Characterizing Bycatch in the Gulf of Mexico United States Federal Shrimp Fishery - Resolving Barriers to Sustainable Fishery Certification

Caracterización de la captura incidental de Pesquería Federal de Camarones de los Estados Unidos en el Golfo de México - Resolviendo Barreras para la Certificación de Pesca Sustentable

Caractérisation des prises accessoires dans le golfe du Mexique Pêcherie fédérale de crevettes aux États-Unis - Résoudre les obstacles à la certification de la pêche durable

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EXTENDED ABSTRACT

The federally-permitted penaeid shrimp fishery of the Gulf of Mexico is one of the United States's most valuable fisheries. Despite decades of gear modifications aimed at reducing bycatch, such as Turtle Excluder Devices (TEDs) and Bycatch Reduction Devices (BRDs), the bycatch associated with shrimp trawls presents a serious challenge for meeting requirements for certification as a sustainable fishery. Without such certification, the shrimp industry is likely to lose market share to international competitors and may have difficulty selling their product to major seafood buyers (Walmart, Kroger, etc.). Two barriers for certification of the federal otter trawl fleet remain: low observer coverage and the "modified characterization protocol" of bycatch, whereby a large percent of bycatch outside a few species of interest remains unidentified and lumped into broad categories of "fish", "crustaceans", and "invertebrates". The goal of this project was to provide an updated database of catch rates (kg/hr) of Gulf of Mexico otter trawl shrimp bycatch with full taxonomic resolution for the species that NOAA does not record. We partnered with shrimp industry members and National Marine Fisheries Service (NMFS) collaborators to (1) collect and fully characterize a representative subsample of bycatch obtained on trips observed by the NMFS observer sampling program for the year 2021 and (2) quantify changes in bycatch composition and catch rates between current (2021) and historical (1992-1994) periods, when complete characterization of bycatch species were last available.

Bycatch was characterized from 510 tows from 16 trips taken across the U.S. Gulf of Mexico, and data were obtained for 997 tows from 1992 to 1994. The taxa in 2021 that comprised greater than 1.00% of total Gulf-wide catch rates were: Brown Shrimp (*Farfantepenaueus aztecus*, 5.846 kg/hr, 21.99%), Atlantic Croaker (*Micropogonias undulatus*, 3.719 kg/hr, 13.99%), Seatrout spp. (*Cynoscion spp.*, 3.574 kg/hr, 13.45%), White Shrimp (*Litopenaeus setiferus*, 3.217 kg/hr, 12.10%), Atlantic cutlassfish (*Trichiurus lepturus*, 0.892 kg/hr, 3.36%), Pink shrimp (*Farfantepenaeus duorarum*, 0.810 kg/hr, 3.05%), non-target Penaeid shrimp sp. (*Penaeidae*, 0.765 kg/hr, 2.88%), Spot (*Leiostomus xanthurus,* 0.695 kg/hr, 2.61%), Bigeye Searobin (*Prionotus longispinosus,* 0.594 kg/hr, 2.24%), Portunus swimming crab spp. (*Portunus spinimanus/Portunus gibbesii,* 0.527 kg/hr, 1.98%), Longspine porgy (*Stenotomus caprinus,* 0.479 kg/hr, 1.80%), Gulf butterfish (*Peprilus burti,* 0.328 kg/hr, 1.23%), Inshore lizardfish (*Synodus foetens,* 0.299 kg/hr, 1.12%), and Paper Scallop (*Amusium papyracea*, 0.269 kg/hr, 1.01%).

Major conclusions of study results included: 1) Compared to data from 1992-1994, catch rates in 2021 of brown shrimp and white shrimp have increased Gulf-wide, catch rates of pink shrimp have increased in the eastern Gulf, and the relative proportion of bycatch has decreased Gulf-wide, 2) Bycatch rates for most common species were less in 2021 than 1992-1994. The major exceptions of increases in Atlantic Croaker (*Micropogonias undulatus*) and Seatrout spp. (*Cynoscion spp.*) are possibly attributable to an overall increase in their populations (Gallaway et al. 2020), 3) Of the species that NOAA does not record that we observed as bycatch in this study, none are considered at risk of extinction, 4) Bycatch composition varies spatially across the GOM (with depth and between eastern and western regions); thus, spatial shifts in shrimping effort through time may alter Gulf-wide bycatch rates and proportions.

KEYWORDS: bycatch, shrimp trawl, sustainability certification