

Alternative estimates of the yield of red snapper from the Gulf of Mexico recreational fishery

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Yield estimates presented in the SEDAR7 AW Report Appendix 1 Table 1 were calculated using only regional stratification of the mean weights. This document develops an alternative stratification approach for estimating the recreational yield. General linear model (GLM) analyses of mean weight are used to define influential variables to include in the stratification. Alternative yield estimates are presented.

The data were the same as those used for the SEDAR7 stock assessment of Gulf of Mexico red snapper to calculate the derived age composition with the exception that for these analyses data from 1981-1983 also were included with the 1984-2003 data used in the derived aging procedure (SEDAR7 AW 18v2). Data were available from the Marine Recreational Fisheries Statistical Survey, the Southeast Fisheries Science Center (SEFSC) Headboat Survey, Texas Parks and Wildlife Department, Alabama Charter Boat Survey, the Gulf States Marine Fisheries Commission's GULFIN program and the SEFSC Trip Interview Program (TIP). Information from almost 280,000 red snapper were available (Table 1). Weights in pounds were calculated from total length in inches (all observations previously had been converted from recorded length types) using the size conversion equations presented in SEDAR7 AW Report Appendix 1 Table 12.

Various general linear model (GLM) analyses were investigated using various combinations of year, region, mode and state within region. The dependent variable weights was the log of weight. All two-way interactions were investigated. Factors were added to the model in a stepwise fashion. Significance of factors was determined from the proportion of the deviation explained by adding each factor to the model. Factors were added which contributed at least a 1% increase in the explained deviation.

The analyses indicated that year, region and state nested within region were significant either as main effects or within interactions. Mode and interactions were not significant.

Therefore the alternative yield estimates for the recreational fishery were calculated using mean weights stratified by year, region and state if there were at least 100 weights within a stratum. If there were not 100 observations in a stratum, then a mean weight for that year and region was used. The alternative estimates of recreational yield are given in Table 2.

Table1. Number of weights available for analysis by year and source.

year	Alabama	GULFFIN	Headboat Survey	MRFSS	TPWD	TIP	total
1981	-	-	-	307	-	-	307
1982	-	-	-	474	-	-	474
1983	-	-	-	1,303	3,965	-	5,268
1984	-	-	-	370	4,643	434	5,447
1985	-	-	-	374	707	62	1,143
1986	-	-	6,416	588	370	-	7,374
1987	-	-	6,171	895	466	-	7,532
1988	-	-	4,907	451	487	-	5,845
1989	-	-	6,570	241	338	10	7,159
1990	78	-	4,618	284	379	266	5,625
1991	28,376	-	3,920	1,200	539	2,774	36,809
1992	16,385	-	8,881	2,616	629	1,607	30,118
1993	9,482	-	7,449	1,086	811	1,741	20,569
1994	10,841	-	7,959	797	1,045	1,491	22,133
1995	1,394	-	8,767	559	1,362	357	12,439
1996	-	-	5,753	481	1,076	143	7,453
1997	-	-	5,135	1,475	1,365	68	8,043
1998	-	-	8,770	3,224	1,315	311	13,620
1999	-	-	4,168	8,254	799	602	13,823
2000	-	-	4,330	8,261	1,112	493	14,196
2001	-	-	3,184	6,965	1,186	275	11,610
2002	-	4,693	3,634	8,153	1,078	417	17,975
2003	-	13,471	3,094	7,139	-	299	24,003
total	66,556	18,164	103,726	55,497	23,672	11,350	278,965

Table 2. Alternative estimates of the yield in pounds harvested (MRFSS A+B1 and landings from the Headboat Survey and the Texas Parks and Wildlife Department survey) by the recreational fishery by year and region.

year	east	west	Total
1981	1,533,327	3,456,242	4,989,569
1982	1,955,443	2,436,287	4,391,730
1983	3,075,297	2,739,675	5,814,973
1984	848,875	3,254,695	4,103,570
1985	1,845,816	1,557,661	3,403,477
1986	1,414,716	917,936	2,332,652
1987	1,456,121	700,820	2,156,941
1988	1,128,764	1,266,446	2,395,210
1989	1,098,348	1,041,703	2,140,051
1990	775,059	562,396	1,337,454
1991	1,176,222	1,130,998	2,307,220
1992	1,964,908	1,968,075	3,932,984
1993	3,343,621	2,973,810	6,317,431
1994	2,358,196	2,669,428	5,027,624
1995	2,037,468	2,547,944	4,585,411
1996	2,028,231	1,860,362	3,888,593
1997	2,826,419	2,209,197	5,035,616
1998	2,804,987	1,889,068	4,694,056
1999	3,574,332	1,041,430	4,615,762
2000	2,325,746	955,886	3,281,631
2001	3,044,955	840,511	3,885,466
2002	3,948,885	1,071,462	5,020,347
2003	3,632,676	1,164,475	4,797,151