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Length Distribution and Release Discard Mortality for Southeastern Yellowtail Snapper

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Introduction

The Southeast Fisheries Science Center (SEFSC) manages the commercial Reef Fish Observer Program (RFOP) and Shark Observer Program (SOP). These two datasets were used to compile length compositions and information on immediate release mortality for yellowtail snapper. The RFOP was implemented as a mandatory program for the Gulf of Mexico commercial fishery in July 2006. Primary gears observed in this program are bottom longline and vertical line (bandit or handline). For bottom longline, the observer program covers about 4 percent of the commercial vessels in the Gulf of Mexico. The vertical line fishery has about 2 percent coverage. The shark observer program became mandatory in January 2002 in both the South Atlantic and Gulf of Mexico for bottom longline vessels that hold shark permits. The SOP database also includes voluntary observer data of the snapper-grouper vertical line fishery from North Carolina to Key West. The vertical line observer data was collected in six non-consecutive years from 2010 to present for 31 vessels.

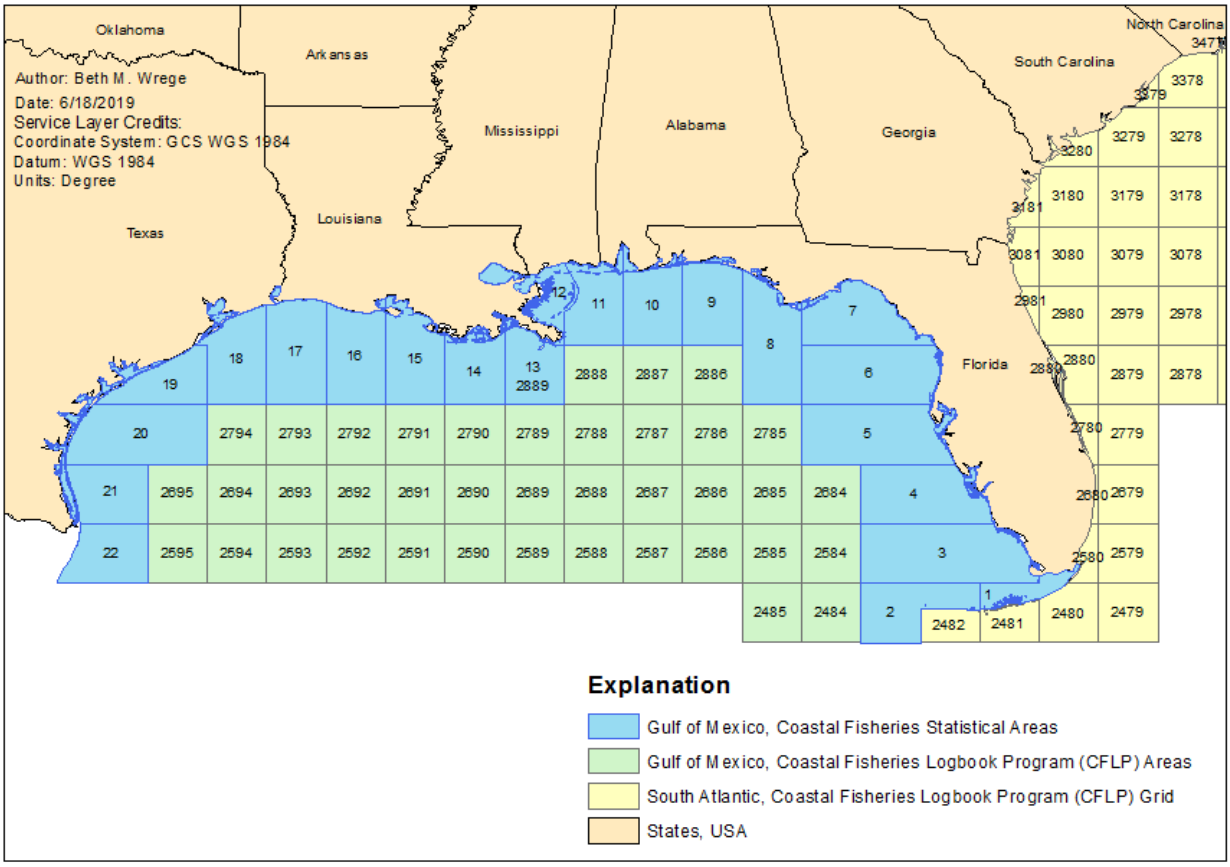
Methods

Data were obtained from both the Reef Fish Observer Program and Shark Observer Program databases. The RFOP and SOP data roughly track the Coastal Fisheries Statistical Areas and Coastal Logbook Program grids which will be used to describe coverage and designate regions (Figure 1). RFOP data included for this analysis are statistical areas 1 and 2 to represent the Florida Keys and grids 3 and 4 to represent the Gulf of Mexico. SOP data in the Florida Keys were only available for statistical area 2.

At sea observers provide information on the condition of a fish when hauled onboard a vessel (alive, dead, barotrauma), disposition (kept, discarded dead, discarded alive, etc.) and length of yellowtail snapper. Lengths were converted to both fork length (cm) and total length (cm) and rounded down to 1 cm bins. Data on both the condition of the fish when initially brought onboard and disposition were used to assess release mortality. Immediate (upon

release) discard mortality was estimated by depth of capture (5 meter depth bins) as the number of observed dead discards divided by the total discards.

Figure 1. Southeast map of data coverage.



Results and Discussion

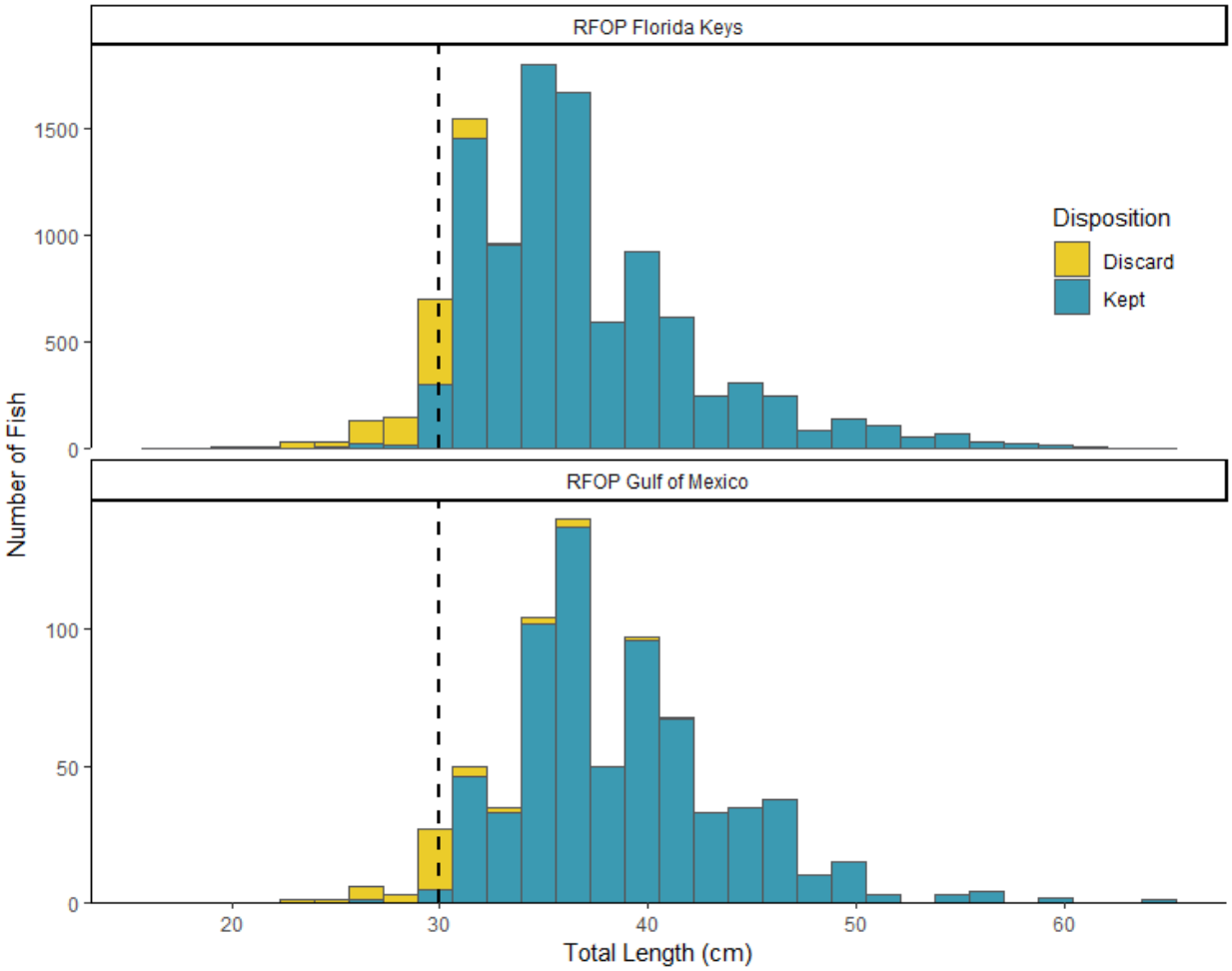
The observer data was categorized by data source, region, and gear. Table 1 summarizes the number of observations available to determine adequate sample size and coverage. Bottom longline trips caught few yellowtail snapper and therefore not included in additional results. Based on Table 1, length distribution plots were created for vertical line trips where data were sufficient (RFOP Florida Keys and RFOP Gulf of Mexico). Due to confidentiality, data from the shark observer program were insufficient to report. Figure 2 shows the distribution of total lengths (cm) of yellowtail snapper for the Florida Keys and Gulf of Mexico by disposition. The reef fish observer data provides length data for 10,461 yellowtail snapper caught within the Florida Keys. This was observed among 44 trips from 2008 to 2017. The mean total length was 36.7 cm. Most discarded fish were released because their total length was less than the minimum size limit (indicated by the dashed line in Figure 2).

Table 1. Data available by gear and region for Reef Fish and Shark Observer data. GoM abbreviates Gulf of Mexico.

Data Source and Gear Type	Region	Total Trips	Trips with Observed Yellowtail Snapper	Number of Yellowtail Snapper Observed*	Years Data Available for Observed Yellowtail Snapper
RFOP Vertical Line	GoM	170	37	756	2008-2017
	Florida Keys	71	44	11,093	2008-2017
RFOP Longline	GoM	217	31	79	2009 - 2017
	Florida Keys	38	9	47	2006 - 2017
SOP Longline	GoM	53	3	7	2007- 2012

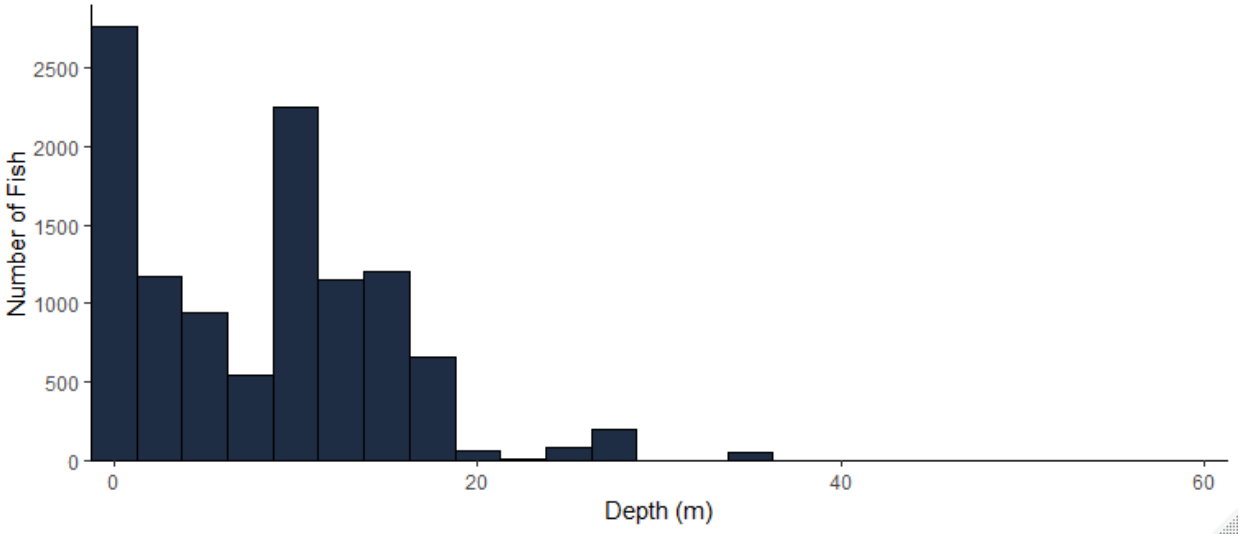
* Number including both kept and discarded fish.

Figure 2. Total length distribution of yellowtail snapper observed during commercial vertical line fishing trips. Separate plots represent the RFOP Florida Keys and RFOP Gulf of Mexico. The vertical dashed lines indicate the minimum size limit. Note different y-axis scales among plots.



Since the Florida Keys is considered a core area, subsequent analyses will only include this region. For the vertical line trips, observers collect the fishing depth and bottom water depth at each location. Where fishing depth was not available for 0.01% of observations, water depth was used as a proxy. Mean fishing depth was 8.1 m with 43% of the fish caught less than 5 meters from the surface. Figure 3 shows the distribution of number of fish caught at depth. This was used to determine depth bins for assessing release discard mortality.

Figure 3. Fishing depth of RFOP vertical line for the Florida Keys.



Percent release discard mortality by depth was calculated based on the discard disposition of the fish (released alive or released dead). No information was available in the observer data set to calculate delayed mortality. Table 2 shows release mortality was highest at the shallow and deep depth bins. Fish caught between 6 to 20 meters experienced the lowest release mortality. The onboard condition (alive, dead, or barotrauma) refers to the initial condition of a fish when it was brought onboard the vessel. Figure 4 illustrates that most fish released dead were initially alive (with no barotrauma) when brought onto the vessel. This indicates delayed release due to extended observer handling times before being discarded. Therefore, the high discard mortality at depth less than 5 meters may be an overestimate and not reflect commercial fishing practices.

Table 2. Release Discard Mortality for the Florida Keys.

Fishing Depth (m)	Number of Discarded Fish	% Total Discards	Number Released Alive (%)	Number Released Dead (%)
< 5 m	330	38%	274 (83%)	56 (17%)
6 – 10 m	219	25%	203 (92.7%)	16 (7.3%)
11 – 15 m	202	25%	192 (95%)	10 (5%)
16 – 20 m	110	13%	98 (89.1%)	12 (10.9%)
> 20 m	18	2%	14 (77.8%)	4 (22.2%)
Total	879		781 (88.9%)	98 (11.1%)

Figure 4. Discarded yellowtail snapper by depth and onboard condition. Condition of the fish when hauled onto a vessel was collapsed to alive or experiencing some form of barotrauma (i.e. protruding swim bladder or bulging eyes).