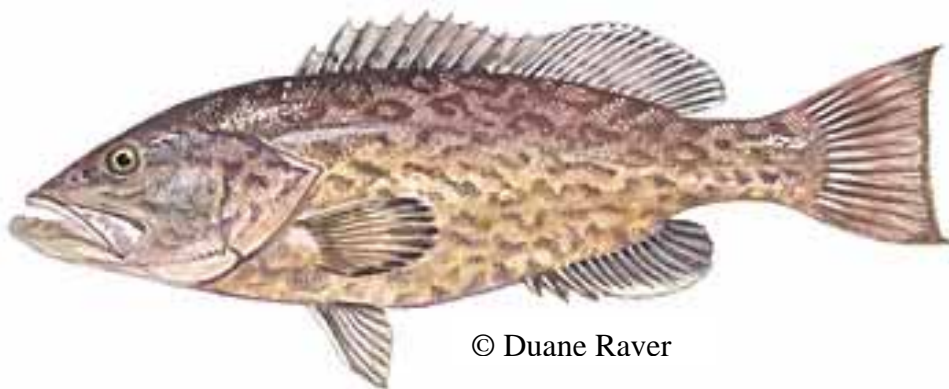


Amendment 16 to the Snapper Grouper Fishery Management Plan

Incidental Catch of Vermilion Snapper and Gag
An Explanation for the Snapper Grouper Advisory Panel – Input Requested



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Jack McGovern
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Incidental Catch of Vermilion Snapper and Gag *An Explanation to the Snapper Grouper Advisory Panel – Input Requested*

1 Introduction

Amendment 16 is being developed to end overfishing of gag and vermilion snapper. A variety of management measures are available including quotas, seasonal closures, bag limits, and size limits. If a quota is met or a seasonal closure is implemented, it is expected there would still be some catch of gag and vermilion snapper when fishermen target co-occurring species. These species would be released and a percentage of the incidentally caught gag and vermilion snapper would die, depending on depth of capture. The magnitude of incidentally caught gag and vermilion snapper that die after a quota is met is referred to as post quota bycatch mortality (PQBM). Furthermore, a decrease in the bag limit or increase in the size limit would be expected to increase the magnitude of dead discards.

The Scientific and Statistical Committee (SSC) recommended quotas be adjusted for dead discards that could occur after a quota is met. Furthermore, the SSC feels a seasonal closure would not be 100% effective in protecting a species since some incidental catch of that species would be expected. The SSC believes the effectiveness of a seasonal closure should be estimated and taken into consideration when considering management measures to achieve a target reduction in harvest. In addition, the SSC recommended size and bag limit analyses take into consideration dead discards occurring from an increase if the number of fish released by fishermen when a bag limit is lowered or a size limit is increased.

At the December 2007 South Atlantic Council (Council) meeting, a methodology to estimate dead discards after a quota is met or during a seasonal closure was presented to both the SSC and the Council. After discussions with the SSC and Council, two issues were unresolved. First, the percentage of trips not be taken by fishermen (commercial and recreational) during a closure or after a quota is met to target a bottom dwelling reef fish species is unknown. Second, the percentage of gag or vermilion snapper that can be avoided by recreational or commercial fishermen by changing fishing methodology and location is also in question. The SSC and Council indicated the Snapper Grouper Advisory Panel (AP) was best suited to provide this information.

Provided herein are methods and examples of estimating dead discards during a closed season. This does not represent the full range of alternatives currently available in Amendment 16. Values are considered preliminary, especially since a new benchmark assessment is being conducted for vermilion snapper in 2008.

Input from the Snapper Grouper AP

Input is needed from commercial and recreational fishermen on the percentage of trips that would not be taken when a fishery was closed and the percentage of gag or vermilion snapper that can be avoided. Any comments on how the methodology can be improved are welcome. A form is provided at the end of this document. The form can be sent to Jack McGovern. An addressed, stamped envelope is provided. Information can also be sent by e-mail (John.McGovern@noaa.gov) or telephone (727-824-5383).

2 Methodology for Determining Dead Discards After a Quota is Met or During a Seasonal Closure

The basic methodology for determining how many dead discards would occur during a closure or after a quota is met is similar for the commercial and recreational sectors:

- Determine average landings over a period of time (1999-2005) for gag and vermilion snapper.
- Identify the species caught with either gag or vermilion snapper.
- Determine the landings of gag or vermilion snapper if co-occurring species were targeted. This is maximum potential incidental catch.
- Determine incidental catch if trips were not taken during a closure (i.e. trips were reduced by 20 to 60%).
- Determine incidental catch if fishermen can avoid a species by modifying gear or changing fishing locations.
- Apply Southeast Data Assessment and Review (SEDAR) accepted release mortality rates to values for incidental catch to determine magnitude of dead discards.
- Determine effectiveness of a closure by comparing the magnitude of estimated dead discards for a particular period of time to the actual historical landings.

3 Commercial Incidental Catch – Assumptions

3.1 Assumptions for estimating dead discards after a commercial quota is met or during a commercial seasonal closure

- Vermilion snapper and gag are taken by many fishermen on the same trip.
- If value of a trip falls below a certain level due to reductions in allowable catch, increased fuel prices, etc., the trip will not be taken.
- Net revenue (total revenue – trip cost) for a trip was calculated. If the net revenue per trip was less than an opportunity cost of labor = \$50.00 then the trip was removed from the data set.
- In determining incidental catch, a co-occurring species is targeted if at least 100 lbs whole weight (ww) is taken on a trip.
- After a quota is met or during a seasonal closure, if vermilion snapper or gag make up greater than 75% of the catch on a trip, the trip is not included in analyses.
- Fishermen will not use diving gear to target gag after a quota is met or during a seasonal closure.
- There will not be an increase in fishing effort before or after a seasonal closure.
- Some trips will not be taken after a quota is met. A range of 20 to 60% is used.
- Fishermen can avoid vermilion snapper and gag to some degree by changing hook size, method of fishing, and location. A range of 20 to 60% is used.
- Dead discards determined by applying release mortality rate of 40% for commercially caught vermilion snapper and gag.

3.2 Example of estimate of dead discards for vermilion snapper and gag associated with commercial quotas assuming no additional gag seasonal closure.

STEP 1. Estimate the monthly commercial catch of a species.

STEP 2 - Drop trips if net revenue is less than opportunity cost.

STEP 3 - Determine when quotas would be met.

Table 1. Cumulative monthly commercial catch of vermilion snapper (pounds gutted weight) during 2000-2005. Example is for a quota = 385,002 lbs gutted weight. Data from logbook.

Month	2000	2001	2002	2003	2004	2005
1	34,270	58,279	73,541	32,640	47,270	76,883
2	77,486	138,234	113,405	66,216	82,162	126,135
3	158,153	222,928	247,676	114,468	173,477	207,973
4	253,874	332,081	359,135	184,414	248,468	251,640
5	359,532	475,162	410,414	253,252	306,342	358,396
6	485,351	631,198	534,162	290,784	337,279	467,811
7	615,477	754,820	618,333	314,541	410,514	558,802
8	772,874	921,838	759,658	345,000	512,486	648,802
9	879,748	1,114,432	862,847	409,009	564,640	775,351
10	1,023,847	1,243,712	1,009,018	525,252	737,856	874,874
11	1,149,532	1,366,441	1,114,919	619,937	870,207	974,640
12	1,234,550	1,473,514	1,164,009	674,784	951,649	1,009,946

Year	2000	2001	2002	2003	2004	2005	
Date when quota met	6/7/2000	5/10/2001	5/10/2001	9/24/2002	7/24/2004	6/7/2005	Average
Landings after proposed quota	849,548	1,088,512	779,007	289,782	566,647	624,944	839,688

Table 2. Cumulative monthly commercial catch of gag (pounds gutted weight) during 2000-2005. Example is for a quota = 423,340 lbs gutted weight. Data from logbook.

Month	2000	2001	2002	2003	2004	2005
1	36,339	56,797	66,593	38,975	49,619	44,653
2	91,407	121,085	107,398	73,415	87,297	87,924
3	92,373	121,297	108,000	74,449	88,119	89,237
4	94,305	124,627	109,381	76,068	89,619	91,254
5	163,492	193,076	174,119	149,314	170,602	163,034
6	204,992	240,712	220,890	217,424	223,568	210,602
7	240,475	274,678	262,627	272,703	265,831	254,297
8	271,890	308,873	290,576	321,339	294,949	290,644
9	295,110	335,356	312,381	355,703	311,746	321,932
10	329,644	374,737	349,754	405,695	358,746	361,517
11	370,458	406,102	394,110	454,288	411,153	405,508
12	414,195	437,729	444,975	496,847	445,254	437,644

Quota	2000	2001	2002	2003	2004	2005	
Dates when quota met	11/11/2000	10/14/2001	11/3/2002	9/28/2003	10/29/2004	10/23/2005	Average

Landings after proposed quota	60,255	83,789	91,035	142,907	91,314	83,704	110,601
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STEP 4 - Remove trips that would not be taken after quota is met.

This step would remove trips that would not be taken after a quota is met because the opportunity cost would exceed the net revenue. This is done by setting the pounds and revenue to 0 after the quota for vermilion snapper or gag is met and adjusting the total lbs and total revenue.

STEP 5 - Determine incidental catch after quota is met.

STEP 5a - Identify most common species taken with vermilion snapper

Table 3. Species most commonly taken on trips with vermilion snapper.

COMMON	Mean	Sum	%	Cum
SNAPPER,VERMILION	460	3,005,272	32.52%	32.52%
GROUPE,GAG	300	1,031,230	11.16%	43.67%
SCAMP	176	779,083	8.43%	52.10%
TRIGGERFISH,GRAY	145	595,067	6.44%	58.54%
AMBERJACK,GREATER	248	553,829	5.99%	64.53%
GROUPE,RED	130	490,283	5.30%	69.84%
JACK,ALMACO	163	407,937	4.41%	74.25%
SNAPPER,RED	104	326,173	3.53%	77.78%
SEA BASSE,ATLANTIC,BLACK,UNC	78	231,433	2.50%	80.29%

Table 4. Species most commonly taken on trips with gag.

COMMON	Mean	Sum	%	Cum
GROUPE,GAG	244	1,166,199	21.67%	21.67%
SNAPPER,VERMILION	481	1,091,995	20.29%	41.96%
SCAMP	182	420,633	7.82%	49.78%
AMBERJACK,GREATER	262	417,058	7.75%	57.53%
GROUPE,RED	175	397,988	7.40%	64.93%
TRIGGERFISH,GRAY	125	228,653	4.25%	69.18%
JACK,ALMACO	181	197,845	3.68%	72.85%
SNAPPER,RED	96	188,736	3.51%	76.36%
SEA BASSE,ATLANTIC,BLACK,UNC	67	119,773	2.23%	81.28%

STEP 5b – Identify trips that target co-occurring species.

Identify trips that caught at least 100 lbs (directed catch) of co-occurring species after quota is met.

STEP 5c - Determine incidental catch.

This step determines the maximum incidental catch that could occur when targeting co-occurring species. It does not adjust incidental catch for the reduction in trips that would not be taken after a quota is met or ability of fishermen to avoid gag or vermilion snapper. That is done in steps 5d and 5e.

Table 5. Maximum incidental catch of vermilion snapper (pounds gutted weight) that could occur after a commercial quota met when targeting co-occurring species. Release mortality = 40%. Trips that contained >75% of vermilion snapper after quota met were removed from analysis.

Month	2000	2001	2002	2003	2004	2005	
5		76,054	10,081				
6	69,748	68,342	61,054			44,739	
7	55,018	53,252	46,252		22,162	35,189	
8	79,099	77,153	54,784		38,505	38,279	
9	50,081	73,883	48,387	22,297	20,577	46,126	
10	69,685	60,000	57,279	44,198	74,135	41,234	
11	65,081	57,351	44,784	48,685	64,784	34,486	
12	21,468	54,676	20,604	26,396	33,577	5,748	Average
Incidental catch	410,180	520,712	343,225	141,577	253,739	245,802	319,206
Dead Discards	164,072	208,285	137,290	56,631	101,495	98,321	127,682

Table 6. Maximum incidental catch of gag (pounds gutted weight) that could occur after a commercial quota met when targeting co-occurring species. Release mortality = 40%. Trips that contained >75% of gag after quota met were removed from analysis. Trips that used diving gear were also removed.

Month	2000	2001	2002	2003	2004	2005	
9				1,983			
10		9,907		29,915	1,771	1,686	
11	6,720	7,958	16,610	22,551	18,144	13,788	
12	16,483	12,712	11,559	17,246	12,432	7,322	Average
Incidental catch	23,203	30,576	28,169	71,695	32,347	22,797	34,798
Dead Discards	9,281	12,231	11,268	28,678	12,939	9,119	13,919

STEP 5d – Determine incidental catch for reduced trips after quota.

Trips that target co-occurring species in STEP 5c were randomly selected to reduce the number of trips from 20% to 60%. This assumes fishermen may stop fishing for vermilion snapper after quota is met.

Table 7. Estimate of vermilion snapper incidental catch and dead discards when trips are reduced after a commercial quota is met. Release mortality = 40%.

Trip reduction	0%	20%	40%	60%
Incidental catch	319,206	177,554	143,839	105,598
Dead Discards	127,682	71,022	57,536	42,239

Table 8. Estimate of gag incidental catch and dead discards when trips are reduced after a commercial quota is met. Release mortality = 40%.

Trip reduction	0%	20%	40%	60%
Incidental catch	34,798	20,456	15,244	11,733
Dead Discards	13,919	8,182	6,098	4,693

STEP 5e – Determine dead discards for reduced trips and behavior after quota.

This step assumes that some trips could be reduced and fishermen could have the ability to avoid vermilion snapper or gag by fishing differently.

Table 9. Estimate of vermilion snapper incidental catch and dead discards when trips are reduced and ability of fishermen avoid vermilion snapper on a trip. Effectiveness determined by comparing estimated dead discards to actual landings for the same period. Release mortality = 40%.

Trip reduction after quota	0%				20%				40%				60%			
	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%
Discards	319,206	255,365	153,219	61,287	177,554	142,043	85,226	34,090	143,839	115,071	69,043	27,617	105,598	84,478	50,687	20,275
Dead Discards	127,682	102,146	61,287	24,515	71,022	56,817	34,090	13,636	57,536	46,029	27,617	11,047	42,239	33,791	20,275	8,110
Effectiveness	84.79%	87.84%	92.70%	97.08%	91.54%	93.23%	95.94%	98.38%	93.15%	94.52%	96.71%	98.68%	94.97%	95.98%	97.59%	99.03%

If 20% of the trips were reduced after a quota was met and fishermen can avoid 40% of vermilion snapper, then the magnitude of incidentally caught vermilion snapper would be 85,226 lbs gutted weight, and the estimate of vermilion snapper that would die is 34,090 lbs gutted weight.

Table 10. Estimate of gag incidental catch and dead discards when trips are reduced and ability of fishermen avoid gag on a trip. Effectiveness determined by comparing estimated dead discards to actual landings for the same period. Release mortality = 40%.

Trip reduction after quota	0%				20%				40%				60%			
	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%
Discards	34,798	27,838	16,703	6,681	20,456	16,365	9,819	3,928	15,244	12,195	7,317	2,927	11,733	9,386	5,632	2,253
Dead Discards	13,919	11,135	6,681	2,672	8,182	6,546	3,928	1,571	6,098	4,878	2,927	1,171	4,693	3,755	2,253	901
effectiveness	87.41%	89.93%	93.96%	97.58%	92.60%	94.08%	96.45%	98.58%	94.49%	95.59%	97.35%	98.94%	95.76%	96.61%	97.96%	99.19%

If 20% of the trips were reduced after a quota was met and fishermen can avoid 40% of gag, then the magnitude of incidentally caught gag would be 9,819 lbs gutted weight, and the estimate of gag that would die is 3,928 lbs gutted weight.

3.3 Example of effectiveness of a January-April commercial seasonal closure for gag

STEP 1. Estimate the monthly commercial catch of a species.

STEP 2 - Drop trips if net revenue is less than opportunity cost.

Table 11. Average commercial landings (pounds gutted weight) of gag during 2001-2005 from logbook after trips removed.

Month	Tot WW	Tot GW	Avg GW
1	309,020	261,881	52,376
2	265,912	225,349	45,070
3	4,883	4,138	828
4	11,809	10,008	2,002
5	430,727	365,023	73,005
6	315,686	267,530	53,506
7	262,087	222,108	44,422
8	211,835	179,521	35,904
9	157,179	133,202	26,640
10	254,353	215,553	43,111
11	263,565	223,360	44,672
12	229,434	194,436	38,887
sum		460,422	

STEP 3 - Determine incidental catch during a seasonal closure.

STEP 3a - Identify most common species taken with vermilion snapper

Table 12. Species most commonly taken on trips with gag.

COMMON	Mean	Sum	%	Cum
GROUPE, GAG	244	1,166,199	21.67%	21.67%
SNAPPER, VERMILION	481	1,091,995	20.29%	41.96%
SCAMP	182	420,633	7.82%	49.78%
AMBERJACK, GREATER	262	417,058	7.75%	57.53%
GROUPE, RED	175	397,988	7.40%	64.93%
TRIGGERFISH, GRAY	125	228,653	4.25%	69.18%
JACK, ALMACO	181	197,845	3.68%	72.85%
SNAPPER, RED	96	188,736	3.51%	76.36%
SEA BASSE, ATLANTIC, BLACK, UNC	67	119,773	2.23%	81.28%

STEP 3b – Identify trips that target co-occurring species.

Identify trips that caught at least 100 lbs (directed catch) of co-occurring species during seasonal closure.

STEP 3c - Determine incidental catch.

This step determines the maximum incidental catch that could occur when targeting co-occurring species. It does not adjust incidental catch for the reduction in trips that would not be taken during a closure or ability of fishermen to avoid gag. That is done in steps 3d and 3e.

Table 13. Estimate maximum incidental catch of gag (pounds gutted weight) that could occur during a commercial seasonal closure when targeting co-occurring species. Release mortality = 40%. Trips that contained >75% of gag during closure were removed from analysis. Trips that used diving gear were also removed.

Month	2001	2002	2003	2004	2005	
1	30,136	27,703	13,610	27,669	32,203	
2	26,780	23,712	15,898	26,890	28,797	
3	93	34	653	195	178	
4	3,093	508	1,331	1,305	314	Average
Incidental catch	60,102	51,958	31,492	56,059	61,492	52,220
Dead Discards	24,041	20,783	12,597	22,424	24,597	20,888

STEP 3d – Determine incidental catch for reduced trips during a closure.

Trips that target co-occurring species in STEP 3c were randomly selected to reduce the number of trips from 20% to 60%. This assumes fishermen may stop fishing for vermilion snapper during a closure.

Table 14. Estimate of gag incidental catch and dead discards during a commercial seasonal closure when trips are reduced. Release mortality = 40%.

Trip reduction	0%	20%	40%	60%
Incidental catch	52,220	14,578	11,815	8,710
Dead Discards	20,888	5,831	4,726	3,484
Effectiveness	79.17%	94.18%	95.29%	96.53%

STEP 3e – Determine dead discards for reduced trips and behavior during a seasonal closure.

This step assumes that some trips could be reduced and fishermen could have the ability to avoid gag by fishing differently.

Table 15. Incidental catch of gag assuming a range in trips (0 to 60%) during a commercial seasonal closure and fishermen can avoid gag (range 0 to 60%) by changing fishing methods.

Trip reduction after quota	0%				20%				40%				60%			
	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%
Discards	52,220	41,776	25,066	10,026	14,578	11,662	6,997	2,799	11,815	9,452	5,671	2,269	8,710	6,968	4,181	1,672
Dead Discards	20,888	16,711	10,026	4,011	5,831	4,665	2,799	1,120	4,726	3,781	2,269	907	3,484	2,787	1,672	669
Effectiveness	79.17%	83.34%	90.00%	96.00%	94.18%	95.35%	97.21%	98.88%	95.29%	96.23%	97.74%	99.10%	96.53%	97.22%	98.33%	99.33%

A January – April commercial spawning season closure would be 95% effective if one assumes 20% of the trips formerly made would not be taken during the closure and fishermen can avoid 20% of the gag they once caught by modifying fishing gear or changing location.

4 Recreational Incidental Catch – Introduction, Assumptions, and Methods

4.1 Assumptions for estimating dead discards during a seasonal closure for MRFSS

- Vermilion snapper and gag are taken by many fishermen on the same trip.
- Recreational fishermen can avoid vermillion snapper and gag to some degree by changing hook size, method of fishing, and location.
- There will not be an increase in fishing effort before or after a seasonal closure.
- Release mortality for gag and vermillion snapper caught by recreational fishermen is 25%.

4.1.1 Effectiveness of recreational seasonal closure for gag, MRFSS data

STEP 1. Estimate the catch of a species during a seasonal closure

STEP 2 - Identify most common species taken with vermillion snapper

Table 16. Catch (A+B1) in number of gag and other species taken on MRFSS trips with gag during January-April (Waves 1 and 2), 1999-2005. Data represents sample and are not expanded.

common	Sum
vermillion snapper	559
black sea bass	427
red snapper	302
gag	298
gray snapper	220
lane snapper	183
greater amberjack	149
king mackerel	96
white grunt	95

STEP 3a - Determine incidental catch during a seasonal closure.

Determine the catch of gag during a seasonal closure when trips for co-occurring species are made.

STEP 3b – Determine incidental catch for reduced trips during a closure.

Trips that target co-occurring species in STEP 3a were randomly selected to reduce the number of trips from 20% to 60%. This assumes fishermen may stop fishing for vermillion snapper during a closure.

Table 17. Estimate of gag incidental catch in number (when targeting co-occurring species) and dead discards from MRFSS during a recreational seasonal closure when trips are reduced. Release mortality = 25%.

Trip reduction	0%	20%	40%	60%
Incidental catch	221	177	140	131
Dead Discards	55	44	35	33
Effectiveness	81.46%	85.15%	88.26%	89.01%

STEP 3c – Determine dead discards for reduced trips and behavior during a seasonal closure.

This step assumes that some trips could be reduced and fishermen could have the ability to avoid gag by fishing differently.

Table 18. Incidental catch of gag (numbers of fish) from MRFSS assuming a range in trips (0 to 60%) during a seasonal closure and fishermen can avoid gag (range 0 to 60%) by changing fishing methods. Release mortality = 25%. Data represents sample and are not expanded.

Trip reduction after quota	0%				20%				40%				60%			
	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%
Percent of discards avoided																
Discards	221	177	106	42	177	142	85	34	140	112	67	27	131	105	63	25
Dead Discards	55	44	27	11	44	35	21	8	35	28	17	7	33	26	16	6
Effectiveness	81.46%	85.17%	91.10%	96.44%	85.15%	88.12%	92.87%	97.15%	88.26%	90.60%	94.36%	97.74%	89.01%	91.21%	94.72%	97.89%

A January – April recreational spawning season closure based on MRFSS data would be 88% effective if one assumes 20% of the trips formerly made would not be taken during the closure and fishermen can avoid 20% of the gag they once caught by modifying fishing gear or changing location.

4.1.2 Effectiveness of a recreational seasonal closure for gag, headboat data

STEP 1. Estimate the catch of a species during a seasonal closure

STEP 2 - Identify most common species taken with vermilion snapper

Table 19. Catch (in numbers) of gag and other species taken on Headboat trips with gag during January-April, 1999-2005. Data represents a sample and not data from all trips.

species	Specname	Sum
10	Vermilion Snapper	320,279
33	Black Sea Bass	264,794
50	White Grunt	186,991
15	Yellowtail Snapper	128,381
51	Tomtate	67,170
16	Lane Snapper	44,563
77	Gray Triggerfish	35,832
18	Gray Snapper	35,096
123	Banded Rudderfish	19,421
97	Blue Runner	18,607
4	Spottail Pinfish	16,410
1	Red Pogy	16,396
98	Bigeye	15,529
230	Sharpnose Shark	15,288
11	Red Snapper	13,406
34	Bank Sea Bass	11,355
3	Knobbed Pogy	10,566
74	King Mackerel	9,472
54	Bluestriped Grunt	9,396
30	Scamp	8,538
22	Red Grouper	7,983
29	Gag	7,369

STEP 3a - Determine incidental catch during a seasonal closure.

Determine the catch of gag during a seasonal closure when trips for most abundant co-occurring species are made.

STEP 3b – Determine incidental catch for reduced trips during a closure.

Trips that target co-occurring species in STEP 3a were randomly selected to reduce the number of trips from 20% to 60%. This assumes fishermen may stop fishing for vermilion snapper during a closure.

Table 20. Estimate of gag incidental catch in number (when targeting co-occurring species) and dead discards from Headboat during a Jan-Apr seasonal closure when trips are reduced. Release mortality = 25%.

Trip reduction	0%	20%	40%	60%
Incidental catch	7,220	3,980	3,200	2,341
Dead Discards	1,805	995	800	585
Effectiveness	75.51%	86.50%	89.14%	92.06%

STEP 3c – Determine dead discards for reduced trips and behavior during a seasonal closure.

This step assumes that some trips could be reduced and fishermen could have the ability to avoid gag by fishing differently.

Table 21. Incidental catch of gag from MRFSS assuming a range in trips (0 to 60%) during a seasonal closure and fishermen can avoid gag (range 0 to 60%) by changing fishing methods.

Trip reduction after quota	0%				20%				40%				60%			
	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%	0%	20%	40%	60%
Discards	7,220	5,776	3,466	1,386	3,980	3,184	1,910	764	3,200	2,560	1,536	614	2,341	1,873	1,124	449
Dead Discards	1,805	1,444	866	347	995	796	478	191	800	640	384	154	585	468	281	112
Effectiveness	75.51%	80.40%	88.24%	95.30%	86.50%	89.20%	93.52%	97.41%	89.14%	91.31%	94.79%	97.92%	92.06%	93.65%	96.19%	98.48%

A January – April recreational spawning season closure would be 89% effective if one assumes 20% of the trips formerly made would not be taken during the closure and fishermen can avoid 20% of the gag they once caught by modifying fishing gear or changing location.

4.2 Estimation of dead discards through bag and size limit analyses.

In conducting bag and size limit analyses, it is assumed that the rate of non-compliance by anglers would be the same regardless of the bag or size limit. Furthermore, reductions in harvest expected with a bag or size limit change take into consideration released fish that would be expected to die.

For example, suppose an existing bag limit is 10 fish. The current take of fish with a bag limit of 10 is 1,000 individuals. If the bag limit was reduced to 8 fish, 900 fish would be retained and 100 would be discarded. Therefore, reducing the bag limit from 10 to 8 fish would reduce harvest by $10\% = (1 - (900/1000))$. However, if release mortality is 25% then, of the 100 fish released, 25 would be expected to die. Adding the 25 dead discards to the 900 fish retained with the new 8 fish bag limit would reduce harvest by $7.5\% = (1 - (925/1000))$ when incorporating release mortality.

Please fill out the form below and send to Jack McGovern. A self-addressed envelope is included. Information can also be sent to Jack by e-mail (John.McGovern@NOAA.GOV) or phone 727-824-5383.

Question that needs to be answered by fishermen

Commercial

- (1) After a quota is met or during a seasonal closure, what percentage of commercial trips will not be taken to catch gag or vermilion snapper? Please circle your best estimate.
- a. Gag: 0% 20% 40% 60% other ____
- b. Vermilion snapper: 0% 20% 40% 60% other ____
- (2) What percentage of gag or vermilion snapper can commercial fishermen avoid by modifying fishing gear or location?
- a. Gag: 0% 20% 40% 60% other ____
- b. Vermilion snapper: 0% 20% 40% 60% other ____

Recreational

- (3) After a quota is met or during a seasonal closure, what percentage of commercial trips will not be taken to catch gag or vermilion snapper? Please circle your best estimate.
- a. Gag: 0% 20% 40% 60% other ____
- b. Vermilion snapper: 0% 20% 40% 60% other ____
- (4) What percentage of gag or vermilion snapper can commercial fishermen avoid by modifying fishing gear or location?
- a. Gag: 0% 20% 40% 60% other ____
- b. Vermilion snapper: 0% 20% 40% 60% other ____

Please send response to:

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