

## Overview of Puerto Rico's Small-scale Fisheries Statistics 2001 - 2004

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### ABSTRACT

The Fisheries Research Laboratory (FRL) of the Puerto Rico Department of Natural and Environmental Resources (DNER) monitors the commercial landings of fish and shellfish in Puerto Rico. Using the correction factor of 86% to estimate the under reported landings data in Puerto Rico during 2002, it was estimated that a total of 3,805,595 pounds of fish and shellfish were landed, with a market value of \$7,877,582. Raw data shows that for 2002 a total of 3,272,812 pounds was reported. The landings estimate for Puerto Rico during 2003, using the correction factor of 56% was 4,265,645 pounds of fish and shellfish, with a wholesale market value of \$7,848,786. The raw data shows that for 2003, the landings reported were 2,388,761 pounds. The landings estimate for Puerto Rico during 2004 using the correction factor of 61%, was 3,056,852 pounds of fish and shellfish, with a wholesale market value of \$7,519,857. The raw data indicates that for 2004, the landings reported were 1,864,680 pounds.

The most important fish, in terms of percentage of total pounds landed (fish and shellfish), for 2002 - 2004, was the yellow-tail snapper (*Ocyurus chrysurus*) 8.2%, silk snapper (mainly *Lutjanus vivanus*) 6.4%, various species of grunts mainly the white grunt (*Haemulon plumieri*) 4.6%, lane snapper (*Lutjanus synagris*) 4.2%, various species of tuna 4.2%, mackerel species (*Scomberomorus cavalla*) 3.3%, dolphin-fish (*Coryphaena hippurus*) 3.2%, various species of parrotfish 3.0%, various species of trunkfish 2.5% and red hind (*Epinephelus guttatus*), reported 2.3%. The most important of the shellfish species were the spiny lobster (*Panulirus argus*) 10.0% and the queen conch (*Strombus gigas*) 8.5%.

The gear types, which accounted for the highest percentage of landing, by weight during 2002 - 2004, were bottom lines 30.0% of the total catch. Bottom lines were followed by fish traps that accounted for 20.3% of the total reported catch. Fish traps were followed by SCUBA divers that fished 19.6% of the total reported catch.

A total of 62,990 finfish and spiny lobsters were measured to collect biostatistical data during 2002 - 2004. Sex determination of fishes in the field has been difficult because of the reluctance of fishers to permit this activity, and the general limitation in available time for measuring samples. The species most frequently measured from 2002 - 2004 were *Ocyurus chrysurus*, *Haemulon plumieri*, *Lutjanus vivanus*, *Sparisoma viride*, *Panulirus argus*, *Sparisoma chrysoterum*, *Epinephelus guttatus*, *Scomberomorus cavalla* and *Lutjanus synagris*. A total of 519 fishing trips were interviewed to collect biostatistical data in 2002, 578 interviews in 2003, and 723 interviews in 2004.

KEY WORDS: Commercial landings, commercial fisheries statistics, Puerto Rico

### Resumen de las Estadísticas Pesqueras en Pequeña Escala en Puerto Rico, 2002 - 2004

El Laboratorio de Investigaciones Pesqueras (LIP) del Departamento de Recursos Naturales y Ambientales (DRNA) de Puerto Rico, monitorea los desembarcos comerciales de pescado y marisco en Puerto Rico. Utilizando el factor de corrección de 86% para estimar los desembarcos no reportados en Puerto Rico durante el 2002, se estima un total de 3,805,595 libras de pescado y marisco fueron desembarcadas, teniendo un valor al por mayor de \$7,877,582. Los datos crudos de 2002, mostraron reportes de 3,272,812 libras reportadas. El estimado durante el 2003, utilizando el factor de corrección de 56%, establece que 4,265,645 de libras fueron desembarcadas, con un valor en el mercado de \$7,848,786. Los datos crudos muestran que 2,388,761 libras fueron reportadas. El estimado de desembarcos de 2004, utilizando el factor de corrección de 61%, 3,056,852 libras de pescado y marisco, con un valor al por mayor en el mercado de \$7,519,857. Los datos crudos de 2004, muestran que se reportaron 1,864,680 libras.

El pez más importantes en terminos de porcentaje del total de libras desembarcadas (pescado y marisco), para el 2002 - 2004, fue la colirrubia (*Ocyurus chrysurus*) con 8.2%, seguido por el chillo (principalmente *Lutjanus vivanus*), 6.4%, varias especies de ronco especialmente cachicata blanca (*Haemulon plumieri*) 4.6%, arrayado (*Lutjanus synagris*) 4.2%, varias especies de atún 4.2%, sierra carita (*Scomberomorus cavalla*) 3.3%, dorado (*Coryphaena hippurus*) 3.2%, varias especies de peces loros 3.0%, varias especies de chapines 2.5% y el mero cabrilla (*Epinephelus guttatus*) reportó 2.3%. Las especies de mariscos más importantes fueron la langosta espinosa (*Panulirus argus*) 10.0% y el carrucho (*Strombus gigas*) 8.5%.

Las artes de pesca que obtuvieron el mayor porcentaje del peso por los desembarcos reportados durante 2002 - 2004, fueron las calas con 30% del total capturado. Estas fueron seguidas por las nasas con 20.3% del total capturado. Seguidas por los buzos de SCUBA que capturaron un 19.6% del total capturado.

Un total de 62,990 peces y langostas espinosas fueron medidos como datos de bioestadísticas durante el 2002 - 2004. Determinación del sexo en el trabajo de campo resultó muy difícil de hacer ya que los pescadores se resisten a que se realice

esta actividad y a la limitación de tiempo disponible para medir las muestras. Las especies más frecuentemente medidas durante 2002 - 2004 fueron *Ocyurus Chrysurus*, *Haemulon plumieri*, *Lutjanus vivanus*, *Sparisoma viride*, *Panulirus argus*, *Sparisoma chrysopterum* y *Epinephelus guttatus*. Un total de 519 viajes de pesca fueron entrevistados para coleccionar datos de bioestadísticas en el 2002, 578 entrevistas en el 2003, y 723 entrevistas en el 2004.

**PALABRAS CLAVES:** Desembarcos comerciales, estadísticas pesqueras comerciales, Puerto Rico

### INTRODUCTION

The Fisheries Research Laboratory (FRL) of the Puerto Rico Department of Natural and Environmental Resources (DNER) monitors the commercial landings of fish and shellfish in Puerto Rico. The Commercial Fisheries Statistics Program (CFSP) was implemented in 1967 under the Commercial Fisheries Research and Development Act of 1964 (PL 88-309) to collect data on the commercial fishery. Currently, this project is funded by the NOAA/National Marine Fisheries Service (NMFS) and the DNER.

The objective of the Puerto Rico CFSP/DNER is to maintain reporting services on the commercial finfish and shellfish resources of Puerto Rico, as well as manage and disseminate the fisheries statistics through coordination of activities between NMFS and the CFSP/DNER. This includes the processing and summary of monthly landings (by species or species group, weight, value, numbers of trips, hours fishing, gear type, etc.), which is needed to manage marine resources effectively. Close cooperation in these activities will avoid duplication and promote efficiency of operations.

This report includes data from January 2001 - December 2004. The Puerto Rico CFSP has six principal goals:

- i) Collect landing data from the island of Puerto Rico ensuring coverage of all coastal municipalities and their major fishing centers.
- ii) Determine the total weight of principal finfish and shellfish landed in Puerto Rico each month.
- iii) Determine the ex-vessel value of principal finfish and shellfish species landed in Puerto Rico each month.
- iv) Manage, correct, evaluate, summarize data and prepare semiannual and annual performance reports.
- v) Collect biostatistician data (i.e. individual lengths and weight, species composition) as needed.
- vi) Collect data to estimate catch per unit effort (CPUE) for landing and biostatistical data.

### PROCEDURES

#### Commercial Landings Data

Commercial fishery landing data were collected from fishers, fish buyers and fishing associations from around Puerto Rico. The commercial fishery statistics as required by Puerto Rico's Law 278 of November 28, 1998 and by DNER Fishing Regulations 6768. The fishers should submit their reports to DNER/CFSP. Also the four port agents and the principal investigator visited the 42 coastal municipalities, including the islands of Vieques and Culebra, and the 88 identified fishing centers, (Figure 1) to obtain data from fish houses. The data collection occurred from January 2002 - December 2004. Data were collected using a landing trip ticket system on a biweekly or monthly basis.

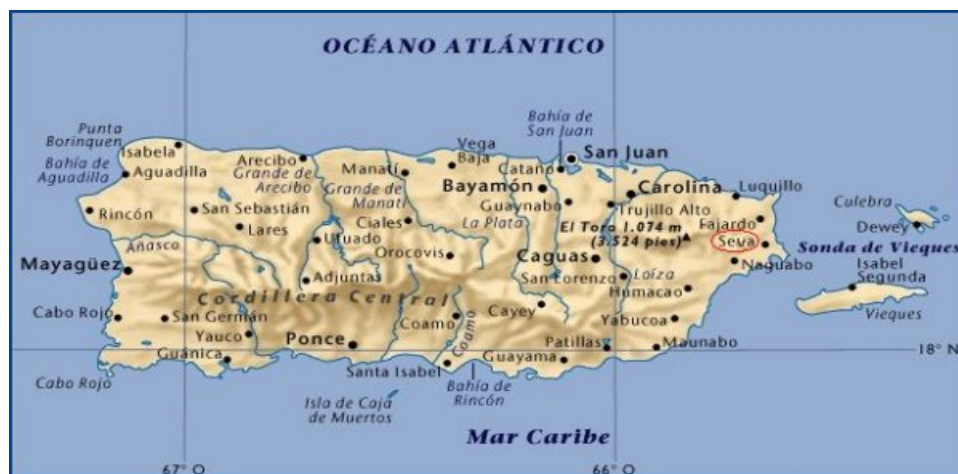


Figure 1. Map of Puerto Rico

Efforts were made to collect the following data: fishing date; name of fish buyer, fisherman and/or helper (to avoid data duplication); fishing license number; municipality; fishing center (municipality landing area); number of trips; gear type; fishing effort (hours spent fishing); weight in pounds by species or family; market value to the fisherman (price in U.S. dollars/pound); maximum and minimum fishing depth; and fishing area. Trip tickets were completed using species common names and identification was possible by using an amended version of the bilingual technical report "Common Names of Fishes in Puerto Rico" (Erdman 1987). A numerical system of species identification was developed to correspond with species codes used in Erdman's publication (additional species have been added by CFSP). Fishers usually landed fishes in the round (not eviscerated), excepting deepwater snapper and large grouper that they usually landed gilled and gutted. Lobster, oysters, and octopus were also landed in the round, and conch weights included meat only. Land crab statistics were reported in number of dozens, with each dozen assumed to produce 1 lb. of meat. Some landings were reported as one of four classes of fish (first, second, third, and "trash" fish) reflecting their market value: "trash" fish are perceived to have little or no market value. Classification varied somewhat by region but the following descriptions were used to characterize each class broadly: first class fish included large snappers, grouper, grunt, trunkfish and hogfish; second class included small snapper and grouper, parrotfish, goatfish, and triggerfish; third class included smaller individuals of second class fish and large squirrelfish. The "trashfish" category included butterflyfish, angelfish, surgeonfish, small squirrelfish and small fishes of a large number of species (Matos-Caraballo and Sadovy 1990).

Catch per unit of effort (CPUE) was evaluated in two ways:

- i) For landings data by calculation of total pounds per trip, making a subsample by month, using only those landings trip tickets that clearly indicated a single trip;
- ii) Use of the biostatistical sampling program (explained in biostatistical procedures).

Landings data were entered in MS-DOS computers, using Microsoft FoxPro, checked against the original landing trip tickets; corrected and analyzed using, Microsoft FoxPro and Microsoft Excel. All data presented in this report are raw data. As in previous years (1988 - 1999) a correction factor was used in calculations to correct for under-reporting. The correction factor was determined after port samplers visited eight fishing centers twice a year during five days. Port samplers during the mentioned period recorded all the trip landings data for the use of the CFSP. Later, the CFSP principal investigator compared the data submitted by commercial fishers and fish houses with the port sampler's records for the same periods.

### Commercial Biostatistical Data

Biostatistical data from finfish and spiny lobster were collected by port agents three days per week. Each individual was identified by species to determine catch composition. Finfishes were measured in fork length (FL) and spiny lobster in carapace length (CL), both in millimeters (mm), and weighed in grams. Data were recorded on the field and copied in the biostatistical data sheet. The form was designed to facilitate entry and processing of effort data. Biostatistical data were entered in Trip Interview Program (TIP) developed by NMFS Southeast Science Center. Later, the data stored in TIP was converted to .dbf format and analyzed using Microsoft Foxpro and Microsoft Excel. The data collected include date, name of fisherman, fishing area, depth, gear, species, length, weight and effort by gear type. When possible, the whole catch was identified at species level, weight (g), identified by sex visual gonad stage, and length measured in millimeters. When measuring the whole catch was not possible (incomplete sample), port agents tried to identify the species level, and tried to sample at least 50 randomly selected individuals measured and weighed. However, sometimes fishers or fish buyers did not allow the port agents to sample 50 individuals. Thus, some samples resulted in  $n < 50$ . Measurements on complete catches are more difficult to obtain when the catch is particularly large, because fish buyers or fishers wish to remove, sell or store fish and/or shellfish rapidly.

## RESULTS

### Commercial Landings Data

Using the correction factor of 86%, in Puerto Rico during 2002, it was estimated that a total of 3,805,595 pounds of fish and shellfish were landed, with a market value of \$7,877,582. Raw data shows that from January-December 2002 a total of 3,272,812 pounds were reported (Table 1A). The landings estimate for Puerto Rico during 2003 using the correction factor of 56% was 4,265,645 pounds of fish and shellfish, with a wholesale market value of \$7,848,786. The raw data shows that for 2003, the landings reported were 2,388,761 pounds (Table 1B). The landings estimate for Puerto Rico during 2004 using the correction factor of 61%, 3,056,852 pounds of fish and shellfish, with a wholesale market value of \$7,519,857. The raw data shows that for 2004, the landings reported were 1,864,680 pounds (Table 1C).

The most important fish, in terms of percentage of total pounds landed (fish and shellfish), for 2002-04, was the yellow-tail snapper (*Ocyurus chrysurus*) 8.2%, silk snapper (mainly *Lutjanus vivanus*) 6.4%, various species of grunts mainly the white grunt (*Haemulon plumieri*) 4.6%, lane snapper (*Lutjanus synagris*) 4.2%, various species of tuna 4.2%, mackerel species (*Scomberomorus cavalla*) 3.3%, dolphinfish (*Coryphaena hippurus*) 3.2%, various species of parrotfish 3.0%, various species of

trunkfish 2.5% and red hind (*Epinephelus guttatus*), reported 2.3% (Tables 1, 2, and 3). The most important of the shellfish species were the spiny lobster (*Panulirus argus*) 10.0% and the queen conch (*Strombus gigas*) 8.5% (Tables 1A, 1B, and 1C).

Matos-Caraballo (1998, 2000) mentioned that several fish and shellfish species, usually discarded by fishers in the past, have now become commercial species. These species did not have market value years ago, but are now sold at reasonable prices. Table 1A shows that the squirrelfish (e.g. *Holocentrus ascensionis* and *H. rufus*) was sold in 2002 at an average price of approximately \$1.21 per pound. Shellfish species in the same situation are *Carpilius corallinus* and *Mythrax spp.*. On the other hand *Acanthurus spp.*, *Holocanthus ciliaris*, *Pomacanthus arcuatus*, and *P. paru* are fished in the municipality island of Vieques, to be sold in the market of Saint Croix and Saint Thomas, USVI.

During 2002 - 2004, prices varied markedly by species (Tables 1A, 1B and 1C) and municipality (Table 2). For example, the lowest average price per pound for fish and shellfish was obtained on the west coast, in the municipality of Aguadilla at \$1.00 during 2003 (Table 2), and the highest average price was obtained in the North Coast, in the municipality of Carolina at \$3.75 (Table 2), although only 100 pounds were reported in year 2003. The highest fish price value during 2002 - 2004, was the queen snapper, \$3.25 per pound in 2004 (Table 1C). The most valued shellfish during 2002 - 2004, were lobsters, \$5.66 per pound in 2002 (Table 1A). The most productive of the 42 municipalities during 2002 - 2004, was Cabo Rojo accounting for 17% of the total landings, by weight (Table 2). During 2002 - 2004, the west coast that reported 36% of the total weight, was the most productive, followed by the south coast that reported 30%, east coast with 22% and north coast with 12% (Table 2). However in the year 2002, the south coast reported 58,426 pounds more than the west coast (Table 2). This is the first time since 1968, that the west coast is not the most productive coast in one single year.

The gear types (as defined in Matos and Torres, 1989), which accounted for the highest percentage of landings, by weight during 2002-04, were bottom lines 30.0% of the

total catch (Figures 3, 4, and 5). Bottom lines were followed by fish traps that accounted for 20.3% of the total reported catch (Figures 3, 4 and 5). Fish traps were followed by SCUBA divers that fished 19.6% of the total reported catch (Figures 3, 4, and 5). The other important Puerto Rico's fishing commercial gears catch percentage are shown in Figures 3, 4, and 5.

Some species were reported in greater quantities in some months of the year. The dolphinfish and the red hind were caught mostly during December, January and February. The tunas (Scombridae) were caught in greater quantities during May - July. The yellowtail snappers were caught in greater quantities during the 12 months, showing peaks for July - October. Fishing activity was affected during the hurricane season, especially during August and September. In September, tropical storms and hurricanes passed close to Puerto Rico and also affected the fishing activity.

A sub-sample of 200 trip ticket landings per month was made to estimate CPUE in landings per trip. Fishing trips are generally of a half-day duration. The CPUE average for landings in 2002, was 63 pounds per trip, for 2003, was 61 pounds per trip, and for 2004, was 79 pounds per trip.

#### Commercial Biostatistics Data

A total of 62,990 finfish and spiny lobsters were measured during 2002-04. Sex determination of fishes in the field has been difficult because of the reluctance of fishers to permit this activity, and the general limitation in available time for measuring samples, and difficulties in assessing any but the ripest individuals, for sex. The species most frequently measured from 2002 - 2004 were *Ocyurus chrysurus*, *Haemulon plumieri*, *Lutjanus vivanus*, *Sparisoma viride*, *Panulirus argus*, *Sparisoma chrysoterum*, *Epinephelus guttatus*, *Scomberomorus cavalla* and *Lutjanus synagris*. A total of 519 fishing trips were interviewed to collect biostatistics data in 2002, 578 interviews in 2003, and 723 interviews in 2004. All this data will be analyzed by species in future studies by CFSP.

Table 1A. Landings reported by species and by coast in Puerto Rico during 2002.

SPECIES	EAST POUNDS	*P/P	NORTH POUNDS	*P/P	SOUTH POUNDS	*P/P	WEST POUNDS	*P/P	TOTAL POUNDS	*P/P
<b>FISH</b>										
Tunas										
Blackfin tuna	821	1.46	1,293	1.92	964	1.29	24,029	1.09	27,107	1.44
Little tunny	1,052	2.08	3,436	1.58	439	1.52	9,559	0.88	14,486	1.52
Skipjack tuna	3,187	2.12	1,206	1.73	1,751	1.29	32,299	0.88	38,443	1.51
Yellowfin tuna	765	2.30	1,980	1.63	1,853	1.52	14,705	1.08	19,303	1.63
Tuna category	3,882	1.66	1,518	2.00	1,468	1.37	4,187	1.14	11,055	1.54
Ballyhoo	21,381	1.22	6,820	1.31	21,521	1.32	18,323	1.39	68,045	1.31
White Grunt	42,303	1.53	9,562	1.82	54,835	1.52	40,400	0.89	147,100	1.44
Hogfish	26,908	2.19	2,479	2.34	29,459	2.47	9,732	2.35	68,578	2.34
Trunkfish	19,308	1.49	1,013	2.43	24,638	1.86	34,151	2.04	79,110	1.96
Dolphinfish	6,308	2.30	12,604	2.51	32,628	2.02	49,082	1.43	100,622	2.07
Squirrelfishes	3,633	1.26	5,151	1.25	6,287	1.29	1,015	1.03	16,086	1.21
Mullets	4,137	1.45	25,507	1.32	22,246	1.24	5,133	0.99	57,023	1.25
Jacks										
Bar jack	12,376	1.40	14,122	1.81	22,987	1.59	13,652	1.11	63,137	1.48
Horse-eye jack	209	1.47	3,033	1.73	513	1.26	1,068	1.13	4,823	1.40
Yellow jack	36	1.63	389	1.99	1,709	1.63	1,081	1.23	3,215	1.62
Jack Category	1,595	1.76	16,693	1.65	5,016	1.38	6,813	1.03	30,117	0.85
Parrotfishes	22,593	1.50	4,727	1.92	49,500	1.54	30,723	0.85	107,543	1.45
Groupers										
Coney	4,234	2.03	2,818	2.22	9,318	1.69	2,668	1.83	19,038	1.94
Red hind	18,598	2.09	10,280	2.42	28,479	2.20	23,849	2.02	81,206	2.18
Misty grouper	456	2.04	1,880	2.20	1,241	1.98	2,102	2.01	5,679	2.06
Nassau grouper	7,801	2.19	3,061	1.98	1,065	1.33	6,781	1.51	18,708	1.75
Yellowfin grouper	2,023	2.09	241	2.61	1,113	2.26	3,539	1.85	6,916	2.20
Grouper category	20,145	2.37	8,401	2.33	12,268	2.32	6,023	1.85	46,837	2.22
Mojarras	1,561	1.70	16,930	1.80	1,520	1.43	984	1.02	20,995	1.49
Snappers										
Lane snapper	29,606	2.23	10,743	2.52	114,993	2.10	29,288	2.04	184,630	2.22
Yellowtail snapper	102,234	2.28	52,144	2.43	88,898	2.11	47,745	1.86	291,021	2.17
Silk snapper	18,407	2.97	39,511	2.92	14,554	3.12	125,556	2.90	198,028	2.98
Mutton snapper	16,590	2.30	7,721	2.60	47,830	2.09	19,701	2.02	91,842	2.25
Queen snapper	4,135	2.53	8,785	3.19	6,384	3.28	90,754	2.86	110,058	2.97
Vermillion snapper	9,355	1.91	9,866	2.33	1,018	2.85	2,896	2.55	23,135	2.41
Wenchman	819	1.91	640	2.36	1,602	3.29	3,136	2.92	6,197	2.62
Snapper category	8,091	2.13	11,173	2.39	27,108	2.00	10,322	1.92	56,694	2.11
Triggerfishes	18,259	1.47	5,463	2.10	15,569	1.74	14,255	1.26	53,546	1.64
Barracudas	1,385	1.22	8,802	1.62	11,314	1.60	3,087	1.25	24,588	1.42
Porgies	13,128	1.54	1,307	1.84	20,636	1.55	2,765	1.17	37,836	1.53
Snooks	3,713	1.80	23,193	1.99	14,316	1.56	3,930	1.55	45,152	1.73
Tarpon	0	0.00	3,978	1.28	0	0.00	443	1.23	4,421	1.26
Goatfishes	10,379	2.16	571	2.42	7,565	1.74	489	1.24	19,004	1.89
Sardines	1,703	1.51	14,142	1.31	7,212	1.32	4,996	1.08	28,053	1.31
Mackerel	18,806	2.10	14,106	2.10	40,051	1.90	44,906	1.78	117,869	1.99
Cero	21,262	2.26	6,442	2.23	18,501	1.90	7,121	1.88	53,326	2.07
Sharks	14,772	1.63	8,948	1.83	4,933	1.96	9,784	1.22	47,409	1.66
Wahoo	323	3.00	459	2.22	281	2.13	32	1.25	1,095	2.15
<b>CLASSIFIED</b>										
First Class	55,385	2.03	30	3.00	3,103	1.84	16,784	1.97	75,302	2.21
Second Class	25,912	1.02	46	2.00	11,716	1.34	9,300	1.04	46,974	1.35
Third Class	19,456	1.18	0	0.00	10,252	1.02	209	1.04	29,917	1.08
Trash	218	1.74	0	0.00	423	0.50	150	0.73	791	0.99
Other fishes	15,503		6,514		54,520		19,713		96,250	
Total Fishes	634,753	1.88	389,728	2.07	855,597	1.75	809,260	1.52	2,689,338	1.80
<b>SHELLFISH</b>										
Conch	118,272	2.48	1,201	3.18	37,704	2.61	78,431	2.19	235,608	2.62
Land crab	734	7.26	544	8.09	948	6.74	4,234	5.14	6,460	6.81
Lobster	106,080	5.82	12,329	5.99	107,916	5.50	74,428	5.32	300,753	5.66
Octopus	1,338	3.21	1,308	2.91	23,981	2.63	1,934	2.30	28,561	3.21
Other shellfish	1,307	3.28	2,504	4.89	4,424	3.60	3,857	2.47	12,092	3.56
Total Shellfish	227,731	3.68	17,886	4.18	174,973	3.51	162,884	2.90	583,474	3.57
TOTAL	862,484	2.16	407,614	2.40	1,030,570	2.05	972,144	1.73	3,272,812	2.07

\* P/P = Average Price Per Pound

Table 1B. Landings reported by species and by coast in Puerto Rico during 2003.

SPECIES	EAST POUNDS	*P/P	NORTH POUNDS	*P/P	SOUTH POUNDS	*P/P	WEST POUNDS	*P/P	TOTAL POUNDS	*P/P
FISH										
Tunas										
Blackfin tuna	695	1.46	2,470	1.85	799	1.47	30,232	0.98	34,196	1.44
Little tunny	126	1.42	2,452	1.46	119	1.50	9,007	0.77	11,704	1.29
Skipjack tuna	844	1.78	464	1.70	1,792	1.44	27,555	0.62	30,655	1.39
Yellowfin tuna	478	2.25	1,393	1.49	553	1.49	21,043	1.04	23,467	1.57
Tuna category	2,565	1.61	869	1.67	1,267	1.39	10,117	0.83	14,818	1.38
Ballyhoo	15,827	1.06	3,357	1.27	13,818	1.09	8,092	0.66	41,094	1.02
White Grunt	22,569	1.43	9,440	1.71	39,299	1.63	36,258	0.89	107,566	1.42
Hogfish	19,220	2.20	952	2.32	19,575	2.63	16,210	2.44	55,957	2.40
Trunkfish	14,154	1.61	671	2.29	18,522	1.87	25,249	1.97	58,596	1.94
Dolphinfish	2,206	2.38	5,793	2.32	17,602	1.91	39,247	1.22	64,848	1.96
Squirrelfishes	1,719	1.52	3,470	1.22	4,841	1.40	671	1.02	10,701	1.29
Mullets	2,554	1.32	18,090	1.18	12,194	1.28	10,008	0.89	42,846	1.17
Jacks										
Bar jack	7,490	1.43	8,742	1.70	9,819	1.65	11,034	1.15	37,085	1.48
Horse-eye jack	83	1.83	2,157	1.55	390	1.22	1,558	1.00	4,188	1.40
Yellow jack	0	0.00	59	2.21	79	1.51	689	1.08	827	1.60
Jack Category	418	1.78	13,477	1.62	2,263	1.35	6,914	1.09	23,074	1.46
Parrotfishes	9,146	1.79	3,003	1.74	40,352	1.59	17,089	0.95	69,590	1.52
Groupers										
Coney	2,463	1.93	2,906	2.01	3,018	1.98	2,615	1.95	11,002	1.97
Red hind	7,403	2.15	7,598	2.35	14,354	2.28	18,690	1.98	48,045	2.19
Misty grouper	576	2.01	725	2.16	704	2.26	3,856	2.24	5,861	2.17
Nassau grouper	4,038	2.20	1,631	2.00	585	1.74	3,963	1.44	10,217	1.85
Yellowfin grouper	662	2.02	203	2.36	3,352	2.14	676	2.23	4,893	2.19
Grouper category	9,374	2.45	4,736	2.28	11,507	2.33	6,092	1.86	31,709	2.23
Mojarras	1,699	1.49	12,753	1.71	1,603	1.63	1,356	1.17	17,411	1.50
Snappers										
Lane snapper	17,531	2.23	6,436	2.34	71,943	2.09	27,240	2.01	123,150	2.17
Yellowtail snapper	56,443	2.28	33,649	2.26	51,303	2.06	35,174	1.75	176,569	2.09
Silk snapper	29,636	2.84	31,702	2.41	22,580	2.71	85,908	2.26	169,826	2.56
Mutton snapper	18,293	2.19	5,619	2.12	35,419	2.06	20,649	1.94	79,980	2.08
Queen snapper	1,633	2.85	6,518	2.98	8,784	3.25	110,064	2.17	126,999	2.81
Vermillion snapper	4,607	1.97	8,752	2.17	875	2.05	1,601	2.80	15,835	2.25
Wenchman	2,033	1.89	780	2.58	1,478	3.46	2,942	2.98	7,233	2.73
Blackfin snapper	2,504	3.06	539	1.75	1,631	2.80	5,270	2.59	9,943	2.56
Snapper category	5,469	2.12	6,410	2.18	16,251	1.91	7,867	1.90	35,998	2.03
Triggerfishes	9,272	1.47	3,402	1.62	18,259	1.77	11,064	1.18	41,997	1.51
Barracudas	848	1.24	3,896	1.34	4,080	1.43	2,452	1.11	11,276	1.28
Porgies	7,029	1.59	520	1.67	9,650	1.68	3,701	1.10	20,900	1.51
Snooks	4,338	1.57	18,977	1.42	6,706	1.45	6,982	1.35	37,003	1.45
Tarpon	0	0.00	1,228	0.98	0	0.00	1,208	0.69	2,436	0.84
Goatfishes	5,442	2.05	321	1.68	5,757	1.65	1,264	1.01	12,784	1.60
Sardines	461	0.71	12,041	0.95	976	1.26	3,468	0.85	16,946	0.94
Mackerel	12,206	2.35	10,377	1.63	30,759	1.65	27,555	1.65	80,897	1.82
Cero	12,460	1.99	3,473	1.68	15,052	1.43	4,639	1.67	35,624	1.69
Sharks	6,184	1.39	5,832	1.24	4,082	1.68	9,112	0.87	25,210	1.30
Wahoo	79	2.50	502	3.13	1,410	1.87	21	2.05	2,012	2.39
CLASSIFIED										
First Class	12,682	1.89	119	1.95	37,971	1.75	12,159	1.97	62,931	1.89
Second Class	652	2.05	142	0.33	30,423	0.84	11,873	0.88	43,090	1.03
Third Class	8,986	0.94	120	0.73	527	1.00	383	1.19	10,016	0.96
Trash	49	1.65	0	0.00	22	1.19	43	1.38	114	1.41
Other fishes	1,658	2.75	5,419	1.35	2,009	1.77	3,731	1.61	12,817	1.87
Total Fishes	346,804	1.90	274,185	1.87	596,354	1.88	704,591	1.64	1,921,936	1.82
SHELLFISH										
Conch	48,465	2.02	795	1.90	32,771	2.57	105,989	1.85	188,020	2.09
Land crab	193	9.15	279	4.92	386	5.03	761	8.25	1,619	6.85
Lobster	67,401	5.25	7,743	5.48	93,929	5.24	73,510	4.42	242,583	5.11
Octopus	603	2.50	240	1.80	24,137	2.38	1,496	1.90	26,476	2.17
Other shellfish	1,157	2.25	1,202	2.92	2,880	2.63	2,890	1.44	8,127	2.36
Total Shellfish	117,819	4.31	10,259	3.40	154,103	3.57	184,646	3.57	466,825	3.71
<b>TOTAL</b>	<b>464,623</b>	<b>2.07</b>	<b>284,444</b>	<b>1.75</b>	<b>750,457</b>	<b>1.90</b>	<b>889,237</b>	<b>1.70</b>	<b>2,388,761</b>	<b>1.84</b>

\* P/P = Average Price Per Pound in U.S. Dollar.

Table 1C . Landings reported by species and by coast in Puerto Rico during 2004.

SPECIES	NORTH POUNDS	*P/P	EAST POUNDS	*P/P	SOUTH POUNDS	*P/P	WEST POUNDS	*P/P	TOTAL POUNDS	*
FISH										
Tunas										
Blackfin tuna	530	1.93	317	1.73	216	1.53	27,940	1.60	29,003	
Little tunny	652	1.81	25	2.00	827	0.94	11,948	0.90	13,452	
Skipjack tuna	346	2.02	569	2.74	487	1.54	20,994	0.84	22,396	
Yellowfin tuna	562	2.05	503	2.84	98	1.57	14,390	1.11	15,553	
Tuna category	883	2.15	1,154	1.64	239	1.59	6,698	0.99	8,974	
Ballyhoo	2,138	1.29	5,872	1.33	13,692	1.15	5,087	1.05	26,789	
White Grunt	3,469	1.71	16,662	1.42	34,118	1.65	35,064	0.85	89,313	
Hogfish	277	2.89	17,057	2.19	12,065	2.74	10,477	2.48	39,876	
Trunkfish	471	2.89	11,580	1.53	16,200	1.67	24,076	2.00	52,327	
Dolphinfish	10,176	2.66	2,417	2.38	12,786	1.96	50,948	1.47	76,327	
Squirrelfishes	1,291	1.09	1,100	1.61	4,361	1.31	360	1.22	7,112	
Mullets	7,604	1.25	1,555	1.43	10,184	1.19	7,550	0.92	26,893	
Jacks										
Bar jack	4,403	1.92	5,805	1.41	8,880	1.61	14,715	1.08	33,803	
Horse-eye jack	701	1.73	85	1.92	126	1.32	988	1.05	1,900	
Yellow jack	8	3.00	30	1.13	142	1.41	526	1.44	706	
Jack Category	6,741	1.73	953	1.80	1,311	1.16	7,537	1.13	16,542	
Parrotfishes	1,404	1.97	5,644	1.67	31,256	1.64	13,375	0.91	51,679	
Groupers										
Coney	725	2.12	1,817	2.08	2,292	2.09	3,024	1.84	7,858	
Red hind	3,158	2.72	8,733	2.23	10,473	2.31	20,720	1.93	43,084	
Misty grouper	138	3.33	485	2.02	299	2.55	3,864	2.24	4,786	
Nassau grouper	313	1.98	1,539	2.31	285	1.52	2,093	1.51	4,230	
Yellowfin grouper	66	2.21	608	2.04	81	2.61	1,433	1.86	2,188	
Grouper category	2,264	2.57	6,262	2.23	10,034	2.31	7,377	1.92	25,937	
Mojarras	3,435	1.76	1,004	1.54	921	1.53	1,012	1.05	6,372	
Snappers										
Lane snapper	3,954	2.61	11,690	2.26	55,174	2.16	28,371	2.02	99,189	
Yellowtail snapper	36,374	2.52	44,235	2.31	37,542	2.15	32,475	1.86	150,626	
Silk snapper	17,133	3.13	8,701	3.01	9,799	3.44	83,233	2.98	118,866	
Mutton snapper	2,764	2.63	11,680	2.33	16,478	2.18	16,136	2.11	47,058	
Queen snapper	3,490	3.40	1,359	2.88	2,855	3.62	71,840	3.21	79,544	
Vermillion snapper	4,715	2.45	3,887	2.11	432	2.60	515	2.52	9,549	
Wenchman	473	3.12	709	1.89	619	3.53	4,476	3.25	6,277	
Blackfin snapper	446	3.33	697	3.15	664	3.49	1,586	2.68	3,393	
Snapper category	3,580	2.75	4,326	2.35	11,563	2.24	10,089	2.39	29,558	
Triggerfishes	2,309	2.02	8,790	1.45	14,009	1.79	18,002	1.22	43,110	
Barracudas	1,352	1.65	517	1.66	3,228	1.59	2,265	1.18	7,362	
Porgies	435	1.61	4,974	1.58	9,747	1.69	2,746	1.33	17,902	
Snooks	6,911	1.96	2,774	1.78	3,129	1.56	5,825	1.51	18,639	
Tarpon	564	1.07	0	0.00	8	1.00	180	1.70	752	
Goatfishes	292	1.82	3,921	2.04	3,183	2.04	868	1.12	8,264	
Sardines	11,067	1.02	476	1.13	478	1.00	2,263	1.13	14,284	
Mackerel	6,075	1.89	13,429	2.34	6,185	1.96	26,940	1.79	52,629	
Cero	2,501	2.15	5,023	2.34	7,921	2.01	4,301	1.96	19,746	
Sharks	3,397	1.83	6,130	1.90	1,732	1.79	3,826	1.29	15,085	
Wahoo	25	2.00	447	3.48	185	1.78	3,879	1.59	4,536	
CLASSIFIED										
First Class	33	2.00	11,711	2.05	1,922	2.02	8,289	2.00	21,955	
Second Class	0	0.00	2,102	1.69	3,396	1.28	6,529	0.94	12,027	
Third Class	8	1.00	8,026	1.15	215	1.50	0	0.00	8,249	
Trash	0	0.00	0	0.00	0	0.00	0	0.00	0	
Other fishes	2,943	2.10	924	2.09	2,684	2.02	6,590	1.83	13,141	
Total Fishes	162,596	1.90	248,304	1.60	364,521	1.56	633,420	1.43	1,408,841	
SHELLFISH										
Conch	60	3.50	57,772	2.50	25,679	3.31	132,529	2.13	216,040	
Land crab	194	13.80	884	15.00	86	9.43	237	2.59	1,401	
Lobster	3,734	6.61	47,796	5.96	70,085	5.96	90,611	5.31	212,226	
Octopus	608	2.46	841	2.87	16,934	2.59	1,789	2.09	20,172	
Other shellfish	856	2.10	586	2.09	2,523	2.02	2,035	1.83	6,000	
Total Shellfish	5,452	5.90	107,879	5.04	115,307	4.61	227,201	3.98	455,839	
TOTAL	168,048	2.03	356,183	2.16	479,828	2.09	860,621	1.96	1,864,680	

\* P/P = Average Price Per Pound in U.S. Dollar.

**Table 2.** Landings reported by municipality and by coast in Puerto Rico during 2002 – 2004

LOCATION	2002 POUNDS	VALUE	P/P*	2003 POUNDS	VALUE	P/P*	2004 POUNDS	VALUE	P/P*
<b>NORTH</b>	<b>407,614</b>	<b>924,476</b>	<b>1.97</b>	<b>284,444</b>	<b>607,131</b>	<b>1.75</b>	<b>168,048</b>	<b>390,451</b>	<b>2.03</b>
Isabela	14,194	42,275	1.97	2,436	4,463	0.87	854	2,781	3.08
Quebradillas	0	0	0.00	0	0	0.00	0	0	0.00
Camuy	2,961	6,060	1.56	4,150	8,284	1.15	4,070	7,822	1.88
Hatillo	1,799	4,860	1.30	1,464	3,694	1.22	993	2,964	1.27
Arecibo	27,627	70,325	2.43	31,816	78,502	2.13	20,771	54,172	2.37
Barceloneta	10,400	21,596	2.11	10,262	20,110	1.76	5,435	14,003	1.94
Manatí	9,797	20,274	2.00	2,711	5,703	1.84	0	0	0.00
Vega Baja	44,046	113,079	1.99	7,694	28,659	2.57	5,518	16,459	2.48
Vega Alta	18,665	35,554	1.80	14,020	28,004	1.41	5,962	14,482	2.05
Dorado	19,829	49,045	2.27	16,215	40,419	2.04	5,938	14,241	2.21
Toa Baja	494	1,738	1.90	560	862	1.18	766	3,099	2.50
Cataño	36,575	92,129	2.34	30,644	58,224	1.90	19,407	47,379	2.34
San Juan	90,814	207,983	2.12	83,735	178,499	1.90	55,475	126,592	2.13
Carolina	18,775	29,695	1.21	100	455	3.75	0	0	0.00
Loíza	63,302	112,898	1.38	57,966	106,821	1.42	20,381	37,560	1.31
Río Grande	33,791	73,895	1.74	18,845	40,363	1.47	19,976	43,277	1.55
Luquillo	14,545	43,070	2.15	1,826	4,069	1.52	2,502	5,622	2.04
<b>EAST</b>	<b>862,484</b>	<b>2,128,659</b>	<b>2.06</b>	<b>464,623</b>	<b>1,206,012</b>	<b>2.07</b>	<b>356,183</b>	<b>927,459</b>	<b>2.16</b>
Fajardo	148,734	381,739	1.81	124,849	370,598	1.87	92,087	275,993	2.06
Ceiba	67,367	172,332	1.99	51,836	131,553	1.94	43,386	102,706	1.94
Naguabo	119,255	279,401	2.22	83,516	201,053	2.04	66,529	168,206	2.52
Humacao	84,357	223,868	2.51	91,798	236,258	2.40	57,314	140,524	2.39
Yabucoa	48,592	98,739	1.74	28,502	59,290	1.68	7,995	16,093	1.23
Maunabo	13,776	27,290	1.65	6,754	16,133	1.82	5,116	13,495	2.72
Culebra	22,602	59,333	2.45	15,800	41,405	2.52	6,833	19,773	2.78
Vieques	357,801	885,957	1.86	61,568	149,722	1.78	76,923	190,669	1.88
<b>SOUTH</b>	<b>1,030,570</b>	<b>2,347,462</b>	<b>1.99</b>	<b>750,457</b>	<b>1,821,942</b>	<b>1.90</b>	<b>479,828</b>	<b>1,243,362</b>	<b>2.11</b>
Patillas	31,840	98,707	2.47	23,674	75,930	2.32	19,438	59,638	2.80
Arroyo	61,279	132,591	1.95	44,674	99,069	1.35	42,530	103,717	1.89
Guayama	106,913	288,691	2.02	97,657	286,195	2.16	80,128	226,130	2.19
Salinas	71,047	182,336	2.04	58,830	163,380	2.04	57,482	168,769	2.38
Santa Isabel	47,100	136,823	2.54	29,904	83,477	2.29	17,428	49,981	2.53
Juana Díaz	133,992	309,008	1.95	77,855	188,013	1.74	64,785	169,379	1.88
Ponce	87,322	170,907	1.83	98,058	209,654	1.51	45,079	101,013	1.82
Peñuelas	31,149	110,447	2.81	57,015	199,996	2.77	49,456	172,846	2.48
Guayanilla	60,270	87,978	1.13	28,771	42,755	0.94	16,087	28,273	1.38
Guánica	149,206	358,056	2.18	64,439	149,372	1.94	22,121	47,094	2.02
Lajas	250,452	471,918	1.79	169,580	324,101	1.73	65,294	116,522	1.68
<b>WEST</b>	<b>972,144</b>	<b>2,105,880</b>	<b>1.67</b>	<b>889,237</b>	<b>2,010,602</b>	<b>1.65</b>	<b>860,621</b>	<b>1,956,347</b>	<b>1.96</b>
Cabo Rojo	450,820	1,007,172	1.93	403,108	923,483	1.92	440,399	1,072,261	2.09
Mayagüez	100,485	198,852	1.67	82,421	173,471	1.74	84,606	193,260	2.04
Añasco	37,938	103,136	1.78	19,713	87,821	1.31	17,736	56,194	1.89
Rincón	147,533	444,880	1.52	176,202	524,522	1.44	113,719	339,463	1.96
Aguada	94,536	146,250	1.48	76,507	111,629	1.48	87,595	122,303	1.52
Aguadilla	140,832	205,590	1.09	131,286	189,676	1.00	116,566	172,867	1.34
<b>TOTAL</b>	<b>3,272,812</b>	<b>7,506,477</b>	<b>1.93</b>	<b>2,388,761</b>	<b>5,645,687</b>	<b>1.84</b>	<b>1,864,680</b>	<b>4,517,619</b>	<b>2.05</b>

P/P\* = Average Price per Pound in U.S.. Dollar



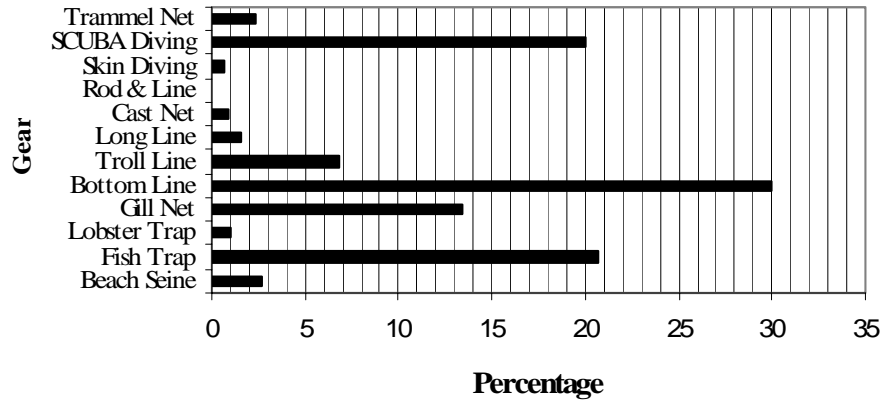


Figure 3. Percentage of landings reported by gear in Puerto Rico during 2002.

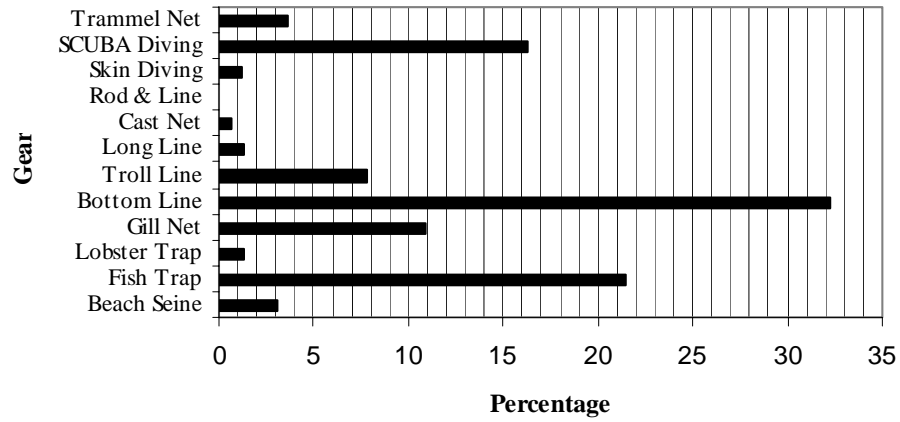


Figure 4. Percentage of landings reported by gear in Puerto Rico during 2003.

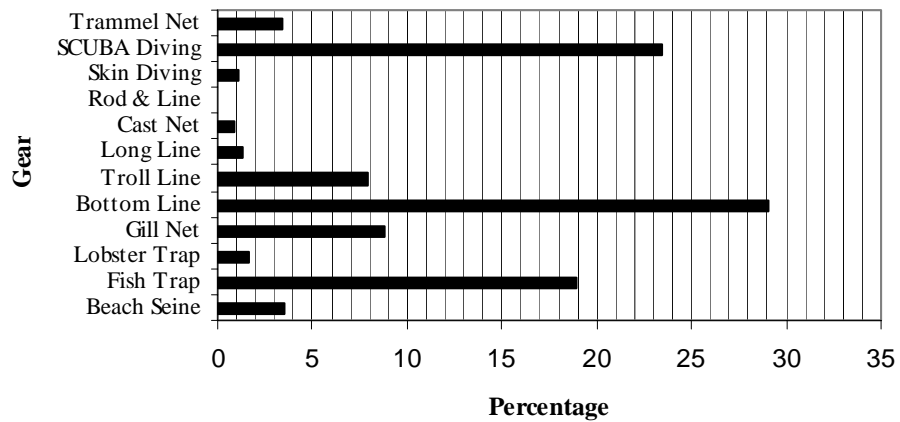


Figure 5. Percentage of landings reported by gear in Puerto Rico during 2004.

## DISCUSSION

### Commercial Landings Data

Commercial landings reported data from 1971 - 2004 are shown in Figure 6. On the other hand, Figure 7 shows the reported landings including the correction factor for under reported data. Figure 6 shows that commercial landings reported have been around two millions pounds from 1987 - 1994. On the other hand, throughout 1997 - 1999, it was observed that more fishers cooperated more with the Statistics Program, resulting in 3.8, 3.5 and 3.3 millions pounds reported. One possible reason to explain the increased landings would be the increases of 500 more active commercial fishers that cooperated with CFSP during 1987 - 1994. Also, the increase in participation occurred because the PRDNER and the Puerto Rico Department of Agriculture have provided economical help to fishers who regularly cooperated with the CFSP. When we compare the landings reported in late 1970s and early 1980s (around 5 million to 7 million pounds), with the reported landings of 1987 - 1996, an indication of overfishing is observed. During 2002 - 2004 it was a decrease in landings reported and in the addition of correction factor (Figures 6 and 7). However, the number active commercial fishers and their fishing vessels did not show major changes since 1971 - 2004. This decrease occurred for two main reasons. First, in March 12<sup>th</sup>, 2004, Hon. Luis E. Rodríguez-Rivera, then Secretary of the DNER, announced the implementation of the Puerto Rico's Fishing Regulations #6768. The regulations include legal minimum size for several species, closed seasons for other species and other management measures to protect the overfished resources. As a result of the fishing regulations commercial fishers became angry with the DNER. Then some commercial fishers organizations ask to their fishers thru newspapers, radio and television news broadcasted, to stop their participation in the CFSP. Approximately 50% of the fishers stopped to submit their trip tickets to CFSP. The second reason for this decrease is due to the fact that 2004 was a bad year for the fishery. Figure 7 shows that adding the under reported estimates in the correction factor, since 2002 - 2004, a landings decrease still observed. Matos-Caraballo (2004), mentioned that the Puerto Rico's fishery census at 2002, shows a reduction of approximately 600 active commercial fishers since 1996. This event occurred probably because of the decline in resources due to overfishing.

Landings by species for 2002 - 2004, showed that snappers, grunts, groupers, tunas, parrotfishes, mackerels, dolphinfish, and trunkfishes were the most reported fish groups by weight in the commercial fisheries. The most important shellfish were the lobster and queen conch. Due to the overfishing problems, most trap fishers targeted the spiny lobster as their main catch. On the other hand, most SCUBA divers targeted the queen conch.

During the last 15 years the author has observed and reported that over 90% of *Lutjanus vivanus* were caught

before reach the minimum size of sexual maturation (MSSM). During 2002 - 2004, and in 1998, silk snapper was the second most reported category reported; in 1999 it was the third. For 2002 - 2004, this category was the second most reported. The CFSP investigated the fishing village of Puerto Real, Cabo Rojo. During the 1980s the mentioned village had approximately 15 to 20 boats averaging over 40 in length, dedicated to the deep sea snapper fishery. The author discovered that approximately five of the mentioned boats are still active in this fishery. Interviewed fishers reported that the main cause that provoked the elimination of the 40 feet long > boats was that the silk snapper catch did not produce money enough to pay the fishing trip expenses. *Lutjanus vivanus* is now regulated with a minimum legal size (MLS) of 14 inches fork length in the DNER Fishing Regulations 6768. However, fishers recommended to the DNER Secretary to change this action to a closed season regulation. The MLS management action needs to be enforced immediately by DNER rangers, to stop the fast declining shown by this species.

The fish market of Saint Croix and Saint Thomas USVI, purchase the Vieques landings of *Acanthurus spp.*, *Holocanthus ciliaris*, *Pomacanthus arcuatus*, *Pomacanthus paru*, and many juvenile reef fish species. The mentioned species are subject to severe fishing pressure. Thus, the CFSP must continue to monitor the exploitation of these resources.

Since 1968 - 1999, the municipal-ity of Cabo Rojo and the west coast had been the most productive municipal-ity and coast respectively (Weiler and Suárez-Caabro 1980, Collazo and Calderón 1988, Matos-Caraballo and Sadovy 1990 and 1991, Matos-Caraballo 1993, 1998, 2000, and 2004). This trend continues although the landings have been decreasing. This result can be associated with the silk snapper fishery and the overfished resources of the west coast.

Various storms and hurricanes passed close to Puerto Rico during August and September 2002 - 2004. In August 22<sup>th</sup>, 2000, Hurricane Debby passed at 30 miles from Culebra Island, affecting the whole of Puerto Rico's coastal areas with surge wave action, winds, and rains which flooded some coastal areas. Tropical storm Jeannie, on September 15<sup>th</sup>, 2004, resulted in no electricity service for four days over 75% of Puerto Rico. These storms caused ocean surge action affecting negatively the fishing activity.

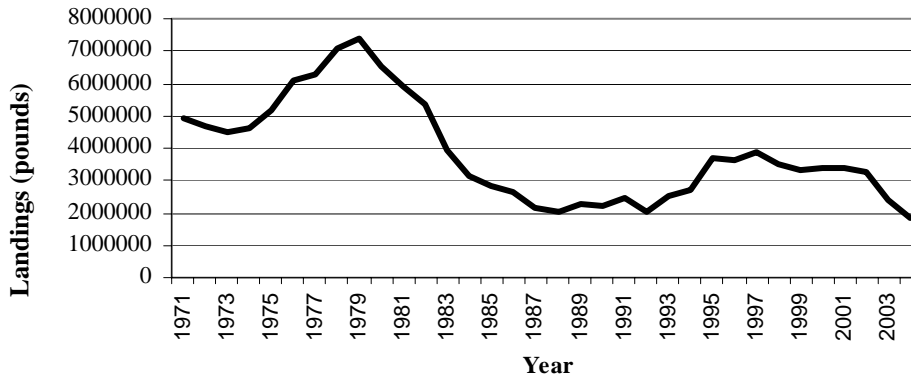
Landings by gear show that fish traps caught 19.6% of the total catch during 2002 - 2004, exceeded by line fishing (30.0%). This gear continued to show a decreasing trend in their catch percent-ages since 1982 (Matos-Caraballo and Sadovy 1990 and 1991, Matos-Caraballo 1992, 1993, 1995, and 2000), when fish traps alone caught 71.2% of the total pounds reported (Collazo and Calderón 1988). On the other hand, an increasing trend was observed in the percentage of reported landings taken by bottom lines and SCUBA divers. CFSP port samplers and principal

investigator observed that approximately 90% of the new and young commercial fishers are SCUBA divers. This observation resulted in the fact that diving was the third most productive gear in landings reported during 2002 - 2004.

The average CPUE during 2002 - 2004, shows an increase from 62 pounds landed per trip to 79 pounds in 2004. The year 2004, has been considered a bad year for fishing landings; also, an increase in the cost of the fishing vessels fuel was observed. Commercial fishers mentioned to CFSP personnel that they started to reduce the number of trips, selected the best weather conditions and increased the number of fishing hours, until obtaining the a good economic catch. The CFSP will continue to observe the CPUE trends.

**Commercial Biostatistical Data**

The total of 62,990 individuals (finfish and spiny lobsters) was measured during 2002 - 2004 and the 1,820 interviews by CFSP personnel will help to know the trends in the fishery populations by species. All this data will be analyzed by species in the near future by CFSP and by NMFS.



**Figure 6.** Commercial landings reported by year in Puerto Rico during 1971-2004.



**Figure 7.** Landings estimated in Puerto Rico including the correction factor during 1971-2004.

### CONCLUSION

Since 1987, Puerto Rico's reported landings of fish and shellfish have continued to be in the vicinity of 2 to 3 million pounds. In 1979, reports of landings in Puerto Rico recorded 7,212,000 pounds of fish and shellfish. During the decade of the 1980s, landings decreased consistently. During 2002 - 2004, reported landings were ranged between 3.2-1.8 millions of pounds of fish and shellfish. Even with the addition of the under reported landings using the correction factor a decreasing trend has been observed. The fishing gears that showed a trend to increase the landings percentage were the bottom lines and SCUBA divers. CPUE shown an increase trend in 2004, but fishers mentioned that they were more selective and increase the fishing time to capitalize the fuel expenses and economically improve their catch. After the analysis of these facts, it was concluded that during 2002 - 2004, several fishery resources in Puerto Rico have continued to decline although the fishery resources are not exhausted. The information presented in this report confirms the need for enforcement of DNER Fishing regulations 6768 by the DNER rangers. The mentioned action will result in the improvement of the Puerto Rico's overfished resources.

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