

**Estimated Gray Triggerfish (*Balistes capriscus*) Landings
From the Marine Recreational Fishery Statistics Survey
(MRFSS) In the Gulf of Mexico**

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SEDAR 9-DW-15

Preliminary Draft

National Marine Fisheries Service
Sustainable Fisheries Division
Contribution Number SFD-2005-24

The Marine Recreational Fisheries Statistics Survey (MRFSS) provides accurate fisheries dependent information across the entire Gulf of Mexico. Data collection of gray triggerfish landings began in 1981. MRFSS adopted a new methodology to estimate charterboat effort called the “For Hire Survey” (FHS). A method presented by Diaz and Phares prepared for the red snapper assessment workshop uses ratios to adjust for the change in MRFSS sampling methodology (Diaz and Phares 2004). These landings ratios were used to convert the gray triggerfish landings estimates.

Table one shows annual estimated landings with calculated coefficients of variation for gray triggerfish as collected by MRFSS. Tables two through five present the landings stratified by the fishing modes sampled: fishing by shore, headboat, charter boat, and private boat. Tables six through ten stratify the gray triggerfish landings by state. Figures one and two illustrate these tables pictorially.

Literature Cited

Diaz and Phares. 2004. “Estimated conversion factors for calibrating MRFSS charterboat landings and effort estimates for the Gulf of Mexico in 1981-1997 with For Hire Survey estimates with application to red snapper landings.” SEDAR Document SEDAR 9-AW-03. National Marine Fisheries Service, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL. Sustainable Fisheries Division Contribution Number SDF-2004-036.

Appendix A: Tables

Year	AB1	B2	B1	A	CV AB1	CV B2	CV B1	CV A
1981	345897.66	70016.01	218949.44	126948.23	0.26	0.47	0.35	0.21
1982	892387.76	76913.97	113536.03	778851.73	0.75	0.41	0.67	0.14
1983	357551.23	319086.46	233778.55	123772.68	0.53	0.39	0.81	0.14
1984	120097.94	152596.17	33151.55	86946.39	0.23	0.77	0.71	0.19
1985	120334.38	80834.85	36717.16	83617.22	0.28	0.30	0.57	0.21
1986	327963.30	63689.18	295765.45	32197.85	0.06	0.85	0.04	0.22
1987	443283.74	129614.80	34437.99	408845.75	0.26	0.55	0.21	0.44
1988	679381.54	106102.84	229062.12	450319.43	0.16	0.20	0.28	0.16
1989	776593.12	201996.04	357624.10	418969.02	0.16	0.20	0.22	0.20
1990	1057504.36	141233.01	279924.10	777580.26	0.37	0.26	0.19	0.18
1991	756264.68	155211.86	290061.22	466203.46	0.19	0.26	0.03	0.14
1992	609675.70	168120.65	61534.13	548141.57	0.16	0.15	0.16	0.10
1993	545558.08	122169.76	120431.29	425126.79	0.17	0.19	0.03	0.08
1994	498669.47	93705.09	224441.93	274227.54	0.09	0.17	0.02	0.11
1995	567540.93	87474.34	54733.54	512807.40	0.23	0.23	0.21	0.15
1996	259843.66	124654.91	44923.05	214920.61	0.25	0.21	0.15	0.16
1997	272133.63	83970.42	23930.32	248203.31	0.19	0.19	0.19	0.10
1998	232073.21	147158.38	15380.87	216692.34	0.10	0.18	0.25	0.10
1999	211014.87	108594.56	17885.66	193129.22	0.08	0.13	0.42	0.08
2000	180783.13	66288.40	31429.94	149353.19	0.12	0.35	0.47	0.10
2001	216953.85	131125.89	12035.66	204918.19	0.10	0.14	0.31	0.10
2002	298349.38	167819.51	42298.54	256050.84	0.09	0.15	0.38	0.08
2003	366180.67	97953.38	4712.60	361468.07	0.16	0.21	0.45	0.16
2004	432002.27	158459.70	35818.18	396184.09	0.09	0.13	0.37	0.09

Table 1: The sum of estimated MRFSS landings by year, where B2 catch is an estimated of the fish returned alive, B1 catch is an estimate of the fish captured and not seen by the interviewer, and A catch is an estimate of the catch captured and seen by the interviewer. AB1 is the sum of A and B1 catch and is considered the catch. The CV of each is in the last four columns is the coefficient of variance for each type of catch.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	1628.271	0	1628.271	0	0.62		0.62	
1982	5888.935	0	5888.935	0	0.81		0.81	
1983	9901.781	0	9901.781	0	1.00		1.00	
1984	38762.11	0	38762.11	5244.054	0.39		0.39	0.75
1985								
1986								
1987	0	0	0	70736.84				0.87
1988	0	0	0	8731.147				0.73
1989	0	0	0	46210.33				0.61
1990	0	58250.23	58250.23	0		0.67	0.67	
1991	47493.8	0	47493.8	40701.73	0.44		0.44	0.43
1992	27980.68	0	27980.68	8639.342	0.57		0.57	0.41
1993	4192.235	0	4192.235	6834.022	0.76		0.76	0.59
1994	1265.367	0	1265.367	13187	0.63		0.63	0.44
1995	2122.777	658.5623	2781.339	7572.236	0.71	1.00	0.59	0.45
1996	0	0	0	6763.39				0.41
1997	1160.906	0	1160.906	1541.034	1.00		1.00	1.00
1998								
1999	0	0	0	5288.883				0.66
2000	1383.203	0	1383.203	0	1.00		1.00	
2001	1107.979	0	1107.979	9508.199	1.00		1.00	0.58
2002	0	0	0	4860.841				0.57
2003	0	0	0	993.4427				1.00
2004	0	0	0	6004.177				0.50

Table 2: Shore mode estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	.	.	.	.				
1982	.	.	.	.				
1983	.	.	.	.				
1984	.	.	.	.				
1985	.	.	.	.				
1986	28569.06	253760.4	282329.4	2086.803	0.54		0.00	3.23
1987	274086.2	14030.69	288116.9	1909.075	0.37		0.01	90.41
1988	340523.7	22001.21	362524.9	6527.979	0.25		0.01	10.39
1989	272862.6	18609.15	291471.8	4971.687	0.34		0.01	16.11
1990	608052.4	106400.5	714452.9	45080.79	0.64		0.03	2.92
1991	366482.2	273212.6	639694.8	28688.74	0.39		0.03	2.16
1992	273457.9	24344.37	297802.2	14753.63	0.33		0.03	3.06
1993	262983.1	111624.2	374607.3	22174.03	0.34		0.03	1.08
1994	194344.6	205539.3	399883.9	13114.63	0.23		0.02	2.10
1995	402783.6	26595.65	429379.2	29888.51	0.31		0.03	2.33
1996	141831.5	28778.18	170609.7	51503.62	0.43		0.13	0.56
1997	163188	13135.21	176323.2	26256.32	0.30		0.06	0.78
1998	110006.9	239.5091	110246.4	24552.85	0.09		0.04	0.39
1999	101361.3	52.05139	101413.4	15949.87	0.08		0.03	0.53
2000	81298.58	163.0751	81461.65	9532.823	0.08		0.02	0.66
2001	120256.3	263.3077	120519.6	16011.56	0.06		0.01	0.49
2002	139188.5	1642.805	140831.3	15674.19	0.07		0.02	0.65
2003	121176.9	743.2188	121920.2	8576.33	0.07		0.01	1.04
2004	173864.5	1336.361	175200.9	21587.32	0.07		0.01	0.57

Table 3: Charter boat estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	58186.89	184892.8	243079.7	59236.37	0.39	0.40	0.31	0.53
1982	32869.62	11005.82	43875.45	56704.08	0.28	0.40	0.23	0.42
1983	33364.84	198261.1	231625.9	303846.9	0.31	0.93	0.80	0.41
1984	7138.615	0	7138.615	144529.8	0.44		0.44	0.81
1985	40429.85	26688.6	67118.45	76583.23	0.43	0.74	0.39	0.32
1986	3628.789	42005.07	45633.86	61602.38	0.52	0.29	0.27	0.88
1987	134759.5	20407.3	155166.8	56968.88	0.36	0.35	0.32	0.64
1988	109795.7	207060.9	316856.6	90843.71	0.17	0.31	0.21	0.22
1989	146106.4	339015	485121.3	150814	0.16	0.23	0.17	0.19
1990	169527.8	115273.3	284801.2	96152.21	0.26	0.32	0.20	0.30
1991	52227.46	16848.62	69076.09	85821.38	0.22	0.47	0.20	0.37
1992	246703	37189.76	283892.8	144727.7	0.12	0.26	0.11	0.16
1993	157951.4	8807.098	166758.5	93161.7	0.17	0.41	0.16	0.22
1994	78617.55	18902.68	97520.23	67403.46	0.14	0.27	0.12	0.17
1995	107901.1	27479.33	135380.4	50013.59	0.30	0.42	0.25	0.29
1996	73089.13	16144.88	89234	66387.9	0.26	0.41	0.23	0.21
1997	83854.4	10795.11	94649.51	56173.06	0.18	0.43	0.17	0.22
1998	106685.4	15141.36	121826.8	122605.5	0.19	0.26	0.17	0.21
1999	91767.9	17833.6	109601.5	87355.8	0.14	0.42	0.13	0.15
2000	66671.41	31266.86	97938.28	56755.58	0.21	0.47	0.21	0.40
2001	83553.87	11772.35	95326.22	105606.1	0.23	0.32	0.20	0.17
2002	116862.4	40655.74	157518.1	147284.5	0.16	0.39	0.16	0.17
2003	240291.1	3969.377	244260.5	88383.61	0.24	0.54	0.24	0.23
2004	222319.6	34481.82	256801.4	130868.2	0.15	0.38	0.14	0.15

Table 4: Private boat estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	67133.06	34056.6	101189.7	10779.64	0.22	0.68	0.49	0.90
1982	740093.2	102530.2	842623.4	20209.89	0.15	0.74	0.80	1.02
1983	80506.06	35517.45	116023.5	15239.56	0.12	1.05	0.30	0.59
1984	41045.66	33151.55	74197.21	2822.33	0.10	0.71	0.30	0.78
1985	43187.37	10028.56	53215.93	4251.621	0.10	0.77	0.39	0.80
1986								
1987								
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1991								
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2000								
2001								
2002								
2003								
2004								

Table 5: Combined charter and headboat estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	19517.67	44.22856	19561.9	0	0.36	1.49	1.09	
1982	32630.27	9388.714	42018.98	0	0.21	1.31	0.94	
1983	10405.15	0	10405.15	344.3358	0.42		1.03	1.49
1984	354.5915	0	354.5915	5808.619	0.69		0.69	1.00
1985	.	.	.	.	.	.	.	.
1986	18492.2	5734.16	24226.36	19.69665	0.19	0.06	0.62	1.59
1987	19753.2	1494.88	21248.08	861.4116	0.27	0.00	0.89	1.52
1988	78582.88	16725.61	95308.48	154.969	0.31	0.03	0.63	1.59
1989	140188.1	25528.8	165716.9	0	0.35	0.20	0.51	
1990	448694.8	148538.5	597233.2	993.6073	0.26	0.26	0.65	1.35
1991	126871.6	25721.12	152592.8	17152.71	0.23	0.00	0.69	0.57
1992	161127.2	16753.24	177880.4	9338.358	0.19	0.25	0.49	0.81
1993	175446	1970.827	177416.8	21055.27	0.13	0.00	0.50	0.56
1994	84083.55	2052.969	86136.52	14004.01	0.20	0.38	0.45	0.44
1995	184443.6	32840.49	217284.1	26711.82	0.18	0.34	0.47	0.50
1996	124370.9	2584.244	126955.1	17264.74	0.19	0.00	0.48	0.45
1997	94163.67	2753.209	96916.88	6166.955	0.17	0.36	0.49	0.96
1998	64764.76	0	64764.76	7827.579	0.17		0.17	0.34
1999	49746.86	2169.401	51916.26	13505.83	0.15	1.00	0.15	0.44
2000	41911.92	543.3071	42455.23	11681.86	0.18	0.73	0.17	0.65
2001	61347.89	1036.46	62384.35	20205.8	0.15	0.75	0.15	0.38
2002	86755.12	20479.42	107234.5	10642.78	0.15	0.69	0.18	0.36
2003	92862.49	95.59403	92958.08	1718.338	0.21	0.00	0.21	0.39
2004	117116.3	12184.32	129300.6	25454.32	0.16	0.88	0.17	0.29

Table 6: Alabama estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	84345.24	203227.9	287573.1	37694.18	0.21	0.37	0.30	0.61
1982	706546.1	85354.92	791901	55964.29	0.16	0.83	0.85	0.43
1983	101520.4	47470.07	148990.5	99520.37	0.16	0.81	0.24	0.74
1984	41533.77	11378.32	52912.09	131248.2	0.21	1.18	0.43	0.88
1985	68058.32	36717.16	104775.5	6076.943	0.26	0.57	0.30	0.69
1986	9061.258	283302.8	292364	62424.82	0.65	0.04	0.04	0.86
1987	382914.6	32943.11	415857.8	128753.4	0.47	0.22	0.27	0.55
1988	365004.8	207654.9	572659.7	78958.88	0.18	0.30	0.16	0.21
1989	260476.1	298480.2	558956.4	175918.7	0.26	0.24	0.15	0.21
1990	232365.6	122094.3	354460	121657.7	0.28	0.30	0.17	0.29
1991	241055.6	263095.8	504151.4	85973.05	0.24	0.03	0.12	0.30
1992	347396.9	43291.26	390688.1	141355.2	0.13	0.20	0.10	0.16
1993	232410.6	117304.3	349714.9	70900.09	0.12	0.03	0.08	0.23
1994	145879.6	221625.8	367505.5	50877.33	0.15	0.02	0.05	0.19
1995	256082.1	20163.78	276245.8	46974.48	0.25	0.10	0.27	0.26
1996	80237.05	41901.06	122138.1	103211.2	0.32	0.16	0.15	0.24
1997	137035.6	21177.11	158212.7	71335.47	0.14	0.21	0.13	0.20
1998	137238.8	15380.87	152619.6	133115.8	0.13	0.25	0.12	0.19
1999	118123.2	8073.365	126196.6	78216.36	0.09	0.68	0.10	0.14
2000	82562.72	2691.14	85253.86	32011.11	0.12	0.61	0.11	0.24
2001	126887.5	8671.515	135559.1	94192.62	0.09	0.40	0.09	0.16
2002	164394.3	18833.11	183227.4	144602.2	0.10	0.39	0.10	0.17
2003	256557.4	3003.439	259560.9	93178.6	0.22	0.46	0.21	0.22
2004	247509.4	13443.92	260953.3	121210.6	0.11	0.41	0.11	0.15

Table 7: Florida estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	84345.24	203227.9	287573.1	37694.18	0.21	0.37	0.30	0.61
1982	706546.1	85354.92	791901	55964.29	0.16	0.83	0.85	0.43
1983	101520.4	47470.07	148990.5	99520.37	0.16	0.81	0.24	0.74
1984	41533.77	11378.32	52912.09	131248.2	0.21	1.18	0.43	0.88
1985	68058.32	36717.16	104775.5	6076.943	0.26	0.57	0.30	0.69
1986	9061.258	283302.8	292364	62424.82	0.65	0.04	0.04	0.86
1987	382914.6	32943.11	415857.8	128753.4	0.47	0.22	0.27	0.55
1988	365004.8	207654.9	572659.7	78958.88	0.18	0.30	0.16	0.21
1989	260476.1	298480.2	558956.4	175918.7	0.26	0.24	0.15	0.21
1990	232365.6	122094.3	354460	121657.7	0.28	0.30	0.17	0.29
1991	241055.6	263095.8	504151.4	85973.05	0.24	0.03	0.12	0.30
1992	347396.9	43291.26	390688.1	141355.2	0.13	0.20	0.10	0.16
1993	232410.6	117304.3	349714.9	70900.09	0.12	0.03	0.08	0.23
1994	145879.6	221625.8	367505.5	50877.33	0.15	0.02	0.05	0.19
1995	256082.1	20163.78	276245.8	46974.48	0.25	0.10	0.27	0.26
1996	80237.05	41901.06	122138.1	103211.2	0.32	0.16	0.15	0.24
1997	137035.6	21177.11	158212.7	71335.47	0.14	0.21	0.13	0.20
1998	137238.8	15380.87	152619.6	133115.8	0.13	0.25	0.12	0.19
1999	118123.2	8073.365	126196.6	78216.36	0.09	0.68	0.10	0.14
2000	82562.72	2691.14	85253.86	32011.11	0.12	0.61	0.11	0.24
2001	126887.5	8671.515	135559.1	94192.62	0.09	0.40	0.09	0.16
2002	164394.3	18833.11	183227.4	144602.2	0.10	0.39	0.10	0.17
2003	256557.4	3003.439	259560.9	93178.6	0.22	0.46	0.21	0.22
2004	247509.4	13443.92	260953.3	121210.6	0.11	0.41	0.11	0.15

Table 8: Louisiana estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981								
1982	228.6065	0	228.6065	449.2992	0.51314		0.51314	1
1983								
1984	0	0	0	957.3243				1
1985								
1986								
1987	1445.555	0	1445.555	0	0.741591		0.741747	
1988	1057.884	0	1057.884	0	0.640707		1.399552	
1989	2467.172	0	2467.172	234.9687	1.414961		1.483507	1.624315
1990	103.4823	9291.29	9394.772	13674.81	0.627471	0.451235	0.446555	0.846133
1991	1399.247	0	1399.247	0	0.479825		0.479825	
1992	3354.393	337.6315	3692.024	2872.103	0.420442	0.943406	0.391814	0.416532
1993	1370.219	459.8135	1830.032	12164.97	0.427835	0	0.333367	0.609499
1994	3709.506	763.1237	4472.629	648.2053	0.287991	0.968175	0.391127	1.567999
1995	8665.659	0	8665.659	700.4378	0.547109		0.547629	1.52792
1996	5362.56	437.7486	5800.309	4108.914	0.580789	0	0.659105	0.680151
1997	2683.268	0	2683.268	20.1717	0.553545		0.593713	1.624315
1998	8504.662	0	8504.662	251.7038	0.993448		0.993448	0.598483
1999	846.6821	0	846.6821	1268.799	0.656215		0.656215	0.683981
2000	503.9906	0	503.9906	0	0.642816		0.642816	
2001	356.4677	0	356.4677	0	0.79162		0.79162	
2002	2011.787	0	2011.787	458.4501	0.902248		0.902248	1
2003	781.3276	0	781.3276	2219.962	0.68276		0.68276	0.710726
2004	12814.52	0	12814.52	920.6125	0.610446		0.610446	1

Table 9: Mississippi estimated landings.

Year	A	B1	AB1	B2	CV A	CV B1	CV AB1	CV B2
1981	3428.375	8137.52	11565.89	29988.54	1	0.835899	0.534381	0.762978
1982	4553.701	0	4553.701	0	1		1	
1983								
1984	31632.98	0	31632.98	1679.484	0.425023		0.425023	1
1985	4773.604	0	4773.604	1432.081	0.199511		1.222196	1.486607
1986								
1987								
1988								
1989								
1990								
1991								
1992								
1993								
1994								
1995								
1996								
1997								
1998								
1999								
2000								
2001								
2002								
2003								
2004								

Table 10: Texas estimated landings.

Appendix B: Charts and Graphs

MRFSS Estimated Gray Triggerfish Landings

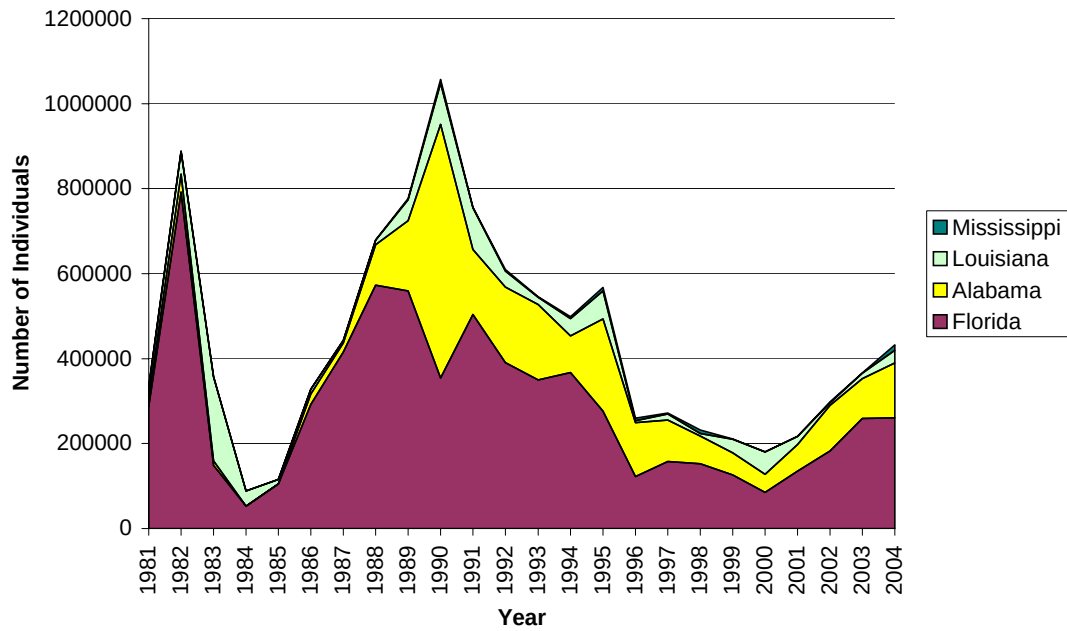


Figure 1: Estimated gray triggerfish landings by state.

MRFSS Estimated Gray Triggerfish Landings

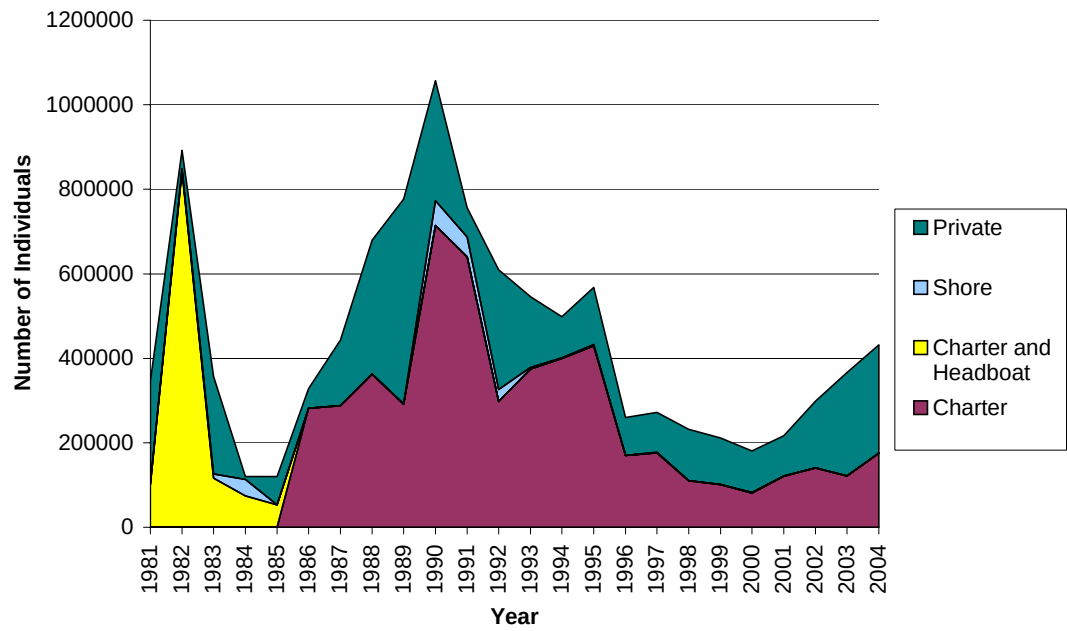


Figure 2: Estimated gray triggerfish landings by mode.