

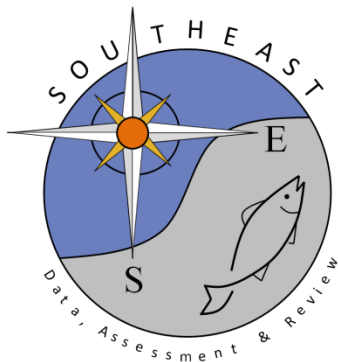
**Discards of Gray Triggerfish Calculated for Commercial Vessels with  
Federal Fishing Permits in the US South Atlantic**

Kevin McCarthy

SEDAR41-DW37

Submitted: 1 September 2014

Updated with 2014 Data: 4 August 2015



*This information is distributed solely for the purpose of pre-dissemination peer review. It does not represent and should not be construed to represent any agency determination or policy.*

Please cite this document as:

McCarthy, K. 2015. Calculated Discards of Gray Triggerfish from US South Atlantic commercial fishing vessels. SEDAR41-DW37. SEDAR, North Charleston, SC. 14 pp.

## Calculated discards of gray triggerfish from US South Atlantic commercial fishing vessels

Kevin McCarthy

National Marine Fisheries Service, Southeast Fisheries Science Center  
Sustainable Fisheries Division, 75 Virginia Beach Drive, Miami, FL, 33149-1099  
[Kevin.J.McCarthy@noaa.gov](mailto:Kevin.J.McCarthy@noaa.gov)

Sustainable Fisheries Division Contribution SFD-2014-011

*August, 2015*

*Discard calculations were updated to include 2014 data (Table 9). Calculated gray triggerfish kept for bait or eaten (including 2014 totals) are provided in Table 10. There were no reports of gray triggerfish kept for bait or eaten from the trap fishery.*

### Introduction

In August 2001, the Southeast Fisheries Science Center (SEFSC) initiated a program to collect commercial fishing vessel discard data from South Atlantic fisheries. A reporting form was developed that supplements the existing vessel coastal logbook forms that are currently mandatory for those fisheries (Poffenberger and McCarthy, 2004). Discard data from the SEFSC coastal fisheries discard logbook program were used to calculate the number of gray triggerfish discarded from commercial vertical line (handline and electric/hydraulic reel, aka bandit rig) and trap (gray triggerfish only) vessels. Approximately 98.5 percent of gray triggerfish discards were reported from vessels fishing those gears.

Data collection for the discard logbook program involves, each year, a 20% random sample of vessels with South Atlantic snapper-grouper, king mackerel, Spanish mackerel, dolphin/wahoo, and shark permits selected to report the number of animals discarded by species. To assure that the sample was representative of vessels with those Federal permits fishing in the South Atlantic, the universe of permitted vessels was stratified by gear fished. Fishing gear strata included handline, bandit rig, trolling, longline, fish trap, gillnet, and diving. A random sample (weighted by effort reported for each vessel during the prior year) was selected from each stratum. The selected fishers were instructed to complete a supplemental discard form for each fishing trip. Trips with no discards were reported as such.

Reported data included the numbers of discards by species, estimated condition of the fish when released, reason for release (due to regulations or unmarketable/unwanted), and the fishing area where the animal was discarded. To calculate species specific discard rates, discard data were matched to the landings and effort data reported to the coastal logbook program. Condition of released fish could be reported as: all animals are dead, majority of the animals were dead, all animals were alive when released, majority of animals were alive, the fish were kept but not sold, and the condition of the animals is unknown.

### Methods

The objective of these analyses was to calculate the numbers of gray triggerfish discarded by vessels that fish commercially for species other than shrimp or other shellfish. Data were also restricted to exclude discard and effort information from pelagic longline vessels that typically fish for swordfish, pelagic sharks, and tunas. The data set included all commercial vertical line (handline and electric/hydraulic reel) and trap fishing trips from federally permitted vessels that reported discards between January 1, 2002 and December 31, 2013 in the US South Atlantic (statistical areas 2300-3700; Figure 1). Data from 2013 may

have been incomplete when the analyses were conducted. The available data for other gears were too few for discards to be calculated.

Total effort reported from the vertical line fishery was available for the years 1992-2013. Although South Atlantic effort data were available beginning in 1992, data collection during that initial year included only a 20 percent sample of commercial fishing vessels in Florida; all vessels in other states were required to report in 1992. All Florida vessels were required to report effort data beginning in 1993 and the SEDAR32 recommendation was to limit the time series to those years with complete effort reporting.

Gray triggerfish discards were initially calculated following the methods of SEDAR32 (McCarthy, 2013) and are summarized here as the continuity method. Due to the limited available discard data, discard rates were calculated as the nominal discard rate among all trips that reported to the discard logbook program over the period 2002-2013. Rates were calculated separately for vertical line and trap gears. Those discard rates were then multiplied by the yearly gear specific total fishing effort (vertical line: total hook-hours fished; trap: total number of traps fished) reported to the coastal logbook program to calculate total discards. Discards were calculated separately for those fish reported as discarded and those that were reported as “kept as bait or eaten”.

Discards were also calculated separately for open and closed gray triggerfish seasons (season specific method). Season specific discard rates (mean 2012-13 rate) were multiplied by year and season specific total effort for each gear. The mean discard rate for the period 2002-11 was multiplied by yearly total effort to calculate discards for the years 1993-2011 for each gear. Total discards and total numbers of fish reported as “kept as bait or eaten” were calculated separately.

Commercial discards may be under reported. If selected, fishers are required to report to the discard logbook program in order to renew their federal fishing permits. Fishers remain in reporting compliance by returning discard logbooks with reports of “no discards”. The percentage of discard reports returned with “no discards” from vertical line and trap trips has increased from 32 to 68 percent in the US South Atlantic over the period 2002-2013. During the SEDAR32 data workshop the issue of possible underreporting of commercial discards was discussed at length. The working group recommended that data be filtered to remove records from vessels that never reported discards of any species during a year. The SEDAR32 working group acknowledged that some South Atlantic commercial fishing trips may not have had discards of any species and discussed the likely maximum number of trips without a report of discards. The SEDAR32 commercial working group recommended excluding data from vertical line vessels that reported more than 17 trips without reporting discards of any species (the mean number of reported trips prior to the first trip with reported discard plus two standard deviations of that mean) or more than 3 trips (mean plus two standard deviations) without a report of discards in the trap fishery. Those data filters were included in the current analyses (continuity and season specific methods).

A further data filter, also recommended during SEDAR32, was to exclude from the total effort summary those trips that reported only mackerel landings. The assumption was that such trips were unlikely to have gray triggerfish discards. The opinion of the SEDAR32 data workshop working group was that including effort from those trips in discard calculations was inappropriate.

Discard logbook and coastal logbook data were also filtered to remove clearly erroneous data (values of gear-specific effort data beyond the 99.9 percentile of the data). Records with multiple gears fished on a trip were also excluded because discards could not be unambiguously attributed to a gear. That data filtering step was not necessary when summing total effort from the logbook data because reported effort data was gear-specific.

The completeness of 2013 effort data was estimated based upon trends in reporting to the coastal logbook program during the years 2010-2012. The percentage of delayed reporting by month during the years 2010-2012 was estimated by determining the number of reports received by June 23 (date of coastal logbook data set used in the analyses) during 2010-2012 compared to the total number of reports ultimately received for each of the years 2010-2012. The estimated level of reporting was 97.4 percent. The monthly mean estimates of reporting are provided below. No expansion of 2013 effort was used in the analyses.

<b>Month</b>	<b>Estimated percent reporting</b>
<b>Jan</b>	99.7
<b>Feb</b>	99.7
<b>Mar</b>	99.5
<b>Apr</b>	99.5
<b>May</b>	99.0
<b>Jun</b>	98.4
<b>Jul</b>	97.3
<b>Aug</b>	96.7
<b>Sep</b>	96.0
<b>Oct</b>	95.7
<b>Nov</b>	93.5
<b>Dec</b>	91.1

## **Results and Discussion**

The number of South Atlantic commercial fishing trips during 2002-2013 with reported discards of gray triggerfish (650 trips) was very low, severely limiting any analysis. Gray triggerfish were reported as discards primarily from vertical line and trap trips. Discards from all other gears combined were reported from 11 trips (Table 1a). Gray triggerfish accounted for 1.1% (9,293 fish) of all reported vertical line discards and 1.1% (2,833 fish) of discards reported from traps (Table 1b).

During the period 2002-2013, trips with reported gray triggerfish landings to the coastal logbook program included 10.8% (20,783) of all vertical line trips and 25.9% (1,866) of all trap trips (Table 2a). Gray triggerfish landings included 3.9% (3,307,357 pounds) of all reported vertical line landings, 1.2% (64,133 pounds) of all trap landings, and 0.13% (112,436 pounds) of total landings by all other gears combined (Table 2b).

Calculated gray triggerfish discards, discard rates, discard rate coefficients of variation, and total effort (hook hours and traps fished reported to the coastal logbook program) are provided in Table 3 (continuity method) and Table 4 (season specific method). Calculated total gray triggerfish kept as bait are provided in Table 5 (continuity method) and Table 6 (season specific method). The numbers of gray triggerfish discards and kept fish were less than 10,000 fish per year. During the 2012 and 2013 closed seasons there were 444 and 1,084, respectively, gray triggerfish reported as kept as bait or eaten. Those fish may have been kept under the recreational fishery daily bag limit. No gray triggerfish were reported as kept as bait in the trap fishery. Although landings of gray triggerfish by all gears other than vertical line were nearly twice the trap fishery landings of gray triggerfish, discards of gray triggerfish were rarely reported from those other gears.

More than 90% of gray triggerfish discarded in the vertical line fishery were reported as “alive” or “majority alive” (Table 7). A small percentage (8.9%) of vertical line gray triggerfish was reported as ‘kept for bait or eaten’. Gray triggerfish discards from the trap fishery were nearly all reported as alive or majority alive.

Gray triggerfish were discarded in the vertical line fishery most frequently due to regulations: 18.6% below legal size, 59.1 due to closed season, and 11.9% due to other regulations (Table 8). Prior to 2008 the reason for discarding could be reported as either due to regulations or due to market conditions. Beginning in 2008 the discard reporting form was expanded to include discarded due to the fish being under legal size or due to closed season. Reports from 2002-2007 citing discards as due to regulations were classified as ‘other regulations’ in Table 8 because discards due to closed season and due to legal size could not be determined. Market conditions were cited for an additional 8.8% of gray triggerfish vertical line discards. The high percentage of vertical line discards reported as due to closed season differs from that found during the SEDAR32 assessment (17.8% due to closed season). This is likely due to the lengthy gray triggerfish

closed season during 2013. The majority of gray triggerfish discards from the trap fishery was reported as due to market conditions.

The number of trips reporting gray triggerfish discards in the US South Atlantic was very low and the number of individuals reported as discarded was also low. Stratification of the available data was limited because of the small sample sizes and, therefore, the discard analyses described here likely do not capture much of the variation in numbers of discards within the gray triggerfish fisheries. Discard rates and calculated discards, unsurprisingly, differed greatly between open and closed fishing seasons; therefore, the calculated discards using the season specific method are recommended for use in the stock assessment. Variation in the number of discards among years with no closed season (or all years in the continuity method) was entirely driven by the effort reported from the vertical line and trap fisheries because a mean discard rate for the years 2002-2011 (or 2002-13, continuity method) was used in the calculation of discards for the years 1993-2011 (1993-2013, continuity method).

## **Literature Cited**

- McCarthy, K. 2013. Calculated discards of gray triggerfish and blueline tilefish from US South Atlantic commercial fishing vessels. Sustainable Fisheries Division Contribution SFD-2013-008. SEDAR32-DW11.
- 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 1a.** Number of trips with reported discards by gear fished; all years combined (2002-2013). Included in total trips are trips with no reported discards and trips that reported gray triggerfish discards. Trips with multiple gears fished reported may be counted more than once.

Species	Vertical line	Trap	All other gears
Gray triggerfish	426	213	11
Total trips	40,690	1,385	31,221

**Table 1b.** Number of discards reported by gear fished; all years combined (2002-2013). “Other species” totals represent discards of all other species reported to the discard logbook program. Discards from trips with multiple gears fished reported may be counted more than once.

Species	Vertical line	Trap	All other gears
Gray triggerfish	9,293	2,833	180
All other species	856,789	248,924	124,969

**Table 2a.** Number of trips with reported landings of gray triggerfish by gear fished; all years combined (2002-2013). Trips that reported multiple gears fished may be counted more than once. Total trips included all trips reported to the coastal logbook program including those reporting gray triggerfish.

Species	Vertical line	Trap	All other gears
Gray triggerfish	20,785	1,866	1,278
Total trips	192,531	7,201	143,862

**Table 2b.** Landings (pounds whole weight) reported by gear fished; all years combined (2002-2013). Landings from trips that reported multiple gears fished may be counted more than once. “Other species” totals represent all other reported landings to the coastal logbook program.

Species	Vertical line	Trap	All other gears
Gray triggerfish	3,307,357	64,133	112,436*
All other species	85,712,134	5,437,342	84,487,567**

\* 54.6% reported from longline vessels

\*\*23.4% reported from longline vessels

**Table 3.** Yearly discards of gray triggerfish from US South Atlantic commercial fisheries calculated using the continuity method. Data filters described in the text. Number of trips reporting to the discard logbook program was summed across the years 2002-2013. Vertical line effort = hook hours fished, trap effort = number of traps fished. Discards are reported as number of fish.

Year	Gear	Trips (discards)	Trips (total effort)	Discard Rate	Discard Rate CV	Total Effort	Calculated Discards
1993	Vertical line	24,705	11,846	0.003952	15.94	1,331,155	5,261
1994	Vertical line	24,705	14,446	0.003952	15.94	1,680,269	6,641
1995	Vertical line	24,705	14,468	0.003952	15.94	1,676,441	6,626
1996	Vertical line	24,705	15,395	0.003952	15.94	1,647,052	6,510
1997	Vertical line	24,705	17,642	0.003952	15.94	1,778,302	7,028
1998	Vertical line	24,705	15,865	0.003952	15.94	1,280,813	5,062
1999	Vertical line	24,705	14,462	0.003952	15.94	1,079,870	4,268
2000	Vertical line	24,705	13,299	0.003952	15.94	1,155,958	4,569
2001	Vertical line	24,705	13,932	0.003952	15.94	1,202,137	4,751
2002	Vertical line	24,705	14,575	0.003952	15.94	1,156,630	4,571
2003	Vertical line	24,705	14,063	0.003952	15.94	982,471	3,883
2004	Vertical line	24,705	13,178	0.003952	15.94	874,447	3,456
2005	Vertical line	24,705	11,843	0.003952	15.94	807,361	3,191
2006	Vertical line	24,705	11,654	0.003952	15.94	880,385	3,479
2007	Vertical line	24,705	12,801	0.003952	15.94	946,780	3,742
2008	Vertical line	24,705	13,040	0.003952	15.94	962,229	3,803
2009	Vertical line	24,705	14,353	0.003952	15.94	1,007,201	3,981
2010	Vertical line	24,705	12,778	0.003952	15.94	820,228	3,242
2011	Vertical line	24,705	13,093	0.003952	15.94	784,566	3,101
2012	Vertical line	24,705	12,334	0.003952	15.94	702,282	2,776
2013	Vertical line	24,705	11,728	0.003952	15.94	727,686	2,876
1993	Trap	1,199	1,023	0.062866	4.71	43,311	2,723
1994	Trap	1,199	1,195	0.062866	4.71	59,745	3,756
1995	Trap	1,199	1,032	0.062866	4.71	55,765	3,506
1996	Trap	1,199	1,168	0.062866	4.71	59,422	3,736
1997	Trap	1,199	1,353	0.062866	4.71	62,406	3,923
1998	Trap	1,199	1,201	0.062866	4.71	53,588	3,369
1999	Trap	1,199	1,075	0.062866	4.71	49,538	3,114
2000	Trap	1,199	829	0.062866	4.71	37,859	2,380
2001	Trap	1,199	1,096	0.062866	4.71	43,626	2,743
2002	Trap	1,199	826	0.062866	4.71	35,942	2,260
2003	Trap	1,199	783	0.062866	4.71	31,505	1,981
2004	Trap	1,199	820	0.062866	4.71	31,221	1,963
2005	Trap	1,199	596	0.062866	4.71	24,787	1,558
2006	Trap	1,199	786	0.062866	4.71	32,018	2,013
2007	Trap	1,199	616	0.062866	4.71	26,389	1,659
2008	Trap	1,199	561	0.062866	4.71	18,820	1,183
2009	Trap	1,199	772	0.062866	4.71	28,804	1,811
2010	Trap	1,199	404	0.062866	4.71	15,552	978
2011	Trap	1,199	237	0.062866	4.71	6,986	439
2012	Trap	1,199	324	0.062866	4.71	8,735	549
2013	Trap	1,199	348	0.062866	4.71	8,773	552



**Table 4.** Yearly discards of gray triggerfish from US South Atlantic commercial fisheries. Discards calculated separately for open and closed seasons. Data filters described in the text. Discard rate for the period 1993-2011 was the single rate calculated using combined 2002-2011 data. Open season 2012-13 discard rate was calculated using combined open season 2012-13 data. Closed season 2012-13 discard rate was calculated using combined closed season 2012-13 data. Numbers of trips (discards) were summed as defined above (i.e., 2002-2011, 2012-13 open season, 2012-13 closed season). Vertical line effort = hook hours fished, trap effort = number of traps fished. Discards are reported as number of fish.

Year	Season	Trips (discards)	Trips (total effort)	Discard Rate	Discard Rate CV	Total Effort	Calculated Discards
Vertical line							
1993	Open	18,617	11,846	0.0021119	11.71	1,331,155	2,811
1994	Open	18,617	14,446	0.0021119	11.71	1,680,269	3,548
1995	Open	18,617	14,468	0.0021119	11.71	1,676,441	3,540
1996	Open	18,617	15,395	0.0021119	11.71	1,647,052	3,478
1997	Open	18,617	17,642	0.0021119	11.71	1,778,302	3,756
1998	Open	18,617	15,865	0.0021119	11.71	1,280,813	2,705
1999	Open	18,617	14,462	0.0021119	11.71	1,079,870	2,281
2000	Open	18,617	13,299	0.0021119	11.71	1,155,958	2,441
2001	Open	18,617	13,932	0.0021119	11.71	1,202,137	2,539
2002	Open	18,617	14,575	0.0021119	11.71	1,156,630	2,443
2003	Open	18,617	14,063	0.0021119	11.71	982,471	2,075
2004	Open	18,617	13,178	0.0021119	11.71	874,447	1,847
2005	Open	18,617	11,843	0.0021119	11.71	807,361	1,705
2006	Open	18,617	11,654	0.0021119	11.71	880,385	1,859
2007	Open	18,617	12,801	0.0021119	11.71	946,780	1,999
2008	Open	18,617	13,040	0.0021119	11.71	962,229	2,032
2009	Open	18,617	14,353	0.0021119	11.71	1,007,201	2,127
2010	Open	18,617	12,778	0.0021119	11.71	820,228	1,732
2011	Open	18,617	13,093	0.0021119	11.71	784,566	1,657
2012	Open	4,334	9,809	0.0021125	15.49	577,452	1,220
2013	Open	4,334	7,208	0.0021125	15.49	422,658	893
2012	closed	1,754	2,525	0.0280321	7.66	124,830	3,499
2013	closed	1,754	4,520	0.0280321	7.66	305,028	8,551
Trap							
1993	Open	895	1,023	0.0523886	4.55	43,311	2,269
1994	Open	895	1,195	0.0523886	4.55	59,745	3,130
1995	Open	895	1,032	0.0523886	4.55	55,765	2,921
1996	Open	895	1,168	0.0523886	4.55	59,422	3,113
1997	Open	895	1,353	0.0523886	4.55	62,406	3,269
1998	Open	895	1,201	0.0523886	4.55	53,588	2,807
1999	Open	895	1,075	0.0523886	4.55	49,538	2,595
2000	Open	895	829	0.0523886	4.55	37,859	1,983
2001	Open	895	1,096	0.0523886	4.55	43,626	2,286
2002	Open	895	826	0.0523886	4.55	35,942	1,883
2003	Open	895	783	0.0523886	4.55	31,505	1,651
2004	Open	895	820	0.0523886	4.55	31,221	1,636
2005	Open	895	596	0.0523886	4.55	24,787	1,299
2006	Open	895	786	0.0523886	4.55	32,018	1,677
2007	Open	895	616	0.0523886	4.55	26,389	1,382
2008	Open	895	561	0.0523886	4.55	18,820	986
2009	Open	895	772	0.0523886	4.55	28,804	1,509
2010	Open	895	404	0.0523886	4.55	15,552	815
2011	Open	895	237	0.0523886	4.55	6,986	366
2012	Open	152	257	0.0437637	3.59	6,787	297
2013	Open	152	130	0.0437637	3.59	3,222	141
2012	Closed	152	67	0.1436618	3.98	1,948	280
2013	Closed	152	218	0.1436618	3.98	5,551	797

**Table 5.** Yearly gray triggerfish discards reported as “kept as bait”, by gear, from US South Atlantic commercial fishing vessels calculated using the continuity method. Kept rate used to calculate total kept fish was the single rate calculated when all data reported from 2002-2013 were combined. Number of trips reporting to the discard logbook program was summed across the years 2002-2013. Vertical line effort = hook hours fished, trap effort = number of traps fished. Calculated kept fish are reported as number of fish.

Year	Gear	Trips (discards)	Trips (total effort)	Discard Rate	Discard Rate CV	Total Effort	Calculated Kept Fish
1993	Vertical line	24,705	11,846	0.000376639	35.43	1,331,155	501
1994	Vertical line	24,705	14,446	0.000376639	35.43	1,680,269	633
1995	Vertical line	24,705	14,468	0.000376639	35.43	1,676,441	631
1996	Vertical line	24,705	15,395	0.000376639	35.43	1,647,052	620
1997	Vertical line	24,705	17,642	0.000376639	35.43	1,778,302	670
1998	Vertical line	24,705	15,865	0.000376639	35.43	1,280,813	482
1999	Vertical line	24,705	14,462	0.000376639	35.43	1,079,870	407
2000	Vertical line	24,705	13,299	0.000376639	35.43	1,155,958	435
2001	Vertical line	24,705	13,932	0.000376639	35.43	1,202,137	453
2002	Vertical line	24,705	14,575	0.000376639	35.43	1,156,630	436
2003	Vertical line	24,705	14,063	0.000376639	35.43	982,471	370
2004	Vertical line	24,705	13,178	0.000376639	35.43	874,447	329
2005	Vertical line	24,705	11,843	0.000376639	35.43	807,361	304
2006	Vertical line	24,705	11,654	0.000376639	35.43	880,385	332
2007	Vertical line	24,705	12,801	0.000376639	35.43	946,780	357
2008	Vertical line	24,705	13,040	0.000376639	35.43	962,229	362
2009	Vertical line	24,705	14,353	0.000376639	35.43	1,007,201	379
2010	Vertical line	24,705	12,778	0.000376639	35.43	820,228	309
2011	Vertical line	24,705	13,093	0.000376639	35.43	784,566	295
2012	Vertical line	24,705	12,334	0.000376639	35.43	702,282	265
2013	Vertical line	24,705	11,728	0.000376639	35.43	727,686	274
1993	Trap	1,199	1,023	0	n/a	43,311	0
1994	Trap	1,199	1,195	0	n/a	59,745	0
1995	Trap	1,199	1,032	0	n/a	55,765	0
1996	Trap	1,199	1,168	0	n/a	59,422	0
1997	Trap	1,199	1,353	0	n/a	62,406	0
1998	Trap	1,199	1,201	0	n/a	53,588	0
1999	Trap	1,199	1,075	0	n/a	49,538	0
2000	Trap	1,199	829	0	n/a	37,859	0
2001	Trap	1,199	1,096	0	n/a	43,626	0
2002	Trap	1,199	826	0	n/a	35,942	0
2003	Trap	1,199	783	0	n/a	31,505	0
2004	Trap	1,199	820	0	n/a	31,221	0
2005	Trap	1,199	596	0	n/a	24,787	0
2006	Trap	1,199	786	0	n/a	32,018	0
2007	Trap	1,199	616	0	n/a	26,389	0
2008	Trap	1,199	561	0	n/a	18,820	0
2009	Trap	1,199	772	0	n/a	28,804	0
2010	Trap	1,199	404	0	n/a	15,552	0
2011	Trap	1,199	237	0	n/a	6,986	0
2012	Trap	1,199	324	0	n/a	8,735	0
2013	Trap	1,199	348	0	n/a	8,773	0

**Table 6.** Yearly gray triggerfish discards reported as “kept as bait” from US South Atlantic commercial fisheries; calculated separately for open and closed seasons. Data filters described in the text. Kept rate for the period 1993-2011 was the single rate calculated using combined 2002-2011 data. Open season 2012-13 kept rate was calculated using combined open season 2012-13 data. Closed season 2012-13 kept rate was calculated using combined closed season 2012-13 data. Numbers of trips (discards) were summed as defined above (i.e., 2002-2011, 2012-13 open season, 2012-13 closed season). Vertical line effort = hook hours fished, trap effort = number of traps fished. Calculated kept fish are reported as number of fish.

Year	Season	Trips (discards)	Trips (total effort)	Discard Rate	Discard Rate CV	Total Effort	Calculated Kept Fish
Vertical line							
1993	Open	18,617	11,846	0.00014	29.46	1,331,155	184
1994	Open	18,617	14,446	0.00014	29.46	1,680,269	232
1995	Open	18,617	14,468	0.00014	29.46	1,676,441	231
1996	Open	18,617	15,395	0.00014	29.46	1,647,052	227
1997	Open	18,617	17,642	0.00014	29.46	1,778,302	245
1998	Open	18,617	15,865	0.00014	29.46	1,280,813	177
1999	Open	18,617	14,462	0.00014	29.46	1,079,870	149
2000	Open	18,617	13,299	0.00014	29.46	1,155,958	160
2001	Open	18,617	13,932	0.00014	29.46	1,202,137	166
2002	Open	18,617	14,575	0.00014	29.46	1,156,630	160
2003	Open	18,617	14,063	0.00014	29.46	982,471	136
2004	Open	18,617	13,178	0.00014	29.46	874,447	121
2005	Open	18,617	11,843	0.00014	29.46	807,361	111
2006	Open	18,617	11,654	0.00014	29.46	880,385	121
2007	Open	18,617	12,801	0.00014	29.46	946,780	131
2008	Open	18,617	13,040	0.00014	29.46	962,229	133
2009	Open	18,617	14,353	0.00014	29.46	1,007,201	139
2010	Open	18,617	12,778	0.00014	29.46	820,228	113
2011	Open	18,617	13,093	0.00014	29.46	784,566	108
2012	Open	4,334	9,809	0.00012	65.83	577,452	67
2013	Open	4,334	7,208	0.00012	65.83	422,658	49
2012	Closed	1,754	2,525	0.00356	13.13	124,830	444
2013	Closed	1,754	4,520	0.00356	13.13	305,028	1,084
Trap							
1993	Open	895	1,023	0	n/a	43,311	0
1994	Open	895	1,195	0	n/a	59,745	0
1995	Open	895	1,032	0	n/a	55,765	0
1996	Open	895	1,168	0	n/a	59,422	0
1997	Open	895	1,353	0	n/a	62,406	0
1998	Open	895	1,201	0	n/a	53,588	0
1999	Open	895	1,075	0	n/a	49,538	0
2000	Open	895	829	0	n/a	37,859	0
2001	Open	895	1,096	0	n/a	43,626	0
2002	Open	895	826	0	n/a	35,942	0
2003	Open	895	783	0	n/a	31,505	0
2004	Open	895	820	0	n/a	31,221	0
2005	Open	895	596	0	n/a	24,787	0
2006	Open	895	786	0	n/a	32,018	0
2007	Open	895	616	0	n/a	26,389	0
2008	Open	895	561	0	n/a	18,820	0
2009	Open	895	772	0	n/a	28,804	0
2010	Open	895	404	0	n/a	15,552	0
2011	Open	895	237	0	n/a	6,986	0
2012	Open	152	257	0	n/a	6,787	0
2013	Open	152	130	0	n/a	3,222	0
2012	Closed	152	67	0	n/a	1,948	0
2013	Closed	152	218	0	n/a	5,551	0

**Table 7.** Reported disposition of gray triggerfish discards and kept discards (bait).

<b>Gear</b>	<b>All dead</b>	<b>Majority dead</b>	<b>All alive</b>	<b>Majority alive</b>	<b>Kept as bait/eaten</b>	<b>Unable to determine</b>	<b>Not reported</b>	<b>N fish</b>
Vertical line	0.5%		83.2%	7.3%	8.9%			9,293
Trap			95.2%	4.4%			0.3%	2,833

**Table 8.** Reported reasons for discarding gray triggerfish.

<b>Gear</b>	<b>Regulations not legal size</b>	<b>Regulations out of season</b>	<b>Regulations other</b>	<b>Market conditions</b>	<b>Not reported</b>	<b>N fish</b>
Vertical line	18.6%	59.1%	11.9%	8.8%	1.7%	9,293
Trap	14.3%	22.1%	10.3%	53.3%		2,833

**Addendum – updated calculated discards with 2014 data included**

**Table 9.** Yearly discards of gray triggerfish from US South Atlantic commercial fisheries. Discards calculated separately for open and closed seasons. Data filters described in the text. Discard rate for the period 1993-2011 was the single rate calculated using combined 2002-2011 data. Open season 2012-14 discard rate was calculated using combined open season 2012-14 data. Closed season 2012-14 discard rate was calculated using combined closed season 2012-14 data. Trips (discards) = trips reporting to the discard logbook program and were summed as defined above (i.e., 2002-2011, 2012-14 open season, 2012-14 closed season). Trips (total effort) = number of trips reporting to the coastal logbook program. Vertical line effort = hook hours fished, trap effort = number of traps fished. Discards are reported as number of fish.

Year	Season	Trips (discards)	Trips (total effort)	Discard Rate	Discard Rate CV	Total Effort	Calculated Discards
Vertical line							
1993	Open	18,612	11,846	0.0021	11.70	1,331,155	2,812
1994	Open	18,612	14,446	0.0021	11.70	1,680,269	3,549
1995	Open	18,612	14,468	0.0021	11.70	1,676,441	3,541
1996	Open	18,612	15,395	0.0021	11.70	1,647,052	3,479
1997	Open	18,612	17,642	0.0021	11.70	1,778,302	3,757
1998	Open	18,612	15,865	0.0021	11.70	1,280,813	2,706
1999	Open	18,612	14,462	0.0021	11.70	1,079,870	2,281
2000	Open	18,612	13,298	0.0021	11.70	1,155,724	2,441
2001	Open	18,612	13,927	0.0021	11.70	1,202,087	2,539
2002	Open	18,612	14,575	0.0021	11.70	1,156,630	2,443
2003	Open	18,612	14,062	0.0021	11.70	982,399	2,075
2004	Open	18,612	13,178	0.0021	11.70	874,447	1,847
2005	Open	18,612	11,843	0.0021	11.70	807,361	1,705
2006	Open	18,612	11,654	0.0021	11.70	880,385	1,860
2007	Open	18,612	12,801	0.0021	11.70	946,780	2,000
2008	Open	18,612	13,036	0.0021	11.70	962,163	2,033
2009	Open	18,612	14,352	0.0021	11.70	1,007,193	2,128
2010	Open	18,612	12,769	0.0021	11.70	819,205	1,731
2011	Open	18,612	13,093	0.0021	11.70	784,566	1,657
2012	Open	7,599	9,814	0.0067	11.97	576,915	3,848
2013	Open	7,599	7,273	0.0067	11.97	427,868	2,854
2014	Open	7,599	5,661	0.0067	11.97	313,762	2,093
2012	Closed	1,774	2,526	0.0277	7.71	124,835	3,460
2013	Closed	1,774	4,728	0.0277	7.71	323,090	8,955
2014	Closed	1,774	8,425	0.0277	7.71	455,476	12,624

**Table 9.** Continued.

<b>Year</b>	<b>Season</b>	<b>Trips (discards)</b>	<b>Trips (total effort)</b>	<b>Discard Rate</b>	<b>Discard Rate CV</b>	<b>Total Effort</b>	<b>Calculated Discards</b>
Trap							
1993	Open	895	1,023	0.05239	4.55	43,311	2,269
1994	Open	895	1,195	0.05239	4.55	59,745	3,130
1995	Open	895	1,032	0.05239	4.55	55,765	2,921
1996	Open	895	1,168	0.05239	4.55	59,422	3,113
1997	Open	895	1,353	0.05239	4.55	62,406	3,269
1998	Open	895	1,201	0.05239	4.55	53,588	2,807
1999	Open	895	1,075	0.05239	4.55	49,538	2,595
2000	Open	895	829	0.05239	4.55	37,859	1,983
2001	Open	895	1,096	0.05239	4.55	43,626	2,286
2002	Open	895	826	0.05239	4.55	35,942	1,883
2003	Open	895	783	0.05239	4.55	31,505	1,651
2004	Open	895	820	0.05239	4.55	31,221	1,636
2005	Open	895	596	0.05239	4.55	24,787	1,299
2006	Open	895	786	0.05239	4.55	32,018	1,677
2007	Open	895	616	0.05239	4.55	26,389	1,382
2008	Open	895	561	0.05239	4.55	18,820	986
2009	Open	895	772	0.05239	4.55	28,804	1,509
2010	Open	895	404	0.05239	4.55	15,561	815
2011	Open	895	237	0.05239	4.55	6,986	366
2012	Open	283	257	0.07818	3.68	6,787	531
2013	Open	283	134	0.07818	3.68	3,342	261
2014	Open	283	59	0.07818	3.68	1,451	113
2012	Closed	154	67	0.14180	4.01	1,948	276
2013	Closed	154	233	0.14180	4.01	6,002	851
2014	Closed	154	203	0.14180	4.01	4,993	708

**Table 10.** Yearly gray triggerfish discards reported as “kept for bait” from the US South Atlantic commercial vertical line fishery; calculated separately for open and closed seasons. Data filters described in the text. Kept rate for the period 1993-2011 was the single rate calculated using combined 2002-2011 data. Open season 2012-14 kept rate was calculated using combined open season 2012-14 data. Closed season 2012-14 kept rate was calculated using combined closed season 2012-14 data. Trips (discards) = trips reporting to the discard logbook program and were summed as defined above (i.e., 2002-2011, 2012-14 open season, 2012-14 closed season). Trips (total effort) = number of trips reporting to the coastal logbook program. Vertical line effort = hook hours fished. Calculated kept fish are reported as number of fish.

Year	Season	Trips (discards)	Trips (total effort)	Kept for Bait Rate	Kept for Bait Rate CV	Total Effort	Calculated Kept Fish
Vertical line							
1993	Open	18,612	11,846	0.000138	29.5	1,331,155	184
1994	Open	18,612	14,446	0.000138	29.5	1,680,269	232
1995	Open	18,612	14,468	0.000138	29.5	1,676,441	231
1996	Open	18,612	15,395	0.000138	29.5	1,647,052	227
1997	Open	18,612	17,642	0.000138	29.5	1,778,302	245
1998	Open	18,612	15,865	0.000138	29.5	1,280,813	177
1999	Open	18,612	14,462	0.000138	29.5	1,079,870	149
2000	Open	18,612	13,298	0.000138	29.5	1,155,724	160
2001	Open	18,612	13,927	0.000138	29.5	1,202,087	166
2002	Open	18,612	14,575	0.000138	29.5	1,156,630	160
2003	Open	18,612	14,062	0.000138	29.5	982,399	136
2004	Open	18,612	13,178	0.000138	29.5	874,447	121
2005	Open	18,612	11,843	0.000138	29.5	807,361	111
2006	Open	18,612	11,654	0.000138	29.5	880,385	122
2007	Open	18,612	12,801	0.000138	29.5	946,780	131
2008	Open	18,612	13,036	0.000138	29.5	962,163	133
2009	Open	18,612	14,352	0.000138	29.5	1,007,193	139
2010	Open	18,612	12,769	0.000138	29.5	819,205	113
2011	Open	18,612	13,093	0.000138	29.5	784,566	108
2012	Open	7,599	9,814	0.000264	37.8	576,915	152
2013	Open	7,599	7,273	0.000264	37.8	427,868	113
2014	Open	7,599	5,661	0.000264	37.8	313,762	83
2012	Closed	1,774	2,526	0.003515	13.2	124,835	439
2013	Closed	1,774	4,728	0.003515	13.2	323,090	1,136
2014	Closed	1,774	8,425	0.003515	13.2	455,476	1,601

Figure 1. Coastal logbook statistical areas.

