

# **NOAA Technical Memorandum NMFS-SEFC-115**



## **REEF FISH DISTRIBUTIONS OFF NORTH CAROLINA AND SOUTH CAROLINA AS REVEALED BY HEADBOAT CATCHES**

**Patricia A. Tester  
Cynthia A. Wolfe  
Robert L. Dixon  
Gene R. Huntsman**

**June, 1983**

**U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southeast Fisheries Center  
Beaufort Laboratory  
Beaufort, North Carolina 28516**

# **NOAA Technical Memorandum NMFS-SEFC- 115**



## **REEF FISH DISTRIBUTIONS OFF NORTH CAROLINA AND SOUTH CAROLINA AS REVEALED BY HEADBOAT CATCHES**

**Patricia A. Tester  
Cynthia A. Wolfe  
Robert L. Dixon  
Gene R. Huntsman**

**June, 1983**

**U.S. DEPARTMENT OF COMMERCE  
Malcolm Baldrige, Secretary  
National Oceanic and Atmospheric Administration  
John V. Byrne, Administrator  
National Marine Fisheries Service  
William G. Gordon, Assistant Administrator  
for Fisheries**

**This TM series is used for documentation and timely communication of preliminary results, interim reports, or similar special purpose information. Although the memos are not subject to complete formal review, editorial control, or detailed editing, they are expected to reflect sound professional work.**

NOAA Technical Memorandum

NMFS - SEFC

Reef Fish Distributions off North Carolina  
and South Carolina as Revealed by Headboat Catches

Patricia Tester

Cynthia Wolfe

Robert L. Dixon

and

Gene R. Huntsman

U.S. DEPARTMENT OF COMMERCE

Malcolm Baldrige, Secretary

National Oceanic and Atmospheric Administration

John V. Byrne, Administrator

National Marine Fisheries Service

William G. Gordon, Assistant Administrator for Fisheries

## INTRODUCTION

Reef fishes of the outer continental shelf of the South Atlantic Bight have supported important recreational headboat fisheries for over two decades (Huntsman 1976) and commercial handline and trawl fisheries for about five years (Ulrich et al. 1976). In this paper we utilize data<sup>1/</sup> from the headboat fishery (Huntsman 1976; Grimes et al. 1982) to present a quantitative description of distributions of several important reef fishes as they are expressed in hook-and-line catches from the outer continental shelf of North Carolina and South Carolina (Figs. 1-7, Table 1). Our focus here is on the species occurring on hard, or "live" bottom in water deeper than 20 m, where most species are tropical or subtropical. We do not discuss the nearshore shallow fishes, principally sciaenids and other estuarine-dependent fishes, nor do we discuss species such as sea robins (Triglidae) and lizardfishes (Synodontidae) that occupy the vast plains of unconsolidated sediments on the Carolina shelf and rarely occur in concentrations large enough to attract recreational or commercial fishermen (Wenner in press).

## METHODS

### Sources of Data

Species distribution maps were prepared from records of 9,027 headboat trips over the continental shelf of North Carolina and South Carolina from 1975 through 1978. The captain or mate of each vessel reported the daily number of fish taken by species, the number of anglers aboard, the duration of the trips, and the location of fishing (Huntsman et al. 1978). Few operators kept records for every trip, and fishing location was sometimes omitted from otherwise complete records. Overall we had complete records for 50%-60% of all trips.

---

<sup>1</sup> For a detailed analysis of the data discussed here, see A. J. Chester, G. R. Huntsman, P. A. Tester, and C. S. Manooch, III, South Atlantic Bight reef fish communities as represented in hook and line catches. In press. Bulletin of Marine Science of the Gulf and Caribbean.

Fishing locations were reported as positions (by alphanumeric code) on a 10' longitude by 10' latitude, polar-oriented grid (Figs. 1-8). A finer scale and different orientation would have been preferable for two reasons. First, large quadrat areas often included greatly different water depths and, consequently, greatly differing fish communities, especially along the steep continental shelf slope. Second, the N-S, E-W orientation did not reflect the NE-SW alignment of isobaths and habitats parallel to the shelf edge. Many vessel operators, however, objected to providing specific locations because they did not want to reveal fishing spots, and most would have rejected a more complex recording system. Therefore, the grid chosen was a compromise between our desire for detailed zoogeographic information and our need for operator acceptance.

Although headboat fishing occurs primarily from March through October, other evidence, from commercial fishing, experimental cruises, and occasional midwinter headboat trips, suggest that reef fish distributions change little by season.

Based on overall importance in the fishery, key species were chosen and their distribution was mapped according to the number of fish taken by grid cell during the four-year period. Total catch was used as an index of distribution. Although catch per unit of effort (CPUE) is the usual choice for this purpose, it was not suitable here because headboats fish only at sites where fish are concentrated and CPUE is acceptably high. Consequently, CPUE would not distinguish between sectors containing many concentrations of fish and sectors containing few. Use of total catch as an index of abundance required that vessels be available to fish in a sector if fish were present. We believe this requirement was fulfilled, since competition for fishing sites was intense, and since the even distribution of headboats and their high speed allowed them access to every grid sector within the 100 m isobath (Fig. 8). A high catch, therefore, indicated great abundance and a low catch indicated scarcity. Mapped values are actually indices of total catch, since incomplete reporting reduced the values and overestimation of catches (Huntsman et al. 1978) inflated them.

Table 1. Common and Scientific names of species for which distributions are shown in Figures 1-7.

Blueline tilefish	<u>Caulolatilus microps</u>
Red porgy	<u>Pagrus pagrus</u>
Longspine porgy	<u>Stenotomus caprinus</u>
Spottail porgy	<u>Diplodus holbrooki</u>
White grunt	<u>Haemulon plumieri</u>
Tomtate	<u>H. aurolineatum</u>
Vermilion snapper	<u>Phomboplites aurorubens</u>
Snowy grouper	<u>Epinephelus niveatus</u>
Rock hind	<u>E. adscensionis</u>
Speckled hind	<u>E. drummondhayi</u>
Gag	<u>Mycteroperca microlepis</u>
Scamp	<u>M. phenax</u>
Black sea bass	<u>Centropristis striata</u>
Gray triggerfish	<u>Balistes capriscus</u>

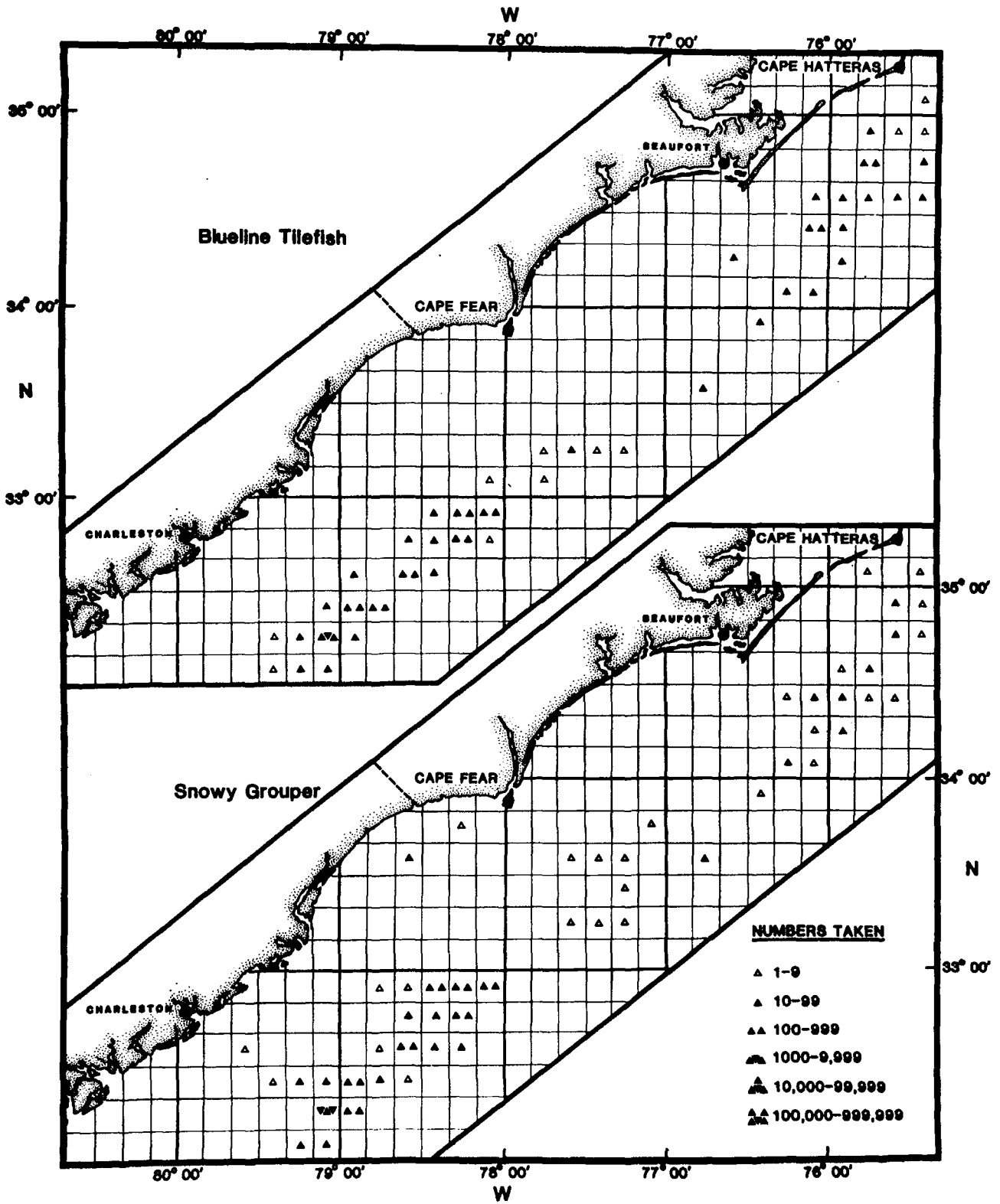


Figure 1. Distribution of catch (numbers) of blueline tilefish and snowy grouper on the North Carolina and South Carolina continental shelf, 1975 to 1978.

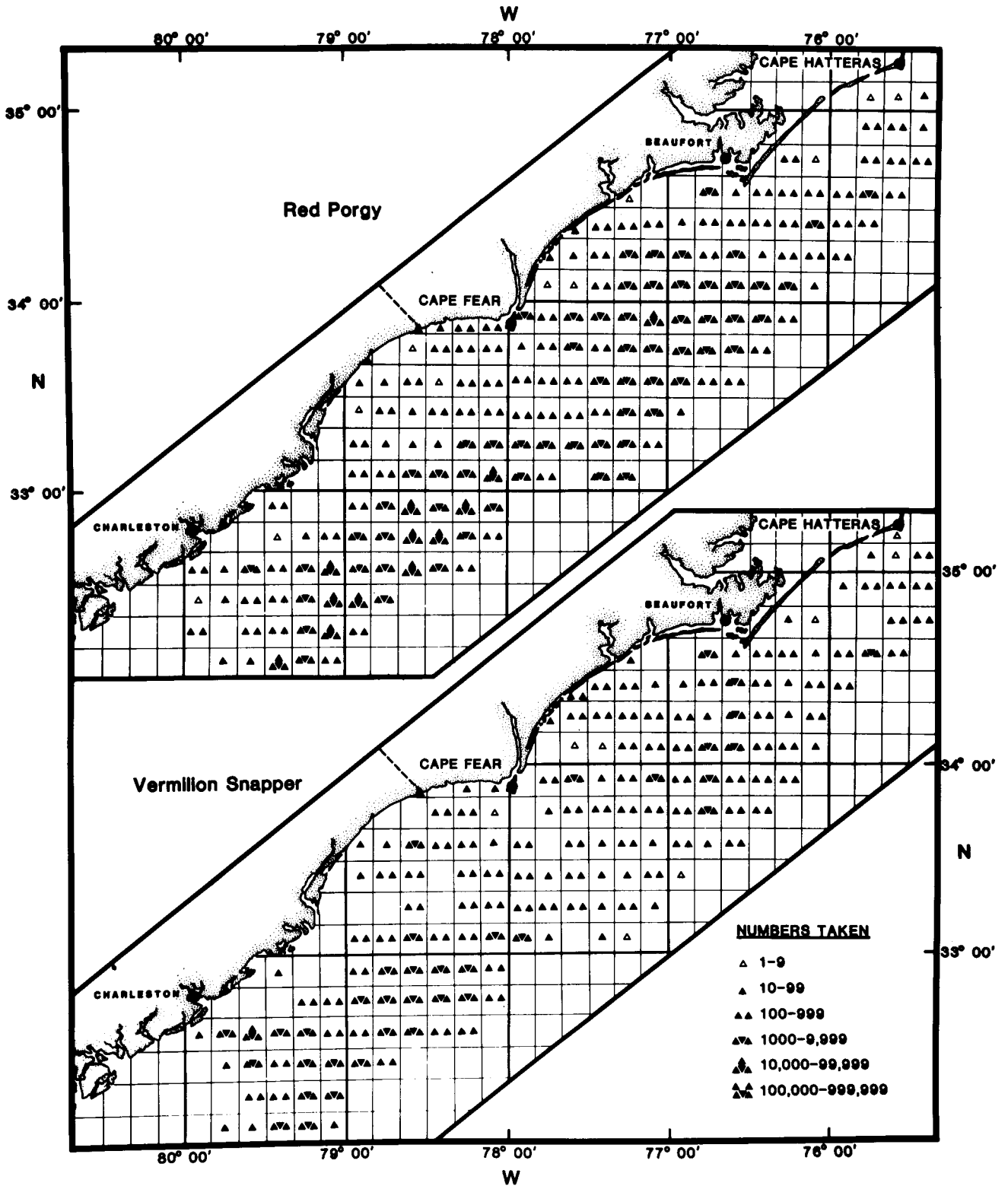


Figure 2. Distribution of catch (numbers) of red porgy and vermilion snapper on the North Carolina and South Carolina continental shelf, 1975 to 1978.



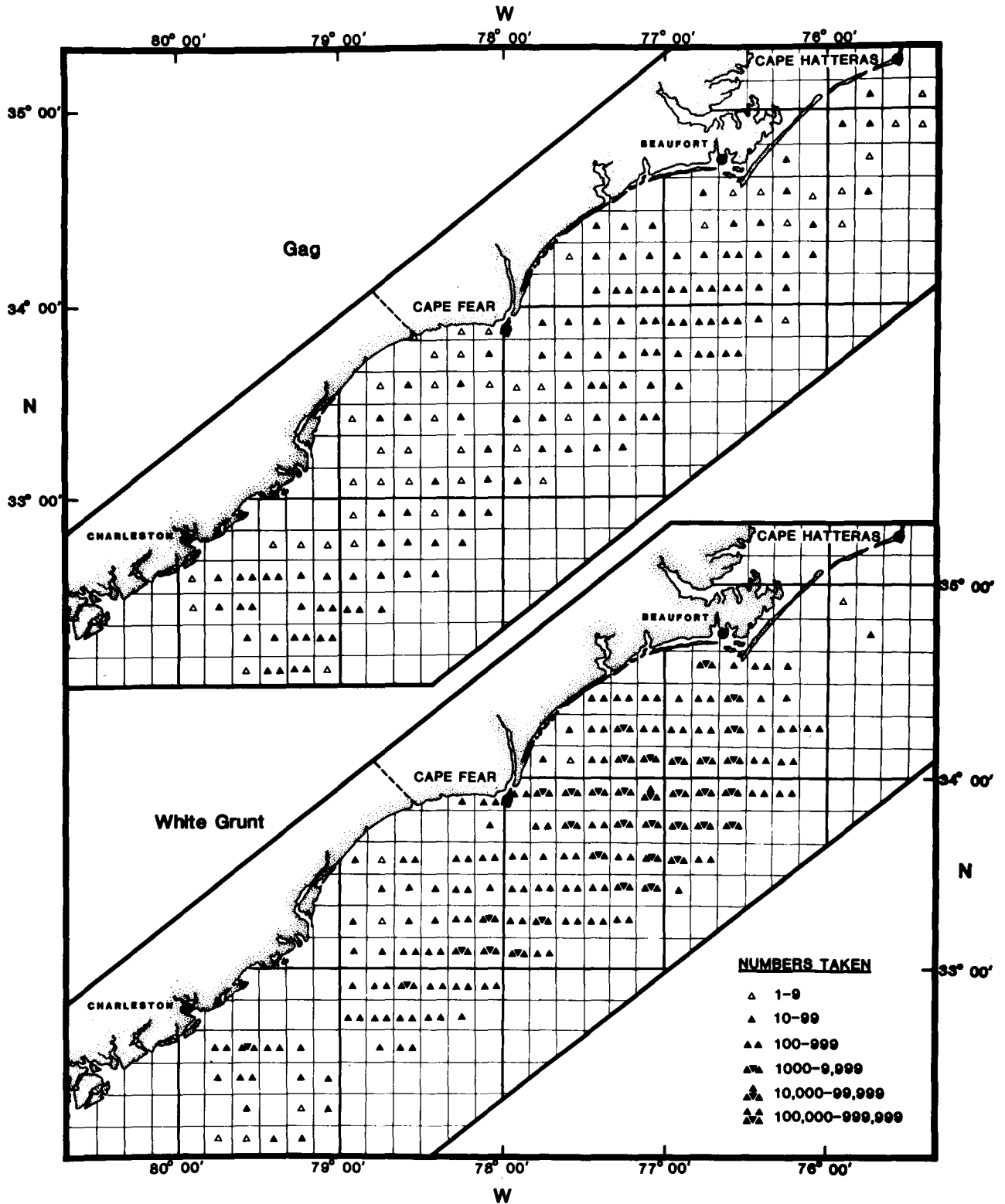


Figure 3. Distribution of catch (numbers) of gag and white grunt on the North Carolina and South Carolina continental shelf, 1975 to 1978.

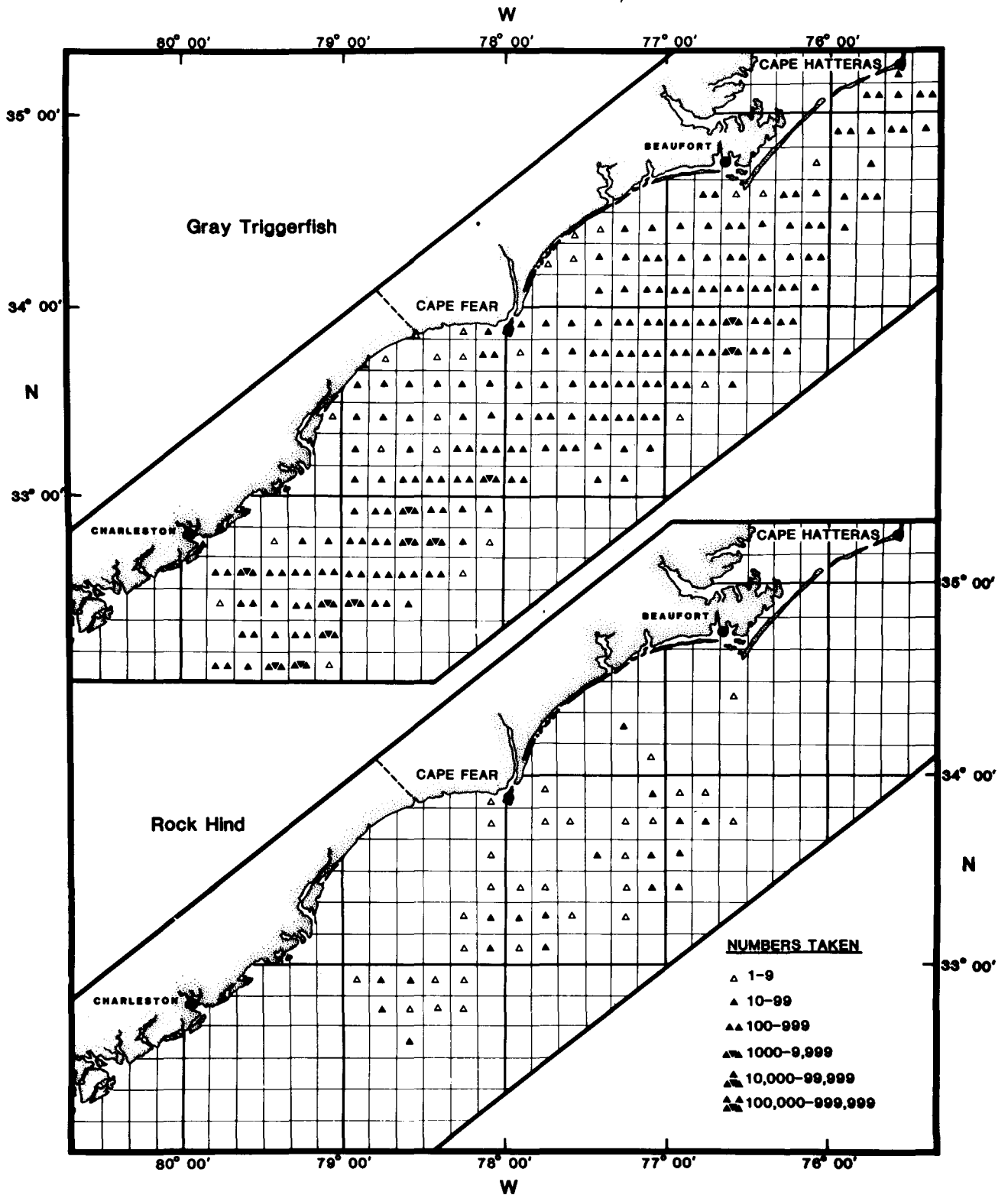


Figure 4. Distribution of catch (numbers) of gray triggerfish and rock hind on the North Carolina and South Carolina continental shelf, 1975 to 1978.

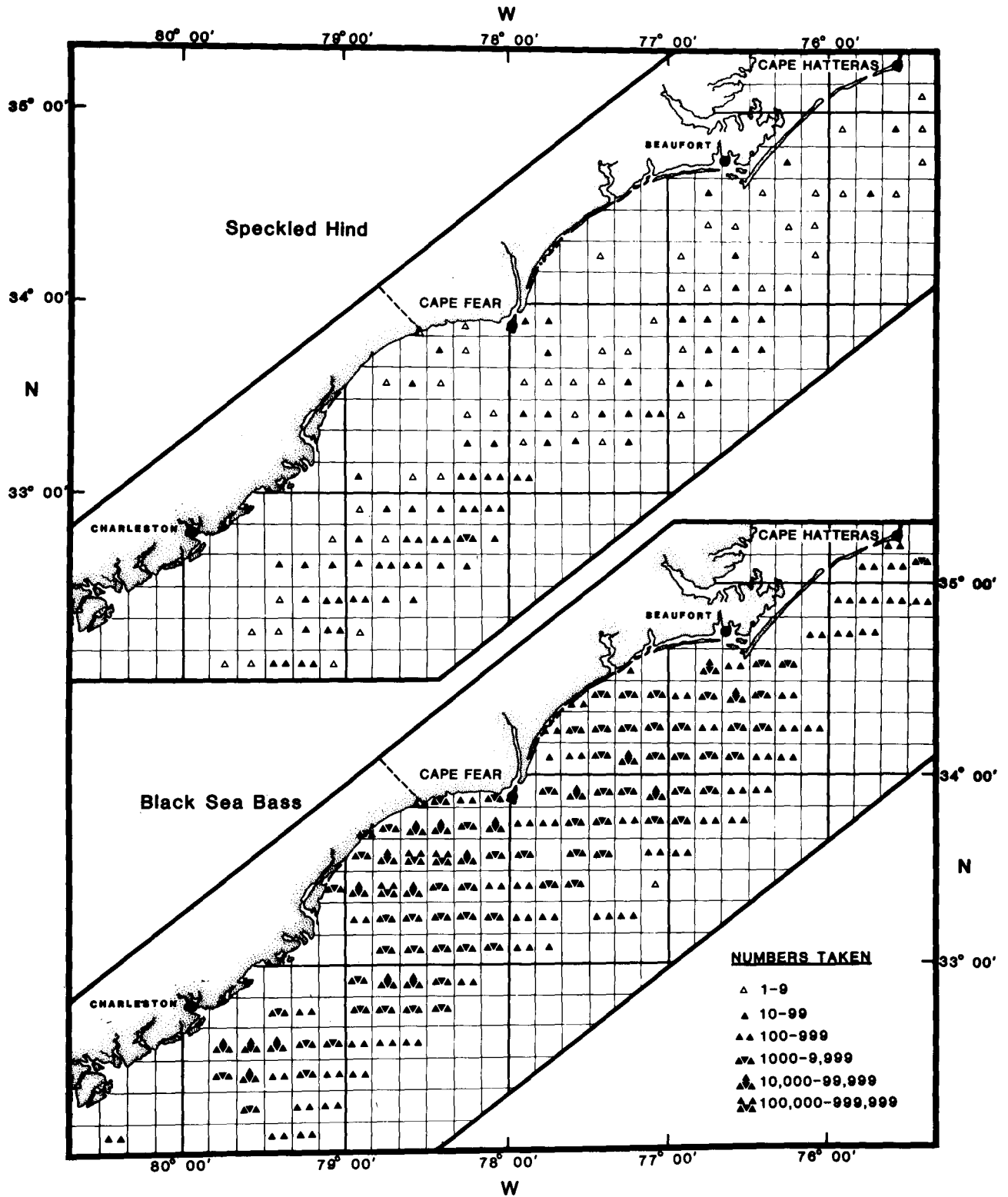


Figure 5. Distribution of catch (numbers) of speckled hind and black sea bass on the North Carolina and South Carolina continental shelf, 1975 to 1978.

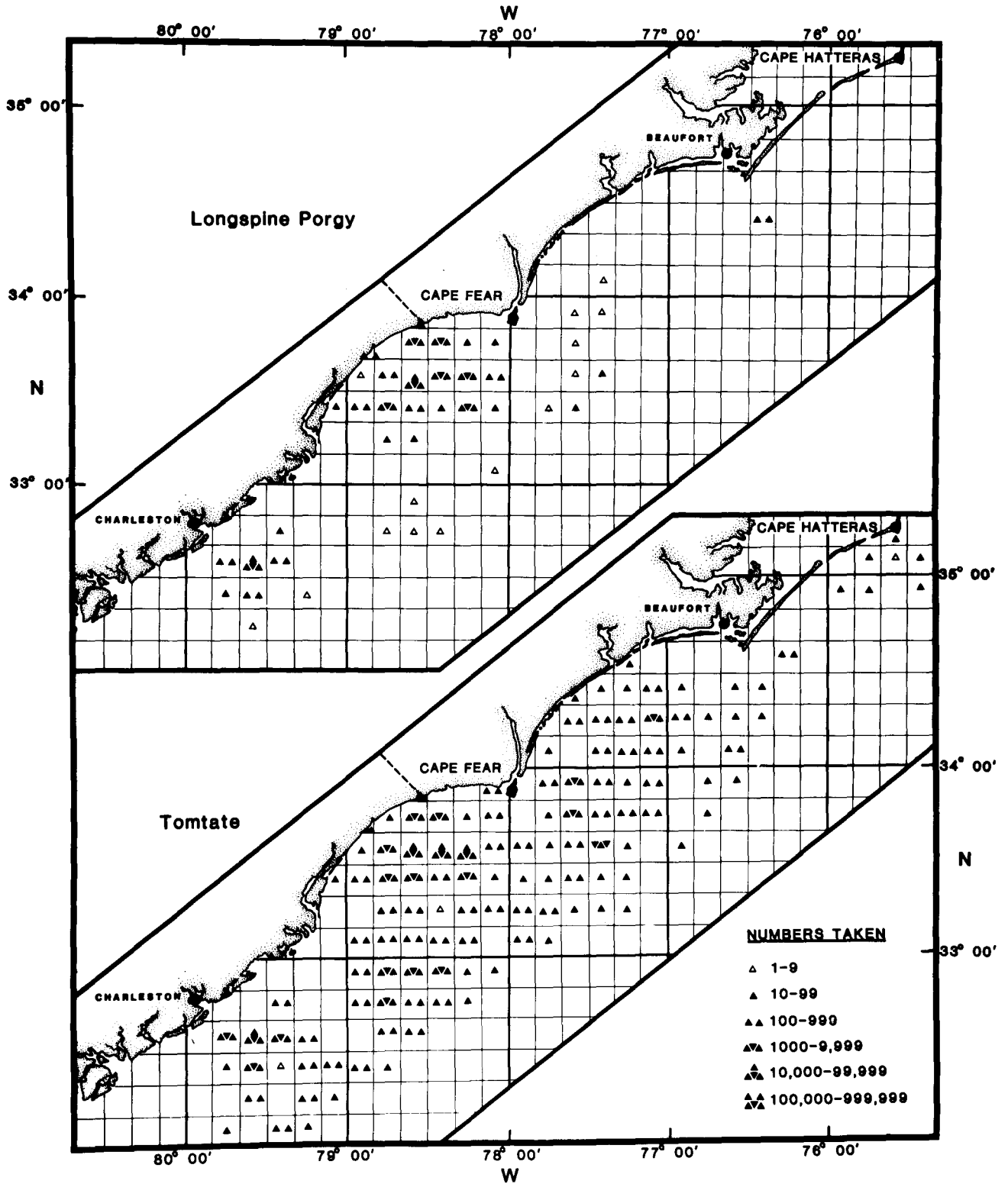


Figure 6. Distribution of catch (numbers) of longspine porgy and tomtate on the North Carolina and South Carolina continental shelf, 1975 to 1978.

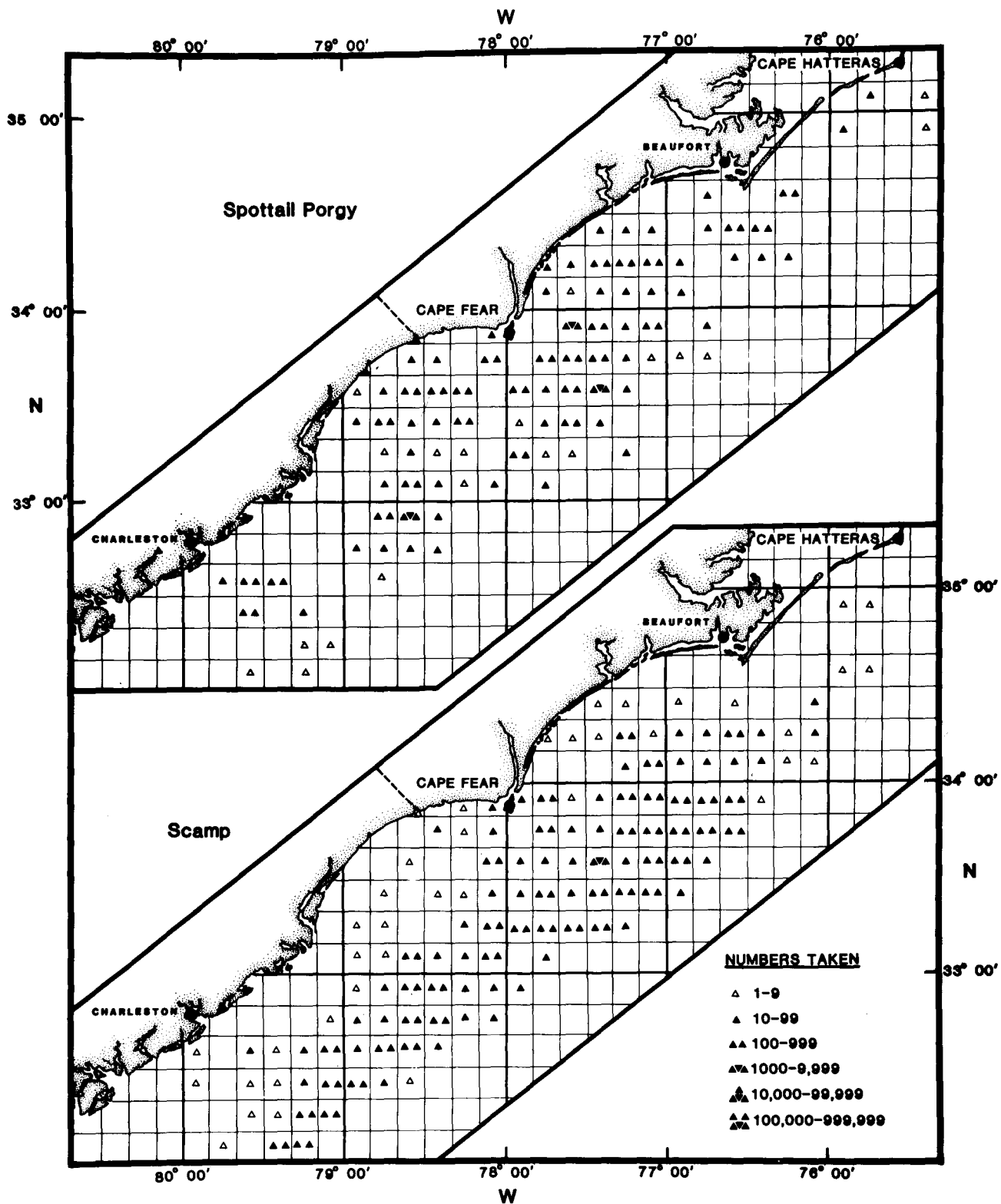
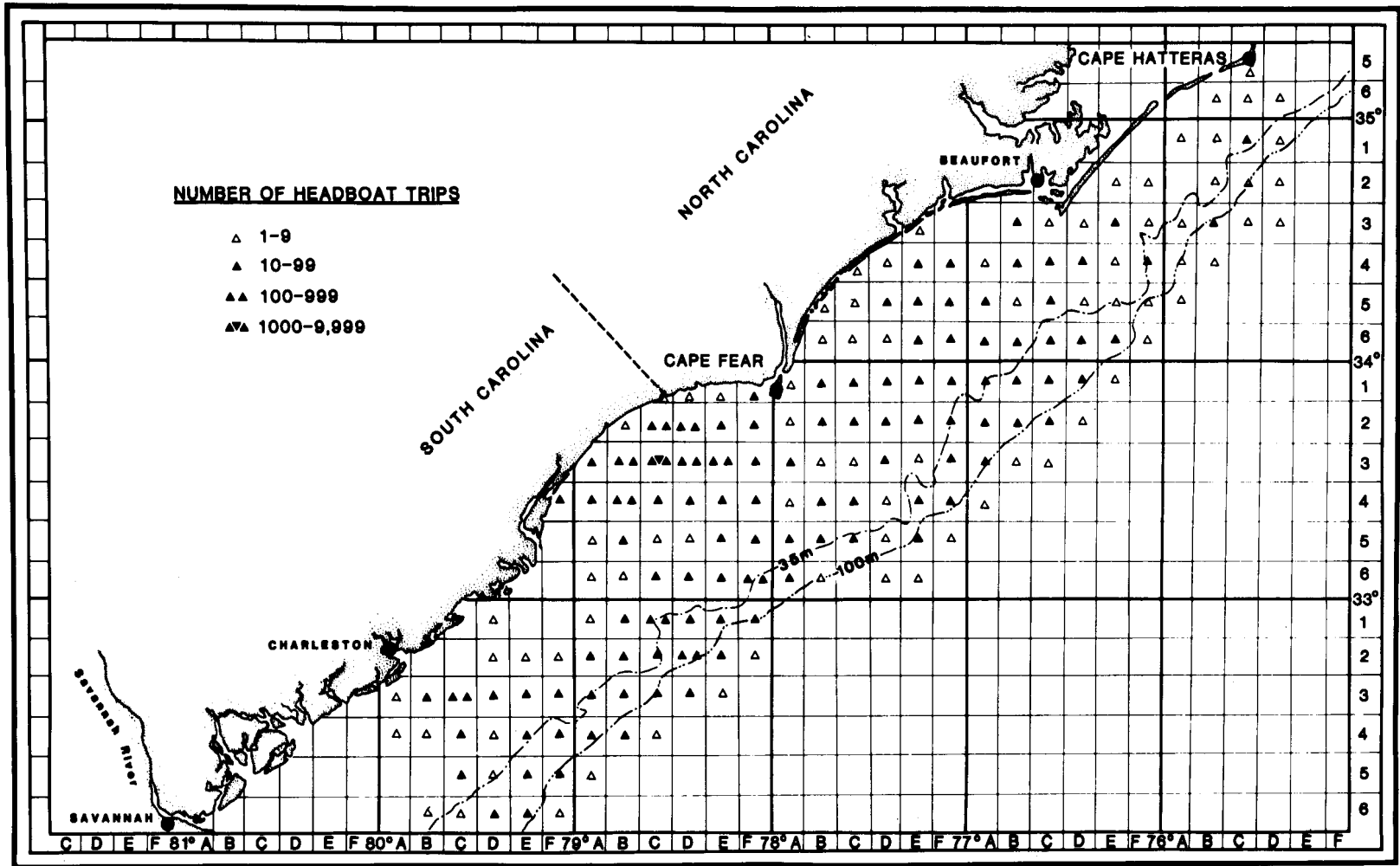


Figure 7. Distribution of catch (numbers) of spottail porgy and scamp on the North Carolina and South Carolina continental shelf, 1975 to 1978.

Figure 8. Geographic distribution of headboat trips for which catch records are available, 1975-1978.



## LITERATURE CITED

- Grimes, C. B., C. S. Manooch, III, and G. R. Huntsman. 1982. Reef and rock outcropping fishes of the outer continental shelf of North Carolina and South Carolina, and ecological notes on the red porgy and vermilion snapper. *Bull. Mar. Sci.* 32: 277-289.
- Huntman, G. R. 1976. Offshore headboat fishing in North Carolina and South Carolina. *U.S. Natl. Mar. Fish. Serv. Mar. Fish. Rev.* 38: 13-23.
- Huntsman, G. R., D. R. Colby, and R. L. Dixon. 1978. Measuring catches in the Carolina headboat fishery. *Trans. Am. Fish. Soc.* 107: 241-245.
- Ulrich, G. F., R. J. Rhodes, and K. J. Roberts. 1976. Status reports on the commercial snapper-grouper fisheries off South Carolina. *Proc. Gulf Caribb. Fish. Inst.* 29: 102-125.