverse relationship in monthly imports between frozen and fresh groupers, with average imports being the highest in March for frozen grouper and lower during other months.

3.2.8 Economic Impacts of the ITQ Program

The commercial harvest and subsequent sales and consumption of fish generates business activity as fishermen expend funds to harvest the fish and consumers spend money on goods and services, such as red grouper purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would spend their money on substitute goods and services. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects may be distributed through regional markets and should not be interpreted to represent the impacts if these species are not available for harvest or purchase.

Estimates of the U.S. average annual business activity associated with the commercial harvest of IFQ species in the Gulf were derived using the model¹¹ developed for and applied in NMFS (2017) and are provided in Tables 3.2.8.1 and 3.2.8.2 for “average” conditions in 2009-2011 and 2012-2016, respectively. This business activity is characterized as full-time equivalent jobs, income impacts (wages, salaries, and self-employed income), and output (sales) impacts (gross business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting.

¹¹ A detailed description of the input/output model is provided in NMFS (2011).

The results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models for individual species are not available. From 2009 to 2011, wreckfish landings resulted in approximately \$817,000 million in gross revenue (2016\$). In turn, this revenue generated employment, income, value-added and output impacts of 109 jobs, \$2.97 million, \$4.2 million, and \$8.1 million, respectively. From 2012-2016, wreckfish landings resulted in approximately \$1.15 million in gross revenue (2016\$). In turn, this revenue generated employment, income, value-added and output impacts of 153 jobs, \$4.18 million, \$5.91 million, and \$11.39 million, respectively. Thus, between these two time periods, revenues from wreckfish landings increased by more than \$332,000, or by more than 40%. This increase was partly attributable to the increase in the commercial ACL implemented under Regulatory Amendment 22 (SAFMC 2015) as well as an increase in the average ex-vessel price for wreckfish (see Section 6.2). At the national level, this increase in revenues subsequently lead to an additional 44 jobs, \$1.2 million in income, \$1.7 million in value-added, and \$3.3 million in output.

Table 3.2.8.1. Economic impacts of the Wreckfish ITQ program, 2009-2011. All dollar estimates are in thousands of 2016 dollars and employment is measured in full-time equivalent jobs.

Industry sector	Direct	Indirect	Induced	Total
Harvesters				
Employment impacts	19	3	4	26
Income Impacts	441	82	198	721
Total value-added impacts	470	295	339	1,103
Output Impacts	817	664	657	2,138
Primary dealers/processors				
Employment impacts	4	2	3	8
Income Impacts	144	133	125	402
Total value-added impacts	153	169	236	559
Output Impacts	463	349	461	1,273
Secondary wholesalers/distributors				
Employment impacts	2	0	2	4
Income Impacts	86	25	90	201
Total value-added impacts	91	43	154	288
Output Impacts	230	84	299	613
Grocers				
Employment impacts	8	1	2	11
Income Impacts	176	59	88	323
Total value-added impacts	188	94	150	432
Output Impacts	301	153	294	749
Restaurants				
Employment impacts	49	3	8	60
Income Impacts	707	214	405	1,327
Total value-added impacts	754	383	682	1,820
Output Impacts	1,378	600	1,347	3,325
Harvesters and seafood industry				
Employment impacts	82	9	18	109

Industry sector	Direct	Indirect	Induced	Total
Income Impacts	1,554	513	907	2,974
Total value-added impacts	1,656	984	1,561	4,201
Output Impacts	3,189	1,850	3,059	8,097

Table 3.2.8.2. Economic impacts of the Wreckfish ITQ Program, 2012-2016. All dollar estimates are in thousands of 2016 dollars and employment is measured in full-time equivalent jobs.

Industry sector	Direct	Indirect	Induced	Total
Harvesters				
Employment impacts	27	4	6	36
Income Impacts	620	115	279	1,014
Total value-added impacts	661	415	477	1,552
Output Impacts	1,149	935	925	3,009
Primary dealers/processors				
Employment impacts	6	2	4	12
Income Impacts	202	187	176	565
Total value-added impacts	216	238	332	786
Output Impacts	651	491	649	1,791
Secondary wholesalers/distributors				
Employment impacts	3	1	3	6
Income Impacts	121	36	127	283
Total value-added impacts	129	60	217	405
Output Impacts	323	118	421	862
Grocers				
Employment impacts	11	1	2	15
Income Impacts	248	82	124	455
Total value-added impacts	264	133	211	608
Output Impacts	424	216	414	1,053
Restaurants				
Employment impacts	69	5	11	85
Income Impacts	995	302	570	1,867
Total value-added impacts	1,061	539	960	2,560
Output Impacts	1,939	844	1,895	4,678
Harvesters and seafood industry				
Employment impacts	115	13	26	153
Income Impacts	2,186	722	1,276	4,184
Total value-added impacts	2,331	1,385	2,196	5,912
Output Impacts	4,487	2,603	4,304	11,394

3.3 Social

Because of its small size, when describing the social environment of the wreckfish fishery, the issue of confidentiality quickly constrains the types of information that can be presented to the public. As is often the case with other social environments, in order to meet National Standard (NS) 8, a summary of communities involved and their dependence upon fishing is often presented. Because of the small footprint of the wreckfish fishery that type of description is not possible. Both the number of vessels

and dealers are so few that little description is possible without revealing confidential information. See SAFMC 2011 for another recent description of the social environment.

In the initial wreckfish ITQ review, SAFMC (2009) described a pattern of participation that has shown a steady decline from 1991 to 2009 for both the number of vessels and dealers active in the fishery. Since 2009, there has been a slight increase in participation, although for some vessels it has been sporadic (Figure 3.3.1). Some vessels participated for one year only, while others enter and leave only to enter again a year or two later. Vessel 14 is the only one that has consistently participated over the time period, although both vessels 5 and 9 have only one year they did not have landings (Figure 3.3.1). In 2016 there were 7 vessels (with known vessel IDs) participating in the fishery with landings.

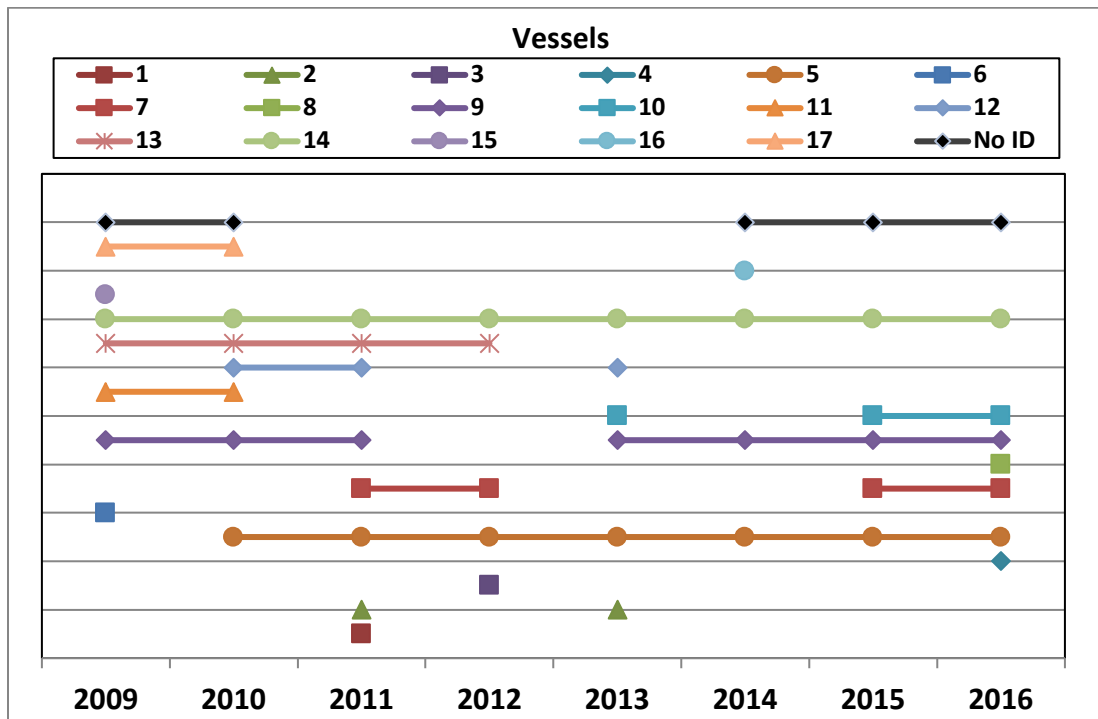


Figure 3.3.1. Vessels participating in the wreckfish fishery with landings 2009-2016. Source: SEFSC 2018.

Participation in the wreckfish fishery is a concern for stakeholders who have suggested that declines in participation due to shifts by some participants to other fisheries may not have been sufficiently considered in the setting of ABCs and ACLs (SAFMC 2009).

Wreckfish has been primarily landed in the states of Florida and South Carolina from 2010 to 2016 with vessels homeported in the communities of Holden Beach, Key Largo, Port Orange, Florida and Charleston, South Carolina. However, shareholders also live in the Jacksonville, Florida area among other towns and communities along with South Atlantic coast. Dealers who handle wreckfish in Florida are in the communities of Daytona Beach, Islamorada, Key Largo, Marathon, Palm Beach Gardens, Port Orange and Tavernier. In South Carolina dealers are located in Charleston, McClellanville and Wadmalaw Island.

With recent changes to the ACLs fishermen have often switched to other fisheries to compensate for reduced quota and for other reasons (Yandle and Crosson 2015). This is evident in Figure 3.3.1 as vessels often drop out of the wreckfish fishery. It is assumed that they have switched to other more lucrative fisheries, but may not always be the case.

Figure 3.3.2 shows the overall commercial fishing engagement for those communities with either vessels homeported or dealers located within the community. Overall commercial engagement is a measure of the importance of fishing within the community as measured by the amount and value of landings, number of vessels and vessel owners located within a community by vessel homeport. Only three communities in Figure 3.3.2 do not exceed both thresholds for fishing engagement in all years. Daytona Beach, Florida and Wadmalaw Island, South Carolina both have at least one year that reaches the lower threshold of ½ standard deviation, while Port Orange exceeds the lower threshold for all years but reaches the highest threshold in only four out of the six years. All other communities score above the highest threshold for all years.

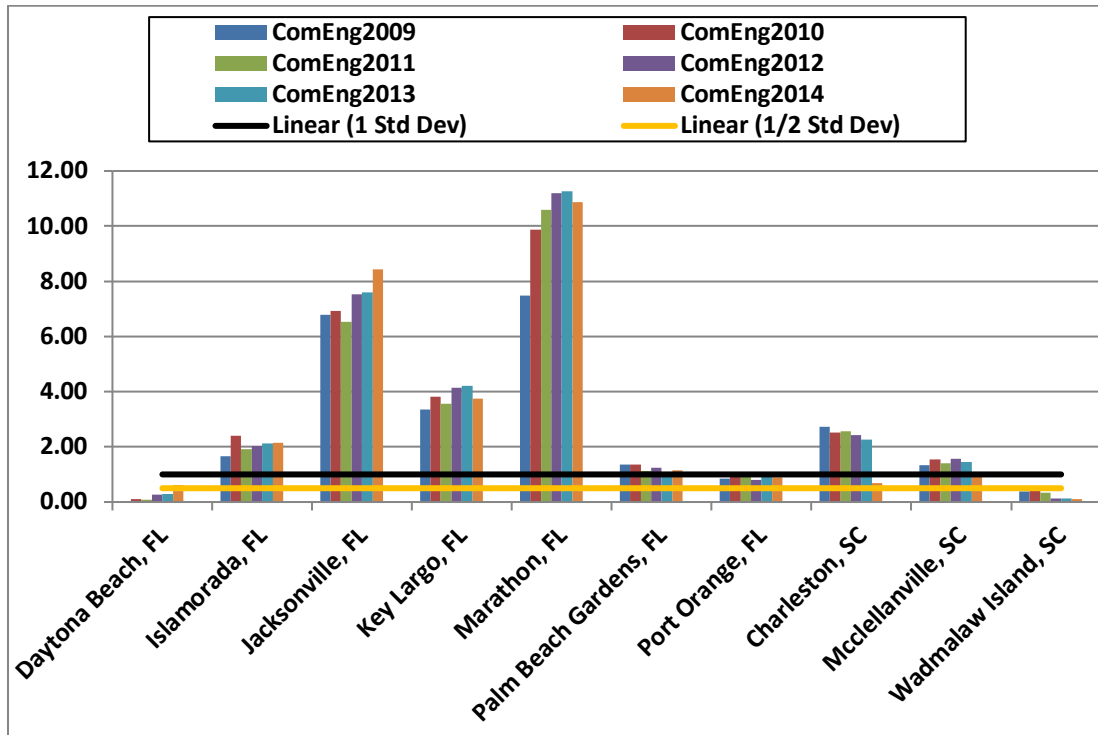


Figure 3.3.2. Overall commercial fishing engagement 2009-2014 for communities with vessels, shareholders or dealers in the wreckfish fishery.
 Source: NMFS SERO Community Social Vulnerability Indicators Database (ACS 2014) 2014.

With most communities exceeding the thresholds in all years, it is likely that commercial fishing plays an important role in the local economy. Other communities that are below the thresholds may have other sectors of their economy that play a larger role or the community defined is not easily demarcated like Wadmalaw Island which is not recognized as a census designated place and placing people within that boundary is more difficult.

Environmental Justice (EJ)

Executive Order 12898 requires that federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. This executive order is generally referred to as environmental justice (EJ).

In order to assess whether a community may be experiencing EJ issues, a suite of indices created to examine the social vulnerability of coastal communities (Colburn and Jepson 2012) is presented in Figures 3.3.3 for those communities that appear in Figure 3.3.1. The three indices are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified as important components that contribute to a community’s vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of vulnerable populations. These indicators are closely aligned to previously used measures of EJ which used thresholds for the number of minorities and those in poverty. For those communities that exceed the threshold, it is expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

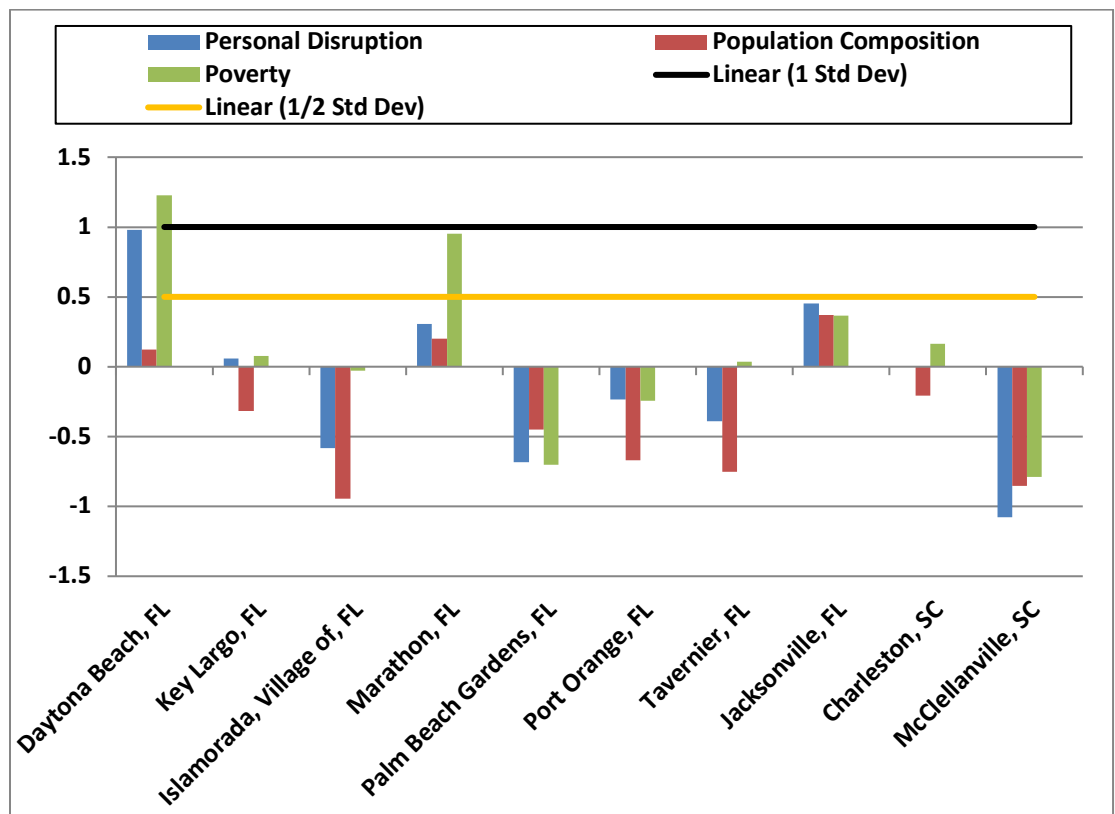


Figure.3.3.3. Social vulnerability indicators for wreckfish fishing communities.
 Source: NMFS SERO Community Social Vulnerability Indicators Database (ACS 2014) 2014.

The communities in Figure 3.3.3 demonstrate few social vulnerabilities, with Daytona Beach the only community that exceeds both thresholds for poverty and close to both thresholds for personal disruption. Marathon is the only other community that exceeds a threshold and that is the ½ standard deviation threshold for poverty.

4.0 Eligibility and Participation in the Wreckfish ITQ Program

4.1 Overview

Section 303A(c)(1)(D) of the MSA indicates that eligibility requirements must be established for LAPPs. Eligibility requirements determine who is allowed to hold shares or allocation (e.g., owner on board provisions, etc.). The section will determine if any restrictions on eligibility are inhibiting or

precluding the achievement of the program's goals and objectives or if any additional restrictions are necessary to achieve particular objectives.

4.2 Eligibility

Eligibility to participate in the Wreckfish ITQ program was established in Amendment 5 (SAFMC 1992). Initial participation requirements included commercial snapper grouper fishermen who could document wreckfish landings during the period beginning January 1, 1989, and ending September 24, 1990 (the effective control date). In addition, the applicant had to be able to document having landed at least an aggregate of 5,000 pounds (dressed weight) of wreckfish between January 1, 1987 and September 24, 1990.

The additional 5,000 lb aggregate minimum wreckfish landings from 1987-1990 was incorporated into the eligibility formula because public comment at the time indicated that a small number of individuals who landed wreckfish in either 1989 or 1990 made only one trip or a partial trip to try wreckfish fishing and never made another trip. The Council did not want to award an initial allocation to those who were not really in the wreckfish fishery. Those who experimented with the fishery and made only one abbreviated trip would have received nearly the same initial allocation as someone who entered the fishery relatively recently, but stayed in the fishery and made a number of trips. The 5,000 lbs threshold was not arrived at arbitrarily; it represented one-half of the trip limit amount, roughly 5-7 days of fishing based on average fishing conditions (SAFMC 1992).

Currently, in order to harvest wreckfish, a fisherman is required to have an open access wreckfish permit, a limited access South Atlantic Unlimited Snapper/Grouper permit, and legally possess ITQ coupons. The Snapper/Grouper permit has additional sets of regulations and reporting requirements. While the wreckfish permit is open access, the ITQ program itself acts as the access-restricting mechanism. Fishermen may apply for a wreckfish permit by completing the Wreckfish permit application.

Furthermore, Amendment 20A (SAFMC 2012) redistributed inactive shares that removed eligibility to fish for wreckfish by some shareholders. Amendment 20A (SAFMC 2012) defined inactive shares as shares belonging to any ITQ shareholder who had not reported wreckfish landings between April 16, 2006, and January 14, 2011, and revert inactive shares for redistribution among active shareholders. Reverted shares were redistributed to remaining shareholders based on their wreckfish landings history from April 16, 2006, through January 14, 2011.

A list of all wreckfish shareholders and wreckfish permit holders are available on the Southeast Regions webpage of frequently asked Freedom of Information Act requests.

4.3 Participation in the IFQ program

Participation in the Wreckfish ITQ program has changed over time (Table 4.3.1). The number of shareholders over time has decreased from the base line time period to the review time period. The decrease in the number of shareholders was directly related to Amendment 20A, where either shareholders transferred all of their shares to an active shareholder or NMFS revoked and redistributed shares from inactive shareholders. Not all shareholders are actively fishing. Each year there were between 5-8 vessels landing at least one pound of wreckfish.

Table 4.3.1. Wreckfish shareholders and vessels, 2009/2010 – 2016/2018 fishing years.

Time Period	Fishing Year	Shareholders	Vessels
Baseline	2009/2010	27	8
	2010/2011	26	7
	2011/2012	33	8
Review	2012/2013	11	6
	2013/2014	7	5
	2014/2015	6	5
	2015/2016	6	6
	2016/2017	6	8

5.0 Allocations, Transferability, and Caps within the Wreckfish ITQ Program

The Magnuson-Stevens Act requires initial allocations to be fair and equitable under all LAPPs. Section 303A(c)(7) of the Magnuson-Stevens Act requires a Council to establish a policy and criteria for the transferability of limited access privileges (shares and allocation). Transferability is generally thought to improve technical efficiency and thus aid in achieving economic efficiency in a fishery (i.e., NS 5 goal). Restrictions on transferability may serve to meet other objectives, such as equity (i.e., NS 4 goal), providing for the sustained participation of and minimizing adverse economic effects on fishing communities (i.e., NS 8 goal), or reducing adverse effects on particular types of habitat. Section 303A(c)(5)(D) of the MSA requires Councils and NMFS to establish limits or caps to prevent the excessive accumulation of harvesting privileges. The accumulation of excessive shares is thought to potentially create market power in the product market, input markets (e.g., gear, bait, labor, etc.), and/or the markets for shares and allocation. Market power creates economic inefficiency, and excessive shares should be avoided for equity/distributional reasons. One of the anticipated effects of limits and caps is to limit the degree of consolidation within the fleet. Consolidation would typically be expected to result in a reduction in capacity and overcapacity, which is a goal of most CSPs. Since allocation, transferability, and caps are explicitly linked together and changes in one may have potential changes in the others, they are reviewed together in this section. This section will review:

- allocations between individuals or entities within the program and the allocations between commercial and recreational sectors.
- if the equity/distributional impacts of existing caps and the impacts those caps have had on the creation of market power by affected entities.
- whether existing transferability provisions are conducive to achieving the specified objectives, keeping in mind that trade-offs often exist between objectives.

5.1 Shares

Share caps are monitored by SERO, who ensures a share cap will not be exceeded before approving a share transfer. This is a manual process that takes into that no person, including a corporation or other entity, may individually or collectively hold greater than 49% of the total shares. For the purpose of considering the share cap, a business' total share is determined by adding the applicable shares held by the business and any other shares held by businesses owned by the original business prorated based on the level of ownership. An individual's total share is determined by adding the applicable shares held by the individual and the applicable shares equivalent to the business share the individual holds in a business. Businesses must provide the identity of the shareholders of the business whenever a wreckfish permit is issued and provide updated information within 30 days of when changes occur.

The number of share transfers were compared from our baseline time period (2009/2010 – 2012/2013 fishing years) to our review time period (2013/2014 – 2016/2017 fishing year) (Table 5.1.1). There were considerably more share transfers in the baseline time period than the review time period. Many of the share transfers occurred in the 2011/2012 fishing year in anticipation of Amendment 20A's

revocation of shares. In that fishing year there were 26 share transfers totaling 67% of all shares (Table 5.1.1). In the most recent years (2014/2015 -2016/2017) there have been no share transfers. While the 2017/2018 fishing year is not included in this review, there have been four share transfers in that time period to three new shareholders. This may be in anticipation of outcomes from this review of the program. Current shareholding can be viewed through the SERO Freedom of Information Act Frequent Requests webpage, under Wreckfish ITQ Shareholders.

In the 2012/2013 fishing year, NMFS revoked shares from inactive accounts and redistributed those shares to the active accounts. Shares were revoked from only four accounts, and redistributed to the six active accounts. The shares revoked totaled 1.402 percent.

Table 5.1.1. Number of shareholders transferring shares and the total percentage transferred by fishing year.

Time period	Fishing Year	N	%
Baseline	2009/2010	2	0.41
	2010/2011	1	1
	2011/2012	26	67.679
Review	2012/2013	2	4.642
	2013/2014	1	2.994
	2014/2015	0	0
	2015/2016	0	0
	2016/2017	0	0

Some shareholders transferred all their shares, while others transferred only a portion of their shares. Those that transferred all of their shareholdings are interpreted as leaving the fishery. From the baseline, out of the 29 share transfers, 24 of those resulted in fishermen transferring all of their shares. Many of those that transferred all of their shares did so in the time period directly preceding Amendment 20A (SAFMC 2012). These were transferred to 8 different active wreckfish shareholders. In the review time period, only two fishermen have transferred all of their shares.

5.2 ITQ Coupons (Allocation)

ITQ coupons are transferred among fishermen through the completion of the sale endorsement located on the back of the coupon. This is then submitted with landings to the Science Center. If the coupon was not used to land wreckfish, NMFS would be unaware of any coupon transfer. SEFSC records in the vessel logbook file whether coupons were purchased in order to complete the landing through a Yes or No indicator and the number of 100 lbs and 500 lbs coupons used. For any given trip multiple 100 lbs and/or 500 lbs coupons may be transferred. In the baseline period, there were no transfers of coupons recorded in the system. The lack of transfers was most likely due to the high quota during those years, which limited the need for transfers required to ensure all harvest could be landed. In the review period, there were a small number of coupons transferred each year equating to total pounds between 10,300 and 43,800 lbs.

Table 5.2.1. Annual number of coupons and number transferred by coupon denomination.

Time period	Fishing Year	100 lb coupons			500 lb coupons		
		# Distrib.	# Trans.	% Trans.	# Distrib.	# Trans.	% Trans.
Baseline	2009/2010	1069	0	0%	3390	0	
	2010/2011	1079	0	0%	3388	0	
	2011/2012	1069	0	0%	3390	0	

Time period	Fishing Year	100 lb coupons			500 lb coupons		
		# Distrib.	# Trans.	% Trans.	# Distrib.	# Trans.	% Trans.
Review	2012/2013	216	8	3.7%	359	19	5.3%
	2013/2014	156	45	28.8%	371	66	17.8%
	2014/2015	356	53	14.9%	331	24	7.3%
	2015/2016	696	55	7.9%	602	49	8.1%
	2016/2017	547	38	6.9%	616	80	13.0%

Table 5.2.2. Total pounds available and transferred.

Time period	Fishing Year	Total pounds distributed	Total pounds transferred	% Pounds Transferred
Baseline	2009/2010	1,801,900	0	0%
	2010/2011	1,801,900	0	0%
	2011/2012	1,801,900	0	0%
Review	2012/2013	201,100	10,300	5%
	2013/2014	201,100	37,500	19%
	2014/2015	201,100	17,300	9%
	2015/2016	370,600	30,000	8%
	2016/2017	362,700	43,800	12%

Moving towards an electronic web-based system where all ITQ coupon or allocation transfers are completed on line would increase the ability to track the transfer of allocation across participants. Transfers could also be in smaller denominations than the ITQ coupons, which may be beneficial to the industry. This would also allow a direct analysis of whom was transferring ITQ coupons to whom. This additional information might add in determining if there were arms-lengths transfers and if transfers crossed regional boundaries. An electronic web-based system could also supply critical quality assurances and checks, as different fields could be made mandatory (e.g., prices, transfer reasons) and/or could restrict the information entered into the field (e.g., identification of transferor and transferee). As some shareholders use agents or contractors to harvest their ITQ coupons, there is not a one-to-one match between the vessels landing wreckfish and the original shareholder. An electronic web-based system would create this one-to-one match and allow for further analysis on allocation transfers among participants.

The Wreckfish ITQ program does not contain an allocation cap, nor is one required for the program. Other catch share programs use various types of allocation caps to monitor and restrict control of the fishery. If it was determined that allocation caps would be beneficial to the program, an electronic system would be able to monitor and control for any allocation cap.

5.3 Recreational Allocation of Wreckfish

Amendment 25 (SAFMC 2011) made the first specific allocation of wreckfish to the recreational sector. That amendment allocated 95% of the total wreckfish ACL to the commercial sector and 5% to the recreational sector. Recreational landings are currently tracked using the Marine Recreational Information Program (MRIP). Wreckfish intercepts by MRIP are exceedingly rare. Only in 2012 did MRIP have a single encounter with only one wreckfish being caught. No other years intercepted wreckfish landings by the recreational sector. With wreckfish MRIP intercepts being so rare, it is uncertain how many are actually being caught by the recreational sector. The Council decided in

December 2018 that a future snapper grouper will include an action that considers allocating the entire wreckfish ACL to the commercial sector or remove the allocation altogether.

5.4 Distributions of Landings, Revenues, and Shares

One of the wreckfish ITQ program's explicit objectives was to "minimize the tendency for overcapitalization in the harvesting and processing/distribution sectors." Although the previous review of this program concluded it was unlikely that overcapacity existed in this program, that conclusion was partly based on the fact that the allowable catch was 2 million lbs at the time. The previous review's conclusion was likely still valid in the 2009/2010-2011/12 baseline time period as, on average, only 13% of the allowable catch was harvested in those years (see Section 3.1). However, after the allowable catch was reduced to 223,250 lbs, the percentage of the allowable catch harvested increased to 93% on average from 2012/2013-2014/2015. The percentage harvested decreased slightly to around 86% in 2015/2016-2016/2017 when the allowable catch was increased.

By significantly reducing the number of shareholders, Amendment 20A (SAFMC 2012) reduced the number of vessels that could potentially harvest wreckfish. However, limiting the number of shareholders does not directly limit the number of vessels that can harvest wreckfish as shareholders can spread their ITQ coupons across multiple vessels they own. As noted in Section 3.3, the average number of vessels harvesting wreckfish has remained about the same between the baseline time period (seven vessels) and the review time period (6.2 vessels). Further, landings in 2015/2016 and 2016/2017 were at their highest level since 1996/1997. Thus, unlike in the previous review, it is not clear that overcapacity is not or could not be a problem in this program.

Regardless of whether the number of participants (i.e., shareholders and vessels) remains the same, the distribution of landings and revenues across vessels and participants in the fishery need not remain the same. For example, if certain types of vessels or participants exit or enter the program over time, then changes in the distributions of landings and revenues are likely to occur. Similarly, the distribution of shares and thus the annual allocation of ITQ coupons would also be expected to change over time.

For example, economic theory suggests that less efficient and typically smaller businesses would be expected to leave the fishery either as a result of having an insufficient amount of quota or because they cannot compete with their larger and more efficient counterparts. Regardless, their shares would be expected to be bought by those with the greatest willingness to pay, which are expected to be those operating at the lowest cost with the highest profits. In turn, those larger, more efficient entities will also accrue the landings and revenues associated with those shares. If this actually occurs, then the distributions of landings, revenues, and shares would be expected to become less equal over time.

The Gini coefficient is commonly used to measure distributional changes over time. The value of the Gini coefficient ranges between 0 and 1. A Gini coefficient of 0 indicates that all entities in the program have an equal or the same percentage of what is being measured (e.g., landings, revenues, shares, etc.), while a Gini coefficient of 1 indicates that a single entity possesses or controls 100% of what is being measured, which in market structure terms is commonly known as a monopoly. Thus, if the Gini

increases over time, the distribution is becoming more unequal; if the Gini decreases over time, the distribution is becoming more equal.

The level at which the analysis is conducted (i.e., the unit of analysis) can be at the vessel, business, lowest known entity (LKE), or some other level. It is advisable to analyze distributional changes at various levels to ensure that choosing a particular level or unit of analysis does not obscure distributional effects that are actually occurring and may be of importance to fisheries managers. It is also advisable to look at changes in the distribution of various economic performance indicators (e.g., landings, revenues, and shares) as their distributional changes may differ over time (i.e., changes may not be of the same magnitude or even in the same direction).

To provide additional context, Brinson and Thunberg (2016) estimated Gini coefficients for the distribution of revenues at the vessel level for all U.S. catch share programs.¹² The wreckfish ITQ program was not included in their analysis because some years of landings data were confidential. For the programs that were included, there was some variability in the effect each program's implementation had on the distribution of revenue and thus the Gini coefficients. For e.g., compared to the baseline period, the Gini coefficient increased by an average of 12% during the first year of program implementation in nine programs. However, the distribution of revenue across vessels in the other three programs became more rather than less equal over time, i.e., the Gini coefficient decreased.

One of the most striking results in their analysis is how unequal the revenue distributions across vessels were in the baseline period for certain programs relative to the other fisheries managed by catch shares. Specifically, the Gini coefficients for the Gulf IFQ programs range from .81-.83 in the baseline time periods. For all other fisheries in their analysis, the Gini coefficient averaged 0.45 in the baseline period, ranging from 0.25 to 0.62. Thus, the Gini coefficients in the Gulf IFQ programs were more than 80% higher in the baseline period compared to the other U.S. catch share programs. Thus, the distributions of revenues across vessels in the Gulf red snapper and grouper-tilefish fisheries were considerably more unequal when the IFQ programs were implemented relative to all other U.S. fisheries where catch share programs have been put in place. Because the effect of the Gulf programs in the years after implementation were not significantly different from most other programs, the revenue distributions at the vessel level are still much more unequal in the Gulf programs compared to their distributions in other U.S. catch share programs.

5.5 Market Concentration and Market Power

When estimates of marginal cost are available, it is generally a straight-forward matter to determine if market power exists, i.e., if price exceeds marginal cost, market power exists. However, the marginal cost estimates necessary for this type of analysis are not currently available.

An alternative way to detect market power is to examine the structure of the industry. Industries that are more concentrated, or situations with a large dominant firm, have some individual suppliers for whom

¹² Their analysis covered the 12 catch share programs that were implemented prior to 2013 and also had sufficient data to generate estimates of all the economic performance indicators.

elasticity is low due to a lack of competitive activity. Low elasticity allows for the exercise of market power. One commonly used measure of concentration is the Herfindahl-Hirschman Index (HHI). Other measures include C5 and C3, the share of the market controlled by the top five or three suppliers, respectively. A sufficiently large share for the largest supplier can also indicate potential market dominance.

According to joint guidance from the Department of Justice and the Federal Trade Commission, a market with an HHI above 2,500 is considered "highly concentrated" (exercise of market power is likely, particularly if concentration increases further)," a market with an HHI between 1,500 and 2,500 is considered "moderately concentrated" (possible concern with market power being exercised given a sufficient increase in concentration)," and a market with an HHI below 1,500 is considered "unconcentrated" (no concerns over the exercise of market power). Further, a regulatory action raises potential "significant competitive concerns" if it produces an increase in the HHI of more than 100 points in a moderately concentrated market or between 100 and 200 points in a highly concentrated market. A regulatory action is presumed "likely to enhance market power" if it produces an increase in the HHI of more than 200 points in a highly concentrated market.

6.0 Price Analyses

6.1 Overview

The following chapter examines share, coupon, and ex-vessel prices for the wreckfish fishery. These different components can be used as measures of economic performance in fisheries managed under a catch share program. Share, quota pound, and ex-vessel price information is important for evaluating the economic performance of catch share programs, particularly when estimates of profitability are not available (Holland et al., 2014). As discussed in Section 3.5, profit estimates for the wreckfish ITQ program are only available for two of the 24 years the program has been in place. Share price should reflect the net present value of the expected profit from landing one pound of quota in the long-run. Purchasing coupons is equivalent to a transfer of quota pounds between parties. Quota pound transfer prices should reflect the expected annual profit from landing one pound of quota. Ex-vessel price is a key input when determining profitability and can provide insight on demand for a fishery product. Economic theory suggests that, when fishermen no longer have to engage in a "race for fish" or "derby fishing," they will adjust their operations to better take advantage of weather and market conditions. Market gluts are expected to be reduced and product quality is expected to improve under catch shares. As a result, ex-vessel prices are expected to increase, resulting in higher gross revenues and profits. Markets for landed product are also expected to be more stable. Specifically, if market gluts are reduced, landings would be expected to be more evenly dispersed over the course of the year, which in turn would be expected to result in more stable ex-vessel prices over the year (i.e., less variability from week to week, month to month, etc.). Further, if profits increase, operators will likely be willing to pay higher prices for shares and allocation, which in turn would be expected to result in higher share and allocation prices.

The price data examined is grouped according to the fishing year in which it occurred, with a fishing year running from April 16 of one year through April 15 of the following year. Prices are further divided into "baseline" and "current" time periods. The fishing years from 2009/2010 through 2011/2012 are considered the "baseline" and the fishing years from 2012/2013 through 2016/2017 are considered the "review" time period. This division in fishing years is selected due to the reduction

wreckfish quota that occurred in the 2012/2013 fishing year when the quota changed from 2 million lbs gutted weight (gw) to 223,350 lbs gw.

When shares of wreckfish are transferred between parties, the price of the transaction is recorded if it is provided by either party. Reporting such information is not mandatory, and several share transactions did not include a recorded price. To convert share transfers into a price per pound, the percentage of total wreckfish quota transferred is multiplied by the total wreckfish quota at the time of the transaction to get an equivalent number of pounds transferred. If provided, the monetary value of the transaction is divided by the equivalent pounds to obtain a price per pound for the share transfer transaction.

Where applicable, the total number of ITQ coupons purchased are recorded on a wreckfish logbook trip report form by coupon type and the total dollar amount paid. This self-reported information can be used to calculate an implied price per pound for coupon purchases by dividing the total pound value of the coupons by the purchase price of the coupon. Ex-vessel price data are collected from wreckfish dealer reports. For each transaction, a dealer is asked for the price per pound of wreckfish purchased. Inflation adjusted share, coupon, and ex-vessel prices are reported in 2016 dollars, unless nominal values are also noted. All nominal dollar values were converted to 2016 dollars using the annual GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

6.2 Analysis and discussion

Share prices

The ability to sell and redistribute shares is an integral part of this catch share program. Shareholders have the ability to sell a portion of their shares or purchase shares from other shareholders to increase their own holdings. Reporting of share prices is challenging, as relatively few share transactions occurred in the examined time series (42 transactions) and price coverage for those transactions was not always reported, with a little over half of the transactions including a price. In the “baseline” period (fishing years 2009/2010 through 2011/2012), the majority of share transfers did include a reported price. On a per-pound basis, the average price during this period was \$0.21 (Table 6.1). In the “review” period (fishing years 2012/2013 through 2016/2017), there were fewer share transactions and most transactions did not include a price. The majority of share transactions that occurred during this time period were due to revocation or redistribution under Amendment 20A (SAFMC 2012), therefore no price was applicable. It is worth noting that the relatively few prices recorded during the “review” period were substantially higher than the “baseline” period, by over an order of magnitude, which is likely a response to the drastic reduction in the total wreckfish quota.

Table 6.1. Statistics for share transfer price per pound (gw), 2009/10 through 2016/17 fishing years (2016 dollars).

Fishing Years	Number of transactions	Number of transactions with price data	Percent of transactions with price data	Inflation adjusted average price per pound	Inflation adjusted median price per pound
2009/10 through 2011/12	29	21	72%	\$0.21	\$0.15
2012/13 through 2016/17 ¹	3	3	100%	-	-

Source: SERO Wreckfish Share Transfer Dataset.

¹Share transfer prices cannot be reported due to concerns over confidentiality.

ITQ Coupon prices

As a transfer of allocation, wreckfish fishery participants can purchase ITQ coupons from other shareholders which allows these participants to land above their share of the wreckfish quota. These ITQ coupons are available in 100-lbs and 500-lbs gw increments. There were no ITQ coupon purchases made during the 2009/2010 through 2011/2012 fishing years (Table 6.2). This was most likely due to the high quota which did result in a need for more ITQ coupons than each shareholder was allocated. For the 2012/13 through 2016/2017 fishing years, there were 437 coupons transferred in 47 transactions, or in 19% of the transactions. This was likely a response to the drastically reduced total wreckfish quota that occurred in 2012. A little over half of these coupons (54%) were in the 500-lbs increment, which may be a factor in how the ITQ coupons are distributed to the shareholders, versus a desire for the larger denomination. The most common nominal price for a coupon through the time series was \$0.50 per lb gw and other prices were mostly within \$0.10 of this value. Five observations included coupon purchase prices of \$1.00 or more per lbgw. The relatively stable nominal price per pound for coupon purchases through the time series, despite an increasing ex-vessel price per pound for wreckfish and variations in trip costs, suggests that coupon prices may not have been driven by market rates, but rather by other factors. As such, they may be an unsuitable metric to estimate marginal profits or economic performance of the fishery.

Table 6.2. Statistics for coupon price per lb gw, 2009/2010 through 2016/2017 fishing years (2016 dollars).

Fishing Years	Number of coupons	Number of transactions	Percent of transactions	Inflation adjusted average price per pound	Inflation adjusted median price per pound
2009/2010 through 2011/2012	0	0	0%	-	-
2012/2013 through 2016/2017	437	47	19%	\$0.74	\$0.51

Source: SEFSC Wreckfish Logbook Dataset.

Ex-vessel prices

Ex-vessel prices were provided for all wreckfish transactions in the examined time period from the 2009/2010 fishing year through the 2016/2017 fishing year. In general, the ex-vessel price per pound for wreckfish increased through most of the time period on both a nominal basis and inflation adjusted basis (Table 6.3). When comparing prices between the “baseline” time period and the “review” time period, average prices increased 26 percent on a nominal basis and 18 percent on an inflation adjusted basis. Comparing the first and last year in the time series, the price per pound for wreckfish increased 50 percent nominally and 35 percent in inflation adjusted terms.

Table 6.3. Statistics for ex-vessel price per lbgw, 2009/2010 through 2016/2017 fishing years.

Fishing Year	Number of observations	Nominal average price per pound	Inflation adjusted average price per pound ¹	Nominal median price per pound	Inflation adjusted median price per pound ¹
2009/2010	51	\$2.91	\$3.24	\$2.95	\$3.29
2010/2011	43	\$3.15	\$3.46	\$3.00	\$3.30
2011/2012	76	\$3.45	\$3.72	\$3.25	\$3.51
2009/2010 through 2011/2012	170	\$3.21	\$3.51	\$3.00	\$3.34
2012/2013	42	\$3.71	\$3.93	\$3.75	\$3.97

Fishing Year	Number of observations	Nominal average price per pound	Inflation adjusted average price per pound ¹	Nominal median price per pound	Inflation adjusted median price per pound ¹
2013/2014	36	\$3.73	\$3.88	\$3.75	\$3.91
2014/2015	36	\$3.96	\$4.05	\$3.90	\$3.99
2015/2016	73	\$4.19	\$4.25	\$4.00	\$4.05
2016/2017	67	\$4.37	\$4.37	\$4.10	\$4.10
2012/2013 through 2016/2017	254	\$4.06	\$4.15	\$4.00	\$4.05

Source: SEFSC Wreckfish Dealer Report Dataset.

¹Converted to 2016 dollars using the annual GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Ex-vessel price data was first collected via wreckfish dealer reports during the 1992/1993 fishing year. When examining a longer time series, ex-vessel prices for wreckfish have generally increased since the implementation of the ITQ system in the fishery (Figure 6.1). Prices did drop in the 2001/2002 and 2002/2003 fishing years, but steadily recovered. Starting in 2009/2010, price growth increased at a faster rate than the previous fishing years, with the highest ex-vessel prices seen in the 2016/2017 fishing year.

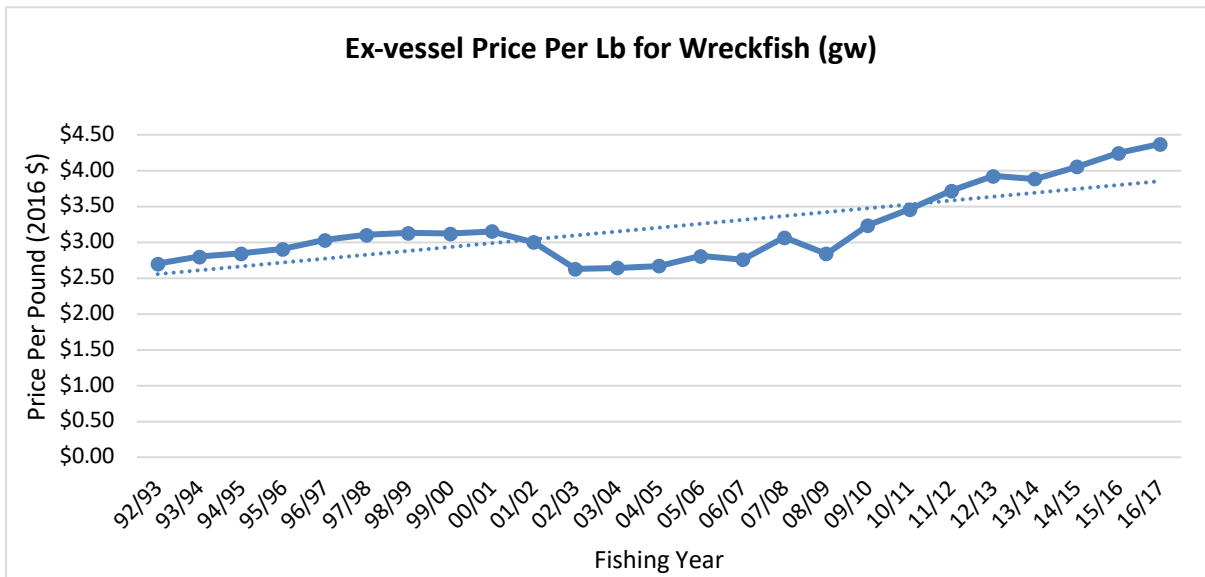


Figure 6.1. Ex-vessel price per lbgw for wreckfish, 1992/1993 through 2016/2017 (2016 dollars).

Source: SEFSC Wreckfish Dealer Report Dataset.

For comparison purposes, ex-vessel price performance for wreckfish substitute species commonly landed in the South Atlantic region were examined. Ex-vessel price data for shallow water groupers (gag, red, scamp, black, coney, red hind, rock hind, graysby, yellowmouth, and yellowfin) and three deep water species (snowy grouper, blueline tilefish, and golden tilefish) was examined over a similar time series (Table 6.4). None of the commercial fisheries for these other species operate under an ITQ system, but the commercial snapper grouper fishery is limited entry and there are further restrictions limiting the number of vessels that can land golden tilefish using bottom longline gear. All species examined exhibited a generally increasing ex-vessel price per pound through the time series, with the highest prices observed in 2016. When comparing average prices from the “baseline” time period with the “review” time period, wreckfish price performance was inline with or exceeded the other species examined. If the change in price between the first and last year in the analysis is examined, the growth in

the ex-vessel price of wreckfish exceeded that of shallow water groupers and snowy grouper but was below the growth of blueline tilefish and golden tilefish in the South Atlantic.

Table 6.4. Statistics for ex-vessel prices (gw) of wreckfish and wreckfish-substitute species landed in the South Atlantic, 2009-2016 (2016 dollars).

	Wreckfish	Shallow Water Groupers	Snowy Grouper	Blueline Tilefish	Golden Tilefish
2009 through 2011 ex-vessel price	\$3.51*	\$4.74	\$4.15	\$2.34	\$3.07
2012 through 2016 ex-vessel price	\$4.15**	\$5.39	\$4.76	\$2.76	\$3.63
Percent change in ex-vessel price between time periods	18%	14%	15%	18%	18%
Percent change in ex-vessel price between the first and last year in time series	35%	26%	29%	68%	59%

Source: SEFSC Coastal Fisheries Logbook (Accessed January 2018).

*Average inflation adjusted price per pound for the 2009/2010 through 2011/2012 fishing years.

**Average inflation adjusted price per pound for the 2012/2013 through 2016/2017 fishing years.

Although economic theory suggests that IFQs and catch share programs in general will increase ex-vessel prices, and thereby gross revenues and profits, Birkenbach et al. (2017) found mixed evidence to support that hypothesis. Their study assessed changes in ex-vessel prices for all U.S. catch share fisheries using differences-in-differences and synthetic control methods. Thus, they attempted to control for all other factors that could have potentially explained changes in ex-vessel prices after the implementation of a catch share program in order to isolate the effect of the program. Although ex-vessel prices did increase following the implementation of catch shares in some fisheries, prices did not increase for all species after controlling for other factors. In general, ex-vessel price increased for the higher-value species within each complex or program. But even when the ex-vessel price did increase, the increase was not as significant as what may have been expected based on estimates that do not control for the effects of other factors. Consistent with Birkenbach et al's findings, Keithly (2017) conducted an analysis which concluded that the Grouper-Tilefish (GT) IFQ program did not influence the ex-vessel prices of Gulf grouper species, even after including "habit formation" into the model. However, the analysis did indicate that monthly ex-vessel prices became more stable during the period after the GT-IFQ program was implemented. The analysis concluded monthly ex-vessel prices stabilized because ITQ program caused monthly landings to be more stable. The wreckfish ITQ program was not included in the Birkenbach et al (2017) study as NMFS was unable to provide several years of annual landings data that were determined to be confidential.

Preferred Practices for the Collection of Price Data

Holland et al. (2014) made several recommendations with respect to the collection of price data in catch share programs. First, information on sale price and/or other compensation received should be collected on all arm's-length quota share and quota pounds transfers, and systems should be implemented to validate and correct the data. In addition to price information, when applicable, other characteristics of transfers should be collected including: whether the transfer is internal to a business; whether there is in-kind compensation for the transfer and what that compensation is; and if there is some contractual form of compensation and what it is (e.g., a proportion of the landed value of the fish once it is sold).

Second, information on ownership ties between different quota account owners should be collected so that arm's-length transactions can be differentiated from transfers between affiliated business entities. Third, if dealers/processors provide quota pounds to fishermen, care should be taken to ensure that ex-

vessel prices and quota pound prices reported do not reflect discounts associated with an agreement to deliver fish to that processor/buyer.

Fourth, share and quota pound prices should be evaluated to determine whether they appear to reflect reasonable values and are useful for informing policymaking (i.e., care should be taken when calculating average prices to exclude transactions with prices that appear to be misreported or errors). Fifth, councils, stakeholders and fishery managers should be made aware of the potential value of catch share market information, particularly share and quota pound prices, and Councils should be asked to consider making provision of quota pound and share price information mandatory when transfers are made.

Finally, to the extent sufficient non-confidential information about prices and volume of activity in quota markets is available, it should be made readily accessible to the public, preferably online and updated regularly. Information should be provided in as disaggregated a form as possible without compromising confidentiality of individuals' transactions (e.g., monthly rather than annual average prices and prices by Sector and/or area if applicable), and information should be as rich as possible (e.g., report median prices and measures of dispersion as well as averages (means)).

6.3 Conclusions

In well developed markets, the prices for shares or coupons that are transferred in an ITQ managed fishery can indicate economic performance and expectations of future changes in a fishery. As noted in Holland et al. 2014, the transfer of shares in the wreckfish fishery are sporadic and tend to be tied to regulatory changes in the fishery. The same can be said for transfer of coupons (quota pounds) given the prevalence of transfers that occurred after the wreckfish quota was decreased in 2012. This condition coupled with the low number of participants and regulatory barriers to quota share transfers as well as restrictive eligibility requirements for participating in the fishery makes the assumption of the market for wreckfish shares being "well developed" a questionable one. Additionally, share and quota price data are voluntary and self-reported, so the validity of the dataset to reflect the actual condition of the wreckfish fishery is unknown and some caution is warranted in interpreting the results.

Nevertheless, the notable change in share price observed between the "baseline" and "review" periods could be interpreted to be consistent with economic theory on ITQs. The increased selling of and low prices for shares observed directly before the quota for wreckfish was decreased in 2012 was likely reflective of uncertainty over future profitability, particularly for participants holding smaller percentages of the total quota given the lower poundage that would be available. Also, the relatively larger discrepancy between ex-vessel price and share price during the "baseline" time period also indicates a likely higher discount rate and lower expectations for future returns in the fishery. The assumption of a higher discount rate in the years when a restrictive regulatory change takes place is consistent with the discount rates for the wreckfish fishery reported in Richardson (1994) and Yandle and Crosson (2014) for the wreckfish fishery in the 1992/1993 and 2012/2013 seasons respectively. In both of these fishing years a regulatory transition occurred in the fishery. While few transactions have been observed after the quota reduction, the transactions for which price data are available indicate a much higher share price, and thus higher expectations over the future profitability of participants remaining in the fishery. This also is likely reflective of a lower applicable discount rate. There was also a smaller discrepancy between share prices and ex-vessel prices also indicating better expectations for future returns in the fishery.

The relatively stable price per pound for coupon purchases through the time series, despite an increasing ex-vessel price per pound for wreckfish and variations in trip costs, suggests that coupon prices may not have been completely driven by market rates, but rather by other factors that are not reflected in the reported coupon transaction. As such, the coupon price estimates may be an unsuitable metric to

estimate the actual marginal profit of the fishery. Also, as noted this data is self-reported and voluntary. Granted those caveats, if the coupon price data is to be interpreted as representative of the fishery, given the relative stability of coupon prices, it could be assumed that profitability has been stable as well for participants that have remained in the fishery.

Finally, the overall effect of the ITQ program on wreckfish prices during the “baseline” and “review” periods is unclear and in fact there may have been little to no effect. The ex-vessel price for wreckfish has increased through the time period examined, as did the prices for substitute species. At the very least it would be safe to assume that the ITQ did not harm ex-vessel prices and potentially allowed the performance of ex-vessel price to remain in line with that of prices observed for other substitute species within the snapper grouper fishery.

8.0 Safety at Sea

Commercial fishing is one of the most dangerous professions, experiencing a high rate of occupational injury (Pfeiffer and Gratz 2016). Commercial fishermen experience a unique set of challenges including working long hours and operating heavy machinery, often in dangerous weather far from shore. In 2016, fishermen and related fishing workers experienced a fatal injury rate of 86 deaths per 100,000 full-time equivalent (FTE) workers. This fatal injury rate is second only to the logging industry (136.5 deaths per 100,000 FTE) and is higher than the national average of 3.6 deaths per 100,000 (BLS 2017). The National Institute for Occupational Safety and Health’s (NIOSH) Commercial Fishing Safety Research and Design Program conducts in depth studies of fishing fatalities to identify hazards present in fisheries throughout the country. NIOSH reported an average of 12 commercial fishing fatalities annually for East Coast fisheries from 2010-2014. This is down from an annual average of 17 commercial fishing fatalities from 2000-2009 (NIOSH 2017).

There have been several pieces of legislation aimed at addressing safety issues in the commercial fishing industry. The Commercial Fishing Industry Vessel Safety Act of 1988 allowed the United States Coast Guard to recommend safety standards for all commercial fishing vessels. Additionally, it required fish processing vessels to be examined once every two years to ensure they are meeting the necessary requirements. The enforcement of the Commercial Fishing Industry Vessel Regulations in 1991 further addressed safety issues in the commercial fishing industry. Additionally, the Coast Guard Authorization Act of 2010 requires training for commercial fishing vessel operators and outlines design and construction requirements for newly constructed vessels.

Open access fisheries often result in a race-to-fish where commercial fishermen feel pressure to complete fishing trips regardless of safety considerations. As a result, commercial fishermen often operate in dangerous weather and at-sea conditions. One objective of catch share programs is improving fishermen safety by allowing for more flexibility in trip scheduling. Improvements in safety at sea have been seen in several IFQ programs implemented in the United States. Woodley (2002) and Hughes and Woodley (2007) illustrate that IFQ programs in the Alaskan halibut and sablefish fishery have improved safety at sea by curtailing the race to fish therefore reducing fatigue and the incentive to fish in poor weather. Additionally, a survey of Alaskan halibut fishermen found more than 85% of respondents believed that IFQs has made fishing for halibut safer (Knapp 1999). In the West Coast sablefish fixed gear fishery, Pfeiffer and Gratz (2016) found that a switch to ITQs in 2001 decreased the annual rate of fishing in high wind days by 79%. Marvasti and Dakhliya (2016) found that the Gulf of Mexico red snapper and grouper-tilefish IFQ programs had reduced the incentive for fishermen to operate in poor weather conditions.

Prior to the implementation of ITQs, the wreckfish fishery was experiencing a race-to-fish scenario. In 1990, the Council established a permit system and a new total allowable catch (TAC) of 2 million pounds. This new TAC was caught within four months (Gauvin et al. 1994). This derby resulted in fishermen operating in less than ideal conditions. Wreckfish are caught farther offshore than other species making dangerous weather conditions particularly hazardous. Since the implementation of the ITQ program in 1992, the size of the wreckfish fleet has shrunk considerably, with many participants moving on to other more lucrative fisheries (Yandle and Crosson 2015). This small size gives participants the flexibility to choose whether to fish depending on weather conditions and other factors related to safety at sea. Additionally, the individuals who have remained in the fishery are career fishermen with sufficient knowledge and experience to participate in the fishery safely. However, should entrance into the wreckfish ITQ program increase, the relative inexperience of new participants may result in new safety at sea concerns.

9.0 New Entrants/Replacement Fishermen in the Wreckfish ITQ Program

9.1 Discussion

The issue of new entrants is one that cuts across multiple program design features, including but not necessarily limited to allocations, transferability, duration, and auctions. Consistent with Section 303A(g) of the MSA, there should be considerations of loan programs to help new entities. This section will review the costs for new entrants, existing or potential loan programs, and potential means to aid new entrants/replacement fishermen.

In order to obtain an open access wreckfish permit, the entity must first be a wreckfish shareholder. In order to harvest wreckfish, the vessel owner or the operator of the vessel must be the wreckfish shareholder or an employee, contractor, or agent of the shareholder and must also possess the limited access South Atlantic commercial snapper-grouper permit. Therefore, the only restriction on entry into the wreckfish ITQ program as a shareholder is the availability of wreckfish shares, while the restriction to harvest wreckfish is also limited by snapper-grouper permits. Since snapper-grouper permits can only be transferred, an entity must obtain and exchange two such permits for one new permit, which may inhibit participation in the program.

10.0 Monitoring and Enforcement in the Wreckfish ITQ Program

According to Section 303A(c)(1)(H) of the Magnuson-Stevens Act, each LAPP must include “an effective system for enforcement, monitoring, and management of the program, including the use of observers or electronic monitoring systems.” Wide-spread non-compliance can adversely affect the ability of other CSP attributes to achieve their desired goals and objectives. This section assesses whether the current enforcement provisions and activities, including resources for conducting the latter, are sufficient to ensure a high rate of compliance with program requirements.

Current law enforcement monitoring requires that permitted wreckfish vessels must land their catch between 8 am and 6 pm and only at office of law enforcement (OLE) approved landing sites. The cost of enforcement of the program is estimated to be \$10,500 per year. This amount represents a maximum of 5% of work time for two federal ZA-3 senior officers with one each in two main areas where wreckfish are landed. Additionally, \$1,000 was added to the officers’ salary for costs such as fuel and materials related to any enforcement and compliance efforts.

If the wreckfish ITQ program was upgraded to an electronic web-based system, the system could ease enforcement through a variety of mechanisms. In the other catch share programs managed by SERO, the online system is used to send notifications to enforcement about landings and allow for the

submission and approval of landing locations. Additional benefits that could be realized from an electronic system may be but are not limited to offload notices, landings history verification, and auditing of catch records.

11.0 Administration and Cost Recovery in the Wreckfish ITQ Program

According to Section 303A(c)(1)(H) of the Magnuson-Stevens Act, each LAPP must include “an effective system for enforcement, monitoring, and management of the program, including the use of observers or electronic monitoring systems.” This section will review if the total administrative costs are being minimized to the extent practicable, which is consistent with NS 7. It is likely there will be trade-offs in the various types of administrative costs.

Cost recovery was not included in the wreckfish ITQ program when it was implemented in 1992 and cost recovery is currently not in place. The administration of the program is split between the regional office and the science center. SERO tracks the shareholders, manages share certificates and share transfers, calculates ITQ for each shareholder, creates and mails out the ITQ coupons. The SEFSC is in charge of the landings portion of the program, and receives the dealer reports with coupons and the vessel logbooks with coupons. SERO spends a minimal amount of time for the administration of the wreckfish ITQ program, as their work is more centered on start of the fishing year activities, rather than throughout the year activities. The bulk of SERO’s administration time is spent in calculating the amount of pounds to be distributed to each shareholder, calculating coupon amounts, creating proofs for coupon printing, and mailing out the coupons. This administration burden is approximately two solid weeks of work for one employee (although it is spread out over a longer time period). Additionally, when there is a share transfer, SERO determines if the share transfer will violate the share cap, creates the new share certificates, and mails out the certificates to the transferee and transferor (if appropriate).

Cost recovery fees are not mandated for programs prior to reauthorization of the Magnuson-Stevens Act, although it does not prohibit the establishment of a cost recovery fee at a future date. Cost recovery fees are used to recover the actual costs directly related to the management, data collection, and enforcement of a catch share program. Under the Magnuson-Stevens Act, this fee shall not exceed 3% of the ex-vessel value of the fish harvested in the program. Many catch share programs across the country, recover much less than the 3% of the ex-vessel value.

In some programs, a cost recovery fee is not collected as the burden of collecting such a fee exceeds the benefits of the fee collected. In order to first determine if a cost recovery fee would be beneficial, an analysis should be completed about the amount of cost for the administration of the program. Moving to an electronic system would not necessarily entail a cost recovery fee, as it may decrease or increase the time and burden of administering the program dependent on the different aspects of the program. Administrative savings could be realized in the reduction in mailing costs, reduction in printing costs, share transfers, allocation transfers, and data collection but might increase in relation to building and maintaining the system framework.

12.0 Privilege Duration and Subsequent Distribution in the Wreckfish ITQ Program

Shares are not issued in perpetuity. According to Section 303A(f) of the Magnuson-Stevens Act, their lifespan is limited to 10 years if the program was established after January 12, 2007, though they will be

renewed if not revoked, limited, or modified.¹³ While the wreckfish ITQ program was established prior to this regulation, the Council still retains the right to revoke shares.

Catch share programs typically allocate initial shares one time, often based, at least in part, on historical catches of those initial participants. Typical catch share programs also allow share transferability, whereby shares are redistributed through share transfers initiated by the participants themselves, typically for monetary compensation. While shares are a revocable privilege, shares are usually revoked only for egregious violations of regulations. Common critiques of typical catch share programs focus on initial distribution of shares, one-time only distribution of shares, cost of shares and allocation after the program has been in place for multiple years, difficulty for new or replacement entrants to join the programs, and absentee ownership of shares and/or allocation.

An alternative to typical catch share programs is an adaptive catch share program, which uses adaptive management to address many of these concerns over time. An adaptive catch share program is designed to reclaim and redistribute a portion of the shares at pre-determined periods, centered on three main components: cycle length, reclamation process, and redistribution process. Initial shares are distributed based on criteria chosen for the program. Once the program is implemented, within any cycle the program functions similar to a non-adaptive catch share. It is at the end of the cycle, where an adaptive catch share program differs from a non-adaptive program. Once a cycle is completed, based on criteria set forth by management, a portion of shares are reclaimed from all accounts and then redistributed to participants. The goal of an adaptive catch share program is to continuously redistribute shares to those participants who have harvested fish. Depending on how the adaptive catch share program is designed, it may be an appropriate choice if one or more of the following conditions are met:

- Initial share distribution may no longer be representative of the fishery.
- A need exists to reduce barriers to new/replacement fishermen.
- Absentee ownership is a concern.
- Number of latent permits is unknown.
- Prior landings history is unknown.

The structure of the adaptive catch share program would may depend on the degree of need for adaptation in the program. For programs that have been in place for many years, the driving need is for an ability to have replacement fishermen (new entrants) to join the fishery without undue burden. An adaptive catch share program could be structure to allow for the long-term replacement of existing fishermen with incoming fishermen as the fleet ages.

The first stage in an adaptive catch share program is setting a pre-determined cycle length (one or more years), where fish are landed using annual allocation. During the cycle, fishing proceeds as it would during a non-adaptive catch share program, with harvest and transferability of allocation or shares allowed as set by the program's regulations. Some shareholders will harvest all of the allocation associated with their shares each year, while others will not. At the end of the first cycle, the reclamation process of an adaptive catch share program reclaims a percentage of shares from all shareholders. While shares are reclaimed from all shareholders, each shareholder has an opportunity to have a greater, smaller, or equal percentage of shares returned to them through the redistribution process. Reclaiming only a portion of the shares is intended to allow for the participants to form a business plan based on a known minimum amount of shares they would have for the next fishing year.

¹³ For example, see the rules to revoke inactive QS in the wreckfish ITQ program (<https://www.federalregister.gov/articles/2012/09/26/2012-23731/fisheries-of-the-caribbean-gulf-of-mexico-and-south-atlantic-snapper-grouper-fishery-off-the>) and the Pacific halibut/sablefish IFQ program (<https://alaskafisheries.noaa.gov/sites/default/files/finalrules/77fr29556.pdf>)

The proportion of shares reclaimed each cycle can be set or progressive. During the redistribution process, the reclaimed shares are distributed to those accounts that landed fish during the cycle. Shares can be redistributed equally or proportionally among those participants with landings. Redistributing shares proportionally based on landings would result in those participants who landed a greater amount of fish receiving a greater amount of redistributed shares than those who landed less fish. Redistribution keeps the shares in the hands of those participants that are actively fishing the resource.

The minimum time for a cycle is one fishing season (typically one year), but could be longer. Cycles may be for a set length of time (e.g., one year in perpetuity) or progressively lengthened over time until a constant cycle length is achieved. Possible impacts of cycle length and the effect on the fishery should be considered when setting a cycle length. Cycle durations would impact how quickly the shares are redistributed to represent the current fishery, the stability of the market for shares and allocation, and the ability and timeliness for new or replacement entrants to acquire shares. Effects of the duration of a cycle may also be magnified by localized events (e.g., red tides, hurricanes) and personal events (e.g., health or vessel problems). Short durations are beneficial when there is a need for rapid adaptive management, as it would allow changes in the distribution of shares to occur more frequently. Longer cycle durations provide for more stability in business planning and may minimize localized effects. Conversely, a longer cycle duration may have a negative impact on new or replacement entrants, because it will take longer to receive shares through redistribution.

Reclamation with redistribution provides a way for new or replacement entrants to earn shares through participation. The percentages of shares to be reclaimed can be set from 0% (i.e., functions like a non-adaptive program) to 100% (i.e., full redistribution each cycle). The goal is to determine what reclamation percentages will best accomplish the program's goals (e.g., a representative share distribution, aids to new or replacement entrants), without creating a barrier to business practices (e.g., the ability to predict allocation available for future trips). Impacts from different reclaimed share percentages should be considered when designing such a program. The participants would need to retain enough shares within their accounts to continue with this business practice. Although reclaiming a high percentage of reclaimed shares each cycle would allow the program to move more rapidly towards representative distribution, it might also create instability in trip planning. Conversely, reclaiming a low percentage of shares each cycle may provide stability but may not redistribute enough shares to address the program's goals in a reasonable time frame. Allocation transfers must be allowed for this adaptive management program to work for new or replacement entrants. The new or replacement entrants would obtain allocation through transfers and land within a cycle. Once these participants have recorded landings, they would be eligible to receive reclaimed shares in the next cycle. While the annual allocation associated with these redistributed shares may not initially be sufficient to support their business practices, it would reduce the amount of allocation to be obtained and result in a reduction in cost. In this manner, an adaptive catch share program may aid new entrants and should be considered when investigating privilege durations and any subsequent redistribution.

13.0 Conclusions

13.1 Progress Towards Goals and Objectives

13.2 Suggested Modifications to the Wreckfish ITQ Program

13.3 Future Research Needs

Life-history studies and a new stock assessment for wreckfish would be useful in understanding the species and revisit catch levels based on the best scientific information available. Lytton et al. (2016) conducted an age validation study on wreckfish in the North Atlantic and provided updated values for maximum age (80 years), along with other life-history parameters, but recommended that several aspects of wreckfish's life-history still need exploring. Samples from the eastern Atlantic are needed to compare potential differences in life history parameters within the North Atlantic population and to investigate connectivity between populations (Lytton et al. 2016). Lytton et al. (2016) also stated that the determination of size and age at maturity and sex-specific differences in age and growth was essential for future stock assessments and required samples from whole, rather than gutted, fish.

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14.1 Appendices

14.1.1 AP Committees recommendations

14.1.2 Shareholder recommendations

14.1.3 SSC/SEP recommendations

14.1.4 Council recommendations

Appendix 1 Overview of review data sources