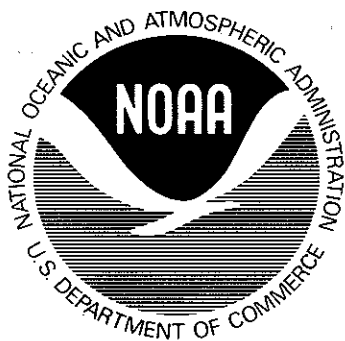




NEWSLETTER 1976



1976 NEWSLETTER

OCEANIC GAME FISH INVESTIGATIONS

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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SOUTHEAST FISHERIES CENTER

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National Marine Fisheries Service, NOAA, Miami, FL 33149

This newsletter marks the completion of our fifth year of research on the biology, ecology, and population dynamics of the billfish stocks in the western North Atlantic, Gulf of Mexico, and the Caribbean Sea. Our coverage of tournaments in 1976 was greater than in any previous year and over 27,000 fishing hours were recorded (Table 1). An additional 8,000 hours of fishing effort were recorded by port sampling on a daily basis at six locations in the Gulf of Mexico (Table 2).

BLUE MARLIN - BAHAMAS

Catch-per-unit-of-effort (CPUE) expressed as the number of fish hooked per hour of trolling was partitioned by area and by species similar to 1975 (Figures 1, 2, and 3). Data for blue marlin in 1976 show an increase in CPUE over 1975 levels for five out of the seven areas examined. One of the more interesting comparisons is between Chub Cay, located in the Berry Islands, and Bimini/Cat Cay, located on the western edge of the Bahama Banks about 60 nautical miles from Chub Cay. Three weeks of tournament fishing are sampled annually at Chub Cay (four in 1976) and three to four at Bimini/Cat Cay. The amount of fishing effort sampled, number of blue marlin hooked, and the CPUE for each area are shown in Table 3. Figure 1 shows that the CPUE's for the two areas fluctuate in the opposite direction with a general trend downward at Bimini/Cat Cay and upward at Chub Cay. Similarly, for the last four years at least, the amount of the decline or increase in CPUE in one area has been very close to the corresponding increase or decline in the other area. When the CPUE's for the two areas are plotted against one another (Figure 4), there is relatively little deviation from a calculated straight line fitted to the points and the correlation coefficient is a highly significant 0.929. There is, therefore, little probability that this negative relationship between the two areas could occur by chance.

When data from the two areas

are combined and a single CPUE calculated for each year (Table 3), a relatively stable condition is evident suggesting that both areas fish on a single stock of blue marlin and the abundance of this stock has remained fairly constant over the period 1972-1976. Further, the decline in CPUE at Bimini/Cat Cay and the increase at Chub Cay suggest that this stock of blue marlin has shifted its distributional pattern over the past five years toward the Chub Cay area.

Analysis of size frequency data from the two areas reveals that blue marlin sampled at Bimini/Cat Cay are generally larger in a given year than blue marlin sampled at Chub Cay (Figure 5). There is also a strong similarity in the trends in average size between the two areas for both males and females. For example, samples of females at both areas increased in average size from 1972 through 1974, decreased in 1975, then increased in 1976. The average size of males also trend in a similar direction except for 1976 when the average size increased at Chub Cay, but decreased at Bimini/Cat Cay.

Only two tagged blue marlin have ever been recaptured that were released at either area. One fish, released at Chub Cay in August of 1968, was recaptured in the same general area in December of the same year. The other blue marlin, also tagged at Chub Cay, was released in February of 1969 and recaptured in the Gulf of Mexico in August of 1971. More tagging is needed in both areas to help resolve the question of seasonal distribution and migration between the two areas.

BLUE MARLIN GULF OF MEXICO

In the Gulf of Mexico, trends in CPUE for blue marlin between the two major fishing areas are similar (Figure 1). When the Gulf data are combined (Table 4), CPUE is relatively constant over the five-year period supporting the hypothesis that there has been no significant change in abundance of blue marlin

in the western North Atlantic over the five-year period, 1972-1976.

Data from other areas, however, show rather wide fluctuations in CPUE. At Jamaica, CPUE is derived from a single tournament and at the Virgin Islands-Puerto Rico area from two tournaments. Both of these areas are important, however, because they produce a great many small blue marlin, probably at their first recruitment into the sport fishery. Relatively large fluctuations in CPUE would be expected if year-class strength varied significantly.

WHITE MARLIN

CPUE for white marlin declined significantly in 1976 after what had been a peak year in 1975 (Figure 2). For three areas: Chub Cay, Bimini/Cat Cay, and the mid-Atlantic states, CPUE in 1976 was at the lowest level since our sampling program began. It is generally believed that white marlin have two main summering grounds off the continental United States; one in the Gulf of Mexico, and one off the mid-Atlantic coast. These two groups are believed to be relatively separate and return each year to their separate areas with little intermixing. The Chub Cay and Bimini/Cat Cay areas lie along the suspected main northward migratory route of white marlin to the mid-Atlantic states area. Figure 2 shows that CPUE in the three Atlantic Ocean areas from 1974 through 1976 trend in the same direction and support the hypothesis that all three areas exploit a single stock.

Trends in CPUE in the Gulf, however, are generally in the opposite direction. This may reflect yearly changes in distribution between the two areas or it may be because the western Gulf is a relatively poor white marlin fishing area, and the trends in CPUE may not be as reliable as in other areas where white marlin are more abundant.

SAILFISH

Data for sailfish (Figure 3) show that in the Florida Keys, CPUE continued to fluctuate greatly from year to year. The sailfish tourna-

ment season in the Keys takes place in November and December and very small young-of-the-year sailfish are abundant in the catch. It is possible that the large year to year fluctuations in CPUE reflect variability in year-class strength. The tournaments off Palm Beach and Stuart are grouped under the southeast Florida area, and normally larger and older sailfish make up the bulk of the catch. If the CPUE in the Keys is adequately measuring the relative abundance of the incoming year-class, this might be reflected in the CPUE off southeast Florida one year later. Figure 3 shows that levels of CPUE off Southeast Florida do indeed coincide with levels of CPUE off the Florida Keys one year earlier. Although the time series is too short to adequately support this hypothesis, the possibility exists, nevertheless, that relative fishing success off southeast Florida in a given year can be predicted from fishing success in the Florida Keys the previous year.

CPUE for sailfish in other areas was variable. The western Gulf experienced another excellent year. There is some speculation that recruitment to the western Gulf stock comes from the Caribbean, particularly off Cozumel. This is based on the movement of the Loop Current clockwise around the Gulf of Mexico. If the group of sailfish off Cozumel in the spring represent a spawning population, then it is likely that eggs and larvae are entrained in the Loop Current, and the western Gulf would be the first area that is fished in the Gulf to receive recruitment from the spawning stock, hence the generally higher CPUE levels there than in any other area of the Gulf that we sample. More information is required on the Cozumel stock including studies on spawning and increased tagging. One tag recovery shows movement from Cozumel to Veracruz and another from Cozumel to Venezuela.

Fishing effort by Japanese long-line vessels in the western North

Deep Sea Roundup	Port Aransas, TX	Jul 13-15	31	222.9	7	0	24	0	0
Governor Charity	St. Thomas, VI	Jul 12-16	4	96.0	23	2	0	0	0
Invitational Blue Marlin									
New Orleans Big Game Fishing	South Pass, LA	Jul 16-18	22	347.6	12	8	2	0	25
Club Ladies Tournament	Port Mansfield, TX	Jul 21-23	13	231.8	2	0	2	0	1
Port Mansfield Bay Billfish	Freeport, TX	Jul 22-24	36	394.9	12	9	60	0	1
Annual Eagle Claw Billfish									
Pensacola Optimist	Pensacola, FL	Jul 23-25	18	255.9	1	16	3	0	1
Fishing Club Billfish	Ocean City, MD	Jul 26-28	14	240.0	2	11	0	1	4
Ocean City Mid-Atlantic	Port Aransas, TX	Aug 5-7	44	634.9	9	5	38	0	0
Texas International Billfish	Port Aransas, TX	Aug 14-15	15	202.4	3	2	2	0	0
Dean Hawn Memorial	Ocean City, MD	Aug 17-18	75	894.0	3	36	0	0	77
\$20,000 White Marlin Open	Panama City, FL	Aug 20-22	34	700.4	11	38	22	0	4
Annual Captains Day Billfish	Port Aransas, TX	Aug 21-22	6	60.0	1	0	0	0	0
Key Allegro Tournament	San Juan, PR	Sep 4-6	67	1,756.6	71	0	0	0	3
San Juan International Blue Marlin	Destin, FL	Sep 4-6	44	632.6	11	46	19	0	0
Annual Ft. Walton-Destin Billfish	Virginia Beach, VA	Sep 4-5	46	511.0	6	88	0	0	1
Annual Virginia Beach Billfish									
Mobile Big Game	Orange Beach, AL	Sep 4-6	26	326.7	6	10	2	0	0
Fishing Club Billfish	Ocean City, MD	Sep 13-15	48	774.0	3	131	0	0	39
Annual Open Marlin	Destin, FL	Sep 17-19	48	903.6	19	49	22	0	0
Destin Billfish Tournament									
Port Aransas Rod and	Port Aransas, TX	Sep 18-19	14	120.0	4	1	39	0	0
Reel Billfish Tournament	Charleston, SC	Sep 22-26	38	581.0	12	0	17	0	0
Oceanic Open	Port Antonio, Jamaica	Oct 4-8	14	578.5	58	0	0	0	0
Jamaica Inter. Blue Marlin	Marathon, FL	Nov 10-13	16	424.5	0	0	55	0	0
Tripod	Marathon, FL	Nov 15	33	264.0	0	0	8	0	0
Bill King One Day Billfish	Key Colony Beach, FL	Nov 17-21	35	942.5	0	0	85	0	0
City of Key Colony Beach Sailfish	Stuart, FL	Dec 9-12	53	479.0	0	0	236	0	0
23 Annual Sailfish									
New Orleans Big Game Fishing	South Pass, LA	May-Oct	50	1,084.4	22	22	3	0	28
Club Member Tournaments									
Grand Totals			1,543	27,368.4	655	750	1,062	18	261

*BM - blue marlin, WM - white marlin, SF - sailfish, BFT - bluefin tuna, YFT - yellowfin tuna

Table 2. Dook sampling results in the Gulf of Mexico, 1976
(tournaments not included; see Table 1 for tournament data).

Port	Number of Boats Interviewed	Number of Hours Fished	Number of Fish Hooked			Number Hooked Per Hour						
			BM*	WM	SF	BFT	YFT	BM	WM	SF	BFT	YFT
Destin, FL	87	3,487.5	65	297	125	0	2	.019	.085	.036	.000	.001
Port Aransas, TX	83	1,792.8	36	10	420	0	0	.020	.006	.234	.000	.000
South Pass, LA	45	1,009.6	43	20	4	0	89	.043	.020	.004	.000	.088
Pensacola, FL	28	548.7	9	27	11	1	8	.016	.049	.020	.002	.015
Panama City, FL	16	327.6	4	33	7	0	18	.012	.101	.021	.000	.055
Grand Isle, LA	23	752.8	15	16	2	0	29	.020	.021	.003	.000	.040
Orange Beach, AL	40	276.3	5	31	8	0	1	.018	.112	.029	.000	.004
TOTALS	392	8,195.3	177	434	577	1	147					

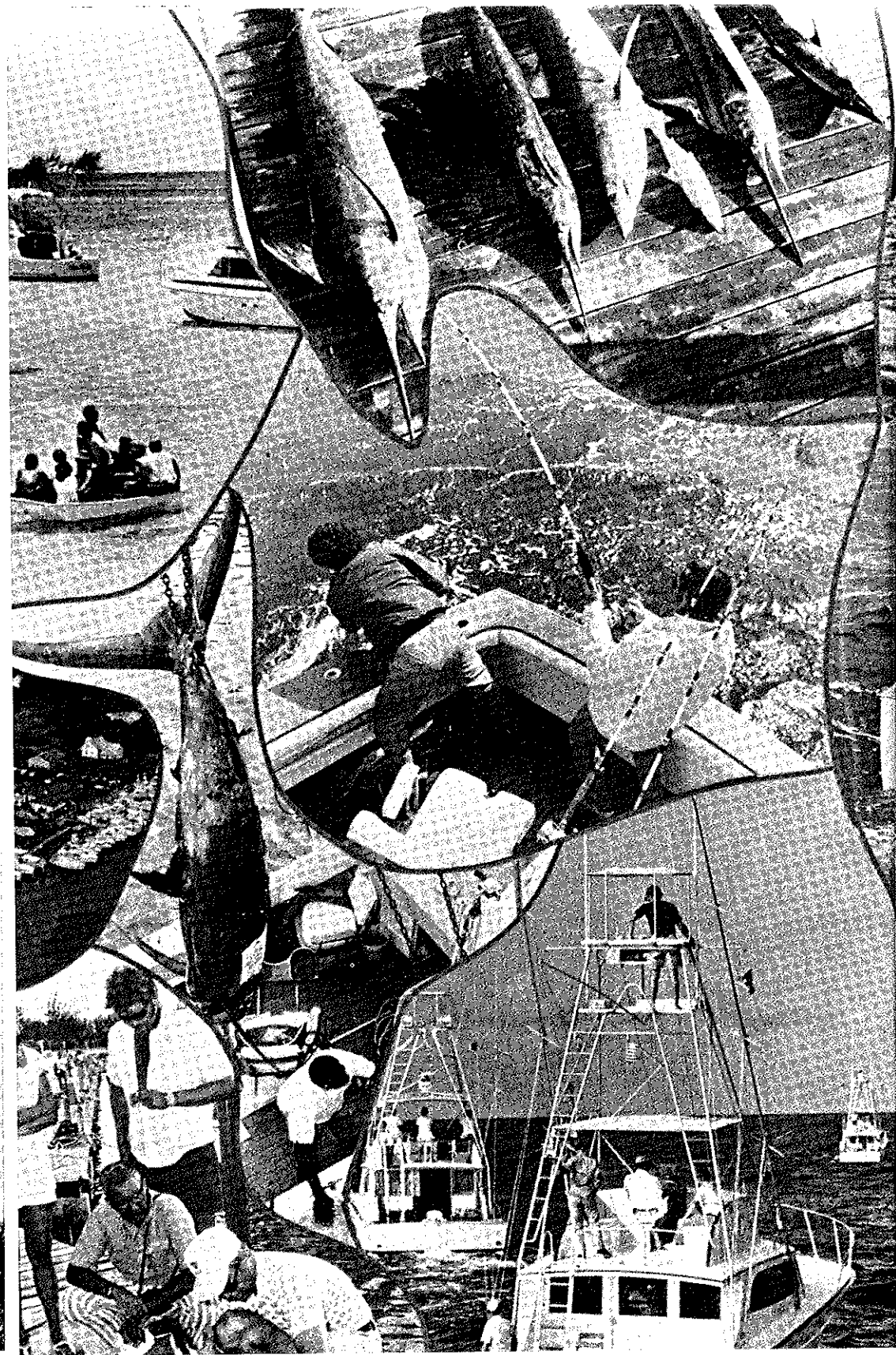
*BM - blue marlin, WM - white marlin, SF - sailfish, BFT - bluefin tuna, YFT - yellowfin tuna

Table 3. Number of hours fished, number of blue marlin hooked, and CPUE (number hooked per hour) for Bimini/Cat Cay and for Chub Cay, 1972-1976.

Year	HOURS FISHED		NUMBER HOOKED		CPUE	
	Bimini/Cat Cay	Chub Cay	Bimini/Cat Cay	Chub Cay	Bimini/Cat Cay	Chub Cay
1972	1,539.7	1,814.5	67	47	.044	.026
1973	2,390.2	2,010.8	62	62	.026	.031
1974	2,753.0	2,407.2	52	96	.019	.040
1975	2,291.7	3,135.4	58	110	.025	.035
1976	2,237.7	2,722.8	48	100	.021	.037
						.034
						.028
						.029
						.031
						.030

Table 4. Number of hours fished, number of blue marlin hooked, and CPUE (number hooked per hour) for the northern and western Gulf of Mexico, 1972-1976.

Year	HOURS FISHED		NUMBER HOOKED		CPUE	
	No. Gulf	West Gulf	No. Gulf	West Gulf	No. Gulf	West Gulf
1972	13,038.8	1,784.0	274	55	.021	.031
1973	8,103.9	1,179.2	175	30	.022	.025
1974	9,597.3	1,409.6	251	57	.026	.040
1975	12,083.7	2,998.1	259	64	.021	.021
1976	14,213.7	4,077.5	311	90	.022	.022
						.022
						.022
						.028
						.021
						.022



photos by Dade Thornton



BLUE MARLIN

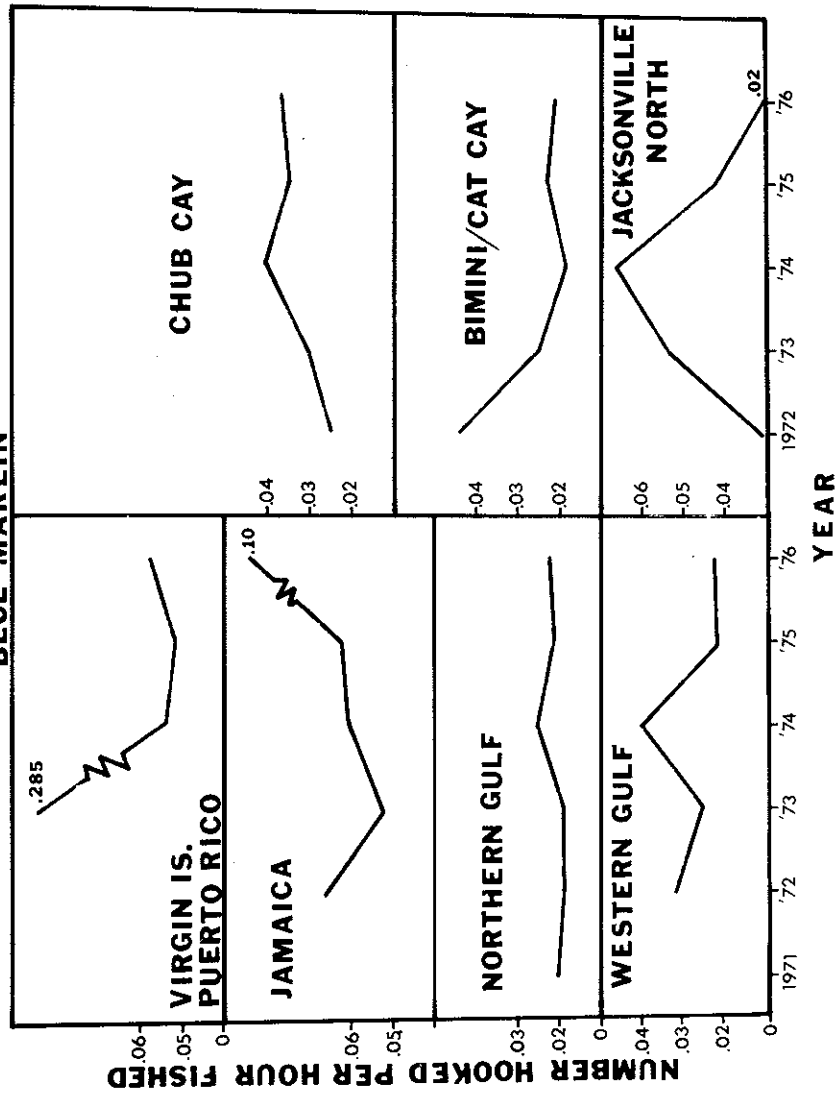


Figure 1 - Catch-per-unit-of-effort (CPUE) expressed as the number of blue marlin hooked per hour of trolling at selected areas, 1972-1976.

WHITE MARLIN

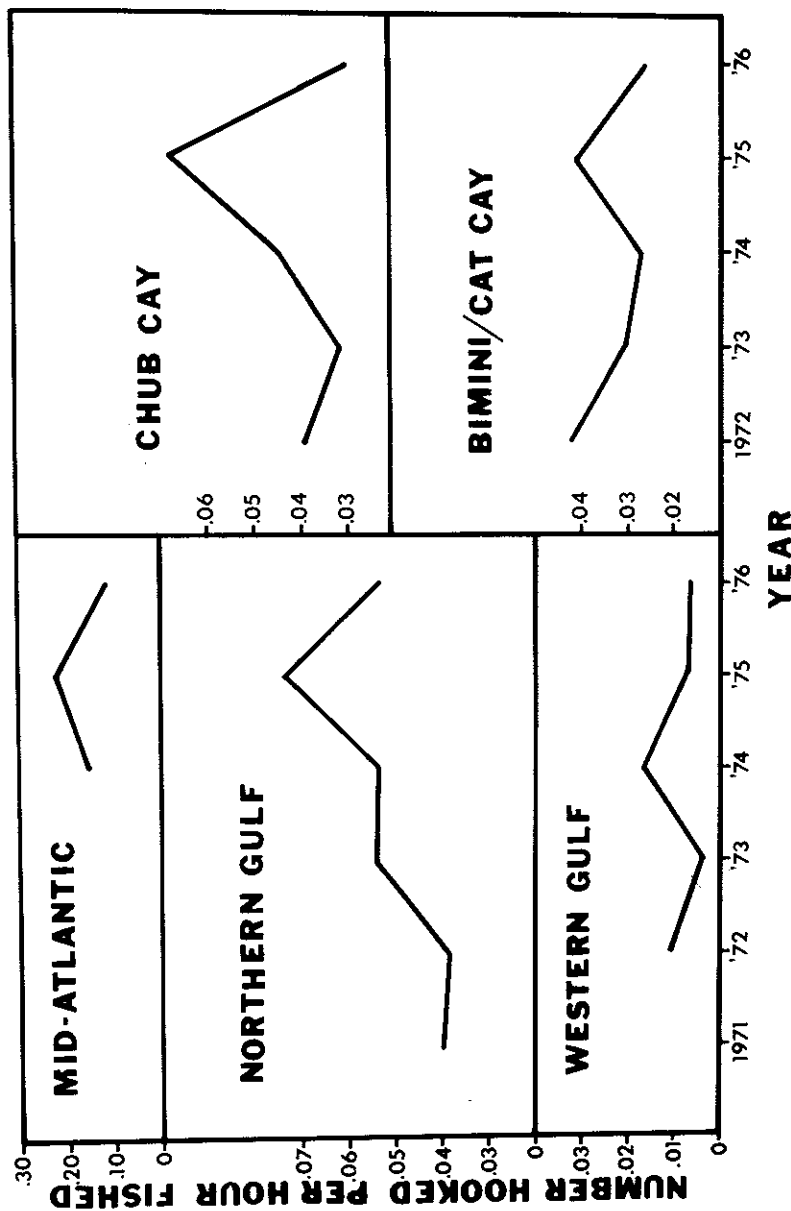


Figure 2 - Catch-per-unit-of-effort (CPUE) expressed as the number of white marlin hooked per hour of trolling at selected areas, 1972-1976.

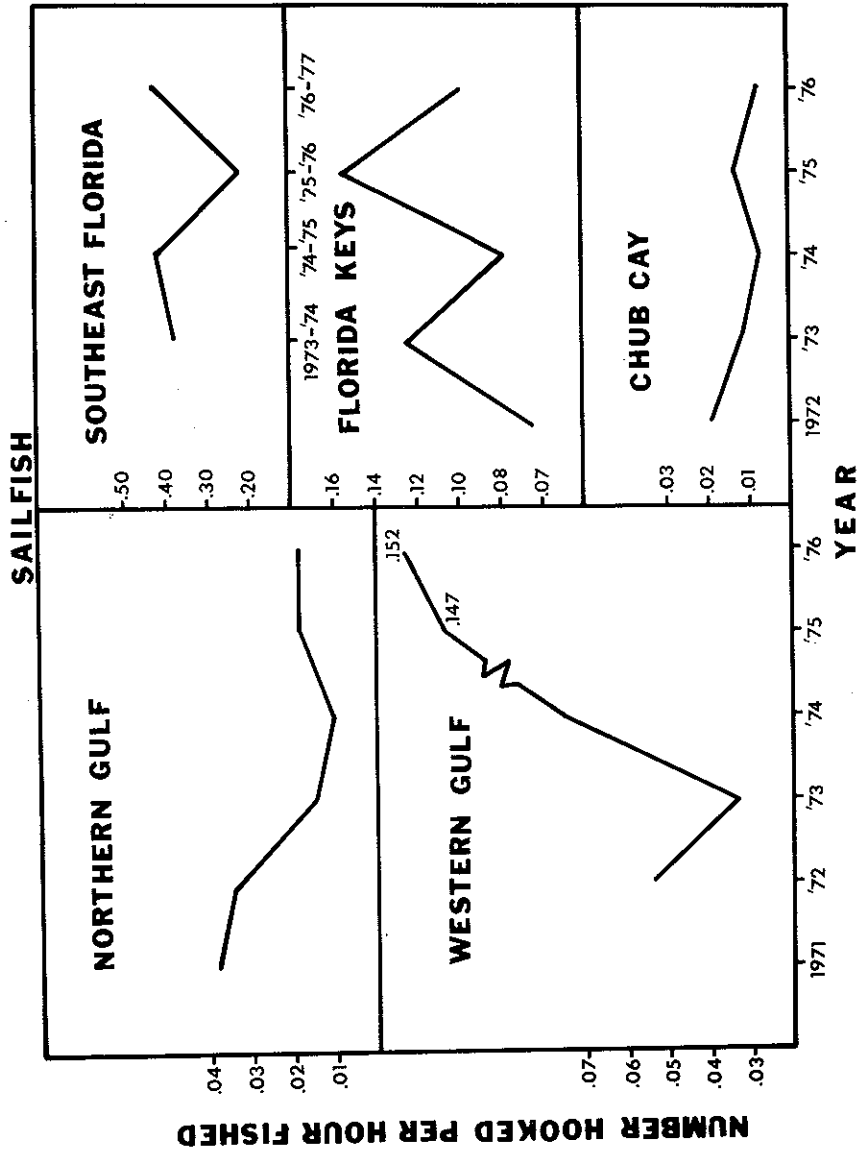


Figure 3 - Catch-per-unit-of-effort (CPUE) expressed as the number of sailfish hooked per hour of trolling at selected areas, 1972-1976.

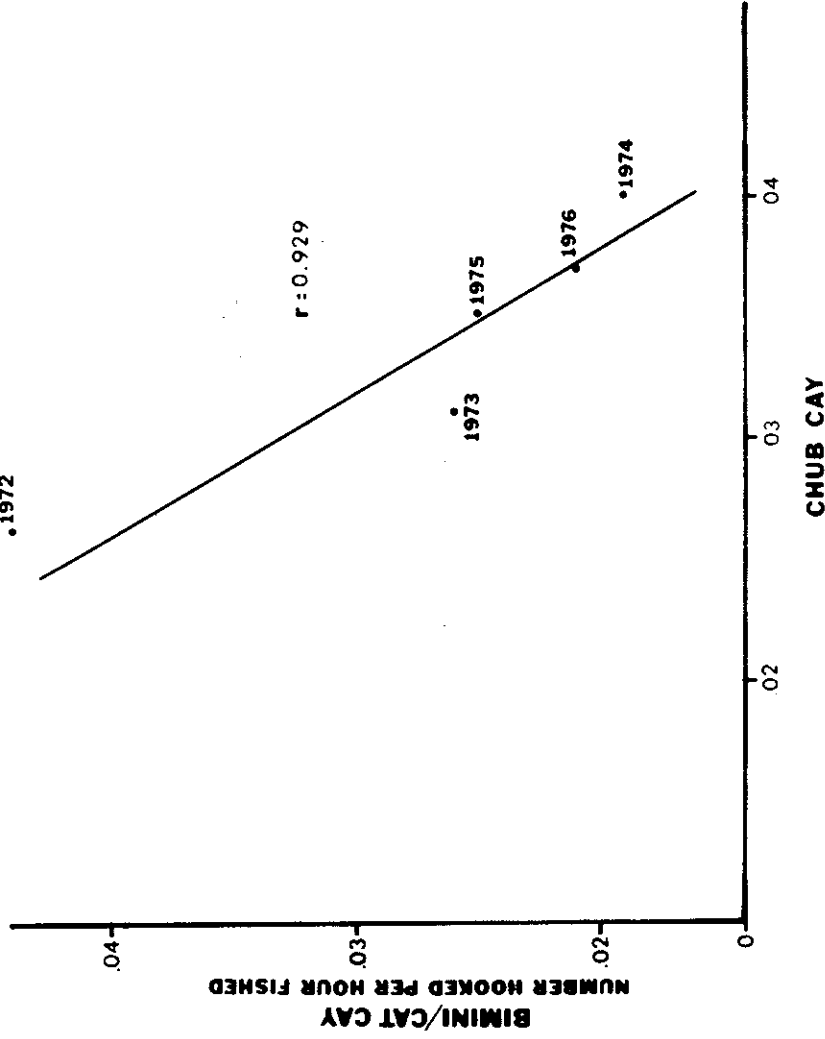


Figure 4 - CPUE of blue marlin at Chub Cay plotted against CPUE of blue marlin at Bimini/Cat Cay and a calculated regression line fitted to the points. The correlation coefficient, $r = 0.929$, is significant at the 99% level.

BLUE MARLIN

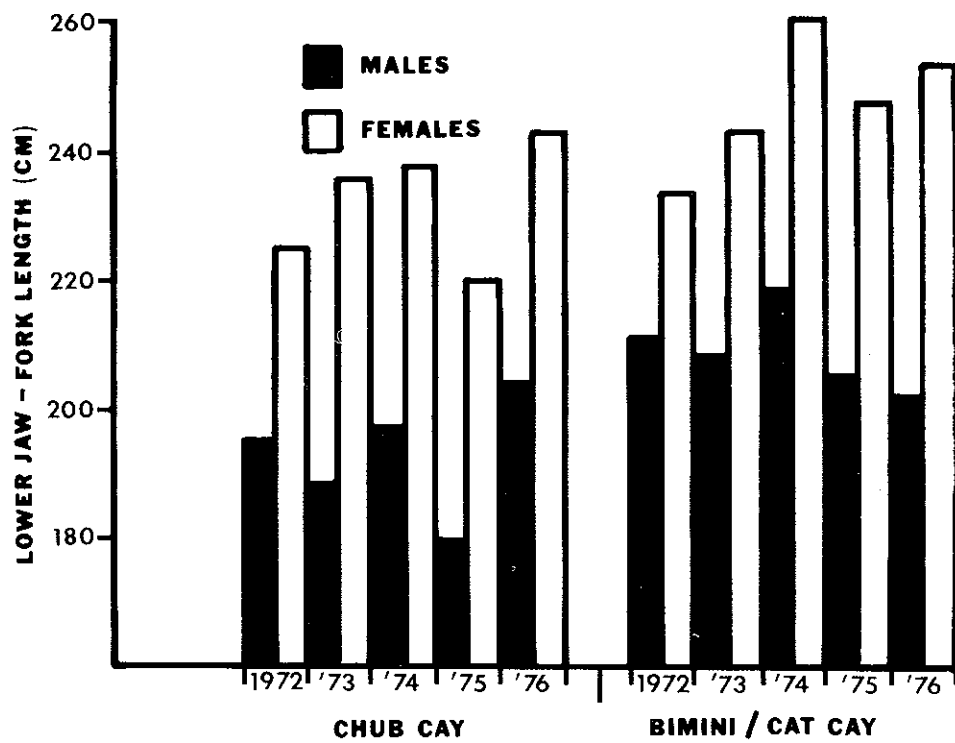


Figure 5 - Length frequencies of male and female blue marlin sampled at Bimini/Cat Cay and at Chub Cay, 1972-1976.

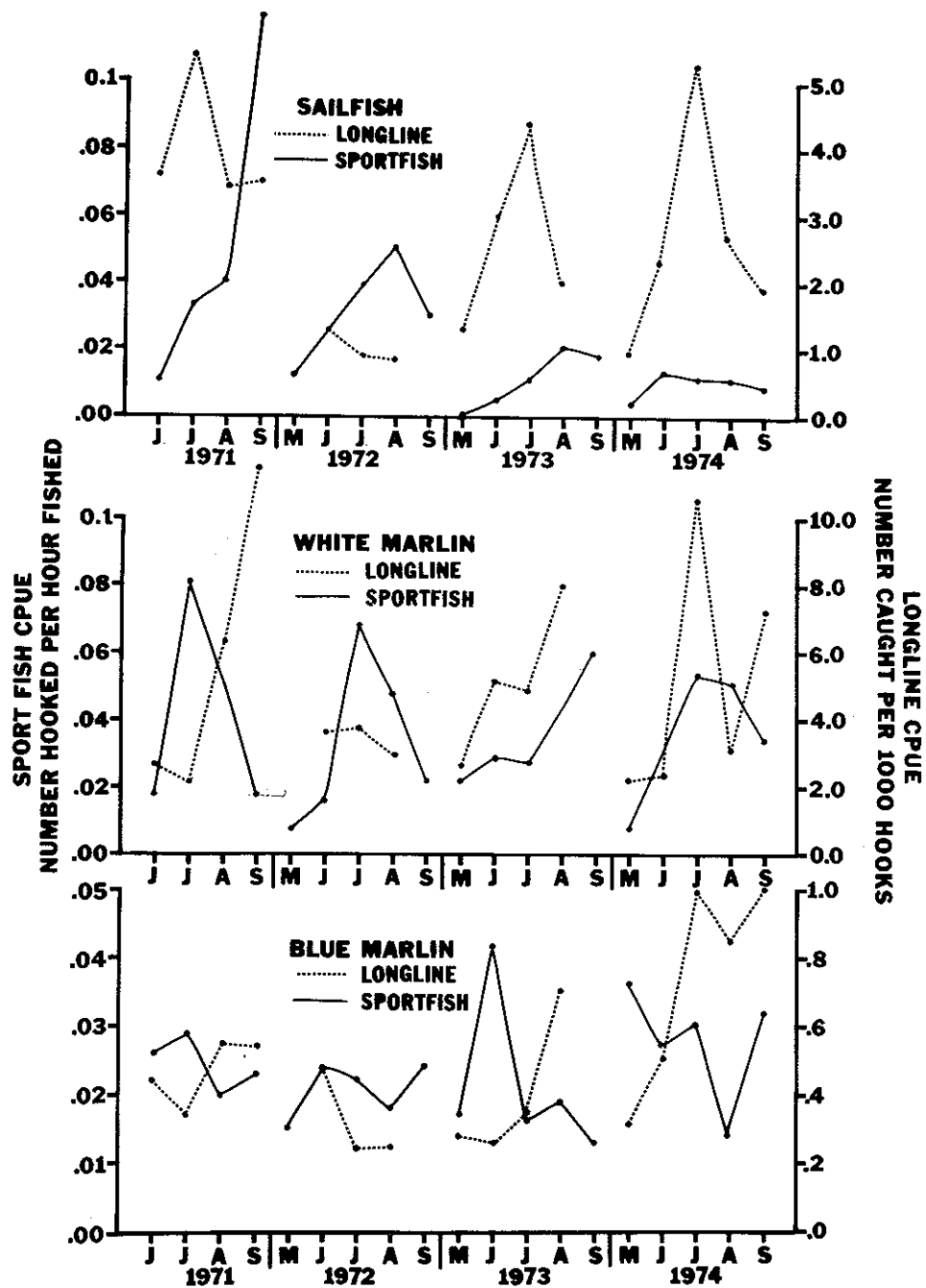


Figure 6 - Catch-per-unit-of-effort for sailfish, white marlin, and blue marlin from the longline fishery and from the sport fishery by monthly periods, 1971-1974. Data are from the northern Gulf of Mexico between 25-30°N latitude and 80-100°W longitude. Months are abbreviated in consecutive order beginning with May (M) or June (J).

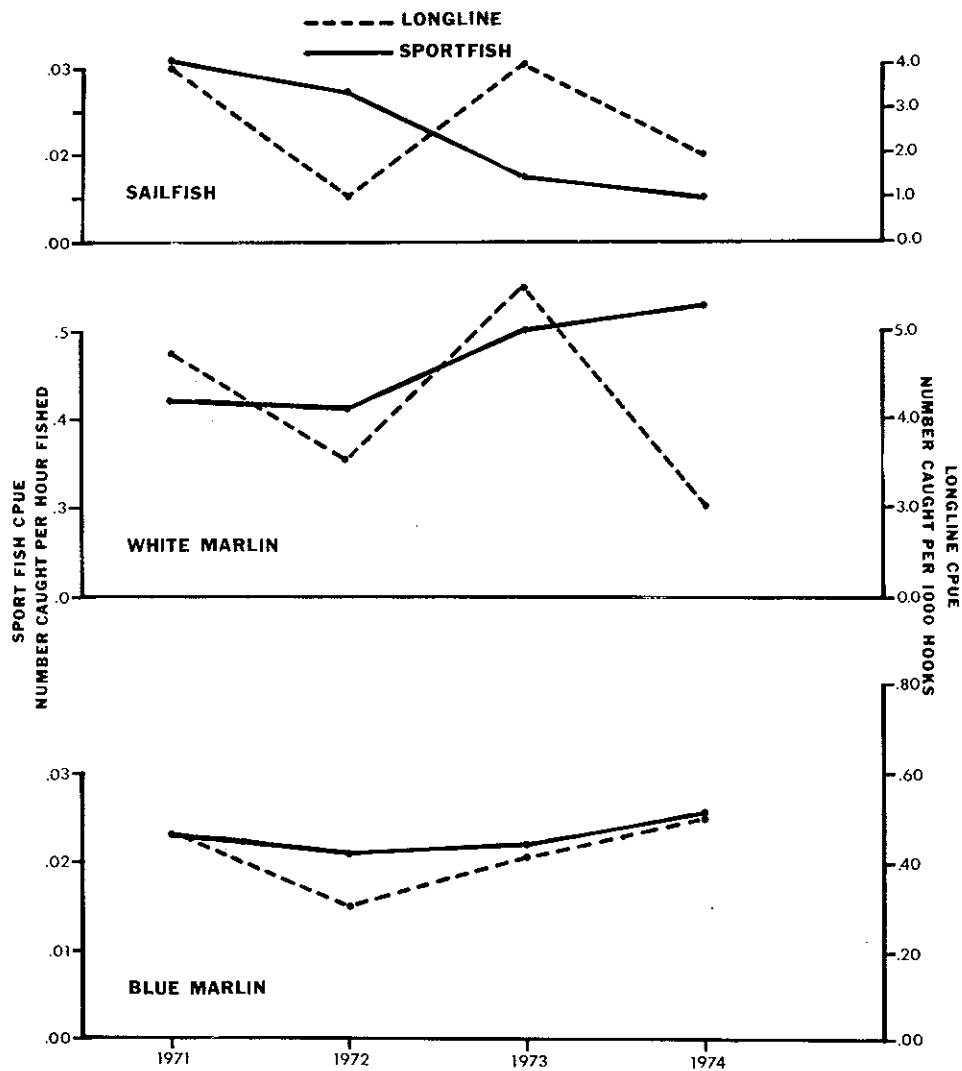


Figure 7 - Catch-per-unit-of-effort for sailfish, white marlin, and blue marlin from the longline fishery and from the sport fishery by year, 1971-1974. Area used is the same as Figure 6.

Atlantic between 10°-40°N latitude and west of 60°W longitude in 1974 was at the lowest level since 1969 (Table 5). Catch rates for all three species of billfishes increased over levels of 1973.

Comparisons were made of catch rates from the Japanese fishery and of hook rates from the sport fishery in the northern Gulf of Mexico where the Japanese often concentrate fishing effort during the summer months. Comparisons were made both on a month by month basis (Figure 6) and on an annual basis (Figure 7). Out of nine available year to year comparisons for sailfish, white marlin, and blue marlin, seven trended in the same direction. This suggests that despite utilizing widely different fishing techniques and different estimates of CPUE, and despite wide fluctuations when compared on a month by month basis, CPUE from both fisheries seem to be measuring similar reactions of a localized stock of fish to the effects of fishing and/or environmental variables. This further suggests that the data obtained from the sport fishery for billfishes is relatively reliable as a tool for estimating changes in relative abundance of billfishes.

YELLOWFIN TUNA

1976 was an unusually good year for yellowfin tuna fishing in the Gulf of Mexico. CPUE off South Pass, Louisiana, where yellowfin are traditionally most abundant, was .045, the highest level recorded since 1971 (Table 6). Fishing for yellowfin was also good at other fishing areas in the northern Gulf (Table 2). For the first time since our sampling began in 1972, yellowfin were reported in significant numbers east of South Pass.

RESEARCH DEVELOPMENTS

The Oceanic Game Fish Investigations Program was organized in 1972 to determine if catch and effort data from the sport fishery could be utilized to detect changes in relative abundance of stocks of Atlantic billfishes. Although there is a great deal of variability in the data and five years is a relatively

short time frame to allow any firm conclusions to be drawn, indications are that the sport fishery can be used to adequately sample billfish stocks, and CPUE from the sport fishery can be utilized to detect changes in relative abundance.

There are several positive indications that lead to this conclusion. The annual trends in CPUE for blue and white marlin in the northern Gulf of Mexico in the longline and sport fishery are similar, suggesting that both are measuring a similar phenomenon. In addition, the trends in CPUE for the three species vary in their stability from year to year in direct relation with the relative life span of the species being measured. CPUE for sailfish, a relatively short lived species for example, fluctuates quite widely from year to year. CPUE for blue marlin on the other hand is relatively stable across the major fishing areas except for two areas where initial recruitment to the sport fishery takes place, and most if not all of the catch is from the incoming year class. Blue marlin are probably the longest lived of the three species of billfishes we study, and the general stability in CPUE is what one would expect from a unit stock with a relatively long life span.

It is also interesting to note that there is a reasonable indication that the relative abundance of sailfish in the Florida Keys as measured by the sport fishery in one year can be used to predict the relative fishing success off southeast Florida the following year. In addition, the significant negative correlation between CPUE of blue marlin between Bimini/Cat Cay and Chub Cay and the general stability of the combined catch rate from both areas also suggests that our sampling techniques are effective and can provide an effective method of determining changes in relative abundances of billfishes from year to year.

TAGGING

The National Marine Fisheries Service-Woods Hole Oceanographic Institution Cooperative Game Fish Tagging Program recorded 1,925

billfish releases in 1976. Sailfish were most frequently tagged with 1,484 releases recorded; most of these were off southeast Florida (894) and Cozumel, Mexico (380).

Twenty-six recoveries were made in 1976; 22 sailfish and 4 white marlin. No blue marlin were recaptured. One sailfish tagged off Cozumel was recaptured off Veracruz. All other recoveries were relatively short term in times at large and distance traveled.

One blue marlin tagged off the Virgin Islands in August of 1976 was recaptured off the Ivory Coast in February of 1977 by a French tuna boat. This marks the first recorded trans-Atlantic migration of a billfish.

MEETINGS

The Second Annual Marine Recreational Fisheries Symposium was held in San Francisco on April 6-7. The theme of the Symposium was management of marine recreational fisheries and papers on theoretical and practical examples of management of marine fisheries were presented. The effect of the extension of U.S. jurisdiction over marine fisheries to 200 miles was also discussed, and the national and international implications of this extension were explored. Preliminary plans call for the 1978 symposium to be held on the east coast of the U. S. next spring.

ACKNOWLEDGMENTS

We again express our gratitude to the many anglers and their crews

for their participation and cooperation in our program. We also acknowledge with appreciation the cooperative tournament sampling conducted by the Florida Department of Natural Resources, Harmon Shields, Director; the Georgia Department of Natural Resources, Joe D. Tanner, Commissioner; and the South Carolina Wildlife and Marine Resources Department, Dr. James A. Timmerman, Jr., Executive Director. We also are grateful for the continued support of big game fishing clubs throughout the U.S., particularly the Port Aransas Rod and Reel Club, the New Orleans Big Game Fishing Club, the Mobile Big Game Fishing Club, the Pensacola Big Game Fishing Club, the Ocean City Light Tackle Club, and the Hatteras Marlin Club. In the Bahamas and Caribbean, we are indebted to the Bimini Big Game Fishing Club, the Cat Cay Club, the Chub Cay Club, the Club Nautico de San Juan, and the Governor's Invitational Blue Marlin Tournament for their support and cooperation.

Special thanks go to Dade Thornton who has provided most of the photography used in all of our Newsletters.

With best wishes and good fishing.

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