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CRFM Fishery Report 2006

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National Reports

Report of Second Annual Scientific Meeting -
Port of Spain, Trinidad and Tobago, 13-22 March 2006

CRFM Secretariat,
Belize & St. Vincent and the Grenadines
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Foreword

The 2006 CRFM Annual Scientific Meeting took place during 13-22 March 2006. During this Meeting, CRFM Resource Working Groups completed eleven of those analyses that were approved by the Third Annual Meeting of the Caribbean Fisheries Forum: queen conch fisheries of Jamaica, The Bahamas, Turks and Caicos; spiny lobster fisheries of the Bahamas and St. Lucia; the shrimp fisheries of Trinidad ad Tobago; the Atlantic Seabob fishery of Guyana; the lane snapper fishery of Trinidad and Tobago; the red snapper fishery of Guyana; the king mackerel fishery of Trinidad and Tobago; the dolphinfish fishery. The Meeting also reviewed and adopted the Report of the First Meeting of the Ad Hoc Working Group on Methods, with amendments.

The Report of the 2006 CRFM Annual Scientific Meeting is published in two Volumes: Volume 1 contains the proceedings of the plenary sessions and the full reports of the CRFM Resource Working Groups that met during 2006. National reports, which had been submitted for consideration by the Working Groups, are published as Supplement 1 to Volume 1, while the Report of the First Meeting of the Ad Hoc Working Group on Methods is published as Supplement 2 to Volume 1. Volume 2 contains the fishery management advisory summaries, which are the same as the first 7 sections (sections 1 to 1.7) of each of the fishery reports. Volume 1 is therefore intended to serve as the primary reference for fishery assessment scientists, while Volume 2 is intended to serve as the main reference for managers and stakeholders.

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LIST OF ACRONYMS AND ABBREVIATIONS

CARICOM	Caribbean Community
CFRAMP	CARICOM Fisheries Resource Assessment and Management Programme
CITES	Convention on International Trade in Endangered Species
CPUE	Catch per Unit of Effort
CRFM	Caribbean Regional Fisheries Mechanism
DECR	Department of Environment and Coastal Resources (Turks & Caicos)
EEZ	Exclusive Economic Zone
FAD	Fish Aggregating Device
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GEF	Global Environment Facility
ICCAT	International Commission for the Conservation of Atlantic Tunas
LRP	Limit Reference Point
MFPF	Marigot Fishing Port Facility
MSY	Maximum Sustainable Yield
MT	Metric Ton
OECS	Organization of Eastern Caribbean States
SGWG	Shrimp and Groundfish Resource Working Group
TAC	Total Allowable Catch
TCI	Turks and Caicos Islands
TED	Turtle Excluder Device
TIP	Trip Interview Programme
USA	United States of America
UWI	University of the West Indies
VPA	Virtual Population Analysis
WECAFC	Western Central Atlantic Fishery Commission

NATIONAL REPORT OF THE BAHAMAS

By: Lester Gittens, Department of Fisheries

1.0 INTRODUCTION

The Bahamas covers an area greater than 343,450 km^2. Of this, 154,553 km^2 comprise shallow waters (up to 200 m depth). The shallow water banks have an average depth around 9 m but water depth can plummet to between 370 m and 3 700 m along the edge.

In terms of landings value, the most important fished resources obtained from the Bahamian Exclusive Fishery Zone include spiny lobster (*Panulirus argus*), queen conch (*Strombus gigas*), and Nassau grouper (*Epinephelus striatus*) according to CY2004 figures. This report will focus on two of these species, the queen conch and the spiny lobster.

2.0 DESCRIPTION OF THE FISHERIES AND FLEETS

The commercial fishing industry of The Bahamas is based primarily on the Little Bahama Bank and the Great Bahama Bank. Cay Sal Bank is also beginning to emerge as a major conch fishing ground.

Commercial fishing vessels range in size from 11 ft to 100 ft. A fisheries census conducted in 1995 showed that there were approximately 9,300 fulltime fishers and over 4,000 small boats and vessels. Approximately 95% of fishers target spiny lobster.

2.1 Conch Fishery and Fleet

Due to the low monetary value of conch (approximately U.S. $3/lbs) compared to spiny lobster (approximately U.S. $15/lbs), fishing effort for conch is relatively low for the 8 months of the year that the spiny lobster fishery is open. Conch is targeted mainly during the seasonal closure of the spiny lobster fishery with over 2/3 of conch landings taking place during this 4 month period. Fishing effort for conch is also believed to be generally higher than the early 1990s due to commercial exports being allowed since 1992.

Queen conch is exploited primarily near densely populated islands and at depths accessible by free diving and hookah gear. The dinghy is the main type of vessel used in the conch fishery. In many instances these small vessels (< 20 ft long) work in conjunction with a larger motorized "mothership" that acts as a base for operations.

The Queen Conch is primarily collected by hand while diving (hookah and free diving) and is landed in the shell or as frozen meat in bags.

2.2 Lobster Fishery and Fleet

Most fishing vessels take part in the commercial fishery. There is often a "mothership" that works with up to eight vessels. Some vessels stay at sea up to four weeks and may land up to 40,000 lbs at one time. Virtually all landings from the fishery are lobster tails.

Fishing gears that are utilized include spears, the lobster hook, compressors, lobster traps and casitas. Of these, a license is required for compressors and lobster traps. The maximum number of traps that can be used is indicated on the permit. The traps must also be of specific dimensions (91.4 cm x 61 cm x 61 cm with slats no less than 2.54 cm apart) unless there is authorization to do otherwise.

Most lobsters are caught with the aid of casitas (locally known as condominiums). Casitas have increased in popularity since the late 1980s and usually consist of a sheet of zinc placed on concrete blocks or wood. They are presently unregulated.

When lobsters aggregate under a casita, a fisher simply lifts the sheet of zinc, uses one end of a lobster hook to catch a lobster and the other end to pierce the exoskeleton on the ventral surface of the thorax. This immobilizes the lobster. The majority of lobsters under the casita are caught before they find refuge elsewhere.

3.0 DATA COLLECTION AND HANDLING

Catch and effort data are collected by interviewing fishers and by inspection of landings. However, collection of landings statistics in this manner for the entire Bahamas is constrained by having few data collectors and multiple landing sites on multiple islands. Accuracy of effort data in relation to conch is further constrained by the tendency of fishers to collect conch only incidentally during most of the year. Therefore, most of the fishing effort attributed to a given trip, on which conch was caught, is not actually directed towards conch.

Catch statistics are supplemented by purchase reports submitted by processing plants. Islands with major fishing communities also have processing plants that purchase a large portion of the fishery products landed on those islands. Access to these reports allows the Department to improve estimates of the total weight of fishery product landed, the total weight exported, the local value of landings, the value of exports, landings by major-island and exports by island. Purchase reports also reflect the weight of exports per year per commercial size category per processing plant for spiny lobsters and thus reflect annual cohort size classes to a limited extent. Improvements in the accuracy of conch landings records are expected within CY2006 as recently developed conversion factors will be applied to past and future landings records.

In August 2005, The Department also initiated the collection of biological data in the form of spiny lobster carapace lengths and frequency of tar spotting for a major fishing ground on the Little Bahama Bank. This data is expected to enhance scientific analyses of the lobster fishery.

Lobster data collected from processing plants is considered largely complete because it is believed that over 90% of lobsters landed are exported and thus recorded. However, most conch is consumed locally and much of it is not recorded due to the personnel constraints mentioned earlier and because a relatively large portion of landings does not end up in processing plants. Nevertheless, the year-to-year differences in recorded landings are considered reflective of actual trends in landings for conch and lobster. The total fishing effort for conch and lobster are unknown.

4.0 POLICIES AND LEGISLATION

The overall management goal for Bahamian fisheries is to ensure that Bahamian fisheries resources are utilized to the maximum benefit of Bahamians. Only Bahamian citizens can take part in commercial fishing unless the individual is in possession of a spousal permit or a work permit that specifically allows fishing.

The primary management objective for the spiny lobster fishery is to ensure that spiny lobsters are harvested for maximum economic benefit that this is done in a sustainable manner. Whereas, the management objective for the conch fishery is to ensure that conch is harvested in a sustainable manner while attempting to meet local demand firstly and foreign demand secondly.

Legislation affecting fisheries includes The Fisheries Resources (Jurisdiction and Conservation) Act 1977 and the Wildlife Conservation and Trade Act 2004.

A summary of regulations from the Fisheries Act that apply to all Bahamian fisheries are seen below: -

1. SCUBA diving for any fisheries resource is prohibited.
2. Compressors can be used for commercial fishing, but only during the lobster season (August 1 to March 31). In order to use a compressor the fisherman must have a permit from the Department of Fisheries, which is issued only to trained, certified divers.
3. Compressors are can only be used in waters between 30 ft and 60 ft.

Approval has also been given for five areas to be designated as marine protected areas. These marine protected areas are expected to positively impact a number of fisheries resources. Public consultations have been held and declaration of the boundaries under The Fisheries Act is expected in the near future.

There are also other regulations and or policies that are specific to each fishery. Regulations specific to the lobster fishery according to the Fisheries Act include:-

1. It is illegal to capture, possess or sell egg-bearing spiny lobster
2. It is illegal to remove the eggs from a spiny lobster
3. It is illegal to possess a spiny lobster that has had the swimmerettes removed
4. There is a closed season during the period April 1st through July 31st.
5. The minimum harvestable size for a spiny lobster is 82.55 mm carapace length or 139.7 mm tail length. The tail length regulation is only enforced when the carapace is absent.

Regulations specific to the conch fishery according to the Fisheries Act include:-

1. It is illegal to capture, possess or sell conch without a well-formed lip.
2. The commercial exportation of conch or conch by-product is only allowed with a license issued by the minister responsible and inspection by the Department of Fisheries
3. Non-commercial exports are limited to 4.5 kg (10 lbs) for any person, and should be in your personal baggage as you leave the country.
4. Sport fishing regulations allow the harvest of 10 conchs per person for foreign vessels, while in possession of a sport-fishing permit.

It is also policy for exports of queen conch to be controlled by an annual export quota. This policy has resulted in a national quota that is divided into individual quotas for each processing plant desirous of exporting conch meat. In addition, permits are required for exportation and importation of queen conch in accordance with the Wildlife Conservation and Trade Act 2004. The provisions under this Act are in accordance with the provisions of the CITES.

With regards to the Fisheries Act and Wildlife Conservation and Trade Act, enforcement is the responsibility of the Department of Fisheries, The Royal Bahamas Defence Force, The Royal Bahamas Police Force and The Customs Department. In addition, Agricultural officers are empowered to conduct enforcement according to The Wildlife Conservation and Trade Act 2004.

5.0 RESEARCH

Research activities that the Bahamas has engaged in recent times include:-

1. Exploration of the possibility of using a standardized minimum meat weight as a management tool for the conch fishery. This research activity has shown that the mean adult wet meat weight of queen conchs is not significantly heavier than that of juveniles. This conclusion holds when either the flared lip or development of the verge are used to determine maturity. Thus meat weight cannot be used to determine maturity and hence should not be used as a conch fishery management tool in The Bahamas (Gittens 2004a).

2. Determination of conch meat conversion factors for The Bahamas. Estimates of meat conversion factors for queen conch in The Bahamas are seen in Table 1. A notable complicating factor in applying conversion factors to landings is that juveniles have a different conversion factor from adults. Thus the undocumented intrusion of juvenile meat weights in landings records will lead to inaccuracies in meat weights estimated using the conversion factors (Gittens 2004b).

Table 1: Queen Conch Conversion Factors For The Bahamas

Description	Conversion Factor	% Of Wet Weight Remaining	% Of Wet Weight Removed
Skinned Conch	1.8	56	44
Conch Meat	2.6	38	62
Trimmings	7.2	14	86

3. A re-examination of the tail length-weight relationship for spiny lobsters in Bahamian waters. This has yielded the following equation for males and females combined:-

$$y = 2.7441\ x^{0.3395}$$

where y = tail length in centimeters and x = tail weight in grams (Gittens 2006).

Planned research activities for CY2006 include a conch abundance survey geared towards assessing the status of the queen conch population on major fishing grounds in The Bahamas. This fishery independent assessment involves SCUBA transects and is expected to take 10 years to be completed. However, results that can inform management decisions are expected to be available 6 months after SCUBA transects begin. The area to be surveyed during the initial six months is The Berry Islands. The Berry Islands are a microcosm of what can be expected of the entire fishery because of its long history of fishing, its continued popularity amongst fishers and the presence of morphologically diverse conchs. The initial component of the conch abundance survey will be done in conjunction with The College of The Bahamas with technical assistance from the Caribbean Fisheries Management Council and the Caribbean Regional Fisheries Mechanism.

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NATIONAL REPORT OF DOMINICA

By: Fisheries Division

1.0 INTRODUCTION

Traditionally, the Commonwealth of Dominica has relied on agriculture and fishing as a means of self-sustenance. The majority of our communities and villages are located on or near the coast, for, among other reasons, the purpose of making the harvesting of fish easier and more efficient. A number of farmers who reside in these coastal communities are also fishers. However, with the downturn in the banana industry, more and more farmers are crossing over to the fishing industry as a prime source of income.

Approximately 4,000 of our some 70,000 population (about 5.7% of our population) are employed in the fishing industry in one way or the other. About 80% of that 4,000 are fishermen, registered and unregistered, full time and part time.

After poultry, fish is the most consumed of all meats by the Dominican population. The contribution of fisheries to the GDP of Dominica is 1.7%.

The fishing industry in Dominica is an open one. Persons can enter and begin operating without any notification to the Fisheries Division or Government. This has posed many problems with the management of the resources. Also the registration system only recently supported the renewal and update of boats and fishers' registration in the industry. However, this is not mandatory, so only a fraction of those registered ever return to renew their registration information. Fisheries regulations are yet to be gazetted.

2.0 DESCRIPTION OF FISHERIES AND FLEETS

Boat Types/Fleet: There are generally four main boat types in use in Dominica. Most are open wooden boats; however, fiber-glassed vessels are becoming more and more popular. The boats are open vessels suitable for single-day fishing trips. Though each vessel type has fundamental differences that may limit the scope and type of fishing operations that can be carried out, generally, any of the boat types can be used within any of the fisheries available.

a) Keel – These are basically small wooden vessels ranging in size from as small as nine (9) feet to about 20 or more feet in length. The hull of these vessels is usually fibred to strengthen the structure. These vessels are powered by outboard engines (usually 40 HP to 115 HP). Because of their structure they used for both inshore and offshore fishing activities. Those strengthened with fiberglass are able to go fishing in the channels for large pelagics. Also fiberglass iceboxes are usually built to fit these boats to hold the day's catch.

b) Canoes – Traditionally, canoes were used by Carib Indians but can be found island-wide, though they are slowly being phased out in preference for keel and FRP. They are vessels dugout from the gommier trees and fitted with planks of plywood. Canoes are most used for pot fishing or net fishing such as seining or cast net. Small coastal pelagic fish are usually targeted by these boats. Sometimes smaller HP engines are used with these boats. But oars are popular propulsion implements.

c) FRP (Fiber Reinforced Plastics)/Pirogue – These vessels are usually imported from the neighboring French Islands, and more recently from Trinidad and Venezuela. However there are

a few FRP boat builders on the island. FRP are the choice vessels for fishing large pelagics and channel fishing in general. They can be 4 to 8 metres long, though larger vessels are present. These vessels are usually outfitted with two outboard engines (sometimes with HP above 115). Because the FRP-type boats are sturdier, they are mainly used for fishing in deeper waters, targeting large migratory pelagics. Some vessels travel more than sixty miles offshore to fish off FADs. These are also open vessels.

d) Longliners – Steel hull and generally, large, covered vessels are uncommon in Dominica's fishing industry. There are only about three such fishing vessels in Dominica. Some are constructed locally of wood and reinforced with fiberglass. These boats are powered by inboard engines or outboard-inboards. But they rarely operate because most fishers tend to prefer fishing for only one day at a time.

Because of the openness of the fishing industry and lack of management legislation mandating licensing or registration before entry, it is difficult to track the numbers of vessels operating in the industry. However, the Fisheries Division has undertaken to educate fishers and the general public on the importance of registration in the management of the marine resources in an effort to get as many persons and vessels into a national database in the absence of management legislation.

Fish Species: For some time now, large pelagics have become the species of choice by both fishers and consumers. With the introduction of the Fish Aggregating Devices (FADs) fishermen can now work more efficiently and are guaranteed of making a catch for their day. FADs cause the large pelagics to gather in a particular area, facilitating capture by fishers. Customers also prefer eating the larger fish (especially the dolphinfish and the tuna). However, these fish are not plentiful year round. Large pelagic catches are a seasonal occurrence, due to the migratory nature of the species. The rest of the year, fishers divert much of their attention to demersals or small coastal pelagics.

Selling price is based on supply and demand (there are no regulations on price control for fish) though in the rural fishing communities it is generally at EC $5.00 per pound for large pelagics and EC $6.00 per pound for demersals. Small coastal pelagics like ballyhoo or flying fish are usually sold at EC $1.00 per pound (or about four fish are sold for a dollar). The prices for other small coastal pelagics vary based on species. In the urban and suburban communities (and especially Roseau), the prices tend to be higher: large pelagics and demersals at $7 to $8 per pound. The price of small coastal pelagics usually remains the same in most areas.

LIST OF THE MAJOR FISH TARGETED

OCEAN PELAGICS/MIGRATORY	
Common Dolphinfish (Dorade) *Coryphaena hippurus*	Yellowfin Tuna (Thon che jaune) *Thunnus albacares*
Skipjack Tuna (Biolet) *Katsuwonus pelamis*	Blackfin Tuna (Thon dos noir) *Thunnus atlanticus*
Flyingfish, Fourwing (Volant) *Hirundichthys affinis*	Ocean Triggerfish (Boos) *Canthidermis maculata*
Wahoo (Waylay bois) *Acanthocybium solandri*	Blue Marlin (Vaway) *Makaira nigricans*
COASTAL PELAGICS/INSHORE	

Common Half-beak Ballyhoo (Balau) *Hyporhamphus unifasciatus*	Round Sardinella (Cayee) *Sardinella aurita*
Crevalle Jack (Carangue) *Caranx crysos*	Mackerel Scad (Mackeyo) *Decapterus macarellus*
DEMERSALS/REEF	
Snappers *Lutjanidae*	Queen Parrotfish *Scarus vetula*
Red Grouper (Vierge) *Epinephelus morio*	Yellow Goatfish (Babawen) *Mulloidichthys martinicus*
Grunts *Haemulidae*	

NB: The Patois/Local names for the fish species above are placed in parenthesis after the common name.

Data Collection/Sampling: Sixteen of thirty known landing sites are monitored by data collectors who are charged with collecting fisheries statistical data. Of these sixteen sites, census information is collected only at the newly constructed Marigot Fishing Port Facility (MFPF). Random sampling is done at the other sites, where data collectors are asked to capture information on at least one half of the activities that take place in their assigned site(s) for each sampling day. Data collectors tend to work for five out of seven days weekly. Basic catch and effort data is collected at the sites and entered in data books that are delivered to the main office of the Fisheries Division on Roseau monthly. This data is then stored electronically using TIP.

Periodically the data collector's activities are monitored by the Fisheries Division. In addition, workshop/meeting sessions are held with data collectors.

3.0 FISHERIES POLICY AND MANAGEMENT

The Fisheries Development Plan outlines the strategies for managing and developing the fisheries industry of Dominica through various means such as training, infrastructural development, and detailed work programmes. The needs of the fisheries industry are identified and action plans are drafted.

In summary the plan seeks to:

- Increase fish production to increase the nutritional status through a higher per capita consumption.
- Promote the national and optimum exploitation of Dominica's fisheries resources based on the application of modern science and technology.
- Create and support programmes aimed at increasing the incomes and living standards of all those dependent on fisheries and related activities.
- Increase employment opportunities through fisheries and fisheries related activities.
- Assist fisheries groups and co-operatives to improve their organizations, leadership skills and socio-economic status by identifying problems and needs in their communities with a view to finding solutions.
- Educating fisherfolk about the marine resources and the need for proper management.

4.0 RESEARCH

The Fisheries Division is planning to conduct the first ever Fisheries Census Survey for Dominica. However, this is still in the planning stages. Funding still needs to be sourced as well as full logistics for actually running the survey.

5.0 LEGISLATION AND MANAGEMENT REGULATIONS

As mentioned previously, fisheries management legislation is lacking. However, legislation is in place for the deployment and management of FADs and for established marine reserves. The Draft Fisheries Regulations contain additional management regimes such as closed seasons for marine turtles and lobsters and minimum mesh size for fish pot wire and nets (1 3/4). It is hoped that the regulations can be gazetted soon.

6.0 FISHERIES INFORMAITON AND STATISITCS

Fisher Registration Information: Registration information as at December 2004.

WORK TIME	MALE	FEMALE	TOTAL
Full Time	493	0	493
Part Time/Occasional	720	7	727
Status Unspecified	132	2	134
TOTAL REGISTERED FISHERS	**1345**	**9**	**1354**

The total estimated number of fishers on island is approximately 3000. It should be noted again that the Dominican fishery is not available only to registered fishermen; any Dominican with a boat and engine currently has nothing legally preventing them from entering the fishing industry, and they can do so without even visiting the Fisheries Division. Notwithstanding this present situation, the Fisheries Division is working towards a licensing system for both fishers and vessels so as to better manage new entrants and monitor resource use.

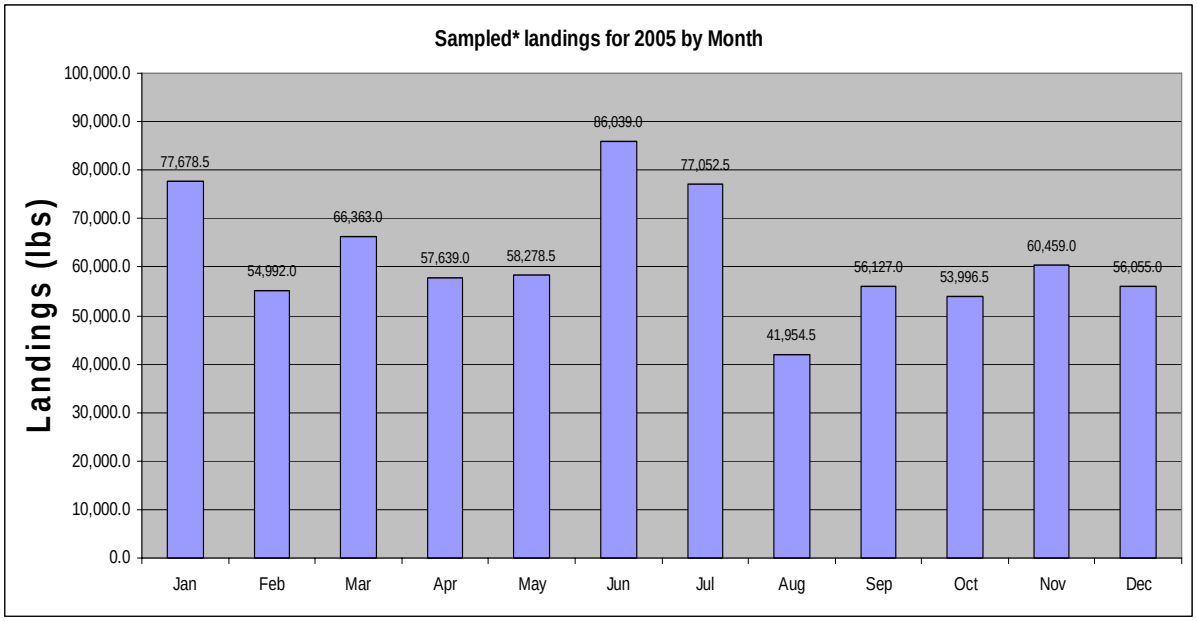
Vessel Registration Information: Registration information as at December 2004.

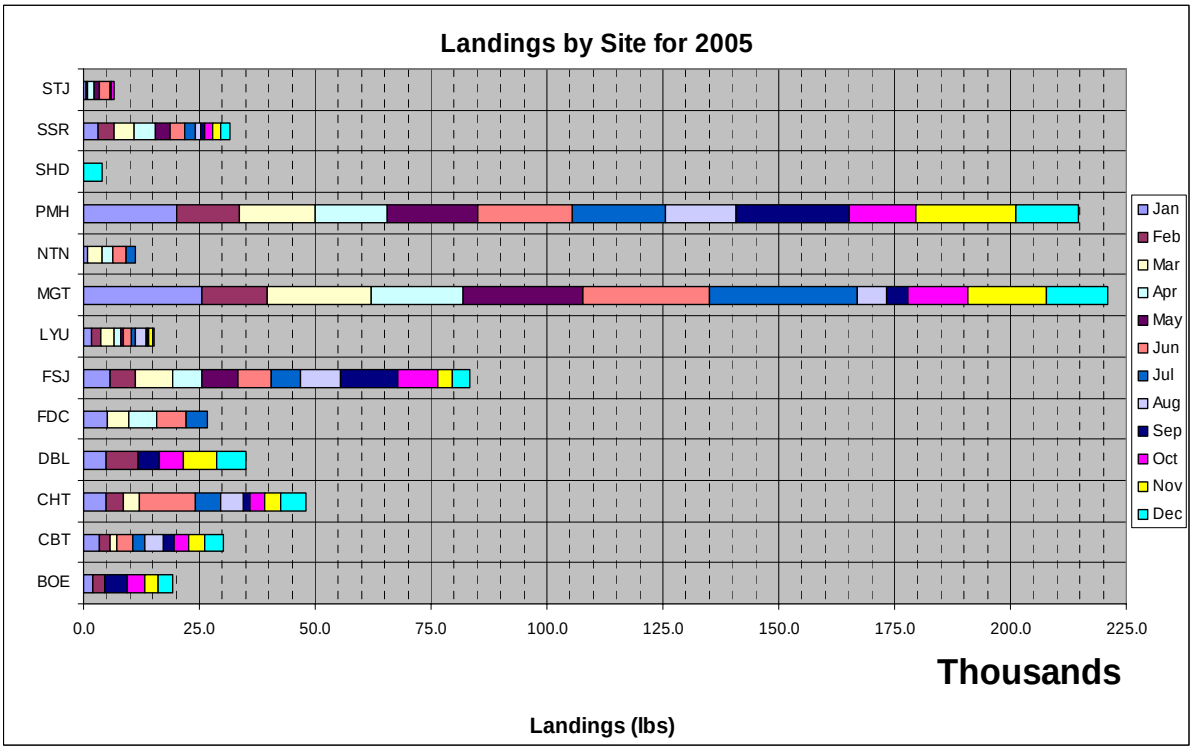
LOA	Powered	Not Powered	TOTAL
Up to 5.9 meters	178	55	233
6 to 10 meters	96	13	109
TOTAL REGISTERED VESSELS			**342**

The majority of fishing vessels are still unregistered. It is estimated that there may be at least 700 vessels total on the island.

Fish Production Statistics: Preliminary fish production information as at January 2006.

The graphs below show the total sampled[1] landings for all thirteen sampled sites.



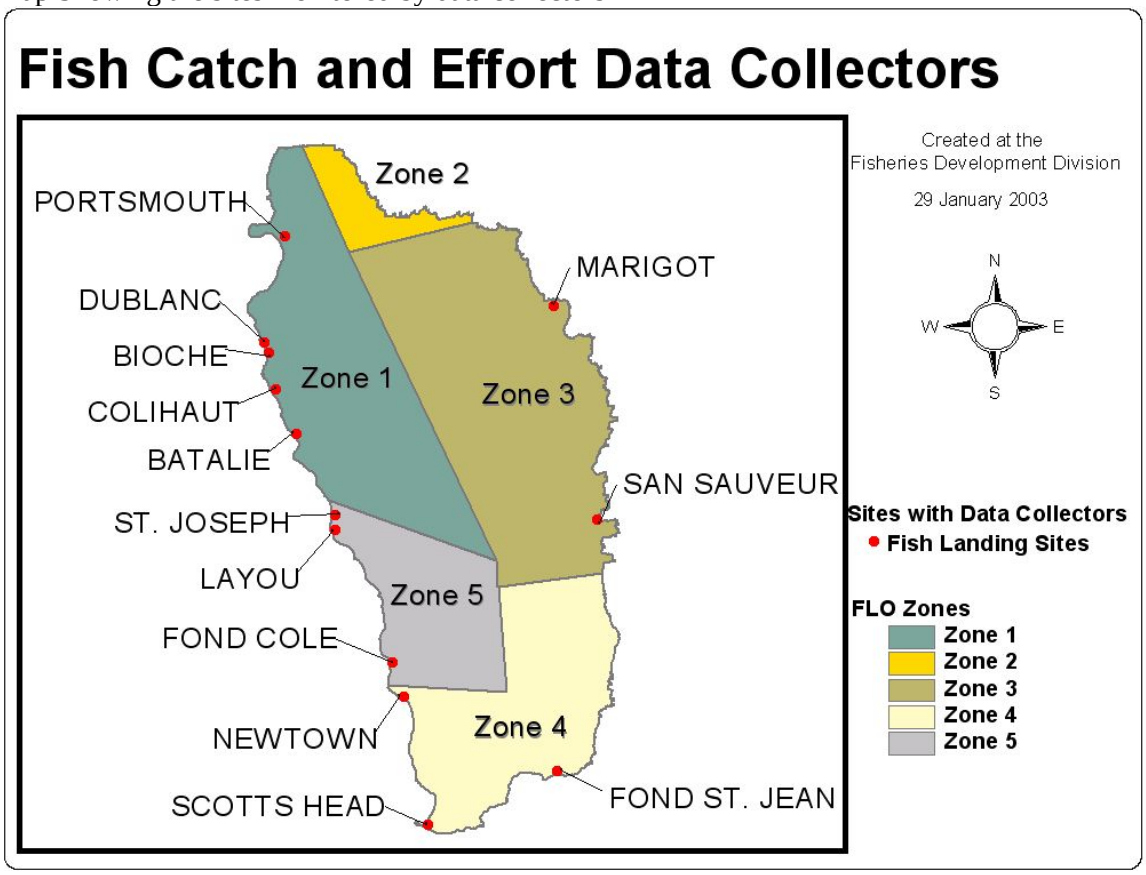


Sampled sites are:
BOE = Bioche CBT = Coulibistrie CHT = Colihaut

[1] Census data is only collected at the Marigot Fishing Port Facility (MFPF). Data from this site is included in this graph as well.

DBL = Dublanc
FDC = Fond Cole
FSJ = Fond St. Jean
LYU = Layou
MGT = Marigot
NTN = Newtown
PMH = Portsmouth
SHD = Scott's Head
SSR = Saint Sauveur
STJ = St. Joseph

Map Showing the sites monitored by data collectors



NATIONAL REPORT OF GUYANA

By: Department of Fisheries

1.0 EXECUTIVE SUMMARY

Guyana has a land area of 215,000 square kilometers, 432 kms of Atlantic coastline and 48,000 square kms, of continental shelf averaging 88kms in width. Its EEZ is approximately 138,240 square kms. The country's extensive river system is by the Essequibo, which, along with several others, discharge immense dominated volumes of fresh water into coastal marine areas.

Guyana's marine environment is also heavily influenced by the Amazon whose outflow into the Atlantic south and east of Guyana is estimated at a rate of 200,000 cubic metres per second. The Amazon waters move in a northwesterly direction along the coast of South America and, on account of the heavy particles, which are brown in colour. This deep brown colour is evident 40-50 kms from the Guyanese coastline and extends as far north as Venezuela. Accordingly, the marine conditions off Guyana are estuarine and support benthic fauna such as shrimp and a variety of demersal fish species.

The fishery sector is of critical importance to the economy and social well being in Guyana. Fish is a major source of animal protein in Guyana. This sector is also a great contributor: to our National Gross Domestic Product, to Export Earning, to Employment, Income and Government revenue. In addition, Guyana Fishery is divided into three main components. Each with further subdivisions as follows:

Marine Fishery

(i) The Offshore Industrial (Trawl) Fishery
(ii) The Inshore Artisanal Fishery
(iii) The semi industrial Fishery

Inland Fishery

(i) Subsistence Fishery
(ii) Ornamental Fish Fishery

Aquaculture

(i) Brackish-water Culture
(ii) Fresh-water Culture

Different species of fish are harvested from these three main components by the use of a variety of gear type e.g. Hook & Line, Pot Traps etc.

On the other hand, our fishery sector are faced with constrains like any other fishery. There is the need for enforcement of Legislation and Management Regulations. There is also the National Fisheries Policy and Management Plan which has to be taken into consideration. Moreover there's the need for development and research.

1.1 Fisheries and the National Economy

The fishery sector is of critical importance to the economy and to the social well being in Guyana. Indeed, the economic contribution of the fisheries has grown dramatically in recent years. The importance of the fisheries is evident in five key areas:

1.1.1 Food Supplies

Fish is the major source of animal protein in Guyana. It is estimated that per capita annual consumption of fish rose from 9 to 27 kilograms between 1980 and 1988, and was nearly 45 kilograms in 1991. In 1996, it was 59.8 kg. It is estimated that the value is around 60 kg (FAO data).

1.1.2 Contribution to the Guyana Economy

The Guyana Bureau of Statistics estimates that the primary sector of fisheries contributed G$154 million to the total Gross Domestic Product (GDP) or value added in 2003, about 1.59 percent of the total GDP

1.1.3 Contributions to Export Earning

Guyana's 2004 export earnings from fisheries were approximately G$ 12.6 billion, while in 2003 it was G$ 11.2 billion. Export in finfish and by-products in 2004 were 12026.2mt and 2003 it was 9849.6mt.

Prawns and seabob exports were 648.15mt and 9039.3mt in 2004 respectively.

1.1.4 Contribution of Employment and Incomes

The fishing industry employs some 5,300 people in harvesting and 6,300 in processing and marketing. More than 11,000 jobs depend directly on fishery and many more people benefit indirectly from fishing-related occupations, such as boat building, supply, and repair. A high proportion of workers in processing, distribution and retail are women. Region 4 has a particularly high concentration of women in all activities of the sector.

1.1.5 Government Revenues derived from the Fisheries

a. Export taxes
b. Licence fees and consumption taxes on imported fuel for fishing vessels
c. Licence fees for fishing vessels.

1.2 Exclusive Economic Zone (EEZ)

Guyana has a coastline of 432 km and a continental shelf area of 48,665 sq. km. The average width of the continental shelf is 112.6 km, while the area of the EEZ is 138,240 sq.km. Resources being exploited within the EEZ are mainly the demersal resources (shrimp and ground fish).

1.3 Fishing Area

The EEZ, for statistical purposes, has been divided longitudinally into nine (9) Fishing Zones, each separated by 30-degree interval. Artisanal users operate on the continental shelf at distances up to 56 km (30 miles) from the shore, all along the coast.

2.0 DESCRIPTION OF THE FISHERIES

The Fisheries Sub-sector of Guyana has three main components, each with further subdivisions as follows:

Marine Fishery

(i) The Offshore Industrial (Trawl) Fishery
(ii) The Inshore Artisanal Fishery
(iii) The semi industrial Fishery

Inland Fishery

(i) Subsistence Fishery
(ii) Ornamental Fish Fishery

Aquaculture

(i) Brackish-water Culture
(ii) Fresh-water Culture

2.1 Offshore Industrial Fisheries

The Offshore Industrial Fishery consists of 133 trawlers, 6 major processing plants, 9 small processing plants, and numerous wharves and dry docking facilities. 48% of these vessels exploit mainly penaeid shrimp (*P. brasiliensis, P.notialis, P. schmitti, and P. subtilis)* with finfish and small amounts of squid (*Loligo spp.*) and lobster (*Panulirus spp.*) as by-catch. The remaining percentage mainly exploit seabob (*Xiphopenaeus kroyeri*) and various finfish species {*Macrodon ancylodon, Micropogonias furnieri, Nebris microps. Arius spp., Cynoscion spp.*), with small quantities of penaeid shrimp as by-catch.

2.2 Red Snapper Fishery

The red snapper fishery of Guyana consists of a semi-industrial fleet. Fishing occurs mainly on the continental shelf between 10-20 fathoms. The red snapper fishery was operational since the 1970's with 7-11 vessels harvesting the resources. The gear type used during these years was the handline. There was a decline in this fishery during the late 1970's to 1995. The decline was because some operators have reverted to using the gillnet polyethylene (drift seine) as they did not have efficient technology for catching snapper as their counterparts in Trinidad and Venezuela.

Guyana now has a licensed fleet of forty five (45) vessels; twenty (20) are Venezuelan owned and leased to Royal Caribbean Inc. who uses hook and line and twenty five (25) represent the local fleet, who uses pots and traps.

2.3 Gear Types

The vessels targeting red snapper use either hook or line or pots and traps. They are constructed of wood. Hook and line fishing method is used for fishing red snappers in deep water over the slope off the Guianas

2.3.1 Hook and Line

Hook and lines are used while fishing with bait. The hooks are baited with sardine. A fisherman holds each line.

The gear is made of nylon wire. Each vessel is equipped with 6-9 lines with five (5) hooks per line. The length of the line varies between 30-60 meters whilst the size of the hook ranges from 5-6. The catch of hook and line is *Lutjanus* species (red snapper), the by-catch is lane snapper and vermillion snapper.

2.3.2 Pots and Traps

The gear is made of nylon or plastic wire mesh and is flat and hexagonal, with two of the sides forming a concave, funnel-shaped angle. Each vessel is equipped with 40-65 traps with a mesh size of 1/4 inch. The traps are often laid out in-groups of 2 or 3 units connected by a rope. The crew size varies from 5-6. The target species for pots and traps is *Lutjanus spp*. (red snapper) the by catch landed include cavalli, Spanish mackerel, grouper, etc.

2.3.3 Chinese seine (Fishing Strategy)

These fishing operations work in relation to the tide and spend between 6 to 12 hours per day fishing. Some operators would fish both tides per day. The seines are attached to poles and set on mud banks, mainly in the river mouths, where tidal currents sweep the fish and shrimp into them.

The seines are set at depths between 2 and 6 fathoms, at a distance of about one-five mile from the shore. The crew size on these vessels ranges between 2 and 4.

The catch consists primarily of *N. schmitti* (whitebelly shrimp), *Xiphopenaeus kroyeri* (seabob), *Macrodon ancylodon* (bangamary), *Nebris microps* (butterfish).

2.3.4 Cadell Line (Fishing Strategy)

Before each trip, the hooks are baited and stored in the trays. Keybrand hooks are normally used. Bait mainly Bangamary. These vessels operate on a daily basis with each fishing trip lasting for approximately 12 hrs. Most of the fishing activities occur at nights. Fishing occurs between 10-12 miles from the coast in waters approximately 5-10 fathoms deep. Crew size on a cadell vessel ranges from 2 to 4. The catch consist mainly of *Arius parkieri* (gillbacker), *Bagre bagre* (catfish), *G. Arius* (cuirass), (*Arius phrygiatus*) kwakwari and various species of shark which are sometimes landed headless and gutted.

2.3.5 Pin Seine (Fishing Strategy)

Pin seine fishing is practised mainly in Regions two (2) and six (6). The net is set at high tide in the Intertidal zone. A row of stakes arranged in a semicircle holds the net in a vertical position. During the ebbing tide the fish are trapped and then retrieved from the mud flats by the use of catamarang", which is an upward-curved mud-riding board of about 2m (6.6 ft) in length and 60 cm (23.6 in) wide fitted with a fin underneath and a box for storing fish. Catches include *Mugilidae spp.* (mullet), *Mugil sp*. (queriman), *Centropomus sp.*(snook), *Macrodon ancylodon* (bangamary), *Micropogonias furnieri* (croaker),and catfishes of the family Arudae.

2.3.6 Gillnets (Fishing Strategy)

Gillnets (polyethylene) vary in length from 1,000 to 1,600 m and are 4 m deep with a stretched mesh measure of 20 cm. Nets are set and hauled manually from the boats. The catch consists mainly of gray snapper, *Cynoscion acoupa*; sea trout, *Cynoscion virescens*; bashaw, *Cynoscion jamaicensis*; pagee, *Lobotes surinamensis*; tarpon, *Tarpon atlanticus*; gillbacker, *Arius grandicassis*; mackerel, *Scomberomorus maculatus*; and sharks, *Carcharhinus spp*. (Chakalall and Dragovich 1979). Some 400 vessels are involved in gillnet fishing.

2.4 Constraints of the fishing industry:

- Lack of inadequate scientific information and data in the resources.
- Lack of technical and financial assistance for marine fishery from government and foreign organization.
- Illegal and unregulated fishing.
- Inadequate monitoring and surveillance of fishing.
- Lack of skilled human resources.
- Status of the economy (fluctuation of currency, unrest etc.)

3.0 NATIONAL FISHERIES POLICY AND MANAGEMENT OBJECTIVES

3.1 Offshore Industrial Large Penaeid Shrimp Fishery, Industrial Seabob Fishery, Inshore Artisanal Fishery (Pin Seines, Chinese Seines, Cadell Lines, Gillnets) & Snapper/ Grouper – Deep Slope Fishery:

- To rebuild and identify target and limit reference points for the Fishery.

- To maintain all non-target species, associated and dependent species above 50% of their mean biomass levels in the absence of fishing activities.
- To stabilise the net incomes of the operators in the large penaeid shrimp fishery.
- To include as many of the existing participants in the fishery as is possible given the biological, ecological and economic objectives listed above.

3.2 Small Pelagic Fishery

- Investigate the feasibility of a directed fishery. Based on the above, investigate the potential for operating a cannery and/or fishmeal plant.

3.2 Large Pelagic Fishery

- To develop the capacity for maximising catches of large pelagics inhabiting or
- Migrating through the EEZ.
- To establish management linkages with international regulatory bodies, such as ICCAT, in order to access vital information to properly manage these fishes.

4.0 RESEARCH

There is no research being carried out.

5.0 LEGISLATION AND MANAGEMENT REGULATIONS

5.1 Act and Regulations in Force

Fisheries Act 2002 (replaced the 1959 Fisheries Act and portions of the 1977 Marine Boundaries Act).

The DOF liaises closely with the Coast Guard and Marine Police on fisheries enforcement issues, but neither agency has adequate surveillance vessels.

The Department of Fisheries monitors compliance with the TED requirements and utilises its staff (TED Inspectors) for the inspections.

Despite some attempts by the fishing industry to regulate itself (e.g. aerial surveillance of offshore shrimp vessels; providing a patrol vessel for the exclusive use of the Coast Guard), more effective enforcement is required to reduce illegal foreign fishing and over-the-side sales and piracy. Foreign poaching seems to be the greatest concern in the snapper/grouper and shrimp fisheries. Theft of engines and fishing gear and the destruction of nets by other fishing vessels are problematic in the artisanal fishery.

Some of the issues affecting the effectiveness of conducting monitoring, control and surveillance have been lack of resources, the large expanse of the maritime zones of Guyana, operational problems of the Coast Guard and the unresolved maritime boundary delimitation agreements with neighbouring states.

5.2 Data Collection Programme

The data collection system consist have the inshore and offshore and logbook programme.
This programme involves the collection of catch, effort, and biological data from the various fisheries. The logbook and observer programmes are also part of the data collection programme.

5.2.1 Artisanal and Industrial data collection programme

The data collection programme is a random stratified programme.
Stratification is done by vessel/gear type. The landings, employment and value of the catch were important factors that led to this type of stratification. This determined the number of vessels to be sampled per month per gear type.

At the starting of every month, sampling schedules are prepared in the three Regions for data collection. A total of 82 vessels are chosen to be sampled for data. These vessels are randomly selected from landing sites in the Regions. They include 20 chinese seine, 17 gillnet nylon, 4 cadell 15 gillnet (outboard), 6 gillnet (inboard), 4 pin seine, 3 handlines and 2 traps for the artisanal fishery and 6 seabob and 5 prawns for the industrial fishery.

The vessels sampled in Region 4 are all the industrial vessels and forty-two artisanal. In Regions, six and two the number of vessels sampled is 13 and 14 respectively.

The number of vessels being targeted for data collection has been reduced due to the manpower shortage. Only 65 vessels are being sampled per month.

Sampling is done three days per week Tuesday to Thursday and at least two trips are scheduled per day. The number of vessels targeted per trip would depend on the landing site being targeted, the number of data collectors and the number of vessels at the site.

Catch and effort and biological data is collected from the vessels selected randomly at the landing sites.

5.2.2 Limitations and strengths of sampling plan

5.2.2.1 Limitations

Sampling days are fixed and this does not give a true representation of fishing activities at landing sites.
Inadequate resources to conduct activity
Ineffective supervision of data collectors
Ineffectiveness of community participation

5.2.2.2 Strengths

With the introduction of data collection programme for the artisanal fisheries, production estimates for the artisanal fishery were revised for previous years and the estimates prepared now are more precise.

Appendices

Table 1. Showing the contribution to GDP AND Growth rate
Source: Bureau of Statistics

	2003	2002	2001	2000	1999	1998
Fishing	154	170	165	164	143	142
Contribution to GDP	1.59	3.1	3.0	3.1	2.6	2.7
Growth Rate	0	3.0	1.0	14.1	1.0	2.6

Table 2. Showing Guyana Exports of Marine Products, 1998-2003(Metric Tonnes)

Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Prawn	1280	1076	924	682	518	648.15
Seabob & Whitebelly	4902	7199	10923	9071	11534	9039.3
Finfish and by-products	4870	5268	6768	9339	9834	12026.2
Crabmeat	25	3.33	3	24	15	22.61
Total Export	11077	13546	18618	19116	21901	21736.26

Table 3. Showing Annual Exports (Foreign Trade) for 1998-2004

Year	Amount (mt)	Value G $
1998	11,627	6.5 billion
1999	11,170	9.0 billion
2000	13,547	7.2 billion
2001	18,340	11.0 billion
2002	19,322	11.5 billion
2003	21,901	11.2 billion
2004	21757.41	12.6 billion

Table 4. Production Statistics for fish and Shrimp from 1998-2003 (Metric Tonnes)

Item	1998	1999	2000	2001	2002	2003
SHRIMP/PRAWNS: (Whole Weight) (Tail Weight) SHRIMP/ SEABOB & 	 1935 1209 10515	 1595 996 9394	 1132 707 16098.0	 1888 1180 25158.0	 1522 951 18405	 1161 726 19017
No. of Trawlers	**94**	**80**	**81**	**111**	**126**	**137**
SHRIMP/ SEABOB & WHITEBELLY- (Artisinal)	17693	3397	635 1464	1428 1382	730 1399	188 2218
TOTAL SHRIMP	**30143**	**14386**	**17864**	**28474**	**20657**	**20366**
FINFISH (Industrial)	1711	933	1139	1253	3175	3311
TOTAL FINFISH (Industrial)	**1711**	**933**	**1139**	**1253**	**3175**	**3311**
FINFISH (Artisinal) No. of Boats Red Snapper FINFISH (INLAND) Including Aquaculture	37479 1331 351 -	34051 1331 273 39	28629 1300 163	23436 1325 555 48	21586 1300 424 60	29801 1000 612 75
TOTAL FINFISH	**39190**	**34984**	**29767**	**24689**	**23370**	**31488**

NATIONAL REPORT OF ST. KITTS

By: Sam Heyliger, Fisheries Division

1.0 EXECUTIVE SUMMARY

St. Kitts and Nevis, a twin island Federation has two separate fisheries administrations. However, there is constant collaboration between both administrations. This report is designed to give an overview of the fisheries of St. Kitts only. The report describes the four major fisheries, gives a list of the management objectives and states the fisheries policy.

The data presented in the report covers fishers, vessels and major species fished in each fishery. The data included covers the period 1995 to 2004 and are presented in various tables.

Research work on going in the field of Aquaculture and the commissioning of the Basseterre Fisheries are two developments of the major interest mentioned during the period under review.

Finally, the report includes the legislative and management regulations that guide the daily functioning of the Fisheries Industry.

2.0 FISHERY AND FLEET DESCRIPTION

There are four major fisheries being monitored regularly, namely: coastal pelagic, offshore pelagic, reef/bank, conch along with one minor fishery in turtles.

2.1 Coastal Pelagic

This fishery employs just over 10% of the registered fishers and less than 3% of the registered vessels. However, this fishery accounts for over 40% of the total landings on an annual basis.
The fishery operates within five nautical miles from shore, although some vessels travel 15 – 20 miles from their homeports (on a daily basis). The major gear used is the beach seine, the length of which varies from 100 fathoms to 300 fathoms and 3 – 6 fathoms in depth. Seines are constructed of nylon twine and have a mesh size of 1" stretched. The trip usually begins before dawn and ends just before midday. The vessels range between 23 and 30 feet in length and are powered by one or two outboard engines ranging between 40 and 65 hp. The crew is normally 5 persons including the captain who is normally the owner. However, the crew can be 4 or as many as 8 at times for normal fishing trips. However, in cases where jacks are being caught, the "crew" including divers and persons onshore, can reach over 50 persons. Additionally, gillnets are sometimes used in close proximity to beaches, rocks and reefs. Gillnets are constructed of monofilament with two and a half to four inch stretch mesh. These nets range in length from 100 feet to 300 feet and 10 – 15 feet deep.

The species targeted in this fishery are the small pelagics including gars, ballyhoo, jacks and small tunas. However, a number of other "reef species" are also taken as the operations normally take place in shallow waters, near reefs and on grass beds/nursery areas. (The data collected on these species has been classified as mixed. The separation of these from those taken in traps have been done since 2002)

2.2 Offshore Pelagic

Unlike the coastal pelagic, this fishery operates up to 35 miles from shore and is highly seasonal in its operation. The crew is normally 2 including the captain who is normally the owner. The vessels used are the same used in the reef fishery and range in size from 16 – 40 feet. The vessels are powered by outboards ranging from 40 – 250 hp. Most of the vessels have twin engines. The

major gear used is trolling lines baited with either small pelagic or artificial lures. Recently, (2003) fishers have begun combining FADs and long line to catch yellow fin tunas. The trip usually begins just after dawn and could extend late into the afternoon depending on distance travelled, weather condition and catch. The species targeted include dolphin fish, tunas and mackerel.

2.3 Reef Fishery

The reef fishery is by far the largest fishery in terms of vessels, persons and gear used. Over 80% of the registered vessels are involved in the reef fishery. This also involves over 75% of the registered fishers. The reef/bank fishery employs a number of gears. These include fish traps, hand lines and spear guns. Until recently (1999) spear guns was not a major contributor to the estimated landings however, data collected up to 2004 has revealed that spear guns landings have increased significantly while that of fish traps has declined. This change is of concern to the officer responsible for resource management as the species targeted are similar to those of the fish trap. However, because the spear fishery is so specific certain species are easy "prey" and overexploitation could be problematic. It has been observed that spear fishers now use SCUBA almost exclusively. Most of these fishers are not certified and none have the required permission (by law). Divers regularly dive depths over 80 feet with two tanks. Formally, this was not the case as spear fishers were free divers. Spear fishing expeditions normally begin before dawn and end just around midday. Spear fishers sometimes travel up to 30 – 40 miles to areas in "open-ocean" to fishing banks and reefs where under normal circumstances only hand line and fish traps were used. It has also been observed that spear fishers have been in conflict with a number of trap fishers using the same areas. The crew for spear fishing trips is more variable than any other fishing operation and could be up to 8 men at one time. Most of the time only one person remains in the vessel while all others dive (spear fish).

Hand line is used from the same size of vessels and is usually used in combination with fish traps. However, the length of the trip varies also the number of crew from 6 hours to 36 hours and from 1 man to 4 men. Hand lines are normally set with a number of hooks (4 –12) and baited with a variety of baits including fry, ballyhoo sprat and squid. Depth for fishing ranges from 5 – 100 fathoms. No electronic reels are used. The sizes of the hooks vary.

With reference to fish traps, traps are made from 1½" chicken wire although some fishers have begun using 1" square mesh coated wire. Again, these traps are baited with a variety of bait including, conch, sprat, fry and cattle hide. Traps are normally set in depths of 5 – 100 fathoms and are allowed to "soak" for 1 – 5 days. Due to the multi-species nature there is no real target species (all demersals) except in the case of lobsters when the traps are baited with cattle hide. The crew is normally 2, including the captain. Each vessel has an average of 25 – 40 traps. Usually, all traps are hauled on each trip (usually once or twice weekly). Lobsters are taken in the same traps along with other reef species.

In general, the reef fishery involves the greatest number of species. Data collected on individual species have been showing some signs that will require management strategy adjustments to avert the collapse of this very important fishery. The ever-increasing landing of parrot-fish by spear fishers is one such sign.

2.4 Conch

Over the last 5 years 1999- 2003, the conch fishery has been the most consistent with respect to landings. This fishery involves less than twenty vessels, ranging in size from 16 – 20 feet and powered by 40 – 65hp engines. Conch is fished by divers using SCUBA gear in the deeper waters (over 60 – 120 feet) while free divers fish the shallower waters. The crew normally

consists of two divers and a "bagman" whose major responsibility is to control the vessel while divers are in the water and retrieve the bags loaded with conch. Usually, only one diver is in the water at a time a practice that is not encouraged by the department. Like the spear fishers, most of the conch divers are not certified. Less than fifty registered fishers are involved in this fishery.

2.5 Turtles

Fishing for turtles can be classified as a minor fishery. It involves less than fifty persons and runs over the period October to February. It is the only fishery that has a closed season. Turtles are taken in nets and by spear gun. The "turtle nets" have a mesh size of over 10". Nets are set in foraging areas for turtles (grass beds/reefs) and are attended daily. Nets are normally set less than one mile off shore. However, turtles are also taken occasionally in beach seines. Very limited data is available on turtle landings.

3.0 DATA COLLECTION

Data is collected using a systematic census at all the major landing sites on a weekly basis. This has been in operation since 1997. The entire island is covered. With the opening of the Basseterre Fisheries Complex much more accurate information will be obtained as to catch composition and species identification.

4.0 NATIONAL FISHERIES POLICY AND MANAGEMENT OBJECTIVES

The government of St. Kitts and Nevis is committed to the conservation and sustainable use of fisheries resources for the benefit of the people of St. Kitts and Nevis

The major objectives for fisheries management are:

- To ensure that the fisheries sector is integrated into the policy and decision-making process concerning fisheries and coastal zone management.

- To maximize the development of the fishery sector through efficient, well coordinated and cost effective management, thereby creating viable employment and stable sources of income for the fishers and the communities involved in fisheries related economic activities.

- To maximize the amount of fish protein available for domestic consumption consistent with sound resource management practices.

- To develop the fishing industry in terms of modernization of fisheries infrastructure and use of appropriate fishing vessels, gear and methods.

- To maximize the value to the economy of St. Kitts and Nevis of the limited fisheries resources exploited sustain ably through cost effective harvesting, value added processing and expansion and diversification of markets.

- To take into account traditional knowledge and interests of local communities and small-scale artisanal fishers in development and management programmes.

- To maintain or restore populations of marine species at levels that can produce the maximum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration the relationships among species.

- To protect and restore endangered marine and freshwater species.

- To preserve rare or fragile ecosystems, as well as habitats and other ecologically sensitive areas, especially mangrove forests, sea-grass beds, reefs and other spawning and nursery areas.

- To promote scientific research with respect to fisheries resource management and development.

- To ensure effective monitoring and enforcement with respect to fishing activities.

- To cooperate with other nations in the management of shared or highly migratory stocks.

- To strengthen the capabilities of the governmental and related institutions to manage the fisheries and to provide the policies and investment incentives to achieve the above mentioned objectives.

5.0 RESEARCH

There is no research being conducted within the department. Mention should be made none-the-less of the recent opening of the Basseterre Fisheries Complex. It is envisioned that this Complex will provide some of the very vital marketing and supply services to for the fishing industry. It is envisioned that this will greatly increase the marketing of the large pelagics.

Meanwhile, a Pilot Project (SNAPPER) St. Kitts and Nevis Aquaculture Pilot Project and Environmental Research, has been in operation for just over three years. The objective of this project is to produce Tilapia in 100% seawater. To date, a number of attempts have been made in obtaining reliable brood stock.

6.0 LEGISLATION AND MANAGEMENT REGULATIONS

6.1 Primary legislation:

- *The Fisheries Act* (1984) was amended in 1992 to incorporate provisions of the OECS harmonized legislation. Fisheries regulations were gazetted in 1995.

- *The Fisheries Act* (1984) covers the establishment of a fisheries advisory committee, fisheries access agreements, local and foreign fishing licensing, fish processing establishments, fisheries research, fisheries enforcement and the registration of fishing vessels. Also, the Act specifies conservation measures such as prohibiting the use of any explosive, poison or other noxious substance for the purpose of killing, stunning, disabling, or catching fish; closed seasons, gear restrictions, creation of marine reserves. The Minister responsible for fisheries is given the authority to create new regulations for the management of fisheries as and when necessary.

6.2 Other fisheries-related legislation:

- *National Conservation and Environmental Protection Act* (1987) - coastal zone management.
- *Maritime Areas Act* (1984) - resources management within EEZ waters.
- *Zoning Ordinance (1991)* - establishment of marine parks in Nevis.
- The Fisheries Division has the primary enforcement role for domestic fisheries. The police are called upon for arresting purposes.
- Fisheries are of little priority for the Coast Guard, which is relied upon for enforcement of illegal foreign fishing. The Coast Guard mainly responds to specific alerts. Suspected illegal fishing by foreign boats remains problematic. Further cross-training between the Coast Guard and the Fisheries Department is required.

Signing of the *OECS Common Surveillance Agreement* in 1991 improved regional cooperation between member states

Table 1. Registered fishers and vessels and fishery

Area	Fishers	Vessels	F.Type	% Contribution	Organization
BE	129	112	CP/OP/R/C/L/S	20	One (Association)
BW**	61	37	R/IP/L/S	10	None
LK	23	15	R	3	None
OL	39	23	CP/OP/R/C/L	25	One (Cooperative)
SP	50	41	CP/OP/R/L	10	One (Cooperative)
DB	73	61	CP/OP/R/L	20	One (Cooperative)
CO	23	12	R/L/C	5	None
FB	23	13	R/C/L/S	2	None
OTHER	48	20	R	5	None
	469	334		100	

BE-Basseterre East, BW-Basseterre West, LK-Lime Kiln, OL-Old Road, SP-Sandy Point, DB-Dieppe Bay, CO-Conaree, FB-Frigate Bay.
** Nevis registered vessels/fishers not included.
CP- Coastal Pelagic, OP – Offshore Pelagic, R- Reef, C – Conch, L – Lobster, S – Sport Fishery (vessels) and gear Used by landing site

Table 2. Vessel sizes and trip

Fishery	Size of vessel	Length of trip	Use of Ice	Type of vessel
Coastal Pelagic	23 – 25 feet	3 – 6 hrs	No	Open pirogue
Ocean Pelagic	20 – 40 feet	6 – 8 hrs	Occasionally	Open pirogue
Reef/Bank	Under 10 – 40 feet	4 – 6 hrs	Most	Open pirogue
	Over 25 feet	12 - 36 hrs	Yes	Decked/Cabin
Conch	16 – 22 feet	6 – 8 hrs	No	Open pirogue
Turtle	16 – 22 feet	N.A.	No	Open pirogue
Lobster	20 – 40 feet	6 – 8 hrs	No	Open pirogue
Sport	25 – 40 feet	4 – 6 hrs	Occasionally	

Table 3.

Age range of fishers	F.B.	B.E.	B.W.	L.K.	C.C.	O.L.	G.H.	S.P.	D.B.	CO.	TOTAL	%
Over 50 years	1	15	10	9	3	10	1	14	12	1	76	28.8
30 - 49 years	5	31	20	3	8	10	2	17	24	7	127	48.2
Under 30 years	4	9	5	3	2	10	1	13	10	3	60	22.8
TOTAL	10	55	35	15	13	30	4	44	46	11	263	
%	3.8	20.9	13.3	5.7	4.9	11.4	1.5	16.7	17.4	4.1		
Formal Education	F.B.	B.E.	B.W.	L.K.	C.C.	O.L.	G.H.	S.P.	D.B.	CO.	TOTAL	
None	2	2	3	1	1	2	0	0	2	0	13	4.9
Elementary	1	17	14	7	6	12	3	14	26	1	101	38.4
Secondary	2	28	12	6	4	13	1	28	15	9	118	44.8
Post-secondary	0	1	1	1	0	2	0	0	0	0	5	1.9
College/University	5	7	5	0	2	1	0	2	3	1	26	9.8
TOTAL	10	55	35	15	13	30	4	44	46	11	263	
Boat length (ft & ins.)	F.B.	B.E.	B.W.	L.K.	C.C.	O.L.	G.H.	S.P.	D.B.	CO.	TOTAL	%
10 ft and under	0	2	1	4	0	0	0	2	0	0	9	4.7
10ft 1" - 16ft	1	12	5	5	4	6	1	12	9	0	55	29.2
16ft 1" - 20ft	4	25	10	1	3	3	0	8	14	1	69	36.7
20ft 1" - 25ft	0	8	3	1	0	7	1	8	11	2	41	21.8
Over 25ft.	0	3	2	0	0	2	0	3	2	2	14	7.4
TOTAL	5	50	21	11	7	18	2	33	36	5	188	
%	2.6	26.5	11.1	5.8	3.7	9.5	1	17.5	19.1	2.6		
Engine Hp	F.B.	B.E.	B.W.	L.K.	C.C.	O.L.	G.H.	S.P.	D.B.	CO.	TOTAL	
No engine	0	3	1	6	0	1	0	9	1	0	21	11.1
15 hp and under	0	3	1	0	1	1	1	1	1	0	9	4.7
25hp - 35hp	0	8	3	3	1	5	1	5	5	1	32	17
40hp - 50hp	3	26	12	2	4	5	0	12	21	0	85	45.2
55hp - 75hp	1	2	2	0	0	3	0	4	2	0	14	7.4
Over 75hp	1	8	2	0	1	3	0	2	6	4	27	14.3
TOTAL	5	50	21	11	7	18	2	33	36	5	188	
Boats with 2 engines	0	7	3	0	0	10	1	10	8	3	42	23.4
% of boats in area	0	14	14	0	0	55	50	30	22	60		

Table 4.

	YEAR	F.B.	B.E.	B.W.	L.K.	C.C.	O.L.	G.H.	S.P.	D.B.	C.O	N.G	TOTAL
Vessels registered	**1996**	**3**	**25**	**8**	**3**	**2**	**3**	**1**	**18**	**13**	**3**	**1**	**80**
	1997	**4**	**34**	**10**	**6**	**2**	**4**	**1**	**21**	**20**	**3**	**1**	**106**
	1998	**5**	**46**	**13**	**9**	**1**	**8**	**2**	**26**	**26**	**4**	**1**	**141**
	1999	**7**	**75**	**26**	**13**	**9**	**19**	**3**	**35**	**50**	**6**	**1**	**244**
	2000	**9**	**88**	**31**	**14**	**12**	**22**	**4**	**38**	**57**	**11**	**1**	**287**
	2001	**9**	**88**	**31**	**14**	**12**	**22**	**4**	**38**	**57**	**11**	**1**	**287**
	2002/3	**13**	**112**	**38**	**15**	**12**	**23**	**5**	**41**	**61**	**12**	**2**	**334**
Active Vessels	**2001**		**38**										
	2002/3												
	YEAR	**F.B.**	**B.E.**	**B.W.**	**L.K.**	**C.C.**	**O.L.**	**G.H.**	**S.P.**	**D.B.**	**C.O**	**N.G**	**TOTAL**
Fishers registered	**1996**	**9**	**51**	**32**	**14**	**11**	**28**	**4**	**33**	**39**	**11**	**2**	**234**
	1997	**10**	**59**	**34**	**15**	**11**	**29**	**4**	**41**	**46**	**11**	**2**	**262**
	1998	**11**	**76**	**38**	**17**	**11**	**29**	**4**	**42**	**48**	**11**	**2**	**289**
	1999	**11**	**85**	**39**	**19**	**11**	**30**	**5**	**42**	**51**	**14**	**2**	**309**
	2000	**12**	**93**	**46**	**19**	**11**	**32**	**5**	**46**	**56**	**16**	**2**	**338**
	2001	**13**	**99**	**53**	**20**	**13**	**33**	**5**	**47**	**60**	**16**	**2**	**361**
	others												**12**
Active/semi-active 2001		**F.B.**	**B.E.**	**B.W.**	**L.K.**	**C.C.**	**O.L.**	**G.H.**	**S.P.**	**D.B.**	**C.O**	**N.G**	**TOTAL**
Coastal Pelagic (Net)		**0**	**2**	**0**	**0**	**0**	**1**	**0**	**1**	**2**	**0**	**0**	**6**
Offshore Pelagic (Troll)		**0**	**3**	**1**	**0**	**0**	**1**	**0**	**1**	**2**	**0**	**0**	**8**
Conch (SCUBA)		**1**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**7**
Reef Fishery (Trap/													
H/line/Spear Fishing)		**3**	**21**	**13**	**4**	**3**	**11**	**1**	**6**	**21**	**5**	**0**	**88**
		4	**31**	**14**	**4**	**3**	**13**	**1**	**8**	**25**	**6**	**0**	**109**

Table 5.

Estimated Landings 1995 –2004 (Weight in lbs)

MAJOR SP.	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Trap/Spear/H.Line										
Doctor fish (*Acanthuridae*)	**10,550**	**24,720**	**9,240**	**19,270**	**13,750**	**2,300**	**990**	**7,760**	**5,270**	**12,250**
Trigger fish (*Balistidae*)	**6,470**	**15,060**	**4,970**	**11,360**	**13,930**	**2,850**	**2,690**	**17,230**	**13,460**	**20,230**
Grunts (*Pomadasyida*)	**2,380**	**22,290**	**3,140**	**7,400**	**6,050**	**140**	**2,120**	**7,660**	**11,660**	**15,930**
Squirrel fish (*Holocentridae*)	**6,380**	**18,990**	**11,330**	**17,290**	**19,380**	**7,090**	**7,100**	**14,900**	**4,490**	**11,530**
Snappers (*Lutjanidae*)	**8,940**	**20,400**	**10,370**	**17,800**	**32,710**	**42,760**	**20,510**	**34,680**	**73,640**	**86,070**
Goat fish (*Mullidae*)	**6,080**	**21,300**	**2,570**	**5,500**	**3,210**	**40**	**0**	**860**	**220**	**1,050**
Parrot fish (*Scaridae*)	**15,930**	**42,330**	**11,590**	**18,200**	**16,540**	**4,460**	**15,570**	**18,220**	**26,030**	**44,820**
Groupers (*Serranidae*)	**16,900**	**39,140**	**21,820**	**24,780**	**25,260**	**13,790**	**7,540**	**21,050**	**30,500**	**42,090**
Lobsters (*Panulirus argus*)	**11,530**	**26,240**	**8,880**	**45,420**	**32,090**	**11,850**	**33,790**	**21,180**	**5,440**	**8,430**
Mixed								**173,210**	**123,740**	**139,290**
SUB TOTAL	**85,160**	**230,470**	**83,910**	**167,020**	**164,100**	**85,280**	**90,310**	**316,750**	**294,450**	**381,690**
Seine Net										
Gars (*Belonidae*)	**27,390**	**58,820**	**57,240**	**132,670**	**128,130**	**132,190**	**82,050**	**76,010**	**119,220**	**164,710**
Ballyhoo (*Exocoetidae*)	**47,280**	**119,000**	**49,670**	**83,250**	**48,820**	**47,760**	**105,140**	**92,520**	**41,430**	**129,840**
Jacks (*Selar crumenophthalmus*)	**0**	**0**	**36,050**	**44,800**	**79,000**	**70,790**	**56,200**	**90,510**	**34,000**	**790**
Dolphin (Coryphaena hippurus)								**1,440**	**100**	**0**
Tuna/Mackerel (Thunnus/Scombridae)								**13,700**	**26,420**	**11,910**
Mixed								**15,560**	**1,340**	**12,810**
SUB TOTAL	**74,670**	**177,820**	**142,960**	**260,720**	**255,950**	**250,740**	**243,390**	**289,740**	**222,510**	**320,060**
Trolling/Longline										
Dolphin (*Coryphaena hippurus)*	**5,890**	**29,250**	**43,060**	**74,970**	**28,620**	**57,250**	**57,570**	**86,100**	**34,750**	**58,190**
Tuna/Mackerel (*Thunnus/Scombridae*)	**2,030**	**7,680**	**5,780**	**22,020**	**20,650**	**6,250**	**9,680**	**9,790**	**14,290**	**17,180**
SUB TOTAL	**7,920**	**36,930**	**48,840**	**96,990**	**49,270**	**63,500**	**67,250**	**95,890**	**49,040**	**75,370**
SCUBA/Free Diving										
Conch (*Strombus gigas*)	**29,090**	**63,520**	**44,530**	**48,370**	**45,980**	**67,960**	**102,620**	**78,670**	**96,550**	**136,670**
Mixed	**28,280**	**74,950**	**32,190**	**47,070**	**67,840**	**48,720**	**280,690**	**0**	**0**	**0**
TOTAL	**225,120**	**583,690**	**352,430**	**620,170**	**583,050**	**516,210**	**784,260**	**773,710**	**662,550**	**913,790**

NATIONAL REPORT OF ST. LUCIA

By: Department of Fisheries

1.0 INTRODUCTION

Saint Lucia, an independent island state, in the Eastern Caribbean, is approximately 539 km^2 in area and lies between latitude 13 ^{o} and 14^o north and longitude 60 ^{o} and 61 ^{o} west (Figure 1). With a population of 159,133, Saint Lucia enjoys a tropical climate moderated by the northeast Trade Winds. Nearshore fishing takes place along the coastline, which extends for 158 km. The island has a narrow coastal shelf area of 522 km^2 and a total Economic Exclusive Zone (EEZ) of 4700 km^2 (Department of Fisheries, 1999). A narrow, steep, insular shelf in contrast to the eastern coast, which has a fairly extensive, less steep, insular shelf, characterizes the western coast. The southern coast has a wider shelf area extending southwards.

Similar to other islands of the Lesser Antilles, two water bodies wash its shores, the Atlantic Ocean on the east and the Caribbean Sea on the west. The marine habitat comprises the full range of tropical marine and coastal habitats including estuaries, mangroves, lagoons, seagrass beds, fringing, patch and barrier reefs, slopes off the island platform, deep bank reefs and open oceans. Nearshore, at depths between 30 m and 80 m on the outer island shelf, are submerged Holocene or early Pleistocene reefs (Mahon, 1990). Two important fishing banks with a total shelf area of 14 km^2 are located a few miles south and northeast within the 200-m depth contour.

Figure 1: Map of Caribbean Basin

2.0 DESCRIPTION OF THE FISHERY

The major fisheries resources of Saint Lucia comprise demersal, coastal pelagic and offshore pelagic fisheries. Although there is some year-to-year variability among these resources in terms

of time, the fishing year of Saint Lucia can generally be divided into two main seasons: a "high' season that extends from December to May when significant landings of offshore migratory pelagics occur and a "low" season that extends from June to November when relatively large quantities of demersal fishes are landed. However, the main "pot-fishing" season extends from June to February (Gobert & Domalian, 1995).

The offshore pelagic fisheries contributed 70% of the annual landings by weight (Department of Fisheries, 2004) which is made up of a number of migratory species including dolphinfish (*Coryphaena hippurus)*; mackerel (*Stromberomorus* spp.*)*; Wahoo (*Acanthocybium solandri)*; blackfin tuna (*Thunnus atlanticus)*; yellowfin tuna (*Thunnus albacares)*; Skipjack tuna (*Katsuwonus pelamis)*; sharks (various families); billfishes (*Istiophoridae, Xiphiidae*) and flying fish (*Hirundichthys affinis)* (Figure 2).

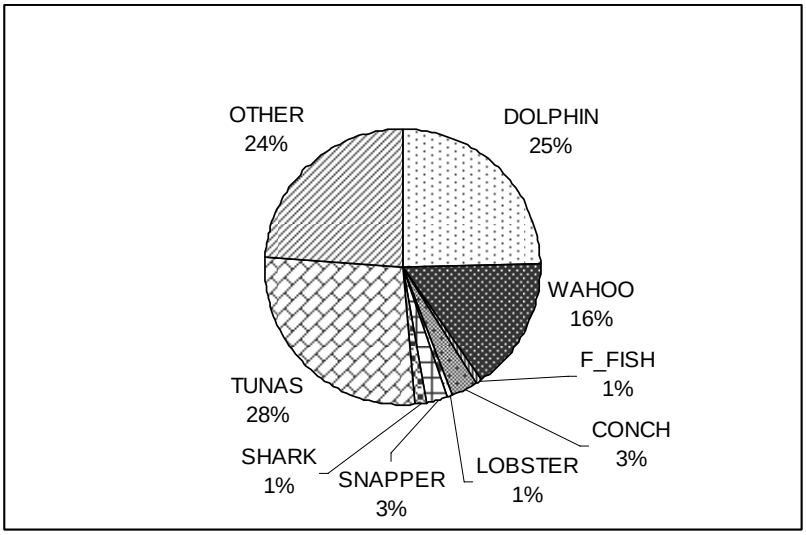


Figure 2: Percentage of landings for different families 2004.

In the coastal pelagic fishery, an array of species is targeted including: ballyhoo (*Hemiramphidae spp*.); barracudas (*Sphyraenidae spp*.); creole wrasse (*Clepticus parrae)*; herrings (*Clupeidae spp*.); jacks (*Carangidae spp*.); mackerels (*Decapterus macarellus)*; needlefishes (*Belonidae spp.).*

The demersal fishery lands are the most highly priced and valuable species for the local, tourism and export sectors including: snappers (Lutjanidae spp.); groupers (Serranidae spp.); Caribbean spiny lobster (*Panulirus argus)* and Caribbean queen conch (*Strombus gigas)*.

3.0 POLICY AND REGULATIONS

The primary legislation governing management of the island's marine resources is the Fisheries Act (No. 10 of 1984) and Fisheries Regulations (No. 9 of 1994) which are based on the Organization of Eastern Caribbean States (OECS) harmonized legislation. The Fisheries Regulations specify conservation measures such as gear restrictions, fishing method restrictions, close seasons and creation of marine reserves. The policy of the Government of Saint Lucia for the fishing sector focuses on development and management of the fishing industry through the promotion of sustainability of the sector through self-sufficiency by increased production from capture fisheries and the aquaculture sector (Department of Fisheries, 2001). Another major

objective outlined within the fisheries policy is the social and economic advancement of fishers and their families. The Fisheries Management Plan, developed through a consultative process with resource users, guides the work program of the Department of Fisheries and outlines specific management plans for major fisheries of Saint Lucia (Department of Fisheries, 2001).

Currently, the fisheries legislation and Fisheries Management Plan are under review to address more recently emerging issues.

4.0 GENERAL STATISTICS ON FLEET TYPES, TYPE OF EFFORT AND TRENDS IN FISHING PATTERNS AND PRACTICES

The Department of Fisheries has 680 vessels registered in its database (Department of Fisheries, 2005). In 2003, the Department of Fisheries undertook a verification exercise of the registered fishing vessels database. Vessels that were known to no longer be in existence or no longer engaged in the fishery were removed from the database. In 2002, fishing vessels were reclassified under the following categories: canoes; pirogue; transom, shaloop; whaler; longliner and other. Efforts by the Department of Fisheries to ensure a movement from the canoe to the more stable fibreglass pirogue by fishers appears to have been a success, with the fibreglass pirogue accounting for 66% of registered vessels in 2004 compared to 41% in 1998 (Figure 3).

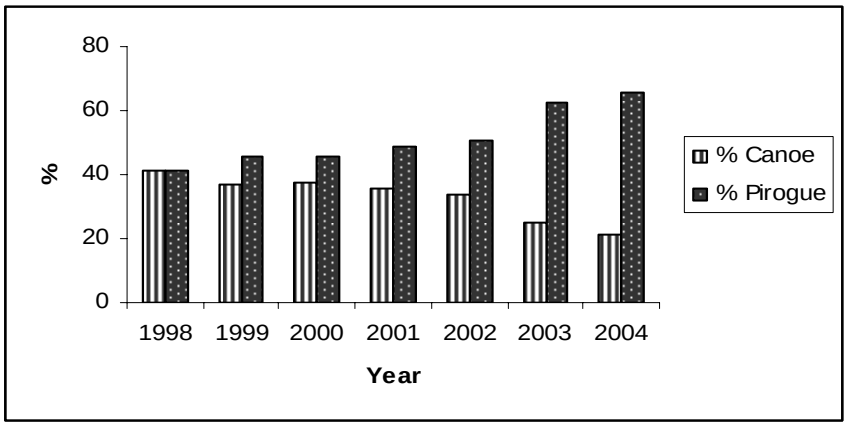


Figure 3: Percentage of registered canoes and pirogues from 1998-2004

On average fishing vessels engaged in the fishery in Saint Lucia are 7m long but range between 5-9 meters and are propelled mainly by 75 horse power outboard engines. Due to the multi-species nature of the fishery in Saint Lucia, fishing vessels are generally equipped with the following gear: trolling lines; flyingfish nets; longlines (palangs); gillnets; handlines; and fishpots (traps). Gillnets and seine nets are less common. Seines and fillets are primarily owned and operated by west coast fishers, but gillnets are operated around the island with the exception of the Soufriere Marine Management Area, where their use has been banned. Most fishers fish within 15 miles of the coastline and fishing trips generally do not exceed twelve hours.

4.1 Sampling Plan

Current fisheries data collection systems include several components such as gathering of data on catch, effort, registration of fishermen and vessels, SCUBA diving and snorkeling establishments, sports fishing vessels and spear gun fishers, in addition to licensing data of fishers and fishing vessels, dive and snorkel leaders.

The catch and effort data collection plan is based on a stratified random sampling regime of three major strata: primary, secondary and tertiary landing sites, based on the number of vessels operating, the fishery types and the volume of fish landed. The island fishery operates out of 22 landing sites. However, catch and effort data are collected at nine landings sites based on a random stratified system. The sites presently sampled include: Gros Islet, Castries, Banannes, Soufriere, Choiseul, Vieux Fort, Micoud, Laborie and Dennery.

At each of the sites being sampled, catch and effort data are collected for every other returning vessel for fifteen days (randomly selected) monthly. Information such as area fished, species caught, gear used, hours fished, and total vessels out, are recorded and submitted monthly to the Data Section. In terms of area fished, the island's coastal waters are divided into two zones for offshore pelagics, and three zones for nearshore and bank species.

4.2 Lobster Fishery

4.2.1 Introduction

Panulirus argus is the most abundant and commercially important of the three *Panulirus* species (*P. argus, P. guttatus* and *P. laevicanda).* However, *P. guttatus* is protected from commercial exploitation since it rarely attains the legal carapace size limit of 95 mm in length. The majority of Caribbean lobster landings come from traps set in depths in excess of 30 m (Luckhurst & Auil-Marshalleck, 1995). Previously, lobsters were fished with trammels nets, which are now banned from the island fishery; however, they are still used illegally on a small scale. Caribbean spiny lobsters are also illegally fished with spear guns by recreational fishers.

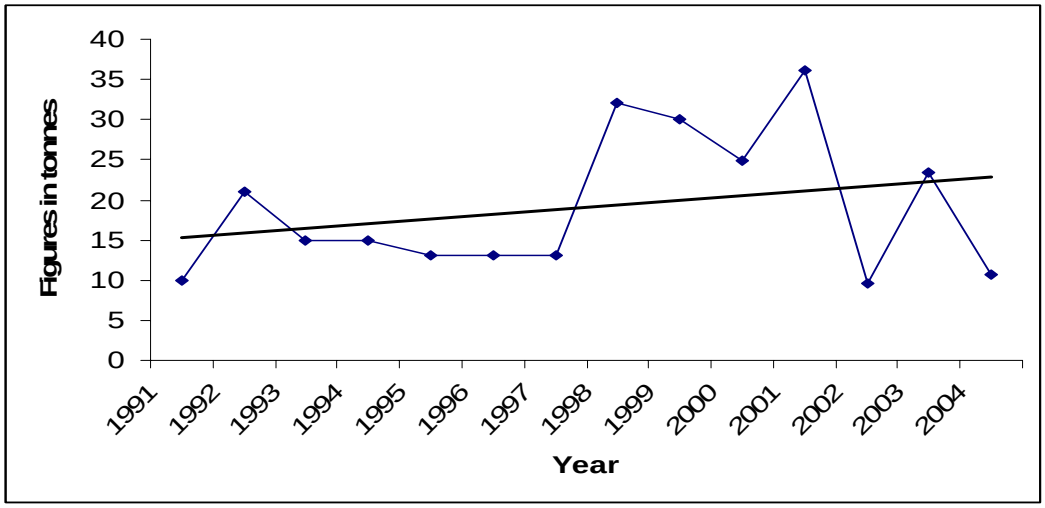
The fishery for lobster sustains important artisanal fisheries during the "low" fishing season. It is regulated with an eight-month fishing season, extending from 1st August to 29th February, inclusive.

The Department of Fisheries, recognizing the need to reduce effort in nearshore fishery implemented a limited entry system for the pot fishery (the main gear used to fish for lobsters) in the 2000 pot-fishing period. Funding for implementing this management regime was provided by the European Union as part of the Sustainable Fisheries Development Project. The main objectives for implementation of such a management measure were to address the problem of over-fishing plaguing this fishery, due to the continued use of illegal mesh sizes for fish pots, the open access nature of the fishery, the recurrent problems of theft of gear and catch, incidental ghost fishing and declining catches. A collaborative approach for developing conditions for the management regime was used (Department of Fisheries. 1999).

However, due to a number of constraints such as the cost, the continued incidents of pot theft and the limited capacities of the Department of Fisheries and the Marine Police Unit for enforcement, the limited entry pot fishery system was discontinued.

4.2.2 Trends in catches or landings during 1990-2004

Fig.4 gives an indication of the annual production of *P. argus* between 1991 and 2004 giving an average annual production of 19.7t. during this period.



(Source: Department of Fisheries, 2005)

Figure 4: Lobster landings (tonnes) from 1991-2004

Although lobster landings do not contribute significantly to the total landings in general, lobster landings have increased. Recorded lobster landings for 2002 were unusually low. However, this may have been attributed to the pot fishery project where the majority of lobsters were sold directly to hotels and restaurants and not landed at landing sites. The majority of lobster landings occur during the first four months of the fishing period.

The lobster fishery is economically significant to the livelihood of pot fishers of coastal communities, particularly during the low period, since there is not much opportunity for alternative employment.

4.2.3 Fisheries legislation and regulations in effect during 1999-2004

The primary legislation governing management of the lobster fishery is the Fisheries Regulations No. 9 of 1994. Under these regulations, it is illegal to harm or have in one's possession any lobster that is undersized, carrying eggs, or molting. It is also illegal to spear, hook a lobster, or remove the eggs from a lobster or use Scuba tanks to catch lobster. Lobsters are protected from fishing from 1st May to 30th August in any year. Finally, lobsters smaller than 95mm carapace in length are protected within the regulations.

In 2001, the Department of Fisheries with assistance from FAO, embarked on a broad based consultative process to review and revise the existing fisheries legislation. The following are proposed amendments regarding lobster management:

4.3 Conch Fishery

4.3.1 Introduction

The Queen conch, *Strombus gigas*, is one of the single species nearshore fisheries of Saint Lucia. Presently, nearshore stocks have been over exploited, resulting in the exploitation at deeper depths with the use of SCUBA gear. Although this species is thought to be distributed around the island, only two significant populations have been identified, one to the north and the other to the south of the island (Nichols & Jennings-Clark, 1994). Information obtained from a recent survey of vessels targeting conch resources (Walker, 2003) indicated that divers harvest conch regularly from various areas off Cas en Bas, Esperance, Grand Anse, Gros Islet, Mennard and Marisule in the north; Vieux Fort and Caille Bleu in the south; and Dennery on the east coast. Conch vessels

target, on average, three areas on a rotational basis. Conch are mainly landed at two landing sites: Gros Islet, located at the north of the island; and Laborie on the south west coast. Conch is more heavily targeted in the north of the island than the south (Walker, 2003).

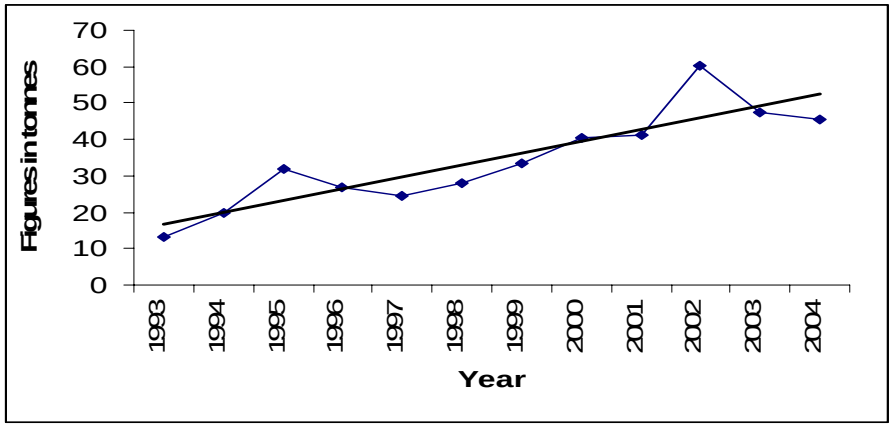
Conch is exploited commercially all year by over 40 fishers in depths ranging from 11 m to 43 m. Fishers operate mainly out of fiberglass pirogues ranging in length from 7.02 m – 8.45 m, powered by outboard engines of 115 – 250 hp. Walker (2003) reported that whilst conch are targeted commercially by some fishers throughout the year, other fishers focus their efforts on this resource during the low period for "offshore" pelagic species, for an average of five months. Most conch fishers undertake more than three dives a week and land an average of 300 conchs per trip. The number of conch landed per trip is dependent on the number of divers and the number of dives undertaken during a trip, and can range from 100 - 500 conch (Walker 2003). Walker (2003) indicated that two divers enter the water per trip and that each diver undertakes between three to four dives (inclusive of decompression dive). Subsistence exploitation occurs in shallower areas, but the extent is unknown.

Due to the nature of the fishery, the marketing system, and an informal policy of the Department of Fisheries, the majority of Queen conch harvested are landed whole (live) and then sold immediately or stored in wire-meshed cages in shallow areas close to shore until sale is obtained.

Two management objectives have been defined for this resource and are articulated in the *Plan for Managing the Fisheries of Saint Lucia (2001- 2005).* They include rebuilding the near shore stocks and ensuring sustainable use of this resource. Options identified for attaining these objectives include initiating a flared lip thickness restriction, controlling effort through a licensing system, implementing closed areas or seasons and co-management arrangements with resource users.

4.3.2 Trends in catches or landings during 1993-2004

Landings of Queen conch have increased steadily in the last few years (Figure 5). This increasing trend can be attributed to an increase demand both in the tourist and local markets.



(Source: Department of Fisheries, 2005)

Figure 5: Landings of conch from 1993 to 2004

Although conch does not contribute significantly to the total landings, this fishery is economically significant to the livelihood of fishers, particularly in Gros Islet where the highest landings of conch are recorded.

4.3.3 Collection of catch and effort statistics during 1999-2004

Over the past decade, very little information on major single species fisheries such as conch has been collected on a consistent basis. Prior to 2001, conch landings were only captured for Gros Islet in the north, where the majority of conch is landed.

In 2001, the sampling plan was revised to include two other sites in the southwest, where fishers from one of these sites are also known to target conch. This revision has improved the information base for this species. Analysis of the 2002 data indicated that conch is now landed at four landing sites: Gros Islet, Castries, Laborie and Vieux Fort.

4.3.4 Fisheries legislation and regulations in effect during 1999-2005

The Fisheries Regulations No. 9 of 1994 provide the mandate for the management of the conch fishery at the national level by prohibiting the harvesting of conch of less than 180 mm total shell length, less than 1 kg total weight and less than 280 g meat weight, not including digestive glands. In addition, these Regulations restrict harvesting of immature conch, defined as individuals without a flared lip. However due to financial and manpower limitations, enforcement focuses on only one of these Regulations - the harvesting of individuals with flared lips due to the ease of implementation in the field. The Fisheries Regulations also make provisions for a closed season but, to date, this management measure has not been implemented.

In 2001, the Department of Fisheries with assistance from FAO, embarked on an initiative to review and revise the fisheries legislation.

4.4 Large Pelagic

4.4.1 Introduction

This fishery, like the other fisheries in Saint Lucia, is primarily conducted from small, open boats, with trolling lines operated by hand. The offshore pelagic fisheries contributed 70% of the annual landings by weight (Department of Fisheries, 2004), which is made up of a number of migratory species, including dolphinfish (*Coryphaena hippurus)*; mackerel (*Stromberomorus* spp.*)*; Wahoo (*Acanthocybium solandri)*; blackfin tuna (*Thunnas atlanticus)*; yellowfin tuna (*Thunnus albacares)*; Skipjack tuna (*Katsuwonus pelamis)*; sharks (various families); and billfishes (*Istiophoridae, Xiphiidae*).

The catch is highly seasonal, with the majority of activity and landings occurring between December and June, but peaking between January and April each year. This fishery is active at all landings sites, but is more prominent at Dennery located on the east and Vieux Fort to the south of the island.

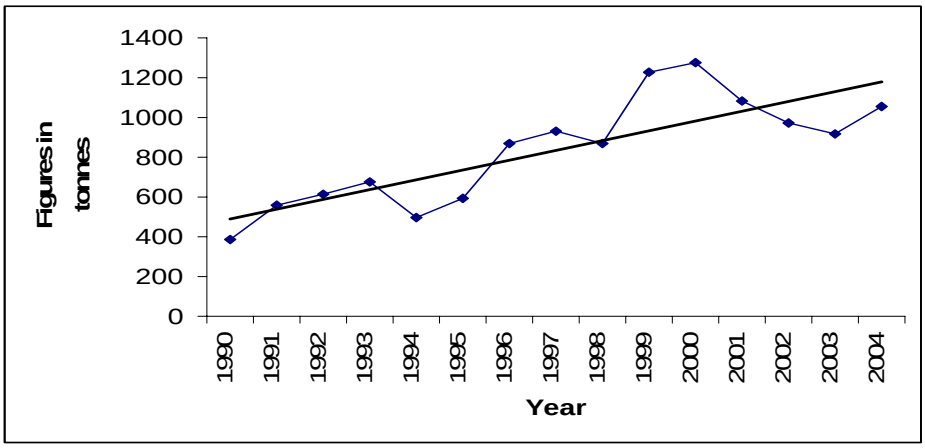
The Department of Fisheries, cognizant that many of the nearshore resources are exploited to over exploited for the last few years, has promoted the offshore pelagic fishery through the introduction new fishing technologies such as Fish Aggregating Device (FADs), and new fishing techniques such as longlining.

Unlike the nearshore fisheries, such as lobster and conch, which are regulated at the national level under the Fisheries Act No.10 of 1984 and the Fisheries Regulations No. 9 of 1994, the pelagic fishery is currently not regulated at the national level. The management objectives for this fishery, as outlined under the Fisheries Management Plan, include:

- The promotion of the sustainable development of the commercial and sport fisheries for large pelagic species;
- Cooperation with other Caribbean States to manage the large pelagic resources;

4.4.2 Trends in catches or landings during 1990-2004

Generally the trend in landings of large pelagics has steadily increased in the last few years (Figure 6) with large pelagics accounting for 70% of the annual landings in 2004.



(Source: Department of Fisheries 2005)

Figure 6: Pelagic Landings (tonnes) from 1990-2004

The trend in increased pelagic landings may be contributed to the efforts undertaken by the Department of Fisheries to promote the fishery as an alternative to the nearshore fishery.

4.4.3 Gear Trends during 1990 - 2004

As part of its efforts to encourage more fishers to enter the pelagic fishery, the Department of Fisheries through its Extension Unit has trained many fishers in the use of longline fishing (palang) on the Department's research vessel. However, few fishers have been able to adapt this technique to their open pirogues, and as a result of this, trolling is the predominant fishing method used to target pelagics.

Fishers have also adopted a fishing method from the French islands, known as drift line fishing. Under this method a vertical line between 50 to 100 meters with one or two hooks is attached to a buoy and placed in the water.

4.4.4 Introduction of new fishing technologies during 1999 -2004

Offshore pelagics remain the major focus for developmental initiatives within the fisheries sector. The Department of Fisheries is actively promoting the deployment of Fish Aggregating Devices (FADs) to assist fishers with their catch. Over the last decade, the Department of Fisheries in collaboration with fishing communities have deployed several FADs in waters adjacent to fishing communities.

In addition, the DOF staff conducted a number of awareness and sensitisation programmes within the major fishing communities to sensitize fishers as to the benefits of FADs and highlight certain practices that they should not engage in while fishing near a FAD.

4.4.5 Collection of catch and effort statistics during 1999 - 2004

Landings information on pelagics is collected at the nine landing sites that are presently sampled, with Vieux Fort and Dennery accounting for the highest landings of pelagics on the island. Presently, the Department of Fisheries is unable to verify the proportion of pelagics captured near FADs and, as a result, the impact that FADs are having on pelagic catches.

Large pelagics are grouped under the following categories: tunas, dolphinfish, wahoo and shark. Analysis of landings of these species between 2000-2003 with the exception of 2003 data show highest landings for dolphinfish followed by tunas (Table 1).

Table 1: Landings of Large Pelagics (tonnes) from 2000-2004

Year	Tunas	Wahoo	Dolphinfish	Shark
2000	473.4	243.1	555.1	4.9
2001	404.4	214.0	427.0	4.5
2002	319.91	242.92	402.17	10.47
2003	456.17	169.3	286.62	5.93
2004	418.9	238.0	375.6	20.3

(Source: Department of Fisheries)

4.4.6 Fisheries legislation and regulations in effect during 1999-2001

Due to the migratory nature of pelagics, there are currently no regulations controlling the harvest of these species for commercial fishing within national waters, as management regimes need to be established at the regional and international scale.

However, under the Fisheries Regulations No. 9 of 1994, the Department of Fisheries regulates sportsfishing, which targets pelagic species.

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NATIONAL REPORT TRINIDAD AND TOBAGO

By: Fisheries Division

1.0 DESCRIPTION OF THE FLEETS

1.1 The Semi-Industrial Pelagic Longline Fleet

In 2005 the number of vessels in the fleet increased from 10 to 14.

2.0 DESCRIPTION OF THE FISHERIES

2.1 The Coastal pelagic Fishery

The coastal pelagic fishery of Trinidad is described in Ferreira and Martin (2005). This report provides additional information on the small coastal pelagic component of this fishery. The small coastal pelagics caught in Trinidad and Tobago include several species belonging to the following families: Clupeidae (Herrings), Engraulidae (Anchovies); Carangidae (small jacks); Belonidae (needlefish) and Hemiramphidae (half beaks). Juveniles of the families Carangidae (larger jacks), Scombridae, Pomatomidae and Sphyraenidae are also caught. Mohammed (1996) gives a detailed list of the associated species. Although the beach seine is the most popular gear associated with the small coastal pelagic fishery in Tobago, the species in Trinidad are caught by a variety of gears: Italian seines, bait seines, beach seines, tuck seines and trawl nets (by-catch). Details of the associated gears and boats are provided in Ferreira and Martin (2005), Chan A Shing (2002) and Mohammed (1996).

2.1.1 Management Objectives

The general management objective is to ensure that the exploitation of the fisheries resources and the conduct of related activities, are consistent with ecological sustainability (e.g. for target species, non-target species, and marine environments) and that proper conservation and management measures are implemented so that the fisheries resources are not endangered by over-fishing.

2.1.2 Fishing vessel and gear trends

The small coastal pelagic fishery is targeted by the artisanal, multi-gear fleet using a variety of gear, all mainly nets. Trends in the number of fishing vessels and gear are provided in Table 1.

Table 1. Number of vessels by primary gear type.

Gear	1991 (# Vessels)	1998 (# Vessels)	2003 (# Vessels)
Trawl	186	114	98
Multifilament gillnet	216	195	174
Monofilament gillnet	163	133	172
Italian Seine	20	12	7
Beach/Land Seine	25	18	12
Joined Multi/Monofilament	0	2	0
Bait Seine	0	5	1

2.1.3 Trends in catches or landings

The main species recorded in the landings in Trinidad are herrings (Clupeidae), Jacks (*Decapterus spp.*), Anchovies or Sardines (Engraulidae: *Anchoviella* spp; *Anchoa* spp; *Cetengraulis edentulus*; *Engraulis eurystole*), Jashua (*Sardinella spp.*), Needlefishes (Belonidae: *Tylosurus spp.*) and Halfbeaks or Ballyhoo (*Hemiramphus brasiliensis*). Estimated annual landings of small coastal pelagics between 1995 and 2004 have ranged between 41 and 952 tonnes, with an annual average of 271 tonnes. Over the same period tuck seines have accounted for 70 percent of the landings, trawl nets for 11 percent, multifilament gillnets for 8 percent and Italian seines for 5 percent. Anchovies are most common in catches of the trawlers and Italian seines while jacks, needlefishes and *Sardinella* spp. are most common in catches of the multifilament gillnet. *Sardinella* spp. are more common in catches of the beach/land seine, Italian seine and gillnets (fillet and monofilament) while most of the herring is caught with tuck seines.

2.1.4 Collection of catch effort statistics

The collection and analysis of landings and effort statistics is described in Ferreira and Martin (2005). Data collection for this fishery however, poses a challenge. Often, commercially important species (e.g., *Caranx hippos* – cavalla) are caught along with small coastal pelagics. When landings of larger commercial species are abundant Data Collectors tend to record only landings for the commercially important species. Some gear pose challenges for data collection when the overall catch is kept penned at sea and sold over a period of days. Guidelines for data collection to facilitate resource assessment are necessary.

2.1.5 Research

Limited research has been conducted on small coastal pelagic species. In Trinidad Heileman (1987) found that *Opisthonema oglinum*, *Harengula jaguana* and *Sardinella aurita* were the most abundant in the landings. *Opisthonema oglinum* and *H. jaguana* were more prevalent from July to December (wet season) while *S. aurita* showed no seasonality. Maharaj and Recksiek (1991) investigated the seasonality, species composition and weight of by-catch associated with the artisanal shrimp trawl fishery in the Gulf of Paria. Highest quantities of by-catch were observed from July to December. The estimated by-catch for 1986 was 1,594 tonnes, of which 620 tonnes was finfish, about 70-80% of which comprised juveniles and adults of *Harengula* spp., *Cetengraulis edentulus*, *Chloroscombrus chrysurus*, *Eucinostomus* spp, *Diapterus rhombeus* and *Cyclopsetta* spp. Annual harvestable biomass of approximately 20,000 tonnes of sardines anchovies and small carangids, with associated average catch rates of 56 kg/hr, 22 kg/hr and 82 kg/hr, were estimated off Trinidad's east, north and south coasts in 1988 (Institute of Marine Research, 1989). Engraulids (*Anchoa* spp., *Anchoviella* spp., *Centgraulis* spp.), Clupeids (*Pellona* spp., *Chirocentrodon* spp., *Harengula* spp., *Opisthonema* spp., *Sardinella* spp.) and Carangids (*Chloroscombrus* spp., *Selene* spp., *Trachinotus* spp., *Oligoplites* spp., *Decapterus* spp.) were the dominant species occurring in the survey.

Examination of catches from set-nets off Teteron Bay and Maracas Bay, Trinidad between 1999 and 2004 and off Castara and Plymouth, Tobago between 2002 and 2004 was conducted under the Project for the Promotion of Sustainable Marine Fisheries Resource Utilization funded by the Japan International Cooperation Agency. The set-net is operated in a community setting, in bays or calm areas along the coastline, with soft-muddy substrate and within the part of schooling fish. It targets mainly pelagic, mid-water and demersal fish in depths of about 12m and allows for the release of by-catch, in live condition. A description of the gear is provided in Fujii *et al.* (2002) and Morimitsu *et al.* (2003). In 2002, average daily catch of clupeids and engraulids from the choko-ami net (medium-scale) set off Maracas was 5455 kg, and average daily catch of other species was 591 kg. Reduction in the size of the net (Otoshi/Masu-ami) yielded an average daily catch of 909 kg at Maracas in 2003, comprising mainly *Sardinella* spp. Experiments off Castara

using the masu-ami, yielded mainly jacks and anchovies in the catch (each about 55 kg over six days); with smaller quantities of sprats, snappers, cavalli and grunts (Caesar, 2002). About 80% of the jacks caught were females, many in spawning condition. Experimentation with the Otoshi/Masu-ami off Plymouth, Tobago caught less fish than in Trinidad. The main species caught were Engraulids (Jashua, *Sardinella* spp.), clupeids, bigeye jack (*Selar crumenophthalmus*), Marianne (*Holocentrus ascensionis* or *Heteropriacanthus cruentatus*), cutlass fish (*Trichiurus lepturus*), Banaan (*Albula vulpes* or *Elops saurus*) and Stingray (Dasyatidae). In all instances, experimentation involved the associated fishing communities in gear construction and deployment as well as retrieval of the catch. It was felt that more economic, social and ecological information was required before a decision could be taken on the introduction of this gear. However, limited enforcement and inadequate legislation hinder the Division's ability to monitor any possible introduction of the gear.

2.1.6 Fisheries Legislation and Regulations

Current legislation impacting on coastal pelagic species include specific restrictions on gear dimensions (net length; width; mesh size) of seines, trawl nets (cod end mesh size must be no smaller than 7.5 cm when trawling for fish, and 3.5 cm when trawling for shrimp); no further increases in the number of trawlers, gillnets (minimum mesh size (diagonal stretched mesh) of approximately 11 cm (4.75 inches) except where mullet is targeted) and prohibition of the sale of sardines (mainly Engraulids – *Sardinella* spp.) other than to bona fide fishers for use as bait. Policy recommendations support the reduction of by-catch in the shrimp trawl fishery through the introduction of By-catch Reduction Devices. This is the subject of a current international project funded by the Global Environment Facility, in which Trinidad and Tobago is a participant.

2.2 Soft-Bottom Demersal (Shrimp and Groundfish) Fishery

2.2.1 Research

2.2.1.1Shrimp

An assessment of shrimp (five species) was conducted using data from Trinidad and Tobago and Venezuelan trawl fleets operating in the Orinoco Delta-Gulf of Paria region for 1988 to 2003 in a biomass dynamics model (the logistic or Schaefer model) (Alio *et al* 2005). The results indicate that the stock is overfished. The biomass appears to have consistently declined since 1988. The maximum sustainable yield is in the region of 1300 t and catches higher than this will not be sustainable. Rebuilding the stock could realize 60% increase in the current catch rate, while making the same catch as currently being landed. The assessment recommended that new fishing controls (such as a closed season ranging from one month (January) to four months (November to February) when the greatest percentage of small shrimp is landed) be introduced to decrease the total number of vessels and/or days at sea permanently.

Virtual Population Analysis (VPA), yield per recruit and biomass per recruit assessments were performed for *F. notialis* and *X. kroyeri* using data for the period 1992 to 2002 from Trinidad trawl fleets (Ferreira and Medley, 2005). The yield per recruit for the two species combined suggests that the stocks are close to full exploitation with the 2002 fishing effort of the trawl fleets directed at these species being estimated to be about 71% of the effort required to obtain the maximum yield from the fishery. The biomass per recruit for the *F. notialis* females suggests that the stock is fully exploited while the biomass per recruit for the *X. kroyeri* females suggests that this stock is overexploited. In spite of the uncertainties in the assessment due to the limitations of the data and the models, a precautionary approach should be applied. The recommendation is therefore to control the fishing effort on these stocks by limiting the numbers of trawlers with a

view to reduction in fleet size. This will require the implementation of a licensing system for trawlers and updating of the fisheries legislation to facilitate a limited entry fishery.

2.2.1.2 Groundfish

Trinidad and Tobago is participating in a global project funded by the GEF and co-ordinated by the FAO, Project EP/GLO/201/GEF "Reduction of Environmental Impact from Tropical Shrimp Trawling, through the Introduction of By-catch Reduction Technologies and Change of Management". This project seeks to reduce the negative environmental aspects of bottom trawling through the removal of barriers to the introduction of environmentally friendly gear and fishing practices. One of the specific objectives of the project is the reduction of discards of fish captured by shrimp trawlers. This involves gear modifications and the introduction of bycatch reduction devices (BRDs).

The Fisheries Division, in collaboration with the University of the West Indies (UWI), is conducting a study on the social and economic importance of bycatch in the trawl fishery industry and the communities supported by the industry. This activity is being funded by the FAO under the Project EP/GLO/201/GEF. The results of the study will be utilized in addition to biological data collected and this information will ultimately inform management decisions aimed at ensuring the economic viability of the fishery and the well-being of related coastal communities.

2.2.2 Data Collection

In 2004 an ongoing biological sampling programme was established for two species of groundfish, *Micropogonias furnieri* (Whitemouth croaker) and *Lutjanus synagris* (Lane snapper). These are two of the main landed bycatch species in the trawl fishery. Length frequencies have been collected from the artisanal, semi-industrial and industrial trawl fleets and computerized in Excel.

Biological data were collected for Serra Spanish mackerel and King mackerel from March to November 2004. Length frequency data were collected for the artisanal fleet operating out of Trinidad. Coverage in relation to the number of landing sites around the island was 17% (Martin, 2005). This data collection programme was terminated due to human resource constraints at the Fisheries Division.

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NATIONAL REPORT OF THE TURKS AND CAICOS ISLANDS

By: Kathy Lockhart, Department of Environment and Coastal Resources

1.0 INTRODUCTION

The Turks and Caicos Islands (TCI) are a group of calcareous islands containing approximately 193 miles^2, of which only 10% is land. The islands are located at the south-eastern end of the Bahamian archipelago, approximately 145 km north of Hispaniola. The Turks and Caicos Islands consist of eight main islands and a series of uninhabited cays dissected by three shallow water banks: the Caicos Bank, the Turks Bank and the Mouchoir Bank.

The most valued industry in the TCI is tourism. However, in terms of export earnings the most valuable industry is the marine fisheries including queen conch (*Strombus gigas*) and spiny lobster (*Panulirus argus*). Most of the catch is landed at the various processing plants within the TCI. However, there is suspected that a significant amount of the catch is not landed at the plant but instead utilized for the local market and consumption. The report will focus on two key species conch and lobster, but will also include other smaller species.

2.0 DESCRIPTION OF FISHERIES AND FLEET

The Turks and Caicos Islands base commercial fishing on the shallow water banks, primarily the Caicos Bank and the Turks Bank. The Mouchoir Bank is considered within the territorial water of the TCI. However, the increased distance requires larger boats, which are not largely utilized in the TCI. The vessels most often utilized in the TCI are small retrofitted V-hull boats ranging in length from 18 ft-20 ft with an 85-115 hp out board engines. There are 2 trap boats that collect lobster and finfish.

Commercial fishermen from the TCI often work more than one fishery at a time. During the open season of lobster, fishermen largely capture spiny lobster. Near the end of the lobster season (around February or March), the fishermen re-prioritize capture and start landing queen conch.

Within the past ten years, the commercial fisheries have directly employed an average of 377 fishers per year. In 2004/2005 fishing season, the number of commercially licensed persons decreased by 20%, from an estimated 454 in 2003/2004 to 366. Similarly the number of commercially licensed vessels remained fairly consistent at 154 licensed vessels in 2003/2004.

3.0 POLICY AND REGULATIONS

Within the Fisheries Management Plan, management strategies have been created. A strategy is to discourage part-time fishers and foreign fishers from participating commercially in the marine fisheries. This strategy has been encouraged by the Department by increasing license fees.

Finally the Department is looking to enter into a bilateral and/or multilateral agreement with regional countries such as the Bahamas, Dominican Republic and Cuba. Through these agreements the Department hopes to improve the management of the fishery, increase enforcement and improve research collaboration. Some of these agreements could involve the FAO-WECAF and/or CRFM to aid in fostering a sustainable regional management of the marine fishery.

3.1 Queen Conch Management Strategies

A conch management strategy is to explore the feasibility of modifying the regulation of minimum size from shell length to shell lip thickness, which would prove a better indicator of size at sexual maturity. However, along with this there needs to be investigation of the phenomenon of "stunting" in queen conchs found on the Caicos Bank.

3.2 Spiny Lobster Management Strategies

A lobster strategy is to establish a Total Allowable Catch (TAC) for the lobster fishery. This strategy will have clearly defined reference points such as a Target Reference Point (TRP) and a Limit Reference Point (LRP).

Another management strategy is prohibiting restaurants and hotels from having in their possession or offering for sale lobster on their menu during the closed season. Here the Department has already created and passed an amendment to the Fisheries Protection Ordinance. This amendment does not allow restaurants/hotels to have lobster for sale during the closed season.

The Department is also trying to encourage local market for lobster derivatives. This could allow for the reduction in processing waste and improve the resource user's net income.

3.3 Finfish Management Strategy

The Fisheries Department plans to implement the United Nations precautionary principle for managing straddling fish stocks and highly migratory fish stocks. It also intends to update the 1990 finfish stock assessment carried out by Medley and Ninnes, by conducting a rapid survey to determine current stock levels. After a stock assessment has been conducted the DECR can then establish harvesting limits (Quota or TAC) with clearly defined reference points, e.g. Target Reference Point (TRP) and Limit Reference Point (LRP) taking into consideration in calculating the annual TAC external extremities such as unreported catch destined for home consumption and poaching by foreign vessels.

To establish a basis for stock assessment, protection of stocks and protection of spawning aggregations, biological research will be conducted to develop regulations such as minimum size, protected areas and closed seasons. Currently, the DECR is developing a monitoring strategy that would allow for the collection of catch and effort data. The Department is also attempting to implement legislation/regulations to promote catch and release by sport fishers.

The Turks and Caicos Islands are also active participants in international fishing agreements such as ICCAT and CRFM. These agreements are to foster sustainable regional management of the coastal and large pelagics.

3.4 Mariculture Management Strategies

The Turks and Caicos Islands are promoting the sustainable development of a mariculture/aquaculture sector. If promoted, mariculture can be used as a means to reduce pressure and effort on the wild populations. It could also diversify the fisheries sector by increasing jobs and revenue.

In order for the Fisheries Department to attain a high quality mariculture fishery, specific guidelines are being created to facilitate the development. However, the TCI is encouraging investment in sustainable mariculture/aquaculture enterprise. Perhaps there could even be a partnership with government agencies and private agencies to develop mariculture and provide education, research and ecologically value-added products.

3.5 Current Regulations in the TCI

3.5.1 Conch

Minimum size restrictions based on shell length (7 inches or the equivalent meat weight of 8 ounces).
Closed season since (July 15-October 14) - CITES Export information aids in the determination of the closing of export.
Gear restrictions; the use of SCUBA gear is prohibited.

3.5.2 Lobster

Minimum size restriction of 3.25 inches; closed season (April 1-August 1); gear restrictions; the use of SCUBA gear is prohibited unlawful to be in possession of any egg-bearing spiny lobster or to strip or in any manner molest any egg-bearing spiny lobster in order to remove the eggs. Unlawful for restaurants and hotels to sell lobster during the closed season

3.6 General Trends and Issues

3.6.1 Status of the Conch Fishery

Strombus gigas (Queen Conch) is the largest export for commercial trade in the Turks and Caicos Islands. This series of data is one of the most extensive data collections in the Caribbean region. The Queen Conch landing have fluctuated from 5,773,906 lbs. (2619 MT) in 1943 to an all time low of 36,155 lbs. (16.4MT) in 1969 after Hurricane Donna (1960). The fishery rebounded and has remained fairly consistent at a current Maximum Sustainable Yield (MSY) of 1,674,990 lbs (760 MT) in 2004. Fluctuations could have occurred from over-fishing and other independent factors such as climate, World Wars I and II and shift to more lucrative employment (Medley & Ninnes 1999, Bene & Tewfik 2001).

Economically, the Queen Conch is the second most valuable fishery in the TCI. The TCI exports approximately 600,000 lbs. of wild harvested conch meat, 190,000 lbs. of conch trimmings, 7,100 lbs. of mariculture conch meat, 1,800 mariculture live conch and 13,000 conch shells and shell derivatives.

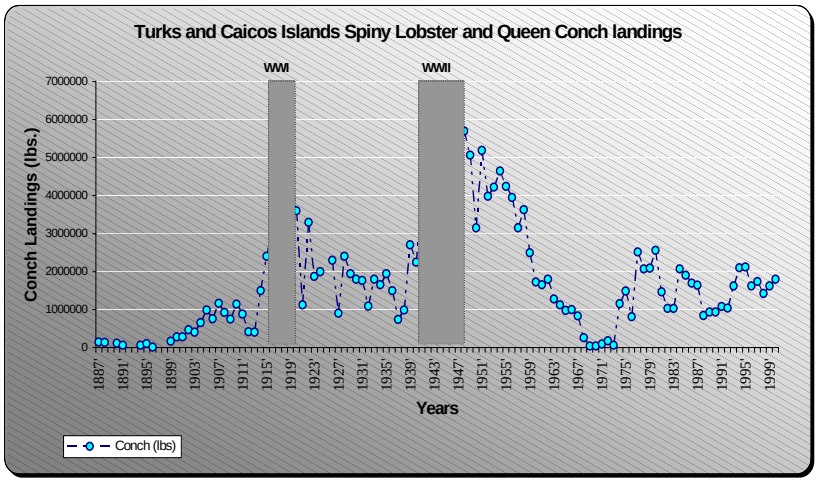

Figure 1: Historical catch landings of Queen Conch, showing the trends and fluctuations in catch over the years.

Even though the Queen Conch is fished extensively throughout the Turks and Caicos Islands, the populations are considered stable. The Turks and Caicos Islands are utilizing a precautionary approach. The Convention of International Trade of Endangered Species of Flora and Fauna (CITES) has Queen Conch listed on Appendix II. Appendix II allows for the international trade with specific permitting. Even though the TCI has not yet ratified to the convention, it is actively instating the protocol of CITES.

A Scientific Authority and Management Authority have been created to aid in the monitoring of the species. The Scientific Authority determines a National Quota for Queen Conch based on a modified Schaefer Model. The quota is then provided for the Management Authority to execute. With many years of catch and effort data, the quota has been set near 1.6 million lbs. of landed conch over the past few years. Through calculations it is estimated that approximately 600,000 lbs. (272,160 kg) of clean meat and trimmings is the current national annual export quota.

The TCI also has created a CITES export permit that is signed off by the Management Authority. The Class "A" Processing Plants will request a permit for export. After it is determined that the plant is within the export quota, a permit will be issued for exportation.

The Fisheries Department has investigated whether the modified Schafer Model is consistent with the current stock. In 1999, a Visual Survey was conducted on the Caicos Bank. Upon analysis of the visual survey, it was determined that the modified Schafer Model (quota) is consistent with what is available for catch landings on the Caicos Bank.

Throughout the Caribbean Region, many Fishery Protected Areas are becoming established. It is suggested that Protected Areas can and will enhance a fishery. Various studies have been conducted within the East Harbour Conch and Lobster Reserve. It was found that there were differences in densities and age structure, with juveniles being significantly denser in fished areas than adults (Tewfik and Bene 1999). Total densities in algal plain in fished areas were 687.2 conchs/ha versus densities of 2162 conchs/ha in protected areas. After calculations it was determined that the overall mean density for both protected (EHCLR) and fished areas (Caicos and Turks Banks) was reported to be the highest in the region at 426.53 conchs/ha.

3.6.2 Status of the Lobster Fishery

Panulirus agrus (Spiny Lobster) is one of the most predominant species for commercial trade in the Turks and Caicos Islands. The landings have fluctuated over the years with a peak in 1992 at 1,312,795 lbs. (590 MT) and a decline of 400,375 lbs. (320 MT) in 2001/2002 fishing season (Figure 2). It is believed that the fluctuations are caused by recruitment to the TCI fishery and/or legal stock size.

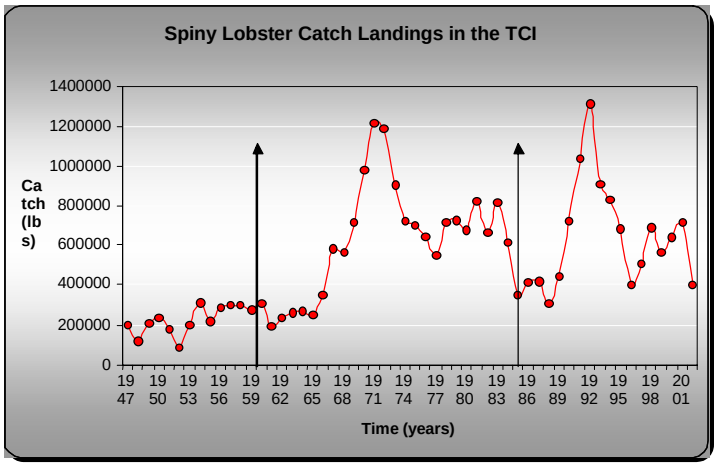

Figure 2 : Graph of catch landings for the Spiny Lobster fishery of the Turks and Caicos Islands. The fishery is characterized by high fluctuations in catches, reaching a peak in 1992.

Even though the catch per unit of effort (CPUE) remains relatively stable around 58-kilograms/man-day from 1985 to 2002, the lobster fishery has over 30% of the total catch landed during the month of August, which is the beginning of each lobster season.

In 2001, an assessment of the spiny lobster stocks of the TCI was conducted utilizing the Gordon-Schaefer and Thompson-Bell models. At that time, both models indicated that the fishery was operating near the Maximum Sustainable Yield (MSY). Both models indicated that the TCI lobster fishery is an open access system. With this current system, the cost of fishing and an elevated effort, the fishery is operating close to the Maximum Economic Yield (f_{MSY}) (Figure 3). If the fishing effort continues to increase, the result could be a loss in profit.

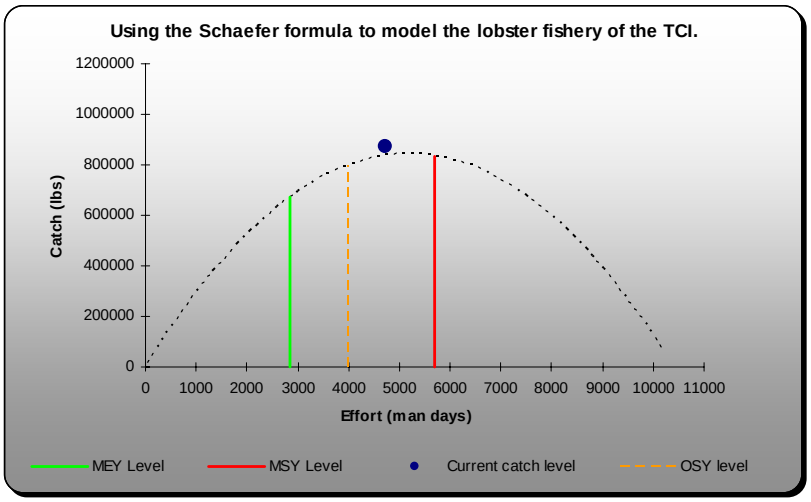

Figure 3: Graph simulating the spiny lobster fishery of the Turks and Caicos Islands. Current catch is very close to the MSY level. The TCI fishery is open access; increase in effort may cause catch to surpass the MSY limit causing overfishing.

The Fisheries Department also conducted analysis on morphometric sampling from 1989-1998. Once lobsters were landed (not purchased by processing plants), they were measured for weight, size and reproductivity. The analysis suggests that approximately 41.3% of the lobster landed

annually were comprised of undersized lobster. This converts to approximately 22% of the total landed catch that is sold to local restaurants, hotels and for personal consumption.

Finally, over the past 20+ years an increase in use of noxious substances has occurred. Bleach or Joy mixed with gasoline has been utilized to flush lobster from their dens to decrease effort and increase catch. Currently the Fisheries Department is conducting research to determine if the "bleach test" if viable in the TCI waters.

3.6.3 Status of the Fin-fish Fishery

The Finfish of the Turks and Caicos Islands has not been a fully utilized fishery. The Fisheries Department has been unsuccessful in collecting information regarding finfish, including shallow reef fish, deep-slope fish, coastal pelagic fish and large pelagic fish. The catch history of these various fisheries is unknown. Finfish are usually sold directly to hotels, restaurants and fish markets, which are for local consumption. It is believed that the fin-fishery is underutilised. Ninnes reported in 1990 a potential yield of 70-140 kg/km off the shelf perimeter of the Turks and Caicos Islands (Caicos Bank, Turks Bank, and Mouchoir Bank).

3.6.4 Status of the Mariculture Fishery

The Conch Farm is the only economically profitable establishment in the world that produces juvenile farmed Queen Conch for sushi food markets in the USA and for the aquarium trade. Since the mid 1990's, export of mariculture/aquaculture conch meat has remained steady at approximately 6000 lbs.

4.0 DATA COLLECTION AND RESEARCH

4.1 Queen Conch and Spiny Lobster

The Department of Environmental and Coastal Resources (DECR) Fisheries has been collecting catch data since 1887, however effort data has only been collected since 1977. This series of data is one of the most extensive data collections in the Caribbean region. Everyday the number of fishers per vessel and the catch data (number of pounds) are recorded at each of the processing plants. Effort is standardized and measured as man-days (number of days fished multiplied by the number of fishers in the boat). Catch per unit-effort (CPUE) is measured as weight of product per man-day (kg man-day^{-1}).

4.2 Mariculture

Currently all mariculture data is collected from CITES Permits issued for export. However, with the help of the Caicos Conch Farm, more information about mariculture of Queen Conch is being collected.

4.3 Local Consumption of Marine Products

The DECR has recently conducted a local consumption survey. The purpose of this survey was to improve data collection of the marine resources. In 2005, the data for queen conch consumption was analyzed. The local consumption index was then incorporated into the surplus model for the Conch assessment. However, there is yet to be concluded a Tourist Consumption survey that should yield a consumption index for visitor of the TCI.

4.4 Local Restaurant Usage of Marine Product

The DECR has developed and implemented a receipt form for local restaurants and hotels. The form collects information pertaining to the amount of marine product flowing through the

restaurant and/or hotel. The forms collect monthly information and are returned to the DECR and placed onto a database to provide more data on our local usage of TCI seafood.

4.5 Other Research

4.5.1 Conch Visual Assessment

As stated in the 2003/2004 National Report, a visual survey was conducted in 2001 by the DECR. Currently, we are conducting a conch visual survey of the Turks and Caicos Islands East Harbour Conch and Lobster Reserve, but intend to conduct a Caicos Bank visual survey within the next 2 years.

4.5.2 Lobster Recruitment Index

The Department realized that the spiny lobster is fluctuating in catch. This could be attributed to a variety of reasons. The Department is currently conducting research to determine the rate at which spiny lobster are retained on the Banks of the Turks and Caicos Islands and are ultimately recruited into the fishery. Casitas have been deployed and are currently being monitored. A private consultant has also deployed collectors and they also are being monitored. The intension of this research is to determine the recruitment of juvenile lobster in commercially important fishing grounds and possibly predict the sustainability of the resource and provide information to improve the management strategies for the DECR.

4.5.2 Spiny Lobster Morphometric Sampling

During lobster season, many lobster are landed at the plants. From a bio-economic study in 2001, approximately 41% of the lobsters captured were undersize. The DECR implemented a sampling program that was conducted in the past 1998. Currently, the DECR has resumed the study in the 2004-2005 lobster season. There is a systematic sampling of the captured and landed catch at the processing plants. Prior to sorting at the scale, measurement of the morphometric parameters such as carapace length, weight, maturity and sex will be recorded. After analysis, the DECR will be able to ascertain if the regulations of the country are adhered to and if the capture of juveniles has any bearing on recruitment.

4.6 References

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