Appendix

Simple Estimation of Growth Potential in the Snapper-Grouper Fishery

SAFMC Visioning Workshop

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Introduction

This document provides a review of the snapper grouper fishery in 2013 by sector (recreational and commercial) to characterize future growth potential, indicated by the difference between 2013 landings and a hypothetical "OY" (optimum yield) value. An effort was also made to identify which species are not fully used within each sector, indicated by landings below the 2013 ACL. To avoid confusion with the term OY, the hypothetical OY derived here will be called POY, for "potential optimum yield".

Please note that this analysis is not intended as an exact or particularly robust examination of future yield and certainly offers no guarantee that any future OY indicated will be available to the fishery in the future. It is simply offered as a tool for discussion during the visioning workshop, to provide some indication of stocks and sectors offering the potential for increased future yield. Finally, it can rightly be called "back of the envelope", put together solely for visioning discussion and lacking any peer review.

Methods

Potential Optimum Yield is intended to represent the total yield a stock may provide, as based on equilibrium MSY principles. Values of POY were derived by sector for each species or species complex which is assigned an ACL. Overall POY for a sector is the sum of values by species. For unassessed stocks and complexes, POY was simply set equal to the 2013 ACL. For assessed stocks, POY was set at 90% of the equilibrium MSY. Sector allocation percentages were then applied to the overall POY to determine commercial and recreational POYs. Total POY for a sector is the sum of species-based POYs, and total for the fishery is the sum of commercial and recreational POYs.

Information on 2013 landings and ACLs is taken from the SERO quota monitoring webpage, for consistency with the information reported in the visioning paper on year round access. MSY values, where available, are based on the SSC assessment recommendations. To reduce the number of species considered, landings and ACLs are reported by species groupings where the Council has specified them as groups for monitoring AMs. No effort was made to address discard losses or specific discard allocations, as this is a topic of

another visioning paper. No effort was made to infer how POY could respond to stocks moving from unassessed to assessed.

Wreckfish is not included in these calculations due to its unique management approach. The recreational ACL for red snapper, reported in numbers, was converted to pounds using the mean weight reported in the projection report of 5.78 pounds. The recreational ACL for snow grouper, also reported in numbers, was converted to weight using the MRIP reported mean weight in 2013 of 28.4 pounds.

One final yet very important caveat stands alone. The information presented here is based on 2013 conditions. Thus it does not reflect current, as in 2014, ACLs. Nor does it reflect the impacts of many actions the Council has taken during 2013 and 2014 to better, more fully, use the overall ACL available.

Growth potential for the fishery can be considered several ways, and it can quickly get confusing when dealing with current landings, current ACL and the POY. The first measure considered is the immediate increase in landings available from fully using or landing the ACL in a particular year. In the results below that is the difference between 2013 landings and ACL. The second measure is longer-term, and is the increase primarily available from rebuilding stocks or reducing uncertainty in assessments and management so that ACL can approach closer to OFL and ABC. Technically this is just the difference between ACL and POY. Finally, when considering actual fishery conditions the sum of both types of growth potential may be of interest, and is reported as the difference between 2013 landings and POY. All of these values can be reported in absolute pounds as well as in percentages.

Several factors will affect the difference between 2013 ACL and POY. Some stocks are at a biomass that exceeds Bmsy, and therefore have short-term realized ACLs that exceed equilibrium MSY. These stocks provide a decrease in POY from 2013 levels. In the snapper grouper complex these are vermilion, greater amberjack, and black sea bass. Other stocks are under rebuilding plans with ACL significantly below MSY. These include red porgy, red grouper, snowy grouper and red snapper, and will provide an increase in POY as compared to 2013 levels. Remaining assessed stocks, those that are neither overfished nor at particularly high biomass, have ACLs based on projections that incorporate estimated stock abundance, a target exploitation rate and measures of uncertainty that in any given year will deviate somewhat from the simplified POY based on 90% of equilibrium MSY. Finally, adjustments for uncertainty applied through the ABC control rule may result in differences between ABC and OFL that are greater than the 10% difference used here to generically estimate POY from MSY. Yellowtail snapper is a good example, with a 2013 total ACL (commercial and recreational combined) that is 88% of the POY. Each of these circumstances can be evaluated as the Council moves from finding a vision to developing specific regulations. However, attempting to address them is far beyond the scope of this work.

Results

Based on the simplified approach used here to derive snapper grouper potential yield, overall total POY could be around 19.7 mpds. Under current allocations, 8.8 mpds would go to the commercial sector and 10.8 to the recreational. The difference between POY and existing, 2013 ACLs is not particularly large, at only around 3 mpds. In other words, the overall resource is nearly fully used despite a few high profiles stocks under rebuilding plans, such as red snapper. The red snapper 2013 ACL is estimated here at around 76,000 pounds, while the POY based on the MSY estimate from the last assessment is 1.9 mpds. This stock alone represents 1.8 mpds of the around 3 mpds difference between 2013 ACL and overall POY . One interpretation this leads to is that more can be gained in the short term, across the entire fishery, from better use of existing ACLs than should be hoped for in the future from rebuilt stocks or changes in uncertainty adjustments.

In 2013 the Snapper-Grouper fishery landed 11.7 mpds (million pounds), representing 71% of the 16.6 mpds ACL (Table 1). Using the terms defined above, immediate growth potential is around 5 mpds. These landings were 59% of the overall POY based on 2013 conditions of 19.8 mpds. The overall ACL for 2013 is 84% of the overall POY, indicating the long term growth potential of the fishery as a whole, expressed as the difference between what was landed in 2013 and the total POY, could be as much as 8 mpds. Note that to take advantage of this potential yield, the Council must primarily find a way to move current landings closer to current ACLs as nearly 5 of these 8 mpds is composed of the unharvested 2013 yield, that "left on the table" by landings less than ACL.

Most of the growth potential appears to lie with the recreational sector. 2013 landings of 5.2 mpds are only 59% of the 2013 ACL and 48% of the POY. In terms of pounds, the recreational fishery could access an additional 3.6 mpds in the short term and 5.7 mpds in the long term.

The commercial fishery landed 6.5 mpds in 2013, representing 85% of the 7.7 mpds ACL and 73% of the 8.9 mpds POY. Total poundage increases for the commercial fishery are less than the recreational, indicating that the commercial fishery is using more of the existing ACL. Commercial yield in pounds could increase by 1.1 mpds through full use of the ACL, and 2.4 mpds in the long term if stocks approach POY levels.

Table 1. Landings, ACL and POY for the snapper-grouper fishery by sector for 2013.

	2013	2013	Equilibrium				pounds	pounds
SECTOR	landings	ACL	POY	Land/ACL	Land/POY	ACL/POY	ACL-Land	POY-Land
comm	6,535,944	7,731,458	8,893,136	0.85	0.73	0.87	1,195,514	2,357,192
rec	5,189,556	8,843,007	10,888,453	0.59	0.48	0.81	3,653,451	5,698,897
total	11,725,500	16,574,465	19,781,589	0.71	0.59	0.84	4,848,965	8,056,089

Another way to consider growth potential is by individual stock. The figures below show the difference between 2013 landings and POY by sector and stock, and are ordered from left to right by decreasing 2013 ACL. In Figure 2, the recreational fishery, considerable increases are possible in the short term for stocks such as yellowtail snapper, greater amberjack, black sea bass and mutton snapper. Of stocks in rebuilding plans, the most potential for increased yield is offered by red snapper. Some stocks or complexes show reductions in the long term, such as snowy grouper which has very low recreational yield overall and a 2013 overage.

Within the commercial fishery (Figure 1), potential increases show up more in the stocks in the middle of the sort order (by decreasing 2013 ACL). Some high potential stocks for the recreational fishery, such as greater amberjack or black sea bass, show the opposite in the commercial fishery. There are notable commercial increases possible from rebuilding stock such as red grouper, red porgy, snowy grouper and red snapper.

The last analysis provided is a big picture overview, showing the time trend of annual yield relative to POY by sector. The recreational fishery (Figure 4) removed more than POY in the early 1980's, before declining to about half of that level around 1998. Landings approached POY in 1998 and 1999 before again dropping, although the recent trend is upward. Since 2000, recreational fishery landings represent 67% of the total potential yield. The commercial fishery exhibits a similar overall trend (Figure 5), with a less sharp and more continual decline from its peak than the recreational fishery. The commercial fishery has been quite consistent since around 2000, taking as landings about 80% of its currently estimated potential yield.

Including this with the materials for the visioning discussion of increased, year-round access, is because it may help determine whether stocks subject to closures have any potential for increased yield to offset and alleviate those closures. For example, in the 2013 commercial fishery, several stocks offering increased yield are subject to the spawning season closure for shallow water grouper. Excluding rebuilding stocks such as red snapper, several of those subject to ACL based closures including gray triggerfish, golden tilefish and the jacks complex do not have much growth potential available. However, our understanding of triggerfish and jacks could change once these stocks are assessed.

Within the recreational fishery, the only ACL closures in 2013 were for golden tilefish and snowy grouper, neither of which offers much potential to alleviate those closure through yield increases. Red snapper offers the most potential for increased yield to lead to a reduction in closures as the stock rebuilds, assuming of course that increased effort and availability do not offset increased ACLs.

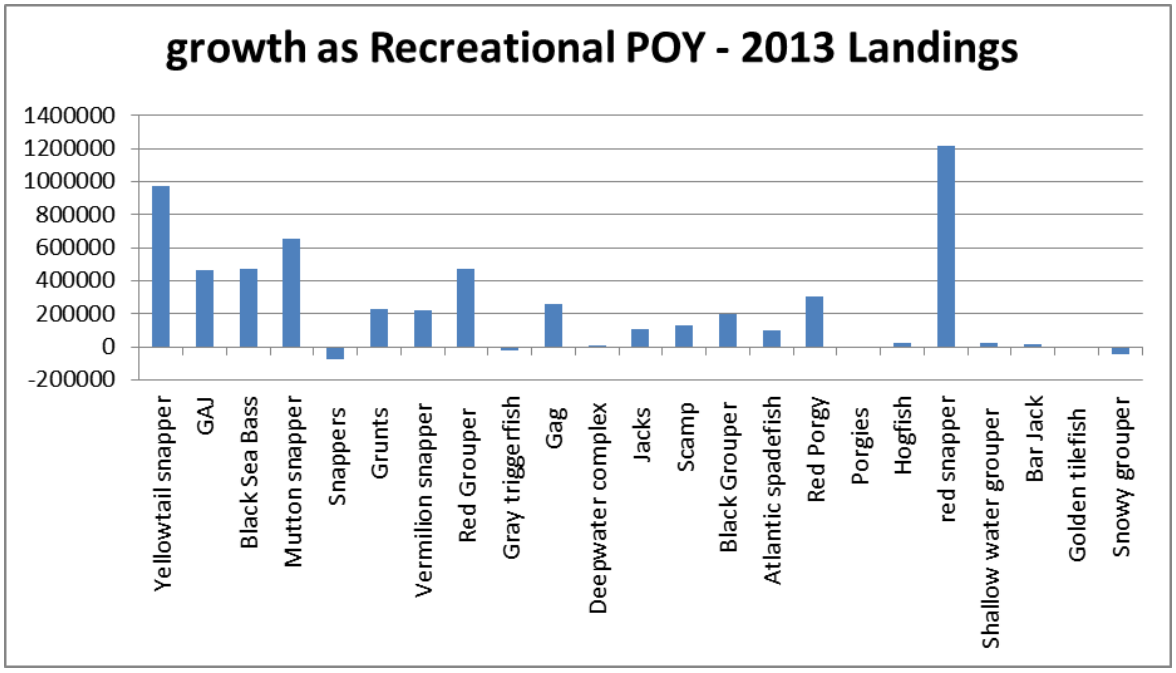

Figure 2. Recreational growth potential by stock, shown as the difference between POY and 2013 landings.

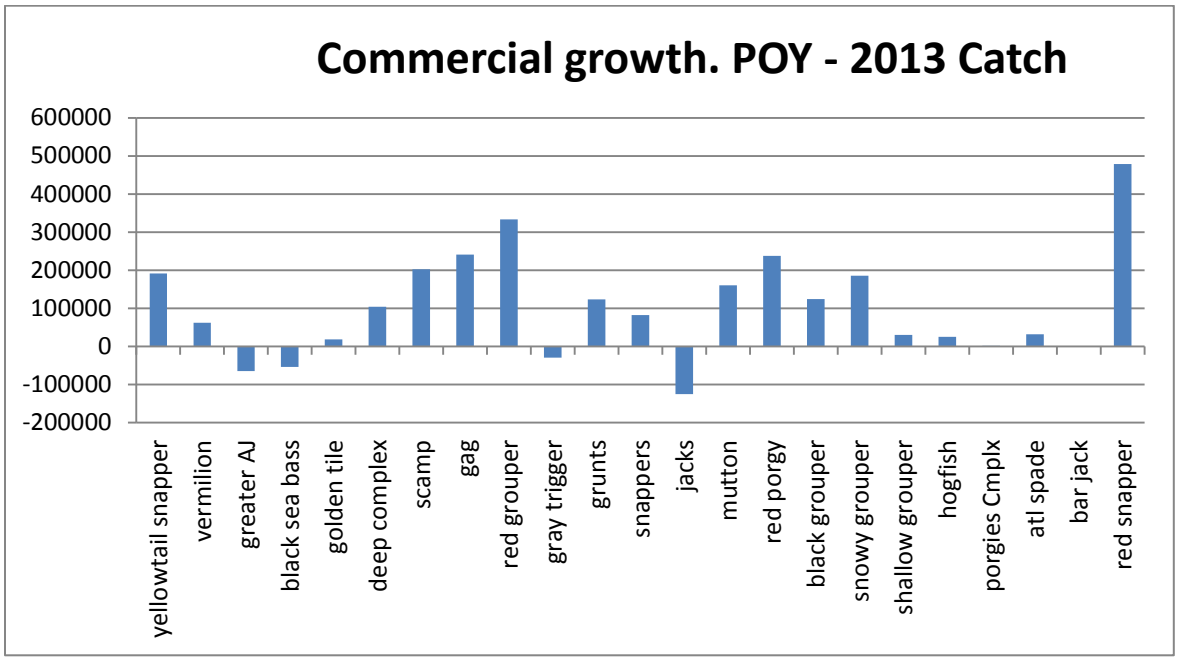

Figure 3. Growth potential in the commercial sector by stock, based on the difference between 2013 catch and potential optimum yield.

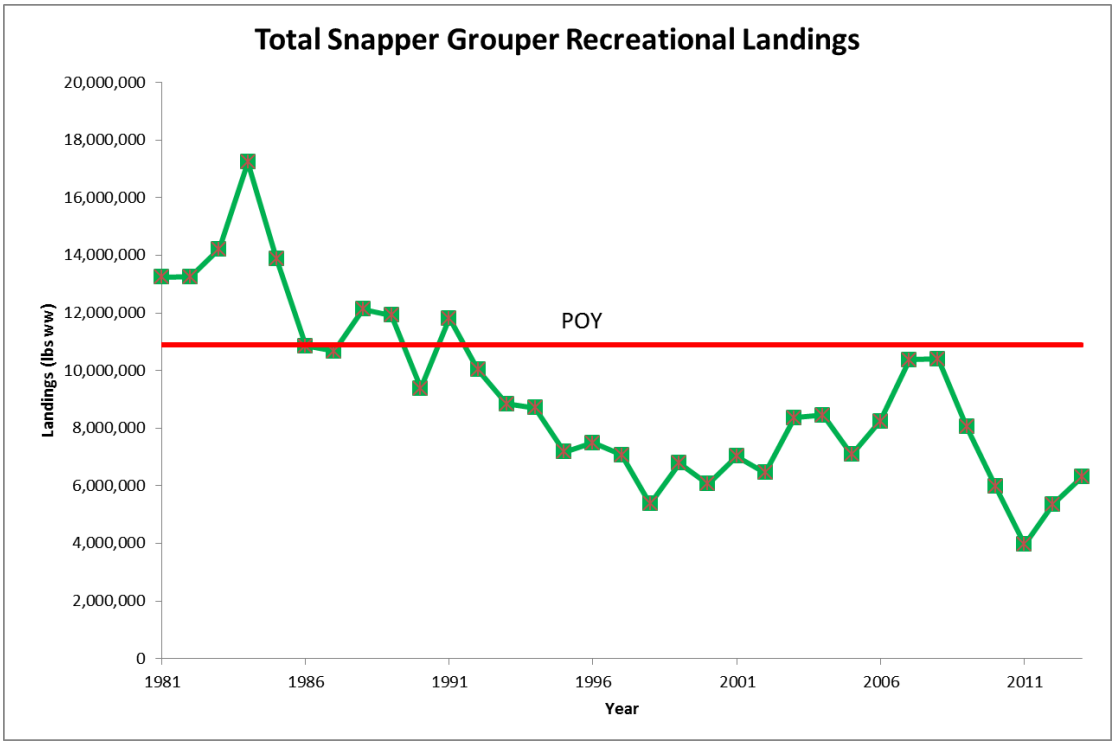

Figure 4. Time series of total recreational landings and 2013 POY

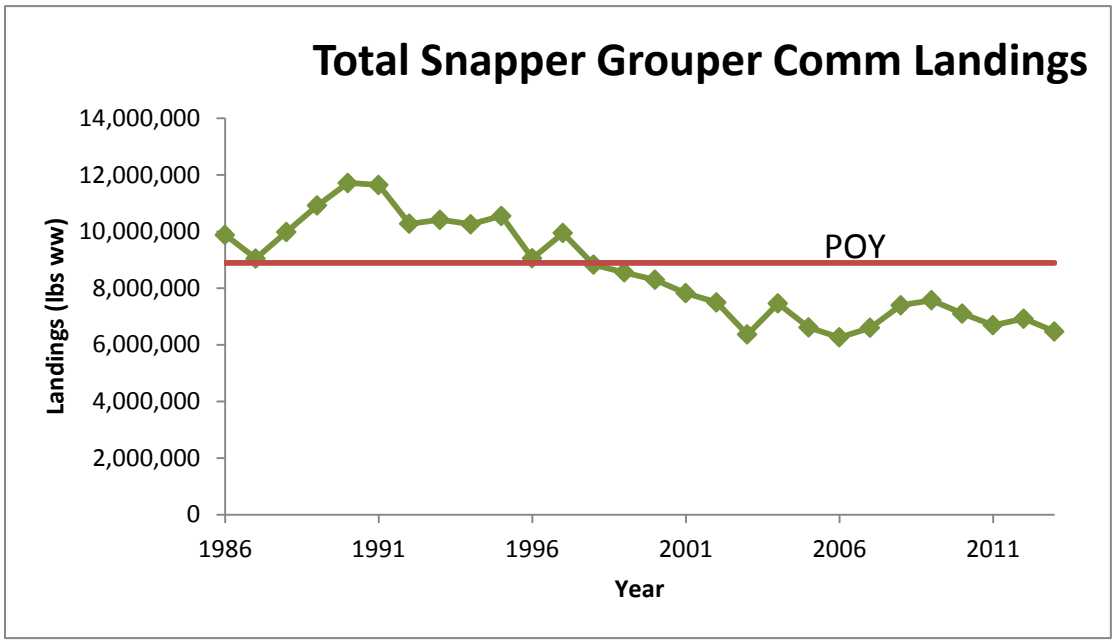

Figure 5. Time series of total commercial landings and 2013 POY.

Attachment 6c: Snapper Grouper Summary Statistics 1999-2013

Background:
Per Council's request, staff prepared an analysis of snapper grouper summary statistics demonstrating landings, ex-vessel revenue, and effort in the fishery for 1999-2013.

Table 1 is an updated analysis of Table 3-5a from Snapper Grouper Amendment 13C (see attachment 6a). Table 1 updates these data for 1999-2003 and provides additional data for 2004-2013 using 2013 dollars for revenue. This is for the commercial fishery only. Items for consideration when interpreting Table 1 include:

- Approximately 35-40% of permit holders are catching roughly 1,000 lbs of snapper grouper per year or less.
- Approximately 15% of permit holders are landing less than 100 lbs (including those permit holders who landed 0 pounds.)
- See the additional notes included with the table for data sources.

Table 2 is an updated analysis of potential average landings by vessel and values for different prices per pound of snapper grouper species based on the number of vessels, Potential Optimum Yield (POY) and the current snapper grouper total Annual Catch Limit (ACL). This is for the commercial fishery only. Table 2 updates an analysis conducted in 2008 by Council staff for the Limited Access Privilege Program workgroup (see Attachment 6b). Items for consideration when interpreting Table 2 include:

- The POY used in this analysis was taken from an analysis conducted for the Council Visioning Workshop held in October 2014 to help characterize future growth potential in the snapper grouper fishery (see Attachment 6d). The POY is a rough calculation to be used only as a tool for discussion to provide some indication of stocks and sectors offering the potential for increased future yield.
- The POY shows what the fishery could support if everything was recovered and all fisheries were fished to OY.
- The current analysis calculated how many vessels could reasonably participate given the current total ACL for all snapper grouper species combined. This shows what the fishery can support today.
- The analysis was conducted assuming fishery participants had income from the snapper grouper fishery only and does not consider participants that fish in other fisheries or have other part-time sources of income.

Attachment 6c: Snapper Grouper Summary Statistics 1999-2013

Table 1. Snapper grouper fishery summary statistics in the South Atlantic: annual landings, ex-vessel revenue, and effort - 1999-2003

Source: Southeast logbook (SEFSC, Beaufort Lab, NMFS) and Southeast permits database (SERO, NMFS).

Item	1999	2000	2001	2002	2003
Snapper grouper landings	7,704,007	7,679,823	7,562,215	6,554,073	5,753,295
Ex-vessel revenue from the snapper grouper fishery	$13,996,781	$14,619,050	$13,902,225	$13,625,649	$12,099,906
Real ex-vessel revenue in $2013*	$19,571,717	$19,777,062	$18,286,960	$17,644,193	$15,319,336
Ex-vessel revenue from all landings in the South Atlantic **	$202,772,265	$218,251,010	$175,665,169	$170,667,823	$156,451,803
Ex-vessel revenue from finfish landings in the South Atlantic **	$58,860,534	$64,460,694	$57,621,958	$57,822,417	$50,842,307
Number of trips	17,200	16,241	16,922	17,116	16,501
Days fished	29,285	28,913	29,567	29,421	27,358
Average days per trip	1.7	1.78	1.75	1.72	1.66
Price/lb	$1.82	$1.90	$1.84	$2.08	$2.10
Real price/lb $2013*	$2.54	$2.58	$2.42	$2.69	$2.66
Number of permitted vessels	1,441	1,341	1,264	1174	1123
Number of vessels with unlimited permits	1,085	1,001	959	907	879
Number of vessels landing snapper grouper species	1,101	1,045	981	978	934
Number of vessels with more than 100 lb of landings	972	920	850	825	788
Number of vessels with more than 1,000 lb of landings	657	606	585	574	533
Number of vessels with more than 5,000 lb of landings	311	304	288	265	259
Number of vessels with more than 10,000 lb of landings	199	195	196	184	156
Number of vessels with more than 50,000 lb of landings	27	26	26	22	14
Number of dealer permits	239	245	252	320	323
Number of processors (snapper grouper species)+	6	11	9		
Number of processors (snapper grouper and unclassified finfish species)+	15	20	17		

NOTES: Table updated from SG Am13C

Landings information came from the Southeast logbook. Data from the Gulf of Mexico and other (unknown) states are not included in this table.

However, Monroe County data is included. Also, wreckfish landings are not included.

* The CPI was used to adjust these values for inflation.

** Data obtained from the NMFS web site.

+Summarized from the NMFS Annual Processor Survey.

Attachment 6c: Snapper Grouper Summary Statistics 1999-2013

Table 1 (continued). Snapper grouper fishery summary statistics in the South Atlantic: annual landings, ex-vessel revenue, and effort - 2004-2008

Source: Southeast logbook (SEFSC, Beaufort Lab, NMFS) and Southeast permits database (SERO, NMFS).

Item	2004	2005	2006	2007	2008
Snapper grouper landings	6,053,131	5,782,527	5,482,851	5,931,175	6,394,924
Ex-vessel revenue from the snapper grouper fishery	$12,709,024	$12,996,581	$13,606,379	$15,708,482	$16,688,284
Real ex-vessel revenue in $2013*	$15,673,140	$15,502,532	$15,722,725	$17,649,106	$18,056,657
Ex-vessel revenue from all landings in the South Atlantic **	$159,255,593	$131,298,038	$140,443,403	$152,400,186	$165,871,739
Ex-vessel revenue from finfish landings in the South Atlantic **	$59,824,194	$56,786,877	$60,457,359	$61,329,879	$60,794,219
Number of trips	15,048	13,754	13,221	14,868	14,755
Days fished	24,821	22,793	23,159	24,436	24,867
Average days per trip	1.65	1.66	1.75	1.64	1.69
Price/lb	$2.10	$2.25	$2.48	$2.65	$2.61
Real price/lb $2013*	$2.59	$2.68	$2.87	$2.98	$2.82
Number of permitted vessels	1066	1007	974	877	815
Number of vessels with unlimited permits	841	801	783	718	664
Number of vessels landing snapper grouper species	908	859	872	895	914
Number of vessels with more than 100 lb of landings	747	719	703	735	746
Number of vessels with more than 1,000 lb of landings	506	459	433	463	467
Number of vessels with more than 5,000 lb of landings	248	224	210	234	237
Number of vessels with more than 10,000 lb of landings	155	142	145	155	166
Number of vessels with more than 50,000 lb of landings	22	22	21	22	23
Number of dealer permits	299	261	300	317	297
Number of processors (snapper grouper species)+					
Number of processors (snapper grouper and unclassified finfish species)+					

NOTES: Table updated from SG Am13C

Landings information came from the Southeast logbook. Data from the Gulf of Mexico and other (unknown) states are not included in this table.

However, Monroe County data is included. Also, wreckfish landings are not included.

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+Summarized from the NMFS Annual Processor Survey.

Attachment 6c: Snapper Grouper Summary Statistics 1999-2013

Table 1 (continued). Snapper grouper fishery summary statistics in the South Atlantic: annual landings, ex-vessel revenue, and effort - 2009-2013

Source: Southeast logbook (SEFSC, Beaufort Lab, NMFS) and Southeast permits database (SERO, NMFS).

Item	2009	2010	2011	2012	2013
Snapper grouper landings	6,800,099	6,267,335	5,928,033	5,993,705	5,688,092
Ex-vessel revenue from the snapper grouper fishery	$16,522,048	$15,303,884	$15,208,213	$15,863,327	$16,184,122
Real ex-vessel revenue in $2013*	$17,940,620	$16,349,684	$15,750,313	$16,095,686	$16,184,122
Ex-vessel revenue from all landings in the South Atlantic **	$147,338,367	$165,686,301	$171,305,618	$171,358,285	$161,184,048
Ex-vessel revenue from finfish landings in the South Atlantic **	$63,111,787	$65,921,070	$66,196,146	$63,927,466	$60,621,483
Number of trips	15,888	14,041	13,670	13,586	12,912
Days fished	26,529	23,118	22,545	21,802	21,457
Average days per trip	1.67	1.65	1.65	1.60	1.66
Price/lb	$2.43	$2.44	$2.57	$2.65	$2.85
Real price/lb $2013*	$2.64	$2.61	$2.66	$2.69	$2.85
Number of permitted vessels	783	763	753	736	723
Number of vessels with unlimited permits	639	624	615	604	593
Number of vessels landing snapper grouper species	936	857	797	809	731
Number of vessels with more than 100 lb of landings	762	691	653	632	611
Number of vessels with more than 1,000 lb of landings	478	450	417	411	396
Number of vessels with more than 5,000 lb of landings	264	249	248	249	233
Number of vessels with more than 10,000 lb of landings	192	168	169	177	166
Number of vessels with more than 50,000 lb of landings	24	23	22	17	14
Number of dealer permits	304	292	281	293	291
Number of processors (snapper grouper species)+					
Number of processors (snapper grouper and unclassified finfish species)+					

NOTES: Table updated from SG Am13C

Landings information came from the Southeast logbook. Data from the Gulf of Mexico and other (unknown) states are not included in this table.

However, Monroe County data is included. Also, wreckfish landings are not included.

* The CPI was used to adjust these values for inflation.

** Data obtained from the NMFS web site.

+Summarized from the NMFS Annual Processor Survey.

Table 2: Potential average landings by vessel and values for different prices per pound of snapper grouper based on number of vessels, potential OY and current snapper grouper total ACL. (Commercial fishery only)

	POY = 8,893,136 lbs				Current ACLs = 1,195,513 lbs			
# Vessels	**Lbs allocated to each vessel**	**$2/lb**	**$3/lb**	**$4/lb**	**Lbs allocated to each vessel**	**$2/lb**	**$3/lb**	**$4/lb**
900	9,881	$19,763	$29,644	$39,525	1,328	$2,657	$3,985	$5,313
700	12,704	$25,409	$38,113	$50,818	1,708	$3,416	$5,124	$6,832
500	17,786	$35,573	$53,359	$71,145	2,391	$4,782	$7,173	$9,564
200	44,466	$88,931	$133,397	$177,863	5,978	$11,955	$17,933	$23,910
100	88,931	$177,863	$266,794	$355,725	11,955	$23,910	$35,865	$47,821
75	118,575	$237,150	$355,725	$474,301	15,940	$31,880	$47,821	$63,761
50	177,863	$355,725	$533,588	$711,451	23,910	$47,821	$71,731	$95,641
25	355,725	$711,451	$1,067,176	$1,422,902	47,821	$95,641	$143,462	$191,282