Observer reported size distribution and discard characteristics of Gulf of Mexico Greater Amberjack from the commercial vertical line and bottom longline fisheries

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SEDAR33-DW14

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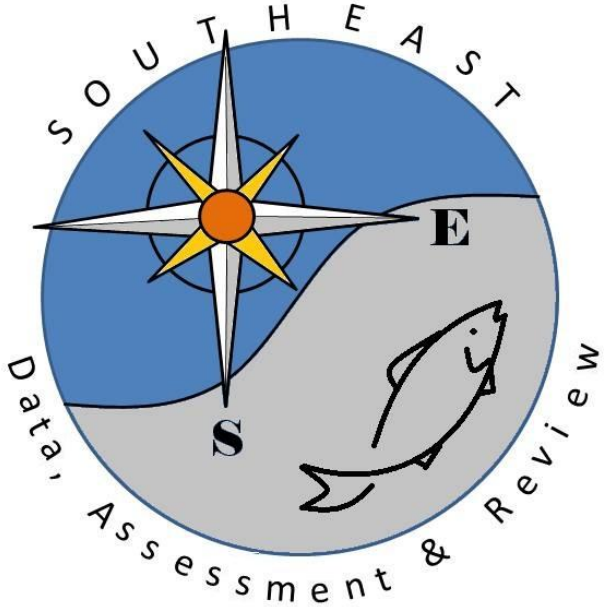

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Introduction

Fishery observer data have been collected from the Gulf of Mexico reef fish fishery since July, 2006. Data collection efforts have been primarily directed towards the vertical line and bottom longline fisheries. Vessels were randomly selected for observer coverage within gear (handline/electric/hydraulic reel vertical line and bottom longline), region (eastern and western Gulf of Mexico), and season (Jan-Mar, Apr-Jun, etc.) strata. Sampling within each gear/region/season stratum was apportioned by the fishing effort (days at sea) reported within each stratum for the previous year. Strata with the highest effort received greater observer coverage (more observer days at sea) than did those strata with lower reported effort.

The observer data were more detailed than the self-reported fishing effort and landings data included in the coastal logbook data set. For example, total catch, including discarded fish, was recorded for each set; where set was defined as fishing at a specific location. A new set began when the vessel moved to a new location and the fishing gear was again deployed. A majority (usually >70%) of fish were measured and the disposition (kept, discarded dead, discarded alive, kept for bait, unknown) of each fish was recorded.

Methods

The available observer reported greater amberjack size and disposition data were used to construct size frequency histograms of discarded and kept fish for each subregion and gear. Subregions were defined as Gulf of Mexico statistical areas 1-7 (southeast), 8-12 (northeast), and 13-21 (west). Gears included vertical lines (handline and electric/hydraulic reels) and bottom longlines. No attempt was made to account for the fraction of fish that was not measured (e.g., if 70% of discarded fish within a stratum were measured while 95% of kept fish were measured in the same stratum, no adjustment was made for that difference in sampling fraction).

Observer reported greater amberjack size frequency histograms were constructed using data collected from July 2006 to December 2012. Yearly changes in the size frequency of discarded and caught greater amberjack were examined. Histograms were produced following stratification of the data by year, subregion, and gear.

In some cases when data was pooled by subregions, months, seasons, and years, there were few numbers of vessels fishing within a category. Thus, data was pooled to maintain confidentiality as covered under NOAA Administrative Order 216-100 and indicated as confidential data in tables. Cells with less than 3 vessels are not shown.

Results

Sampling effort

Table 1 shows the annual number of sets sampled by observers for each subregion during open and closed seasons and total effort for the bottom longline gear. Sampling began in July 2006 for vertical line vessels and in August 2006 for longline vessels. There were 6,400 sets observed in the longline gear. Eighty-five percent (5,477 sets) of the longline observer effort was conducted in the southeastern (SE) subregion, 8% (499 sets) were in the western (W) subregion and 7% (424 sets) were in the northeast (NE) subregion No observed longline sets occurred in 2007-2008 in the NE and 2006-2007 in the West. Forty percent of the observer sampling occurred in the open season and 60% was in the closed season. Twenty percent of NE sampling, 42% of the SE sampling, and 41% of the W sampling were during open seasons. Sample sizes were highest during 2011 due to increased funding for observer coverage of the bottom longline fishery and lowest during 2006 and 2007. Closed season coverage was higher than open season.

Tables 2 shows the annual number of sets sampled by observers for each subregion during open and closed seasons and total effort for the vertical line gear. There were 22,631 sets observed in the vertical gear. Seventy percent of the vertical line observations occurred in the SE subregion, 22% were in the NE subregion and 8% were in the W subregion. There was greater coverage in the vertical line fishery than the longline in the W subregion with only weaker coverage only in 2009-2010. There was observed coverage during all years and all months in the vertical line across subregions, although there were months within particular years where there was no coverage. Forty-one percent of the observer sampling occurred in the open season and 59% was in the closed season. Forty-seven percent of NE sampling, 38% of the SE sampling, and 52% of the W sampling were during open seasons.

Catch and discard of greater amberjack in longline and vertical line fisheries

Tables 3 shows the number of positive greater amberjack sets, number of sets, and frequency of occurrence of greater amberjack by year and subregions for the longline gear. There were 462 positive longline sets for amberjack which gave a frequency of occurrence of 0.07. In the longline gear, amberjack frequency was 0.06 in the SE subregion, 0.12 in the NE subregion, and 0.20 in the W subregion.

Tables 4 shows the number of positive greater amberjack sets, number of sets, and frequency of occurrence of greater amberjack by year and subregions for the vertical line gear. There were 600 positive vertical line sets for greater amberjack which gave a frequency of occurrence of 0.03. In the vertical line, greater amberjack frequency per set was 0.01 in the SE subregion, 0.06 in the NE subregion, and 0.08 in the W subregion. Highest frequency of occurrences per set were in zones 17 (0.15) and 14 (0.11) in the western subregion and statistical zone 8 (0.09) in the NE subregion .

Table 5 shows the monthly number of longline amberjack caught and number of discards by subregion in observed longline sets. There were 729 greater amberjack caught in observer reported longline sets and 460 greater amberjack discards across years and subregions . Discards comprised 67.7% of the greater amberjack caught in the longline. Percent discards was 88% in the NE subregion, 68% in the W subregion and 57% in the SE subregion. Table 6 shows the number amberjack caught by subregion, year , and fishing season. 2008 had the highest fish/set across areas following by 2010. There were no fish caught in 2006 and there was no sampling in 2007-2008 in the NE region. Likewise, there was no sampling in 2006-2007 in the W subregion. Table 7 shows the longline discards by subregion, year, and fishing season. Observer coverage and discards were highest in 2009-2011.

Table 8 shows the monthly number of vertical line greater amberjack caught and number of discards by subregion in observed sets across years. There were 1,731 greater amberjack caught in observer reported sets and 1,440 amberjack discards across years and subregions. Discards comprised 66.1% of greater amberjack caught in the

vertical line. Percent discards was 79% in the NE subregion, 49% in the SE subregion, and 50% in the W subregion. Table 9 shows the number amberjack caught by subregion, year, and fishing season. The greatest number of fish caught occurred in 2012, when the coverage was highest. Open season catches were three times that of the closed season and fish/set was three times higher than closed season. Highest annual fish/set occurred in 2008 and highest open season fish/set occurred in 2012 followed by 2008. The lowest open season fish/set was in 2009-2010. Closed season fish/set ranged from 0.03 in 2010 to 0.06 in 2009. Table 10 shows vertical line discards by subregion, year, and fishing season. Highest discards /set were in 2007 across area. Discards were higher in the open season than the closed season (0.09 vs. 0.04).

Table 11 shows the number of greater amberjack longline discards and sets by subregion and year for all seasons combined. The highest discards/set in the W subregion (0.24) and the NE subregion (0.16). The SE subregion had the greatest observed effort but the lowest discards/set (0.05).

Table 12 shows the number of greater amberjack vertical line discards and sets by subregion and year for all seasons combined. The relative differences in the number of discards between subregions in the vertical line were similar to the longline. The highest discards/set in the W subregion (0.13) and the NE subregion (0.11). The SE subregion had the greatest observed effort but the lowest discards/set (0.02).

Size frequency and fate of greater amberjack

Yearly size frequency distributions of greater amberjack observed in the eastern Gulf of Mexico bottom longline fishery are provided in Figure 1. Most of the measurements were in fork length. Only two fish were measured in total length. Seventy-seven percent of the amberjack caught were measured and the percentage of the fish measured ranged from 60-94% annually. During 2006-2007 and 2012, the total number of measured greater amberjack in observed sets (9-16 fish) was low. Sample sizes were highest during 2010 due to increased funding for observer coverage of the bottom longline fishery and 79% of the fish were measured.

The percentage of measured discarded fish were lower the percentage of caught fish. Sixty-seven percent of the discarded amberjack were measured (312 fish) since the observer program began. In 2007 only two discarded fish were measured out of six fish and only 57.5% (77 fish) of the discarded amberjack were measured in 2011. Seventy-one percent of the discarded fish (132) were measured in 2010 in the year with the most discards and increased coverage.

In general, kept fish tended to be larger (>92.5 cm) while the size of discards included both small and large fish. The proportion of kept fish was highest during 2008 and 2009. The majority of amberjack caught were in the 92.5-112.5 cm range and discards were slightly smaller (87.5-97.5 cm). Figure 2 shows size composition by year. No clear changes in the size frequency distribution of amberjack caught were apparent across the years 2009-2011 when sample sizes were greater. Figure 3 shows size composition of discards by year.

Size frequency distributions of greater amberjack observed in the eastern Gulf of Mexico vertical line fishery by year are shown in Figure 4 for the period 2006-2012. The total number of observed amberjack catches were higher in the vertical line fishery than the longline (1245 vs 548) during the period 2006-2012. Figure 5 shows the size composition of greater amberjack by year. The number of fish caught ranged from 34 to 621 fish per year in observed sets. Few fish were caught in 2006 and 2009. Bimodal distributions in 2007, 2010, 2011 and 2012 suggest that the fishery was exploiting various age classes. Figure 6 shows the size composition of discards by year. Discards were highest in 2007, 2011, and 2012. Smaller fish tended to be discarded in 2006, 2007, and 2010 and large fish tended to be discarded in 2011 and 2012. A bimodal pattern was also present in 2007 and 2012. .

Figure 7 shows the fate (discarded dead, discarded alive, kept =landed) of greater amberjack by area in the longline. Fish discarded alive was the most likely fate and represented 55.5% of the fish caught across areas. The percent of discards reported alive was 50.9% in the SE subregion, 58.8% in the W subregion, and 76.4% in the NE subregion. Fish discarded dead represented a 10% of the fish caught across areas. The percent of fish reported discarded dead was 15.3% in the NE subregion, 9.5% in the SE subregion, and 11.7% in the W subregion. Kept fish comprised 33.8% of the caught fish across areas. The percent of fish kept was 8% of the fish caught in the NE subregion, 39.5% in the SE subregion, and 29.4% in the W subregion.

Figure 8 shows the fate of greater amberjack by area in the vertical line Fish discarded alive was the most likely fate and represented 50.8% of the fish caught across areas. The percent of discards reported alive was 52.9% in the SE subregion, 28.8% in the W subregion, and 64.6% in the NE subregion. Fish discarded dead represented a 4.5% of the fish caught across areas. The percent of fish reported discarded dead was 5% in the NE subregion, 3.3% in the SE subregion, and 5.2% in the W subregion. Kept fish comprised 44.7% of the caught fish across areas. The percent of fish kept was 30.4% of the fish caught in the NE subregion, 43.9% in the SE subregion, and 66% in the W subregion.

The percent of fish discarded alive was greater in the longline than the vertical line gear (55.5% vs 50.8%) and the percent of fish discarded dead was also greater (10% vs. 4.5%). More fish were kept in the vertical line gear than the longline gear (44.7% vs. 33.8%). The number of discards reported as dead by observers may have been artificially high. The working group for red snapper (SEDAR 31) suggested that the percent of discarded fish reported dead may have been influenced by observer behavior as fish were often held on deck in baskets for a period of time prior to measurement and died in the interval.

Figure 9 shows the size composition of greater amberjack caught in the observed Gulf of Mexico longline by fishing depth. Smallest fish (<45 cm) were caught at shallowest fishing depths (<50 m) and modal length increased with depth. Figure 10 shows size composition of greater amberjack caught in the observed Gulf of Mexico vertical line fishery. Smallest fish (<55 cm) were taken at depth less than 55 m and as in the longline modal length increased with depth.

Table 1. Number of sets sampled by subregion, year, and fishing season in observed longline gear. CD=confidential data

	2006	2007	2008	2009	2010	2011	2012	Total
				Northeast				
Open season	CD	0	CD	36	CD	13	CD	84
Closed season	CD	0	CD	48	CD	215	CD	340
Total	CD	0	CD	84	70	228	CD	424
				Southeast				
Open season	189	160	61	207	864	724	87	2,292
Closed season	0	34	246	914	628	1,256	107	3,185
Total	189	194	307	1,121	1,492	1,980	194	5,477
				West				
Open season	CD	0	CD	0	CD	72	CD	204
Closed season	CD	0	CD	122	CD	55	CD	295
Total	CD	0	CD	122	191	127	CD	499
				All areas				
Open	201	160	110	243	951	809	106	2,580
Closed	0	34	246	1,084	802	1,526	128	3,820
Totals	201	194	356	1,327	1,753	2,335	234	6,400

Table 2. Number of sets sampled by subregion, year, and fishing season in observed vertical line. CD= confidential data

season	2006	2007	2008	2009	2010	2011	2012	Total
				Northeast				
Open season	232	641	CD	284	279	289	414	CD
Closed season	0	119	CD	65	81	729	1,622	CD
Total	232	760	275	349	360	1,018	2,036	5,030
				Southeast				
Open season	675	1,261	605	741	714	1,210	806	6,012
Closed season	0	589	484	512	1,320	1,524	5,283	9,712
Total	675	1,850	1,089	1,253	2,034	2,734	6,089	15,724
				West				
Open season	233	CD	194	CD	17	28	189	967
Closed season	0	CD	93	CD	31	296	408	910
Total	233	319	287	69	48	324	597	1,877
				All areas				
Open season	1,140	2,205	CD	1,028	1,010	1,527	1,409	CD
Closed season	0	724	CD	643	1,432	2,549	7,313	CD
Total	1,140	2,929	1,651	1,671	2,442	4,076	8,722	22,631

Table 3. Number of positive greater amberjack sets, number of sets, and frequency of occurrence by year and subregion in observed longline. CD=confidential data.

Positive gag sets

Year	SE	NE	West	Grand Total
2006	12	CD	CD	CD
2007	15			15
2008	35		CD	CD
2009	59	5	32	96
2010	121	8	31	160
2011	56	32	20	108
2012	14	CD	CD	19
Total	312	49	101	462

Number of Sets

Year	SE	NE	West	Grand Total
2006	189	CD	CD	CD
2007	194			194
2008	307		CD	CD
2009	1,121	84	122	1,327
2010	1,492	70	191	1,753
2011	1,980	228	127	2,335
2012	194	CD	CD	234
Total	5,477	424	499	6,400

Frequency

Year	SE	NE	West	Grand Total
2006	0.06	CD	CD	CD
2007	0.08			0.08
2008	0.11		CD	CD
2009	0.05	0.06	0.26	0.07
2010	0.08	0.11	0.16	0.09
2011	0.03	0.14	0.16	0.05
2012	0.07	CD	CD	0.08
Total	0.06	0.12	0.20	0.07

Table 4. Number of positive greater amberjack sets, number of sets, and frequency of occurrence by year and subregion in vertical line

Positive gag sets

Year	SE	NE	West	Grand Total
2006	10	13	10	33
2007	33	32	31	96
2008	12	36	49	97
2009	10	17	7	34
2010	13	14	6	33
2011	15	46	18	79
2012	57	133	38	228
Total	150	291	159	600

Number of Sets

Year	SE	NE	West	Grand Total
2006	675	232	233	1,140
2007	1,850	760	319	2,929
2008	1,089	275	287	1,651
2009	1,253	349	69	1,671
2010	2,034	360	48	2,442
2011	2,734	1,018	324	4,076
2012	6,089	2,036	597	8,722
Total	15,724	5,030	1,877	22,631

Frequency

Year	SE	NE	West	GrandTotal
2006	0.01	0.06	0.04	0.03
2007	0.02	0.04	0.10	0.03
2008	0.01	0.13	0.17	0.06
2009	0.01	0.05	0.10	0.02
2010	0.01	0.04	0.13	0.01
2011	0.01	0.05	0.06	0.02
2012	0.01	0.07	0.06	0.03
Total	0.01	0.06	0.08	0.03

Table 5. Monthly catch of greater amberjack and number of discards, percent of fish discarded, and number of sets in observed longline in the Gulf of Mexico by subregion.

subregion	month	no amberjack	discards	%discards	Sets
ne	1	Confidential data			
ne	2	Confidential data			
ne	3	12	11	92%	54
ne	4	29	29	100%	125
ne	5	Confidential data			
ne	6	Confidential data			
ne	7	Confidential data			
ne	8	Confidential data			
ne	9	Confidential data			
ne	10	Confidential data			
ne	11	Confidential data			
ne	12				0
	all months	75	66	88%	424

subregion	month	no amberjack	discards	%discards	Sets
se	1	45	10	22%	243
se	2	58	26	45%	606
se	3	36	31	86%	519
se	4	73	67	92%	984
se	5	56	46	82%	436
se	6	71	17	24%	270
se	7	39	37	95%	180
se	8	15	2	13%	224
se	9	29	16	55%	541
se	10	37	10	27%	428
se	11	8	6	75%	272
se	12	11	6	55%	780
	all months	478	274	57%	5,483

subregion	month	no amberjack	discards	%discards	Sets
w	1	Confidential data			
w	2	Confidential data			
w	3	Confidential data			
w	4	Confidential data			
w	5	Confidential data			
w	6	Confidential data			
w	7	Confidential data			
w	8	Confidential data			
w	9	Confidential data			
w	10	Confidential data			
w	11	Confidential data			
w	12				0
	all months	176	120	68%	499

All areas and months	Totals
no. amberjack	729
discards	460
%discards	63.1%

Table 6. Number of caught greater amberjack, number of sets, and number/set by subregion, year, and fishing season in observed longline gear. Blanks indicate no sampling. CD=confidential data

Season	2006	2007	2008	2009	2010	2011	2012	Total
				Northeast				
Open season	CD		CD	11	CD	0	CD	14
Closed season	CD		CD	6	CD	42	CD	61
Total	CD		CD	17	12	42	CD	75
				Southeast				
Open season	15	10	30	67	116	25	1	264
Closed season	0	11	32	19	81	55	16	214
Total	15	21	62	86	197	80	17	478
				West				
Open season	CD		CD	23	CD	44	CD	90
Closed season	CD		CD	0	CD	19	CD	86
Total	CD		CD	46	63	43	CD	176
				All areas				
Fish caught	15	21	85	149	272	165	22	729
Sets	201	194	356	1,327	1,753	2,335	234	6,400
Fish/set	0.07	0.11	0.24	0.11	0.16	0.07	0.09	0.11
				Open season				
Fish caught	15	10	53	78	160	48	4	368
Sets	201	160	110	243	951	809	106	2,580
Fish/set	0.07	0.06	0.48	0.32	0.17	0.06	0.04	0.14
				Closed season				
Fish caught		11	32	71	112	117	18	361
Sets	0	34	246	1,084	802	1,526	128	3,820
Fish/set		0.32	0.13	0.07	0.14	0.08	0.14	0.09

Table 7. Number of greater amberjack discards by subregion, year, and fishing season in observed longline gear. Blanks indicate no sampling. CD=confidential data

	2006	2007	2008	2009	2010	2011	2012	Total
				Northeast				
Open season	CD		CD	8	CD	0	CD	11
Closed season	CD		CD	3	CD	39	CD	55
Total	CD		CD	11	12	39	CD	66
				Southeast				
Open season	8	2	6	9	48	17	0	90
Closed season		4	31	11	80	44	14	184
Total	8	6	37	20	128	61	14	274
				West				
Open season	CD		CD		CD	14	CD	44
Closed season	CD		CD	36	CD	20	CD	76
Total	CD		CD	36	46	34	CD	120
				All areas				
Number of discards	8	6	40	67	186	134	19	460
Number of sets	201	194	356	1327	1753	2335	234	6400
Discards/set	0.53	0.29	0.47	0.45	0.68	0.81	0.86	0.63
				Open season				
Number of discards	8	2	9	17	75	31	3	145
Number of sets	201	160	110	243	951	809	106	2,580
Discards/set	0.04	0.01	0.08	0.07	0.08	0.04	0.03	0.06
				Closed season				
Number of discards		4	31	50	111	103	16	315
Number of sets	0	34	246	1,084	802	1,526	128	3,820
Discards/set		0.12	0.13	0.05	0.14	0.07	0.13	0.08

Table 8. Monthly catch, number of discards, and percent discards of greater amberjack in observed vertical line gear inthe Gulf of Mexico by region.

subregion	month	no. amberjack	discards	%discards	Sets
ne	1	119	85	71%	447
ne	2	144	107	74%	394
ne	3	105	101	96%	623
ne	4	159	153	96%	545
ne	5	15	14	93%	505
ne	6	4	4	100%	98
ne	7	59	40	68%	407
ne	8	58	49	84%	670
ne	9	36	27	75%	498
ne	10	58	12	21%	325
ne	11	26	24	92%	262
ne	12	20	19	95%	257
	all months	803	635	79%	5,031

subregion	month	no. amberjack	discards	%discards	Sets
se	1	69	52	75%	1,188
se	2	150	22	15%	671
se	3	35	33	94%	1,620
se	4	17	17	100%	1,718
se	5	25	25	100%	1,831
se	6	5	5	100%	1,124
se	7	21	21	100%	1,874
se	8	29	26	90%	1,820
se	9	9	3	33%	1,401
se	10	10	3	30%	589
se	11	31	27	87%	930
se	12	49	37	76%	958
	all months	450	271	60%	15,724

subregion	month	no. amberjack	discards	%discards	Sets
w	1	149	16	11%	143
w	2	18	6	33%	188
w	3	17	16	94%	179
w	4	5	5	100%	114
w	5	12	12	100%	86
w	6	4	0	0%	90
w	7	175	114	65%	315
w	8	10	9	90%	194
w	9	29	12	41%	151
w	10	13	7	54%	106
w	11	32	28	88%	99
w	12	14	13	93%	212
	all months	478	238	50%	1,877

All areas and months	Totals
no. amberjack	1,731
discards	1144
%discards	66.1%

Table 9. Number of greater amberjack caught by subregion, year, and fishing season in observed vertical line. CD= confidential data.

season	2006	2007	2008	2009	2010	2011	2012	Total
			Northeast					
Open season	16	40	CD	20	18	87	209	CD
Closed season		3	CD	11	11	55	264	CD
Total	16	43	69	31	29	142	473	803
			Southeast					
Open season	20	65	36	0	4	18	167	310
Closed season		24	9	18	25	13	51	140
Total	20	89	45	18	29	31	218	450
			West					
Open season	11	CD	160	CD	0	0	142	373
Closed season		CD	7	CD	9	29	49	105
Total	11	60	167	11	9	29	191	478
			All areas					
Number of fish	47	192	281	60	67	202	882	1,731
Number of sets	1,140	2,929	1,651	1,671	2,442	4,076	8,722	22,631
Number/set	0.04	0.07	0.17	0.04	0.03	0.05	0.10	0.08
			Open season					
Number of fish	47	CD	259	CD	22	105	518	1,136
Number of sets	1,140	CD	1,035	CD	1,010	1,527	1,409	9,354
Number/set	0.04	0.07	0.25	0.02	0.02	0.07	0.37	0.12
			Closed season					
Number of fish		CD	22	CD	45	97	364	595
Number of sets	0	CD	616	CD	1,432	2,549	7,313	13,277
Number/set		0.04	0.04	0.06	0.03	0.04	0.05	0.04

Table 10. Number of greater amberjack discards by subregion, year, and fishing season in observed vertical line. CD= confidential data.

subregion	season	2006	2007	2008	2009	2010	2011	2012
				Northeast				
Open season	13	32	55	CD	8	34	152	CD
Closed season		2	6	CD	11	55	244	CD
Total	13	34	61	23	19	89	396	635
				Southeast				
Open season	8	57	23	0	4	14	31	137
Closed season		22	9	18	25	12	48	134
Total	8	79	32	18	29	26	79	271
				West				
Open season	6	31	CD	0	CD	0	7	140
Closed season		0	CD	11	CD	27	44	98
Total	6	31	103	11	9	27	51	238
				All areas				
Number of discards	27	144	196	52	57	142	526	1,144
Number of sets	1,140	2,929	1,651	1,671	2,442	4,076	8,722	22,631
Discards/set	0.02	0.05	0.12	0.03	0.02	0.03	0.06	0.05
				Open season				
Number of discards	27	142	190	CD	46	87	282	CD
Number of sets	1,140	2,205	1,035	CD	1,010	1,527	1,409	CD
Discards/set	0.02	0.06	0.18	CD	0.05	0.06	0.20	CD
				Closed season				
Number of discards		24	22	CD	45	94	336	CD
Number of sets	0	724	616	CD	1,432	2,549	7,313	CD
Discards/set		0.03	0.04	CD	0.03	0.04	0.05	CD

Table 11. Number of greater amberjack discards, number of sets, and discards/set by year and subregion in observed longline. CD= confidential data

Discards

Year	SE	NE	W	Grand Total
2006	8	CD	CD	8
2007	6	0	0	6
2008	37	0	CD	40
2009	20	11	36	67
2010	128	12	46	186
2011	61	39	34	134
2012	14	CD	CD	19
Total	274	66	120	460

Number of Sets

Year	SE	NE	W	Grand Total
2006	189	CD	CD	201
2007	194	0	0	194
2008	307	0	CD	356
2009	1,121	84	122	1,327
2010	1,492	70	191	1,753
2011	1,980	228	127	2,335
2012	194	CD	CD	234
Total	5,477	424	499	6,400

Discards/set

Year	SE	NE	W	Grand Total
2006	0.04	CD	CD	0.04
2007	0.03			0.03
2008	0.12		CD	0.11
2009	0.02	0.13	0.30	0.05
2010	0.09	0.17	0.24	0.11
2011	0.03	0.17	0.27	0.06
2012	0.07	CD	CD	0.08
Total	0.05	0.16	0.24	0.07

Table 12. Number of greater amberjack discards, number of sets, and discards/set by year and subregion in observed vertical line

Discards

Year	SE	NE	W	Grand Total
2006	8	13	6	27
2007	79	34	31	144
2008	32	61	103	196
2009	18	23	11	52
2010	29	19	9	57
2011	26	89	27	142
2012	79	396	51	526
Total	271	545	238	1,054

Number of sets

Year	SE	NE	W	Grand Total
2006	675	232	233	1,140
2007	1,850	760	319	2,929
2008	1,089	275	287	1,651
2009	1,253	349	69	1,671
2010	2,034	360	48	2,442
2011	2,734	1,018	324	4,076
2012	6,089	2,036	597	8,722
Total	15,724	5,030	1,877	22,631

Discards/set

Year	SE	NE	W	GrandTotal
2006	0.01	0.06	0.03	0.02
2007	0.04	0.04	0.10	0.05
2008	0.03	0.22	0.36	0.12
2009	0.01	0.07	0.16	0.03
2010	0.01	0.05	0.19	0.02
2011	0.01	0.09	0.08	0.03
2012	0.01	0.19	0.09	0.06
Total	0.02	0.11	0.13	0.13

Figure 1. Size composition of greater amberjack caught and discarded in observed longline gear in Gulf of Mexico. Note that the legal size limit is 91.4 cm (36 inches).

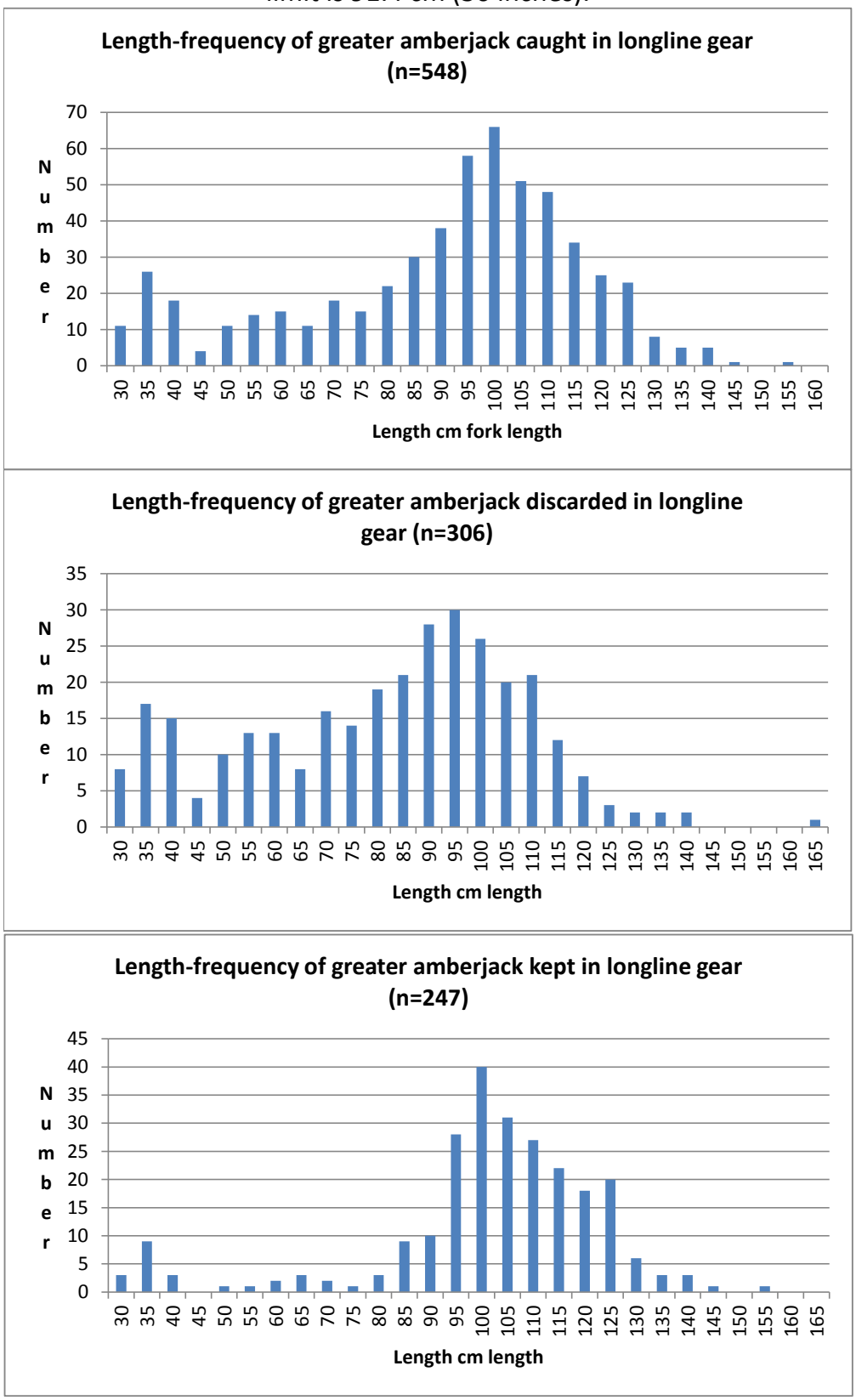


Figure 2. Size composition of greater amberjack caught in observed longline gear by year. Note that the legal size limit is 91.4 cm (36 inches).

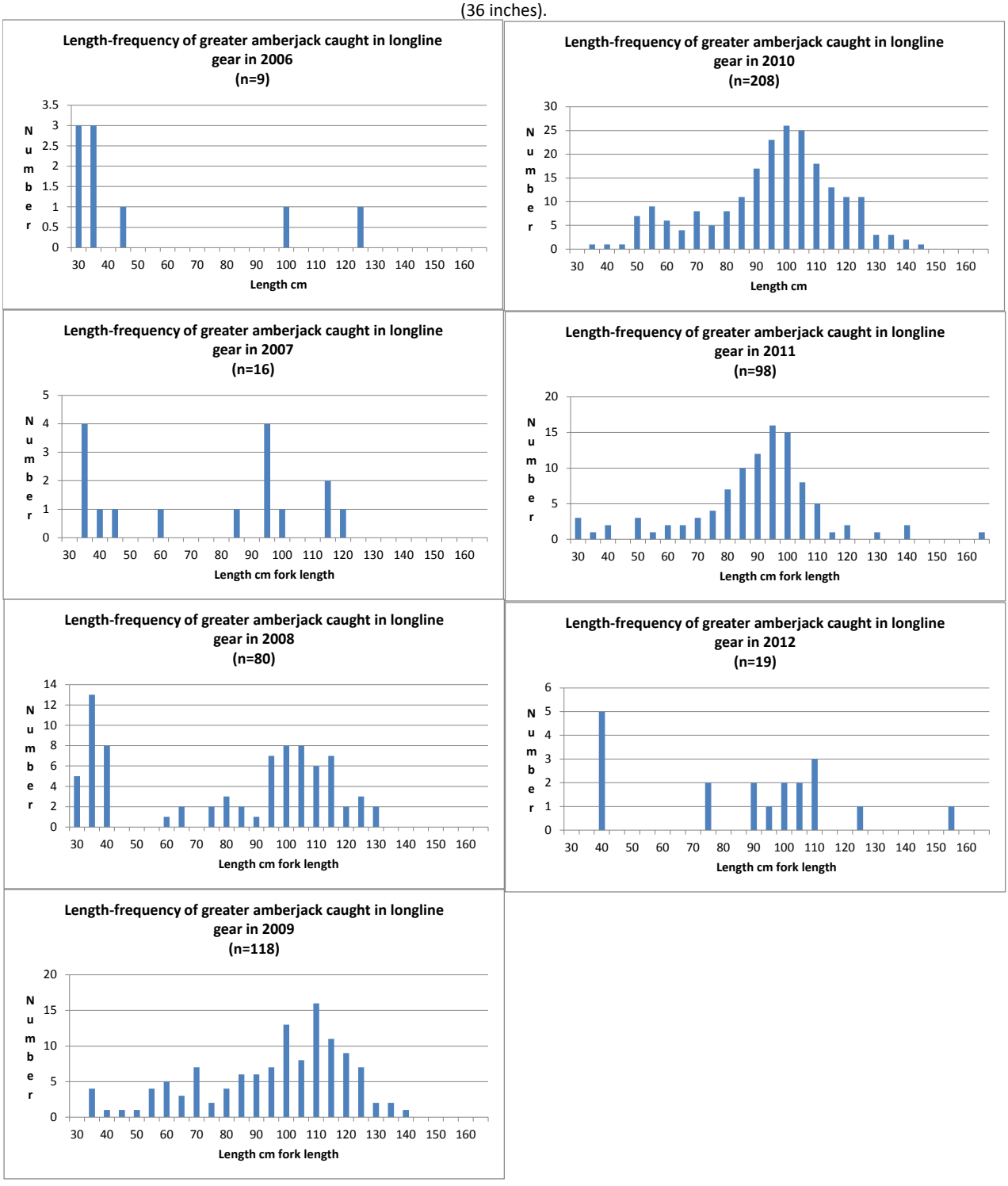


Figure 3. Size composition of discarded greater amberjack in observed longline gear by year. Note that the legal size limit is 91.4 cm (36 inches).

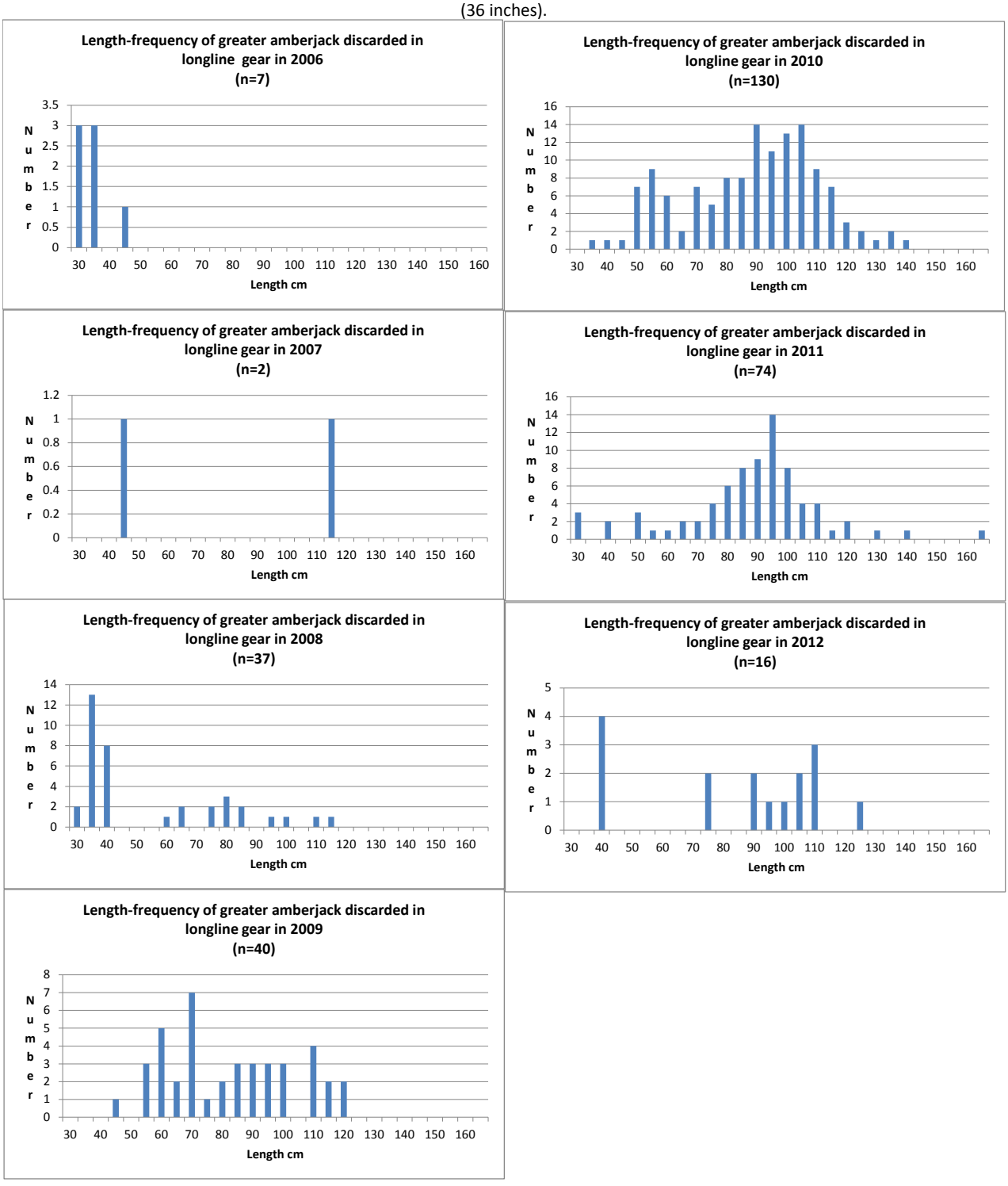


Figure 4. Size composition of greater amberjack caught, discarded, and kept in observed bandit gear. Note that the legal size limit is 91.4 cm (36 inches).

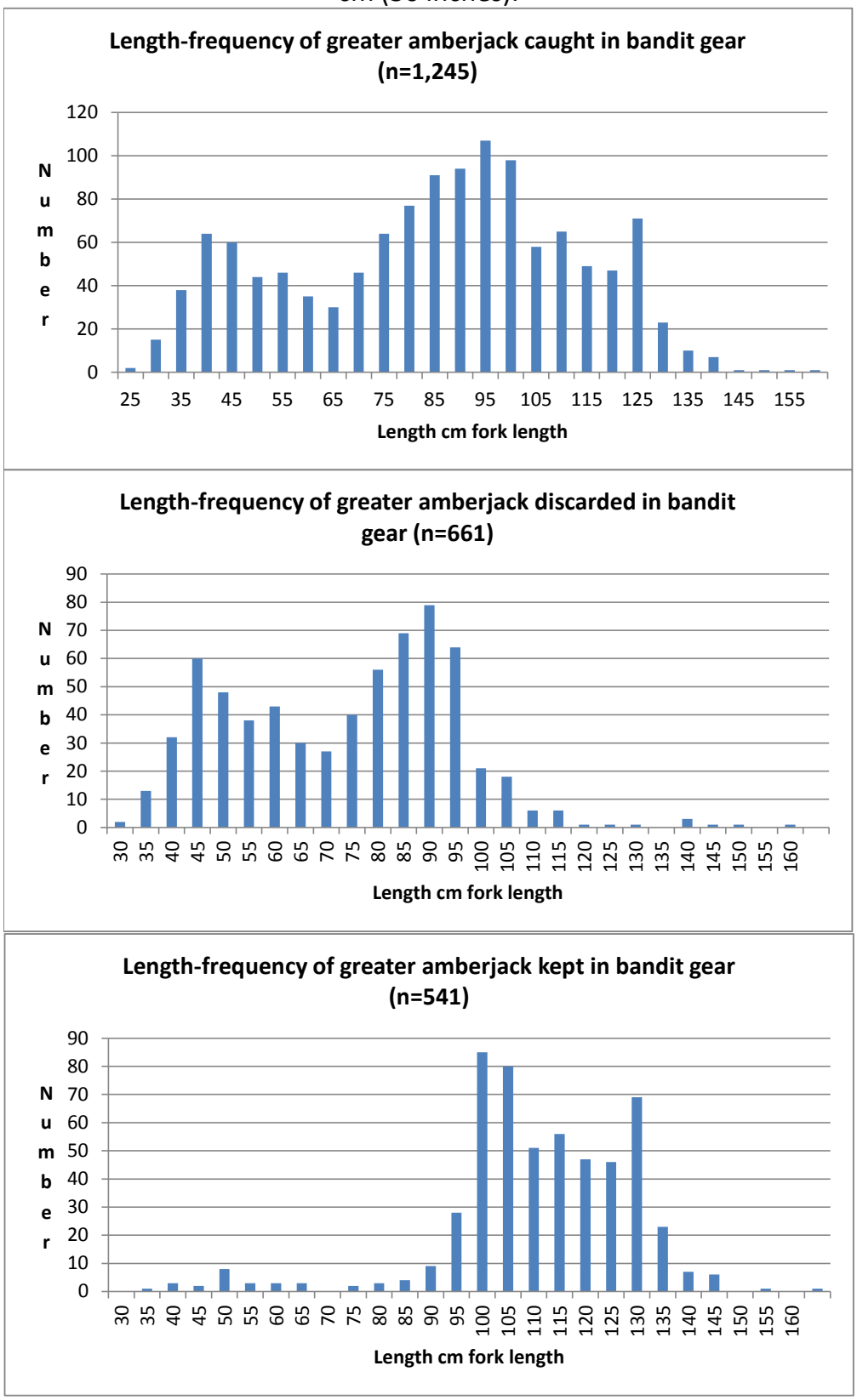


Figure 5. Size composition of greater amberjack caught in observed vertical line gear by year. Note that the legal size limit is 91.4 cm (36 inches).

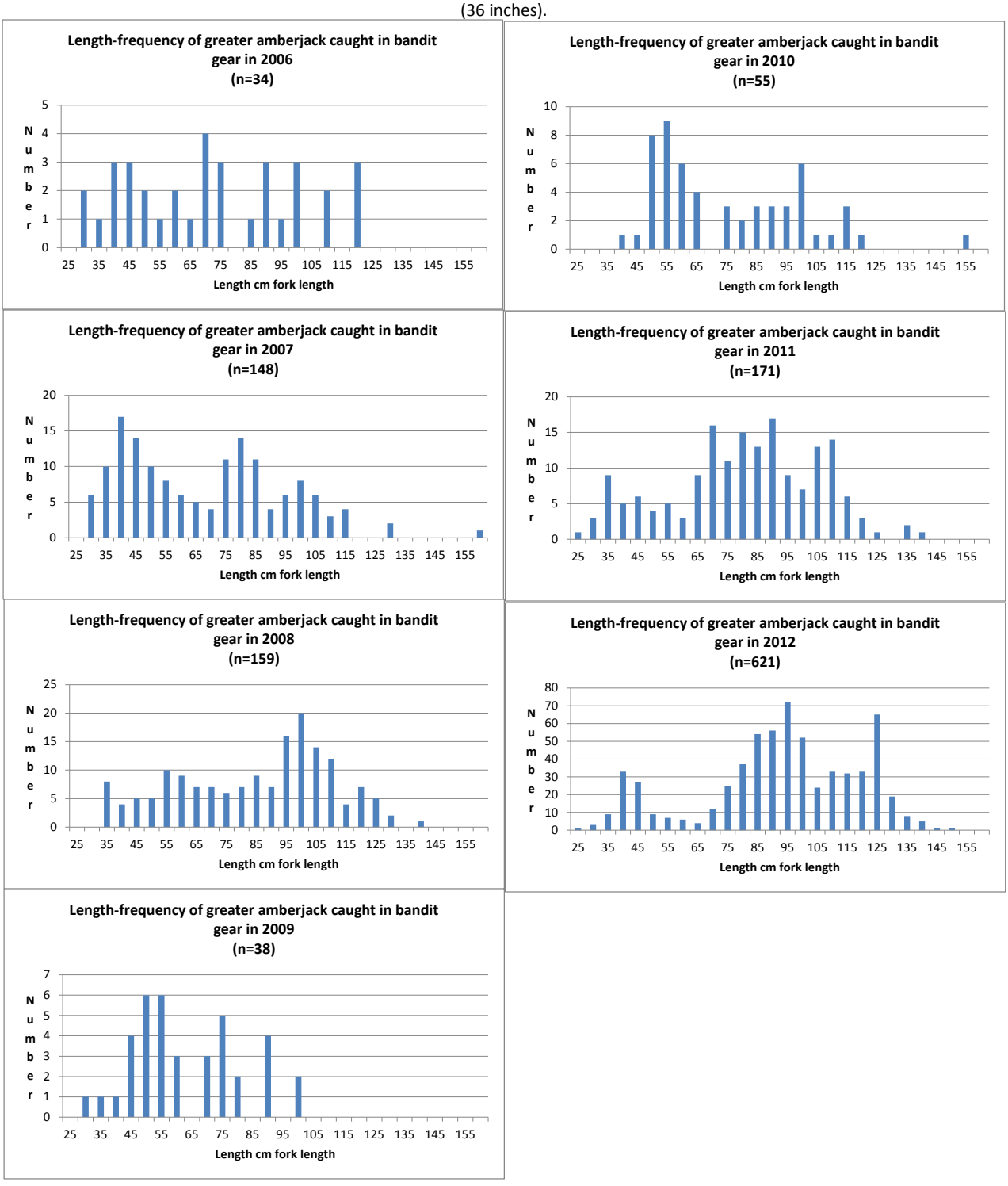
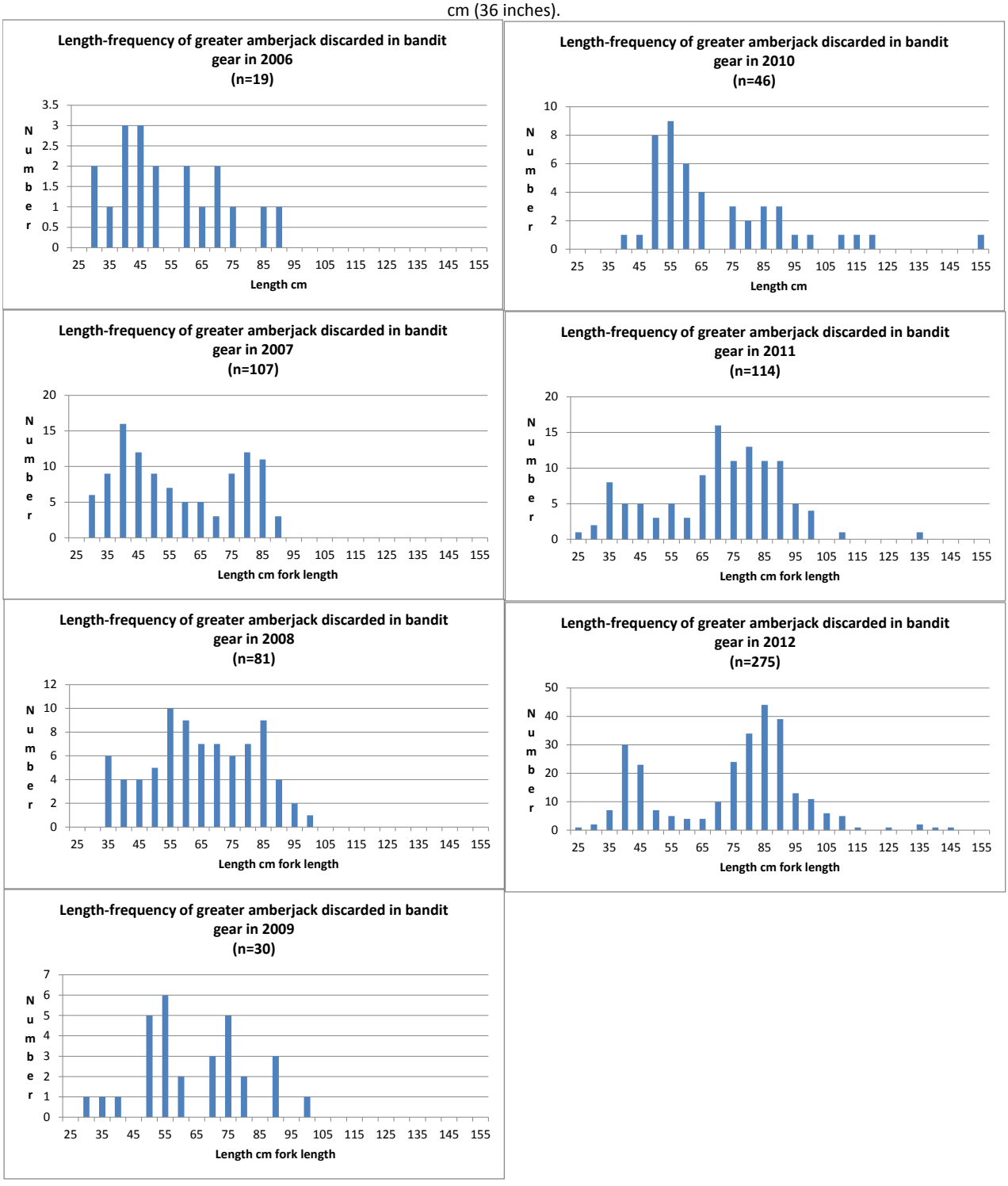


Figure 6. Size composition of discarded greater amberjack from observed vertical line by year. Note that the legal size limit is 91.4 cm (36 inches).



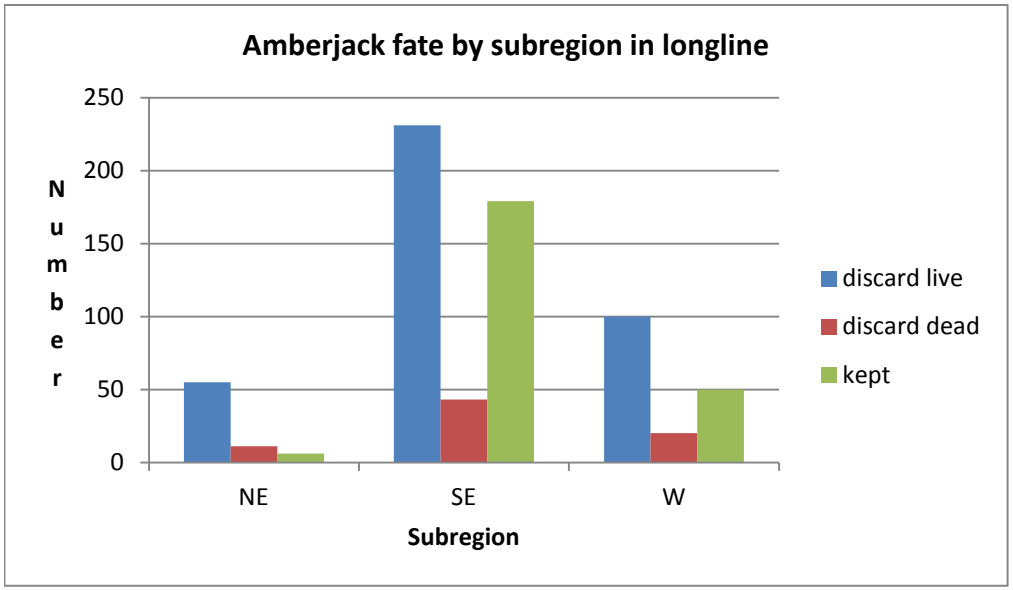


Figure 7. Fate of amberjack by subregion in Gulf of Mexico observer longline

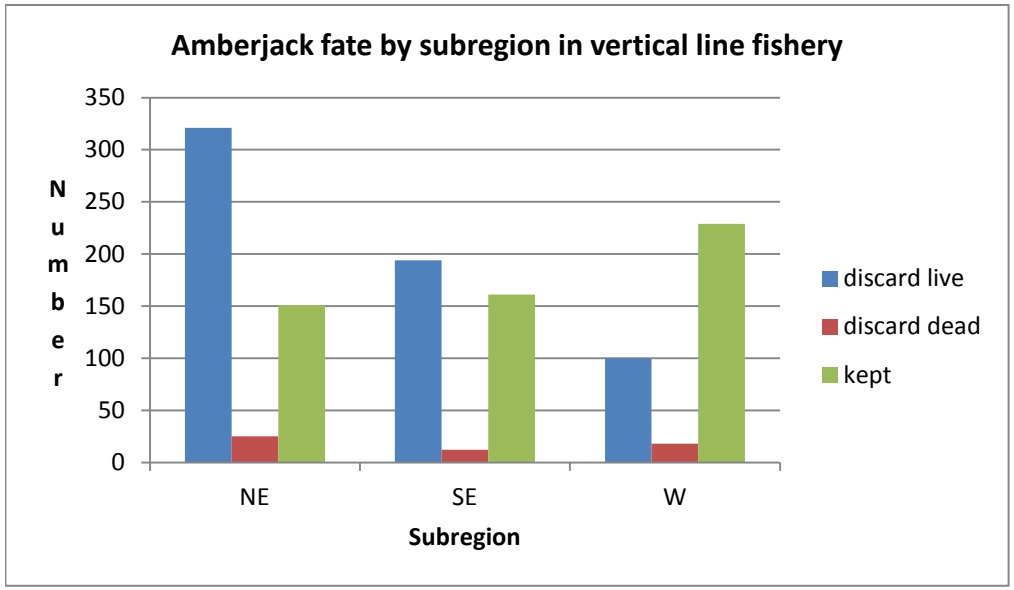


Figure 8. Fate of amberjack by subregion in Gulf of Mexico observer vertical line

Figure 9. Size composition of greater amberjack by fishing depth in observer Gulf of Mexico longline gear.

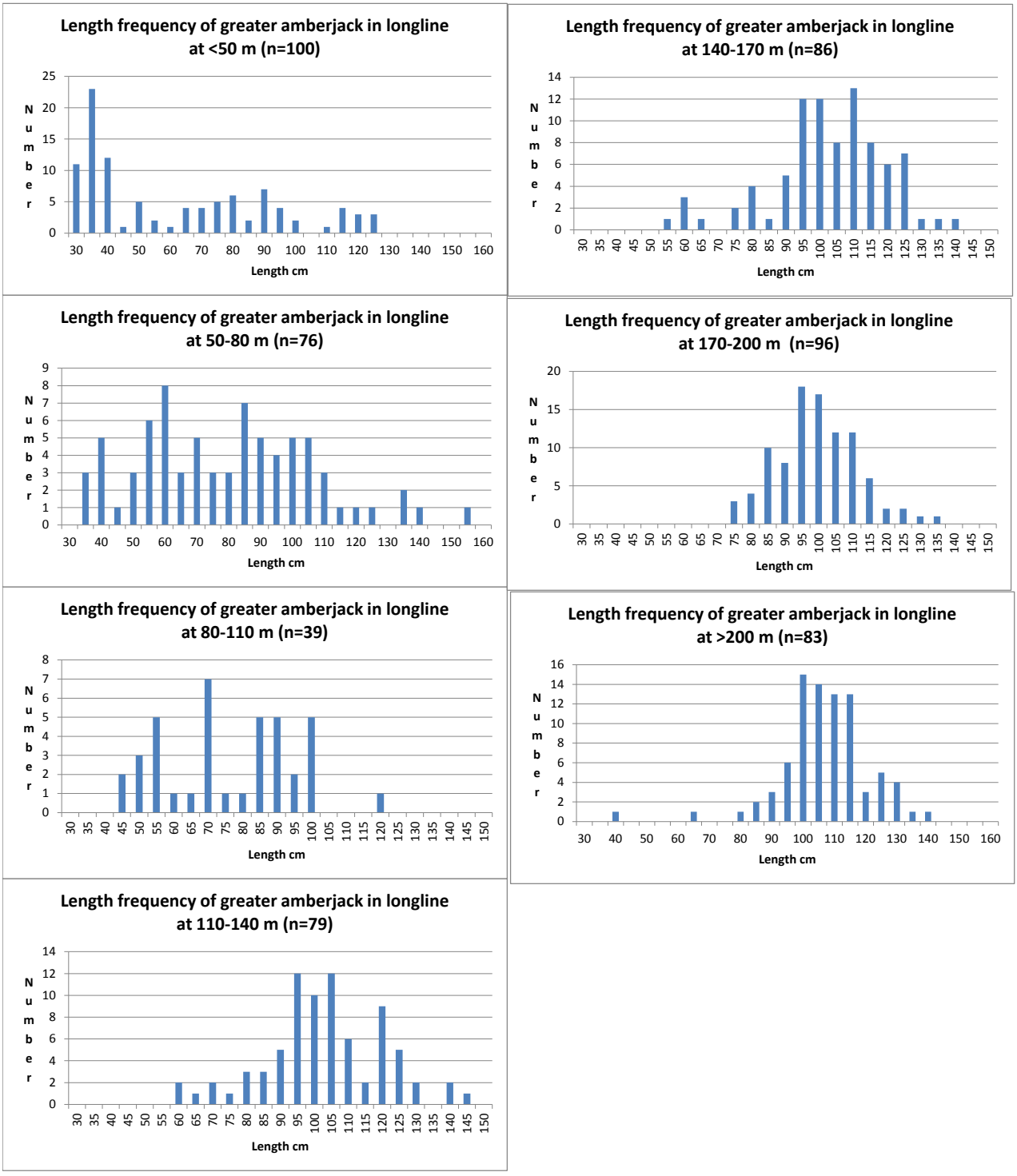


Figure 10. Size composition of greater amberjack by fishing depth in observer Gulf of Mexico vertical line gear.