

## **Bycatch Reduction in the Gulf of Mexico and South Atlantic Shrimp Fleet**

During the 1960s and 1970s, a significant groundfish fishery existed in the Gulf of Mexico. There were about 50 vessels in the fishery which targeted a groundfish complex that consisted of over 170 species, dominant of which were croaker, spot, seatrout, cutlassfish, sea catfish, porgies, perch, drums, hake, and butterfish. The primary directed fishery was for the pet food, harvesting 50,000 tons, and for human consumption, harvesting approximately 13,000 tons annually. However, during the latter part of the 1970s the shrimp trawling fleet had been established and began to grow considerably. Approximately 310,000 tons of groundfish were taken by the shrimp fleet and discarded. The average ratio of weight of finfish to shrimp in the shrimp trawl fishery during the 1970s was about 10:1. One of the profound consequences of this high bycatch rate was that the Gulf's groundfish fishery was virtually eliminated.

Shrimp trawl technology advanced rapidly through the 1980s and the fleet grew dramatically. By the early 1990s, shrimping had become the largest and most lucrative fishery in the southeast. In 2001 shrimp landings in the Gulf of Mexico totaled 116,429.1 metric tons with a market value of \$496,319,593. In the South Atlantic, shrimp landings totaled 10,714.9 metric tons with a market value of \$50,354,605. However, in recognition of the fishery's high bycatch rate, the Gulf Council and NOAA Fisheries undertook an effort in the late 1980s to design gear and implement a Fishery Management Plan that would significantly reduce finfish bycatch. However, with the advent of the endangered species act and the designation of all Atlantic sea turtles as endangered or threatened, it became imperative that trawls be developed that would exclude sea turtles.

During the 1980s, NOAA Fisheries developed and tested many TED designs and initiated a program to have shrimp vessels voluntarily install and evaluate them. In 1987 it became mandatory in the Atlantic Ocean and Gulf of Mexico that all shrimp trawls except try nets be equipped with TEDs and by 1992, shrimpers in inshore bays, estuaries and sounds had to use them, as well. NOAA Fisheries and shrimpers learned that, as TEDs designs were refined through the 1990s, TEDs were remarkably effective at excluding turtles as well as large finfish and debris. Consequently, by 2001 observed compliance rates averaged 96% and sea turtle populations have either stabilized or shown signs of recovering.

Unfortunately, mortality of the immense number of finfish small enough to fit between the bars of a typical TED's grid, which are a minimum of four inches apart, remained alarmingly high, especially for juvenile red snapper, which share the same habitats as shrimp targeted for human consumption: brown, white, and pink. Red snapper are among the Gulf's most prized finfish species. But when a 1988 comprehensive stock assessment revealed that the stock was severely overfished, a fact that was primarily attributable to the juveniles being captured in shrimp trawls, NOAA Fisheries initiated an aggressive research program to identify, develop, and evaluate gear options for reducing finfish bycatch in the Gulf and South Atlantic shrimp fisheries with a minimum loss of shrimp production.

From 1990 to 1996 fishery researchers and commercial fishers, working under the auspices of the southeast regional bycatch program, developed and tested a total of 145 bycatch reduction device (BRD) designs. These evaluations were conducted under a research plan developed by the Gulf and South Atlantic Fisheries Foundation and a testing protocol developed by NOAA Fisheries. Sixteen of the designs were operationally tested aboard commercial shrimp vessels by the Foundation, the Georgia Department of Natural Resources, NOAA Fisheries Galveston and Mississippi Laboratories, the North Carolina Department of Marine Fisheries, the Texas Shrimp Association, Texas A&M Sea Grant, and the University of Georgia Sea Grant. These evaluations resulted in the production of a vast database consisting of more than 3,400 tows. Those data resulted in the identification and adoption of BRDs in shrimp trawl modifications that have reduced overall finfish bycatch by approximately 40%. With the full cooperation and involvement of the shrimp industry, NOAA Fisheries gear technologists are continually learning how to further reduce finfish bycatch.