Status of the Fisheries and Regulations Regarding Queen Conch in Jamaica in 1996

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ABSTRACT

The Jamaican fishery for the queen conch, *Strombus gigas*, is the largest in the region at the present time, and this has been so since 1991 when exports surpassed those of Mexico. During the 1995/96 season the quota was 1,900 tonnes, and a quantity just below this figure was harvested under the terms of conch quotas issued by the Fisheries Division. The National Total Allowable Catch (NTAC) system of managing the fishery operated successfully in the 1995.96 season and minor adjustments are recommended with reasons for these changes to the conch fishery management plans discussed. Illegal foreign fishing for conch on Pedro Bank by Honduran vessels was a continuing problem. Although still to ratify the CITES, all necessary institutional, operational and reporting requirements under the CITES have been implemented. Management changes for the 1996/'97 season include: 1) annual quota reduced by 100 tonnes to 1,800 tonnes, 2) Jamaica to ratify CITES, 3) no new licenses issued for industrial conch fishing, and 4) protection of Pedro Bank from illegal foreign conch fishing (poaching) through the establishment of a joint Coast Guard/Fisheries Division offshore base. Among the suggestions for future changes in management are: 1) reduction of total harvest to 2/3 MSY by year 2005 AD, 2) closure of critical (deeper) conch areas on Pedro Bank, 3) identification and protection of conch nursery area(s) on Pedro Bank, and 4) consideration of ban on conch fishing with SCUBA gear.

KEY WORDS: Catch quotas, conch, fishery management, Jamaica

INTRODUCTION

The Jamaican conch *(Strombus gigas)* fishery is a relatively new fishery which has seen rapid development beginning as a rather diffuse artisanal conch fishery, to the current mainly industrial one, now with diver-equipped vessels averaging 23 m LOA, operating mainly on Pedro Bank (Figure 1). There is still a small scale conch fishery operating simultaneously. The conch fishery has been described by Mahon *et al.* (1992) and Mahon *et al.* (in press), but a short summary would include the following. The conch fishery is comprised of three

categories of fishers. Firstly, small-scale fishers resident on the Pedro Cays (Pedro Bank) who free-dive nearby to about 15m. Carrier or collector vessels transport cleaned meats from the cays to Kingston mainly. The second group is small-scale fishers who travel from the island to the Pedro Cays to dive with SCUBA near the cays or to dive for conch on the southern island shelf. The third group is the industrial fishers operating vessels with a mean size of 23 m LOA with up to 20 divers (most average approximately 10 divers) all over Pedro Bank to approximately 25 m depth. Catches are taken to Kingston for processing. It is this component which has shown the most rapid growth and which is the basis for the increased catches. Local demand for conch has historically always been small and thus nearly all conch landings are exported.

There have been large increases in processed conch exports from Jamaica since 1991 with matching rises in foreign exchange earning for the country. Jamaica has been since 1991, the major queen conch producer in the Caribbean in a market worth some US$60 million per year (Chakallal and Cochrane, 1996).

A preliminary study of the conch stocks on Pedro Bank, the main fishing ground was conducted in 1991 by the CARICOM Fisheries Resources Assessment & Management Project (CFRAMP) and the University of the West Indies (UWI) in conjunction with the Fisheries Division (Mahon *et al.*, 1992). That study provided an approximate estimate of the biomass and the maximum sustainable yield (MSY) for conch on the main grounds (Mahon *et al.*, 1993).

A stock assessment based visual survey of the Pedro Bank queen conch stocks was conducted by a team from the Fisheries Division, the University of Puerto Rico and the CFRAMP (Appeldoorn, 1995). Estimates of conch density on Pedro Bank, the main fishing ground, (see Figure 1) by Appeldoorn (1995) are a remarkable 10 to 100 times that on most other Caribbean conch fishing grounds (Table 1). The stock consists of a large percentage of stoned conch (older than five years), although younger conch comprise the bulk of current catches. A similar density of adult queen conch (160 individuals/ha) was reported by Weil & Laughlin (1984) from a fished area in the Los Roques archipelago off the Venezuelan mainland. These authors found a density in the Los Roques National Park, (a protected area) between 1981 and 1983, some 11 times greater than that found on Pedro Bank. This finding also gives some credence and support to the benefits of setting aside a part of the Pedro Bank as a protected area or reserve. The Jamaican conch fishery has a history of cooperative management between the larger producers and the Fisheries Division, especially since 1991/1992. The artisanal fishery remains essentially unmanaged.

PRODUCTION AND EXPORTS

Jamaica has quickly become a large exporter of conch in the Caribbean

(Appeldoorn, 1994) and since 1992 has led the region in exports. Figure 2 shows the rise in exports from negligible levels in 1979 to at least 1,865 tonnes in the recently completed 1995/96 conch season. The season runs from November to June annually. The history of the export of conch is quite dramatic, as shown in Figure 2. In 1989 approximately 100 tonnes of conch was reported as exported by Jamaica, but only 49 tonnes of this total is recorded as going to the United States (Mulliken, 1996). It would appear that since about that time, Jamaican conch has been exported to France and this mostly occurs via Martinique. The extent of this market shift has only recently been recognized (Aiken & Kong, in press). In 1990, (see Figure 2) conch exports increased to approximately 800 tonnes. Catches rose sharply from 1991 to 1993, when production rose to an all time high of at least 2,000 tonnes of processed conch (*Strombus gigas*) meat indicated by this amount of exports alone (see Figure 2) which were recorded from CITES sources. The processing loss for conch in Jamaican plants was about 40% and has now been reduced to an estimated 30% at the time of writing.

As shown in Figure 2, at the end of the 1993/94 conch season, Jamaica exported 2,051 tonnes of conch meat, valued at US$8.9 million (data from the Statistical Institute of Jamaica. The 1995 export figure (after the closed of the 1994/95 season, is 2,132 tonnes with a value of US$10.6 million. This value is based on the majority of the conch exports going to France wia a value of US$2.25/lb (=$5.0/kg).

Table 1. Adult queen conch density estimates in the greater Caribbean.

LOCATION	DENSITY (#/Ha)	SURVEY DATE	REFERENCE
Bermuda	0.52	1988	Berg et al. (1992a)
Florida Keys	0.50	1987/88	Berg et al. (1992b)
Bahamas			
Exuma Cays (fishery reserve)	103.86	1994	Stoner and Ray (1996)
Exuma Cays (fished area)	25.06	1994	Stoner and Ray (1996)
Grand Bahama Bnk.	20.79	1983/84	Smith and Van Nierop (1984)
Little Bahama Bnk.	28.50	1983/84	Smith and Van Nierop (1984)
Puerto Rico	8.11	1985/86	Torres Rosado (1987)
U.S. Virgin Islands			
St. Thomas	11.79	1990	Friedlander *et al.* (1994)
St. Thomas	9.70	1981	Wood and Olsen (1983)
St. John	12.64	1990	Friedlander *et al.* (1994)
St. Croix	7.60	1981	Wood and Olsen (1983)
Pedro Bank, Jamaica	170.17	1994	Appeldoorn (1995)
Los Roques, Venezuela			
(fished)	160	1981/83	Weil and Laughlin (1984)
(unfished)	1,886	1981/83	Weil and Laughlin (1984)

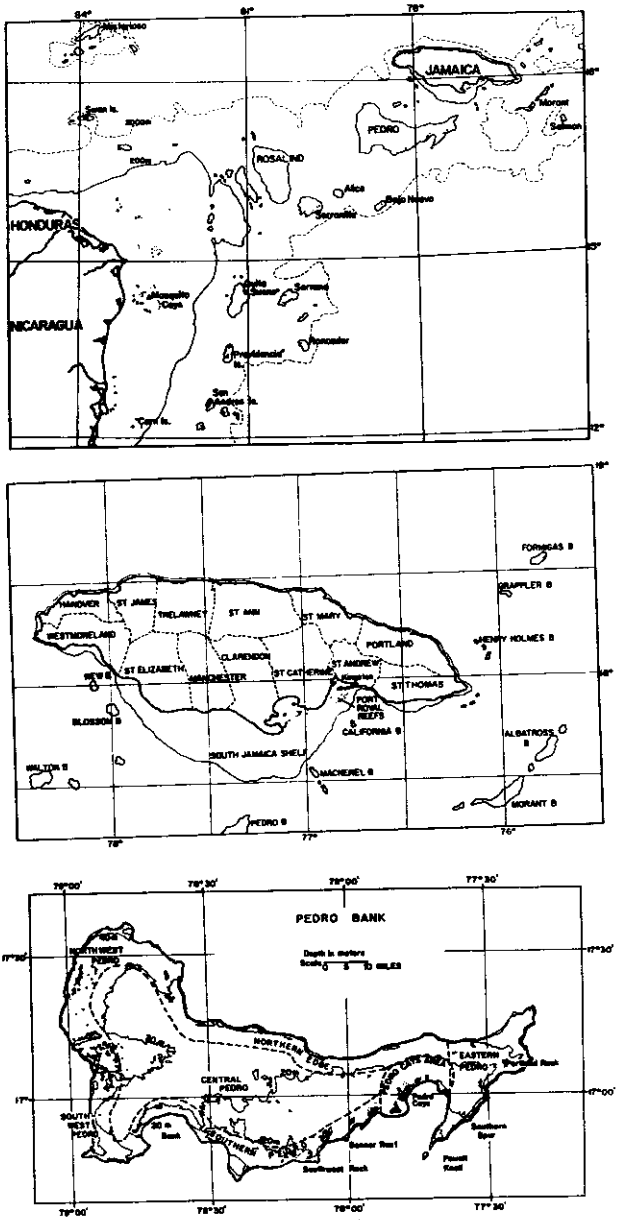

Figure 1. Map of Jamaica, nearby oceanic banks, and Pedro Bank, the main industrial conch fishing ground (-100m bathymetric contour shown)

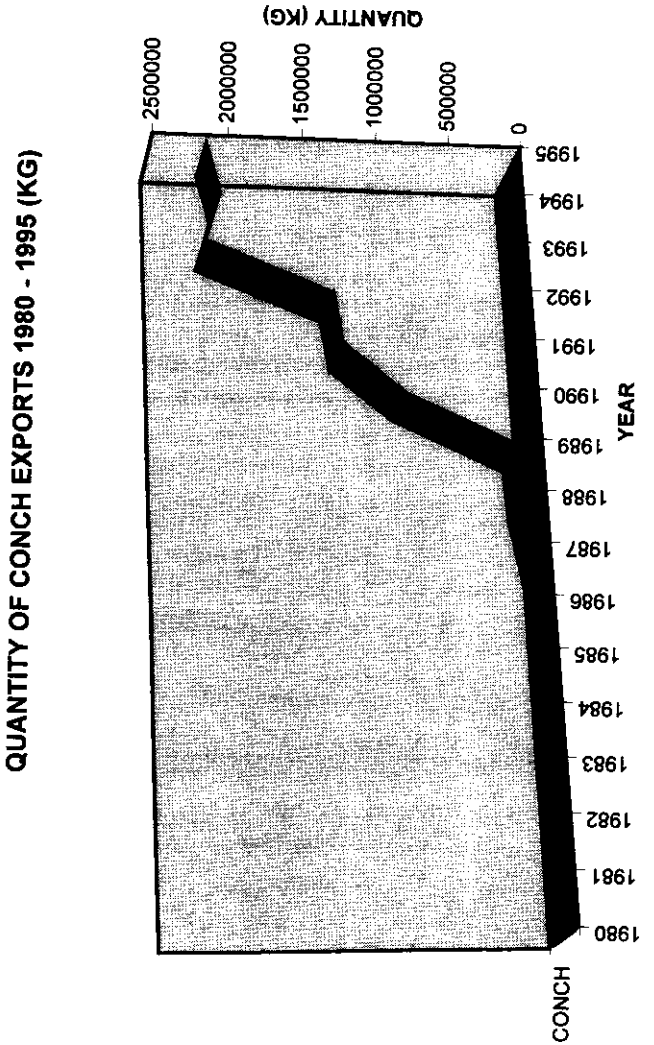

Figure 2. Jamaica conch exports 1979-1995/96 seasons

Table 2. US imports of Jamaican conch 1989-1994 (From Mulliken, 1996)

Year	1989	1990	1991	1992	1993	1994
Imports (tonnes)	49.2	204.1	340.5	453.3	582.5	402.2

THE OPERATION OF THE FISHERY IN 1995/'96 SEASON

The fishery produced in the 1995/96 season from November to June, 1,860 tonnes of whole meats, which is just 40 tonnes short of the annual quota (NTAC or National Total Allowable Catch). There was a total of 14 licenses issued in the season and there was a total of 14 conch industrial vessels. Problems encountered were selling of quotas by companies to other companies already in possession of quotas. The lack of proper enforcement and erratic data collection were other problems encountered. Achievements included the submissions by industrial operators of logbooks and a slight reduction in the overall catch from the previous season.

Data collection system

Figures for the conch fishery, believed to be accurate are available on request from processors. Since the end of 1995, a pilot system for the routine collection of catch and effort data, including conch fishery data, has been conducted by the Fisheries Division. Some conch production figures have also come from import records of US customs, CITES documentation and private interviews with conch processors.

Newly published reports which included US imports of conch from Jamaica (Mulliken, 1996), showed a change from 49 tonnes in 1989 to 204 tonnes in 1990 to 340 tonnes in 1991, 453 tonnes in 1992, 582 tonnes in 1993 and finally 402 tonnes in 1994 (see Table 2). These figures of Jamaican conch exports were said to be not reflected in US CITES annual report data. Mulliken (1996) reports that in 1993, France (a CITES signatory) imported 250,000 conch "bodies" from Jamaica. Jamaica will probably ratify the CITES agreement in 1996 making more data available to researchers.

There is a growing body of information on the Jamaican conch fishery (see Appendix A) which is assisting with the development of suitable regulation and management of the resource. There has been a first accurate ground survey-based estimate of MSY for Pedro Bank conch (Appeldoorn, 1995), for all three depth zones exploited 0 - 10 m, 10 - 20 m, 20 - 30m and this estimate is 1,818 tonnes/year. This estimate deliberately does not consider the deeper (> 30 m resources), and these deep conch are probably functioning as additional spawning

stock. The 1993 catch rates were equivalent to an exploitation rate of 2.08 tonne/km^2 which is higher than the estimated MSY. By comparison, Ninnes (1994) estimated the potential yield of Turks & Caicos Island conch to be (averaged for the bank) 0.087 tonne/km^2. It was agreed in 1995 that there will be a 100 tonne reduction in the quota each year until 2,000 AD to attain 1,500 tonne/year., starting with the 1995/96 season.

Regulations

The regulations in force for the conch 1995/96 season ending in June, 1996, are shown in Table 3. They indicate that the fishery is managed by control over licensing conch fishing operators/processors and conch vessels and also (more indirectly), by monitoring conch exports. Importantly, there is a close season annually from July to October inclusive. Figure 3 shows that there is a system of National Total Allowable Catches (NTAC) which is modified annually to reflect the 1995 estimate of potential and maximum sustainable yield and the ultimate management objective of 2/3 MSY by 2001/2002 season. The MSY was estimated at 1,818 tonne/year and it follows that by the 2000/2001 season, the NTAC should be as close as possible to 1,365 tonne/year or 2/3 MSY. One other management objective which is generally agreed upon is the goal of regulating fishing effort at $F_{0.1}$. This regulation however, must be based upon good estimates of fishing mortality (F) and further research on this and other aspects of queen conch population dynamics is needed.

Related to conch management, is the declaration in 1996 that Jamaica has agreed to become a signatory to CITES, suggesting that she will observe the CITES rules and regulations relating to trade (exportation) in conch. This is quite important to the management of the fishery as one of the most significant CITES regulations relate to production and export data collection and reporting to CITES every year.

Table 3. Conch Management Measures 1995/96 Season

1.	No new licenses for industrial conch fishing
2.	Annual quota is 2,000 tonnes
3.	No new conch vessels licensed
4.	Close season increased to four months (July to October inclusive)
5.	Jamaica to become signatory to **CITES**.

Changes in Regulations

Aiken and Kong (in press) suggested slight modifications to the management plan for conch in 1995 and also made recommendations for long-term management for the fishery. All the management plans for the Jamaican

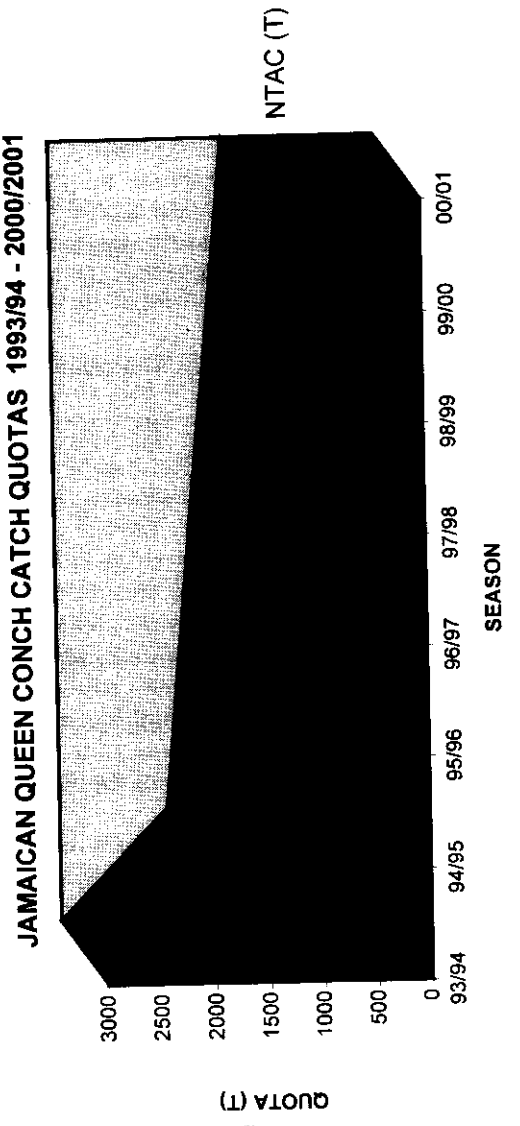

Figure 3. Changes in NTAC (National Total Allowable Catch) for the 1993/94 through 2000/2001 fishing seasons

conch fishery are generally in keeping with the Acceptance of the Precautionary Approach to Fisheries (FAO, 1995).
Suggestions for changes in the regulations in the near future are provided below (Table 4).

Table 4. Suggested Changes in Management Regulations

1. Ban on **Scuba** gear (This allows the retention of hookah gear, but effectively the fishery becomes limited to between 15 - 20 m)
2. Total harvest to be reduced to 2/3 MSY by year 2005 at the latest (or $f_{0.1}$).
3. Introduction of 224 g whole meat (unprocessed) minimum weight limit
4. Protection of Pedro Bank conch from foreign fishing (poaching) by joint Coast Guard/Fisheries Division. Establishment of an offshore base on the Pedro Cays
5. Closure of critical areas on Pedro Bank (e.g. All areas deeper than 30 m to protect mature spawning stock)

The benefits of most of these measures are discussed in Aiken and Kong (in press). In Jamaica, one of the more difficult measures to contemplate is the banning of the use of SCUBA gear for conch fishing. This is potentially problematic due to the significant investment by conch fishers, especially that sector which fishes by travelling from the island shelf to fish conch on Pedro Bank with SCUBA gear. However, as pointed out in a review by Espeut (1995) of the injuries and state of training of Jamaican SCUBA-diving conch fishers, many crippling and lesser injuries commonly occur. Also, SCUBA diving for conch allows overexploitation to rapidly occur (Appeldoorn, 1987; Rattier and Battaglya, 1994). Regional countries that have seen fit to ban SCUBA conch fishing include all members of the Organization of Eastern Caribbean States (OECS), Martinique, and Belize.

These suggestions for management changes are believed to best represent a compromise between our current state of knowledge of the biology of the queen conch in Jamaican waters and the socio-economic features characteristics of the fishery.

Other Developments

The construction of the long-awaited offshore anti-poaching base on Pedro Bank began in summer of 1996 when the foundations were laid on North-east Cay, one of three cays on the eastern fringe of Pedro Bank. This base will be jointly operated by the Jamaica Defence Force Coast Guard and the Fisheries Division. The base will be completed by mid-1997.

There is interest in the assessment of the offshore conch stocks in the Colombia/Jamaica Joint Regime Area in the southwest Caribbean. The first

cooperative oceanic bank finfish assessment between those countries took place at Alice Shoal (approx. 300 km to the southwest of Kingston) between 1995 and 19996 and there is agreement to assess other valuable fishable resources including conch.

FUTURE NEEDS

There is generally a shortage of information needed for sustainable management of the conch resources of Jamaica. These are set out in Table 5 and are listed as follows:

Table 5. Future Information Needs for the Conch Fishery

1.	Collection of accurate total landing statistics
2.	Estimation of degree of under/over-reporting
3.	Identification of all artisanal conch landing sites
4.	Monitoring island conch landings
5.	Conduction of a one-year conch fishery study for biological and socio-economic purposes
6.	Accurate assessment of the spawning season
7.	Determination of catch per unit effort for the artisanal conch fishery
8.	Conduct a mark-recapture study to determine "M " on Pedro Bank
9.	Refinement of first estimates of "F"
10.	Determination of sexual dimorphism to assess preferential harvest rates.

DISCUSSION

The conch fishery in Jamaica has shown some signs of the effects of the reduction of the annual quotas by 100 tonnes over the previous season. There is need for the refinement of estimates of populations parameters, such as F and M. There are a number of recommendations for future studies that serve in part to identify the gaps in the levels of existing knowledge of Jamaican conch. An important suggestion is the validation of data collected in logbooks and by the catch and effort data collection scheme. This is the very foundation of the proper management of the fishery. Control of the selling of quotas is a genuine problem that also needs to be addressed. New management suggestions include the introduction of a 224 g (unprocessed whole meat) minimum weight limit and the banning of SCUBA gear (but retention of hooka gear). These last regulations are in keeping with several other regional countries that have moved to ensure sustainable harvesting of conch stocks.

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