9 RESEARCH RECOMMENDATIONS

The research recommendations listed below (in no particular order) are offered by the PDT and the stock assessment working group to improve future management strategies and stock assessments of the South Atlantic southern flounder stock. Those recommendations followed by an asterisk (*) were identified as the top five high priority research recommendations and are discussed further below. High (H), Medium (M), Low (L) rankings are not in order of importance

Biological/Stock Assessment/Fishery

- H - Conduct studies to quantify fecundity and fecundity-size/age relationships in Atlantic southern flounder *
- H - Improve estimates of the discard (B2) component (catches, lengths, and ages) for southern flounder from MRIP *
- H - Expand, improve, or add fisheries-independent surveys of the ocean component of the stock *
- H - Determine locations of spawning aggregations of southern flounder *
- H - Complete an age validation study using known age fish *
- M - Promote data sharing and research cooperation across the South Atlantic southern flounder range (North Carolina, South Carolina, Georgia, and Florida)
- M - Further research on factors that impact release mortality of southern flounder in the recreational hook and line fishery.
- M - Research on deep hooking events of different hook types and sizes on southern flounder
- M - Coast wide at-sea observations of the flounder pound net fishery.
- M - Develop a survey that will provide estimates of harvest and discards for the recreational gig fisheries in North Carolina, South Carolina, Georgia, and Florida
- M - Develop a survey that will provide estimates of harvest and discards from gears used to capture southern flounder for personal consumption
- M - Collect additional discard data (ages, species ratio, lengths, fates) from other gears (in addition to gill nets) targeting southern flounder (pound net, gigs, hook-and-line, trawls)
- M - Expand, improve, or add inshore and offshore surveys of southern flounder to develop indices for future stock assessments
- M - Collect age and maturity data from the fisheries-independent SEAMAP Trawl Survey given its broad spatial scale and potential to characterize offshore fish
- M - Conduct studies to better understand ocean residency of southern flounder
- M - Consider the application of areas-as-fleets models in future stock assessments given the potential spatial variation (among states) in fishery selectivity and fleet behavior in the southern flounder fishery
- M - Consider the application of a spatial model to account for inshore and ocean components of the stock as well as movements among states
- M - Work to reconcile different state-level/regional surveys to better explain differences in trends
- L - Develop a recreational CPUE (e.g., from MRIP intercepts or the Southeast Regional Headboat Survey if sufficient catches are available using a species guild approach to identify trips, from headboat logbooks, etc.) as a complement to the more localized fishery independent indices
- L - Explore reconstructing historical catch and catch-at-length data prior to 1989 to provide more contrast in the removals data
- L - Study potential species interactions among Paralichthid flounders to explain differences in population trends where they overlap

- L – Explore potential impacts stocking may have on the southern flounder population and the costs associated with implementing a stocking program
- L - Continued otolith microchemistry research to gain a better understanding of ocean residency of southern flounder.
- L - Fishery dependent sampling of the commercial spear fishery for flounder in the ocean.
- L - Harvest estimates and fishery dependent sampling of the recreational spear fishery for flounder in the ocean.
- L - Further research on flatfish escapement devices in crab pots that minimize undersized flounder bycatch and maximize the retention of marketable blue crabs.
- L - Expand tagging study to ocean component of the stock to estimate emigration, immigration, movement rates, and mortality rates throughout the stock's range
- L - Develop protocol for archiving and sharing data on gonads for microscopic observation of maturity stage of southern flounder for North Carolina, South Carolina, Georgia, and Florida (in progress, maybe)
- L - Examine the variability of southern flounder maturity across its range and the effects this may have on the assessment model
- L - Further research on the size distribution of southern flounder retained in pound nets with 5.75-inch and 6-inch escape panels.
- L - Research on the species composition and size distribution of fish and crustaceans that escape pound nets through 5.75-inch and 6-inch escape panels.
- L - Develop a survey that will estimate harvest and discards from commercial gears used for recreational purposes
- L - Continue at-sea observations of the large mesh gill net fishery including acquiring biological data on harvest and discards (underway).
- L – Develop survey that better represents the for-hire industry.

Ecosystem

- M - Development of alternative gears to catch southern flounder (some research completed, more may be needed).
- L - Continued gear research in the design of gill nets and pound nets to minimize protected species interactions (some research completed, more may be needed).
- L – Investigate the impacts of warming water temps on the southern flounder stock.
- L – Develop a study that evaluates inlets and their relationship to southern flounder migration
- L – Develop studies to investigate the impacts of emerging compounds on southern flounder

Socio/Economic

The top five research priorities with an (*) identify data needs for continued improvements to the coast-wide stock assessment. Gaining a better understanding of the ocean component of the stock is critical and includes gathering information on the spawning locations, expanding and developing surveys to provide independent abundance trends for the ocean component of the stock, and conducting research to identify fecundity estimates for spawning females by length. Determining the age of fish is critical when estimating maturity and stock structure so verifying the ages of wild fish through an age validation study

would provide additional precision. Finally, a large component of removals from this stock is fish released during recreational fishing activities. Many of these fish are not intercepted by port agents during sampling as they are not kept. It is critical that estimates of discards by size and species are available for the various flounder species across the species range.