

Estimated Takes of Loggerhead Sea Turtles in the Vertical Line Component of the Gulf of Mexico Reef Fish Fishery July 2006 through December 2008 Based on Observer and Logbook Data.

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Background

This report estimates total captures of loggerhead sea turtles in the vertical line component of the U.S. Gulf of Mexico (GOM) reef fish fishery from the second half of 2006 through the end of 2008. Fishers engaged in the GOM reef fish fishery use bottom longlines, vertical lines, and fish traps to target a variety of species, including some snappers, groupers, tilefish, jacks, and other assorted species.

The vertical line component includes handline, bandit gear, and rod and reel. The handline is defined as a line with attached hook (s) that is tended directly by hand. The bandit gear is defined as a rod and reel that remains attached to a vessel when in use from which a line and attached hooks are deployed. Rod and reel refers to a rod and reel that is not attached to a vessel or, if attached is readily removable. In the case of both bandit gear and rod and reel, the line is paid out from and retrieved on the reel manually, electrically, or hydraulically.

The SEFSC started placing observers on GOM reef fish fishery vessels in the second half of 2006, and continues to sample the fishery to date. The Galveston Laboratory reef fish observer program (RFOP) is responsible for sampling the GOM reef fish fishery. In addition, the supplementary discard data program (SDDP) collects discard data from self-reported fishermen logbooks. For the purposes of this report, the incidental capture of sea turtles (hereafter “takes”) refers to sea turtles that were incidentally captured during fishing operations. Between them, the two programs observed a total of one sea turtle capture taken in the RFOP for the vertical line component (Table 1) and four captures from the supplementary discard data program (Table 2). Takes of turtles in the bottom longline component of the reef fish fishery has been assessed previously (SEFSC 2007, SEFSC 2008, SEFSC 2009).

This report estimates total loggerhead sea turtle takes, and stratified takes, based on catch per hook-hour (number of lines fished * number of hooks per line * total hours fished) using both bycatch data bases. The observer program capture was assumed to be from representative samples from the RFOP of commercial vessels using combined bandit and handline gears, and was extrapolated using total reported effort. Total reported effort was collected from permitted fishers by the Fisheries Logbook System (FLS) database, at the Southeast Fisheries Science Center (SEFSC). Similarly SDDP data were used to calculate sea turtle CPUE and extrapolated to total effort.

Estimation of the total fishery effort for extrapolation from the observed takes to total estimated takes was constrained by the information consistently and reliably reported in the FLS data. The time spent fishing per set was more variable than the time per trip. For this analysis we used number of hook-hours (number of lines fished*number of hooks per line*total hours fished). The use of sets and hooks as effort variables have been used in longline estimates, the commercial directed shark bottom longline (Richards 2006, SEFSC 2007) and the pelagic longline (e.g. Johnson et al. 1999, Walsh and Garrison 2006) but were inappropriate for our use here because fishing characteristics are different in the vertical line fishery. The use of these effort variables also was constrained by what was considered to be reliably reported to the FLS coastal logbook. Other self-reported effort variables such as soak time, or other gear characteristics are not considered reliable, in part because of temporal changes in reporting requests (e.g. time fished per set vs. per trip), or because some characteristics are set based

¹ Biological Opinion on the continued authorization of reef fish fishing under the Gulf of Mexico (GOM) Reef Fish Fishery Management Plan (RFFMP) and proposed Amendment 23.

rather than trip based (e.g. depth fished per set in observer data vs. average depth fished per trip in reported effort).

All stratified analyses approximately followed the observer program designs. For the purposes of this report, season 1 was defined as Jan 1 thru June 31, and season 2 as July 1 thru December 31, and GOM was spatially divided into east and west strata at 88 degrees W longitude. A similar report was prepared to provide estimates of bycatch in the GOM bottom longline fishery for July 2006-2008 (SEFSC 2009). Unlike the longline reef fishery, sharks are not a target species in the vertical line fishery (Steve Turner, NMFS SEFSC, personal communication).

Fishery Effort: FLS data

Handline catch and fishing effort of commercial vessels operating in the Gulf of Mexico have been monitored by the National Marine Fisheries Service (NMFS) through the Southeast Fisheries Science Center's coastal logbook program (McCarthy, 2006). The program collects data by fishing trip on catch and effort for vessels with permits to fish in a number of fisheries managed by the Gulf of Mexico Fishery Management Council. The Gulf of Mexico coastal logbook program began in 1990 with the objective of a complete census of reef fish fishery permitted vessel activity where a 20% sample of vessels was targeted. Beginning in 1993, the sampling in Florida was increased to require reports from all vessels permitted in the reef fish fishery. These data represent our best estimate of total fishing effort.

For each fishing trip, the logbook database includes a unique trip identifier, the landing date, fishing gear deployed, areas fished (equivalent to NMFS shrimp statistical areas), number of days at sea, number of crew, gear specific fishing effort (for handline: number of lines fished, number of hooks per line and estimated total fishing time), species caught and weight of the landings. Logbook data also contain information on interaction with turtles although these interactions probably are under-reported. When a logbook record contained data for multiple regions (east/west) fished for a single fishing trip, data were split between the regions and each region was given 50% of the effort. Multiple trip entries only comprised 0.2% of the data. Prior to 2001, handline and electric reel (bandit rigs) gears were reported as a single gear type. Data from trips using those gear types were combined in these analyses.

FLS handline data were used to estimate bycatch within the database and used to extrapolate catch rates from the observer database. Handline bycatch rate was calculated in number of turtles per hook-hour. Within the FLS data, catch per unit effort for each trip was calculated as:

$$\text{CPUE} = \text{total number of turtles} / (\text{number of lines fished} * \text{number of hooks per line} * \text{total hours fished})$$

Extrapolated estimates of total takes in this report were based upon self-reported effort from SEFSC FLS. All federally permitted commercial fishers report their activities by individual trip to the FLS without reference to a target fishery. To determine participation in the GOM reef fish fishery from the trip based coastal logbook program, we assumed that effort was a part of the fishery if the fishers reported using bandit or handline gear.

The total bandit and handline effort within the coastal logbook was assumed to represent total fishery effort. Overall there is some level of under-reporting (logbooks forms that are never

submitted to the SEFSC), which we assumed was small, but resulted in a negative bias to our estimates of total takes.

We found that effort (hook-hours) in the vertical line fishery in the western Gulf of Mexico was about 2.0 times that for the eastern Gulf. We found that there were 1-14 reels/set in the water at one time and the number of hooks within a set ranged from 1-330. We found that the number of hooks per reel was found to range from 1 to 45.

Turner (2000) reported that 1-2 hooks was typical of handline fisheries targeting groupers, 10-15 hooks per line might indicate targeting red snapper and 20+ hooks might indicate targeting vermilion snapper. Sixty-seven percent of our trips reported 1-2 hooks per line, about 9% reported 3-9 hooks per line, about 11% reported 10-19 hooks per line and about 11% reported 20-40 hooks per line. Turner (2000) found that the geographic distribution of trips showed that effort with 1-2 hooks occurred throughout the Gulf of Mexico, but was primarily concentrated in the eastern GOM while the 3-9 hook trips were more evenly distributed though fewer in number. We found that 87% of the eastern GOM fished with 1-2 hooks compared to 29% in the western GOM. Hooks per line counts of 10-15 were 7% in eastern GOM and 27% in the western GOM, and hookcounts of >20 were 2% in the eastern GOM and 29% in the western GOM .

There was a total of 4 turtle interactions reported in the logbook data which represent total effort for the Gulf of Mexico (Table 2). All of the interactions occurred in statistical areas 7-11, which ranged from north Florida to Louisiana. Three turtles were taken in the eastern Gulf and one in the western gulf. One was taken in the second half of 2007 and three were taken in first half of 2008. None were taken in the second half of 2006 or 2008 or in the first half of 2007. All were reported to be alive when released.

Observed Effort:

The RFOP program deploys observers on commercial vertical line vessels that target reef fish. We used data from July 2006 through 2008. The RFOP used random sampling in their attempt to achieve a representative sample of the fishery. The RFOP attempts to randomly sample all vessels with reef fish permits stratified by gear type (hand, bandit, longline), season (January – March, April-June, July-September, October – December) and region (east and west GOM). For the RFOP, GOM strata were divided at 88 degrees W longitude by effort in statistical areas 1-8 (east) and 9-21 (west) (http://www.sefsc.noaa.gov/PDFdocs/2009_COASTAL_FISHERIES.pdf). For the sampling of the GOM reef fish fishery, the RFOP essentially randomly samples vessels from the total effort allocated to the directed fishery. The observer program does not sample proportional to fishing effort, so extrapolation to the entire fishery requires the assumption that the sample was representative of total fishing effort either because the random sample of vessels was sufficiently large to capture the variability in reported effort by vessel or that vessels operate in a sufficiently similar way (e.g. similar number of trips per year and hook-hours per trip).

There was a total of one observed take of a loggerhead turtle (*Caretta caretta*) (Table 1) from vertical line gear (bandit) targeting reef fish within the GOM in 197 trips or 265,339 hook-hours. The interaction occurred off of north Florida in statistical zone 8 and is one of the turtles reported in the logbook data. The representative sample is what was used for estimation of take rates and extrapolation to the total fishery effort. Of all the observed representative samples,

0.57% of trips captured turtles. This turtle was entangled on a fishing line (not hooked) and released uninjured. Fifty-five turtles were sighted (not captured- but reported seen) by observers in the eastern GOM and five in the western GOM. The number of turtles sighted by observers per trip (0.00396) was 5.4 times higher in the eastern Gulf of Mexico trips than in the western Gulf (0.0007) suggesting that turtles are more common in the eastern Gulf of Mexico fishing area.

Observed annual vertical line effort in the observer program is shown in Table 4 for trips and hook-hours. Nearly all the effort (all reels) was monitored by observers on boats in the vertical line fishery. This was partly due to the small number of rigs used on the boats (1-14) which enabled observers to keep track of all lines.

The percent of observed effort for the total fishery varied depending upon strata, effort unit, and observer program (Table 5).

Take rate estimation methods

A delta lognormal approach (Pennington 1983) is frequently used to estimate the mean and variance of observations where there is a high frequency of zero catch data. This method combines a binomial model (frequency of occurrence) for the total observations by hook-hour with the average density for the non-zero catch per unit effort (CPUE) data, which are assumed to be lognormally distributed. However, because the average density of non-zero catches was always 1, what we really have is a binomial model based on presence/absence data. Extrapolated takes by the fishery were estimated by the multiplication of catch/effort (hook-hours) from the observer database times the total number of hook-hours from the total fishery from the coastal logbook data. Confidence intervals were calculated using the Wilson's binomial confidence intervals (Wilson 1927). In any case, the extrapolated estimates based upon sparse data sets should not be assumed to be reasonable without potentially invoking large assumptions regarding unobserved events. Although pooling the data across stratifications of season and region might be justified to reduce the sparseness of the data, such pooling may not be appropriate because it would ignore the non-random distribution of the sea turtles incidentally captured, and the potential differential operation of the fishery between areas or seasons.

Extrapolated takes

Extrapolated estimated sea turtle takes are presented in Tables 7 and 10. All information needed to reproduce these estimates is provided in Tables 4 (total effort), 6 and 9 (CPUE): takes, observed effort, and total effort, respectively. Percent coverage of SDDP data that was used to calculate CPUE is in Table 8.

For the period of July 2006-2008, we estimated the total number of interactions of the Gulf of Mexico handline reef fish fishery with loggerhead at 92 when we restrict our estimates to the first half of 2008 for the eastern Gulf of Mexico. We estimated that 81 turtle interactions in the vertical line component of the reef fishery occurred if we estimate catches across years for the eastern Gulf of Mexico or 82 turtles if we extrapolate for the entire Gulf of Mexico effort (across years and regions). No interactions were found in the western Gulf of Mexico even though total fishing effort (hook-hours) is greater.

We estimated total interactions of the vertical handline reef fishery with loggerhead sea turtles

from July 2006-2008 in the entire Gulf of Mexico to be 17.7 based on the SDDP data with 13.2 interactions if we restrict the data to only the eastern GOM and 4.5 in the western Gulf of Mexico. Annual takes for the second half of 2007 were estimated at 5.3 for the eastern GOM and 2.9 for the western GOM. The annual takes for the first half of the year 2008 were estimated at 5.9 loggerhead sea turtles. All other years and seasons were estimated at zero.

Potential bias and unquantified uncertainty in the extrapolated takes

The relatively small number of total observed takes in the reef fish fishery (1 turtle from the RFOP, Table 1), and the lack of observed takes in most strata, contribute to the inaccuracy of the estimates. We could not determine the direction of potential bias due to unobserved strata or sparse data associated with relatively low sampling effort. Relatively low observer coverage (Table 4) coupled with the small magnitude of coverage by the RFOP in a strata with relatively large effort is problematic. To obtain observer effort at an expected take level of 5 sea turtles or more per seasonal strata, based on current observed rates might require an increase in observer effort of at least 6.4 times 2008 seasonal effort in the eastern strata where most turtles were captured, while observer coverage in the western strata may need to be increased over 17.3 times current levels. Increased observer effort may improve estimates but the levels of observation needed to detect turtles with any statistical significance would be astronomical and would exceed the budget allotted to the entire observer program for all fisheries. The number of turtles taken in this fishery are just too few to accurately assess catch rates because they are a rare event.

Overall, we are not confident that our estimated confidence intervals encompass the true take estimate for this fishery. The width of the confidence intervals was large (about 290-460-% of the midpoint estimate for the eastern gulf and 560-580% for the western gulf) which shows little precision in our midpoint estimate and we recommend caution to users of this information.

Users need to be aware that a number of assumptions inherent to the methods used are either untested or probably are violated. The primary point we emphasize is that the estimates provided here are point estimates with large uncertainty.

The reef fish logbook reports record data in a crude manner in that changes in catch and effort within a trip can not be recorded in detail (Turner, 2000). The analysis of catch and effort on a trip basis assumes that all of the fishing occurred as recorded. Certainly some fishing trips use multiple gear configurations, such as different numbers of hooks per handline or bandit rig or fish in multiple areas. Also the logbook data does not permit recording catch and effort by multiple gear configurations within a gear type, such as different numbers of hooks per line. Perhaps of more concern might be geographic changes of fishing effort even within a statistical grid. Vessels probably move among locations within a trip and catch rates may differ between locations. If such changes have occurred in a similar manner throughout the time series analyzed then the standardized indices of abundance may not have been affected; however if such within trip shifts in fishing have changed with changing stock, market or regulatory conditions then the indices of abundance could have been affected.

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Table 1: Observed takes of loggerhead sea turtles in the vertical line component of the reef fish fishery in the Gulf of Mexico. Season 1 is January to June and season 2 is July to December. Data are from the Galveston Laboratory's reef fish observer program (RFOP).

Year	Season	Region	Species	Number	Information
2006	2			0	
2007	1			0	
2007	2			0	
2008	1	East	Loggerhead	1	Turtle was tangled in leader of a bandit reel. Turtle was untangled and released uninjured.
2008	2			0	

Table 2: Reported catches of loggerhead sea turtles by vertical line in the Gulf of Mexico by fishers targeting reef fish. Season 1 is January to June and season 2 is July to December. The self-reported data are from the Southeast Fisheries Science Center’s Fisheries Logbook System (FLS and SDDP)

Year	Season	Region	Species	Number turtles
2006	2			0
2007	1			0
2007	2	East	Loggerhead	1
2008	1	East	Loggerhead	2
2008	1	West	Loggerhead	1
2008	2			0

Table 3(a-b): Reported effort in (a) trips and (b) hook-hours from the Southeast Fisheries Science Center's Fisheries Logbook System (FLS) for fishing vessels that reported using vertical line gear. Season 1 was January through June and season 2 was July through December. GOM is Gulf of Mexico, divided into east and west strata at 88 degrees W longitude. Individual sets are not reported.

3a. Self-reported trips

Year	Season	Eastern GOM	Western GOM
2006	2	2899	2456
2007	1	2820	1001
2007	2	2731	1258
2008	1	3003	1010
2008	2	2445	1133
All years		13,898	6,858
Gulf of Mexico		20,756	

3b Self-reported hook-hours (total effort)

Number of reels x number of hooks/reel x hours fished

Year	Season	Eastern GOM	Western GOM
2006	2	1,149,092	4,456,233
2007	1	848,723	3,398,422
2007	2	1,062,703	3,228,742
2008	1	887,000	2,749,713
2008	2	826,271	3,265,724
All years		4,773,788	17,098,833
Gulf of Mexico		21,872,621	

Table 4. Observed reef fish vertical line effort for the Gulf of Mexico (GOM) in (a) trips and (b) hook-hours from the Galveston Laboratory reef fish observer program (RFOP) by year and season. The Gulf of Mexico is divided into east and west strata at 88 degrees W longitude. Season 1 was January through June, and season 2 was July through December.

4a: Trips

Year	Season	Eastern GOM	Western GOM
2006	2	21	18
2007	1	28	16
2007	2	32	29
2008	1	17	14
2008	2	15	7
All years		113	84
Gulf of Mexico		197	

4b: Hook-hours (Observed effort)

Number of reels x number of hooks/reel x time fished

Year	Season	Eastern GOM	Western GOM
2006	2	6,394	27,977
2007	1	8,953	21,060
2007	2	24,024	68,298
2008	1	9,603	39,171
2008	2	9,754	50,105
All years		58,728	206,611
Gulf of Mexico		265,339	

Table 5. Percent of the total fishery effort observed by the RFOP for reef fish vertical line for Gulf of Mexico (GOM) in (a) trips and (b) hook-hours from Galveston Laboratory's reef fish observer program (RFOP) by year, season, and region divided by total effort from Southeast Fisheries Science Center's Fisheries Logbook System (FLS) for fishing vessels that reported using vertical line gear (from Tables 2 and 3) by respective strata. Season 1 was January through June, and season 2 was July through December. The Gulf of Mexico is divided into east and west strata at 88 degrees W longitude.

5a: Percent Observed Trips

Year	Season	Eastern GOM	Western GOM
2006	2	0.7	0.6
2007	1	0.1	1.4
2007	2	1.0	1.9
2008	1	0.6	1.2
2008	2	0.8	0.7

5b: Percent Observed Hook-hours

Year	Season	Eastern GOM	Western GOM
2006	2	0.3	0.2
2007	1	0.7	0.6
2007	2	1.3	0.5
2008	1	1.0	0.7
2008	2	0.5	0.4

Table 6. Estimated CPUE (numbers per hook-hours) of loggerhead sea turtles in the Gulf of Mexico (GOM) by year and season in the vertical line portion of the reef fish fishery by Galveston Laboratory reef fish observer program (RFOP). The Gulf of Mexico is divided into east and west strata at 88 degrees W longitude. Season 1 was January to June, and season 2 was July to December. Note the 2008 Season 1 estimate for the eastern GOM is based on one observed take of a loggerhead turtle.

YEAR	SEASON	EASTERN GOM	95% CI	CV	WESTERN GOM
2006	2	0.0			0.0
2007	1	0.0			0.0
2007	2	0.0			0.0
2008	1	0.0001041	0.0000183 - 0.000590	1.0	0.0
2008	2	0.0			0.0
Across years by region		0.00001703	0.00000301- 0.0000965	1.0	0.0
Gulf of Mexico		Estimate	95% CI	CV	
		0.000003768	0.000000665-0.0000214	1.0	

Table 7. Extrapolated takes of loggerhead sea turtles in the Gulf of Mexico (GOM) by year and season in the vertical line portion of the reef fish fishery based on the Galveston Laboratory reef fish observer program (RFOP). A). Pooled across strata, B). Summed yearly estimates. The Gulf of Mexico is divided into East and West strata at 88 degrees W longitude. Estimates were determined by multiplying CPUE (Table 6) from observer program times total effort (Table 3b) reported from the Southeast Fisheries Science Center's Fisheries Logbook System (FLS). Season 1 is January to June and season 2 is July to December. Note that the 2008 Season 1 estimate for the eastern GOM is based on one observed take of a loggerhead turtle. The calculations are given below.

A. Pooled

Year	Season	Eastern GOM	LCI	UCI	Calculations	Western GOM
2006	2	0.0				0.0
2007	1	0.0				0.0
2007	2	0.0				0.0
2008	1	92.3	16.3	523.1	=0.0001041 x 887,000	0.0
					LCI=0.000059 x 887,000	
					UCI=0.0000183 x 887,000	
2008	2	0.0				0.0
Across years by region		81.3	14.3	460.5	=0.00001703 x 4,773,788	0.0
					LCI=0.00000301 x 4,773,788	
					UCI=0.0000965 x 4,773,788	
Gulf of Mexico across years						
		Estimate	LCI	UCI	Calculations	
		82.4	14.6	467.0	=0.000000665 x 21,872,621	
					LCI=0.000000665 x 21,872,621	
					UCI=0.0000965 x 21,872,621	

B. Summed yearly estimates

Year	Season	Eastern GOM	LCI	UCI	Calculation	Western GOM	
2006	2	0.0				0.0	
2007	1	0.0				0.0	
2007	2	0.0				0.0	
2008	1	92.3	16.3	523.1	=0.0001041 x 887,000	0.0	
2008	2	0.0				0.0	
Across years by region		92.3	16.3	523.1		0.0	
		Gulf of Mexico across years					
		92.3	16.3	523.1			

Table 8. Supplementary discard data program (SDDP) percent coverage and self-reported discard effort of the vertical line component of the reef fish fishery based on the Southeast Fisheries Science Center's Fisheries Logbook System (FLS). The Gulf of Mexico is divided into east and west strata at 88 degrees W longitude. Coverage estimates were determined by multiplying percent coverage x total hook-hours of effort. Season 1 is January to June and season 2 is July to December.

Year	Season	Percent SDDP effort	SDDP effort Eastern GOM	SDDP effort Western GOM
2006	2	12%	137,891	534,748
2007	1	19%	161,257	645,700
2007	2	19%	201,914	613,461
2008	1	34%	301,580	934,902
2008	2	34%	280,932	1,110,346
All years			1,083,574	3,839,158
Gulf of Mexico			4,922,732	

Table 9. Estimated CPUE (number per hook-hour) of loggerhead sea turtles in the Gulf of Mexico (GOM) by year and season in the vertical line portion of the reef fish fishery Galveston Laboratory reef fish as estimated from supplementary discard data program (SDDP) data reported from Southeast Fisheries Science Center’s Fisheries Logbook System (FLS). The Gulf of Mexico is divided into east and west strata at 88 degrees W longitude. Season 1 is January to June and season 2 is July to December. Note that estimates are based on one to four turtles per strata. NE= not estimatable.

Year	Season	Eastern GOM			Western GOM		
		Point estimate	95% CI	CV	Point estimate	95% CI	CV
2006	2	0.0	-	-	0.0	-	-
2007	1	0.0	-	-	0.0	-	-
2007	2	0.00000495	-0.000000874- 0.0000281	1.0	0.0	-	-
2008	1	0.00000663	0.00000182- 0.0000241	0.71	0.00000277	0.000000189- 0.00000606	1.0
2008	2	0	-	-	0	-	-
Across years by region		0.00000277	0.00000094- 0.00000814	1.0	0.00000026	0.000000046- 0.00000148	1.0
Gulf of Mexico		Point estimate			95% CI		CV
		0.00000020			0.000000036- 0.0000012		1.0

Table 10. Extrapolated takes of loggerhead sea turtles in the Gulf of Mexico (GOM) by year and season in the vertical line portion of the reef fish fishery estimated from supplementary discard data program (SDDP) data from the Southeast Fisheries Science Center's Fisheries Logbook System (FLS). The Gulf of Mexico is divided into east and west strata at 88 degrees W longitude. Estimates were determined by multiplying SDPP cpue (Table 8) times total effort (Table 3b). Season 1 is January to June and season 2 is July to December. Note that estimates are based on one to four observed takes of loggerhead turtles per strata. A) Pooled estimates (data estimated by totals in strata) B). Summed estimates (yearly estimates summed). Lower (LCI) and upper (UCI) confidence intervals were calculated by multiplying CPUE 95% confidence intervals (Table 8) times total effort.

A. Pooled estimates

Year	Season	Eastern GOM point estimate	LCI	UCI	Western GOM point estimate	LCI	UCI
2006	2	0.0	-	-	0.0	-	-
2007	1	0.0	-	-	0.0	-	-
2007	2	5.3	0.9	29.8	0.0	-	-
2008	1	5.9	1.6	21.4	2.9	0.5	16.7
2008	2	0.0	-	-	0.0	-	-
All years		13.2	4.5	38.9	4.5	0.8	25.2
Gulf of Mexico		Point estimate	LCI	UCI			
		4.4	0.8	25.2			

B. Summed yearly estimates

Year	Season	Eastern GOM point estimate	LCI	UCI	Western GOM point estimate	LCI	UCI
2006	2	0.0	-	-	0.0	-	-
2007	1	0.0	-	-	0.0	-	-
2007	2	5.3	0.9	29.8	0.0	-	-
2008	1	5.9	1.6	21.4	2.9	0.5	16.7
2008	2	0.0	-	-	0.0	-	-
All years		11.2	2.5	51.2	2.9	0.5	16.7
Gulf of Mexico		Point estimate					
		14.1	3.0	67.9			