

## **Appendix F. Bycatch Practicability Analysis**

### **1.1 Population Effects for the Bycatch Species**

#### **Background**

The South Atlantic Fishery Management Council (Council) is proposing the implementation of Spawning Special Management Zones (SMZ) by means of Amendment 36 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Amendment 36). The purpose of the action is to identify important spawning habitat for snapper grouper species that can be designated for protection to enhance spawning and increase recruitment and to reduce bycatch and bycatch mortality of snapper grouper species, including speckled hind and warsaw grouper. Also, the Council is seeking to align the existing South Carolina marine protected area with the permitted site.

### **1.2 Finfish Bycatch Mortality**

The South Atlantic snapper grouper fisheries are characterized by moderately high discards, especially of yellowtail snapper and black sea bass (**Table F-1**). The most discards originate from handline/electric rig and trap gears, with some discards from trolling gear and relatively low discards from other gears. It is possible that trip-level reporting leads to the relatively high discard estimates from trolling gear; these may be sets using another gear on a trip declared as a trolling gear trip. It is difficult to compare the ratio of commercial landings to commercial discards (**Table F-1**), because commercial landings are reported in pounds and discards are reported in numbers of fish; however black sea bass, gray snapper, and yellowtail snapper discards appear to be high relative to landed commercial catch.

**Table F-1.** Top ten stocks with mean estimated South Atlantic commercial discards (#fish) during snapper grouper trips (defined as trips with >50% of landings from snapper grouper stocks), sorted from largest to smallest, by gear, for the 2009-2013 period. Source: SEFSC Commercial Logbook (accessed May 2015) and Commercial Discard Logbook (accessed November 2014).

Stock	Bouy Gear	Stock	Diver	Stock	Handline /Electric	Stock	Longline	Stock	Trap	Stock	Trolling
snowy grouper	1.9	black sea bass	27.7	yellowtail snapper	5483.2	shark dogfish smooth	52.6	black sea bass	3708.8	black sea bass	946.7
gag	1.9	red snapper	23.1	gray snapper	1887.4	shark sandbar	26.1	pinfish spottail	59.0	greater amberjack	771.9
red snapper	1.0	gag	12.5	black sea bass	1274.6	hake atlantic red & white	4.5	gray triggerfish	54.8	black grouper	475.5
		red pogy	6.3	red snapper	1132.6	hammerhead	3.2	white grunt	43.6	almaco jack	423.0
		shark atlantic sharpnose	4.7	vermilion snapper	721.6	snowy grouper	0.5	grunts	32.7	scamp	194.3
		almaco jack	3.6	red pogy	640.7	rays unc	0.3	scup	30.8	gag	68.4
		finfishes unc for food	3.4	gag	492.3	shark blue	0.2	red pogy	27.6	shark unc	56.5
		spanish mackerel	2.7	unc amberjack	172.2	skates	0.1	finfishes unc	8.3	barracuda	56.3
		vermilion snapper	1.7	unc groupers	143.9	shark unc	0.0	gag	8.2	red snapper	32.2
		unc amberjack	1.6	unc snappers	130.9	shark dogfish unc	0.0	vermilion snapper	5.8	red pogy	19.1

*Source:* SEFSC Commercial Logbook (accessed May 2015) and Commercial Discard Logbook (accessed November 2014).

Recreational discards of several Snapper-Grouper stocks are higher than the landings for certain modes of fishing (**Table F-2**). Red grouper, black grouper, gag, and yellowtail snapper discards, especially, are many times higher than their landings across most modes. The magnitude of Private mode discards across all Reef Fish stocks is much higher than for the Headboat or Charter modes.

**Table F-2.** South Atlantic snapper grouper headboat, charter, private, and commercial mean estimates of landings and discards (2009-2013).

Species	HEADBOAT			CHARTER			PRIVATE			COMMERCIAL	
	Landings (N)	Discards (N)	Ratio (D:L)	Landings (N)	Discards (N)	Ratio (D:L)	Landings (N)	Discards (N)	Ratio (D:L)	Landings (lbs)	Discards (N)
Almaco jack	3,276	246	8%	2,581	1,211	47%	3,900	6,108	157%	197,432	800
Atlantic spadefish	133	35	27%	262	48	18%	101,741	114,598	113%	27,045	0
Banded rudderfish	15,614	2,665	17%	2,658	2,428	91%	7,603	6,474	85%	68,163	115
Bank sea bass	5,607	0	0%	792	2,084	263%	2,708	10,135	374%	540	0
Bar jack	341	59	17%	0	141		2,818	8,995	319%	4,457	0
Black grouper	337	1,339	397%	900	8,002	889%	6,589	24,499	372%	51,616	1,351
Black sea bass	165,443	553,232	334%	62,295	182,704	293%	257,417	2,682,646	1042%	510,102	60,568
Black snapper	0	0	0%	0	0		0	0		9	0
Blackfin snapper	79	59	75%	68	0	0%	1,843	0	0%	1,546	0
Blue runner	19,715	9,236	47%	10,749	15,023	140%	627,727	658,209	105%	227,134	1,762
Blueline tilefish	4,148	78	2%	9,576	459	5%	19,680	650	3%	341,160	234
Coney	50	51	101%	11	19	181%	723	174	24%	54	3
Cottonwick	13	0	0%	0	0		148	0	0%	0	0
Cubera snapper	367	19	5%	4	0	0%	1,960	111	6%	4,395	0
Dog snapper	48	12	25%	57	0	0%	822	0	0%	308	0
Gag	2,479	4,678	189%	2,688	16,025	596%	14,258	80,697	566%	471,689	7,004
Golden crab	0	0		0	0		0	0		634,192	0
Golden tilefish	8,868	0	0%	120,672	30,875	26%	904,657	520,822	58%	472,484	12
Goliath grouper	0	30	14966%	0	0		0	8,054		0	215
Gray snapper	43,916	6,465	15%	16,081	1,236	8%	279,017	1,292,452	463%	122,538	26,114
<i>Gray triggerfish</i>	57,539	12,135	21%	35,115	7,709	22%	92,990	111,012	119%	401,615	2,138
Graysby	1,604	1,306	81%	1,136	418	37%	5,467	10,518	192%	618	23
Greater amberjack	3,448	1,811	53%	16,390	6,814	42%	20,143	23,684	118%	897,173	1,635

Hogfish	140	231	165%	41	3	7%	29,102	3,190	11%	42,219	41
Jolthead porgy	6,690	114	2%	3,014	0	0%	10,681	1,240	12%	5,055	0
Knobbed porgy	5,562	182	3%	727	0	0%	7,769	326	4%	22,913	0
Lane snapper	18,673	2,290	12%	11,644	3,506	30%	45,257	130,718	289%	3,057	210
Lesser amberjack	207	31	15%	12	0	0%	51	0	0%	17,374	23
Longspine porgy	6	0	0%	0	0		290	170	59%	0	0
Mahogany snapper	45	4	8%	0	0		35	0	0%	45	0
Margate	765	206	27%	188	59	32%	3,436	3,952	115%	3,876	23
Misty grouper	0	0		0	0		0	0		655	1
Mutton snapper	13,001	3,436	26%	19,547	8,826	45%	75,902	113,500	150%	73,908	597
Ocean triggerfish	729	0	0%	304	77	25%	4,107	3,769	92%	0	0
Queen snapper	5	0	0%	1	0	0%	0	0		3,087	84
Red grouper	1,373	10,547	768%	945	5,631	596%	18,781	52,502	280%	258,312	1,614
Red hind	212	64	30%	85	0	0%	460	564	123%	7,781	47
Red porgy	20,697	14,510	70%	9,527	3,034	32%	16,657	5,350	32%	170,004	9,800
Red snapper	5,398	44,889	832%	4,246	16,805	396%	20,521	94,894	462%	82,133	13,272
Rock hind	1,319	574	44%	83	18	22%	517	2,324	450%	13,147	11
Rock sea bass	8	0	0%	177	238	134%	2,524	6,330	251%	389	16
Sailors choice	286	0	0%	37	1,367	3740%	16,170	12,371	77%	0	0
Sand tilefish	796	952	120%	396	3,439	868%	4,863	22,423	461%	995	159
Saucereye porgy	148	1	0%	0	0		1,462	0	0%	0	0
Scamp	2,547	2,016	79%	2,275	1,361	60%	4,080	2,406	59%	194,931	740
Schoolmaster	244	0	0%	2	0	0%	4,873	2,435	50%	30	0
Scup	9,968	1,866	19%	294	28	9%	647	1,508	233%	0	414
Silk Snapper	1,322	108	8%	276	34	12%	153	855	558%	10,166	7
Snowy grouper	151	51	34%	984	341	35%	861	331	38%	86,858	264
Tomtate	51,944	59,693	115%	1,159	6,544	565%	65,439	227,285	347%	176	620

Vermilion snapper	145,661	87,183	60%	37,198	18,308	49%	52,666	50,317	96%	966,504	9,033
<i>White grunt</i>	143,151	36,412	25%	19,706	9,601	49%	195,099	184,863	95%	108,712	389
Whitebone porgy	4,910	159	3%	2,893	9	0%	9,109	1,088	12%	13	0
Yellowedge grouper	20	2	9%	35	0	0%	44	0	0%	15,619	6
Yellowfin grouper	13	5	42%	0	0		97	0	0%	3,275	6
Yellowmouth grouper	12	5	43%	15	0	0%	0	0		204	0
Yellowtail snapper	99,863	33,144	33%	179,508	76,571	43%	287,217	715,637	249%	1,216,264	71,453

*Sources:* MRIP data from SEFSC Recreational ACL Dataset (Jan 2015), Headboat data from SEFSC Headboat Logbook CRNF files (expanded; July 2014), Commercial landings data from SEFSC Commercial ACL Dataset (July 2014) with discard estimates from expanded SEFSC Commercial Logbook (Nov 2014) and Commercial Discard Logbook (Nov 2014).

*Note:* Commercial gray triggerfish includes "triggerfishes, unclassified" category; commercial white grunt includes "grunts, unclassified" category.

### *Release Mortality Rates*

Release mortality rates are unknown for many managed species. Recent Southeast Data, Assessment, and Review (SEDAR) assessments include estimates of release mortality rates based on published studies. Stock assessment reports can be found at <http://www.sefsc.noaa.gov/sedar/>.

SEDAR 32 (2013) estimates release mortality rates of 100% for blueline tilefish. SEDAR 17 (2008) recommended a release mortality rate for vermilion snapper of 41% for the commercial sector and 38% for the recreational sector. The recent stock assessment for yellowtail snapper chose a rate of 10% release mortality as an approximation for the lower bound on release mortality for yellowtail snapper (FWRI 2012). SEDAR 10 (2006) estimated release mortality rates of 40% and 25% for gag taken by commercial and recreational fishermen, respectively. SEDAR 24 (2010) used release mortality rates of 48% commercial; 41% for-hire, and 39% private recreational for red snapper. Commercial and recreational release mortality rates were estimated as 20% for black grouper and red grouper in SEDAR 19 (2010). SEDAR 15 (2008) estimated a 20% release mortality rate for greater amberjack. SEDAR 32, which is under development, assumes a 12.5% release mortality rate for gray triggerfish. Snowy grouper are primarily caught in water deeper than 300 feet and golden tilefish are taken at depths greater than 540 feet; therefore, release mortality of the species are probably near 100% (SEDAR 4 2004, SEDAR 25 2011). Release mortality of black sea bass is considered to be low (7% for the recreational sector and 1% for the commercial sector) (SEDAR 25 2011) indicating minimum size limits are probably an effective management tool for black sea bass. Commercial sector discard mortality for red porgy is 35%, and 8% for the recreational sector (SEDAR Update 2012). SEDAR 32 (2013), estimates discard mortality for blueline tilefish is 100%, consistent with other deep-water species (i.e., snowy grouper, and golden tilefish); however, if new management is implemented to reduce the discard mortality rate, it might be appropriate for population projections to consider something lower than 100% (SEDAR 32 2013).

## **1.3 Practicability of Management Measures in Directed Fisheries Relative to their Impact on Bycatch and Bycatch Mortality**

### **Expected Impacts on Bycatch for the Proposed Action**

The Council is proposing the implementation of Spawning SMZs. The fishing for, harvest, and possession of species in the snapper grouper fishery management unit (FMU) would be prohibited within the SMZs. The Council is also considering allowing transit through the Spawning SMZs with snapper grouper species onboard under certain conditions. Bycatch of the snapper grouper species within the closed areas would be significantly reduced or eliminated. Bycatch would only occur through poaching activities or while fishing for other species not in the snapper grouper FMU (e.g., dolphin, wahoo, mackerel, tuna, sharks). Bycatch while fishing for the species not in the snapper grouper FMU is unlikely as these species are pelagic species or likely not in the areas where the SMZs are being proposed. It is not clear if overall bycatch of

species in the snapper grouper FMU will decrease since fishermen may transfer effort outside the closed areas.

### **Past, Current, and Future Actions to Prevent Bycatch and Improve Monitoring of Harvest, Discards, and Discard Mortality.**

The Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2; SAFMC 2011g) included actions that removed harvest of octocorals off Florida from the Coral, Coral Reefs, and Live/Hard Bottom Habitat Fishery Management Plan (Coral FMP); set the octocoral ACL for Georgia, South Carolina, and North Carolina equal to 0; modified management of special management zones (SMZs) off South Carolina; revised sea turtle release gear requirements for the snapper grouper fishery that were established in Amendment 15B to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP; SAFMC 2008); and designated new essential fish habitat (EFH) and EFH-Habitat Areas of Particular Concern in the South Atlantic. There is no bycatch associated with octocoral harvest within the management area of the Coral FMP since harvest is prohibited. CE-BA 2 also included an action that limited harvest and possession of snapper grouper and coastal migratory pelagics (CMP) species to the bag limit in SMZs off South Carolina. This action could reduce bycatch of regulatory discards around SMZs by restricting commercial harvest in the area, but it would probably have very little effect on the magnitude of overall bycatch of snapper grouper species in the South Atlantic.

Other actions have been taken in recently implemented amendments that could reduce bycatch of and bycatch mortality of federally-managed species in the South Atlantic. Amendment 13C to Snapper Grouper FMP (SAFMC 2006) required the use of 2 inch mesh in the back panel of black sea bass pots, which has likely reduced the magnitude of regulatory discards. Amendment 16 to the Snapper Grouper FMP (SAFMC 2009) required the use of dehooking devices, which could help reduce bycatch mortality of vermilion snapper, black sea bass, gag, red grouper, black grouper, and red snapper. Dehooking devices can allow fishermen to remove hooks with greater ease and more quickly from snapper grouper species without removing the fish from the water. If a fish does need to be removed from the water, dehookers could still reduce handling time in removing hooks, thus increasing survival (Cooke et al. 2001). Furthermore, Amendment 17A to the Snapper Grouper FMP (SAFMC 2010a) required circle hooks for snapper grouper species north of 28 degrees latitude, which is expected to reduce bycatch mortality of snapper grouper species. Amendment 17B to the Snapper Grouper FMP (SAFMC 2010b) established ACLs and AMs and address overfishing for eight species in the snapper grouper management complex: golden tilefish, snowy grouper, speckled hind, warsaw grouper, black sea bass, gag, red grouper, black grouper, and vermilion snapper. Overfishing is no longer occurring for golden tilefish, black sea bass, snowy grouper, red grouper, black grouper, and vermilion snapper.

The Comprehensive ACL Amendment (SAFMC 2011b) implemented ACLs and AMs for species not undergoing overfishing in the Fishery Management Plans for snapper grouper, dolphin and wahoo, golden crab and *Sargassum*, in addition to other actions such as allocations and establishing annual catch targets for the recreational sector. The Comprehensive ACL Amendment (SAFMC 2011b) also established additional measures to reduce bycatch in the snapper grouper fishery with the establishment of species complexes based on biological,

geographic, economic, taxonomic, technical, social, and ecological factors. ACLs were assigned to these species complexes, and when the ACL for the complex is met or projected to be met, fishing for species included in the entire species complex is prohibited for the fishing year. ACLs and AMs will likely reduce bycatch of target species and species complexes as well as incidentally caught species.

Amendment 18A to the Snapper Grouper FMP (SAFMC 2011f), included actions that could reduce bycatch of black sea bass and the potential for interactions with protected species. Actions in Amendment 18A limited the number of participants in the black sea bass pot sector, required fishermen bring pots back to port at the completion of a trip, and limited the number of pots a fishermen can deploy. Amendment 24 to the Snapper Grouper FMP (SAFMC 2011h) established a rebuilding plan for red grouper, which was overfished and undergoing overfishing. Red grouper is no longer undergoing overfishing or overfished. Amendment 24 (SAFMC 2011h) also established ACLs and AMs for red grouper, which could help to reduce bycatch of red grouper and co-occurring species.

The final rule (78 FR 23858; April 23, 2013) for Amendment 18B to the Snapper-Grouper FMP (SAFMC 2012), established an endorsement program for the commercial golden tilefish longline sector, which could have positive effects for habitat and protected species. Regulatory Amendment 14 to the Snapper Grouper FMP, which has been approved by the Council, includes actions that could adjust management measures for a number of snapper grouper species, some of which could reduce the magnitude of discards. The final rule (78 FR 49183; September 12, 2013) for Regulatory Amendment 15 to the Snapper Grouper FMP included actions for yellowtail snapper and gag that are expected to reduce bycatch of snapper-grouper species. Regulatory Amendment 17 to the Snapper Grouper FMP, which is under development, includes actions that affect marine protected areas, and could reduce bycatch of many snapper grouper species, especially speckled hind and warsaw grouper.

The Council's For-Hire Reporting Amendment, which went into effect on January 27, 2014, has changed the reporting frequency for landings by headboats from monthly to weekly, and requires that reports be submitted electronically. The action is expected to provide more timely information on landings and discards. Improved information on landings would help ensure ACLs are not exceeded. Furthermore, more timely and accurate information would be expected to provide a better understanding of the composition and magnitude of catch and bycatch, enhance the quality of data provided for stock assessments, increase the quality of assessment output, and lead to better decisions regarding additional measures to reduce bycatch. Management measures that affect gear and effort for a target species can influence fishing mortality in other species. Therefore, enhanced catch and bycatch monitoring would provide better data that could be used in multi-species assessments.

The Council will develop a joint amendment with the Gulf of Mexico Fishery Management Council (Gulf of Mexico Council) to require that all federally-permitted charter vessels reporting landings information to the Southeast Fisheries Science Center (SEFSC) electronically. Additionally, the Gulf of Mexico and Councils will also begin development of a joint amendment to require that all federally-permitted commercial fishing vessels in the southeast also report their logbook landings information electronically. These future actions will help to



improve estimates on the composition and magnitude of catch and bycatch of snapper grouper species, as well as all other federally-managed species in the southeast region.

Additional information on fishery related actions from the past, present, and future considerations can be found in **Chapter 6** (Cumulative effects) of the environmental assessment.

## **1.4 Ecological Effects Due to Changes in the Bycatch**

The ecological effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level. As mentioned in the above section, actions have been taken, and are underway to reduce bycatch and enhance data reporting for snapper grouper species. Better bycatch and discard data would provide a better understanding of the composition and magnitude of catch and bycatch, enhance the quality of data provided for stock assessments, increase the quality of assessment output, and lead to better decisions regarding additional measures to reduce bycatch. Management measures that affect gear and effort for a target species can influence fishing mortality in other species. Therefore, enhanced catch and bycatch monitoring would provide better data that could be used in multi-species assessments.

The Spawning SMZs are likely to significantly reduce or eliminate discards of species in the snapper grouper FMU within the areas. Elimination of fishing pressure and bycatch within the Spawning SMZs could result in an increase in the mean size/age and biomass of many snapper grouper species that occur within the closed areas. Many of the Spawning SMZs may be important areas for spawning. Implementation of the Spawning SMZs would reduce or eliminate bycatch of spawning fish and protect spawning areas for these species. Therefore, a prohibition of fishing for or possessing snapper grouper species with the exception of vessels in transit will likely result in positive ecological changes in the community structure of reef ecosystems within the closed areas.

## **1.5 Changes in the Bycatch of Other Fish Species and Resulting Population and Ecosystem Effects**

The Spawning SMZs are likely to significantly reduce or eliminate the number of discards of a number of species in the snapper grouper FMU in the areas and could result in an increase in the mean size/age and biomass of species that reside there. The Spawning SMZs may be important nursery areas to juvenile species. In addition to ecological changes within the Spawning SMZs, establishment of the closed areas could result in ecological changes to surrounding areas. For example, many of the species that are known to occur in the Spawning SMZs such as gag and greater amberjack may move hundreds of miles each year, presumably to spawn (McGovern et al. 2005). Other species such as snowy grouper, speckled hind, and Warsaw grouper may only remain in area for a portion of their life history since these species move into deeper water with increasing size and age. Without fishing pressure and bycatch, an increase in size and density of

fish species within the Spawning SMZs is expected. As a result, there may be spillover into adjacent reef habitats. Furthermore, spawning of a number of deepwater (e.g., golden tilefish, speckled hind, and blueline tilefish) and shelf-edge species (e.g., vermilion snapper, red porgy, gag, scamp, etc.) may occur in the Spawning SMZs. Thus, the Spawning SMZs may serve as a source of spawning products to surrounding areas.

## **1.6 Effects on Marine Mammals and Birds**

Under Section 118 of the Marine Mammal Protection Act (MMPA), NMFS must publish, at least annually, a List of Fisheries (LOF) that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. Of the gear utilized within the snapper grouper fishery, only the black sea bass pot is considered to pose an entanglement risk to marine mammals. The southeast U.S. Atlantic black sea bass pot sector is included in the grouping of the Atlantic mixed species trap/pot fisheries, which the 2014 LOF classifies as a Category II (79 FR 14418, March 14, 2014). Gear types used in these fisheries are determined to have occasional incidental mortality and serious injury of marine mammals. For the South Atlantic snapper grouper fishery, the best available data on protected species interactions are from the SEFSC Supplementary Discard Data Program (SDDP) initiated in July of 2000. The SDDP sub-samples 20% of the vessels with an active permit. Since August 2001, only three interactions with marine mammals have been documented; each was taken by handline gear and each released alive (McCarthy SEFSC database). The longline and hook-and-line gear components of the snapper grouper in the South Atlantic are classified in the 2014 LOF as Category III fisheries.

Although the black sea bass pot sector can pose an entanglement risk to large whales due to their distribution and occurrence, sperm, fin, sei, and blue whales are unlikely to overlap with the black sea bass pot sector operated within the snapper grouper fishery since it is executed primarily off North Carolina and South Carolina in waters ranging from 70-120 feet deep (21.3-36.6 meters). There are no known interactions between the black sea bass pot sector and large whales. NMFS' biological opinion on the continued operation of the South Atlantic snapper grouper fishery determined the possible adverse effects resulting from the fishery are extremely unlikely. Thus, the continued operation of the snapper grouper fishery in the southeast U.S. Atlantic exclusive economic zone is not likely to adversely affect sperm, fin, sei, and blue whales (NMFS 2006).

North Atlantic right and humpback whales may overlap both spatially and temporally with the black sea bass pot sector. 2007 Revisions to the Atlantic Large Whale Take Reduction Plan folded the Atlantic mixed species trap/pot fisheries into the plan (72 FR 193; October 5, 2007). The new requirements (78 FR 58249; September 23, 2013) to prohibit the use of black sea bass pots during November through April each year will help further reduce the likelihood of North Atlantic right and humpback whale entanglement in black sea bass pot gear.

The Bermuda petrel and roseate tern occur within the action area. Bermuda petrels are occasionally seen in the waters of the Gulf Stream off the coasts of North Carolina and South Carolina during the summer. Sightings are considered rare and only occurring in low numbers

(Alsop 2001). Roseate terns occur widely along the Atlantic coast during the summer but in the southeast region, they are found mainly off the Florida Keys (unpublished US Fish and Wildlife Service data). Interaction with fisheries has not been reported as a concern for either of these species.

Fishing effort reductions have the potential to reduce the amount of interactions between the fishery and marine mammals and birds. Although, the Bermuda petrel and roseate tern occur within the action area, these species are not commonly found and neither has been described as associating with vessels or having had interactions with the snapper grouper fishery. Thus, it is believed that the snapper grouper fishery is not likely to negatively affect the Bermuda petrel and the roseate tern.

## **1.7 Changes in Fishing, Processing, Disposal, and Marketing Costs**

Research and monitoring is ongoing to understand the effectiveness of proposed management measures and their effect on bycatch. In 1990, the Southeast Fisheries Science Center (SEFSC) initiated a logbook program for vessels with federal permits in the snapper grouper fishery from the Gulf of Mexico and South Atlantic. Approximately 20% of commercial fishermen are asked to fill out discard information in logbooks; however, a greater percentage of fishermen could be selected with emphasis on individuals that dominate landings. The SEFSC is developing electronic logbooks, which could be used to enable fishery managers to obtain information on species composition, size distribution, geographic range, disposition, and depth of fishes that are released. Further, the Joint Commercial Logbook Reporting Amendment is being developed by the South Atlantic Council and the Gulf of Mexico Council, which would require electronic reporting of landings information by federally-permitted commercial vessels to increase the timeliness and accuracy of landings and discard data.

Recreational discards are obtained from MRIP and logbooks from the NMFS headboat program. Additional data collection activities for the recreational sector are being considered by the South Atlantic Council that could allow for a better monitoring of snapper grouper bycatch in the future. Some observer information has been provided by Marine Fisheries Initiative and Cooperative Research Programs (CRP), but more is desired for the snapper grouper fishery. In December 2012, the Southeast Region Headboat Survey underwent a transition from paper logbooks to electronic logbooks, which is expected to improve the quality of data in that sector. As of January 1, 2013, the paper logbook form has been replaced by a new electronic logbook. The form is available through a password protected Web site on the internet, which can be accessed by personal computer, computer tablet, or “smart phone”. The South Atlantic Council approved the For-Hire Amendment at their March 2013 meeting, which was approved and implemented in January 2014. This amendment requires weekly electronic reporting by the headboat sector.

Cooperative research projects between science and industry are being used to a limited extent to collect bycatch information on the snapper grouper fishery in the South Atlantic. For example, Harris and Stephen (2005) characterized the entire (retained and discarded) catch of reef fishes

from a selected commercial fisherman in the South Atlantic including total catch composition and disposition of fishes that were released. The Gulf and South Atlantic Fisheries Foundation, Inc. conducted a fishery observer program within the snapper grouper vertical hook-and-line (bandit rig) fishery of the South Atlantic United States. Through contractors they randomly placed observers on cooperating vessels to collect a variety of data quantifying the participation, gear, effort, catch, and discards within the fishery.

In the spring 2010, Archipelago Marine Research Ltd. worked with North Carolina Sea Grant and several South Atlantic Unlimited Snapper Grouper Permit holders to test the effectiveness of electronic video monitoring to measure catch and bycatch. A total of 93 trips were monitored with video monitoring, 34 by self-reported fishing logbooks, and 5 by observers. Comparisons between electronic video monitoring data and observer data showed that video monitoring was a reliable source of catch and bycatch data.

Research funds for observer programs, as well as gear testing and testing of electronic devices are also available each year in the form of grants from the Marine Fisheries Initiative, Saltonstall-Kennedy program, and the CRP. Efforts are made to emphasize the need for observer and logbook data in requests for proposals issued by granting agencies. A condition of funding for these projects is that data are made available to the Councils and NMFS upon completion of a study.

Additional administrative and enforcement efforts would help to implement and enforce fishery regulations. NMFS established the South East Fishery-Independent Survey in 2010 to strengthen fishery-independent sampling efforts in southeast U.S. waters, addressing both immediate and long-term fishery-independent data needs, with an overarching goal of improving fishery-independent data utility for stock assessments. Meeting these data needs is critical to improving scientific advice to the management process, ensuring overfishing does not occur, and successfully rebuilding overfished stocks on schedule.

## **1.8 Changes in Fishing Practices and Behavior of Fishermen**

Establishment of Spawning SMZs through Amendment 36 could result in a modification of fishing practices by commercial and recreational fishermen, thereby affecting the magnitude of discards outside of the proposed areas. While it is likely bycatch of species in the snapper grouper FMU will be eliminated or significantly reduced in the Spawning SMZs, there is a potential for the discards to be transferred outside the Spawning SMZs if fishermen shift effort in areas that are not closed to fishing.

Fishermen can be educated about methods to reduce bycatch and enhance survival of regulatory discards. While this may be advantageous for mid-shelf species, deepwater species experience nearly 100% mortality from depth related trauma. Furthermore, it is not clear that changes in behavior could substantially affect the amount of bycatch incurred. Gear changes such as hook type or hook size could have some effect on reducing bycatch mortality. Furthermore, closed seasons, new or reduced quotas, reduced trip limits, and increased size limits could cause some commercial and recreational fishermen to reduce effort.

Social effects of the proposed actions are addressed in **Chapter 4** of the amendment.

## **1.9 Changes in Research, Administration, and Enforcement Costs and Management Effectiveness**

Research and monitoring is ongoing to understand the effectiveness of proposed management measure and their effect on bycatch. In 1990, the SEFSC initiated a logbook program for vessels with federal permits in the snapper grouper fishery from the Gulf of Mexico and South Atlantic. In 1999, logbook reporting was initiated for vessels catching king and Spanish mackerel (Gulf of Mexico and South Atlantic Fishery Management Councils). Approximately 20% of commercial fishermen from snapper grouper, dolphin wahoo, and CMP fisheries are asked to fill out discard information in logbooks; however, a greater percentage of fishermen could be selected with emphasis on individuals that dominate landings. Recreational discards are obtained from the MRIP and logbooks from the NMFS headboat program.

Additional data collection activities for the recreational sector of the snapper grouper, dolphin wahoo, and CMP fisheries are being considered by the Council that could allow for a better monitoring of bycatch in the future. The Council is also developing an amendment to improve commercial logbook reporting for these fisheries. Some observer information for the snapper grouper fishery has been provided by the SEFSC, Marine Fisheries Initiative, and Cooperative Research Programs (CRP), but more is desired for the snapper grouper, dolphin wahoo, and CMP fisheries. Currently, for the snapper grouper fishery, headboats are required to carry observers, if selected.

Cooperative research projects between science and industry are being used to a limited extent to collect bycatch information on the snapper grouper fishery in the South Atlantic. For example, Harris and Stephen (2005) characterized the entire (retained and discarded) catch of reef fishes from a selected commercial fisherman in the South Atlantic including total catch composition and disposition of fishes that were released. The Gulf and South Atlantic Fisheries Foundation, Inc. (Foundation) conducted a fishery observer program within the snapper grouper vertical hook-and-line (bandit rig) fishery of the South Atlantic United States. Through contractors they randomly placed observers on cooperating vessels to collect a variety of data quantifying the participation, gear, effort, catch, and discards within the fishery.

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for observer and logbook data in requests for proposals issued by granting agencies. A condition of funding for these projects is that data are made available to the Councils and NMFS upon completion of a study.

Stranding networks have been established in the Southeast Region. The NMFS SEFSC is the base for the Southeast United States Marine Mammal Stranding Program (<http://sero.nmfs.noaa.gov/pr/strandings.htm>). NMFS authorizes organizations and volunteers under the MMPA to respond to marine mammal strandings throughout the United States. These organizations form the stranding network whose participants are trained to respond to, and collect samples from live and dead marine mammals that strand along southeastern United State beaches. The SEFSC is responsible for: coordinating stranding events; monitoring stranding rates; monitoring human caused mortalities; maintaining a stranding database for the southeast region; and conducting investigations to determine the cause of unusual stranding events including mass strandings and mass mortalities (<http://www.sefsc.noaa.gov/species/mammals/strandings.htm>).

The Southeast Regional Office and the SEFSC participate in a wide range of training and outreach activities to communicate bycatch related issues. The NMFS Southeast Regional Office issues public announcements, Southeast Fishery Bulletins, or News Releases on different topics, including use of turtle exclusion devices, bycatch reduction devices, use of methods and devices to minimize harm to turtles and sawfish, information intended to reduce harm and interactions with marine mammals, and other methods to reduce bycatch for the convenience of constituents in the southern United States. These are mailed out to various organizations, government entities, commercial interests and recreational groups. This information is also included in newsletters and publications that are produced by NMFS and the various regional fishery management councils. Announcements and news released are also available on the internet and broadcasted over NOAA weather radio.

NMFS established the South East Fishery-Independent Survey in 2010 to strengthen fishery-independent sampling efforts in southeast U.S. waters, addressing both immediate and long-term fishery-independent data needs, with an overarching goal of improving fishery-independent data utility for stock assessments. Meeting these data needs is critical to improving scientific advice to the management process, ensuring overfishing does not occur, and successfully rebuilding overfished stocks on schedule.

### **1.10 Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources**

Any changes in economic, social, or cultural values from the proposed actions are discussed in **Chapter 4** of the environmental assessment.

## **1.11 Changes in the Distribution of Benefits and Costs**

The distribution of benefits and costs expected from proposed actions in the environmental assessment are discussed in **Chapter 3**. Economic and social effects of the proposed actions are addressed in **Chapter 4** of this document.

## **1.12 Social Effects**

The social effects of all the measures are described in **Chapter 4** of the environmental assessment.

## **1.13 Conclusion**

This section evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality using the ten factors provided at 50 CFR section 600.350(d)(3)(i). In summary, bycatch in the Spawning SMZs would only occur through poaching activities or while fishing for other species not in the snapper grouper FMU (e.g., dolphin, wahoo, mackerel, tuna, sharks). Bycatch while fishing for the species not in the snapper grouper FMU is unlikely as these species are pelagic species or likely not in the areas where the SMZs are being proposed. It is not clear if overall bycatch of species in the snapper grouper FMU will decrease since fishermen may transfer effort outside the closed areas. However, bycatch of the snapper grouper species within the closed areas would be significantly reduced or eliminated as fishing for these species would be prohibited. In addition, the Council, NMFS, and the SEFSC have implemented and plan to implement numerous management measures and reporting requirements that have improved, or are likely to improve monitoring efforts of discards and discard mortality. Therefore, no additional action is needed to minimize bycatch or bycatch mortality within the snapper grouper fishery.

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