



RESEARCH AND MONITORING PLAN FOR THE SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

2025-2029



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Abstract

The South Atlantic region is a complex marine environment with diverse fisheries that require a wide range of research and monitoring to effectively manage the fisheries. The 2025–2029 Research and Monitoring Plan (RMP) for the South Atlantic Fishery Management Council (SAFMC) outlines a strategic framework to guide data collection, scientific investigation, and stakeholder collaboration for fisheries management from North Carolina through the Florida Keys. This comprehensive plan addresses the biological, ecological, social, and economic dimensions of fisheries by identifying key priorities across SAFMC fishery management plans (FMPs). The RMP emphasizes the data needs of stock assessments including enhanced fishery-dependent and fishery-independent data collection and gathering life history information on the fished species. It also highlights the importance of incorporating human dimensions into management through social and economic studies and community engagement. As the ecosystem evolves, baseline data are crucial for ecosystem impact assessments and long-term monitoring. Another key component of the RMP is monitoring habitat health including mapping and characterization of essential fish habitat, assessing coral reef health, and analyzing ecosystem impacts. By addressing the priorities outlined in the RMP, more effective can be achieved through adaptive management, technological innovation, and interagency coordination. The alignment of scientific efforts with management needs in the RMP should help build effective, ecosystem-based, and resilient fisheries governance in the South Atlantic region.

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1.0 Introduction

The South Atlantic Fishery Management Council (SAFMC) manages marine resources within the federal waters of the South Atlantic region, spanning from North Carolina to the Florida Keys. The SAFMC's management decisions rely on sound science and robust stakeholder engagement.

To support this mission, the SAFMC Research and Monitoring Plan (RMP) serves as a strategic framework to guide data collection, scientific research, and monitoring efforts across the region. This plan identifies key research priorities and data needs essential for informed decision-making, adaptive management, and the long-term sustainability of fishery resources and the ecosystems upon which they depend. It also provides a coordinated approach to working with partners including the National Marine Fisheries Service (NMFS), state agencies, academic institutions, and stakeholders to address information gaps, enhance stock assessments, and evaluate the effectiveness of management measures.

By aligning research efforts with management objectives, the SAFMC aims to improve the understanding of ecological, economic, and social dynamics within the fisheries it manages. This RMP will be updated regularly to reflect emerging issues, advances in science, and the evolving needs of fisheries management in the South Atlantic region.

1.1 General Research Priorities

The research priorities of the SAFMC are intended to support management, stock assessments, ecosystem-based fisheries management, and to ensure decisions use the most up-to-date scientific information. These priorities are established in collaboration with the Scientific and Statistical Committee, and stakeholders, and are closely aligned with the goals and objectives outlined in the SAFMC's Fishery Management Plans (FMP). Key research priorities include:

Stock Assessment Support and Data Needs

Improving stock assessments is essential for sustainable management.

- Refinement of life history parameters (e.g., age, growth, and reproductive biology).
- Improved estimates of natural and discard mortality (particularly for snapper grouper species).
- Enhanced catch and effort data from both commercial and recreational sectors.
- Studies to delineate stock structure and connectivity.
- Studies to better inform selectivity.
- Improve the ability to incorporate changes in stock productivity and distribution in stock assessments.
- Review proxies for maximum sustainable yield as new stock assessments are completed.

- Explore less complex models that can be updated on a more regular basis.
- Develop carryover analyses for stocks based on recommendations from Holland et al. 2020 for species eligible for carryover in the South Atlantic region (see Comprehensive ABC Control Rule Amendment, SAFMC 2023).
- Develop abundance and catch times series to inform projection timeframes including autocorrelation and partial autocorrelations functions, and other recommendations and guidance from the [Catch Level Working Group Report](#).

Monitoring of Managed and Ecosystem Component Species

Regular and reliable monitoring of species abundance, distribution, and habitat use is critical.

- Develop abundance trends for all managed species.
 - Baseline and trend monitoring of data-poor and unassessed species.
 - Juvenile abundance index to help improve projections.
- Track changes of incidental catch and bycatch species.
- Monitor species interactions, predator-prey relationships, and ecosystem impacts.
- Develop larval transport models to better understand stock structure and connectivity among stocks and regions.
- Improve the understanding of environmental factors on productivity, growth, and survivorship of managed species.
- Provide updates for stocks (abundance, catch, distribution, and habitat use) in rebuilding plans every two years and updates for all species every five years.
- Evaluate commercial discard logbook program and provide comparison between observer estimates and logbook estimates.

Social, Economic and Human Dimensions Research

Understanding the social and economic drivers of fisheries is key to effective management.

- Evaluate sector allocations for each stock every 7 years, at a minimum.
- Conduct economic analyses of management alternatives.
- Develop social impact assessments on fishing communities.
- Conduct behavioral studies of fishers and market dynamics.

Ecosystem Dynamics

With increasing environmental variability, the SAFMC prioritizes research on:

- Evaluating climate impacts on species distribution, abundance, and productivity.
- Monitoring of oceanographic conditions to better describe environmental drivers and habitat modeling.
- Developing ecosystem indicators and risk assessments.

- Integrating recommendations from the 2023 Climate Scenario Planning summit into management.

Effectiveness of Management Measures

Evaluating how regulations and programs perform is critical. This includes:

- Conducting post-implementation reviews of gear restrictions, bag limits, size limits, area closures, and seasonal limits.
- Conducting compliance assessments and enforcement effectiveness.
- Developing performance metrics for catch-share and quota-based programs.

1.1.1 Data Collection Methods

To address the above research priorities, the SAFMC supports a comprehensive suite of data collection methodologies. These methods integrate fishery-dependent and fishery-independent data, utilize modern technologies, and emphasize collaboration across jurisdictions and disciplines.

Fishery-Dependent Data

These data are collected directly from fishing activities and include:

- Commercial and recreational landings and discards,
- Observer and at-sea monitoring programs,
- Electronic reporting and monitoring (ER/EM) technologies,
- Citizen Science projects or cooperative research projects to address specific data gaps, and
- Surveys of stakeholders for social and economic and data.

Fishery-Independent Surveys

These scientifically designed surveys collect data independent of fishing effort:

- Coastal Trawl Survey, Southeast Reef Fish Survey, and South Atlantic Deepwater Survey,
- Reef fish visual census and underwater video surveys,
- Acoustic surveys, remote sensing, and bottom mapping,
- State surveys, and
- Environmental and habitat assessments.

Biological Sampling

To support stock assessments and life history research:

- Collect length and age data for managed species;
- Collect otoliths, gonads, and tissue samples to:
 - Focus on Tier 1 species (see Appendix 1) and

- Collect life history information for all other species to allow consideration of a variety of data-limited approaches to set catch level recommendations; and
- Conduct genetic, tagging, diet, and isotopic studies to:
 - Collect information for stock structure,
 - Collect samples for future use in close kin mark recapture analysis,
 - Understand how species distribution is changing and the driving forces behind any changes, and
 - Improve predator-prey interactions to inform ecosystem-based management approaches.

Community and Stakeholder Engagement

Local knowledge is an important supplement to traditional data sources:

- Conduct participatory research with fishing communities to better understand fishery dynamics,
- Evaluate the SAFMC's Citizen Science Program to foster mutual learning, collaboration, and program engagement,
- Evaluate outreach and communication efforts conducted by SAFMC to engage or communicate with stakeholders,
- Develop baseline data for *Lines of Communication* to gather feedback from stakeholders, and
- Utilize management strategy evaluations to gather input on management alternatives.

Technological Innovation and Data Integration

The Council supports the adoption of new tools to enhance data quality and accessibility:

- Real-time data collection platforms and mobile apps,
- Machine learning and data visualization tools, and
- Integrated databases for multi-source information sharing.

1.1.3 High Priorities for Research and Monitoring in the South Atlantic Region

The SAFMC will be requested to provide feedback and recommendations for high priority research and monitoring in the South Atlantic Region at their September 2025 meeting.

As examples, items are provided below based on staff and Advisory Panels feedback collected in Spring 2025. These examples highlighted in yellow will be replaced by Council suggestions in September.

Monitoring:

- Continue to collect fishery-dependent data to estimate catch for SAFMC managed species.
 - Provide yearly estimate of catch through logbooks, trip tickets, dockside sampling, effort surveys, and other methods.
 - Ensure estimates of catch are statistically robust for use in management.
 - Continue efforts to verify accuracy of fishing effort surveys.
 - Provide a comparison of logbook and observer discards estimates for fisheries with observer programs by 2027.
- Continue to collect economic logbook data to help describe the economics of each fishery.
- Continue to collect fishery-independent data. Key programs in the region include the Coastal Trawl Survey, Southeast Reef Fish Survey, South Atlantic Deepwater Longline Survey, Reef Fish Visual Census, and National Coral Reef Monitoring Program.
- Further expand Cooperative Research Programs in the South Atlantic region to better utilize stakeholder expertise.
- Monitor compliance with fishing regulations and provide regular updates at Council meetings.
- Evaluate usage of best fishing practices to reduce discard mortality.
- Update Essential Fish Habitat designations as needed and upgrade information used to determine EFH and EFH-Habitat Areas of Particular Concern.
- Evaluate efficacy of management measures.
- Continue the Citizen Science Program to fill data gaps (see Appendix 3).

Coastal Migratory Pelagics:

- Conduct more frequent stock assessments for coastal migratory pelagic species.
- Develop a standardized fishery independent survey for coastal migratory pelagics.
- Improve methods to track abundance along the Atlantic Coast by developing calibration between NEAMAP and SEAMAP.
- Use data from the Northeast Fishery Science Center observer program to expand bycatch observations in the gillnet fishery.
- Improve estimates of shore-based catches for Atlantic Spanish mackerel.
- Explore moving away from age-based distribution models in future stock assessments for Atlantic king mackerel and Atlantic Spanish mackerel.
- Consider conducting a management strategy evaluation (MSE) for Atlantic Spanish mackerel.
- Investigate state-space models and non-stationarity as shifting stocks or changing distribution could impact estimates of productivity, catchability, and selectivity.

Dolphin Wahoo:

- Conduct studies to investigate distinct population segments.
- Use advanced modeling techniques to estimate stock abundance and fishing mortality.
- Conduct social-ecological systems studies to improve understanding of interactions and connections between the fishery and marine ecosystem.

Snapper Grouper:

- Improve discard monitoring for high-release mortality species (e.g., Red Snapper, Deepwater Groupers) using observer programs or other methods.
- Update estimates of discard mortality based on adoption of regulations designed to reduce discard mortality (e.g., circle hook, dehooking device, descending device).
- Investigate state-space models and non-stationarity as shifting stocks or changing distribution could impact estimates of productivity, catchability, and selectivity.

Social and Economic Panel:

- Work with NMFS to update community snapshots using census, fishery, and local data.
- Study social science use in fisheries management decision-making process and what motivates stakeholders to participate.
- Assess stakeholder perceptions of management measures, enforcement, equity, and trust.
- Evaluate the cumulative economic effects of regulations and environmental events (e.g., hurricanes, algal blooms, upwelling events) including methods to understand the economic effects or value of managed areas.
- Collect economic information on the seafood supply chain for SAFMC managed species covering from the seafood dealer to the final consumer.
- Expand and update economic information on how the recreational sector values catching or harvesting SAFMC managed species.
- Monitor the social and economic effects of closures, access changes, and natural disasters on fishing communities.
- Identify communities vulnerable to climate change, habitat loss, species distribution changes, and regulatory shifts.
- Social dimensions of the South Atlantic shrimp fishery.
- Develop methods to understand the social impact and cultural value of managed areas.

1.1.2 Short-term Research and Monitoring Needs for Stock Assessment for 2025-2027

Past stock assessments provide research recommendations for the next stock assessment. The following list is drawn from SEDAR reports and SSC's discussions of the species' stock assessment.

Black Grouper

- Continue development of the FWC Management Strategy Evaluation (MSE) for Black Grouper, started in 2024:
 - Resolve the Gag-Black Grouper species identification and landings data issues that stopped SEDAR 48.
 - Obtain more genetic samples of Black Grouper from areas of southeastern US (Texas to North Carolina) to assess potential population structure.
 - Recommendations from SEDAR 48 Data Workshop (DW):
 - Additional fishery-independent survey effort to supplement the reef visual census index to assess population abundance trends.
 - More observer coverage for the snapper-grouper fishery.
 - Expand TIP sampling to better cover all statistical strata.
 - Conduct more biological sampling to obtain age data.

Hogfish

- Continue development of the stock assessment for Hogfish in Florida:
 - Conduct genetic sampling to better define the boundaries between the southeast Florida Keys and East Florida (FLK/EFL) stock and the Georgia through North Carolina (GA-NC) stock.
 - Monitor changes in growth that may occur due to reduced fishing pressure on the southeast Florida and Florida Keys stock.
 - Recommendations from SEDAR 37:
 - Conduct focused life history studies in the FLK/EFL and GA-NC stocks across a range of sizes/ages to test for differences in growth, maturity, and fecundity relative to the West Florida stock for which more information is available.
 - Develop/improve fisheries-independent surveys for the GA-NC stock to specifically track Hogfish abundance.
 - Improve biological sampling of Hogfish in all regions from fishery-dependent data sources.
 - Develop a life history study to ascertain the contribution of males to spawning reproductive potential.

Gag

- Conduct a stock assessment for Gag with a topical working group in 2026.
 - Sample juvenile and spawning Gag to identify important spawning populations.
 - Identify factors contributing to decreased recruitment.
 - Monitor recruitment through non-traditional datasets such as channel net sampling.
 - Incorporate length composition from the video survey, as feasible. As indicated in the

SEDAR 71 report, “The utility of the SERFS video index for future assessment could be improved if length information of observed fish were available to inform the selectivity of the index.”

- Better characterize the reproductive dynamics of Gag (e.g., sex ratio, maturity schedule, batch fecundity, spawning seasonality, spawning frequency, and sperm limitation). Develop recruitment indices:
 - Recreational catches in inland waters (MRIP definition) as an indicator of recruitment.
 - Estuarine habitat traps (oyster shell traps), Witham collectors, and oyster culture trays.

Snowy Grouper

- Conduct a stock assessment for Snowy Grouper with a topical working group to discuss South Atlantic Deepwater Longline Survey in 2027.
 - The SSC noted two major uncertainties for the next assessment:
 - Uncertainties regarding maximum age assumptions and resulting estimation of natural mortality.
 - Estimation of a Beverton-Holt stock recruitment curve with fixed steepness. Consider not specifying the stock recruitment (SR) relationship and model recruitment as an average value with random residuals. Rather than calculating MSY and BMSY from the SR curve, consider alternative proxies.
 - Explore the effect of different methods used to develop indices of abundance. Determine why they generate different trends and peaks/valleys and how best to treat these data.
 - Explore MRIP data in greater detail to:
 - understand what causes outliers (e.g., 2012),
 - determine potential for bias in discard estimates, and
 - determine how best to treat these data in the assessment.

King Mackerel

- Conduct a stock assessment for King Mackerel in 2026 and 2027.
 - Provide a means to model projected discards in a manner that relaxes the assumption that discards would increase/decrease in proportion to changes in the landings.
 - Explore alternative age references or age-specific time series for the SEAMAP and NEAMAP fishery independent survey.
 - Explore model sensitivity to the exclusion of sub-legal fish observations. Explore assumptions regarding the size/age of discards and bycatch.
 - Evaluate model sensitivity to the age-data and explore alternative parameterizations (such as inverse age-length keys).
 - Explore the cause of high max gradient for the model. Describe the cause and

- implement improvements, as feasible.
- As feasible, explore the possibility of including a sensitivity run with FISHstory length data (1950s-1970s).
 - Channel net sampling or
 - Chevron trap catches of ages 1-3

Red Grouper

- Conduct a stock assessment for Red Grouper with a stock identification workshop and data workshop in 2027.
 - Develop models to evaluate the current rebuilding plan for the single stock.
 - Evaluate the frequency and magnitude of recruitment coming from other regions such as the Gulf or areas to the south.
 - Identify factors contributing to decreased recruitment.
 - Update reproductive biology parameters and evaluate potential latitudinal variation in spawning characteristics.
 - Incorporate index of abundance of South Florida Red Grouper.

1.1.4 Specific Monitoring Priorities

Increase funding for fisheries-independent monitoring in the South Atlantic. Specific needs include:

- Restoring MARMAP funding to a minimum of \$850,000 annually.
- Maintaining funding for SEAMAP at levels sufficient to support long-term fishery independent survey operations.
- Maintaining funding for SEFIS to support video survey work.
- Increasing funding for SEFIS to support the use of stereo cameras, or other such technology, to measure fish length during the video survey.
- Providing funding for the managed area monitoring needs.
 - Implement a monitoring and research program to address issues relevant to ecosystem management. Topics include trophic interactions, food preferences, predator-prey relationships, and ecosystem connectivity.
 - Develop and implement new methods for decreasing uncertainty of recreational catch estimates for federally managed offshore species, including enhancements to the MRIP survey, add-on surveys, and new methods for collecting recreational catch data.

The Council specifically requests that NMFS complete the work of the MRIP rare event species estimation working group by March 31, 2026, and provide a final report on the group's recommendations for review by the SAFMC SSC in April 2026.

- Evaluate the commercial discard logbook program and provide comparison between observer estimates and logbook estimates.
- Evaluate the Southeast or-Hire Integrated Electronic Reporting (SEFHIER) Program. Produce a report on the SEFHIER Program including compliance rates and comparison between MRIP and SEFHIER estimates by March 2026 and make the report available for SEP discussion in April 2026.
- Improve estimates of commercial discards and make timelier for use in SAFE reports.

1.1.5 Specific Annual Reporting Requests

- Provide, by June 1 bi-annually, SAFE reports that provide stock status including OFL and MSY, an evaluation of the management program including whether ACLs were met, or AMs triggered and addressing reasons for such, results of independent fisheries monitoring, complete landings and discard losses in weight and numbers of fish, fishery dependent monitoring statistics, and measures of effort and economic value for all managed stocks.
- Provide, by October 1 annually, a report on the SERFS program for the previous year's work that includes:
 - Survey sampling effort (number of sets; include a map of sampled sites), biological sampling intensity, (number of length and age structures by species).
 - Data should include the previous year's trap data, and video data from two years back.
 - Abundance indices and trends for Level 1 and 2 stocks listed in Table 1.
- Provide bi-annual progress reports, by the SEFSC, at the June SAFMC meeting, detailing efforts to implement the research recommendations noted in Council RMPs.

2.0 Research and Monitoring for the Fishery Management Plan for Coastal Migratory Pelagic Resources in the Gulf and Atlantic Region

2.1 Introduction

Atlantic Migratory Group King Mackerel (*Scomberomorus cavalla*) and Atlantic Migratory Group Spanish Mackerel (*Scomberomorus maculatus*) are key species in commercial and recreational fisheries along the U.S. Atlantic coast. Effective management requires robust research and monitoring efforts guided by assessments conducted through the Southeast Data, Assessment, and Review (SEDAR) process and amendments to [the FMP for Coastal Migratory Pelagic \(CMP\) Resources](#) in the Gulf and Atlantic Regions. This plan outlines strategies to enhance data collection, stock assessments, and management for the South Atlantic region.

2.2 Objectives

- Improve stock assessment accuracy through comprehensive data collection.
- Enhance fishery-dependent and fishery-independent monitoring programs.
- Enhance the understanding of biological and ecological importance of coastal migratory pelagics species to the ecosystem.
- Evaluate social and economic factors affecting the fishery including impacts of regulations.
- Identify research priorities for habitat, migration patterns, and environmental influences.
- Strengthen cooperative management and stakeholder engagement.
- Monitor compliance with regulatory measures.

2.3 Data Collection and Stock Assessments

2.3.1 Fishery-Dependent Data Collection

- **Commercial Landings and Effort Surveys:** Continue mandatory reporting of commercial catches through state and federal programs.
 - Develop a review of discard estimates to include in Standard Bycatch Reporting Methodology by December 2026
- **Recreational Catch Surveys:** Utilize the Marine Recreational Information Program (MRIP), Southeast Region Headboat Survey, and Southeast For-Hire Integrated Electronic Reporting Program for catch estimates.

- Develop a review of discard estimates to include in Standard Bycatch Reporting Methodology by December 2026.
- Improve estimates of shore-based catches.
- Consider new methods to collect recreational catch data.
 - Enhance angler reporting through mobile applications and citizen science initiatives.
- **Observer Programs:** Expand observer coverage to improve bycatch estimates and validate self-reported data.
 - Use data from the Northeast Fishery Science Center observer program to expand bycatch observations in the gillnet fishery.
- **Electronic Reporting and Logbooks:** Enhance electronic monitoring to improve timeliness and accuracy of data.
- **Biological Sampling:** Conduct biological sampling at landing sites to assess size, age, and reproductive status.
- **Social and Economic Data:** Continue collecting social and economic data on recreational and commercial fisheries needed for stock assessments and amendments.
- **Improve historical context of the fisheries.** Document historical use patterns (oral histories, ethnographic studies).

2.3.2 Fishery-Independent Data Collection

- **Adult Surveys:** Develop standardized surveys to monitor abundance trends of adult King and Spanish Mackerel.
 - Develop a standardized survey for coastal migratory pelagics.
 - Improve methods to track abundance along the Atlantic Coast by developing calibration between NEAMAP and SEAMAP
- **Juvenile Recruitment Monitoring:** Conduct surveys in estuarine and nearshore nursery habitats.
 - Develop methods to integrate data collected through multiple surveys collected by state and federal agencies.
 - Investigate an index of abundance for the Atlantic Coast based on multiple surveys.
- **Distribution and Stock Structure Studies:** Conduct studies to describe migration and stock structure.

2.3.3 Stock Assessment Enhancements

- **SEDAR Process Participation:** Ensure regular benchmark and update assessments.
 - Consider other assessment types for assessing stock and developing catch level recommendations on a more regular basis.

- **Age and Growth Studies:** Improve length and age sampling to describe catches in recreational and commercial fisheries.
- **Spawning Potential Ratio Proxy:** Investigate potential proxies for estimating maximum sustainable yield

2.4 Regulatory Impact Evaluation

- **Quota and Size Limit Effectiveness:** Assess impacts of Annual Catch Limits (ACLs) and minimum size regulations.
- **Bycatch and Discard Mortality Studies:** Implement discard survival research to refine management measures.
- **Economic Impact Assessments:** Conduct surveys to understand the economic and cultural value of the commercial and recreational fishery.
 - Track secondary, wholesale, and retail prices to better understand the value of the commercial fishery.
 - Understand King and Spanish Mackerel exported in fish auctions in Northeast.
 - Investigate changes in price due to recreational tournaments.
- **Discrete Choice Models:** Conduct research to better understand tradeoffs between different management options for for-hire and recreational fisheries
 - Investigate different seasons and bag limits for the recreational sector that would be useful for understanding trade-offs with reduced catch limits.
- **Trip Limit Analysis:** Conduct research to better understand tradeoffs between different management options for commercial fisheries.
 - Investigate social and economic effects on the commercial fishery due to trips limits.

2.5 Habitat and Ecosystem Research

- **Essential Fish Habitat (EFH) Studies:** Conduct habitat mapping to identify critical areas.
- **Climate Change Impact Assessments:** Model temperature and oceanographic effects on distribution and productivity.
 - Continue to work with NEFSC to gather all the information.
 - Investigate offshore components as habitat for king mackerel.
- **Prey and Predator Interactions:** Study trophic dynamics to inform ecosystem-based management.
- **Investigating the Impact of Coastal and Offshore Development on fish distribution and health:**
 - Noise pollution from vessels

- Building of infrastructure for energy development
- Sediment dredging for sand for beach renourishment
- Sand placement on beaches during renourishment projects
- Shore restoration
- Pollution from vessels (waste management plans and discharge)

2.6 Stakeholder Engagement and Cooperative Management

- **Fisheries Workshops and Outreach:** Enhance stakeholder involvement through meetings and training programs.
- **Collaborative Research with Fishermen:** Support cooperative research projects to incorporate industry knowledge.
- **Interstate and Federal Coordination:** Strengthen partnerships with state agencies and federal entities (e.g., SEFSC, NEFSC, SAFMC, MAFMC, ASMFC).

2.7 Management Strategies

- **Regulatory Amendment and Management Measures**
 - Implement annual catch limits (ACLs) based on stock assessments.
 - Maintain accountability measures such as seasonal closures and bag limits.
 - Improve bycatch reduction strategies and enforce gear restrictions.
- **Adaptive Management Framework**
 - Establish a rapid response mechanism for adjusting regulations based on new data.
 - Incorporate productivity variation in projections for long-term stock sustainability planning.
 - Foster cross-agency collaboration with NOAA Fisheries, Atlantic States Marine Fisheries Commission, state agencies, and academia.

2.8 Monitoring and Compliance Enforcement

- **Port Sampling and Dockside Monitoring:** Enhance coverage for commercial and recreational landings verification.
- **Regulation Awareness Campaigns:** Increase compliance through education and communication.

2.9 Future Research Priorities

- Develop a fishery-independent survey for coastal migratory pelagics in the South Atlantic region. There is no adult index of abundance.

- **Climate Resilience Strategies:** Develop adaptive management measures for Spanish and King Mackerel.
- Investigate impact of start date on the results of the assessment.
- Describe how infrastructure availability for fishery has changed and could affect for-hire and commercial fisheries.
 - Can the Spanish mackerel fishery change to other species if the fish moves offshore?

Conclusion

This RMP provides a structured approach to improving the scientific understanding and management of Coastal Migratory Pelagics. Through continued advancements in data collection, stock assessment methodologies, and regulatory evaluations, fisheries managers can ensure sustainable utilization and conservation of these vital species.

3.0 Research and Monitoring for the Fishery Management Plan for Coral, Coral Reef, and Live/Hard bottom Habitats of the South Atlantic Region

3.1 Introduction

The FMP for Coral, Coral Reef, and Live/Hard bottom Habitats of the South Atlantic Region (Coral FMP) protects coral resources, including both shallow-water coral reefs and deepwater coral habitats, such as the Oculina Bank. These habitats support high biodiversity, provide essential fish habitat (EFH), and are vulnerable to physical and climate-related impacts. This plan outlines priority research and monitoring needs to inform adaptive, ecosystem-based management.

3.2 Goals and Objectives

Goals:

- Ensure the long-term health and resilience of coral ecosystems in the South Atlantic.
- Inform management decisions with robust scientific data on coral condition, trends, and threats.

Objectives:

- Monitor the status and trends of coral species and habitats.
- Identify and assess anthropogenic and natural threats (e.g., fishing gear impact, ocean acidification, warming).
- Evaluate the effectiveness of existing Coral Habitat Areas of Particular Concern (CHAPCs).
- Improve mapping and characterization of shallow and deepwater coral distributions.

3.3 Key Research Priorities

3.3.1 Shallow-Water Coral Research

- **Habitat mapping and species inventories:** Expand spatial coverage using diver surveys, autonomous underwater vehicles (AUVs), and satellite/aerial imagery.
- **Coral health and disease monitoring:** Track prevalence of stony coral tissue loss disease (SCTLD) and bleaching events.
- **Recruitment and recovery dynamics:** Understand larval supply, settlement, and resilience following disturbance.
- **Water quality impacts:** Examine effects of land-based runoff, turbidity, and sedimentation.
- **Anthropomorphic impacts:** Understand fishing gear and anchoring impacts on coral growth.

3.3.2 Deepwater Coral Research

- **High-resolution mapping:** Use multibeam sonar, ROVs, and drop cameras to define coral mound structures and habitat extent.
- **Species composition and functional roles:** Inventory associated invertebrates and fish species across depths.
- **Gear interaction assessment:** Analyze bycatch records and evaluate the effectiveness of gear restrictions in CHAPCs.
- **Climate stressors:** Investigate vulnerability to acidification and temperature changes through in-situ sensors and lab experiments.

3.4 Monitoring Framework

3.4.1 Monitoring Indicators

- Coral cover and diversity
- Disease prevalence and bleaching frequency
- Presence/absence of indicator and keystone species
- Physical damage (e.g., anchoring, gear contact)
- Oceanographic parameters (temperature, pH, salinity, oxygen)

3.4.2 Monitoring Methods

Coral Type	Methodologies
Shallow	Diver transects, photoquadrats, benthic surveys, UAVs, video trap surveys, citizen science
Deepwater	ROV surveys, towed camera systems, benthic landers, acoustic mapping

3.5 Data Management and Reporting

- Establish Historical baselines to use as comparisons of coral health
- Incorporate findings into the SAFMC's EFH and FMP updates.
- Share data with regional and national databases (e.g., NOAA Deep Sea Coral Database).

3.6 Partnerships and Collaboration

- NOAA NCCOS, SEFSC, and OER
- Academic institutions and NGOs
- State agencies
- Fishers and citizen science programs (especially for shallow reef monitoring)

3.7 Adaptive Management

Use research outcomes to:

- Modify spatial protections (e.g., expand or revise CHAPCs),
- Update gear regulations, and
- Improve resilience through restoration strategies (e.g., coral outplanting).

3.8 Funding Needs and Opportunities

- Leverage competitive grants (e.g., RESTORE, NOAA CRCP)
- Federal support for coral reef science and management
- Explore cost-sharing with industry for gear impact mitigation studies

4.0 Research and Monitoring for the Fishery Management Plan for the Dolphin and Wahoo Fishery of the Atlantic.

4.1 Introduction

Dolphin (*Coryphaena hippurus*) and wahoo (*Acanthocybium solandri*) are highly migratory species targeted by both commercial and recreational fisheries along the U.S. Atlantic coast. The [FMP](#), developed by the SAFMC and approved in 2003, established regulations to ensure sustainable harvest. Subsequent amendments have refined catch limits, allocations, and data collection methods. This RMP aims to enhance data collection efforts, ensure compliance with catch limits, and monitor the overall health of these fisheries.

4.2 Research Objectives

A. Stock Assessment and Population Dynamics

- Improve data collection on population age structure, age, growth, and reproductive rates.
- Conduct studies to investigate distinct population segments.
- Use advanced modeling techniques to estimate stock abundance and fishing mortality.

B. Fisheries-Dependent Data Collection

- Expand observer coverage on commercial and for-hire vessels.
- Improve electronic reporting systems for recreational and commercial landings.
- Enhance collaboration with state agencies (e.g., FL, NC, SC, GA) to improve accuracy of recreational data.

C. Fisheries-Independent Surveys

- Conduct tagging programs to track migration patterns.
 - Incentivize tagging system for dolphin.
- Utilize acoustic telemetry and satellite tagging for real-time movement data.
- Establish a fishery-independent survey to track the abundance of adult dolphin and wahoo.
- Establish long-term monitoring of juvenile recruitment through ichthyoplankton surveys.

D. Environmental and Ecosystem Research

- Investigate the effects of climate change on distribution and spawning patterns.
 - Monitor spawning hot spots for dolphin.
 - Research range expansion and distribution shifts of dolphin.
- Monitor habitat use in relation to oceanographic conditions (e.g., sea surface temperature, upwelling, and eddies).
- Assess predator-prey relationships and trophic interactions.

E. Social and Economic Research

- Conduct surveys to assess economic contributions of recreational and commercial fisheries.
- Evaluate the effects of regulatory measures on fishing communities.
- Assess consumer demand and market trends for dolphin and wahoo.
- Conduct recreational valuation studies for dolphin and wahoo.
- Conduct social-ecological systems studies to improve understanding of interactions and connections between the fishery and marine ecosystem.
- Conduct a situation assessment to gather stakeholder perceptions of the management system for dolphin and wahoo.

4.3 Monitoring Plan

A. Stock Monitoring & Assessment

- **Management Strategy Evaluation:**
 - Complete management strategy evaluation for dolphin.
 - Incorporate dolphin tagging data.
 - Conduct regular updates of the management procedure to inform changes to recommended catch levels.
- **Data Limited Approaches:**
 - Develop data limited approaches for estimating sustainable harvest for wahoo.
- **Catch Monitoring:**
 - Commercial: Use Vessel Trip Reports (VTRs), logbooks, trip tickets, and electronic monitoring.
 - Recreational: Continue Marine Recreational Information Program (MRIP) survey, Southeast Region Headboat Survey, and Southeast For-Hire Integrated Electronic Reporting Program.
 - Select 10 to 20% of recreational fishery participants to report.
 - Better define the universe of the private recreational fishery by considering a permit.
 - Implement requirements for tournaments to report all catch.
- **Size and Age Sampling:** Expand age structure collection for age determination and size collection to inform size structure.
- **Bycatch & Discards:** Monitor through observer programs and electronic and logbook reporting.
 - Complete a Standard Bycatch Reporting Methodology review by December 2026.

B. Catch Limits & Compliance Monitoring

- **Annual Catch Limits (ACLs):** Evaluate landings against ACLs set in the FMP and amendments.

- **Accountability Measures:** Ensure catch levels do not consistently exceed catch limits.
 - Include in Stock Assessment and Fishery Evaluation (SAFE) reports.
- **Quota Tracking:** Improve real-time reporting through electronic logbooks and dealer reports.

C. Habitat & Ecosystem Monitoring

- **Essential Fish Habitat (EFH):** Conduct mapping and habitat use studies to refine EFH designations.
- **Climate Impact Studies:** Track shifts in species distribution relative to ocean temperature changes.
- **Food Web Analysis:** Assess prey availability and diet shifts due to ecosystem changes.

D. Enforcement & Data Validation

- **Electronic Monitoring:** Expand pilot programs for commercial vessels.
- **Observer Coverage:** Increase observer coverage in key fishing areas.
- **Port Sampling:** Conduct dockside validation of self-reported data and collection of biological information.

4.4 Research Priorities

Priority Area	Research Focus	Methods	Lead Agencies
Stock Assessment	Population estimates, stock structure and movement	Management strategy evaluation, tagging, modeling	NOAA, SAFMC, Dolphinfish Research Program
Fisheries Data	Landings, discards, effort	Observers, logbooks, surveys	State Agencies, SEFSC
Environmental Studies	Climate change, habitat use	Oceanographic monitoring, telemetry	NOAA, Universities, Dolphinfish Research Program
Social and Economic Research	Market trends, valuation	Surveys, interviews	SAFMC, NOAA

Conclusion

This RMP provides a framework for sustainable management of dolphin and wahoo along the U.S. Atlantic coast. By improving data collection, enhancing scientific assessments, and monitoring fishery impacts, stakeholders can ensure long-term sustainability while supporting the economic value of these fisheries.

5.0 Research and Monitoring for the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region

5.1 Introduction

The FMP for the Golden Crab Fishery of the South Atlantic Region was established in 1995, after the trap fishery for Snapper Grouper Fishery was closed (except for Black Sea Bass pots). The golden crab (*Chaceon fenneri*) supports a specialized commercial trap fishery primarily off the southeastern U.S. in deepwater habitats of the South Atlantic region. This RMP outlines strategies to support science-based management of the fishery, ensuring sustainability, ecosystem health, and economic viability.

5.2 Objectives

1. Assess stock status and trends of the South Atlantic golden crab population.
2. Monitor fishery performance and compliance with regulations.
3. Evaluate bycatch and habitat impacts.
4. Incorporate social and economic data to support management decisions.
5. Foster collaboration among stakeholders, including industry, scientists, and managers.
6. Support adaptive management through timely feedback loops.

5.3 Biological Research and Monitoring

Stock Assessment and Population Dynamics

Goals:

- Develop stock assessment models with biological and catch data.
- Identify reproductive patterns and recruitment variability.

Actions:

- Conduct periodic direct surveys (e.g., trap surveys) in known fishing grounds and unfished areas.
- Collect size, sex, and reproductive condition from port sampling and onboard observers.
- Refine life history parameters: growth, natural mortality, fecundity.

Frequency:

- Annual sampling for length-frequency data.
- Update on models used to monitor health of the fishery every 5 years.
- Tagging and Movement Studies

Goals:

- Understand spatial distribution, habitat use, and migration.

- Inform spatial management and gear restrictions.

Actions:

- Implement trap-based tagging programs with industry collaboration.
- Use archival or pop-up tags where it is feasible to track depth and temperature profiles.

5.4 Fishery-Dependent Monitoring

Logbooks and Catch Reporting

Goals:

- Maintain accurate landings and effort data.
- Track spatial and temporal fishing patterns.

Actions:

- Mandatory electronic logbooks with fine-scale location and effort data.
- Audit logbooks against dealer reports and dockside monitoring.

Responsible Agency:

- NOAA Fisheries Southeast Fisheries Science Center (SEFSC) and State agencies.

Observer and Electronic Monitoring (EM)

Goals:

- Validate self-reported data.
- Document bycatch and discards.

Actions:

- Deploy human observers on a randomized subset of vessels.
- Consider other cost-effective methods to collect data on a voluntary basis through Citizen Science or cooperative research.

Metrics:

- Discard rates, bycatch species composition, soak time, trap loss.

5.5 Fishery-Independent Surveys

Habitat-Based Surveys

Goals:

- Estimate golden crab abundance independent of fishery data.
- Monitor benthic habitat conditions.

Actions:

- Conduct ROV and drop-camera surveys along slope habitats (200–800 m).
- Stratify by region (NC, SC, GA, FL) and habitat type (sediment, coral, rock).

Partnerships:

- SEFSC, academic institutions (e.g., Harbor Branch, UNCW), and NOAA’s Deep Sea Coral Research and Technology Program.

5.6 Ecosystem and Habitat Considerations

Habitat Characterization and Vulnerability

Goals:

- Minimize gear impacts to sensitive deepwater habitats.
- Support essential fish habitat (EFH) designations.

Actions:

- Map deepwater habitats with multibeam sonar and ROV surveys.
- Overlay fishing effort with habitat maps to assess spatial overlap.

Climate and Oceanographic Monitoring

Goals:

- Assess climate-driven changes to golden crab distribution and productivity.

Actions:

- Monitor deepwater temperatures, oxygen levels, and currents.
- Integrate data from NOAA’s Integrated Ocean Observing System (IOOS) and SECOORA.

5.7 Social and Economic Research

Fleet Dynamics and Economic Performance

Goals:

- Understand the economic viability of the fishery.
- Support cost-effective management strategies.

Actions:

- Conduct cost-earnings surveys of golden crab vessels.
- Monitor market prices, processing capacity, and supply chain issues.

Social Indicators and Community Impacts

Goals:

- Assess the fishery’s role in fishing businesses and coastal communities.
- Evaluate impacts of regulations on fishermen and processors.

Actions:

- Use NOAA’s Social Indicators Data Portal.
- Interview key informants and hold stakeholder workshops.

5.8 Data Management and Integration

Goals:

- Ensure accessible, high-quality data for managers and researchers.

Actions:

- Integrate biological, fishery-dependent, and socioeconomic data in centralized systems (e.g., Atlantic Coastal Cooperative Statistics Program - ACCSP).
- Aggregate data into dashboards and tools for SAFMC staff and stakeholders.
- Use GIS and spatial analysis tools for spatial planning.

5.9 Adaptive Management and Feedback

Goals:

- Use research findings to support timely, responsive management.
- Develop a management strategy evaluation.

Actions:

- Present annual monitoring updates to the SAFMC Golden Crab Advisory Panel.
- Update FMP measures (e.g., quotas, effort controls, area restrictions) based on new data.
- Conduct Management Strategy Evaluations (MSE) to test robustness of regulations under uncertainty.

5.10 Partnerships and Funding Opportunities

Key Collaborators:

- NOAA Fisheries (SEFSC, SERO)
- SAFMC
- State Fish and Wildlife Agencies (NC, SC, GA, FL)
- Industry Associations and Vessel Operators
- Academic Institutions and NGOs

Funding Sources:

- Saltonstall-Kennedy Grants
- MARFIN (Marine Fisheries Initiative)
- NOAA Deep-Sea Coral Research Program
- Cooperative Research Programs

5.11 Performance Metrics and Reporting

Metrics:

- Trends in stock abundance and catch per unit effort (CPUE)
- Observer/EM coverage rates
- Bycatch and habitat interaction levels
- Economic profitability indicators
- Stakeholder satisfaction with management process

Reporting:

- Biennial Stock Assessment and Fishery Evaluation Reports
- 5-year Research and Monitoring Review
- SAFMC updates

Conclusion

This RMP is essential to support ecosystem-based, adaptive management of the golden crab fishery in the South Atlantic. By combining scientific rigor, stakeholder engagement, and technology-driven monitoring, the plan aims to ensure the long-term health of golden crab populations, deep-sea habitats, and coastal economies.

6.0 Research and Monitoring for the Fishery Management Plan for Pelagic Sargassum Habitat of the South Atlantic Region

This RMP outlines a coordinated strategy to assess, monitor, and manage Sargassum from North Carolina through Key West, Florida. The plan supports the mandates of the Magnuson-Stevens Act and the [FMP for Pelagic Sargassum Habitat of the South Atlantic Region's](#) management goals. It is designed to support sustainable harvests, identify and monitor essential fish habitat, and identify social and economic drivers of the fishery.

6.1 Objectives

1. **Evaluate ecological roles of pelagic Sargassum as Essential Fish Habitat (EFH).**
2. **Monitor Sargassum biomass trends** across nearshore and offshore areas.
3. **Assess the impacts of Sargassum inundation on nearshore reefs and beaches**, particularly smothering effects, hypoxia, and socio-economic impacts.
4. **Quantify fisheries species use of Sargassum habitat**, including larval, juvenile, and adult stages.
5. **Identify human use conflicts**, including impacts to tourism, beach access, and port navigation.
6. **Support sustainable harvest management** through science-based quotas and spatial restrictions.

6.2 Monitoring Components

A. Sargassum Distribution and Abundance

- **Remote sensing:** Use satellite information for large-scale Sargassum bloom detection.
- **In situ surveys:** Vessel-based transects to estimate Sargassum density and composition.
- **Data integration:** Collaborate with NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML), University partners, and GCFI's Sargassum Information Hub.

B. Offshore EFH Benefits

- Tagging and tracking studies for EFH-dependent species (e.g., dolphinfish, jacks, triggerfish, snappers, groupers, amberjacks).
- Trophic studies to assess food web linkages to Sargassum communities.
- Recruitment indices for species known to use Sargassum as nursery habitat.
- Biodiversity assessments using eDNA and underwater ROV surveys.

C. Nearshore Impacts from Inundation

- **Beach accumulation mapping:** GIS-based shoreline assessments.

- **Benthic reef monitoring** (nearshore hardbottoms, coral/sponge habitats):
 - Benthic cover (smothering, shading).
 - Oxygen profiles in high-deposition areas.
 - Algal decomposition rate studies.
- **Water quality monitoring:** Dissolved oxygen, nutrient enrichment, temperature.
-
- **Socio-economic surveys:** Stakeholder feedback on nuisance events, beach closures, tourism impact.

6.3 Research Needs and Priorities

- Identify source regions and drivers of massive Sargassum influxes (e.g., Amazon River nutrient loading, climate shifts).
- Establish standardized Sargassum biomass estimation methods.
- Determine threshold levels for ecological impacts on nearshore habitats.
- Conduct species-specific EFH dependency analysis.
- Evaluate connectivity between Sargassum and downstream nursery habitats.
- Explore sustainable harvest potential without compromising ecological function.
- Forecast climate-related changes in Sargassum bloom dynamics.
- Assess cumulative impacts from frequent inundation on coral resilience.
- Integrate Sargassum data into EFH updates and ecosystem models.

6.4 Partnerships and Collaboration

- NOAA NMFS Habitat Division
- NOAA Coral Reef Conservation Program
- Florida FWC and DEP, SC DNR, NC DMF, GA DNR
- Academic institutions
- International efforts (e.g., CARICOM, SargNet, UN Sargassum Working Group)

6.5 Reporting and Adaptive Management

- Annual SAFMC review of Sargassum status and research outcomes.
- Use findings to:
 - Adjust seasonal harvest limits.
 - Refine EFH designations.
 - Inform management triggers for inundation response.
- Develop outreach tools for coastal communities and fishers.

7.0 Research and Monitoring for the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region

7.1 Introduction

This RMP outlines a coordinated strategy to assess, monitor, and manage penaeid (brown, white, and pink shrimp) and rock shrimp (*Sicyonia brevirostris*) fisheries from North Carolina through Key West, Florida. The plan supports the mandates of the Magnuson-Stevens Act and the SAFMC [Shrimp FMP](#) management goals. It is designed to support sustainable harvests, identify and monitor essential fish habitat, and identify social and economic drivers of the fishery.

7.2 Objectives

1. Monitor sustainable harvest proxies to track stock conditions
2. Enhance fishery-dependent and fishery-independent data to better inform management.
3. Identify and monitor essential fish habitat (EFH) including nursery and spawning areas.
4. Assess changes in bycatch and gear interactions (TEDs, BRDs) and reduce bycatch mortality.
5. Track social and economic conditions to better understand the drivers in the fishery.
6. Facilitate adaptive management through integration of new research and continued monitoring.

7.3 Fishery-Dependent Monitoring

Observer and Port Sampling Programs

- **Observer Coverage:**
 - Conduct analysis to determine the appropriate level of sampling to describe bycatch.
 - Continue observer coverage as needed to describe bycatch and incidental catch in the fishery.
- **Bycatch Biological Data:** Collect length-frequency, sex ratio, and species composition on bycatch species.
- **Bycatch Trends and Changes:** Track changes in bycatch composition.
- **Port Sampling Program:** Continue or expand port sampling to collect length and sex data and identify areas of high activity which are not being sampled.
- **Incidental Catch Monitoring:** Monitor incidental catch in shrimp fisheries

VMS and Compliance Monitoring

- **Enforcement:** Enforce spatial closures (e.g., Oculina Bank HAPC, South Atlantic Shrimp Fishery Access Areas).
- **Bycatch Gear:** Evaluate effectiveness of gear regulations (TED/BRD compliance).

7.4 Fishery-Independent Research

SEAMAP-South Atlantic Trawl Surveys

- **Stock Abundance:** Track abundance indices (CPUE) for brown and white species
- **Monitor Recruitment:** Track recruitment strength through plankton surveys

Larval and Post-Larval Surveys

- **Larval Abundance:** Conduct plankton tows to monitor larval shrimp abundance and phenology.
 - Sample estuaries and nearshore ocean for juvenile penaeids and rock shrimp.
 - Integrate findings into larval transport models (NOAA NOS partnership).

New Surveys

- **Pink Shrimp:** Develop long-term fishery independent survey to monitor the pink stock from Key West to North Carolina.
- **Rock Shrimp:** Develop long-term fishery independent survey to monitor rock shrimp in the South Atlantic region.

7.5 Biological and Ecosystem Research

Life History and Reproductive Studies

- **Life History:** Update fecundity, maturity, and spawning timing estimates by region.
- Use length-based catch curves and modal progression analysis.
- Estimate natural (M) and fishing (F) mortality rates by species and region.

Gear Selectivity and Bycatch Studies

- Evaluate TED and BRD efficiency under varying operational conditions.
- **Regional Bycatch Trends:** Identify regional differences in bycatch species composition.
- **Emerging BRD Configurations:** Test alternative gear configurations or materials for selectivity improvements.
- **Shark Interactions:** Test alternative methods or gears to reduce shark impacts to gear

Environmental and Habitat Monitoring

- **Identify Habitat:** Describe habitat and environmental associations with each species and life stage by deploying environmental sensors (temperature, salinity, DO) in estuarine and offshore areas.
- **Habitat Mapping:** Map EFH using a variety of techniques including side-scan sonar, sediment grabs, and remote video (ROVs).

Habitat Changes: Track habitat alterations due to hurricanes, red tides, beach renourishment, and human activity.

7.6 Social and Economic Monitoring

Economic Assessments

- Conduct cost-earnings surveys in partnership with Gulf & South Atlantic Fisheries Economics Program (GSFEP).
- Track market trends, export dependencies, and fleet profitability.

Community Profiles and Vulnerability Assessments

- Update community profiles.
- Assess regulatory and environmental risks to fleet and shore-based infrastructure.
- Assess the effects of offshore wind, resource mining, or other offshore development on the shrimp fishery.

7.7 Data Management and Integration

- **Centralized Repository:** Use ACCSP as the central data hub for fishery-dependent data.
- **Visualization and Access:** Develop GIS dashboards to share stock, habitat, and fleet data with agencies and stakeholders.

7.8 Research Coordination and Adaptive Feedback

Interagency Coordination

- **Quarterly Technical Working Groups:** Involving NOAA, SAFMC, state biologists.

Shrimp Futures

- Support the efforts of the NOAA Fisheries Shrimp Futures project which aims to:
 - Collaborate with fishermen to develop a vision for the future of their fishery from an ecological, economic, and social perspective
 - Identify barriers to achieving that vision
 - Identify success and opportunities to support the shrimping industry
- Encourage the project to increase collaboration with South Atlantic State agencies and ASMFC

7.9 Priority Research Needs

- Model climate-driven distribution shifts (temperature/salinity impacts).
- Enhance understanding of larval transport and estuarine dependency.
- Evaluate cumulative ecosystem effects of shrimp trawling (e.g., habitat degradation).
- Quantify economic resilience and adaptation strategies in coastal communities.
- Evaluate the need for the limited access permit (RSLA) in the South Atlantic region
- Evaluate the need for operator cards in the South Atlantic Rock Shrimp Fishery

8.0 Research and Monitoring for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

8.1 Introduction

The Snapper Grouper Fishery in the South Atlantic from North Carolina to Key West, Florida, spans a highly productive and ecologically complex marine region. This area supports over 50 managed species that are central to commercial and recreational fisheries. [The FMP](#), developed by the SAFMC, aims to sustainably manage this diverse complex.

To improve the scientific basis for management, this RMP incorporates region-specific priorities and SEDAR stock assessment recommendations, guiding data collection, analysis, and assessment improvement efforts through an adaptive and ecosystem-based approach.

8.2 Objectives

1. Support sustainable fisheries and healthy ecosystems in the South Atlantic region.
2. Improve data availability and quality for regionally important species.
3. Address spatial variability in biology, fisheries, and habitat from NC to Key West.
4. Reduce uncertainty in stock assessments through targeted research and monitoring.
5. Incorporate regional ecosystem dynamics and climate variability.

8.3 Fisheries-Dependent Data Collection

Catch, Effort, and Discards

- Continue monitoring commercial and recreational fisheries using established or certified methods in the region.
- Continue or implement electronic reporting for commercial and charter/headboat fleets (e.g., SEFHIER).
- Prioritize validation efforts in high-activity ports of self-reported data.
- Increase sampling effort during key seasonal fisheries.
- Improve discard monitoring for high-release mortality species (e.g., Red Snapper, Deepwater Groupers) using observer programs or other methods.
- Complete needed updates to the permit database.
- Make catch estimates for all information sources readily available (e.g., commercial discard estimates, SRHS)
- Update estimates of discard mortality based on adoption of regulations designed to reduce discard mortality (e.g., circle hook, dehooking device, descending device).

- Document historical and current use patterns (oral histories, ethnographic studies).

Social and Economic and Effort Metrics

- Conduct regular social and economic surveys to capture economic trends, cultural ties, and effort shifts across the region.
- Monitor for-hire fishing effort through electronic logbooks and mobile apps.

8.4 Fisheries-Independent Monitoring

Survey Expansion and Standardization

- Continue snapper grouper surveys:
 - Video trap survey.
 - South Atlantic Deepwater Longline Survey.
 - Roving visual census
- Ensure sampling is sufficient to cover all current habitat available to the complex.
 - Expand surveys south of Cape Canaveral and north of Cape Hatteras.
 - Expand surveys in south Florida to deeper water
- Develop methods to calibrate surveys in the South Atlantic and Mid-Atlantic regions
- Develop recruitment indices for assessed species especially for species with potential regime shifts (low recruitment species and Red Snapper).

Environmental and Habitat Monitoring

- Map high-relief and deepwater habitats using multibeam sonar and identify habitat types using ROVs.
- Incorporate environmental data layers (SST, salinity, upwelling indices) into spatial models to explain recruitment and distribution shifts.

8.5 Life History and Stock Structure Research

Growth, Maturity, and Reproduction

- Conduct life history sampling for Tier 1 species and for species showing latitudinal variation (e.g., Black Sea Bass, Hogfish, Red Grouper, White Grunt).
- Reevaluate age-at-maturity and spawning seasonality for Red Snapper and Gag Grouper across latitudinal gradients.
- Improve estimates of batch fecundity, spawning frequency, and spawning aggregations using gonad histology and field observations.

Stock Structure and Movement

- Use tagging, otolith microchemistry, and genetic markers to resolve regional stock structure for species that have spatially separated fishery-dependent or fishery-independent catches (e.g., red grouper).
- Assess connectivity between spawning and nursery areas
- Identify spawning areas

8.6 Ecosystem and Bycatch Research

- Study community impacts of changing species distribution.
- Continue development of food web models to improve understanding of changing conditions on species abundance and sustainability.
- Study food web interactions of apex predators (e.g., Goliath Grouper, sharks) and their effects on reef fish populations.
- Quantify bycatch of managed and non-managed species in deep-drop fisheries targeting Snowy Grouper, Yellowedge Grouper, Tilefish, and Wreckfish.
- Monitor interactions with protected species in the fishery.
- Monitor managed areas.
 - Document occurrence of spawning within Spawning SMZs by high priority species in the Snapper Grouper complex (See Appendix 2 for a list of species).
 - Characterize usage of Deepwater MPAs by managed species.
 - Develop annual monitoring to collect data inside and outside managed areas to enable comparison among managed sites and reference sites. Identify fish population demographics (e.g., size and age structure, sex ratio, species use of habitat by life stage, spawning activities, etc.) within and adjacent to the managed areas.
 - Complete multibeam surveys of the MPAs.
 - Evaluate compliance with regulations for managed areas.
 - Use hydrodynamic modeling to assess connectivity between MPAs and other habitats.
- Describe maximum sustainable yield for the fishery
- Investigate different methods to develop optimal yield for the fishery.
- Complete a review of the Standard Bycatch Reporting Methodology by December 2026.

8.7 SEDAR Stock Assessment Research Recommendations

Species	Priority Research Needs
Red Snapper	Refine discard mortality estimates (especially in FL); enhance age and growth; investigate causes of potential high recruitment to inform projections; investigate impacts of high red snapper abundance on competition and

Species	Priority Research Needs
	predation of other reef associated species; obtain estimate of natural mortality focused on ages <7; monitor climate impacts on species distribution and changes in peak spawning.
Gag Grouper	Improve spatial resolution of maturity and spawning season data; identify spawning aggregation sites; study sex transition rates; investigate potential impacts of sperm limitation on stock recovery.
Black Sea Bass	Identify causes for changes in recruitment; investigate how the fishery is changing based on contact percentage in stock assessment; investigate range shifts; re-investigate growth model to better describe length at age; collect size or age information for released fish in different recreational fishing modes.
Gray Triggerfish	Improve discard estimates in bottom hook-and-line fisheries; verify maturity schedules by region; address connectivity among fish in the South Atlantic and Mid-Atlantic regions.
Red Porgy	Investigate trends in life history changes; describe potential changes in abundance due to changes in predation (e.g. Red Lionfish and Red Snapper); investigate reasons for low recruitment.
Speckled Hind / Warsaw Grouper	Identify important habitats for Speckled Hind and Warsaw Grouper; review catch level recommendations.

8.8 Data Management and Collaboration

- Coordinate data streams between NOAA Fisheries, state agencies (FWC, GADNR, NC DMF, SCDNR), and universities.
- Create an integrated data system for tracking biological samples, habitat mapping, and survey efforts.
- Expand cooperative research and citizen science programs involving fishermen from NC through FL Keys.

8.9 Prioritization Framework and Funding

High Priority

- Red Snapper discard mortality and independent indices.
- Gag Grouper reproductive dynamics and spawning aggregations.
- Enhanced survey coverage in south Florida and north of Cape Hatteras and offshore deep habitats.
- Report on Standard Bycatch and Reporting Methodology.
- Causes of low recruitment in the region.
- Impact of changing recreational estimates on the management process.
- Develop reliable catch estimates for stocks with high PSEs.

- Develop annual estimates of commercial discards based on observer program and compare with logbook estimates.
- Gather quantitative information on the extent to which shark predation may be influencing fishing-based or natural mortality for Council managed species.
- Incorporate length composition into the video survey where possible.

Medium Priority

- Monitoring compliance with regulations.
- Video monitoring for deepwater reef species.
- Socioeconomic tracking of fishery participation.
- Research needs for protogynous stocks, particularly groupers, Hogfish, Red Porgy, and Black Sea Bass:
 - Investigate effects of hermaphroditism on the steepness parameter.
 - Investigate temporal patterns in sexual transition and develop explanations for any patterns identified.
 - Investigate methods for incorporating the dynamics of sexual transition in assessment models.

Low Priority

- Historical reconstruction of landings for under-assessed species.
- Rare-event species life history studies (e.g., Graysby, Rock Hind).

Funding Sources: NOAA RESTORE, MARFIN, CRP, Saltonstall-Kennedy, SECOORA, state wildlife grants.

8.10 Evaluation and Adaptive Management

- Update research priorities biennially in conjunction with Council planning cycles.
- Integrate results into FMP amendments, ACL revisions, and rebuilding plans.
- Monitor climate-driven distribution shifts and revise models and essential fish habitat accordingly.
- Evaluate the Oculina Experimental Closed Area, Deepwater Marine Protected Areas, and Spawning Special Management Zones.
- Evaluate management measures to achieve purpose and need described in the amendments.

9.0 Research and Monitoring for the Fishery Management Plan for Spiny Lobster in the Gulf and South Atlantic

9.1 Introduction

The spiny lobster (*Panulirus argus*) fishery is a valuable commercial and recreational resource in the South Atlantic, particularly off Florida's coast and the Florida Keys. This RMP is developed to support the [FMP for Spiny Lobster in the Gulf and South Atlantic](#) in managing the spiny lobster fishery in alignment with the Magnuson-Stevens Fishery Conservation and Management Act.

9.2 Objectives

1. Assess and monitor the biological status of the spiny lobster stock.
2. Track fishery performance, landings, and effort.
3. Monitor recruitment and spawning behavior.
4. Evaluate ecological and habitat impacts, including marine protected areas (MPAs).
5. Quantify social and economic performance and community dependence.
6. Integrate findings into adaptive and ecosystem-based management strategies.

9.3 Biological Research and Monitoring

Stock Assessment and Population Dynamics

Goals:

- Provide up-to-date stock status to guide quota and season decisions.

Actions:

- Regular updates to stock assessment models (e.g., using SEFSC data).
- Collect data on size-at-age, growth, maturity, and natural mortality.
- Incorporate larval supply and settlement patterns into population models.

Frequency:

- Comprehensive stock assessments every 5 years.
- Annual data updates and trend monitoring.

Data Sources:

- NOAA SEFSC, FWC, academic research.

Reproduction and Recruitment Studies

Goals:

- Understand spawning behavior, larval dispersal, and settlement.

Actions:

- Monitor presence of berried (egg-bearing) females.

- Conduct plankton tows to quantify larval density during spawning peaks.
- Track post-larval settlement with artificial collectors (e.g., Witham collectors).

Geographic Focus:

- Florida Keys, Biscayne Bay, Dry Tortugas, Southeast Florida reefs, and off the Carolinas.

Tagging and Movement Studies

Goals:

- Understand local and regional movement, site fidelity, and connectivity.

Actions:

- Implement cooperative tagging programs with fishers.
- Use acoustic telemetry and visual tracking (e.g., in protected areas).
- Integrate genetic and oceanographic modeling for larval dispersal.

9.4 Fishery-Dependent Monitoring

Landings, Effort, and Dealer Reports

Goals:

- Track commercial and recreational harvest trends.

Actions:

- Mandatory trip and dealer reporting for commercial vessels.
- Integration of data from the Atlantic Coastal Cooperative Statistics Program (ACCSP).
- Recreational harvest surveys (e.g., MRIP – Marine Recreational Information Program).

Metrics:

- Total landings (lbs.), catch per unit effort (CPUE), number of trips, area fished.

Trap Monitoring and Gear Performance

Goals:

- Monitor trap usage, ghost gear, and soak time impacts.

Actions:

- Consider other cost-effective methods to collect data on a voluntary basis through Citizen Science or cooperative research.
- Map trap densities and overlap with benthic habitats.
- Quantify trap loss and ghost fishing rates.

Innovation:

- Evaluate biodegradable trap panels for reducing ghost fishing.

Bycatch and Discards

Goals:

- Quantify and reduce bycatch (e.g., juvenile lobsters, finfish, turtles).

Actions:

- Onboard observer coverage and video monitoring trials.
- Estimate undersized and non-retained catch and mortality.
- Evaluate effectiveness of trap modifications (e.g., escape gaps).

9.5 Fishery-Independent Monitoring

Settlement and Juvenile Abundance Monitoring**Goals:**

- Track year-class strength and recruitment variability.

Actions:

- Monthly juvenile surveys in nursery habitats (e.g., seagrass beds, mangroves).
- Standardized post-larval settlement monitoring using artificial collectors.

Habitat Monitoring and Benthic Surveys**Goals:**

- Assess habitat quality, degradation, and restoration success.

Actions:

- Visual transects using SCUBA, ROVs, and drop cameras.
- Coral reef, sponge, and seagrass mapping using GIS.
- Monitor habitats within no-take zones and Sanctuary Preservation Areas (SPAs).

9.6 Ecosystem and Climate Considerations

Disease and Environmental Stressors**Goals:**

- Monitor prevalence and spread of disease (e.g., PaV1 virus).

Actions:

- Conduct health assessments of juveniles and adults in various habitats.
- Track incidence of shell disease, parasites, and abnormal molting.

Climate and Oceanographic Effects**Goals:**

- Understand the impacts of warming oceans, hypoxia, and acidification.

Actions:

- Correlate recruitment and distribution with water temperature and salinity.
- Model shifts in larval drift using ocean current data (MOM6, HYCOM/SECOORA or other models).

- Integrate satellite data for Sargassum abundance and coastal upwelling events.

9.7 Social and Economic Monitoring

Fleet Economics and Market Dynamics

Goals:

- Track the economic health of the spiny lobster commercial and recreational sector.

Actions:

- Conduct cost-earnings surveys of commercial fishers.
- Monitor market prices, dockside sales, and export demand (e.g., live lobster to Asia).

Community and Cultural Importance

Goals:

- Assess fishing community dependence and social resilience.
- Assess crew availability and job satisfaction in the spiny lobster fishery.

Actions:

- Analyze social indicators (NOAA Social Indicators Portal).
- Document historical and current use patterns (oral histories, ethnographic studies).

9.8 Data Integration and Management

Goals:

- Support transparent, efficient, and accessible data management.

Actions:

- Centralize biological, fishery, and socioeconomic data in ACCSP.
- Integrate GIS layers (e.g., habitat, MPAs, trap locations).
- Develop real-time data dashboards for managers and stakeholders.

9.9 Adaptive Management and Policy Feedback

Goals:

- Ensure that research informs regulatory and policy adjustments.

Actions:

- Present monitoring summaries to the SAFMC Lobster Advisory Panel.
- Support rulemaking with updated data (e.g., trip limits, closed seasons).
- Conduct Management Strategy Evaluations (MSE) for alternative policies.

9.10 Research Collaboration and Funding

Key Partners:

- NOAA Fisheries SEFSC and SERO

- Florida Fish and Wildlife Conservation Commission (FWC)
- SAFMC
- Universities
- National Marine Sanctuary Program (FKNMS)
- Fishers, cooperatives, and NGOs

Funding Sources:

- Saltonstall-Kennedy Grants
- MARFIN (Marine Fisheries Initiative)
- Florida Sea Grant
- Cooperative Research Program
- National Fish and Wildlife Foundation (NFWF)

9.11 Performance Metrics and Evaluation

Biological Indicators:

- Stock status (biomass, fishing mortality)
- Recruitment indices
- Size-frequency distributions

Fishery Indicators:

- CPUE trends
- Compliance rates
- Gear loss and bycatch levels

Social and Economic Indicators:

- Profitability and effort levels
- Community dependence and employment
- Market dynamics

Habitat/Ecosystem Indicators:

- Reef health trends
- Disease incidence
- Trap density in sensitive habitats

9.12 Reporting and Transparency

Deliverables:

- Biennial Stock Assessment and Fishery Evaluation Reports
- Five-Year Scientific Review and FMP Evaluation

Stakeholder Engagement:

- Collaborate with Florida Fish and Wildlife Conservation Commission to hold regular stakeholder workshops
- Provide public access to summarized monitoring results

Conclusion

A robust, multi-dimensional RMP is critical for the sustainable management of spiny lobster fisheries in the South Atlantic. By combining scientific rigor, ecosystem-based principles, and stakeholder collaboration, this plan ensures resilience in the face of biological, economic, and environmental change.

10.0 Social and Economic Research and Monitoring Priorities in the South Atlantic Region

10.1 Introduction

Effective fisheries management in the South Atlantic region requires not only robust biological data but also a comprehensive understanding of the human dimensions of fisheries. This Social and Economic RMP outlines strategies to improve the collection, integration, and application of human dimension data to support adaptive and inclusive management decisions.

10.2 Goals and Objectives

Goal 1: Improve understanding of the social and economic dynamics of South Atlantic fisheries.

Goal 2: Integrate social and economic data into the fishery management processes.

Goal 3: Enhance stakeholder engagement through inclusive, community-based research and citizen science.

Goal 4: Do good quality social and economic data collection to reduce potential bias in findings.

Goal 5: Gather information on optimum yield focused on social and economic factors and support resilience in coastal fishing communities.

10.3 Priority Research Areas

Economic Research Priorities

- **Fishery Dependence and Revenue Flow**
 - Track changes in commercial and for-hire revenues by species, gear, and port.
 - Examine fishery dependence among communities and regions.
- **Cost and Earnings Data**
 - Expand cost-earnings surveys for the commercial and for-hire sectors.
 - Assess profitability, input costs, and financial risks.
- **Market Dynamics and Value Chains**
 - Study domestic and export seafood market trends.
 - Analyze seafood price variability, value-added processing, and supply chains.
- **Economic Impact and Contribution**
 - Update input-output models (e.g., IMPLAN) to estimate regional economic contributions of fishing activity.
 - Evaluate the cumulative economic effects of regulations and environmental events (e.g., hurricanes, algal blooms, upwelling events).

- Develop methods to understand the economic effects or value of managed areas developed by SAFMC.

Social Research Priorities

- **Fishing Community Profiles**
 - Work with NMFS to update community snapshots using census, fishery, and local data.
 - Highlight cultural, demographic, and occupational characteristics.
 - Social dimensions of the South Atlantic shrimp fishery (based on Gulf Shrimp fishery).
- **Governance and Perceptions**
 - Assess stakeholder perceptions of management measures, enforcement, equity, and trust.
 - Study social science use in the decision-making process and what motivates stakeholders to participate.
- **Social Vulnerability and Resilience**
 - Work to expand available indicators of social vulnerability to include fishing community specific exposures to risks, such as loss of working waterfronts, species shifts, etc.
 - Continue to map indicators of social vulnerability, adaptive capacity, and exposure to risks.
 - Identify communities vulnerable to climate change, habitat loss, and species and regulatory shifts.
- **Human Well-being and Quality of Life**
 - Measure impacts of fishery participation on mental, physical, and economic well-being.
 - Monitor the effects of closures, access changes, and natural disasters on fishing communities.
 - Develop methods to understand the social impact and cultural value of managed areas developed by SAFMC.

10.4 Data Collection and Monitoring

Existing Data Sources to Leverage

- NOAA Fisheries Social Indicators Portal
- NOAA Fisheries Community Profiles
- NOAA Fisheries Voices Oral History Archive
- NOAA Fisheries SEFSC and Atlantic HMS economic logbook and surveys
- Fisheries Economics of the U.S. (FEUS) reports
- National Fishermen and Vessel Registries

- U.S. Census and American Community Survey
- Atlantic Coastal Cooperative Statistics Program (ACCSP)

New or Enhanced Data Needs

- Real-time or near-real-time social and economic data streams
- Socioeconomic logbooks or add-ons for existing reporting
- Ethnographic fieldwork and oral history programs
- Local Ecological Knowledge (LEK) documentation
- Develop methods to inform long-term optimum yield in fisheries
- Impact of changing geographic fish distribution
- Potential impacts to fishing community due to flood and storm damage
- Observations and predictions on species distribution changes
 - Better linkage between the Greater Atlantic and South Atlantic regions.
- Improved communication with stakeholders to better understand stakeholder management needs and fishery observations.

Monitoring Strategies

- Review socioeconomic status reports every 5 years
- 5-year community trend assessments
- Periodic policy impact evaluations
- Continuous feedback loops with stakeholders
- Integrate more social and economic data in the biennial Stock Assessment and Fishery Evaluation (SAFE) reports for each FMP.

10.5 Collaboration and Partnerships

- **Federal:** NOAA Fisheries (SEFSC and SERO), NMFS Office of Science & Technology
- **State Agencies:** FL, GA, SC, NC marine resource divisions
- **Academic Institutions:** Regional Sea Grant programs, universities with coastal sociology/economics programs
- **Community Partners:** Fishing cooperatives, harbor authorities, tribal organizations
- **NGOs and Private Sector:** Industry, environmental, and fishing participant organizations,

10.6 Application in Management

- Continue to incorporate social and economic data into FMP amendments and expand the current available sources and quality of data.

- Develop Social Impact Assessments (SIA), Regulatory Impact Review (RIR), and Regulatory Flexibility Act (RFA) for all major actions.
- Use participatory modeling, scenario planning, and citizen science to engage stakeholders in the research and management processes.
- Support adaptive management measures that can respond quickly to changes in fisheries dynamics.

10.7 Economic and Social Science Priorities by FMP

10.7.1 All Finfish Fisheries

- Provide regularly updated estimates of recreational economic values for Council managed species.
 - Develop methods that allow regular updates of economic value information.
 - Develop or expand economic value estimates that focus on angler opportunity in addition to realized harvest (abundance, catch rates, opportunity to harvest a given bag limit, etc.).
- Provide information on how changes in allocation or species availability influence recreational and commercial net benefit estimates.
- Develop estimates or models for the response of angler behavior to regulation changes for Council managed species.
- Develop a social and economic profile and an economic impact model for the South Atlantic headboat component of the for-hire sector.
- Develop net revenue estimates generated for seafood dealers from the sale of Council managed species.
- Develop a study to quantify current and baseline access to fishing infrastructure throughout the South Atlantic region to evaluate community dependance and cultural importance of fishing activities.
- Develop a social and economic profile of commercial and recreational participants involved in Council managed fisheries (commercial captain and crew, for-hire captain and crew, private, charter, or headboat anglers, etc.).
- Explore management alternatives that would facilitate overlapping open harvest seasons to allow commercial boats to maximize net revenue.

10.7.2 Coastal Migratory Pelagics

- Describe how management regulations such as state and federal regulations may limit access to fisheries based on changes in species distribution temporally or spatially (particularly Spanish Mackerel).
- Investigate social and economic effects on the commercial fishery due to trips limits.

- Track secondary, wholesale, and retail prices to better understand the value of the commercial fishery.
- Investigate changes in price due to recreational tournaments.
- Investigate whether the importance of CMP species has changed in private recreational or for-hire fisheries as other fishery regulations or abundance changed.

10.7.3 Coral

- Update the National Coral Reef Monitoring Program Socioeconomic Monitoring for South Florida.
- Develop a social and economic monitoring program for deep water coral in the region.
- Continue research on social and economic effects of extreme ocean temperatures, coral bleaching, and stony coral tissue loss disease on fisheries in the South Atlantic region.

10.7.4 Dolphin Wahoo

- Improve the description of fishery preferences for stakeholders in private and for-hire components of the recreational sector for Dolphin and Wahoo along the coast.
- Describe social and economic effects of hurricanes and warming surface ocean water on the Dolphin and Wahoo fishery.

10.7.5 Golden Crab

- Develop social and economic indicators for the Stock Assessment and Fishery Evaluation Report.
- Review effects of current regulations on fishermen and processors.

10.7.6 Sargassum

- Describe demand for sargassum (current quota is 5,000 lbs. in federal waters and seasonally limited).
- Describe social and economic costs associated with sargassum inundation on beach and reefs.

10.7.7 Shrimp

- Describe impact of imports on domestic shrimp fisheries.
- Track market trends and fleet profitability.
- Continue monitoring fisheries north of North Carolina.
- Assess regulatory and environmental risks to the fleet and
- Describe changes to shore-based infrastructure available to the fishery.
- Describe fleet characteristics to understand how the fleet has changed over the past 20 years.
- Describe demographics in the fishery
- Evaluate the benefits of fishermen training programs

10.7.8 Snapper Grouper

- Evaluate the cumulative economic and social implications of existing regulations on the multi-species Snapper Grouper fishery in the South Atlantic.
- Describe the impact of the limited entry system on underserved communities.
- Conduct an economic analysis on the capacity of the commercial Snapper Grouper fishery.

10.7.9 Spiny Lobster

- Describe how the value of spiny lobster has changed in northern Florida.
- Develop a description of the usage of tailing permits by state or area of landing.
- Describe social and economic impacts of environmental events (e.g., hurricanes, algal bloom) on fisheries.

11.0 Habitat and Ecosystem Research and Monitoring Priorities in the South Atlantic Region

- **Mapping and Characterization of EFH**
 - Map and characterize mesophotic coral and euphotic coral distribution in the South Atlantic region.
 - Characterize use of submerged aquatic vegetation (SAV) habitat by managed species.
 - Prioritize topographic mapping of ocean soft bottom and compile existing bathymetric and hydrologic information to develop bathymetric maps of ocean soft bottom habitat. Identify mapping gaps and priorities.
- **Monitor Health of Habitats**
 - Document essential fish habitat loss over time (e.g., wetland and SAV).
 - Evaluate the health of coral reef systems compared to historical baselines and assess causes of coral health changes.
 - Evaluate changes in estuarine and near coastal water quality and estimate impact of poor water quality on habitat and recruitment for federally managed species and their prey.
 - Characterize baseline natural flows and flow regimes for South Atlantic River basins, estuary, and nearshore habitats for use in evaluating developmental impacts.
 - Project potential losses of estuarine primary productivity related to shoreline development, sea level rise, and subsequent loss of saltmarsh habitat.
 - Integrate a time series and spatial maps of temperature, chlorophyll -a, freshwater flow, salinity, etc. into the Ecosystem status report and /or future integrated ecosystem assessment reports.
 - Assess the relative shrimp productivity of freshwater marsh vegetated habitat relative to saltmarsh vegetated habitat.
 - Re-evaluate the abundance and distribution of Atlantic Sargassum relative to trends off the west coast of Florida.
 - Develop ecosystem-level reference points (ELRPs) and thresholds as an important step to informing statutorily required reference points by identifying key dynamics, emergent ecosystem properties, or major ecosystem-wide issues that impact multiple species, stocks, and fisheries.
- **Analyze Anthropogenic Impacts**

- Estimate impacts of fishing gear on EFH including coral, coral reefs, and live hard bottom habitat.
- Compile the impacts of sand and sediment dredging and beneficial use projects on estuarine dependent species.
- Produce an analysis of the spatial and temporal dimensions of dredge-and-fill beach renourishment projects combined with other large-scale coastal engineering projects, within the SAFMC geographic range. Define cumulative impacts, on productivity and biomass of nearshore ecosystems, occurring as a result of dredge-and-fill beach renourishment.
- Review grain size compatibility and ecological and economic benefits of using compatible sand to the USACOE and CZM agencies.
- Investigate potential impacts of debris from space launches being dropped into the South Atlantic region and economic impacts of fishery closures due to space launches.
- Research regionally focused cost-benefits analyses between purchasing oceanfront properties as opposed to renourishing beaches.
- Estimate rates of recruitment of fouling fauna and recruitment of motile fauna to proposed concrete blankets to cover windfarm power lines.
- Seek novel opportunities to cooperatively expand long term monitoring (e.g., new sensors on offshore wind platforms- acoustic, cameras monitoring fishing effort, local cell phone coverage, etc.).
- Cooperate with State partners to secure funding for programs to support long-term, multi-year standardized monitoring of artificial reefs and their communities, with the necessary long-term funding to provide multi-year trends in reef fish productivity and allow valid future comparisons of temporal and spatial data.
- Review Federal management and operation plans for artificial reefs to determine if they are up to date and meet the guidelines put forth by ASMFC Artificial Reef Committee and as permitted by USCOE, and update, as necessary. Encourage state partners to do the same.
- Study artificial reefs and determine how they interact with adjacent natural habitats to determine the role of artificial reefs on recruitment, range expansion, and abundance.
- Conduct long-term, multi-year standardized monitoring of artificial reefs and their communities to provide multi-year trends in reef fish productivity and allow valid future comparisons of temporal and spatial data.
- Encourage use of mitigation reefs for offshore dredging and development operations.
- NOAA Fisheries in cooperation with the Council, develop a list of regionally specific requirements or Best Management Practices for flow-altering projects

that can potentially impact EFH or other resources and support scheduling projects to not coincide with spawning migrations or early development of sensitive species.

- **Collect data and research necessary to move EFH classifications from Level 1 Presence Absence to higher tiers.**
 - Expand characterization of juvenile reef fish use of habitat.
 - Use existing surveys to collect early life stage habitat use.
 - Quantify forage fish stock abundances and dynamics, and their impacts on predator productivity.
 - Quantify managed species diet compositions to identify predator dependency of forage species spatially and temporally in the South Atlantic.
 - Characterize life history of primary prey for Council managed species, including snapper grouper, king and Spanish mackerel, cobia, dolphin, and wahoo.
 - Identify hotspots of high abundance of managed species for each FMP.
 - Parameterize offshore ocean habitats used by estuarine dependent species for use in ecosystem models.
 - Survey fish on soft substrates that have shown affinity for sand in other areas (e.g., juvenile red snapper and lane snapper) and in various life stages but have been under-studied in the South Atlantic
 - Identify shallow-water habitat of Coastal Migratory Pelagic species.
 - Identify the transect pathways between reefs relative to migration between and residence time on specific sites.
- **Climate readiness:**
 - Characterize seasonal patterns for managed species exhibiting seasonal north-south movement: major snapper grouper species including gag, jacks, cobia, dolphin, mackerels etc.
 - Develop and engage in a cooperative process with the MAFMC, ASMFC, GMFMC, and/or CFMC to explore ways to adaptively manage species that are expected to shift or expand their ranges.
 - Develop models that better incorporate habitat changes and environmental variability into stock assessments (e.g., habitat suitability).
 - Develop and prioritize environmental indicators (metrics used to track and assess the state of the environment) and define triggers for management action.
 - Investigate potential effects of changing environmental indicators and tidal variances on estuarine and coastal communities within the South Atlantic coastal region.

- The Council, in cooperation with NOAA Fisheries, should discuss and consider actions to include environmental indicators in the ABC Control Rule.
 - Determine if warmer winters are disrupting natural recruitment mechanisms of larvae and post larvae (i.e., brown shrimp) to the estuaries.
 - More closely identify optimal salinities for early life phases of penaeid shrimp and examine relative abundance, survival rates and growth rates of young shrimp in habitats near the saltwater/freshwater interface in the upper estuary.
 - Determine how changes in the Gulf Stream dynamics and shelf stratification are affecting recruitment dynamics of Snapper-Grouper species in the South Atlantic.
- **Invasive species**
 - Evaluate annual levels of ballast water and invasive species content from vessels transiting into the South Atlantic region to identify future threats and estimate the quantity of known threats.
 - Develop treatments for ballast water that will decrease invasive species movement without hurting ecosystem health when the ballast water is released.
 - Consider EFP applications for the development of novel gears that target non-native and invasive species. Provide support for these applications, as merited.
 - Provide support for invasive species control programs and strategies in areas of high ecological/economic importance that do not impact populations of managed species or their habitats.
- **Aquaculture**
 - Identify data gaps related to siting with aquaculture facilities. Proper siting can prevent or reduce negative impacts of marine aquaculture on EFH.
 - Identify potential species interactions with aquaculture facilities in the South Atlantic.
 - Work with grant funding agencies to identify data gaps related to siting and species interactions with aquaculture facilities and prioritize projects to develop site-selection tools for applicants.
- **Reports**
 - Develop a Habitat Assessment for the South Atlantic Region.
 - Develop an Integrated Ecosystem Assessment for the South Atlantic Region.
 - Update the Ecosystem status report for the South Atlantic Region.
 - Develop risk assessments to evaluate the vulnerability of South Atlantic species with respect to their exposure and sensitivity to ecological and environmental factors affecting their populations.

12.0 Best Fishing Practices Research and Monitoring Priorities in the South Atlantic Region

Social Norms in Best Fishing Practices Adoption

- Better understanding of existing social norms within different groups and communities due to the variety of anglers goals and desires for targeting snapper grouper species.
 - How do anglers identify themselves within their perceived group and in relation to other groups?
 - Angler sentiment on different species to allow information to be communicated in a more positive way.
 - How do different groups of anglers view a successful trip? What are the key drivers and tradeoffs for trip satisfaction?
- Better understanding how different types of anglers value the snapper grouper fishery would allow outreach efforts to be designed in a way that is an additive to a positive fishing experience.
 - Example: if fishermen are driven by mastering different techniques, descending device usage could be marketed as another technique mastered by anglers.

Best Fishing Practices Outreach Evaluation

- A thorough review of existing data collection efforts is needed to better understand the scope of angler perceptions.
 - Synthesize the information we have and identify gaps that need to be filled.
- Conduct a meta-analysis across a range of species and BFPs.
 - Review studies to estimate conservation benefits associated with different BFPs.
 - Identify high-impact, low-adoption (especially non-regulated) practices.
 - Highlight where targeted outreach efforts could help improve adoption of the most effective BFPs.
- An evaluation of the current SAFMC outreach programs is essential to understand what is working and where improvements are needed.
 - Compare program outcomes to goals and objectives to assess their effectiveness.
 - Identify key barriers to success, such as adoption challenges, regulatory constraints, or gaps in outreach.
 - Define clear and measurable success metrics to guide future program adjustments.

Integration into the Science and Management Process

- Data collection on prevalence of use and knowledge of descending devices from citizen science work as well as observer coverage to validate angler submitted data and aggregation of this data across platforms.

- Improved data collection efforts of discard mortality, including better resolution of landings and effort across sectors, depths and seasons and use of “guild-analysis” to obtain better estimates of discard mortality for species where data is lacking.
- Stock assessment simulations/sensitivities or management strategy evaluations to estimate how adoption of best fishing practices affects stock dynamics and future productivity.

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Appendix 1. SAFMC Assessment Priorities.

Level 1: High data collection priority, age-based assessment goal

Level 2: High data collection priority, data limited or non-age-based assessment goal

Level 3: Management actions or biological traits impede typical assessment approaches

Stock	Level*	Most Recent Assessment or Schedule. Bold indicates approved by SEDAR Steering Committee.
Black Grouper	1 (2)	MSE has been started
Black Sea Bass	1	2025 Update to SEDAR 76
Blueline Tilefish	1	SEDAR 92 (in review) - 2025
Dolphin	1/3	2026 SEFSC MSE; Needs international cooperation & approach
FLK/EFL Hogfish	1	2025 FWC Benchmark
Gag	1	Scheduled for 2026
GA-NC Hogfish	1 (2)	2014 Benchmark (failed review), Data issues limit future assessment
Golden Tilefish	1	SEDAR 89 (TY – 2022)
Gray Snapper	1	not scheduled at this time
Gray Triggerfish	1 (2)	SEDAR 82, operational assessment not conducted
Greater Amberjack	1	Scheduled for 2028
King Mackerel	1	Scheduled for 2026
Mutton Snapper	1	SEDAR 79 (TY - 2023)
Red Grouper	1	Scheduled for 2027
Red Porgy	1	Schedule for 2028
Red Snapper	1/3	SEDAR 90 Ongoing
Scamp	1	Scheduled for 2029
Snowy Grouper	1	Scheduled for 2027
Spanish Mackerel	1	Scheduled for 2028
Spiny Lobster	1/3	not scheduled at this time
Vermilion Snapper	1	not scheduled at this time
White Grunt	1	not scheduled at this time
Yellowtail Snapper	1	SEDAR 64 with multiple updates
Almaco Jack	2	not scheduled at this time, ID issues with Greater Amberjack
Atlantic Spadefish	2	not scheduled at this time
Banded Rudderfish	2	not scheduled at this time
Bar Jack	2	not scheduled at this time
Knobbed Porgy	2	not scheduled at this time
Lane Snapper	2	not scheduled at this time
Red Hind	2	not scheduled at this time
Silk Snapper	2	not scheduled at this time
Tomtate	2	not scheduled at this time
Wahoo	2	not scheduled at this time

Penaeid Shrimp	2	not scheduled at this time
Golden Crab	3	not scheduled at this time
Goliath Grouper	3	2016 attempt, multiple data issues
Nassau Grouper	3	not scheduled at this time
Speckled Hind	3	not scheduled at this time
Warsaw Grouper	3	not scheduled at this time
Wreckfish	3	MSE has been initiated by SAFMC

* / and () indicates stock or species may fall under multiple levels.

Appendix 2. Focal species considered for the establishment and evaluation of the Spawning Special Management Zones.

Family	Common Name	Scientific Name
Amberjack Groupers	Greater Amberjack	<i>Seriola dumerili</i>
	Coney	<i>Cephalopholis fulvus</i>
	Graysby	<i>C. cruentata</i>
	Goliath Grouper	<i>Epinephelus itajara</i>
	Nassau Grouper	<i>E. striatus</i>
	Red Grouper	<i>E. morio</i>
	Red Hind	<i>E. guttatus</i>
	Rock Hind	<i>E. adscensionis</i>
	Speckled Hind	<i>E. drummondhayi</i>
	Snowy Grouper	<i>Hyporthodus niveatus</i> formerly <i>E. niveatus</i>
	Warsaw Grouper	<i>H. nigritus</i> formerly <i>E. nigritus</i>
	Yellowedge Grouper	<i>H. flavolimbatus</i> formerly <i>E. flavolimbatus</i>
	Black Grouper	<i>Mycteroperca bonaci</i>
	Gag	<i>M. microlepis</i>
	Scamp	<i>M. phenax</i>
Snappers	Blackfin Snapper	<i>Lutjanus buccanella</i>
	Cubera Snapper	<i>Lutjanus cyanopterus</i>
	Mutton Snapper	<i>L. analis</i>
	Red Snapper	<i>L. campechanus</i>
	Silk Snapper	<i>L. vivanus</i>
Tilefishes	Yellowtail Snapper	<i>Ocyurus chrysurus</i>
	Golden Tilefish	<i>Lopholatilus chamaeleonticeps</i>
	Blueline Tilefish	<i>Caulolatilus microps</i>

Appendix 3. SAFMC Citizen Science Research Priorities



SAFMC Citizen Science Program

Citizen Science Research Priorities

Age Sampling:

- a. Target volunteers: Recreational
- b. Data needed: otolith collection
- c. Target species: Cobia, Greater Amberjack, Scamp, Snowy Grouper, Gag, Knobby Porgy, Porgy complex, Almaco Jack, Dolphin, Wahoo, Lane Snapper, Hogfish (GA-NC stock), Red Grouper, Vermilion Snapper, Blueline tilefish
- d. Anticipated outcome: characterize the age of catches
- e. Potential cost: \$\$

Maturity Data:

- a. Target volunteers: Recreational and commercial; tournaments
- b. Data needed: gonad collection (either actual biological samples or pictures)
- c. Target species: Cobia, Red Porgy, Snowy Grouper, Spiny Lobster, Gag, Red Grouper, Black Grouper, Scamp, Black Seabass, Greater Amberjack, Wahoo, Mutton Snapper
- d. Anticipated outcome: improved reproductive information
- e. Potential cost: \$\$

Discard Information:

- a. Target volunteers: Recreational and commercial
- b. Data needed: length of fish; depth caught/released; number of fish; reason for discard; devices used
- c. Target species: all SAFMC managed species particularly, Scamp, Red Snapper, deepwater groupers, Red Porgy, Greater Amberjack, Cobia, King Mackerel (sub-legal releases), and Gray Triggerfish
- d. Anticipated outcome: improved discard removals estimates, ability to characterize size composition of discards
- e. Potential cost: \$-\$\$

Genetic Sampling:

- a. Target volunteers: Recreational and commercial; bait and tackle shops; tournaments
- b. Data needed: fin clips

- c. Target species: Cobia, Hogfish (both stocks), Red Grouper, White Grunt, Spanish Mackerel, Dolphin
- d. Anticipated outcome: stock identification
- e. Potential cost: \$-\$\$

Fishing Infrastructure:

- a. Target volunteers: Recreational, commercial, and community members/citizens
- b. Data needed: GPS location of existing and previously existing/closed fishing-related infrastructure (commercial fishing facilities, marinas, bait/tackle shops, icehouse, fuel docks, boat ramps, piers, roadside seafood stands, retail markets, etc.)
- c. Anticipated outcome: Baseline for fishing-related infrastructure to help document potential impacts from regulations
- d. Potential cost: \$

Historical Fishing Photos:

- a. Target volunteers: Recreational and for-hire
- b. Data needed: digitized images (will need to scan print photos into digital format)
- c. Target species: commonly caught charter/headboat species
- d. Anticipated outcome: length compositions for certain species; improved historical information
- e. Potential cost: \$-\$\$

Fishery Oral Histories:

- a. Target volunteers: For-hire and commercial captains
- b. Data needed: interviews with fishermen to learn about the history and current state of a fishery; possibly pair interviews with topic #6 (Historical Fishing Photos)
- c. Anticipated outcome: documentation of how fisheries operated over time (catchability changes over time with improvements in technology; markets; clients; species distribution; size of fish; weather; etc.) and other observational data
- d. Potential cost: \$

Oceanographic/Environmental/Weather Conditions:

- a. Target volunteers: Recreational and commercial
- b. Data needed: Bottom temperature; weather impacts to fishing; presence/absence of sargassum and size of area; movement of forage fish (bait) and shifts in patterns of a fishery (i.e., mackerel)

- c. Anticipated outcome: building database on climate and conditions; distribution of sargassum; how forage fish impacts patterns in a fishery
- d. Potential cost: \$-\$\$

Rare or Data Limited Species Observations:

- a. Target volunteers: Recreational and commercial
- b. Data needed: Point observations of data limited or unusual or rarely encountered species
- c. Anticipated outcome: baseline for species shift; increasing information available for data limited species
- d. Potential cost: \$-\$\$

Historic Personal Fishing Logbooks/Diaries:

- a. Target volunteers: For-hire and commercial
- b. Data needed: translate fishermen's historic logbooks into electronic data/database
- c. Anticipated outcome: develop relative indices of abundance
- d. Potential cost: \$-\$\$

Observations in Managed Areas:

- a. Target volunteers: Recreational and commercial, divers
- b. Data needed: species, length, depth, videos/photos
- c. Target species: snapper and grouper
- d. Anticipated outcome: species composition, changes in fish abundance over time
- e. Potential cost: \$\$

Movement and Migration:

- a. Target volunteers: Recreational and commercial, focus on supporting and working with existing tagging programs
- b. Data needed: species, location, length, tag details
- c. Target species: Dolphin and Wahoo
- d. Anticipated outcome: movement and migratory patterns
- e. Potential cost: \$-\$\$

Shark Predation:

- a. Target volunteers: Recreational and commercial
- b. Data needed: observations of shark depredation, location, species
- c. Anticipated outcome: document shark depredation observations

d. Potential cost: \$-\$\$