

**ESTIMATES OF GREATER AMBERJACK, VERMILION SNAPPER, AND GRAY  
TRIGGERFISH DISCARDS BY VESSELS WITH FEDERAL  
PERMITS IN THE GULF OF MEXICO**

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## **I. Introduction**

A Southeast Data, Assessment, and Review (SEDAR) has been established for greater amberjack, vermilion snapper, and gray triggerfish that are managed under the Gulf of Mexico Management Council's Fishery Management Plan for the Reef Fish. As part of the data that are provided for the Data Workshop, discard data from the Southeast Fisheries Science Center (SEFSC) coastal fisheries logbook program are used to estimate the numbers of fish that were discarded during the period August 1, 2001 through December 31, 2004.

In August 2001, the Southeast Fisheries Science Center (SEFSC) initiated a program to collect information on the numbers of fish that are being discarded in the Gulf of Mexico and South Atlantic fisheries. To collect this information, the SEFSC developed a form that supplements the existing vessel logbooks that are currently mandatory for these fisheries (Poffenberger and McCarthy, 2004).

A 20% sample of the vessels with a Gulf of Mexico, South Atlantic snapper-grouper, king mackerel, Spanish mackerel or shark permit were selected to report. The random selection process is done without replacement, i.e. when a vessel is selected, the same vessel is not selected in subsequent years. To assure that the sample is representative of the total universe of vessels with these Federal permits, the universe of permitted vessels is stratified and a random sample is selected, without replacement, from each stratum. During the first year (8/1/2002 - 7/31/2003), three strata were used. One of the strata was geographical location where the vessel fished during 2000. There are two categories in this stratum - the Gulf of Mexico (Florida Keys to the Texas-Mexico border) and the South Atlantic (which extends from the North Carolina - Virginia border to the Florida Keys). The second stratum was based on the type of gear. There are 5 categories in this stratum - handline, longline, trolling, trap and gill nets. The third stratum is based on the fishing activity of the vessels during calendar year 2000 which were divided into two groups: vessels that made between 1 and 10 trips and vessels that made more than 10 trips. In all, there are 20 strata; however, there were too few boats that used gill nets in the Gulf of Mexico, so all of the boats that used gill nets in the Gulf were combined into a single stratum. Consequently, random selections were made in 19 strata.

Inconsistency between the vessel's fishing activity during 2000 and the 8/1/2001 - 7/31/2002 reporting period resulted in the fishing activity strata being dropped from the sample selection for the second year of the survey beginning in 8/1/2002. As a result of this change the data were categorized by only 10 strata after the first year of the survey (Poffenberger and McCarthy, 2004).

The selected fishermen were instructed to complete a supplemental discard form for every fishing trip that they made. If they did not have any discards for the trip, they were instructed to complete a discard form and write "no discards" on the form. If they did not fish during a calendar month and submitted a no-fishing form, then they did not have to submit a discard form.

In addition to the numbers of discards, fishermen are asked to record their best estimate of the condition of the fish when they were released. The fishermen are given 6 options for the condition of released fish. These options are: all animals are dead, majority of the animals are dead, all animals are alive when released, majority of animals are alive, the fish are kept but not sold, and the condition of the animals is unknown. The fishermen are also asked to specify a reason why the fish (animals) were discarded. The

choices are that the fish are discarded because of regulations or because the fish are unmarketable or unwanted.

## II. Methods

The data set for this analysis includes all trips from sampled vessel that reported discards between August 1, 2001 and December 31, 2004. During this period, discard information was submitted for 7,194 trips. Of those trips, discards were reported on 5,383 trips and no discards were reported on the remaining 1,811 trips. Discards of greater amberjack were reported on 853 trips or 15.8% of the trips where discards were reported. Discards of vermilion snapper were reported on 341 trips (6.3%) and gray triggerfish discards were reported on 69 trips (1.3%).

By way of comparison, there were 58,891 trips reported by vessels that have been issued a Federal permit to fish for species in the reef fish, shark, and king/Spanish mackerel fisheries in the Gulf of Mexico during the period for which the discard program has been conducted. Greater amberjack catches were reported for 7,384 of this total number of trips or about 12.5% of the trips. There were 13,551 trips landing vermilion snapper (23%) and 12,365 trips landing gray triggerfish (21%).

The objective of this analysis was to estimate the numbers of greater amberjack, vermilion snapper, and gray triggerfish discarded by vessels that fish commercially for species other than shrimp or other shellfish. Fishing activity for these analyses does not include the surface longline vessels that typically fish for swordfish, pelagic sharks, tunas, and other highly migratory species.

The following categorical variables were considered as possible influences on the reported discards of greater amberjack, vermilion snapper, or gray triggerfish. Generally the levels of the categorical variables were the same as used in developing indices of abundance from the handline fishery for these species (SEDAR9-DW 05, SEDAR9-DW 10)

YEAR and MONTH were, separately, considered as variables

The factor SEASON was constructed for greater amberjack and gray triggerfish analyses to create four periods generally reflective of differential CPUE and possible weather associated impacts on the fishery. Those periods were:

January - March	SEASON = 1
April - June	SEASON = 2
July- September	SEASON = 3
October - December	SEASON = 4

In the vermilion snapper analyses, SEASON was defined differently to follow the definitions used in prior assessments and the current commercial index of abundance. The periods were:

December - February	SEASON = 1
March - May	SEASON = 2
June - August	SEASON = 3
September - November	SEASON = 4

The factor REGION reflected geographic differences in number of fishing trips and cpue. Two levels were considered for the vermilion snapper and gray triggerfish data.

“East” = Eastern Gulf of Mexico, including statistical areas 1-12.  
“West” = Western Gulf of Mexico, including statistical areas 13-21.

For analyses involving greater amberjack data, five levels were defined. Fishing areas 2-3, 4-8, 9-12, 13-

19, and 20-21 were considered as separate levels of this variable. Fishing area 1 was excluded from the analyses involving greater amberjack because a large fraction of the greater amberjack catch from that area is thought to be from Atlantic waters.

Red snapper permit type and fishing season were also defined as variables. Two levels of RSSEASON were defined:

“open” = open red snapper fishing season  
“closed” = closed red snapper fishing season

Three levels of PERMIT were also constructed:

“class1” = class 1 red snapper permitted vessel  
“class2” = class 2  
“none” = non-permitted vessel

Amberjack fishing season (AJSEASON) was defined by two levels:

“open” = open greater amberjack fishing season  
“closed” = closed greater amberjack fishing season

The subsample of vessels required to report discards changes every year, asynchronously with calendar year. The variable DISCARD PERIOD was constructed to examine any effect that change in vessels reporting discards may have on discard cpue relative to annual cpue variation. Levels of this variable were:

“8/01-12/01” = PERIOD 1  
“1/02-7/02” = PERIOD 2  
“8/02-12/02” = PERIOD 3  
“1/03-7/03” = PERIOD 4  
“8/03-12/03” = PERIOD 5  
“1/04-7/04” = PERIOD 6  
“8/04-12/04” = PERIOD 7

The number of hooks per handline fished was also defined as a variable with three levels. The defined levels differed among the species examined and reflected differential cpue, as well as, adhering to the variable definitions used in constructing the commercial indices of abundance prepared for the SEDAR9 data workshop.

For greater amberjack, hooks per line levels were: 1-2, 3-9, and >9. Levels for vermilion snapper were: <10, 10-20, and >20. Levels of this variable for gray triggerfish were: 1-3, 4-6, and >6.

Generalized linear model (GLM) analyses were used to determine those variables with significant effects on the proportion of trips reporting discards of the species of interest and on the catch rates of trips reporting discards. Parameterization of each model was accomplished using a GLM procedure (GENMOD; Version 8.02 of the SAS System for Windows © 2000. SAS Institute Inc., Cary, NC, USA). An initial GLM procedure fit a type-3 model, assumed a binomial error distribution, and selected the logit link. The response variable was proportion successful trips (trips reporting discards of the species of interest). An analysis of catch rates on successful trips (only those reporting discards of the species of interest) was also conducted. In that case, a type3 model assuming lognormal error distribution was employed. The linking function selected was “normal”, and the response variable was ln(CPUE).

For each GLM, a stepwise approach to quantify the relative importance of the factors was used. First the null model was run. These results reflect the distribution of the nominal data. Each potential factor was added to the null model one at a time, and the resulting reduction in deviance per degree of freedom was examined. The factor that caused the greatest reduction in deviance per degree of freedom was added to the base model if the factor was significant based upon a Chi-Square test ( $p < 0.05$ ), and the reduction in

deviance per degree of freedom was  $\geq 1\%$ . This model then became the base model, and the process was repeated, adding factors and interactions individually until no factor or interaction met the criteria for incorporation into the final model.

### III. Results

The fishing activity for red snapper was stratified into four gear categories - (1) handline gear, which includes manual gear and power assisted handline gear (bandit rigs), whether it is hydraulic or electric; (2) bottom longline gear; (3) traps; (4) trolling; and (5) a general category that includes all other types of gear, i.e., gill nets, dive gear, etc. The numbers of trips for each of the gear categories for the 8/1/2001 - 12/31/2004 period are presented in Table 1. The numbers of trips where greater amberjack, vermilion snapper, and gray triggerfish were reported as part of the catch are also presented in Table 1. In addition, the numbers of trips by gear category where discard information was reported are also presented in this table. Data analyses was limited to vessels fishing with handline gear because of the small sample sizes of vessels fishing other gear types and reporting discards of the species of interest.

The total number of trips reported to the logbook program and the numbers of trips with discard information are shown in Tables 2a for each fishing region and in 2b for each sub-region. The total pounds reported landed in the logbooks and numbers of individuals of each species discarded for each region are also shown in Table 2.

The numbers of trips and reported catches by vessels with either a Class I, Class II, or no red snapper endorsement are shown in Table 3. The numbers of trips and discards of greater amberjack, vermilion snapper, and gray triggerfish are also shown in this table.

The numbers of trips reported for the open and closed seasons during the 8/1/2001 - 12/31/2004 period are shown in Table 4. The numbers of trips with greater amberjack, vermilion snapper, and gray triggerfish catches and discards are also shown in this table.

Table 5 includes the total number of trips reported by handline vessels during the open and closed seasons for the 8/1/2001 - 12/31/2004 period. The numbers of trips with greater amberjack and gray triggerfish catches and discards are also shown. Analyses of vermilion snapper data did not include this factor.

Several temporal factors were examined. Total numbers of trips and pounds landed by handline vessels for the period 8/1/2001 - 12/31/2004 are shown by year (Table 6), month (Table 7), discard period (Table 8), and season (Tables 9a and 9b). The reporting period for discards does not coincide with the calendar year, but begins in August and ends the following July when a new subsample of vessels is selected to report discards over the next 12 months.

The number of hooks per handline fished was categorized differently for each of the species examined. The number of trips and landed pounds by handline vessels are provided in Tables 10a (greater amberjack), 10b (vermilion snapper), and 10c (gray triggerfish). Each table includes, for each hooks/line category, all landings reported to the reef fish logbook program (in pounds) and total number of discards reported to the logbook discard program for the period August 2001 to December 2004. In addition, pounds landed and discards reported for each of the three species examined are provided.

The stepwise construction of the binomial model identified the following factors as significant in the probability of vessels discarding greater amberjack:

Hooks per line, red snapper endorsement, discard period, and region

Stepwise construction of the lognormal model of discard rates on trips reporting discards identified three significant factors that also met the criteria of reduction in deviance per degree of freedom of more than one percent. The factors were:

Hooks per line, discard period, and region

Small sample sizes, due to these multiple strata, necessitated the use of only those factors that reduced the deviance per degree of freedom more than seven percent in the GLM. Only hooks per line and discard period were used for estimating total greater amberjack discards.

Estimates of total discards for each strata of discard period and hooks per line category are provided in Table 11a. Estimates were made by multiplying the total number of trips in a discard period-hook per line strata by the mean number of discards reported from trips in the same strata. Estimated average weight of discarded fish is reported in the discard program. Those estimates were used to calculate an estimated total weight of discarded fish. The estimates of weight of discarded greater amberjack are included in Table 11a.

Discard estimates were also made for the years prior to the beginning of the discard program. The number of trips in each strata was multiplied by the mean number of discards reported for trips in the same strata to estimate the total discards in each strata per year (Table 11b). Estimated weights of discarded greater amberjack are also given by strata. Yearly estimates were made by summing the totals of each strata by year (Table 11c). Estimates of the number of discarded fish and weight of discards are made for the years 1993 (when the reef fish commercial logbook program began a complete census of the Gulf of Mexico fishery) through 2004.

The following factors were identified through the stepwise construction of the binomial model as significant in the probability of vessels discarding vermilion snapper:

Hooks per line, month, discard period, red snapper permit endorsement, and region

Stepwise construction of the lognormal model of vermilion snapper discard rates of positive trips identified three significant factors that also met the criteria of reduction in deviance per degree of freedom of more than one percent. The factors were:

Hooks per line, discard period, and month

Again, small sample sizes and a high number of strata, resulted in the use of only those factors that reduced the deviance per degree of freedom more than seven percent in the GLM. As with greater amberjack, only hooks per line and discard period were used for estimating total vermilion snapper.

Estimation of total discards and weight of discards for the vermilion snapper Gulf of Mexico commercial handline fishery followed the method used for greater amberjack. Discards for each strata of discard period and hooks per line category are provided in Table 12a. Estimates prior to the inception of the discard program are provided in Table 12b. Yearly estimates are shown in Table 12c. Estimates are only made back to September 14, 1997 when the vermilion snapper commercial size limit was changed from eight to 10 inches.

Data for gray triggerfish discards were very limited, therefore these data were not stratified. Mean gray triggerfish discards per trip were calculated for all handline trips. Estimates of yearly discards were made by multiplying the total number of trips per year by the mean number of gray triggerfish discarded per trip (Table 13). Mean weight of discards reported for gray triggerfish was used to calculate total weight of estimated discards (Table 13). Estimates are made back to 2000 because the gray triggerfish minimum size limit was changed on November 24, 1999.

The condition of discarded fish were reported by fishermen to the discard logbook program. The reported condition of discarded greater amberjack, vermilion snapper, and gray triggerfish are given in Table 14.

Approximately 24% of greater amberjack were reported as dead or the majority of discarded fish were dead when released. This total includes fish kept but not sold. Fishermen reported that 64% of discarded fish were alive or that most of the released were alive. Over half of released vermilion snapper (51.9%) were dead or most of the released fish were dead. Approximately 39% of vermilion snapper were reported as “all alive” or “majority of released fish alive”. Reported release mortality of gray triggerfish, however, was very low, 5.7% (including fish kept but not sold).

#### **IV. Literature Cited**

Poffenberger, J. and K. McCarthy. 2004. Estimates of red snapper discards by vessels with Federal permits in the Gulf of Mexico. SEDAR 7-DW-22.

Table 1. Numbers of trips reported to the logbook program and to the discard program by type of gear in the Gulf of Mexico, 8/1/01-12/31/04.

Gear Type	All Logbook Data				Discard Data			
	All Trips	Greater Amberjack	Vermilion Snapper	Gray Triggerfish	All Trips	Greater Amberjack	Vermilion Snapper	Gray Triggerfish
Handline	44,820	5,669	12,985	10,797	4,508	813	294	55
Longline	6,909	1,345	261	428	504	27	2	1
Trap	1,411	21	266	934	153	3	45	14
Trolling	3,572	49	12	20	161	10	0	0
Other	2,179	300	27	186	57	0	0	0
Total	58,891	7,384	13,551	12,365	5,383	853	341	70

Table 2a. Numbers of handline\* trips and reported landings from logbooks and number of discards of vermilion snapper and gray triggerfish by assessment region in the Gulf of Mexico, 8/1/2001-12/31/2004.

Region**	Number of Trips		Vermilion Snapper		Gray Triggerfish	
	Logbook	Discards	Logbook (lbs)	Discards (no.)	Logbook (lbs)	Discards (no.)
East	34,068	3,317	3,339,624	11,356	402,977	312
West	10,829	1,191	3,981,744	14,369	290,324	110
Total	44,897	4,508	7,321,368	25,725	693,301	422

\* The handline gear category includes electric reel (bandit) gear.

\*\* East is the area included in statistical grids 1-12. West is the area included in statistical grids 13-21.

Table 2b. Numbers of handline\* trips and reported landings from logbooks and number of discards of greater amberjack by zone in the Gulf of Mexico, 8/1/2001-12/31/2004.

Zone**	Number of Trips		Greater Amberjack	
	Logbook	Discards	Logbook (lbs)	Discards (no.)
2-3	4,749	292	164,687	33
4-8	18,602	2,029	874,439	6,608
9-12	6,743	740	156,032	8,792
13-19	10,172	1,125	1,118,596	58,617
20-21	657	66	17,983	517
Total	40,923	4,252	2,331,737	74,567

\* The handline gear category includes electric reel (bandit) gear.

\*\* Denotes statistical grids included in each zone. Statistical area 1 was excluded from analyses including greater amberjack.

Table 3. Numbers of headline\* trips, reported landings from logbooks (pounds whole weight), and number of discards of greater amberjack, vermilion snapper, and gray triggerfish in the Gulf of Mexico by red snapper permit endorsement for the entire logbook data and the discard data, 8/1/01-12/31/04.

Species	All Logbook Data						Discard Data					
	Class I Endorsements		Class II Endorsements		No Endorsements		Class I Endorsements		Class II Endorsements		No Endorsements	
	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Discards	Trips	Discards	Trips	Discards
All Species	10,114	10,917,677	17,775	19,400,200	17,008	17,939,086	1,178	532,466	2,036	286,141	1,294	84,191
Greater Amberjack	2,112	853,654	2,145	869,680	1,417	646,836	359	56,184	378	16,937	76	1,458
Vermilion Snapper	7,163	5,106,940	4,704	1,593,786	1,134	620,642	149	19,228	120	5,734	25	763
Gray Triggerfish	5,303	455,675	4,196	176,271	1,310	61,354	10	132	31	169	13	121

\* The headline gear category includes electric reel (bandit) gear.

Table 4. Numbers of headline\* trips reported for the entire logbook data and discard data for the open and closed seasons in the Gulf of Mexico red snapper fishery, 8/1/01-12/31/04.

Red Snapper Season	All Trips		Trips With Greater Amberjack		Trips With Vermilion Snapper		Trips With Gray Triggerfish	
	Logbook	Discards	Logbook	Discards	Logbook	Discards	Logbook	Discards
Open	19,959	2,100	2,114	379	7,757	146	6,315	32
Closed	24,938	2,408	3,560	434	5,244	148	4,494	22
Total	44,897	4,508	5,674	813	13,001	294	10,809	54

\* The headline gear category includes electric reel (bandit) gear.

Table 5. Numbers of headline\* trips reported for the entire logbook data and discard data for the open and closed seasons in the Gulf of Mexico greater amberjack fishery, 8/1/01-12/31/04.

Greater Amberjack Season	All Trips		Trips With Greater Amberjack		Trips With Gray Triggerfish	
	Logbook	Discards	Logbook	Discards	Logbook	Discards
Open	32,991	3,542	5,478	621	8,002	46
Closed	11,906	966	196	192	2,807	8
Total	44,897	4,508	5,674	813	10,809	54

\* The headline gear category includes electric reel (bandit) gear.

Table 6. Numbers of handline\* trips and reported catches (pounds whole weight) of greater amberjack, vermilion snapper, and gray triggerfish in the Gulf of Mexico by year for the entire logbook data and the discard data, 8/1/01-12/31/04.

Year	All Trips						Trips with Greater Amberjack						Trips with Vermilion Snapper						Trips with Gray Triggerfish						
	Logbook		Discards		N fish		Logbook		Discards		N fish		Logbook		Discards		N fish		Logbook		Discards		N fish		
	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	
2001**	5,196	5,809,067	458	62,175	712	228,262	98	6,992	1,382	841,984	32	1,328	1,231	80,525	12	161									
2002	13,809	15,082,626	1,096	207,476	1,659	583,503	217	15,878	3,766	2,025,531	53	1,609	3,214	211,378	9	55									
2003	13,799	14,203,719	1,613	350,339	1,729	815,128	283	34,764	4,090	2,410,293	153	19,102	3,371	224,813	8	73									
2004	12,093	13,161,552	1,341	282,808	1,574	743,276	215	16,945	3,763	2,043,560	56	3,686	2,993	176,585	25	133									
Total	44,897	48,256,963	4,508	902,798	5,674	2,370,170	813	74,579	13,001	7,321,368	294	25,725	10,809	693,301	54	422									

\* The handline gear category includes electric reel (bandit) gear.

\*\* Includes data from 8/01-12/01 only.

Table 7. Numbers of handline\* trips and reported catches (pounds whole weight) of greater amberjack, vermilion snapper, and gray triggerfish in the Gulf of Mexico by month for the entire logbook data and the discard data, 8/1/01-12/31/04.

Month	All Trips						Trips with Greater Amberjack						Trips with Vermilion Snapper						Trips with Gray Triggerfish						
	Logbook		Discards		N fish		Logbook		Discards		N fish		Logbook		Discards		N fish		Logbook		Discards		N fish		
	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	
Jan	2,786	3,116,150	242	34,051	505	159,202	48	2,588	511	475,624	11	631	506	33,132	--	--									
Feb	3,491	3,456,170	264	50,386	449	198,453	57	2,452	985	364,093	61	7,489	833	50,127	3	25									
Mar	3,954	3,889,628	340	72,274	94	18,664	68	4,883	1,150	595,971	15	1,157	903	54,215	4	13									
Apr	4,311	4,530,807	366	61,541	37	5,228	71	6,040	1,207	742,988	19	1,078	972	66,745	3	5									
May	3,641	3,786,671	260	71,371	65	12,330	53	12,136	1,138	706,578	10	588	932	69,257	1	3									
Jun	3,679	4,016,227	268	50,322	687	426,184	56	3,577	1,074	673,083	16	1,018	892	65,274	1	5									
Jul	3,726	4,126,963	283	56,916	702	336,853	67	6,524	1,018	577,229	18	1,171	753	34,211	4	19									
Aug	4,060	4,566,046	538	107,467	754	433,667	90	8,485	1,171	813,348	26	1,010	892	60,797	10	195									
Sep	2,631	2,760,681	341	61,885	499	266,632	61	6,331	674	664,396	40	3,164	526	40,982	6	41									
Oct	4,782	5,246,420	594	118,788	712	190,855	87	9,932	1,407	659,191	43	6,899	1,257	69,711	8	50									
Nov	4,185	4,471,672	540	109,228	610	164,131	92	7,987	1,427	494,312	18	795	1,289	82,815	10	39									
Dec	3,651	4,289,529	472	108,569	560	157,970	63	3,644	1,239	554,556	17	725	1,054	66,036	4	27									
Total	44,897	48,256,963	4,508	902,798	5,674	2,370,170	813	74,579	13,001	7,321,368	294	25,725	10,809	693,301	54	422									

\* The handline gear category includes electric reel (bandit) gear.

Table 8. Numbers of handline\* trips and reported catches (pounds whole weight) of greater amberjack, vermilion snapper, and gray triggerfish in the Gulf of Mexico by discard period for the entire logbook data and the discard data, 8/1/01-12/31/04.

Discard Period	All Trips						Trips with Greater Amberjack						Trips with Vermilion Snapper						Trips with Gray Triggerfish					
	Logbook			Discards			Logbook			Discards			Logbook			Discards			Logbook			Discards		
	Trips	Pounds		Trips	N fish		Trips	Pounds		Trips	N fish		Trips	Pounds		Trips	N fish		Trips	Pounds		Trips	N fish	
8/01-12/01	5,196	5,809,067		458	62,175		712	228,262		98	6,992		1,382	841,984		32	1,328		1,231	80,526		12	161	
1/02-7/02	8,604	9,209,823		415	61,719		782	285,011		90	2,242		2,228	1,239,839		32	929		1,896	132,358		--	--	
8/02-12/02	5,205	5,872,803		681	145,757		877	298,492		127	13,636		1,538	785,691		21	680		1,318	79,019		9	55	
1/03-7/03	8,571	8,907,597		896	187,498		895	431,024		169	22,869		2,458	1,512,435		84	9,234		2,008	127,505		4	27	
8/03-12/03	5,228	5,296,122		717	162,841		834	384,105		114	11,895		1,632	897,859		69	9,868		1,363	97,308		4	46	
1/04-7/04	8,413	8,805,195		712	147,644		862	440,880		161	13,089		2,397	1,383,291		34	2,969		1,887	113,097		12	43	
8/04-12/04	3,680	4,356,357		629	135,164		712	302,396		54	3,856		1,366	660,269		22	717		1,106	63,487		13	90	
Total	44,897	48,256,963		4,508	902,798		5,674	2,370,170		813	74,579		13,001	7,321,368		294	25,725		10,809	693,301		54	422	

\* The handline gear category includes electric reel (bandit) gear.

Table 9a. Numbers of headline\* trips and reported catches (pounds whole weight, number of discards) of greater amberjack and gray triggerfish in the Gulf of Mexico by season for the reef fish logbook and discard data, 8/1/01-12/31/04.

Season	All Trips						Trips with Greater Amberjack						Trips with Gray Triggerfish						
	Logbook		Discards		N fish		Logbook		Discards		N fish		Logbook		Discards		N fish		
	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish	
Jan-Mar	10,231	10,461,947	846	156,711	1,048	376,319	173	9,923	2,242	137,474	7	38							
Apr-Jun	11,631	12,333,705	894	183,234	789	443,742	180	21,753	2,796	201,276	5	13							
Jul-Sep	10,417	11,453,690	1,162	226,268	1,955	1,037,152	218	21,340	2,171	135,990	20	255							
Oct-Dec	12,618	14,007,621	1,606	336,585	1,882	512,957	242	21,563	3,600	218,562	22	116							
Total	44,897	48,256,963	4,508	902,798	5,674	2,370,170	813	74,579	10,809	693,301	54	422							

\* The headline gear category includes electric reel (bandit) gear.

Table 9b. Numbers of headline\* trips and reported catches (pounds whole weight, number of discards) of vermilion snapper by season in the Gulf of Mexico for the reef fish logbook and discard data, 8/1/01-12/31/04.

Season	All Trips						Trips with Vermilion Snapper					
	Logbook		Discards		N fish		Logbook		Discards		N fish	
	Trips	Pounds	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	Pounds	Trips	N fish
Dec-Feb	9,928	10,861,849	978	193,006	2,735	13,942,273	89	8,845				
Mar-May	11,906	12,207,105	966	205,186	3,495	2,045,536	44	2,823				
Jun-Aug	11,465	12,709,236	1,089	214,705	3,263	2,063,660	60	3,199				
Sep-Nov	11,598	12,478,773	1,475	289,901	3,508	1,817,899	101	10,858				
Total	44,897	48,256,963	4,508	902,798	13,001	7,321,368	294	25,725				

\* The headline gear category includes electric reel (bandit) gear.

Table 10a. Numbers of handline\* trips and reported catches (pounds whole weight and number of discards) of greater amberjack by the number of hooks per handline fished in the Gulf of Mexico reported in the reef fish logbook and discard programs, 8/1/01-12/31/04.

Hooks per Line	All Trips				Trips with Greater Amberjack			
	Logbook		Discards		Logbook		Discards	
	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	N fish
1-2	28,700	30,872,766	2,804	303,212	2,540	1,359,558	311	6,983
3-9	5,193	5,538,325	426	48,247	619	411,068	69	3,755
>9	10,987	11,826,182	1,278	551,339	2,509	598,538	433	63,841
Total	44,880	48,256,963	4,508	902,798	5,674	2,370,170	813	74,579

\* The handline gear category includes electric reel (bandit) gear.

Table 10b. Numbers of handline\* trips and reported catches (pounds whole weight and number of discards) of vermilion snapper by the number of hooks per handline fished in the Gulf of Mexico reported in the reef fish logbook and discard programs, 8/1/01-12/31/04.

Hooks per Line	All Trips				Trips with Vermilion Snapper			
	Logbook		Discards		Logbook		Discards	
	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	N fish
<10	33,910	36,430,781	3,230	351,459	4,674	929,385	124	4,304
10-20	8,006	8,510,370	878	352,762	6,061	3,987,416	98	9,703
>20	2,981	3,315,811	400	198,577	2,266	2,404,568	72	11,718
Total	44,897	48,256,963	4,508	902,798	13,001	7,321,368	294	25,725

\* The handline gear category includes electric reel (bandit) gear.

Table 10c. Numbers of handline\* trips and reported catches (pounds whole weight and number of discards) of gray triggerfish by the number of hooks per handline fished in the Gulf of Mexico reported in the reef fish logbook and discard programs, 8/1/01-12/31/04.

Hooks per Line	All Trips				Trips with Gray Triggerfish			
	Logbook		Discards		Logbook		Discards	
	Trips	Pounds	Trips	N fish	Trips	Pounds	Trips	N fish
1-3	30,662	32,920,868	2,944	319,007	4,038	133,687	42	276
4-6	2,410	2,667,968	172	17,349	646	51,521	4	92
>6	11,811	12,653,041	1,392	566,442	6,116	507,072	8	54
Total	44,883	48,256,963	4,508	902,798	10,800	693,301	54	422

\* The handline gear category includes electric reel (bandit) gear.

Table 11a. Estimates of greater amberjack total discards and total weight of amberjack discards for the Gulf of Mexico handline fishery by discard period and hooks fished per line.

Discard Period	Hooks Per Line	Mean Discards	Mean Weight Per Discard	Trips	Total Discards Estimate	Total Discard Weight
8/01-12/01	1-2	11.0399	15.0941	3,343	36,906.3	557,067.0
8/01-12/01	3-9	7.4444	15.8181	671	4,995.2	79,014.9
8/01-12/01	>9	11.1882	14.8123	1,174	13,135.0	194,559.4
1/02-7/02	1-2	7.8300	15.0941	5,430	42,516.9	641,754.3
1/02-7/02	3-9	11.7778	15.8181	1,097	12,920.2	204,373.4
1/02-7/02	>9	0.5696	14.8123	2,074	1,181.4	17,499.1
8/02-12/02	1-2	14.1066	15.0941	3,308	46,664.6	704,360.6
8/02-12/02	3-9	23.0000	15.8181	597	13,731.0	217,198.3
8/02-12/02	>9	17.4791	14.8123	1,294	22,617.9	335,023.4
1/03-7/03	1-2	24.8516	15.0941	5,479	136,162.1	2,055,243.7
1/03-7/03	3-9	17.5814	15.8181	983	17,282.5	273,376.5
1/03-7/03	>9	4.8050	14.8123	2,107	10,124.2	149,962.7
8/03-12/03	1-2	29.8801	15.0941	3,338	99,739.7	1,505,481.2
8/03-12/03	3-9	13.3404	15.8181	550	7,337.2	116,061.1
8/03-12/03	>9	9.6854	14.8123	1,340	12,978.4	192,240.4
1/04-7/04	1-2	18.8824	15.0941	5,485	103,569.7	1,563,291.5
1/04-7/04	3-9	47.8276	15.8181	905	43,284.0	684,670.1
1/04-7/04	>9	15.9947	14.8123	2,023	32,357.3	479,286.0
8/04-12/04	1-2	17.5929	15.0941	2,293	40,340.5	608,903.7
8/04-12/04	3-9	18.5455	15.8181	382	7,084.4	112,061.2
8/04-12/04	>9	8.7727	14.8123	930	8,158.6	120,848.2

Table 11b. Estimates of greater amberjack total discards and total weight of greater amberjack discards for the Gulf of Mexico handline fishery by year and hooks fished per handline.

Discard Period	Hooks Per Line	Mean Discards	Mean Weight Per Discard	Trips	Total Discards Estimate	Total Discard Weight
1993	1-2	18.9957	15.0941	7,140	135,629	2,047,202
1993	3-6	20.0681	15.8181	2,499	50,150	793,281
1993	>6	10.1157	14.8123	3,047	30,823	456,553
1994	1-2	18.9957	15.0941	8,168	155,157	2,341,953
1994	3-6	20.0681	15.8181	2,277	45,695	722,809
1994	>6	10.1157	14.8123	3,114	31,500	466,592
1995	1-2	18.9957	15.0941	7,963	151,263	2,283,175
1995	3-6	20.0681	15.8181	2,019	40,517	640,910
1995	>6	10.1157	14.8123	2,880	29,133	431,530
1996	1-2	18.9957	15.0941	6,805	129,266	1,951,150
1996	3-6	20.0681	15.8181	2,052	41,180	651,385
1996	>6	10.1157	14.8123	3,364	34,029	504,051
1997	1-2	18.9957	15.0941	7,269	138,080	2,084,189
1997	3-6	20.0681	15.8181	1,773	35,581	562,820
1997	>6	10.1157	14.8123	3,625	36,669	543,158
1998	1-2	18.9957	15.0941	7,537	143,171	2,161,031
1998	3-6	20.0681	15.8181	1,973	39,594	626,308
1998	>6	10.1157	14.8123	3,624	36,659	543,009
1999	1-2	18.9957	15.0941	8,054	152,991	2,309,267
1999	3-6	20.0681	15.8181	2,150	43,146	682,494
1999	>6	10.1157	14.8123	3,600	36,417	539,412
2000	1-2	18.9957	15.0941	8,143	154,682	2,334,785
2000	3-6	20.0681	15.8181	2,471	49,588	784,392
2000	>6	10.1157	14.8123	3,281	33,190	491,614
2001	1-2	18.9957	15.0941	5,149	97,809	1,476,337
2001	3-6	20.0681	15.8181	1,225	24,583	388,863
2001	>6	10.1157	14.8123	1,992	20,150	298,475

Table 11c. Yearly estimates of greater amberjack total discards and total weight of greater amberjack discards for the Gulf of Mexico handline fishery.

Year	Estimate of Total Number of Discards	Total Discard Weight Estimate
1993	216,602	3,297,035
1994	232,352	3,531,354
1995	220,913	3,355,615
1996	204,475	3,106,586
1997	210,330	3,190,168
1998	219,424	3,330,347
1999	232,554	3,531,174
2000	237,460	3,610,792
2001	197,579	2,994,316
2002	139,632	2,120,209
2003	283,624	4,292,366
2004	234,794	3,569,061

Table 12a. Estimates of vermilion snapper total discards and total weight of vermilion snapper discards for the Gulf of Mexico handline fishery by discard period and hooks fished per line.

Discard Period	Hooks Per Line	Mean Discards	Mean Weight Per Discard	Trips	Total Discards Estimate	Total Discard Weight
8/01-12/01	<10	5.4343	2.0276	4,020	21,846.0	44,294.9
8/01-12/01	10-20	8.3455	1.3515	852	7,110.3	9,609.6
8/01-12/01	>20	2.0333	1.166	322	654.7	763.4
1/02-7/02	<10	20.8601	2.0276	6,530	136,216.6	276,192.7
1/02-7/02	10-20	2.5532	1.3515	1,597	4,077.4	5,510.7
1/02-7/02	>20	1.4688	1.166	477	700.6	816.9
8/02-12/02	<10	1.9056	2.0276	3,911	7,452.7	15,111.1
8/02-12/02	10-20	3.5966	1.3515	943	3,391.6	4,583.7
8/02-12/02	>20	2.4359	1.166	351	855.0	996.9
1/03-7/03	<10	4.0796	2.0276	6,464	26,370.4	53,468.7
1/03-7/03	10-20	4.0266	1.3515	1,559	6,277.5	8,484.0
1/03-7/03	>20	5.2727	1.166	548	2,889.5	3,369.1
8/03-12/03	<10	0.5529	2.0276	3,888	2,149.6	4,358.5
8/03-12/03	10-20	0.0833	1.3515	911	75.9	102.6
8/03-12/03	>20	1.6702	1.166	429	716.5	835.5
1/04-7/04	<10	2.4855	2.0276	6,390	15,882.3	32,203.0
1/04-7/04	10-20	4.3820	1.3515	1,413	6,191.8	8,368.2
1/04-7/04	>20	4.8900	1.166	610	2,982.9	3,478.1
8/04-12/04	<10	11.9810	2.0276	2,675	32,049.2	64,982.9
8/04-12/04	10-20	19.4054	1.3515	703	13,642.0	18,437.2
8/04-12/04	>20	2.7400	1.166	227	622.0	725.2

Table 12b. Estimates of vermilion snapper total discards and total weight of vermilion snapper discards for the Gulf of Mexico handline fishery by year and hooks fished per handline.

Discard Period	Hooks Per Line	Mean Discards	Mean Weight Per Discard	Trips	Total Discards Estimate	Total Discard Weight
1997*	<10	5.8542	2.0276	2,320	13,581.7	27,538.3
1997*	10-20	6.4269	1.3515	453	2,911.4	3,934.7
1997*	>20	3.19	1.166	157	500.8	584.0
1998	<10	5.8542	2.0276	9,514	55,696.9	112,931.0
1998	10-20	6.4269	1.3515	2,574	16,542.8	22,357.6
1998	>20	3.19	1.166	1,050	3,349.5	3,905.5
1999	<10	5.8542	2.0276	10,210	59,771.4	121,192.5
1999	10-20	6.4269	1.3515	2,792	17,943.9	24,251.2
1999	>20	3.19	1.166	808	2,577.5	3,005.4
2000	<10	5.8542	2.0276	10,622	62,183.3	126,082.9
2000	10-20	6.4269	1.3515	2,410	15,488.8	20,933.2
2000	>20	3.19	1.166	871	2,778.5	3,239.7
2001	<10	5.8542	2.0276	6,376	37,326.4	75,683.0
2001	10-20	6.4269	1.3515	1,433	9,209.7	12,447.0
2001	>20	3.19	1.166	559	1,783.2	2,079.2

\*Estimate for partial year following the size limit change in vermilion snapper September 14, 1997.

Table 12c. Yearly estimates of vermilion snapper total discards and total weight of vermilion snapper discards for the Gulf of Mexico handline fishery.

Year	Estimate of Total Number of Discards	Total Discard Weight Estimate
1997*	16,994	32,057
1998	75,589	139,194
1999	80,293	148,449
2000	80,451	150,256
2001	77,930	144,877
2002	152,694	303,212
2003	38,479	70,618
2004	71,370	128,195

\*Estimate for partial year following the size limit change in vermilion snapper September 14, 1997.

Table 13. Yearly estimates of gray triggerfish total discards and total weight of discards for the Gulf of Mexico handline fishery. Includes trips reporting multiple areas fished.

Year	Mean Discards	Mean Weight Per Discard	Trips	Estimate of Total Number of Discards	Total Discard Weight Estimate
2000	0.0939	1.378	13,903	1,305	1,799
2001	0.0939	1.378	13,564	1,274	1,755
2002	0.0939	1.378	13,811	1,297	1,787
2003	0.0939	1.378	13,823	1,298	1,789
2004	0.0939	1.378	12,805	1,202	1,657

Table 14. Discard condition of greater amberjack, vermilion snapper, and gray triggerfish reported for handline trips to the commercial reef fish discard logbook program, 8/1/01-12/31/04. Percent of total in parentheses.

Species	All Dead	Majority Dead	All Alive	Majority Alive	Kept	Unknown	Unreported	Total
Greater Amberjack	3,388 (4.5)	14,152 (19.0)	21,422 (28.7)	26,322 (35.3)	541 (0.7)	8,745 (11.7)	9 (0.01)	74,579
Vermilion Snapper	2,034 (7.9)	10,410 (40.5)	1,831 (7.1)	8,308 (32.3)	892 (3.5)	2,250 (8.7)		25,725
Gray Triggerfish		5 (1.2)	250 (59.2)	137 (32.5)	19 (4.5)	11 (2.6)		422