

Portrait of the Queen Conch (*Lobatus gigas*) in Puerto Rico During 1998 - 2013

Semblanza de la Pesquería de Carrucho (*Lobatus gigas*) en Puerto Rico Durante 1998 - 2013

Portrait de la Pêche au Lambi (*Lobatus gigas*) à Porto Rico au Cours de 1998 à 2013

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ABSTRACT

The Queen Conch (*Lobatus gigas*) has been a very important fishery in Puerto Rico since 1980s. Since the middle of 1980's the SCUBA divers fishers shown an increase in their number of active fishers and pounds landed. Currently they are most of the full time commercial fishers. The SCUBA divers primary target is the queen conch and lobsters, thus both species have been in the top five landed in Puerto Rico since 1988. The mentioned facts resulted in large fishing pressure on the queen conch.

The Puerto Rico's Department of Natural and Environmental Resources (DNER) has the responsibility of manage the fisheries resources in the Island. The DNER Commercial Fisheries Statistics Program (CFSP) has been collected landings, biostatistical and census data from commercial fisheries since 1968. During 1998 - 2013, an average of 201,325 pounds/year was reported in Puerto Rico by commercial fishers. The wholesale price represented an average of \$681,173 yearly. The retail sales of queen conch would be estimated in an average of \$2,000,000 million/year. The fishing pressure resulted in an overfishing resource. The DNER and NOAA fisheries established fishing measures to avoid the collapse of the fishery. Closed season was established for all Puerto Rico in 1996. Later since 2005, NOAA Fisheries established a total closure of queen conch on the United States Exclusive Economic Zone (9 - 200 nautical miles) around the Island. Currently the fishery of queen conch is limited at the Puerto Rico's territorial waters. This paper will show the landings (pounds), effort, price and marketing of queen conch during 1998 - 2013.

KEY WORDS: Puerto Rico, queen conch, commercial landings, management, socioeconomic

INTRODUCTION

The queen conch fishery in Puerto Rico started as food for the poor people whom were not able to pay for the first class fish. Jarvis (1932) mentioned that the marketing was bad for this species. The people at this period of time prefer this snapper and groupers. Jarvis (1932), also mentioned that the shellfish in general were considered that spoiled faster than the reef fishes. However, old commercial fishers mentioned that during the 1950s and 1960s, they caught queen conch for their own consumption using the boat's paddle in waters of 2 - 5 feet. The fishers mentioned to the authors that during the 1960 - 1970s the queen conch in shallow waters were abundant. During the 1960s and 1970s, the marketing of the queen conch improved to become an important commercial shellfish in Puerto Rico. During the 1980s, the queen conch was one of the favorites seafood served at the Puerto Rico' restaurants. Many young commercial fishers started to practice SCUBA diving to catch the queen conch. The municipalities of Vieques, Fajardo, Mayaguez, Cabo Rojo, Peñuelas, and Naguabo reported 80% of the queen landed in Puerto Rico during the mentioned period. Unfortunately, during the late 1980s, it was observed that this species was overfished. The shallow water populations were considered rare, and the SCUBA divers had to go deeper to obtain the minimum catch to be an economical successful trip. Because the SCUBA divers were going deeper to catch the queen conch and they did not follow the SCUBA safety regulations many of them die and or were physically disabled. During the 1990s it was determined that the Puerto Rico queen conch need to be regulated to protect the populations. The NOAA's Caribbean Fisheries Management Council (CFMC) and Puerto Rico's Department of Natural and Environmental Resources (DNER) established the closed season from July 1st to September 30th of each year. Later since 2014, the closed season was established from August 1st to October 31st each year. This paper will discuss the queen conch landings reports from 1998 - 2013.

METHODS

Commercial fishery landings data were collected from fishers, fish buyers, and fishing associations from around Puerto Rico. Commercial fishery statistics must be submitted to DNER/CFSP as a compulsory requirement of Law Number 278 (November 29, 1998) and PR Fishing Regulation 6768 (March 2004) and later for newest Fishing Regulation 7949 (November 24, 2010).

Port samplers and the principal investigator visited the 88 identified fishing centers in the 42 coastal municipalities including the islands of Vieques and Culebra (Figure 1). The data collection occurred from 1998 - 2013. Data were collected using a landing trip ticket system (Figure 2) on a monthly basis during the project. The Trip Ticket System (only one trip reported by one ticket) was established by the CFSP in 2003. Efforts were made to collect the following data:

- i) Fishing date,
- ii) Name of fish buyer, fisherman and/or helper (to avoid data duplication),
- iii) Fishing license number,
- iv) Municipality,
- v) Fishing center (municipality landing area),
- vi) Number of trips,
- vii) Gear type; fishing effort (hours spent fishing),

- viii) Weight in pounds by species or taxonomic family,
- ix) Market value to the fisherman (price in U.S. dol-lars/pound),
- x) Maximum and minimum fishing depth, and
- xi) 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 1985). A numerical system of species identification was developed to correspond with species codes used in Erdman's publication. Species reported not included in the mentioned publication are added and numbered by CFSP's principal investigator. Fishers usually landed fishes in the round (not eviscerated), except the deep water snapper and large grouper that they usually landed gilled and gutted. Lobster, oyster, and octopus were also landed in the round, and conch weights included meat only. However, this paper will analyze only the queen conch reported landings.

RESULTS AND DISCUSSION


Table 1 shows that a total of landings in pounds of queen conch reported by commercial fishers during 1998-2014, while Table 2 represents the landings as a percentage of total landings in Puerto Rico for this period. There was a total of 3.15 millions of queen conch caught for the mentioned period. The highest production per year occurred in 2001 with 326,467 pounds reported and the lowest was 2010 with 121,067 pounds reported (Table 1). During 2006 - 2010 a decrease in queen conch reported

landings was observed (Figure 3). On the other hand it was observed a trend to increase in the landings reported among 2010 - 2013. These trends probably occurred due to four facts. First, it was observed a decrease in the number of active commercial fishers (Matos caraballo and Agar, 2010). Second, during 2004, the DNER established the Fishing Regulations 6768 (Matos-Caraballo and Agar, 2010). Most commercial fishers were angry with the implementation of closed seasons, special permit to catch queen conch and lobsters Ifishers have to pay \$15/permit) and minnum legal sizes for various important commercial species. The result of this action discourage many fishers to report their catch to the DNER/CFSP (Matos-Caraballo, 2012). Approximately for year 2010, most fishers observed the benefits of the closed seasons and the fishing regulations and more commercial fishers started to report once more (Matos-Caraballo, 2012). The third probably reason of the trends was that during 2008 - 2010 the cost of the fuel was very high and the local economy in Puerto Rico was in a resession, thus the fishers reduced thir fishing trips resulting in decaese of the fishing pressure on the re-sources. The last fact that helped to explain the increase in the landings during 2010 - 2013, was that the closed season of the queen conch helped to improve the populations. SCUBA divers commercial fishers reported that they noted an increase in the number of the juveniles queen conch. The mentioned fishers believed that the close season has been successful. Thus, the commercial fishers are guiding other fishers to execute all the fishing regulations.

The average price of the queen conch per pound was \$2.22 in 1998 and increased to \$4.95 in 2014 (Figure 4).



Figure 1. Map of Puerto Rico.



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PROGRAMA DE ESTADÍSTICAS PESQUERAS
SISTEMA DE UN BOLETO POR VIAJE

Fecha del desembarco: ____/____/____

Pesca: Diurna Nocturna

Reportado por: Pescadería Pescador

Municipio de desembarco: _____ Centro de desembarco: _____

Nombre del peseador: _____ Número de licencia (1) _____

Nombre del pescador (2) _____ Número de licencia (2) _____

Nombre del pescador (3) _____ Número de licencia (3) _____

Número de teléfono: _____ Profundidad donde ocurrió la mayor captura _____ (for seas)

Registro de embarcación: _____ Área de captura: _____ (puede ser más de un área).

Número Permiso si aplica: HIMS _____ Pesca capturada una distancia de la costa: _____ Si pescó con redes o capones ¿cuántos días estuvieron sumergidos? _____

Mayor _____ (9 millas)

Menor o igual a _____ (9 millas)

CLASE DE PESCADO	PESO	PRECIO POR LIBRA	ARTES	HORAS PESQUERO	CANTIDAD O TAMAÑO DE ARTES	CLASE DE PESCADO	PESO	PRECIO POR LIBRA	ARTES	HORAS PESQUERO	CANTIDAD O TAMAÑO DE ARTES
PELAGICOS						PARGOS Y MEROS DE AGUAS PROFUNDAS					
(219) JUNCO (Yellowfin)						(142) BEBUDO (Vermilion Snapper)					
(229) BACORA (Skipjack tuna)						(143) CARTUCHO (Queen Snapper)					
(228) BONITO (Blackfin tuna)						(139) CHILLO (Silk Snapper)					
(230) VACA (Little tunny)						(144) MUYAMA DE AFUERA (Caroline Snapper)					
(720) PATUDO (Bigeye tuna)						(141) CHOPA NEGRA (Black Snapper)					
(27) ATUN BLANCO (Skipjack)						(138) NEGRA O AL NEGRA (Blackfin Snapper)					
(225) ATUNES (Familia)						760 NEGRO QUE J. DEL HONDO (Yelloweye snapper)					
(128) DORADO (Dogfish or Marlin)						(086) MERO GUASA (Misty grouper)					
(232) PETO (Wahoo)						PR-120 (Atlantic Sharpnose)					
TIBURONES						PECES DE ARRECIFE					
(005) TIBURONES (Familia)						(079) MERO S (Groupers)					
(010) TIGRE (Tiger Shark)						(083) CABRILLA (Red Hind)					
(116) COHUALACABOS (SMALL SHARKS)						(091) GUAJIL (Yellowfin Grouper)					
Añot Especies mano						(080) MANTEQUILLA (Coney)					
(012) LIMON (LEMON SHARK)						(130) PARGOS (Familia) (Snappers)					
(002) MUYA (SHARK)						(136) ARRAYADO (Lane Snapper)					
(003) TIBURON (SHARK)						(140) COLIRRUBIA (Yellowtail snapper)					
Añot Especies mano						(134) SAJA (Jutton snapper)					
MARISCOS						(06) PARGO MULTO (Giant Snapper)					
(206) CALAPAJES (WRIGLES)						(189) CAPITAN (Hogfish)					
(241) CARRUCHO (Cooch)						(256) CHARINES (Thunifishes)					
(004) JUEY DE TIERRA (Land Crab)						(064) GALLOS (Squidfish)					
(001) LANGOSTA (SCUD CRUSTACEAN)						(192) LOROS (Parrotfish)					
(003) CANGREJO DE CAROL (Coral Crab)						(251) PEJE PUERCO (Queen triggerfish)					
(002) PULPO (Octopus)						(00) PIGUI PIGUI o PIGUILLA (Squilla family)					
(003) OTRO MARIPOSA (Other shellfish)						(164) PULMAS (Porgies)					
CARNADA Y ESPECIE DE BAJURA						(176) SALICANTE ABRILLO (Wing garfish)					
(036) BARDINAS (Sardines)						(175) SALICANTE COLORADO (Spot tail garfish)					
(085) BALAJU (Bajuncho)						(106) JURELES (Familia) (Jackies)					
(199) JAREA (White Mullet)						(115) COJINUA (Bar Jack)					
(147) MOJARRAS						(162) RONCO S (Familia) (Grunts)					
(078) ROBALOS (Snooks)						(118) JUREL OJON (Horseeye Jack)					
(936) CALAMAR (Squid)						(234) SIERRA ALASANA (Cero Mackerel)					
(908) CAMARON (Shrimp)						(233) SIERRA CARITE (Kingfish Mackerel)					
Añot Especies mano						(648) PEZ LEON (Lion Fish)					

Figure 2. Puerto Rico's Commercial Fisheries Statistics Program Trip Ticket.

The price increase was approximately 46% in 15 years. Historical landings records shows that queen conch was in the top five species landed in Puerto Rico since 1988 (Matos-Caraballo 2012). Figure 5 shows that the north coast landed less queen conch than any other coast since 1998 - 2013. The north coast is the less productive fishery coast in Puerto Rico, because the platform it is very narrow and trade winds discourage the fishing activity (Suarez-Caabro 1979). On the other hand, the west coast reported the highest number of pounds landed of queen conch since 1998 - 2013 (Figure 5). The west coast increase the number of SCUBA divers that fished queen conch and lobsters, the young fishers that entered the fishery are SCUBA divers.

Queen conch landings by month do not shows any regular pattern since 1998 - 2013. However, January, February, March and April, October and November, shows higher landings. This peaks occurred for two reasons. First, during the January – April occurred the tourist high season and the religious celebration of the lent, resulted in month with high queen conch demand. Second, during october (1996 - 2012) finished the queen conch closed season and the effort on the species is high. Some times the CFSP personnel reported that during November and December some fishhouses established a quota of 20 pounds/per/trip because the abundance is high after the closed season and the marketing is slow because during Christmas Puerto Ricans traditionally eat more turkey and pork.

CONCLUSIONS

The queen conch landings reported since 1998 - 2013, shows that this resource it has been stable. The commercial fishery of this important shellfish shows that after the establishment of the closed season started to improve their populations. The fishery regulations by DNER and NOAA/CFMC that includes permanent close of this fishery on Exclusive Economic Zone (EEZ) helped in the conservation of this species. Also, the commercial fishers that follow And support the fishing regulations were important part of this success.

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Table 1. *Strombus gigas* Landings Reported by year in Puerto Rico

YEAR	POUNDS	*P/P	Pound % compared with 1998
1998	260,990.00	2.22	100.00
1999	213,739.00	2.25	81.90
2000	261,702.00	2.23	100.27
2001	326,467.00	2.44	125.09
2002	235,608.00	2.62	90.27
2003	188,020.00	2.09	72.04
2004	216,040.00	2.86	82.78
2005	195,553.00	3.14	74.93
2006	201,491.00	3.72	77.20
2007	143,653.00	3.78	55.04
2008	131,243.00	3.83	50.29
2009	122,660.00	4.01	47.00
2010	121,067.00	4.34	46.39
2011	161,377.75	4.63	61.83
2012	135,065.50	4.71	51.75
2013	235,167.00	4.8175	90.11

Table 2. *Strombus gigas* (%) compared with the total of Landings Reported by year in Puerto Rico

YEAR	EAST	NORTH	SOUTH	WEST
1998	11.59	0.49	4.30	10.27
1999	8.00	0.37	4.05	9.95
2000	14.77	0.38	3.74	13.16
2001	10.41	0.43	4.06	17.57
2002	13.71	0.29	3.66	8.07
2003	10.43	0.28	4.37	11.92
2004	16.22	0.04	5.35	15.40
2005	15.11	0.34	5.04	16.66
2006	16.57	0.20	4.54	14.32
2007	17.53	0.52	10.98	11.74
2008	19.26	1.33	7.51	10.95
2009	15.18	0.80	5.00	14.02
2010	15.88	0.92	5.72	13.50
2011	18.44	1.52	5.67	14.76
2012	7.80	0.68	2.49	7.30
2013	37.96	1.61	8.48	22.42

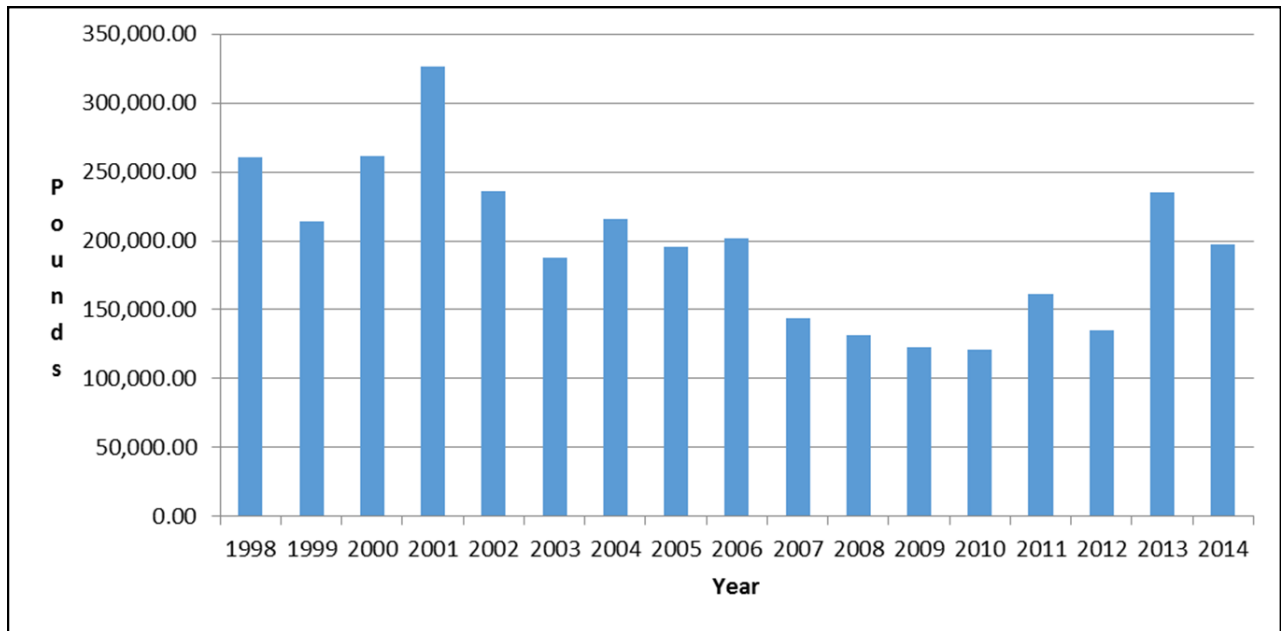


Figure 3. Queen conch commercial reported landings in Puerto Rico 1998 - 2014.

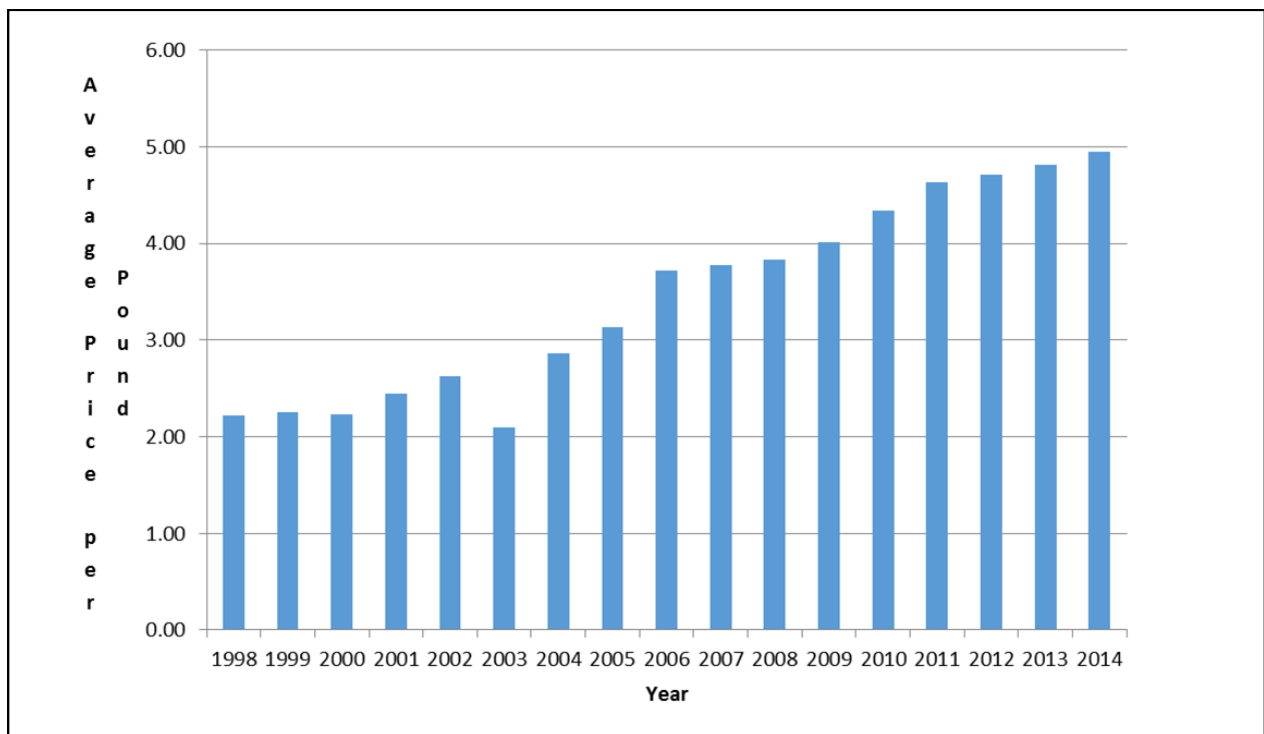


Figure 4. Queen conch average price per pound yearly reported by commercial fishers in Puerto Rico during 1998 - 2013.

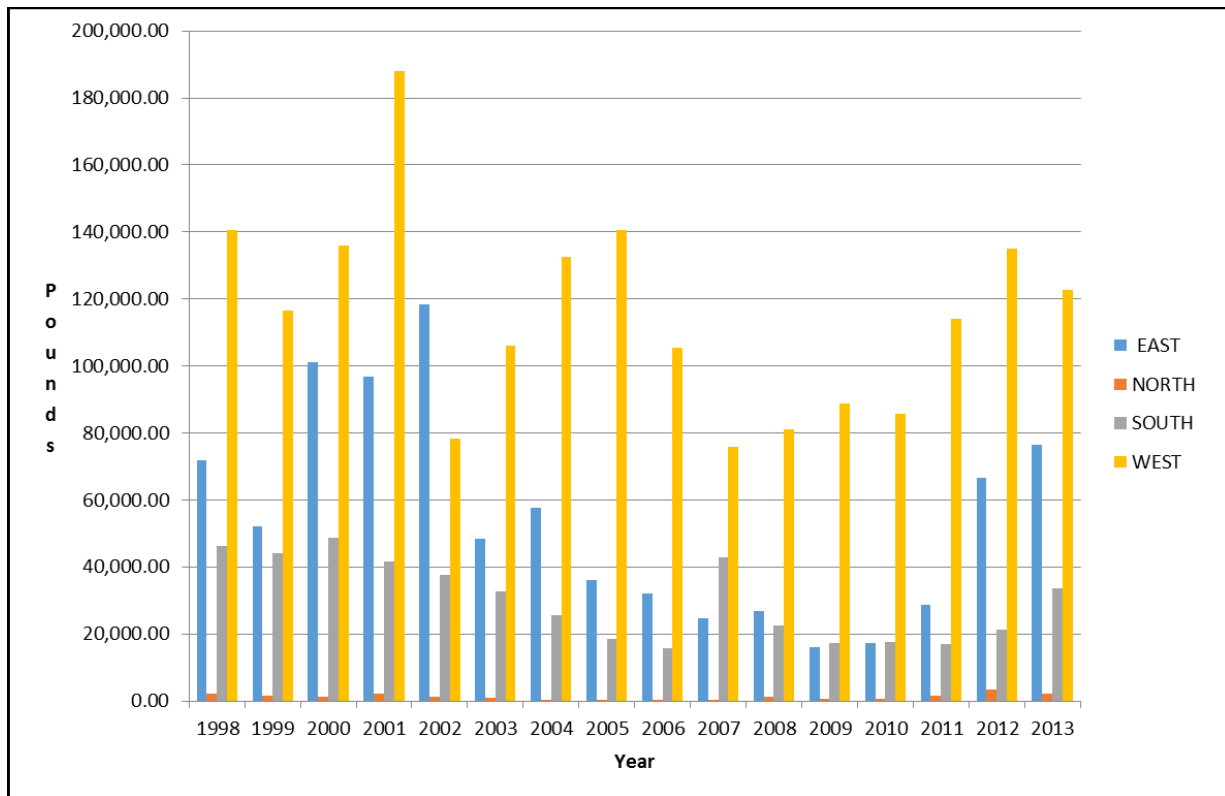


Figure 5. Queen conch commercial landings reported by coast in Puerto Rico during 1998 - 2013.