Standardized catch rates of gray triggerfish (*Balistes capriscus*) from headboat at-sea-observer data

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SEDAR41-DW15

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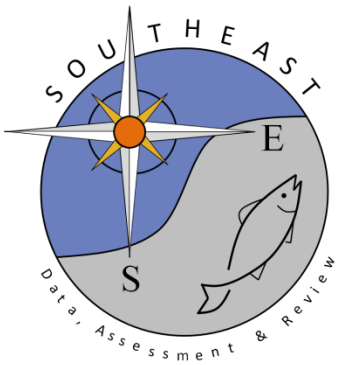
Addendum: 20 August 2014

***Addendum added to reflect changes made during Data Workshop.**
Final index is found in the addendum.



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Standardized catch rates of gray triggerfish (*Balistes capriscus*) from headboat at-sea-observer data

Sustainable Fisheries Branch, National Marine Fisheries Service,
Southeast Fisheries Science Center, 101 Pivers Island Rd, Beaufort, NC 28516

*__Addendum at end of document reflecting changes made at Data Workshop__

Abstract
Standardized catch rates were generated from the Southeast headboat at-sea-observer program for 2005-2013. The analysis included areas from central North Carolina through south Florida. The index is meant to describe population trends of fish in the size/age range of fish landed and discarded by headboat vessels. Data filtering and subsetting steps were applied to the data to model trips that were likely to have directed gray triggerfish effort.

Background and Data Description

The data used for this index were all trips in the headboat at-sea observer database which harvested and discarded gray triggerfish from 2005-2013. The at-sea-observer program occurred from 2004-2009 in North and South Carolina, but did not occur in Florida and Georgia in 2004. In addition, after 2007 the Florida Keys were no longer included in the at-sea observer program. Trip-level information included state, county, Florida region, year, month, day, dock to dock hours (total trip hours), the number of hours fished (to the nearest half hour), the total number of anglers on the boat, the number of anglers observed on a trip, the number of gray triggerfish discarded, minimum depth of the fishing trip, and maximum depth of the fishing trip. Depth information was not collected for South Carolina, North Carolina, and Georgia; therefore, it was not used in this analysis. Refer to working paper SEDAR41-DW34 for more details regarding this program.

Methods

Data treatment
Data from 2004 were dropped from the analysis because Georgia and Florida were not sampled. Due to the 12" minimum size in Florida, triggerfish discards were infrequent in North Carolina, South Carolina and Georgia. Due to this regulation a catch index including harvest and discards was explored. Observer trips by year and area relative to all headboat trips as well as total gray triggerfish observed are presented in Table 1.

Data were restricted to include trips with the presence of at least one of the following associated species identified in Shertzer and Williams (2008) (bank seabass, black seabass, gag, gray triggerfish, greater amberjack, knobbed porgy, red porgy, red snapper, scamp, tomtate, vermillion snapper, white grunt, whitebone porgy).

Response and explanatory variables

CPUE – Catch per unit effort (DPUE) is defined as units of fish/ angler interviewed and was calculated as the number gray triggerfish harvested and discarded divided by the number of anglers interviewed. CPUE relative to each explanatory variable is provided in Figure 1-5.

YEAR – A summary of the total number of trips with red snapper effort per year is provided in Table 1.

AREA –Area was defined as North Carolina, South Carolina and Georgia, north Florida (nFL), south Florida, (excluding the keys, flreg=3)

SEASON – The seasons were defined as winter (January, February, March), spring (April, May, June), summer (July, August, September) and fall (October, November, December).

PARTY – Four categories (quantiles) for the number of anglers on the vessel were considered in the standardization process.

HRSF– Four categories (quantiles) for the number of hours fished were considered in the standardization process.

Objective for SEDAR 41 Data Workshop

- Approve or modify proposed factors and factor definitions
- Discuss cpue definition (anglers vs angler-hours)
- Discuss filtering using associated species (bank seabass, black seabass, gag, gray triggerfish, greater amberjack, knobbed porgy, red porgy, red snapper, scamp, tomtate, vermillion snapper, white grunt, whitebone porgy)
- Disscuss management regulations and their potential influence on index
- Run GLM based on DW decisions regarding data and factors
- Estimate uncertainty
- Update working paper and provide text, figures, and research recommendations for the SEDAR 41 DW report

LITERATURE CITED

Shertzer. K. W. and E H Williams. 2008. Fish assemblages and indicator species: reef fishes off the southeastern United States. Fisheries Bulletin. 106:257-269.

Table 1. Trips by area and year and catch (harvest + discards) of gray triggerfish in the south Atlantic headboat at-sea-observer data relative to the proportion of all headboat trips by state and year. (n.HB.obs= total observer trips, n.HB=total headboat trips, %cov= percent of all headboat trips observed, num.h&d= number of gray triggerfish harvested and discarded combined.)

	NC				SC/GA				nFL				sFL				All			
year	n.HB.obs	n.HB	%cov	num.h&d	n.HB.obs	n.HB	%cov	num.h&d	n.HB.obs	n.HB	%cov	num.h&d	n.HB.obs	n.HB	%cov	num.h&d	n.HB.obs	n.HB	%cov	num.h&d
2005	97	565	17%	112	64	1632	4%	77	42	1450	3%	31	76	2048	4%	127	279	5695	5%	347
2006	88	495	18%	29	52	1865	3%	44	35	1611	2%	17	53	1938	3%	93	228	5909	4%	183
2007	91	463	20%	98	60	2162	3%	31	48	1699	3%	28	49	2057	2%	93	248	6381	4%	250
2008	78	571	14%	198	42	1982	2%	38	50	1928	3%	13	57	4734	1%	73	227	9215	2%	322
2009	69	432	16%	162	43	2204	2%	90	52	2078	3%	19	61	5536	1%	118	225	10250	2%	389
2010	83	548	15%	372	29	2376	1%	23	46	1933	2%	19	54	6065	1%	101	212	10922	2%	515
2011	79	476	17%	225	25	2553	1%	196	46	1704	3%	10	47	5852	1%	79	197	10585	2%	510
2012	70	506	14%	289	44	2514	2%	105	48	1743	3%	8	48	6531	1%	44	210	11294	2%	446
2013	53	529	10%	447	52	2287	2%	205	46	1916	2%	41	66	8370	1%	135	217	13102	2%	828
total	708	4585	15%	1932	411	19575	2%	809	413	16062	3%	186	511	43131	1%	863	2043	83353	2%	3790

Figure 1. Harvest+discard/angler box plots by year and area.

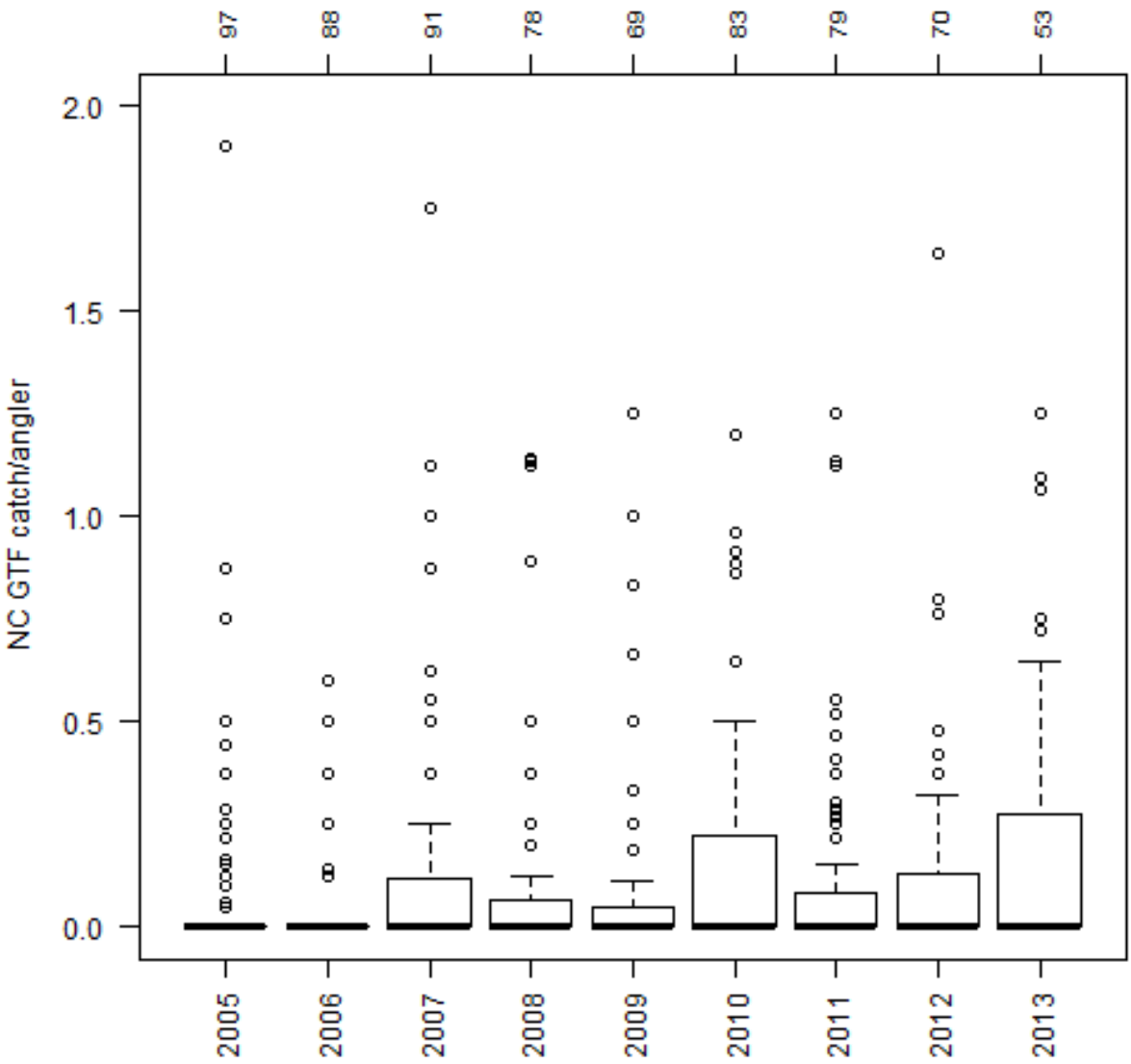
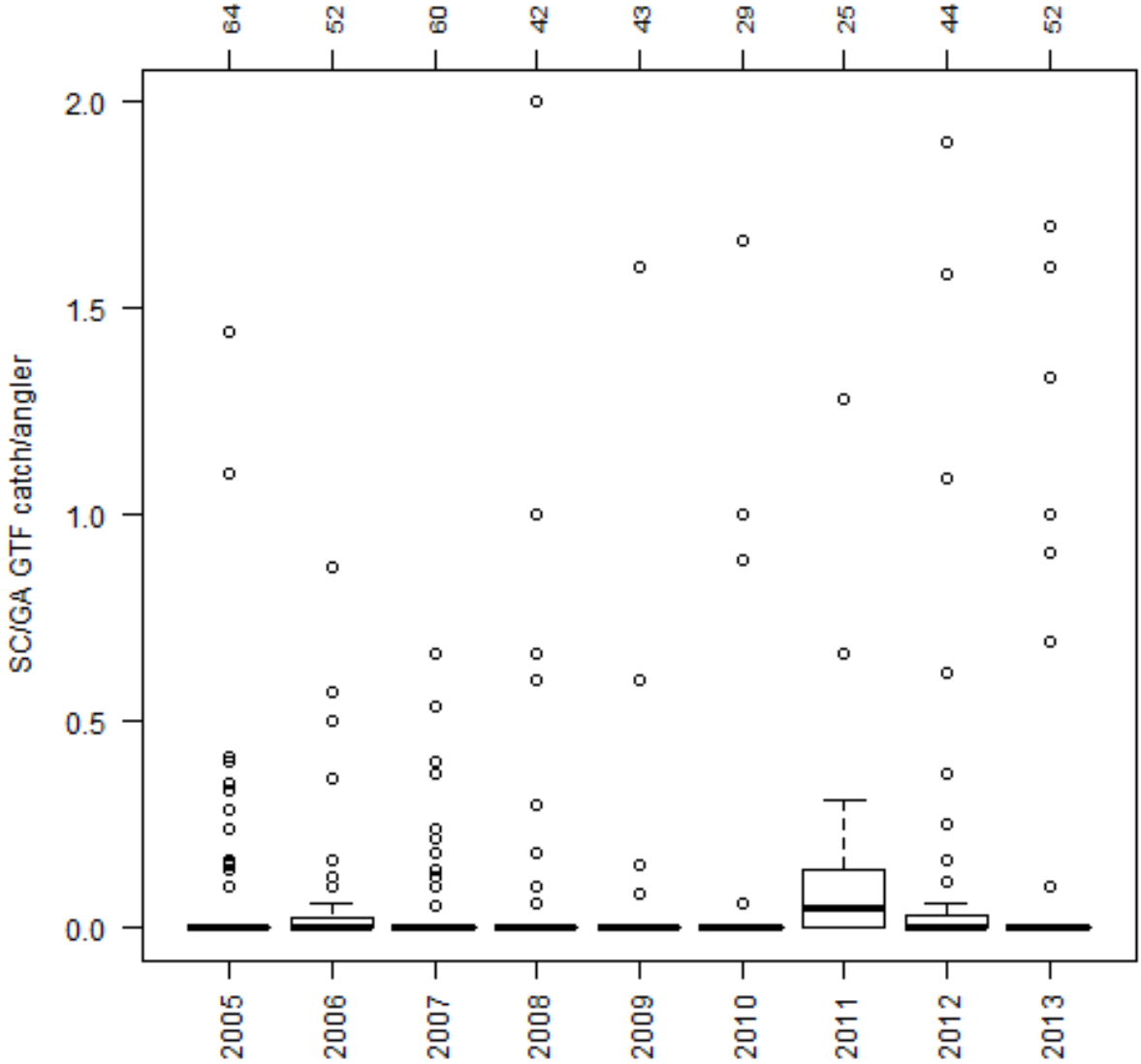


Figure 1. (continued)



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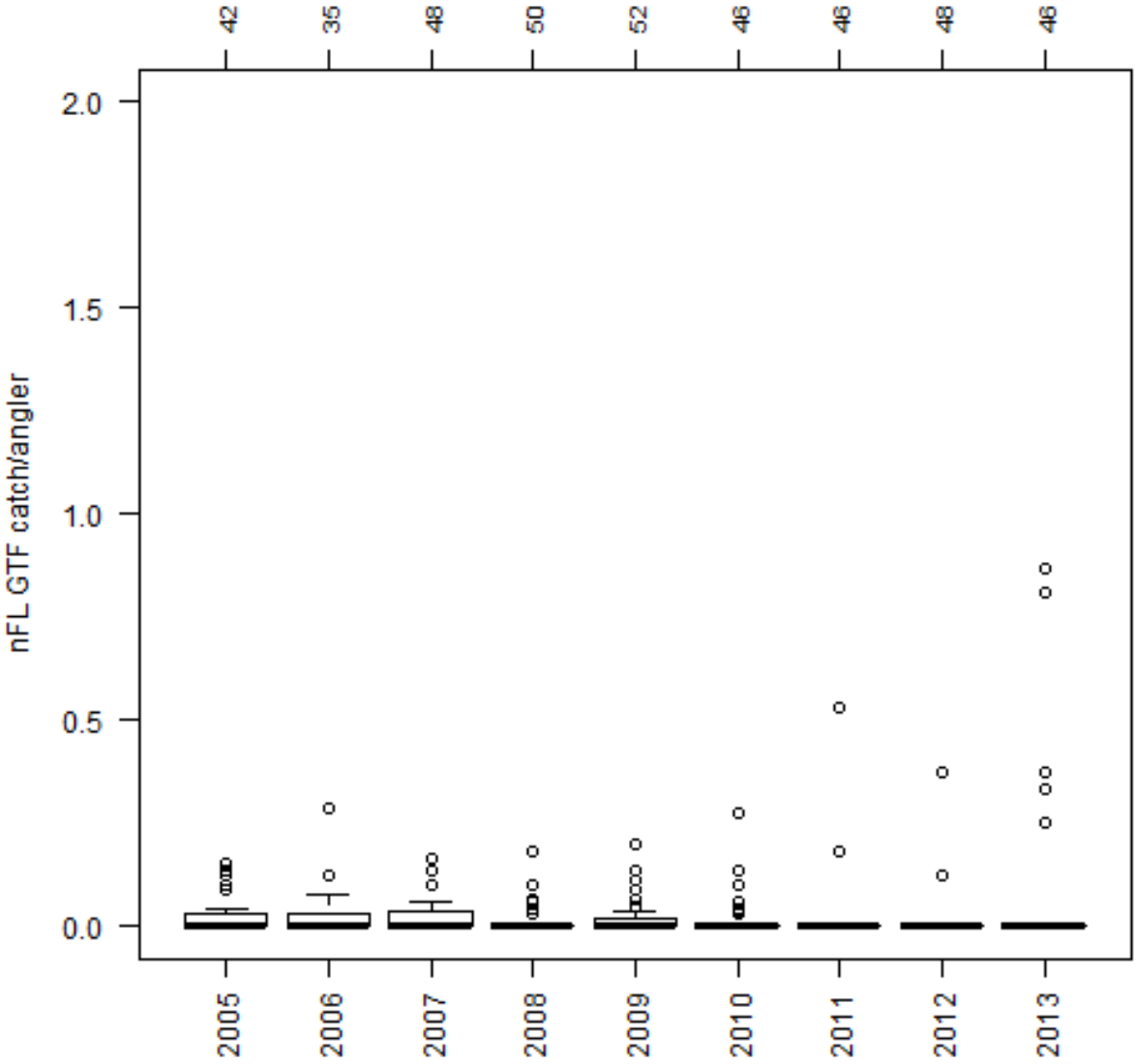


Figure 1. (continued)

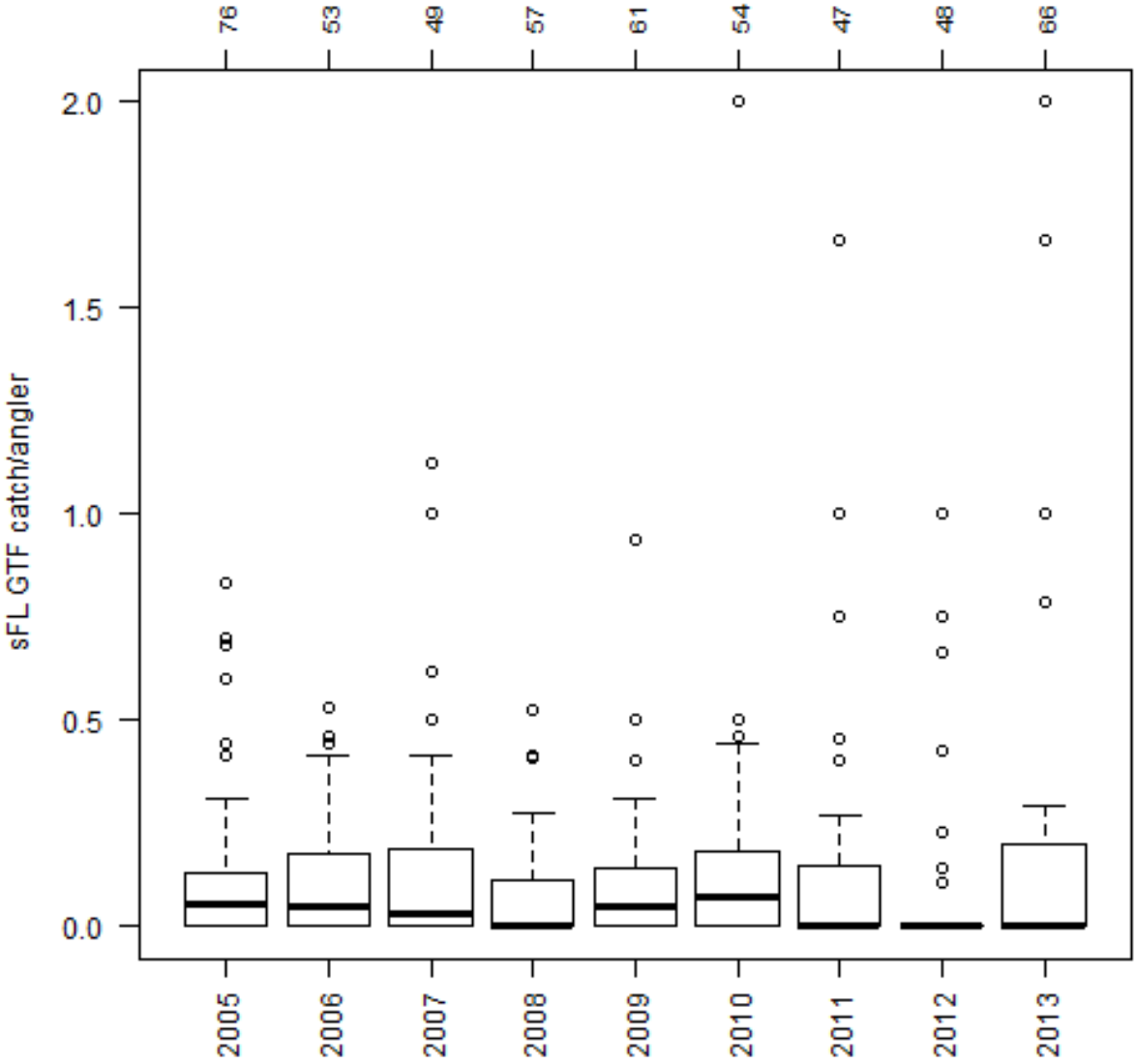


Figure 2. Harvest+discard /angler by year and area.

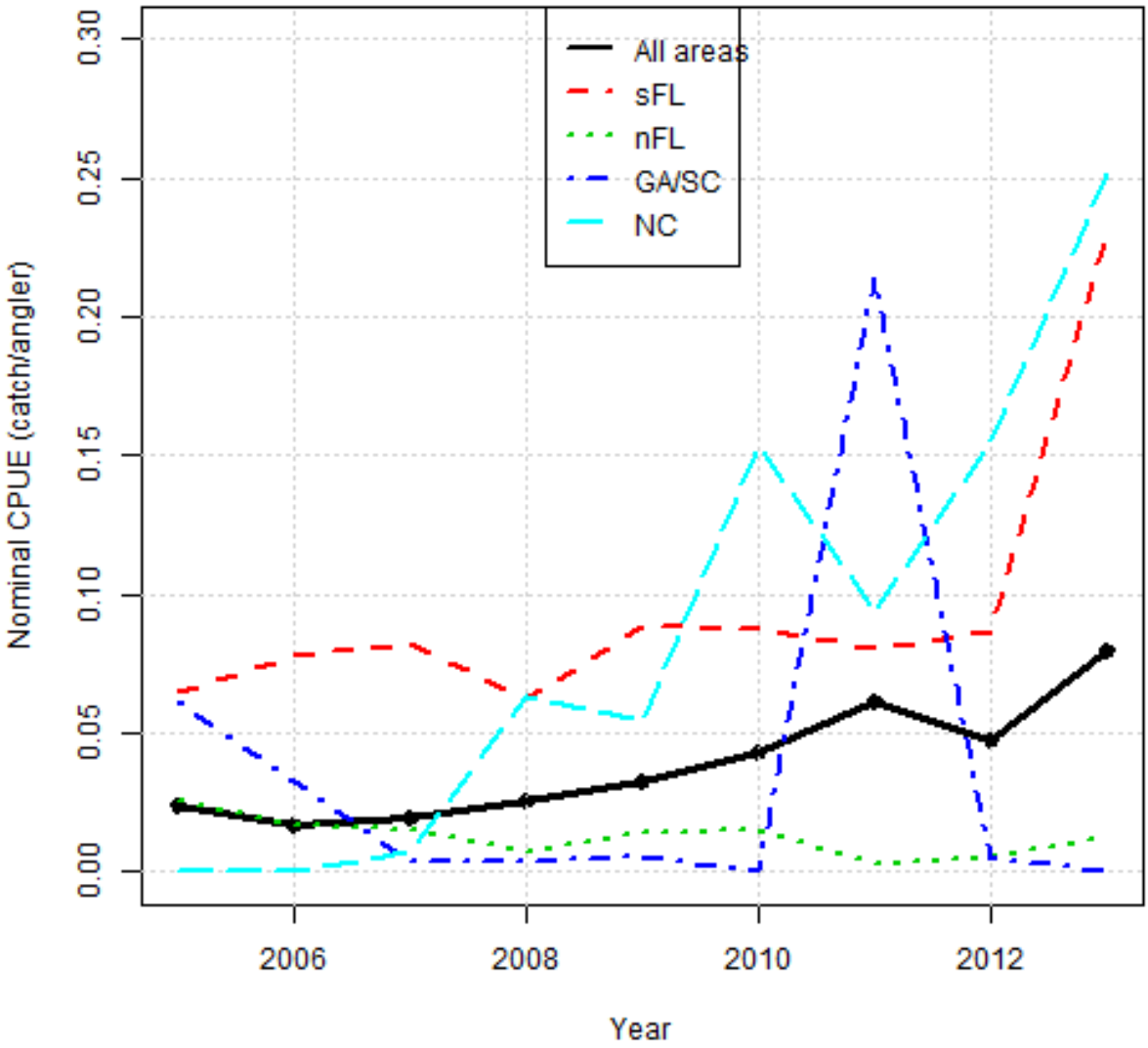


Figure 3. Harvest+discard /angler by year and season.

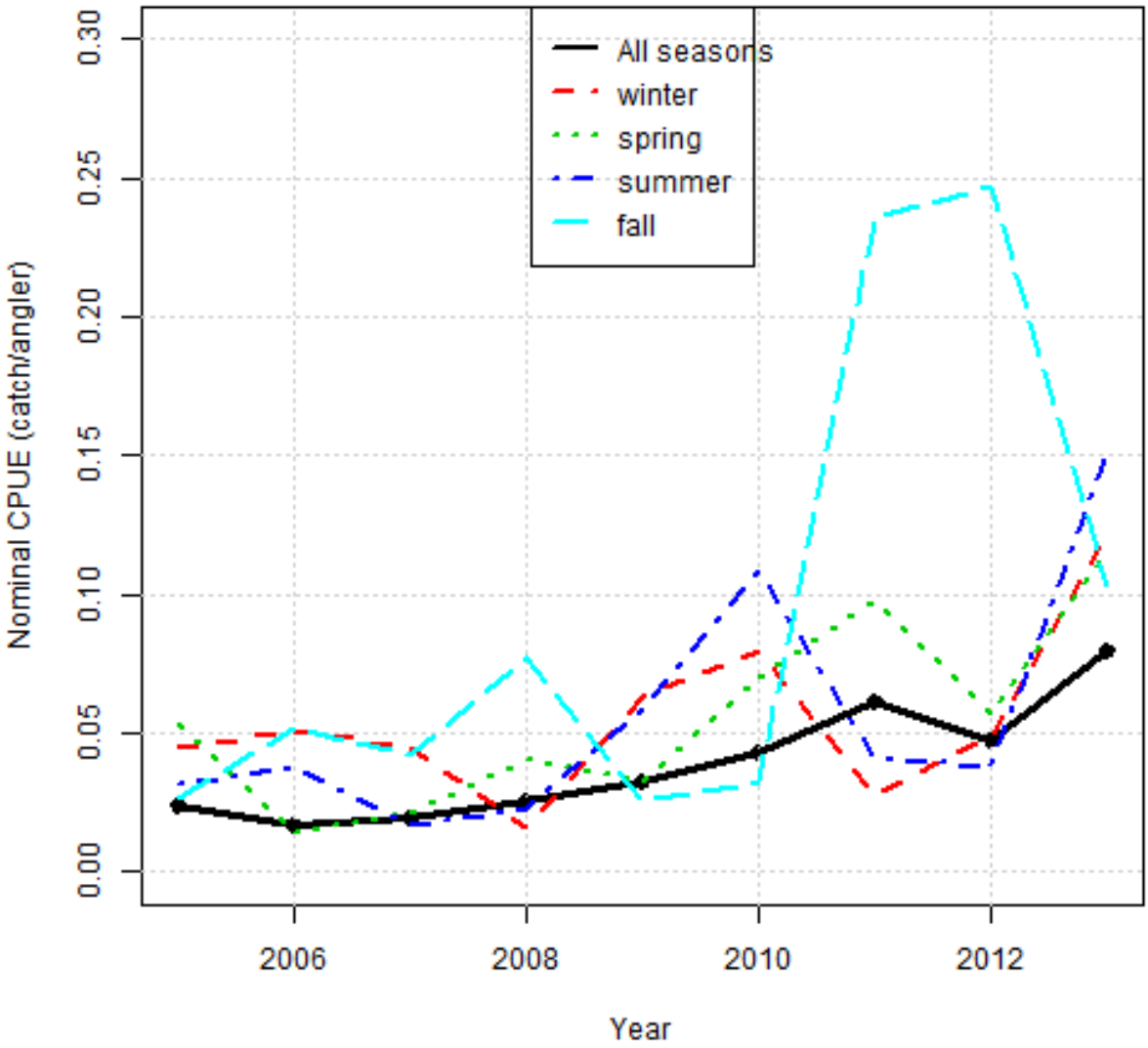


Figure 4. Harvest+discard /angler by year and party size.

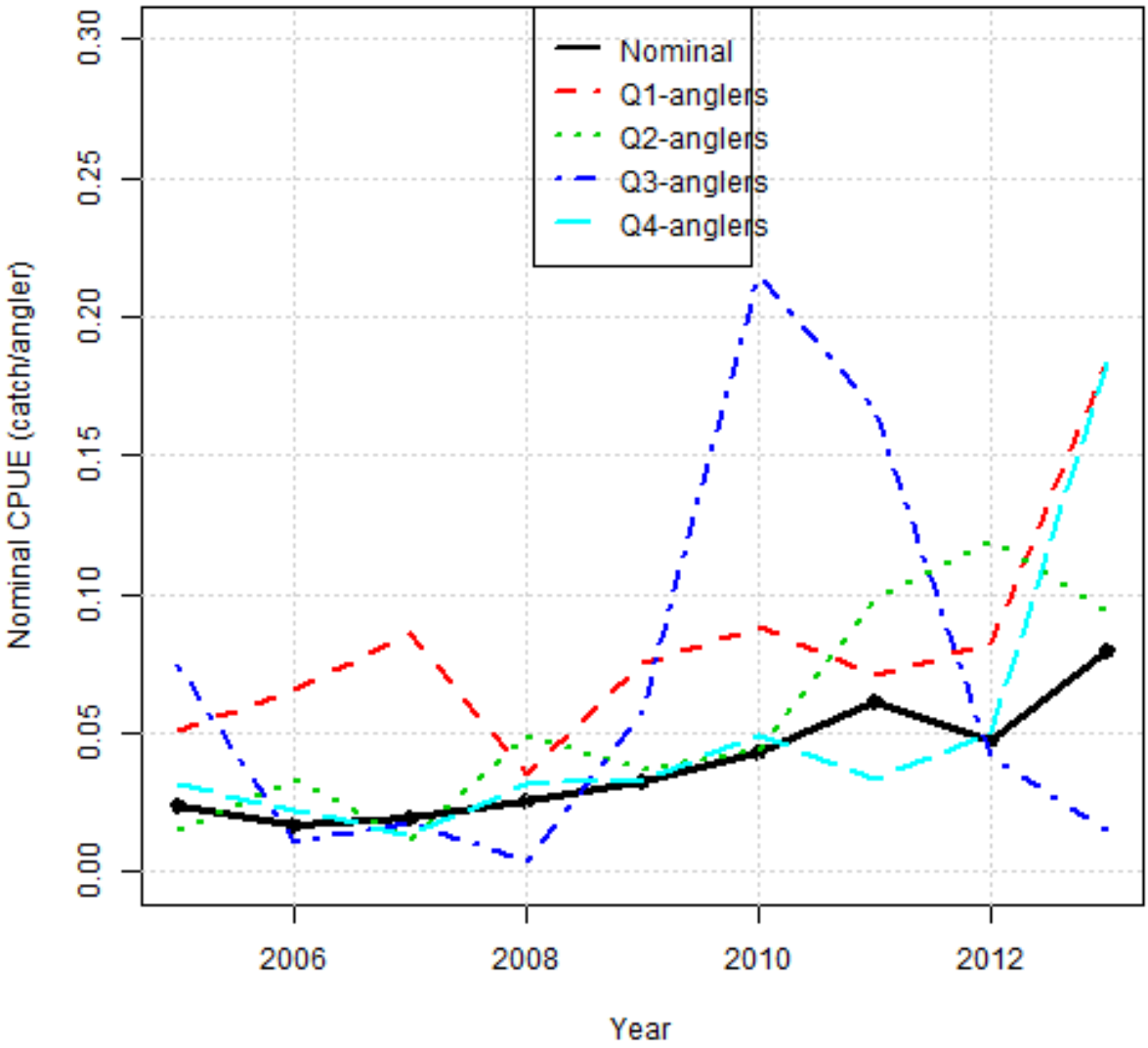
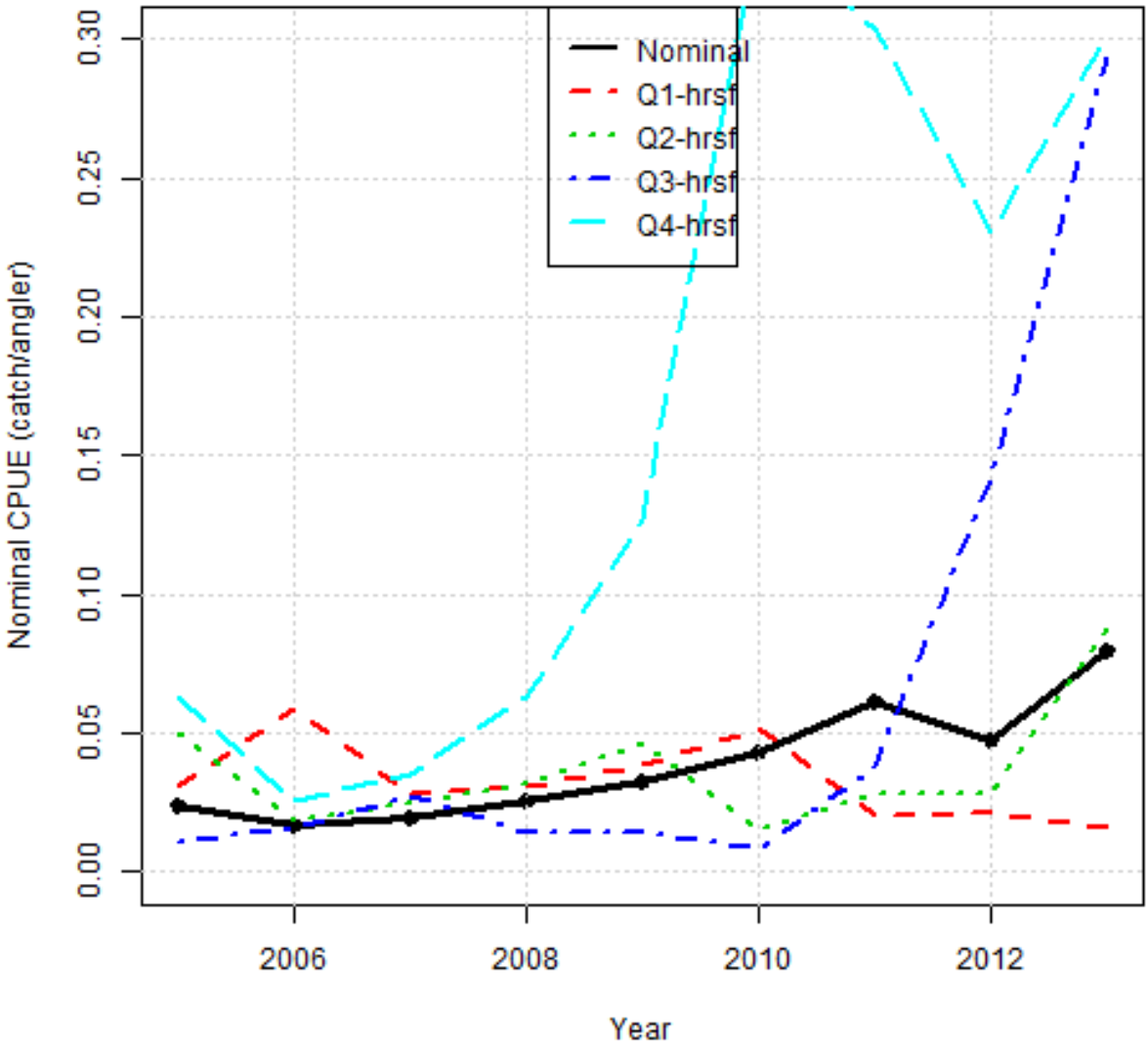


Figure 5. Harvest+discard /angler by year and hours fished.



ADDENDUM

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from headboat at-sea-observer data

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August 2014

Abstract
Standardized catch rates were generated from the Southeast headboat at-sea-observer program for 2005-~~2013~~2009. The analysis included areas from central North Carolina through south Florida. The index is meant to describe population trends of fish in the size/age range of fish landed and discarded by headboat vessels. Data filtering and subsetting steps were applied to the data to model trips that were likely to have directed gray triggerfish effort.

SEDAR 41 Index Working Group Review

Data workshop findings

The SEDAR 41 index working group (IWG) reviewed the methods used to develop an index of abundance for gray triggerfish from headboat at-sea observer data. Several decisions from SEDAR 41 index working group were also considered during the SEDAR 32 index working group. The following topics were discussed at the data workshop and include the final decisions and justification.

Start & end year

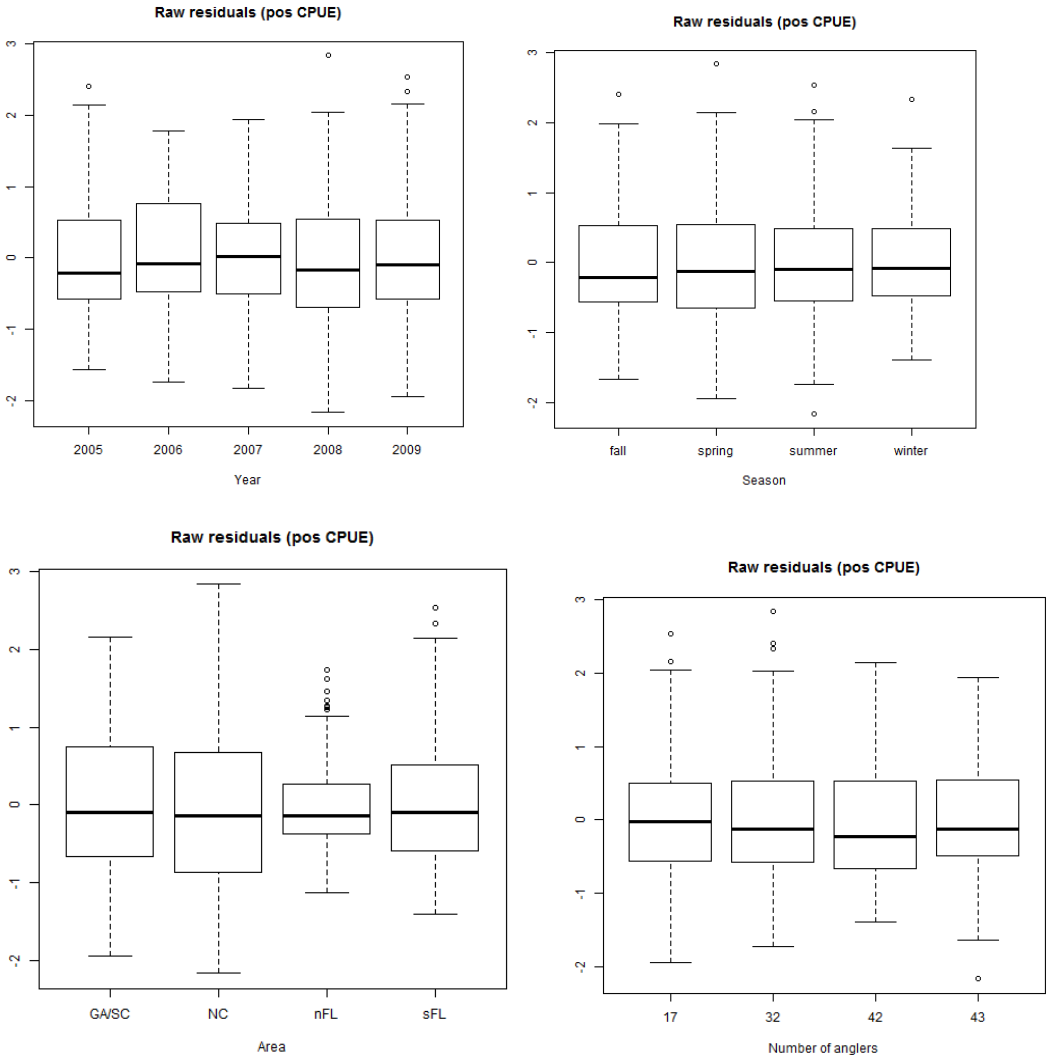
For a fisheries dependent index like the headboat at-sea observer index, identifying changes in angler behavior are important when developing an index. SEDAR 41 IWG participants along with fisherman present at the meeting discussed the red snapper closure in 2010 and its potential impact on the gray triggerfish headboat at-sea observer index in 2010-2013. Because of this shift in behavior (targeting), the IWG recommended to end the at-sea observer index in 2009. Unlike the red snapper index, modeling discards for gray triggerfish was difficult due to the 12" TL minimum size limit in Florida only. The IWG decided not to recommend this index for use because the at-sea observer index included fish caught in the index (overlapping data used from headboat logbook index).

The following represents the final model input and dGLM results for the GTF headboat logbook index.

Table 1. The relative nominal CPUE, number of trips, standardized index, and CV for the gray triggerfish headboat at-sea observer data in the south Atlantic from **2005-2009**.

Year	Relative nominal CPUE	N	Proportion N positive	Standardized index	CV (index)
2005	1.0052	297	0.4074	0.9990	0.1297
2006	0.7393	249	0.3293	0.7904	0.1587
2007	0.8401	269	0.3755	1.1065	0.1187
2008	1.0649	246	0.3577	0.8624	0.1650
2009	1.3505	239	0.4226	1.2417	0.1308

Figure 6. CPUE residuals for by factors.



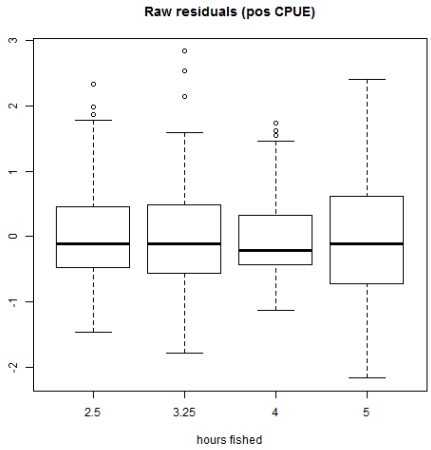
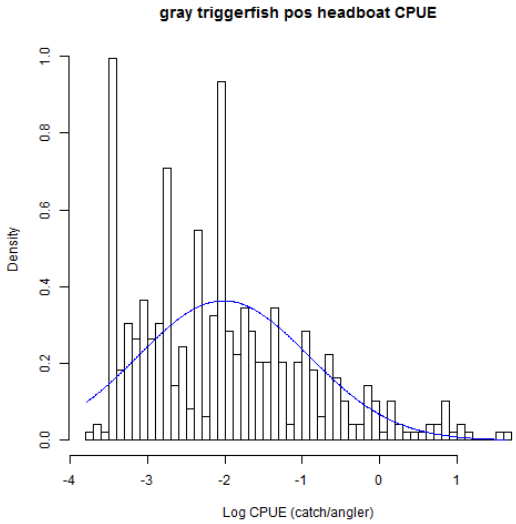


Figure 7. The lognormal distribution and qq plot of catch for the south Atlantic headboat at sea observer during **2005-2009**.



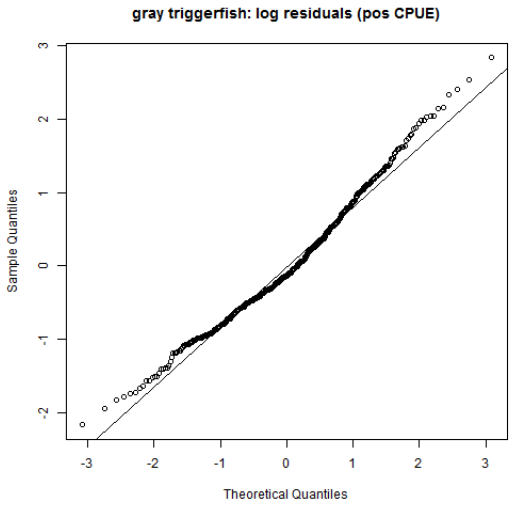


Figure 8. The standardized and nominal CPUE index with error bars at (+/-) 2 standard deviations (nominal by area below) computed for gray triggerfish in the south Atlantic using the headboat at-sea observer data during **2005-2009**.