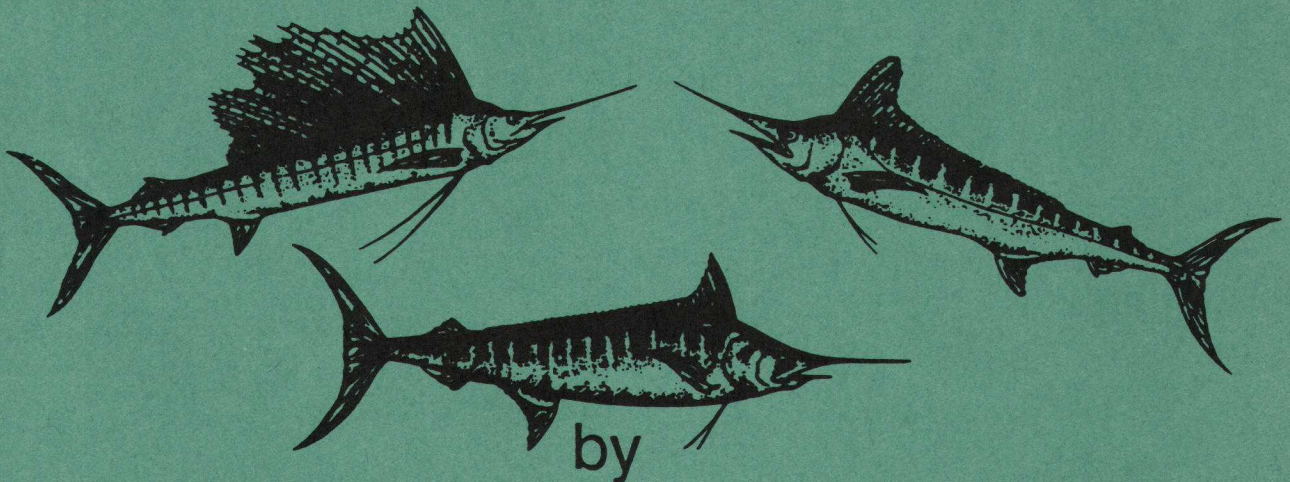


**NOAA Technical Memorandum
NMFS-SEFC-289**

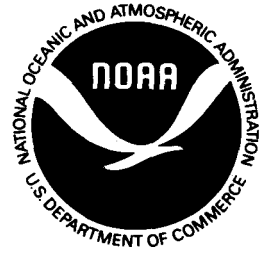
**BIG GAME FISHING IN THE
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DURING 1990**



**Paul J. Pristas
and**

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BY

Paul J. Pristas and Anna M. Avrigian

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**NATIONAL MARINE FISHERIES SERVICE
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AUGUST 1991

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The recreational fishing community has been most supportive and helpful to the National Marine Fisheries Service's billfish survey. Constituents of this recreational fishery provided both direct and indirect financial and other assistance to assure a successful outcome of this study. Appreciation for this support is gratefully extended to those who helped (Table 1).

Port samplers conducted approximately 2,738 interviews during the 1990 season. For a job well done, we thank: Juli Callais, Grand Isle, LA; Wm. "Hank" Geier, South Padre Island, TX; Pam Heard, Port Aransas, TX; Richard Kersten, Destin, FL; Craig Martin, Pensacola, FL/Mobile, AL; and Joe Yurt, South Pass, LA.

INTRODUCTION

The 1990 season marked the 20th anniversary of the National Marine Fisheries Service's (NMFS) Recreation Billfishing Survey in the northern Gulf of Mexico. Although some preliminary studies had been made on the billfishes (i.e., blue marlin, Makaira nigricans; white marlin, Tetrapturus albidus; sailfish; Istiophorous platypterus; swordfish, Xiphias gladius; and longbill spearfish, Tetrapturus pfluegeri) of the Gulf area, yearly consistent/comparable data collections were not begun until 1971. Studies on these long-lived species were initiated from the Panama City, Florida, NMFS Laboratory to obtain indices of abundance and distribution estimates, and collect relevant biological and ecological data. Information derived from this study has been vital to management decisions concerning this fishery resource. The data are acquired primarily by port samplers conducting on-site interviews with recreational billfishing anglers at major ports from St. Petersburg, Florida to Port Isabel, Texas. Data are also provided by anglers voluntarily phoning or mailing in information regarding their big game fishing trips. In our analyses, data are generally summarized for three primary regions of the northern Gulf: northwestern, northcentral and northeastern (Fig. 1). In the northwestern Gulf, Texas is divided into three sections: eastern (Freeport, TX to the Texas-Louisiana border), central (Port O'Connor to Corpus Christi), and southern (Port Mansfield to the Texas-Mexico border) for continuity in data analyses.

CATCH AND EFFORT

Catches (includes landings and releases) of billfishes by species, as well as the number of hours trolled (i.e., fishing effort), are the primary data collected during the on-site dockside interviews and from contributed data reports. Related data on driftfishing (i.e., drifting dead bait down-rigged for swordfish) are also presented in this report for documentation purposes. However, these data are not included in the analyses of trolling effort data because of the change in fishing method and target species.

Data collection efforts by the port samplers and those voluntarily reporting their fishing trips resulted in a total of 24,602 hours of trolling effort being documented during the 1990 season (Table 2). This represented a 17% increase over the 21,113 hours recorded during the 1989 season. The increase for the entire northern Gulf was supported by recorded increases in all three major regions. By region, the increases were 21%, 13%, and 17% for the northeastern, northcentral, and northwestern Gulf, respectively. The increases for the entire Gulf, as well as for the three areas, suggest better fishing conditions in 1990 than the previous season. For example, in 1989, anglers reported

trolling efforts were hampered by large amounts of floating Sargassum grass, Sargassum sp., throughout most of the season. The amount of recorded effort in 1990 was 6% above the previous 19-year average.

The apparent increase in fishing effort may have led to an increase in catches (includes killed "boated" fishes and released fishes) compared to the previous season. In 1990, 566 billfishes were reported caught (Tables 2 and 3) compared to 488 billfishes in 1989. By species, blue marlin accounted for 49% (276 fish), white marlin 37% (209 fish), and sailfish 14% (78 fish) of the catches, with three spearfish also reported. In recent years, enactment of various federal and state fishing laws, in addition to genuine concern by sport anglers, has resulted in an increase in the numbers of billfishes being released. A total of 66% of the reported catches of billfishes were released, making this the third consecutive year (60% in 1989, 51% in 1988) in which a majority of the catches were released. Compared to 1989, the percentage released for each of the three species increased in 1990: 63% vs. 65% for blue marlin; 72% vs. 75% white marlin; and 23% vs. 49% for sailfish (Fig.2). It is difficult to determine the survival of released billfishes as the amount of mortality (i. ., death and tag shedding) is unknown. Of the three northern Gulf regions, only the northwestern Gulf showed an increase in the release percentage compared to 1989: 72% vs. 43%. In the northcentral Gulf, 73% were released vs. 79% in 1989. In the northeastern Gulf, the 1990 and 1989 percentages were 61% and 63%, respectively.

During the 1990 season, 646 hours of driftfishing activity were recorded. This was a slight increase of 4% over the 621 hours recorded in 1989. One sailfish and four swordfish were reported caught in conjunction with this fishing effort.

INDICES OF RELATIVE ABUNDANCE

The measure of relative abundances in fish populations can be affected by a wide variety of factors. For example, fishes may not be rising to baits, the same fish can be hooked more than once during a fishing trip, or errors in reporting or recording of fishing activity can occur. Therefore, we consider the number of fish hooked-per-hour-of-trolling (HPUE) as our best estimate of apparent relative abundance. These estimates are derived by dividing the reported numbers of fishes hooked by the number of hours trolled (i.e., fishing effort).

The HPUE measurements of yearly apparent relative abundances for marlins and sailfish are shown in Fig. 3 for each year, as well as the accumulative average for the 20-year period of this study. The 1990 HPUE for blue marlin equalled the 1978 historic low of 0.021. The HPUE for 1990 was also 19% below the 20-year

average rate (0.026). Compared to the previous season (1989), HPUEs for the northeast and northcentral Gulf regions had decreased (0.023 vs. 0.017, and 0.023 vs. 0.021, respectively), while in the northwestern Gulf the HPUE increased (0.027 vs. 0.033). The three consecutive years of decreasing HPUEs should be closely observed over the next several seasons for additional signs of a possibly depressed fishery.

After reaching an historic low HPUE (0.011) for white marlin in 1989, the HPUE (0.014) in 1990 showed a 27% increase over the previous year (Fig. 3). The 19-year average HPUE (0.038) rate decreased slightly to a 20-year average of 0.037. Compared to the previous season, increased HPUEs for white marlin occurred in the northeastern Gulf (0.014 vs. 0.018) and northwestern Gulf (0.008 vs. 0.013). The northcentral Gulf HPUE rate decreased from 0.007 to 0.006. The 27% increase in the 1990 HPUE rate for white marlin may indicate a reverse of the decreasing trend in HPUE rates for this species which has occurred, in general, over the previous seven seasons.

The 1990 HPUE rate for sailfish remained at the historic low level (0.003) that it reached in 1989 (Fig. 3). This rate is 80% below the 20-year accumulative average rate (0.015) and may reflect the scarcity of this species in the recreational catches along the northern Gulf that anglers have remarked about over the last several years. Although the HPUE rate for the northern Gulf remained the same as in 1989, the northeastern and northcentral regions showed a slight increase in HPUEs (0.001 vs. 0.004, and 0.000 vs. 0.001, respectively) while the northwestern region experienced a substantial decrease (0.014 vs. 0.008) in HPUE.

For all three species combined, the 1990 HPUE (0.038) is slightly above the historic low HPUE (0.037) that occurred in 1989 (Fig. 3). The depressed HPUEs for billfishes recorded for the last several seasons resulted in decreasing the accumulative yearly average of 0.079 (19-year average) in 1989 to 0.077 (20-year average) in 1990. Except for two years (1982, 1983) when the accumulative yearly average remained constant (0.090), this average measurement has decreased annually since 1980, when the accumulative yearly HPUE was 0.092. Since the percentage of releases of the catches has been increasing in the recreational fishery along the northern Gulf for the last several years, it appears that factors other than recreational fishing mortality may be adversely affecting these resources (i.e., billfishes).

WEIGHTS

The analyses of size data, in conjunction with other data analyses, can provide insight into the health or general status of fisheries and are often used in fishery management decisions. In recent years, size limits imposed by many tournaments and

federal and state size regulations have affected the average measurements of the landings, and may not represent the actual size composition of the resources (i.e., billfishes). However, length and weight data are still recorded to provide an estimate of the size composition of the catches. Weight data recorded from all fishing methods (i.e., trolling, drifting, and live baiting) are presented in Table 4. A summary of yearly data, as well as the average weight for the 20-year period, are shown in Fig. 4.

Less than four pounds separated the heaviest (596.0 pounds) blue marlin, landed in the northeastern Gulf, from the second heaviest (592.2 pounds) fish, landed in the northcentral Gulf (Table 4). The average weight (327.8 pounds) for this species in 1990 continued an increasing trend and was the heaviest on record (Fig. 4). The yearly accumulative average weight increased to an all-time record of 262.0 pounds. These data reflect the increases in minimum size limits by tournaments in conjunction with federal and state size regulations (i.e., mandatory releasing of small billfishes only allows landings and measurements of larger fishes).

The heaviest (79.6 pounds) white marlin (Table 4) was almost 10 pounds heavier than the largest (70.0 pounds) white marlin landed the previous season. Although the smallest fish (41.0 pounds) was one pound less than the smallest in 1989, the average weight increased from 53.3 pounds in 1989 to 54.5 pounds in 1990 (Fig. 4). The average weight for white marlin in 1990 was 2.2 pounds heavier than the 20-year accumulative average weight of 52.3 pounds.

The largest (71.0 pounds) sailfish was reported from south Texas in the northwestern Gulf (Table 4). Only one sailfish weight was recorded at each of four ports; the smallest (25.0 pounds) for the season was from Pensacola, Florida. The yearly averages for sailfish have fluctuated very little during the 20 years of this study, generally remaining between 41 and 45 pounds (Fig. 4) with the yearly accumulative average remaining at 42.6 pounds since 1986.

BAITS

Bait analyses can be important to fisheries managers by providing information about various types of fishing methods which, in turn, may influence catch rates. These changes could, therefore, affect our estimates of apparent relative abundances. In recent years, comparatively fast trolling with artificial baits (i.e., lures) has been the predominant style of fishing for billfishes. In earlier years (i.e., prior to the late 1970s), slower trolling with natural baits predominated.

Trolling only with artificial baits accounted for 87% of the reported fishing effort (Table 5). In descending frequency, the other methods accounted for the following percentages of fishing effort: both bait types simultaneously 10%; dead baits only 3%; and live baits only 1%. As in 1989, dead baits accounted for the highest HPUE (0.062) in the northern Gulf. However, artificial baits had the highest HPUE (0.025) in the northern Gulf and in two of the three areas when both baits were trolled simultaneously (i.e., 0.021, northeastern Gulf; 0.044, northwestern Gulf). Dead baits accounted for 53% of the HPUE (Fig. 5) when the baits were fished independent of each other in the northern Gulf. Artificial baits produced 61% of the HPUE in the northern Gulf when fished in conjunction with dead baits.

FISHING AREAS

For many years, billfishing constituents have been interested in the reported fishing activities by other anglers in their areas. To depict the reported activity, "fishing charts" showing indices of low, mid, and high activity by 10-minute latitudinal and longitudinal blocks are presented in Figs. 6-8. The indices are compiled by computing the numbers of billfishes raised-per-hour-of-trolling for consistency with previous reports. Data are given for blocks in which 10 hours or more of trolling effort was reported.

Fishing effort was expended over a 10% larger area of the northeastern Gulf (Fig. 6) in 1990 than in 1989 (105 vs. 96 blocks). Numerical comparisons between 1989 and 1990 indicate that fishing was more favorable in 1989 than depicted on the 1990 chart. The sole high value block resulted from a comparatively low amount of fishing effort producing a high proportion of successful billfishing activity during one or two days late in the season.

The northcentral Gulf (Fig. 7) apparently experienced a considerable expansion (40%) of the fishing area (60 blocks) during 1990 compared to the area (43 blocks) reportedly fished in 1989. However, in 1990 the sampling effort at Grand Isle was more intense than in 1989 and the resultant data may have included more blocks. While the percentage of empty blocks in 1990 and 1989 only varied by 1%, the percentage (15%) of high value blocks in 1990 was about three times greater than in 1989.

The fishing area in the northwestern Gulf (Fig. 8) was the same size (73 blocks) in 1990 and 1989 and, also, was distributed in the same general pattern within this region. In contrast to 1989, when the majority of the mid blocks and all of the high value blocks were north of 27°N latitude, the percentages of the various value blocks were about equally distributed north and south of latitude 27°N in 1990. This indicates there may have

been a more equal distribution of fishing effort or billfishes among the northern and southern areas during the season.

RELATED OBSERVATIONS

1. The first reported billfish catch of the season was on 11 May, from South Pass, Louisiana. The crew of the "Rebel Y 11" reported tagging and releasing a blue marlin, while fishing the New Orleans Big Game Fishing Club's "First" Tournament.

2. This was the second consecutive year that no "Grand Slams" (i.e., catches of a blue marlin, white marlin, and sailfish on a 1-day trip) were reported during the season. The last reports of "Grand Slams" were in 1988 when two were recorded.

Table 1. Persons and tournament organization that actively assisted the NMFS Recreational Billfishing Survey in the northern Gulf of Mexico during the 1990 fishing season.

Name	Location
George Ballard	Pensacola, FL
Bethany Barfield	Pensacola, FL
Bay Point Invitational Tournament	Panama City, FL
Blue Marlin Classic Tournament	Perdido Key, FL
East Pass Towers Tournament	Destin, FL
Florida West Coast Championship Tournaments	Madeira Beach, FL
Fort Walton Beach Sailfish Club	Ft. Walton Beach, FL
Nancy Hanna	Pensacola, FL
Jim Hubbard	Houston, TX
Ellen Lewallen	Pensacola, FL
Mobile Big Game Fishing Club/Ladies	Mobile, AL
New Orleans Big Game Fishing Club/Ladies	New Orleans, LA
Pensacola Big Game Fishing Club/Ladies	Pensacola, FL
Poco Bueno Tournament	Port O'Connor, TX
Pamela Roberts	Pensacola, FL
Donnie Rozier	Pensacola, FL
Mary Rozier	Pensacola, FL
Theresa Rutherford	Pensacola, FL
Sportsmans Blue Marlin Tournament	Orange Beach, AL
Betty Martin	San Benito, TX

Table 2. Hours trolled and billfishes raised (R), hooked (H), and boated/released (B/R) in the northern Gulf of Mexico, 1990.

	Hours trolled	Blue marlin			White marlin			Sailfish			Swordfish			Spearfish			All species		
		R	H	B/R	R	H	B/R	R	H	B/R	R	H	B/R	R	H	B/R	R	H	B/R
Northeast Gulf	13,975	294	239	52/62	363	258	36/92	61	49	14/20	0	0	0/0	2	2	0/2	720	548	102/174
St. Petersburg	833	16	15	7/1	6	6	3/2	10	10	5/0	0	0	0/0	0	0	0/0	32	31	15/3
Panama City	2,092	24	16	4/3	38	24	3/8	12	8	5/1	0	0	0/0	0	0	0/0	74	48	12/12
Destin	2,467	79	50	16/13	113	51	8/32	21	17	2/12	0	0	0/0	0	0	0/0	213	118	26/57
Pensacola	4,493	93	83	13/27	117	102	14/30	11	10	0/5	0	0	0/0	0	0	0/0	221	195	27/62
Mobile	4,090	82	75	12/18	89	75	8/20	7	4	2/2	0	0	0/0	2	2	0/0	178	154	22/40
Northcentral Gulf	6,630	197	142	26/53	61	41	2/25	5	4	2/2	0	0	0/0	0	0	0/0	208	187	30/80
Grand Isle	921	30	30	5/10	12	12	2/4	1	1	1/0	0	0	0/0	0	0	0/0	42	43	14/0
South Pass	5,709	167	112	21/43	49	29	0/21	4	3	1/2	0	0	0/0	0	0	0/0	166	144	16/80
Northwest Gulf	3,997	177	130	14/59	87	51	10/31	56	31	13/12	0	0	0/0	3	3	3/0	323	215	40/102
East Texas	36	1	1	1/0	1	1	0/1	0	0	0/0	0	0	0/0	0	0	0/0	2	2	1/1
Central Texas	1,506	79	74	3/26	36	30	6/14	10	8	2/3	0	0	0/0	2	2	2/0	127	114	13/43
South Texas	2,455	97	55	10/33	50	20	4/16	46	23	11/9	0	0	0/0	1	1	1/0	194	99	26/58
Total all area	24,602	668	511	92/174	511	350	48/148	122	84	29/34	0	0	0/0	5	5	3/0	1,306	950	172/356

Table 3. Numbers of billfishes reported as boated or released (B/R) with no accompanying data on fishing hours in the northern Gulf of Mexico, 1990.

	Number					
	Blue marlin	White marlin	Sailfish	Swordfish	Spearfish	All species
Northeastern Gulf	4/3	4/6	8/1	0/0	0/0	16/10
St. Petersburg	4/0	3/0	7/0	0/0	0/0	14/0
Panama City	0/0	0/0	1/0	0/0	0/0	1/0
Destin	0/0	0/0	0/0	0/0	0/0	0/0
Pensacola	0/3	1/6	0/1	0/0	0/0	1/10
Mobile	0/0	0/0	0/0	0/0	0/0	0/0
Northcentral Gulf	0/0	0/0	0/0	0/0	0/0	0/0
South Pass	0/0	0/0	0/0	0/0	0/0	0/0
Grand Isle	0/0	0/0	0/0	0/0	0/0	0/0
Mississippi	0/0	0/0	0/0	0/0	0/0	0/0
Northwestern Gulf	0/3	0/3	3/3	0/0	0/0	3/9
East Texas	0/3	0/0	0/0	0/0	0/0	0/3
Central Texas	0/0	0/0	0/0	0/0	0/0	0/0
South Texas	0/0	0/3	3/3	0/0	0/0	3/6
Total all area	4/6	4/9	11/4	0/0	0/0	19/19

Table 4. Weights (pounds) of billfishes recorded in conjunction with fishing effort in the northern Gulf of Mexico, 1990.

	St. Pete	Panama City	Destin	Pensacola	Mobile	Grand Isle	South Pass	East Texas	Central Texas	South Texas	Total combined
Blue marlin											
# weighed	7	4	13	12	12	5	21	1	2	10	87
Largest	403.5	393.5	535.0	596.0	513.5	521.0	592.2	255.0	243.5	370.0	596.0
Smallest	205.0	245.7	224.5	210.0	213.6	200.0	203.0	255.0	225.5	140.9	140.9
Average	298.6	323.2	325.2	331.9	309.4	328.8	373.2	255.0	234.5	300.4	327.8
White marlin											
# weighed	3	3	8	14	8	2	0	0	4	4	45
Largest	59.9	66.3	64.8	70.0	79.6	57.4			52.5	54.0	79.6
Smallest	52.0	53.0	48.0	43.0	49.6	55.4			41.0	47.0	41.0
Average	56.5	59.7	54.0	54.5	58.1	56.4			47.4	50.9	54.5
Sailfish											
# weighed	4	5	1	1	2	1	1	0	2	8	23
Largest	59.0	43.0	47.8	25.8	39.2	32.8	38.0		56.3	71.0	71.0
Smallest	37.0	34.7	47.8	25.8	37.8	32.8	38.0		38.2	28.0	25.8
Average	45.3	38.4	47.8	25.8	38.5	32.8	38.0		47.3	42.7	41.5
Swordfish											
# weighed	0	0	2	0	1	0	0	0	0	0	3
Largest			108.0		33.6						108.0
Smallest			36.2		33.6						33.6
Average			72.1		33.6						59.3
Spearfish											
# weighed	0	0	0	0	0	0	0	0	2	1	3
Largest									20.9	60.7	60.7
Smallest									15.0	60.7	15.0
Average									18.0	60.7	32.2

Tabl 5. Hours trolled and number of billfishes hooked-per-hour-of-trolling (HPUE) with various baits fished in the northern Gulf of Mexico, 1990.

	<u>Dead bait only</u>		<u>Live bait only</u>		<u>Artificial bait only</u>		<u>Both simultaneously</u>		
	Hours trolled	HPUE	Hours trolled	HPUE	Hours trolled	HPUE	Hours trolled	Nat. HPUE	Art. HPUE
Northeastern Gulf	522	.065	88	.034	11,379	.038	1,985	.017	.021
Northcentral Gulf	0	0	20	0	6,601	.028	9	0	0
Northwestern Gulf	121	.050	74	0	3,349	.054	454	.015	.044
All three areas	643	.060	182	.010	21,330	.038	2,448	.016	.025

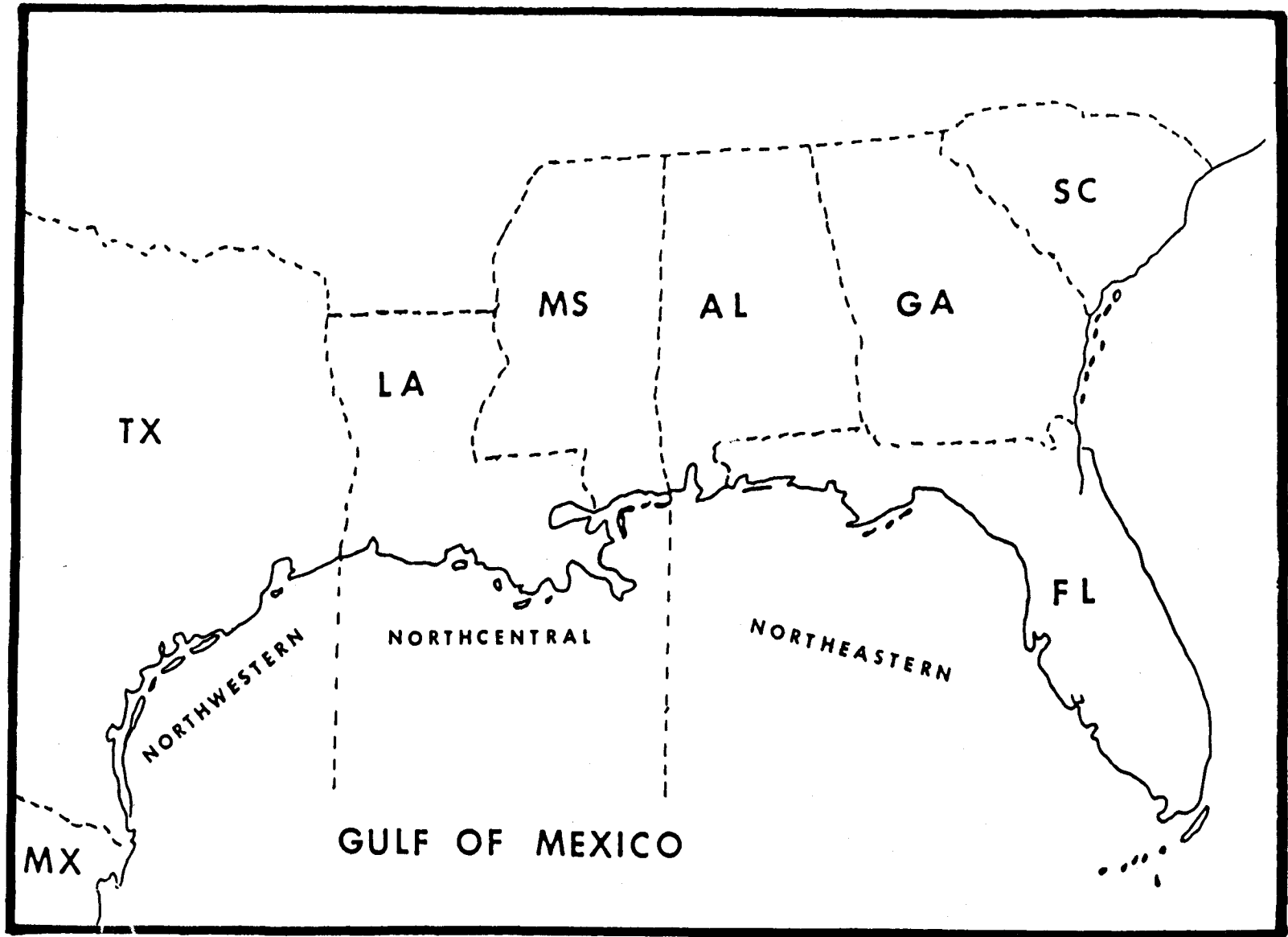
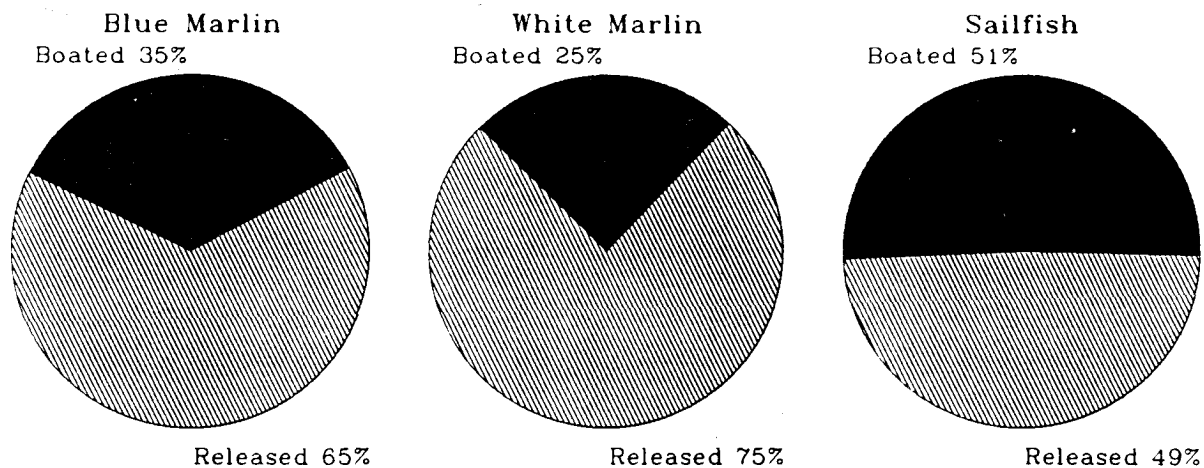


Figure 1. Three primary regions of the Recreational Billfishing Survey in the northern Gulf of Mexico.

SPECIES



ALL BILLFISHES

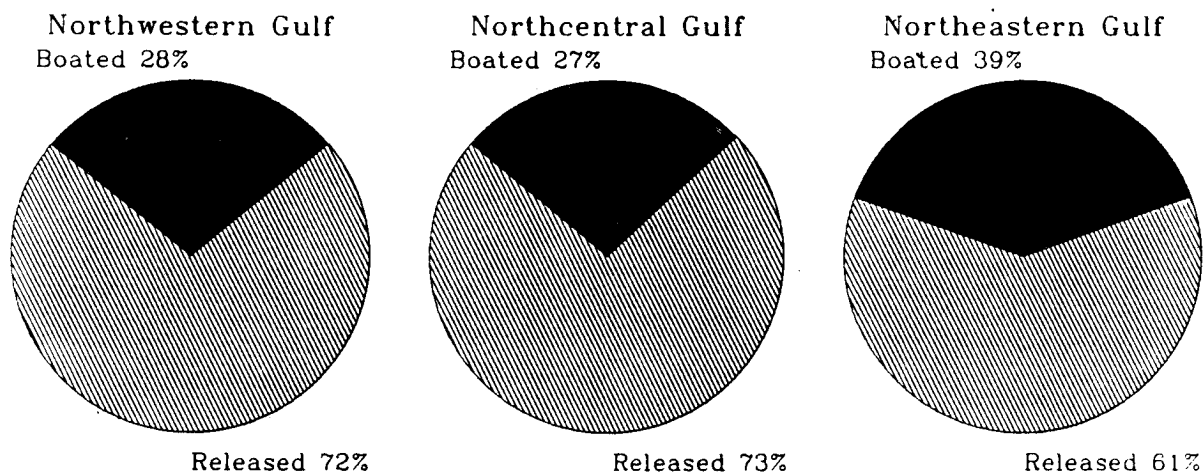


Figure 2. Percentage of billfishes released vs. boated by species and by area in the northern Gulf of Mexico, 1990.

NUMBER OF FISH HOOKED--PER--HOUR--TROLLING (H P U E)

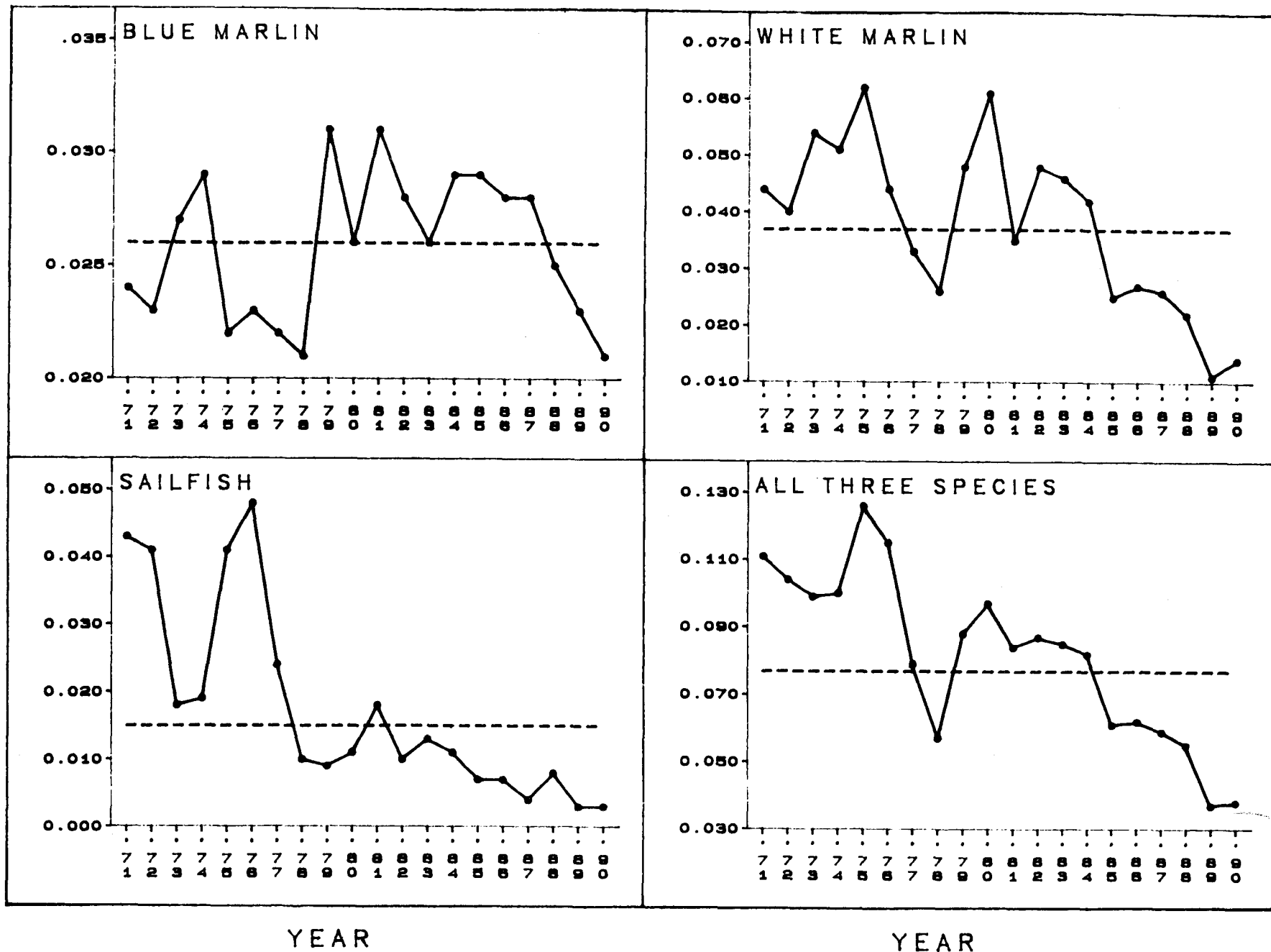


Figure 3. Numbers of billfishes hooked--per--hour--of--trolling (HPUE) in northern Gulf of Mexico, 1971-1990. Dashed line indicates 20-year average of each category.

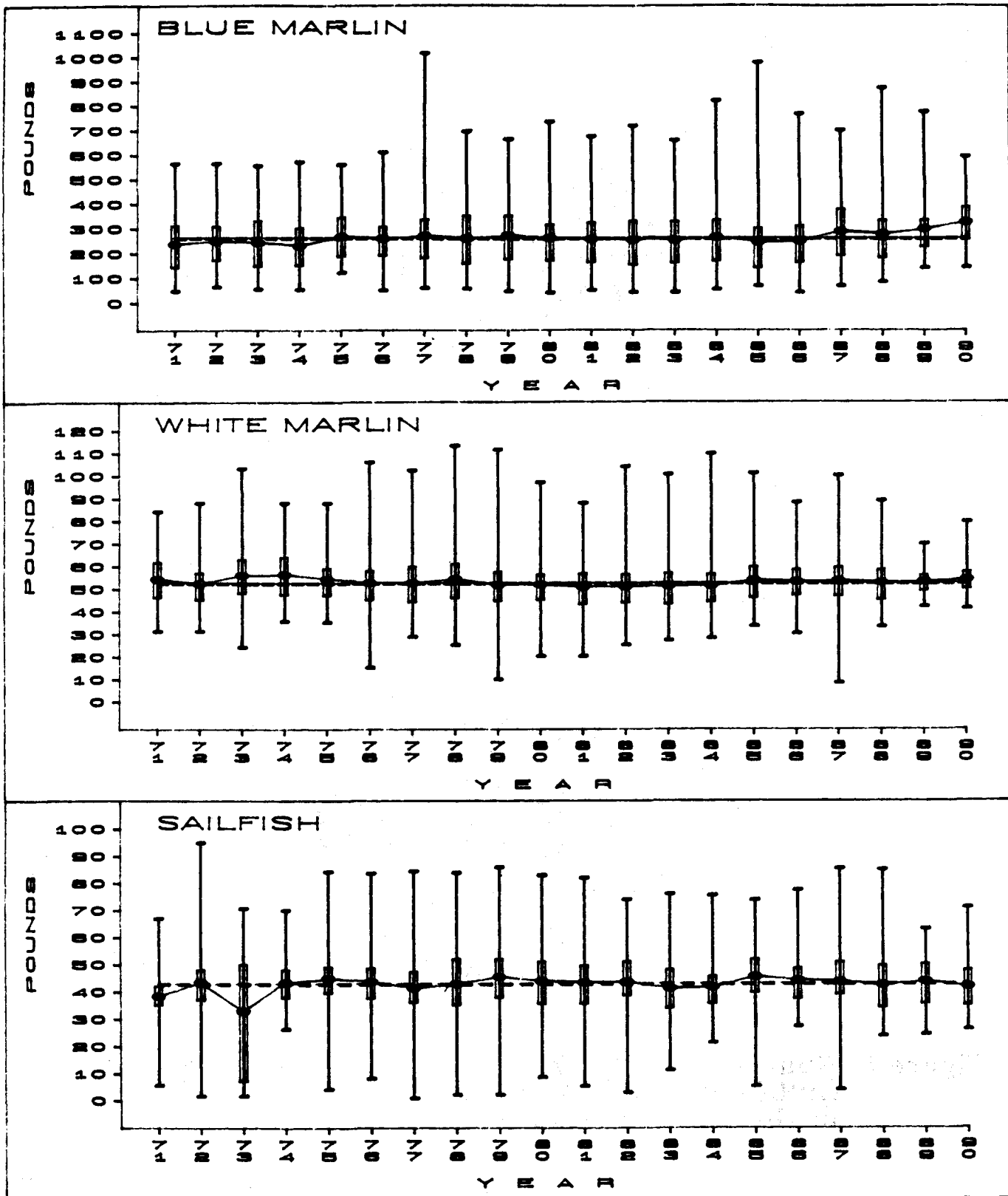
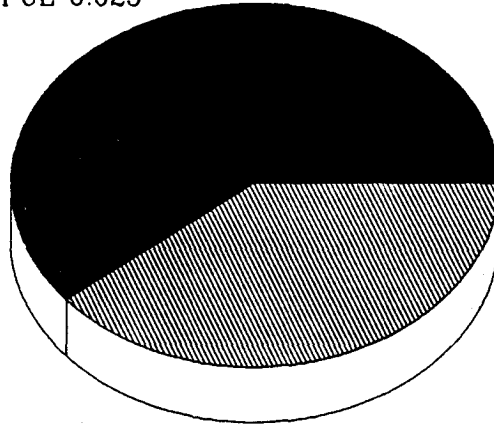


Figure 4. Yearly average weights (lbs) of billfishes with range (vertical line) and 50% grouping (rectangle) around mean weight. Dashed line indicates 20-year average weight, 1971-1990.

BAITS USED SIMULTANIOUSLY

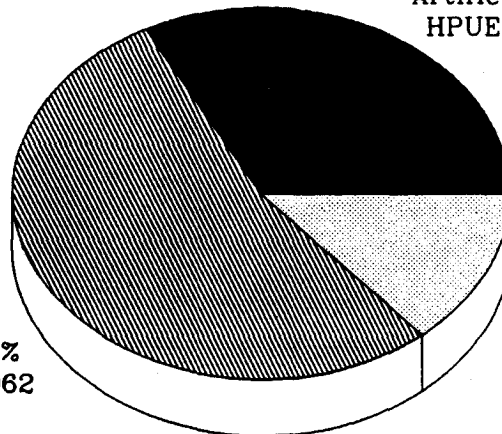
Artificial 61%
HPUE 0.025



Dead 39%
HPUE 0.016

BAITS USED INDEPENDENTLY

Artificial 33%
HPUE 0.038



Dead 53%
HPUE 0.062

Live 14%
HPUE 0.016

Figure 5. Numbers of billfishes hooked-per-hour-trolling (HPUE) and percent of HPUE for various baits in the northern Gulf of Mexico, 1990.

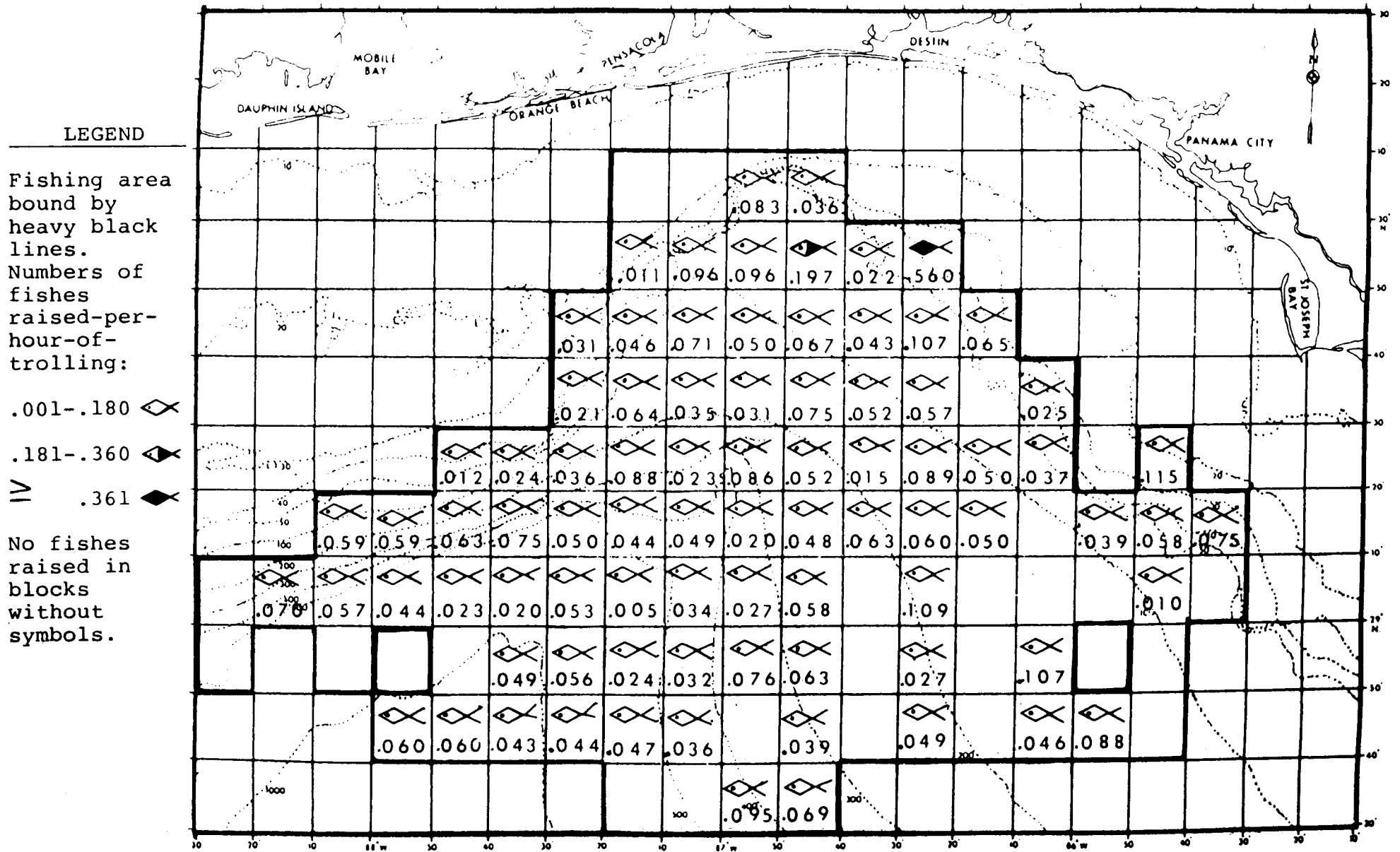


Figure 6. Numbers of billfishes raised-per-hour-of-trolling in the northeastern Gulf of Mexico by 10-min. blocks, 1990.

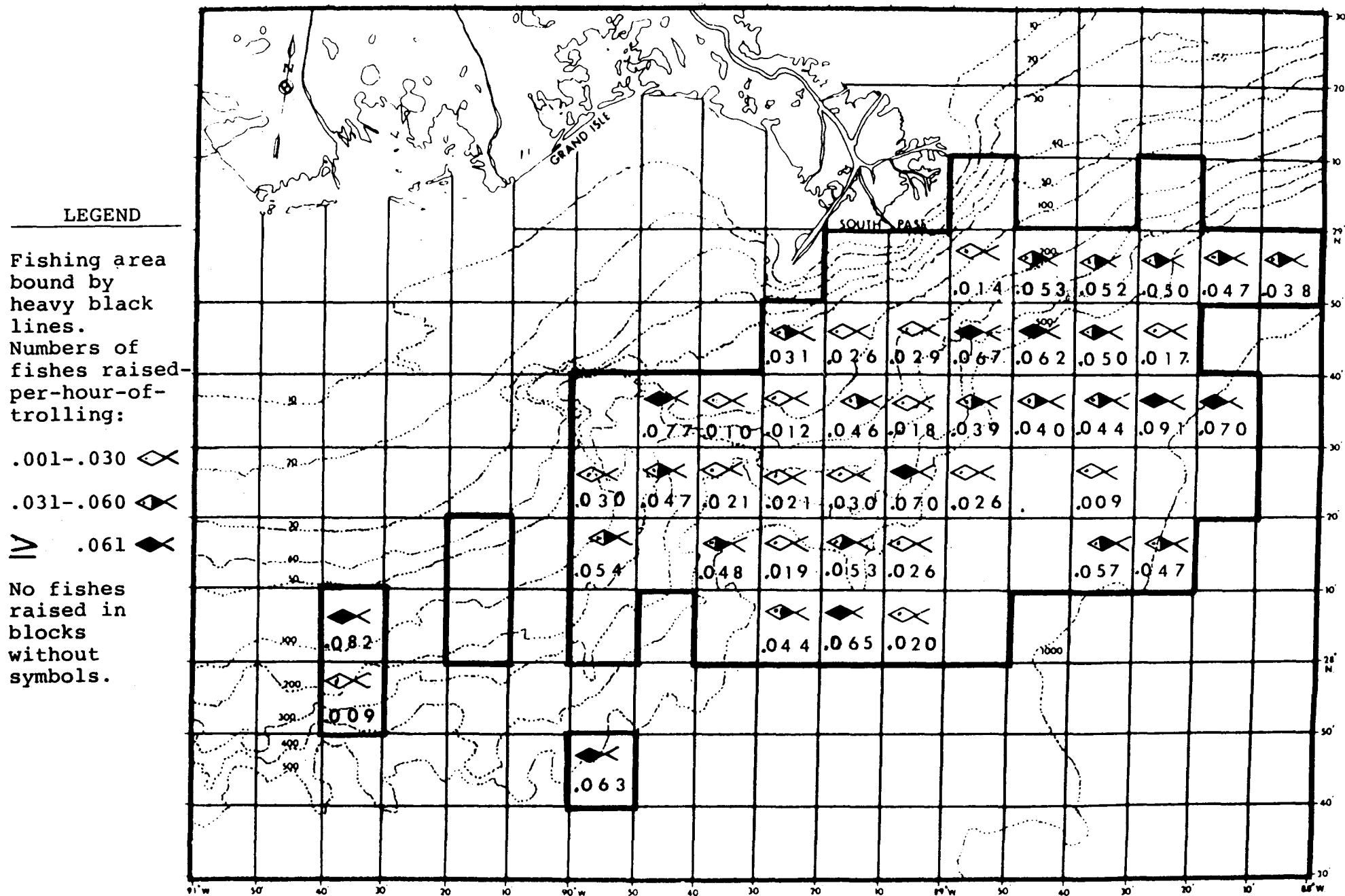
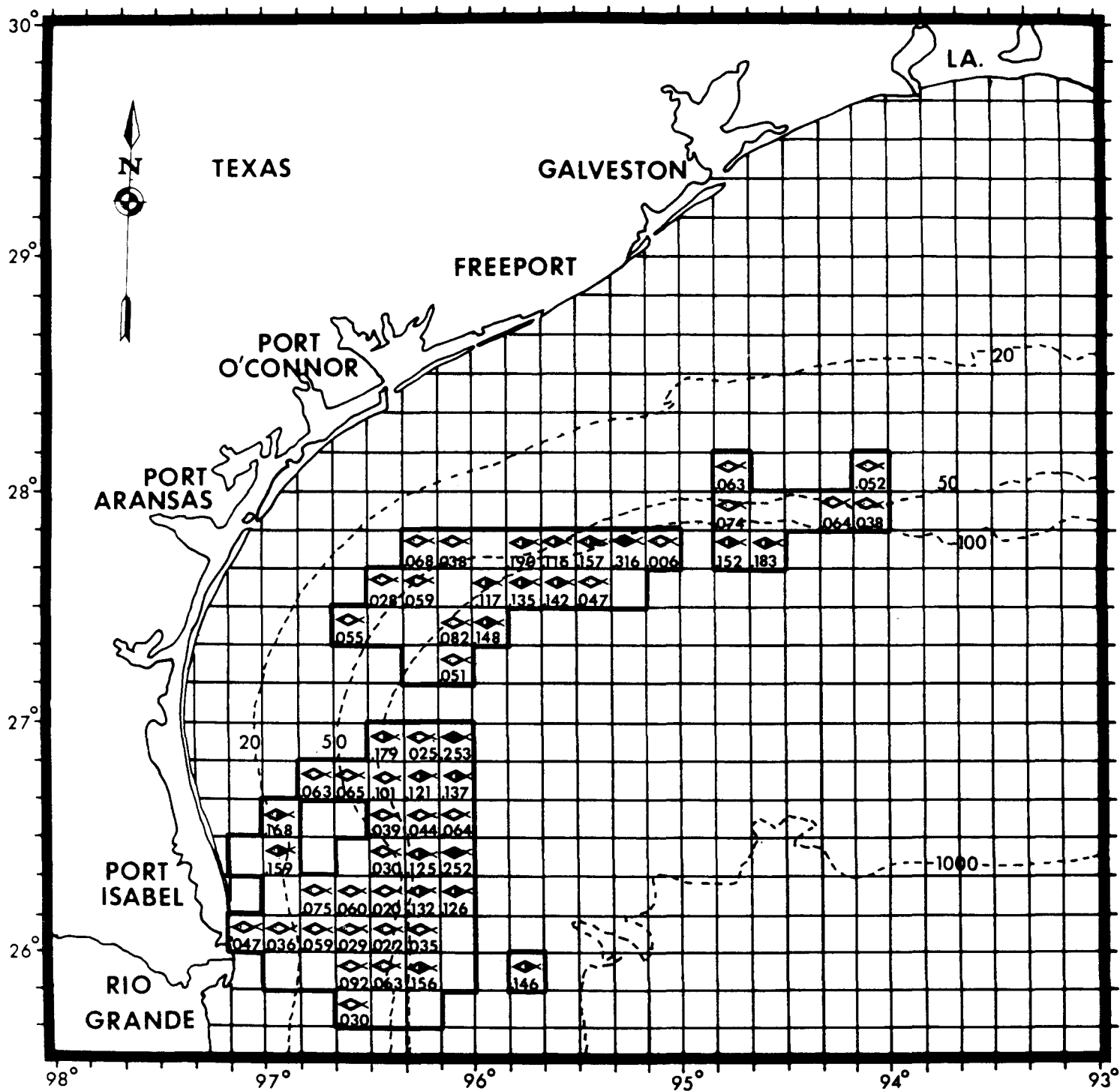


Figure 7. Numbers of billfishes raised-per-hour-of-trolling in the northcentral Gulf of Mexico by 10-min. blocks, 1990.



L Fishing area bound by
 E heavy black lines.
 E No fish raised in
 N blocks without symbols.
 D

- ⬮ .001-.105 fishes raised-per-hour-trolling.
- ⬮ .106-.210 fishes raised-per-hour-trolling.
- ⬮ ≥ .211 fishes raised-per-hour-trolling.

Figure 8. Numbers of billfishes raised-per-hour-trolling in the northwestern Gulf of Mexico by 10-min. blocks, 1990.