Part 1 of 2 Response to the Analysis Request for the South Atlantic Comprehensive ACL Amendment dated 1/28/2011.

March 7, 2011

The South Atlantic Fishery Management Council (Council) is developing a Comprehensive ACL Amendment to the subject FMPs to consider long-term management measures expected to achieve optimum yield (OY). To assist in this process, the Southeast Regional Office requested assistance on the following actions. 5, 6, 7, 8, 9, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, and 27.

The purpose of this communication is to offer additional clarification on the earlier analysis provided for selected actions in the South Atlantic Comprehensive Annual Catch Limits (ACL) Amendment and to provide the analysis of those actions dealing with Golden crab. This communication summarizes the key results for management actions 5, 6, 7, 8, 9, 11, 13, 14, 15, 20 (recreational), 25 (recreational), 26 and 27. Analyses for the remaining actions will be delivered by March 11 (or earlier if possible) in a second communication.

In reviewing this communication, the reader should note that the economic estimates were converted to 2009 dollars. Also, the reported estimates are single year effects (unless otherwise stated). The data used for this analysis came from the Southeast Fisheries Science Center (SEFSC).[1]

Action No. 5

Action 5 mandates that allocation be specified for snapper grouper species that do not currently have allocation. This action considers seven alternatives, namely

Alternative 1 (No Action). Retain the current allocations. Do not specify allocations for those species where no allocations have been specified.

Alternative 2 (Preferred). Divide allocations for species that do not currently have allocations between two sectors, commercial and recreational, using the following equation: Allocation by sector = (0.5 x catch history) + (0.5 x current trend). Note: catch history =1986 onward, current trend = 2006-2008 for this amendment.

Alternative 3. Divide allocations for species that do not currently have allocations among three sectors, commercial, recreational, and for-hire, using the following equation: Allocation by sector = (0.5 x catch history) + (0.5 x current trend). Note: catch history =1986 onward, current trend = 2006-2008 for this amendment.

Alternative 4. Divide allocations for species that do not currently have allocations between 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.

[1] SEFSC transmittal memorandum titled "SEFSC Updates on Annual Catch Limits (ACL) Landings Datasets'. This memorandum was dated September 29, 2010.

Alternative 5. Divide allocations for species that do not currently have allocations between 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. Divide allocations for species that do not currently have allocations between 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. Divide allocations for species that do not currently have allocations between 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.

Discussion[2]

Alternative 1 (No Action) would maintain the allocations that are currently in place for certain species but would not specify commercial or recreational allocations for the remaining species or species groups in the snapper-grouper FMP.

Alternative 2 (Preferred) 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 (Preferred)** 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 (Preferred)** 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 (Preferred)**, 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. 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 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, 3 and 4 base their allocation formula on longer (and, thus older) time series whereas alternatives 5, 6, and 7 base their allocation formula on shorter (and, thus more recent) time series. Broadly speaking, since recreational participation has increased in recent years; thus, alternatives 5, 6, and 7 tend to place a higher weight towards the recreational sector relative to the alternatives 2, 3 and 4 (Table 1). The actual allocation will differ by species. Alternatives 5, 6, and 7 will likely generate less dislocation relative to alternatives 2, 3 and 4 since these more closely capture the status quo.

[2] The status quo landings for Action 5 are assumed to correspond to those in Alt 2 of Action 6 (Preferred) using commercial and recreational weights derived from the average 2005-2009 landings.

Table 2 shows the maximum changes in anticipated landings and gross revenue to the commercial sector and consumer surplus to the recreational sector under the various alternatives relative to status quo condition. These annual figures assume that the fleets are willing and able to harvest the entire ACL. [3] The reader should be cautioned that the use of gross revenues tends to overestimate the relative loss in terms of producer surplus because it ignores harvesting costs. Producer surplus from the commercial sector is the appropriate welfare measure that needs to be used when comparing consumer surplus estimates from the recreational sector.

As noted above, the statistics offered in Table 2 should be considered as an upper bound on the potential economic benefits since it is uncertain how fishing practices would change following the adoption of multiple allocation weights. Presently, the actual behavioral response is unknown. Also, the resulting net benefits 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, which is also unknown.

[3] Gross revenues were estimated by multiplying the dockside prices times the commercial allocation and consumer surplus was calculated by multiplying willingness to pay estimate times the recreational allocation.

Table 1: Action 5: Allocation proposals for snapper-grouper species that do not to currently have them.

	Preferred Alternative 2		Alternative 3			Alternative 4		Alternative 5		Alternative 6		Alternative 7	
Species or Species Complex	Comm	Rec	Comm	Private	For-Hire	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec
Deep-Water Grouper & Tilefish													
Yellowedge Grouper	94%	6%	93%	5%	2%	94%	6%	98%	2%	88%	12%	100%	0%
Blueline Tilefish	64%	36%	64%	11%	25%	73%	27%	95%	5%	57%	43%	38%	62%
Silk Snapper	74%	26%	74%	3%	23%	74%	26%	67%	33%	85%	15%	71%	29%
Snowy Grouper													
Golden Tilefish													
Shallow-Water Grouper													
Scamp	71%	29%	71%	7%	21%	72%	28%	77%	23%	66%	34%	67%	33%
Gag													
Red Grouper													
Black Grouper													
Jacks													
Almaco Jack	46%	54%	46%	12%	42%	44%	56%	27%	73%	47%	53%	52%	48%
Banded Rudderfish	23%	77%	23%	11%	66%	22%	78%	15%	85%	26%	74%	23%	77%
Lesser Amberjack	57%	43%	57%	15%	29%	62%	38%	70%	30%	53%	47%	29%	71%
Greater Amberjack	52%	48%	52%	19%	29%	53%	47%	54%	46%	49%	51%	43%	57%
Porgies, Grunts, and Hinds													
Whitebone Porgy	2%	98%	2%	42%	57%	2%	98%	3%	97%	0%	100%	0%	100%
Knobbed Porgy	52%	48%	52%	5%	43%	52%	48%	50%	50%	55%	45%	59%	41%
Jolthead Porgy	4%	96%	4%	54%	42%	4%	96%	2%	98%	6%	94%	4%	96%
Red Hind	75%	25%	75%	15%	10%	76%	24%	78%	22%	74%	26%	70%	30%
Rock Hind	57%	43%	57%	11%	31%	55%	45%	40%	60%	65%	35%	67%	33%
Tomtate	0%	100%	0%	20%	80%	0%	100%	0%	100%	0%	100%	0%	100%
White Grunt	35%	65%	35%	25%	40%	36%	64%	37%	63%	34%	66%	37%	63%
Snappers													
Gray Snapper	27%	73%	27%	42%	31%	30%	70%	40%	60%	19%	81%	12%	88%
Lane Snapper	16%	84%	16%	48%	36%	17%	83%	22%	78%	10%	90%	6%	94%
Cubera Snapper	17%	83%	17%	46%	37%	16%	84%	16%	84%	17%	83%	26%	74%
Yellowtail Snapper	72%	28%	72%	12%	16%	73%	27%	70%	30%	77%	23%	65%	35%
Mutton Snapper	32%	68%	32%	44%	24%	34%	66%	42%	58%	24%	76%	13%	87%
Individuals ACLs													
Red Snapper	32%	68%	32%	36%	32%	33%	67%	40%	60%	47%	53%	24%	76%
Red Porgy													
Blue Runner	15%	85%	15%	26%	58%	16%	84%	15%	85%	16%	84%	14%	86%
Gray Triggerfish	47%	53%	47%	24%	29%	47%	53%	49%	51%	46%	54%	44%	56%
Vermilion Snapper													
Goliath Grouper	51%	49%	51%	36%	14%	52%	48%	53%	47%	0%	100%	0%	100%
Atlantic Spadefish	15%	85%	15%	41%	45%	15%	85%	14%	86%	16%	84%	11%	89%
Wreckfish													
Hogfish	37%	63%	37%	58%	6%	38%	62%	42%	58%	30%	70%	28%	72%
Nassau Grouper	10%	90%	10%	69%	22%	10%	90%	10%	90%	0%	100%	0%	0%
Warsaw Grouper	21%	79%	21%	50%	29%	21%	79%	24%	76%	11%	89%	6%	94%
Speckled Hind	52%	48%	52%	5%	43%	52%	48%	50%	50%	55%	45%	59%	41%
Black Sea Bass													

Table 2: Action 5: Changes in gross revenues to the commercial sector and consumer surplus to the recreational sector relative to the status quo condition.

Species or Species Complex	Preferred Alt 2 ($, alt 2 minus alt1)		Alt 3 ($, alt 3 minus alt1)			Alt 4 ($, alt 4 minus alt1)		Alt 5 ($, alt 5 minus alt1)		Alt 6 ($, alt 6 minus alt1)		Alt 7 ($, alt 7minus alt1)	
	Comm ($, gross revenue)	Rec ($, consumer surplus)	Comm ($, gross revenue)	Private ($, consumer surplus)	For-Hire ($, consumer surplus)	Comm ($, gross revenue)	Rec ($, consumer surplus)	Comm ($, gross revenue)	Rec ($, consumer surplus)	Comm ($, gross revenue)	Rec ($, consumer surplus)	Comm ($, gross revenue)	Rec ($, consumer surplus)
Deep-Water Grouper & Tilefish													
Yellowedge Grouper	10,666	(41,276)	10,048	(38,307)	580	10,666	(41,276)	13,135	(50,830)	6,962	(26,944)	14,369	(55,607)
Blueline Tilefish	82,076	(180,643)	22,971	(70,244)	110,398	37,747	(296,840)	73,866	(580,877)	11,479	(90,267)	(19,715)	155,038
Silk Snapper	(37,027)	1,760	(428)	4,861	3,101	(428)	1,760	(4,169)	17,163	5,452	(22,445)	(2,031)	8,362
Snowy Grouper													
Golden Tilefish													
Shallow-Water Grouper													
Scamp	24,746	(82,269)	24,746	(239,351)	(113,690)	37,798	(125,661)	103,058	(342,624)	(40,515)	134,694	(27,463)	91,302
Gag													
Red Grouper													
Black Grouper													
Jacks													
Almaco Jack	(13,626)	37,454	(13,626)	(9,317)	(46,771)	(16,196)	44,517	(38,038)	104,553	(12,342)	33,922	(5,917)	16,265
Banded Rudderfish	(4,075)	13,844	(4,075)	(6,812)	(20,656)	(4,655)	15,817	(8,721)	29,631	(2,332)	7,923	(4,075)	13,844
Lesser Amberjack	285	(742)	285	120	749	502	(1,308)	850	(2,212)	111	(290)	(932)	2,424
Greater Amberjack	227,776	(557,201)	227,776	(432,118)	125,084	247,456	(605,344)	267,136	(653,486)	168,736	(412,774)	50,656	(123,918)
Porgies, Grunts, and Hinds													
Whitebone Porgy	118	(777)	118	(9,201)	(8,819)	118	(777)	177	(1,173)	(2)	13	(2)	13
Knobbed Porgy	(822)	2,052	(822)	(6,189)	(8,241)	(822)	2,052	(1,490)	3,719	180	(449)	1,515	(3,783)
Jolthead Porgy	(521)	1,052	(521)	3,788	2,736	(521)	1,052	(1,111)	2,246	70	(141)	(521)	1,052
Red Hind	405	(1,768)	405	(5,758)	(3,991)	864	(3,772)	1,783	(7,782)	(54)	237	(1,891)	8,256
Rock Hind	(7,876)	25,160	(7,876)	(5,460)	(27,865)	(9,600)	30,670	(22,535)	71,992	(977)	3,121	748	(2,388)
Tomtate	(10)	24	(10)	(28,106)	(28,130)	(10)	24	(10)	24	(10)	24	(10)	24
White Grunt	31,878	(66,651)	31,878	(61,700)	4,951	36,960	(77,278)	42,043	(87,904)	26,795	(56,025)	42,043	(87,904)
Snappers													
Gray Snapper	142,533	(755,946)	142,533	(525,623)	230,323	178,254	(945,395)	297,322	(1,576,893)	47,278	(250,748)	(36,069)	191,300
Lane Snapper	20,227	(96,502)	20,227	(134,224)	(37,723)	22,349	(106,625)	32,958	(157,240)	7,496	(35,763)	(991)	4,729
Cubera Snapper	(1,826)	10,613	(1,826)	9,065	(1,548)	(2,035)	11,825	(2,035)	11,825	(1,826)	10,613	51	(294)
Yellowtail Snapper	246,705	(1,036,684)	246,705	(2,296,405)	(1,259,722)	322,066	(1,353,360)	95,983	(403,331)	623,510	(2,620,064)	(280,822)	1,180,050
Mutton Snapper	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
Individuals ACLs													
Red Snapper	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Porgy													
Blue Runner	(14,591)	38,381	(14,591)	(66,238)	(88,335)	(8,401)	22,098	(14,591)	38,381	(8,401)	22,098	(20,782)	54,665
Gray Triggerfish	21,247	(37,663)	21,247	(85,104)	(47,441)	21,247	(37,663)	32,268	(57,200)	15,736	(27,894)	4,715	(8,357)
Vermilion Snapper													
Goliath Grouper	0	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic Spadefish	2,237	(13,345)	2,237	(21,346)	(12,086)	2,237	(13,345)	1,552	(9,260)	2,921	(17,431)	(502)	2,996
Wreckfish													
Hogfish	26,608	(103,454)	26,608	(124,223)	(31,095)	29,264	(113,780)	39,887	(155,083)	8,017	(31,172)	2,706	(10,520)
Nassau Grouper	0	0	0	0	0	0	0	0	0	0	0	0	0
Warsaw Grouper	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Hind	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Sea Bass													

Action No. 6

Action 6 calls for the establishment of Annual Catch Limits (ACLs) and Optimum Yield (OY) for the snapper grouper fishery. This action considers four alternatives, namely

Alternative 1 (No Action). Retain existing ACLs for snapper grouper species or species groups. Do not specify ACLs for species that do not have them.

Alternative 2 (Preferred). Establish ACLs for species as needed where ACL = OY = ABC.

Alternative 3. Establish ACLs for species as needed where ACL = OY = 90% of the ABC.

Alternative 4. Establish ACLs for species as needed where ACL = OY = 80% of the ABC.

Discussion

The establishment of ACLs is intended to reduce the risk of overfishing for those snapper grouper species that do not currently have them. For those stocks requiring biological protection, 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 revenues, but may also generate higher long-run gross revenues 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, it must be noted, that the actual level of economic benefits and OY 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 is expected to result in the greatest short-term gross revenues and consumer surplus to the commercial and recreational sector, respectively, but will also likely generate the smallest long-term gross revenues and consumer surplus to commercial and recreational sectors (respectively) since the status quo alternative maintains harvests levels at the 2005-2009 average catch levels. These current harvest levels may prevent some of the stocks from achieving higher long-run abundance levels. The ‘no action’ alternative offers the greatest risk for overfishing.

Alternatives 2, 3, and 4 would establish ACLs for those snapper-grouper species that do not currently have one. With the exception of greater amberjack, mutton snapper and yellowtail snapper, all of the proposed ACLs would be set below the 2005-2009 average harvest levels.

Table 3, Table 4, and Table 5 show the anticipated forgone gross revenues to the commercial fleet and forgone consumer surplus to the recreational fleet relative to the status quo. These annual figures presume that the commercial and recreational fleets can harvest the entire ACL, including greater amberjack, mutton snapper and yellowtail snapper. The statistics offered in these tables should be considered as an upper bound on the potential economic benefits since it is uncertain how fishing practices would change following the adoption of multiple snapper-grouper ACLs, 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 revenues by targeting other species. On the other hand, if commercial fishing firms had limited flexibility to modify the composition of their catches, then they could reduce their overall snapper grouper landings, switch to other fishing gears, or exit the fishery altogether depending on how binding the ACLs become. Thus, the resulting benefits will be a function of the actual behavioral response, which are presently unknown. Similarly, the recreational consumer surplus estimates offered in Table 3, Table 4, and Table 5 should be considered as an upper bound because it is unlikely that as the number of pounds caught decrease, recreational participation and consumer surplus will decrease at the same rate. Again, the resulting benefits will be a function of the actual behavioral response, which are presently unknown.

Table 3 shows that the implementation of alternative 2 will significantly reduce current landings of certain species like blueline fish (79%), lesser amberjack (54%), gray triggerfish (46%), Almaco jack (42%), and Atlantic spadefish (41%). However, these short-run reductions may be offset in the future as ACLs may be increased as the long-run stock abundance increases. Table 3 also shows the short-run anticipated reductions in gross revenues to the commercial fleet and consumer surplus to the recreational sector relative to the status quo.

Alternatives 3 and 4 are anticipated to generate larger long-run benefits than Alternative 2 (Preferred) since they would create a buffer between the ACL and the ABC. These more conservative alternatives 3 (90% of the ABC) and 4 (80% of the ABC) provide a greater insurance against the risk of overfishing than alternative 2. Alternatives 3 and 4 presumably will reach sooner higher long-run stock abundances than alternative 2, which could allow the ACLs to be increased sooner. Table 5 shows that as the ACL becomes more conservative the short-run reductions in landings relative to the status quo are quite significant for certain species such blueline tilefish (83%), lesser amberjack (63%), gray triggerfish (57%), Almaco jack (54%) and Atlantic spadefish (53%)

Table 3: Action 6 (Alternative 2). Establish ACLs for species where ACLs=OY=ABC.

Species	Total landings (pounds, whole weight)	Comm landings (pounds, whole weight)	Rec landings (pounds, whole weight)	Comm benefits ($, gross revenues)	Rec benefits ($, consumer surplus)	Share of tot. landings relative to Alt. 1 (%)	Comm benefits minus Alt 1 comm benefits ($, gross revenues)	Rec benefits minus Alt 1 rec benefits ($, consumer surplus)
Almaco jack	144,364	66,407	77,957	59,103	190,703	58%	(66,411)	(73,769)
Atlantic spadefish	167,003	25,050	141,953	10,271	347,254	59%	(3,435)	(267,930)
Banded rudderfish	80,671	18,554	62,117	13,359	151,954	68%	(12,126)	(49,943)
Blue runner	665,653	99,848	565,805	92,859	1,384,111	67%	(68,421)	(635,790)
Blueline tilefish	105,242	67,355	37,887	105,074	464,788	21%	(279,764)	(2,560,529)
Cubera snapper	11,093	1,886	9,207	3,545	100,593	59%	(5,523)	(51,305)
Goliath grouper	0	0	0	0	0	0%	0	(6,831)
Gray snapper	578,002	156,061	421,941	321,485	4,609,930	78%	92,392	(2,259,443)
Gray triggerfish	399,323	187,682	211,641	259,001	517,731	54%	(179,322)	(506,192)
Greater amberjack	1,968,000	1,023,360	944,640	1,023,360	2,310,843	124%	379,569	(9,994)
Hogfish	94,512	34,969	59,543	98,264	650,533	66%	(10,259)	(491,379)
Jolthead porgy	24,394	1,406	22,988	1,701	56,235	60%	(1,156)	(38,204)
Knobbed porgy	34,071	17,717	16,354	17,363	40,006	91%	(2,715)	(1,900)
Lane snapper	92,655	14,825	77,830	33,949	850,335	97%	19,862	(121,672)
Lesser amberjack	4,623	2,635	1,988	2,477	4,863	46%	(2,317)	(7,397)
Mutton snapper	1,155,222	369,671	785,551	898,301	8,582,552	206%	696,875	3,352,967
Nassau grouper	0	0	0	0	0	0%	0	(151)
Red hind	16,342	12,257	4,086	34,441	50,120	79%	(8,737)	(15,705)
Rock hind	22,456	12,800	9,656	49,152	118,458	65%	(38,346)	(24,690)
Scamp	353,714	251,137	102,577	926,695	1,258,385	77%	(251,705)	(493,183)
Silk snapper	17,937	13,273	4,664	39,555	57,212	82%	(9,324)	(10,579)
Tomtate	43,630	10	43,620	10	106,707	65%	(5)	(56,352)
White grunt	434,398	152,039	282,359	177,886	690,725	67%	(38,860)	(433,582)
Whitebone porgy	16,160	323	15,837	120	38,741	77%	117	(12,770)
Yellowedge grouper	19,471	18,303	1,168	58,020	14,332	80%	(1,072)	(55,059)
Yellowtail snapper	2,898,500	2,086,920	811,580	5,425,992	8,866,933	241%	3,276,516	4,756,795

Table 4: Action 6 (Alternative 3). Establish ACLs for species where ACLs=OY=90%*ABC.

Species	Total landings (pounds, whole weight)	Comm landings (pounds, whole weight)	Rec landings (pounds, whole weight)	Comm benefits ($, gross revenues)	Rec benefits ($, consumer surplus)	Share of tot. landings relative to Alt. 1 (%)	Comm benefits minus Alt 1 comm benefits ($, gross revenues)	Rec benefits minus Alt 1 rec benefits ($, consumer surplus)
Almaco jack	129,927	59,766	70,161	53,192	171,632	52%	(72,321)	(92,840)
Atlantic spadefish	150,303	22,545	127,758	9,244	312,529	53%	(4,462)	(302,655)
Banded rudderfish	72,604	16,699	55,905	12,023	136,759	62%	(13,462)	(65,139)
Blue runner	599,087	89,863	509,224	83,573	1,245,698	60%	(77,707)	(774,202)
Blueline tilefish	94,718	60,620	34,098	94,566	418,310	19%	(290,272)	(2,607,007)
Cubera snapper	9,984	1,697	8,287	3,191	90,537	53%	(5,877)	(61,362)
Goliath grouper	0	0	0	0	0	0%	0	(6,831)
Gray snapper	520,202	140,455	379,747	289,336	4,148,938	70%	60,243	(2,720,435)
Gray triggerfish	359,391	168,914	190,477	233,101	465,958	49%	(205,222)	(557,964)
Greater amberjack	1,771,200	921,024	850,176	921,024	2,079,758	111%	277,233	(241,078)
Hogfish	85,061	31,473	53,588	88,438	585,481	59%	(20,085)	(556,431)
Jolthead porgy	21,954	1,265	20,689	1,531	50,610	54%	(1,326)	(43,829)
Knobbed porgy	30,664	15,945	14,719	15,626	36,006	82%	(4,451)	(5,900)
Lane snapper	83,389	13,342	70,047	30,554	765,297	88%	16,467	(206,710)
Lesser amberjack	4,161	2,372	1,789	2,229	4,377	41%	(2,565)	(7,883)
Mutton snapper	1,039,700	332,704	706,996	808,471	7,724,298	185%	607,045	2,494,713
Nassau grouper	0	0	0	0	0	0%	0	(151)
Red hind	14,708	11,031	3,677	30,997	45,108	71%	(12,181)	(20,716)
Rock hind	20,210	11,520	8,690	44,236	106,610	59%	(43,262)	(36,538)
Scamp	318,343	226,024	92,319	834,027	1,132,548	69%	(344,373)	(619,020)
Silk snapper	16,143	11,946	4,197	35,599	51,490	74%	(13,281)	(16,301)
Tomtate	39,267	9	39,258	9	96,036	59%	(6)	(67,023)
White grunt	390,958	136,835	254,123	160,097	621,652	61%	(56,648)	(502,654)
Whitebone porgy	14,544	291	14,253	108	34,867	69%	105	(16,644)
Yellowedge grouper	17,524	16,473	1,051	52,218	12,899	72%	(6,874)	(56,493)
Yellowtail snapper	2,608,650	1,878,228	730,422	4,883,393	7,980,240	217%	2,733,917	3,870,101

Table 5: Action 6 (Alternative 4). Establish ACLs for species where ACLs=OY=80%*ABC.

Species	Total landings (pounds, whole weight)	Comm landings (pounds, whole weight)	Rec landings (pounds, whole weight)	Comm benefits ($, gross revenues)	Rec benefits ($, consumer surplus)	Share of tot. landings relative to Alt. 1 (%)	Comm benefits minus Alt 1 comm benefits ($, gross revenues)	Rec benefits minus Alt 1 rec benefits ($, consumer surplus)
Almaco jack	115,491	53,126	62,365	47,282	152,562	46%	(78,231)	(111,909)
Atlantic spadefish	133,602	20,040	113,562	8,217	277,802	47%	(5,489)	(337,382)
Banded rudderfish	64,537	14,844	49,693	10,687	121,564	55%	(14,798)	(80,334)
Blue runner	532,522	79,878	452,644	74,287	1,107,288	53%	(86,992)	(912,613)
Blueline tilefish	84,194	53,884	30,310	84,059	371,832	17%	(300,779)	(2,653,485)
Cubera snapper	8,874	1,509	7,365	2,836	80,471	47%	(6,232)	(71,427)
Goliath grouper	0	0	0	0	0	0%	0	(6,831)
Gray snapper	462,402	124,849	337,553	257,188	3,687,947	62%	28,095	(3,181,426)
Gray triggerfish	319,458	150,145	169,313	207,200	414,184	43%	(231,123)	(609,739)
Greater amberjack	1,574,400	818,688	755,712	818,688	1,848,674	99%	174,897	(472,163)
Hogfish	68,049	25,178	42,871	70,751	468,387	48%	(37,773)	(673,526)
Jolthead porgy	19,515	1,125	18,390	1,361	44,987	48%	(1,496)	(49,452)
Knobbed porgy	27,257	14,174	13,083	13,890	32,005	72%	(6,187)	(9,901)
Lane snapper	74,124	11,860	62,264	27,159	680,268	78%	13,072	(291,739)
Lesser amberjack	3,698	2,108	1,590	1,981	3,890	37%	(2,813)	(8,370)
Mutton snapper	924,178	295,737	628,441	718,641	6,866,045	165%	517,215	1,636,459
Nassau grouper	0	0	0	0	0	0%	0	(151)
Red hind	13,074	9,806	3,269	27,553	40,097	63%	(15,624)	(25,727)
Rock hind	17,964	10,239	7,725	39,320	94,762	52%	(48,178)	(48,386)
Scamp	282,971	200,909	82,062	741,356	1,006,707	61%	(437,044)	(744,861)
Silk snapper	14,350	10,619	3,731	31,645	45,771	65%	(17,235)	(22,020)
Tomtate	34,904	8	34,896	8	85,365	52%	(7)	(77,694)
White grunt	347,519	121,632	225,887	142,309	552,581	54%	(74,437)	(571,726)
Whitebone porgy	12,928	259	12,669	96	30,993	61%	93	(20,518)
Yellowedge grouper	15,577	14,642	935	46,416	11,466	64%	(12,676)	(57,926)
Yellowtail snapper	2,318,800	1,669,536	649,264	4,340,794	7,093,546	193%	2,191,317	2,983,408

<u>Action No. 7</u>

Action 7 calls for the specification of accountability measures and annual catch targets for species in the snapper grouper FMU. This action considers seven alternatives, namely

Alternative 1 (No Action). Do not specify AMs for species or species groups in the Snapper Grouper FMU that do not have them.

Commercial

Alternative 2. Specify Annual Catch Targets (ACT) for the commercial sector, apply ACT to commercial sector AM Alternatives 3 and 4.

> **Subalternative 2a (Preferred).** 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 (Preferred). After the commercial ACL is met or projected to be met, <u>all purchase and sale is prohibited and harvest and/or possession is limited to the bag limit.</u>

Alternative 4 (Preferred). If the commercial sector ACL is exceeded, the Regional Administrator shall publish a notice to <u>reduce the commercial sector ACL in the following season by the amount of the overage.</u>

Recreational

Alternative 5. Specify Annual Catch Targets (ACT) for the recreational sector, apply ACT to recreational sector AM Alternatives 6-7.

> **Subalternative 5a.** The recreational sector ACT equals 85% of the recreational sector ACL.
> **Subalternative 5b.** The recreational sector ACT equals 75% of the recreational sector ACL.
> **Subalternative 5c (Preferred).** The recreational sector ACT equals sector ACL [(1-PSE) or 0.5, whichever is greater].

Alternative 6. For post-season accountability measures, compare recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running average.

> **Subalternative 6a.** If the recreational sector ACL is exceeded, the Regional Administrator shall publish a notice to reduce the recreational sector ACL in the following season by the amount of the overage.
> **Subalternative 6b (Preferred).** If the recreational sector 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 recreational sector ACL for the following fishing season.

Alternative 7. The Regional Administrator shall publish a notice to <u>close the recreational fishery when the ACL is projected to be met.</u>

Discussion

Alternative 1 (No Action) would likely cause no short-term economic dislocation but has the most potential to cause the most long-term economic dislocation since the absence of AM could either increase the risk of overfishing or result in the overfishing snapper grouper stocks, which would require to lower the ACL in the future.

(Commercial)

Alternative 2 introduces the notion of a buffer between the ACT and ACL. Subalternative 2a (Preferred) sets no buffer, Subalternative 2b sets the buffer at 90% of the ACL, and Subalternative 2c sets the buffer at 80% of the ACL.

Table 6 shows the anticipated changes in annual landings and gross revenues of the proposed three subalternatives assuming the commercial fleet can harvest the entire ACTs. This table shows that the anticipated forgone landings and gross revenues increase as the ACTs become more conservative. Table 6 figures in should be considered an upper bound since the adoption of multiple ACTs could bring about a change in fishing practices, which may prevent the fleet of harvesting all of the ACTs. If fishing firms can easily re-organize their catch mix as the ACTs become constraining, then they could potentially offset any forgone revenues by targeting other species. On the other hand, if fishing firms have limited flexibility to modify the composition of their catches as ACTs become binding, then fishermen may cutback harvesting snapper-grouper species, they may switch to other fisheries, or they may exit the fishery altogether. Thus, actual benefits accrued will not only depend of the magnitude of the available landings and the resulting (yet unknown) change in fishing practices but also will also depend on the management regime in place. Management regimes that favor harvesting privileges, like catch shares, are more prone to generate larger economic net benefits relative to a quota regulated open access regime.

Alternative 3 (Preferred) will likely generate marginally lower gross revenues in the short-run (but still be bound by the figures in Table 6) than Alternative 2 since this alternative prevents the commercial sector from profiting from the harvest of snapper grouper species in quantities exceeding the ACL. Establishing an ACT that is 90 or 80% of the commercial ACL would also reduce the need to close or implement post season AMs that are meant to correct for an ACL overage. The long-term benefits may be higher than those under Alternative 2 since Alternative 3 better hedges against the risk of overfishing; thus, minimizing the likelihood that future ACLs may have to be decreased if the ACT is exceeded.

Alternative 4 (Preferred) calls for reducing the commercial sector ACL in the following season by the amount of the overage; thus, protecting these stability of the stocks while avoiding overfishing. This alternative will likely have lower short-run benefits but potentially higher long-run benefits than alternatives 1 and 2.

(Recreational)

Alternative 5 establishes the ACTs as a proportion of the ACL. Lower ACTs will likely result in higher short-term forgone benefits but higher long-term benefits because they help hedge against the risk of overfishing. Hence, this alternative minimizes the chance that the Council will have to implement post-season accountability measures (AM).

Table 7 shows the incremental changes in recreational landings and recreational consumer surplus relative to subalternative 5a.

Alternative 6 calls for post-season accountability measures (AM). Subalternative 6b will likely result in higher short-term losses but higher long-term benefits because of it more precautionary in nature than subalternative 6a.

Alternative 7 will likely cause higher short-term losses than **alternative 6** but higher long-term benefits since it closes the fishery when the ACL is projected to be met.

Table 6: Action 7 (SubAlternatives 2b, and 2c). Set ACTs as a proportion of ACLs.

Species or Species Complex	Alt 2b minus Alt 2a Comm landings (wwt)	Gross revenue ($)	Alt 2c minus Alt 2a Comm. Landings (wwt)	Gross revenue ($)
Deep-Water Grouper & Tilefish				
Yellowedge Grouper	(1,830)	(5,802)	(3,661)	(11,604)
Blueline Tilefish	(6,735)	(10,507)	(13,471)	(21,015)
Silk Snapper	(1,327)	(3,955)	(2,655)	(7,911)
Snowy Grouper	(9,782)	(28,662)	(19,564)	(57,324)
Golden Tilefish	(31,676)	(74,755)	(63,351)	(149,509)
Shallow-Water Grouper				
Scamp	(25,114)	(92,670)	(50,227)	(185,339)
Gag	(41,765)	(149,518)	(83,530)	(299,037)
Red Grouper	(29,234)	(80,394)	(58,468)	(160,787)
Jacks				
Almaco Jack	(6,641)	(5,910)	(13,281)	(11,821)
Banded Rudderfish	(1,855)	(1,336)	(3,711)	(2,672)
Lesser Amberjack	(264)	(248)	(527)	(495)
Greater Amberjack	(102,336)	(102,336)	(204,672)	(204,672)
Porgies, Grunts, and Hinds				
Whitebone Porgy	(32)	(12)	(65)	(24)
Knobbed Porgy	(1,772)	(1,736)	(3,543)	(3,473)
Jolthead Porgy	(98)	(118)	(195)	(236)
Red Hind	(1,226)	(3,444)	(2,451)	(6,888)
Rock Hind	(1,280)	(4,915)	(2,560)	(9,830)
Tomtate	0	0	0	0
White Grunt	(15,204)	(17,789)	(30,408)	(35,577)
Snappers				
Gray Snapper	(15,606)	(32,148)	(31,212)	(64,297)
Lane Snapper	(1,482)	(3,395)	(2,965)	(6,790)
Cubera Snapper	(189)	(355)	(377)	(709)
Yellowtail Snapper	(208,692)	(542,599)	(417,384)	(1,085,198)
Mutton Snapper	(36,967)	(89,830)	(73,934)	(179,660)
Individuals ACLs				
Red Snapper	0	0	0	0
Red Porgy	(19,765)	(30,438)	(39,530)	(60,877)
Blue Runner	(9,985)	(9,286)	(19,970)	(18,572)
Gray Triggerfish	(18,768)	(25,900)	(37,536)	(51,800)
Vermilion Snapper	(68,603)	(197,577)	(137,206)	(395,154)
Goliath Grouper	0	0	0	0
Atlantic Spadefish	(2,505)	(1,027)	(5,010)	(2,054)
Hogfish	(3,497)	(9,826)	(6,994)	(19,653)
Nassau Grouper	0	0	0	0
Warsaw Grouper	0	0	0	0
Speckled Hind	0	0	0	0
Black Sea Bass	(36,462)	(72,924)	(72,924)	(145,848)

(*) Assumes Alt 2 of Action 6 as the Alt 2a baseline.

Table 7: Action 7 (SubAlternatives 5b, and 5c). Set ACTs as a proportion ACLs.

Species or Species Complex	Alt 5b minus Alt 5a		Alt 5c minus Alt 5a	
	Rec Landings (wwt)	consumer surplus ($)	Rec Landings (wwt)	consumer surplus ($)
Deep-Water Grouper & Tilefish				
Yellowedge Grouper	(117)	(1,433)	(57)	(702)
Blueline Tilefish	(3,789)	(46,479)	(9,078)	(111,363)
Silk Snapper	(466)	(5,721)	(444)	(5,447)
Snowy Grouper	(195)	(2,389)	(512)	(6,282)
Golden Tilefish	(980)	(12,025)	N/A	NA
Shallow-Water Grouper				
Scamp	(10,258)	(125,839)	(21,726)	(266,526)
Gag	(40,127)	(492,267)	(12,199)	(149,649)
Red Grouper	(32,966)	(404,417)	(53,207)	(652,729)
Jacks				
Almaco Jack	(7,796)	(19,070)	(6,704)	(16,400)
Banded Rudderfish	(6,212)	(15,195)	(11,417)	(27,929)
Lesser Amberjack	(199)	(486)	(696)	(1,702)
Greater Amberjack	(94,464)	(231,084)	2,456	6,008
Porgies, Grunts, and Hinds				
Whitebone Porgy	(1,584)	(3,874)	(3,076)	(7,524)
Knobbed Porgy	(1,635)	(4,001)	(3,192)	(7,809)
Jolthead Porgy	(2,342)	(5,729)	(4,538)	(11,102)
Red Hind	(409)	(5,012)	(1,039)	(12,740)
Rock Hind	(966)	(11,846)	(2,578)	(31,628)
Tomtate	(4,363)	(10,673)	(3,482)	(8,517)
White Grunt	(28,236)	(69,073)	1,807	4,421
Snappers				
Gray Snapper	(42,194)	(460,993)	20,591	224,965
Lane Snapper	(7,783)	(85,034)	(3,067)	(33,503)
Cubera Snapper	(921)	(10,059)	(1,948)	(21,286)
Yellowtail Snapper	(81,158)	(886,693)	18,829	205,713
Mutton Snapper	(78,555)	(858,255)	14,454	157,919
Individuals ACLs				
Red Snapper	0	0	N/A	NA
Red Porgy	(19,765)	(215,945)	(8,776)	(95,880)
Blue Runner	(56,581)	(138,411)	(21,161)	(51,766)
Gray Triggerfish	(21,164)	(51,773)	(169)	(414)
Vermilion Snapper	(34,112)	(372,691)	(1,023)	(11,181)
Goliath Grouper	0	0	N/A	NA
Atlantic Spadefish	(14,195)	(34,725)	(18,482)	(45,212)
Hogfish	(5,954)	(65,053)	(7,860)	(85,870)
Nassau Grouper	0	0	N/A	NA
Warsaw Grouper	0	0	N/A	NA
Speckled Hind	0	0	N/A	NA
Black Sea Bass	(48,262)	(592,064)	11,679	143,279

Action No. 11:

Action 11 calls for the establishment of management measures for wreckfish.

Recreational

Alternative 2. Remove wreckfish from the 20-fish aggregate snapper grouper bag limit.

Alternative 3 (Preferred). Implement a one-wreckfish per vessel per day bag limit for the recreational fishery.

Alternative 4. Implement a one-wreckfish per angler per day bag limit for the recreational fishery.

Alternative 5. Implement a 5-wreckfish per vessel per day bag limit for the recreational fishery.

Alternative 6 (Preferred). Establish a July-August recreational season.

Alternative 7. Establish a May-June recreational season.

Discussion

Action 11 suggests six alternatives for managing recreational wreckfish harvest in addition to a no action alternative. The economic description of the snapper-grouper fishery indicates that there have been no recreational trips that targeted or harvested wreckfish in the South Atlantic between 2005 and 2009. This makes it difficult to complete an analysis of the expected economic effects of the proposed policy changes. However, if accurate, the data suggests that the economic effects associated with changes in the wreckfish policies suggested in this Action will be minimal.

Action No. 13:

Action 13 calls for the specification of sector allocations for black grouper.

Alternative 1 (No action). Do not establish sector allocations for black grouper

Alternative 2 (Preferred). Establish commercial and recreational sector allocations based on criteria outlined in subalternatives below.

Subalternative 2a. Commercial = 68% and recreational = 32% using catch history from 1986-2008. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 2b. Commercial = 71% and recreational = 29% using catch history from 1986-1998. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 2c. Commercial = 63% and recreational = 37% using catch history from 1999-2008. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 2d. Commercial = 60% and recreational = 40% using catch history from 2006-2008. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 2e (Preferred). Commercial = 65% and recreational = 35% using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008. The commercial and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Alternative 3. Establish commercial, recreational, and for-hire sector allocations based on criteria outlined in subalternatives below.
Subalternative 3a. Commercial = 68%, for-hire = 25%, and recreational = 7% using catch history from 1986-2008. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 3b. Commercial = 71%, for-hire = 24%, and recreational = 5% using catch history from 1986-1998. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 3c. Commercial = 63%, for-hire = 26%, and recreational = 11% using catch history from 1999-2008. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 3d. Commercial = 60%, for-hire = 29%, and recreational = 11% using catch history from 2006-2008. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.
Subalternative 3e. Commercial = 65%, for-hire = 26%, and recreational = 9% using 50% of catch history from 1991-2008 + 50% of catch history from 2006-2008. The commercial, for-hire, and recreational ACLs specified for 2011 would remain in effect beyond 2011 until modified.

Discussion

Subalternatives 2c-2e and 3c-3e tend to favor the recreational sector relative to subalternatives 2a-2b and 3a-3b because they rely on shorter and more recent time series which saw an increase in recreational participation in the last years. **Subalternatives** 2c-2e and 3c-3e will likely generate less dislocation relative to subalternatives 2a-2b and 3a-3b because they close capture the status quo.

Ideally, when examining the economic effects of alternative allocations, estimates of marginal commercial and recreational benefits under the various allocation proposals should be considered so that scarce fish resources can be redistributed (or re-allocated) to those sectors that generate the highest benefits to society. Societal benefits are maximized at the allocation level where the marginal net benefits to the commercial and recreational sectors are equal. Unfortunately, marginal net benefits for the various proposals were not available so the analysis relied on gross revenues and 'generic grouper' willingness to pay estimates.

The reader should be cautioned that the use of gross revenues tends to overestimate the relative loss in terms of producer surplus. Producer surplus from the commercial sector is the appropriate welfare measure that needs to be used when comparing consumer surplus estimates from the recreational sector.

Alternative 3 in Action 13 proposes five different allocations of the black grouper harvest that separate the recreational allocation between the for-hire and other recreational interests. This suggests that the potential changes in economic value (producer surplus) to the for-hire sector should be measured separately. However, the economic description of the snapper-grouper fishery indicates that there were no charter trips targeting black grouper and only an average of 642 charter trips per year harvesting black grouper in the South Atlantic between 2005 and 2009. This makes it difficult to complete an analysis of the expected economic effects of the proposed policy changes. However, if accurate, the data suggests that the economic effects to the for-hire sector associated with changes in the black grouper allocations suggested in this Action will be minimal.

Table 8 shows maximum anticipated changes in gross revenue to the commercial sector and anticipated changes in consumer surplus to the recreational sector under the various alternatives.[4] This table shows two gross revenues estimates. The first estimate is derived from a model developed by Jim Waters. This model accounts for all the revenues generated by those trips that catch black grouper. This model accounts for all regulatory changes that have been recently being implemented (e.g., red snapper moratorium, aggregate shallow water grouper ACL) which constrains catch mix; and hence, gross revenues. Appendix A discusses the features of this model. The other gross revenue estimate simply multiplies the commercial sector allocation poundage by its dockside price, which is consistent with the estimates provided in earlier actions. This latter estimate assumes that the fleet can harvest the entire allocation whereas the former estimate relies on historical trips to predict forgone revenues.

[4] Gross revenues were estimated by multiplying the dockside prices times the commercial allocation and consumer surplus was calculated by multiplying willingness to pay estimate times the recreational allocation. The willingness to pay estimates were derived from Carter, D.W. and C. Liese. 2011. The Economic Value of Catching and Keeping or Releasing Saltwater Sportfish in the Southeast United States. *In Review*; and
Habb, T., R. Hicks, K. Schnier, J. C. Whitehead. 2009. Angler heterogeneity and the species-specific demand for recreational fishing in the southeast United States. National Marine Fisheries Service Marine Fisheries Initiative Grant Report #NA06NMF4330055, Miami, Florida.

Table 8: Changes in revenue from black grouper landings due to establishment of sector allocations.

Alternatives	**Sector Allocation**	**Comm. Sector** changes in gross revenue ($) relative to No Action (Waters' Model)	**Comm. Sector** changes in gross revenue ($) relative to No Action	**Rec. Sector** changes in consumer surplus ($) relative to No Action	**Private & Shore** changes in consumer surplus ($) relative to No Action	**For Hire Sector** changes in consumer surplus ($) relative to No Action	**For Hire Sector** changes in net operating revenue ($) relative to No Action
1 (No Action)	No ACL	-	-	-	N/A	N/A	N/A
2a	68%C,32%R	0	288,473	91,632	N/A	N/A	N/A
2b	71%C,29%R	0	312,440	1,149	N/A	N/A	N/A
2c	63%C,37%R	(5,000)	248,529	242,436	N/A	N/A	N/A
2d	60%C,40%R	(16,000)	224,563	332,919	N/A	N/A	N/A
2e (Preferred)	65%C, 35%R	(3,000)	264,507	182,114	N/A	N/A	N/A
3a	68%C, 25%FH, 7% PS	0	288,473	N/A	(477,792)	569,423	Minor since no targeted black grouper trips
3b	71%C, 24%FH, 5% PS	0	312,440	N/A	(538,113)	539,262	Minor since no targeted black grouper trips
3c	63%C, 26%FH, 11% PS	(5,000)	248,529	N/A	(357,148)	599,584	Minor since no targeted black grouper trips
3d	60%C, 29%FH, 11% PS	(16,000)	224,563	N/A	(357,148)	690,067	Minor since no targeted black grouper trips
3e	65%C, 26%FH, 9% PS	(3,000)	264,507	N/A	(417,470)	599,584	Minor since no targeted black grouper trips

Action 14:

Action 14 calls for the establishment of Annual Catch Limits (ACL) and Optimum Yield (OY) for Black Grouper

Alternative 1 (No Action). Retain aggregate recreational and commercial ACLs for black grouper, red grouper, and gag.

Alternative 2 (Preferred). ACL = OY = ABC.

Alternative 3. ACL = OY = 90% of the ABC.

Alternative 4. ACL = OY = 80% of the ABC.

Discussion

Alternative 1 would retain the aggregate ACL which could increase the risk of overfishing since it does not afford special protection to the black grouper stocks. Alternatives 2, 3 and 4 establish an ACL. Alternatives 3 and 4 create a buffer between the ACL and ABC. In general, the short-run economic benefits tend be higher when there is no or little buffer between the ACL and the ABC. As the ACL becomes more conservative, the anticipated short-term forgone economic benefits tend to increase. The long-term economic benefits will depend on the ability of the ACL to reduce the risk of overfishing and/or increase stock abundance.

Table 9 shows maximum anticipated short-term changes in gross revenue to the commercial sector and anticipated changes in consumer surplus to the recreational sector under the various alternatives. As before, two gross revenue estimates are offered. The first is derived from Jim Waters' model, and the second is estimated multiplying dockside prices times the ACL under the assumption that the fleets catch the entire ACL.[5] Appendix A discusses Jim Waters model. The reader should be cautioned that the use of gross revenues tends to overestimate the relative loss in terms of producer surplus, which is a more appropriate welfare measure to be used when comparing it to losses in consumer surplus.

[5] Gross revenues were estimated by multiplying the dockside prices times the commercial allocation and consumer surplus was calculated by multiplying willingness to pay estimate times the recreational allocation.

Table 9: Changes in revenue from black grouper landings due to establishment of ACL and OY for black grouper.

Alternative	ACL Formula	**Comm. Sector** changes in gross revenue ($) relative to No Action (Waters' Model)	**Comm. Sector** changes in gross revenue ($) relative to Alt 2	**Rec. Sector** changes in consumer surplus ($) relative to Alt 2
1 (No Action)	Group ACL (gag, black/red grouper)	-	-	-
2 (Preferred)	ABC	(3,000)	-	-
3	90% ABC	(27,000)	(60,207)	(124,574)
4	80% ABC	(65,000)	(120,414)	(249,133)

(*) Commercial ACL values are based on preferred allocation alternatives (65% commercial/35% recreational) in Action 13.

Action 15:

Action 15 calls for the establishment of accountability measures/management measures for the black grouper.

Commercial

Alternative 2. Specify Annual Catch Targets (ACT) for the commercial sector, apply the ACT to commercial AM Alternatives 3 and 4.

Subalternative 2a (Preferred). 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 (Preferred). After the commercial ACL is met or projected to be met, all purchase and sale of black grouper is prohibited and harvest and/or possession is limited to the bag limit.

Alternative 4 (Preferred). 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.

Discussion

Subalternative 2a (Preferred) sets no buffer, Subalternative 2b sets the buffer at 90% of the ACL, and Subalternative 2c sets the buffer at 80% of the ACL.

Table 10 shows the anticipated changes in short-term landings and gross revenues of the proposed three subalternatives. As before, we offer the results of Jim Waters' model and the expected gross revenue assuming that the commercial fleet can harvest the ACTs. This table shows that the anticipated landings and gross revenues decrease as the ACTs become more conservative.

Table 10 figures in should be considered an upper bound since the adoption of multiple ACTs could bring about a change in fishing practices, which may prevent the fleet of harvesting all of the ACTs. If fishing firms can easily re-organize their catch mix as the ACTs become constraining, then they could potentially offset any forgone revenues 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 cutback harvesting snapper-grouper species, they many switch to other fisheries, or they may exit the fishery altogether. Thus, actual benefits accrued will not only depend of the magnitude of the available landings and the resulting (yet unknown) change in fishing practices but also will also depend on the management regime in place. Management regimes that favor harvesting privileges, like catch shares, are more prone to generate larger economic net benefits relative to a quota regulated open access regime.

Alternative 3 (Preferred) will likely generate marginally lower economic benefits in the short-run (but still be bound by the figures in Table 10) than Alternative 2 since this alternative prevents the commercial sector from profiting from the harvest of snapper grouper species in quantities exceeding the ACL. Establishing an ACT that is 90 or 80% of the commercial ACL would also reduce the need to close or implement post season AMs that are meant to correct for an ACL overage. The long-term economic benefits may be higher than those under Alternative 2 since Alternative 3 better hedges against the risk of overfishing; thus, minimizing the likelihood that future ACLs may have to be decreased if the ACT is exceeded.

Alternative 4 (Preferred) calls for reducing the commercial sector ACL in the following season by the amount of the overage; thus, protecting these stability of the stocks while avoiding overfishing. This alternative will likely have lower short-run economic benefits but potentially higher long-run economic benefits than alternatives 2.

Table 10. Changes in gross revenue from black grouper landings due to establishment of a commercial sector ACT for black grouper.

Subalternative	ACT Formula	**Comm. Sector** changes in gross revenue ($) relative Alt 2a (Waters' Model)	**Comm. Sector** changes in gross revenue ($) relative to Alt 2a
2a (Preferred)	No ACT	$0	-
2b	90% ACL	(24,000)	(60,143)
2c	80% ACL	(62,000)	(120,287)

(*) Commercial ACL values are based on preferred ACL (245,810 lbs ww) in Action 14 and preferred allocation alternatives (65% commercial/35% recreational) in Action 13.

(Recreational)

Alternative 5 establishes the ACT as a proportion of the ACL. Lower ACT will likely result in higher short-term forgone economic benefits but higher long-term economic benefits because they help hedge against the risk of overfishing. Hence, this alternative reduces the chance that the Council will have to implement post-season accountability measures (AM). Table 11 shows the incremental changes in recreational landings and recreational consumer surplus relative to subalternative 5a.

Alternative 6 calls for post-season accountability measures (AM). Subalternative 6b will likely result in higher short-term economic losses but higher long-term economic benefits because of it more precautionary in nature than subalternative 6a.

Alternative 7 will likely cause higher short-term economic losses than **alternative 6** but higher long-term economic benefits since it closes the fishery when the ACL is projected to be met. Thus, this alternative will likely be more helpful minimizing the risk of having overages in the fishery.

Table 11. Changes in gross revenue from black grouper landings due to establishment of a recreational sector ACT for black grouper.

Subalternative	ACT	**Rec. Sector** changes in consumer surplus ($) relative to Alt 5a
5a	ACT=85% ACL	-
5b	ACT=75% ACL	(124,559.40)

5c(Preferred)	ACT=(1-PSE) or .5 ACL	(174,380.26)

Action 20: Establish Management Measures for Dolphin
Alternative 1 (No Action). Retain current management regulations.

- Sale of recreationally caught dolphin in or from the Atlantic EEZ prohibited. For-hire vessels possessing the necessary state and Federal commercial permits can sell dolphin harvested under the bag limit in or from the Atlantic EEZ.
- Commercial soft cap of 1.5 million pounds or 13% of total landings, whichever is greater.
- Recreational daily bag limit of 10 dolphin per person per day in or from the EEZ not to exceed 60 dolphin per boat per day whichever is less. Bag limit of 10 dolphin per paying passenger on headboats.
- Minimum size limit for dolphin of 20 inches fork length off Florida and Georgia, and no minimum size limit north of Georgia. Note: Florida regulations require a minimum size limit of 20 inches fork length; a 10 fish per person bag limit with a 60 fish boat limit; and a saltwater products license, a restricted species endorsement, and a federal commercial vessel permit to sell dolphin, exceed the10-fish bag limit, or exceed 60 per vessel per day statewide.
- Vessel permits and operator permits are required for commercial and for-hire sectors.

Alternative 2. Prohibit bag limit sales of dolphin from for-hire vessels.

Under Alternative 2, charter vessels will not be able to sell dolphin fish harvested under the bag limit, even with the appropriate permits. This will result in a loss of producer surplus relative to the no action alternative. We do not have the information on the relevant costs of selling fish for charter vessels that is necessary to measure the loss in producer surplus associated with this alternative. Therefore, we measure the loss in terms of foregone revenues from the sale of fish. The use of revenues will overstate the loss relative to the same loss measured in terms of producer surplus. We assume that the average annual revenues associated with selling dolphin fish on charter trips is given by the amount sold by charter vessels with charter dolphin/wahoo permits from 2005 to 2009. The results and data sources are reported in the table below.

Action 20: Alternative 2

Foregone Revenues due to Prohibiting Bag Limit Sales from Charter Vessels

	Trips				Revenues			
Year	EFL_GA	FL_Keys	NC_SC	Total	EFL_GA	FL_Keys	NC_SC	Total
2005	165	132	85	382	$12,786	$17,724	$7,002	$37,512
2006	117	178	126	421	$8,584	$32,127	$16,034	$56,745
2007	138	187	213	538	$17,082	$38,253	$28,327	$83,661
2008	184	214	180	578	$20,555	$32,867	$20,581	$74,003
2009	275	271	288	834	$21,947	$39,749	$40,887	$102,583
Avg.	176	196	178	551	$16,191	$32,144	$22,566	$70,901

Based on trips with a charter dolphin/wahoo (CDW) permit that caught at least one pound of dolphin, but less than the 60 fish boat limit in pounds (495lbs in GA-EFL and 533lbs in NC-SC). The trips and landings information are from the SE Logbook data and the prices are from the ALS data.

Alternative 3. Establish a minimum size limit of 20 inches fork length off South Carolina.

The reduction in consumer surplus to the recreational sector predicted with this alternative is documented in the table below. The data sources and method are listed below the table.

Alternative 3

Reduction in Economic Value to the Recreational Sector in South Carolina with a 20 inch minimum size limit

	Head	Private	Charter	Total
ALT1 Landings (lbs)	10,329	160,536	55,954	226,820
ALT3 Reduction (%)	8.70%	0.00%	5.06%	
ALT3 Reduction (lbs)	899	0	2,831	3,730
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	7.92	10.69	12.41	
wpt/lb	$16.21	$12.01	$10.34	
dCS	$14,571	$0	$29,285	$43,856
Target (angler) trips	1,122	na	1,375	2,497
ALT3 Reduction in Target Trips	98	na	70	167
NOR per angler trip	$63	na	$128	
dPS	$6,147	na	$8,906	
dTS	$20,718	$0	$38,191	$58,909

ALT1 landings assumed to be the average annual landings of dolphin in SC from 2005 to 2009.

ALT3 % reduction from Table 4-39 of the DEIS

The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1

The lbs/fish is based on the average annual landings of dolphin in SC from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT3 Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT3 Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)[6]

'na' indicates not applicable or not available.

[6] Dumas, C.F., J.C. Whitehead, C.E. Landry, and J.H. Herstine. 2009. "Economic Impacts and Recreation Value of the North Carolina For-Hire Fishing Fleet." North Carolina Sea Grant FRG Grant Report 07-FEG-05.

Alternative 4. Establish a minimum size limit of 20 inches fork length from Florida through New England.

The reduction in consumer surplus to the recreational sector predicted with this alternative is documented in the table below. The data sources and method are listed below the table.

Action 20: Alternative 4

Reduction in Economic Value to the Recreational Sector in North and South Carolina with a 20 inch minimum size limit

	Head	Private	Charter	Total
ALT1 Landings (lbs)	14,047	170,865	3,417,573	3,602,485
ALT4 Reduction (%)	15.11%	5.84%	4.56%	
ALT4 Reduction (lbs)	2,122	9,979	155,841	167,942
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	7.10	9.86	10.65	
wpt/lb	$18.08	$13.01	$12.05	
dCS	$38,379	$129,838	$1,877,823	
Target (angler) trips	4,582	na	30,429	35,011
ALT4 Reduction in Target Trips	692	na	1,388	2,080
NOR per angler trip	$63	na	$128	
dPS	$43,617	na	$177,608	$221,225
dTS	$81,996	$129,838	$2,055,431	$2,267,265

ALT1 landings assumed to be the average annual landings of dolphin in SC and NC from 2005 to 2009.

ALT4 % reduction from Table 4-40a of the DEIS

The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1
The lbs/fish is based on the average annual landings of dolphin in SC and NC from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT4 Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT4 Reduction (%) X NOR/trip
The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.
The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)
'na' indicates not applicable or not available.

Alternative 5. Increase the minimum size limit in Florida and Georgia to 22 inches or 24 inches fork length.The reduction in consumer surplus to the recreational sector predicted with this alternative is documented in the following two tables. The data sources and method are listed below each table.

Action 20: Alternative 5a

Reduction in Economic Value to the Recreational Sector in Florida and Georgia with a 22 inch minimum size limit

	Head	Private	Charter	Total
EFL ALT1 Landings (lbs)	1,974	464,942	39,602	506,519
GA ALT1 Landings (lbs)	31	5,095	506	5,632
EFL ALT5a Reduction (%)	19.73%	17.24%	17.01%	
GA ALT5a Reduction (%)	19.73%	17.24%	17.01%	
ALT5a Reduction (lbs)	396	81,034	6,822	88,252
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	7.33	10.18	8.75	
wpt/lb	$17.51	$12.61	$14.67	
dCS	$6,927	$1,021,534	$100,100	$1,128,562
Target (angler) trips	13,155	na	17,296	30,451
ALT5a Reduction in Target Trips	2,596	na	2,942	5,538
NOR per angler trip	$63	na	$128	
dPS	$163,517	na	$376,582	$540,099
dTS	$170,444	$1,021,534	$476,683	$1,668,661

ALT1 landings assumed to be the average annual landings of dolphin in EFL and GA from 2005 to 2009.
ALT5a % reduction from Table 4-40b of the DEIS
The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1
The lbs/fish is based on the average annual landings of dolphin in the EFL and GA from 2005 to 2009.
dCS = ALT1 landings (lbs) X ALT5a Reduction (%) X wtp/lb
All estimates are in 2009 dollars.
dPS = ALT1 Target trips X ALT5a Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.
The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)
'na' indicates not applicable or not available.

Action 20: Alternative 5b

Reduction in Economic Value to the Recreational Sector in Florida and Georgia with a 24 inch minimum size limit

	Head	Private	Charter	Total
EFL ALT1 Landings (lbs)	1,974	464,942	39,602	506,519
GA ALT1 Landings (lbs)	31	5,095	506	5,632
EFL ALT5b Reduction (%)	36.31%	35.97%	36.13%	
GA ALT5b Reduction (%)	36.31%	35.97%	36.13%	
ALT5b Reduction (lbs)	728	169,072	14,491	184,292
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	7.33	10.18	8.75	
wpt/lb	$17.51	$12.61	$14.67	
dCS	$12,748	$2,131,356	$212,618	$2,356,722
Target (angler) trips	13,155	na	17,296	30,451
ALT5b Reduction in Target Trips	4,777	na	6,249	11,026
NOR per angler trip	$63.00	na	$128.00	
dPS	$300,927	na	$799,878	$1,100,805
dTS	$313,676	$2,131,356	$1,012,496	$3,457,528

ALT1 landings assumed to be the average annual landings of dolphin in EFL and GA from 2005 to 2009.
ALT5b % reduction from Table 4-40b of the DEIS
The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1
The lbs/fish is based on the average annual landings of dolphin in the SA from 2005 to 2009.
dCS = ALT1 landings (lbs) X ALT5a Reduction (%) X wtp/lb
All estimates are in 2009 dollars.
dPS = ALT1 Target trips X ALT5b Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.
The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)
'na' indicates not applicable or not available.

Alternative 6. Reduce the boat limit (e.g. reduce by 1/3). Note: this applies only to charterboats and recreational vessels, not headboats.

Subalternative 6a. Reduce the boat limit by 25%.
Subalternative 6b. Reduce the boat limit by 33%.
Subalternative 6c. Reduce the boat limit by 50%.

The reduction in consumer surplus to the recreational sector predicted with this alternative is documented in the tables below. The data sources and method are listed below each table.

Action 20: Alternative 6a

Reduction in Economic Value to the Recreational Sector with a 25% reduction in the Boat Limit to 45 fish

	Head	Private	Charter	Total
ALT1 Landings (lbs)	26,705	5,146,878	3,506,140	8,679,723
ALT6a Reduction (%)	0.00%	0.00%	7.39%	
ALT6a Reduction (lbs)	0	0	259,104	259,104
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	6.84	7.82	8.87	
wpt/lb	$18.75	$16.42	$14.47	
dCS	$0	$0	$3,748,469	$3,748,469
Target (angler) trips	17,737	na	47,726	65,463
ALT6a Reduction in Target Trips	0	na	3,527	3,527
NOR per angler trip	$63.00	na	$128.00	
dPS	$0	na	$451,450	$451,450
dTS	$0	$0	$4,199,919	$4,199,919

ALT1 landings assumed to be the average annual landings of dolphin in SA from 2005 to 2009.
ALT6a % reduction from Table 4-41 of the DEIS
The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1
The lbs/fish is based on the average annual landings of dolphin in the SA from 2005 to 2009.
dCS = ALT1 landings (lbs) X ALT6a Reduction (%) X wtp/lb
All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT6a Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)

'na' indicates not applicable or not available.

Action 20: Alternative 6b

Reduction in Economic Value to the Recreational Sector with a 33% reduction in the Boat Limit to 40 fish

	Head	Private	Charter	Total
ALT1 Landings (lbs)	26,705	5,146,878	3,506,140	8,679,723
ALT6b Reduction (%)	0.00%	0.00%	10.85%	
ALT6b Reduction (lbs)	0	0	380,416	380,416
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	6.84	7.82	8.87	
wpt/lb	$18.75	$16.42	$14.47	
dCS	$0	$0	$5,503,504	$5,503,504
Target (angler) trips	17,737	na	47,726	65,463
ALT6b Reduction in Target Trips	0	na	5,178	5,178
NOR per angler trip	$63.00	na	$128.00	
dPS	$0	na	$662,819	$662,819
dTS	$0	$0	$6,166,322	$6,166,322

ALT1 landings assumed to be the average annual landings of dolphin in SA from 2005 to 2009.

ALT6b % reduction from Table 4-41 of the DEIS

The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1

The lbs/fish is based on the average annual landings of dolphin in the SA from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT6b Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT6b Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)

'na' indicates not applicable or not available.

Action 20: Alternative 6c

Reduction in Economic Value to the Recreational Sector with a 50% reduction in the Boat Limit to 30 fish

	Head	Private	Charter	Total
ALT1 Landings (lbs)	26,705	5,146,878	3,506,140	8,679,723
ALT6c Reduction (%)	0.00%	0.40%	22.40%	
ALT6c Reduction (lbs)	0	20,588	785,375	805,963
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	6.84	7.82	8.87	
wpt/lb	$18.75	$16.42	$14.47	
dCS	$0	$337,953	$11,362,072	$11,700,025
Target (angler) trips	17,737	na	47,726	65,463
ALT6c Reduction in Target Trips	0	na	10,691	10,691
NOR per angler trip	$63.00	na	$128.00	
dPS	$0	na	$1,368,400	$1,368,400
dTS	$0	$337,953	$12,730,472	$13,068,425

ALT1 landings assumed to be the average annual landings of dolphin in SA from 2005 to 2009.

ALT6c % reduction from Table 4-41 of the DEIS

The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1

The lbs/fish is based on the average annual landings of dolphin in the SA from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT6c Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT6c Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)

'na' indicates not applicable or not available.

Alternative 8. Reduce the recreational bag limit to level that will provide the reduction in harvest needed to not exceed the recreational ACL. In December the Council approved a motion for a bag limit of 9 dolphin per person but not as a preferred alternative.

The reduction in consumer surplus to the recreational sector predicted with this alternative is documented in the table below. The data sources and method are listed below the table.

Action 20: Alternative 8

Reduction in Economic Value to the Recreational Sector with a reduction in the Bag Limit to 9 fish

	Head	Private	Charter	Total
ALT1 Landings (lbs)	26,705	5,146,878	3,506,140	8,679,723
ALT8 Reduction (%)	0.00%	1.00%	5.00%	
ALT8 Reduction (lbs)	0	51,469	175,307	226,776
wtp/fish	$128.34	$128.34	$128.34	
lbs/fish	6.84	7.82	8.87	
wpt/lb	$18.75	$16.42	$14.47	
dCS	$0	$844,884	$2,536,177	$3,381,060
Target (angler) trips	17,737	na	47,726	65,463
ALT8 Reduction in Target Trips	0	na	2,386	2,386
NOR per angler trip	$63.00	na	$128.00	
dPS	$0	na	$305,446	$305,446
dTS	$0	$844,884	$2,841,623	$3,686,507

ALT1 landings assumed to be the average annual landings of dolphin in SA from 2005 to 2009.

ALT8 % reduction from Table 4-45a of the DEIS

The wtp/fish is $103 in 2000 dollars for dolphin (>20") from Haab et al. (2009) Table 6-1

The lbs/fish is based on the average annual landings of dolphin in the SA from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT8 Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT8 Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)

'na' indicates not applicable or not available.

Summary of the Reduction in Economic Value to the Recreational Sector with the Alternatives in Action 20

Alternative	Head	Private	Charter	Total
ALT1	$0	$0	$0	$0
ALT2	$0	$0	$70,901	$70,901
ALT3	$20,718	$0	$38,191	$58,909
ALT4	$81,996	$129,838	$2,055,431	$2,267,265
ALT5a	$170,444	$1,021,534	$476,683	$1,668,661
ALT5b	$313,676	$2,131,356	$1,012,496	$3,457,528
ALT6a	$0	$0	$4,199,919	$4,199,919
ALT6b	$0	$0	$6,166,322	$6,166,322
ALT6c	$0	$337,953	$12,730,472	$13,068,425
ALT8	$0	$844,884	$2,841,623	$3,686,507

All changes are measured relative to ALT1.

Economic value for all alternatives are measured in terms of changes in consumer and producer surplus, except for ALT2 which is measured in terms of changes in revenues from the sale of dolphin fish by charter operations with dolphin wahoo charter permits.

Action 25: Establish Management Measures for Wahoo

Alternative 1 (No Action). Retain current management measures for wahoo.

- Sale of recreationally caught wahoo in or from the Atlantic EEZ is prohibited.
- 500 pound commercial trip limit for wahoo (landed head and tail intact) with no transfer at sea allowed.
- Recreational bag limit of 2 wahoo per person per day in the Atlantic EEZ.

Alternative 2. Establish a boat limit of 2-12 wahoo per boat/vessel per day in the recreational fishery.

The reduction in consumer surplus to the recreational sector predicted with this alternative is documented in the tables below. The data sources and method are listed below each table.

Action 25: Alternative 2a

Change in Economic Value to the Recreational Sector with a 2 wahoo boat limit

	Head	Private	Charter	Total
ALT1 Landings (lbs)	5,041	729,051	225,450	959,542
ALT2 Reduction (%)	0.00%	17.23%	28.43%	
ALT2 Reduction (lbs)	0	125,615	64,096	189,711
wtp/fish	$100.93	$100.93	$100.93	
lbs/fish	35.65	23.10	21.07	
wpt/lb	$2.83	$4.37	$4.79	
dCS	$0	$548,817	$307,001	$855,818
Target (angler) trips	2,305	na	6,678	8,983
ALT2a Reduction in Target Trips	0	na	1,899	1,899
NOR per angler trip	$63	na	$128	
dPS	$0	na	$243,015	$243,015
dTS	$0	$548,817	$550,016	$1,098,833

ALT1 landings assumed to be the average annual landings of wahoo in the SA from 2005 to 2009.

ALT2 % reduction from Table 4-59 of the DEIS

The wtp/fish is $81 in 2000 dollars for big game from Haab et al. (2009) Table 6-1

The lbs/fish is based on the average annual landings of wahoo in SA from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT2a Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT2a Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)

'na' indicates not applicable or not available.

Action 25: Alternative 2b

Change in Economic Value to the Recreational Sector with a 12 wahoo boat limit

	Head	Private	Charter	Total
ALT1 Landings (lbs)	5,041	729,051	225,450	959,542
ALT2 Reduction (%)	0.00%	0.00%	1.00%	
ALT2 Reduction (lbs)	0	0	2,255	2,255
wtp/fish	$100.93	$100.93	$100.93	
lbs/fish	35.65	23.10	21.07	
wpt/lb	$2.83	$4.37	$4.79	
dCS	$0	$0	$10,799	$10,799
Target (angler) trips	2,305	na	6,678	8,983
ALT2b Reduction in Target Trips	0	na	67	67
NOR per angler trip	$63	na	$128	
dPS	$0	na	$8,548	$8,548
dTS	$0	$0	$19,346	$19,346

ALT1 landings assumed to be the average annual landings of wahoo in the SA from 2005 to 2009.

ALT2 % reduction from Table 4-59 of the DEIS

The wtp/fish is $81 in 2000 dollars for big game from Haab et al. (2009) Table 6-1

The lbs/fish is based on the average annual landings of wahoo in SA from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT2b Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT2b Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)

'na' indicates not applicable or not available.

Alternative 3 (Preferred). Establish a recreational limit of 2 wahoo per vessel per day.

Action 25: Alternative 3

Change in Economic Value to the Recreational Sector with a 2 wahoo boat limit

	Head	Private	Charter	Total
ALT1 Landings (lbs)	5,041	729,051	225,450	959,542
ALT3 Reduction (%)	0.00%	17.23%	28.43%	
ALT3 Reduction (lbs)	0	125,615	64,096	189,711
wtp/fish	$100.93	$100.93	$100.93	
lbs/fish	35.65	23.10	21.07	
wpt/lb	$35.65	$4.37	$4.79	
dCS	$0	$548,817	$307,001	$855,818
Target (angler) trips	2,305	na	6,678	8,983
ALT3 Reduction in Target Trips	0	na	1,899	1,899
NOR per angler trip	$63	na	$128	
dPS	$0	na	$243,015	$243,015
dTS	$0	$548,817	$550,016	$1,098,833

ALT1 landings assumed to be the average annual landings of wahoo in the SA from 2005 to 2009.

ALT3 % reduction from Table 4-59 of the DEIS

The wtp/fish is $81 in 2000 dollars for big game from Haab et al. (2009) Table 6-1

The lbs/fish is based on the average annual landings of wahoo in SA from 2005 to 2009.

dCS = ALT1 landings (lbs) X ALT3 Reduction (%) X wtp/lb

All estimates are in 2009 dollars.

dPS = ALT1 Target trips X ALT3 Reduction (%) X NOR/trip

The head boat target trips (angler hours) are estimated as the proportion of charter trips to total charter trips times the average annual head boat trips (angler hours) from 2005-2009.

The target angler charter trips are from the description of the fishery.

The Net Operating Revenue (NOR) per angler trip for head boats and charter boats is from Dumas et al. (2009)

'na' indicates not applicable or not available.

Summary of the Change in Economic Value to the Recreational Sector with the Alternatives in Action 25

Alternative	Head	Private	Charter	Total
ALT1	$0	$0	$0	$0
ALT2a	$0	$548,817	$550,016	$1,098,833
ALT2b	$0	$0	$19,346	$19,346
ALT3	$0	$548,817	$550,016	$1,098,833

All changes are measured relative to ALT1.
Economic value for all alternatives are measured in terms of changes in consumer and producer surplus.

Action 26: Establish Annual Catch Limits (ACL) and Optimum Yield (OY) for Golden Crab

Alternative 1 (No Action). Do not specify an ACL for Golden Crab.

Alternative 2 (Preferred). ACL= OY=ABC= 2,000,000 pounds.

Alternative 3. ACL = OY = 85% of the ABC = 1,700,000 pounds.

Alternative 4. ACL = OY =75% of the ABC = 1,500,000 pounds.

Alternative 5. ACL = OY =65% of the ABC = 1,300,000 pounds.

Discussion

Under Alternative 1 (No Action), there would be no cap placed on the landings of the golden crab. Although, current landings are moderate, rising demand and the adoption of new technologies such as re-circulating seawater systems is likely to increase production, potentially increasing the risk of overfishing.[7] The rate of technological growth is presently unknown.

Alternatives 2 to 5 call for the adoption of progressively more conservative ACLs. Given the moderate landings occurring in the golden crab fishery at this time (around 570,000 pounds), minimum negative short-term economic effects (if any) are expected from adopting Alternatives 2-5 relative to Alternative 1 (No Action).

Table 12 shows the anticipated single year changes in landings and gross revenues relative to the alternative 1 under different (annual) production growth scenarios. For simplicity, we considered three (landings) annual growth scenarios, ranging from 5% to 15%. The No action alternative assumes that the 'status quo' catch is the 5-year average ranging from 2005-2009. Table 12 figures shows that the one-year projected landings under the various scenarios were not bidding relative to the proposed ACLs; thus, the relative low changes in expected landings and revenues. Landings and gross revenues were derived from Crosson (2010).[8]

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[7] Re-circulating systems reduce mortality markedly, increase product quality and allow for greater take of live golden crab.

[8] Crosson, Scott B. 2010. Trends in the South Atlantic Golden Crab Fishery. NOAA Technical Memorandum NMFS-SEFSC-608.

Table 12: Anticipated gross revenues of management alternatives under Action 26.

Alternatives	ACL	Expected landings (lbs)	Change in landings relative to Alt 1 (lbs)	Change in gross revenue relative to Alt 1 ($)
		5% Growth Scenario		
Alternative 1	None	-	-	-
Alternative 2	2,000,000	598,604	28,505	47,033
Alternative 3	1,700,000	598,604	28,505	47,033
Alternative 4	1,500,000	598,604	28,505	47,033
Alternative 5	1,300,000	598,604	28,505	47,033
		10% Growth Scenario		
Alternatives	ACL	Expected landings (lbs)	Change in landings relative to Alt 1 (lbs)	Change in gross revenue relative to Alt 1 ($)
Alternative 1	None	-	-	-
Alternative 2	2,000,000	627,109	57,010	94,066
Alternative 3	1,700,000	627,109	57,010	94,066
Alternative 4	1,500,000	627,109	57,010	94,066
Alternative 5	1,300,000	627,109	57,010	94,066
		15% Growth Scenario		
Alternatives	ACL	Expected landings (lbs)	Change in landings relative to Alt 1 (lbs)	Change in gross revenue relative to Alt 1 ($)
Alternative 1	None	-	-	-
Alternative 2	2,000,000	655,614	85,515	141,100
Alternative 3	1,700,000	655,614	85,515	141,100
Alternative 4	1,500,000	655,614	85,515	141,100
Alternative 5	1,300,000	655,614	85,515	141,100

Action 27: Establish Accountability Measures for Golden Crab

Alternative 1 (No Action). Do not establish accountability measures for Golden Crab.

Alternative 2 (Preferred). After the ACL is projected to be met, all harvest, purchase, and sale of golden crab is prohibited.

Alternative 3 (Preferred). If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the ACL or ACT in the following season by the amount of the overage.

Discussion

Failure to implement AM for the golden crab fishery under **Alternative 1 (No Action)** could result in overages and the smallest long-term and economic benefits relative to the other alternatives since the risk of overfishing is the greatest.

The combination of Alternatives 2 and 3 would likely generate the greatest short-term costs but long-term economic benefits since they provide the greatest hedge against overfishing. Alternative 2 alone would be precautionary but would not likely generate the greatest long-term economic benefits since it does not provide a mechanism for addressing overages, if these occur. On the other hand, Alternative 3 would. While **Preferred Alternative 2** would have fewer negative short-term economic effects, **Preferred Alternative 3** may have more long term positive economic effects, but could have significant negative short-term effects that affect market viability.

Appendix A: Discussion on the method used in Water's model.

Commercial fishermen in the south Atlantic snapper-grouper fishery are required to submit logbook trip reports within 7 days of the completion of each trip. The general method of analysis in the model was to hypothetically impose proposed regulations on individual fishing trips as reported to the logbook database. Each reported trip was examined with regard to a combination of rules proposed in the Comprehensive ACL Amendment, and the effects of the rules on trip catches and revenues were calculated. A five-year average was used to estimate the expected effects of proposed regulations so that anomalies that may have affected fishing success in any one year would be averaged out. Logbook data for the five year period, 2005-2009, were used to simulate the fishery with the proposed management alternatives associated with black grouper for the Comprehensive ACL Amendment.

Logbook trip reports include information about landings by species, but do not include information about trip revenues. Therefore, average monthly prices were calculated from the NMFS Accumulated Landings System and merged with logbook trip reports by year, month, species and state. Ex-vessel revenue for each species was calculated as the product of average monthly prices and reported pounds per trip[9]. Gross revenue for trip *j* in year *t* was calculated as trip revenues from all species *s*, $TR_{j,t} = \sum R_{s,j,t}$. Revenues were adjusted to constant 2009 dollars with the consumer price index for all items and all urban consumers.[10]

Short-term economic losses were measured as the resulting reduction in trip revenues from landings of black grouper. If a regulatory alternative is predicted to close the black grouper

[9] Previous applications of this model calculated changes in net operating revenue to measure the effects of proposed regulations. The same approach could have been utilized for the analysis of regulations associated with black grouper in the Comprehensive ACL Amendment; however, the regulatory effects associated with the other snapper-grouper species covered in the ACL Amendment were analyzed using only trip revenues. Thus, for consistency operating and labor costs were not incorporated into the black grouper analysis.

[10] The consumer price index for all urban consumers can be found at http://data.bls.gov. See series CUUR0000SAO, which was adjusted to a 2009 base period for this study.

fishery then all revenues that would have been generated from trips with black grouper landings after the closing date would be lost. Trips that target species other than black grouper would continue accumulating short-term economic losses equal to the foregone revenues associated with black grouper landings. A shortcoming to this approach is the continuation of regulated trips that mainly land black grouper along with a minor amount of bycatch species. In reality, if trip costs are greater than the revenue generated from these bycatch species then that trip would not be expected to continue. However, since trip costs are not incorporated in this analysis the trip continues accumulating short-term economic losses equal to the foregone revenues associated with black grouper landings. In this case industry losses could be overstated since cost savings accrued from not taking the trip do not figure into the calculation of short-term net economic losses.

Ex-vessel revenues for the combination of proposed rules denoted by *a* in regulated year t, $GR_{a,t}$, were totaled for all trips within each logbook year, k, from 2005-2009, with annual totals averaged across all five years.

$$GR_{a,t} = \frac{\sum_{k=2005}^{k=2009} \sum_{j=trips} TR_{a,j,k}}{5}$$

The five-year average is interpreted as the expected annual economic effect of the proposed combination of rules on industry gross revenues in rebuilding year t, $GR_{a,t}$. Each analysis was conducted for a single management year, $t = 2012$.

This approach is interpreted as follows. If 2012 is similar to fishing conditions that existed in 2009, then the analysis of proposed regulations with logbook data from 2009 would represent the predicted outcome of proposed regulations for 2012. However, if 2012 turns out to be similar to fishing conditions that existed in 2005, then the analysis of proposed regulations with data from 2005 would represent the predicted outcome for 2012. We do not know exactly what conditions will prevail in 2012; therefore, we construct an average predicted outcome based on the five most recent years for which data are available.

The predicted outcome for rule-combination *a* is compared to the predicted outcome for no-action (*i.e.*, no additional management) to determine if the proposed alternatives are expected to generate net benefits or losses to commercial fishers. The fishery without additional management was evaluated by simulating the effects of rules recently implemented by Snapper-Grouper Amendments 13C, 15A, 16, 17A and 17B with the historical logbook data from 2005-2009. Net benefits are expected to accrue to the fishery if the predicted outcome for rule combination *a* exceeds the predicted outcome without additional regulation. A net loss would accrue if the predicted outcome for rule combination *a* is less than the predicted outcome for no additional management. Because the analysis is short-term for management year 2012 only, we expect it to estimate the short-term losses associated with implementation of rules proposed in the Comprehensive ACL Amendment.

The regulatory alternatives in the ACL Amendment associated with black grouper can all be viewed as annual quotas since the ACLs and AMs could prematurely close the commercial black grouper fishery when compared to past years. Quotas may or may not result in fishery closures though. When quotas are filled, the closure dates vary annually depending on the speed at which the fishery lands its quota for species *s*. The closure extends through the end of the fishing year once the quota is filled.

The model sets variable $open_s = 0$ to reflect a no-harvest rule resulting from fishery closures after the quota is filled. Otherwise, it sets $open_s = 1$ to indicate that the fishery for species s is open and that trips are unaffected by a quota closure.

$$q_{s,j,t} = h_{s,j,t}\, open_s$$

Variable $h_{s,j,t}$ represents quantity of species s caught on trip j in year t, and $q_{s,j,t}$ denotes quantity kept after accounting for the effects of a fishery closure. Note that the black grouper fishery could also be closed due to an aggregate annual quota that includes landings of gag, red and black groupers.

The model compares the accumulated fishery landings of species s with its quota to determine if and when the fishery would be closed. This is accomplished by sorting logbook trip reports by year, month and day landed, and then performing a chronological trip-by-trip accumulation of landings that likely would occur given the selected combination of proposed management alternatives. The model sets $open_s = 1$ at the beginning of each fishing year, and sets $open_s = 0$ as soon as accumulated landings exceed the quota for species s.

Quotas tend to promote a race for fish as fishermen compete to maximize their shares of the overall catch before the fishery is closed. The model does not include the possibility that fishermen might accelerate their trips in anticipation of a fishery closure, or that dockside prices might fall if market gluts occur due to the accelerated harvesting activity. More work is needed on these issues since they are two of the primary outcomes of quota management.