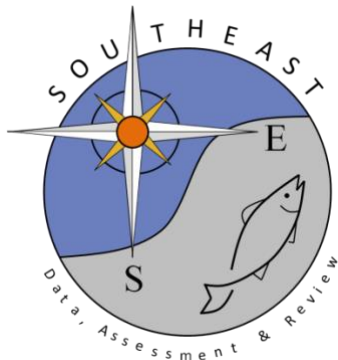


Electronic Monitoring Documentation of Mutton Snapper (*Lutjanus analis*) in the Eastern Gulf of Mexico Bottom Longline Fishery

Max Lee, Genevieve Patrick, Carole Neidig, and Ryan Schloesser

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## **Overview of Electronic Monitoring Efforts in the Gulf of Mexico Commercial Bottom Longline Reef Fish Fishery**

The Center for Fisheries Electronic Monitoring at Mote (CFEMM) has been pioneering electronic monitoring (EM) in the Gulf of Mexico (GoM) commercial reef fish fishery since 2016, utilizing Saltwater Inc. hardware and software. Industry volunteer participation has included collaborations with 22 commercial bottom longline (BLL) and vertical line vessels. Data reported below, including for mutton snapper (*Lutjanus analis*), was generated by 13 Eastern Gulf of Mexico (EGoM) BLL vessels fishing out of ports along Florida's west coast from Cortez, FL to Redington Shores, FL from July 2016 to October 2021.

- Mutton Snapper Recorded = 751
- Total Catch Events Recorded = 76,672
- Trips = 279
- Hauls Reviewed = 1,684 (Represents 25% of all potentially analyzable set-haul events)
- Sea Days = 2,602
- Unique species/species groupings annotated = 127

### **Video Review Protocol**

Saltwater Inc. (SI) (Anchorage, AK) Electronic Monitoring Unit hard drives from participating vessels are collected during dockside visits or mailed by the respective captains or vessel owners. These drives are loaded to workstations, where SI review software is used to annotate the collected video footage. Sets and hauls are marked along a timeline by reading associated sensor data (hydraulic pressure and rotation). Subsamples of 25% of complete set/haul events from each trip are reviewed. Each recorded catch event is assigned characteristics based on a series of dropdown menus for the reviewer to select from. These variables include:

- **Species**
- **Handling**
  - Brought onboard,
  - Not handled (dropped off),
  - Cutoff at rail (no entanglement),
  - Cutoff at rail (entanglement), or
  - Unknown handling.
- **Condition**
  - Live healthy,
  - Live stomach and/or eyes protruding,
  - Live damaged,
  - Dead on arrival damaged,
  - Dead on arrival undamaged, and

- Unknown condition.
- **Fate**
  - Retained,
  - Retained as bait,
  - Discarded live healthy (vented),
  - Discarded live healthy (not vented),
  - Discarded live damaged (not vented),
  - Discarded live damaged (vented),
  - Discarded dead,
  - Discarded unknown, and
  - Unknown fate.
- **Shark Specific Attributes**
  - Sex - Male/Female
  - Maturity - Juvenile/Known Adult
  - Size Estimate - Small (>1m), Medium (1.1 to 2.9m), and Large (>3m)

### **Post-Review Processing**

Resulting data navigates a CFEMM established QA/QC process where all annotated events and sensor data anomalies are reviewed by experienced staff to screen for identification errors or missing catch. Aggregated groupings of trips are further screened using “R”, applying a series of over 50 error checks to flag any abnormalities. Once approved, final data is appended to the master database in Access™. For reporting purposes, additional automatic calculations and environmental metadata are linked to the Access™ database through an export routine in “R”, allowing for key variables to be associated to catch events such as depth, average temperature, and bottom type, with over 200 variables recorded.

### **Overview of Mutton Snapper (*Lutjanus analis*) Occurrence in the EGoM BLL Fishery**

The EGoM BLL fishery primarily targets red grouper, red snapper, and yellowedge grouper across the West Florida Shelf from offshore Appalachicola, FL to the Dry Tortugas. The CFEMM documented 751 captures of mutton snapper on EGoM BLL gear targeting reef fish, from 1,684 reviewed hauls. Mutton snapper in the region were the eighth most frequently caught species on this gear type and were recorded on 10.2% of all BLL hauls.

### **Catch and Effort Distribution**

Mutton snapper were recorded on BLL gear from 24.4618° latitude to 28.5017° latitude, and as far offshore as -84.8769° longitude, with the majority being recorded south of 26 degrees latitude (Figure 1). These individuals were encountered in depths from 39.5 to 114.1m, with an average capture depth of 71.4m. Catch per unit effort (CPUE) was calculated based on hook-hours, using the EGoM limit of 750 hooks. The average species-

specific CPUE within 10 x 10 minute grid cells is depicted in Figure 2. Results showed high CPUE in the southern portion of the fishing area outside the Pulley Ridge and Dry Tortugas MPAs. A hotspot analysis conducted for mutton snapper shows significant clustering of individuals coinciding with areas of high CPUE adjacent to these southern MPAs (Figure 3).

### **Condition on Arrival, Discards, and Depredation**

At vessel mortality for this species was 3.73%, with 1.47% showing signs of depredation (Table 1). Retention rates are high (>99%), with nominal discards primarily occurring due to damaged catch (Table 2).

### **Management Factors Influencing Catch in the BLL Fishery**

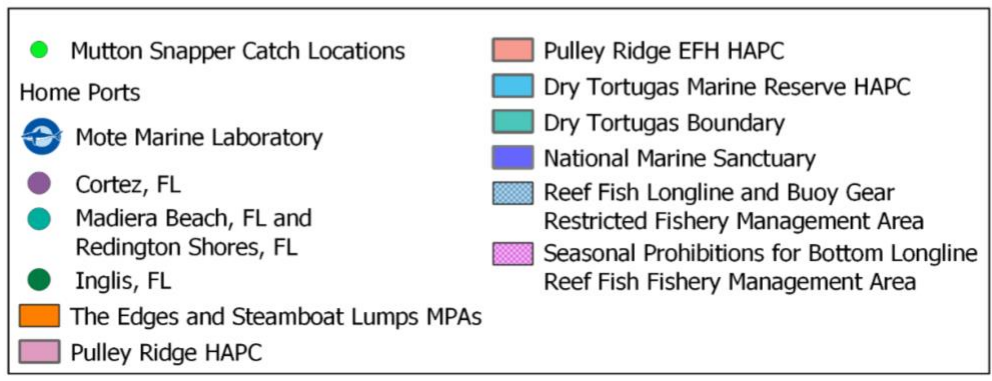
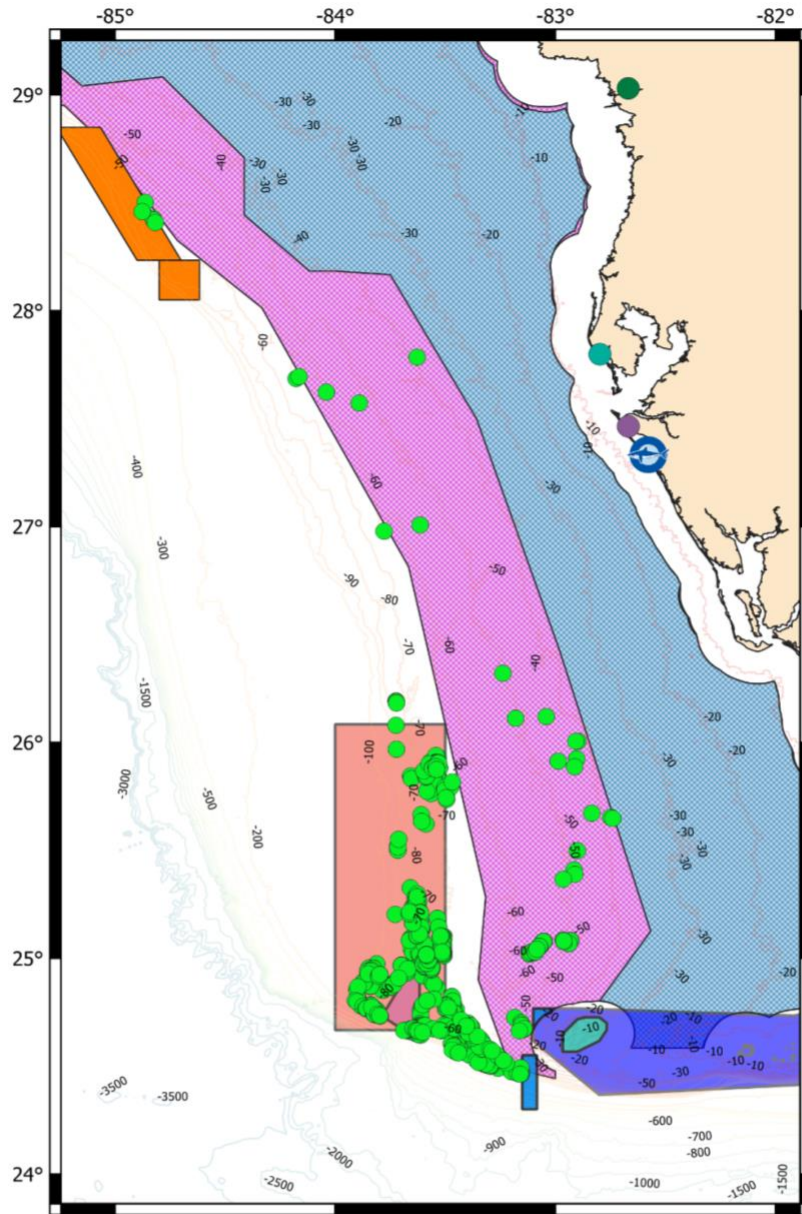
Mainly a bycatch species, mutton snapper are not a primary target, except on occasion during the BLL seasonal closure. This closure occurs inside 35 fathoms annually from June to September in an effort to reduce interactions with sea turtles. Nearly 90% of captures occur outside of this seasonally closed area, as shown in Figure 1. While the primary targets of this fishery are IFQ limited, mutton snapper are not. This allows for full retention of legal sized mutton snapper. Size limits had only a nominal impact on discards, as the majority of catches were large individuals and well above the minimum commercial size limit.

**Table 1.** Condition of mutton snapper on arrival on BLL gear in the EGoM.

<b>Condition On Arrival</b>	<b>% of Mutton Snapper</b>
Dead on Arrival - Damaged	0.80
Dead on Arrival - Undamaged	2.93
Live - Damaged	0.67
Live - Healthy	82.96
Live - Stomach and/or Eyes Protruding	12.52
Unknown Condition	0.13

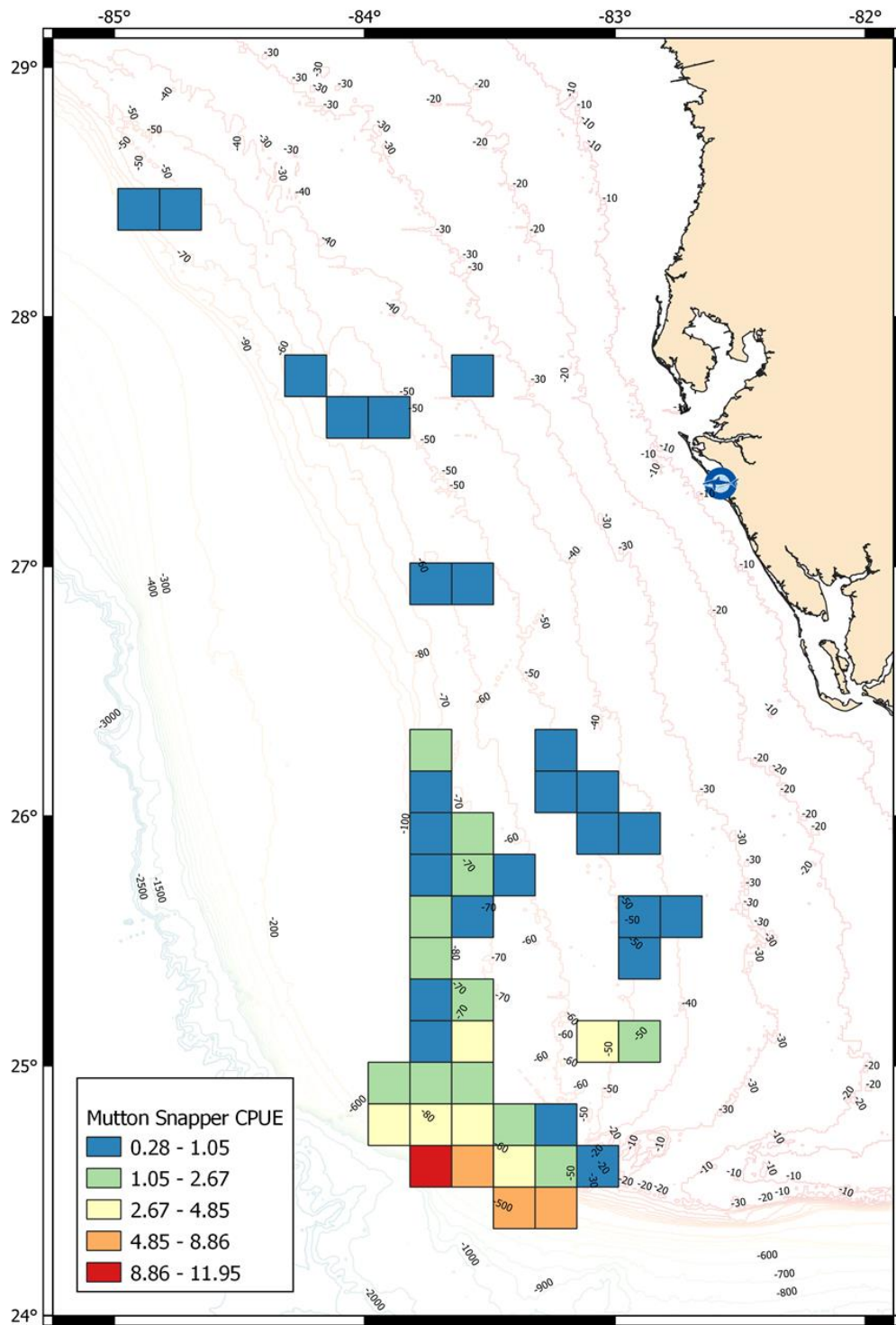
**Table 2.** Fate of mutton snapper on BLL gear in the EGoM.

<b>Catch Fate</b>	<b>% of Mutton Snapper</b>
Discarded - Dead	0.53
Discarded - Live and Healthy (Not Vented)	0.13
Discarded - Live and Healthy (Vented)	0.27
Retained	99.07

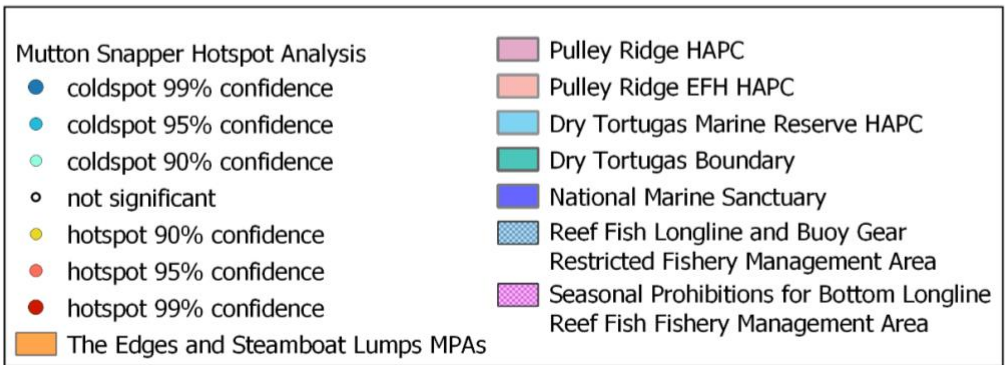
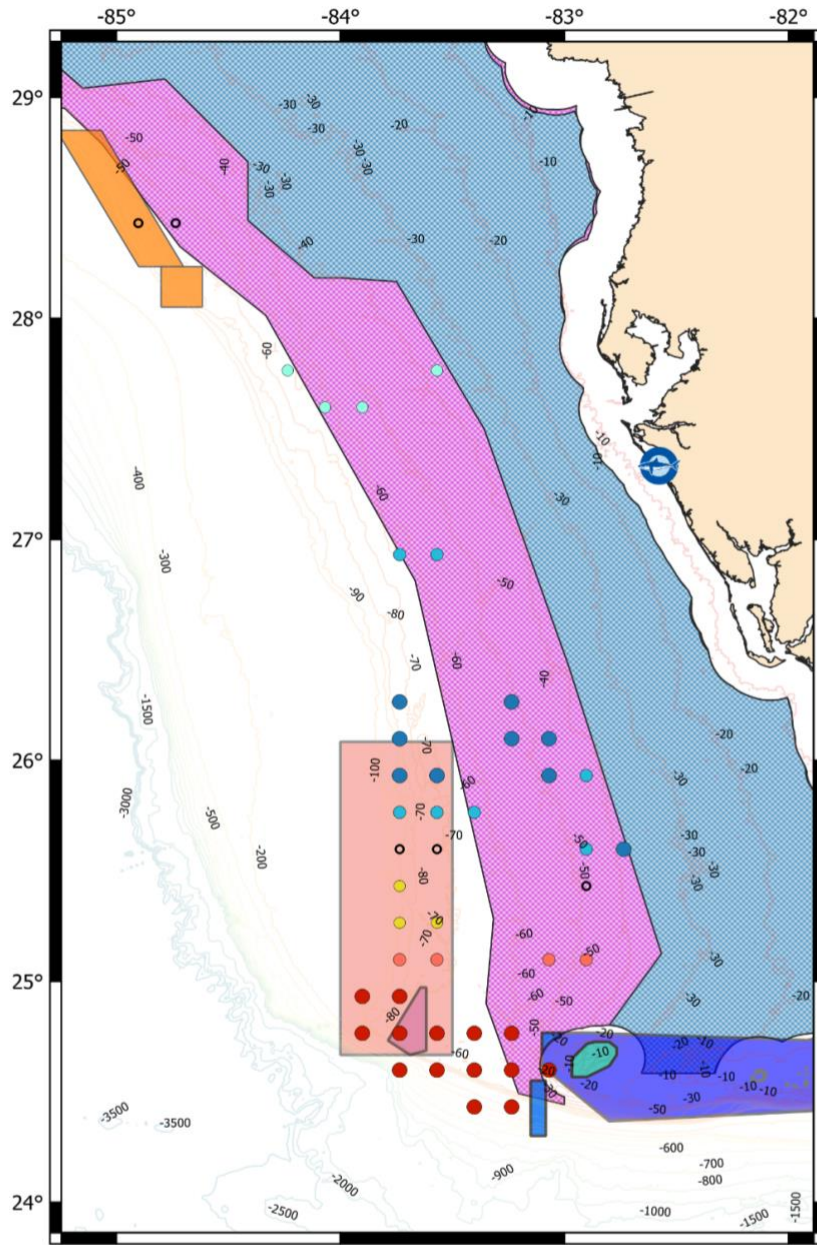


**Figure 1.** Individual locations of Mutton Snapper recorded in the EGoM BLL fishery ( $n=751$ ).





**Figure 2.** Catch per unit effort of mutton snapper in the EGoM BLL fishery with a grid cell size of 10 x 10min.



**Figure 3.** Hotspot analysis for mutton snapper in the EGoM BLL fishery.