

# Evaluation of Statistical Data from Fishing Tournaments in Puerto Rico Collected from 2000 - 2006

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## ABSTRACT

Fishing tournaments are one of the most popular nautical activities celebrated in Puerto Rico. These are held year-round and they target from reef to pelagic species. Data on these fishing tournaments was gathered from 2000 - 2006 as a component of a larger project whose main goal is the characterization of recreational fisheries in the Island. A total of 247 fishing tournaments have been visited with a total of 94,819.88 kg of fish weighed. Since 2002, a steady increase in angler participation has been noted. The Catch per unit Effort (CPUE) for most of the targeted species has decreased over the years. Several trends in fishing preference have been changing over the last few years following an increase in enforcement and adoption of new fishing regulations pertaining to recreational fisheries in Puerto Rico. Due to quota regulations, larger size fish are now landed, and there has been a change from all landing to all tag and release billfish tournaments. A decrease in shore fishing tournaments has been noted over the past three years.

KEY WORDS: Puerto Rico, recreational fisheries, fishing tournaments

## Evaluación Datos Estadísticos de los Torneos de Pesca en Puerto Rico

Los torneos de pesca son una de las actividades marítimas más importantes en la isla de Puerto Rico. Estos se celebran a través del año; Estos van desde especies arrecifales hasta especies pelágicas. Desde el año 2000 se ha recopilado información de estas actividades marinas, como parte de un proyecto de mayor escala que monitorea la pesca recreativa marina en las aguas de Puerto Rico.

Un total de 247 torneos de pesca han sido visitados. Se ha medido y pesado un total de 94,819.88 Kg. Un aumento en la participación ha sido observado desde el 2002. La Razón por Unidad de Pesca para la mayoría de las especies de torneo ha disminuido a través de los años. Con el aumento en la vigilancia en los torneos de pesca y con la implementación del nuevo reglamento de pesca para Puerto Rico se han notado cambios en las preferencias de los pescadores recreativos que participan en torneos de pesca. Las cuotas aplicables a especies importantes para la pesca recreativa han traído cambios a los torneos de pesca, con este cambio peces más grandes están siendo abordados y en adición se ha observado un cambio de abordar peces de pico a torneos donde se liberan todas las capturas de estos peces. Se ha observado una disminución en los torneos de orilla en los últimos 3 años.

PALABRAS CLAVES: Puerto Rico, pesca recreativa, torneos de pesca

## INTRODUCTION

Since 1950s recreational fishing tournaments in Puerto Rico has been monitored and studied Erdman (Erdman 1962). Since then, it has provided a good source of information to scientists and managers. In particular, billfish tournaments in Puerto Rico have been a source of data on the species biology, recreational fishermen preferences, and socio-economic importance of recreational fishing, characterizing the activity for the Caribbean and the Atlantic, all this valuable information helped in the development of regulations for recreational fishing (Clark *et. al.* 1999 a and b). The economic importance of recreational fishing in the island has been documented in the past, but aspects of the biology of fish caught during tournaments have been neglected. (Clark *et. al.* 1999 a), this made recreational fishing a source of high economical value but with no monitoring as it has been for commercial fishermen since 1967 by the Commercial Fisheries Research and Development Act of 1964 (Matos-Caraballo

2002).

In 2004, after a few years of public hearings, scientific studies etc; a new fishing regulation was established for all fisheries in Puerto Rico (Law 278, Regulation No. 6768), this was the first time recreational fishing was going to be regulated and practices penalized. Among others, quotas were established for recreational fishermen for wahoo, dolphinfish, and conch. Minimum size requirements for some species changed and a no sale prohibition was included. Gear restrictions were included for recreational fishermen.

This event changed some practices within some fishing tournaments, it also created difficulties when monitoring this activity, since some recreational fishermen unlike commercial fishermen were not used to all the regulations and laws applicable to fishing (minimum sizes, quotas, seasonal closures, etc.)

Under current laws, recreational fishing tournaments have to register and comply with the DNER Navigation

Commissioners Office (DNER, Law 430, and Regulation 6979); these events are required to have a valid permit for the activity and to educate fishermen on the current fishing and security laws for marine activities.

Recreational fishing tournaments are still an important marine activity in Puerto Rico. Although it was not monitored consistently in the past, the current systems of data collection for recreational fishing in Puerto Rico patterns are noted in this activity.

Most of the tournaments held in Puerto Rico, are for pelagic fishes. These are the ones most consistently held and the ones with the most participation (Rodriguez-Ferrer and Rodriguez-Ferrer 2006).

The objectives of this study are to analyze patterns in recreational fishing tournaments in Puerto Rico, characterize its trends so that better management plans are put into practice in Puerto Rican waters. This analysis provides island-wide information on recreational fishing tournaments for the period of 2000 - 2006.

### METHODS

Project staff contacted Puerto Rico Sport Fishing Association or other organizations to obtain the annual tournament agenda. Then, project staff attended each tournament and collects the landings and/or releases, collect biometrical data as well as total effort information from records (logbooks). These will include information on sex (whenever possible), length and weight, and species identifications as a minimum.

Data obtained for the project was gathered as part of project F-42 of the Marine Resources Division of the Fish and Wildlife Bureau of the Department of Natural and Environmental Resources (DNER).of the Commonwealth of Puerto Rico.

Fishermen were contacted upon their arrival at the weigh station, where they were interviewed regarding fishing for the day. The following information was obtained:

- i) Boat name,
- ii) Number of people fishing,
- iii) Time spent fishing,
- iv) Fishing location,
- v) Fish species,
- vi) Number of tag/releases,
- vii) Fish Condition at release (i.e. mutilated, healthy, dead, etc.),
- viii) Sex,
- ix) Length (mm),
- x) Weight (lbs/kg) of boarded fish.

For the purpose of this study, the term "by catch" refers to any fish species that was not targeted in the tournament, however, the same information (i.e. weight, length, sex, etc.) was mostly collected at the piers. Whenever possible, all boarded fish were measured and weighted for each boat.

Whenever possible, all boarded fish were measured to the nearest millimeters (mm), weighed in pounds during the tournament and further converted to kilograms for data analysis., All measurements were taken measuring in a straight line from the fish lower jaw (LJ) to the tail fork (TL).

For Billfish, measurements were taken drawing a straight line on the floor from the lower jaw (LJ) to the tail fork (TF).

### Data Analysis

The data were entered for further analysis using Microsoft Access 2000®. The information was annotated to determine size and weight frequencies by species. These data were used to determine Catch Per Unit Effort (CPUE) for the fishing activity.

To standardize the data, ORC Macro Intercept Interviewing Manual for the Atlantic and Gulf Coasts ten (10) digit species code was applied. From the data collected, the catch per unit effort was determined using the following formula:

$$\begin{aligned} \text{Catch per Unit Effort} &= \text{CPUE} = C/f \\ \text{Catch} &= C = \text{Number of fish} \\ \text{Fishing Effort} &= f = \text{Number Boats} \times \text{Time-Spent} \\ &\quad \backslash \text{Fishing} \end{aligned}$$

### RESULTS

A total of 247 fishing tournaments were visited in the period from 2000 to 2006 with 463 fishing days (Table 1). Approximately 61,456 boats and personal watercrafts were registered as active at the DNER Navigation Commissioners Office for this period. Of these a total of 6,198 boats (11.67% of registered boats) participated in tournament related activities (Table 1). A total of 23,323 participants registered on these tournaments over the period 2000-2006 (about 35% of fishermen took part in several tournaments including different targeted species) (Table 1).

The total number of tournaments held ranged from 27-46 per year, a slight decrease in tournaments has been seen throughout the years of the study (Table 1). There two kinds of tournaments held in Puerto Rico year round. Tournaments that target one species such as blue marlin (*Makaira nigricans*), sailfish (*Istiophorus platypterus*), dolphinfish (*Coryphaena hippurus*), wahoo (*Acanthonibius solandri*), barracudas (*Sphyraena barracuda*), tarpon (*Megalops atlanticus*), snook (*Centropomus undecimalis*), king mackerel (*Scomberomorus cavalla*) were visited. The other kinds of tournaments are the ones that target more than one species. These tournaments are categorized as several species tournaments; pelagic species such as tunas (*Scombridae*), billfishes, wahoo and dolphin fish are all target species. Shore fishing tournaments include reef fish species, bottom fishing tournaments that mainly target snappers (*Lutjanidae*) and dolphin/wahoo tournaments (only these two species are targeted (Table 2 and 3).

Tournaments that target blue marlin, dolphinfish and wahoo have been the most common over the years (Table 2). Several changes in tournaments have been noted, for example great barracuda, mackerel, shore, and bottom fishing tournaments have decrease over the years at a point that some of these tournaments are no longer held (Table 2).

A total of 94,819.88 kg of fish has been measured over the six years of sampling fishing tournaments (Table 1). The total weight varies between 10,000 and 15,000 kg a year. The year with the highest total weight was 2002 also the year with the most participation (Table 1 and 2). Dolphinfish tournaments had the highest total weight of landed target species, followed by the blue marlin (Table 3).

The overall Catch per unit effort (CPUE) for recreational fishing tournaments has shows a decrease over the years for some tournaments modes (i.e. shore fishing), others have stayed on the same range (dolphinfish, mackerel), others has increased such as in the bottom fishing (Table 4).

## TOURNAMENT DESCRIPTION

### Blue Marlin Tournaments

Blue marlin is the most targeted species on fishing tournament in Puerto Rico. Fishing activity on Blue Marlin can be divided as fish that are tag and/or released, and fish boarded. A total of 119 specimens have been measured for a total weight of 19,468 kg and an average

**Table 1.** Total number of tournaments visited 2000-2006

Year	Number of tournaments	Fishing Days	Total number of participants	Total number of boats	Total weight (kg) (target species and bycatch included)
2000	27	61	3041	845	12,444.55
2001	44	78	4790	1170	15,777.91
2002	46	80	5590	1504	15,785.45
2003	37	61	4661	1178	11,046.55
2004	35	67	4951	1307	10,657.88
2005	31	48	1616	415	14,939.27
2006	27	58	3625	1086	14,168.27
<b>Total</b>	<b>244</b>	<b>453</b>	<b>23,323</b>	<b>6,198</b>	<b>94,819.88</b>

**Table 2.** Total number of tournaments visited by species

Type of Tournament	2000	2001	2002	2003	2004	2005	2006	Total
Blue Marlin	13	19	18	11	13	6	11	91
Dolphinfish	5	12	8	10	8	7	7	57
Wahoo	0	3	3	1	1	2	3	13
Dolphinfish/wahoo	4	2	1	2	1	0	1	11
Several species	0	3	9	4	4	1	2	23
Tarpon/robalo	0	1	2	1	1	1	1	7
Shore	0	7	3	2	0	0	0	12
Bottom Fishing	1	5	0	2	2	2	0	12
Sailfish	3	2	2	2	1	1	3	14
Mackerel	1	2	1	0	1	0	0	5
Great barracuda	0	0	0	1	1	0	0	2
<b>Total</b>	<b>27</b>	<b>56</b>	<b>47</b>	<b>36</b>	<b>33</b>	<b>20</b>	<b>28</b>	<b>247</b>

**Table 3.** Total kilograms landed of target species by tournament type by year.

Species	2000	2001	2002	2003	2004	2005	2006	Total
Blue Marlin	3,692	4,559	4,146	1,396	1,837	2,764	1,074	19,468
Sailfish	40	0	0	92	45	68	0	245
Dolphinfish	5,177	8,742	8,294	6,107	8,973	5,103	13,136	55,532
Wahoo	0	455	565	205	130	412	382	2,149
Mackerel	93	287	84	0	30	NT	NT	494
Several spp.	NT	171	786	530	595	2470	684	5,236
Bottom fishing	43	627	0	325	427	928	NT	2,350
Dolphin/wahoo	1,478	1,726	610	539	480	266	271	5,370
Great Barracuda	NT	NT	NT	0	30	NT	NT	30
Shore	2	793	184	NT	NT	NT	NT	979
Tarpon/snook	NW	NW	NW	NW	NW	NW	NW	NW
Total								<b>91,853</b>

NT = no tournament visited, NW = this species was measured and released without weight

**Table 4.** Catch per unit effort for fishing tournaments (2000-2007).

Tournament Type	2000	2001	2002	2003	2004	2005	2006
Dolphinfish	0.82	0.47	0.52	0.37	0.45	0.42	0.47
Wahoo	NT	0.07	0.06	0.09	0.06	0.09	0.06
Sailfish	0.01	0.17	0.002	0.01	0.01	0.01	None boarded
Mackerel	0.21	0.13	0.09	NT	0.11	NT	NT
Dolphinfish/Wahoo	0.35	1.09	0.20	0.30	0.38	NT	0.22
Shore	NT	0.24	0.39	0.15	NT	NT	NT
Several Species	NT	0.14	0.24	0.49	0.16	0.27	0.22
Bottom fishing	0.38	0.79	NT	1.1	2.04	2.53	NT
Blue Marlin	0.003	0.004	0.003	0.002	0.001	0.002	0.001

weight of 163.59 kg (Table 3 and 5). Fish size ranges between 2032 to 3261 mm, which is right at the legal size. Fishing activity for blue marlin has changed for tournament focused on landing fish to all release tournaments. The number of landed fish has steadily decrease and the number of tag and release fish has increase (Table 5).

#### Dolphinfish Tournaments

In the case of dolphinfish, the second most targeted species, but the most boarded, 57 out of 247 tournaments were dolphinfish tournaments (Table 2). A total of 55,532 kilograms of dolphinfish were boarded during fishing tournaments that target this species (Table 3). Size range from 100 to 1,525 mm for landed fish.

#### Wahoo Tournaments

A total of 2,149 kg have been measured for the species (Table 3). The size ranges from 570 to 1,640 mm. Wahoo is also boarded as bycatch on tournaments that target other species; this will be addressed on the bycatch session.

#### Mackerel Tournaments

Mackerel tournaments are less common, 5 out of 247 tournaments visited targeted mackerels (Table 2). Total weight for this species was 484 kg. This species is often seen as bycatch on blue marlin tournaments. Size of measured fish ranged from 625 to 790 mm.

#### Sailfish Tournaments

For other game fish such as sailfish, fourteen tournaments were visited. Total weigh for the specie's tournaments was 245, sailfish tournaments are mainly tag and released. The measured fish ranged is sizes form 1,473 to 1,752 mm.

#### Bottom Fishing Tournaments

This type of tournament is mainly practiced by commercial fishermen. Twelve tournament have been visited from 2000 - 2006. A total of 2,350 kg of fish were measured at the weight stations. Size ranges from 230 to 430 mm. Species such as snappers, grunts and sharks are commonly landed on these tournaments. This activities are the most difficult to track because they do not advertise the tournaments and rarely are registered at the DNER's Navigation Commissioners Office which is the one in charge of giving permits to marine events.

#### Shore Fishing Tournaments

These tournaments were fairly common the first three years of the study (2000 - 2003). Afterwards, they have been difficult to track. Total weight for these tournaments was 979 kg with sizes ranging from 40 to 774 mm. Mainly small reef species such as French grunt (*H. flavolineatum*), White grunt (*H. plumieri*), Peacock flounder (*B. lunatus*), Hogfish (*L. maximus*), Scorpionfish family (*Scorpaenidae spp.*), Sergeant major (*A. saxatilis*), Pudding wife (*H.*

**Table 5.** Fishing activity for Blue Marlin (*Makaira nigricans*) tournaments 2000 - 2006

Year	Boarded	Tag and released	Released
2000	30	215	230
2001	31	252	119
2002	23	262	94
2003	17	499	37
2004	9	495	54
2005	8	484	517
2006	8	437	78

*radiatus*), Squirrelfish genus (*Holocentridae spp.*), Reef croaker (*O. dentex*), and Sandtile fish (*M. plumieri*) are landed.

### Great Barracuda Tournaments

Great barracuda tournaments were only held in 2003 and 2004. In 2005 the New Fishing Law 278 came into effect. Under this law the possession and sell of great barracudas is prohibited, making these tournaments impractical. From the data collect over these two years a total of 30 kg were landed with sizes raging from 136 to 1420 mm. Most of Great Barracuda are now reported as released.

### Dolphinfish/Wahoo

This type of tournament is common by mid fall where this two species are abundant. A total weight of 5,370 kg of wahoo and dolphinfish has been landed on these tournaments. Size ranged from 100 to 1500 mm.

### Tarpon/Snook Tournaments

Only one club has consistently held a tarpon/snook, all release tournaments. Like barracudas, tarpon cannot be retained, and snook have minimum and maximum size requirements (22 inches min - 48 in max). These species are not weight; they are released by the fishermen after measuring them. Size ranges from 101 to 990 mm.

### Several Species Tournaments

There is a tournament modality were several species are the main targets. In this type of tournament, the prizes are given either by categories or to the biggest fish regarding the species. Generally fishing is done trolling through the water, targeting offshore species, or bottom fishing. The species targeted the most on these tournaments are dolphinfish, wahoo, mackerels, blue marlin, tunas (i.e. yellow fin, albacore, big eye tuna, skipjack), and silk snapper. A total of 5,236 kg were measured in this type of tournament. The size ranges from 180 to 2,616 mm.

### Bycatch

In all the tournaments data was collected on species that are boarded but are not part of the species targeted on the tournament. These specimens are difficult to get data from due to the fact that they are filleted and/or gutted

before the weighing of the targeted species has finished, making it difficult for the personnel to collect this data. From the data collected, dolphinfish, great barracuda, wahoo, and tunas are the most boarded bycatch species (Figure 1).

## DISCUSSION

There has been noted change in tournament modalities and species targeted over the study period. Data collected over the past seven years has permitted to recognize patterns related to recreational fisheries activities (type of tournaments held, size of landed fish, and targeted species among others). In Puerto Rico, tournaments for dolphinfish and blue marlin are an important part of the recreational fishing activities. These tournaments have evolved throughout the years, with the changes in applicable regulations for these species. In the case of dolphinfish, since 2005 it has been regulated for recreational fishers in the Island; a quota of five dolphinfish per fishermen (20 per boat) was established, with this new regulation.

Previous to the implementation of the regulation (2000 - 2004), landings of 50 plus fish per boat daily were frequent, and high numbers of immature fish and females were mostly landed. Regardless of the size of the fish, some fishermen brought immature fish just to land the maximum daily allowed.

With these changes for the species, these tournaments were transformed, most of the clubs/marinas still held their tournament, changing the prizes from boat with the most fish landed, towards prizes for highest total weight. These adjustments encouraged fishermen to land bigger fish and the tendency of landing small immature specimens has almost disappeared. Even before these regulations came into effect, some clubs had established minimum weight requirements for dolphinfish landed. This practice has been emulated by other clubs since. As a result, total weight of landed fish has increased. "Recreational fishing targets large, top-level predatory fish in the ocean. Removal of these fish can create dramatic changes in ocean food webs and cause cascading effects that alter the overall productivity and health of marine ecosystems" (SeaWeb August 27, 2004). The effects of this selective fishing have to be studied for all the species for which quotas were applied. One study states that older fish and invertebrate populations might be crucial to maintenance of resource stocks. (Birkeland *et al.*). The reproductive biology of the species needs to be evaluated so that these measures taken are truly effective. Tournament organizers stated, that they were going to have lower participation in these tournaments since the regulations came into effect, but no changes in the participation in dolphinfish tournaments has been noted. There is still a tendency by recreational fishermen to sell dolphinfish caught in these tournaments; although surveillance by DNER Rangers has increased, this has not lessen the amount of illegally sold dolphinfish.

Blue Marlin tournaments have had changes within the

current regulations. Since 2003, recreational anglers, are required a permit given by NOAA Fisheries, Puerto Rico government adopted these regulations for landed Highly Migratory Species in PR. The permit establishes minimum size requirements for these species (which include billfish, sharks, and tunas) among other specifications. Since the intensification in law enforcement agents in tournaments, increased compliance with these permits and billfish regulations.

In the case of blue marlin tournaments, since permits and minimum size requirements were placed for the species, changes in billfish fishing were noticed. Each year there are fewer clubs that land fish and more clubs that encourage all release tournaments. For the last three years of this project law enforcement officers (DNER Rangers and NOAA Fisheries personnel) have been effective monitoring these tournaments, and fishermen compliance with regulations.

The only noted modification in tournament mode are the shore fishing tournaments, which have consistently diminished over the past three years; most of the organizers of these fishing tournaments blame new fishing regulations established for the elimination of these activities.

Since 2000, few clubs celebrate consecutive wahoo tournaments. One club had yearly wahoo tournaments, but this marina has not had a wahoo tournament in a while. This highly migratory species, like the dolphinfish has a bag limit established by 2004 fishing regulations, a quota of five fish (20 per boat) was also established for this species. In 2006, only two clubs held wahoo tournaments and both followed regulations for the species. Wahoo is commonly brought as bycatch year-round in tournaments.

Since 2004, the Fisheries Research Laboratory, within its Investigation Program has been studying life history and sexual maturity for the species; tournaments provide a good source of tissue samples for this study. The information gathered in this project will provide managers better tools to ensure, the good use of this resource (Miguel Figuerola, Commonwealth of Puerto Rico Department of Natural and Environmental Resources, Fisheries Research Laboratory Pers. comm.).

There is a common practice by some recreational fishermen to have "pool tournaments", these are defined as fishing activity where a group of fishermen decide to fish and have determined the amount paid by each fishermen. The fishermen with the biggest fish win all the money. There is only one prize for the biggest fish. These events do not follow permit requirements, most of the time these events undergo no planning. These "pool tournaments" are held in recreational and commercial fishing facilities. Project personnel have become aware of this ongoing issue and have covered most of these tournaments, regardless of whether it has permits. In some cases, DNER Rangers have intervened with illegal tournaments being held at private marinas. However, the activity is not stopped, but organizers are instructed on current laws and requirements

for marine events in Puerto Rico.

*"While the cumulative impact of commercial fishers is constrained by limits on who, where, when and how much fish they can catch, there are no controls on the aggregate impact of recreational fishers. Current management of saltwater recreational fisheries focuses primarily on the individual fisherman -- setting limits on the number and size of fish one can bring in -- without restricting the number of people allowed to fish" (SeaWeb 2004, August 27).*

This statement can be applied to recreational fishing in Puerto Rico, even with the new regulations applied, some of the aspects included in this regulation have yet to come into effect for recreational fishermen in Puerto Rico (license systems), and the ongoing changes to this regulation favoring different sectors affects the overall management of the fishery in Puerto Rico. Better analysis of the recreationally important fish stocks and education for users of the resource is crucial for these regulations and management plans to have good results.

#### ACKNOWLEDGEMENTS

We would like to thank tournament organizers and anglers throughout the Island for their cooperation with the data collection. We are greatly in debt with the DNER personnel that help us gather the data. Also we like to thank the DNER Fisheries Laboratory and its entire staff for helping us achieves the goals set for this project. As well, we would like to thank NOAA-Task Force agents for their presence during tournaments.

#### LITERATURE CITED

- Birkeland Charles, and Paul K. Dayton. 2004. The importance in fishery management of leaving the big ones, Department of Zoology, 2538 The Mall, Edmondson 164, University of Hawaii at Manoa, Honolulu, Hawaii 96822, USA Scripps Institution of Oceanography La Jolla, California 92093-0227, USA.
- Clark, D.J., R.B. Ditton, and R. Chaparro, 1999a. A Human Perspective on the Billfish Fishery in Puerto Rico, *Proceedings of the Gulf and Caribbean Fisheries Institute* **46**:274-288.
- Clark, D.J., R.B. Ditton, and R. Chaparro. 1999b. The Economic Importance of Recreational Billfish Angling in Puerto Rico, *Proceedings of the Gulf and Caribbean Fisheries Institute* **46**:47-59.
- Erdman, D.S. 1962. The Sport Fishery for Blue Marlin off Puerto Rico. *Transactions of The American Fisheries Society* **91**(2):225-227
- Law 278 Commonwealth of Puerto Rico Department of Natural and Environmental Resources. 1998. New Fishing Law.
- Law 430 Commonwealth of Puerto Rico Department of Natural and Environmental Resources. 2000. Law of Navigation and Water Safety (P. del S. 1215).
- Matos-Caraballo, D. 2002. Overview of Puerto Rico's small-scale Fisheries Statistics, *Proceedings of the Gulf and Caribbean Fisheries Institute* **55**:108-113.
- Rodriguez Ferrer G. and Y. Rodriguez-Ferrer. 2006. Annual Report 2006. Department of Natural and Environmental Resources Marine Resources Division. 30 pp.
- SeaWeb (2004, August 27). Study In Science Reveals Recreational Fishing Takes Big Bite Of Ocean Catch. *Science Daily*.