

Descriptions of Florida's Atlantic Coast Gray Triggerfish (*Balistes capricus*)
recreational fishery assessed using fishery-dependent survey data

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SEDAR82-DW13

Received: 9/21/2022



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Please cite this document as:

Corbett, Ellie, Maria Kappos, and Beverly Sauls 2022. Descriptions of Florida's Atlantic Coast Gray Triggerfish (*Balistes capriscus*) recreational fishery assessed using fishery-dependent survey data. SEDAR82-WP13. SEDAR, North Charleston, SC. 16 pp.

Descriptions of Florida's Atlantic Coast Gray Triggerfish (*Balistes capricus*) recreational fishery assessed using fishery-dependent survey data

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FDM-FWRI

The following analysis intends to provide a brief description of the for-hire/private recreational fishing fleets for Gray Triggerfish in Florida's east coast waters. The data reports include numbers of harvested and discarded fish, depth profiles, size distributions of harvested and discarded fish (fork lengths in mm), and release conditions of fish.

All analyses presented are derived from three sources: long-term monitoring data collected by at-sea observers (At-Sea: 2005-2020) aboard randomly selected for-hire fishing vessels (smaller charter boats and large headboats), dockside sampling of the private fleet (State Reef Fish Survey – SRFS: 2020), and dockside sampling of the private and charter fleet (The Marine Fisheries Initiative Survey – MARFIN: 2017-2020). All data are aggregated by fleet (charter, headboat, private) and region. Regions of Florida are designated as northeast Florida (NEFL – Nassau to Brevard counties, statistical zones 722-732), southeast Florida (SEFL – Indian River to Miami-Dade counties, statistical zones 736-744), and Florida Keys (KEYS – Monroe County, statistical zones 1, 2, 748).

Surveys

Marine Fisheries Initiative Survey

From 2017-2020, the state of Florida was awarded a 3-year Marine Fisheries Initiative Survey (MARFIN) grant to implement a biological sampling program to improve stock assessments in the data-poor region of the South Atlantic. Fishing access sites near major inlets were randomly selected each week to survey anglers and collect representative data on the biological composition of catch from private and charter boat-based sectors of the recreational fishery. In July 2020, state funding was secured to continue the survey long-term. Data collected through this survey includes length, weight, age structures and sex ratios from reef fishes and other managed species, as well as trip-level data on area fished, depths fished, fishing methods, gear types, and characteristics of discards. The study provides spatially explicit data to characterize depths and areas fished during private and charter boat trips in the South Atlantic.

State Reef Fish Survey

The State Reef Fish Survey was implemented on the Florida Gulf coast in 2015 and was expanded state-wide in July 2020, extending coverage to include the Atlantic coast of the state. This specialized survey collects data from private recreational anglers who target reef fish species. Anglers wishing to harvest certain reef fish species, including Gray Triggerfish, are required to have a State Reef Fish Angler designation on their fishing license. The State Reef Fish Survey is composed of two survey components: a mail survey of State Reef Fish anglers, which collects data on angler effort, and a dockside intercept survey, which collects data on angler catches and fishing practices. Interview assignments are drawn from a subset of sampling sites known to have offshore fishing activity to intercept fishers that target reef fish. Data collected during dockside assignments include information regarding fishing depths and distances from shore while fishing for offshore species, number of harvested species, and self-reported estimates of fish (by species) released during the fishing day. A subset of landed fish are measured (fork length in mm) and weighed (in kilograms) during the survey. Data presented here summarize information from dockside sampling and do not estimate effort.

At-Sea Sampling of for-hire vessels

At-sea data are collected on both headboats and charter boats that were randomly selected weekly, throughout the year. Sampling coverage varied by region and fleet. No sampling occurred between April 2020 and May 2021 due to the COVID-19 pandemic.

South Atlantic coast of Florida (NEFL, SEFL)

On the South Atlantic coast, at-sea headboat sampling has been conducted continuously since 2004 funded by the Atlantic Coast Cooperative Statistic Program (ACCSP), with this report including data collected between 2005 and 2020. Charter boats on the Atlantic coast were also surveyed during a 3-year MARFIN grant from 2013-2015.

Florida Keys (KEYS)

At-sea observer surveys have been conducted intermittently in the Florida Keys due to funding gaps. Headboats were first surveyed from 2005 to 2007 with funding through the Gulf Fisheries Information Network (GulfFIN). In 2010, headboat sampling coverage was re-initiated, along with the initiation of charter boat sampling. Coverage for both fleets has been continuous since 2010, with the exception of a funding gap in 2014-2015 for headboats.

Data collected during sampled trips included vessel location (coordinates in degrees and minutes) and depth at each fishing station. Gray Triggerfish caught (including both harvested and discarded individuals) during sampled trips were measured [midline length (ML = FL); mm]. The final disposition of Gray Triggerfish was observed by biologists, including barotrauma treatment and the condition of discarded fish post-release. Observers assisted with handling fish, but decisions to harvest or retention fish and whether barotrauma mitigation should occur were left to the anglers and crew. Many fish were tagged with conventional plastic-tipped dart tags, and angler recaptures were reported on a hotline.

Release Conditions

To the extent possible, at-sea observer data were used to estimate total numbers and proportions of fish released in each of four conditions during monitored for-hire trips. The four release conditions were, in short: **good**: no barotrauma treatment, fish swam strongly down, **vent**: fish vented and swam strongly down, **impaired**: one of several visually obvious impairments at the surface (regardless of barotrauma treatment), **deep-hooked**: fish hooked in damaging location or released with the hook in the body. Fish that were released dead or observed preyed upon by a predator at the surface were also recorded. These categories are further described in Table 1.

Results

A total of 196 private and charter boat fishing parties that reported catching Gray Triggerfish were intercepted in dockside surveys between 2017 and 2020. Of those, 48% of trips were sampled in southeast Florida, 45% of trips were sampled in northeast Florida, and 7% of

trips were sampled in the Florida Keys. Of the 2,287 Gray Triggerfish reported in angler surveys, 34% were harvested and 66% were discarded (Table 2a). Southeast Florida had the highest discard rate (Table 2a).

At-sea observers participated in a total of 897 charter and headboat trips between 2010 and 2020 that reported catching Gray Triggerfish. The highest number of trips (540, 60%) were sampled in southeast Florida. Discard rates were higher in Southeast Florida and the Keys compared to Northeast Florida (Table 2b).

Capture depth in all fleets showed similar trends, apart from the charter fleet intercepted by MARFIN and SRFS biologists in the Keys (Table 3a and Table 3b). In both private and charter fleets in the northeast and southeast region, at least 45% of fish encountered were caught at depths less than 50 meters and both regions had a higher percentage of ultimately discarded fish over ultimately harvested fish at these depths. The Florida Keys charter fleet had the highest percentage of fish intercepted from the 80+ meter depth bin, but the private fleet had the highest percentage of fish intercepted from the 0-19 meter depth bin (Figure 1). It is important to note the sample size of trips in the Keys contributes to only 7% of the total number of reported trips. For charter and headboat fleets from at-sea observations, at least 90% of all Gray Triggerfish encountered were caught at depths less than 50 meters. More than 50% of fish encountered by at-sea observers in the northeast and southeast were caught between 20-50 meters, but in the Florida Keys more than 80% of fish from both charter and headboat fleets were caught in waters less than 20 meters deep (Figure 2). While numerous larger fish were encountered, many of the Gray Triggerfish encountered on both private and for-hire fleets were smaller than the current legal size (12" midline length) regardless of depth (Figure 3-5).

Because many of the fish encountered are not legal to keep, depredation, release condition, and post-release predation are important factors to understand for this species. 91.82% of fish were released in good condition without being vented, 3.45% were vented but swam down strongly, 4.20% of fish were impaired upon release, .24% of fish were deep-hooked, and less than one percent were released dead or eaten by a predator (Table 4).

Literature Cited

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Table 1. Description of release condition categories for Gray Triggerfish observed on for-hire vessels (modified from Sauls 2014).

| Condition category | Description |
|---|---|
| Good (not vented/not impaired) | Fish immediately submerged without the assistance or venting, and did not exhibit any impairments |
| Vented (not impaired) | Fish immediately submerged after the swim bladder was vented, and did not exhibit any impairments |
| Impaired (vented or unvented: displaying distress) | Any fish that exhibited one or more of the following impairments: <ol style="list-style-type: none"> 1) chased by a predator near the surface 2) disoriented or unresponsive at the surface before submerging 3) buoyant at the surface and unable to submerge 4) improperly vented by puncturing the stomach or anus 5) bleeding from the gills 6) exophthalmia (pop-eye), indicative of severe barotrauma |
| Deep Hooked (hook embedded in deep tissue) | Any fish for which either of the following was true: <ol style="list-style-type: none"> 1) hook embedded in gill, eye, esophagus, or gut 2) released with hook still embedded |
| Dead | Any fish that was observed to float away making no movements |
| Preyed Upon | Any fish that was observed to be eaten by a marine predator once released. Most predators were dolphins, sharks, barracuda, and goliath grouper |
| Recompressed | Fish that were descended toward the bottom using a weighted device. |

Table 2a. **Dockside Private Fleet Interviews (SRFS + MARFIN)** Gray Triggerfish total catch, positive trips, harvested fish, and discarded fish by Florida region.

| Region | Number of Fish | Number of Trips | Percent Harvested | Percent Discarded |
|-------------------|-----------------------|------------------------|--------------------------|--------------------------|
| NEFL | 1320 | 87 | 44.5 | 55.5 |
| SEFL | 900 | 95 | 16.9 | 83.1 |
| KEYS | 67 | 14 | 64.2 | 35.8 |
| <i>State-Wide</i> | 2287 | 196 | 34.2 | 65.8 |

Table 2b. **At-Sea Observations of for-hire fleets (at-sea)** Gray Triggerfish total catch, positive trips, harvested fish, and discarded fish by Florida region.

| Region | Number of Fish | Number of Trips | Percent Harvested | Percent Discarded |
|-------------------|-----------------------|------------------------|--------------------------|--------------------------|
| NEFL | 1025 | 235 | 80.0 | 20.0 |
| SEFL | 3106 | 540 | 25.4 | 74.6 |
| KEYS | 232 | 122 | 7.8 | 92.2 |
| <i>State-wide</i> | 4363 | 897 | 37.3 | 62.7 |

Table 3a. **Dockside interviews of private fleet (SRFS + MARFIN)** percentage of Gray Triggerfish harvested and released in each fleet by depth. Data are self-reported values collected dockside by samplers interviewing private anglers at the end of their fishing day. These values include recalled numbers of released fish and estimated maximum fishing depth for the day. Maximum fishing depth was chosen to represent the most conservative (worst case) scenario.

| | Depth (m) | NEFL | | SEFL | | KEYS | | Total |
|---------------------|-----------|------------|------------|------------|------------|-----------|-----------|-------------|
| | | Charter | Private | Charter | Private | Charter | Private | |
| Discard | 0-19 | 2.78 | 2.69 | 1.51 | 23.93 | . | 50 | 115 |
| | 20-29 | 12.22 | 21.77 | 30.23 | 13.39 | . | 10 | 293 |
| | 30-39 | 65.83 | 66.4 | 4.28 | 13.39 | 21.43 | . | 551 |
| | 40-49 | 15 | 3.76 | 21.66 | 8.55 | . | . | 184 |
| | 50-59 | 2.78 | 1.61 | 11.08 | 6.84 | . | . | 84 |
| | 60-69 | 1.39 | 1.61 | 15.11 | 4.56 | . | 20 | 89 |
| | 70-79 | . | . | 2.52 | 3.42 | 7.14 | . | 23 |
| | 80+ | . | 2.15 | 13.6 | 25.93 | 71.43 | 20 | 165 |
| Harvest | 0-19 | 0.78 | 2.11 | 2.68 | 2.5 | 2.5 | 33.33 | 15 |
| | 20-29 | 9.77 | 20.48 | 41.96 | 30 | . | . | 152 |
| | 30-39 | 53.13 | 44.58 | 11.61 | 25 | . | 33.33 | 308 |
| | 40-49 | 8.98 | 17.77 | 15.18 | 10 | . | . | 103 |
| | 50-59 | 13.67 | 7.83 | 1.79 | 7.5 | . | . | 66 |
| | 60-69 | 11.72 | 2.11 | 11.61 | 12.5 | 32.5 | . | 68 |
| | 70-79 | . | 0.6 | 5.36 | . | 7.5 | . | 11 |
| | 80+ | 1.95 | 4.52 | 9.82 | 12.5 | 57.5 | 33.33 | 60 |
| <i>Grand Totals</i> | | <i>616</i> | <i>704</i> | <i>509</i> | <i>391</i> | <i>54</i> | <i>13</i> | <i>2287</i> |

Table 3b. **At-Sea Observations (at-sea)** Numbers and percentage of Gray Triggerfish harvested and released in each fleet by depth. Charter and Headboat depth are measured values (vessel exact fishing depth and counts of released fish) taken by observers deployed on for-hire fishing trips. Maximum fishing depth was chosen to represent the most conservative (worst case) scenario.

| | Depth (m) | NEFL | | SEFL | | KEYS | | Total |
|---------------------|-----------|------------|------------|------------|-------------|-----------|------------|-------------|
| | | Charter | Headboat | Charter | Headboat | Charter | Headboat | |
| Discard | 0-9 | . | . | . | 0.05 | 38.78 | 42.42 | 90 |
| | 10-19 | . | 0.6 | 0.94 | 11.6 | 61.22 | 41.82 | 335 |
| | 20-29 | 43.59 | 87.95 | 49.37 | 27.85 | . | 3.64 | 883 |
| | 30-39 | 17.95 | 11.45 | 42.77 | 21.8 | . | 7.88 | 611 |
| | 40-49 | 38.46 | . | 3.14 | 22.05 | . | 3.64 | 472 |
| | 50-59 | . | . | 2.2 | 11.2 | . | . | 231 |
| | 60-69 | . | . | . | 4.65 | . | 0.61 | 94 |
| | 70-79 | . | . | . | 0.65 | . | . | 13 |
| | 80+ | . | . | 1.57 | 0.15 | . | . | 8 |
| Harvest | 0-9 | . | . | . | . | 36.36 | 28.57 | 6 |
| | 10-19 | . | 3.78 | 1.19 | 6.94 | 45.45 | 28.57 | 69 |
| | 20-29 | 21.08 | 83.33 | 57.74 | 17.1 | 9.09 | . | 657 |
| | 30-39 | 24.32 | 12.89 | 30.95 | 23.23 | . | 28.57 | 346 |
| | 40-49 | 52.97 | . | 1.79 | 27.9 | 9.09 | . | 373 |
| | 50-59 | 1.62 | . | 0.6 | 14.68 | . | . | 98 |
| | 60-69 | . | . | 7.14 | 8.06 | . | 14.29 | 63 |
| | 70-79 | . | . | . | 1.61 | . | . | 10 |
| | 80+ | . | . | 0.60 | 0.48 | . | . | 4 |
| Grand Totals | | 409 | 616 | 486 | 2620 | 60 | 172 | 4363 |

Table 4. **At-Sea Observations of for-hire fleets (at-sea)** Numbers of Gray Triggerfish released by release category across at-sea for-hire recreational fishery data. *Fish observed preyed upon at the surface by marine predator (dolphin, shark, barracuda, or Goliath Grouper).

| Release Condition | NEFL | | SEFL | | KEYS | | Total |
|--------------------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|--------------|
| | <i>Charter</i> | <i>Headboat</i> | <i>Charter</i> | <i>Headboat</i> | <i>Charter</i> | <i>Headboat</i> | |
| 1-Good | 25 | 159 | 319 | 1928 | 49 | 181 | 2661 |
| 2-Vent | 14 | 14 | 16 | 40 | . | 16 | 100 |
| 3-Impaired | . | 1 | 9 | 99 | 1 | 12 | 122 |
| 4-Deep-hooked | . | 1 | . | 3 | 1 | 2 | 7 |
| 5-Dead | 1 | . | . | 2 | 1 | . | 4 |
| 6-Preyed Upon | . | . | . | 3 | . | . | 3 |
| 7-Recompressed | . | . | . | 1 | . | . | 1 |
| <i>Grand Totals</i> | <i>40</i> | <i>175</i> | <i>344</i> | <i>2076</i> | <i>52</i> | <i>211</i> | <i>2898</i> |

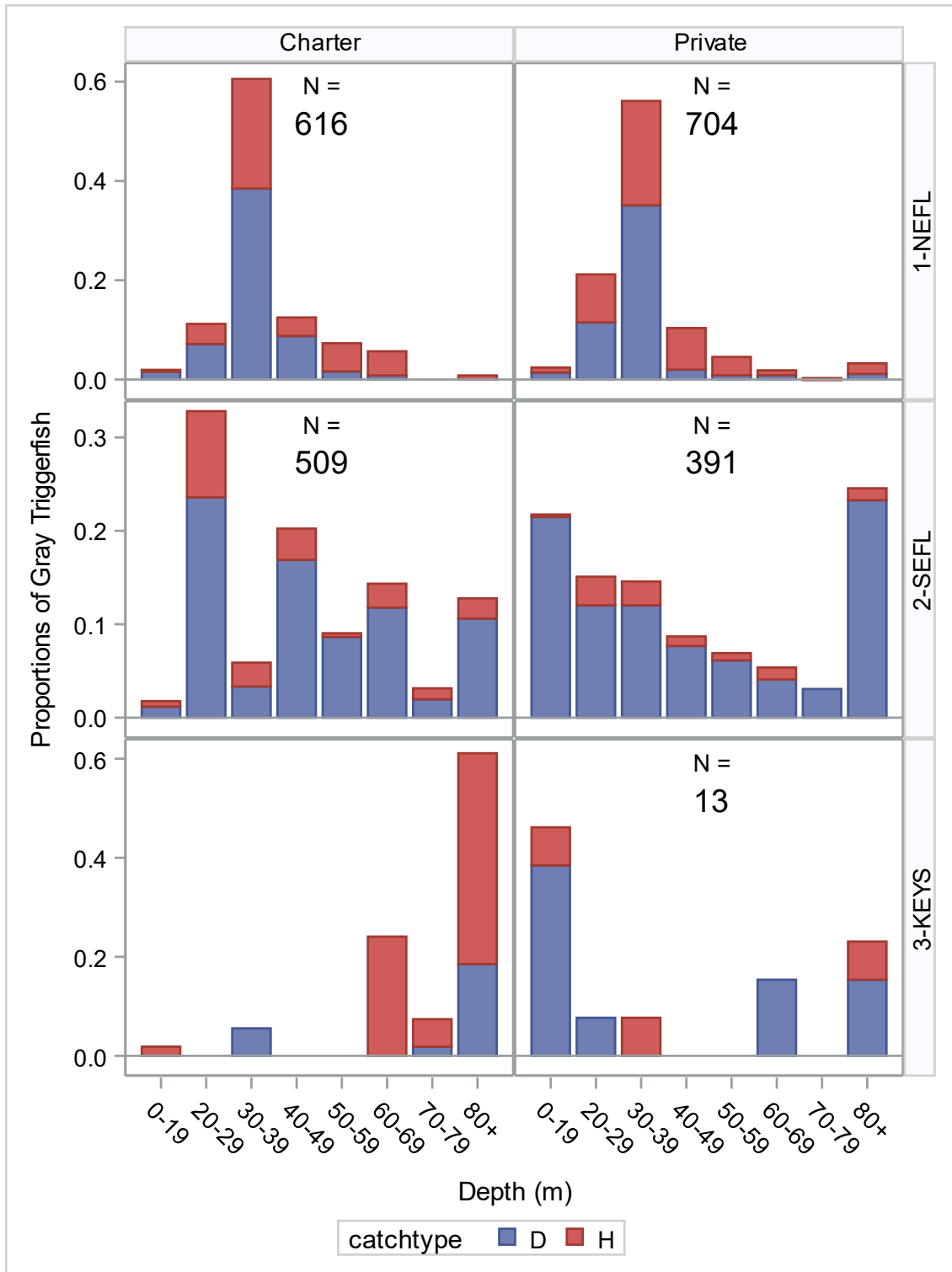


Figure 1. **Dockside interviews of private fleet (SRFS + MARFIN)** Proportions of Gray Triggerfish harvested, and proportions discarded in each depth bin. Total numbers of fish observed in each fleet/region are listed in each panel.

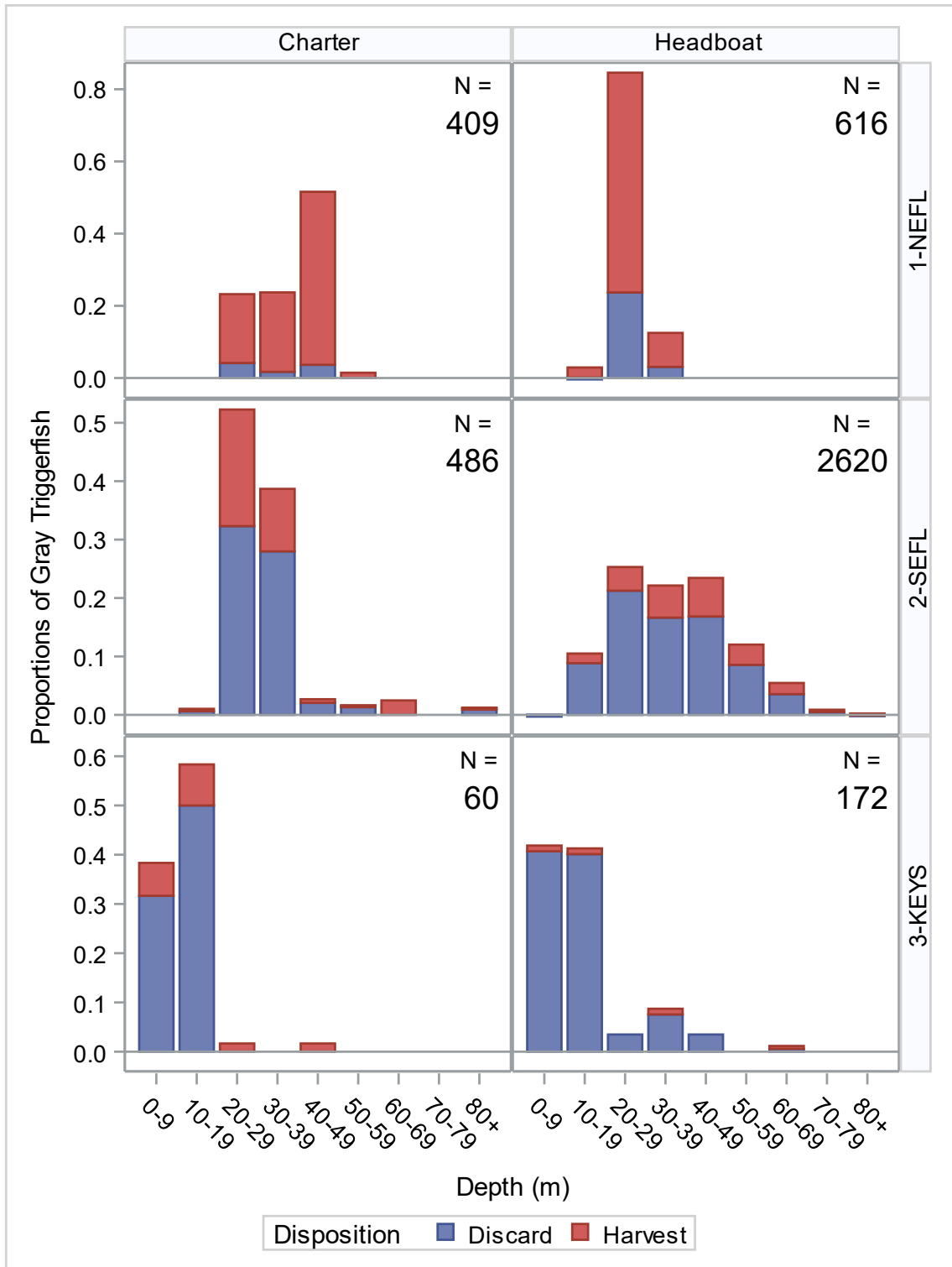


Figure 2. **At-Sea Observations of for-hire fleets (at-sea)** Proportions of Gray Triggerfish harvested, and proportions discarded in each depth bin. Total numbers of fish observed in each fleet/region are listed in each panel.

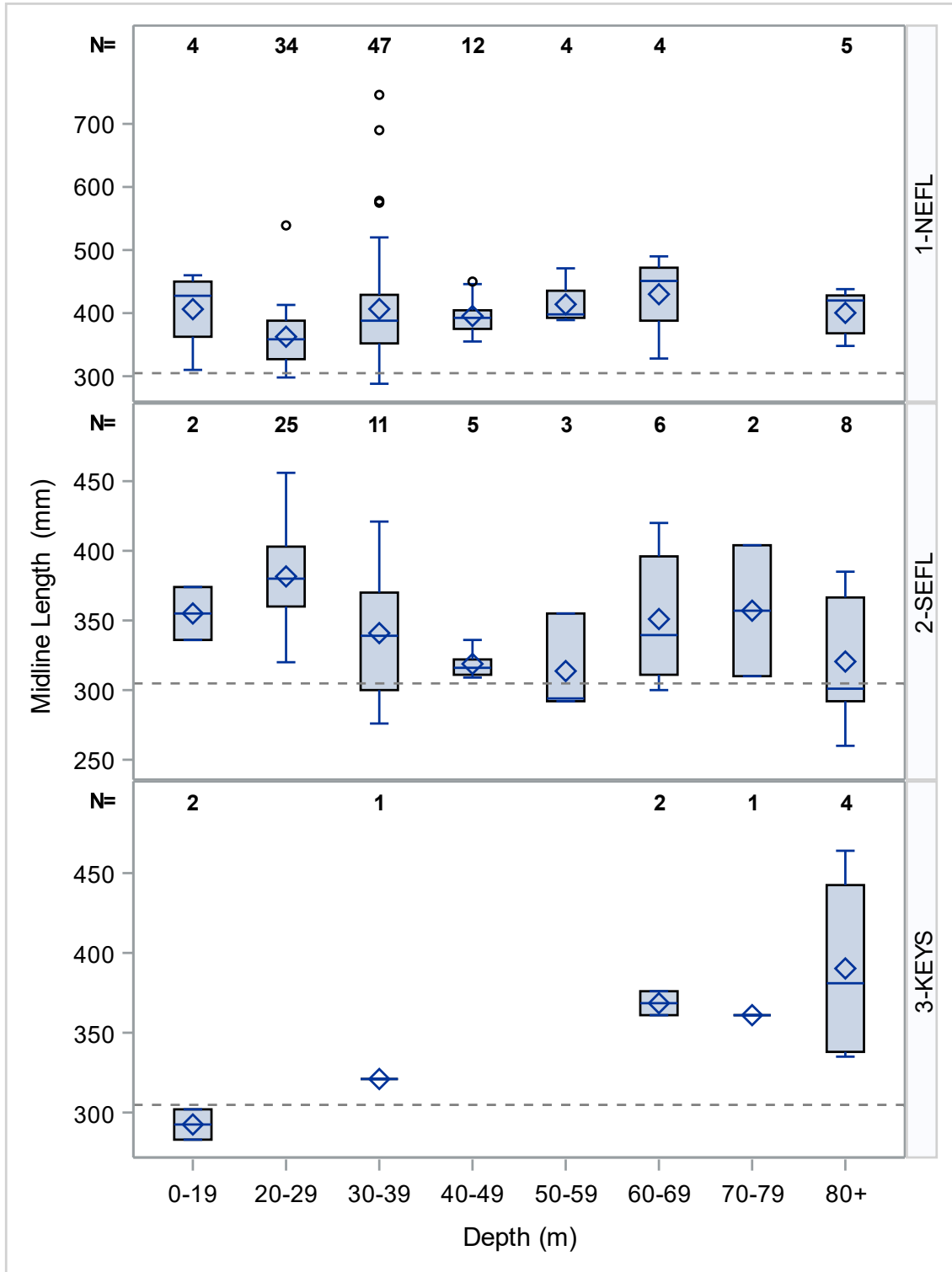


Figure 3. Dockside interviews of private fleet (SRFS + MARFIN) Midline length (mm) of all harvested Gray Triggerfish as a function of capture depth (m) 2017-2020. Total numbers of fish measured by depth bin in each fleet are listed in each panel. The current minimum legal size (12' TL) is indicated by a dashed line.

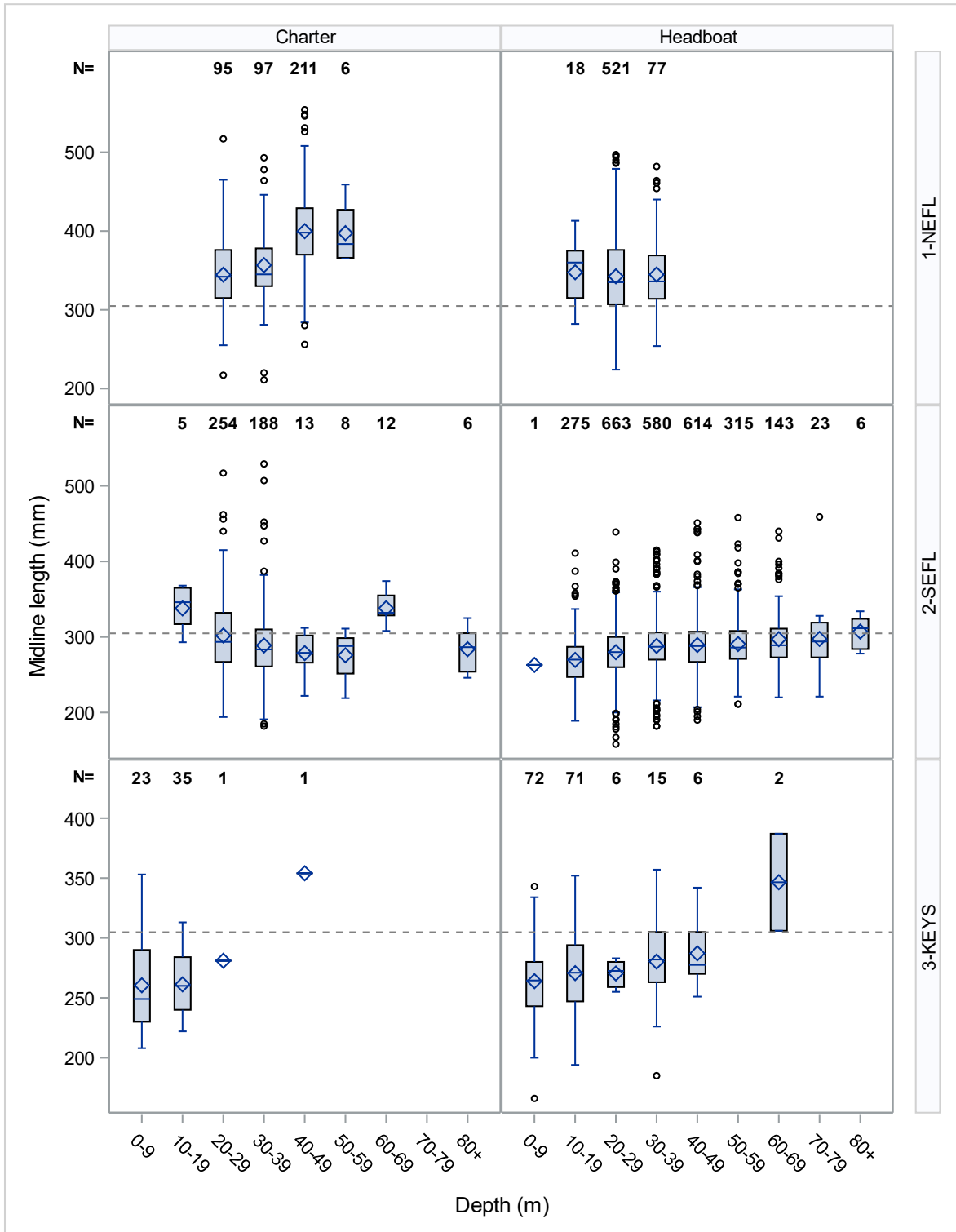


Figure 4. **At-Sea Observations of for-hire fleets (at-sea) Midline length (mm) of harvested and discarded Gray Triggerfish** as a function of capture depth (m) 2010-2020. Total numbers of fish encountered by depth bin in each fleet are listed in each panel. The current minimum legal size (12' TL) is indicated by a dashed line.

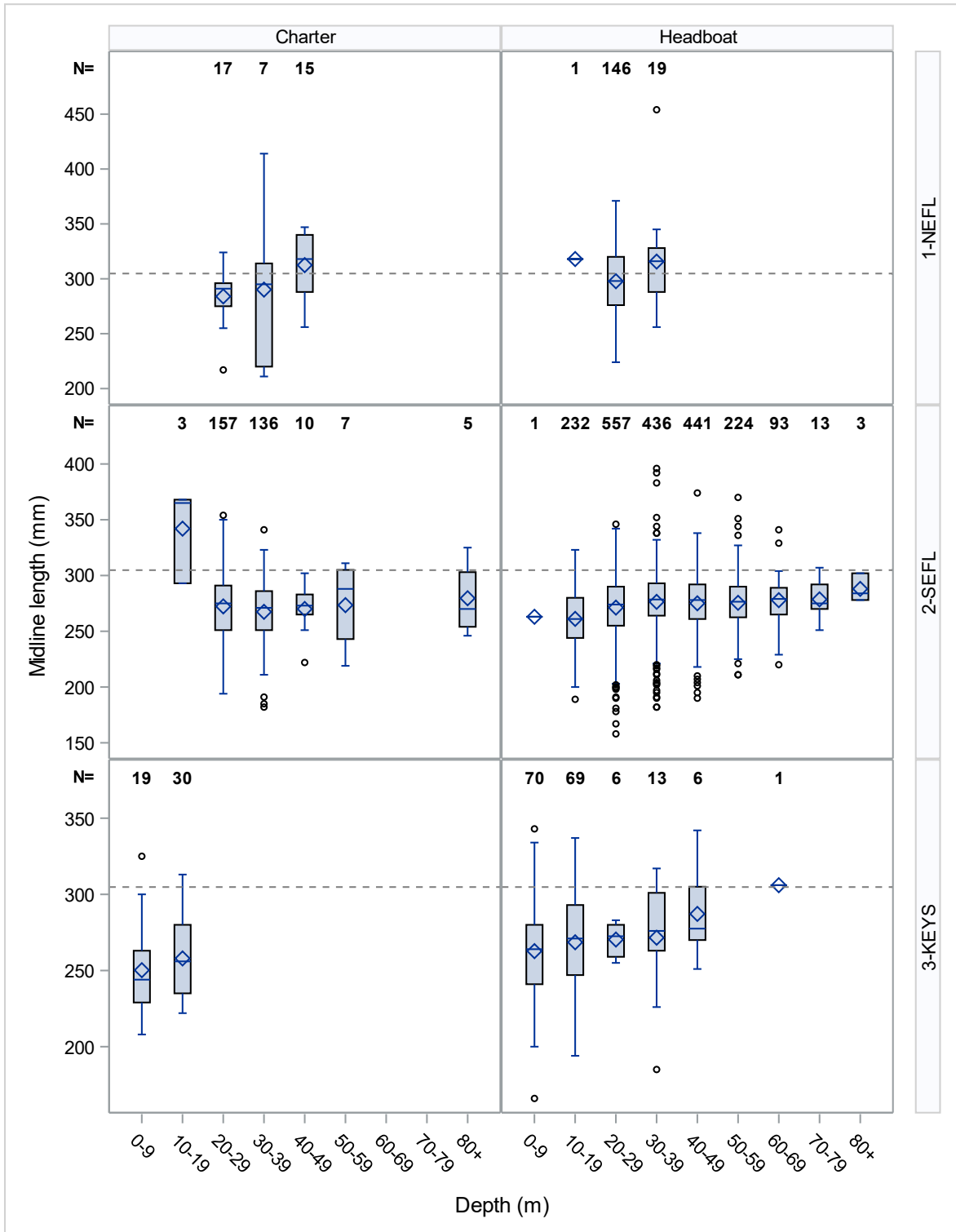


Figure 5. **At-Sea Observations of for-hire fleets (at-sea) Midline length (mm) of discarded Gray Triggerfish** as a function of capture depth (m) 2010-2020. Total numbers of fish measured by depth bin in each fleet are listed in each panel. The current minimum legal size (12' TL) is indicated by a dashed line.

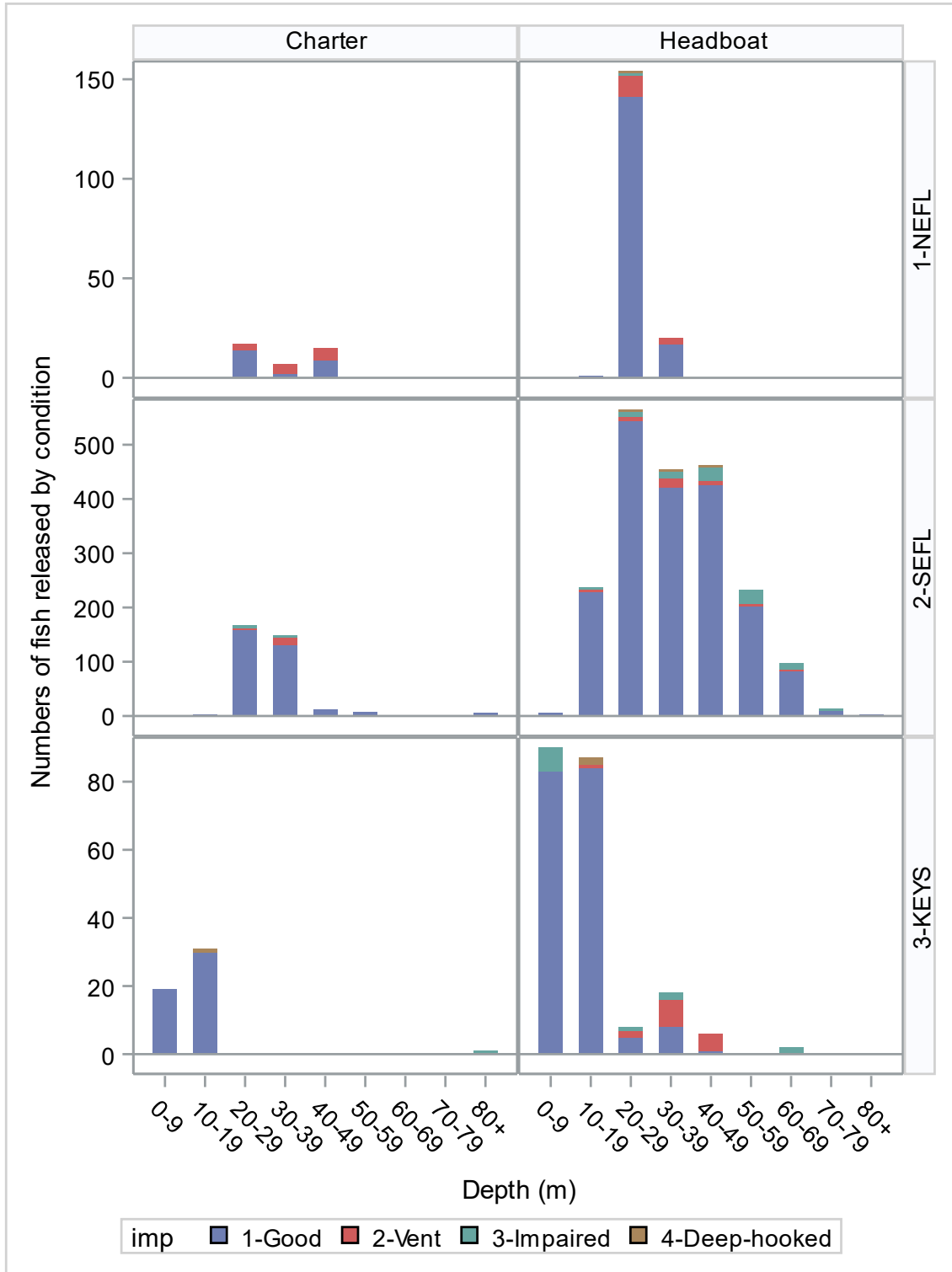


Figure 6. **At-Sea Observations of for-hire fleets (at-sea)** Total number of discarded Gray Triggerfish observed in each of four impairment categories. Release categories are described in Table 1.