

## SEA TURTLE CAPTURES OFF THE SOUTHEASTERN UNITED STATES BY EXPLORATORY FISHING VESSELS 1950-1976

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### INTRODUCTION

Since 1950 the National Marine Fisheries Service has conducted exploratory trawling activities along the south Atlantic and Gulf coast of the United States as well as through the rest of the Gulf of Mexico and Caribbean Sea, including the northeast coast of South America. Over the past 26 years, exploratory, experimental, and simulated commercial fishing representing approximately 54 vessel-years was accomplished (Figure 1). Catch records for the National Marine Fisheries Service vessels, *Oregon*, *Oregon II*, and *George M. Bowers* and from the chartered vessels *Pelican*, *Combat*, and *Silver Bay* have been maintained in the Southeast Fisheries Center data bank at Pascagoula, Mississippi. All incidental captures of marine turtles (Figure 2) were recorded and maintained in the data system. A total of 53 turtles have been taken during this period, including 41 loggerhead (*Caretta caretta*), seven green (*Chelonia mydas*), four hawksbill (*Eretmochelys imbricata*), and one leatherback (*Demochelys coriacea coriacea*).

Since trawling activities have been implicated in marine turtle mortalities, it was felt that an ex-

amination of these records might reveal discernible patterns for these incidental catches. If these records were established as a representative sample of trawling activities, it might be possible to extrapolate turtle captures and possible mortalities. Secondly, and more importantly, it is hoped that these data might reveal evidence of behavioral patterns and provide suggestions to significantly reduce incidental captures.

### DATA TREATMENT

The Southeast Fisheries Center data bank is organized into seven faunal zones (2, 3, 4, 5, 6, 7, 28) between Cape Hatteras, North Carolina, and Brownsville, Texas (Figure 3). Discussions in this paper are separated by faunal zones. Parameters examined within each faunal zone include: total trawling effort and captures by season, time of day, water depth, size and type of trawl, and length of tow.

Unfortunately, the records do not include precise information on mortalities. However, by reviewing captures with vessel and program staff, it

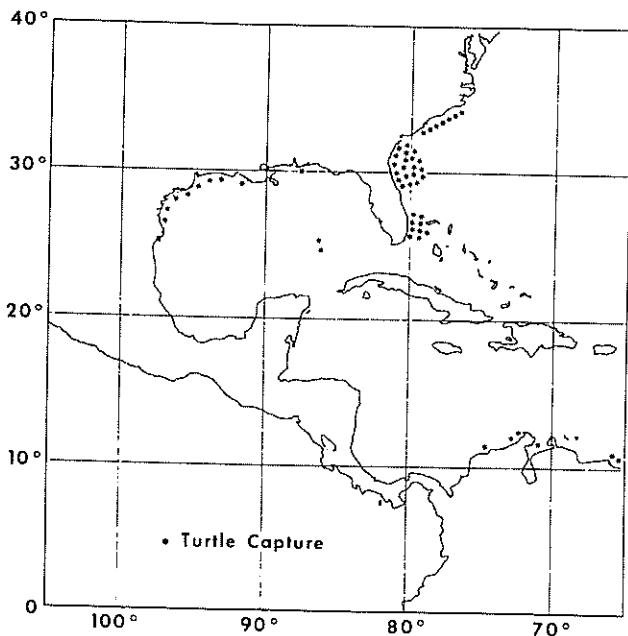


Figure 2. Exploratory fishing turtle captures—Gulf of Mexico and Caribbean Sea.

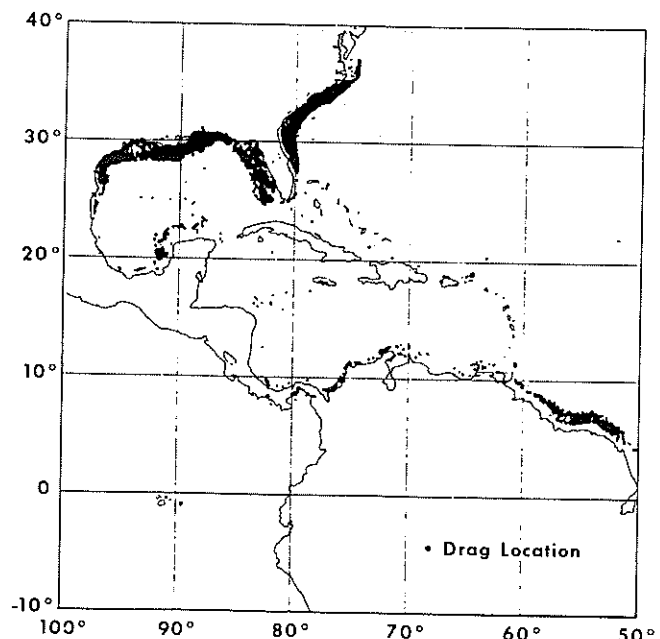


Figure 1. Exploratory fishing effort—Gulf of Mexico and Caribbean Sea.

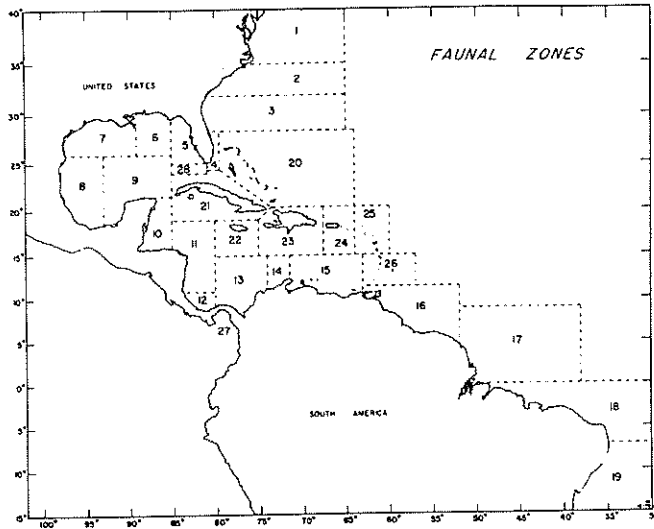


Figure 3. Faunal Zones - Automatic data processing, Southeast Fisheries Center - Pascagoula Laboratory.

has been possible to identify only two fatalities (dead-on-deck) out of the 53 total captures. On several captures, it was obvious that the turtles were exhausted; however, these all seemed to recover on deck and were subsequently released.

These data were retrieved from two data banks, Pascagoula and Bay St. Louis, Mississippi. Slight differences in content and statistical catch and effort data for the two banks produced slightly discrepant results in some instances.

Further, we have noted in recent communications and public testimony that many mortality estimates are centered in coastal sounds and inside waters. None of the exploratory trawling data covered in this report comes from inside waters. Therefore, it has not been possible to determine a meaningful relationship between reported commercial catches, mortalities and these data. In fact, the data show significantly different capture rates and patterns than have been previously described.

Only those stations in which trawling occurred inside the 50-fathom depth curve have been considered for this report.

## RESULTS

Multiple correlations were performed on turtle captures as a function of depth, gear type and size, time of day and season or quarter. Positive correlations existed between turtle capture and gear size, time of day, and season. Greater catch rates were made with the higher opening bottomfish trawls of 18 m or more headrope length than with the smaller (less than 18 m) shrimp trawls. A turtle capture rate

of 0.009 turtles/h was calculated for the larger trawls (2,955 hours total bottomfish trawl effort and 29 turtle captures). A rate of 0.004 turtles/h (4,670 hours total shrimp trawl effort and 19 turtle captures) was calculated for the smaller trawls, even though about 50% more effort was expended utilizing the shrimp trawls.

As mentioned above, positive correlations also existed between turtle captures and time of day and season. Turtle captures were positively correlated to fishing during daylight hours and in the fall and winter quarters.

Since over 50% of turtles captured are found in faunal zones 2, 3, and 4 (Cape Hatteras to the southern tip of Florida), data from these zones have been separated and analyzed in terms of capture depth, quarter and time of day (Figures 4, 5, 6). Turtle species captured within zones 2, 3, and 4 are given in Table 1.

TABLE 1. TURTLE SPECIES CAPTURED.

Zone	Species	Number
2	Loggerhead	6
	Hawksbill	1
3	Loggerhead	20
4	Loggerhead	9

Figures 4, 5, and 6 display three parameters: turtles per hour, percent effort and percent turtles as related to the specific function (depth, quarter, time). The percent effort and percent turtles categories describe data quality. Quantitative information is associated with the turtle/h curve. Zonal summations for each function are present at the bottom of each figure.

Considering turtle capture as a function of depth (Figure 4) most captures occurred inshore (0 - 20 fm) with declining captures offshore (20 - 50 fm). Turtle catch rate increases inshore moving from north to south.

Turtle capture as a function of quarter (Figure 5) declined in spring and summer and increased in fall and winter.

Turtle capture and effort data were grouped into six-hour time increments to determine if any correlation exists as a function of time of day (Figure 6). Highest capture rates occurred during daylight hours.

## CONTINUING EFFORTS

The Southeast Fisheries Center is continuing sea turtle studies in areas of behavior, sampling strategies, and population models. A study is being conducted on fishing gear to eliminate incidental sea

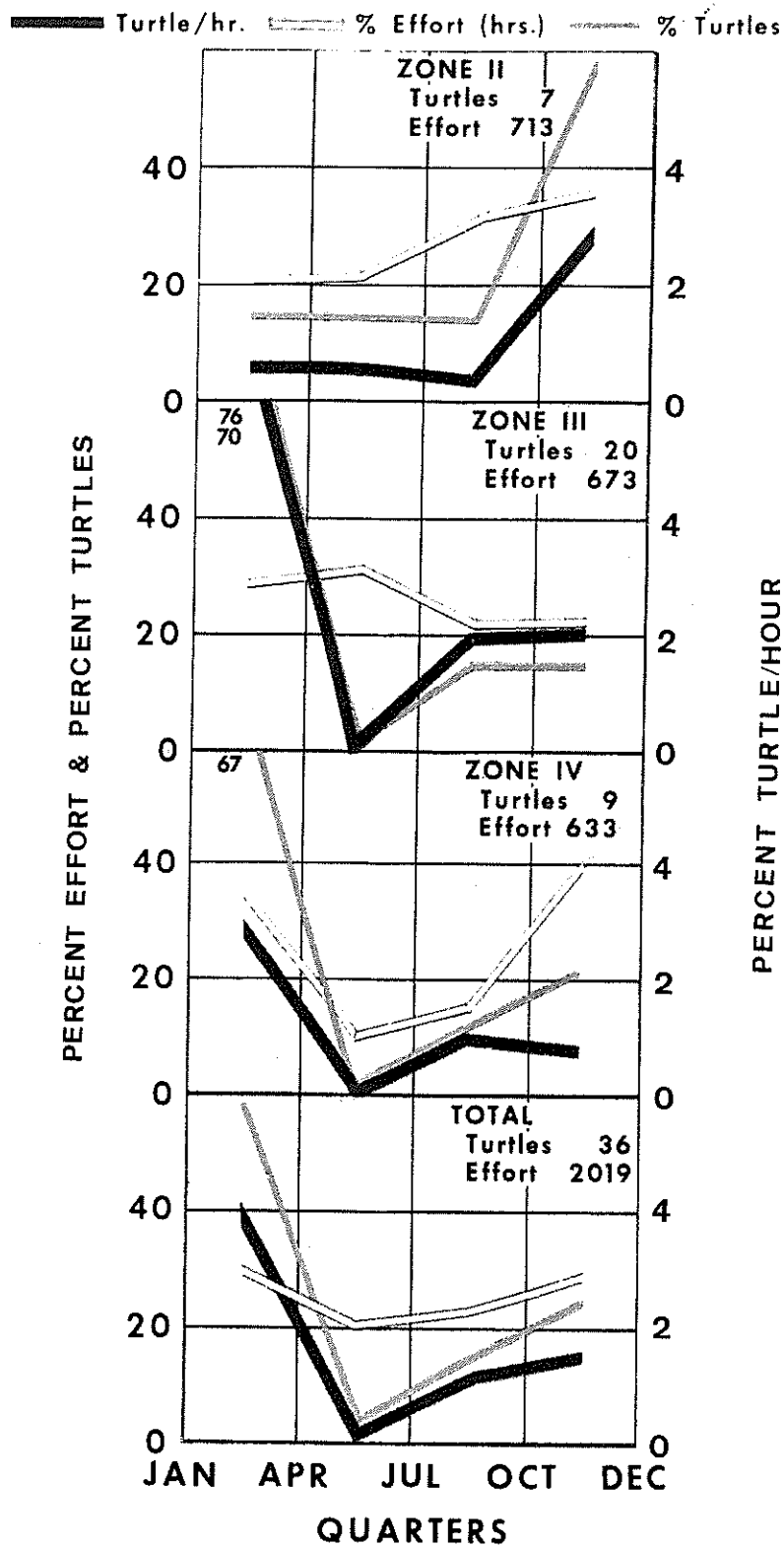


Figure 4. Turtle capture as a function of quarter.

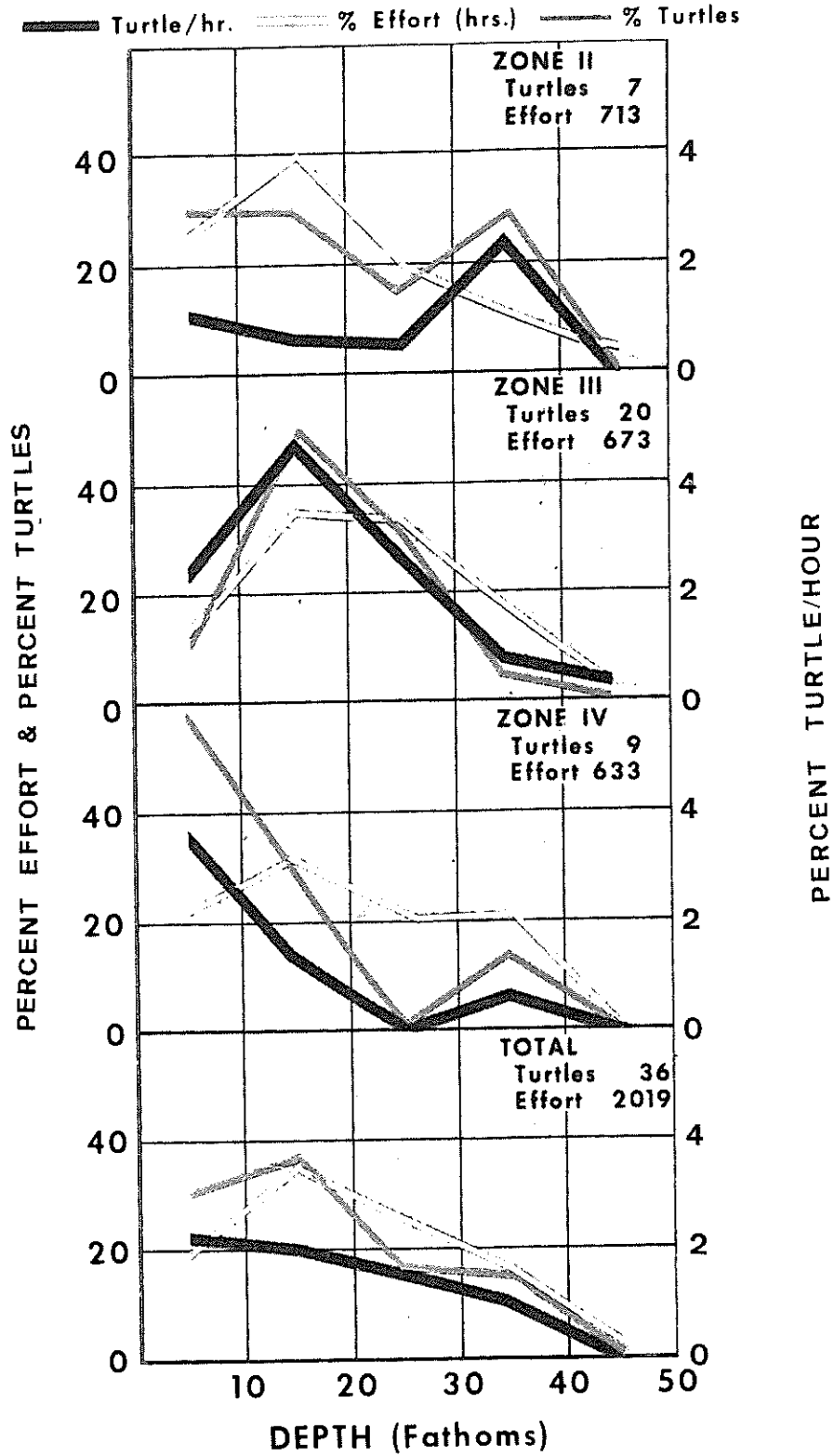


Figure 5. Turtle capture as a function of depth.

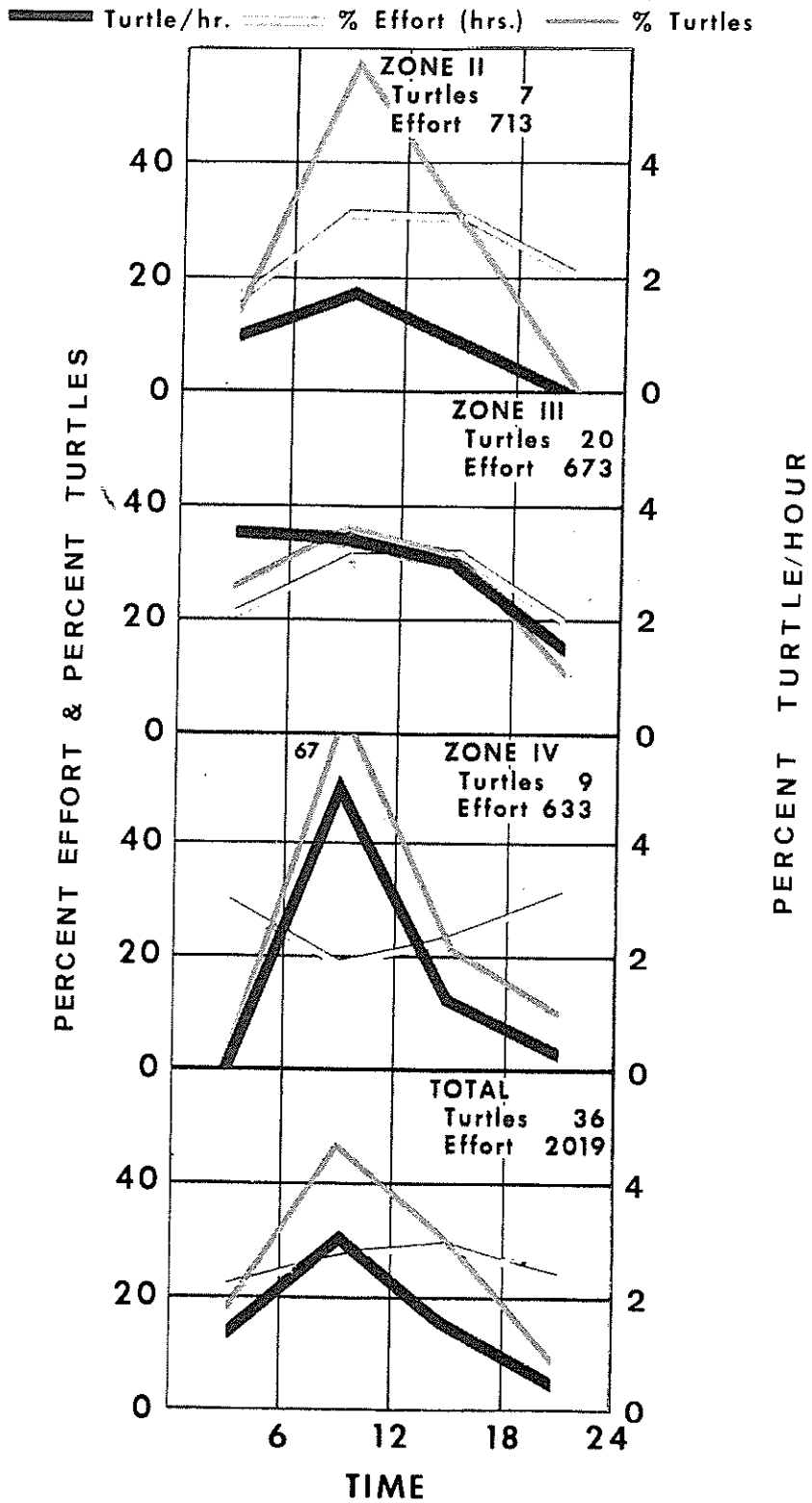


Figure 6. Turtle capture as a function of time.

turtle captures during commercial fishing operations.

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