



SNAPPER GROUPE AMENDMENT 17B

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4.1 Speckled hind/warsaw grouper

4.1.1 Biological Effects

4.1.2 Economic Effects

Commercial Fishery

Recreational Fishery

Alternative 1 (Status Quo) would result in the least short-term economic effects on the recreational fishery. However, it may not provide enough protection to the stocks, and thus would tend to reduce potentially in a substantial way the long-term economic benefits derivable from the fishery.

The overall short-run economic effects of **Alternative 2** would appear to be relatively small as can be partly inferred from the relative levels of recreational harvest and effort on these two species. An average of 18,000 pounds was harvested by the recreational sector for the years 2003-2007 (Table 3-46). Of this total, about 62 percent was accounted for by the private/rental mode, 27 percent by the charter mode, and 11 percent by the headboat mode. There is, however, little evidence on the desirability of these two species as target species on recreational trips. Table 3-51 shows there is virtually an absence of target trips for these two species by the charter or private/rental mode of fishing. No targeting effort information for headboats is generally collected on a routine basis as those for the other fishing modes, and unlike for **Alternative 3** below, no attempt is made to estimate the possible number of headboat trips targeting the two species. Hence, there is a fairly good chance that the economic effects of **Alternative 2** on recreational anglers fishing through the charter and private/rental fishing modes and potentially on for-hire operations would be relatively small. The economic effects on headboats would depend on the importance of these two species on their fishing trips, but this cannot be ascertained with current available information.

Of the various alternatives, **Alternative 3** would be expected to bring about the largest adverse economic impacts on the recreational sector in the short run, considering the larger number of species being subject to the ban on retention and possession. Table 4-7 below shows the recreational harvests of deepwater species. Recreational harvests of yellowedge grouper, misty grouper, and queen snapper are sparse, so they are combined for the current purpose. A total

harvest of about 281 thousand pounds of deepwater species is approximately 2.6 percent of total recreational harvest of snapper grouper in the South Atlantic. While relatively small, harvests of deepwater species could be a significant part of charterboat harvests, as these species comprise about 10.5 percent of total charterboat harvests of snapper grouper. Headboat and private/rental harvests of deepwater species comprise only about 0.2 percent and 1.0 percent of their respective total harvests of snapper grouper.

However, an examination of target effort depicts a slightly different scenario. For the years 2003-2007, an average of 2,671 trips was taken by charterboat and private/rental anglers targeting deepwater species. No species-specific target trip information for anglers fishing through headboats is available, but some attempt is estimating this number is shown in the table and discussed below. Of the total trips targeting deepwater species with the exclusion of headboats, 64 percent were accounted for by private/rental mode anglers and 36 percent by charterboat anglers. It would then appear that, based on target trips, the private/rental mode anglers would experience more consumer surplus reductions than their charterboat counterparts under **Alternative 3 would**. Thus, even though harvests of deepwater species comprised only 1 percent of total snapper grouper harvests by private/rental anglers, valuation of this harvest level would appear to be more than that of harvests through charterboats. Only Florida and North Carolina registered target trips for deepwater species, and total target trips are about evenly divided between these two states.

Considering the number of species involved, an attempt is made to estimate the number of headboat trips “targeting” deepwater species. The number in the Table 4-7 (1,015) is estimated by multiplying the number of headboat angler trips by the ratio of deepwater species caught to total snapper-grouper caught in headboats. The ratio is calculated by area and applied to headboat trips by area, and the resulting numbers are summed across all areas. As calculated, the number of headboat trips appears to be a substantial overestimate of the unknown true number of headboat trips targeting deepwater species. This can be inferred from the fact that headboats generally account for only a small portion of total deepwater species harvested by the recreational sector. The immediate implication here is that economic losses to the headboat sector, as well possibly as those of the entire recreational sector, are overestimated.

Table 4-7 South Atlantic average harvest of and target effort for deepwater species, by mode, 2003-2007.

Species	Charterboat	Headboat	Private/Rental	Total
Harvest in Pounds				
Snowy Grouper	50,553	684	2,547	53,717
Speckled Hind	1,037	1,218	0	2,097
Warsaw Grouper	3,848	1,171	11,258	15,953
Blueline Tilefish	94,120	436	45,693	140,218
Silk Snapper	502	2,311	173	935
Yellowedge Grouper, Misty Grouper, Queen Snapper	71	319	242	346

Total	150,131	6,139	59,913	213,266
Target Trips				
All Deepwater Species	952	1,015	1,719	2,671

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab and MRFSS database, NOAA Fisheries, NMFS, SERO.

By allowing harvest, possession, and retention of deepwater species within a depth of 240 feet, **Preferred Alternative 4** would provide lower negative economic effects than **Alternative 3**. The magnitude of differential economic effects would depend on the level of recreational activities for the deepwater species in the open areas. This amount cannot be estimated with available information.

To provide some insights into the possible magnitude of the short-run economic losses, changes to consumer surplus and net operating revenues, in 2009 dollars, are presented in Table 4-7a. The same methodology described in Amendment 17A is used for the current purpose. A value of \$123 \$80 per angler trip, per kept fish is used for consumer surplus, \$155 \$128 per angler trip for charterboat net operating revenue, and \$77 \$68 per angler trip for headboat net operating revenue. Total economic effects of **Alternative 3** would range from about \$476 thousand \$5.7 million, if effects on headboats were excluded, to \$679 thousand \$5.8 million if effects on headboats are included. When including headboat effects, the total economic effects may be considered overestimates of the true effects. **Alternative 2** would result in significantly lower short-run economic effects than those presented in the table. In addition, the economic effects of **Alternative 4** would be lower than those of **Alternative 3** but higher than those of **Alternative 2**. The effects of these other alternatives cannot be quantified with available information. To the extent that we assign the value of all catches to target trips, the estimated change in CS would likely be overestimates of the economic effects of **Alternative 3**. This is due to the resulting higher average kept rates per angler per trip.

Table 4-7a. Reductions in consumer surplus and net operating revenues due to **Alternative 3**.

	Charterboat	Headboat	Private/Rental	Total-WH	Total-WOH
Cons. Surplus	\$117,096	\$124,845	\$211,437	\$453,378	\$328,533
Net Oper. Rev.	\$147,560	\$78,155		\$225,715	\$147,560
Total	\$264,656	\$203,000	\$211,437	\$679,093	\$476,093

Total-WH is total with headboat trips included; Total-WOH is total excluding headboat trips.

Table 4-7a. Reductions in consumer surplus and net operating revenues due to **Alternative 3**.

	Charterboat	Headboat	Private/Rental	Total-WH	Total-WOH
Cons. Surplus	\$3,960,320	\$21,112	\$1,650,240	\$5,631,672	\$5,610,560
Net Oper. Rev.	\$121,856	\$69,020		\$190,876	\$121,856
Total	\$4,082,176	\$90,132	\$1,650,240	\$5,822,548	\$5,732,416

Total-WH is total with headboat trips included; Total-WOH is total excluding headboat trips.

4.2 Golden tilefish

4.2.1 Golden Tilefish Allocations

4.2.1.1 Biological Effects

4.2.1.2 Economic Effects

The general nature of any management imposed fish allocation is that either the user groups would be able to maintain their respective fishing opportunities or one group would tend to benefit more but usually at the expense of the others. From a purely economic standpoint, an allocation alternative may be adjudged better than any other alternatives if it would result in net economic benefits to society. This could happen if at least one group benefits while the other groups are not made worse off; or if one group is made worse off, the extent of benefits to the “winning” group outweighs the losses to the others. One complicating issue of this general rule is the choice of baseline values from which an allocation change is made. In the present case where the allocation is solely based on landings by the commercial and recreational sectors, regulations affecting both sectors could have affected the actual distribution of landings. In such a case, the historical landings may not be considered ideal in determining the “economically best” allocation alternative, because those landings were not mainly driven by the economics of the two sectors. In addition, there currently exists no adequate commercial and recreational sector economic model for use in assessing the economic outcome of the various allocation alternatives. Given these considerations, the analysis of the various allocation alternatives can only focus on their distributional implications.

Alternative 1 (status quo) would not alter the course of sectoral landings, and thereby would not change the economic status of the two sectors. **Alternatives 2 through 4**, although based on landings in different periods, would essentially result in similar sectoral allocations. Each sector would likely receive an allocation that is reflective of their historical landings, so the potential change in distributional landings would be relatively minimal. Therefore, the consequent economic benefits/losses of each sector would unlikely be affected. **Alternative 5** would allocate fish to the recreational sector that would be significantly higher than the sector’s historical landings. In principle, this alternative would provide the recreational sector more opportunities to generate more economic benefits from the fishery. On the other hand, the commercial sector would be severely restricted by this alternative.

4.2.2 Golden Tilefish ACLs and AMs

4.2.2.1 Biological Effects

4.2.2.2 Economic Effects

Commercial Sector

Recreational Sector

Alternative 1 (Status Quo), which provides for no accountability measures on the recreational sector, would be expected to have no short-run economic effects on the recreational sector.

Preferred Alternative 2 would specify a recreational sector ACL based on the sector's allocation of the yield at F_{0y} , with implementation of an AM when the ACL is exceeded. Given the various allocation alternatives, the recreational ACL would be equivalent to 10,092 pounds whole weight (9,011 pounds gutted weight), 13,457 pounds whole weight (12,015 pounds gutted weight), or 168,213 pounds whole weight (150,190 gutted weight). Based on 2003-2007 average recreational landings of 68 thousand pounds (Table 3-49), the two low recreational ACLs would likely be exceeded even if landings were averaged over a number of years. It is very likely then that implementation of an AM would increasingly shorten the fishing season over the years. The high ACL, on the other hand, is very unlikely to be exceeded, and thus would afford the recreational sector more opportunities to derive more benefits from the fishery.

Alternative 3 would close the recreational fishery once the common commercial/recreational ACL of about 327 thousand pounds is reached. For the period 2003-2007, commercial landings averaged annually at about 331 thousand pounds (Table 3-26) while recreational harvests averaged at about 68 thousand pounds (Table 3-49), or a total of 399 thousand pounds. With the ACL being about 82 percent of average commercial/recreational harvests, it is likely that the recreational sector, together with the commercial sector, would experience closures under **Alternative 3**. It is possible the commercial sector could trigger closures of both sectors even with inconsequential amount of recreational harvests.

Given the ACL of **Alternative 3**, implementing a one golden tilefish per vessel limit under **Alternative 4** would mitigate potential recreational sector losses under a single ACL. If only the commercial quota were monitored to trigger a closure, it is likely the closure would occur sometime in September of that particular year. As can be seen from Table 4-8d, the recreational sector would have harvested most of its usual harvests. The relatively small losses to the recreational sector under a September closure would even fall further under **Alternative 4**.

The ACL of 321,003 pounds under **Alternative 5** would be about 81 percent of total commercial and recreational harvests. This ACL is slightly lower than that under **Alternative 3**, but otherwise both **Alternatives 3 and 5** would have similar economic implications on the recreational sector. This ACL would be exceeded and the recreational season closed.

To get some general sense on when the various ACLs would possibly be reached, Table 4-8d is constructed showing the average monthly commercial and recreational landings of golden tilefish for the years 2003-2007. The monthly recreational landings are estimated by equally splitting a wave's landing into the relevant two months.

Under **Alternative 2**, the recreational ACL of 10,092 pounds would be met sometime in May and the ACL of 13,457 would be reached in early June. As noted earlier, the ACL of 168,213

pounds would unlikely be met. Within the 2003-2007 period, it was only in 2005 that the recreational sector landed substantially more golden tilefish than its average. In this year, the recreational sector registered an accumulative landings of about 168 thousand pounds by the end of July. This one year’s recreational landings would unlikely be repeated in the near future, given the various regulations that have recently been implemented or would be implemented in the near future. The single ACL of about 327 thousand pounds under **Alternative 3** would be reached at the end of September. By then, the recreational sector would have landed about 96 percent of its average landings. Under **Alternative 4**, the recreational sector would not experience closures or shortened season, but the AM of 1 fish per vessel per day would likely be imposed starting October. The single ACL of about 321 thousand pounds under **Alternative 5** would be reached towards the end of September when the recreational sector would have landed slightly less than 96 percent of its average landings.

Table 4-8d. Average monthly commercial and recreational landings of golden tilefish, in thousand pounds, 2003-2007.

	Comm.	Rec.	Total	Comm. Cumulative	Rec. Cumulative	Total Cumulative
January	23.2	0.0	23.2	23.2	0.0	23.2
February	25.4	0.0	25.4	48.6	0.0	48.6
March	33.0	0.5	33.5	81.6	0.5	82.1
April	45.2	0.5	45.7	126.8	1.0	127.8
May	40.2	11.9	52.1	167.0	12.9	179.9
June	26.8	11.9	38.7	193.8	24.9	218.7
July	11.4	19.2	30.6	205.2	44.0	249.2
August	23.2	19.2	42.4	228.4	63.2	291.6
September	33.2	2.6	35.8	261.6	65.8	327.4
October	36.6	2.6	39.2	298.2	68.4	366.6
November	20.0	0.0	20.0	318.2	68.4	386.6
December	13.0	0.0	13.0	331.2	68.4	399.6
Total	331.2	68.4	399.6			

The relative magnitude of economic effects of the various ACLs and AMs for golden tilefish may be roughly approximated using the same methodology employed for Amendment 17A. A value of \$123 \$80 per angler trip is used for consumer surplus and \$155 \$128 per angler trip for charterboat net operating revenue. These values are applied on angler target trips to arrive at the estimated losses in consumer surplus and net operating revenues. Headboats are unlikely to be affected due to the absence of headboat landings of and target trips for golden tilefish. Table 4-8e presents estimates of reductions in consumer surplus and charterboat net operating revenues.

Alternative 2 provides for 3 ACLs, but only the lower two would result in adverse economic effects as shown in Table 4-8e. The positive effects of the third ACL cannot be estimated. The estimated economic effects of the two ACLs of **Alternative 2** are incurred the following year after the ACL is reached. In addition, the following year’s shortened season is assumed to consist of closing all consecutive months after the ACL is reached in the prior year. The adverse economic effects of **Alternatives 3 and 5** are substantially lower than those of the two lower ACLs of Alternative 2. Nevertheless, considering that there is only a single ACL under

Alternatives 3 and 5, the possibility exists for the commercial fishermen to alter their fishing behavior, such as fishing more intensively in the first months of the fishing year. In this eventuality, the fishery may be closed earlier and consequently result in more losses to the recreational sector than shown in the table. In addition, if the recreational landings were not adequately monitored, a fishery closure would occur only after the recreational sector has reached its usual level of harvests. This could result in practically no losses to the recreational sector in the current year but more losses in subsequent years if the single ACL is reduced in the following year.

In general, the long-term economic implications of the various alternatives would be the opposite of the short-term effects. That is, the larger short-term negative impacts are on the recreational (and commercial) sector, the more positive long-term effects can be expected. Naturally, this would depend on how the measures, including monitoring and enforcement, are successful in generating higher stock levels that would be supportive of higher recreational fishing opportunities.

Table 4-8e. Reductions in consumer surplus and net operating revenues from the various recreational ACL/AM for golden tilefish.

	Charterboats	Private/Rental	Total
<i>Alternative 2: ACL of 10,092 pounds; closure starts in June*</i>			
Consumer surplus	\$26,322	\$17,417	\$43,739
Net operating revenue	\$33,170		\$33,170
Total	\$59,492	\$17,417	\$76,909
<i>Alternative 2: ACL of 13,457 pounds; closure starts in July*</i>			
Consumer surplus	\$22,509	\$17,417	\$39,926
Net operating revenue	\$28,458		\$28,458
Total	\$50,967	\$17,417	\$68,384
<i>Alternative 3: single ACL of 326,554; closure starts in October</i>			
Consumer surplus	\$2,706	\$8,708	\$11,414
Net operating revenue	\$3,410		\$3,410
Total	\$6,116	\$8,708	\$14,824
<i>Alternative 5: single ACL of 321,003; closure starts in September</i>			
Consumer surplus	\$5,412	\$17,417	\$22,829
Net operating revenue	\$6,820		\$6,820
Total	\$12,232	\$17,417	\$29,649

*The AM for Alternative 2 involves a reduction in fishing season the following year and not an immediate fishery closure.

Table 4-8e. Reductions in consumer surplus and net operating revenues from the various recreational ACL/AM for golden tilefish.

	Charterboats	Private/Rental	Total
<i>Alternative 2: ACL of 10,092 pounds; closure starts in June*</i>			
Consumer surplus	\$1,164,160	\$101,952	\$1,266,112
Net operating revenue	\$27,392		\$27,392
Total	\$1,191,552	\$101,952	\$1,293,504
<i>Alternative 2: ACL of 13,457 pounds; closure starts in July*</i>			

Consumer surplus	\$995,520	\$101,952	\$1,097,472
Net operating revenue	\$23,501		\$23,501
Total	\$1,019,021	\$101,952	\$1,120,973
<i>Alternative 3: single ACL of 326,554; closure starts in October</i>			
Consumer surplus	\$119,680	\$50,976	\$170,656
Net operating revenue	\$2,816		\$2,816
Total	\$122,496	\$50,976	\$173,472
<i>Alternative 5: single ACL of 321,003; closure starts in September</i>			
Consumer surplus	\$239,360	\$101,952	\$341,312
Net operating revenue	\$5,632		\$5,632
Total	\$244,992	\$101,952	\$346,944

*The AM for Alternative 2 involves a reduction in fishing season the following year and not an immediate fishery closure.

4.2 Snowy grouper

4.3.1 Biological Effects

4.3.2 Economic Effects

Commercial Sector

Recreational Sector

Alternative 1 (Status Quo), which provides for no accountability measures, would be expected to have no short-run economic effects on the recreational sector.

As provided in Amendment 15B, the recreational ACL would be set at 523 fish (4,400 gw) for the recreational snowy grouper fishery. This ACL is very low even when compared to the recreational landings of snowy grouper after the bag limit reduction in 2006. If effectively constrained to its ACL, the recreational sector may appear to incur relatively large short-run economic losses. **Alternative 2 (Preferred)**, with its bag limit of 1 fish per vessel per day, offers a high likelihood of constraining the recreational sector to its ACL. In a sense, **Alternative 2** would render the recreational snowy grouper fishery a bycatch fishery, if it already were not. As with other measures, there arises the issue of effective monitoring and enforcement of the bag limit. Although the recreational ACL is low, target trips for snowy grouper are low in all fishing modes (see Table 3-50). The immediate implication here is that the economic effects of **Alternative 2** may turn out to be relatively small. While charterboats accounted for most of recreational snowy grouper harvest (Table 3-45), the private mode

registered a slightly higher target trip (Table 3-50), giving rise to the possibility that the private mode would incur slightly more losses in consumer surplus.

Alternative 3 would close the recreational fishery once the single commercial and recreational ACL of about 103 thousand pounds is reached. For the period 2003-2007, commercial landings averaged annually at about 230 thousand pounds (Table 3-26), but due partly to more restrictive regulations over time commercial landings fell to about 123 thousand pounds in 2007. In addition, Amendment 15B would impose a commercial ACL (quota) of 82,900 pounds gutted weight, with the commercial sector closed once the quota is met. It would appear, then, that factors, other than this present amendment, exist to reduce future commercial landings. Recreational landings of snowy grouper have been variable over time and averaged annually at about 54 thousand pounds for the years 2003-2007 (Table 3-45). With the bag limit reduction to 1 fish per person per day in 2006, recreational landings in 2007 plummeted to about half of its annual average. Again, factors exist, other than this amendment, which would reduce future recreational landings of snowy grouper. In addition, some alternatives under Action 1, including the current preferred alternative, would act to reduce, partially or fully, recreational landings of snowy grouper. Therefore, given those other factors that would reduce commercial and recreational landings in the future, the adverse economic effects of **Alternative 3** on the recreational sector may be deemed relatively small.

Alternative 4 would implement the same bag limit as **Alternative 2**, but only when the commercial ACL of 82,900 pounds gutted weight is reached. The economic effects of both alternatives would be similar in nature but not in magnitude. **Alternative 4** would bring about lower reductions in economic benefits than **Alternative 2**, because the recreational sector would operate at the more restrictive bag limit only part of the year. The recreational sector, by possibly exceeding its ACL and fishing part of the year with less competition from the commercial sector, would experience relatively lower economic losses under **Alternative 4**.

The economic effects of the various alternatives would partly depend on when the appropriate ACL is reached. Table 4-10d is constructed to provide some approximate timing of when the ACL is reached. Only the 2007 catch distribution is used because of the clear downward trend in commercial and recreational landings. This downward trend may be expected to continue in the near future because of restrictive regulations under the previous amendments.

Under **Preferred Alternative 2**, the recreational sector would remain open all year long. However, if the monthly landings distribution in 2007 persisted into the future, the recreational ACL of about 5,192 pounds whole weight would be reached in July. Implementation of AM would shorten the following year's season, with the closure possibly commencing in August. The ACL of **Alternative 3** would be reached early August, with recreational (and commercial) fishery closure starting in late August or early September. Given the commercial ACL of about 97,824 pounds whole weight under **Alternative 4**, the recreational AM of 1 fish per vessel per day would commence in September. The recreational sector, nonetheless, would remain open year round.

Table 4-10d. Average monthly commercial and recreational landings of snowy grouper, in thousand pounds whole weight, 2007.

	Comm.	Rec.	Total	Comm. Cumulative	Rec. Cumulative	Total Cumulative
January	6.00	0.07	6.07	6.00	0.07	6.07
February	5.00	0.08	5.08	11.00	0.15	11.15
March	13.00	0.59	13.59	24.00	0.73	24.73
April	22.00	0.59	22.59	46.00	1.32	47.32
May	13.00	0.96	13.96	59.00	2.29	61.29
June	20.00	1.05	21.05	79.00	3.33	82.33
July	12.00	4.59	16.59	91.00	7.92	98.92
August	11.00	4.58	15.58	102.00	12.50	114.50
September	8.00	0.01	8.01	110.00	12.51	122.51
October	4.00	0.07	4.07	114.00	12.58	126.58
November	4.00	7.34	11.34	118.00	19.92	137.92
December	4.00	7.34	11.34	122.00	27.25	149.25
Total	122.00	27.27	149.27			

Given certain assumptions on the number of target trips that may be affected by the various alternatives, recreational losses in terms of consumer surplus and net operating revenues may be roughly approximated. A similar methodology used in Amendment 17A is used here, with \$123 \$80 as consumer surplus loss, \$155 \$128 as net operating revenue loss to charterboats, and \$77 \$68 as net operating revenue loss to headboats. Table 4-10e presents these losses.

The ACL under **Alternative 2** is about 20 percent of 2007 recreational landings. Assuming similar proportion between landings and target trips, Alternative 2 would adversely affect 80 percent of recreational target trips. On average, target trips were 247 for charterboats, 414 for private/rental, and 98 for headboats. Headboat target trips are derived by taking the proportion of monthly snowy grouper landings to monthly snapper-grouper landings of headboats, and then applying the resulting ratio on the monthly headboat angler trips. Thus, Alternative 2 would adversely affect 198 charterboat trips, 331 private/rental trips, and 78 headboat trips.

Alternative 3 is assumed to adversely affect recreational target trips for September through December, considering that the ACL would be reached in August. With this assumption, the number of target trips adversely affected would be 0 for charterboats, 414 for private/rental, and 19 for headboats.

Alternative 4 is assumed to adversely affect 80 percent of target trips in September through December, considering that the recreational AM of 1 fish per vessel per day would take effect in September. In addition, it is assumed that the same ratio as used for **Alternative 2** would apply to the trips when the recreational sector is subject to the 1 fish per vessel per day bag limit. This alternative would then adversely affect 0 charterboat trips, 331 private/rental trips, and 15 headboat trips.

Table 4-10e. Reductions in consumer surplus and net operating revenues from various alternatives.

	Charterboats	Headboats	Private/Rental	Total
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	Alternative 2			
Cons. Surplus	\$24,354	\$9,594	\$40,713	\$74,661
Net Oper. Rev.	\$30,690	\$6,006		\$36,696
Total	\$55,044	\$15,600	\$40,713	\$111,357
	Alternative 3			
Cons. Surplus	\$0	\$2,337	\$50,922	\$53,259
Net Oper. Rev.	\$0	\$1,463		\$1,463
Total	\$0	\$3,800	\$50,922	\$54,722
	Alternative 4			
Cons. Surplus	\$0	\$1,845	\$40,713	\$42,558
Net Oper. Rev.	\$0	\$1,155		\$1,155
Total	\$0	\$3,000	\$40,713	\$43,713

Table 4-10e. Reductions in consumer surplus and net operating revenues from various alternatives.

	Charterboats	Headboats	Private/Rental	Total
	Alternative 2			
Cons. Surplus	\$364,320	\$811	\$105,920	\$471,051
Net Oper. Rev.	\$25,344	\$5,304		\$30,648
Total	\$389,664	\$6,115	\$105,920	\$501,699
	Alternative 3			
Cons. Surplus	\$0	\$198	\$132,480	\$132,678
Net Oper. Rev.	\$0	\$1,292		\$1,292
Total	\$0	\$1,490	\$132,480	\$133,970
	Alternative 4			
Cons. Surplus	\$0	\$156	\$105,920	\$106,076
Net Oper. Rev.	\$0	\$1,020		\$1,020
Total	\$0	\$1,176	\$105,920	\$107,096

Some of the factors that may produce results different from ones described above include the level of compliance, effectiveness in monitoring and enforcing the various ACLs/AMs and adaptive change in behavior of the affected individuals. Alternative 2 would impose a very restrictive bag limit that could limit the recreational sector to its ACL if compliance level were high or enforcement effective. If not, the ACL would be exceeded and, given an adequate monitoring effort, the recreational season would be shortened the following year. A shortened season, however, can prompt certain behavioral changes that could render monitoring inadequate, such as misreporting landings of snowy grouper.

Given the difficulty of obtaining recreational landings records on a real time basis, commercial landings records would be relied more in determining whether the ACL under **Alternative 3** has been reached. In this case, **Alternative 3** would allow both the commercial and recreational sectors to exceed their respective ACLs. If closures do occur, as shown above, the commercial sector may shift more effort to the early part of the year, resulting in even shorter seasons. While the commercial sector would still exceed its ACL, the recreational sector may eventually be

landing fish lower than its ACL. More economic losses to the recreational sector can be expected from such a situation.

Under **Alternative 4**, the recreational sector would incur more economic losses if the commercial sector starts shifting more effort towards the start of the year. The recreational sector, nonetheless, would likely remain open all year long so that even if losses increase over time the sector would be best off under this alternative.

4.4 Black grouper, black sea bass, gag, red grouper, and vermilion snapper

4.4.1 Biological Effects

4.4.2 Economic Effects

Commercial Fishery

Recreational Fishery

Alternative 1 (Status Quo) would have no short-term adverse economic effects on the recreational sector, but it could pose some problems on the long-term viability of each of the five fisheries, especially that the recreational sector is a major participant in all of them.

Alternative 2, which provides for various levels of ACLs, would generally establish triggers for the implementation of AMs. While AMs have direct economic impacts, ACLs would condition the implementation of AMs, with lower ACLs likely increasing the probability of implementing AMs. **Preferred Alternative 2b** incorporates an AM but only for the commercial sector, so that the general statement about ACL still holds for the recreational sector. Although both **Alternative 2a** and **Preferred Alternative 2b** provide ACLs based on expected harvests of red and black grouper and gag ACL from the implementation of Amendment 16, the economic consequences of implementing AMs could differ between the two sub-alternatives. Assuming a gag ACL per Amendment 16, **Alternative 2a** would imply species-specific implementation of AMs while **Preferred Alternative 2b** would trigger an AM implementation for all three stocks. It is then possible that under **Alternative 2a** the economic effects of AMs would be limited to one or two fisheries whereas those effects could affect all three fisheries under **Preferred Alternative 2b**. Indeed, fishers would have more flexibility in adjusting their activities under **Preferred Alternative 2b** so as not trigger or at least to delay the implementation of AMs.

Alternative 3, which provides for various levels of ACTs, would mainly condition the type of specific management measures for the recreational fishery. Generally, lower ACTs would tend to require more stringent measures resulting in larger adverse economic effects in the short run. In this sense, **Alternative 3a** would be associated with the smallest negative economic effects on the recreational sector, followed by **Alternative 3b**, and **Alternative 3c**.

Alternative 4 (Preferred) would appear to provide more stability in the estimation of harvests vis-à-vis the chosen ACL, since there is a good deal of year to year variations in recreational harvests of the subject five species. One year of high harvests due to a variety of reasons could

trigger AM implementation when there is actually a downward trend in harvest, or conversely a year of very low harvest would not trigger AM implementation when in fact there is an upward trend in harvest, particularly if this trend is brought about by increasing effort. It would appear then that averaging of harvests over a range of years would potentially allow consideration of both short-term and long-term economic effects.

Alternative 5, which provides for AMs, would have direct economic consequences on the recreational sector, with the timing of the economic effects partly dependent on the stock status. Although not using the ACT to trigger an in-season AM is explicit in **Alternative 5a**, it appears to be implicit in **Preferred Alternative 5b**. Both sub-alternatives consider the ACL as the more binding constraint. **Alternative 5a** would delay the adverse economic effects on the recreational sector to the following year via a reduction in the fishing season if the ACL were exceeded in the current year. On the other hand, the adverse economic effects on the recreational sector would be immediate under **Preferred Alternative 5b** once the ACL is projected to be met in the current year. ACL reductions in subsequent years could trigger larger adverse economic effects. Considering that projections may be inaccurate, a fishery closure under **Preferred Alternative 5b** could unduly penalize the recreational sector. Of course, this could also mean that ACL adjustments in the following year would not result in more severe economic effects. A reverse condition would ensue if the projection inaccuracy were to lead to overharvest of any of the subject species in the current year. Although a fishery closure, in terms of fixed shortened season under **Alternative 5a** or variable shortened season under **Preferred Alternative 5b**, would not necessarily result in fishing trip cancellations, benefits would still be negatively affected by increasing fishing costs or reducing the quality of fishing. In addition, both sub-alternatives would likely have distributional implications across the various fishing modes likely in proportion to the importance of a species to a particular fishing mode. For example, black sea bass is heavily dominated by the shore/private/rental mode whereas vermilion snapper is dominated largely by headboats (see Table 3-49), thus the adverse economic effects would be more on shore/private/rental mode with respect to black sea bass but more on headboats with respect to vermilion snapper.

There are two more issues worth mentioning regarding the economic effects of the two sub-alternatives of **Alternative 5**. First, **Preferred Alternative 5b** would provide better protection to overfished stocks than **Alternative 5a**, implying that the long-run economic effects of **Preferred Alternative 5b** would likely be more positive than those of **Alternative 5a**. Second, adoption of **Preferred Alternative 5b** could leave uncertain the actual measures for species not considered overfished. Thus, it is possible that the short-run economic values derived from species not overfished may be maintained at the baseline levels, but the long-run economic effects could be severe.

More recent amendments affecting the various species considered in this section are expected to constrain recreational landings to their respective ACLs. Thus, the ACL/AMs of this amendment would likely have minimal adverse economic effects on the recreational sector in the very near future. One possible exception to this is the case with black sea bass. In 2006, a recreational allocation (ACL) of 409,000 pounds gutted weight (483,000 whole weight) was set, together with a 12-inch size limit and a 15-fish bag limit. In 2007, the recreational sector landed approximately 831,000 pounds whole weight of black sea bass. In all likelihood, the black sea

bass ACL would be reached, and the fishery subsequently closed in the current season or the season reduced in the following year. Based on 2007 monthly recreational landings, the ACL would be reached in very early July. Implementing a July closure would affect about 3,666 charterboat trips, 5,147 headboat trips, and 25,599 private/rental trips. Headboat target trips are derived by taking the proportion of monthly black sea bass landings to monthly snapper-grouper landings of headboats, and then applying the resulting ratio on the monthly headboat angler trips.

Given the number of adversely affected recreational trips, recreational losses in terms of consumer surplus and net operating revenues may be roughly approximated. A similar methodology used in Amendment 17A is used here, with \$123 \$80 as consumer surplus per angler trip, per kept fish, \$155 \$128 as net operating revenue to charterboats, and \$77 \$68 as net operating revenue to headboats. Estimated potential losses are presented in Table 4-XX. Possible overestimation of changes in consumer surplus exists due to the assignment of the economic value of all catches to target trips. This method of assignment has the tendency to inflate the average number of kept fish.

Table 4 XX. Economic effects of ACL/AM for black sea bass.

	Charter	Headboat	Private/Rental	Total
Cons. Surplus	\$450,918	\$633,081	\$3,148,677	\$4,232,676
Net oper. revenue	\$568,230	\$396,319		\$964,549
Total	\$1,019,148	\$1,029,400	\$3,148,677	\$5,197,225

Table 4-XX. Economic effects of ACL/AM for black sea bass.

	Charter	Headboat	Private/Rental	Total
Cons. Surplus	\$6,745,440	\$753,521	\$38,910,480	\$46,409,441
Net oper. revenue	\$469,248	\$349,996		\$819,244
Total	\$7,214,688	\$1,103,517	\$38,910,480	\$47,228,685

4.5 Update the framework procedure for specification of Total Allowable Catch (TAC) for the Snapper Grouper Fishery Management Plan (FMP) to incorporate Annual Catch Limits (ACLs), Annual Catch Targets (ACTs), and Accountability Measures (AMs).

4.5.1 Biological Effects

4.5.2 Economic Effects

There is likely to be no economic impacts resulting from **Alternative 2 (Preferred)** since it is expected that the changes that will occur are simply changes in terminology.