Appendix Q. Mutton Snapper

TABLE OF CONTENTS

Background

The preferred alternative in **Action 1** of the Comprehensive Annual Catch Limit (ACL) Amendment would remove mutton snapper from the snapper grouper fishery management unit (FMU) and shift management to Florida. At the March 2011 South Atlantic Fishery Management Council (South Atlantic Council) meeting, the Council member representing the State of Florida indicated the state's willingness to manage mutton snapper and extend state regulations for the species into federal waters off of Florida. Almost all landings of mutton snapper occur in Florida, and 67% of commercial and recreational landings of mutton snapper occurred in state waters during 2005-2009. Thus state management would be appropriate. An economic analysis in **Section 4.1.1.2** of the Comprehensive ACL Amendment indicated the benefits associated with retaining federal management of mutton snapper are relatively small.

Included in **Appendix Q** are actions and alternatives for mutton snapper that assume mutton snapper would not be removed from the FMU through **Action 1** in the Comprehensive ACL Amendment. This analysis has been conducted in the event the South Atlantic Council decides to retain mutton snapper in the FMU.

Life history information

Mutton snapper are found in the Western Atlantic from Massachusetts to southeastern Brazil, including the Caribbean Sea and the Gulf of Mexico. The species is most abundant around the Antilles, the Bahamas, and off southern Florida. Mutton snapper can be found in both brackish and marine waters at depths of 25-95 m (82-312 feet; Allen 1985). Juveniles generally occur closer to shore, over sandy, vegetated (usually *Thalassia*) bottom habitats, while large adults are commonly found offshore among rocks and coral habitat (Allen 1985).

Allen (1985) reports a maximum size of 94.0 cm (37.2 in) TL (male) and 15.6 kg (34.6 lbs). Burton (2002) reported a maximum age of 29 years for mutton snapper. Mutton snapper are gonochorists (separate sexes). Size at 50% maturity is 33.0 cm (13.1 in) FL and 41.4 cm (16.4 in) fork length (FL) for males and females, respectively, off Puerto Rico (Figuerola and Torrez Ruiz 2001). All males and females are probably mature by 43.1 cm (17.1 in) FL and 45.0 cm (17.8 in) FL, respectively. Spawning occurs in aggregations (Figuerola et al. 1997). Individuals have been observed in spawning condition in the U.S. Caribbean from February through July (Erdman 1976). Some spawning occurs during February to June off Puerto Rico, but spawning peaks during the week following the full moon in April and May. Spawning aggregations are known to occur north of St. Thomas, USVI, and south of St. Croix, USVI, in March, April, and May (Rielinger 1999).

Assessment information

A stock assessment for mutton snapper was completed through the Southeast Data Assessment and Review (SEDAR) process in 2008 (SEDAR 15A). All but one model run (of a total of 75 runs) for mutton snapper support the conclusion that overfishing is

not occurring. The review workshop determined the stock was not overfished and that spawning stock biomass from the base run was increasing. The South Atlantic Council's Scientific and Statistical Committee (SSC) determined SEDAR 15A (2008) was based upon the best available scientific information at their June 2008 meeting.

Action 1: Establish Species Groupings for Snapper Grouper Species (Including Mutton Snapper)

Alternative 1 (No Action). Do not establish multi-species groupings for the Snapper Grouper FMU.

Alternative 2. Establish species groups (**Table Q-1**) for the Snapper Grouper FMU using associations based on life history, catch statistics from commercial logbook and observer data, recreational headboat logbook and private/charter survey, and fishery-independent MARMAP data. Establish sub-complexes within species complexes. Complex and/or sub-complex ACLs will be a sum of the individual ACLs included in that complex (all sectors combined) and/or sub-complex. When a complex ACL is exceeded, all species in that complex, as well as those in sub-complexes will be subject to AMs. When a sub-complex ACL is exceeded, but is below the combined ACL of the complex, only the species in that particular sub-complex will be subject to AMs.

Table Q-1. Complexes (dark gray), sub-complexes (light gray), and individual ACLs (white) for snapper grouper species under the Alternative 2 species grouping approach

Deep-Water Grouper & Tilefish Complex	Subcomplexes	'Snappers' Complex	Subcomplexes
Yellowedge grouper$_2$	Yellowedge grouper$_2$	Gray snapper$_2$	Gray snapper$_2$
Blueline tilefish	Blueline tilefish	Lane snapper	Lane snapper
Silk Snapper$_2$	Silk Snapper$_2$	Cubera snapper	Cubera snapper
Snowy grouper$_1$	Snowy grouper$_1$	Yellowtail snapper$_1$	Yellowtail snapper$_1$
Golden tilefish$_1$	Golden tilefish$_1$	Mutton snapper$_1$	Mutton snapper$_1$
Shallow Water Grouper Complex	**Subcomplexes**	**Hinds & Grunts Complex**	
Scamp	Scamp	Red hind	
Gag$_{1,2}$	Gag$_{1,2}$	Rock hind	
Red grouper$_1$	Red grouper$_1$	White grunt	
Black grouper$_1$	Black grouper$_1$		
'Jacks' Complex	**Subcomplexes**		
Almaco jack$_2$	Almaco jack$_2$		
Banded rudderfish	Banded rudderfish		
Lesser amberjack	Lesser amberjack		
Greater amberjack$_1$	Greater amberjack$_1$		
Individual ACLs Not Affiliated With A Complex			
Red snapper$_1$	Vermilion snapper$_1$	Wreckfish	Warsaw grouper$_3$
Red porgy$_1$	Goliath grouper$_{1,3}$	Hogfish$_1$	Speckled hind$_3$
Blue runner	Atlantic spadefish	Nassau grouper$_3$	Black sea bass$_1$
Gray triggerfish			

1 = Assessed species; 2 = Most vulnerable species in complex (PSA analysis); 3 = Prohibited (ACL = 0).

Alternative 3. Establish species groups (**Table Q-2**) for the Snapper Grouper FMU based on similar life histories (indicator species in bold).

Table Q-2. Complexes (units) for snapper grouper species under the Alternative 3 grouping approach.

SHALLOW WATER GROUPER **UNIT 1** **Gag** Red grouper Red hind Rock hind Black grouper Scamp **UNIT 2** **Goliath grouper** **UNIT 3** **Nassau grouper**	**JACK UNIT** **Greater amberjack** Almaco jack Banded rudderfish Lesser amberjack Blue runner **GRUNT AND PORGY** **UNIT 1** **Red porgy** **UNIT 2** **White grunt** **SEA BASS UNIT** **Black sea bass**
DEEP WATER GROUPER AND TILEFISH UNIT **Snowy grouper** Yellowedge grouper Warsaw grouper Speckled hind Tilefish (golden) Blueline tilefish	**SHALLOW WATER SNAPPER, TILEFISH, AND WRASSE UNIT** **Yellowtail snapper** Gray (mangrove) snapper Lane snapper Hogfish Cubera snapper
WRECKFISH **Wreckfish**	**TRIGGERFISH AND SPADEFISH UNIT** **Gray triggerfish** Atlantic spadefish
MID-SHELF SNAPPER UNIT **Vermilion snapper** Silk snapper Red snapper Mutton snapper	

Alternative 4. Establish single species ACLs and grouped species complexes for the establishment of ACLs (**Table Q-3**). Single species ACLs would be established for assessed and targeted species, and species where ACL=0. Complexes for groups of species would be established for other species using associations based on life history, catch statistics from commercial logbook and observer data, recreational headboat logbook and private/charter survey, and fishery-independent MARMAP data. When a complex ACL is exceeded, all species in that complex will be subject to AMs. When an individual ACL is exceeded, the individual stock, and in some cases, other species that are closely associated with it, will be subject to AMs.

Note: **Alternative 4** is the preferred alternative for snapper-grouper species in the Comprehensive ACL Amendment.

Table Q-3. Complexes (gray) and individual ACLs (white) for snapper grouper species under the Alternative 4 grouping approach.

Deep-Water Grouper & Tilefish Complex	Individual ACLs
Yellowedge grouper$_2$	Atlantic spadefish
Blueline tilefish	Greater amberjack$_1$
Silk Snapper$_2$	Blue runner
Jacks Complex	Gray triggerfish
Almaco jack$_2$	Snowy grouper$_1$
Banded rudderfish	Golden tilefish$_1$
Lesser amberjack	Warsaw grouper$_3$
Snappers Complex	Wreckfish
Gray snapper$_2$	Scamp
Lane snapper	Gag$_1$
Cubera snapper	Red grouper$_1$
Hinds & Grunts Complex	Goliath grouper$_{1,3}$
Red hind	Nassau grouper$_3$
Rock hind	Black sea bass$_1$
White grunt	Black grouper$_1$
	Speckled hind$_3$
	Red porgy$_1$
	Hogfish$_1$
	Yellowtail snapper$_1$
	Red snapper$_1$
	Vermilion snapper$_1$
	Mutton snapper$_1$

1 = Assessed species; 2 = Most vulnerable species in complex (PSA analysis); 3 = Prohibited (ACL = 0).

1.1 Biological Effects

Alternative 1 (No Action) would not establish species groups in the snapper grouper FMU, and would hence require individual ACLs for species that are not being removed from the FMU in **Action 1**. **Alternative 2** meets the above guidelines and establishes species groups using life history, fishery-dependent, and fishery-independent data for the species remaining in the snapper grouper FMU. Multivariate statistical analyses were used to identify stock associations from life history, fishery-dependent, and fishery-independent data sources. Heavily targeted stocks and stocks with assessments would be managed at both the complex level and at the individual level, unless they had low levels of association with other stocks. Stocks that did not logically group into any complex would be managed only by an individual ACL.

In **Alternative 2**, stocks within complexes would be managed by two ACLs; one at the complex level, and another at the individual or sub-complex level. When a complex ACL is exceeded, all species in that complex would be subject to AMs. When a sub-complex ACL is exceeded, but is below the combined ACL of the complex, only the species in that particular sub-complex would be subject to AMs. Complex ACLs would be the sum of the individual ACLs and sub-complex ACLs included in that complex (all sectors combined).

Alternative 3 represents an approach towards species groupings that was explored during the development of Snapper Grouper Amendment 13B. Eight management groups were proposed: Shallow Water Grouper Units 1, 2 and 3; Deep Water Grouper and Tilefish Unit; Shallow Water Snapper, Tilefish, and Wrasse Unit; Mid-Shelf Snapper Unit; Triggerfish and Spadefish Unit; Jack Unit; Grunt and Porgy Units 1 and 2; Sea Bass Unit; and Wreckfish Unit **(Table Q-2)**. Generally, each unit was composed of species that were usually targeted, or captured, collectively due to similarities in susceptibility to fishing gear, occupying similar habitats, and/or possessing similar life history strategies and/or depth preferences. The indicator species specified for each unit is highlighted in bold font. The South Atlantic Council's SSC did not endorse this approach as "best available science", because it felt that the scientific rationale presented was inadequate to justify the groupings for their intended purpose. The SSC also felt that groupings by life-history attributes or taxonomy alone did not address aggregations of species that are caught together by each gear type used in the fishery.

Alternative 4 meets the 50 CFR 600.320(d)(1) guidelines and establishes species groups using life history, fishery-dependent, and fishery-independent data for all 33 species remaining in the FMU. Detailed quantitative analyses included Productivity-Susceptibility Analysis (PSA) and life history characteristics, in addition to examining differences in vulnerability and other population dynamic parameters. Multivariate statistical analyses were used to identify stock associations from life history, fishery-dependent, and fishery-independent data sources. Identified associations between stocks were used to develop complexes for unassessed stocks (**Table Q-3**). Heavily targeted stocks, stocks with assessments, stocks with fishery closures, and stocks that did not fall into any complexes would be managed only by individual ACLs. When a complex ACL is exceeded, all species in that complex will be subject to AMs. Complex ACLs will be a

sum of the individual ACLs included in that complex (all sectors combined). When an individual ACL is exceeded, only the individual species, and/or, possibly other species that are closely associated with it, will be subject to AMs.

Grouping less productive, vulnerable, and/or data-poor stocks into complexes helps mitigate uncertainty in individual landings histories, mitigates issues with species identification, and provides buffers against the unnecessary implementation of AMs. This approach is relatively simple and also carries a minimal administrative burden with regards to quota monitoring as compared to the other alternatives.

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires regional fishery management councils to implement ACLs and AMs for all stocks under Federal management by 2011, to ensure overfishing does not occur. **Alternative 1 (No Action)** would not accomplish this. **Alternatives 2, 3,** and **4** would help in accomplishing Magnuson-Stevens Act goal of ensuring overfishing does not occur, with **Alternative 4** having the highest potential of yielding the best biological effect.

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between Endangered Species Act (ESA)-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely to adversely affect marine mammals or *Acropora* species. **Alternatives 2, 3,** and **4** are unlikely to alter fishing behavior in a way that would cause new adverse effects to these species. The biological benefit to sea turtles and smalltooth sawfish from **Alternatives 2, 3,** and **4** is unclear. If these alternatives perpetuate the existing amount of fishing effort they are unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. This scenario is likely to provide little additional biological benefits to sea turtles and smalltooth sawfish, if any. However, if these alternatives reduce the overall amount of effort in the fishery the risk of interaction with sea turtles and smalltooth sawfish will likely decrease, providing additional biological benefits to these species.

1.2 Economic Effects

The analysis of economic effects for this action assumes all preferred alternatives (**Alternative 4 (Preferred), Alternative 5 (Preferred), Alternative 7 (Preferred),** and **Alternative 8 (Preferred)**) are selected to remove species (except mutton snapper) from the FMU under **Action 1** in the Comprehensive ACL Amendment.

While all alternatives would avoid overfishing to some extent, **Alternative 1 (No Action)** would result in individual ACLs being placed on all species currently in the snapper grouper FMU and thus is the most likely to prevent overfishing of these species relative to **Alternative 2**, and **Alternative 3**, and **Alternative 4. Alternative 2** would be the next most likely to prevent overfishing of species within the snapper grouper FMU as it would establish 29 ACLs: 5 complex ACLs (Deepwater grouper and tilefish, Shallow water

grouper, Jacks, Snappers, and Hinds/Grunts), 3 sub-complex ACLs (yellowedge grouper/blueline tilefish/silk snapper; almaco jack/banded rudderfish/lesser amberjack; and gray snapper/lane snapper/cubera snapper) and 21 individual ACLs (snowy grouper, golden tilefish, scamp, gag, red grouper, black grouper, greater amberjack, yellowtail snapper, red snapper, red porgy, blue runner, gray triggerfish, vermilion snapper, goliath grouper, Atlantic spadefish, wreckfish, hogfish, Nassau grouper, Warsaw grouper, speckled hind, and black sea bass). All 14 assessed species (red grouper, black grouper, golden tilefish, red snapper, hogfish, red porgy, black sea bass, goliath grouper,[1] gag, snowy grouper, vermilion snapper, greater amberjack, mutton snapper, and yellowtail snapper), 3 prohibited species (Nassau grouper, warsaw grouper, and speckled hind) and 5 unassessed species (scamp, blue runner, gray triggerfish, Atlantic spadefish, wreckfish) would have an individual ACL. As under **Alternative 1 (No Action)**, the probability of overfishing and associated risk would be minimized for these 21 species. The probability of overfishing and associated risk for the 9 unassessed species (yellowedge grouper, blueline tilefish, silk snapper, almaco jack, banded rudderfish, lesser amberjack, gray snapper, lane snapper, and cubera snapper) covered by sub-complex ACLs would be higher than under **Alternative 1 (No Action)**, but less than if they were covered only by a complex ACL. Four of these 9 unassessed species (yellowedge grouper, silk snapper, almaco jack, and gray snapper) are considered most vulnerable species according to the PSA analysis. The 3 unassessed species covered by a complex ACL (red hind, rock hind, and white grunt) would be subject to the highest probability of overfishing and associated risk relative to **Alternative 1 (No Action)**, though none are considered most vulnerable species according to the PSA analysis.

Alternative 4 would be the next most likely to prevent overfishing of species within the snapper grouper FMU as it would establish 25 ACLs: 4 complex ACLs (Deep-water grouper and tilefish, Jacks, Snappers, and Hinds/Grunts) and 21 individual ACLs (snowy grouper, golden tilefish, scamp, gag, red grouper, black grouper, greater amberjack, yellowtail snapper, red snapper, red porgy, blue runner, gray triggerfish, vermilion snapper, Goliath grouper, Atlantic spadefish, wreckfish, hogfish, Nassau grouper, Warsaw grouper, speckled hind, and black sea bass). As such, all 14 assessed species (red grouper, black grouper, golden tilefish, red snapper, hogfish, red porgy, black sea bass, goliath grouper,[2] gag, snowy grouper, vermilion snapper, greater amberjack, mutton snapper, and yellowtail snapper), 3 prohibited species (Nassau grouper, Warsaw grouper, and speckled hind) and 5 unassessed species (scamp, blue runner, gray triggerfish, Atlantic spadefish, wreckfish) would have an individual ACL. As under **Alternative 1 (No Action)** and **Alternative 2**, the probability of overfishing and associated risk would be minimized for these 21 species. The probability of overfishing and associated risk for the 12 unassessed species (yellowedge grouper, blueline tilefish, silk snapper, almaco jack, banded rudderfish, lesser amberjack, gray snapper, lane snapper, cubera snapper, red hind, rock hind, and white grunt) covered by complex ACLs would be higher than under **Alternative 1 (No Action)**. Four of these 12 unassessed species (yellowedge grouper, silk snapper, almaco jack, and gray snapper) are considered most vulnerable species according to the PSA analysis. The 12 unassessed species covered by a complex

[1] Goliath grouper is a prohibited as well as an assessed species.
[2] Goliath grouper is a prohibited as well as an assessed species.

ACL under **Alternative 4** are effectively grouped in the same manner as the 9 unassessed species covered by a sub-complex ACL and 4 unassessed species covered by a complex ACL under **Alternative 2.** Thus, for these 12 species, the probability of overfishing and associated risk is effectively equivalent under **Alternative 2** and **Alternative 4**.

Alternative 3 is the least likely to prevent overfishing of species within the snapper grouper FMU as it would establish 12 ACLs: 6 complex (unit) ACLs (Shallow water grouper unit 1, Deep-water grouper and tilefish, Mid-shelf snapper unit, Jack unit, Shallow water snapper/tilefish/wrasse unit, and Triggerfish/spadefish unit) and 6 individual ACLs (Goliath grouper, Nassau grouper, wreckfish, red porgy, white grunt, and black sea bass). As such, only 3 of the 14 assessed species (red porgy, black sea bass, and goliath grouper[3]), 1 prohibited species (Nassau grouper) and 2 unassessed species (wreckfish and white grunt) would have an individual ACL. As under **Alternative 1 (No Action)**, the probability of overfishing and associated risk would be minimized for these 6 species. However, an additional 5 assessed species would be indicator species for their respective complexes/units (gag for Shallow water grouper unit 1, snowy grouper for Deep-water grouper and tilefish, vermilion snapper for Mid-shelf snapper unit, greater amberjack for Jack unit, and yellowtail snapper for Shallow water snapper/tilefish/wrasse unit). In effect, these 5 assessed indicator species would be treated the same as species covered by an individual ACL. Thus, as under **Alternative 1 (No Action)**, **Alternative 2**, and **Alternative 4**, the probability of overfishing and associated risk would be minimized for the 11 species covered by an individual ACL or considered an indicator species.

Conversely, 5 assessed species (red grouper, black grouper, golden tilefish, red snapper, and hogfish) and 2 prohibited species (warsaw grouper and speckled hind) would only be covered by a complex/unit ACL under **Alternative 3**. Thus, the probability of overfishing and associated risk would be higher for these 5 assessed and 2 prohibited species under **Alternative 3** relative to **Alternative 1 (No Action)**, **Alternative 2**, and **Alternative 4**. The 5 assessed species are economically important, or at least somewhat economically important, to the commercial and/or recreational sectors of the snapper grouper fishery.

The probability of overfishing and associated risk for the 15 unassessed species (yellowedge grouper, blueline tilefish, silk snapper, almaco jack, banded rudderfish, lesser amberjack, gray snapper, lane snapper, cubera snapper, red hind, rock hind, scamp, blue runner, gray triggerfish, and Atlantic spadefish) covered by complex ACLs would be higher under **Alternative 3** relative to **Alternative 1 (No Action)**. Further, 4 of these 15 unassessed species (scamp, blue runner, gray triggerfish, and Atlantic spadefish) are covered by individual ACLs under **Alternative 2** and **Alternative 4**. Thus, the probability of overfishing and associated risk for these 4 unassessed species would be higher under **Alternative 3** relative to **Alternative 2** and **Alternative 4**. Four of these 15 unassessed species (yellowedge grouper, silk snapper, almaco jack, and gray snapper) are also considered most vulnerable species according to the PSA analysis.

[3] Goliath grouper is a prohibited as well as an assessed species.

Thus, with respect to expected long-term economic benefits derived from protecting snapper grouper species in the FMU from overfishing, **Alternative 1 (No Action)** is expected to generate the greatest long-term economic benefits, followed by **Alternative 2** and **Alternative 4**, which are expected to generate equivalent long-term economic benefits, while **Alternative 3** would yield the least long-term economic benefits. Since the grouping of species in the snapper-grouper FMU is an administrative action, and thus does not directly affect participants in the snapper grouper fishery, these expected economic benefits are the result of indirect rather than direct economic effects.

However, these expected economic benefits must be evaluated relative to the expected economic costs in order to estimate the net economic benefits associated with each of these alternatives. In general, the expected economic costs are a function of expected administrative costs associated with implementing, monitoring, and enforcing ACLs, AMs, and ACTs as well as the probability of triggering AM actions in the future (e.g., fishery closures reductions in ACLs, reductions in fishing seasons, etc.).

Administrative costs arise from fishery management and the required scientific research to support management. Based on the number of ACLs, which are 33, 29, 25, and 12, respectively, administrative costs would be greatest under **Alternative 1 (No Action)**, followed by **Alternative 2**, **Alternative 4**, and the least under **Alternative 3**. Relative to **Alternative 1 (No Action)**, the reduction in ACLs and thus expected administrative costs is 64% under **Alternative 3**, 24% under **Alternative 4**, and 12% under **Alternative 2**. Since the methodology under **Alternative 2** is considered more scientifically complex, and thus more costly in terms of research costs, relative to **Alternative 4**, the difference in administrative costs is even greater than the difference in the number of ACLs suggests. On the other hand, the probability of triggering an AM action in the future is inversely related to the number of ACLs, all else being equal. Thus, the probability of triggering an AM action in the future would be the greatest under **Alternative 1 (No Action)**, followed by **Alternative 2**, **Alternative 4**, and the least under **Alternative 3**. AM actions in the future are expected to generate adverse indirect economic effects on fishery participants. Thus, total expected economic costs are expected to be the greatest under **Alternative 1 (No Action)**, followed by **Alternative 2**, **Alternative 4**, and the least under **Alternative 3**.

Although quantitative estimates of the expected net economic benefits cannot be generated for these alternatives, a qualitative assessment based on the available information can be conducted. An analysis of the information discussed above suggests that expected net economic benefits would be greatest under **Alternative 4**, followed by **Alternative** 2, **Alternative 3**, and **Alternative 1 (No Action)**. However, this conclusion must be cautioned by the fact that it is unknown how fishing behavior will be altered under the different species grouping methodologies and potential AMs in the future.

1.3 Social Effects

It is difficult to determine what the social effects would be from species groupings as many of the impacts would come from the thresholds for ACLs that are determined for each species group as a result. While this solution helps resolve the problem of placing ACLs on all species, especially those that do not have stock assessments, it may place further burdens on different fishing sectors according to their fishing practices for a particular species. **Alternative 1 (No Action)** would likely result in some type of ACL being placed on every species, which could induce a cumbersome management regime. By grouping species according to the methodology in **Alternative 2**, the burden of placing ACLs on all species is removed. Although there will continue to be monitoring issues that arise from the monitoring of species groups as well. By basing the groupings on life history and associations with harvesting behavior, these groupings should help account for different fishing behaviors and tie that behavior to more realistic fishing thresholds. However, it is not known how each grouping will be affected by fishing behaviors over time and whether or not harvest levels will change as a result and trigger accountability measures (AM) in response to ACL thresholds being met. The same is true for **Alternative 3** in that the grouping by species life history does tend to lump those species together that might be harvested together, however there are differences in harvesting behaviors that are not accounted for but were in **Alternative 2**. With **Alternative 4** there are similar components of other alternatives in that species groupings will allow for regulations that account for behavior and life history and some catch history, yet continues the species specific ACLs with which fishermen are more familiar. If thresholds are set lower than actual harvest rates, then there will be negative social impacts as species complexes are closed, forcing fishermen to switch to other species, use catch and release only or not fish at all. Catch and release could increase discard bycatch and not fishing at all could have negative impacts on local economies.

1.4 Administrative Effects

The establishment of species groupings will aid in the establishment of ACLs, ACTs, and AMs for species for which there is not a lot of information. The development of species groupings requires complex data analysis and manipulation which requires staff time. However, if the number of species in the snapper grouper FMU can be reduced by incorporating species complexes and groupings, the administrative impacts of establishing, monitoring and implementing ACLs, ACTs and AMs will be reduced.

Action 2: Establish Jurisdictional Allocations for Mutton Snapper

Alternative 1. (No Action). Do not establish jurisdictional allocation of the mutton snapper Acceptable Biological Catch (ABC) between the Gulf and South Atlantic Councils.

Alternative 2. Establish a jurisdictional allocation based on the Florida Keys (Monroe County) jurisdictional boundary between the Gulf and South Atlantic Councils for mutton snapper Acceptable Biological Catch (ABC) based on the following method:

South Atlantic = 77% of ABC and Gulf = 23% of ABC (Established by using 50% of catch history from 1990-2006 + 50% of catch history from 2004-2006).

Alternative 3. Establish a jurisdictional allocation based on the Florida Keys (Monroe County) jurisdictional boundary between the Gulf and South Atlantic Councils for mutton snapper Acceptable Biological Catch (ABC) based on the following method: South Atlantic = 79% of ABC and Gulf = 21% of ABC (Established by using catch history from 2002-2006).

Alternative 4. Do not establish a jurisdictional allocation based on the Florida Keys (Monroe County) jurisdictional boundary between the Gulf and South Atlantic Councils for mutton snapper. The South Atlantic Council would manage mutton snapper in the South Atlantic and Gulf of Mexico.

2.1 Biological Effects

The Gulf of Mexico Fishery Management Council (Gulf Council) and South Atlantic Fishery Management Council requested that jurisdictional allocation alternatives be developed for mutton snapper between the two Council's jurisdictional areas. The stock assessment for mutton snapper treated the Gulf and South Atlantic management unit as a single stock rather than providing separate assessments. The stock assessment was completed in 2008 and concluded that the stock is neither overfished nor undergoing overfishing.

The South Atlantic Scientific and Statistical Committee (SSC) recommended that the overfishing limit (OFL) be set equal to the equilibrium maximum sustainable yield proxy, which is the yield at $F30\%_{SPR}$= 1.52 mp whole weight (ww) and the Acceptable Biological Catch (ABC) be set equal to the equilibrium optimum yield, which is the yield at $F40\%_{SPR}$ = 1.16 mp whole weight (ww). The Gulf Council's SSC recommended a consistent OFL and ABC, but separated landed weight from the dead discards (**Table Q-4**).

Table Q-4. OFL and ABC Recommendations from Gulf Council's SSC.

OFL (ww)		
Landings	Discards	Total
1,480,000	35,300	1,515,300

ABC (ww)		
Landings	Discards	Total
1,130,000	26,500	1,156,500

Table Q-5. Mutton snapper ABC (landed catch pounds ww) in Gulf of Mexico and South Atlantic based on jurisdictional allocation alternatives.

	Not Adjusted for Dead Discards		Adjusted for Dead Discards	
Alternative	Gulf	South Atl	Gulf	South Atl
Alternative 2	265,880	890,120	259,900	870,100
Alternative 3	242,480	913,520	237,300	892,700
Alternative 4	0	1,156,000	0	1,130,000

Currently, the ABC applies across Council jurisdictions; therefore, the Councils would have to agree to a jurisdictional allocation between the Gulf and South Atlantic. Mutton snapper are widely distributed in the western Atlantic from Massachusetts and Bermuda to southeastern Brazil, including the Gulf of Mexico, the Bahamas, and the Greater and Lesser Antilles. Mutton snapper is found throughout the coastal waters of the Gulf of Mexico and is associated with coral reefs, sandy bottoms, and seas grasses, including estuaries and bays with mangroves (SEDAR 15A 2008).

Alternative 1 (No Action) would not establish jurisdictional allocation of mutton snapper between the Gulf and South Atlantic Councils. Under this alternative, mutton snapper would be managed jointly. The two Councils would need to agree on an ACL and on a common set of regulations (i.e., bag limits, size limits, and closed season(s)). If the Councils decided not to allocate this species by region they would have to agree on a recreational and commercial allocation.

Alternative 2 would establish a jurisdictional allocation based on the Florida Keys (Monroe County) jurisdictional boundary between the Gulf and South Atlantic Councils for mutton snapper acceptable biological catch based on the following method: South Atlantic = 77% of the ABC and Gulf = 23% of the ABC. These percentages were derived by using the formula presented in the June 10, 2010 letter from the South Atlantic Council for mutton snapper allocation as the following: use 50% of the catch history from 1990-2006 + 50% of the catch history from 2004-2006. The concept of this method is to use all available years to determine the split. The catch history was recommended to begin in 1990 when fish identification and sampling methods improved (J. O'Hop, personal communication). The catch history ends in 2006 based on available data when the stock assessment was completed. Using catch history from 1990-2006 and catch history from 2004-2006 resulted in the same jurisdiction allocation as this alternative.

Alternative 3 would establish a jurisdictional allocation based on the Florida Keys (Monroe County) jurisdictional boundary between the Gulf and South Atlantic Councils for mutton snapper acceptable biological catch (ABC) based on the following method: South Atlantic = 79% of the ABC and Gulf = 21% of the ABC. These percentages were derived by using catch histories from 2002-2006, the most recent 5 years of data.

Alternatives 2 and **3** are similar, with only 2% difference in allocation of the ABC between the Gulf and South Atlantic Councils. Based on the stock assessment for mutton snapper the commercial landings (handline and longline combined) are close to a 50:50 split between the Gulf and South Atlantic Councils. The recreational landings (Marine Recreational Fisheries Statistical Survey (MRFSS) and headboat) are primarily from the South Atlantic jurisdiction.

Alternative 4 would be dependent upon the Gulf Council relinquishing management of mutton snapper. Under this alternative the South Atlantic Council would manage mutton snapper in the South Atlantic, where most of the landings occur as well as the Gulf of Mexico. The biological effects of **Alternative 4** could be slightly greater than **Alternatives 2** and **3** because management measures (a two month spawning season

closure) are more restrictive for the commercial sector in the South Atlantic than in the Gulf of Mexico. However, commercial landings of mutton snapper are small relative to recreational landings, and landings from the Gulf of Mexico are much less than those in the South Atlantic. In the South Atlantic and Gulf of Mexico, there is a 16 inch total length minimum size limit is in place for the commercial and recreational sectors, and mutton snapper is included in the 10 snapper aggregate recreational bag limit in both regions.

Regardless of which alternative is selected, SEDAR 15A (2008) indicates management measures in both areas are sufficient to prevent overfishing of mutton snapper. Furthermore, both Councils are in the process of specifying ACLs and AMs for all management species. Therefore, additional measures have been and are being considered to ensure mutton snapper does not experience overfishing.

2.2 Economic Effects

Under **Preferred Alternative 4** for **Action 1** of the South Atlantic Comprehensive ACL Amendment, mutton snapper is to be removed from the snapper grouper FMU. In general, greater economic efficiency is attained when the allocation of management authority over all snapper grouper species and thus the associated costs more closely mirror the distribution of the resource. Although landings from state waters account for a smaller percentage (67%) of the total landings of mutton snapper relative to other snapper grouper species being removed from the FMU, the effective landings of mutton snapper being removed from federal management is about 174,000 pounds rather than almost 562,000 pounds (whole weight). Most landings of mutton snapper are from state and federal waters off Florida and occur at Florida ports. Thus, the economic benefits associated with retaining federal management of mutton snapper are relatively small. In turn, federal resources (labor and capital) could be used to more effectively manage the other snapper grouper species expected to remain in the FMU.

Given that the preferred alternative in the Comprehensive ACL Amendment would remove mutton snapper from the snapper grouper FMU, there is currently no action in that document to establish an allocation of mutton snapper between the commercial and recreational sectors in the South Atlantic. The analysis of economic effects for the alternatives considered under this Action to establish a jurisdictional allocation of mutton snapper between the South Atlantic and Gulf Councils assumes that the allocation of mutton snapper between the commercial and recreational sectors in the South Atlantic will remain as it has been on average from 2005-2009. Also, under **Alternative 1 (No Action)**, the distribution of mutton snapper landings between the South Atlantic and Gulf Councils' jurisdictions is assumed to remain the same as it has been on average from 2005-2009. Analysis adopts the South Atlantic Council SSC's recommendation for ABC that does not make adjustments for dead discards and assumes MRFSS landings data from Monroe County are assigned to the Gulf of Mexico. In addition, the analysis assumes the average commercial ex-vessel price per pound for mutton snapper is $2.43 and the estimated recreational willingness to pay per pound for mutton snapper is $10.93 (personal communication, SEFSC).

As can be seen in **Table Q-6**, relative to **Alternative 1 (No Action)**, the greatest losses in commercial gross revenue, consumer surplus in the recreational sector, and thus total economic benefits to participants in the South Atlantic mutton snapper fishery would accrue under **Alternative 2**. Losses in commercial gross revenue, consumer surplus in the recreational sector, and thus total economic benefits to participants in the South Atlantic mutton snapper fishery would accrue under **Alternative 3.** Thus, participants in the South Atlantic mutton snapper fishery would be economically better off under **Alternative 1 (No Action)** relative to **Alternative 2** and **Alternative 3**. Conversely, participants in the South Atlantic mutton snapper fishery would experience gains in commercial gross revenue, consumer surplus in the recreational sector, and thus total economic benefits under **Alternative 4**. Therefore, participants in the South Atlantic mutton snapper fishery would be economically better off under **Alternative 4** relative to **Alternative 1 (No Action)**, **Alternative 2** and **Alternative 3**.

Table Q-6. Changes in South Atlantic Commercial Gross Revenue, Recreational Consumer Surplus, and Total Economic Benefits for **Alternatives 2-4** relative to **Alternative 1 (No Action)** under the Action to establish allocation for mutton snapper. ACLs are in lbs whole weight. Based on ABC recommendation from South Atlantic Council's SSC, which does not adjust the ABC for dead discards. Assumes ACL = ABC.

Alternative	SA ACL	Gulf ACL	SA Commercial ACL	SA Recreational ACL	SA Commercial Gross Revenue	SA Recreational CS	Change in SA Gross Revenue Relative to Alt. 1	Change in SA CS relative to Alt 1	Total Change in Economic Benefits
Alternative 1	970K	184K	310K	660K	$754,573	$7,212,294	$0	$0	$0
Alternative 2	890K	266K	285K	605K	$691,692	$6,611,273	-$62,881	-$601,021	-$663,902
Alternative 3	913K	243K	292K	621K	$710,386	$6,782,994	-$44,167	-$429,300	-$473,467
Alternative 4	1,156K	0	370K	786K	$898,301	$8,582,552	$125,689	$1,370,258	$1,495,947

Table Q-7. Changes in gross revenue to the commercial sector and consumer surplus to the recreational sector for **Alternatives 2-7** relative to **Alternative 1 (No Action)** under the Action to establish an ACL for mutton snapper. Based on ABC recommendation from South Atlantic Council's SSC, which does not adjust the ABC for dead discards. Assumes ACL = ABC.

Alternative	ACL	Commercial ACL	Recreational ACL	Commercial Gross Revenue	Recreational CS	Change in Gross Revenue relative to Alt. 1	Change in CS relative to Alt 1
Alternative 2 (ACL=ABC)	1,156K	370K	786K	$898,301	$8,582,552	$696,875	$3,352,967
Alternative 3 (ACL=90%* ABC)	1,040K	333K	707K	$808,471	$7,724,298	$607,045	$2,494,713
Alternative 4 (ACL=80%*ABC)	924K	296K	628K	718,641	6,866,045	$517,215	$1,636,459

Table Q-8. Alternatives to establish commercial and recreational ACL allocations for mutton snapper. Assumes MRFSS data from Monroe County, Florida are allocated to Gulf of Mexico.

Alternative 2		Alternative 3			Alternative 4		Alternative 5		Alternative 6		Alternative 7	
Comm	Rec	Comm	Private	For-Hire	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec
32%	68%	32%	44%	24%	34%	66%	42%	58%	24%	76%	13%	87%

Table Q-9. Changes in gross revenue to the commercial sector and consumer surplus to the recreational sector for **Alternatives 2-7** relative to **Alternative 1 (No Action)** under the Action to establish allocation for mutton snapper.

Alternative 2		Alternative 3			Alternative 4		Alternative 5		Alternative 6		Alternative 7	
Comm benefits minus Alt 1 benefits (gross revenue, $)	Rec benefits minus Alt 1 benefits (consumer surplus, $)	Comm benefits minus Alt 1 benefits (gross revenue, $)	Private benefits minus Alt 1 benefits (consumer surplus, $)	For-Hire benefits minus Alt 1 benefits (consumer surplus, $)	Comm benefits minus Alt 1 benefits (gross revenue, $)	Rec benefits minus Alt 1 benefits (consumer surplus, $)	Comm benefits minus Alt 1 benefits (gross revenue, $)	Rec benefits minus Alt 1 benefits (consumer surplus, $)	Comm benefits minus Alt 1 benefits (gross revenue, $)	Rec benefits minus Alt 1 benefits (consumer surplus, $)	Comm benefits minus Alt 1 benefits (gross revenue, $)	Rec benefits minus Alt 1 benefits (consumer surplus, $)
483,927	(2,175,782)	483,927	(1,671,037)	504,745	540,070	(2,428,210)	764,646	(3,437,922)	259,352	(1,166,070)	(49,439)	222,284

2.3 Social Effects

In establishing jurisdictional allocations for mutton snapper the social effects are similar to those for other species, like yellowtail snapper, within the Comprehensive ACL Amendment. Depending upon how the allocation is determined, the ensuing harvest thresholds will determine the overall social effects. Although **Alternative 1 (No Action)** may make management of mutton snapper more difficult as monitoring of landings with ACLs and AMs creates scenarios for more administrative burdens in accounting for catches. Furthermore, the social effects of **Alternative 4** would be dependent upon how the South Atlantic Council addresses issues regarding required permits to catch mutton snapper in the Gulf of Mexico and South Atlantic. The Councils would have to jointly meet and decide upon management which could add burdens to management through longer timeframes for decision-making. The allocation based upon **Alternatives 2** and **3** are very close in their allocation and the social effects would differ minimally between the two. Both alternatives use data from the most recent years with **Alternative 2** using older data also to account for the historical fishery. The social effects of **Alternatives 2**, **3**, and **4** would likely be positive in the long term as it would allow for management and accountability based upon regional fishing activities. It becomes problematic in areas like the Florida Keys where fishermen may fish in both jurisdictional areas and management differences could make fishing decisions more complicated. Overall, if management becomes more accountable and fishing thresholds provide stability in harvest the benefits should be positive. It will depend upon the ability to monitor and implement any AMs through each council process over time.

2.4 Administrative Effects

Alternative 1 (No Action) would retain the current allocations and would result in the least administrative burden. Currently, the ABC applies across Council jurisdictions; therefore, the Councils would have to agree to a jurisdictional allocation between the Gulf and South Atlantic. Under **Alternatives 2** and **3**, 77% and 79% of the ABC, respectively, would be divided among the commercial and recreational sectors. This could increase the administrative impacts to NOAA Fisheries Service as landings would need to be monitored to ensure the commercial and recreational ACLs are not exceeded. **Alternative 4** could increase the administrative burden if changes are needed to the Federal Gulf Reef Fish and the Federal Snapper Grouper Permits.

Action 3: Specify Allocations for Mutton Snapper

Alternative 1 (No Action). Do not specify allocations for mutton snapper.

Alternative 2. Specify allocations for mutton snapper among two sectors, commercial and recreational, using the following equation:
Allocation by sector = (0.5 * catch history) + (0.5 * current trend) whereby, catch history =1986 -2008, current trend = 2006-2008 for this amendment. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Alternative 3. Specify allocations for mutton snapper among three sectors, commercial, recreational, and for-hire, using the following equation:
Allocation by sector = (0.5 * catch history) + (0.5 * current trend) whereby, catch history =1986 -2008, current trend = 2006-2008 for this amendment. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Alternative 4. Specify allocations for mutton snapper among two sectors, commercial and recreational using data from 1986-2008. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Alternative 5. Specify allocations for mutton snapper among two sectors, commercial and recreational using data from 1986-1998. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Alternative 6. Specify allocations for mutton snapper among two sectors, commercial and recreational using data from 1999-2008. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Alternative 7. Specify allocations for mutton snapper among two sectors, commercial and recreational using data from 2006-2008. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Note: **Alternative 2** is the preferred ACL alternative for snapper-grouper species in the Comprehensive ACL Amendment.

3.1 Biological Effects

Alternative 1 (No Action) would not specify commercial and recreational allocations for mutton snapper. If an allocation is not specified only a single ACL could be established for both sectors and options for an AM would be limited. **Alternatives 2-4** would divide allocations among commercial and recreational sectors based on various years of landings. Tables 11 shows allocations assuming all MRFSS landings from Monroe County are allocated to the Gulf of Mexico, which is how landings data are currently apportioned. MRFSS data in Table 12 are post-stratified so that all MRFSS data are apportioned to the South Atlantic. This may be more appropriate as there is a greater amount of reef habitat for mutton snapper on the Atlantic side of Monroe County, FL.

Alternative 2 would divide allocations among the recreational and commercial sectors based on historical landings information from 1986-2008 and 2006-2008. **Alternative 3** would be similar to **Alternative 2** with the exception that the allocations for the recreational sector would be divided into private recreational and for-hire recreational components. The commercial allocation under **Alternatives 2** and **Alternative 3** would be identical. Sector specific ACLs would be based on allocations. Therefore, there is a greater chance that the ACLs would be exceeded for private recreational and for-hire recreational sectors under **Alternative 3** than for private recreational and for-hire recreational combined under **Alternative 2.**

Alternative 4, which would set allocations based on data from 1986 to 2008, is almost identical to **Alternative 2**, which uses landings data from 1986-2008 and 2006-2008. **Alternative 5**, which is based on data from 1986-1998, would allocate a larger portion of the ACL to the commercial sector than allocation alternatives that include more recent landings information. Allocation **Alternatives 6** and **7**, which use landings data from 1999-2008, and 2006-2008, respectively, would allocate a greater proportion of the ACL to the recreational sector than alternatives that include data from earlier years (**Tables Q-10 and Q-11**).

Table Q-10. Percentage of ACL that would be allocated to the commercial and recreational sectors under **Alternative 2**, and **Alternatives 4**, **5**, **6**, and **7** as well as commercial, private, and for-hire sectors under **Alternative 3**. Does not post stratify MRFSS data in Monroe County to South Atlantic.

	Alternative 2		Alternative 3			Alternative 4		Alternative 5		Alternative 6		Alternative 7	
Species	Comm	Rec	Comm	Private	For-Hire	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec
Mutton Snapper	32%	68%	32%	44%	34%	34%	66%	42%	58%	24%	76%	13%	87%

Table Q-11. Percentage of ACL that would be allocated to the commercial and recreational sectors under **Alternative 2**, and **Alternatives 4**, **5**, **6**, and **7** as well as commercial, private, and for-hire sectors under **Alternative 3**. Post-stratifies MRFSS data to South Atlantic.

	Alternative 2		Alternative 3			Alternative 4		Alternative 5		Alternative 6		Alternative 7	
Species	Comm	Rec	Comm	Private	For-Hire	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec
Mutton Snapper	24%	76%	24%	19%	57%	26%	74%	30%	70%	19%	81%	10%	90%

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely adversely affect marine mammals or *Acropora* species. **Alternatives 2-7** are unlikely to alter fishing behavior in a way that would cause new adverse effects to these species. The impacts from **Alternatives 2-7** on sea turtles and smalltooth sawfish are unclear. If these allocations perpetuate the existing amount of fishing effort they are unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. This scenario is likely to provide little additional biological benefits to sea turtles and smalltooth sawfish, if any. However, if these alternatives reduce the overall amount of effort in the fishery the risk of interaction with sea turtles and smalltooth sawfish will likely decrease, providing additional biological benefits to these species.

3.2 Economic Effects

Alternative 1 (No Action) would not specify sector specific allocations for mutton snapper in the South Atlantic. **Alternative 2** would divide allocations among the recreational and commercial sectors based on historical landings information from 1986-2008 and 2006-2008. **Alternative 3** would be similar to **Alternative 2** with the exception that the allocations for the recreational sector would be divided into private recreational and for-hire recreational components. The commercial allocation under **Alternative 2** and **Alternative 3** would be similar.

Alternative 4, which would set allocations based on data from 1986 to 2008, is also similar to **Alternative 2**, which uses landings data from 1986-2008 and 2006-2008. **Alternative 5**, which is based on data from 1986-1998, would generally allocate a larger portion of the ACL to the commercial sector than other allocation alternatives that base their allocation formula on more recent landings information. **Alternatives 6** and **7**, which use landings data from 1999-2008 and

2006-2008, respectively, would allocate a greater proportion of the ACL to the recreational sector than other alternatives, which base their allocation formula on data from earlier years.

To summarize, **Alternatives 2** to **7** would specify allocation shares for the commercial and recreational sector based on historical landings information. **Alternatives 2-5** base their allocation formula on a longer time series, and thus relatively more historical data, whereas **Alternatives 6** and **7** base their allocation formula on a shorter time series and thus more recent data. Broadly speaking, since recreational participation has increased in recent years, **Alternatives 6** and **7** tend to place a higher weight towards the recreational sector relative to **Alternatives 2-5**.

As commercial allocations become more binding, then a number of commercial operations may change their catch mix. Similarly, as recreational allocations become more binding, participation rates may also change. Presently, the actual behavioral response is unknown. In addition, the resulting net benefits will depend on the regulatory framework in place (e.g., individual transferable quota, limited entry, trip limits in the commercial sector or bag limits, size limits, or seasonal closures in the recreational sector) and compliance with ACLs, which is also unknown. **Section 4.1.4.2** in the Comprehensive ACL Amendment provides a more detailed analysis on the economic effects of establishing allocations for snapper grouper species and is incorporated herein by reference.

3.3 Social Effects

By establishing sector allocations there could likely be some changes in fishing behavior and impacts to the social environment. The mere act of separating a particular threshold into two or three sectors has the perception of creating scarcity in that limits have been imposed on each individual sector. Each subsequent division will drive perceptions of scarcity and likely change the fishing behavior of those within a particular sector. Because there has been an initial sector allocation between the commercial and recreational, **Alternative 1 (No Action)** may have few social effects. With **Alternative 2**, the use of the newer data provides more benefit to the recreational sector with an increase in allocation, as the recreational sector has increased participation over time as reflected in harvesting trends. The difference with **Alternative 3** is the splitting of the recreational sector into two allocations which may provide the charter sector with more stability and the possibility to plan with a known quantity of allocation. However, as mentioned, there can be many different social effects that result as further allocations are divided and perceptions are formed. There has been significant resistance to further splitting the recreational sector and allocating to the private sector and the charter sector with protests occurring at regional headquarters and elsewhere. Comments to the amendment have also trended toward no sector separation within the recreational component. The other alternatives are variations on the same with the allocations varying according to the time series used. Again, the more recent time series favor the recreational sector as in **Alternatives 4, 6** and **7** for mutton snapper; although for some there is little change. **Alternative 5** tends to provide more allocation to the commercial sector. Again, it is difficult to predict the social effects with any allocation scheme as it would depend upon other actions in conjunction with this one. A reduction in allocation for one sector may be compounded by a restrictive choice of ABC or ACL and may have further effects that could be either negative or positive depending upon the combination of

effects. Therefore, the choice of an allocation will need to be assessed with other actions to determine the overall social effects and whether short term losses are offset by any long term biological gains.

3.4 Administrative Effects

Alternative 1 (No Action) would retain the current allocations and would result in the least administrative burden. **Alternatives 2** through **7** would increase the administrative impacts to NOAA Fisheries Service as landings would need to be monitored in relation to the commercial, recreational, and for-hire portions of the allocation for ACL overages and commercial quota purposes. However, the increase in administrative burden would not differ between the various action alternatives.

Action 4: Establish Annual Catch Limits (ACLs) and Optimum Yield (OY) for Mutton Snapper

Alternative 1 (No Action). Do not specify ACLs for mutton snapper.

Alternative 2. Establish recreational and commercial ACLs for mutton snapper based on the preferred allocation alternative, where ACL = OY = ABC.

Alternative 3. Establish recreational and commercial ACLs for mutton snapper based on the preferred allocation alternative, where ACL = OY = 90% of the ABC.

Alternative 4. Establish recreational and commercial ACLs for mutton snapper based on the preferred allocation alternative, where ACL = OY = 80% of the ABC.

Note: Alternative 2 is the preferred ACL alternative for snapper-grouper species in the Comprehensive ACL Amendment.

4.1 Biological Effects

Alternative 1 (No Action), would retain the current regulations established and proposed for snapper grouper species, which include ACLs for species experiencing overfishing. Since the Magnuson-Stevens Act requires ACLs for all fisheries in FMPs by 2011, except fisheries for species with annual life cycles, **Alternative 1 (No Action)** would not meet this requirement.

Alternatives 2-4 would set OY equal to the ACL. Setting OY equal to ACL would provide greater insurance that overfishing is prevented, the long-term average biomass is near or above B_{MSY}. Setting OY equal to the ACL, which range from being equal to the ABC in **Alternative 2** to some portion of the ACL in **Alternatives 3-4**, would be based on the ABC recommended by the South Atlantic and Gulf Council's SSC therefore take into consideration scientific uncertainty in the specification of OFL.

Table Q-12. Commercial and recreational ACLs (pounds ww) for mutton snapper in Alternatives 2, 3, and 4 in this action based on allocation alternatives and ABC alternatives specified in previous actions. Assumes MRFSS data from Monroe County are allocated to the South Atlantic.

South Atlantic ABC = 870,100 pounds whole weight (landed catch)													
	Allocation Alt 2		Allocation Alt 3			Allocation Alt 4		Allocation Alt 5		Alternative 6		Alternative 7	
ACL Alt	Comm	Rec	Comm	Private	For-Hire	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec
Alt 2	212,334	657,766	212,334	163,846	493,921	224,629	645,471	262,736	607,364	167,514	702,586	91,156	778,944
Alt 3	223,364	691,936	223,364	172,357	519,579	236,298	679,002	276,385	638,915	176,216	739,084	95,891	819,409
Alt 4	169,867	526,213	169,867	131,076	395,137	179,703	516,377	210,189	485,891	134,011	562,069	72,925	623,155
South Atlantic ABC = 892,700 pounds whole weight (landed catch)													
	Allocation Alt 2		Allocation Alt 3			Allocation Alt 4		Allocation Alt 5		Alternative 6		Alternative 7	
ACL Alt	Comm	Rec	Comm	Private	For-Hire	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec
Alt 2	217,849	674,851	217,849	168,101	506,750	230,463	662,237	269,561	623,139	171,865	720,835	93,524	799,176
Alt 3	196,064	607,366	196,064	151,291	456,075	207,417	596,013	242,605	560,825	154,678	648,752	84,171	719,259
Alt 4	174,279	539,881	174,279	134,481	405,400	184,371	529,789	215,649	498,511	137,492	576,668	74,819	639,341
South Atlantic ABC = 1,113,000 pounds whole weight (landed catch)													
	Allocation Alt 2		Allocation Alt 3			Allocation Alt 4		Allocation Alt 5		Alternative 6		Alternative 7	
ACL Alt	Comm	Rec	Comm	Private	For-Hire	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec
Alt 2	275,758	854,242	275,758	212,786	641,456	291,726	838,274	341,216	788,784	217,550	912,450	118,384	1,011,616
Alt 3	248,182	768,818	248,182	191,508	577,310	262,553	754,447	307,095	709,905	195,795	821,205	106,546	910,454
Alt 4	220,606	683,394	220,606	170,229	513,164	233,381	670,619	272,973	631,027	174,040	729,960	94,707	809,293

Alternative 2 would set the ACL equal to the ABC. The National Standard 1 guidelines indicate ACL can be set very close to ABC. The ACL would be divided into sector-specific ACLs based on the Council's choose of an allocation alternative in **Action 3. Alternatives 3** and **4** would have a greater positive biological effect than **Alternative 2** because they would create a buffer between the ACL and ABC, with **Alternative 4** setting the most conservative ACL at 80% of the ABC. However, scientific uncertainty is taken into consideration by setting ABC below OFL, and the South Atlantic Council is considering alternatives that could set ABC at 80% or 90% of the SSC's recommended level. Creating a buffer between the ACL and ABC would provide greater assurance that overfishing is prevented, and the long-term average biomass is near or above B_{MSY}. Setting a buffer between the ACL and ABC would be appropriate in situations where there is uncertainty in whether or not management measures are constraining fishing mortality to target levels. ACTs, which are not required but are being considered by the South Atlantic Council, can also be set below the ACLs to account for management uncertainty and provide greater assurance overfishing does not occur.

4.2 Economic Effects

The establishment of ACLs is intended to reduce the risk of overfishing for mutton snapper. ACLs constrain existing catch levels to increase the long-run abundance of these stocks. By constraining current harvest levels, ACLs may lead to short-run reductions in gross revenue for the commercial sector, but may also generate higher long-run gross revenue as annual allowable harvest levels are raised due to the recovery of overfished stocks and/or to the reduction of the risk of overfishing. As the long-run abundance of these stocks increases, the potential for economic benefits and the likelihood of achieving OY is improved. However, the magnitude of the actual economic benefits as well as whether and when OY is achieved will depend on the regulatory framework in place (e.g., individual transferable quota versus limited entry in commercial sector case or bag limits versus season length in the recreational sector case) and the continued compliance with the ACLs.

Alternative 1 (No Action) is expected to result in the greatest short-term gross revenue and consumer surplus to the commercial and recreational sectors, respectively, but will also likely generate the smallest long-term gross revenue and consumer surplus to the commercial and recreational sectors, respectively, since this alternative maintains harvests levels at their average 2005-2009 levels. These current harvest levels may prevent some mutton snapper from achieving higher long-run abundance levels. This alternative runs the greatest risk for overfishing.

Alternatives 2, **3**, and **4** would establish ACLs for mutton snapper. It is uncertain how fishing practices would change following the adoption ACLs for mutton snapper and multiple other snapper-grouper ACLs (Comprehensive ACL Amendment and Amendment 17B), particularly those for overfished and/or less productive species. For example, if commercial fishing firms could readily re-organize their product mix, then they could potentially offset any forgone revenue by targeting other species. On the other hand, if commercial fishing firms had the flexibility to modify the composition of their catches, then they could reduce their overall snapper grouper landings, switch to other fishing gear, or exit the fishery altogether depending on how restrictive the ACLs are. Thus, the resulting benefits will be a function of the actual behavioral response, which are presently unknown. Similarly, as the number of pounds caught by recreational fishermen decreases, recreational participation and consumer surplus would decrease at the same rate. Again, the resulting benefits will be a function of the actual behavioral response, which are presently unknown.

Contrary to **Alternative 2**, **Alternatives 3** and **4** would create a buffer between the ACL and the ABC. **Alternatives 3** (90% of the ABC) and **4** (80% of the ABC) provide greater insurance against the risk of overfishing than **Alternative 2** and thus are more conservative. **Alternatives 3** and **4** presumably will achieve attain higher long-run stock abundances than **Alternative 2**, which could allow the ACLs to be increased sooner allow for higher ACLs in the long-run. Thus, **Alternatives 3** and **4** are anticipated to generate larger long-run economic benefits (i.e., higher gross revenue for the commercial sector and higher consumer surplus in the recreational sector) relative to **Alternative 2**. A detailed analysis on the effect of establishing multiple ACLs for snapper grouper ACLs is provided in **Section 4.1.5.2** of the Comprehensive ACL Amendment and is incorporated herein by reference.

4.3 Social Effects

Establishing an ACL for mutton snapper will have social effects similar to the discussions under previous actions and in the Comprehensive ACL Amendment. As discussed previously, choosing a more restrictive ACL like **Alternative 4** would likely have more negative effects in the short term than would **Alternative 3 or Alternative 2**. The overall effects would also be tied to other actions and how they combine to affect a particular sector. In **Alternative 1 (No Action)** there may likely be few direct effects depending upon how other actions would affect the biological thresholds and the implications for stock status. With more liberal choices in setting thresholds in other actions, there could be long term consequences if a stock is vulnerable. Choosing **Alternative 2** would be less restrictive than the later alternatives and would not further compound any negative effects of reduced harvest from other alternatives if they occur.

4.4 Administrative Effects

Specifying an ACL or sector ACLs alone would not increase the administrative burden over the status-quo. However, the monitoring and documentation needed to track the ACL can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place. **Alternative 1 (No Action),** would not meet the requirements of the Magnuson-Stevens Act for mutton snapper, which would result in a significant administrative burden on the agency if it resulted in subsequent litigation. The administrative impacts of specifying an ACL through **Alternatives 2-4** are minimal and would not differ much between the three action alternatives. However, once the ACL is specified, the administrative burden associated with monitoring and enforcement, implementing management measures, and AMs would increase. Other administrative burdens that may result from all of the alternatives considered would take the form of development and dissemination of outreach and education materials for fishery participants.

Action 5: **Establish Accountability Measures for the Commercial Sector for Mutton Snapper**

Alternative 1 (No Action). Retain the existing commercial AMs for mutton snapper.
Alternative 2. Specify Annual Catch Targets (ACT) for the commercial sector, apply the ACT to commercial AM Alternatives 3 and 4.

Subalternative 2a. Do not establish a commercial sector ACT.

Subalternative 2b. The commercial sector ACT equals 90% of the commercial sector ACL.

Subalternative 2c. The commercial sector ACT equals 80% of the commercial sector ACL.

Alternative 3. After the commercial ACL is met or projected to be met, all purchase and sale of mutton snapper is prohibited and harvest and/or possession is limited to the bag limit.

Alternative 4. If the commercial sector ACL is exceeded, the Regional Administrator shall publish a notice to reduce the commercial sector ACL in the following season by the amount of the overage.

5.1 Biological Effects

Magnuson-Stevens Act National Standard 1 guidelines recognize that existing FMPs may use terms and values that are similar to, associated with, or may be equivalent to AMs in many fisheries for which annual specifications are set for different stocks or stock complexes. In these situations the guidelines suggest that, as Councils revise their FMPs they use the same terms as set forth in the guidelines. Current snapper grouper regulations include size limits, seasonal closures, bag limits, and prohibited gear types for mutton snapper.

There are several types of AMs that may be applied for mutton snapper. In-season AMs are those that are triggered during the fishing season, typically before an ACL is exceeded or when it is projected to be met. Some examples of in-season AMs include quota closures, trip or bag limit changes, gear restrictions, or catch shares. Post-season AMs would be triggered if the ACL is exceeded and would typically be implemented the following fishing season. Post-season AMs could include seasonal closures, reduced trip or bag limits, or shortening of the fishing season implemented in the subsequent year. Ideally, a combination of in-season and post-season AMs would be used to first prevent the ACL or ACT from being exceeded, and then provide a mechanism to correct for an overage if one should occur. Implementing a post season AM in addition to an in-season AM would reduce the risk of overfishing since there would be two layers of protection against unsustainable harvest rates. It is important to note that the new framework procedure for setting total allowable catch in the snapper grouper fishery in Amendment 17B to the Snapper Grouper FMP, would allow for timely adjustments to be made to AMs if the South Atlantic Council and NOAA Fisheries Service determine a change is needed.

The efficacy of in-season AMs is largely reliant upon in-season monitoring of landings, which may be especially difficult for the recreational sector. The MRFSS and the newly implemented Marine Recreational Information Program (MRIP) uses random survey methods and may not capture data on species that are infrequently encountered. Therefore, in-season tracking of mutton snapper landings in the recreational sector would be based on the MRFSS program and state landings reports. An additional obstacle to tracking recreational harvest in-season is that there is a lag time between when the fish are landed and when those landings are reported in the landings database. This lag time means that projections of when the ACL is expected to be met would need to be employed. Landings projections are not always 100% accurate, thus using such estimates could lead to an in-season AM being triggered prematurely, or not soon enough causing an ACL overage.

The South Atlantic Council may choose one or more post-season AMs to supplement any of the in-season AMs. This would be the most administratively burdensome scenario; however, if an ACL overage were to occur after an in-season AM has been implemented, a post-season AM would be available to the Regional Administrator as a means to correct an overage and prevent overfishing. Post-season AMs would allow all landings for a particular season to be reported

before any harvest restriction measures would take effect. This method of accountability alone may correct for one year's or several years' overages; however, it does little to prevent an overage from occurring again unless it is chosen in conjunction with an in-season AMs.

National Standard 1 guidelines recommend the use of ACTs in systems of AMs so that an ACL is not exceeded. For fisheries without in-season management control to prevent the ACL from being exceeded, AMs may utilize ACTs that are set below ACLs so that catches do not exceed the ACLs. If an ACT is specified as part of the AMs for mutton snapper, an ACT control rule that accounts for management uncertainty may be utilized for setting the ACT. The objective for establishing an ACT and related AMs is that the ACL not be exceeded.

AMs are designed to provoke an action once either the ACL or ACT is reached during the course of a fishing season to reduce the risk overfishing will occur. However, depending on how timely the data are, it might not be realized that either the ACL and/or ACT has been reached until after a season has ended. Such AMs include prohibited retention of species once the sector annual catch target is met, shortening the length of the subsequent fishing season to account for overages of the ACL, and reducing the ACL in the subsequent fishing season to account for overages.

Since the ACT is typically set lower and would be reached sooner than the ACL for any given species, using an ACT rather than the ACL as a trigger for AMs in the recreational sector may prevent an ACL overage. This more conservative approach, would likely help to ensure that recreational data uncertainties do not cause or contribute to excessive ACL overages for vulnerable species. Using recreational ACTs rather than the ACLs to trigger recreational AMs may not eliminate ACL overages completely; however, using such a strategy for the recreational sector may reduce the need to compensate for very large overages, which could benefit the biological and socioeconomic environments.

Alternative 1 (No Action) would perpetuate the current level of fishing with no mechanism to maintain harvest levels at or below the ACLs established in the previous section. Therefore, taking no action to establish AMs would not benefit the biological environment.

Alternative 2 invokes the concept of establishing a commercial sector ACT, which would presumably be set lower than the commercial sector ACL, except under **Subalternative 2a**. **Subalternative 2a** would not set a commercial sector ACT at all for the purpose of triggering AMs in the commercial sector. **Subalternatives 2b** and **2c** would establish an ACT as an actual harvest level that presumably once exceeded, would trigger an AM as intended under NS 1 guidelines. **Subalternatives 2b** and **2c** would establish reduced harvest levels (90% and 80% of the ACL, respectively) designed to hedge against an ACL overage and therefore, provide a buffer between the ACT and ACL, and account for management uncertainty. Establishing an ACT that is 90% or 80% of the commercial ACL would also reduce the probability that post season AMs that are meant to correct for an ACL overage would be needed.

Alternative 3 would prevent the commercial sector from profiting from the harvest of mutton snapper in quantities exceeding the ACL, and thus provides a disincentive to target mutton snapper once the ACL has been reached. **Alternative 3** could serve as a complement to

Alternative 4 in that it would correct for an ACL overage in the post season if one were to occur during the fishing season. For assessed species like mutton snapper, the greater the uncertainty associated with calculating the probability of overfishing, the more precautionary the value of the ABC and subsequent ACL, and the higher the probability the ACL would be met earlier in the season triggering the in-season AM under **Alternative 3**. The biological benefits of a shortened fishing season for mutton snapper would depend on the exact reduction of the season length, and subsequent changes to fishing behavior. If a commercial fishing season is shortened due to triggering the **Alternative 3** AM, regulatory discards may not necessarily increase since fishermen would still be allowed to retain the bag limit.

Alternative 4 could complement **Alternative 3** because it would correct for an ACL overage in the post season if such an event were to occur. **Alternative 4** would reduce the commercial sector ACL in the following season by the amount of the overage. The ACL can be reduced by the approximate amount as that taken in excess the year before, and may shorten the season if the lower ACL is met earlier in the year. A shortened season may result in increased regulatory discards if no level of harvest is permitted after the ACL is reached. However, under **Alternative 3**, fishermen would still be able to retain bag limit quantities of fish, which may reduce the number of regulatory discards that would otherwise result from a shortened season. Under this scenario **Alternative 4** could be expected to provide a moderate biological benefit.

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely to adversely affect marine mammals or *Acropora* species. **Alternatives 2-4** and the associated subalternatives are unlikely to alter fishing behavior in a way that would cause new adverse effects to these species. The biological benefits to sea turtles and smalltooth sawfish from **Alternatives 2-4** and the associated subalternatives are unclear. If they perpetuate the existing amount of fishing effort they are unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. This scenario is likely to provide little additional biological benefits to sea turtles and smalltooth sawfish, if any. However, if these alternatives reduce the overall amount of effort in the fishery the risk of interaction with sea turtles and smalltooth sawfish will likely decrease, providing additional biological benefits to these species.

5.3 Economic Effects

Action 5 considers alternatives that would help ensure mutton snapper did not experience overfishing. AMs are designed to prevent ACLs from being exceeded, and if exceeded, correct or mitigate any overages (50 CFR 600.310(g)). The National Standard 1 guidelines identify two types of AMs: in-season and post-season, the latter of which is invoked when an ACL is exceeded. These two types of AMs are not mutually exclusive and may be used simultaneously when appropriate. As discussed above, establishing AMs is an administrative action, and thus has no direct effects on the economic environment.

Alternative 1 (No Action) leaves the current management measures for the commercial mutton snapper sector in place. **Subalternative 2a** sets no buffer, **Subalternative 2b** sets the buffer at 90% of the ACL, and **Subalternative 2c** sets the buffer at 80% of the ACL. Anticipated

landings and gross revenue would decrease as the ACTs become more conservative. If fishing firms can easily re-organize their catch mix as the ACTs become constraining, then they could potentially offset any forgone revenue by targeting other species. On the other hand, if fishing firms have limited flexibility to modify the composition of their catches as ACT become binding, then fishermen may reduce harvests of mutton snapper, switch to other fisheries, or exit the fishery. Thus, the magnitude of the actual effects will depend on the ACT, whether the ACT is used to establish additional measures in the future, and the resulting though presently unknown change in fishing practices, as well as the management regime in place. Management regimes that favor harvesting privileges, like catch shares, are relatively more likely to generate larger economic benefits in the long-run relative to a regulated open or limited access regime.

Alternative 3 will likely generate marginally lower economic benefits in the short-run than **Alternative 2**. The extent of these potential reductions in short-run gross revenue is unknown at this time since the probability the ACL will be exceeded is unknown. Establishing an ACT under **Subalternative 2b** or **Subalternative 2c** that is 90% or 80% of the commercial ACL would reduce the probability of closing the commercial sector or implementing post season AMs that are meant to correct for an ACL overage. Further, the probability that short-run losses in gross revenue will occur is also a function of NOAA Fisheries Service's ability to accurately project whether and when an ACL is met. Inaccurate projections could either result in premature closures, which would unnecessarily interrupt commercial fishing operations and result in gross revenue losses in the current year, or allow harvests to exceed the ACL, which would result in commercial sector ACL reductions and gross revenue losses in the following year under **Alternative 4**.

Alternative 4 calls for reducing the commercial sector ACL in the following season by the amount of the overage. This alternative will likely generate adverse short-run economic effects (i.e., lower short-run gross revenue) but potentially long-run positive economic effects relative to **Alternative 1 (No Action)** as it would help stabilize stock abundance and reduce the risk overfishing. The extent of these adverse short-run economic effects is unknown at this time since the probability the ACL will be exceeded is unknown.

5.4 Social Effects

Alternative 1 (No Action) would have few negative social impacts as it would not impose further restrictions on the commercial sector retaining current accountability measures for several grouper species. A buffer could be imposed through **Alternative 2** which might reduce the harvest threshold further from the ACL. **Subalternative 2a** would be less restrictive than **Subalternative 2b or 2c** and therefore have fewer negative social effects. Once the ACL is met in **Alternative 3** with harvest restricted to bag limit and no sales there should be beneficial social effects in keeping the fishery sustainable. The payback provision in **Alternative 4** should provide added protection for the stock and beneficial social effects.

5.5 Administrative Effects

Alternative 1 (No Action) would not produce near-term administrative impacts. Administrative impacts of **Alternatives 2-4** would be greatest relative to the commercial AMs proposed. Specifying an ACT (**Alternative 2** and associated sub-alternatives) or sector ACTs alone would

not increase the administrative burden over the status-quo. However, the monitoring and documentation needed to track how much of the ACT has been harvested throughout a particular fishing season can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place. The need for enforcement and monitoring of AMs would also increase the administrative burden. However, **Alternative 3** and **Alternative 4** would be expected to have similar administrative impacts.

Action 6: Establish Accountability Measures/Management Measures for the Recreational Sector for Mutton Snapper

Alternative 1 (No Action). Do not specify new recreational AMs for mutton snapper.

Decision 1. Specify an ACT?

Alternative 2. Specify an ACT.

Subalternative 2a. Do not specify an ACT.
Subalternative 2b. The ACT equals 85% of the ACL.
Subalternative 2c. The ACT equals 75% of the ACL.
Subalternative 2d. The ACT equals ACL[(1-PSE) or 0.5, whichever is greater].

Decision 2. What is the AM trigger?

Alternative 3. Specify the AM trigger.

Subalternative 3a. Do not specify an AM trigger.
Subalternative 3b. If the *annual landings* exceed the ACL in a given year.
Subalternative 3c. If the *mean landings* for the past three years exceed the ACL.[1, 2]
Subalternative 3d. If the *modified mean landings* exceed the ACL. The modified mean is the most recent 5 years of available landings data with highest and lowest landings estimates removed from consideration.[1,2]
Subalternative 3e. If the lower bound of the 90% *confidence interval* estimate of the MRFSS landings' population mean plus headboat landings is greater than the ACL.

Notes:
[1] *Start the clock over.* In any year the ACL is reduced or increased, the sequence of future ACLs will begin again starting with a single year of landings compared to the ACL for that year, followed by a 2-year average of landings compared to the 2-year average annual catch limits in the next year, followed by a 3-year average of landings compared to the 3-year average of ACLs for the third year, and so on.
[2] For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.

Decision 3. Is there an in-season AM?

Alternative 4. Specify the in-season AM.

Subalternative 4a. Do not specify an in-season AM.

Subalternative 4b. The Regional Administrator shall publish a notice to close the recreational sector when the ACL is projected to be met.

Decision 4. Is there a post-season AM?

Alternative 5. Specify the post-season AM.

Subalternative 5a. Do not specify a post-season AM.

Subalternative 5b. For post-season accountability measures, compare ACL with landings over a range of years. For 2011, use only 2011 landings. For 2012, use the mean landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running mean.[1]

Subalternative 5c. *Monitor following year.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator would take action as necessary.

Subalternative 5d. *Monitor following year and shorten season as necessary.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator will publish a notice to reduce the length of the fishing season as necessary.

Subalternative 5e. *Monitor following year and reduce bag limit as necessary.* If the ACL is exceeded, the following year's landings would be monitored for persistence in increased landings. The Regional Administrator will publish a notice to reduce the bag limit as necessary.

Subalternative 5f. *Shorten following season.* If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the length of the following fishing year by the amount necessary to ensure landings do not exceed the ACL for the following fishing season.

Subalternative 5g. *Payback.* If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL in the following season by the amount of the overage.

Table Q-13. The recreational ACT for each of the alternatives. Average PSE during 2005-09 equals 13. Values are in lbs whole weight. Assumes Alternative 2 is the preferred allocation and ACL alternative in Actions 3 and 4.

		Recreational Sector ACT		
Species	**Recreational Sector ACL**	**ACT Subalt. 5a; ACT=85%(ACL)**	**ACT Subalt. 5b; ACT=75%(ACL)**	**ACT Subalt. 5c; ACT equals sector ACL[(1-PSE) or 0.5, whichever is greater]**
Mutton Snapper	854,242	726,106	640,682	743,191

6.1 Biological Effects

Alternative 1 (No Action) would not specify recreational AMs for mutton snapper and would not comply with the requirements of the Magnuson-Stevens Act. **Alternative 1 (No Action)** would perpetuate the current level of fishing with no mechanism to maintain harvest levels at or below the ACLs established in the previous section. Therefore, taking no action to establish AMs would not benefit the biological environment.

With the exception of **Subalternative 2a, Alternative 2** and its subalternatives would specify a recreational sector ACT, which would be set lower than the recreational sector ACL**.** **Subalternative 2a** would not set a recreational sector ACT at all for the purpose of triggering AMs in the recreational sector. **Subalternatives 2b** and **2c** would establish an ACT as an actual harvest level that presumably once exceeded, would trigger an AM . **Subalternatives 2b** and **2c** would establish reduced harvest levels (85% and 75% of the ACL, respectively) designed to hedge against an ACL overage and therefore, provide a buffer between the ACT and ACL, and account for management uncertainty. **Subalternative 2d** would have the greatest biological benefit of the three subalternatives by adjusting the ACL by 50% or the percent standard error (PSE) from the recreational fishery, whichever is greater (**Table Q-13**). The lower the value of the PSE the more reliable the landings data. By using PSE (**Table Q-13**) in **Subalternative 2d**, more precaution is taken in the estimate of the ACL with increasing variability and uncertainty in the landings data. Establishing an ACT below the recreational ACL would also reduce the need to close or implement post season AMs that are meant to correct for an ACL overage.

With the exception of **Subalternative 3a**, **Alternative 3** and its subalternatives would specify the AM trigger under different scenarios. Under **Subalternative 3b**, AMs would be triggered if the annual landings exceeded the ACL in a given year. **Subalternative 3c** would examine the trend in the past three years of landings data to determine if AMs would be triggered. If in any year the ACL is reduced or increased, the sequence of future ACLs would begin again starting with a single year of landings compared to the ACL for that year, followed by a 2-year average of landings compared to the 2-year average annual catch limits in the next year, further followed by a 3-year average of landings compared to the 3-year average of ACLs for the third year, and so on. For example, for year 2011, 2011 landings would be used. For 2012, mean landings of 2011 and 2012 would be used. For 2013 and beyond, the most recent three-year running mean would be used to determine if the ACL is exceeded.

Using the average of three years landings would help address any anomalous peaks and drops reflected in the landings data; however, if one of the three years was associated with an extremely large spike in landings, which may or may not be attributable to an actual increase in harvest or some sampling variability, that spike would greatly influence the three year average for several years in the future and potentially result in the unnecessary triggering of harvest restrictions.

Subalternatives 3d is similar to **Subalternative 3c**, except that a review of the most recent 5-year time series of landings data would be conducted to determine which of the five years were associated with the highest and lowest harvest levels. After the years of highest and lowest landings were determined, those two years' landings would be removed from the time series leaving three years of landings to be averaged. If the averaged total of the remaining three years'

landings was greater than the ACL for the individual species or species complex then the AMs would be triggered.

Subalternative 3e would trigger AMs if the lower 90% confidence interval estimate of MRFSS landings' population mean plus headboat landings is greater than the ACL. The application of the 90% confidence interval could be considered a more conservative parameter to use when estimating overage amounts. Additionally, if years of high landings are indeed attributable to increased harvest due to spikes in recruitment or effort shifts rather than sampling effects, this method of implementing AMs may remove years of high landings inappropriately, and thus fail to trigger corrective action when it would have been needed.

One of the benefits of employing the approaches in **Subalternatives 3c-3e** to implementing AMs is that it provides an opportunity for fishery managers to use a data set uninfluenced by anomalous highs and lows, which could be caused by statistical variability. Alternatively, it may be difficult to decide if such differences in recreational landings are due to statistical or sampling variances, or if they can be attributed to actual increased harvest. In the case of the latter, the modified mean approach (**Subalternative 3d**) may not be the most biologically advantageous compared to other alternatives considered that would retain high and low landings years. In cases where it cannot be determined that one year's high landings are definitively caused by statistical variation, it may be difficult to justify removing that year's landings from the time series of data, especially if there is a strong year class known to have entered the fishery at that time or if there have regulations implemented that cause an extreme effort shift.

Since management uncertainty is already accounted for in the choice of an ACT (**Subalternative 2d**), scientific uncertainty is accounted for in the specification of the ABC (and its corresponding ACL), the biological benefits would increase in order from **Subalternatives 3e -3b.**

Alternative 4 examines the need for an in-season AM; the South Atlantic Council chose to not have an in-season AM as defined in **Subalternative 4a**. **Subalternative 4b** would allow the Regional Administrator to publish a notice to close the recreational sector when the ACL is projected to be met. In season monitoring of recreational landings is difficult. Currently, there is a time lag in when recreational data become available. There would likely be considerable uncertainty in imposing in season AMs for species in the recreational sector, particularly for species which are infrequently taken. Therefore, post-season AMs may be more appropriate for the recreational sector. Biological benefits may not be affected adversely by not having an in-season AM due to the current preferred alternatives for an ACT and AM trigger.

With the exception of **Subalternative 5a**, which would not specify a post-season AM, **Alternative 5** and its sub-alternatives specify methodologies for specifying post-season AM actions that would be taken if the ACL is exceeded. Under **Subalternative 5b**, ACLs would be compared with landings over a range of years to determine the magnitude of the ACL overage for imposing post-season AMs. For example, for 2011, only 2011 landings would be used. For 2012, the mean landings from 2011 and 2012 would be used, and for 2013 and beyond, the most recent three-year running mean would be used. If **Subalternative 5b** is not selected as a preferred alternative, the magnitude of the ACL overage would simply compare the landings from a particular fishing year to the ACL. If the ACL is exceeded, **Subalternatives 5c-5e** would

monitor the following year's landings for persistence in increased landings. Under **Subalternative 5c**, the Regional Administrator would take action as necessary to ensure an ACL was not exceeded in a year subsequent to an ACL overage. Under **Subalternative 5d**, the Regional Administrator would publish a notice to reduce the length of the fishing season as necessary, and under **Subalternative 5e**, the Regional Administrator would publish a notice to reduce the bag limit as necessary. Under **Subalternative 5f**, if the ACL is exceeded, the Regional Administrator would publish a notice to reduce the length of the following fishing year by the amount necessary to ensure landings do not exceed the recreational sector ACL for the following fishing season. In contrast, under **Subalternative 5g**, there would be a payback provision for exceeding an ACL, whereby, the Regional Administrator would publish a notice to reduce the recreational sector ACL in the following season by the amount of the overage.

Subalternatives 5d and **5f** would ensure that the amount of the previous year's ACL overage would be accounted for in the subsequent year's protection via a shortened season, and thus would be biologically beneficial. The monitoring component of **Subalternatives 5c-5e** would allow for any anomalies or data reporting irregularities to be taken into account before the AMs would be effective, hence possibly adding a socio-economic benefit to the biological benefit of any management measures such as reducing the length of the following fishing season (**Subalternative 5f)**. There would be an opportunity to determine if a spike in landings is merely a factor of some statistical variability, or if it is due to truly high landings that continue to persist into the following fishing season. Years of exceptionally high landings are not eliminated under these alternatives, rather they are monitored to assess whether spikes in landings can truly be considered outliers or if they are in fact years of increased harvest that need to be addressed through corrective action.

If the ACL is continually exceeded, additional AMs may need to be implemented to reduce harvest pursuant to National Standard 1 guidelines for performance standards. Under the updated framework procedure implemented through Amendment 17B to the Snapper Grouper FMP, the SSC would examine the social and economic impact analyses for a specific allocation, ACL, ACT, AM, quota, bag limit, or other fishing restriction. If it was determined by the South Atlantic Council and its SSC that the management measures in place are not constraining catch to a target level, adjustments could be made through a future regulatory amendment.

There is likely to be no additional biological benefit to protected species from **Alternative 1 (No Action)** because it would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Previous ESA consultations determined the snapper grouper fishery was not likely to adversely affect marine mammals or *Acropora* species. **Alternatives 2-5** and the associated subalternatives are unlikely to alter fishing behavior in a way that would cause new adverse effects to these species. The biological benefits to sea turtles and smalltooth sawfish from **Alternatives 2-5** and the associated subalternatives are unclear. If they perpetuate the existing amount of fishing effort they are unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. This scenario is likely to provide little additional biological benefits to sea turtles and smalltooth sawfish, if any. However, if these alternatives reduce the overall amount of effort in the fishery the risk of interaction with sea turtles and smalltooth sawfish will likely decrease, providing additional biological benefits to these species.

6.2 Economic Effects

Action 6 considers alternatives that would help prevent mutton snapper from experiencing overfishing. AMs are designed to prevent ACLs from being exceeded, and if exceeded, correct or mitigate any overages (50 CFR 600.310(g)). The National Standard 1 guidelines identify two types of AMs: in-season and post-season, the latter of which is invoked when an ACL is exceeded. These two types of AMs are not mutually exclusive and may be used simultaneously when appropriate. As discussed above, establishing AMs is an administrative action, and thus has no direct effects on the economic environment.

Alternative 1 (No Action) would not establish a mutton snapper ACT for the recreational sector. This alternative has the most potential to cause the greatest economic dislocation in the long-run since the absence of an ACT could either increase the risk of overfishing or result in overfished mutton snapper stock, which would require lower ACLs in the future. **Alternative 2** considers alternatives for establishing an ACT which would, in general, establish the recreational ACTs as a proportion of the ACL. Specifically, **Subalternative 2a** sets no ACT and thus creates no buffer between the ACT and the ACL, which would be the least conservative of the four alternatives considered. **Subalternative 2b** sets the ACT at 85% of the ACL and thus creates a 15% buffer, **Subalternative 2c** sets the ACT at 75% of the ACL and thereby creates a 25% buffer, while **Subalternative 2d** sets the ACT at 50% of the ACL or at (1-PSE) of the ACL, whichever is greater.

The more conservative the ACTs, the higher the short-term forgone losses in landings and consumer surplus. **Subalternative 2c** generates higher short-term losses in consumer surplus relative to **Subalternative 2b** and **Subalternative 2d** generates higher short-term losses in consumer surplus relative to **Subalternative 2c**. These estimates assume the recreational sector can harvest the ACT. These short-run losses are expected to be offset in the long-run when stock abundance is anticipated to increase. Higher stock abundance is expected to increase harvest and thus consumer surplus, and also reduce the long-run harvesting costs in the for-hire sector, though the latter effect cannot be shown with available data. However, these results indicate that while **Subalternative 2d** is more conservative and thus generates the highest short-term losses in landings and consumer surplus for most species relative to **Subalternative 2b** and some species relative to **Subalternative 2c**, it is not always the most conservative and thus does not always generate the highest short-term losses in landings and consumer surplus.

If recreational fishermen can easily re-organize their catch mix as the ACTs become increasingly restrictive, then they could potentially offset any forgone revenue by harvesting other species. On the other hand, if recreational fishermen have limited flexibility to modify the composition of their catches as ACTs become more binding, then they may either reduce their harvests of snapper-grouper species, switch to other fisheries, or exit the fishery. Thus, the magnitude of the actual effects will depend on the ACT, whether the ACT is used to establish additional measures in the future, and the resulting though presently unknown change in fishing practices, as well as the management regime in place.

Alternative 3 considers alternatives for establishing an AM trigger. **Subalternative 3a** would not specify an AM trigger and thus would not generate any indirect economic effects. The primary difference between **Subalternatives 3b**, **3c**, **3d**, and **3e** is the probability of an ACL being exceeded under each alternative relative to the others. An ACL is most likely to be

exceeded for certain snapper species under **Subalternative 3b**, followed by **Subalternative 3c** and **Subalternative 3d**, while the ACL is the least likely to be exceeded under **Subalternative 3e**. Assuming these same relative probabilities apply to mutton snapper, **Subalternative 3b** is the most conservative alternative and in turn has the highest likelihood of triggering an in-season AM under **Alternative 4** or a post-season AM under **Alternative 5**. Thus, expected adverse, indirect economic effects in the short-term are greatest under **Subalternative 3b**, followed by **Subalternative 3c** and **Subalternative 3d**, while such effects are the least under **Subalternative 3e**. Conversely, expected positive, indirect economic effects in the long-term are the greatest under **Subalternative 3b**, followed by **Subalternative 3c** and **Subalternative 3d**, while such effects are the least under **Subalternative 3e**.

Alternative 4 considers alternatives for establishing an in-season AM. **Subalternative 4a** would not establish an in-season AM and thus would not generate any indirect economic effects. **Subalternative 4b** would establish an in-season AM, in the form of closing the recreational sector when its ACL is projected to be met. Because there is some positive probability the recreational sector's ACL will be exceeded, **Subalternative 4b** would generate greater adverse, indirect economic effects in the short-term relative to **Subalternative 4a**. The inability to properly monitor the recreational sector could generate additional adverse indirect economic effects if it is closed too soon or too late due highly inaccurate projections.

Alternative 5 considers alternatives for establishing a post-season AM. **Subalternative 5a** would not establish a post-season AM and thus would not generate any indirect economic effects. **Subalternative 5b** would not generate any indirect economic effects as it only specifies the years of landings data to compare against the ACL when determining if a post-season AM is necessary. **Subalternative 5c** may generate the same indirect economic effects in the short-term as **Subalternative 5d** and **Subalternative 5e** as it allows the Regional Administrator to shorten the following season or reduce the bag limit if the ACL is exceeded for two years in a row. Since economic welfare in the recreational sector is generally more dependent on the length of the fishing season than on the bag limit, the adverse indirect economic effects resulting from **Subalternative 5e** are expected to be greater than under **Subalternative 5d** in the short-term**.**

Under **Subalternative 5f** and **Subalternative 5g**, a post-season AM (i.e., reducing the length of the fishing season) must be implemented in the following year if the ACL is exceeded in just one year, whereas a post-season AM is only required if the ACL is exceeded in two consecutive years under **Subalternatives 5c-5e.** Because the probability that a post-season AM will be required is greater under **Subalternative 5f** and **Subalternative 5g** relative to **Subalternatives 5c-5e**, the expected adverse indirect economic effects resulting from **Subalternative 5f** and **Subalternative 5g** are also expected to be greater than under **Subalternatives 5c-5e** in the short-term.

Because of the immediate payback provision, where the recreational sector ACL in the following season is directly reduced by the amount of any overage, there is a higher probability of adverse indirect short-term economic effects under **Subalternative 5g** relative to **Subalternative 5f**. The payback that would be implemented under **Subalternative 5g** would further assist with protecting the stock whereas **Subalternative 5f** alone would not since it reduces the length of the recreational fishing season rather than recreational sector ACL in the following year.

6.3 Social Effects

Alternative 1 (No Action) would not establish ACTs or AMs for mutton snapper recreational sector which may have few negative social effects as there are measures in place through previous management action. No ACT would be established through **Subalternative 2a,** which may not have any negative social effects through further harvest reductions. **Subalternative 2b-2d** offer buffers that would impose increasingly stricter thresholds on the harvest that in turn would have increasing negative social effects if these levels are reductions from current harvest trends. However, these levels may be necessary to maintain a sustainable stock. **Subalternative 2d** would set an ACT that is the most conservative of the alternatives.

Under **Alternative 3** the AM trigger is set, which in itself should not have any negative social effects, but could impose negative effects indirectly if the trigger initiates management action that is unnecessary at the time or delays management action when it is necessary. **Subalternative 3a** would not set an AM trigger and could impose indirect effects as mentioned. **Subalternative 3b** would impose a trigger when annual catch landings are exceeded. Other alternatives would use various methods to moderate a closure based upon one year's landing as in **Subalternative 3c,** which uses the mean over the past three years. This could be beneficial if for some reason landings in one or more years were artificially high or low due to anomalies in harvesting behavior or stock status. An even longer time frame for "smoothing out" landings is used in **Subalternative 3d,** which may be more beneficial if landings are especially volatile. The more conservative trigger would be in **Subalternative 3e,** which could impose negative social effects as harvest levels are well below averages in most years. The choice of whether to impose an in-season AM is outlined in **Subalternative 4a** which would not specify an in-season AM which could have beneficial social effects as there would be no closure when the ACL is projected to be met in **Subalternative 4b**.

Post season AMs are considered under **Alternative 5** with several different sub-alternatives. **Subalternative 5a** could have negative social effects if stocks status is affected by the lack of any AMs through post-season measures. **Subalternative 5b** uses smoothing allowing for adjustments to the landings, which would account for uncertainty in recreational landings whether from sampling or statistical anomalies and would likely have fewer negative social effects than **Subalternative 5c,** which uses only the next year for monitoring. **Subalternative 5d** would shorten the next season with close monitoring of the fishery and may have benefits if management can respond in a timely manner to keep the fishing season open for as long as possible. Reducing the bag limit in **Subalternative 5e** may be preferable in some fisheries, depending upon the impacts of bag limit reductions compared to shorter seasons. This may be specific to a species or fishery. **Subalternative 5f** may have more negative social effects as it does not allow for more flexibility in setting parameters for the fishing season the next year as in **Subalternative 5d**. Again, depending upon the alternative chosen, the combination with other actions can have a compounding effect upon the social environment. Fishermen will likely prefer the longest fishing season with the highest bag limit and the subsequent trade-offs between shorter seasons or lower bag limits may depend upon the area fished. In **Subalternative 5g** payback would reduce the next years ACL and could have negative social effects depending upon the amount of payback. However, over time such payback may be necessary to sustain the stock.

6.4 Administrative Effects

Recreational data collection can be more administratively burdensome due to time delay and lengthy review. **Alternative 1 (No Action)** would not produce near-term administrative impacts. However, this alternative would not comply with Magnuson-Stevens Act requirements and therefore, may trigger some type of legal action for not doing so. If this scenario were to occur, the burden on the administrative environment could be significant in the future. **Alternative 1 (No Action)** and associated sub-alternatives deal with the specification of the ACT. Specifying an ACT or sector ACTs alone would not increase the administrative burden over the status-quo. However, the monitoring and documentation needed to track how much of the ACT has been harvested throughout a particular fishing season can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place. **Alternative 3** specifies the AM trigger. Once specified, this is not likely to have any administrative impacts. Alternative **4** and associated sub-alternatives would specify the in-season AM. This action, like **Alternative 5** to specify the post-season AM will likely have an increased administrative burden associated with enforcement, monitoring, rule-making and informing the public. However, the alternatives and associated sub-alternatives are not likely to differ much in their impacts.

References

Allen, G.R. 1985. FAO species catalogue. Vol. 6. Snappers of the world. An annotated and illustrated catalogue of lutjanid species known to date. FAO Fish. Synop. 6(125):208 p.

Burton, M.L. 2002. Age, growth and mortality of mutton snapper, *Lutjanus analis*, from the east coast of Florida, with a brief discussion of management implications. Fish. Res. 59:31-41.

Figuerola, M, D. Matos-Caraballo, and W. Torres. 1997. Maturation and reproductive seasonality of four reef fish species in Puerto Rico. Proceedings of the Gulf Caribbean Fisheries Institute 50: 938-968.

Erdman, D.S. 1976. Spawning patterns of fishes from the northeastern Caribbean. Agric. Fish. Contrib. Puerto Rico Department of Agriculture Vol. 8.

Figuerola, F.M. and W. Torrez Ruiz. 2001. Aspectos de la biología reproductiva de la sama (*Lutjanus analis*) en Puerto Rico y recomendaciones para su manejo. Final Laboratorio de Investigaciones Pesqueras, Puerto Rico Departamento de Recursos Naturales y Ambientales.

Rielinger, D.M. 1999. Impacts of fishing gear on habitat in Tropical Seas: Gulf of Mexico, South Atlantic, and Caribbean. Reefkeeper International.

SEDAR 15A. 2008. Stock Assessment Report 3. South Atlantic and Gulf of Mexico Mutton Snapper. Available from the SEDAR website: www.sefsc.noaa.gov/sedar/