

**Marine Recreational Fishing Statistics
of the U.S. Virgin Islands, January, 1983
to September, 1985**

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ABSTRACT

Private and charter sportfishing boats were surveyed from January 1, 1983 to September 30, 1985 in the U.S. Virgin Islands (St. Thomas and St. Croix), to gather information on catch and effort, document all billfishes caught, and collect length and weight data on gamefishes.

A total of 3,684 interviews with recreational fishermen were conducted during the survey, documenting 28,033 hours of effort trolling for billfishes and other gamefishes. The target species of this fishing effort was blue marlin. Sportfishermen caught 1,522 blue marlin, 84 white marlin, 57 sailfish and four spearfish during the survey. A major effort to tag and release billfishes occurs in St. Thomas year-round, and up to 75% of all the billfishes caught, primarily blue marlin, were either tagged or released at sea. The six most important gamefish species by weight were: blue marlin, yellowfin tuna, wahoo, king mackerel, dolphin and little tunny.

Information on species composition and catch per unit of effort is presented by year, month and island. Data on seasonality by species are also presented. Blue marlin were most abundant during July and August, and the moon phase appears to have a significant effect on blue marlin fishing.

INTRODUCTION

The sportfishery for blue marlin and other billfishes in U.S. Virgin Islands waters began in the mid-1950's. In the years that followed, recreational fishing effort has greatly expanded, and a thriving sportfishing fleet presently operates from the east end of the island of St. Thomas. St. Thomas is reputed to have the world's best blue marlin fishing, which attracts many visiting boats and anglers every year.

Recreational fishing effort is mostly from vessels over 30 feet in length, i.e., charter and private sportfishing boats that fish offshore on an almost daily basis. Smaller privately-owned boats (under 30 feet in length) fish on weekends and holidays, concentrating on inshore species, but occasionally venturing offshore for billfishes and other pelagics.

Over half of the boats surveyed were visiting sportfishing boats from the mainland U.S., Puerto Rico, the Bahamas, the British Virgin Islands and the Dominican Republic. Visiting boats stay for the blue marlin season, from mid-June to mid-September, and/or come to fish in one of St. Thomas' two

famous IGFA-sanctioned blue marlin tournaments. A major effort to tag and release blue marlin and other billfishes is expended by recreational fishermen year-round, particularly those on visiting boats. More than 75% of all the billfishes caught are either tagged and/or released (Brandon and Tobias, 1985). Other popular gamefishes are: wahoo, dolphin, yellowfin tuna and king mackerel.

Fishing spots visited by the sportfishing boats include: the "North Drop Off," located approximately 20 miles north of St. Thomas; the "South Drop Off," only eight miles south; and the "Seamount," an underwater plateau to the southeast, about 15 miles south of Ginger Island, BVI (Fig. 1). Of these spots, the "North Drop Off" is the favorite and most frequented for its concentrations of blue marlin.

In contrast, the island of St. Croix does not have a large charter or visiting sportfishing fleet, and the major part of the recreational fishing effort comes from smaller boats under 30 feet in length.

Over the years, very few records have been kept on recreational fishing in the U.S. Virgin Islands. Since blue marlin is the target species of the recreational fishery of St. Thomas and a considerable tag and release effort is involved, there was a need for accurate catch and effort data and information on all billfishes caught, especially when Atlantic blue marlin stocks appear to be overexploited at present (de Sylva, 1972; CMFC Draft FMP, 1982).

For the first time a recreational fishing survey was conducted in the U.S. Virgin Islands by the Virgin Islands Division of Fish and Wildlife, with the assistance of funds provided by the Dingell-Johnson program and the National Marine Fisheries Service. This paper summarizes the results of the recreational port sampling program conducted from January 1, 1983 until September 30, 1985. Data from the island of St. Thomas is emphasized, for 92% of the total data collected pertains to its recreational fishery. The objectives of this survey were (a) to determine the harvest and effort for billfishes and various gamefishes in the U.S. Virgin Islands, document all species of billfishes, particularly blue marlin, that are hooked, boated, tagged, released and lost in Virgin Island waters, and (b) to collect length and weight data of gamefishes landed by recreational fishermen in the U.S. Virgin Islands. This information should help contribute to the better management and conservation of Atlantic billfish stocks and other marine resources in the near future.

METHODS

For the purpose of this study, we followed the National Marine Fisheries Service definition of recreational fishing, that is, fishing primarily with hook and line for pleasure, amusement, relaxation, or home consumption. If part or all of the catch was sold, the monetary returns constituted an insignificant portion of the person's income.

The survey was conducted by brief personal interviews with

recreational fishermen, charter boat captains and mates on sportfishing boats to obtain catch and effort information. Occasional telephone interviews with captains or owners of other sportfishing boats in St. Thomas were also conducted. The three annual fishing tournaments on both islands were covered intensively. Standardized port sampling questionnaires were used during the interviews and an abbreviated form used to record tournament data. The schedules of biologists and port sampling agents were adjusted to include coverage of recreational fishing effort on weekends, holidays and tournaments.

Data collected included catch; effort (hours spent trolling); area fished; fishing activity related to the time of day; billfish by species hooked, boated, tagged, released or lost; length, weight and sex of billfishes landed. Other gamefishes caught were also weighed and measured whenever possible. This data was recorded on the questionnaires and analyzed by the Division of Fish and Wildlife at the end of the year. Any other additional information volunteered by the interviewees was recorded on field notebooks kept by the Division.

RESULTS

Landings

Tables 1 and 2 present the results of the Dingell-Johnson recreational fishing survey conducted in the U.S. Virgin Islands from October 1, 1982 to September 30, 1984. St. Thomas and St. Croix data are separated for comparison, because of the vast differences in the recreational fisheries of each island. Tournament data are included. Tables 1 and 2 were taken from the U.S. Virgin Islands Division of Fish and Wildlife's Final Project Report FW:3-5. Tables 3, 4 and 5 present the results by year of the recreational fishing survey from January 1, 1983 to September 30, 1985 for the island of St. Thomas only.

A total of 3,684 interviews were conducted during the period of October 1, 1982 to September 30, 1985 in the U.S. Virgin Islands, 92% from St. Thomas and 8% from St. Croix. Eighty eight percent of the interviews came from boats over 30 feet in length, 12 percent from smaller vessels. Over half of the interviews were from visiting sportfishing boats.

Fishing methods employed by all recreational fishermen included trolling, both inshore and offshore (98%), bottomfishing and traditional handlining techniques (1%) and spearfishing/diving (less than 1%). Sometimes recreational fishermen on smaller boats (< 30 ft) used multiple fishing methods, for example, trolling and spearfishing.

A total of 160,717 pounds of fish were landed during 28,033 hours of trolling by the 86 boats surveyed in 694 days. Offshore, or deep-sea fishing accounted for 93.2% of the recreational fishing effort, the rest being inshore fishing. The weight of fish landed does not truly represent the actual weight of fish caught, for a major tag and release effort for billfishes, and sometimes yellowfin tuna, occurs in St. Thomas year-round. Up to 75% of the billfishes caught during the

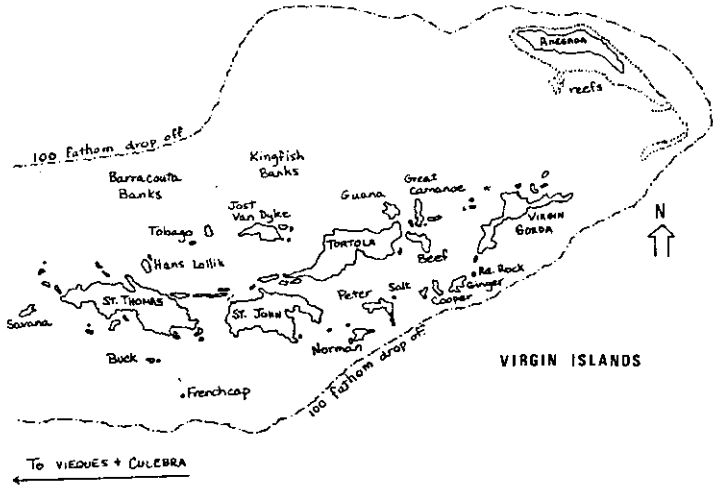


Figure 1. Map of the Virgin Islands.

FIGURE 2. CATCH/EFFORT, SEASONALITY AND MOON PHASE DATA COLLECTED FOR BLUE MARLIN IN ST. THOMAS DURING 1983

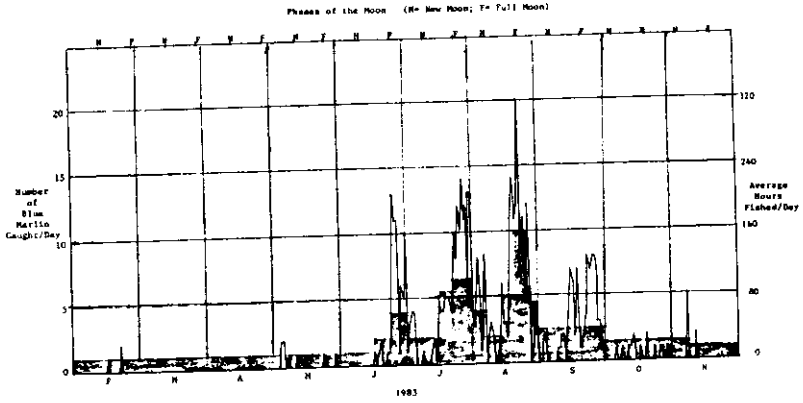


Table 1. Recreational fishing statistics collected from January-September 1983 in St. Thomas and St. Croix for a NOAA pelagic gamefish survey.
Catch data in pounds

Species	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		TOTAL			
	STT	STX	STT	STX	STT	STX	STT	STX	STT	STX	STT	STX	STT	STX	STT	STX	STT	STX	STT	STX		
Sailfish	-	-	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	-	
Spearfish	-	163	661	232	60	163	-	-	-	940	555	3,723	116	7,628	450	-	-	-	-	35	59	
Blue Marlin	-	120	52	-	113	-	65	112	130	273	-	-	144	145	-	-	-	1,00	-	19,162	1,479	
White Marlin	-	-	271	266	1,141	165	183	32	943	213	45	166	-	-	-	-	-	-	-	505	469	
Dolphin	-	-	253	22	358	294	238	37	215	141	313	54	73	6	15	52	171	163	4	2,617	866	
Mahoe	-	-	-	-	92	-	11	-	366	62	43	26	-	-	25	3	-	-	-	1,685	725	
Blackfin Tuna	16	40	196	4	24	-	102	-	-	109	631	-	-	458	-	274	-	1,408	-	757	95	
Yellowfin Tuna	155	234	581	-	124	-	46	-	45	-	-	-	-	26	-	54	-	10	-	3,286	1,32	
Bonito	92	84	37	-	16	92	10	-	543	72	19	-	-	37	-	20	43	135	-	1,039	817	
Skipjack Tuna	219	15	484	-	385	-	334	-	456	18	163	-	-	209	-	124	52	72	9	2,446	94	
King Mackerel	18	4	48	-	40	-	28	-	4	5	13	-	-	18	-	5	19	-	-	174	28	
Cero Mackerel	15	37	35	36	118	18	56	52	225	82	45	18	-	153	-	107	82	-	-	754	325	
Paracorda	-	-	11	5	85	-	-	-	17	-	18	-	-	47	-	50	-	30	-	258	17	
Jacks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No. Days Fished	3	7	13	6	14	4	10	9	16	16	17	6	25	25	3	27	7	25	1	150	69	
No. Interviews	6	10	37	9	51	18	27	10	40	17	80	10	273	4	265	7	98	1	877	85	877	85
Hours Fished	46	40	253	69	184	85	185	55	220	120	572	48	2,314	22	2,551	28	804	4	7,129	480	7,129	480
Lbs. Fish Caught	515	463	2,901	565	2,556	771	1,073	245	3,919	1,530	5,081	544	8,793	256	16,730	390	2,024	13	33,594	4,936	33,594	4,936
CPUE (lbs./hr.)	11.19	11.58	11.47	8.13	13.88	3.07	5.80	4.45	17.81	11.86	8.38	11.33	3.80	11.64	2.64	13.93	2.52	3.25	4.71	10.26	10.26	10.26

Table 2. Recreational fishing statistics collected from October 1, 1983 to September 30, 1984 for St. Thomas and St. Croix under the Dingell-Johnson recreational survey. Catch data in pounds

SPECIES	1983												1984												TOTAL
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
Bass	1176.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1176.0	
Bluegill	329.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	329.0	
Brook Trout	720.0	310.0	270.0	220.0	180.0	140.0	100.0	60.0	20.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2220.0	
Crappie	120.0	45.0	175.0	135.0	100.0	75.0	50.0	25.0	10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	605.0	
Rock Bass	1094.0	65.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	1094.0	
Striped Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
White Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Walleye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Worm Eaters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	4313.0	478.0	1392.0	1085.0	755.0	515.0	325.0	185.0	80.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10308.0	
Bluegill (lb)	378.0	11.0	345.0	231.0	241.0	11.0	188.0	34.5	435.0	1029.0	511.5	52.0	416.0	842.0	842.0	280.5	184.0	842.0	280.5	784.0	842.0	171.5	280.5	3780.0	
Brook Trout (lb)	330.0	31.0	231.0	231.0	279.0	11.0	247.0	56.5	178.0	1029.0	378.0	46.0	348.0	348.0	348.0	109.5	378.0	348.0	109.5	348.0	348.0	71.5	348.0	3300.0	
Crappie (lb)	154.42	5.64	3.64	3.24	32.35	9.68	7.88	5.88	8.43	3.37	6.18	6.46	6.22	12.58	10.68	12.36	10.38	23.00	6.93	1.60	4.88	7.29	7.76	1544.2	
Rock Bass (lb)	59	6	39	24	34	7	37	13	63	37	80	12	70	37	68	21	100	18	14	293	14	505	18	590	
Striped Bass (lb)	24	6	16	5	17	6	31	13	23	9	27	12	12	15	23	13	19	15	30	3	36	22	28	240	
Walleye (lb)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Worm Eaters (lb)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other (lb)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total (lb)	83,277.5	9,400.4	21,148.0	16,145.0	11,148.0	7,148.0	4,148.0	2,148.0	1,148.0	272.0	71.0	18.0	4.0	14.0	114.0	48.0	512.0	1,134.4	9,400.4	21,148.0	16,145.0	11,148.0	7,148.0	83,277.5	

Table 3. Recreational fishing statistics, St. Thomas, USVI - 1983

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Yearly Totals	% of Total
Blue Marlin	0	661	60	0	940	3,723	7,627.5	6,004	146	1,194	261	700	20,916.5	48.35
White Marlin	0	52	113	65	130	0	144.5	0	0	0	0	100	604.5	1.40
Sailfish	0	35	0	0	0	0	0	0	0	399	206	85	655.0	1.52
Spearfish	0	0	0	0	35	0	0	0	0	0	16	0	51.0	0.01
Dolphin	0	271	1,141	183	943	45	0	15	19	130	172	103	3,022.0	7.02
Maheo	0	253	358	238	215	313	3	52	183	763	229	228	2,915.0	6.77
Yellowfin Tuna	155	234	24	102	0	631	4.3	274	1,408	1,024.5	80	2,308	6,699.5	15.56
Blackfin Tuna	16	196	92	11	366	43	0	25	18	46	108	266.5	1,187.5	2.76
Skifjack Tuna	0	37	16	10	543	19	37	20	135	0	0	1	851.5	2.21
Bonito	92	584	124	46	45	68	109	69	70	67	125	132	1,511.0	3.55
King Mackerel	219	484	385	334	456	163	213	124	72	382	135	6	3,030.0	7.04
Cero Mackerel	18	48	40	28	4	13	35	7	18	17	12	23	263.0	0.61
Barracuda	15	35	118	56	225	45	153	107	8	118	22	101	1,003.0	2.33
Jacks	0	11	85	0	17	18	47	50	0	43	6	12	289.0	0.67
Other	-	3 shark	-	-	-	shark	-	-	35 (cobbia)	-	-	-	35.0	0.01
Monthly Total	515	2,901	2,556	1,073	3,919	5,081	8,897	6,747	2,112	4,113.5	1,382	3,756	43,052.5	
Lbs. Fish Caught	46	258	336	177	240.5	572	2,470.5	2,554	812	378	245	291	8,380.0	
Hours Fished	11.19	11.24	7.61	6.06	16.29	8.88	3.60	2.64	2.60	10.88	5.64	12.91	5.14	
CPUE (lbs/hr)	6	37	51	27	40	80	277	268	102	59	39	34	1,029	
# Interviews	3	13	14	10	16	17	25	27	25	24	16	19	209	

Table 4. Recreational fishing statistics, St. Thomas, USVI - 1984

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEARLY TOTALS	% OF TOTAL
Blue Marlin	602.0	389.0	602.0	634.0	1760.0	4388.0	8933.0	11,881.0	3438.0	1947.0	381.0	175.0	35,330.0	54.25
White Marlin	0	0	0	145.0	80.0	288.0	48.0	0	0	0	0	0	621.0	.96
Sailfish	261.5	58.0	20.0	0	0	0	0	0	0	77.0	0	60.0	467.5	.74
Spearfish	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolphin	161.0	358.0	25.5	567.0	548.5	80.5	117.5	63.0	58.0	92.5	158.0	332.5	2562.0	3.94
Wahoo	255.0	292.0	624.0	343.0	508.0	583.5	286.0	336.0	380.0	570.0	766.5	94.0	5887.0	9.08
Yellowfin Tuna	358.0	123.0	0	106.0	285.0	325.0	917.0	376.0	838.0	995.0	359.0	245.0	4927.0	7.60
Blackfin Tuna	45.0	50.0	51.0	96.5	38.0	74.0	105.0	124.5	160.5	178.0	251.5	285.0	1459.0	2.25
Skippack Tuna	24.0	12.0	50.0	39.0	206.0	380.0	221.0	80.0	149.0	75.0	208.5	132.0	1576.5	2.43
Little Tunny	517.5	462.0	262.0	185.0	83.0	134.0	185.0	108.0	335.0	286.0	179.5	390.5	3147.5	4.86
King Mackerel	470.0	2156.0	1535.0	448.0	252.0	311.0	250.0	237.0	145.0	177.0	258.5	493.0	6132.5	10.39
Cero Mackerel	33.0	29.0	55.0	48.5	24.0	10.0	10.5	14.5	29.0	3.0	12.0	51.0	319.5	.49
Barracuda	112.3	40.0	162.0	86.0	30.0	51.0	174.0	28.0	41.0	41.0	56.0	21.0	843.0	1.30
Jacks	62.0	33.0	9.0	14.0	16.0	15.0	54.5	12.0	75.0	28.0	68.0	89.0	475.5	.73
Other									35.0	360.0	3.0	26.0	424.0	.65
Monthly Total	2901.0	4002.0	3393.5	2712.0	3830.5	6840.0	11,310.5	13,320.0	5723.5	4829.5	2701.5	3243.0	64,800.0	
Lbs. Fish Caught														
Hours Fished	386.0	425.0	551.5	436.0	358.5	660.5	2301.5	2730.5	920.0	308.0	352.0	330.0	9741.5	
Offshore -N	225.0	102.0	220.0	123.0	72.0	486.5	2061.0	2649.5	793.0	224.0	208.0	120.0	7266.0	74.6
-S	22.0	76.0	75.0	161.0	21.0	154.0	62.5	21.0	35.0	44.0	119.0	117.0	1105.0	11.3
Inshore	121.0	247.0	256.5	152.0	68.0	38.0	178.0	60.0	92.0	40.0	25.0	93.0	1370.5	14.1
CPUE (lbs/hr)	7.88	9.42	6.16	6.22	10.68	10.36	4.91	4.88	6.22	15.68	7.67	9.83		6.65
# of Interviews	57	63	80	70	68	103	263	305	102	52	55	61	1279	
Days Fished	21	23	27	25	23	29	30	30	28	23	18	22	299	

Table 5. Recreational Fishing Statistics from January to September, 1985 for St. Thomas, USVI

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	YEARLY TOTALS
Blue marlin	315.0	497.0	260.0	0	0	2020.5	8012.5	7157.0	1448.0	19710.0
White marlin	0	59.0	0	105.0	270.0	354.0	300.5	125.0	0	1213.5
Sailfish	92.0	0	48.0	0	0	0	0	0	0	140.0
Spearfish	0	0	0	0	0	0	0	0	0	0
Dolphin	362.0	1086.5	1083.0	3100.5	1812.5	357.0	59.5	24.0	54.5	7939.5
Wahoo	1003.0	483.0	1225.0	1038.5	582.5	615.0	259.0	295.0	886.0	6386.5
Yellowfin Tuna	423.0	1266.0	705.0	571.0	642.0	532.0	332.0	351.0	163.0	4985.0
Blackfin Tuna	49.0	177.0	82.5	114.0	152.0	141.0	30.5	62.5	28.5	837.0
Skipjack Tuna	0	68.0	125.5	140.0	621.0	202.5	203.0	140.0	141.0	1641.0
Little Tunny	533.0	130.5	229.5	125.0	152.0	134.5	124.5	50.5	22.0	1501.5
King Mackerel	537.0	1326.5	576.5	652.0	475.0	230.5	237.5	213.0	78.0	4326.0
Cero Mackerel	90.5	67.5	59.5	57.0	18.0	33.5	8.0	8.0	13.0	355.0
Barracuda	46.0	38.0	30.0	6.0	11.0	0	66.0	0	11.0	208.0
Jacks	48.0	35.0	38.0	11.0	1.5	0	22.0	21.0	10.0	186.5
Other	1.5	2.0	2.0	3.0	25.0	0	39.0	0	17.0	89.5
Monthly Total Lbs Fish Caught	3500.0	5236.0	4464.5	5923.0	4762.0	4620.5	9694.0	8447.0	2872.0	49519.0
Hours Fished	574.0	555.0	681.0	643.0	552.0	1071.0	2171.5	2636.0	727.0	9610.5
- Offshore	469.0	378.0	569.0	595.0	542.0	1067.0	2157.5	2628.0	723.0	9128.5
CPUE (lbs/hr)	6.10	9.43	6.56	9.21	8.62	4.31	4.46	3.20	3.95	5.15
No. Interviews	85	75	92	90	80	134	290	329	95	1270
Days Fished	27	26	29	28	24	29	30	31	25	249

Table 6. Billfish, by Species, Hooked, Boated, Tagged, Released and Lost, and Percent Caught, Including Tagged and/or Released Fish in St. Thomas, USVI - 1983 - 1985*

SPECIES/YR	HOOKEED	BOATED	TAGGED	RELEASED	LOST	% CAUGHT	% TAGGED/RELEASED
Blue marlin							
'83	600	84	161	282	73	87.8	84.1
'84	658	123	214	231	90	86.3	78.4
'85	618	74	244	109	191	69.1	82.7
White marlin							
'83	20	11	4	2	3	85.0	35.3
'84	30	11	8	8	3	90.0	39.3
'85	55	21	10	9	15	72.2	47.5
Sailfish							
'83	25	16	4	4	1	95.8	33.3
'84	30	15	10	3	2	93.3	46.4
'85	5	3	1	1	0	100.0	40.0
3 YR TOTALS*							
Blue marlin	1876	281	619	622	354	81.1	81.5
White marlin	105	43	22	19	21	80.0	48.8
Sailfish	60	34	15	8	3	95.0	40.3
Spearfish	5	3	0	1	1	80.0	25.0
ALL SPECIES	2046	361	656	650	379	81.5	78.1

* Up to September 30, 1985.

survey, primarily blue marlin, were either tagged or released. In addition, the majority of the barracudas, large king mackerel and jacks (about 60%) were released because of suspected ciguatera poisoning.

The six most important species by weight were: blue marlin (52.0%), yellowfin tuna (9.5%), wahoo (8.6%), king mackerel (8.3%), dolphin (7.4%) and little tunny (3.3%). These six species composed almost 90 percent of the total fish sampled during the survey.

Catch and Effort

A total of 160,717 lb of fish were landed recreationally during 28,003 hours of trolling in the U.S. Virgin Islands, resulting in a catch-per-unit-of-effort (CPUE) of 5.73 lb/hr. Highest CPUE occurred in the months of May, June and October.

Offshore fishing accounted for the major part (93.2%) of the recreational fishing effort in St. Thomas. Most of the offshore effort (80%) took place on the "North Drop Off;" the remaining fishing effort was expended on fishing the "South Drop Off" and the Seamount."

Offshore fishing effort was greatest in August, followed by the month of July. Most inshore effort occurred during the months of January to April, when the seas are rough and blue marlin are not as abundant. Overall fishing effort was greatest in the summer months.

Table 6 presents billfish data collected from January, 1983 to September, 1985 in St. Thomas. A total of 2,046 billfish of all species were hooked, 361 boated, 656 tagged, 650 released and 379 lost. Of these, 1,876 of the fish hooked were blue marlin, with 281 boated, 619 tagged, 622 released and 354 lost. Over 81% of all the billfishes were caught (including those tagged and released), reflecting good angler success in St. Thomas.

Table 7 gives the total hours spent trolling in St. Thomas and indicates the number of hours it took to hook and/or catch a billfish. It takes at least 12.0 hr to hook a billfish, and 14.9 hr to catch one. For blue marlin, it only takes 13.1 hr to hook a fish, and 16.2 hr to catch one. In comparison with other parts of the Atlantic, the least amount of effort expended to catch a blue marlin is in St. Thomas (according to Lopez, 1982), and this is still true.

Fish Hooked Per Unit of Effort

An index for measuring abundance of blue marlin has been used by Lopez since 1972. Nowadays, it is widely used in tournament statistics worldwide. The abundance index is calculated by dividing the number of billfish hooked by the number of hours spent trolling. These numbers are expressed as the number of fish hooked per unit of effort (HPUE).

The overall HPUE for blue marlin in the Bahamas, the Gulf of Mexico and the east coast was calculated at 0.03 (Lopez, 1982). HPUE for the Bahamas in 1982 was 0.034 (Lopez and Bertolina, 1983). St. Thomas HPUE figures for 1983, 1984 and 1985 were

Table 7. Summary of hours spent trolling for billfish in St. Thomas,
USVI -- 1983 - 1985*

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>TOTALS*</u>
TOTAL HOURS TROLLED	7824.5	8371.0	8406.5	24,602.0
<hr/>				
NO. OF FISH HOOKED BY SPECIES				
Blue marlin	600	658	618	1876
White marlin	20	30	55	105
Sailfish	25	30	5	59
ALL SPECIES**	648	718	679	2046
<hr/>				
NO. OF FISH CAUGHT*** BY SPECIES				
Blue marlin	527	568	427	1522
White marlin	17	27	40	84
Sailfish	23	28	5	56
ALL SPECIES**	570	613	472	1655
<hr/>				
HOURS TROLLED TO HOOK A FISH				
Blue marlin	13.0	12.7	13.6	13.1
White marlin	391.2	279.0	152.8	234.3
Sailfish	326.0	279.0	1681.3	417.0
ALL SPECIES**	12.1	11.7	12.4	12.0
<hr/>				
HOURS TROLLED TO CATCH*** A FISH				
Blue marlin	14.8	14.7	19.7	16.2
White marlin	460.3	310.0	210.2	292.9
Sailfish	340.2	299.0	1681.3	439.3
ALL SPECIES**	13.7	13.6	17.8	14.9

* Up to September 30, 1985

** Including five spearfish

*** Including tagged and released fish

Note: Some numbers may be misleading due to seasonality and uneven distribution of the species.

Table 8. Tournament, date, hours fished and number of blue marlin hooked and caught (including tagged and released), percent released and HPUE (Index of Abundance) in St. Thomas, USVI - 1983-1985

Tournament	Date	Hours Fished	Number of Blue Marlin			HPUE
			Hooked	Caught	Tagged/Released(%)	
Fourth of July	Jul.2-4,1983	707.0	14	13	1/1 (15.4)	.0198
Virgin Islands International Open	Aug.22-24	192.0	18	15	7/8 (100.0)	.0938
Annual July Open	Jul.6-8,1984	542.5	34	14	0/1 (7.1)	.0626
Virgin Islands International Open	Aug.9-12	288.0	54	31	0/30 (96.8)	.1875
Annual July Open	Jul.4-6,1985	588.5	36	14	0/0 (0)	.0612
Virgin Islands International Open	Aug.27-29	336.0	42	25	11/13 (96.0)	.1250
<u>Tournament Averages - 1983-1985</u>						
Annual July Open		1638.0	84	41	1/2 (7.3)	.0513
V.I. Intl. Open		816.0	114	71	18/51 (97.2)	.1397
<u>All Tournaments - Averages - 1983-1985</u>						
		2454.0	198	112	19/53 (64.3)	.0807

Table 9. Smallest, Largest and Average Weight of Billfish, by Species, in St. Thomas, USVI - 1983-1985*

SPECIES	1983			1984			1985*			83-85*
	smallest	largest	average	smallest	largest	average	smallest	largest	average	AVERAGE
Blue Marlin	90.0	710.0	277.6	91.0	823.0	292.1	85.0	602.0	266.3	280.9
White Marlin	40.0	130.0	67.2	39.0	80.0	56.4	35.0	90.0	57.8	59.8
Sailfish	26.5	58.0	40.9	20.0	60.0	36.6	42.0	50.0	46.7	39.5

* Up to September 30, 1985.

0.076, 0.078 and 0.074 respectively, with an overall HPUE of 0.076. Comparison of the St. Thomas HPUE with those from other areas shows that twice as many or more blue marlin are hooked in St. Thomas than in any other area.

Tournament Data

Table 8 summarizes tournament data collected at the two annual blue marlin tournaments held in St. Thomas during the last three years: the Annual July Open (Fourth of July) and the Virgin Islands International Open. A total of 112 blue marlin were caught during the 2454 hours fished in 18 days in these tournaments. However, 198 blue marlin were hooked in total, and of these, only 56.6% caught. Over 64% of the blue marlin caught were either tagged or released. Overall tournament HPUE for 1983-1985 was 0.081, higher than the average HPUE for St. Thomas.

Size Composition

Annual smallest, largest and average weights of billfishes sampled are presented in Table 9. Average weights of blue marlin, white marlin and sailfish caught during the survey were 280.9 lb, 59.8 lb and 39.5 lb respectively. The largest blue marlin was caught in 1984 and weighed 823.0 lb.

Sex Composition

Billfish catches are shown by sex and species in Table 10 for all fish sampled. Three times as many female blue marlin as males were caught.

Table 10. Billfish catch breakdown by sex - St. Thomas 1983-1985

Species	Males			Females		
	'83	'84	'85	'83	'84	'85
Blue marlin	11	10	8	12	25	20
White marlin	0	1	0	0	3	4
Sailfish	3	1	0	4	1	0

Seasonality

A pretty well established blue marlin season is observed by recreational fishermen in St. Thomas during the summer months, from mid-June to mid-September. This seasonality is evident in Figure 3, when up to 32 blue marlin were caught in one day in

August, 1984. Previous reports also document this seasonality (Damman, 1969; Olsen and Wood, 1983).

White marlin were not as abundant as blue marlin, and were occasionally caught during the months of April to August. Several sailfish were caught during the survey, from October to March. Sailfish had virtually disappeared from St. Thomas waters for several years prior to September, 1983.

Other gamefishes, such as dolphin which "ran" from February to May showed marked seasonality. Yellowfin tuna were most abundant from October to December; blackfin tuna during November and December, while skipjack were more common in the summer, during June and July. King mackerel were most abundant in the winter months, especially in February and March. Some species, such as wahoo and little tunny (locally called "bonito"), appear in catches year-round but were more commonly caught during winter months. Barracuda are also caught throughout the year.

Effect of Moon Phase

Blue marlin catch/effort, seasonality and moon phase data collected in St. Thomas during 1983, 1984 and 1985 are shown in Fig. 2, 3 and 4 respectively. There appears to be a correlation showing a greater number of blue marlin hooked and/or caught at full moon than at other times. Many more fish are raised, hooked and caught on days close to the full moon and similar phenomenon has been reported in parts of the Gulf of Mexico (Lopez, 1982). Some boats and fishermen refuse to go out fishing when the moon "isn't right," i.e., new moon. Also of interest is that tournament dates in the U.S. Virgin Islands are scheduled close to or at full moon. Further analysis of data is needed to validate this theory.

Time of Day

Table 11 indicates billfish activity relative to time of day. The times of greatest relative abundance for all species of billfishes combined were between 1000 and 1500 hr. Blue marlin were caught between 0700 and 1900 hr, and most (88.4%) hooked between 0900 and 1500 hr. The probability of hooking a blue marlin was greater between 1000 and 1500 hr, the peak time being 1100 to 1400 hr.

White marlin and sailfish were hooked between 0800 and 1600 hours. The majority of the white marlin (86.1%) and sailfish (77.8%) were hooked from the hours of 1000 to 1400. The data suggest that all species feed at the same times.

Fish effort was not the same for all hours fished, so this may have influenced the data just discussed.

Bait Information

Most sportfishing boats in St. Thomas troll both artificial and natural baits simultaneously. However, several boats will only troll either all artificial or all natural bait on occasion. Table 12 summarizes the number of billfish hooked by

FIGURE 3. CATCH/EFFORT, SEASONALITY AND MOON PHASE DATA COLLECTED FOR BLUE MARLIN IN ST. THOMAS DURING 1984.

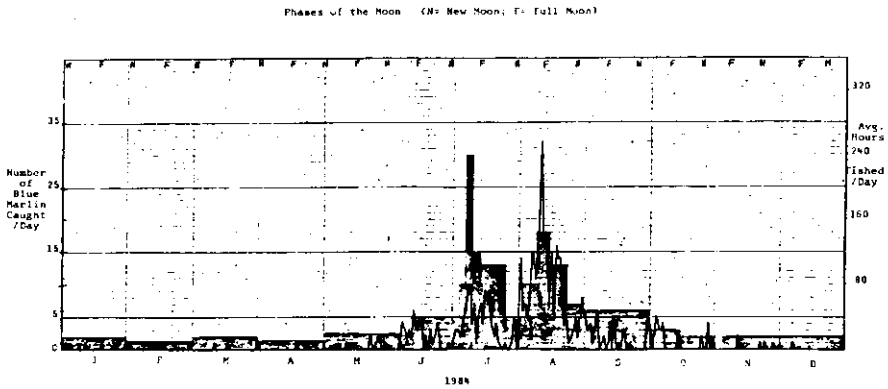


FIGURE 4. CATCH/EFFORT, SEASONALITY AND MOON PHASE DATA COLLECTED FOR BLUE MARLIN IN ST. THOMAS DURING 1985.

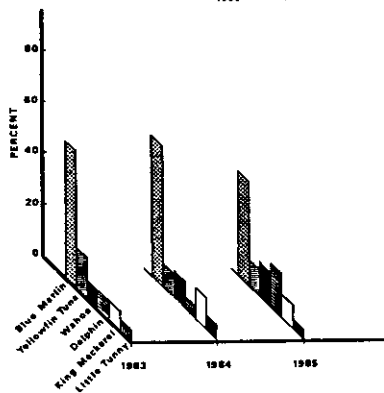
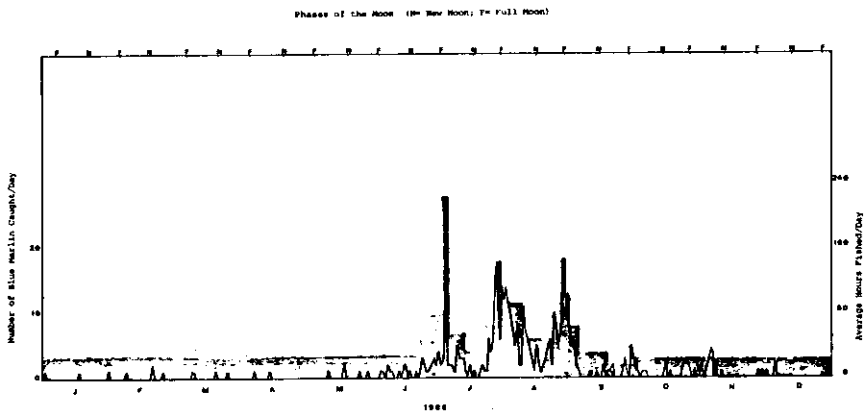


Figure 5. Percent composition of the six most abundant species caught during January, 1983 to September, 1985 in St. Thomas, U.S.V.I.

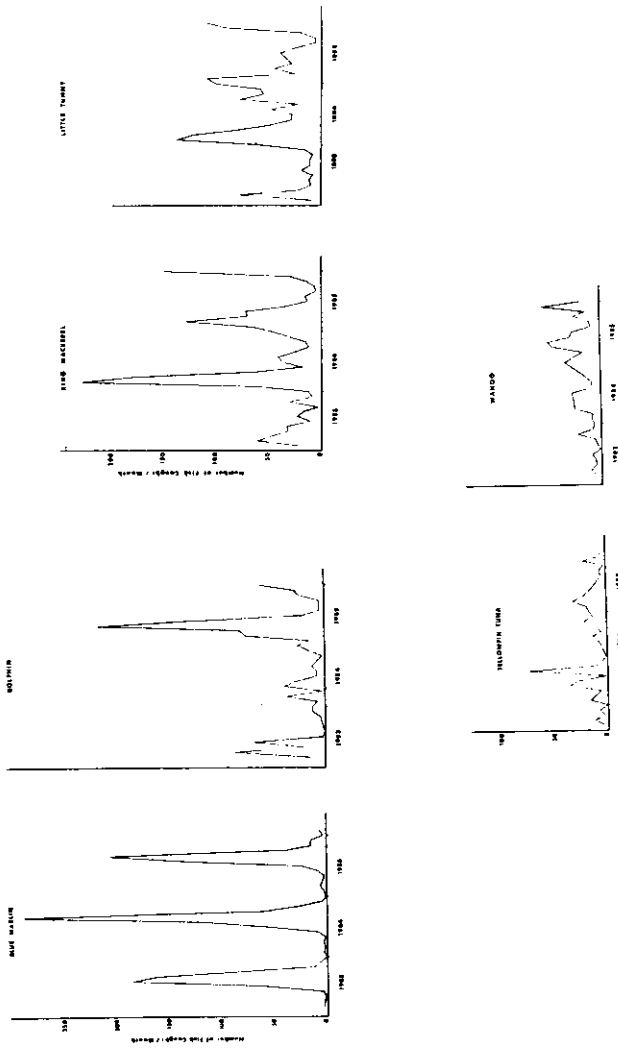


Figure 6. Seasonality of pelagic gamefishes caught from 1983 to 1985 in St. Thomas, U.S. Virgin Islands.

type of bait during the survey. The majority of the billfish were hooked while trolling with both artificial and natural baits at the same time. Blue marlin appear to prefer artificial baits twice as much as natural baits, but further analysis of the data is necessary to determine which type of bait is more effective.

Table 11. Number of billfish hooked by time of day, St. Thomas January, 1983 - September, 1985

Hour	Blue marlin			White marlin			Sailfish		
	'83	'84	'85	'83	'84	'85	'83	'84	'85
0700-0759	0	1	0	0	0	0	0	0	0
0800-0859	5	5	11	0	0	0	0	1	0
0900-0959	42	36	40	0	2	2	0	1	1
1000-1059	61	70	74	2	0	7	2	2	1
1100-1159	88	95	71	3	8	7	4	4	0
1200-1259	70	64	55	2	5	3	5	2	0
1300-1359	66	73	58	1	4	3	4	3	1
1400-1459	59	81	63	3	11	9	1	1	0
1500-1559	48	79	72	1	0	3	3		0
1600-1659	19	40	30	0	1	2	0	0	0
1700-1759	15	20	25	0	0	0	0	0	0
1800-1959	0	3	5	0	0	0	0	0	0
1900-1959	0	0	0	0	0	0	0	0	0

Table 12. Number of billfish hooked, by type of bait, St. Thomas, 1983-1985

Bait	Blue marlin	White marlin	Sailfish
Natural	388	24	17
Artificial	821	27	2
Live	15	1	0
Both Natural and Artificial (1983)	420	13	17

Discussion and Summary

Recreational fishing in the U.S. Virgin Islands varies greatly by island. St. Thomas has an established sportfishing fleet which targets its effort offshore for blue marlin, while in contrast, recreational fishing in St. Croix is mostly from smaller boats that target their effort on non-billfish species.

Data from the island of St. Thomas is emphasized in this paper because of the much greater recreational fishing effort that takes place on this island, and its highly successful blue marlin fishing.

St. Thomas recreational landings remained similar over the survey period, and the average catch-per-unit-of-effort (CPUE) was 5.73 lb/hr. Yearly landings data did not represent the actual weight of fish caught, since approximately 75% of all billfishes and up to 60% of all barracudas, large king mackerel and jacks were released at sea. Estimated landings calculated for 1984 were over three times the actual landings sampled (Brandon and Tobias, 1985). There were differences in the landings for individual species, for instance over the previous years, in 1985 landings of white marlin, dolphin and wahoo increased, while those of sailfish, blackfin tuna, little tunny and barracuda decreased.

The six most important species by weight were the same throughout the survey, and composed approximately 90% of the total landings sampled. These species were: blue marlin, yellowfin tuna, wahoo, king mackerel, dolphin and little tunny. Abundance of some species, such as dolphin and little tunny, varied from year to year.

Overall, offshore fishing for billfishes and blue marlin was better in 1984. More billfishes were hooked and caught in general. It took less hours to hook and catch a blue marlin, and the index of abundance for blue marlin (HPUE) was higher than in 1983 and 1985. Comparison of St. Thomas' HPUE with those from other areas of the world showed that twice as many or more blue marlin were hooked in St. Thomas than in any other area.

Size composition for billfishes showed little variation during the two and a half years survey. Larger blue marlin were caught during 1984, almost 12 lb heavier than the survey average. White marlin caught in 1983 weighed 7 lb heavier than average. Sex composition information showed an apparent trend of more female blue marlin being caught in 1985. Seasonality of the billfish species was similar for each year of the survey.

There appears to be a correlation between the number of blue marlin raised, hooked and caught and the full moon period. Effects of moon phase were reported in graphical form.

The times of greatest relative abundance for all species of billfishes combined were between 1000 and 1500 hr. Peak time to hook a blue marlin was between 1100 and 1400 hr.

Blue marlin seem to prefer artificial bait twice as much as natural bait. Most billfishes were hooked by boats trolling both artificial and natural baits simultaneously. More analysis of bait preference data is necessary to determine which type of bait is most effective.

The U.S. Virgin Islands Division of Fish and Wildlife's recreational fishing survey has contributed valuable information about our islands billfishes and gamefishes, and its sportfishing fleet, which is an established industry that grosses many thousands of dollars annually and furnishes recreational enjoyment for thousands of people.

ACKNOWLEDGMENTS

Funding for this project was provided in part by the National Marine Fisheries Service under an amendment to the U.S. Virgin Islands Division of Fish and Wildlife's State Federal Statistical Program, and by the Department of Interior's U.S. Fish and Wildlife Service through Dingell-Johnson Grant FW:3 to the Division. I greatly appreciate my colleague William Tobias' contribution of all the data for the island of St. Croix.

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