

Updated Projections for 2010 Quota Closure Date for Gulf of Mexico Recreational Greater Amberjack

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Southeast Regional Office
St. Petersburg, Florida

September 1, 2010

Introduction

Gulf of Mexico greater amberjack are managed under regulations and quotas established by the Gulf of Mexico Fisheries Management Council (Gulf Council) and the National Marine Fisheries Service (NMFS). Amendment 30A to the Reef Fish Fishery Management Plan established annual catch limits and accountability measures for greater amberjack, modified the rebuilding plan, increased the recreational minimum size limit from 28 to 30 inches fork length, set a zero bag limit for captain and crew of for-hire vessels, and set commercial and recreational quotas. The quota for 2010 was reduced from 1,368,000 to 1,243,184 pounds whole weight (ww) to repay a 9% quota overage in 2009. A previous analysis (SERO-LAPP-2010-02) estimated the 2010 reduced quota would be exceeded between July and August, assuming the fishery proceeded at a pace similar to 2009. The previous analysis also noted the following:

“If the fishery proceeds at rates more similar to those observed in 2007 and 2008, it may not exceed the adjusted quota...If the Deepwater Horizon oil spill on April 20, 2010 reduces effort throughout the Gulf of Mexico, this may result in lower landings relative to the 2009 assumption. It should be noted that although the effects of this environmental catastrophe are as yet unquantified, it may have negative impacts upon stock status and the regional economy.”

(SERO-LAPP-2010-02, p. 10).

If the quota has not been achieved by the projected closure date, the Regional Administrator may “readjust the reduced fishing season to ensure recreational harvest achieves but does not exceed the intended harvest level” (50 CFR §622.49(a)(1)(ii)).

Since the completion of SERO-LAPP-2010-02 on May 13, 2010, it has become clear that the Deepwater Horizon/BP oil spill (DWH/BP oil spill) has had substantial impacts upon effort and landings in the Gulf of Mexico, due to fishery closures, concerns about seafood safety, and a variety of other cascading effects. This reanalysis of the projected quota closure date for greater amberjack in 2010 considers Marine Recreational Fisheries Statistics Survey (MRFSS) landings estimates through Wave 3 (e.g., June 30), headboat landings estimates through July 23, and available information regarding the short-term impacts of the DWH/BP oil spill upon recreational greater amberjack landings.

Methods and Results

Data Available for Landings in 2010

Recreational greater amberjack landings were obtained from two data sources:

1. Marine Recreational Fisheries Statistics Survey (MRFSS), including the For-hire charter survey; and
2. Southeast Fisheries Science Center Headboat survey (HBS).

Private recreational and For-hire charter greater amberjack landings were available from MRFSS through June 30, 2010 (Table 1). These landings are estimated using a combination of dockside intercepts (landings data) and phone surveys (effort data). Landings in pounds whole weight (lbs ww) are estimated annually by two-month wave (e.g., Wave 1 = Jan/Feb, ..., Wave 6 = Nov/Dec), area fished (inland, state, and federal waters), mode of fishing (charter, private/rental, shore), and state (Florida, Alabama, Mississippi, and Louisiana). MRFSS landings of greater amberjack in the Gulf of Mexico are post-stratified for West Florida, with Monroe County landings removed.

Headboat landings based on self-reported data from logbooks completed by headboat operators were available from January 1 to July 23, 2010 (Table 2). Landings are reported by vessel, day/month, and statistical reporting area (i.e., area 18 = Dry Tortugas off west coast of Florida, ..., area 27 = Southeast Texas). Landings were not adjusted for non-reporting; however, based on a review of the 2010 Headboat Activity Reports, it was concluded that compliance for this time period was >98% (K. Brennan, SEFSC, pers. comm.). Consequently, these reported landings are representative of headboats participating in the Gulf of Mexico Headboat Survey. Due to low numbers of dockside samples for greater amberjack so far in 2010, mean weights for headboat landings were generated using average weights by area from 2007-2009.

The Texas Parks and Wildlife Department (TPWD) creel survey generates estimates of landings for private/rental boats and charter vessels fishing off Texas. Landings are reported in numbers by high (May 15-November 20) and low-use time periods (November 21-May 14), area fished (state vs. federal waters), and mode of fishing (private vs. charter). These landings estimates were not available at the time of this analysis; however, between 2000-2009, TPWD-reported landings have only comprised 1% of the overall greater amberjack recreational landings, with the majority of landings (92% ± 1%) reported to MRFSS (Figure 1).

Table 1. MRFSS post-stratified landings (lbs ww) for 2010, all modes.

2010 STATE	CHARTER				PRIVATE				ALL MODES		
	Jan- Feb	Mar- Apr	May- June	TOTAL	Jan- Feb	Mar- Apr	May- June	TOTAL	80% LCL	GRAND TOTAL	80% UCL
ALABAMA	0	13,351	24,171	37,522	0	16,777	12,390	29,167	2,430	66,689	138,339
LOUISIANA	2,485	48,340	0	50,825	0	0	0	0	18,841	50,825	83,688
MISSISSIPPI	0	0	0	0	0	0	0	0	0	0	0
WFL PANHANDLE	3,174	56,267	95,943	155,384	14,711	30,111	162,071	206,893	215,376	362,277	513,326
WFL PENINSULA	0	36,392	31,094	67,486	48,166	65,905	129,657	243,728	123,162	311,214	499,266
Grand Total	5,659	154,350	151,208	311,217	62,877	112,793	304,118	479,788	359,809	791,005	1,234,619

Table 2. Estimated pounds (ww) of greater amberjack landed by recreational headboats in Gulf of Mexico in 2010, with weights computed using averages by area from 2007-2009.

AREA	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
FL Peninsula	398	988	241	116	214	351	21	509
NWFL and AL	81	1,172	700	651	619	667	16	3,907
LA	0	143	159	954	700	0	0	1,956
NETX	0	0	0	173	375	245	1,082	1,876
Port Aransas, TX	140	168	561	406	280	687	477	2,719
SETX	0	0	0	0	42	558	391	991
TOTAL	619	2,471	1,661	2,301	2,230	2,509	1,987	13,778

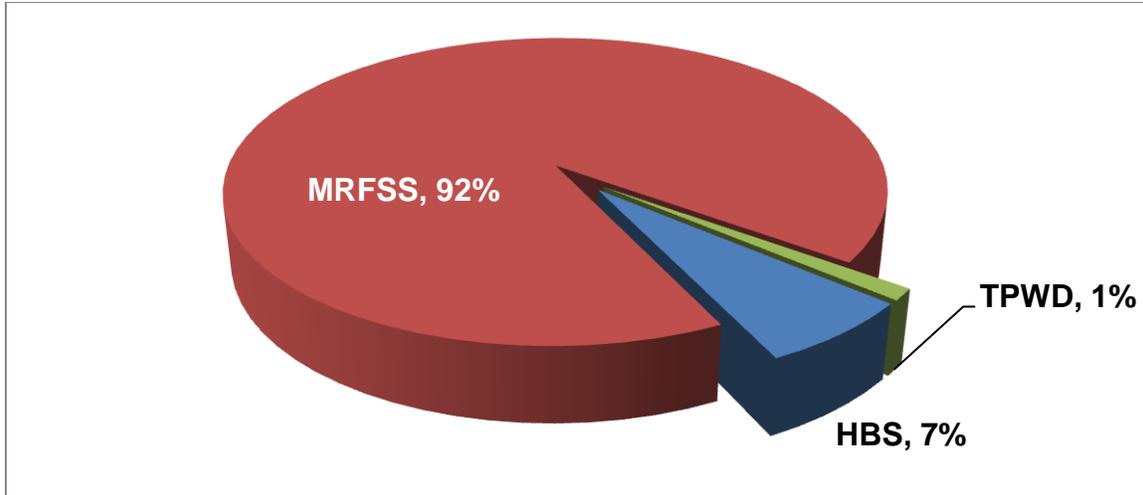


Figure 1. Average percent recreational landings of greater amberjack in the Gulf of Mexico, 2000-2009, by data source.

Projected Landings in 2010

The 2009 quota of 1,368,000 lbs was exceeded by 124,817 lbs (SERO-LAPP-2009-02). In compliance with accountability measures specified at 50 CFR 622.49(a)(1)(ii), the 2010 quota was reduced to 1,243,184 lbs (whole weight). The goal of this modeling effort was to project when the 2010 recreational greater amberjack quota would be met using available 2010 landings data, historical landings data (2007-2009), and comparisons of weekly for-hire fishing effort prior to and following the DWH/BP oil spill. Historically, both landings (Figure 2) and targeted effort (SERO-LAPP-2009-02) have been highest for greater amberjack from May-August (e.g., Waves 3 and 4), and much lower from September-December.

Using available data from MRFSS and the HBS, and expanding for TPWD, preliminary estimates were generated for recreational greater amberjack landings through June 30, 2010. TPWD landings were expanded as an average of 2007-2009 landings. Between 2007-2009, TPWD-reported landings averaged $11,020 \pm 4,157$ ($\pm SE$) lbs ww. The resultant overall estimate for landings through June 30 was 807,724 lbs ww (80% CI = $\pm 431,196$); approximately 65% of the 2010 quota.

Cumulative landings in 2010 relative to landings trends in 2009 and the average of 2007-2009 are presented in Figure 2A. January and February 2010 were characterized by an unusually cold winter, which appears to have severely depressed recreational fishing effort. However, landings in March and April were higher than either previous trend. Landings were reduced in May and June, presumably due to the expanding fishery closures associated with the DWH/BP oil spill. Historical trends suggest the 807,724 lbs landed might represent 60% of the cumulative landings in 2010 (Figure 2B). Expanding this rate through the end of the year would imply a total harvest in 2010 of 1,346,207 lbs in the absence of a quota closure.

Annual trends in landings are relatively consistent across datasets and years (Figures 3A-C), with Waves 3-4 comprising the bulk of the landings (35% and 21%, respectively). Waves 5 and 6 historically have accounted for a small amount of the annual landings (7% and 5%, respectively). Based on this information, the landings in Wave 4 (e.g., July-August) will be a major determining factor in projecting the recreational greater amberjack quota closure date. There is a reasonable expectation that landings during July-August 2010 may be lower than historical averages, given that most fishable waters off Louisiana, Alabama, and Mississippi were closed due to the DWH/BP oil spill through the end of August, and the West Florida Panhandle was essentially closed until August 6, 2010. The fishery closures associated with the DWH/BP oil spill may reduce the recreational greater amberjack harvest rate relative to historical levels. Weekly charter effort off the Florida Panhandle and Louisiana between July and late August 2010 was, on average, only 21% and 26% of 2009 levels, respectively (Figure 4).

A previous quota closure analysis (SERO-LAPP-2009-02) indicated that annual landings between 2007-2009 were steadily increasing, and it was assumed that landings in 2010 would proceed either at or above the 2009 pace. From 2006-2009, there were no clear trends in average weight of landed greater amberjack (SERO-LAPP-2009-02). As such, no assumptions of increases in average weight of landed fish were explored in this modeling effort.

Due to the lack of clear temporal trends in landings and effort, a variety of assumptions were evaluated with regards to recreational landings from July-December, 2010. In all cases, HBS-reported landings through July 23, 2010 were included and expanded by 25.8% to account for the 8 remaining days in July. Four scenarios for estimating MRFSS and TPWD July-December 2010 landings and HBS August-December 2010 landings were evaluated. Scenarios 1 and 2 employed methods described in a prior quota closure analysis (SERO-LAPP-2009-02), but accounted for received 2010 landings data. Scenarios 3 and 4 accounted for received 2010 landings data and also attempted to predict the effects of existing fishery closures and potential re-openings associated with the DWH/BP oil spill.

Scenario 1: 2009 Proxy

In Scenario 1, it was assumed landings in July-Dec 2010 would proceed on pace with 2009 landings, as 2009 landings were the nearest temporal proxy. A recreational quota closure was implemented 53 days into the 61 day MRFSS Wave 5 in 2009. Assuming a uniform distribution of landings in Wave 5, Wave 5 landings would have been ~13% higher, and were expanded for the 2010 projection following this logic. Projecting 2010 landings based on 2009 trends also required the extrapolation of historical MRFSS 2000-2008 landings trends to predict what landings would have been during MRFSS Wave 6 of 2009, since the recreational sector was closed. MRFSS and TPWD landings were assumed distributed uniformly within sampling waves and were assigned by month based on the ratio of days between the two months within each wave. The methods for the expansion of 2009 landings and computation of confidence limits are described in more detail by SERO-LAPP-2009-02.

Scenario 2: 2007-2009 Average Proxy

In Scenario 2, it was assumed landings in July-Dec 2010 would proceed on pace with the average of 2007-2009 landings. MRFSS, HBS, and TPWD landings were only averaged between 2007-2008 for October-December due to the closure of the greater amberjack fishery in October 2009. The assignment of landings within waves by month was accomplished as described in Scenario 1.

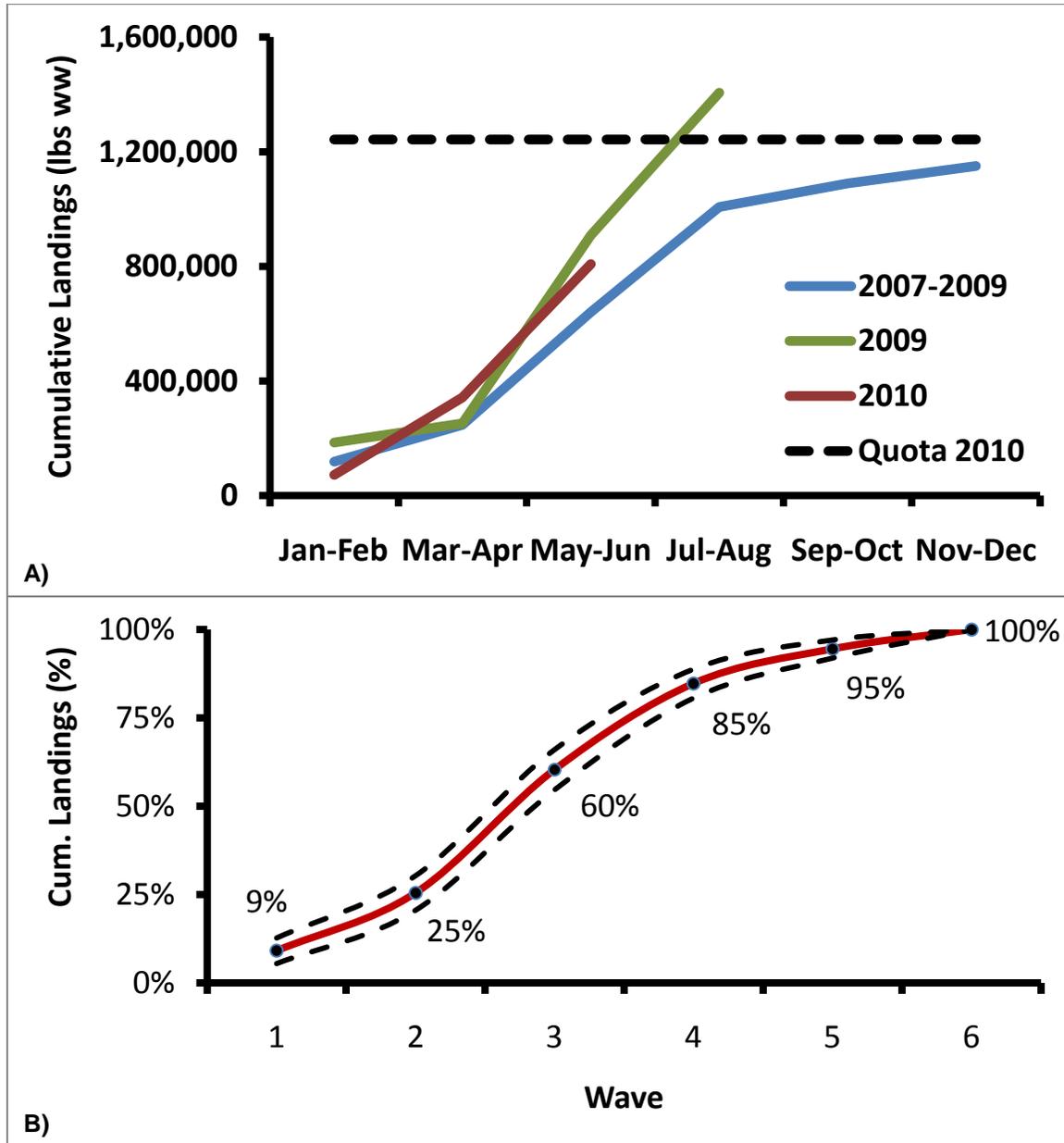


Figure 2. Cumulative recreational landings of Gulf greater amberjack by wave, A) by year, 2007-2010, and B) as an average 2000-2008 with 95% confidence intervals.

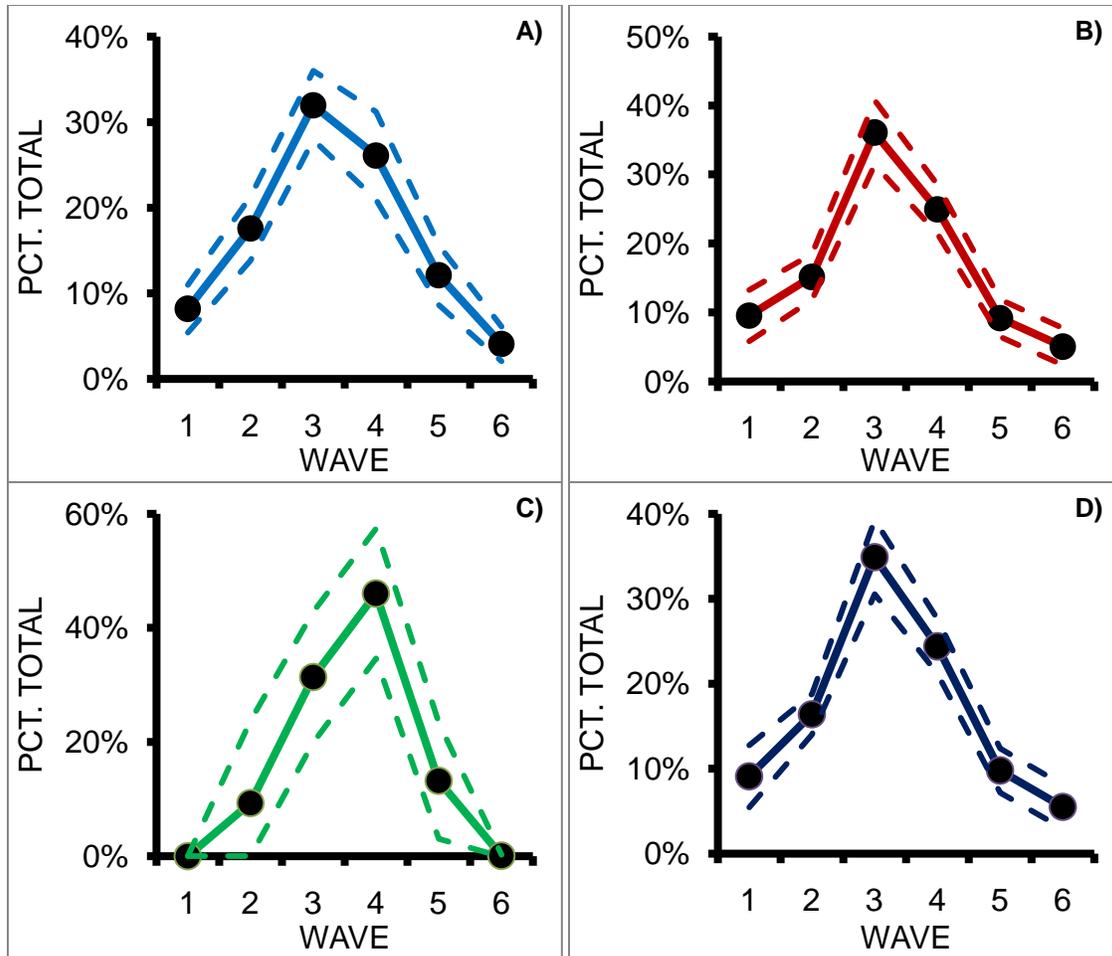


Figure 3. Landings by wave, with 95% confidence limits, for A) HBS 2000-2009, B) MRFSS 2000-2009, C) TPWD 2000-2008, and D) All sectors 2000-2008. In (C) and (D), averaging is done through 2008 because TPWD 2009 landings were not provided by wave.

Scenario 3: 2009 Proxy with DWH Scalar

In Scenario 3, it was assumed landings in July-Dec 2010 would proceed on pace with 2009 landings, but would be somewhat reduced due to the persistence of fishery closures associated with the DWH/BP oil spill off some Gulf states. These closures have clearly impacted effort relative to historical levels (Figure 4). For example, 2010 charter boat effort was between 8-35% of 2009 effort levels during the fishery closure near Panama City between June 28-Aug 6. By contrast, 2010 charter boat effort off the Florida peninsula has been near or above 2009 levels since early May. Charter boat effort off Alabama, Louisiana, and Mississippi has been reduced to 10-20% of 2007-2009 average levels (NMFS Fisheries Statistics Division, pers. comm., Sept. 1, 2010).

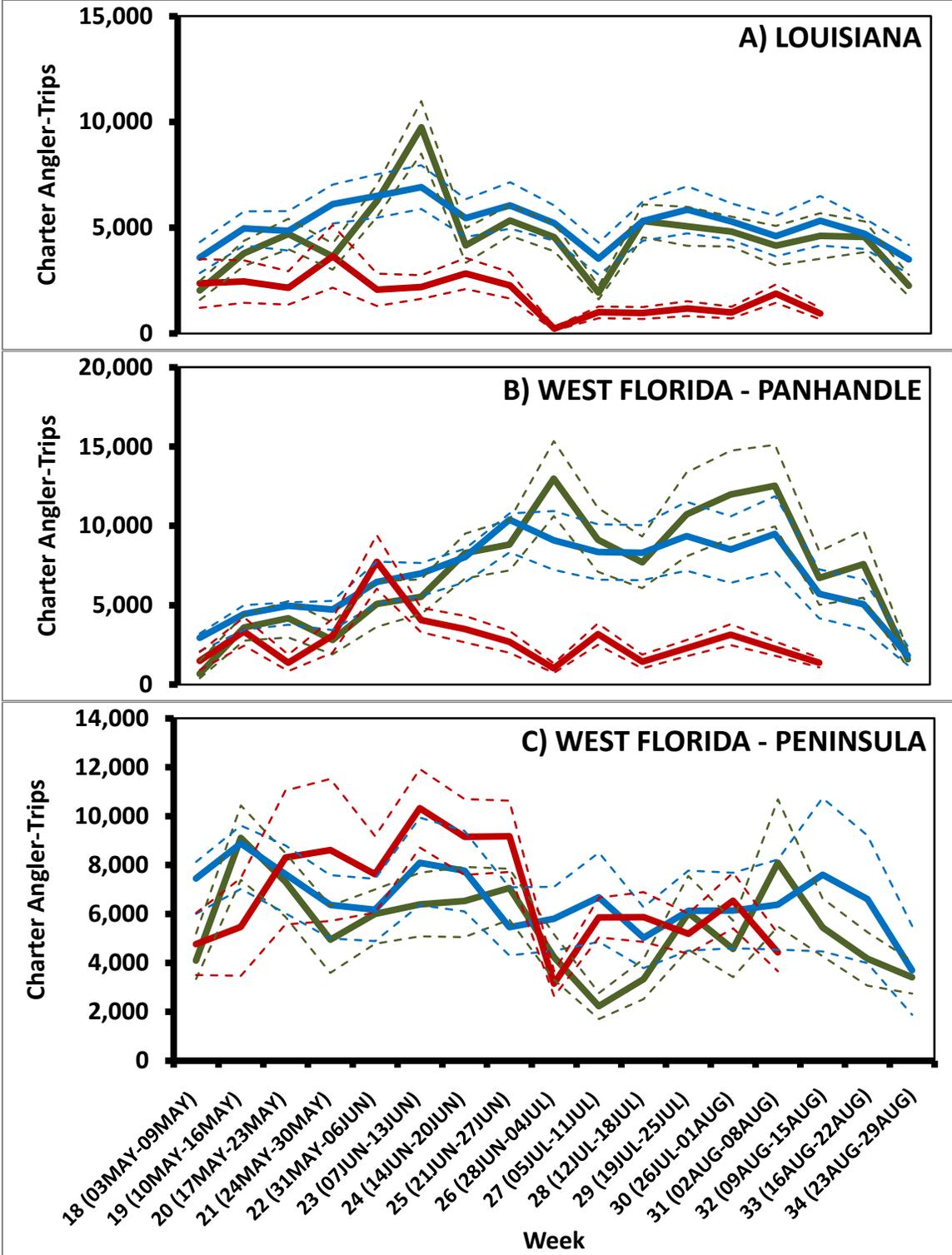


Figure 4. Charter trips taken off West Florida A) Peninsula and B) Panhandle in 2010 (red) relative to 2009 (green) and 2007-2009 (blue) averages. Note panhandle was closed between 6/28-8/6; whereas peninsular Florida has experienced no major closures associated with the DWH/BP oil spill.

The average percent of landings attributable to post-stratified region within waves was computed based upon 2007-2009 MRFSS data, as preliminary analyses suggested this longer time series was more representative of the 2010 spatial distribution of effort (Table 3). These proportions were then applied to 2009 landings by wave to estimate landings for each region.

Table 3. Average percent landings (2007-2009) by wave of Gulf greater amberjack.

AVG 07-09	Jan- Feb	Mar- Apr	May- June	July- Aug	Sept- Oct	Nov- Dec
ALABAMA	0%	2%	18%	5%	2%	3%
LOUISIANA	46%	31%	9%	20%	22%	21%
MISSISSIPPI	0%	0%	0%	1%	0%	0%
WFL PAN	4%	38%	65%	62%	49%	51%
WFL PEN	50%	29%	8%	13%	27%	26%

Source: Personal communication from NMFS Fisheries Statistics Division [9/1/2010]

An evaluation of average landings attributable to post-stratified area in the Gulf clearly illustrates the important contributions of the Florida panhandle and Louisiana to the overall greater amberjack recreational harvest. However, the greater amberjack fishing grounds off the Florida panhandle began closing on June 2, 2010 due to the DWH/BP oil spill. They were nearly completely closed by June 28, 2010, and were not reopened until August 6, 2010. Similarly, the waters off Louisiana, Alabama, and Mississippi have been closed since well before the beginning of Wave 4 (e.g., July 1, 2010), and it is reasonable to assume that these waters will remain closed at least until the end of Wave 4 (e.g., August 31, 2010). It was assumed that 50% of LA, and 75% of AL and MS waters would be open during Wave 5 (e.g., October 31, 2010). To account for these closures, the percent of time open within an area during a wave was multiplied by the percent of overall landings accounted for by the area within the wave (Table 4A). The resulting values, when summed across areas within the wave, resulted in a scalar for reduced landings in the Gulf relative to 2009 levels (Table 4B). For example, Gulf landings would be reduced to 38% of 2009 levels in Wave 4 due primarily to the closures off the Florida panhandle and Louisiana. The impacts of Texas landings were not considered in this function due to differences in data collection procedures and their relative insignificance (~1%) relative to Gulf-wide landings.

Table 4. Percent A) time open during wave and B) scalar for reduced landings due to DWH/BP oil spill fishery closures, by post-stratified area.

A. PERCENT TIME OPEN DURING WAVE				B. SCALAR FOR ZONE/WAVE			
STATE	July- Aug	Sept- Oct	Nov- Dec	STATE	July- Aug	Sept- Oct	Nov- Dec
ALABAMA	0%	75%	100%	ALABAMA	0%	2%	3%
LOUISIANA	0%	50%	100%	LOUISIANA	0%	11%	21%
MISSISSIPPI	0%	75%	100%	MISSISSIPPI	0%	0%	0%
WFL PAN	40%	100%	100%	WFL PAN	25%	49%	51%
WFL PEN	100%	100%	100%	WFL PEN	13%	27%	26%
				TOTAL	38%	89%	100%

Scenario 4: 2009 Proxy with DWH Scalar and Effort Shift to peninsular West Florida

In Scenario 4, it was assumed landings in July-Dec 2010 would proceed on pace with 2009 landings, but would be somewhat reduced due to the persistence of fishery closures off some Gulf states. Unlike Scenario 3, Scenario 4 assumed that effort shifting would occur off peninsular Florida, offsetting some of the reductions in landings ordinarily originating from the Florida panhandle. A comparison of the MRFSS Wave 1-3 landings by wave and post-stratified region between 2009 and 2010 shows WFL Panhandle landings at 50% of their 2009 levels in May-June 2010; whereas WFL Peninsula landings in May-June 2010 were almost three times higher than in 2009. To account for this apparent effort increase or effort shift, peninsular Florida scalars in Table 4B from Scenario 3 were multiplied by three during July-August; no adjustments were made for September-December (Table 5). As a result, Scenario 4 features landings rates between those expressed by Scenario 1 and Scenario 3.

Table 5. Scalar for reduced landings due to fishery closures associated with DWH/BP oil spill, by post-stratified area, assuming a threefold increase in landings off peninsular Florida relative to historical (2007-2009) levels in July-August, 2010.

STATE	July-Aug	Sept-Oct	Nov-Dec
ALABAMA	0%	2%	3%
LOUISIANA	0%	11%	21%
MISSISSIPPI	0%	0%	0%
WFL PAN	25%	49%	51%
WFL PEN	38%	27%	26%
TOTAL	63%	89%	100%

Projected Landings

Cumulative landings through time were computed assuming landings were uniformly distributed among days in a month, with landings-per-day ratios across sectors unique to each month and scenario (Figure 5). Projected quota overages by scenario are presented in Table 6. Under all scenarios, the 80% lower confidence limit (LCL) for landings would not exceed the quota. The mean estimate for three of the four scenarios evaluated project a quota overage within the fishing season in 2010. In all scenarios, the 80% upper confidence limit (UCL) suggests the quota was exceeded on June 30, 2010.

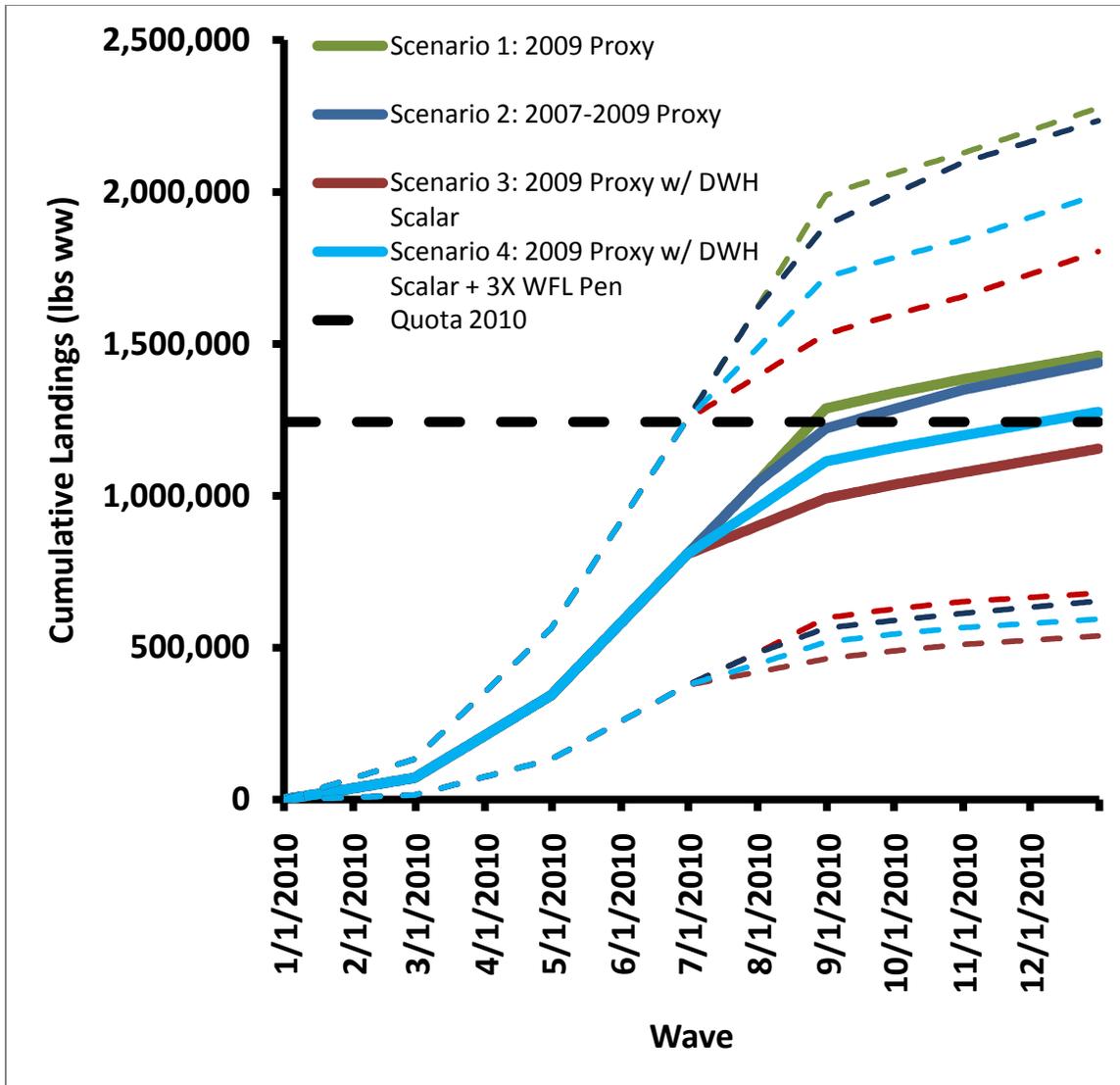


Figure 5. Projected cumulative Gulf greater amberjack recreational landings by scenario (solid lines), with 80% lower and upper confidence limits (dashed lines).

Table 6. Projected quota overage dates by scenario.

RESULTS Method for Jul-Dec	CLOSURE DATE		
	80% LCL	MEAN	80% UCL
2009 Proxy	N/A	8/26/2010	6/30/2010
2007-2009 Proxy	N/A	9/11/2010	6/30/2010
2009 Proxy with (2007-2009) DWH effort by area scalar	N/A	N/A	6/30/2010
2010 Proxy with (2007-2009) DWH effort by area scalar and tripled FL peninsula (up to 100%)	N/A	12/6/2010	6/30/2010

Discussion

As with any modeling approach, the projections presented by this analysis are sensitive to the input data and assumptions. In addition to the uncertainty surrounding the landings estimates, there is uncertainty associated with changes in angler behavior, which are notoriously difficult to predict. Environmental (e.g., hurricanes, rough winters), economic (e.g., increased fuel prices, reduced market demand), and management (e.g., fishery closed areas) forcing factors may result in significant changes in angler behavior, making historical trends poor proxies for future effort. For example, January and February of 2010 were unseasonably cold in the Gulf of Mexico, and MRFSS-reported greater amberjack landings in January-February, 2010 were only 38% of their 2009 January-February levels. However, MRFSS-reported greater amberjack landings in March-April, 2010 were 479% of their 2009 March-April levels, possibly indicating intra-annual effort compensation.

It is unlikely that Scenarios 1 and 2 are reliable representations of the greater amberjack landings rate in 2010, especially during July-August. The fishery closures associated with the DWH/BP oil spill, which at one point (July 16) covered 35% of the Gulf of Mexico Exclusive Economic Zone, have likely had major impacts upon reef fish landings in the Gulf of Mexico. During July 2010, the core geographic area of the recreational greater amberjack harvest (e.g., Florida Panhandle and Louisiana) was essentially closed to fishing. Unless an unprecedented level of effort shifting occurred in both the private and charter angling community, it is unlikely that landings in July-August 2010 will approach their 2009 levels. Charter effort off the Florida Panhandle and Louisiana between July and late August 2010 appears to be reduced to approximately 25% of 2009 levels (NMFS Fisheries Statistics Division, pers. comm., Sept. 1, 2010).

It is reasonable to assume that the reduced landings associated with the DWH/BP oil spill fishery closures will continue at least partially into September 2010. Scenario 4 is the only scenario in which the DWH/BP oil spill and associated fishery closures promotes effort shifting; landings off the Florida peninsula are assumed to be three times 2009 levels in July-August to compensate for closures off the Florida panhandle and other Gulf states. No scenarios were investigated in which landings in July-December 2010 would exceed 2009 levels. There is a possibility that reopening off the Florida panhandle in August 2010 and potential reopening off Louisiana, Alabama, and Mississippi in subsequent months may lead to increased landings relative to 2009 levels if fishermen increase their effort relative to 2009 levels to compensate for time off the water. If fishermen do increase their effort relative to historic levels, the fishery may reach or exceed the adjusted quota sooner than predicted in Scenarios 3 or 4.

Additionally, if average weight of fish landed increases as the population recovers, the fishery may reach the adjusted quota sooner (see Figure 3B). As fishing for greater amberjack requires relatively specialized gears and angling techniques, if targeting of greater amberjack increases due to increased desirability or reduced opportunities to fish for other species, the fishery may reach its quota sooner. Although fishing for greater amberjack is somewhat specialized, they are often caught during trips where red snapper

are caught (SERO-LAPP-2010-03). Reduced landings of red snapper during the June 1 – July 24 recreational fishing season, likely due to fishery closures associated with the DWH/BP oil spill, have prompted a reopening of the Gulf red snapper recreational fishery on October 1, 2010. This reopening may lead to increased encounters with greater amberjack. The interplay of these various dynamics might lead to landings higher than predicted in any of the modeling scenarios. However, it is nearly impossible to quantify at this time what effects these dynamics will have on overall greater amberjack landings. Other, as yet unquantifiable, impacts of the DWH/BP oil spill on greater amberjack stock status, catchability, recruitment, cascading ecosystem and trophic effects, angler behavior, and market dynamics for Gulf seafood products have also not been incorporated in this analysis.

The imprecision associated with landings estimates (in lbs) derived from MRFSS is responsible for the extremely broad confidence limits in Table 8. These confidence limits may slightly underestimate the uncertainty in the projections, as no uncertainty around the HBS and TPWD landings estimates was provided. However, the importance of these other data sources to the total landings (~8%) is minimal relative to MRFSS; therefore, a large percentage of the uncertainty in the estimates for 2010 projected landings is probably captured by this modeling approach.

Historically, Waves 3 and 4 are the largest contributors to the annual greater amberjack recreational harvest, at 35% and 24%, respectively. MRFSS Wave 4 data (e.g., July 1-August 31, 2010) should become available for analysis in mid-October. Using this data and weekly effort estimates from the charter fleet for September and October, a more precise estimate for the quota closure date could be generated. The only scenarios that explicitly considered the impacts of the DWH/BP oil spill and associated fishery closures indicated it was unlikely the adjusted quota would be exceeded prior to mid-October, 2010. NMFS will continue to monitor recreational greater amberjack landings and new quota projections will be conducted upon receipt of July 1-August 31 landings data in mid-October.

Citations

SEDAR 9 SAR-2. 2006. Gulf of Mexico Greater Amberjack. SEDAR, Charleston, SC, 178 p.

SERO-LAPP-2010-02. Projected 2010 Quota Closure Date for Gulf of Mexico Recreational Greater Amberjack. 10 p.

SERO-LAPP-2010-03. Species groupings for ACL/AM management in the Gulf of Mexico reef fish fishery. 89 p.