

1. INTRODUCTION

1.1 Background

Greater Amberjack, *Seriola dumerili*, is one of four jacks of 42 species of reef fish in the management unit for the Fishery Management Plan for Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP), implemented in November 1984. Gray triggerfish *Balistis capriscus* is the only balistid in the management unit. Two serranids are not managed, leaving 15 groupers, 14 snappers, five tilefishes, four jacks, one triggerfish and one wrasse. The jurisdiction of the Reef Fish FMP includes all waters of the Gulf of Mexico (GOM) bounded outside by 200 nautical miles (nm) and inside by the state's territorial waters which are 3 nm in Alabama, Mississippi and Louisiana and 3 leagues or about 9 nm in Florida and Texas.

Greater Amberjack landings history and relationship to previous amendments

Landings from the commercial fishery for greater amberjack are available from the Accumulated Landings System (ALS) since 1962 and the most recent assessment used data from 1963 through 2004. Recreational landings have been collected since 1979 through the Marine Recreational Fishing Statistical Survey (MRFSS). Table 1.1.1 shows commercial and recreational landings from 1979 through 2004 as used in the current stock assessment, with landings for 2005 added. During this historical time period, the recreational fishery took about 70 percent of the harvest while the commercial fishery took the remaining 30 percent. Overall, catch increased rapidly to approximately 7 million pounds (mp) in 1982, fluctuated significantly through 1989 when catch peaked at 7.8mp. Thereafter, landings decreased through 1999 and have generally increased since then. Landings appear to have been affected by regulations in 1990 through Amendment 1 that set minimum size limits to 28 inches FL for the recreational and 36 inches FL for the commercial fisheries and established a bag limit of three fish for the recreational fishery (Figure 1.1.1). A recreational bag limit reduction to one fish in 1997 and a commercial closed season in 1998 may also have caused reductions in landings, although it is less clear than for the size limit changes in 1990.

Table 1.1.1. Greater amberjack landings in whole weight (pounds) from 1979 through 2005

Year	Recreational	Commercial	Total
1979	495,846	151,462	647,308
1980	614,345	178,386	792,731
1981	1,167,455	235,116	1,402,571
1982	6,627,526	223,509	6,851,035
1983	3,171,896	278,804	3,450,700
1984	1,618,454	525,782	2,144,236
1985	2,064,141	753,436	2,817,577
1986	5,458,441	1,100,107	6,558,548
1987	4,848,768	1,537,551	6,386,319
1988	1,558,424	2,030,980	3,589,404
1989	5,924,636	1,932,021	7,856,657
1990	1,114,172	1,210,045	2,324,217
1991	3,549,304	1,375,180	4,924,484
1992	2,651,556	991,156	3,642,712
1993	3,091,383	1,569,610	4,660,993
1994	2,256,131	1,269,953	3,526,084
1995	855,834	1,259,060	2,114,894
1996	1,495,759	1,266,832	2,762,591
1997	1,068,789	1,114,756	2,183,545
1998	736,152	698,681	1,434,833
1999	876,758	775,190	1,651,948
2000	1,051,917	921,795	1,973,712
2001	1,326,182	732,834	2,059,016
2002	2,088,426	790,403	2,878,829
2003	2,689,195	999,151	3,688,346
2004	2,140,039	954,788	3,094,827
2005	1,458,336	739,612	2,197,948

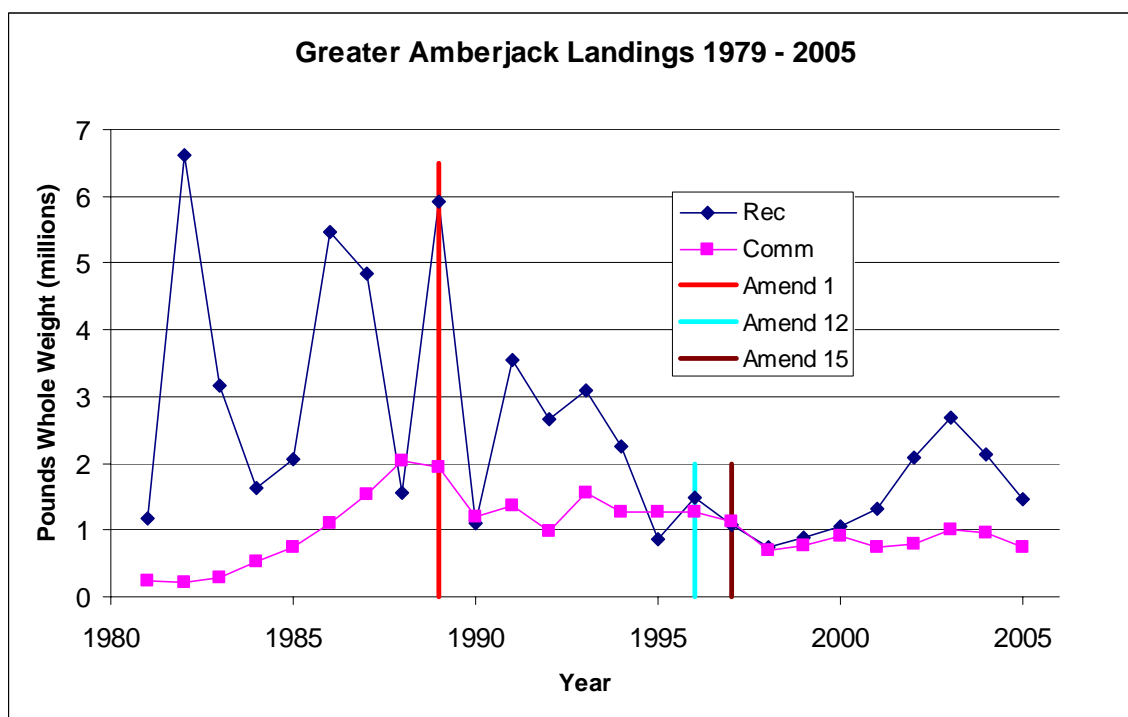


Figure 1.1.1 Recreational and commercial landings of greater amberjack from 1979 through 2005 with the implementation date for management regulations noted. Amendment 1 implemented a recreational three-fish bag, 28-inch fork length (FL) size limit, and a commercial 36-inch FL size limit. Amendment 12 reduced the bag limit to one fish. Amendment 15 set a commercial closed season from March through May.

Gray Triggerfish landings history and previous amendments

Table 1.1.2 shows commercial and recreational landings from 1981 through 2004 as used in the current stock assessment with landings for 2005 added. Over this historical time period, the recreational fishery took about 84 percent of the harvest while the commercial fishery took the remaining 16 percent. Overall, catch increased steadily to approximately 3 mp from 1985 to 1990, then declined steadily to a historical low of approximately 604,000 pounds in 2000. Thereafter, landings generally increased until 2005. A 20 reef fish aggregate recreational bag limit for all reef fish species not having a bag limit was set in 1997. Minimum size was set at 12 inches total length (TL) in late 1999. Landings do not appear to have been affected by these regulations (Figure 1.1.2).

Table 1.1.3 shows commercial and recreational landings by State from 2001 through 2004. Alabama and West Florida account for 86 percent of all Gulf landings; and more specifically, Alabama and the Panhandle Counties of Florida through Jefferson County account for an estimated 69 percent of all Gulf gray triggerfish landings.

Table 1.1.2. Gray triggerfish landings from 1981 through 2005. Directed fleet expressed in pounds, whole weight, while shrimp bycatch is expressed in the number of age - 1 equivalent fish.

Year	Rec-E	Rec-W	Comm-E	Comm-W	Total Directed	Shrimp bycatch
1981	748,779	179,617	64,498	25,362	1,018,256	1,467,734
1982	2,032,601	362,711	62,959	33,714	2,491,985	1,206,518
1983	397,614	387,301	49,588	23,831	858,334	1,462,755
1984	120,970	844,623	37,445	32,749	1,035,787	304,994
1985	280,865	479,950	54,840	37,786	853,441	855,586
1986	898,096	79,077	72,858	22,771	1,072,802	279,374
1987	1,135,998	199,066	89,313	34,290	1,458,667	1,044,555
1988	1,638,073	158,328	137,978	57,084	1,991,464	1,364,168
1989	1,765,965	212,002	230,361	87,271	2,295,599	906,437
1990	2,313,261	184,941	359,686	99,351	2,957,239	1,286,703
1991	1,688,392	399,955	341,319	103,211	2,532,877	523,154
1992	1,434,485	688,825	338,119	112,076	2,573,505	3,100,516
1993	1,317,044	309,425	381,279	177,448	2,185,197	432,660
1994	1,152,103	186,425	251,578	153,141	1,743,248	1,951,471
1995	1,139,967	329,441	207,212	130,664	1,807,284	1,065,855
1996	618,125	226,006	142,185	125,332	1,111,647	1,498,133
1997	664,794	100,211	107,780	76,909	949,694	1,751,775
1998	560,509	93,309	106,153	70,571	830,542	1,004,208
1999	445,430	43,997	116,194	102,826	708,447	242,742
2000	337,241	109,209	63,042	95,095	604,586	1,656,166
2001	487,622	152,572	108,464	67,718	816,375	490,376
2002	721,872	77,016	148,600	86,963	1,034,451	5,115,407
2003	856,626	58,622	166,425	85,385	1,167,059	854,441
2004	951,559	78,092	141,411	77,122	1,248,184	167,162
2005	672,984		150,178		823,162	1,244,000

NOTE: E = statistical grids 1-12 and W = statistical grids 13 – 21. 2005 shrimp bycatch is estimated

Table 1.1.3. Commercial and Recreational landings (pounds) of gray triggerfish by State, 2001-2004

Recreational Landings (MRFSS and headboat)				
	TX	LA	MS	AL&WFL
2001	20,938	35,942	23,728	407,225
2002	23,212	17,246	40,348	667,193
2003	27,867	32,558	31,004	758,749
2004	25,510	86,932	53,763	820,867
Commercial Landings (ALS)				
	TX	LA	MS	AL&WFL
2001	15,202	51,317	2,241	107,422
2002	14,548	71,144	1,538	148,126
2003	20,810	62,259	1,780	166,975
2004	27,695	48,740	1,690	140,430

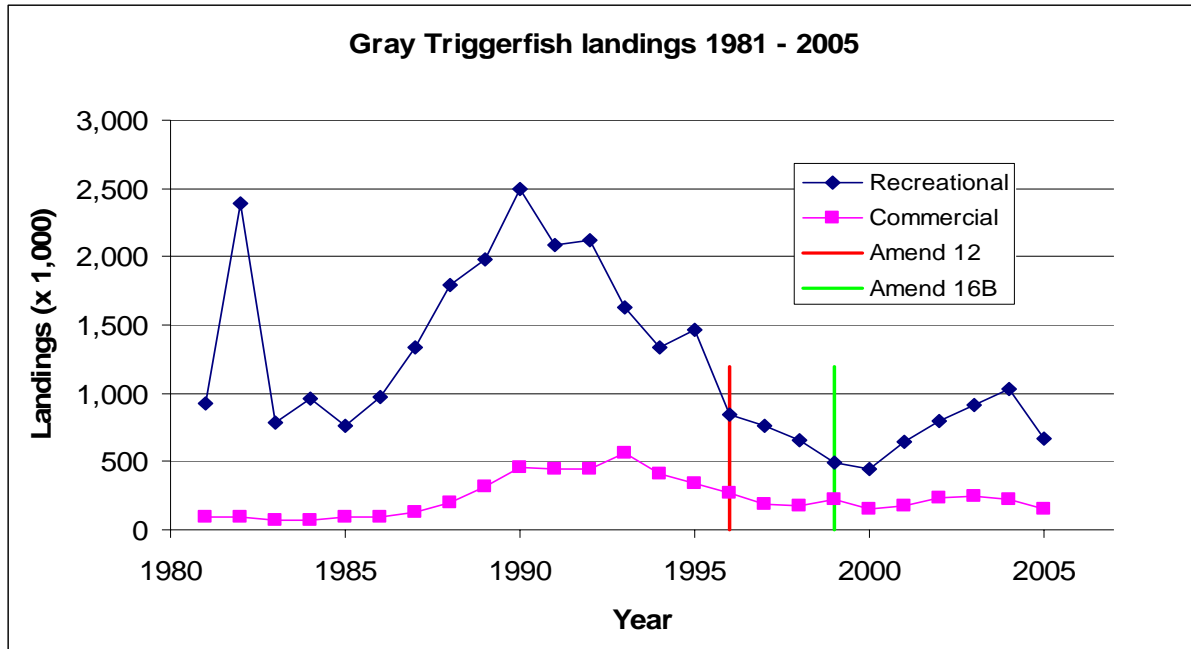


Figure 1.1.2 Recreational and commercial landings of gray triggerfish from 1981 through 2005 with the implementation date for management regulations noted. Amendment 12 implemented a recreational bag limit of 20 reef fish for all those species that did not have a bag limit beginning in 1997. Amendment 16B set a size limit of 12 inches TL beginning in November 1999.

1.2 Status of the Greater Amberjack and Gray Triggerfish Stocks in the Gulf of Mexico

Greater amberjack

Secretarial Amendment 2 to the Reef Fish FMP established a rebuilding plan for greater amberjack based on a stock assessment conducted in 2000. That assessment determined that the greater amberjack stock was overfished and undergoing overfishing as of 1998 (Turner 2000). The effects of management measures to reduce the recreational bag limit from three to one fish (January, 1997) and to close the commercial fishery from March through May (January, 1998) were not incorporated into the assessment because they were too new; however, the projected effects of these management measures were expected to eliminate overfishing; therefore, no new management measures were implemented.

A new assessment was conducted in 2006 using a simple surplus production model called A Stock-Production Model Incorporating Covariates (ASPIC Prager 2004). Other models, such as the calibrated Virtual Population Analysis (VPA) used in the 2000 assessment and an age-structured surplus production model were applied to the stock, but a lack of good-quality ageing data added an unknown amount of uncertainty to these methods and they were not considered adequate (SEDAR 9 2006a). Results from the ASPIC base model are:

<i>Parameter</i>	<i>Value</i>
Population parameters and management benchmarks	
MSY (million pounds)	5.039
B_{MSY}	8.873
F_{MSY}	0.568
Stocks parameters in 2004	
F_{2004}	0.863
F_{2004} / F_{MSY}	1.520
B_{2004}	4.250
B_{2004} / B_{MSY}	0.479

Based on the parameter estimates for 2004, the stock was overfished ($B_{2004} / B_{MSY} < 1.0$) and undergoing overfishing ($F_{2004} / F_{MSY} > 1.0$). Biomass (B) was less than half of B_{MSY} and fishing mortality was 52 percent too high in 2004. Stock biomass declined from at least 1986 through 1998 and then increased through 2003 (Figure 1.2.1). However, these results were very dependent upon the weighting applied to the catch rate indices by fishing sector. The base-case model weighted the indices by the proportion of total catch for each sector over the last eight years. When each catch rate is weighted equally, the stock remains overfished but less so than the base case, and is just barely in the overfishing state (SEDAR 9 2006a).

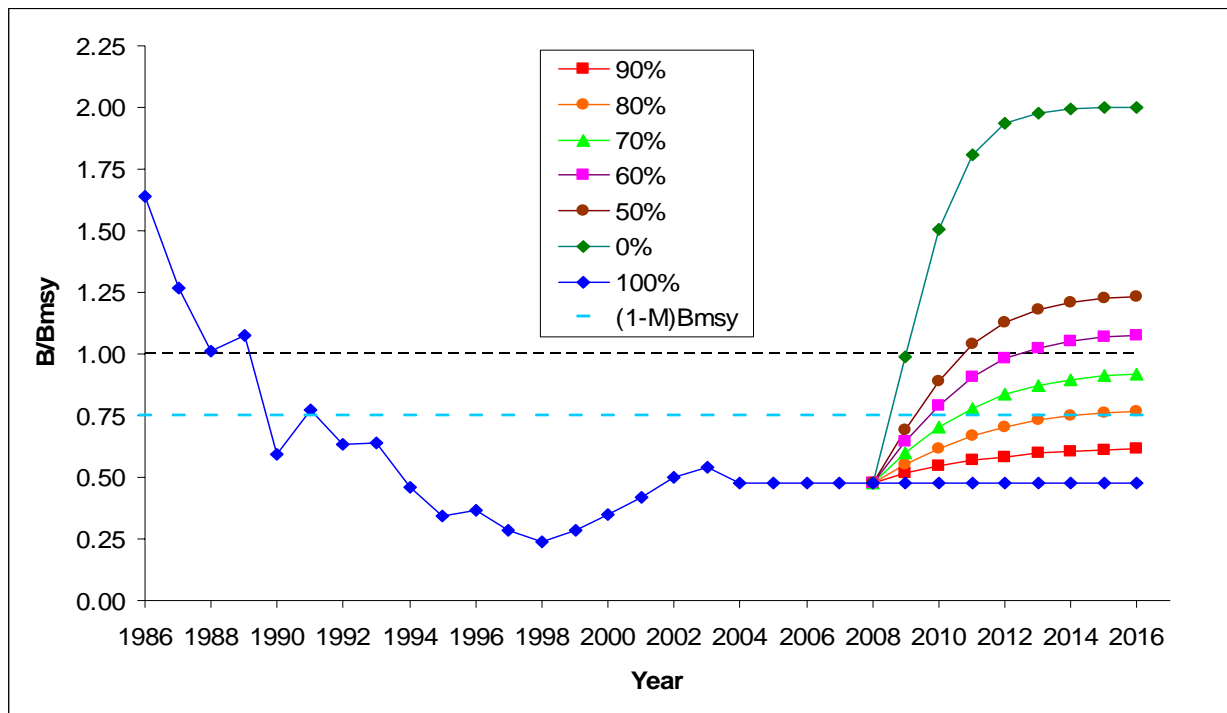


Figure 1.2.1. Greater amberjack relative biomass trends from 1986 to 2004 and relative biomass projections from 2005 through 2016 using constant fishing mortality rate trajectories at various levels of F relative to F during 2004. Reprinted from a PowerPoint presentation given to the SSC and Reef Fish AP on August 8, 2006 by Guillermo Diaz, SEFSC

Some of the uncertainty in the stock status derives from the indices of relative abundance being inconsistent between sectors in 2004 (Figure 1.2.2). Reasons stated by the Review Panel included: (1) the minor components of the fishery (recreational headboats and commercial longline) exhibited an increase while the major components of the fishery (recreational charter and private boats and commercial hand line vessels) exhibited different degrees of decrease and (2) there may be different selectivities between sectors, different fishing locations of each sector with some being more representative of the true stock status than others, or possibly a strong recruitment into the fishery combined with the selectivity by the charter boats for smaller fish. This makes the projections both uncertain and uninformative, so the SEDAR 9 Review Panel recommended that an update assessment be conducted in the next few years to determine the stock trajectory with more precision.

Subsequent to the SEDAR 9 report, the indices were updated to include the values for 2005 (Figure 1.2.2). The MRFSS and handline indices, representing 92 percent of the total catch, continued to decline in 2005 and the headboat index declined significantly in 2005 to near historic lows. Collectively these three sectors of the fishery represent over 97 percent of the total harvest. Only the commercial longline index representing 2.5 percent of the total harvest continued to increase. Therefore, the SEDAR 9 assessment including weighted indices by the proportion of catch by sector appears to be valid; the stock is continuing to undergo overfishing and remains overfished.

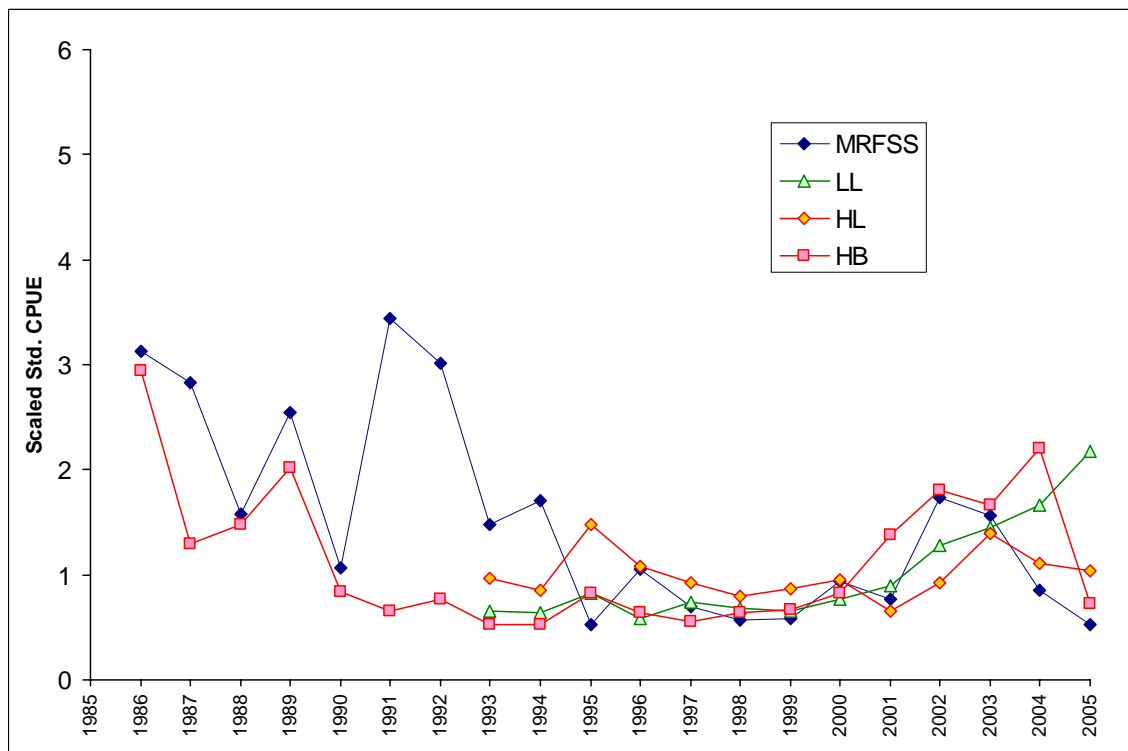


Figure 1.2.2. Greater amberjack catch per unit effort trends from recreational (MRFSS and Headboat, HB) and commercial (Longline, LL and Handline, HL) sectors from 1985 through 2005. Reprinted from a PowerPoint presentation given to the SSC and Reef Fish AP on August 8, 2006 by Guillermo Diaz, SEFSC

Sustainable Fisheries Act (SFA) compliant thresholds and targets were defined in Secretarial Amendment 2. The maximum fishing mortality threshold (MFMT) is defined as the fishing mortality rate at maximum sustainable yield (MSY). Minimum stock size threshold (MSST) is defined as $(1-M)*B_{MSY}$ with natural mortality (M) equal to 0.25. MSY is the yield associated with F_{MSY} (proxy = $F_{30\%SPR}$) when the stock is at equilibrium and optimum yield (OY) is the yield associated with $F_{40\% SPR}$ when the stock is at equilibrium. $F_{30\%SPR}$ was defined as the proxy for F_{MSY} for greater amberjack because biomass-based estimates were considered less accurate than SPR-based estimates in the 2000 assessment. However, the more recent SEDAR 9 assessment accepted the biomass-based estimates for these parameters.

Gray triggerfish

Two assessments of gray triggerfish were conducted in 2001 using different versions of a generalized surplus production model (Valle et al. 2001; Porch 2001). Both assessments indicated that the stock was significantly overfished and undergoing overfishing. Fishing mortality rates were 65 to 70 percent too high and biomass estimates were 15 to 42 percent of B_{MSY} . However, all the models run by Valle et al. (2001) and Porch (2001), were highly sensitive to parameter input restrictions and all but one indicated that the stock had been severely overfished from the beginning of the time series. This was considered unrealistic since historically gray triggerfish was not a desirable target species. Additionally, it was unknown what effect the 12-inch TL minimum size limit implemented in 1999 would have. So no new regulations were implemented at that time.

A new stock assessment was completed in 2006 using an age-structured production model (SEDAR 9 2006b). The stock was determined to be undergoing overfishing but it was uncertain whether the stock was also overfished (Table 1.2.1).

Table 1.2.1. Status determination criteria and stock status of gray triggerfish. Reproduced from SEDAR 9 Review Workshop Advisory Report, 2006.		
Parameter	Base Value	(Low-High Steepness)
Population parameters and management benchmarks		
$F_{20\%SPR}$	0.419	
$F_{30\%SPR} = MFMT$	0.269	
$F_{40\%SPR}$	0.186	
F_{MSY}	0.45	(0.294-0.525)
SSB_{MSY} (measured as egg production)	1.21t	(1.78t-1.049t)
$SSB_{30\%SPR}$	2.094t	(1.967t-2.109t)
$SSB_{20\%SPR}$	1.316t	(1.083t-1.355t)
F_{OY}	Not defined	
MSY (lbs, including shrimp bycatch)	1.638m	(1.441m-1.707m)
Stock parameters in 2004		
F_{2004}	0.435	(0.431-0.435)
$F_{2004}/MFMT$	1.62	(1.6-1.62)
F_{2004}/F_{MSY}	0.97	(1.47-0.83)
F_{2004}/OY	Not defined	
SSB_{2004} (eggs)	1.345t	(1.323t-1.351t)
$SSB_{2004}/SSB_{SPR20\%}$	1.02	(1.22-1)
$SSB_{2004}/SSB_{SPR30\%}$	0.642	(0.67-0.64)
SSB_{2004}/SSB_{MSY}	1.11	(0.74-1.29)

Based on the definition of MFMT ($F_{30\%SPR}$), the current fishing mortality rate is about 62 percent too high (Figure 1.2.3). The Review Panel also examined biomass based fishing mortality rates which were in the range of F_{MSY} but felt this measure was not acceptable because it was sensitive to the stock-recruitment relationship which is poorly estimated. The Review Panel stated that no conclusion could be made whether the stock is overfished although it appears to be approaching an overfished condition. Based on the Council's preferred definition for MSST in this amendment ($(1-M)*SSB_{30\%SPR}$), current stock biomass as measured in eggs is below this threshold and the stock is considered overfished (Figure 1.2.4). Projections of SSB to 2017 for MFMT (proxy for $F_{MSY} = F_{30\%SPR}$), for 90 percent of MFMT, and for 75% of MFMT are also depicted in Figure 1.2.4.

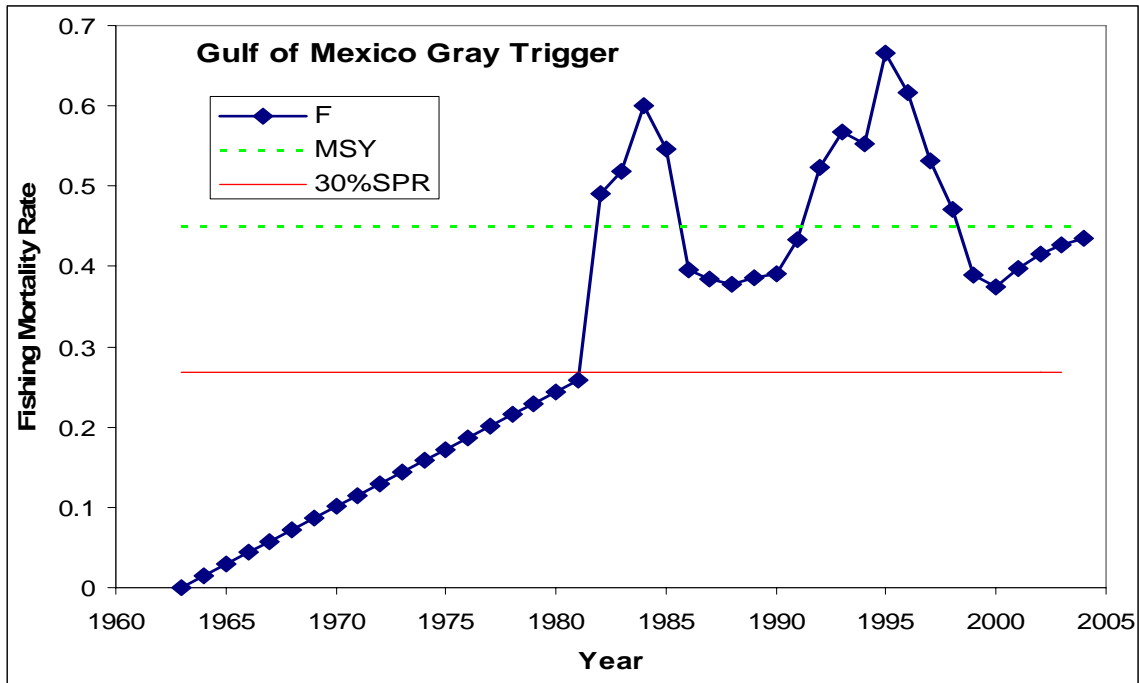


Figure 1.2.3. Gray triggerfish fishing mortality estimates from 1963 through 2004. Fishing mortality at MSY and 30% SPR are shown.

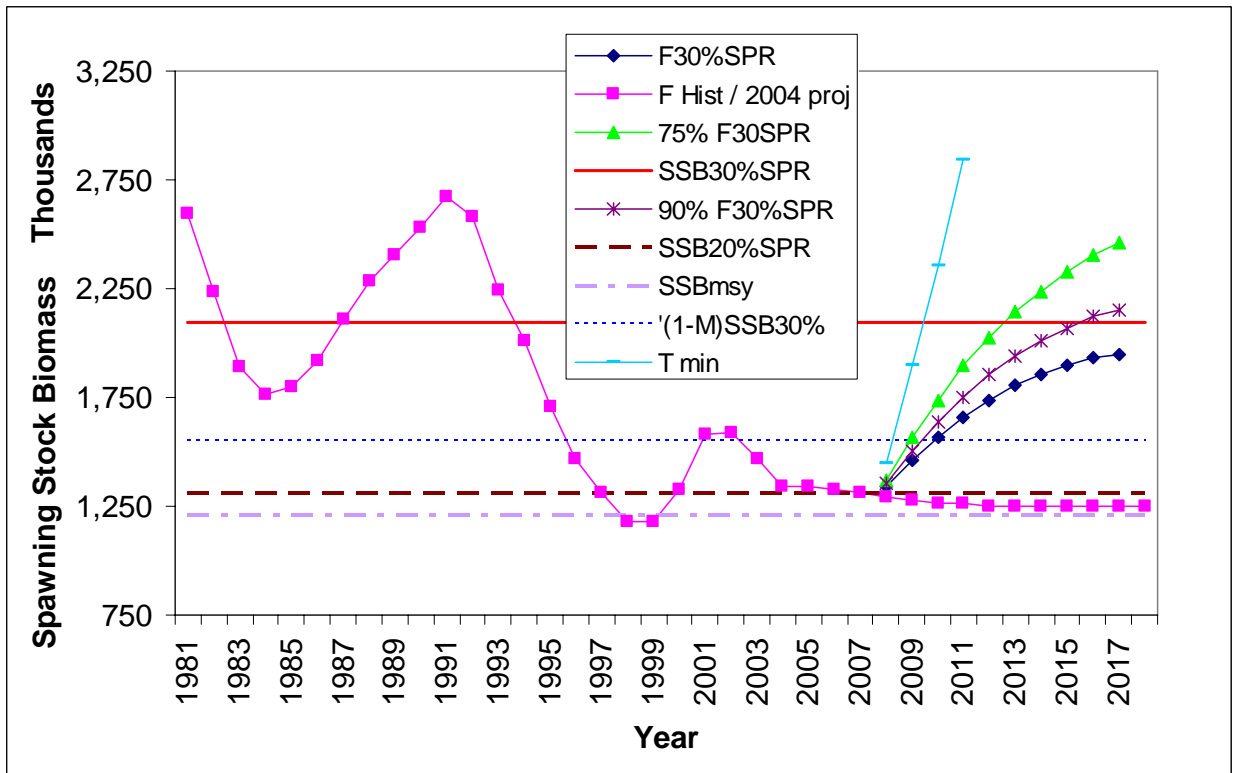


Figure 1.2.4. Gray triggerfish spawning stock biomass estimates from 1963 through 2004. Spawning stock biomass projections at MSY, F_0 , 30 percent SPR, $(1-M)*30\%SPR$, and 20 percent SPR are shown from 2008 through 2017.

Subsequent to the completion of the SEDAR 9 assessment and review of gray triggerfish, the Council requested an evaluation of the catch per unit effort (CPUE) indices using only trips which caught gray triggerfish rather than all trips that targeted reef fish typically caught with vermilion snapper. The Council's Reef Fish AP believed that gray triggerfish must be targeted using smaller hooks than would be used for typical reef fish fishing. The CPUE indices were rebuilt using only positive trips and then the base SEDAR 9 stock assessment model was rerun with the new indices (Sladek Nowlis 2006). Results using the new indices improved the biomass estimates slightly (3.6 percent), but the stock was still undergoing overfishing and considered overfished (based on the Council's preferred MSST definition in this amendment). The estimate of current F (2004) decreased by 10 percent which decreased the estimate of overfishing from 62 percent too high to 53 percent too high. However, Sladek Nowles (2006) recommended that the original base assessment with zero trip identified by the Stevens and McCall method (SEDAR9 2006b) is the most defensible method because there are times when fishers use methods that are capable of catching gray triggerfish but do not. Adding zero trips improves the likelihood that the CPUE indices are a reasonable representation of relative stock abundance.

No thresholds or benchmarks have been set specifically for gray triggerfish. Amendment 1 to the Reef Fish FMP, implemented in 1990 before the SFA, was passed, established the MSST at 20 percent SPR for all reef fish species. The Generic SFA Amendment proposed SFA definitions for OY, MSST and MFMT for three reef fish species and generic definitions for all other reef fish. The definition of MFMT for other reef fish, $F_{30\%SPR}$, was approved and implemented; however, those for OY and MSST were not.

1.3 Purpose and Need for Action

The MSFCMA requires NOAA Fisheries Service (NMFS) and regional fishery management councils to prevent overfishing, and achieve, on a continuing basis, the optimum yield from federally managed fish stocks. These mandates are intended to ensure fishery resources are managed for the greatest overall benefit to the nation, particularly with respect to providing food production and recreational opportunities, and protecting marine ecosystems. To further this goal, the MSFCMA requires fishery managers to specify through rebuilding plans their strategy for rebuilding overfished stocks to a sustainable level within a certain time frame, and to minimize bycatch and bycatch mortality to the extent practicable.

Greater amberjack have been under a rebuilding plan since 2003. However, a new stock assessment completed in 2006 concluded that the stock is not recovering as projected (SEDAR 9 2006a). It remains overfished and recently returned to an overfishing condition. This amendment is necessary to end overfishing and adjust total allowable catch (TAC) and management measures to bring the greater amberjack rebuilding plan back on course for recovery within the original ten-year time frame.

Gray triggerfish were declared to be undergoing overfishing in October 2006 based on the 2006 stock assessment (SEDAR 9 2006b). Overfished status was not determined because the Council had yet to adopt a definition for MSST. Based on the preferred MSST definition for gray triggerfish in this amendment, the stock is overfished. This amendment is necessary to set TAC

and management measures to end overfishing of gray triggerfish, set management targets and thresholds, and establish a rebuilding plan for gray triggerfish.

This amendment proposes to reduce the harvest of greater amberjack by 32 percent and the harvest of gray triggerfish by 60 percent in order to end overfishing and allow the stocks to recover to B_{MSY} within each species' respective rebuilding schedule. These landings reductions will reduce fishing mortality to at or below F_{OY} levels, which equate to a 50 percent reduction in F for greater amberjack and 54 percent reduction in F for gray triggerfish. In addition, management thresholds and targets will be set for gray triggerfish that comply with the SFA and annual catch limits and accountability measures will be established for both species to comply with the recent reauthorization of the MSFCMA.

1.4 History of Management

The Reef Fish FMP [with its associated environmental impact statement (EIS)] was implemented in November 1984. The original list of species included in the management unit consisted of snappers, groupers, and sea basses. Gray triggerfish and *Seriola* species, including greater amberjack, were in a second list of species included in the fishery, but not in the management unit. The species in this list were not considered to be target species because they were generally taken incidentally to the directed fishery for species in the management unit. Their inclusion in the FMP was for purposes of data collection, and their take was not regulated [49FR 39548].

Amendment 1 [with its associated environmental assessment (EA), regulatory impact review (RIR), and initial regulatory flexibility analysis (IRFA)] to the Reef Fish FMP, implemented in 1990, added greater amberjack and lesser amberjack to the list of species in the management unit. It set a greater amberjack recreational minimum size limit of 28 inches (FL) and a 3-fish recreational bag limit, and a commercial minimum size limit of 36 inches FL. This amendment set as a primary objective of the FMP the stabilization of long-term population levels of all reef fish species by establishing a survival rate of biomass into the stock of spawning age to achieve at least 20 percent spawning stock biomass per recruit (SSBR), relative to the SSBR that would occur with no fishing. A framework procedure for specification of TAC was created to allow for annual management changes. This amendment also established a commercial vessel reef fish permit as a requirement for harvest in excess of the bag limit and for the sale of reef fish.

Amendment 4 (with its associated EA and RIR), implemented in May 1992, added the remaining *Seriola* species (banded rudderfish and Almaco jack) to the management unit, and established a moratorium on the issuance of new commercial reef fish vessel permits for a maximum period of three years.

Amendment 5 (with its associated supplemental environmental impact statement, RIR, and IRFA), implemented in February 1994, required that all finfish except for oceanic migratory species be landed with head and fins attached, and closed the region of Riley's Hump (near Dry Tortugas, Florida) to all fishing during May and June to protect mutton snapper spawning aggregations.

Amendment 12 (with its associated EA and RIR), submitted in December 1995 and implemented in January 1997, reduced the greater amberjack bag limit from three fish to one fish per person, and created an aggregate bag limit of 20 reef fish for all reef fish species not having a bag limit (including lesser amberjack, banded rudderfish, Almaco jack and gray triggerfish). NMFS disapproved proposed provisions to include lesser amberjack and banded rudderfish along with greater amberjack in an aggregate one-fish bag limit and to establish a 28-inch FL minimum size limit for those species.

Amendment 15 (with its associated EA, RIR, and IRFA), implemented in January 1998, closed the commercial greater amberjack fishery Gulf-wide during the months of March, April, and May. An August 1999 regulatory amendment (with its associated EA, RIR, and IRFA) closed two areas (i.e., create two marine reserves), 115 and 104 square nautical miles respectively, year-round to all fishing under the jurisdiction of the Gulf Council with a four-year sunset closure.

Generic Sustainable Fisheries Act Amendment (with its associated EA, RIR, and IRFA), partially approved and implemented in November 1999, set the MFMT for greater amberjack and gray triggerfish at $F_{30\% SPR}$. Estimates of MSY, MSST, and OY were disapproved because they were based on SPR proxies rather than biomass based estimates.

Amendment 16B (with its associated EA, RIR, and IRFA), implemented in November 1999, set a slot limit of 14 to 22 inches FL for banded rudderfish and lesser amberjack for both the commercial and recreational fisheries, and an aggregate recreational bag limit of five fish for banded rudderfish and lesser amberjack. This amendment also set a 12 inch TL minimum size for gray triggerfish.

Secretarial Amendment 2, implemented in July, 2003 for greater amberjack, specified MSY as the yield associated with $F_{30\% SPR}$ (proxy for F_{MSY}) when the stock is at equilibrium, OY as the yield associated with an $F_{40\% SPR}$ when the stock is at equilibrium, MFMT equal to $F_{30\% SPR}$, and MSST equal to $(1-M)*B_{MSY}$ or 75 percent of B_{MSY} . It also set a rebuilding plan limiting the harvest to 2.9 mp for 2003-2005, 5.2 mp for 2006-2008, 7.0 mp for 2009-2011, and for 7.9 mp for 2012. This was expected to rebuild the stock in seven years. Regulations implemented in 1997 and 1998 (Amendments 12 and 15) were deemed sufficient to comply with the rebuilding plan so no new regulations were implemented.