South Atlantic Research and Monitoring Prioritization Plan for 2021-2025

This document provides summarized research needs identified by the South Atlantic Council.

I. Short Term Research Needs for Stock Assessments to be Completed in 2023-2024

- FWC Benchmark Assessment for Black Grouper, planned to start in 2025:
  - Resolve the Gag-Black Grouper species identification issues that stopped SEDAR 48.
- FWC Benchmark Assessment for Hogfish, planned to start in 2024:
  - Conduct genetic sampling to better define the boundaries between the southeast Florida and Florida Keys stock and Georgia through North Carolina stock.
  - Monitor changes in growth that may occur due to reduced fishing pressure on the southeast Florida and Florida Keys stock.
- Red Porgy Operational Assessment, planned to start in 2025:
  - Investigate temporal trends in growth, sex at age, and female maturity.
  - Investigate whether males establish and maintain territories as part of their spawning behavior.
  - Investigate the potential impacts of increased abundance of Red Lionfish and Red Snapper on Red Porgy including predation on juvenile Red Porgy and competition for prey between Red Porgy and Red Snapper.
- Blueline Tilefish Operational Assessment, planned to start in 2024:
  - Address life history information gaps noted in SEDAR 50.
  - Evaluate recent survey efforts to determine if an independent abundance index can be developed.
- Tilefish Operational Assessment, planned to start in 2024:
  - Explore alternative distributional assumptions for natural mortality for MCBE uncertainty analysis.
  - Consider incorporation of new fishery-independent abundance data and life history data from CRP Cooperative Bottom longline survey data, deepwater survey data, SCDNR vertical longline survey, SA deepwater longline survey.
  - The SSC recommends investigating the relationship between recruitment and environmental variability to predict recruitment using environmental data. This may help reduce uncertainty resulting from the high age of recruitment to the fishery and the lag between the terminal year of the assessment management action.
  - Collect information on pre-recruit (<age7) abundance, acknowledging this information may be difficult to collect given lack of knowledge on where younger fish are located and what gear could be used to collect them. Consider the use of sonar or ROVs to assess the density of occupied burrows (e.g., Wolcott's work on ghost crabs).

- Snowy Grouper Operational Assessment, planned to start in 2025:
  The SSC noted 2 major uncertainties that should be addressed 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.
- White Grunt Research Track Assessment, starts in 2024:
  - Continue efforts to evaluate stock boundaries.

II. Assessment Research Priorities

- General assessment topics
  - Evaluate assessment projection performance, considering their ability to estimate landings, recruitment, and biomass levels.
  - Evaluate sample size cutoffs for using age and length compositions. What should be the minimum standards, and how does this interplay with the number of age and length classes modeled in the assessment?
  - Initiate long-term continuous monitoring of age structures and age validation for species listed as Level 1 in Table 1.
  - Develop a method to account for non-independence of the SERFS trap and video indices in the likelihood function of assessments.
  - Evaluate estimation of the Stock-Recruitment relationship (SRR) and steepness parameter used in SA assessments, and update the prior distribution analysis used as proxy steepness values (Shertzer and Conn, 2012) based on developments in stock assessment science and SRR estimation since its publication.
  - Research needs for protogynous stocks, particularly Black Sea Bass, groupers, and Hogfish:
    - Investigate possible 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.
- Spanish Mackerel
  - Need observer coverage of fisheries that catch Spanish Mackerel (gillnets, castnets, handlines, poundnets, and shrimp trawls) for bycatch estimates.
  - Examine how schooling or migratory dynamics may influence the catchability of the species. In particular, research the assumption of the hyperstability of indices that sample the schooling portion of the stock.
  - Evaluate stock structure using updated data and modern techniques, such as genetics.
- Gag
  - Sample juvenile and spawning Gag to identify important spawning populations.
  - Identify factors contributing to decreased recruitment.

    - As indicated in the 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 including sex ratio [age at sexual transition], maturity schedule, batch fecundity, spawning seasonality and spawning frequency, as well as the potential for sperm limitation" and incorporate, if possible, into future assessments.
    - Develop and evaluate 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.
        - Chevron trap catches of ages 1-3

- Red Snapper
    - Document spawning migrations or aggregations and return of fish to non-spawning areas.
    - Evaluate the effects of environmental variation on recruitment and survivorship.
    - Obtain empirical estimates of natural mortality for all ages in the US South Atlantic with a special focus on ages ≤ 7.
    - Investigate possible historical changes in sexual maturity. The current estimate of age of sexual maturity is low and unusual for other Lutjanids.
    - Quantify egg size and quality as well as batch size by age, especially for young females.
    - Estimate discard mortality associated with different release techniques, gear, and size classes.
    - Monitor impact of climate change on distribution and peak spawning. Incorporate findings in assessment if found to be important.

- Black Sea Bass
    - Investigate the potential for a range shift in the black sea bass population, and the potential causes, such as climate change.
    - Estimate discard mortality associated with different release techniques and gear and areas.
    - Identify factors contributing to decreased recruitment.

- Blueline Tilefish
    - Develop aging techniques for future Blueline Tilefish age structured stock assessments.

- Red Grouper
    - Evaluate the frequency and magnitude of recruitment coming from other regions such as the Gulf of Mexico or areas to the south.
    - Identify factors contributing to decreased recruitment.
    - Update reproductive biology parameters and evaluate potential latitudinal variation in spawning characteristics.

- Mutton Snapper
    - Conduct a multi-year study to collect age and gonad samples at spawning sites during the spawning season. This should entail identifying the diurnal usage patterns at spawning sites during the year.
- Yellowtail Snapper
    - Examine the effects of anthropogenic noise on catchability.
- Obtain life history traits for priority unassessed species: Almaco Jack, Atlantic Spadefish, Dolphin, Hogfish (GA-NC stock), Lane Snapper, and Wahoo; provide von Bertalanffy growth parameters, maturity, and reproductive rates.
- Define migratory patterns for wahoo.

III. Research Needs for Managed Areas (Spawning SMZs and Deepwater MPAs).

- Document occurrence of spawning within Spawning SMZs by priority species in the Snapper Grouper complex (needed before 2025).
- Characterize usage of Deepwater MPAs by managed species.
- Develop an 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.

IV. Management Research Needs

- Climate Change Related Priorities
    - Develop models to predict suitable areas for shallow-water and deep-water coral as climate changes.
    - Develop models to predict changes in managed fish populations due to climate change, including changes to species' distribution, movements, and reproductive patterns. Species of particular interest include Dolphin, King and Spanish Mackerel, shrimp, and Wahoo.
    - Expand existing fishery independent monitoring programs and implement additional monitoring programs required to ensure survey coverage of the resources managed by the Council. Programs are required to cover the complete range and life history stages of managed stocks and include their forage and prey.

- Investigate how potential shifts or expansions in managed species ranges may affect fishing community dependance on key species and overall community revenue.

- Social and Economic Priorities
  - Evaluate the cumulative economic and social impacts of existing regulations on the multi-species Snapper Grouper fishery in the South Atlantic.
  - Provide estimates of the recreational economic values for Council managed species.
  - Conduct an economic analysis on the capacity of the commercial snapper grouper fishery.
  - 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.

- Characterize usage of and evaluate compliance with the best practices recommendations for reducing discard mortality in the snapper grouper fishery. Develop or modify fishery-dependent data collection programs to collect the information necessary to address this need.

- Develop and annually update abundance indices for all managed species effectively sampled in the trap-video survey.

V. Habitat Research and Monitoring Needs

- Map coral distribution in the South Atlantic region.

- Monitor health of coral reef systems.

VI. 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.
  - Funding MARMAP sufficiently to support reinitiating long bottom longline sampling that provides the only abundance information for deepwater stocks such as Tilefish.
  - 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 MPA/SMZ monitoring needs noted above.

- 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 but not limited to 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 January 31, 2022 and provide a final report on the groups' recommendations for review by the SAFMC SSC in April 2022.
- Improve estimates of commercial discards.

VII. Specific Annual Reporting Requests

- Provide by June 1 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 SEFIS 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)
    - Abundance indices and trends for Level 1 and 2 stocks listed in Table 1.
- Provide annual progress reports, by the SEFSC at the June Council meeting, detailing efforts to implement the research recommendations noted in Council Research and Monitoring Plans.

Table 1. SAFMC Assessment Priorities. Years are anticipated years of delivery.

Stock	Level**	Assessment Status. **Bold** indicates approved by SEDAR Steering Committee.
Black Grouper	1 (2)	2017 Benchmark attempt, data issues with Gag
Black Sea Bass	1	**2023 Operational**
Blueline Tilefish	1	**2024 Operational**
Dolphin	1/3	Needs international cooperation & approach
FLK/EFL Hogfish	1	**2024 FWC Benchmark**
Gag	1	2021 Operational
GA-NC Hogfish	1 (2)	2014 Benchmark (failed review), Data issues limit future assessment
golden Tilefish	1	2021 Standard, 2025 Operational
Gray Triggerfish	1 (2)	**2022/23 Research Track**; ageing issues
Greater Amberjack	1	2020 Standard
King Mackerel	1	2020 Update
Mutton Snapper	1	**2022/2023 FWC Benchmark**
Red Grouper	1	**2023 Operational**
Red Porgy	1	2020 Standard
Red Snapper	1/3	2021 Operational
Scamp	1	**2020/21 Research Track,** 2022 Operational
Snowy Grouper	1	2020 Update, 2025 Operational
Spanish Mackerel	1	**2022 Operational**
Spiny Lobster	1/3	not scheduled at this time
Vermilion Snapper	1	**2023 Operational**
White Grunt	1	2024/25 Research Track candidate; stock ID concern
Yellowtail Snapper	1	2020 Benchmark
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	2014 industry funded assessment

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