

LANDINGS OF BLUE MARLIN (*Makaira nigricans*) AND WHITE MARLIN (*Tetrapturus albidus*) IN BERMUDA DURING THE PERIOD 1975 - 1991 WITH AN OVERVIEW OF RECENT DEVELOPMENTS IN BILLFISHING ON THE ISLAND

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SUMMARY

*Landings of blue marlin from 1975 to 1991 and white marlin from 1982 to 1991 from the Bermuda fisheries statistical database are presented. The marked increase in reported landings of blue marlin in the past three years appears to be effort-related and is probably a reflection of the growing popularity of billfishing by licensed charter fishing vessels. With a growing conservation movement in the fishery, there has been a corresponding increase in the proportion of billfish tagged and released over this same period; this proportion rose from 48% in 1989 to 81% in 1991. Landings of white marlin, which is considered more of an incidental catch, have remained at consistently low levels during this same period. An analysis of the seasonality of catch of blue marlin over a six year period indicates that July and August are the peak catching months in Bermuda. In the past two years, blue marlin were reported caught in May for the first time. The Annual Billfish Tournament, which takes place during the peak of the marlin season, has become a significant release event with release rates above 80% for the past several years. Catch per unit of effort over the last five years of this tournament showed a significant decline until 1990 followed by a modest increase.*

RESUME

*Le présent document fait état des débarquements de makaire bleu de 1975 à 1991 et de makaire blanc de 1982 à 1991 d'après la base de données statistiques de pêche des Bermudes. L'accroissement marqué des débarquements signalés de makaire bleu ces trois dernières années semble être lié à l'effort, et reflète probablement la popularité croissante de la pêche aux istiophoridés par les bateaux de pêche affrétés sous licence. Vu l'intérêt croissant de la pêcherie pour la conservation, il s'est produit un accroissement correspondant du pourcentage d'istiophoridés marqués et relâchés pendant cette même période; ce pourcentage s'est accru de 48 % en 1989 à 81 % en 1991. Les débarquements de makaire blanc, qui est plutôt considéré comme une capture accessoire, sont restés à un niveau constamment faible pendant cette même période. Une analyse de la saisonnalité des prises de makaire bleu sur une période de six ans indique que juillet et août sont les principaux mois de capture aux Bermudes. Ces deux dernières années, des prises de makaire bleu ont été signalées pour la première fois au mois de mai. L'"Annual Billfish Tournament", qui se déroule pendant le plein de la saison des makaires, est devenu une occasion significative de marquage, les poissons marqués dépassant 80 % depuis quelques années. La CPUE de ce championnat les cinq dernières années a montré une baisse significative jusqu'en 1990, suivie d'une hausse modeste.*

RESUMEN

*Se presentan los desembarques de aguja azul, de 1975 a 1991, y de aguja blanca, de 1981 a 1991, de la base de datos estadísticos de las pesquerías de las Bermudas. El marcado aumento en los desembarques de aguja azul comunicados en los últimos tres años parecen estar relacionados con el esfuerzo y probablemente reflejan un incremento de popularidad de la pesca del marlín por pesqueros en alquiler, con licencia. Al estar en alza el movimiento de conservación de la pesquería, se ha producido el correspondiente aumento*

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*en la proporción de marlines marcados y liberados durante el mismo período; dicha proporción aumentó desde el 48% en 1989 hasta el 81% en 1991. Los desembarques de aguja blanca, que se considera mas bien como captura fortuita, han permanecido a niveles bajos en el curso del mismo período. Un análisis de la naturaleza estacional de la captura de aguja azul a lo largo de un período de seis años, indica que julio y agosto son los meses álgidos de captura en las Bermudas. En los últimos dos años, se informó por vez primera de la captura de aguja azul en el mes de mayo. El Torneo Anual de Marlines, que se desarrolla en el momento cumbre de la temporada del marlín, se ha convertido en un importante evento en cuanto se refiere a liberación, con tasas del 80% en los últimos años. La captura por unidad de esfuerzo en este torneo, en los últimos cinco años, presentaba un importante descenso hasta 1990, seguido de un ligero ascenso.*

## 1. INTRODUCTION

The Bermuda fisheries statistical database started in 1975. It is a compulsory self reporting scheme in which licensed fishermen are required to keep a daily log of their catch and effort and submit forms on a weekly basis. There is presently no requirement for recreational fishermen to license their vessels or submit statistics. The main commercial fishery during the 1970's and into the 1980's was an Antillian fish pot fishery but a relatively small number of licensed charter fishing vessels and commercial line fishing vessels directed their fishing effort at pelagic species such as tuna, wahoo and amberjack. Interest in marlin fishing started to develop in the early-1970's and the first annual billfish tournament was held in 1974. This four day tournament, which is held during a national holiday (late July - early August) has taken place every year since its inception. As the standards of the charter fishing vessels and their fishing gear improved over the years, and as local captains became more proficient at catching marlin, it appears that this increased success in catching marlin led to more directed effort. A strong conservation movement developed starting in the mid-1980's which promoted the tag and release of marlin. Blue marlin fishing was given a substantial local boost in 1984 by the landing of a specimen weighing 1,130 lbs, at that time the third largest blue marlin ever recorded from the Atlantic Ocean. The publicity surrounding this specimen probably helped promote blue marlin fishing on the island by making the public more aware of these magnificent fish and it must have contributed to competition amongst local charter fishing vessels to catch a larger specimen.

## 2. METHODS

The data used in this paper are derived from two sources. Firstly, the annual landings figures have been extracted from the database maintained by the Division of Fisheries. Although there has been no systematic dockside sampling of marlin catches by Fisheries staff over the years, and thus validation of reported weights, it is considered that the figures are generally reliable because of the motivation of charter fishermen to properly document their catch, the high profile given by the local news media to marlin catches and the lack of incentives to falsify records on the reporting form. The figures reported are annual total landings by all licensed fishing vessels. Landings by recreational fishing vessels are not included. It is estimated that recreational fishing vessels may have caught up to approximately 20% of the blue marlin taken in 1991. A corresponding figure for 1990 is less than 10%. As there is no formal requirement to report recreational billfish catches, the weights of these fish are not available for inclusion in the database. Weights in the database are reported in pounds (Division of Fisheries, 1991) but have been converted to metric tons for ease of comparison with other databases.

The second source of information used was the detailed billfish catch records maintained by Bermuda's International Game Fish Association (IGFA) representative. These records (from 1985 until the present) provide a more detailed outline of billfish catches because they include all recreational catches as well as the weight of each individual fish, whether weighed or estimated. The consensus amongst the fishermen with the most experience in estimating billfish weights is that their estimates are generally accurate within 10% of the actual weight. There appears to be a tendency to underestimate the weight of the larger fish (e.g. specimens over 850-900 lbs). The ability to accurately estimate weights has become particularly important with the recent increase in local tag and release activity because the weights of most of the specimens cannot be verified.

### 3. RESULTS AND DISCUSSION

#### 3.1 Historical Database Landings

The reported landings of blue marlin and white marlin by licensed fishing vessels (Fig. 1) show several trends. Landings of blue marlin from 1975 to 1982 remained relatively constant except for 1978 and 1980 when landings approximately doubled. The year 1981 was a poor fishing year throughout the Bermuda fishery and the very low marlin landings in this year appear to be a reflection of this fact. From 1983 onward, the landings of blue marlin show a steady increase (except for 1986-87) reaching a total of 18.4 metric tons in 1991.

Landings of white marlin are reported only from 1982 onwards. This is due to the fact that white marlin were only included as a separate species on the statistics reporting forms starting in that year. From 1975 to 1981, white marlin were included in an "other" category in the pelagic species group which was comprised of other billfish species and tuna species which were infrequently caught. Interviews with charter fishing vessel captains suggest that the majority of the landings reported under this "other" category were made up of white marlin and that catches were relatively consistent over these years. The reported landings from 1982 to 1991 (Fig.1) indicate some small year to year variation but they have been relatively consistent over the past three years at just over one metric ton.

The landings figures in tabular form are found in Table 1.

#### 3.2 Seasonality of Catches of Blue Marlin

Data are available (starting in 1985) for the total number of blue marlin caught each month of the year in the Bermuda fishery. These figures include catches from licensed charter fishing vessels as well as recreational fishing vessels. The monthly catch figures for 1989 were not available. The six remaining years are presented in Figures 2 and 3. The overall pattern indicates that July/August is the peak period for catches. The season usually starts in June and ends in October or November. In 1991, the first blue marlin of the season, weighing approximately 450 lbs, was caught on May 19th. Another four fish (range 150-550 lbs) were caught by the end of May. This is the first year in which blue marlin were reported caught in May and it is probably a reflection of the increased effort directed toward pelagic species in general in the fishery rather than charter vessels starting to fish for marlin earlier. In 1992, the first blue marlin of the year was caught on May 18th, a specimen weighing 583 lbs. This is a further sign that increased effort for pelagics may be having the effect of starting the marlin season earlier. A possible explanation is that when commercial line fishermen are not having success with traditional chumming for tuna, they are shifting their effort to trolling for pelagic species earlier in the season and they are using heavier rigs capable of landing a blue marlin. However, favorable oceanographic conditions may also have an influence on the presence and abundance of fish early in the season.

The pattern in 1986 was atypical with June having the highest catch and catches declining thereafter through to November (Fig. 2). This pattern of a high catch in June may have been associated with the possible presence of a cold eddy from the Gulf Stream which was in close proximity to Bermuda for most of the month (NOAA, 1986). Marlin may have been present in above average abundance if they remained in this water mass as it approached the island and stayed in close proximity.

The number of white marlin taken is considered too small to do a comparable analysis of catch seasonality.

#### 3.3 Trends in Tag and Release of Blue Marlin

Following the active promotion of the tag and release of marlin by the Sea Horse Anglers Club of Bermuda starting in 1985, the proportion of all marlin tagged and released rose from 41% in that year to a high of 81% in 1991 (Fig. 4). In the Annual Billfish Tournament, marlin which are released are given the same point value as fish which are boated. An examination of the tournament results for the five year period 1987-91 indicates that the proportion of marlin released has ranged from 78% to 83%. In this year's tournament (1992), all 25 of the marlin which were caught were released. This is the first year that no marlin were boated during this tournament and is a clear indication that the island's marlin fishermen have made an active decision in favor of the conservation of these species. In recognition of

this conservation approach, the Bermuda Game Fishing Association in conjunction with the Department of Tourism has produced an attractive certificate of release which is given to any person who releases a game fish while fishing in local waters. The issuance of these certificates began in July 1990 and the program has been well received.

A notable event occurred on August 14, 1992 when a Bermuda tagged blue marlin was recaptured. This was the first documented recapture of a tagged blue marlin on the island. It's estimated weight at the time of tagging (August 5, 1990) was 180 lbs (81.8 Kg). It was recaptured within a few miles of its tagging location (Argus Bank) and it's weight was estimated at 260 lbs. Both of the fishermen involved in the tagging and recapture of this specimen were experienced marlin fishermen and therefore the weight estimates were probably accurate within 10% of the true weight. The specimen was re-tagged and re-released.

### **3.4 Annual Billfish Tournament - Fishing Effort**

Obtaining reliable measures of fishing effort directed at marlin by charter fishing vessels appears to be a difficult task. There is no means of extracting this effort data from the Bermuda database to use in conjunction with the billfish catch statistics. As Bermuda has an annual four day event when fishing is specifically for billfish and if reliable measures of fishing effort can be obtained for this period, then calculations of catch per unit of effort (CPUE) are possible. An analysis of existing information indicated that reliable measures of fishing effort were available only for the past five years. The measure of effort is vessel fishing days where a day is defined as eight daylight hours. The results of this limited analysis (Fig. 5) show that CPUE has varied considerably over this five year period. A program was implemented in 1992 to provide standardized measures of fishing effort for billfish which may be used for longer term analysis of CPUE through the summer season.

### **3.5 Size of Blue Marlin Caught**

Bermuda has produced two of the largest blue marlin caught in the Atlantic in recent years. In addition to the 1,130 lbs specimen taken in June 1984, a larger fish (1,180 lbs) was taken in July 1989. This specimen was believed to be well in excess of 1,200 lbs when caught but substantial fluid loss (and thus weight loss) occurred before it could be properly weighed. The heads of both of these specimens were retained and were sent to the Coordinator for the Western Atlantic, ICCAT Enhanced Research Program for Billfish. The otoliths and dorsal spines were used for an ongoing study of age and growth in blue marlin and these specimens were amongst the largest examined in this study.

In June 1992, a blue marlin weighing 883 lbs was boated. It was the largest specimen of the season. In 1991, two specimens over 800 lbs were caught; a fish that was boated weighed 815 lbs while the second specimen, estimated at 850 lbs, was tagged and released. In 1990, the largest fish caught was 754 lbs. The size of these recent specimens confirms the consistent presence of large blue marlin in Bermuda's waters.

### **3.6 Acknowledgments**

I am grateful to Tom Smith, the International Game Fish Association representative in Bermuda since 1980, for allowing me access to the billfish records which he has maintained over the years. He also kindly reviewed the manuscript. Captains Alan Card and Alan de Silva, two of the most experienced marlin fishermen on the island, offered me insights into the fishery from their years of experience. David Pantry, president of the Sea Horse Anglers Club, provided me with valuable information about the Annual Billfish Tournament over the past five years.

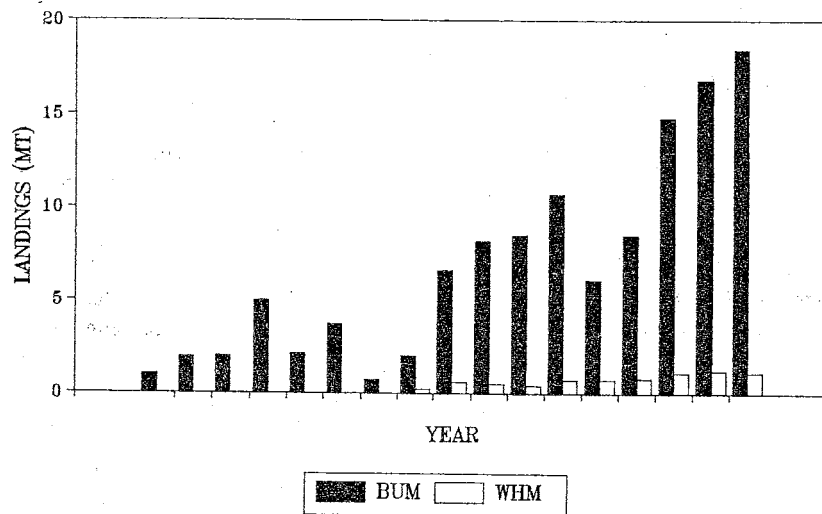
## **4. LITERATURE CITED**

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NOAA, 1986. Oceanographic Analysis Charts, National Weather Service, National Oceanic and Atmospheric Administration.

**Table 1.** Reported landings in metric tons of blue marlin and white marlin from Bermuda's fishery statistical database. White marlin have only been reported as a separate species since 1982.

Year	Blue Marlin	White Marlin
1975	1.0	
1976	1.9	
1977	2.0	
1978	5.0	
1979	2.1	
1980	3.7	
1981	0.7	
1982	2.0	0.2
1983	6.6	0.6
1984	8.2	0.5
1985	8.5	0.4
1986	10.7	0.7
1987	6.1	0.7
1988	8.5	0.8
1989	14.8	1.1
1990	16.8	1.2
1991	18.4	1.1



**Fig. 1.** Reported landings of blue marlin and white marlin from Bermuda's fishery statistical data base. White marlin have only been reported as a separate species since 1982. See text for further details.

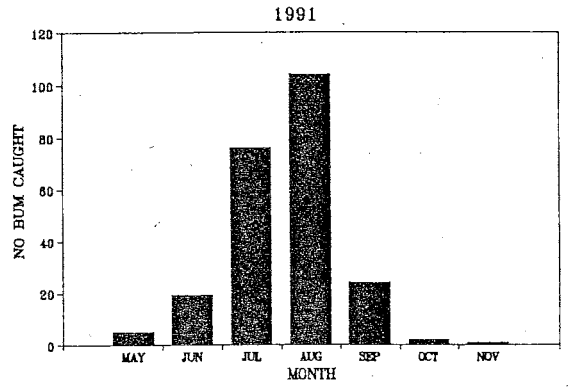
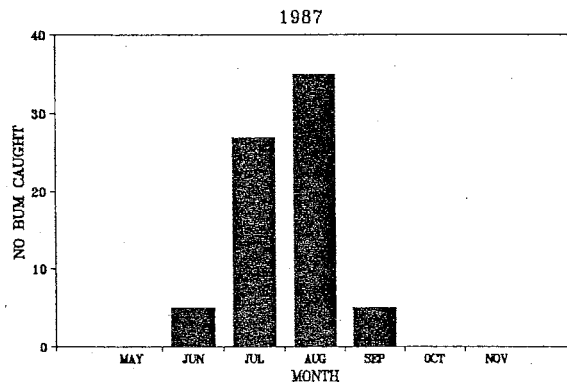
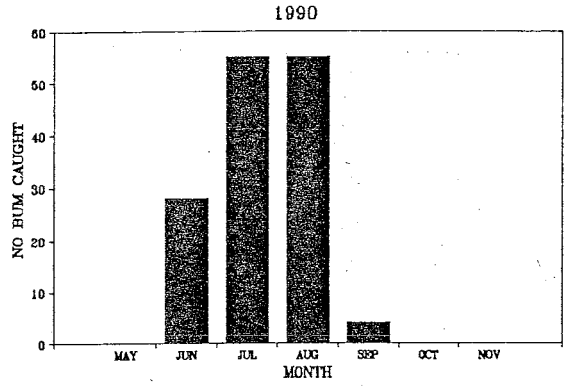
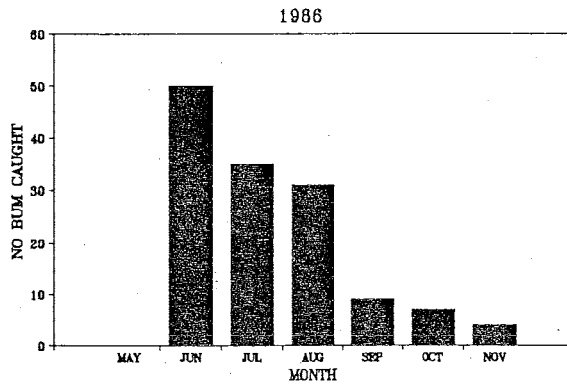
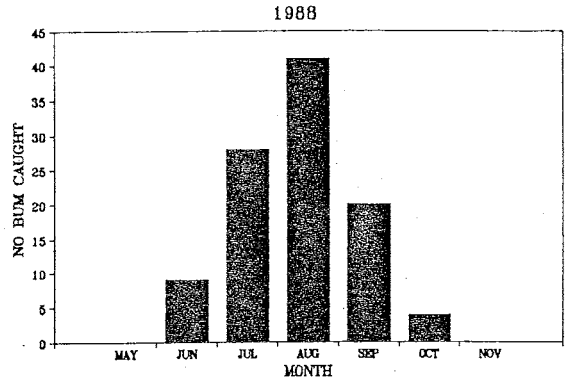
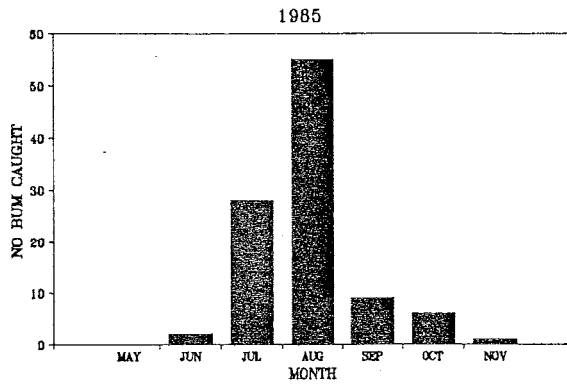


Fig. 2. Catch by month of blue marlin in the Bermuda fishery for 1985, 1986 and 1987.

Fig. 3. Catch by month of blue marlin in the Bermuda fishery for 1988, 1990 and 1991.

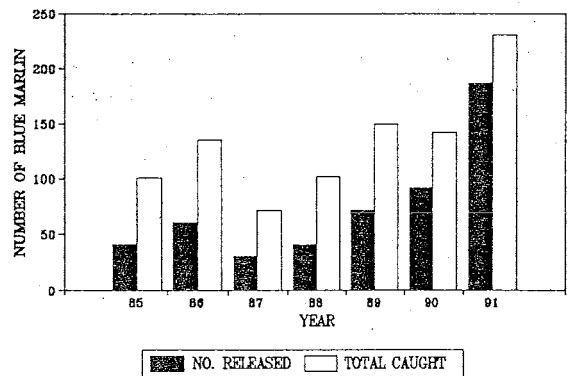


Fig. 4. Total number of blue marlin caught and number released in the Bermuda fishery from 1985 to 1991.

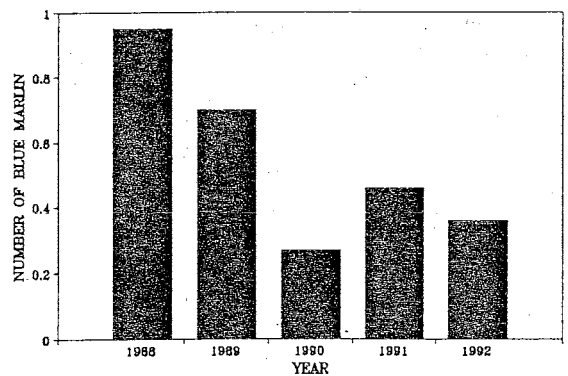


Fig. 5. Catch per unit of effort of blue marlin in Bermuda's annual billfish tournament from 1988 to 1992.