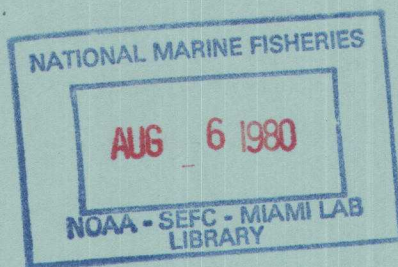
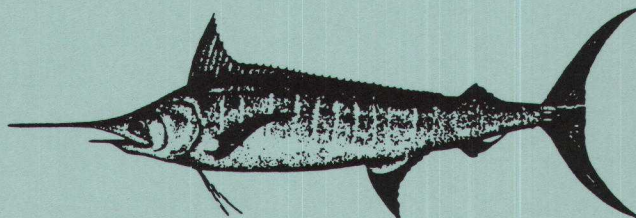


NOAA Technical Memorandum

NMFS-SEFC-23



BIG GAME FISHING IN THE NORTHERN
GULF OF MEXICO DURING 1979.



Paul J. Pristas

July 1980

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Center
Panama City Laboratory
3500 Delwood Beach Road
Panama City, Florida 32407

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Richard A. Frank, Administrator
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Terry L. Leitzell, Assistant Administrator for Fisheries

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INTRODUCTION

This is the ninth annual report on big game fishing in the northern Gulf of Mexico. The purpose of these reports was to present to the fishing constituents the results of analyses of the data that we collected from them in return for their cooperation in supplying us the data. These reports, produced for the benefit of fishermen, would not have been possible without the excellent cooperation given by sport fishermen, charter boat captains and other big game fishing enthusiasts.

The study of big game fishes in the northern Gulf of Mexico began in 1970 after the resource potential was discovered by the U.S. Fish and Wildlife Service in the mid-1950s. Although the study is conducted at the National Marine Fisheries Service (NMFS) Panama City Laboratory, data collection is a function of the Technical and Information Management Services - Southeast Fisheries Center - for the Center's Oceanic Pelagics Program. The purposes of this study are to assess the stock status of blue marlin (Makaira nigricans), white marlin (Tetrapturus albidus), and sailfish (Istiophorus platypterus); to determine their relative abundance and distribution; and to study their biology and ecology.

SURVEY DATA

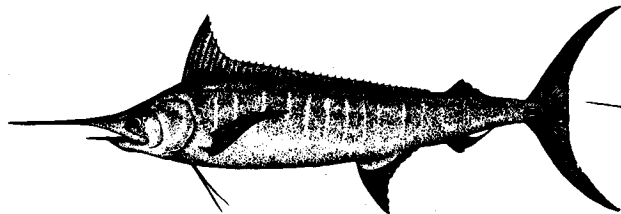
To collect data on big game fishing, the NMFS had port samplers stationed through the season as follows: one at Port Aransas, Texas (northwestern Gulf); one each at Grand Isle and South Pass, Louisiana (northcentral Gulf); one at Mobile, Alabama/Pensacola, Florida, and one each at Destin, and Panama City, Florida (northeastern Gulf). Although most dock sampling (nontournament) data came from Port Aransas, the majority of Texas data came from collections along the Texas coast and is, therefore, listed as Texas data. Data included: weather conditions; time fishing started and number of hours fished; type of bait; fishing technique; fish (by species) raised, hooked, and boated or released, and time of day these actions occurred; length, weight, and sex; and fishing effort by area (latitude and longitude). When an interview revealed that fishing had occurred in several 10-minute (latitude and longitude) squares with no indication of the amount of time spent in each square, equal fishing time was allotted to each square by dividing the total fishing time by the number of squares.

The fishing effort reported in this study is the amount of time trolled for big game fishes minus the time spent fighting a fish. Most analyses from this trolling activity are related to catches of marlins and sailfish. The reporting of spearfish (T. pflugeri) and swordfish (Xiphias gladius) in Table 1 is only for documentation of these catches. In addition, the port samplers recorded over 800 hr of driftfishing (Table 1a). Biological data in Tables 2 and 3 are for fishes taken by both fishing methods.

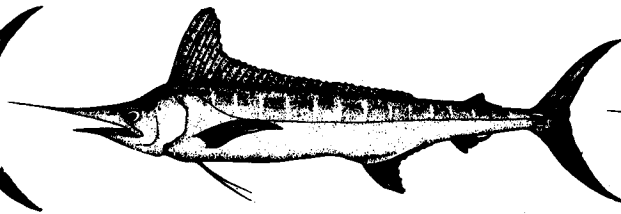
CATCH AND EFFORT

In 1979, we recorded 23,937.4 hr of fishing effort (Table 1), which was 24% (7,405.5 hr) less than in the previous year. Panama City and Mobile were the only two ports where increased fishing effort was recorded, with increases over the previous season of 12% and 41%, respectively. Recorded effort decreased 56% at Destin, 34% at Pensacola, 18% at South Pass, 11% at Grand Isle, and 28% in Texas. Compared to the 1978 season, these percentages represent a 28%

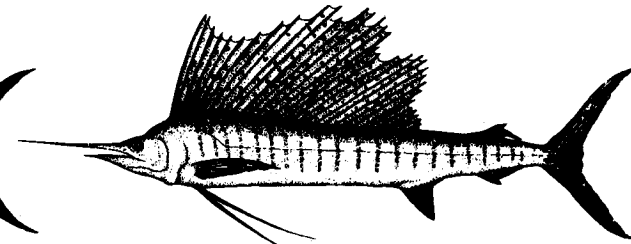
1979 SUMMARY FOR THE NORTHERN GULF OF MEXICO



BLUE MARLIN



WHITE MARLIN



SAILFISH

Percent of hooked fish boated or released

40.5

50.5

65.0

Size range (pounds)

45.0 - 665.8

9.8 - 111.5

2.0 - 86.0

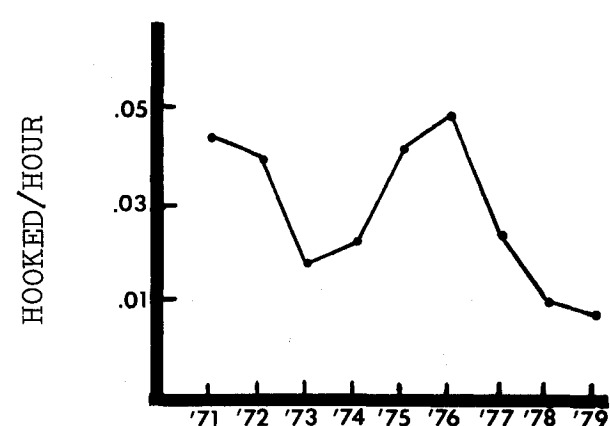
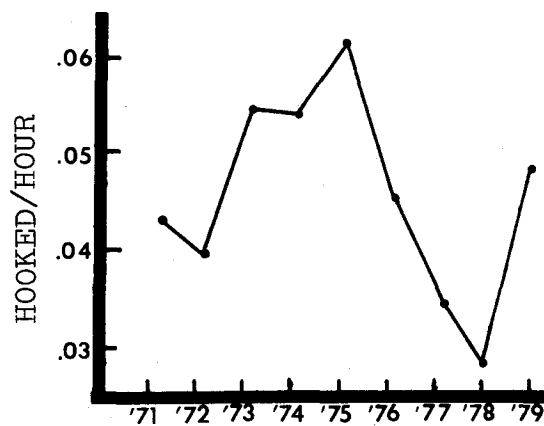
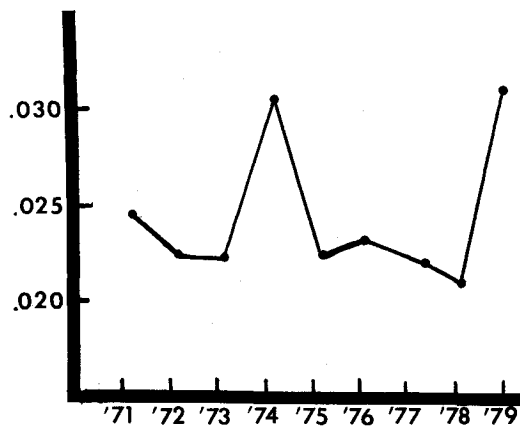
Sex ratio (M:F)

1:4.6

1:1.5

1:2.5

Relative abundance



Y E A R

decrease in the northwestern Gulf.

Recorded catches in 1979 (Table 1) of blue marlin and white marlin increased, while those of sailfish decreased from 1978. Of these catches, 19 blue marlin, 100 white marlin, and 14 sailfish were released. Compared to the previous season, increases in catch per hour (CPH) of these combined three species occurred at: Destin (20%); Pensacola (200%); Mobile (11%); South Pass (67%); Grand Isle (75%); and Texas (61%). The CPH decreased 25% at Panama City. The CPH recorded throughout the northern Gulf of Mexico showed a 39% increase over the previous season.

The CPH for the three species either increased or remained unchanged from the previous year (Fig. 1). For blue marlin it (0.013) increased 44% over the 1978 CPH and was 30% above the previous 8-yr average. For white marlin, the CPH (0.024) was 50% above the 1978 rate and was 4% below the 8-yr average. The catch rate sailfish (0.006) was the same as in 1978 and was 68% below the average for the previous eight years. The CPH of all combined species (0.043) was 20% below the 8-yr average.

For the second consecutive year, the number of hours spent driftfishing, primarily for swordfish, was documented (Table 1a). The 816 hr represent an increase of 29% over 1978 in recorded driftfishing effort. The majority of the effort (44%) and the greatest number of catches (27) were recorded from Destin, with the highest CPH (0.101) recorded at Pensacola. Although the combined CPH resulted in a 67% higher CPH than did trolling.

SIZE COMPOSITION

The largest, smallest, and average weights of billfishes taken while trolling or driftfishing were determined (Table 2). As in the past three seasons, the largest blue marlin (665.8 lb) was reported from the northcentral Gulf (South Pass). The largest white marlin (111.5 lb) was landed in Texas and was only 1.8 lb less than the record white marlin, which was landed at Destin last year. The smallest white marlin (9.8 lb), also reported from Texas, was only 101 cm from tip of lower jaw to tail fork and was the smallest of this species we have ever recorded. Both the largest (86.0 lb) and smallest (2.0) sailfish were landed in the northeastern Gulf: Pensacola and Destin, respectively. Only two spearfish were weighed this season, both at Panama City. Fifty-four swordfish weights were recorded. The largest fish (317.0 lb) was landed in Texas, while the smallest (6.3 lb) was reported from Pensacola.

The average weights of blue marlin, white marlin, and sailfish were compared for the nine years of this study (Fig. 2). The blue marlin average weight for 1979 (275 lb) was the highest for the 9-year period and was 23 lb above the previous 8-yr average. White marlin averaged 52 lb, a weight slightly below the 8-yr average of 54 lb. Sailfish averaged 45 lb, which was 2 lb above the average weight from 1971 to 1978. The average weight of blue marlin appeared to have an increasing trend over the last five years whereas for the other two species, neither an increasing or decreasing long term trend was readily discernible.

SEX COMPOSITION

In 1979 the sexes of 611 billfishes were determined (Table 3). The number of female blue marlin per male (4.6:1) exceeded that for last year (4.4:1) and is the highest such ratio recorded for this species thus far. This was the third consecutive year that female blue marlin outnumbered males by more than 4:1. The nearly equal ratio (1.5:1) of female to male white marlin occurred again this year. This ratio has remained less than 2:1 during the past three seasons. In last year's report, I noted that when the CPH of sailfish was low, females outnumbered males by a large margin (i.e., more than 2:1) and, conversely, when the CPH of sailfish was high, the female to male ratio would drop below 2:1. This season the CPH of sailfish equalled the lowest CPHs recorded in 1973 and 1976, and females outnumbered males by the second highest ratio (2.5:1) on record (highest ratio, 2.6:1, occurred in 1978). During 1979, only two spearfish (one male, one female) and four swordfish (three males, one female) were examined.

RELATIVE ABUNDANCE

As an index of relative abundance, hooked-per-unit-of-effort (HPUE), i.e., the number of fish hooked-per-hour-of-trolling, was used (Table 4). The HPUE for blue marlin increased at all ports with the exception of Mobile, where a moderate decrease (17%) was recorded. Once again, blue marlin appeared to be most abundant in the northcentral Gulf with the highest HPUE (0.041) recorded at South Pass. The HPUE for white marlin increased at all ports, with a 2.25-fold increase over the previous season in the northwestern Gulf. For sailfish, the HPUE increased at Pensacola, Mobile, and Grand Isle; decreased at Panama City, Destin, and Texas; and remained the same at South Pass. In the northwestern Gulf, where these fish are generally most abundant, a decrease of nearly 13% occurred.

Because of the increase in the apparent relative abundance of marlins in 1979, the general abundance of billfishes in the northern Gulf appeared to reverse the declining trend recorded for the previous three years (Fig. 3). Compared to 1978, the HPUE for blue marlin increased 52% and was 39% greater than the 8-yr average. The HPUE for white marlin increased 78% over 1978 and was 7% above the 8-yr average. For sailfish, the HPUE (0.009) was the lowest we have recorded during the nine years of study and was 70% below the average of the previous eight years. For the three combined species, the HPUE in 1979 increased 52% over the previous season, but remained 11% below the average rate of the preceding eight seasons.

Between 1972 and 1979, the percent of total recorded fishing effort that was expended in tournament fishing ranged from about 5% to 65%. Since 1975, over 40% of the collected data have been tournament data. At times, the HPUEs from both sources of data have differed considerably.

To compare relative abundance as measured by the two methods of sampling, the yearly HPUE from tournament data, dock data, and both combined were calculated (Fig. 4). Year-to-year trends in relative abundance of blue marlin appeared to be the most inconsistent of the three species. From 1975 to 1979, the year-to-year changes in the two HPUEs coincided only once. For whitemarlin, the year-to-year trends in the HPUE of tournament and nontournament fishing were in the same direction since 1975. The HPUE rates of sailfish have shown the most consistent agreement between tournament and nontournament fishing. Between 1972 and 1979, the HPUEs from the two

sources of data have tended in the same direction five of the seven times. When data for all three species were combined, the two HPUEs showed the same trends from 1975 to 1979. In 1979, for each of the three species, the HPUEs calculated from the two types of fishing efforts were nearly identical. Thus, when the amount of tournament data exceeded 40%, there was general agreement on the relative abundance as measured by the two types of data.

In two previous reports from this study, fluctuations in the indexes of relative abundance were made from two fisheries: recreational (U.S. sport) and commercial (Japanese longline). Despite differences in estimators of abundance (hook rate vs. catch rate), differences in fishing gear, the generally separate fishing areas, and the inclusion of spearfish in Japanese sailfish data, year-to-year fluctuations of the indexes for the two fisheries coincided 60% of the time.

To determine better if data from both fisheries were measuring similar changes in the apparent relative abundance of billfishes, monthly comparisons of the HPUE of the recreational fishery and the catch-per-thousand-hooks (CPUE) of the commercial fishery were made from 1971 to 1977 (Fig. 5). During six of the seven years, the indexes of relative abundance for both fisheries generally showed corresponding increasing or decreasing fluctuations throughout the season. Only in 1972, opposite trends occurred: commercial CPUE decreased from May through August while recreational HPUE increased during the same period. Consequently, when the three species were considered as a single resource, data from both fisheries appeared to be measuring similar fluctuations in relative abundance throughout the summer season in the northern Gulf of Mexico.

FISHING SUCCESS

The numbers of fishes that were raised, hooked, and boated or released from each of the areas are shown in Table 5 for the three species. For blue marlin, the success of boating a hooked fish (release included) was practically the same (down 0.5%) as it was the previous year. The success of boating white marlin that were "hooked-up" decreased about 15% compared to 1978. Fishing success for sailfish increased about 5% compared to the previous year. Overall, of the 2,121 billfishes that were reportedly hooked throughout the northern Gulf of Mexico, 48% (1,024) were boated or released compared to 53% in 1978.

FISHING AREA

From previous reports the discussion of fishing areas and the related abundances of billfishes had led to the question of whether there had been a shift of fishing effort over various areas that could account for apparent shifts in abundance. Consequently, the amount of yearly effort expended in each area was plotted from 1971 to 1978. These data showed there was no significant shift in fishing effort by area and time that could be related to fluctuations in abundance, as indicated by the number of fish raised.

The number of fish raised-per-hour-of-trolling by 10-min latitude and longitude squares for the three areas of the northern Gulf are shown in Charts 1-12. Fishing areas where 10 hr or more of trolling activity occurred are marked by heavy black outline; blank squares indicate no fish raised.

Northeastern Gulf

The fished area in 1979 (Charts 1-4) were almost the same in size as in 1978 (66 vs. 65 squares). Last year, we reported that we had recorded fishing south of 29°N latitude for the first time in this study. In 1979, the reported fished areas below this latitude doubled (6 vs. 3 squares) over the previous season; no raised fish were recorded. Blue marlin were raised in 76% (44 squares) of the fished area (Chart 1) compared to 60% (39 squares) of the fished area in the previous season. Although the apparent relative abundance of white marlin (Fig. 3) increased this year, they did not appear to be as widely dispersed as last year (Chart 2). White marlin were raised in only 68% (45 squares) of the fished area compared to 75% (51 squares) in 1978. In 1978, white marlin were raised in all three fished squares south of 29°N latitude. Sailfish were reported in only 42% (28 squares) of the fishing area (Chart 3), compared to 68% (44 squares) in 1978. No sailfish were raised south of 29°N latitude, whereas, in 1978 they were raised in one of the three squares. Billfishes appeared to be concentrated in a smaller area in 1979 (Chart 4) compared to 1978. Even though their apparent relative abundance increased this season (Fig. 3), they were reported to have been raised in only 49 (74%) of the 66 fished squares compared to 58 (89%) of the 65 fished squares in 1978.

Northcentral Gulf

In 1979, fishing was restricted to a 39% smaller area (41 vs. 67 squares) in the northcentral Gulf (Charts 5-8) than during the previous season. Chart 5 shows blue marlin were raised in 83% of the fished area and, in contrast to other seasons, had their highest concentration inshore. Chart 6 shows the percentage of the area (71%) in which white marlin were raised. It was about the same as the previous season, but the number of squares (29) where white marlin were seen was considerably less than the 47 squares in 1978. As in past seasons, the number of sailfish raised (13) was so small that only seven squares (17%) had sailfish recorded in them (Chart 7). Chart 8 shows billfishes were raised in about the same percent of the fishing area as in 1978 (93% and 91%, respectively). However, in 1979 higher concentrations generally occurred closer to shore.

Northwestern Gulf

In the northwestern Gulf, the majority of data was from the central portion of the Texas coast. The port sampler, stationed at Port Aransas, was only able to cover two tournaments in south Texas (Texas International Fishing Tournament, South Padre Island; Port Mansfield Fishing Tournament, Port Mansfield) and one tournament in North Texas (Eagle Claw Texas Open, Freeport). Even with this limited coverage, Charts 9-12 show the reported fishing area for the northwestern Gulf expanded from 54 squares in 1978 to 101 squares in 1979. Blue marlin were raised in 44% (44 squares) of the fished area and were more widely distributed than the other two species (Chart 9). Generally, higher concentrations were found closer to shore than during the previous season, when they were most abundant between the 100 and 300-fath curves. Fishermen reported raising white marlin in 37% (37 squares) of the fishing area compared to 39% (16 squares) in 1978 (Chart 10). Although sailfish were raised in only 30% of the fished area (Chart 11), compared to 59% in 1978, the number of squares in which they were reported was nearly the same for the two years (30 and 32 squares, respectively). Billfishes were raised in 60% (61 squares)

of the fished area, with the heavy concentration inshore (square T-220, T-241) to marlins (Chart 12).

RELATED OBSERVATIONS

1. The 317.0-lb swordfish landed during the Eagle Claw Texas Open Fishing Tournament, Freeport, Texas, was 31 lb heavier than the Texas State record, which was landed in August, 1978.
2. A new state record was established in Alabama with the 499.3-lb blue marlin landed during the Blue Water Classic at Orange Beach.
3. We recorded 137 yellowfin tuna (Thunnus albacares) caught during the Texas International Fishing Tournament, which occurred two months after the Ixtoc I oil spill first began in Campeche Bay. Only 154 yellowfin tuna were recorded as caught in the northwestern Gulf during the entire season, compared to 6 in 1978, and 17 in 1977. Many Tournament participants speculated that tuna were forced closer to the Texas fishing grounds by the oil, or that bait species that the tuna depended on were forced closer to shore.
4. Mr. Charles Marshall, fishing aboard his boat "Happy Hooker" during the Pensacola International Billfish Tournament, caught a 67-lb white marlin with a Japanese longline hook embedded in its jaw. The fish had been tagged and released by a NMFS observer aboard a Japanese longline vessel fishing approximately 185 km southwest of South Pass, Louisiana, almost exactly one year earlier.

ACKNOWLEDGMENTS

I am grateful for the cooperation given by the following anglers, charter boatmen, and officers of sport fishing groups: organizers of the Texas Championship Billfish Tournament, and Boatman's Association, Port Aransas; Jesse and Jacquie Edmundson, Freeport; Russ Wilhour, Key Allegro; Walter Fondren, Port O'Conner; organizers of the Texas International Fishing Tournament, Port Isabel; the Port Mansfield Chamber of Commerce, Port Mansfield; the Golden Meadow Big Game Fishing Club; Herman "Dutch" Prager, Jr., Maumus F. Claverie, Jr. and the New Orleans Big Game Fishing Club; the Baton Rouge Big Game Fishing Club; Ralston Reynolds and the Mobile Big Game Fishing Club; Bobby Snellgrove and the Pensacola Big Game Fishing Club; Bert Bookout and the Fort Walton Beach Sailfish Club; Malcolm Patterson, Joy Dunlap and the Destin Charter Boat Association; and the Panama City Fishing Association.

The port samplers made approximately 4,000 interviews to collect these data. I thank Bert Scott, Port Aransas; Myron Fischer, Grand Isle; Joe Yurt, South Pass, Robert Merlano and Meg Brooks, Pensacola; and Kevin Fitzsimmons, Destin, for their outstanding work throughout the season.

I express my gratitude to Conner Davis, Gulf of Mexico Fishery Management Council, for constructive comments about data analyses; and Rita Bloechel, and Carl Saloman, Panama City Laboratory, for the preparation of text and figures, respectively.

I extend a very warm and special thanks to Donna S. Parker, YACC member, Panama City Laboratory, whose help and dedication was especially appreciated.

Table 1.--Summary of recorded trolling for big game fishes in the northern Gulf of Mexico, 1979.

	Panama City	Destin	Pensacola	Mobile	South Pass	Grand Isle	Texas	All Areas Combined
Total hr. trolled	1,221.7	3,143.0	2,265.1	3,447.8	5,450.8	4,046.0	4,363.0	23,937.4
Number of recorded catches*								
Blue marlin	16	46	15	22	98	50	59	306
White marlin	38	111	97	145	88	32	73	584
Sailfish	4	28	18	14	3	3	64	134
Spearfish	2	1	0	0	0	0	0	3
Swordfish	0	0	0	0	0	0	2	2
All billfishes	60	186	130	181	189	85	198	1,029
Catch-per-hour								
Blue marlin	0.013	0.015	0.007	0.006	0.018	0.012	0.014	0.013
White marlin	0.031	0.035	0.043	0.042	0.016	0.008	0.017	0.024
Sailfish	0.003	0.009	0.008	0.004	0.001	0.001	0.015	0.006
Spearfish	0.002	0.000	0	0	0	0	0	0.000
Swordfish	0	0	0	0	0	0	0.000	0.000
All billfishes	0.049	0.059	0.057	0.052	0.035	0.021	0.045	0.043
Hours trolled to catch a								
Blue marlin	76.4	68.3	151.0	156.7	55.6	80.9	73.9	78.2
White marlin	32.2	28.3	23.4	23.8	61.9	126.4	59.8	41.0
Sailfish	305.4	112.2	125.8	246.3	1,816.9	1,348.7	68.2	178.6
Spearfish	610.9	3,143.0	0	0	0	0	0	7,979.1
Swordfish	0	0	0	0	0	0	2,181.5	11,968.7
All billfishes	20.4	16.9	17.4	19.0	28.8	47.6	22.0	23.3

*Includes releases

Table 1a.--Summary of recorded driftfishing for big game fishes in the northern Gulf of Mexico, 1979.

	Panama City	Destin	Pensacola	Mobile	South Pass	Grand Isle	Texas	All Areas Combined
Total hr. fished	115.6	358.6	79.0	35.5	43.3	119.0	65.0	816.0
Number of recorded catches*and catch- per hour()								
Swordfish	7(.061)	26(.073)	8(.101)	2(.056)	1(.023)	9(.076)	4(.062)	57(.070)
Blue marlin	0	0	0	0	0	0	0	0
White marlin	1(.009)	0	0	0	0	0	0	1(.001)
Sailfish	0	1(.003)	0	0	0	0	0	1(.001)
All billfishes	8(.069)	27(.075)	8(.101)	2(.056)	1(.023)	9(.076)	4(.062)	59(.072)

*Includes releases

Table 2.--Weights (pounds) of billfishes recorded in the northern Gulf of Mexico, 1979.

	Panama City	Destin	Pensacola	Mobile	South Pass	Grand Isle	Texas	All Areas Combined
Blue marlin								
Largest	485.0	500.0	592.8	499.3	665.8	453.5	632.0	665.8
Smallest	138.0	45.0	57.0	110.0	70.0	89.5	58.5	45.0
Average	253.1	285.6	293.2	279.3	314.5	259.2	215.6	274.9
White marlin								
Largest	70.3	76.0	95.0	89.0	89.9	77.5	111.5	111.5
Smallest	40.0	34.5	38.5	38.0	33.5	39.0	9.8	9.8
Average	50.3	55.0	51.7	51.4	53.6	55.1	45.4	51.5
Sailfish								
Largest	40.0	75.0	86.0	62.0	61.1	69.0	71.5	86.0
Smallest	34.5	2.0	28.8	3.5	39.8	40.3	27.0	2.0
Average	38.0	42.6	52.0	38.3	53.5	58.7	45.5	45.3
Spearfish								
Largest	46.3	0	0	0	0	0	0	46.3
Smallest	26.0	0	0	0	0	0	0	26.0
Average	36.2	0	0	0	0	0	0	36.2
Swordfish								
Largest	118.5	184.0	100.0	201.0	29.0	138.8	317.0	317.0
Smallest	20.0	12.5	6.3	30.0	29.0	29.0	20.5	6.3
Average	63.4	69.8	34.1	115.5	29.0	68.4	122.6	71.3

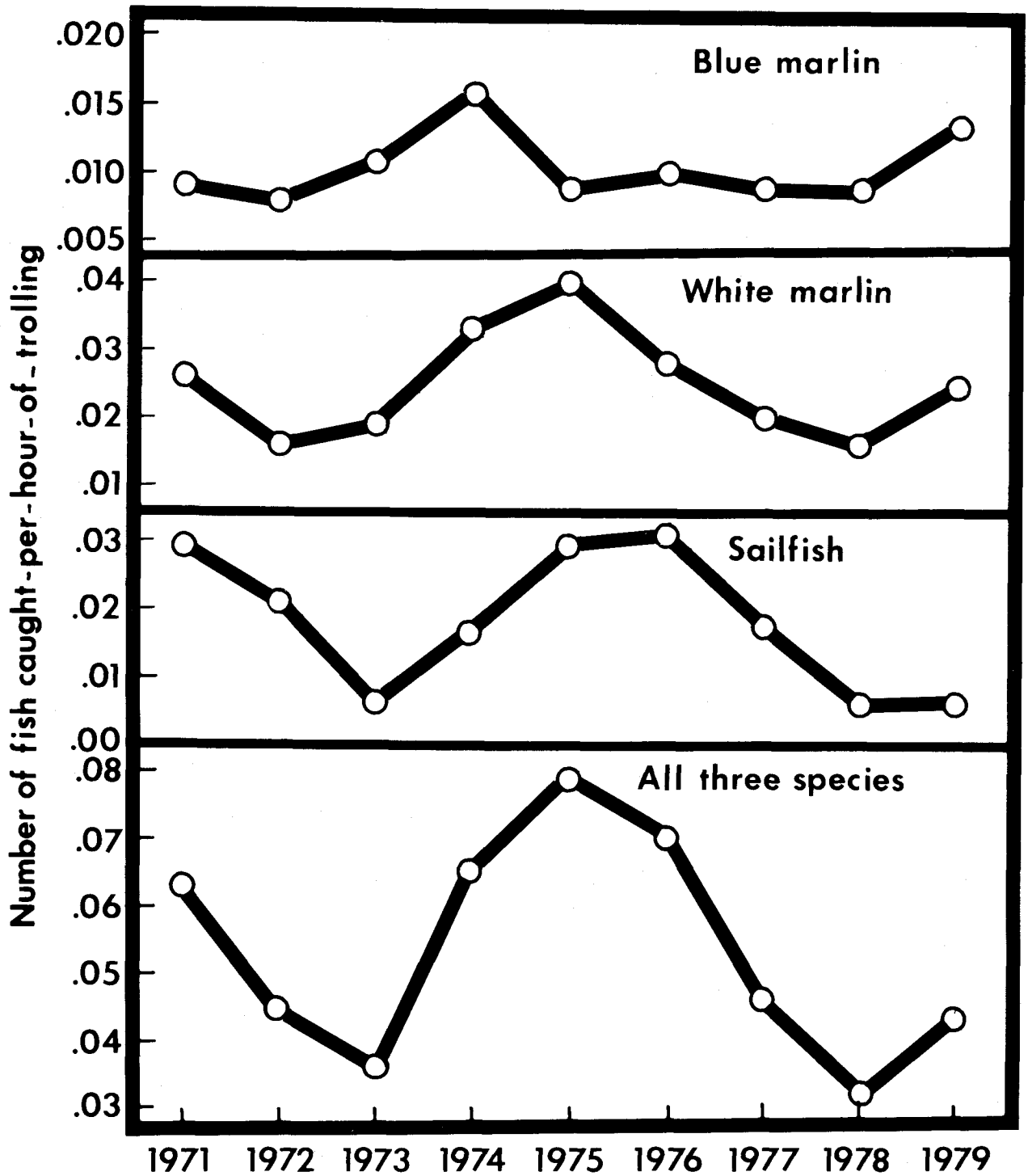
Table 4.--Billfishes hooked-per-hour-of-trolling and hours trolled to hook a fish in the northern Gulf of Mexico, 1979.

	Total hours trolled	Fish hooked-per-hour-of-trolling and hours trolled to hook one fish ()			
		Blue Marlin	White Marlin	Sailfish	All three species
- - - - - Number - - - - -					
Northeastern Gulf	10,077.6	0.029 (34.2)	0.086 (11.7)	0.011 (94.2)	0.126 (8.0)
Panama City	1,221.7	0.033 (30.5)	0.073 (13.7)	0.007 (152.7)	0.112 (8.9)
Destin	3,143.0	0.031 (32.4)	0.064 (15.6)	0.013 (78.6)	0.108 (9.3)
Pensacola	2,265.1	0.024 (41.9)	0.079 (12.6)	0.015 (66.6)	0.118 (8.5)
Mobile	3,447.8	0.030 (33.2)	0.114 (8.8)	0.007 (137.9)	0.152 (6.6)
Northcentral Gulf	9,496.8	0.035 (28.3)	0.019 (53.7)	0.001 (1,055.2)	0.055 (18.2)
South Pass	5,450.8	0.041 (24.4)	0.025 (40.7)	0.001 (1,090.2)	0.066 (15.1)
Grand Isle	4,046.0	0.028 (35.8)	0.011 (94.1)	0.001 (1,011.5)	0.040 (25.3)
Northwestern Gulf					
Texas	4,363.0	0.028 (35.2)	0.026 (37.9)	0.021 (48.5)	0.075 (13.3)
All three areas	23,937.4	0.032 (31.7)	0.048 (20.7)	0.009 (116.2)	0.088 (11.3)

Table 5.--Hours trolled and billfishes raised, hooked, and boated/released in the northern Gulf of Mexico, 1979.

	Total hours trolled	Blue marlin			White marlin			Sailfish			Unidentified billfishes	
		R	H	B	R	H	B	R	H	B	R	H
		----- Number -----										
Northeastern Gulf	10,077.6	351	295	99	1,032	864	391	126	107	64	11	1
Panama City	1,221.7	53	40	16	130	89	38	14	8	4	4	1
Destin	3,143.0	139	97	46	321	201	111	53	40	28	6	0
Pensacola	2,265.1	54	54	15	180	180	97	34	34	18	0	0
Mobile	3,447.8	105	104	22	401	394	145	25	25	14	1	0
Northcentral Gulf	9,496.8	441	336	148	273	177	120	9	9	6	1	0
South Pass	5,450.8	320	223	98	218	134	88	5	5	3	1	0
Grand Isle	4,046.0	121	113	50	55	43	32	4	4	3	0	0
Northwestern Gulf												
Texas	4,363.0	124	124	59	115	115	73	90	90	64	3	3
All three areas	23,937.4	916	755	306	1,420	1,156	584	225	206	134	15	4
% of raised			82.4	33.4		81.4	41.1		91.6	59.6		26.7
% of hooked				40.5			50.5			65.0		

R = Raised
H = Hooked
B = Boated/released



1971 1972 1973 1974 1975 1976 1977 1978 1979
 Figure 1.-- Number of billfishes caught - per - hour - of - trolling in the northern Gulf of Mexico, 1971-79.

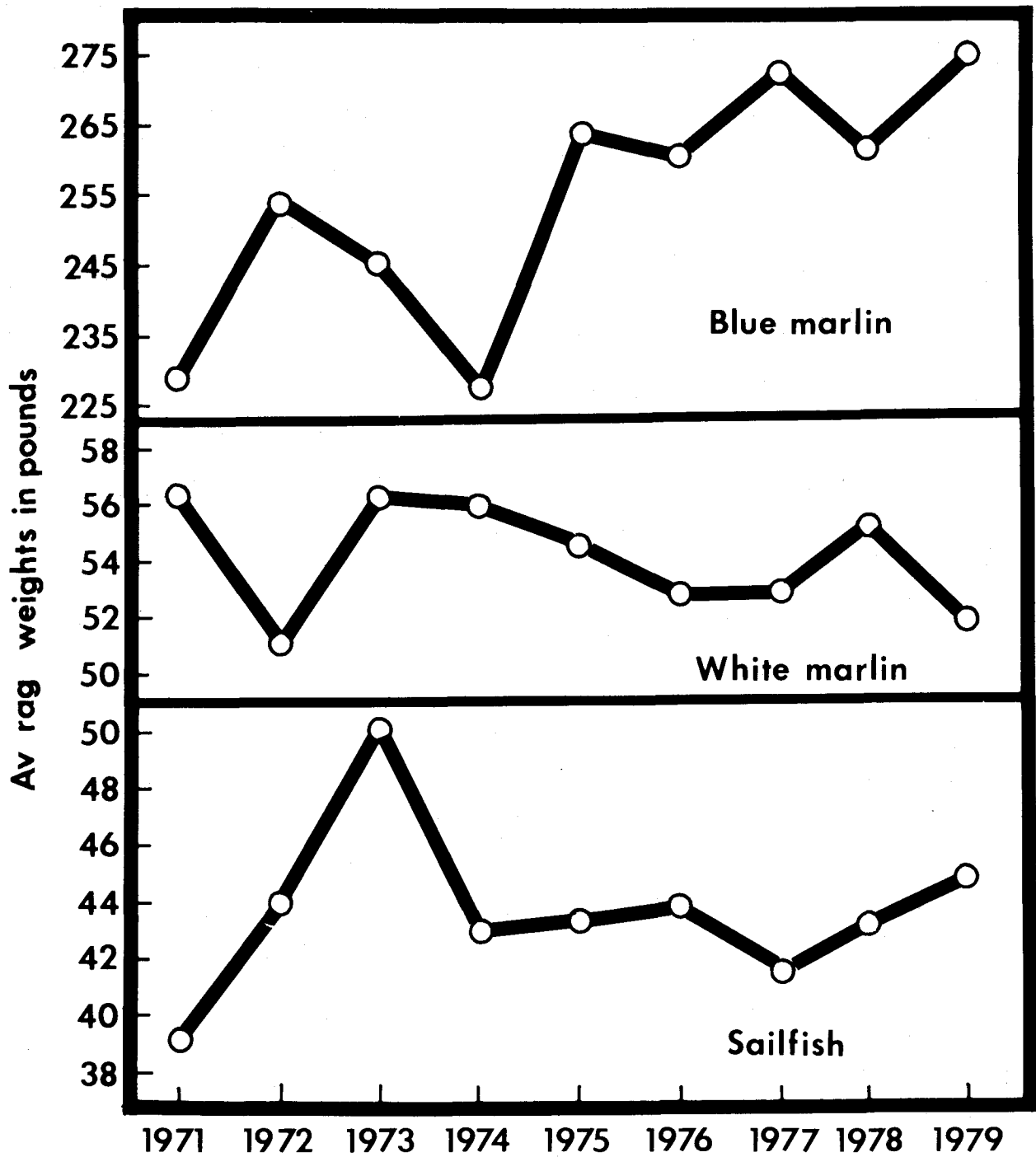


Figure 2.-- Average weights (pounds) of billfishes in the northern Gulf of Mexico, 1971- 79.

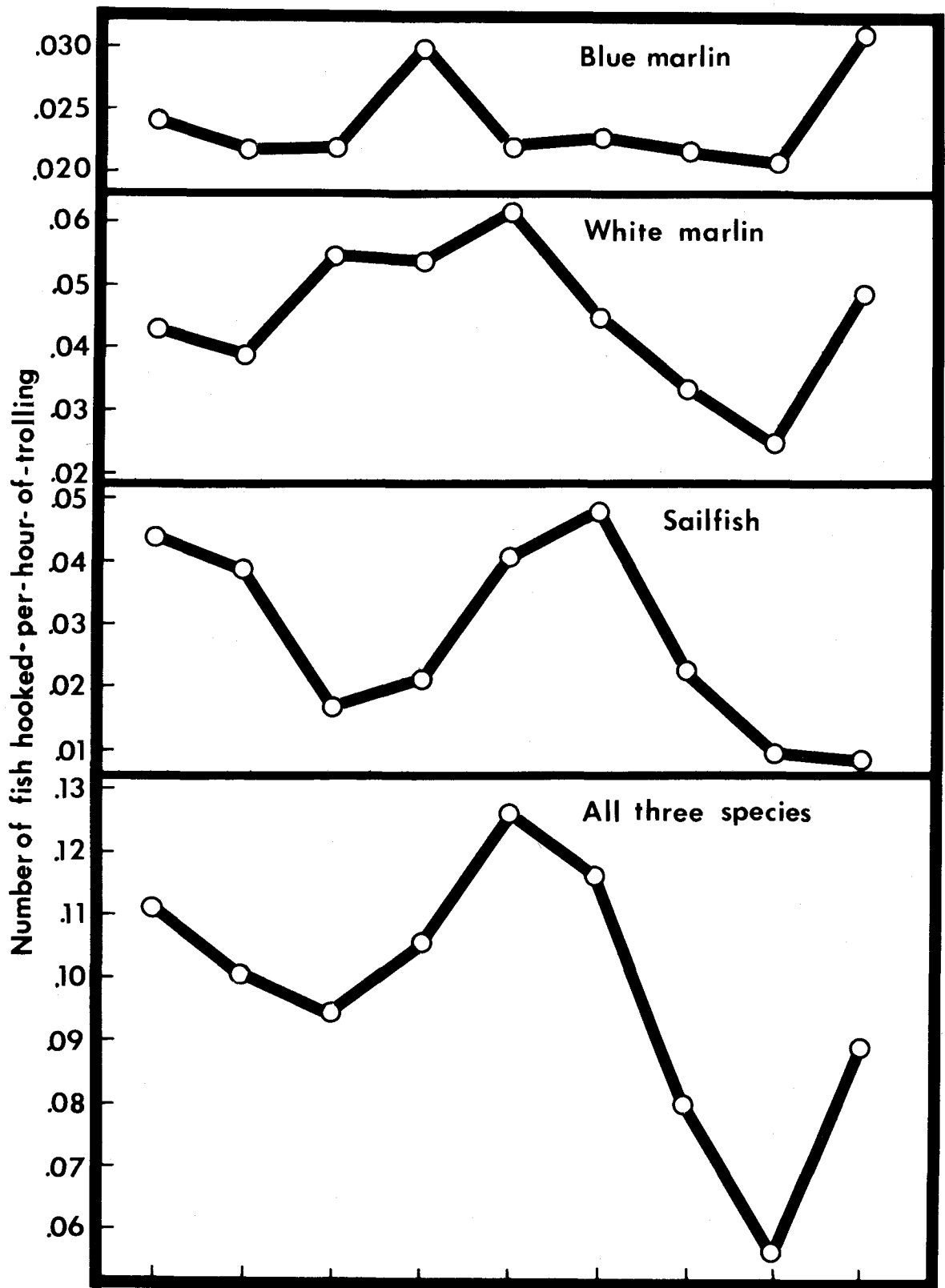


Figure 3.-- Number of billfishes hooked-per-hour-of-trolling in the northern Gulf of Mexico, 1971-79.

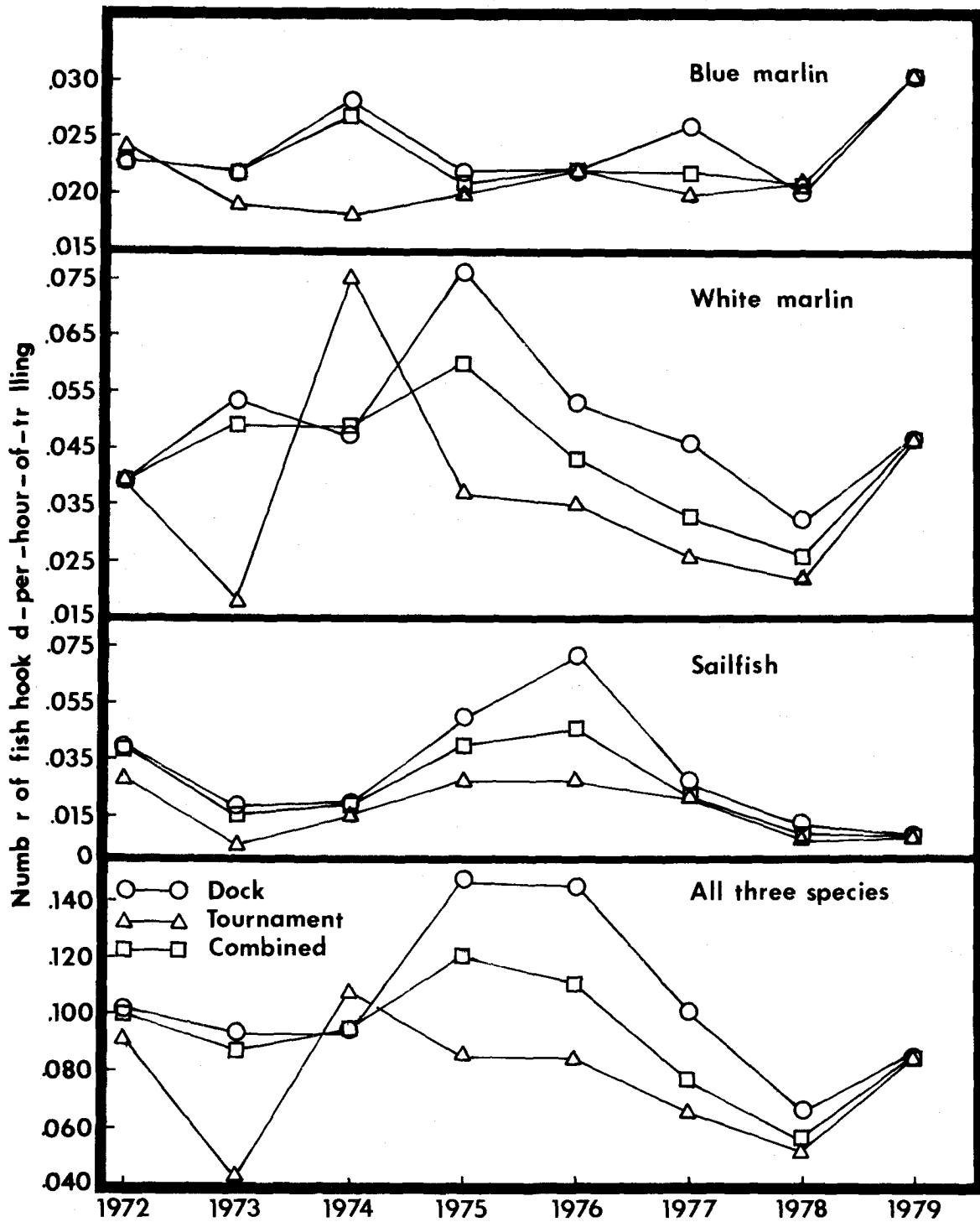


Figure 4.-- Number of billfishes hooked-per-hour-of-trolling determined from nontournament (dock) and tournament sampling in the northern Gulf of Mexico, 1972-1979.

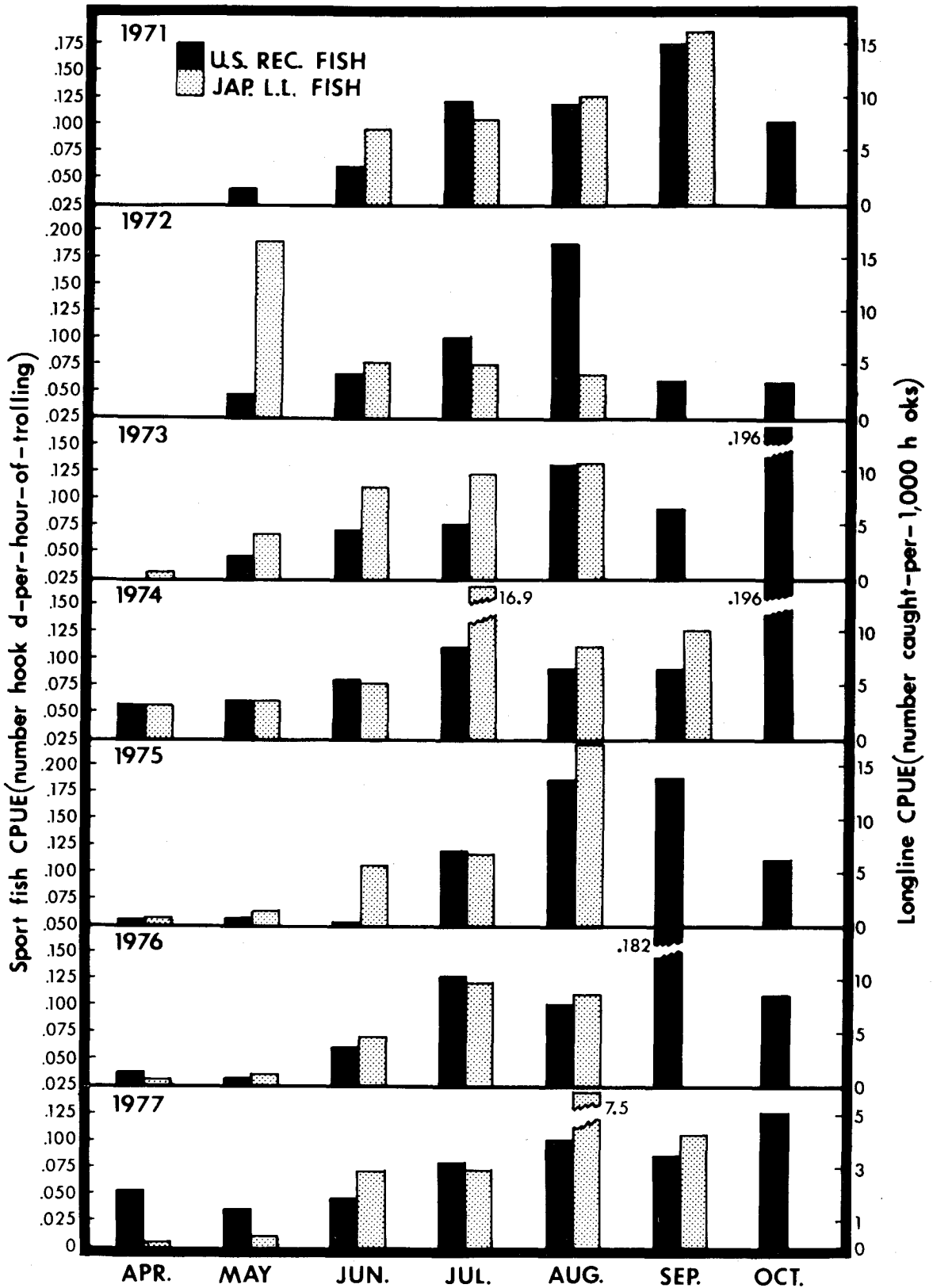





Figure 5.-- U.S. sport fishery and Japanese longline fishery monthly catch-per-unit-of-effort between 25-30° N. latitude and 85-100° W. longitud , 1971-77.

LEGEND

Fishing area bound by heavy black lines. Number of fish raised-per-hour-of-trolling:

.001-.025 

.026-.050 

≥ .051 

No fish raised in squares without symbols.

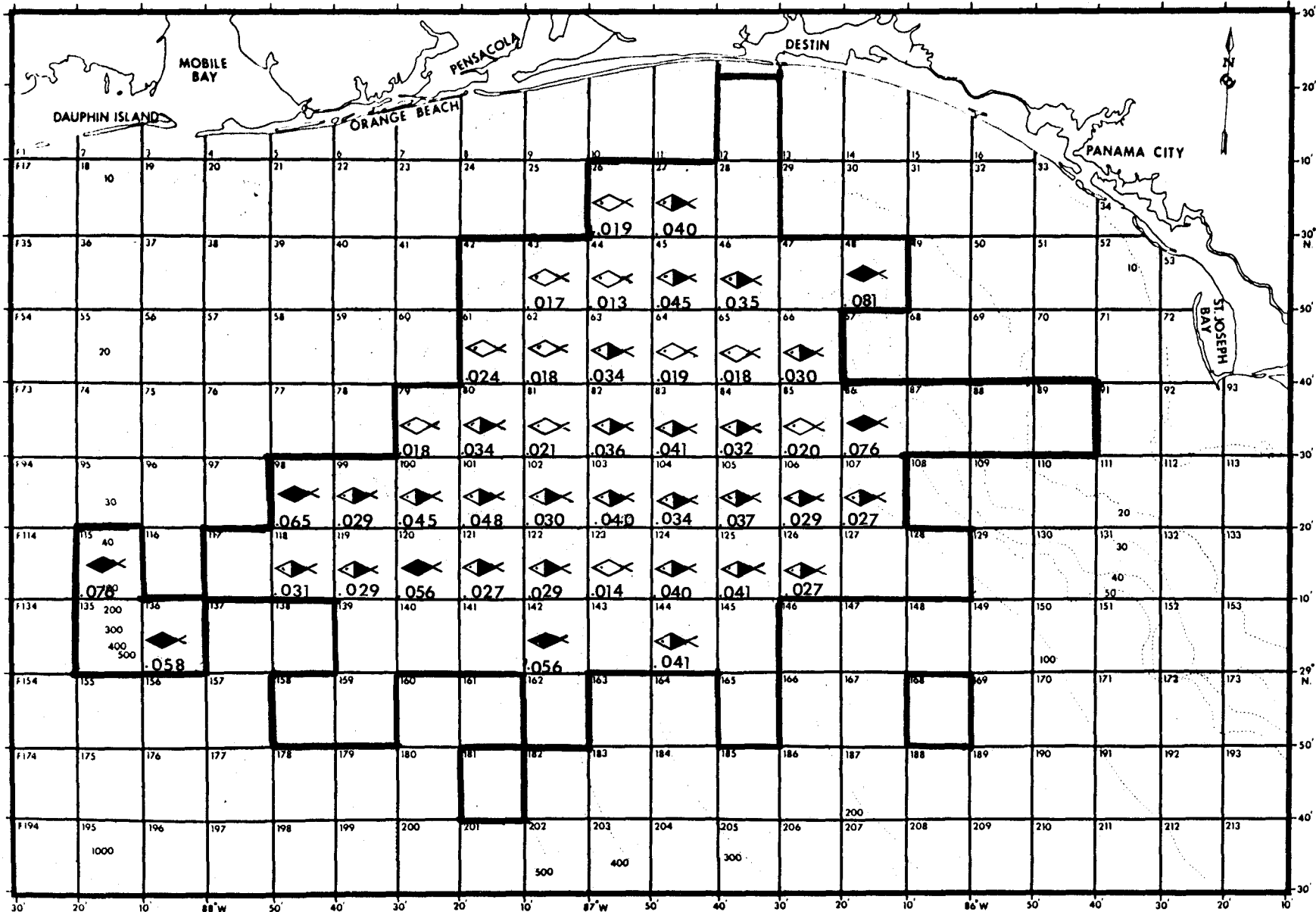





CHART 1.--Number of blue marlin raised-per-hour-of-trolling in the northeastern Gulf of Mexico by 10-min squares, 1979.

LEGEND

Fishing area bound by heavy black lines. Number of fish raised-per-hour-of-trolling:

.001-.075 

.076-.150 

≥ .151 

No fish raised in squares without symbols.

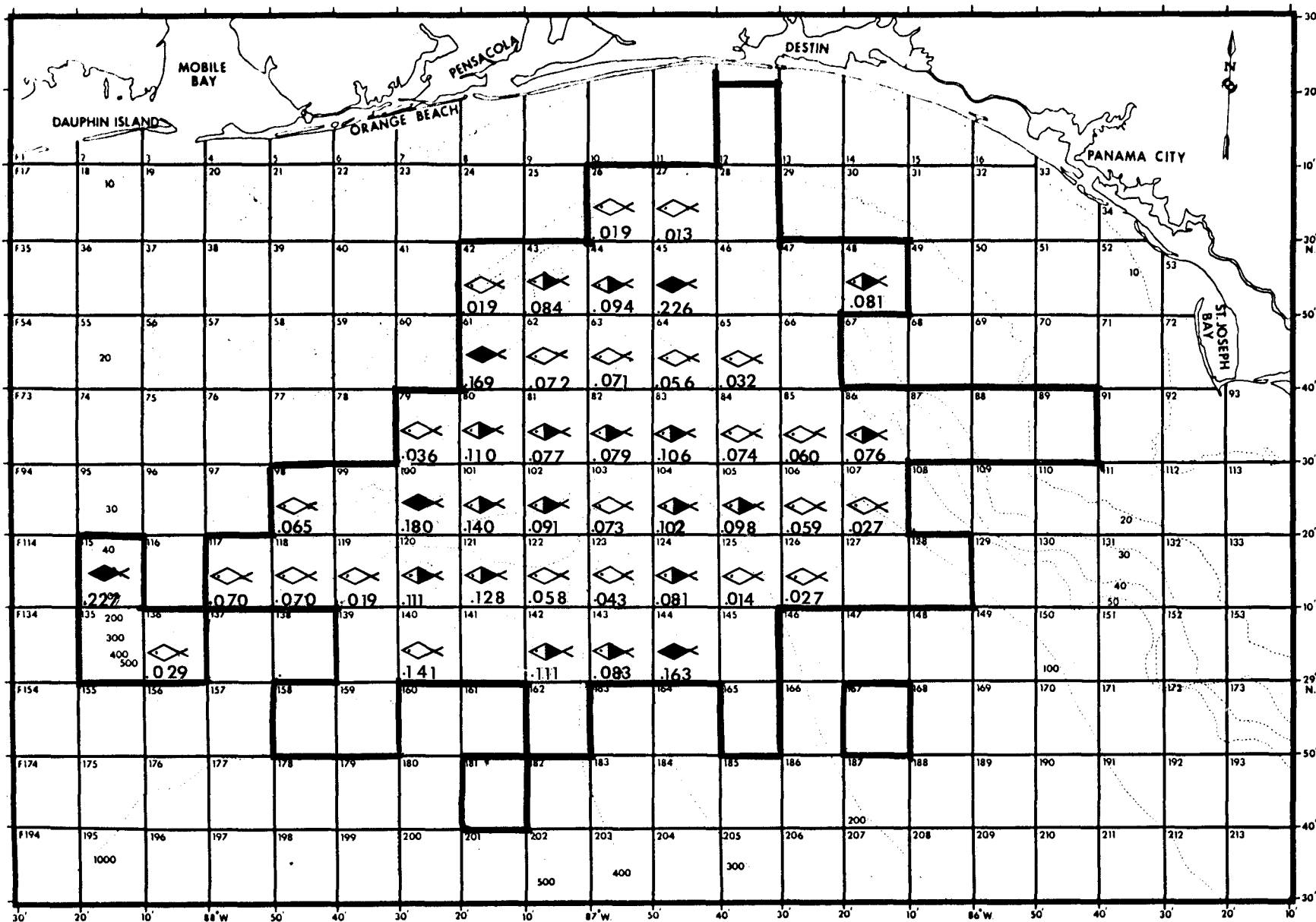





CHART 2.--Number of white marlin raised-per-hour-of-trolling in the northeastern Gulf of Mexico by 10-min squares, 1979.

LEGEND

Fishing area bound by heavy black lines.
 Number of fish raised-per-hour-of-trolling:

- .001-.054 
- .055-.109 
- ≥ .110 

No fish raised in squares without symbols.

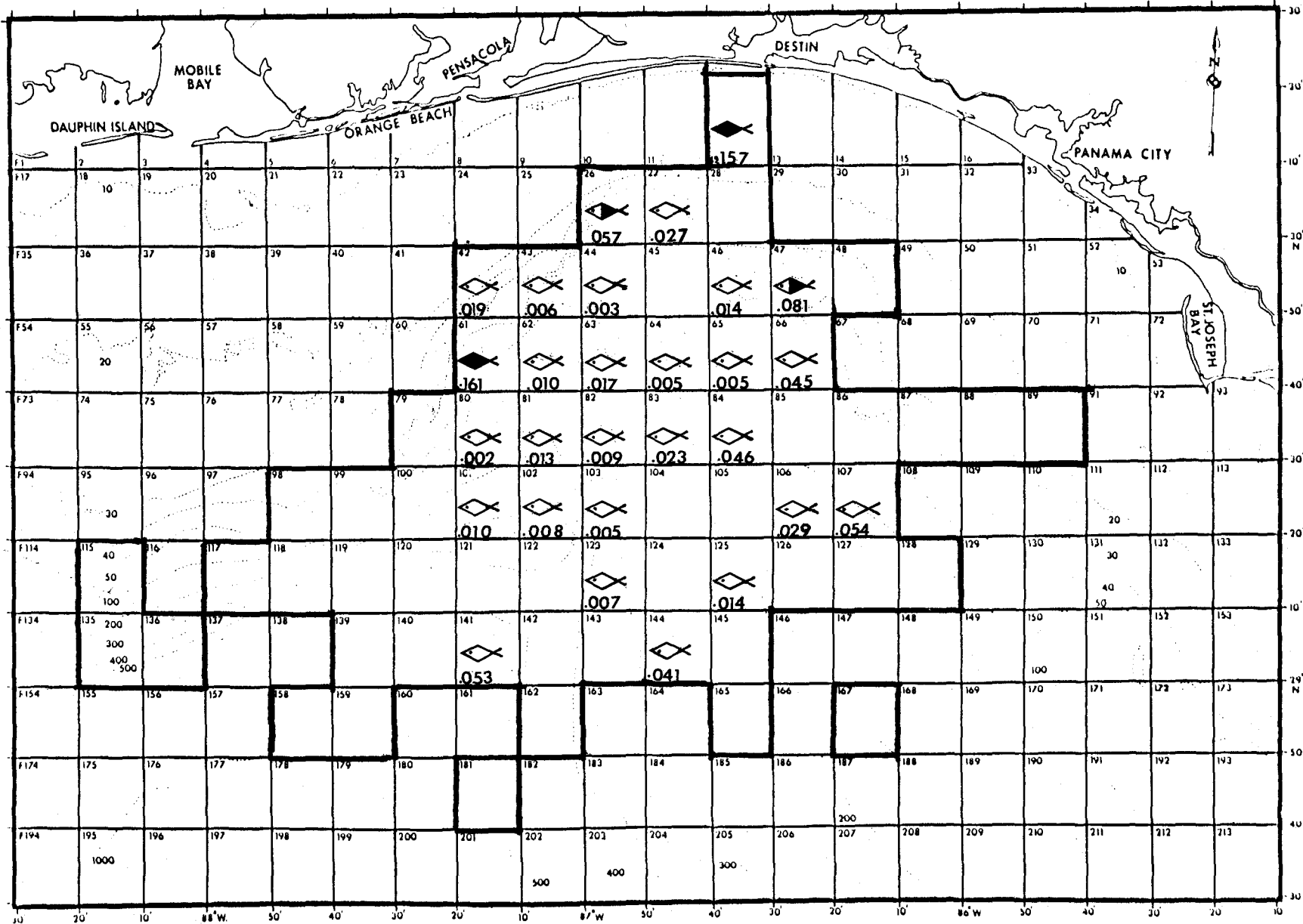





CHART 3.--Number of sailfish raised-per-hour-of-trolling in the northeastern Gulf of Mexico by 10-min squares, 1979.

LEGEND

Fishing area bound by heavy black lines.
 Number of fish raised-per-hour-of-trolling:

- .001 - .100 
- .101 - .200 
- ≥ .201 

No fish raised in squares without symbols.

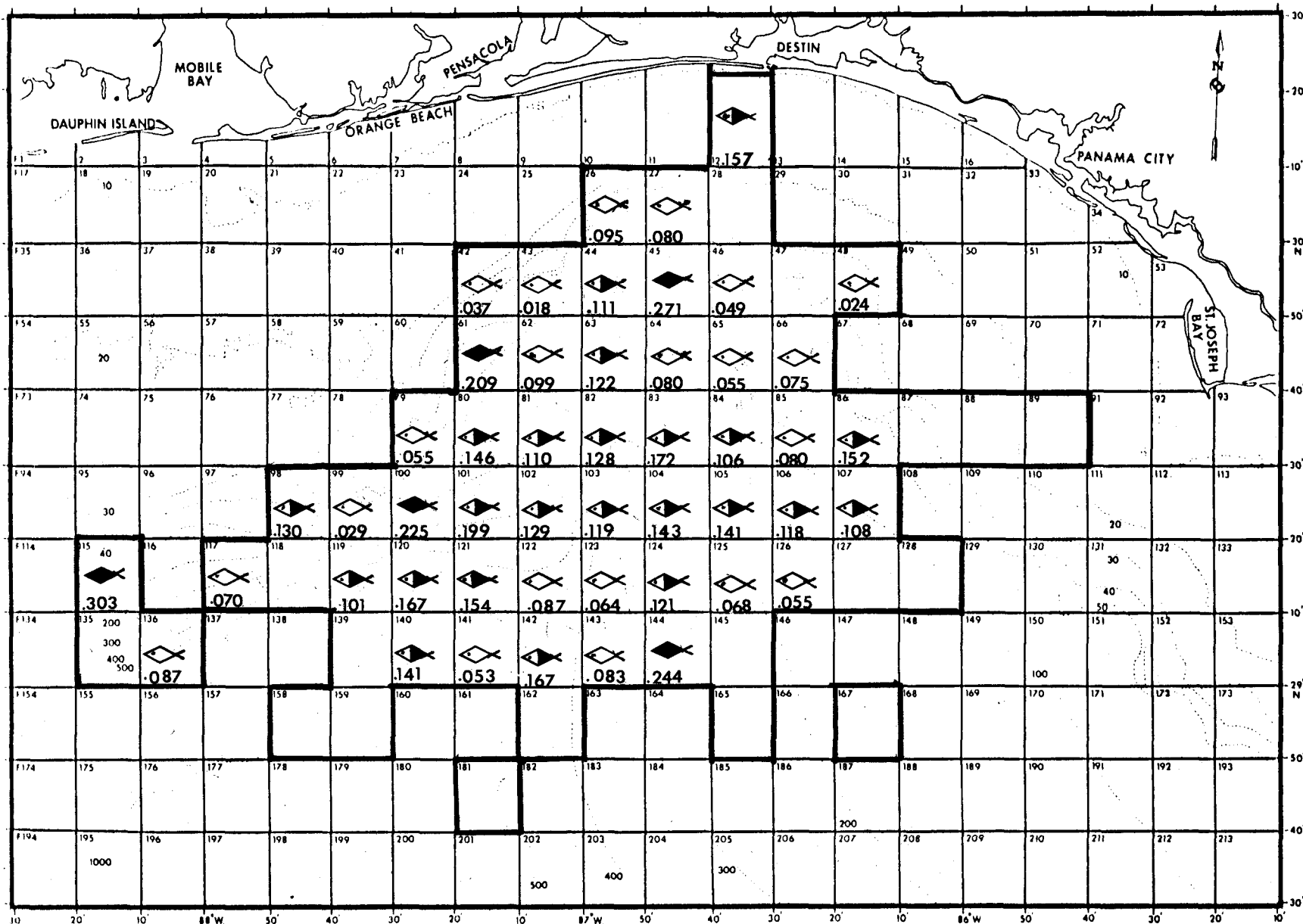





CHART 4.--Number of billfishes raised-per-hour-of-trolling in the northeastern Gulf of Mexico by 10-min squares, 1979.

LEGEND

Fishing area bound by heavy black lines. Number of fish raised-per-hour-of-trolling:

- .001-.035 
- .036-.070 
- ≥ .071 

No fish raised in squares without symbols.

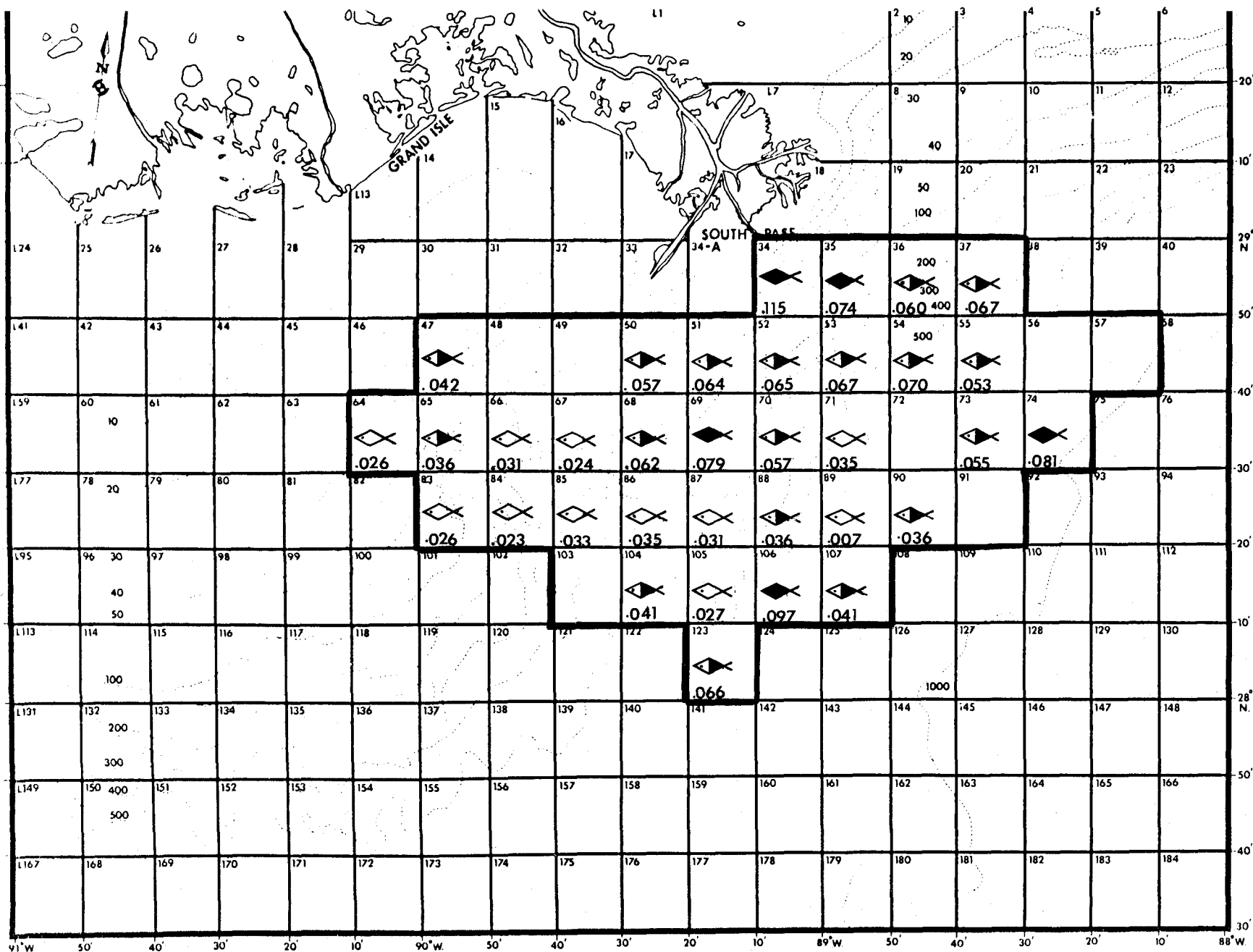





CHART 5.--Number of blue marlin raised-per-hour-of-trolling in the northcentral Gulf of Mexico by 10-min squares, 1979.

LEGEND

Fishing area bound by heavy black lines. Number of fish raised-per-hour-of-trolling:

.001-.039 

.040-.079 

≥ .080 

No fish raised in squares without symbols.

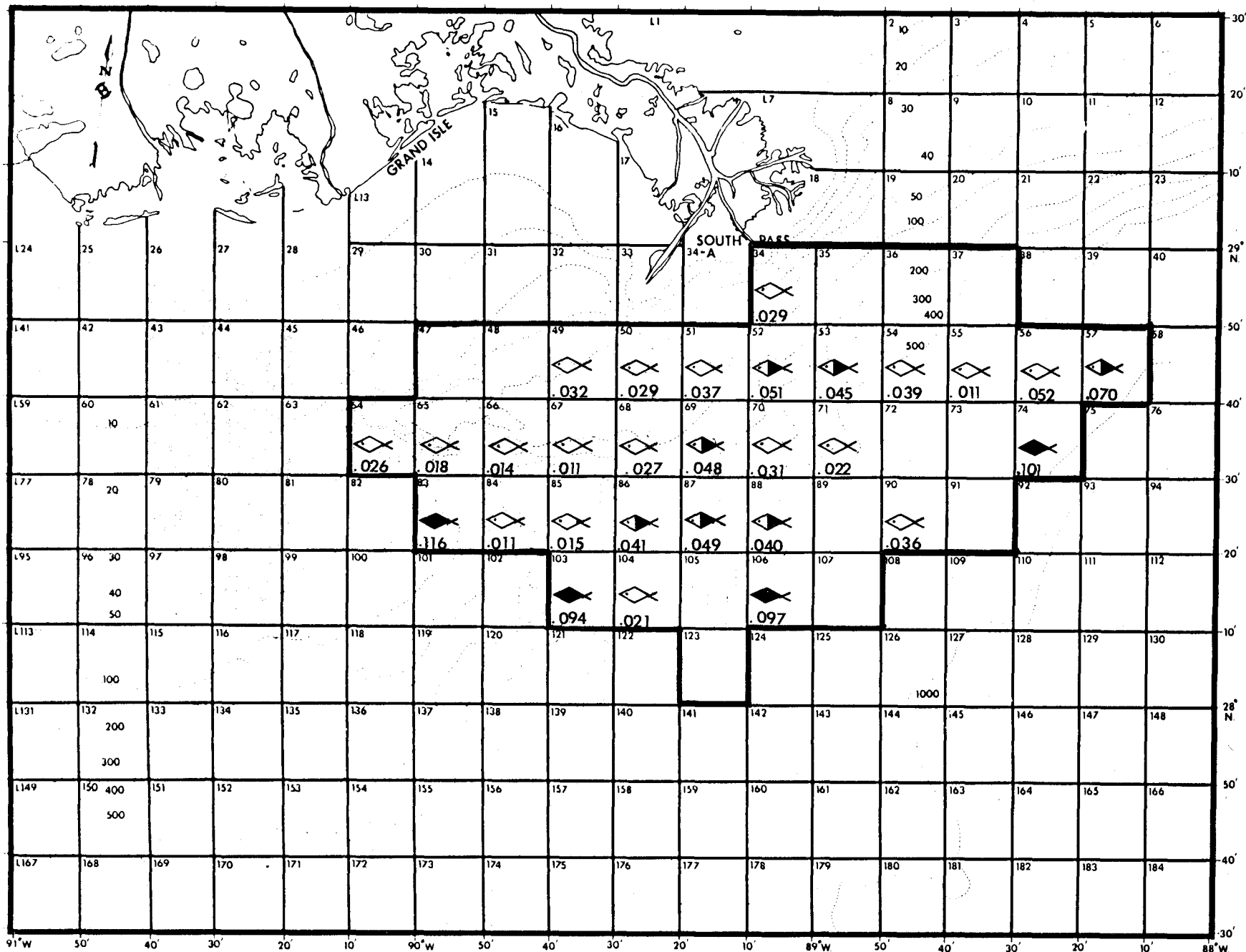





CHART 6.--Number of white marlin raised-per-hour-of-trolling in the northcentral Gulf of Mexico by 10-min squares, 1979

LEGEND

Fishing area bound by heavy black lines.
 Number of fish raised-per-hour-of-trolling:

.001 - .015 
 .016 - .030 
 ≥ .031 

No fish raised in squares without symbols.

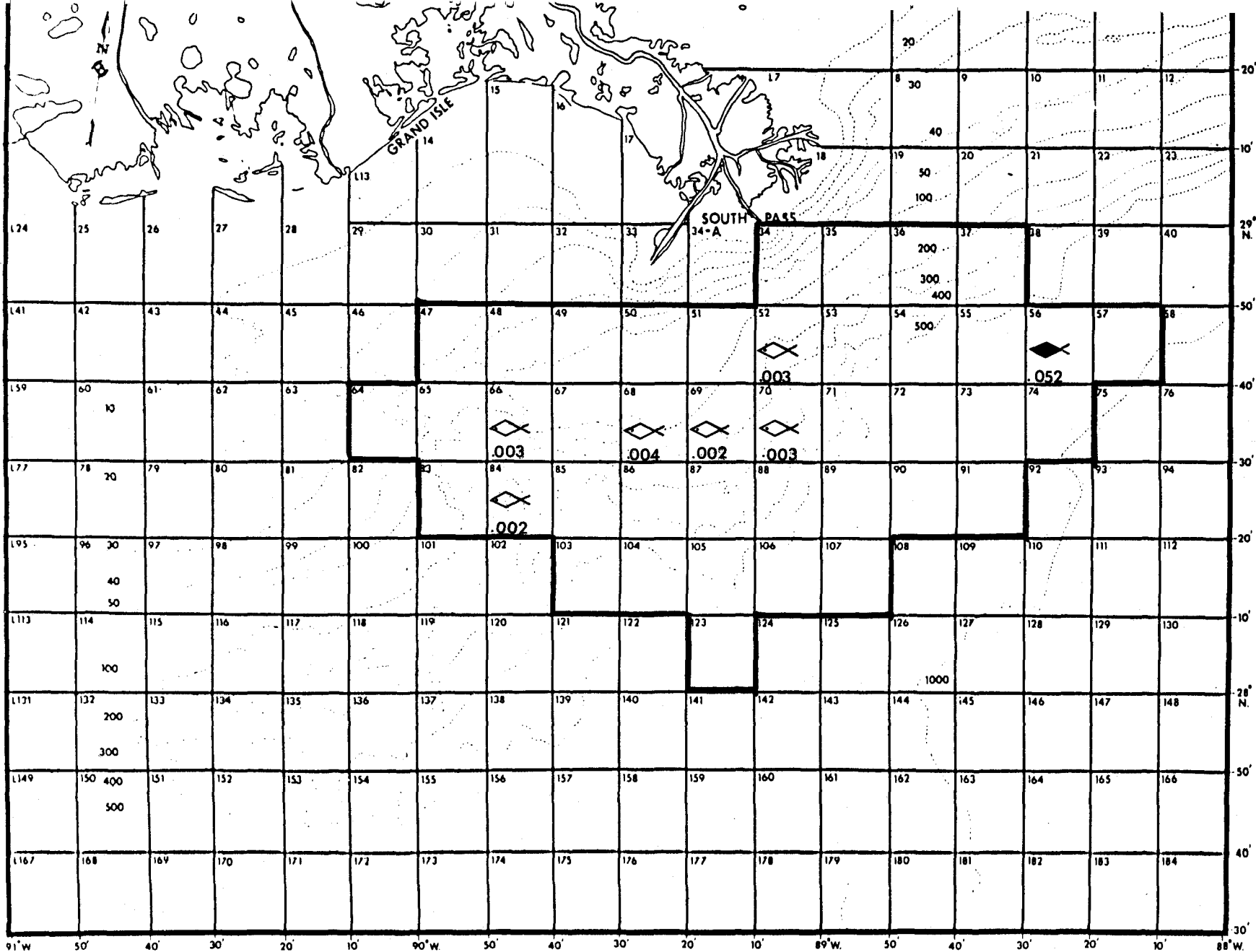





CHART 7.--Number of sailfish raised-per-hour-of-trolling in the northcentral Gulf of Mexico by 10-min squares, 1979.

LEGEND

Fishing area bound by heavy black lines. Number of fish raised-per-hour-of-trolling:

- .001-.060 
- .061-.120 
- ≥ .121 

No fish raised in squares without symbols.

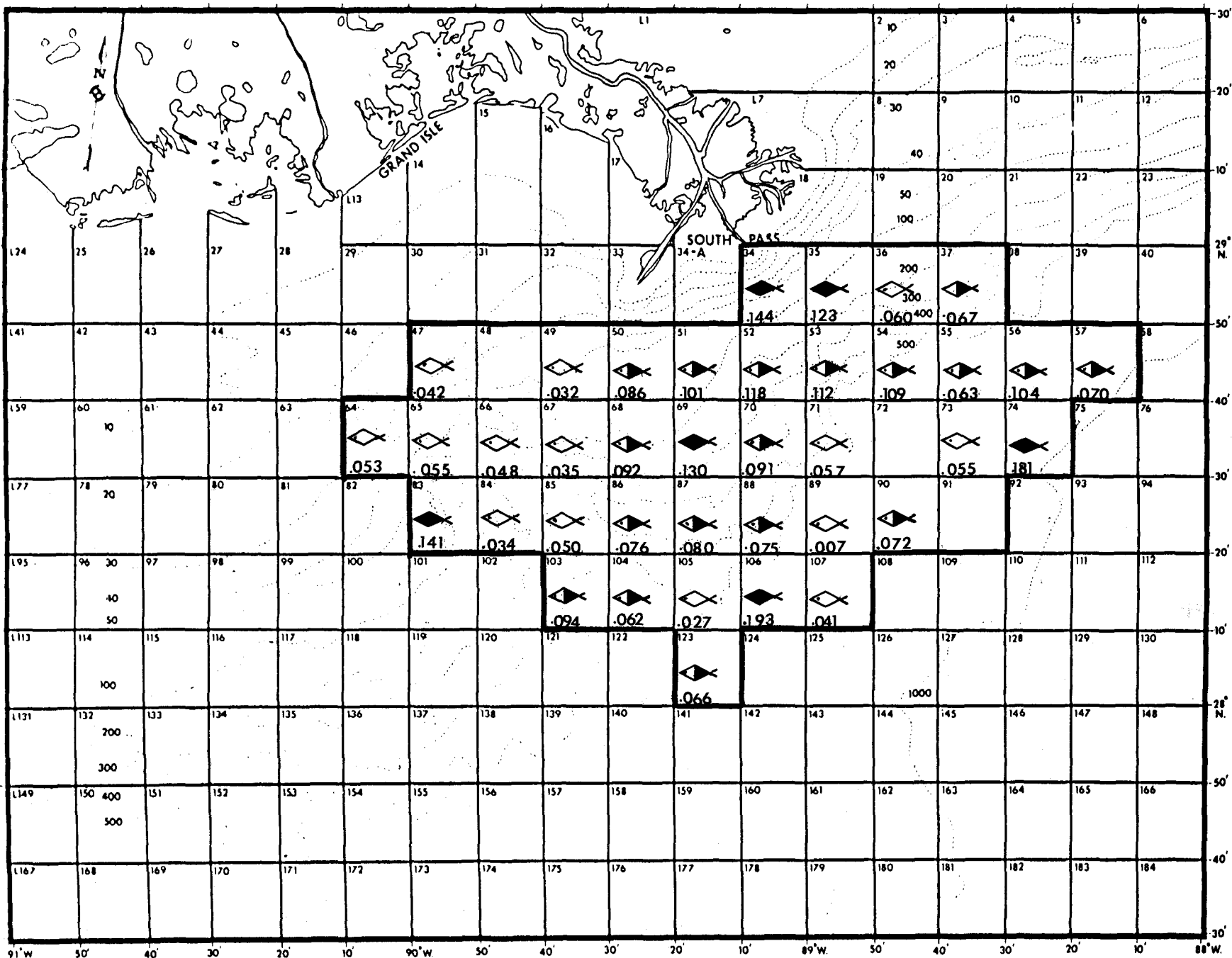
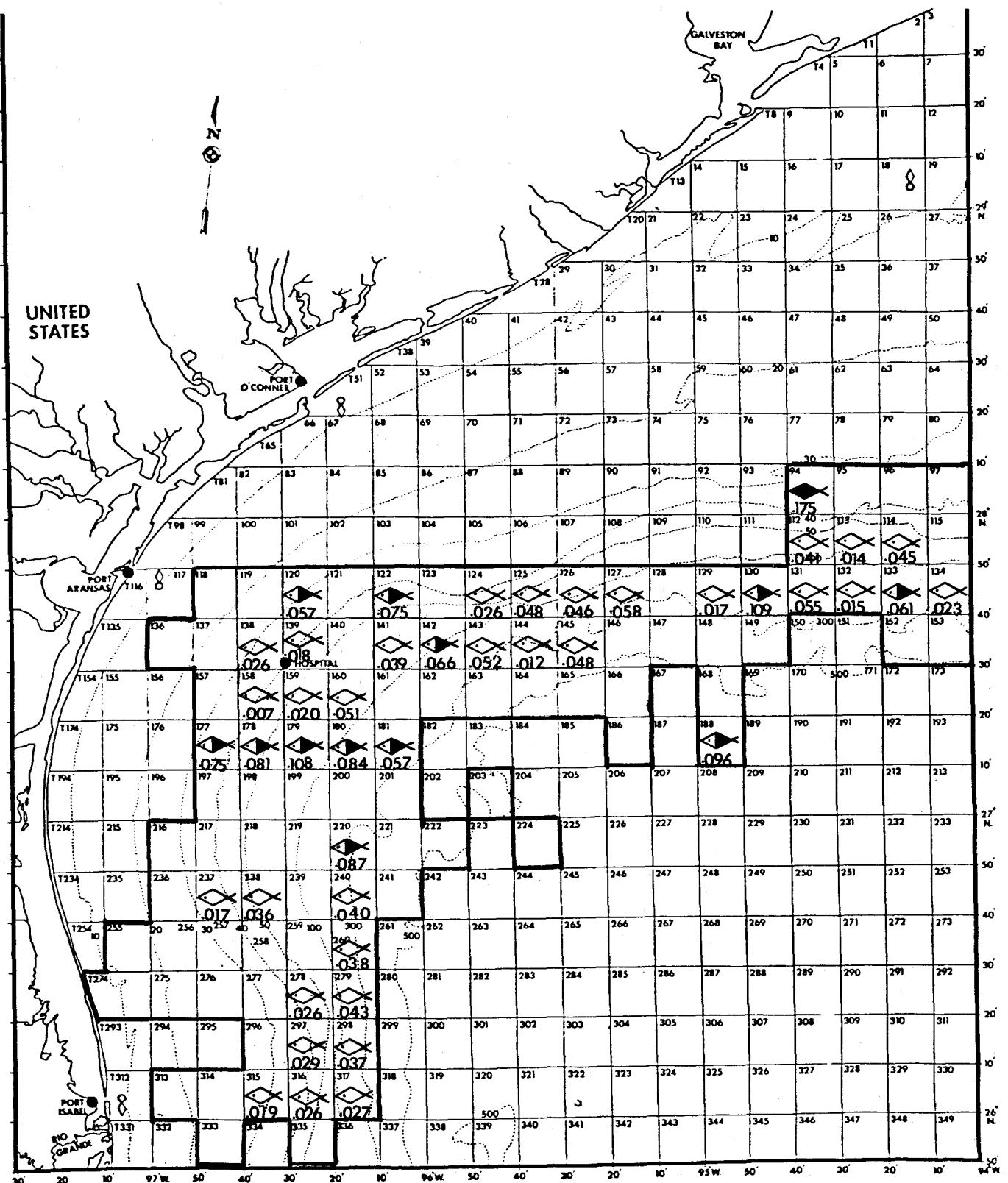
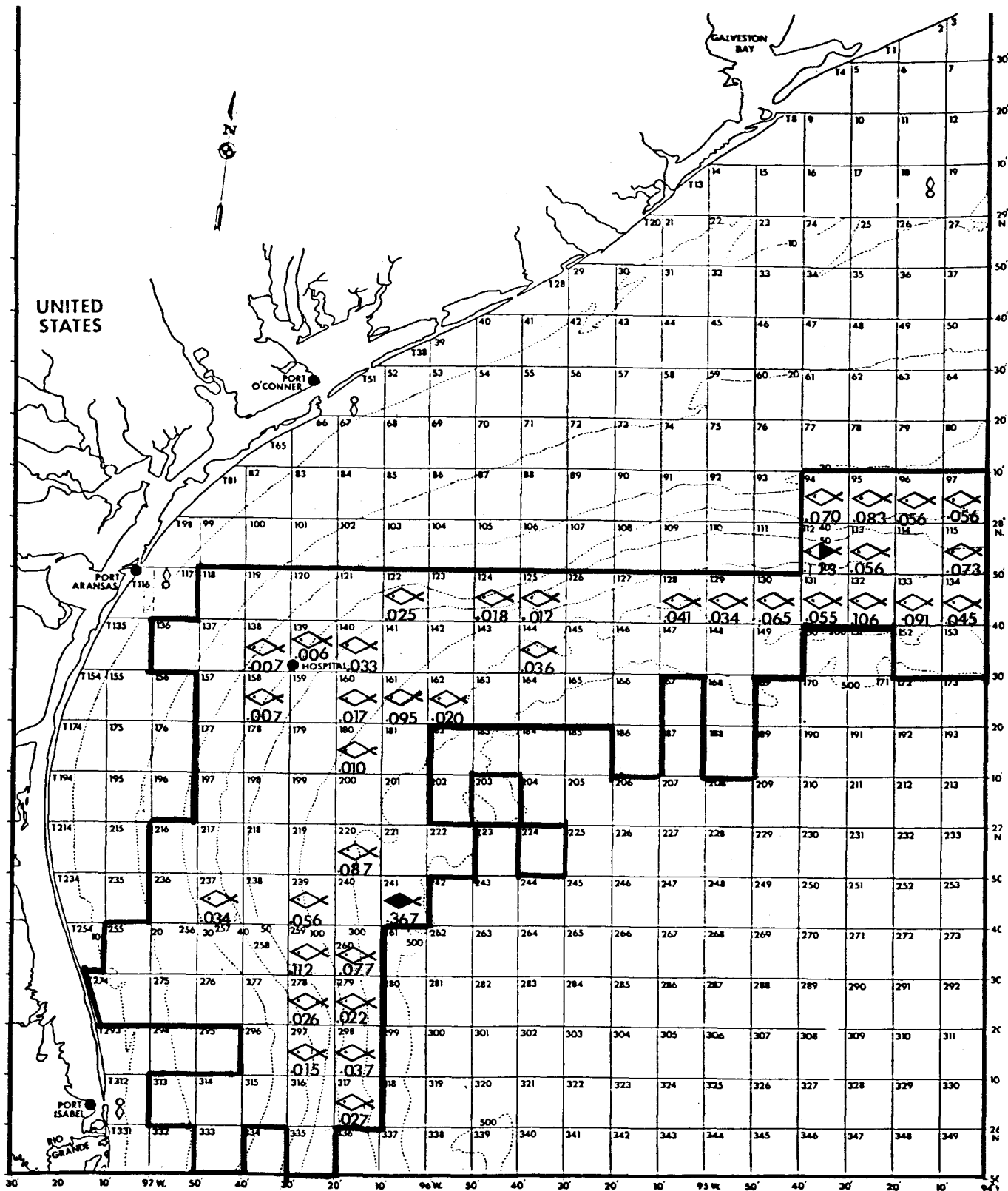


CHART 8.--Number of billfishes raised-per-hour-of-trolling in the northcentral Gulf of Mexico by 10-min squares, 1979.



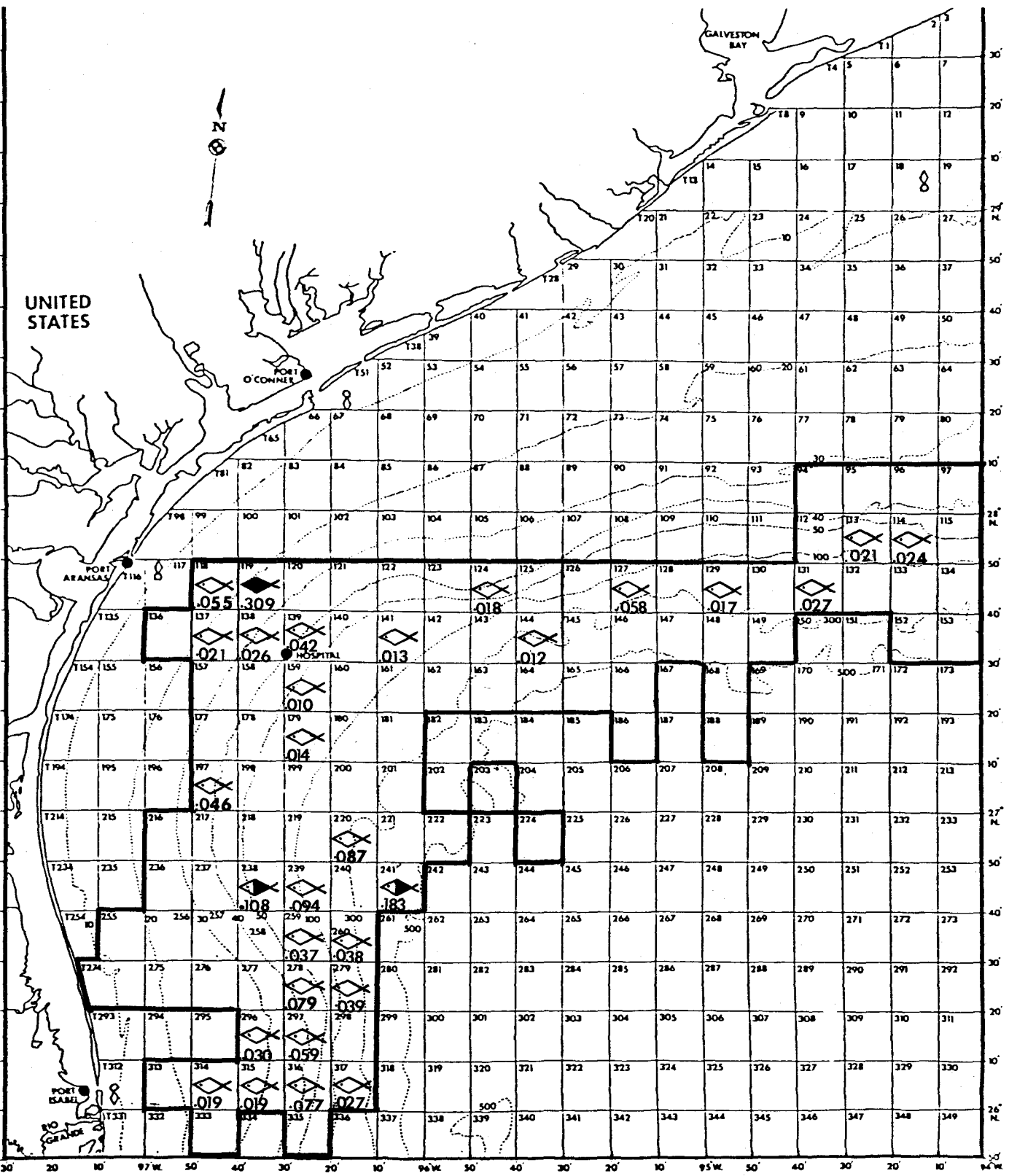
L Fishing areas $.001-.055$ fishes raised-per-hour-of-trolling.
 E bound by heavy $.056-.110$ fishes raised-per-hour-of-trolling.
 G black lines.
 E No fish raised $\geq .111$ fishes raised-per-hour-of-trolling.
 N in squares
 D without symbols.

CHART 9.--Number of blue marlin raised-per-hour-of-trolling in the northwestern Gulf of Mexico by 10-min squares, 1979.



L Fishing areas 001-120 fishes raised-per-hour-of-trolling.
 E bound by heavy 121-240 fishes raised-per-hour-of-trolling.
 G black lines. $\geq .241$ fishes raised-per-hour-of-trolling.
 E No fish raised
 N in squares
 D without symbols.

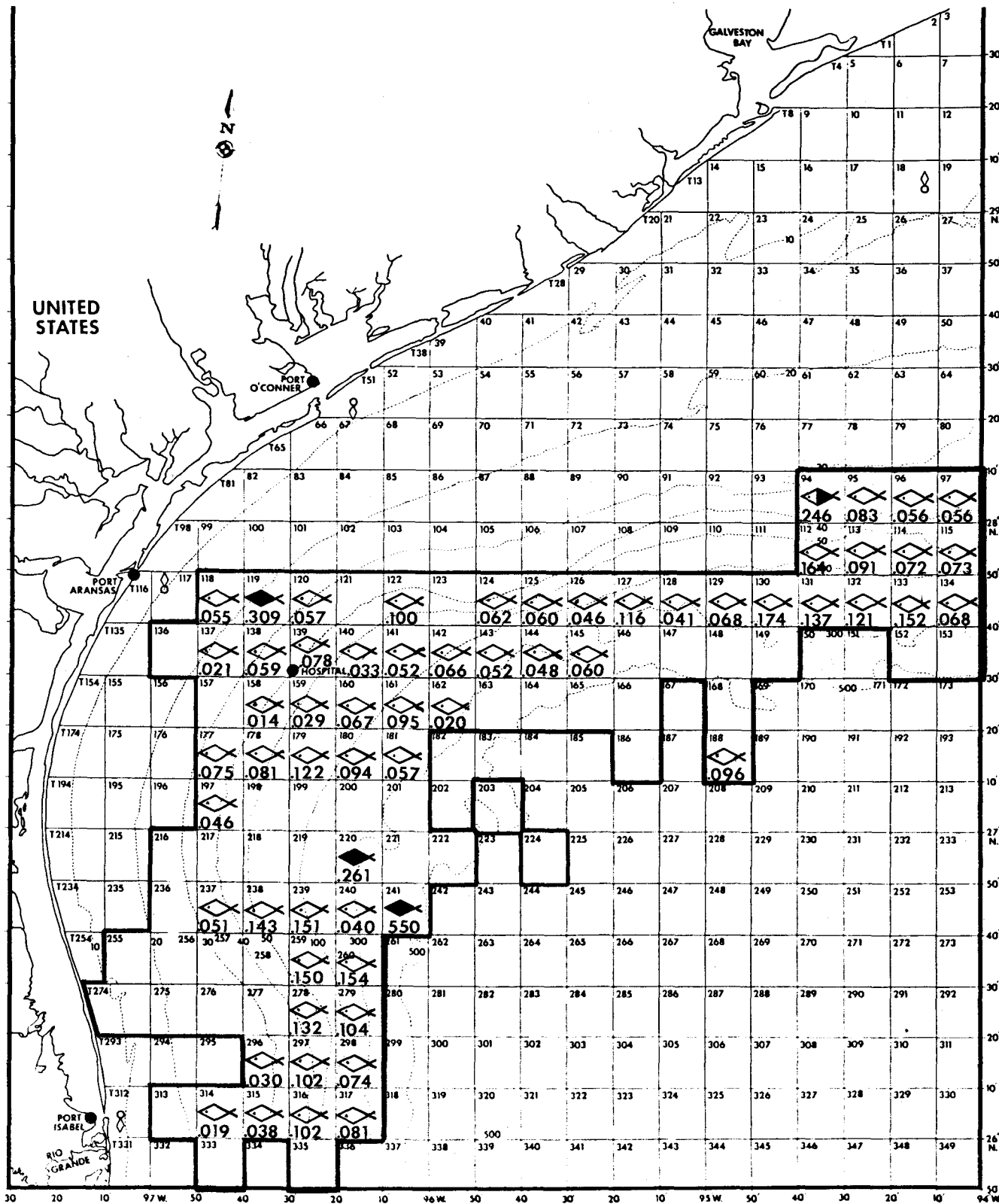
CHART 10.--Number of white marlin raised-per-hour-of-trolling in the northwestern Gulf of Mexico by 10-min squares, 1979.



L Fishing areas
 E bound by heavy
 G black lines.
 E No fish raised
 N in squares
 D without symbols.

001-100 fishes raised-per-hour-of-trolling.
 101-200 fishes raised-per-hour-of-trolling.
 ≥ 201 fishes raised-per-hour-of-trolling.

CHART 11.--Number of sailfish raised-per-hour-of-trolling in the northwestern Gulf of Mexico by 10-min squares, 1979.



L Fishing areas .001-180 ◇ fishes raised-per-hour-of-trolling.
 E bound by heavy .181-260 ◐ fishes raised-per-hour-of-trolling.
 G black lines. ≥ .261 ◼ fishes raised-per-hour-of-trolling.
 E No fish raised
 N in squares
 D without symbols.

CHART 12.--Number of billfishes raised-per-hour-of-trolling in the northwestern Gulf of Mexico by 10-min squares, 1979.