

Evaluation of SAFMC Snapper-Grouper Amendment 17

Area Closure Alternatives

SSC Review Draft

June 2009

This document describes one potential approach developed by SAFMC staff for evaluating the effects of alternative area-based closures for reducing harvest and discard of red snapper. The basic approach is to allocate landings by fishery sector to grids corresponding to the one-degree latitude and longitude statistical blocks that provide the area reporting basis in the Southeast commercial logbook program (Figure 1). Landings by grid and sector are summed for open and closed grids to determine the proportion of landings ‘saved’ from closing a grid or group of grids. Total expected removals from any particular option becomes the sum of existing discards that will continue due to fishing for other species and additional discards that will result from no possession of red snapper in the open areas.

Baseline values are the average of 2005-2007. Discard mortality used for baseline conditions is the same as that used in the SEDAR 15 assessment of Atlantic red snapper and is 90% for the commercial sector and 40% for the recreational sectors.

NOTE: Headboat discards in this version are the average 2005-2006 as reported in the stock assessment. Updated estimates through 2007 are expected soon.

Landings by grid and the area-grid keys are not reported in this document to maintain confidentiality for headboat and logbook records.

Baseline Landings and Allocation to Grids

One degree latitude and longitude blocks were chosen as the standard area unit to evaluate fishing locations due to their use in the logbook program and the ability to extract similar information from the headboat program variable “location”. For this analysis, “grid” refers to the one degree blocks shown and labeled in Figure 1. The baseline period used to evaluate the effects of potential regulatory actions is the average observed for 2005-2007. Discards, estimated in numbers by all data programs, were converted to weight using an average 2007-2009 mean weight of 1.53 pounds derived from assessment projection tables that provide discards in both numbers and weight.

Datasets considered and adjustments necessary to allocate landings and discards to grids are described in the following section.

Headboat Sector

The SEFSC headboat survey program provides trip level estimates of catch, discard, and effort for headboats operating in the Gulf and South Atlantic. The standard parameter for reporting fishing location in the headboat program is “area” (Figure 2, Attachment 1). The headboat program defines 13 areas in the South Atlantic, generally following state boundaries and including a depth component in some areas. Delineation between offshore and inshore areas is made for waters off NC and SC based upon the 100 ft contour. Some headboat trip records also include reporting to an optional parameter termed “location” which provides finer scale geographic information based on sub-dividing one-degree of latitude and longitude blocks. The “location” variable is described in the headboat sampling program documentation as follows:

“Location is lat/long and sometimes a subdivision thereof. Characters 1-4 are lat/long in degrees; character 5 (= A to F) defines the column and character 6 (= 1 to 6) the row of a 6x6 grid of 10-minute squares within lat-long (A is the leftmost column and 1 is the top row).”

According to this documentation, the first 4 characters of the “location” variable correspond to the one-degree blocks used in the commercial logbook program. Therefore, for this analysis, the “location” variable was truncated so that only the first 4 digits which provide the one-degree latitude and longitude block were used to create a variable which directly corresponds to the grids used here to evaluate geographic management options.

Although all records report the headboat program variable “area”, only a subset report the additional information of “location”. For trips reporting red snapper landings over 2005-2007, approximately 83% of the landings are reported by trips that also included reporting of the variable “location” (Table 1). Importantly, reporting to location is not random, suggesting that at some times and in some areas those reporting the data are more consistent in reporting the optional location variable. In particular, no records for areas 6 and 11 contain entries for ‘location’. Landings from these areas were assigned to grids based on the overlap between head program “AREA” and the grids, as shown in Table 2

Total catch was allocated to grids by first determining the distribution of catch among the one-degree grids within each “area”, using those records that actually reported “location” and the adjustment described above for those areas lacking reporting to ‘location’, to develop an Area-Grid key. Total landings by “area” were multiplied by the proportion of catch from that area reported for each grid, and landings were then summed across grids. Total discards by area, reported by the headboat program in numbers, were converted to weight using an average mean weight of 1.53 pounds and then allocated to grids using the area-grid key derived from observed catches.

Private/Charter Recreational Sector

The Marine Recreational Fisheries Statistics Survey (MRFSS) provides estimates of effort, landings, and discards for private, rental, and charter modes of recreational fishing. MRFSS discard

estimates are available in numbers, while landings are available in both pounds and numbers. Effort is available as trips and number of anglers. The SEDAR 15 assessment of red snapper included recreational landings from North Carolina through East Florida, with the minimal landings of red snapper from Monroe County allocated to the Gulf stock as was done in the prior assessment of Gulf of Mexico red snapper through SEDAR 7. This analysis follows that same protocol for consistency and does not include landings from Monroe County, Florida.

The finest geographical delineation for standard MRFSS estimates is state, however, Florida Florida Fish and Wildlife Conservation Commission (FWCC) conducts additional sampling to allow post-stratification of recreational estimates by 5 regions within the state. Staff of the FWCC provided post-stratified MRFSS estimates of catch and discard by region for North Florida (Nassau to Brevard Counties), South Florida (Indian River to Dade Counties), and Monroe County.

MRFSS landings (Pounds, Type A+B1) and discards (Numbers, Type B2) for North Carolina, South Carolina, and Georgia were obtained by querying the MRFSS dataset for red snapper landing by state and year for 2005-2007. Landings and discards for Florida by region were obtained from the post-stratified dataset provided by FWCC (Table 3). Note that these post-stratified landings for Florida are slightly less than those which may be obtained from a current MRFSS query of “Florida East Coast”; the difference of 5,780 pounds represents 2.2% of the total Private/Charter sector landings.

Areas in the area-grid key were collapsed by state and Florida region to accommodate the MRFSS reporting convention according to the distribution of AREA and state or region as shown in Table 4 below. New proportions of catch by grid and state or region were calculated to provide an adjusted key. Discards in numbers were converted to weight using the average of 1.53 pounds. Average 2005-2007 landings and discards by state and region were allocated to grids using the adjusted area-grid key.

Commercial Sector

The Southeast Logbook program provides snapper-grouper species catch information for federally permitted fishermen required to provide trip-level logbook reports. Data elements include pounds landed and area fished based on one degree blocks of latitude and longitude (Figure 1). Information is also provided on the length of trip and level of effort (eg, size of crew, amount and type of gear). Logbook records were used to determine average 2005-2007 landings of red snapper by grid. A supplemental discard logbook program enables estimation of commercial discards from a sub-sample of logbook fishermen. Commercial discards in numbers were provided by SEFSC from the supplemental logbook information for 2005-2007.

Commercial logbook reports by grid are potentially a subset of the total commercial landings as reported in stock assessment, as some fish are legally landed by fishermen who are not federally permitted and therefore not required to submit federal logbooks. Also, some records may include missing or incorrect information for fishing area. (An example of incorrect information would be

reported grids that represent areas fully on land). The SEDAR 15 assessment of red snapper was used to provide base total landings, and logbook-derived landings by grid were scaled by a factor of 1.048 to match landings reported in the assessment to maintain consistency and completeness. Total commercial discards in numbers were converted to weight using the average weight of 1.53 pounds, and then the pounds discarded were allocated to grids using the distribution of logbook landings by grid.

Estimating Area effects

The impact of alternative closed areas was evaluated by comparing the catch within a selected group of grids to the baseline total catch to determine the percent reduction expected from closing the defined area (group of grids) and to determine the pounds expected to be removed through discards given no possession of red snapper and no effort directed toward snapper grouper in the areas classified as 'closed'. A closed area is treated as closed to all snapper-grouper fishing, so therefore both catch and discard will be 0 for all grids in the area. Red snapper possession is prohibited in the remaining 'open' areas, so the fish encountered will be subject to discard and expected removals will be determined by the discard mortality rate which varies by sector.

To determine the impact of a particular area closure option, landings in all grids included in the closed area option are summed to determine the amount of total landings taken within the area. This provides the initial savings in directed landings obtained by closing the area. This total is divided by the total landings for all areas to determine the percentage of directed landings saved from the closure and subtracted from the total landings to provide the expected encounters of red snapper in areas remaining open.

Additional calculations are required to account for discard effects, both the decrease in discards resulting from the area closure and the increase in discards resulting from the 'no possession' restriction in the remaining areas. It is assumed that discards have the same distribution over areas as landings, so total baseline discards are separated into those occurring in the open area and those occurring in the closed area using the overall impacts derived from the evaluation of directed landings by grid. Expected discards for an option are the sum of the continuing portion of baseline discards in the open area $\{(1 - \% \text{ landings from the closed area}) * \text{base discards}\}$ and the additional discards due to a no-possession restriction in the open area $(\text{open area landings} * \text{discard mortality})$. Dividing total discards by the baseline total removals $(\text{landings} + \text{discards})$ provides the total % reduction from the option.

Because the Council is considering regulations in Amendment 17 to prohibit possession of deepwater species, it is likely that fishing activity will decrease in deep areas, especially the hook and line effort component that targets a variety of species. This action will thereby likely decrease the average depth of commercial effort, and as it is the depth of operations that was primarily cited in the

greater discard mortality from commercial fisheries, the evaluations of alternatives presented here apply a 40% discard mortality rate when calculating commercial fishery savings.

Results

Summary results for the following alternatives are presented in Table 5.

Alternative 2. Prohibit all commercial and recreational harvest, possession, and retention of red snapper year-round in the South Atlantic EEZ.

Alternative 3. Prohibit commercial and recreational harvest, possession, and retention of species in the snapper grouper FMU year-round in an area that includes commercial logbook grids 2880, 2980, 3080, and 3180 between a depth of 98 feet (16 fathoms; 30 m) to 240 feet (40 fathoms; 73 m). Allow black sea bass harvest, possession, and retention in the closed area if fish were harvested with black sea bass pots with endorsements. Allow golden tilefish harvest, possession, and retention in the closed area. Allow harvest, possession, and retention of snapper grouper species in the closed area if fish were harvested with spearfishing gear. Prohibit all commercial and recreational harvest, possession, and retention of red snapper year-round in the South Atlantic EEZ.

Alternative 4. Prohibit commercial and recreational harvest, possession, and retention of species in the snapper grouper FMU year-round in an area that includes commercial logbook grids 2880, 2980, 3080, 3179, 3180, 3278, and 3279 between a depth of 98 feet (16 fathoms; 30 m) to 240 feet (40 fathoms; 73 m). Allow black sea bass harvest, possession, and retention in the closed area if fish were harvested with black sea bass pots with endorsements. Allow golden tilefish harvest, possession, and retention in the closed area. Allow harvest, possession, and retention of snapper grouper species in the closed area if fish were harvested with spearfishing gear. Prohibit all commercial and recreational harvest, possession, and retention of red snapper year-round in the South Atlantic EEZ.

Alternative 5. Prohibit commercial and recreational harvest, possession, and retention of species in the snapper grouper FMU year-round in an area that includes commercial logbook grids 2880, 2980, 3080, and 3180. Allow black sea bass harvest, possession, and retention in the closed area if fish were harvested with black sea bass pots with endorsements. Allow golden tilefish harvest, possession, and retention in the closed area. Allow harvest, possession, and retention of snapper grouper species in the closed area if fish were harvested with spearfishing gear. Prohibit all commercial and recreational harvest, possession, and retention of red snapper year-round in the South Atlantic EEZ.

Alternative 6 . Prohibit commercial and recreational harvest, possession, and retention of species in the snapper grouper FMU year-round in an area that includes commercial logbook grids 2880, 2980, 3080, 3179, 3180, 3278, and 3279. Allow black sea bass harvest, possession, and retention in the closed area if fish were harvested with black sea bass pots with endorsements. Allow golden tilefish harvest, possession, and retention in the closed area. Allow harvest, possession, and retention of snapper grouper species in the closed area if fish were harvested with spearfishing gear. Prohibit all commercial and recreational harvest, possession, and retention of red snapper year-round in the South Atlantic EEZ.

Original Area. This is the largest closed area considered initially and subsequently removed to the appendix as a rejected option.

Alternative 2 will only result in a limited reduction (32%) of red snapper removals due to discard losses that will occur from the continued encounters of red snapper that are expected in the mixed species snapper grouper fishery. If the discard mortality is assumed to be 40% in the future as a result of the proposed prohibition on deepwater species possession, the percent reduction will increase slightly to 43%.

Although a rejected option, the ‘original area’ alternative is retained for comparison with area closure alternatives presented to the Council previously. This option results in a 94% reduction in removals, and would provide total removals estimated at 35,430 pounds.

Alternatives 3 and 5 are very similar with regard to red snapper impacts as estimated from the area closure, as both close essentially the same area. Both result in a reduction of 85% and estimated removals of 92,113 pounds.

Alternatives 4 and 6 are also similar in terms of area effects. These options provide a reduction of 88% and total estimated removals of 74,013 pounds.

Depth Adjustment

Despite the fact that some red snapper are reported as being harvested from grids far offshore (e.g., 3175, 3177), life history information and the bulk of reported landings records suggest that most red snapper are found between 100 and 240 feet, or 30 to 73 meters. Therefore, landings reported from these areas may be fish that were picked up during limited effort in shallower areas. Since regulatory actions may prohibit such effort in areas where red snapper are found, an additional adjustment could be made to the commercial landings to remove the reported harvest from the deepwater areas far offshore. Baseline landings reported for these grids from the commercial fishery are 1,526 pounds.

Table 1. 2005-2007 average landings in pounds, discard in numbers and pound, and discard losses in pounds for the headboat, Private/Charter, and Commercial sectors. Discard loss is based on the discard mortality rates used in the SEDAR 15 assessment of red snapper, 90% commercial and 40% recreational.

	Headboat	Private/Charter	Commercial
Total Landings in the analysis	45,862	262,434	107,183
Landings including "location" information	38,227	262,434	102,274
Total Discard (Numbers)	34,200	237,128	17,236
Discard loss (Numbers)	13,680	94,851	15,513
Discard loss (Pounds)	20,630	145,122	23,735

Table 2. Headboat GRID determinations for AREAS lacking location reports.

Area	% Landings reporting 'location'	Grids Assigned	% Allocation
6	0	3080	50
		3180	50
11	0	2579	25
		2679	50
		2779	25

Table 3. 2005-2007 total landings and discards and discard losses in pounds and numbers for the Private/Charter sector by state and region.

Area	Landings Pounds	Discard Number	Dead Discard Number	Discard Pounds
NC	20,929	2,339	936	1,431
SC	28,508	7,077	2,831	4,331
GA	71,338	56,595	22,638	34,636
N FL	605,953	605,535	242,214	370,588
S FL	60,574	39,838	15,935	24,381
05-07 avg	262,434	237,128	94,851	145,122

Table 4. Relationship of MRFSS STATE to Headboat AREA variables.

MRFSS STATE	Headboat AREA
NC	1, 2, 3, 9, 10
SC	4, 5
GA	6
N. FL	7, 8
S. FL	11
Monroe Co.	12, 17

Table 5. Expected total and by-sector removals from various area closure alternatives.

Option	Private/Charter	Headboat	Commercial	Total	Overall % Reduction
Alt 1.	250,709	39,275	120,199	410,182	0.32
Alt 1 + Deepwater Prohibition	250,709	39,275	53,422	343,405	0.43
Orig Area (appendix alt)	27,328	861	7,150	35,340	0.94
A3	59,030	7,630	25,453	92,113	0.85
A4	55,088	5,063	13,862	74,013	0.88
A5	59,030	7,630	25,453	92,113	0.85
A6	55,088	5,063	13,862	74,013	0.88

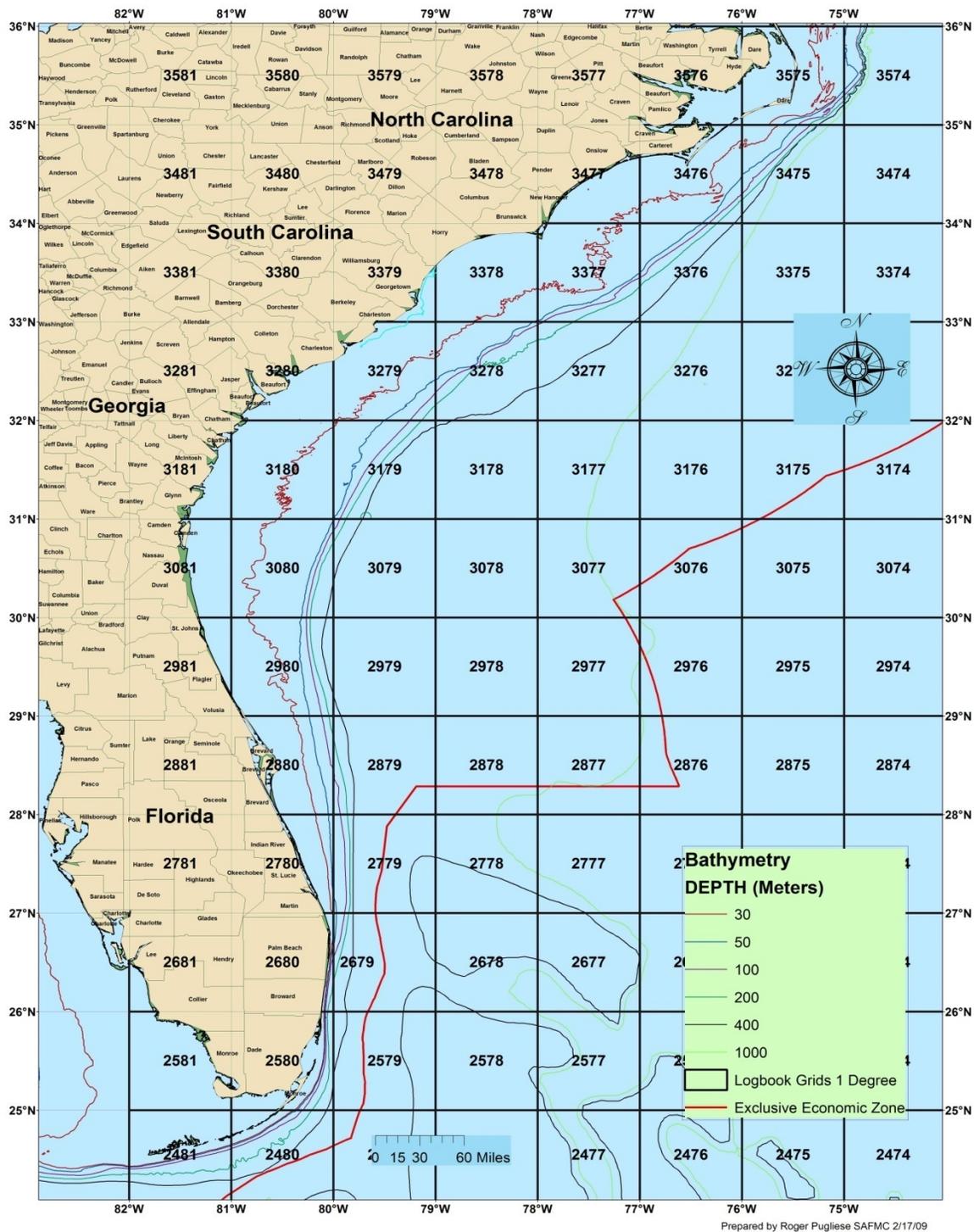


Figure 1 . South Atlantic 'Grids' based on one-degree of latitude and longitude blocks.

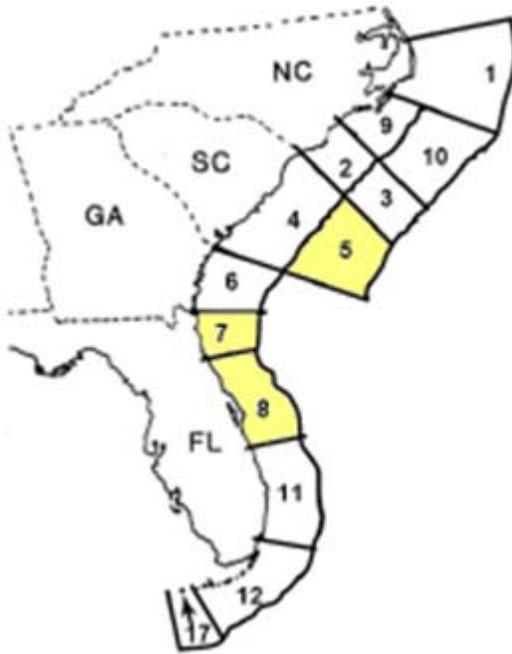


Figure 2. Location of SEFSC Headboat Program reporting "AREA"s.

Attachment 1. Southeast Headboat Program Areas Codes and Descriptions

SOUTHEAST REGION HEADBOAT SURVEY

AREA (LOCATION) CODES

<u>CODE</u>	<u>AREA NAME</u> *	<u>DESCRIPTION</u>
1	CAPE HATTERAS, NC (OFFSHORE)	VA/NC BORDER - OKRACoke ISLAND, NC
2	CAPE FEAR, NC (INSHORE)	TOPSAIL ISLAND - OCEAN ISLE BEACH, NC
3	CAPE FEAR, NC (OFFSHORE)	Same as above
4	SOUTH CAROLINA (INSHORE)	CALABASH, NC - HILTON HEAD ISLAND, SC
5	SOUTH CAROLINA (OFFSHORE)	Same as above
6	GEORGIA	SAVANNAH - BRUNSWICK, GA
7	NORTHEAST FLORIDA (SECTION 1)	FERNANDINA BEACH - ST. AUGUSTINE, FL
8	NORTHEAST FLORIDA (SECTION 2)	DAYTONA BEACH - SEBASTIAN, FL
9	CAPE LOOKOUT (INSHORE)	MOREHEAD CITY - SNEADS FERRY, NC
10	CAPE LOOKOUT (OFFSHORE)	Same as above
11	SOUTHEAST FLORIDA	FORT PIERCE - MIAMI, FL
12 FL	FLORIDA KEYS	KEY LARGO - KEY WEST,
17	DRY TORTUGAS, FLORIDA (Vessels docked in FL Keys)	FISHING AREA AROUND THE DRY TORTUGAS, FL
18 TORTUGAS, FL	DRY TORTUGAS, FLORIDA (Vessels docked on west coast of FL)	FISHING AREA AROUND THE DRY

