

**Annual Report for 2014  
on the Implementation of the Terms and Conditions of the  
2011 Biological Opinion on the Continued Authorization of Reef Fish Fishing  
under the Gulf of Mexico Reef Fish Management Plan**

**National Marine Fisheries Service  
National Oceanic and Atmospheric Administration  
Southeast Fisheries Science Center**

**For Public Distribution: Confidential Data Have Been Removed**

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## Introduction

The Gulf of Mexico reef fish fishery uses bottom longlines and vertical lines to target snappers, groupers, tilefish, jacks, and other species. The National Marine Fisheries Service (NMFS) began placing observers on Gulf of Mexico reef fish fishery vessels in the second half of 2006 and continues to sample the fishery. On September 30, 2011, a Biological Opinion on the Continued Authorization of Reef Fish Fishing under the Gulf of Mexico Reef Fish Management Plan was completed and the corresponding incidental take statement was issued. This Biological Opinion included several reasonable and prudent measures (RPMs) to minimize the impacts of future takes of sea turtles and smalltooth sawfish by the Gulf reef fish fishery and to monitor levels of incidental take. These RPMs require NMFS to: (1) avoid and minimize take through outreach and education; (2) minimize future gear impacts through research; and (3) monitor the frequency, magnitude, and impact of incidental take. Non-discretionary Terms and Conditions (T&C) are specified for each of these RPMs.

This report satisfies several Terms and Conditions of the 2011 Biological Opinion on the Gulf of Mexico reef fish fishery that NMFS is required to implement. It specifically addresses T&C 1a-c –develop and implement a comprehensive outreach plan to promote that takes be avoided to the extent practicable and that any captured sea turtle or smalltooth sawfish are handled in a way that minimize adverse effects from incidental take and reduces the likelihood of mortality; T&C 3 –conduct or fund projects to characterize the fishery and its interactions with sea turtles and smalltooth sawfish, and potential fishing gear and fishing behavior modifications that reduce adverse impacts from this fishery; T&C 4 – update careful release protocols and modify release gears as new information becomes available; T&C 5 –observe a minimum of 100,000 bottom longline hooks per year; T&C 6 –provide a minimum of 105 sea days per year of observer coverage for the vertical line component of the fishery; T&C 7 – determine and implement the number of trips, sets, and/or hook-hours that must be observed in areas typically fished off southwest Florida and adjacent to where smalltooth sawfish are most common, such as off the Florida Keys to be confident that smalltooth sawfish take is as extremely rare as estimated; T&C’s 8-11 –specify observer data and sample collection and record keeping requirements, review observer data, and provide information on captures<sup>1</sup> and release condition of each bycaught sea turtle in the bottom longline portion of the U.S. Gulf of Mexico reef fish fishery; T&C 13 –progress towards improving quantitative stock assessments of the primary incidentally-caught species; T&C 15 –maintain a database on fishing gear found associated with sea turtle strandings and to share the results with SERO; and T&C 18 –prepare an annual bycatch report including bycatch estimates and CPUEs, a summary of the methods and data used, the distribution of observed and total fishing effort for the bottom longline component of the Gulf reef fish fishery, and every year starting after the 2012 fishing year a total three-year running take estimate for each component of the fishery must be provided.

<sup>1</sup> For the purpose of this report, captures of sea turtles (hereafter “takes”) refers to sea turtles that were incidentally captured during fishing operations.

One significant difference between the 2009 and 2011 Biological Opinions is the establishment of a rarity threshold for sea turtle takes. NMFS determined that the best way to deal with statistical problems caused by the rarity of sea turtle takes per unit effort was to devise a rarity metric which would confirm the rarity of the event in a statistical manner and provide confidence that the overall take in the fishery is below the Incidental Take Statement (and is on track to remain below the three-year Incidental Take Statement). NMFS is confident that the annual take level would not be exceeded if the observed take level is 1 or less per 100,000 hooks; this is the rarity threshold established for sea turtle takes. For any year in which there is a take rate of one or fewer loggerheads per 100,000 hooks, an annual estimated take will not be calculated because the take rate is too low to derive a precise point estimate of take.

To comply with government regulations (*i.e.*, Magnuson-Stevens Fishery Conservation and Management Act - MSFCMA), confidential information has been removed from this Annual Report; therefore, exact reproduction of the estimates provided in the appendix may not be possible.

## **1. RPM 1: Avoiding and Minimizing Take Through Outreach and Education**

### ***1.1. T&C 1 Develop and Implement a Comprehensive Outreach Plan***

The Reef Fish Outreach Plan for the Gulf of Mexico is designed to meet the requirements of the Terms and Conditions of the Biological Opinion by training permitted participants in the reef fish fisheries as well as government officials from both State and Federal Agencies, and non-governmental organizations (NGOs). The required in-person training and education of commercial and recreational fishermen on: (1) identification of sea turtle species, (2) how to use required and recommended sea turtle gear-removal equipment, (3) the “Careful Release and Protocols for Sea Turtle Release with Minimal Injury,” and (4) the importance of maximizing gear removal to maximize post-release survival of sea turtles, and can be conducted through voluntary workshops, fishing club meetings, and/or dockside visits. SEFSC, working with the Gulf of Mexico Fishery Management Council (GMFMC), identifies groups and offers training throughout the region.

#### ***1.1.1. T&C 1a Establishment of a POC to interact with constituents on sea turtle interactions***

The SEFSC’s point of contact (POC), Charles Bergmann, is a member of the SEFSC Harvesting Systems Unit and is assisted by Nick Hopkins. Mr. Bergmann and Mr. Hopkins answer constituent questions about sea turtle release gear and safe handling and release protocols, and actively reach out to fishermen to learn about their experiences, trouble-shoot problems, and share solutions and successful experiences with other fishermen and NMFS scientists and managers.

### ***1.1.2. T&C 1b In-Person Training and Education of Commercial and Recreational Fishermen***

Outreach and training on sea turtle safe handling and release procedures were conducted with commercial and recreational fishers at 14 locations in 2014 around the Gulf region including; Panama City, Madeira Beach, Cortez, Crystal River, and Steinhatchee, FL; South Padre Island, Port Mansfield, Corpus Christi, Port Aransas, Port O'Connor, Freeport, and Galveston, TX; Orange Beach, AL; and DuLac, LA. This effort provided information and training in sea turtle release gear and safe handling methods to approximately 200 individuals, throughout the Gulf of Mexico region. Placards were distributed describing safe handling and release methods as well as the web address for NMFS Technical Memorandum NMFS-SEFSC-580, Careful Release Protocols for Sea Turtle Release with Minimal Injury.

### ***1.1.3. T&C 1c Increased Collaboration and Communication with Federal and State Agency Partners***

Training was conducted with Federal and State Agency partners at 9 of the 14 locations mentioned in 1.2. Partners that attended these events included NOAA Sea Grant, NMFS Southeast Regional Office, National Park Service, and Texas Parks and Wildlife. Additional training was provided to Florida Fish and Wildlife Commission (FWC) marine enforcement officers at the FWC academy in Quincy, FL. Additional training was provided to the U.S. Coast Guard at the USCG Gulf Regional Fisheries Training Center in New Orleans, Louisiana.

## **2. RPM 2: Minimizing Future Gear Impacts through Research**

### ***2.1. T&C 3 NMFS Conducted or Funded Research that Better Characterizes the Fishery and its Interactions with Sea Turtles and Smalltooth Sawfish***

#### ***2.1.1. Hook Timer Project***

In 2010, NMFS conducted a pilot study, Characterization of Target Catch CPUE as a Function of Bait Soak Time in the Gulf of Mexico Bottom Longline Reef Fish Fishery: A Pilot Study to Examine Potential Sea Turtle Mitigation Measures, to investigate the potential of reducing gear soak times as a method for reducing sea turtle interactions and mortality on reef fish bottom longlines. The objective of the fishery-dependent project was to characterize the catch per unit effort of the primary target species as it relates to hook soak time in the Gulf of Mexico reef fish bottom longline fishery.

The initial phase of the hook timer study carried out Sept.–Dec., 2010 found that the duration of typical sets are longer than necessary to effectively catch reef fish. The study results indicate that reduced soak times could reduce bycatch of sharks and possibly sea turtles, and could reduce the mortality of turtles that are caught. Phase I results were presented at a series of industry workshops in August 2011. Fishers suggested exploring seasonal and bait type effects for reef fish bite times in future research. Based on industry feedback, Phase II of the research was conducted January – May 2013. The experimental design was the same as for Phase I, with

the exception of season and alternating bait between sets. The results of Phase II were presented to commercial reef fish fishers through two workshops conducted in Madeira Beach and Cortez, FL in August 2014.

We were unable to detect a seasonal effect or bait effect for how quickly reef fish take the hook between Phase I and Phase II. The research indicates that reducing the soak time of sets in the bottom longline reef fish fishery has the potential to mitigate the impact of the fishery on sharks and sea turtles without affecting the harvest of target catch. **During 2015, researchers plan to conduct an analysis of** bottom longline observer data to determine if the outreach efforts have resulted in the desired effect by reducing the mean soak time of bottom longlines deployed in the fishery.

### ***2.1.1. Video Monitoring Pilot Project***

In partnership with the shrimp trawl industry and Saltwater, Inc., the SEFSC began a pilot study in 2014 to test video monitoring hardware and software to determine the feasibility of developing a cost-effective and reliable system of monitoring primarily smalltooth sawfish and other large bycatch species, inclusive of sea turtle bycatch, release mortality, and other shipboard practices aboard shrimp trawl vessels. Electronic video cameras in conjunction with observers captured imagery for 42 days at sea and 77 tows. No interactions with Smalltooth sawfish were documented.

While this pilot study was conducted in the Gulf of Mexico shrimp fishery and not the reef fish fishery, the technology could be applied to other fisheries. Future recommendations include using a more reliable GPS data collection method, ensuring cameras are clean and aimed away from glare to improve image quality during low light periods, and installing cameras closer to the deck for better images.

### ***2.2. T&C 4 Updates to Careful Release Protocols and Modifications of Release Gears as New Information Becomes Available***

No updates to release protocols or modifications to release gears were made in 2014.

## **3. RPM 3: Monitoring the Frequency, Magnitude, and Impact of Incidental Take**

### ***3.1. Coastal Logbook Data***

Landings and fishing effort of commercial bottom longline vessels operating in the Gulf of Mexico are monitored by NMFS through the coastal logbook program. The program collects catch and effort data by fishing trip for vessels with permits to fish in a number of fisheries managed by the GMFMC. The coastal logbook program began in 1990 with the objective of a census of reef fish fishery permitted vessel activity, with the exception of Florida where a 20% sample of vessels was required to report. Beginning in 1993, the sampling in Florida was increased to require reports from all vessels permitted in the reef fish fishery.

### **3.1.1 Data Collection Methodology**

For each fishing trip the logbook database includes a unique trip identifier, the landing date, fishing gear deployed, areas fished, number of days at sea, gear specific fishing effort (*e.g.*, longline: number of sets, number of hooks per set, length of the longline), species caught, and weight of the landings in pounds. Multiple areas and gears fished may be recorded for a single fishing trip. Data are filtered to remove records with missing effort data, clearly erroneous data (*e.g.*, more than 24 sets/day, longline lengths more than 25 miles), and trips that report fishing in both regions. Since coastal logbook data are trip-based, effort cannot be apportioned among areas when multiple areas are recorded in a single trip. Total effort reported to the coastal logbook program was compiled by the species targeted. Reef fish targeted trips were defined as trips by those vessels that did not have a commercial directed shark permit, or trips by vessels that did have a commercial directed shark permit but landed 2/3 by weight species other than sharks. The data were further stratified by region as defined by the Reef Fish Observer Program: eastern Gulf of Mexico and western Gulf of Mexico. The eastern region included statistical areas 1-10 and the western region included statistical areas 11-21 (Figure 1).

Three measures of effort were summarized for the reef fish fishery: number of trips, number of sets, and total hooks fished. Hook hours fished could not be used as a measure of fishing effort because of inconsistent reporting of the time spent fishing. In some cases, fishers reported hours fished per set, but other fishers reported total hours fished. In many cases, it was not clear which “hours of fishing” had been reported. Additionally, different start and end points are used to measure Average Soak Duration for SBLOP and RFOP. SBLOP calculates it from when the set ends to when the haul begins, whereas RFOP calculates it from when the first buoy is set to when the last buoy is retrieved.

### **3.1.2. Coverage Levels**

All vessels with permits to land federally managed species (other than swordfish and tunas) in the Gulf of Mexico are required to report landings and effort information to the coastal logbook program.

### **3.1.3. Reported Effort**

All reef fish effort (trips, sets, and total hooks fished) for both regions during 2014, as defined in section 3.1.1, reported to the coastal logbook program (less filtered data as defined above) was included in the totals provided in Table 1. Reported effort (trips, sets, and hooks fished) by region, target, and permit type are provided in Table 2.

### **3.1.4. Supplemental Discard Program**

In August 2001, NMFS initiated a program to collect commercial fishing vessel discard data from Gulf of Mexico and US South Atlantic Federally managed commercial fisheries. A reporting form was developed that supplements the existing coastal logbook forms that are mandatory for those fisheries. Discard data from the SEFSC coastal fisheries discard logbook program have

been routinely used to calculate the number discarded fish from commercial fishing vessels. For Gulf of Mexico stocks, however, observer reported discard data have been used for discard calculation (including discards of protected species) rather than the fisher reported discard logbook data. Observer data from the US South Atlantic are few and the discard logbook data are still used to inform stock assessments.

Data collection for the discard logbook program involves, each year, a 20% random sample of vessels with Gulf of Mexico Federal reef fish, snapper-grouper, king mackerel, Spanish mackerel, dolphin/wahoo, and shark permits. To ensure that the sample is representative of vessels with those Federal permits, the universe of permitted vessels is stratified by region and gear fished. A random sample (weighted by fishing effort reported in the previous year) is selected, without replacement, from each stratum. Fishing gear strata include hand line, bandit reel, trolling, bottom longline, trap, gillnet, and diving. The selected fishers are instructed to complete a supplemental discard form for every fishing trip they make. Trips with no discards are reported as such.

Reported data include the numbers of discards by species, estimated condition of the animal when released, reason for release (due to regulations or unmarketable/unwanted), and the fishing area where the animal was discarded. During 2014, protected species interactions with bottom longline vessels in the Gulf of Mexico, as reported to the supplemental discard logbook program, were limited to three seagulls. All three animals were reported dead at release.

### **3.2. Observer Programs**

#### **3.2.1. Background**

The two mandatory SEFSC-based NMFS observer programs in the Gulf of Mexico that monitor the commercial reef fish sector are the Shark Bottom Longline Observer Program (SBLOP) and the Reef Fish Observer Program (RFOP). The SBLOP has been observing the shark-directed bottom longline fishery in the Atlantic Ocean and Gulf of Mexico since 1994 (Hale and Carlson 2007, Hale *et al.* 2007, Morgan *et al.* 2009, Hale *et al.* 2009, Hale *et al.* 2010). Currently 202 U.S. fishers are permitted to target sharks (excluding dogfish) in the Atlantic Ocean and Gulf of Mexico, and an additional 251 fishers are permitted to land sharks incidentally. Amendments to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan, based on updated stock assessments, have eliminated the major directed shark fishery in the U.S. Atlantic and Gulf of Mexico (NMFS 2007). Amendment 22 to the GMFMC's Reef Fish Fishery Management Plan dictates mandatory observer coverage which is accomplished through the RFOP. In July 2006, NMFS, in collaboration with the commercial fishing industry and the GMFMC, implemented a mandatory observer program to characterize the commercial reef fishery operating in the U.S. Gulf of Mexico (Scott-Denton *et al.* 2010, Scott-Denton *et al.* 2011, Scott-Denton and Williams 2013). The fishery consists of approximately 821 federally permitted vessels (SERO, 2013). The primary gears used include bottom longline and vertical lines (bandit reel - electric or hydraulic; and hand lines). Although numerous reef fish species are retained, the predominant targets of these fisheries are groupers and snappers.

### **3.2.2. Data Collection Methodology**

NMFS observers were placed on commercial reef fish vessels operating throughout the Gulf of Mexico based on random selection stratified by season, gear, and region. Seasonal categories (*i.e.*, quarters) for both observer programs were: 1) January – March, 2) April – June, 3) July – September, and 4) October – December. Regions for the purpose of this analysis, for both observer programs, were eastern Gulf (shrimp statistical zones 1-10) and western Gulf (shrimp statistical zones 11-21; Figure 1).

For the SBLOP, vessels possessing valid directed shark and reef fish permits were randomly selected for coverage, with a target coverage level of 4-6% based on previous years effort in the coastal fisheries logbook. Because of the overlap with vessels targeting reef fish and shark within the same trip and vessels possessing directed shark permits (Hale and Carlson 2007), observers boarded trips regardless of the indicated target species. In 2014, a lapse in funding resulted in observer coverage of the shark research fishery only; thus, no trips targeting reef fish were observed by SBLOP in 2014. This did not affect our ability to meet the target coverage level for the entire fishery.

In the RFOP, proportional sampling effort, based on coastal logbook data, among seasons and gears in the eastern and western Gulf of Mexico for all vessels with federal reef fish permits was recommended by NMFS in 2006, and used thereafter for vessel selection stratification purposes. In 2009, through Catch Shares funding, additional observer coverage was directed toward the reef fish fishery in the eastern Gulf of Mexico to monitor protected species. This increased coverage alternates between gear types (bottom longline for two years and vertical line for one year). In 2014, increased coverage was directed toward the bottom longline fishery although at a reduced level due to funding. Collectively in 2014, the primary gear types assessed included bottom longline and vertical line (bandit reel and hand line). Mandatory observer coverage for the reef fish fishery is currently approximately 3% of the total sea days reported in 2014 coastal logbook data.

For both programs, selection letters requiring observer coverage were issued to the permit holder via U.S. Certified Mail approximately one to two months prior to the upcoming fishing season. Once the permit holder received the selection letter, he or she was required to make contact with the observer coordinator and indicate intent to fish during the upcoming fishing season. If the permit holder intended to fish, the observer coordinator deployed an observer to the port of departure. Vessels were required to have a current Commercial Fishing Vessel Safety Examination decal prior to the selection period for mandatory observer coverage.

Trip, set/haul, gear and fishing characteristics by program for the 2014 commercial reef fish season are depicted (Table 3). Effort by region (Table 4) and by region and season (Table 5) are given. Sea days and percent coverage levels are depicted in Table 6. Protected resources interactions are shown in Table 7.

### ***3.2.3. T&C 5 Bottom Longline Component of the Gulf Reef Fish Fishery***

The SBLOP did not observe any trips targeting reef fish in 2014; however, 94 trips targeting sharks were observed in 2014.

The RFOP observed 615,682 hooks (858 sets on 27 trips; Table 3) targeting shallow-water reef fish (mainly red grouper) or deepwater grouper/tilefish (mainly yellowedge grouper and tilefish) using bottom longline gear in the Gulf of Mexico in 2014 – the Biological Opinion requires observation of a minimum of 100,000 bottom longline hooks per year . The length of the mainline for this gear ranged from 0.9 to 22.2 km with an average of 7.7 km. The bottom depth fished ranged from 35.4 to 369.4 m with an average of 83.3 m. Hooks set ranged from 147 to 2,126 hooks with an average of 718 hooks fished. Circle hooks were deployed on all sets with size 13/0 the dominant (50.3%). The average soak duration (the time from when the first buoy entered the water until the last buoy was hauled back) was 4.0 hr. No sea turtle, marine mammal, or sea bird interactions were documented in the bottom longline component of the Gulf of Mexico reef fish fishery in 2014 (Table 7).

### ***3.2.4. T&C 6 Vertical Line Component of the Gulf Reef Fish Fishery***

The RFOP observed 467.8 sea days (4,321 sets during 109 trips; Table 3) targeting shallow-water reef fish, mainly red grouper and snapper in the Gulf of Mexico in 2014 – the Biological Opinion requires a minimum of 105 sea days per year of observer coverage for the vertical line component of the fishery. The bottom depth fished ranged from 3.9 to 1,475.5 m with an average of 48.7 m, and the number of hooks ranged from 1 to 204 hooks with an average of 22 hooks fished. Circle hooks were deployed on most (98.5%) sets with size 9/0 the dominant (29.8%). The average soak duration was 0.5 hr. One loggerhead sea turtle interaction and no sea bird interactions were documented in the vertical line component of the Gulf reef fish fishery in 2014. Table 8 provides a summary of takes, gear characteristics, capture and release conditions, and final disposition of sea turtles documented by the observer program.

### ***3.2.5. Modified Buoy Gear of the Gulf Reef Fish Fishery***

While not specifically addressed in the T&Cs of the 2011 Biological Opinion, modified buoy gear has been used in the Gulf reef fish fishery in recent years. The RFOP did not observe any trips on vessels using modified buoy gear in 2014.

### ***3.2.6. T&C 7 Determine and Implement the Number of Trips, Sets, and/or Hook-Hours that Must be Observed to be Confident that Smalltooth Sawfish Take is as Extremely Rare as Estimated***

NOAA Fisheries observers have never documented a Smalltooth sawfish take in the GOM reef fish fishery, so there are no data with which to calculate the number of trips, sets, and/or hook-hours that must be observed to be confident that Smalltooth Sawfish take is as extremely rare as estimated. We interpret the lack of observed takes as support for the description of Smalltooth Sawfish takes as extremely rare.

### ***3.2.7. T&Cs 8, 9, 10, 11 Documentation of Protected Species Interactions***

Observers record information on the SEFSC sea turtle life history form or collect specified data for smalltooth sawfish, take photographs, and when possible, tag animals prior to release (T&C 8). In 2014, the bycaught sea turtle was not landed, so no tags were applied and tissue was not obtained for genetic analysis.

Observers collect data pertaining to vessel, gear, location, and biological information. For each set (the location of gear placement at a defined time), the type, number and construction material of the fishing gear were recorded (T&C 10). Latitude, longitude, depth, and environmental parameters including sea state and bottom type were recorded at the start of each set. The total time the gear remained in the water (soak or fishing time) was calculated. Fishery data were obtained from each set. Discarded and retained species were processed, recording length, weight, and condition when brought onboard, and if necessary, condition at release. Sightings or capture of sea turtles and other protected species were recorded in accordance with NMFS protocol (NMFS 2008), SEFSC observer program staff are notified when takes occur, and SERO is notified no later than 3 days after the conclusion of each trip (T&C 11).

### ***3.3. T&C 13 Improvements in Quantitative Stock Assessment***

NMFS has made progress towards the goal of improved quantitative stock assessment. We are developing a variety of quantitative assessment tools to evaluate the risks and benefits associated with various impact assessment approaches. This process will enable identification of the most sensitive assessment parameters, which can be useful when prioritizing research and data collection efforts.

### ***3.4. T&C 15, 16 Fishing Gear Found Associated with Stranded Sea Turtles***

STSSN participants collect fishing gear associated with stranded sea turtles and send it to Mr. Charles Bergmann (SEFSC) for identification. The “Fishing Gear Database” for the Gulf of Mexico and SE U.S. (Texas-North Carolina) is maintained and updated quarterly by staff at the SEFSC Pascagoula Laboratory. In 2014, 203 sea turtle strandings and incidental captures (200 in the Gulf of Mexico, 3 in the Atlantic) were reported with associated fishing gear. It is important to note that quarterly updates may not include all gear found in the previous quarter since there is a time lag for individual states submission of gear/data. A copy of the database including all 2014 data to date was submitted to SERO on April 9, 2015.

### ***3.5. T&C 18 Annual Bycatch Report***

One sea turtle was observed taken in the randomly sampled portion of the vertical line component of the Gulf of Mexico reef fish fishery in 2014. No sea turtles were captured in the bottom longline component of the fishery. No sawfish, sea birds, or marine mammals were observed as bycatch in the Gulf of Mexico reef fish fishery in 2014. Like sea turtle takes, the frequency of these events is rare. Three-year running sea turtle take estimates are provided in Appendix A.

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- Walters, C. 2003. Folly and fantasy in the analysis of spatial catch rate data. *Canadian Journal of Fisheries and Aquatic Science*, 60: 1433-1436.

Figure 1. Map of shrimp fishery statistical zones in the Gulf of Mexico.

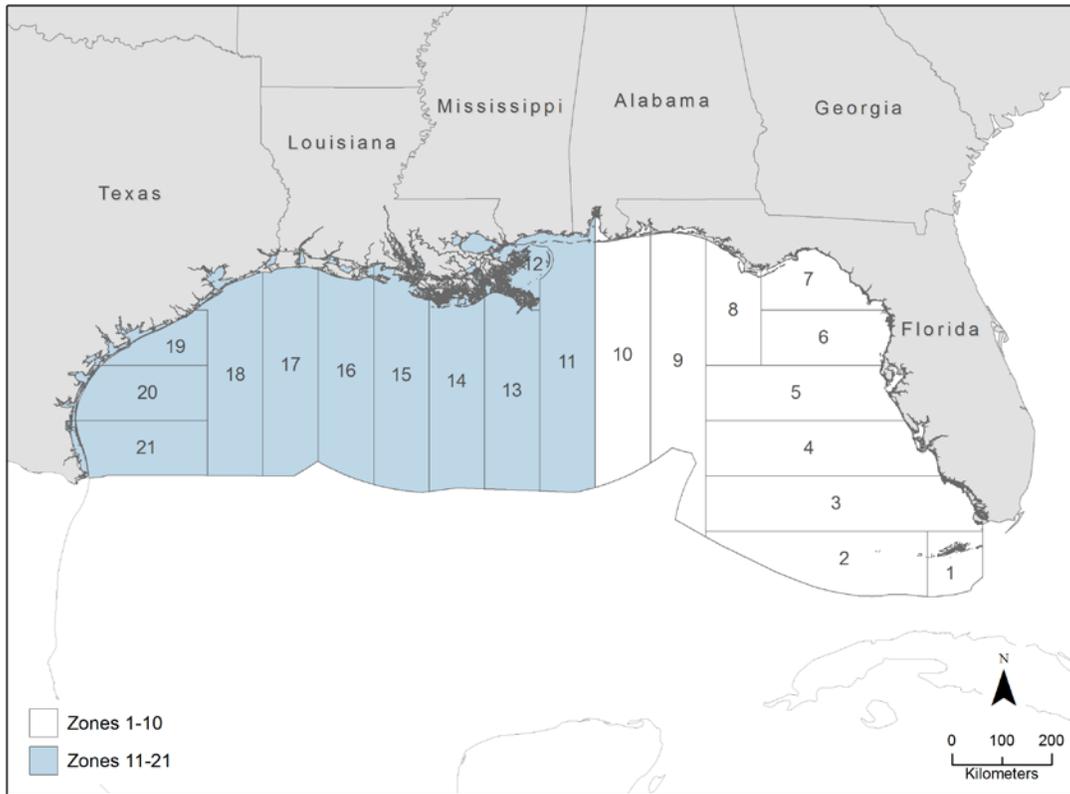


Table 1. Effort by region (combined statistical zones, East = 1-10, West = 11-21) reported to the coastal logbook program during 2014. Non-confidential data only

Effort Measure	Eastern Gulf	Western Gulf
Number of trips	723	593
Number of sets	20,771	2,474
Total hooks fished	15,555,925	2,154,599

Table 2. Detailed effort reported to the coastal logbook program during 2014 including all effort, subdivided by target group (as defined in section 3.1.1).

Region	Target <sup>1</sup>	Permit <sup>2</sup>	Trips	Sets	Total hooks
Eastern Gulf	reef fish	0	454	14,145	10,558,585
Eastern Gulf	reef fish	1	221	6,546	4,970,880
Eastern Gulf	shark	1	48	80	26,460
Eastern Gulf	mixed	1	NR	NR	NR
Western Gulf	reef fish	0	40	1,876	2,041,700
Western Gulf	reef fish	1	*	*	*
Western Gulf	shark	0	*	*	*
Western Gulf	shark	1	553	598	112,899
Western Gulf	mixed	1	NR	NR	NR

<sup>1</sup>reef fish – trips by vessels that did not have a commercial directed shark permit and trips by vessels that did have a commercial directed shark permit but landed 2/3 by weight species other than sharks;

shark – trips by vessels with directed shark permits that landed 2/3, by weight, sharks of any species;

mixed – trips by vessels with directed shark permits that did not land a 2/3 majority of either shark or reef fish species

<sup>2</sup> 0 – vessels without directed shark permits, 1 – vessels with directed shark permits

\* Data not presented due to data confidentiality requirements

NR – no reports to coastal logbook program

Table 3. Trip, set, and gear characteristics for all sets targeting reef fish species in the Gulf of Mexico in 2014 observed by the Reef Fish Observer Program.

	Bottom Longline	Vertical Line
Number of Trips	27 <sup>2</sup>	109
Trip Length (days)	5 – 22 ( $\bar{x}$ = 14.1)	1 – 15 ( $\bar{x}$ = 5.5)
Number of Vessels	25	85
Total Sets	858	4,321
Sea Days	356	467.8
Bottom Depth (m)	35.4 – 369.4 ( $\bar{x}$ =83.3)	3.9 – 1,475.5 ( $\bar{x}$ =48.7)
Mainline Length (km)	0.9 – 22.2 ( $\bar{x}$ = 7.7)	-
Mainline Material	Cable (67.8%) Monofilament (32.2%)	Monofilament (86.6%) Cable (10.9%) Other (2.5%) Nylon (0.1%)
Mainline Test (lbs)	500 – 2,500 ( $\bar{x}$ = 1,266)	12 – 1,000 ( $\bar{x}$ = 196.5)
Gangion Length (ft)	1.7 – 10.5 ( $\bar{x}$ = 5.9)	-
Gangion Material	Monofilament (100%)	-
Distance Between Hooks (ft)	8.0 – 50.0 ( $\bar{x}$ = 22.9)	-
Rod Mount	-	Fixed (70.2%) Portable (29.8%)
Reel Type	-	Electric (59.4%) Hand (27.8%) Hydraulic (12.8%)
Number of Hooks/Set	147 – 2,126 ( $\bar{x}$ = 718)	1 – 204 ( $\bar{x}$ = 22)
Hook Brand	Mustad (82.8%) Eagle Claw (17.2%)	Mustad (90.7%) Eagle claw (3.3%) NR (1.8%) Gamakatsu (1.1%) Daemon (1.0%) Viking Gulfstar (0.7%) Youvella (0.6%) Other (0.5%) Laser Sharp (0.1%) VMC (0.1%)
Hook Shape	Circle (100%)	Circle (98.5%) J-Hook (0.7%) Double Circle (0.3%) Double J-Hook (0.3%) Lure/J-Hook (0.2%)
Hook Offset	Straight (71.9%) Offset (28.1%) - 10° (83.9%) - 5° (16.1%) -	Straight (89.6%) Offset (10.4%) - 5° (46.8%) - 10° (49.3%) - 25° (3.2%) - NR (<1%)
Hook Size	13/0 (50.3%) 14/0 (29.8%) 15/0 (10.3%) 12/0 (3.3%) 11/0 (3.2%) 8/0 (3.2%)	9/0 (29.8%) 8/0 (29.0%) 13/0 (10.0%) 10/0 (8.1%) 4/0 (6.5%) 3/0 (5.1%) 11/0 (3.4%) 14/0 (3.3%) 12/0 (2.2%) Other (< 1%)
Total Hooks Set	615,682	92,918
Avg Soak Duration in hrs <sup>1</sup>	1.2– 16.3 ( $\bar{x}$ = 4.0)	<0.1 – 12.6 ( $\bar{x}$ = 0.5)
Total Hours Fished (sets)	3,412.6 (858)	2,168.8 (4,318)
Total Hook Hours	2,630,216.0	66,528.5

<sup>1</sup> Different start and end points are used to measure Average Soak Duration for SBLOP and RFOP. SBLOP calculates it from when the set ends to when the haul begins, whereas RFOP calculates it from when the first buoy is set to when the last buoy is retrieved.

<sup>2</sup> Includes one unsampled trip.

NR – not recorded by observer

Table 4. Effort by region for all observed sets targeting reef fish species in the Gulf of Mexico Reef Fish Observer Program for 2014.

	Bottom Longline	Vertical Line
<b>Eastern Gulf</b>		
n	832	3,900 <sup>2</sup>
Hooks Set	585,258 <sup>1</sup>	67,539
Hours	3,207.0	1,740.8 <sup>3</sup>
<b>Western Gulf</b>		
n	*	421
Hooks Set	*	25,379
Hours	*	428.0

<sup>1</sup> Hooks set was not reported for 1 sets.

<sup>2</sup> Location was inferred for one set based on other sets in trip.

<sup>3</sup> Hours was not reported for 3 sets.

\* Data not displayed due to confidentiality.

Table 5. Observed reef fish effort (trips, sets, and hooks) for the Gulf of Mexico from the Reef Fish Observer Program by region, gear type, and season for 2014. Data were aggregated into two seasons (1 – January-June and 2 – July-December).

	Season	Eastern Gulf		Western Gulf	
		Bottom Longline	Vertical Line	Bottom Longline	Vertical Line
TRIPS	1	18.0	43.1	*	10.9
	2	8.0	40.7	*	14.3
SETS	1	537	1,921	*	176
	2	295	1,979 <sup>2</sup>	*	245
HOOKS	1	369,145 <sup>1</sup>	27,938	*	8,384
	2	216,113	39,601	*	16,995

<sup>1</sup> Hooks set was not reported for 1 sets.

<sup>2</sup> Hours was not reported for 3 sets. Location was inferred for one set based on other sets in trip.

\* Data not displayed due to confidentiality

Table 6. Number of sea days for all gear types for Observer Program sets and industry in the Gulf of Mexico in 2014.

Gear Type	RFOP	Industry	Percent Coverage
Bottom Longline	356	7,775	4.6%
Vertical Line	467.8	22,646	2.1%
Total	823.8	30,421	2.7%

Table 7. Observed protected species interactions for sets targeting reef fish species in the Gulf of Mexico in 2014.

	Bottom Longline	Vertical Line
Sea Turtles	0	1
Marine Mammals	0	0
Sea Birds	0	0

Table 8. Summary of sea turtle takes observed in the Gulf of Mexico reef fish fishery in 2014. Seasons = 1 – Jan-Mar, 2 – Apr-Jun, 3 – Jul-Sep, 4 – Oct-Dec.

	Turtle 1
Species	Loggerhead
Observer Program	RFOP
Gear	Vertical Line (Bandit Reel)
Season	4
Depth (ft)	97
Number of Hooks	2 (For this set)
Hook Type	Circle
Hook Size	14/0
Offset (°)	10
Bait	Herring
Capture Condition	Alive, injured
Final Disposition	Released alive
Hook Location	Unknown
Hook Removed	No
Entangled Capture	No
Entangled Released	No
Line Left (ft)	2.0
Estimated Carapace Length (ft)	2.0
Curved Carapace Length (cm)	-
Injury Category Row	IV
Release Condition Column	B

**Injury Category Row:**

IV: unknown hook location

**Release Condition Column:**

B: released with hook or with hook and with trailing line  $\geq$  half the length of the carapace

## Appendix A

### Extrapolated Total Takes of Loggerhead Sea Turtles in the Eastern Gulf of Mexico in the Bottom Longline and Vertical Line Portions of the Reef Fish Fishery.

T&C 18 specifies that the Annual Report on the Implementation of the Terms and Conditions of the 2009 Biological Opinion for the Gulf of Mexico Reef Fish Fishery include bycatch and catch per unit effort (CPUE) estimates for periods in which the take level for the bottom longline component was high enough to exceed the rarity threshold. The take level did not exceed the rarity threshold, 1 take per 100,000 hooks for the bottom longline component. Extrapolations of bycatch estimates using methods employed in previous reports were conducted for the vertical line component (Table A1), and as stated in the 2009 report, these 2014 extrapolated estimates are based upon sparse data sets (*i.e.*, one or two sea turtle takes) and should not be assumed to be reasonable without potentially invoking large assumptions regarding unobserved events. The RFOP sampled the entire bottom longline fishery and the SBLOP sampled the portion of the fishery that also had directed shark permits, therefore relative weightings usually were needed (in prior years) to produce a bycatch estimate for the entire fishery, but were not possible for this estimate because no samples were observed by the SBLOP in 2013 and 2014. Weightings would be determined by approximated logbook effort (in sets) by the proportion of the fishery that either the RFOP or the SBLOP were presumed to have selected from. For 2013 and 2014, it was not possible to assign estimated relative weightings, therefore the RFOP based estimate is all that is presented and is assumed to represent an appropriate sample of the entire bottom longline portion of the Reef Fish fishery.

Table A1. Extrapolated total takes and catch per unit effort (CPUE, in takes per hooks-hour) of loggerhead sea turtles in the Eastern Gulf of Mexico Vertical line component of the reef fish fishery based on observations by the Reef Fish Observer Program for 2014. Total logbook reported effort for the vertical line component in 2014 was 7,990,847 hook-hours.

Observer Program	CPUE (hook-hours)	Takes	95% CI	CV
RFOP	0.000015	120.1	21.2 – 680.4	0.99

The 2011 Biological Opinion of the Gulf of Mexico reef fish fishery requires SEFSC to produce a three-year running sea turtle take estimate for each component of the fishery every year starting after 2012. The number of observed takes did not exceed the rarity threshold (1 take per 100,000 hooks) in any year from 2009 through 2014 for the bottom longline component of the fishery, so no estimates of take were required. However, since take estimates were computed and presented in the 2012 and 2013 reports, they have been consolidated and presented below.

Year	Observer Program	Estimated Takes*	95% CI	CV
2012	SBLOP, RFOP	12.5	2.3 – 68.6	1.06
2013	RFOP	11.9	3.4 - 41.4	0.70
2014	RFOP	0		
Three-year running total		24.4		

\* Weighted sum of Stratified Estimates (2011, 2012); Extrapolated Takes (2013)

The three-year running sea turtle take estimate for the vertical line component of the fishery is presented below. Observed sea turtle takes in the vertical line component of the Gulf of Mexico reef fish fishery occurred only in 2012 (2 turtles) and 2014 (1 turtle) for the years 2012 through 2014.

Year	Observer Program	Estimated Takes	95% CI	CV
2012	RFOP	81.2	22.3 – 296.1	0.71
2013	RFOP	0		
2014	RFOP	120.1	21.2 – 680.4	0.99
Three-year running total		201.3		

The three-year running sea turtle take estimate for all components of the fishery was 225.7, far below the total take statement for the Reef fish fishery. We want to emphasize that the extrapolated takes in this report are based on very few observed turtle takes (one or two turtles in any given year), and they are highly uncertain.