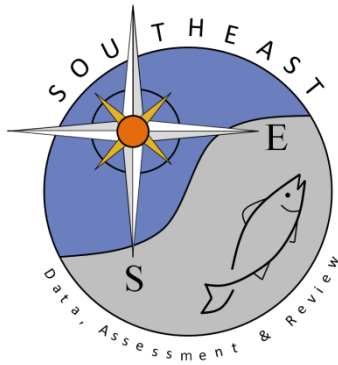


**Calculated discards of gray triggerfish and blueline tilefish from  
US South Atlantic commercial fishing vessels**

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

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### 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 and blueline tilefish discarded from commercial vertical line (handline and electric/hydraulic reel, aka bandit rig) and trap (gray triggerfish only) vessels. Approximately 99 percent of gray triggerfish and 96.5 percent of blueline tilefish 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 by 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. There are six options for the condition of released fish: 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. To calculate species specific discard rates, discard data were matched to the landings and effort data reported to the coastal logbook program.

### Methods

The objective of these analyses was to calculate the numbers of gray triggerfish and blueline tilefish discarded by vessels that fish commercially for species other than shrimp or other shellfish. Data from fishing activity for the analyses did not include those reported from the surface longline vessels that typically fish for swordfish, pelagic sharks, and tunas. The data set included all commercial vertical line and trap fishing trips from federally permitted vessels that reported discards between January 1, 2002 and December 31, 2012 in the US South Atlantic (statistical areas 2300-3700; Figure 1). Data from 2012 may have been incomplete when the analyses were conducted. Reports of gray triggerfish and blueline tilefish discards from vessels fishing other gears included only one percent of all gray triggerfish and three and one half percent of blueline tilefish for the period 2002-2012. The available data for other gears were too few for discards to be calculated.

Due to the limited available discard data, discard rates for both species were calculated as the nominal discard rate among all trips that reported to the discard logbook program over the period 2002-2012. Rates were calculated separately for vertical line (both species) and trap (gray triggerfish only) gears. Those discard rates were then applied to 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. Discards were calculated separately for those fish reported as discarded and those that were reported as “kept as bait or eaten”.

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 31 to 63 percent in the US South Atlantic over the period 2002-2012. To examine the affect of discard under reporting on the calculation of total discards, discard rate was calculated using three separate data filters: including all records in the discard data set, ‘no discards’ reports excluded from the analysis, and filtering the data set of records from vessels that never reported discards of any species during a year. Vessels with very few trips during a year may have had, by chance, no discards during those few trips. For the final data filtering approach records from vessels with six or fewer trips reported in a year, all with no discards reported, were included in the analyses.

To address the issue of incomplete 2012 data, total effort was estimated based upon trends in reporting to the coastal logbook program during the years 2009-2011. The percentage of delayed reporting by month during the years 2009-2011 was estimated by determining the number of reports received by January 24 (date of most recent coastal logbook data available) during those years and the total number of reports ultimately received for each of the years 2009-2011. The monthly mean percentage of delayed reports was used to expand the monthly total effort used to calculate discards for 2012 using the formula:

$$\text{Monthly reported effort} + (\text{monthly reported effort} * \text{month specific expansion factor}).$$

Discard rates for 2012 were calculated using data as reported. Effort expansion factors are provided below.

Month	Estimated percent reporting	Expansion factor
Jan	97.667	0.023
Feb	97.071	0.029
Mar	95.245	0.048
Apr	95.088	0.049
May	93.080	0.069
Jun	91.500	0.085
Jul	88.881	0.111
Aug	84.894	0.151
Sep	79.969	0.200
Oct	70.468	0.295
Nov	39.656	0.603
Dec	8.046	0.920

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). Discard logbook data 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.

## Results and Discussion

The number of trips from 2002-2012 with reported discards of gray triggerfish (448 trips) or blueline tilefish (15 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 fewer than 10 trips (Table 1a). Blueline tilefish discards were reported from vertical line trips exclusively (Table 1a). Gray triggerfish accounted for 0.49% (3,599 fish) of all reported vertical line discards and 1.05% (2,033 fish) of discards reported from traps (Table 1b). Blueline tilefish reported discards were 0.005% (41 fish) of all vertical line discards (Table 1b).

During the period 2002-2012, trips with reported gray triggerfish landings to the coastal logbook program included 11.2% (19,714) of all vertical line trips and 26.5% (1,802) of all trap trips (Table 2a). Blueline tilefish landings were reported from 3.3% (5,873) of vertical line trips and 1.9% (132) of trap trips. In addition, 1,101 bottom longline trips had blueline tilefish landings reported (Table 2a), however, no blueline tilefish discards were reported from longline trips. Gray triggerfish landings included 3.7% (3,014,220 pounds) of all reported vertical line landings, 1.2% (60,860 pounds) of all trap landings, and 0.14% (105,978 pounds) of total landings by all other gears combined (Table 2b). Landings of blueline tilefish were 1.1% (862,861 pounds) of all vertical line, 0.37% (19,033 pounds) of all trap, and 2.1% (1,635,567 pounds) of landings reported for all other gears. Of the blueline tilefish landings reported from gear other than vertical line or trap, more than 99% was reported from longline gear (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 Tables 3-5. Separate tables provide calculated discards for each discard data filtering method described in the methods section. Calculated total gray triggerfish kept as bait are provided in Tables 6-8. No gray triggerfish were reported as kept as bait in the trap fishery. Total yearly gray triggerfish calculated discards and calculated fish kept as bait are shown in Table 9. Although landings of gray triggerfish by the bottom longline fishery were of similar magnitude to those reported from the trap fishery, no gray triggerfish discards were reported from the bottom longline fishery.

Very few blueline tilefish were reported as discarded. No discards were reported from the bottom longline fishery even though landings of gray triggerfish from the bottom longline fishery were greater than those reported from any other gear (Table 2b). Total yearly discards, along with reported effort, are provided in Table 10 for each data filtering method. The 2002-2012 mean discard rates calculated for each data filtering method are provided in Table 11. Coefficients of variation for each discard rate are also provided in Table 11. Very low mean discard rates, coupled with a few highly variable trips reporting discards resulted in the very large coefficients of variation observed.

More than 92% of gray triggerfish discarded in the vertical line fishery were reported as “alive” or “majority alive” (Table 12). A small percentage (6.8%) 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. Almost all blueline tilefish were reported as “dead” when released or “kept” (Table 12).

Gray triggerfish were discarded in the vertical line fishery most frequently due to regulations: 39% below legal size, 17.8% due to closed season, and 17.6% due to other regulations (Table 13). 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 regulations may have been reclassified as ‘other regulations’ because discards due to closed season and due to legal size could not be determined. Market conditions were cited for an additional 21.3% of gray triggerfish vertical line discards. Market conditions was indicated as the reason for almost three quarters of gray triggerfish discarded in the trap fishery. The reason reported for discarding blueline tilefish was most often given as due to closed season (61%). An additional 31.7% were discarded due to market conditions (Table 13).

The number of trips reporting either gray triggerfish or blueline tilefish discards in the US South Atlantic was very low and the number of individuals of those species 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 and blueline tilefish fisheries. Variation in the number of discards among years was entirely driven by the effort reported from the fisheries (vertical line and trap).

Of additional concern is the increase in the number of trips reported as having 'no discards'. Inclusion of data from those trips may result in an underestimate of discard rates. Further discussion with commercial fishers regarding the likelihood that most commercial fishing trips in recent years have no discards of any species is necessary to corroborate the observed high percentage of no discard trips reported.

## **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 1a.** Number of trips reporting discards by species and gear fished; all years combined (2002-2012). Included in total trips are trips with no reported discards and trips that reported gray triggerfish or blueline tilefish discards. Trips with multiple gears fished reported may be counted more than once.

Species	Vertical line	Trap	All other gears
Gray triggerfish	295	166	7
Blueline tilefish	15		
Total trips	34,075	1,147	26,822

**Table 1b.** Number of discards reported by species, region, and gear fished; all years combined (2002-2012). “Other species” totals represent all other discards (excluding blueline tilefish and gray triggerfish) 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	3,599	2,033	62
Blueline tilefish	41		
All other species	747,885	191,378	113,713

**Table 2a.** Number of trips reporting landings by species and gear fished; all years combined (2002-2012). 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 or blueline tilefish. Trips with multiple gears fished reported may be counted more than once.

Species	Vertical line	Trap	All other gears
Gray triggerfish	19,714	1,802	1,151
Blueline tilefish	5,873	132	1,232*
Total trips	175,922	6,792	132,868

\*1,101 longline trips

**Table 2b.** Landings (pounds whole weight) reported by species and gear fished; all years combined (2002-2012). Landings from trips that reported multiple gears fished may be counted more than once. “Other species” totals represent all other reported (excluding gray triggerfish and blueline tilefish) landings to the coastal logbook program.

Species	Vertical line	Trap	All other gears
Gray triggerfish	3,014,220	60,860	105,978*
Blueline tilefish	862,861	19,033	1,635,567**
All other species	77,451,934	5,101,156	76,572,173***

\* 56.9% reported from longline vessels

\*\*99.6% reported from longline vessels

\*\*\*21.7% reported from longline vessels

**Table 3.** Yearly discards of gray triggerfish, by gear, from US South Atlantic commercial fishing vessels. All “no discards” reports retained. Number of trips reporting to the discard logbook program was summed across the years 2002-2012. Calculated discards using estimated expanded 2012 effort are also shown. 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	33,948	12,553	0.001442	14.88	1,367,680	1,972
	Trap	1,145	1,047	0.045305	4.83	43,876	1,988
1994	Vertical line	33,948	15,273	0.001442	14.88	1,706,792	2,461
	Trap	1,145	1,225	0.045305	4.83	60,807	2,755
1995	Vertical line	33,948	15,328	0.001442	14.88	1,708,760	2,464
	Trap	1,145	1,054	0.045305	4.83	56,550	2,562
1996	Vertical line	33,948	16,585	0.001442	14.88	1,690,267	2,437
	Trap	1,145	1,208	0.045305	4.83	60,432	2,738
1997	Vertical line	33,948	18,960	0.001442	14.88	1,842,783	2,657
	Trap	1,145	1,375	0.045305	4.83	62,886	2,849
1998	Vertical line	33,948	18,613	0.001442	14.88	1,389,722	2,004
	Trap	1,145	1,237	0.045305	4.83	54,612	2,474
1999	Vertical line	33,948	16,888	0.001442	14.88	1,184,176	1,707
	Trap	1,145	1,090	0.045305	4.83	49,768	2,255
2000	Vertical line	33,948	15,496	0.001442	14.88	1,233,937	1,779
	Trap	1,145	858	0.045305	4.83	38,887	1,762
2001	Vertical line	33,948	16,285	0.001442	14.88	1,272,991	1,835
	Trap	1,145	1,119	0.045305	4.83	44,456	2,014
2002	Vertical line	33,948	16,657	0.001442	14.88	1,172,216	1,690
	Trap	1,145	836	0.045305	4.83	36,243	1,642
2003	Vertical line	33,948	17,012	0.001442	14.88	1,004,868	1,449
	Trap	1,145	803	0.045305	4.83	32,058	1,452
2004	Vertical line	33,948	15,832	0.001442	14.88	916,359	1,321
	Trap	1,145	851	0.045305	4.83	32,124	1,455
2005	Vertical line	33,948	14,263	0.001442	14.88	854,003	1,231
	Trap	1,145	620	0.045305	4.83	25,690	1,164
2006	Vertical line	33,948	15,436	0.001442	14.88	961,042	1,386
	Trap	1,145	806	0.045305	4.83	32,732	1,483
2007	Vertical line	33,948	16,458	0.001442	14.88	1,028,151	1,482
	Trap	1,145	629	0.045305	4.83	26,721	1,211
2008	Vertical line	33,948	16,684	0.001442	14.88	1,052,358	1,517
	Trap	1,145	571	0.045305	4.83	19,263	873
2009	Vertical line	33,948	18,888	0.001442	14.88	1,090,968	1,573
	Trap	1,145	782	0.045305	4.83	28,999	1,314
2010	Vertical line	33,948	16,344	0.001442	14.88	893,566	1,288
	Trap	1,145	410	0.045305	4.83	15,613	707
2011	Vertical line	33,948	16,320	0.001442	14.88	850,528	1,226
	Trap	1,145	238	0.045305	4.83	7,002	317
2012	Vertical line	33,948	12,681	0.001442	14.88	649,643	937
	Trap	1,145	271	0.045305	4.83	7,183	325
2012	Vertical line	33,948	expanded	0.001442	14.88	725,900	1,047
	Trap	1,145	effort	0.045305	4.83	8,294	376



**Table 4.** Yearly discards of gray triggerfish, by gear, from US South Atlantic commercial fishing vessels. All “no discards” reports excluded. Number of trips reporting to the discard logbook program was summed across the years 2002-2012. Calculated discards using estimated expanded 2012 effort are also shown. 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	13,129	12,553	0.003728	9.22	1,367,680	5,099
	Trap	1,002	1,047	0.051771	4.51	43,876	2,272
1994	Vertical line	13,129	15,273	0.003728	9.22	1,706,792	6,363
	Trap	1,002	1,225	0.051771	4.51	60,807	3,148
1995	Vertical line	13,129	15,328	0.003728	9.22	1,708,760	6,371
	Trap	1,002	1,054	0.051771	4.51	56,550	2,928
1996	Vertical line	13,129	16,585	0.003728	9.22	1,690,267	6,302
	Trap	1,002	1,208	0.051771	4.51	60,432	3,129
1997	Vertical line	13,129	18,960	0.003728	9.22	1,842,783	6,870
	Trap	1,002	1,375	0.051771	4.51	62,886	3,256
1998	Vertical line	13,129	18,613	0.003728	9.22	1,389,722	5,181
	Trap	1,002	1,237	0.051771	4.51	54,612	2,827
1999	Vertical line	13,129	16,888	0.003728	9.22	1,184,176	4,415
	Trap	1,002	1,090	0.051771	4.51	49,768	2,577
2000	Vertical line	13,129	15,496	0.003728	9.22	1,233,937	4,600
	Trap	1,002	858	0.051771	4.51	38,887	2,013
2001	Vertical line	13,129	16,285	0.003728	9.22	1,272,991	4,746
	Trap	1,002	1,119	0.051771	4.51	44,456	2,302
2002	Vertical line	13,129	16,657	0.003728	9.22	1,172,216	4,370
	Trap	1,002	836	0.051771	4.51	36,243	1,876
2003	Vertical line	13,129	17,012	0.003728	9.22	1,004,868	3,746
	Trap	1,002	803	0.051771	4.51	32,058	1,660
2004	Vertical line	13,129	15,832	0.003728	9.22	916,359	3,416
	Trap	1,002	851	0.051771	4.51	32,124	1,663
2005	Vertical line	13,129	14,263	0.003728	9.22	854,003	3,184
	Trap	1,002	620	0.051771	4.51	25,690	1,330
2006	Vertical line	13,129	15,436	0.003728	9.22	961,042	3,583
	Trap	1,002	806	0.051771	4.51	32,732	1,695
2007	Vertical line	13,129	16,458	0.003728	9.22	1,028,151	3,833
	Trap	1,002	629	0.051771	4.51	26,721	1,383
2008	Vertical line	13,129	16,684	0.003728	9.22	1,052,358	3,923
	Trap	1,002	571	0.051771	4.51	19,263	997
2009	Vertical line	13,129	18,888	0.003728	9.22	1,090,968	4,067
	Trap	1,002	782	0.051771	4.51	28,999	1,501
2010	Vertical line	13,129	16,344	0.003728	9.22	893,566	3,331
	Trap	1,002	410	0.051771	4.51	15,613	808
2011	Vertical line	13,129	16,320	0.003728	9.22	850,528	3,171
	Trap	1,002	238	0.051771	4.51	7,002	362
2012	Vertical line	13,129	12,681	0.003728	9.22	649,643	2,422
	Trap	1,002	271	0.051771	4.51	7,183	372
2012	Vertical line	13,129	expanded	0.003728	9.22	725,900	2,706
	Trap	1,002	effort	0.051771	4.51	8,294	429

**Table 5.** Yearly discards of gray triggerfish, by gear, from US South Atlantic commercial fishing vessels. Records from vessels that exclusively submitted “no discards” reports were excluded. Number of trips reporting to the discard logbook program was summed across the years 2002-2012. Calculated discards using estimated expanded 2012 effort are also shown. 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	24,513	12,553	0.001997	12.63	1,367,680	2,731
	Trap	1,118	1,047	0.046399	4.77	43,876	2,036
1994	Vertical line	24,513	15,273	0.001997	12.63	1,706,792	3,408
	Trap	1,118	1,225	0.046399	4.77	60,807	2,821
1995	Vertical line	24,513	15,328	0.001997	12.63	1,708,760	3,412
	Trap	1,118	1,054	0.046399	4.77	56,550	2,624
1996	Vertical line	24,513	16,585	0.001997	12.63	1,690,267	3,375
	Trap	1,118	1,208	0.046399	4.77	60,432	2,804
1997	Vertical line	24,513	18,960	0.001997	12.63	1,842,783	3,680
	Trap	1,118	1,375	0.046399	4.77	62,886	2,918
1998	Vertical line	24,513	18,613	0.001997	12.63	1,389,722	2,775
	Trap	1,118	1,237	0.046399	4.77	54,612	2,534
1999	Vertical line	24,513	16,888	0.001997	12.63	1,184,176	2,365
	Trap	1,118	1,090	0.046399	4.77	49,768	2,309
2000	Vertical line	24,513	15,496	0.001997	12.63	1,233,937	2,464
	Trap	1,118	858	0.046399	4.77	38,887	1,804
2001	Vertical line	24,513	16,285	0.001997	12.63	1,272,991	2,542
	Trap	1,118	1,119	0.046399	4.77	44,456	2,063
2002	Vertical line	24,513	16,657	0.001997	12.63	1,172,216	2,341
	Trap	1,118	836	0.046399	4.77	36,243	1,682
2003	Vertical line	24,513	17,012	0.001997	12.63	1,004,868	2,007
	Trap	1,118	803	0.046399	4.77	32,058	1,487
2004	Vertical line	24,513	15,832	0.001997	12.63	916,359	1,830
	Trap	1,118	851	0.046399	4.77	32,124	1,491
2005	Vertical line	24,513	14,263	0.001997	12.63	854,003	1,705
	Trap	1,118	620	0.046399	4.77	25,690	1,192
2006	Vertical line	24,513	15,436	0.001997	12.63	961,042	1,919
	Trap	1,118	806	0.046399	4.77	32,732	1,519
2007	Vertical line	24,513	16,458	0.001997	12.63	1,028,151	2,053
	Trap	1,118	629	0.046399	4.77	26,721	1,240
2008	Vertical line	24,513	16,684	0.001997	12.63	1,052,358	2,101
	Trap	1,118	571	0.046399	4.77	19,263	894
2009	Vertical line	24,513	18,888	0.001997	12.63	1,090,968	2,178
	Trap	1,118	782	0.046399	4.77	28,999	1,346
2010	Vertical line	24,513	16,344	0.001997	12.63	893,566	1,784
	Trap	1,118	410	0.046399	4.77	15,613	724
2011	Vertical line	24,513	16,320	0.001997	12.63	850,528	1,698
	Trap	1,118	238	0.046399	4.77	7,002	325
2012	Vertical line	24,513	12,681	0.001997	12.63	649,643	1,297
	Trap	1,118	271	0.046399	4.77	7,183	333
2012	Vertical line	24,513	expanded	0.001997	12.63	725,900	1,449
	Trap	1,118	effort	0.046399	4.77	8,294	385

**Table 6.** Yearly discards kept as bait of gray triggerfish, by gear, from US South Atlantic commercial fishing vessels. All “no discards” reports retained. Number of trips reporting to the discard logbook program was summed across the years 2002-2012. Calculated discards using estimated expanded 2012 effort are also shown. 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 kept as bait
1993	Vertical line	33,948	12,553	0.000113397	40.06	1,367,680	155
	Trap	1,145	1,047	0		43,876	0
1994	Vertical line	33,948	15,273	0.000113397	40.06	1,706,792	194
	Trap	1,145	1,225	0		60,807	0
1995	Vertical line	33,948	15,328	0.000113397	40.06	1,708,760	194
	Trap	1,145	1,054	0		56,550	0
1996	Vertical line	33,948	16,585	0.000113397	40.06	1,690,267	192
	Trap	1,145	1,208	0		60,432	0
1997	Vertical line	33,948	18,960	0.000113397	40.06	1,842,783	209
	Trap	1,145	1,375	0		62,886	0
1998	Vertical line	33,948	18,613	0.000113397	40.06	1,389,722	158
	Trap	1,145	1,237	0		54,612	0
1999	Vertical line	33,948	16,888	0.000113397	40.06	1,184,176	134
	Trap	1,145	1,090	0		49,768	0
2000	Vertical line	33,948	15,496	0.000113397	40.06	1,233,937	140
	Trap	1,145	858	0		38,887	0
2001	Vertical line	33,948	16,285	0.000113397	40.06	1,272,991	144
	Trap	1,145	1,119	0		44,456	0
2002	Vertical line	33,948	16,657	0.000113397	40.06	1,172,216	133
	Trap	1,145	836	0		36,243	0
2003	Vertical line	33,948	17,012	0.000113397	40.06	1,004,868	114
	Trap	1,145	803	0		32,058	0
2004	Vertical line	33,948	15,832	0.000113397	40.06	916,359	104
	Trap	1,145	851	0		32,124	0
2005	Vertical line	33,948	14,263	0.000113397	40.06	854,003	97
	Trap	1,145	620	0		25,690	0
2006	Vertical line	33,948	15,436	0.000113397	40.06	961,042	109
	Trap	1,145	806	0		32,732	0
2007	Vertical line	33,948	16,458	0.000113397	40.06	1,028,151	117
	Trap	1,145	629	0		26,721	0
2008	Vertical line	33,948	16,684	0.000113397	40.06	1,052,358	119
	Trap	1,145	571	0		19,263	0
2009	Vertical line	33,948	18,888	0.000113397	40.06	1,090,968	124
	Trap	1,145	782	0		28,999	0
2010	Vertical line	33,948	16,344	0.000113397	40.06	893,566	101
	Trap	1,145	410	0		15,613	0
2011	Vertical line	33,948	16,320	0.000113397	40.06	850,528	96
	Trap	1,145	238	0		7,002	0
2012	Vertical line	33,948	12,681	0.000113397	40.06	649,643	74
	Trap	1,145	271	0		7,183	0
2012	Vertical line	33,948	expanded	0.000113397	40.06	725,900	82
	Trap	1,145	effort	0		8,294	0

**Table 7.** Yearly discards kept as bait of gray triggerfish, by gear, from US South Atlantic commercial fishing vessels. All “no discards” reports excluded. Number of trips reporting to the discard logbook program was summed across the years 2002-2012. Calculated discards using estimated expanded 2012 effort are also shown. 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 kept as bait
1993	Vertical line	13,129	12,553	0.000293213	24.9	1,367,680	401
	Trap	1,002	1,047	0		43,876	0
1994	Vertical line	13,129	15,273	0.000293213	24.9	1,706,792	500
	Trap	1,002	1,225	0		60,807	0
1995	Vertical line	13,129	15,328	0.000293213	24.9	1,708,760	501
	Trap	1,002	1,054	0		56,550	0
1996	Vertical line	13,129	16,585	0.000293213	24.9	1,690,267	496
	Trap	1,002	1,208	0		60,432	0
1997	Vertical line	13,129	18,960	0.000293213	24.9	1,842,783	540
	Trap	1,002	1,375	0		62,886	0
1998	Vertical line	13,129	18,613	0.000293213	24.9	1,389,722	407
	Trap	1,002	1,237	0		54,612	0
1999	Vertical line	13,129	16,888	0.000293213	24.9	1,184,176	347
	Trap	1,002	1,090	0		49,768	0
2000	Vertical line	13,129	15,496	0.000293213	24.9	1,233,937	362
	Trap	1,002	858	0		38,887	0
2001	Vertical line	13,129	16,285	0.000293213	24.9	1,272,991	373
	Trap	1,002	1,119	0		44,456	0
2002	Vertical line	13,129	16,657	0.000293213	24.9	1,172,216	344
	Trap	1,002	836	0		36,243	0
2003	Vertical line	13,129	17,012	0.000293213	24.9	1,004,868	295
	Trap	1,002	803	0		32,058	0
2004	Vertical line	13,129	15,832	0.000293213	24.9	916,359	269
	Trap	1,002	851	0		32,124	0
2005	Vertical line	13,129	14,263	0.000293213	24.9	854,003	250
	Trap	1,002	620	0		25,690	0
2006	Vertical line	13,129	15,436	0.000293213	24.9	961,042	282
	Trap	1,002	806	0		32,732	0
2007	Vertical line	13,129	16,458	0.000293213	24.9	1,028,151	301
	Trap	1,002	629	0		26,721	0
2008	Vertical line	13,129	16,684	0.000293213	24.9	1,052,358	309
	Trap	1,002	571	0		19,263	0
2009	Vertical line	13,129	18,888	0.000293213	24.9	1,090,968	320
	Trap	1,002	782	0		28,999	0
2010	Vertical line	13,129	16,344	0.000293213	24.9	893,566	262
	Trap	1,002	410	0		15,613	0
2011	Vertical line	13,129	16,320	0.000293213	24.9	850,528	249
	Trap	1,002	238	0		7,002	0
2012	Vertical line	13,129	12,681	0.000293213	24.9	649,643	190
	Trap	1,002	271	0		7,183	0
2012	Vertical line	13,129	expanded	0.000293213	24.9	725,900	213
	Trap	1,002	effort	0		8,294	0

**Table 8.** Yearly discards kept as bait of gray triggerfish, by gear, from US South Atlantic commercial fishing vessels. Records from vessels that exclusively submitted “no discards” reports were excluded. Number of trips reporting to the discard logbook program was summed across the years 2002-2012. Calculated discards using estimated expanded 2012 effort are also shown. 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 kept as bait
1993	Vertical line	24,513	12,553	0.000157043	34.04	1,367,680	215
	Trap	1,118	1,047	0		43,876	0
1994	Vertical line	24,513	15,273	0.000157043	34.04	1,706,792	268
	Trap	1,118	1,225	0		60,807	0
1995	Vertical line	24,513	15,328	0.000157043	34.04	1,708,760	268
	Trap	1,118	1,054	0		56,550	0
1996	Vertical line	24,513	16,585	0.000157043	34.04	1,690,267	265
	Trap	1,118	1,208	0		60,432	0
1997	Vertical line	24,513	18,960	0.000157043	34.04	1,842,783	289
	Trap	1,118	1,375	0		62,886	0
1998	Vertical line	24,513	18,613	0.000157043	34.04	1,389,722	218
	Trap	1,118	1,237	0		54,612	0
1999	Vertical line	24,513	16,888	0.000157043	34.04	1,184,176	186
	Trap	1,118	1,090	0		49,768	0
2000	Vertical line	24,513	15,496	0.000157043	34.04	1,233,937	194
	Trap	1,118	858	0		38,887	0
2001	Vertical line	24,513	16,285	0.000157043	34.04	1,272,991	200
	Trap	1,118	1,119	0		44,456	0
2002	Vertical line	24,513	16,657	0.000157043	34.04	1,172,216	184
	Trap	1,118	836	0		36,243	0
2003	Vertical line	24,513	17,012	0.000157043	34.04	1,004,868	158
	Trap	1,118	803	0		32,058	0
2004	Vertical line	24,513	15,832	0.000157043	34.04	916,359	144
	Trap	1,118	851	0		32,124	0
2005	Vertical line	24,513	14,263	0.000157043	34.04	854,003	134
	Trap	1,118	620	0		25,690	0
2006	Vertical line	24,513	15,436	0.000157043	34.04	961,042	151
	Trap	1,118	806	0		32,732	0
2007	Vertical line	24,513	16,458	0.000157043	34.04	1,028,151	161
	Trap	1,118	629	0		26,721	0
2008	Vertical line	24,513	16,684	0.000157043	34.04	1,052,358	165
	Trap	1,118	571	0		19,263	0
2009	Vertical line	24,513	18,888	0.000157043	34.04	1,090,968	171
	Trap	1,118	782	0		28,999	0
2010	Vertical line	24,513	16,344	0.000157043	34.04	893,566	140
	Trap	1,118	410	0		15,613	0
2011	Vertical line	24,513	16,320	0.000157043	34.04	850,528	134
	Trap	1,118	238	0		7,002	0
2012	Vertical line	24,513	12,681	0.000157043	34.04	649,643	102
	Trap	1,118	271	0		7,183	0
2012	Vertical line	24,513	expanded	0.000157043	34.04	725,900	114
	Trap	1,118	effort	0		8,294	0

**Table 9.** Yearly calculated gray triggerfish discards and discards kept as bait. Calculated discards using estimated expanded 2012 effort are also shown in the last row. Discards are in number of fish.

Year	Calculated discards (all records)	Calculated discards (exclude vessels that never reported discards)	Calculated discards (exclude 'no discards' records)	Calculated kept as bait (all records)	Calculated kept as bait (exclude vessels that never reported discards)	Calculated kept as bait (exclude 'no discards' records)
1993	3,960	4,767	7,371	155	215	401
1994	5,216	6,230	9,511	194	268	500
1995	5,026	6,036	9,298	194	268	501
1996	5,175	6,179	9,430	192	265	496
1997	5,506	6,598	10,126	209	289	540
1998	4,478	5,309	8,008	158	218	407
1999	3,962	4,674	6,991	134	186	347
2000	3,541	4,268	6,614	140	194	362
2001	3,850	4,605	7,048	144	200	373
2002	3,332	4,022	6,247	133	184	344
2003	2,901	3,494	5,406	114	158	295
2004	2,777	3,320	5,079	104	144	269
2005	2,395	2,897	4,514	97	134	250
2006	2,869	3,438	5,278	109	151	282
2007	2,693	3,293	5,217	117	161	301
2008	2,390	2,995	4,921	119	165	309
2009	2,887	3,524	5,569	124	171	320
2010	1,996	2,509	4,140	101	140	262
2011	1,544	2,023	3,533	96	134	249
2012	1,262	1,630	2,794	74	102	190
2012	1,423	1,834	3,135	82	114	213

**Table 10.** Calculated blueline tilefish discards and kept discards (bait). Calculated discards using estimated expanded 2012 effort are also shown in the last row. Discards are in number of fish.

Year	Total Effort	Calculated discards (all records)	Calculated discards (exclude vessels that never reported discards)	Calculated discards (exclude 'no discards' records)	Calculated kept as bait (all records)	Calculated kept as bait (exclude vessels that never reported discards)	Calculated kept as bait (exclude 'no discards' records)
1993	1,367,680	20	28	52	11	16	29
1994	1,706,792	25	35	65	14	20	37
1995	1,708,760	25	35	65	14	20	37
1996	1,690,267	25	34	64	14	19	36
1997	1,842,783	27	38	70	15	21	40
1998	1,389,722	20	28	53	12	16	30
1999	1,184,176	17	24	45	10	14	25
2000	1,233,937	18	25	47	10	14	26
2001	1,272,991	19	26	49	11	15	27
2002	1,172,216	17	24	45	10	13	25
2003	1,004,868	15	21	38	8	12	22
2004	916,359	14	19	35	8	11	20
2005	854,003	13	17	33	7	10	18
2006	961,042	14	20	37	8	11	21
2007	1,028,151	15	21	39	9	12	22
2008	1,052,358	16	21	40	9	12	23
2009	1,090,968	16	22	42	9	13	23
2010	893,566	13	18	34	7	10	19
2011	850,528	13	17	32	7	10	18
2012	649,643	10	13	25	5	7	14
2012	725,900	11	15	28	6	8	16

**Table 11.** Blueline tilefish discard rates and discard rate coefficients of variation.

	Discards (all records retained)	Discards (exclude vessels that never reported discards)	Discards (exclude 'no discards' records)	Kept as bait (all records)	Kept as bait (exclude vessels that never reported discards)	Kept as bait (exclude 'no discards' records)
<b>Mean discard rate</b>	0.000014737	0.000020409	0.000038106	0.000008297	0.000011491	0.000021454
<b>CV</b>	80.94	68.78	50.33	81.47	69.23	50.66

**Table 12.** Reported disposition of gray triggerfish and blueline tilefish discards and kept discards (bait). Totals may not sum to 100 percent due to data confidentiality constraints.

Species	Gear	All dead	Majority dead	All alive	Majority alive	Kept as bait/eaten	Unable to determine	Not reported	N fish
Gray triggerfish	Vertical line			83.0%	9.7%	6.8%			3,599
	Trap			93.4%	6.2%				2,033
Blueline tilefish	Vertical line	63.4%				31.7%			41

**Table 13.** Reported reasons for discarding gray triggerfish and blueline tilefish. Totals may not sum to 100 percent due to data confidentiality constraints.

Species	Gear	Regulations not legal size	Regulations out of season	Regulations other	Market conditions	Not reported	N fish
Gray triggerfish	Vertical line	39.0%	17.8%	17.6%	21.3%	4.3%	3,599
	Trap	11.7%		13.1%	73.2%		2,033
Blueline tilefish	Vertical line		61.0%		31.7%		41



Figure 1. Coastal logbook statistical areas.

