ISSN: 1998-1015

CRFM Fishery Report - 2011

VOLUME 1, Supplement 1

National Reports

Report of Seventh Annual Scientific Meeting - Kingstown, St. Vincent and the Grenadines 16 - 24 June 2011

CRFM Secretariat,
Belize
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CRFM FISHERY REPORT - 2011. Volume 1, Suppl. 1 – National Reports. Report of Seventh Annual Scientific Meeting – Kingstown, St. Vincent and the Grenadines, 16 - 24 June 2011.

Correct Citation:
CRFM. 2011. Report of Seventh Annual Scientific Meeting – Kingstown, St. Vincent and the Grenadines, 16 - 24 June 2011 - National Reports. *CRFM Fishery Report – 2011*. Volume 1, Suppl. 1. 65 p.

ISSN: 1998-1015
ISBN: 978-976-8165-46-6.

Published by the Caribbean Regional Fisheries Mechanism Secretariat,
Belize

Foreword

The Seventh Annual Scientific Meeting took place during 16-24 June 2011 in Kingstown, St. Vincent and the Grenadines. During this Meeting, CRFM Resource Working Groups examined data from the following fisheries: the flyingfish fishery of the Eastern Caribbean, the seabob fishery of Suriname, and the shrimp trawl fishery of Trinidad and Tobago and Venezuela. The SGWG also reviewed catch and effort data from the white shrimp fishery in Kingston Harbour, Jamaica. The LPWG conducted an exercise using catch and effort data from the blackfin tuna fisheries in St. Lucia, Vincent & the Grenadines and Trinidad & Tobago; reviewed the report on the fishing fleets targeting dolphinfish, flyingfishes and blackfin tuna in Martinique and Guadeloupe; reviewed the report on blackfin tuna catch, catch rates, and size structure from Venezuelan fisheries; and completed an ERAEF scoping analysis for the Eastern Caribbean dolphinfish fishery. This year's CLWG meeting was specially convened to facilitate the peer review of a Caribbean spiny lobster stock assessment that was conducted intersessionally in The Bahamas during 2010. The RSWG did not meet in 2011.

A training seminar on bioeconomics of the ecosystem approach to fisheries was held during the meeting of the DMTWG. An update on the progress made by the JICA FAD and Statistics pilot studies with special emphasis on the data collection, storage, and management aspects was also provided. A plenary session was held to review and discuss issues and recommendations pertaining to data, methods and training, as well as review the inter-sessional activities of the DMTWG.

During the plenary session of the Seventh Annual Scientific Meeting, updates were provided on relevant projects which included; the CIDA pelagic internship hosted by CRFM, the CLME project, the Regional Governance Framework Project, the CRFM/JICA Formulation of a Master Plan on Sustainable Use of Fisheries Resources for Coastal Community Development in the Eastern Caribbean Project, and the ACP Fish II Programme.

The Report of the Seventh 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 for 2011. Eight national reports were submitted for consideration by the Seventh Annual Scientific Meeting, and these are published as Supplement 1 to Volume 1. Volume 2 contains part A (Overview), and the fishery management advisory summaries of individual fishery reports comprising part B of each Working Group report, where relevant. Volume 1 is 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.

The covers for this volume were designed and prepared by Mr. Shaun Young, while the photographs were provided by Ms. Maren Headley, Ms. Elaine Ferrier, Mr. Motoki Fujii and Ms. Brooke Campbell. These contributions are gratefully acknowledged.

Table of Contents

List of Acronyms and Abbreviations

AFDP	-	Artisanal Fishery Development Project
BFC	-	Basseterre Fisheries Complex
BFD	-	Belize Fisheries Department
CARICOM	-	Caribbean Community
CARIFIS	-	Caribbean Fisheries Information System
CEO	-	Chief Executive Officer
CERMES	-	Centre for Resources Management and Environmental Studies
CITES	-	Convention on International Trade in Endangered Species
COP	-	Conference of Parties
CPUE	-	Catch Per Unit Effort
CRFM	-	Caribbean Regional Fisheries Mechanism
CZMA	-	Coastal Zone Management Authority
DECR	-	Department of Environment and Coastal Resources
DOF	-	Department of Fisheries
EEZ	-	Exclusive Economic Zone
FAC	-	Fishery Advisory Committee
FAD	-	Fish Aggregating Device
FAO	-	Food and Agriculture Organization of the United Nations
FD	-	Fisheries Division
FIS	-	Fisheries Information System
FPR	-	Fibreglass Reinforced Pirogues
GDP	-	Gross Domestic Product
ICCAT	-	International Commission for the Conservation of Atlantic Tuna
IFREMER	-	Institut Français de Recherche pour l'Exploitation de la Mer
IUU	-	Illegal, Unregulated and Unreported
JICA	-	Japanese International Cooperation Agency
JNCC	-	Joint Nature Conservation Committee
LMP	-	Lobster Management Project
LP	-	Large Pelagics
MSY	-	Maximum Sustainable Yield
MT	-	Metric Tonne
OHB	-	Old Harbour Bay
SCP	-	Small Coastal Pelagics
OECS	-	Organization of Eastern Caribbean States
STATIN	-	Statistical Institute (Jamaica)
TAC	-	Total Allowable Catch
TCI	-	Turks and Caicos Islands
UNCLOS	-	United Nations Convention on the Law of the Sea
USA	-	United States of America
UWI	-	University of the West Indies

NATIONAL REPORTS – CRFM MEMBER STATES

NATIONAL REPORT OF BELIZE

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1. Fishery and Fleet Description

The number of fishermen and boats employed in Belize's fishing industry varies year after year. However, there has been a general increasing pattern in the number of fishermen from 1731 fishermen in 2004 to 2472 fishermen in 2010 representing an increase of 43% (figure 1). This large increase in the number of fishermen is attributed to more Belizeans becoming fishermen due to unavailability of job opportunities and economic difficulties in other productive sectors, such as the sugar cane industry.

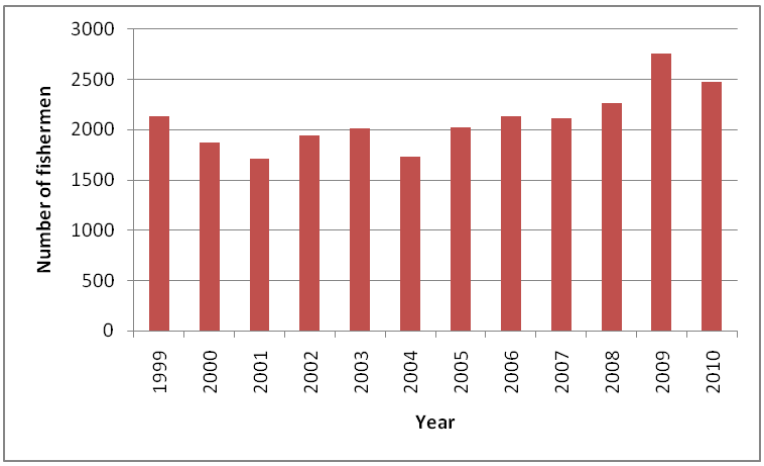

Figure 1. Number of licensed fishermen involved in the fishing industry during the period 1999 to 2010.

While the number of fishermen involved in the fishing industry has increased substantially, the number of boats has remained relatively stable during the period 2001 to 2010 as the number of boats employed in the industry has fluctuated between 600 and 700 boats (figure 2).

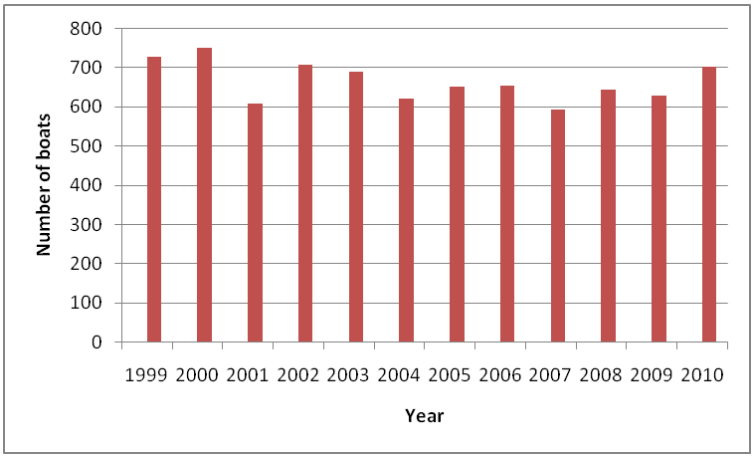

Figure 2. Number of boats employed in the fishing industry during the period 1999 to 2010.

2. Status of Main Fisheries

Lobster Fishery

Lobster fishing as an economic activity started in Belize in the mid to late 1950s and landings were initially low but the fishery developed and landings increased rapidly until it reached the highest recorded level of 1021 tons (live weight) in 1981.

In 2010, lobster tails production volume increased by 7.7% from 464,968 lbs in 2009 to 500,650 lbs in 2010. While lobster export volume decreased by 10.8% from 486,600 lbs in 2009 to 433,960 lbs in 2010, export earnings increased by 11.2% from $11.68 million in 2009 to $12.98 million in 2010. This increase in earnings is directly attributed to an improvement in the lobster tail price in the US market. Belize's lobster tails (figure 3) is exported primarily to the United States of America.

In 2010, lobster head meat production volume amounted to 53,685 lbs, which represented an increase of 15% compared to last year. The income generated from the export of 58,500 lbs of head meat amounted to $336,000.

Figure 3. Freshly landed lobster tails

A declining trend in lobster catches was observed during the period 1999 to 2009 while fishing effort (assuming number of fishermen is taken as a measurement of fishing effort) gradually increased (Figure 4).

While there have been some peaks and troughs in lobster production volume, in the last two decades lobster production volume has remained fairly stable averaging around 700 tons per year (live weight). Lobster landings however, have remained relatively stable in the last 5 years. One interpretation is that the lobster stock has reached its maximum yield and cannot produce additional biomass despite the high fishing effort being applied to this fishery. No additional fishing effort should be applied to this fishery and real efforts should be made to control and/or reduce the number of fishermen involved in this fishery.

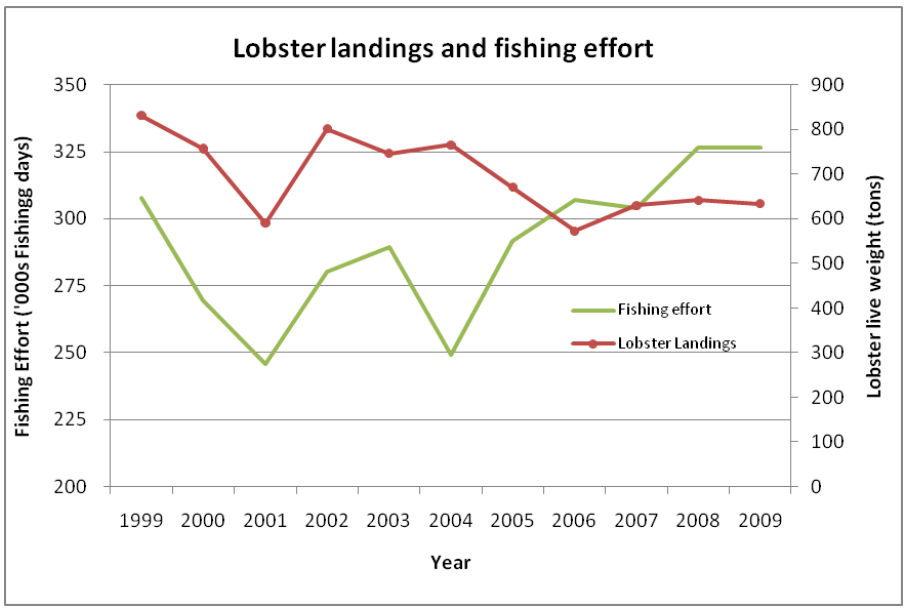

Figure 4. Lobster landings during the period 1999 to 2009.

Conch Fishery

Conch meat (figure 5) production volume experienced a slight decline of 4.1% from 736,017 lbs in 2009 to 705,775 lbs in 2010. Conch meat export volume increased by 4.9% from 691,900 lbs in 2009 to 726,050 lbs in 2010. The discrepancy in the production volume and the export volume is the result of a small portion of conch meat conch not sold by the fishermen cooperatives in 2009 and which was exported in 2010. Therefore, the export volume appears to be higher than production volume. Conch meat export earnings increased by 4.94% from $7.61 million in 2009 to $7.98 million in 2010. This increase in earnings is directly attributed to the increase in conch meat export and the slight improvement in conch price in the US market.

Figure 5. Freshly landed conch meat (85% clean)

Figure 6 shows annual conch production volume during the last 15 years (1996- 2010). Conch production volume gradually increased from 2002 to 2010. This increase is attributed to the increase in the number of fishermen during the same period. In simple terms this trend could mean that more conch meat was produced because more fishing effort was applied to the fishery, assuming that the number of fishermen is

taken as a measurement of fishing effort. It is noted however, that the number of fishermen (licensed fishermen) taken as a measurement of fishing effort needs to be considered with caution due to the fact that not all licensed fishermen are actually conch fishermen. In fact, with the recent implementation of the sport fishing license by the Coastal Zone Management Authority (CZMA) it is believed that many sport fishing guides obtained a general fisherman license to avoid paying the higher fees for the sport fishing license and these persons do not necessarily engage in conch fishing on a commercial basis. Therefore, the increase in production may not necessarily or entirely occur in response to the increase in the number of fishermen.

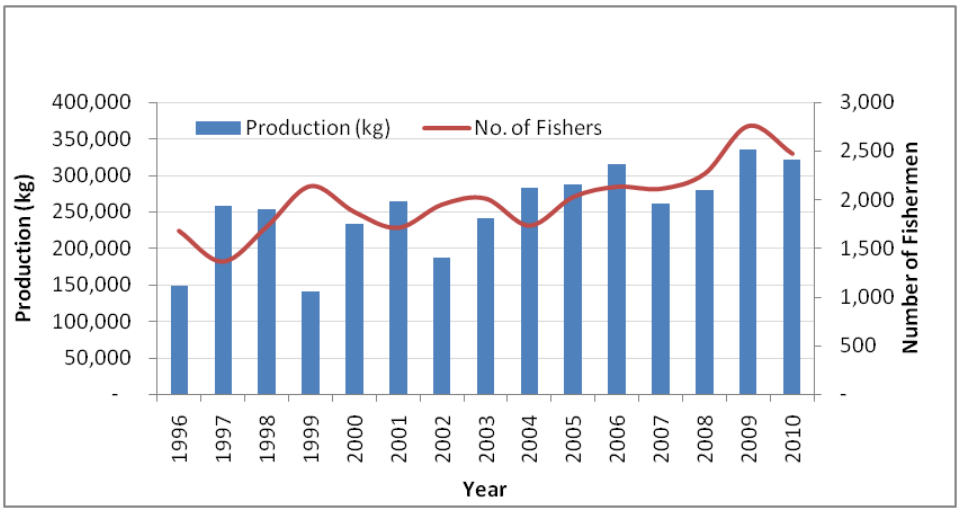

Figure 6. Conch production volume and number of fishermen during the period 1996 to 2010.

In general, the conch fishery is considered stable at this time. However, no additional fishing effort is being recommended in this fishery. A reduction in the number of conch fishermen (taken as a measurement of fishing effort) is recommended as it would allow the strengthening of the conch stock and existing conch fishermen could receive increased benefits through higher catch levels over time and increased earnings.

With proper enforcement and improved management efforts (for example: Managed Access/ Catch Shares) the conch fishery could remain at a viable level in future years.

Prognosis of the Main Fisheries

Lobster production volume is expected to remain stable with the possibility of a slight increase for the 2011 fishing season, following the relatively stable recruitment pattern for the last 4 years (M. Gongora, 2010). Lobster prices are expected to remain at current levels or increase slightly in the international market thus it is possible that earnings may increase.

If the pattern of increasing conch production volume with higher fishing effort continues in 2011, as has been observed over the last few years, then it is likely that production volume will increase in 2011. Fishing effort however, is not being recommended for further increase as the conch fishery is considered to be close to its maximum sustainable yield. Any further increase in fishing effort could put at risk the sustainability of this fishery.

Finfish production volume is expected to increase substantially in 2011. This is as a result of the high demand for finfish in the USA and countries in the Caribbean region, especially Jamaica. In 2010, finfish exports amounted to over 107, 000 pounds. This finfish export is the result of new entrants in the industry. Rainforest Company Ltd., a company operating out of Mango Creek in the Stann Creek District

received a finfish export license and exported 72,047 pounds in 2010. The remainder of the finfish export was done by PG Fisheries Company, another company operating out of Punta Gorda (purchase fish from fishermen in Mango Creek, Riversdale and Placencia areas) that has an agreement with Rio Grande Fishermen Cooperative, and Placencia Fishermen Cooperative. BRIFRA, a company operating out of Belize City has signed an agreement with National Fishermen Producers Cooperative is also expected to start exporting finfish to the United States of America in the first quarter of 2011. Increased monitoring and data collection in the finfish fishery will be carried out during 2011 with the objective to develop and implement management measures to ensure sustainability in this fishery.

Sea cucumber export is expected to remain strong in 2010 due to the high demand for this commodity in the Asian markets. The fishery is expected to remain stable as production volume in 2011 will continue to be managed by a quota system and the number of fishermen licenses will also be limited to ensure sustainability and viability of the fishery. Strict monitoring of catch landings and exports will be done in 2011.

Shrimp exports will be reduced to zero due to the new regulations banning all forms of trawling in Belizean waters. The little shrimp production volume by fishermen using cast nets and rudimentary fishing gears will produce just enough marine shrimp for the local markets in Punta Gorda Town and Belize City. Shrimp price is expected to increase in 2011 in these markets as demand for the product could increase while production will be minimal.

3. Statistics and Sampling

Catch per Unit Effort (CPUE) data for lobster and conch was gathered throughout the year from the two main fishermen cooperatives based in Belize City. The data sets have been compiled for the last five years. These data will be analyzed by the end of 2011.

Fishery dependent lobster catch data was collected during open fishing season in Fishing Zone 5 (most important fishing area) by the Capture Fisheries Unit. The marine reserves also collected some catch data in other fishing zones. Lobster catch data was also collected on a weekly basis at landing sites (fishermen cooperatives). All shipments of conch meat were inspected to ensure compliance with Belize's fisheries regulations before a CITES export permit is issued by the Fisheries Department.

Finfish production data was also collected on a monthly basis from fish markets in the principal coastal fishing communities including Corozal Town, Belize City, Dangriga Town and Punta Gorda Town. The monthly data sets collected in these communities include catches by species, catches, area fished, gear used and days spent fishing.

An assessment of the status of the conch stock in Belize was a major activity carried out in 2010 (see details in the research section).

4. National Fisheries Policies and Management Objectives

The national fisheries policy and management objectives remain practically unchanged for 2010 except for the recent approval (June 2011) by the Government of Belize for the development and implementation of a Managed Access/Catch Shares program that will be first introduced in the Glovers Reef and Port Honduras Marine Reserves.

It is remarkably heartening to notice that fishermen generally appreciate and accept the concept and implementation of the Managed Access/Catch Shares Program in the Glovers Reef Marine Reserve and Port Honduras Marine Reserve in 2011. This program seeks to better manage fishing effort and the fishery resources in those two protected areas but the full benefits are yet to be seen when the program is rolled out nationally and fishermen or groups of fishermen are assigned fishing rights to certain fishing areas and quotas for the various fishery commodities.

The major fisheries policy objective seeks to maintain a sustainable yield of the fisheries resources while continuing to contribute to food production, foreign exchange earnings and to improved nutritional status in the longer term. Specifically, the fisheries policy will:

- Encourage and promote sustainable fish production systems in both sea areas and inland fisheries.
- Diversify production of the underutilized fish species in traditional waters so as to reduce pressure on high valued fish.
- Encourage deep-sea fishing to take advantage of the 12-mile zone.
- Increase value added activities in the production system, fish processing and prepared fish food.
- Improve management of the ecological systems and marine environment of fish habitats.
- Expand production of non-traditional fish species.
- Retain product quality and remain competitive in export markets.
- Improve the economic and social well being of fishers and their communities.

5. Research

Fisheries research continues to be directed to the two main commercially important fishery resources: Spiny lobster (*Panulrius argus*) and Queen conch (*Strombus gigas*).

A National Conch Survey was carried out during the period August 1 to September 15, 2010 as was scheduled and a Catch Quota for the fishing season October 2010 to June 2011 was determined. This survey was carried out in compliance to the bi-annual conch stock assessment as agreed with the Convention for International Trade of Endangered Species of Flora and Fauna (CITES).

The national conch survey was carried out using line transects along the entire length of the Belize Barrier Reef (World Heritage Site). Figure 7 shows the sampling stations along the barrier reef where the underwater belt-transects were carried out including open fishing areas and the marine reserves of Belize: Bacalar Chico Marine Reserve, Hol-Chan Marine Reserve, Caye Caulker Marine Reserve, South Water Caye Marine Reserve, Gladden Spit and Silk Cayes Marine Reserve, Sapodilla Cayes Marine Reserve, Glovers Reef Marine Reserve, Laughing Bird Caye National Park.

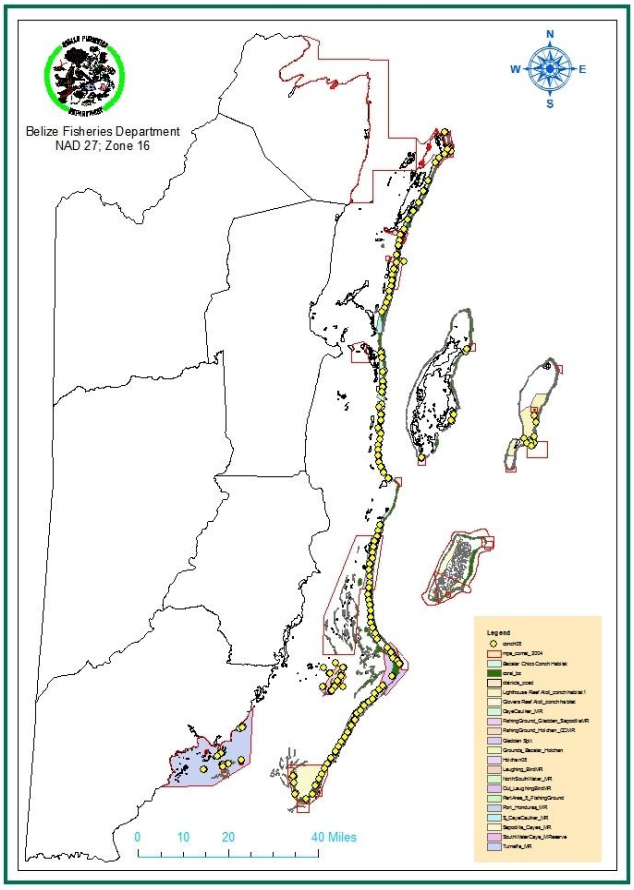

Figure 7. Map of Belize with the various survey sites along the barrier reef Map showing

The National Conch Survey carried out 125 underwater belt transects at 13 sampling stations along the Barrier reef. A total of 6,615 conchs were measured and the national average conch density was estimated at 290 conchs ha^{-1}.

An analysis of the length frequency structure of the population showed that 79% of all conchs measured were considered sub-legal while 21% were legal size conch (>178 mm). Conch shell length ranged from 50 mm to 339mm. The mean conch length was estimated at 141.2 mm (SD= 43.06, *n*= 6615). Figure 8 shows two main cohorts observed in the conch population; cohort one (*n*=2075) was composed of conchs measuring 65 -115 mm and cohort two (*n*=4540) was composed of conchs measured 116 – 285 mm. It is noted that 75% of conchs in cohort two are just below the legal size limit. These conchs are expected to enter the fishery next year.

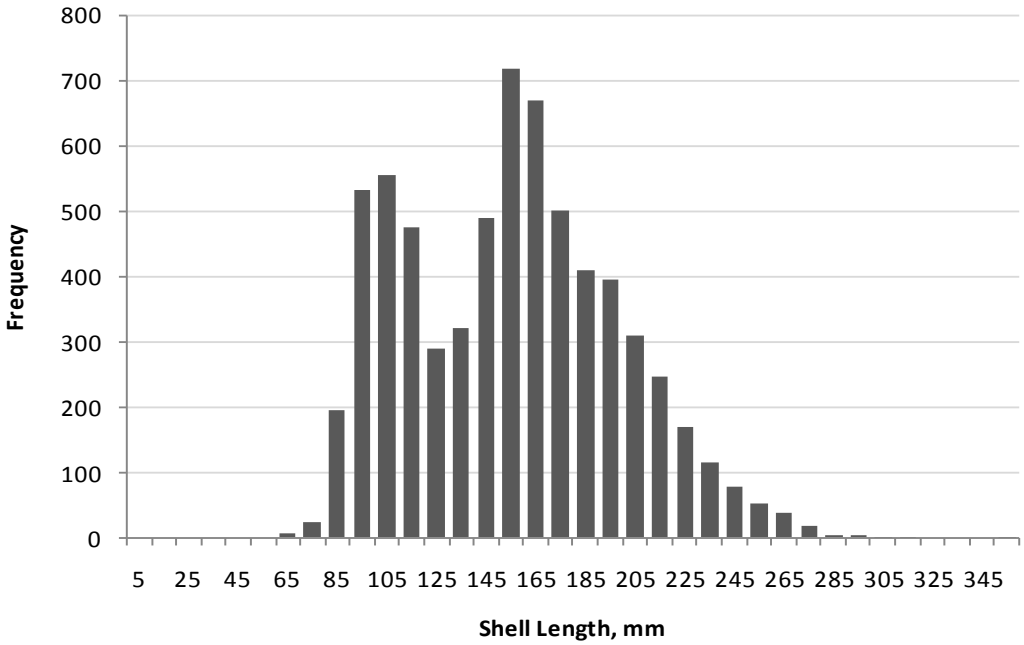

Figure 8. Conch shell length frequency distribution (n=6615). The red line indicates legal conch size.

Figure 9 shows sampled conch percentage composition by age. It is observed that the population is composed primarily of conchs ranging from ages one to three. Age two conch had the highest percentage of 31.4%, age three conch composed 28.8% and age one conch composed 21.6%.

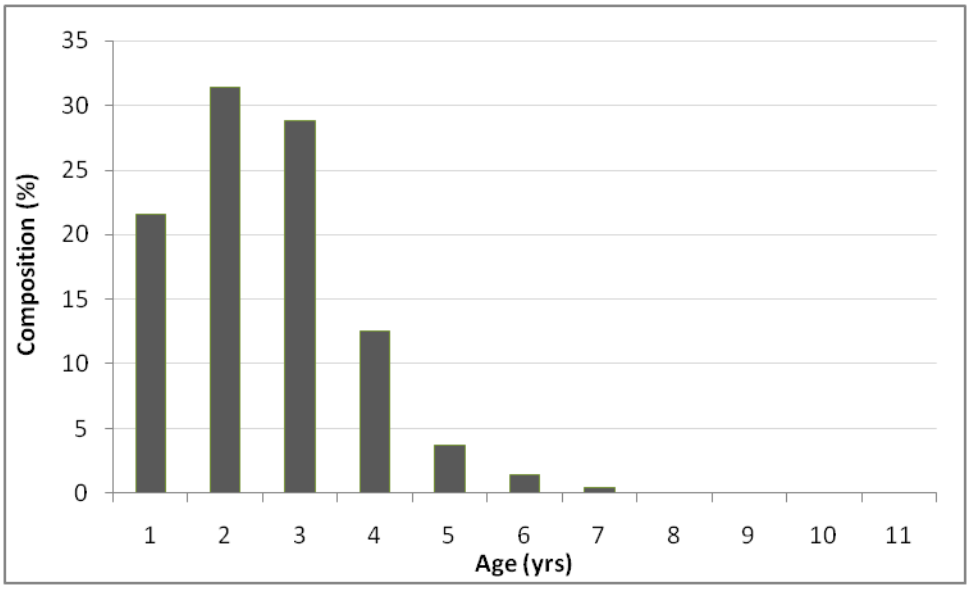

Figure 9. Conch population age composition.

Another result of the National Conchs Survey was the estimation of Maximum Sustainable Yield (MSY) for Belize's conch fishery using three methods. These included an empirical method, Fox method and Schaeffer method. It is important to note that based on the results of the length frequency analysis of the 2010 national conch survey, only 25% of the population was considered legal size and hence suitable for harvest under the current conch regulations.

Three estimates of potential yield were determined as follows: Fox model yielded 367 tons, Schaefer model produced 424 tons and the empirical method produced an estimate of 348 tons of conch meat.

The empirical method employed conch abundance data from the survey, total area of suitable conch habitats and assumed a minimum conch meat weight of 85 g (3 ounces). With this method, the national conch biomass was estimated at 1,854 mt (4,079,834 lbs). As suggested by Garcia *et al.* (1989) only 25% of the total sampled population considered to be of legal size was considered as suitable harvestable biomass amounting to 464 mt (1,019,959 lbs). By following the precautionary approach principle, then only 75% of the harvestable biomass totaling 348 mt (764,969 lbs) was considered as available to the fishery.

The various assumptions of the Surplus Production models (Fox and Schaefer models) where the stock is considered solely as undifferentiated biomass, that is, age- and size-structure, along with sexual and other differences, are ignored (Haddon, M. 2001) were key factors that did not allow for adoption of a high value for the TAC in order to avoid an over-estimation of the stock size. Consequently, the lowest estimate of potential yield of 348 tons estimated by the empirical method was considered and taken as the most suitable conch TAC for the 2010-2011 conch fishing season.

The conch densities observed for 2010 were higher than previous year suggesting that current regulations and management measures are functional. The TAC (348 tons or 764,969 lbs) is higher than that of 2008 but coincides with the increase in average conch density of 290 conch ha^{-1}.

The length frequency analysis and the age structure of the sampled conchs indicate that as soon as conchs enter the legal size they are harvested. Nonetheless, it is strongly believed that the deep water populations of adult conchs beyond the continental shelf are providing sufficient seed stock to the inshore fishery as indicated by the presence of 75% sublegal conchs as the reports show during the last 6 years.

6. Legislation and Management Regulations

A full and comprehensive revision of the entire Belize Fisheries Act was initiated in 2010 and is expected to be finalized at the end of 2011. This extremely important work is being carried out by the Fisheries Department with the assistance of the Wildlife Conservation Society that has provided funding for the hiring of a foreign fisheries legal expert and a local counterpart to undertake this work. A task force involving several government and non-government organizations was formed to oversee the work of the consultants.

At the end of the revision process it is anticipated that the new Fisheries Act, will among other things, establish the foundation of legal framework for fisheries management, fisheries research, international cooperation, conservation, marine reserves and law enforcement functions of the Fisheries Department.

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NATIONAL REPORT OF GRENADA

Prepared By Crafton J. Isaac
Fisheries Division, Grenada

1. Fishery and Fleet descriptions

Grenada Fisheries continues to be predominantly hook and line targeting demersal and pelagic species. Shell fish (lobster and conch) are targeted by divers utilizing scuba gear and (in the case of lobsters) wire loops. However, a small percentage of artisanal fishers employ traditional gear such as traps (for reef species and lobsters) and gill nets. A significant percentage of lobsters continue to be captured illegally by modified gillnets. The white sea urchin (*Tripneustes ventricosus)* remains a closed fishery.

Small coastal pelagics (SCP) are captured by beach seines that are deployed whenever these species school close to shore. Because of the benthic topography (general absence of coral reefs) beach seines are deployed primarily on the west and north coast of mainland Grenada, the islet of Isle de Rhonde and in suitable bays in Carriacou. As a result of the decline in landings of flyingfish, SCP has become the main source of bait for the pelagic longline fishery. Larger individuals of Bigeye Scads (*Selar crumenophthalmus)* and Round Scads *(Decapterus tabl*) are sold directly (live bait) from the seine to the longliners or kept alive in submerged cages for later use. The smaller individuals are sold as bait to demersal fishers.

The Large Pelagics (LP) are targeted by the surface longline and the trolling fleets. The longline boats are based in the capital, St. George's, at sites along the west coast of mainland Grenada and at Petite Martinique. Longliners target large tunas such as Yellowfin Tuna (*Thunnus albacaras*) and Albacore (*Thunnus alalunga*) as well as billfishes for both the local and export market. Species such as the Common Dolphinfish (*Coryphaena hippurus* , Wahoo (*Acanthocybium solandri),* Blackfin (*Thunnus altlanticus)* and other small tunas are largely captured by the troll fishery operating out of the east coast of Grenada. In the case of Common Dolphinfish the main trolling center situated in the town of Grenville on the east coast accounted for 61%, 54.2% and 65.1% of all landings from 2008 – 2010. For the same period this site accounted for 64.1%, 65.6% and 62.2 of all Blackfin Tunas landed.

With the introduction of an improved VHF communication network, longliners are able to fish farther and for longer periods. However, the fleet of small longliners employing a "light" palang continues to account for a significant portion of large pelagic landings (especially Atlantic Sailfish). The gear on these boats represents an indigenous modification of the surface longline for near shore fishing. The first "small reel" boat appeared in 1997.

Table 1 provides a summary of the local fishery in terms of craft and species targeted. The table does not show unregistered boats or fishers for these operate mainly on a subsistence basis.

VESSEL TYPE	GEAR	NO. OF VESSELS (2010)	FISHING ACTIVITY	SPECIES	EFFORT	REMARKS
TYPE I (Longline). Open (wooden) pirogue. 5.4m – 6.6m 25HP – 40HP outboard	Surface longline. 120 – 250 hooks. Handmade fiberglass manual reel. Box. Bait: Scads mainly, preferably live.	210	Day trips (0 – 30nm) 0500hrs – 1700hrs. Might include more than 1 trip /day. West of Grenada (deep ocean)	Large pelagics (Tunas & billfish). Lesser extent dolphinfish & mackerels	Hours fished	Carry no ice but target for export. Quality maintained by landing soon after fish is hooked. ***An indigenous modification of longline fishing.*** VHF radio
TYPE II. (Longline). Decked pirogue with front cabin. 8.4m – 10.8m Pair of 40HP outboards	Surface longline. >300 hooks Fibreglass manual reel. Icebox Bait: Scads mainly, preferably live	120	Day trips (0 – 50nm). West of Grenada (deep) ocean)	Large pelagics (Tunas & billfish). Lesser extent dolphinfish & mackerels	Hours fish	VHF radio
TYPE III (Longline) Decked (FRP & wood) launch with cabin, galley & berths. 10m – 12m 50HP – 350HP inboard diesel 13m -18m 50HP – 350HP inboard diesel	Surface longline 450 – 500 hooks Hydraulic operation Bait: Scads mainly. Preferably live Ice bin Surface longline >500 hooks Hydraulic	75	Fishing trip: 3days. Up to 80+ nm. West Grenada Fishing trip: 8 – 10 days	Large pelagics (tuna & billfish) Large Pelagics (tuna & billfish)	Number of days out Number of days out	VHF and SSB communication Radar VHF and SSB communication

	operation Bait: Scad mainly. Preferably live Ice bin		Up to 80+nm			
TROLLING/HANDLINING/DIVING Open wooden or fiberglass pirogue 6m + 40HP, 55HP & 75HP outboards	Trolling lines (2 – 6) Bait: Mainly artificial lures. Sometimes fish Handline (3) Bait: fish (esp. small scads) Diving: scuba tanks (3) Loops & baskets Spear guns	130 120	Day trips. Up to 40mn All points but focused mostly in the east, north and south Day trip Up to 15nm Throughout area Day trip On continental shelf	Large and small tunas, dolphinfish, mackerels (Wahoo& King mackerel) Demersals (snappers, hinds, coney etc) Lobster, conch, fin fish reef species	Hours Fished Hours fished Hours fished	
SEINE BOATS 4.8m – 8.4m Wooden double-ender pirouge	Beach seines	19	Encircling schooling small coastal pelagics as sighted	Scads, cavallis, rainbow runners, needlefish, ballyhoo	Catch/cast	

Table 1. Summary of Grenada fishing Fleet

2. Statistics and Sampling

As a consequence of the implementation of the Artisanal Fisheries Development Project (AFDP) in the early 1980s the Grenada fisheries sub-sector has grown substantially both in size and complexity to become largely commercial in character. Multi-million dollar investments have occurred in shore- based infrastructure, fishing fleet, fishing technology, training and quality assurance. In 2008 estimated total landings of fish was 1,385,553.36 kg with a value of US$11,900,430.12. For the same period Grenada exported 532,793.20 kg of fish earning US$3, 965,223.71 in foreign exchange.

Yet there has not been a parallel investment in data collection and management. At present Grenada's data "collection system functions at a minimum level providing estimates of total catch" (Medley, P. Consultant report, 2008). This statement reflects the minimum investment in personnel, time and equipment that obtains. Table 2 summarizes the data collection system as it currently operates.

LANDING SITE (TYPE)	**DATA CAPTURED**	**DATA COLLECTORS**	**FORMAT**
PRIMARY (Established landing sites with markets, cold storage etc)	i)Site location & data collector iii)Boat name, number & length iv)Weight by specie v)Gear type and number vi) Area fished vii) Effort - Hours/days fished	Market clerks employed by the Fisheries Department. Mostly untrained.	Daily Fish landing Log. A Trip interview format.
SECONDARY (Beaches away from fishing infrastructure. Often remote	i)Weight by specie (for SCP only). Ii)Name of owner iii) location of catch ***Occurs only sporadically***	No person(s) assigned for such data collection	No fixed format.
TERTIARY (Processors/exporters)	i)Site location & data collector ii)Boat & Captain name iii)Weight by specie iv) Export price & weight by specie	Fisheries Department data clerk visits site	Data clerk notebook for later transfer to Daily fish landing log.

Table 2. Summary of data collection system

For the large pelagics, coverage of over 90% was estimated up to 2 years ago but with the loss of data from the troll fishery (Dolphin fish, small tunas and mackerels) on the east coast has downgraded that value. However, a 1.4 lifting factor is applied for actual landings of large pelagics while 1.75 is applied to demersals. The coverage (or lack thereof) of the secondary landing sites requires urgent attention.

The confidence level of the data collected from the tertiary landing sites is affected by the lack of a standard format for recording catches. The Fisheries Division has not exercised its authority as the licensing agency to impose a standard format (compatible to the software used) on fish exporters and processors. Consequently some confusion exists in the minds of the staff members who examine and collect data from these sources. Similarly, catch and effort with respect to the longline fishery would not be elucidated unless standard logbooks are introduced.

Only the catch data (total landings) is extracted from the daily log forms for input into the computer. This imposes limitations on the value of the data for assessment purposes other than tracking trends in landings. The measurement of effort is concerned only with hours or days spent at sea rather than time spent in actual fishing (or in the case of longline actual number of hooks set). In the dive fishery the recorded effort and actual effort bears no relationship. This inconsistency in the recording of effort imposes difficulty in providing a reliable index of abundance (Medley, P. Consultant report, 2008).

In conclusion, although data collection is critical for fishery management this fact is not reflected in the investment of personnel, equipment and training for this activity.

3. National Fisheries Policy and Management Objectives

Grenada's national fisheries policy is partly articulated in the FISHERIES DIVISION CORPORATE PLAN (2009). The Fisheries Division views itself as the "lead agency" facilitating management and development within the sub-sector. Its mission is to promote "sustainable utilization of living marine resources for current and future generations". It recognizes that fishing is conducted under open access/common property context.

The management objectives for specific fisheries are contained in the draft PLAN FOR MANAGING THE MARINE FISHERIES OF GRENADA (revised in 2008) but not yet finalized or implemented. Table 3 summarizes the management objectives for each major fishery.

FISHERY	MANAGEMENT OBJECTIVES
LARGE OCEANIC PELAGICS	i) Promote sustainable development of the fishery ii) Promote development of the catch and release sport fishery iii) Establish linkages with international regulatory bodies, such as ICCAT, in order to access vital information to properly manage these fisheries
SMALL OCEANIC PELAGICS	i) Maintain and improve the net incomes of the fishers in the fishery at a level above the national minimum desired income
SHALLOW REF AND DEEP BANK/SLOPE	i) Maintain the shallow shelf and bank stock at all times at an acceptable percentage above the mean unexploited level ii) Maintain and improve on the incomes of operators in the fishery at a level above the national minimum desired income
LOBSTERS	i) Maintain stocks at all times at an acceptable percentage above the mean unexploited level ii) Maintain and improve on the net incomes of operators in the fishery above the national minimum desired income
CONCH	i) Maintain or rebuild stocks at all times at an acceptable percentage above the unexploited level

	ii) Maintain and improve on the net incomes of operators in the fishery above the national minimum desired income iii) To include as many participants in the fishery as is possible given the biological, ecological and economic objectives.
SEA URCHINS	i) Make preparations for limited re-opening of the fisheries ii) Maintain current stock levels in recovered areas iii) Continue stock rebuilding activities in depleted areas

Table 3. Summary of fisheries management plans

4. Research

No new research has been undertaken over the past year. Research into the impact of management on the Molinere-Beausejour Marine Protected Area by the University of Wisconsin, USA (with oversight by St. George's University) is ongoing.

5. Legislation and Management Regulations

Fisheries management operates under the following legislative instruments:

- Fisheries Act No.15 of 1986
- Fisheries (Fishing Vessel Safety) Regulations, SRO:3 of 1990
- Fisheries (Amendment) Regulations, SRO:24 of 1996
- Fish and Fishery Products Regulations, SRO:17 of 1999
- Fisheries (Amendment) Regulations of 2001
- Fisheries (Marine Protected Areas) Regulations, SRO 78 of 2001
- Fisheries (Levera Beach Closed Area) Regulations, SRO: of 2010

Although reports suggest a significant level of illegal, unregulated and unreported (IUU) fishing by both local and foreign boats, the authorities' efforts at interdiction have been paltry. There is no mechanism in place for regular patrols nor is there a formal protocol between the Fisheries Division and the Coast Guard. Enforcement is sporadic and uncoordinated. The other aspects of Monitoring, Control and Surveillance are similarly deficient. As was noted under the heading of **Statistics and Sampling,** monitoring of fishing activity is inadequate. Likewise the department remains unable to evaluate the effectiveness of the controls that have been put in place through legislative instruments.

NATIONAL REPORT OF JAMAICA

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1. Fishery and Fleet Descriptions

The Jamaican fishery is made up largely of artisanal fishermen operating from open canoe type boats powered by either outboard motors or oars. The artisanal fishery which operates over inshore and offshore areas has been considered by many to be the 'employer of last resort'. The fisheries of Jamaica have over 20,000 fishers (20,323 registered fishers as at September 2010); most of these are artisanal fishers operating from open canoes or reinforced fiberglass-type boats powered by either outboard motors or oars. There are approximately 9,000 boats (5,329 registered boats as at September 2010), ranging from 4 to 9 meters, operating from 187 fishing beaches distributed around the Jamaican territorial waters. Vessels 12m and above, powered by inboard engines are considered industrial vessels.

The inshore fishery takes place in the coastal waters of the Island shelf and its nine proximal banks. Historically, this area has supported the bulk of the fishery activities in terms of manpower and vessels. The major fishing gear used for reef fish is the Z-shaped Antillean fish trap. Other common gear includes the gill nets, seine nets, hook-and-line, and spear guns. There is some collection of crustaceans, molluscs and algae by SCUBA or skin divers. Larger decked vessels target lobster and conch on the offshore banks (primarily Pedro and Morant Banks; also Formigas, Henry Holmes and Grappler Banks).

In the early 1980s, large companies and investors began processing and exporting conch and lobster caught on offshore banks. The vast majority of the catch is sold fresh for domestic consumption. Most lobster tails, conch and valuable finfish species such as snappers are exported to hard currency markets in a chilled or frozen state. Most of the remaining catch is sold in relatively small quantities to a large number of vendors who then take the fish to the nearby towns and communities where it is sold on local markets.

Landing Sites

The fisheries landing sites in Jamaica range from beaches with a small number of canoes through to hundreds of vessels including steel-hulled industrial ships. Key fishing beaches are located in Old Harbour Bay, Port Royal, Rocky Point and the modern fishing port complex in Whitehouse, Westmoreland.

Figure 1: Major marine fish landing sites of Jamaica

2. Statistics and Sampling

Jamaica is divided into two statistical areas, the north coast as area 1 and the south coast as area 2. During 1995, a survey was conducted in both areas at about 90% of the known landing sites to determine the number of vessels at each site and classify them by gear type, fishing ground and target fishery. As a result the beaches on the north coast were divided into six categories based on beach size (i.e. number of boats) and gear type while the south coast has three categories based on beach size. The categories are used as sampling strata and it is assumed that, within a stratum the gears, vessels and fishing grounds are homogeneous throughout the area. This means fishermen at all beaches within a category have access to fisheries of similar productivity. Once all the beaches were classified into strata, one or more beaches were selected to be sampled in each stratum (See figure 2).

Each sample beach is visited two days per month and the data collected from vessels landing that day. The data includes vessel identification, fishing effort (amount of gear, number of crew, hours fished), fishing ground, species landed by weight and price. Other data collected includes total number of vessels that went to sea that day, the number of fishing days for the month and descriptive comments on the weather and beach conditions.

Biological data such as weight, length, sex and maturity of select species are also collected monthly. These species include the Atlantic thread herring, Caribbean spiny lobster, shrimp, dolphinfish, skipjack tuna and conch. In conjunction with the catch and effort data, the biological data is used for stock assessment and for detecting trends etc., which are necessary for proper decision making.

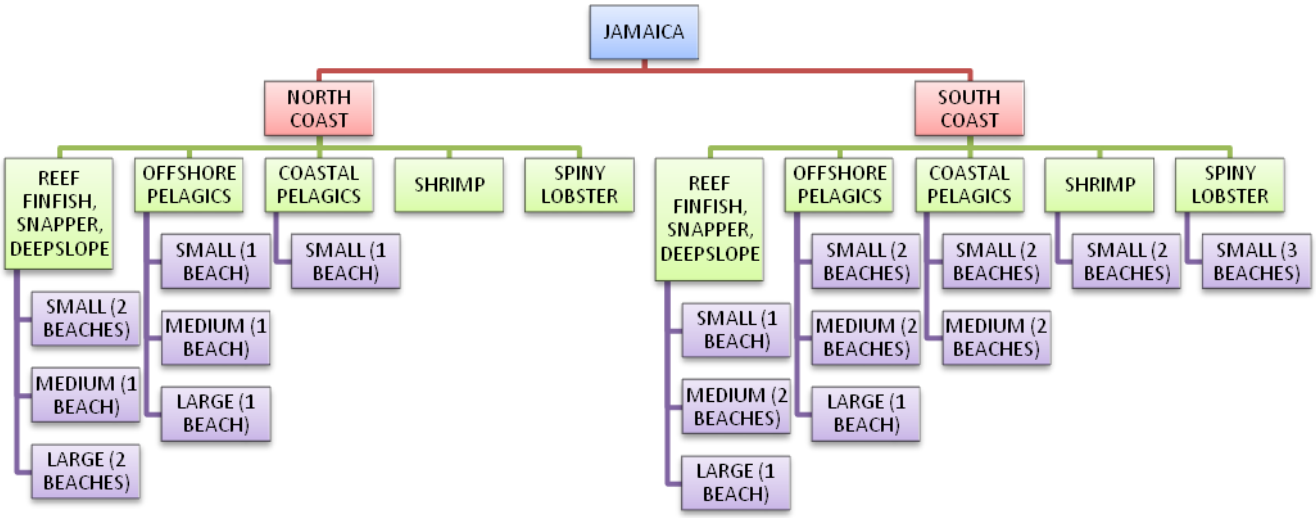

Figure 2: Over view of the sampling plan for the artisanal fishery of Jamaica

Landings Estimates

Annual catches of both marine and inland fishes for the period 2000 to 2010 are shown in the table below. Import and export data are obtained from the Statistical Institute of Jamaica. However, current information was not available at the time of this report.

Table 1. Jamaica fish production trend 2000-2010 (MT)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Artisanal (Finfish)	4348.57	7,000.00	4594.92	8811.03	7158.39	12329.85	11,048.24	9475.01	12544.43	11,389.85
Conch	946	946.00	504.25	550.00	640	650	640	400	400	440
Lobster (Industry)	943.39	358.67	300.00	134.49	362.00	97.98	150	150	150	200
Shrimp	38.5	37.54	37.00	-	875.04	476.10	-	-	105	283.9
Others	51.38	144.00	456.00	-	-	-	-	-	5.6	
Total Marine Fish Production	6,327.84	8342.21	5436.17	9495.5	9035.43	13067.83	11,838.24	10,025.01	13,205.03	12,313.75
Total Tilapia Production	5,000.00	5995.44	2968.50	4200.00	4795	7,543.35	5,600	5,800	5,030	3,900
TOTAL Fish Production MT	**11,327.84**	**14,337.65**	**8,404.67**	**13,695.52**	**13,830.43**	**21,087.28**	**17,438.24**	**15,825.01**	**18,235.03**	**16,213.75**

3. National Fisheries Policy and Management Objectives

The National Fisheries Policy provides a framework for the formulation of strategies designed to address the important issues and challenges and opportunities facing the industry, including: globalization, trade expansion, economic efficiency, industry structure and governance, and food safety and quality. The main goals of the National Fisheries Policy are:

(1) Contribute to economic growth and reduction of poverty

(2) Contribute to sustainable livelihood of Jamaicans through employment in fisheries

and related activities

(3) Contribute to the provision of Food security

Its immediate objectives are:

(1) Ensure sustainable development of the fisheries sector
(2) Promote efficiency of the fishing and aquaculture industry
(3) Promote economic and social development of fisheries sector
(4) Improve systems and procedures for the management of the fishing and aquaculture industry
(5) Promote partnerships with stakeholders in the management and development of capture fisheries and aquaculture, and ensure transparency and accountability in the governance of fisheries resources.
(6) Comply with international standards and best practices for capture fisheries and aquaculture development and management in keeping with Jamaica's commitments under various agreements and conventions.

The goal to be achieved from proper management of the marine fisheries of Jamaica is the sustainable use of fisheries resources for the maximum benefit of the people of Jamaica. The management objectives for each fishery are discussed below.

a) Shallow-Shelf and Reef Fishery

Objective: To rehabilitate reef fisheries to sustainable levels within the context of coastal zone management and conservation-oriented fishing practices.

Most of the catch is taken by artisanal fishers using mainly Antillean Z-traps. However prohibited fishing practices such as dynamite, poisons, and other noxious substances remain problematic. Fish biomass has already been reduced by up to 80% on the fringing reefs of the north coast, mainly as a result of intensive artisanal fish trapping. It is hoped that fishing activities could be diverted from the reef for a period, which would in effect reduce fishing effort. We have to encourage co-management of the fishery. Increased surveillance and enforcement of legislation is also needed to stop persons destroying the reef.

b) Deep slope Fishery

Objective: to prohibit fishing effort on spawning aggregations and protect areas where these species normally inhabit during the early life stages.

The deep slope fishing areas within Jamaican waters is relatively small. Catches from the deep slope represent approximately 10% of total annual catch of marine fish. The fishery needs to be better studied. There is also need for increased awareness among fishers of the vulnerability of the stock and the potential for over-fishing.

c) Coastal Pelagics

Objectives: to ensure the viability of the fishery through maintaining and enhancing habitat, and protection of nursery areas.

The coastal zone where this fishery is based is an area in use by many other interests (water sport, tourist, harbour use). Management strategy must include some arrangement to reduce conflicts, arrangement to control land-based pollution and coastal development and discourage the use any destructive practices in the zone.

d) Large Pelagics

Objectives: the sustainable development of the fishery, to cooperate with other states (particularly Caribbean states) to assess, protect and conserve the large pelagic resource.

This fishery will need to be studied preferably on a regional basis, and a regional management plan developed.

e) Lobster

Objective: to restore/rehabilitate the fishery through protection of lobsters and protection and enhancement of their habitat.

There is already legislation in place to prevent the taking of berried lobster, prohibit the landing of lobsters during the close season. There is need for gear restrictions effort reduction and co-management arrangements.

f) Conch

Objectives: To ensure optimum sustainable yields and develop the fishery in other areas.

The introduction of a large-scale industrial fishery, which has almost totally displaced the artisanal conch fishery of the years prior to 1980, has increased production substantially. Conch is particularly susceptible to over-fishing because it is sedentary and aggregates in specific habitats. Estimated catches (based on export data) increased from 50 MT in 1987 to 2,051 MT in 1994, however actual catches may be much higher due to illegal fishing. The fishery therefore needs close supervision and a strong management framework.

New regulations (The Fishing Industry (Amendments Of Schedule) Order 2000) provided for quantity of conch in storage to be declared before the closed season, provides for the inspection of conch in holding areas, establishes minimum size restriction for conch and reserve the coastal shelf for the artisanal fishery.

g) Shrimp

Objectives: ensure sustainability and full efficient use of the fishery.

Some of the gears used in this fishery take excessive by-catch due to the inefficiency of the gear. There is need therefore to introduce by-catch reduction devices to the fishery.

4. Research

The Fisheries Division conducts research and implements policies and legislations in order to manage and preserve a sustainable fishing industry. Current projects/researches along with resources necessary for their completion are listed below.

DEVELOPMENT OF LOBSTER CASITA/CONDOMINIUM TECHNOLOGY

Lobster Management Programme (LMP)

The LMP seeks to use scientific research as a background for management and policy decisions in an effort to protect and sustainably manage the Caribbean Spiny Lobster, *Panulirus argus*, fishery in Jamaica. The LMP focuses on the three main lifecycle stages of the Caribbean Spiny Lobster, namely the adult stage, juvenile stage and the puerulus or post larval stage. The programme seeks to conduct research on these main lifecycle stages so as to be able to accurately

determine a) seasonality of each stage; b) current stock size; c) carrying capacity of the fishery; d) policy measures required for the sustainability of the fishery and (e) the use of lobster juvenile condominiums as an enhancement tool. The type of data collected at this time is mainly fishery dependent catch and effort data on adults and fishery independent data on pueruli and juveniles. The LMP is split into three monitoring programmes as follows:

1. **Pueruli Monitoring Programme**
   The Programme was established to develop a seasonality forecast of the larval (pueruli) stage of the Spiny Lobster. This seasonality forecast would then be used to predict the number of Spiny Lobster recruits that would enter the existing population.

2. **Lobster Biological Data Collection (OHB)**
   This programme was established in 2010 based on the recommendations of the Cuban Lobster experts (Dr. Maria Estela de Leon, Dr. Rafael Puga). It was started in Old Harbour Bay. This programme consists of measuring the adult stage of the Spiny Lobster that is caught by the local fishers located on the Old Harbour Bay fishing beach. The type of data collected include sex, carapace length, tail length, sample weight and where possible the type of fishing gear used, fishing ground and soak time is also recorded.

3. **Lobster Condominium Programme**
   The programme was established to develop a seasonality forecast and stock assessment of the juvenile stage of the Spiny Lobster. This programme was expanded in 2010 to conduct research into the use of condominiums to help provide additional habitat for the enhancement of the juvenile stage of the lobster life cycle.

ASSESSMENT OF FISH PRODUCTION

The Division through its sampling plan collects catch and effort and biological data to be used for stock assessment and management and for detecting fish production trends. The fisheries targeted include — reef and pelagic resource, lobster and conch, coastal pelagic resource, shrimp and ground fish. There are however a few limitations:

- Limited staff to cover a larger number of beaches thereby increasing the number of sampling days
- Additional resources are needed human, transportation and otherwise

MONITORING FISHERIES ACTIVITIES DURING AND OUT OF CLOSE SEASONS

The Division continues to execute its regular enforcement activities island-wide during the Lobster (April 1 – June 30) and Conch (gazetted each year) Close Seasons. During these times of enforcement, the Division relies on the support of the hotel industry in providing accommodation as the money allocated is not sufficient to cover all costs.

DEVELOPMENT OF FISHERIES POLICY AND NEW LEGISLATION

This project will address the problems of declining production in the Jamaica marine capture fisheries; it will develop a framework to improve both the institutional capacity and the present management practices in the industry. A new legislation which prohibits persons from having lobsters during the Close Season took effect in 2009.

MONITORING AND SUPPORT TO FISH SANCTUARIES

The Fisheries Division currently has 10 sites across the island declared as fish sanctuaries. These sites were selected based on the following criteria:

1. Ecological characteristics: presence of seagrass beds, a reef system, and/or shallow waters abutting mangrove stands

2. General agreement of the primary stakeholders: fishers, investors, hotel and tourism businesses
3. The presence of a management entity with whom the Fisheries Division may form partnerships with
4. The potential impacts that point-source pollutants may have on these sites

The management of these sanctuaries will be a collaborative effort between government and local community organizations, particularly fisher organizations and non-governmental organizations (NGOs). Memoranda of Agreement between the Ministry of Agriculture and Fisheries and partnering entities were who would manage the daily activities on behalf of the Fisheries Division

AQUACULTURE

The Aquaculture Branch has its main emphasis in Fingerling production, Research and Extension Services.

- *Fingerling production* of the Red Tilapia hybrid male is the main type produced and sold to farmers.
- For *Extension Services,* the Aquaculture Branch provides expert advice on Site Selection, Pond Construction, Stocking, Feeding, Harvesting and Marketing through its resource persons or extension officers.
- *Research:* work is currently being done to involve salt water culture of Tilapia. Investigations are also being done on growth and survival of the mangrove oyster *Crassostrea rhizophorea*.

Oyster Culture

Objectives of the oyster culture project include developing marketable products produced from oysters; promoting and marketing the products developed. The Scientific Research Council has responded affirmatively to the request to investigate the development of products using oysters.

Ornamental Fish Production

Ornamental fish production is a blooming area in aquaculture. One of the aims of the Aquaculture Branch is to establish ornamental fish production as a small business enterprise in inner-city communities.

In addition to the ongoing projects of the Division four major sub-projects have been added, namely:

1. Fishing beach infrastructure redevelopment for thirty (30) beaches.
2. Fisheries conservation and rehabilitation which seeks to improve capture fisheries by the rehabilitation of destroyed habitats.
3. Strengthening stakeholder capacity

5. Legislation and Management Regulations

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) was ratified by Jamaica on March 21, 1983. Subsequently, Jamaica has pursued a consistent policy of updating its laws to ensure full compliance with the provisions of UNCLOS.

The pieces of legislation relevant to the maritime zones and areas of Jamaica are the Maritime Areas Act 1996 and the Exclusive Economic Zone Act 1991. The Maritime Areas Act is an important piece of legislation that has significantly increased Jamaica's jurisdiction over maritime space. The Exclusive Economic Zone Act 1991 established Jamaica's 200 nautical miles EEZ.

The enactment of this piece of legislation establishes a maritime regime (about 274,000 km^2) that is approximately 25 times the size of the landmass of mainland Jamaica.

The main pieces of legislation presently governing fisheries activities in Jamaica are the Fishing Industry Act 1975, the Fishing Industry Regulations 1976 and the Morant and Pedro Cays Act 1907, administered by the Fisheries Division of the Ministry of Agriculture and Fisheries, and the Aquaculture, Inland, Marine Products and By Products (inspection, licensing and export) Act 1999 administered by the Veterinary Division. As part of the modernization of the public sector the Fisheries Division is currently undergoing transformation into an executive agency. This will result in a semi-autonomous agency with greatly improved efficiency. As part of the modernization process a Chief Executive Officer (CEO) is in place to drive the transformation into an executive agency. The transformation is expected to be completed by 2012.

The main pieces of legislation relating to the management of marine fisheries of Jamaica are the Morant and Pedro Cays Act 1907 and the Fishing Industry Act 1975. These laws establish the system of registration and licensing of fishers and fishing vessels.

Several other statutes contain provisions relevant to fisheries. These are the Exclusive Economic Zone Act 1991, Maritime Areas Act 1996, Natural Resources Conservation Authority Act 1991, Beach Control Act 1956, and the Wildlife Protection Act 1945.

LEGISLATION	OBJECTIVE & SCOPE
PRIMARY LEGISLATION	
Fishing Industry Act, 1975 and Fishing Industry Regulation, 1976	licensing and fishing regulation with territorial and archipelagic seas.
OTHER FISHERIES-RELATED LEGISLATION	
Morant and Pedro Cays Act, 1907	licensing of fishers based on offshore banks
Wildlife Protection Act, 1945	prohibit deleterious fishing practises (eg. Dynamite); protection of manatees; turtles etc.
Natural Resource Conservation Act, 1991	management of coastal zone resources
Natural Resource (National Parks) Regulation, 1993	management of marine parks
Exclusive Economic Zone Act, 1991	management of resource outside 12-miles territorial limit
Town and Country Planning Act	mangrove clearance
Beach Control Act, 1945	infrastructure development on beaches; protection of black coral and organisms
Harbours Act, 1971	conduct of vessels at sea
Territorial Sea Act, 1971The Maritime Areas Act, 1996	declaration of Archipelagic State and territorial seas
The Meat, Meat products and Meat by-products Inspection (Export to specified countries) Act, 1989	export license for seafood and inspection of processing plant

LEGISLATION	OBJECTIVE & SCOPE
INTERNATIONAL CONVENTION & LAWS	
United Nations Conventions on the Law of the Sea (UNCLOS)	- legal order for the seas and oceans which will facilitate international communication and will promote the peaceful uses of the seas and oceans - conservation of living resources - the study, protection and preservation of the marine environment - navigational rights, territorial sea limits, economic jurisdiction, legal status of resources on the sea-bed beyond limits of national jurisdiction
Caribbean Community CARICOM, 1973	- economic integration (Caribbean Common Market) - co-operation in non-economic areas and operation of certain common services - co-ordination of foreign policies of independent member states
Conservation and Management of Straddling Fish Stocks and highly Migratory Fish Stocks	- part of the implementation of the provisions of the UNCLOS
Convention on Biological Diversity, 1992	- conserve bio-diversity - promote the sustainable use of its component encourage equitable sharing of the benefits arising out of the utilization of genetic resources

NATIONAL REPORT OF MONTSERRAT

1. Introduction

Montserrat, the Emerald Isle of the Caribbean, is a British Overseas Territory located 16 45'N 62 12'W in the Leeward Islands in the Caribbean Sea. The island measures approximately 16 km (10 miles) long and 11 km (7 miles) wide, giving 40 kilometres (25 miles) of rugged coastline. For the territorial waters around Montserrat, the United Kingdom claims a limit of 3nm for its Territorial Sea and an Economic Exclusion Zone limit of 200nm for fisheries jurisdiction.

Sixteen (16) years of continuous volcanic activity have significantly impacted the marine environment. The coastline is constantly changing due to volcanic activities. The last major volcanic eruption occurred on 11 February 2010. Several pyroclastic flows entered the sea on the eastern coast of Montserrat extending the coast line by approximately one (1) mile, resulting in the loss of several species of fish and their habitat. The once rocky coastline on the east and west coast is been transformed into sandy beaches. On the North West and North shore line the beaches are becoming narrower and smaller. This could be associated with sea level rise.

Vision

Healthy, productive marine resources cared for, understood and used wisely for the benefit of all now and in the future.

2. Fisheries Management Objectives

- To strengthen the Fisheries Division's management capabilities by incorporating the sub-sector concerns in the wider frame work of Coastal Zone Management and Development Planning.
- To increase the role of the Fishing Industry in the building of the National Economy.
- To use the fisheries resources wisely so as to improve income and employment opportunities, alleviate poverty and contribute to food and nutrition security in Montserrat.
- To ensure that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development (which include the exercise of the precautionary principle), in particular the need to have regard to the impact of fishing activities on non-targeted species and the long term sustainability of the marine environment.
- To protect the marine environment and its resources by reducing pollution and protecting the maritime area against adverse effects of human activities through enforcement, so as to safeguard human health and to conserve the marine ecosystem.
- To design and implement training and extension programme in order to improve the status and career orientation of all stakeholders in the fisheries sector and to increase public awareness of fisheries potential.
- To improve fish landing facilities, marketing, storage, distribution and quality enhancement.

3. Description of Fishery

Montserrat's fisheries resource is diversified. It is comprised of Demersal, Coastal Pelagic and Off Shore Pelagic Fish. There is no season for the capture of fish with the exception of sea turtles. There is a close season for the capture of sea turtles from 1 June – 30 September yearly. Significant reductions in fish caught have been observed over the past years.

The fishery in Montserrat is open access. With the obvious reduction in single species caught, 98% of the fishers are now targeting multi-species using various fishing gears instead of single gear.

Fishing trips are concentrated within twelve (12) miles of the coast line and trips can range between two (2) to six (6) hours. Fish traps contribute to over 60% of the fish harvested. Four (4) types of traps are used; the Z-trap, rectangular traps, British foot and V-traps utilizing 1.5 inches mesh size. Traps are set individually and 98% of the fishers retrieve them manually. Average soak time varies between 3 – 6 days weather permitting. Vessel crew ranges between 2 - 4 individuals depending on the size of the vessel. Approximately 30% of the vessels are equipped with electronic navigation and sonar devices. 98% of fish is landed whole.

With the absence of a fish market and adequate storage facility, fishers are forced to go into the various villages to sell. Catches are normally sold within twelve (12) hours. Gears used in harvesting fish are fish traps, beach seine, bottom long line, finger line, gill nets, trolling lines and floating long line.

There is no export market for fish caught. However, the demand for local fish exceeds the supply. In order to satisfy the market demand, fish is imported either frozen or processed.

There has been a significant increase in the amount of Gar caught. With a small population and lack of storage facility, when large quantities of Gar fish are caught they are release immediately. Efforts are on the way to establish a market for this species of fish.

The quantities of fish caught over the past years have been reduced. This may be a result of natural hazards such as volcano, tropical systems and invasion of the lion fish in the marine environment. However no scientific studies have been conducted to determine the real cause of reduction in fish caught. The value in price change was due to the continuous increase of fuel price. Price ranged from EC$6.00/lb in 2004 to EC$10.00/lb in 2010. There is no concession for the fuel for fishers in Montserrat resulting in the price of fish been unregulated.

Table 1: Main Species of Fish targeted

	Local Name	**Scientific Name**
Demersal	Red Hind	*Epinephelus guttatus*
	Queen Triggerfish	*Balistes vetula*
	Longjaw Squirrelfish	*Holocentrus marianus*
	Honeycomb Cowfish	*Lactophrys poligonius*
	Blue Tang	*Acanthurus coeruleus*
	Coney	*Epinephelus fulvus*
	Caesar Grunt	*Haemulon Carbonarium*
	School Master	*Lutjanidae*
	Red Snapper	*Lutjanus campechanus*

Coastal Pelagics	Ballyhoo	*Hemiramphidae spp.*
	Jacks	*Carangidae spp.*
	Bigeye Scad	*Selar crumenophthalumus*
	King Mackerel	*Scomberomorus maculatus*
	Needle fish(Gar)	*Belonidae spp.*
	Bar Jack	*Caranx ruber*
Pelagics	Dolphin Fish	*Coryphaena hippurus*
	Wahoo	*Acanthocybium solandri*
	Skip Jack Tuna	*Katsuwonus pelamis*
	Sharks (various)	
	Yellow fin Tuna	*Thunnus albacares*
	Bonito	

Table 2: Annual Quantity/Value of fish landed 2004 - 2010

Year	Coastal Pelagics	Demersal	Pelagics	Quantity LBS	Value (EC$)	FISHING BOATS
2010	15,898	34,045	3,210	53,153	$ 502,514.00	38
2009	22,424	56,122.5	2,065.5	80,612	$ 762,162.00	33
2008	23,107	42,235	1,874	67,422	$ 626,530.00	26
2007	21,143	55,434	759	77,381	$ 576,198.00	26
2006	37,006	71,136	1,200	109,344	$ 710,327.00	26
2005	41,916	67,514	1,696	111,237	$ 722,208.00	25
2004	29,808.5	37,550.5	1,650	69,099	$ 379,701.00	23

Table 3: Value of Imports of Fishery Commodities, (EC$) Montserrat

Commodity	Total EC$	2004	2005	2006	2007	2008	2009
Fresh or chilled fish	**46,401**	17,331	244	564	1,736	12,484	14,042
Frozen fish	**770,110**	80,673	102,149	155,839	140,133	147,637	143,679
Fish fillets, fresh, chilled, or frozen	**355,817**	35,426	43,048	33,473	56,280	97,092	90,498
Fish dried, salted or in brine: smoked	**2,314,272**	305,762	322,223	406,098	380,472	426,163	473,554
Crustaceans, live, fresh, chilled, frozen, dried, salted or in brine	**238,356**	20,587	31,612	43,337	42,529	51,987	48,304
Molluscs, live, fresh, chilled, frozen, dried, salted or in brine	**4,957**	642	626	2,043	1,646	0	0
Total, (EC$)	**3,729,913**	**460,421**	**499,902**	**641,354**	**622,796**	**735,363**	**770,077**

Table 4: Volume of Imports of Fishery Commodities, (Kg) Montserrat

Commodity	Total Kg	2004	2005	2006	2007	2008	2009
Fresh or chilled fish	**4,721**	1,516	69	163	328	1,371	1,274
Frozen fish	**50,527**	10,731	7,475	8,200	9,109	8,400	6,612
Fish fillets, fresh, chilled, or frozen	**24,113**	2,921	4,222	2,242	3,845	5,216	5,667
Fish dried, salted or in brine: smoked	**189,444**	33,582	33,247	27,373	44,254	23,313	27,675
Crustaceans, live, fresh, chilled, frozen, dried, salted or in brine	**8,103**	905	927	1,074	1,379	1,816	2,002
Molluscs, live, fresh, chilled, frozen, dried, salted or in brine	**452**	6	65	203	178	0	0
Total, (Kg)	**277,360**	**49,661**	**46,005**	**39,255**	**59,093**	**40,116**	**43,230**

There are thirty eight (38) motorised fishing boats ranging from 12 - 30 feet operating in the fisheries which are all are powered with outboard motors ranging from 15 -225 horse power. Most are open pirogues and a few have a small forward or aft cabin. Over the years, fishers have been replacing the traditional wooden boats with fibreglass reinforced pirogues.

None of these fishing vessels are registered or licensed. The Department is presently in the process of establishing a boat registry and licensing the boats. It is anticipated that this process would be completed by the end of 2011.

Volcanic activities have reduced the landing sites to two (2): Isle Bay on the west coast and the main landing Little Bay on the north coast, where 99% of the boats are moored.

Due to the lack of a landing facility for fishers, fish caught are off loaded on the commercial jetty operated by the Montserrat Port Authority. Arrangements have been made between the appropriate authorities for the usage of this facility, so as to eliminate conflicts during the port's operations.

There are approximately 150 full-time and part-time fishers representing 2.3% of the total population of Montserrat. 70% of the fishers are over the age of 55 and have been operating in the sector for over 40 years. The Fisheries Division is presently on a drive to encourage young fishers to join the sector.

Fishers are allowed duty free concessions on all fishing equipment including engines. Duty free concession on one (1) pick-up truck every 5 years for vessel owners only is also received.

4. Data Collection

Catch and effort data are collected by Data Collectors at the main landing site, Little Bay, during working hours Monday to Friday 8:00 – 4:00pm. Weekend data is retrieved from the fishers at the beginning of the next working week. Fishers are encouraged to provide the data should they arrive after normal working hours. This information is sometimes communicated via telephone. In some cases actual weights are recorded where as in other cases estimates are used. The catch and effort data collected is entered into CARIFIS. Previous years catch and effort data were

recorded on hard copy only. However, with the hard work of the two data collectors over the past year, fourteen years (1997 -2010) of hard copy data have been entered into the CARIFIS system. The data entered have been sent to the CRFM Secretariat.

5. Research

Turtle Conservation Project

A turtle conservation project is presently being undertaken in Montserrat. This project is sponsored by the Joint Nature Conservation Committee (JNCC). Over the past years nesting sites have been significantly impacted by natural disasters, animals, birds and human activities. The aim of the project is to build an artificial turtle nursery site (hatchery) at a safe location. During the turtle nesting season, staff would monitor the beaches daily. When eggs are found they would be carefully removed and transferred to the safe site. After the eggs are hatched the young hatchling would be released into the sea. It should be noted that each new nest would be covered. This would ensure that if several nest hatches at the same time the young ones would not be mixed up. Records will be kept.

Artificial Reef

One artificial reef was constructed on the west coast in approximately 5 – 50 feet of water. This reef is expected to assist in providing new habitat for various species of fishes thus increasing the fish stock. Preliminary observation indicates that several species are adapting to the new environment. However, it is also evident that some of the reef is been impacted by silt.

Challenges within the sector

1. A reduction in total catch. This is related to volcanic activities. No real studies have been conducted, however it is anticipated that this is due to the lost of reefs, sea grass beds and some fishing grounds which are covered by volcanic ash.
2. There is a maritime exclusion zone which extends approximately 2 km offshore between Sturge Park and O'Garro's and approximately 4 km offshore between Roaches Yard and Spanish Point, decreasing to 2 km offshore from Spanish Point to Pelican. Fishers caught fishing in this area are subject to a fine. This has resulted in a reduction of the fishing area.
3. Heavy rainfall usually triggers mudflows which enters the marine environment. As a result the water becomes discoloured. Fishes tend to avoid these water (gar, ballyhoo, jacks, robins, bonito, mackerel etc) this results in zero fish catch during some fishing days when these species are targeted.
4. Regular strong ocean currents during fishing trips results in very low catches.
5. Yearly tropical systems and rough seas create losses to the fishers with their fish traps. Fishers incur expenses when removing and replacing their fishing vessels from the water because of the lack of a safe harbour.
6. Lack of adequate infrastructure (storage and fish market facility). Fishers are forced to limit the amount of fish caught during fishing trips. This may result in fishers having to increase the number of days they fish.
7. Ciguatera fish poisoning continues to affect the health of individuals. Several persons have been affected by fish poison, resulting in customers being afraid to purchase fish. Several years ago a study was conducted on fish poisoning in the Leeward Island, however there has been no follow up.
8. Fishers do not receive any concession on the fuel. Some fishers are forced to reduce the weekly trips in order to maximize profit. This also results in fishers increasing the price of fish. As a result of the increase in prices the consumer is forced to purchase less.

9. With the sighting of the invasive lion fish, it is expected that the fish stock is been impacted.

Capacity building

Over the past year, the Fisheries Division has been on a drive to improve the knowledge and skills of both Staff and Fishers.

- The Fisheries Officer attended the International Ocean Institute – Canada training programme on Ocean Governance: Policy, Law and Management. This training programme was made possible with sponsorship from Lloyds of London and CRFM. Additional training was received in Advance Leadership Training for Heads of Fisheries Department/Division.
- A Long-line training workshop was conducted by Mr. Roland A. Baldeo, Technologist from Grenada. This was held 3 October – 23 October 2010. The Workshop was funded by the Caribbean Development Bank – Private Sector Development Division. Fishers were introduced to this method of fishing. The aim was to train fishermen so that they would venture into deeper waters to increase the amount and variety of fish captured. Safety at Seamanship, radio and GPS training was also part of the programme. Thirty-three (33) fishers successfully completed the training.
- A Caribbean fish trap construction and human development training workshop took place from 1 November – 21 November 2010. Basic Needs Trust Fund sponsored the training. This workshop provided two (2) weeks of practical and theoretical skills training in the construction of fish traps and lectures in human development skills for eighteen (18) fishers between the ages of 15 and 35.
- Three (3) staff members got training in the use of CARIFIS.

6. Fisheries Policy and Regulations

The fisheries Act 2002, Legislations and Regulations are with the appropriate authorities for review and amendments. It is expected that the final draft would be completed by December 2011.

NATIONAL REPORT OF ST. KITTS AND NEVIS

Prepared by: S. Heyliger, Assistant Fisheries Officer

1. Country Profile

Geography	People
Location: (there is no map on page 2)17deg 18'N 62deg. 44'W **Area:** 261 km2 **Coastline:** 135 km **Maritime claims:** **EEZ:** 200 nm; **Territorial sea: 12** nm **International disputes:** none **Climate: s**ubtropical tempered by constant sea breezes; little seasonal temperature variation; rainy season (May to November) **Terrain:** volcanic with mountainous interiors **Natural resources:** negligible **Environment:** subject to hurricanes (June to November)	**Population:** 38, 958 (July 2005 est.); **Growth rate**: 0.38 % (2005 est.) **Ethnic divisions:** Predominantly Black, some British, Portuguese, and Lebanese **Languages:** English **Literacy:** 97% **Labor force:** 18, 172 (June 1995)

2. Fisheries Management

Department Vision:
To provide employment opportunities within the Fisheries sector, while ensuring that all of the fish and fishery products that are available for local consumption and export, are obtained while practicing conservation measures that will protect their sustainability.

The Fisheries
There are five major fisheries that are managed by the Department. These are Queen Conch (*Strombus gigas),* Caribbean Spiny Lobster (*Panulirus argus*), small coastal pelagic, large or ocean pelagic and reef/bank and slope fisheries.

On St. Kitts there are five major sites which account for nearly 70% of the total of the vessels in the Federation. Some of these sites are characterized by their major or unique fishing activity. For example, most conchs are landed at East Basseterre, the location of the Basseterre Fisheries Complex. Old Road is known for their coastal pelagics, like jacks, ballyhoo and gars, while Dieppe Bay is famous for lobster landings and boats from Nevis that bring their catch to St. Kitts do so by using the West Basseterre landing site.

The largest landing area in Nevis is adjacent to the Fisheries Complex in Charlestown. This facility provides gear and equipment, ice and walk-in freezers, outboard motor repairs, fish processing, and stalls for marketing the fish.

***Fishers*:** 679 on St. Kitts (about < 30 % full-time); 300 on Nevis (about 70% full-time)

Programs
Each fishery is managed under a separate program. The program is given the title of the related fishery.

3. Resources Management

LARGE (OCEAN) PELAGIC FISHERY
Catches of pelagics are seasonal and often target the dolphin fish (*Coryphaena hippurus)* and tunas (Scombridae). Larger pelagics are harvested by commercial and sport fishermen mainly by trolling. The commercial fishery is conducted by about 25 fishers using fifteen vessels, outfitted with trolling hooks and lines. Most vessels have a crew of 2- 3 including the captain. Trolling lines are normally 80 – 100lbs test with a single hook. Artificial lures are sometimes used especially for the tuna and mackerel. Fishers prefer to use ballyhoo or flying fish to catch dolphin fish. Some fishers have been using Fish Aggregation Devices (FADs) in conjunction with long lines to catch yellowfin tunas.

Objective
Promote the positive aspects of the traditional nature of this fishery and encourage new entrants.

SMALL (COASTAL) PELAGIC FISHERY
Fish are mostly caught by seine nets. Seining is often carried on close to beaches. Beach seining where nets are hauled onto the beach is discouraged as large numbers of juvenile fish are often taken and discarded. Gill nets (fixed or drifting) are used sometimes for catching jacks. Cast nets are also used along the beach to catch fry. Fish are sold fresh at the landing site by fishermen or by vendors. Market demand may limit catches at certain times. In shore pelagics are also used as bait in long line, trolling and trap fisheries. Five vessels using seine nets are involved in the fishery and approximately 30 persons are employed in this fishery on a regular basis.

Objectives
Increase landings
Encourage new entrants

REEF FISHERY
The species targeted by this fishery are those demersals that live within the ecosystem of coral reefs and are taken with traps, hand lines, gill nets and spear guns and are fished at various depths throughout the extensive shelf area. The quality of the catch ranges from miscellaneous reef fish (more commonly taken in shallow areas) to snappers and groupers (more commonly taken in deeper areas). The high local demand for reef fish of any size causes the fishery to be susceptible to overfishing. At most locations demersals are fished from small open boats, but a few larger boats (29 - 45 ft) now specialize in deep-water vertical long line fishing for snapper and groupers. In the past, traps were only baited to catch lobster, however recently traps are baited to catch a variety of fish.

The Antillean Z-traps of various sizes are mainly used however, rectangular and arrowhead traps are also used. Fishers haul their traps 2-3 times weekly, and may haul 25 - 45 traps each trip.

Often traps (pots) are set without buoys to reduce pot stealing which accentuates the problem of ghost fishing by lost traps.

Objective
Promote stock recovery

LOBSTER FISHERY
The lobster is part of the reef fishery, but has been separated by management due to its importance to the economy and very long life cycle. Lobsters are taken in the same traps that catch reef fish and to a lesser extent by divers. Lobsters are usually caught in small numbers and stored in holding cages until they are sold. Most of the catch is exported but sales to local restaurants and hotels are increasing.

Lobster is the second most important export marine product of St. Kitts and Nevis, second only to the Queen Conch. Lobster populations are considered to be over-exploited in near shore areas. Fishers report increasing scarcity in a number of areas in St. Kitts.

Objective
Promote stock recovery.

CONCH FISHERY
This fishery is carried out by SCUBA and free divers usually over sea grass beds and coral rubble, with some fishers operating without permits and others being uncertified divers. The majority of the fishing is undertaken from small wooden open fishing boats with an average length of 5 m with motors ranging from 25 to 40 HP. Each boat fishes with approximately three persons. Conch populations are considered to be heavily exploited within the Federation especially on the leeward side of the islands. However, conch are beginning to reappear in near shore areas in response to the concentration of fishing effort in deeper waters and the slowdown in exports to EU markets. This is the major export marine product for St. Kitts and Nevis.

Objective
Promote stock recovery. .

DATA MANAGEMENT
The department of Fisheries in both islands has the same method of data collection and analysis which is based upon the CARICOM region data systems CARIFIS. In St. Kitts data collection is done on a systematic census schedule. Information from all vessels landing at the selected site is captured and stored in an excel file due to the difficulties experienced using CARIFIS. Monthly reports on estimates of landings are produced.

Objective
To develop and implement systems for proper fisheries information collection, analysis and reporting.

Table 1: Registered Boats and Fishers

Year	1999	2000	2001	2002
Boats	224	287	287	303
Fishers	309	338	373	450

Year	2003	2004	2005	2006
Boats	NA	NA	361	385
Fishers	477	490	501	542

Year	2007	2008	2009
Boats	396	414	439
Fishers	600	634	679

A frame survey of the landing sites on St. Kitts was conducted in the first quarter of 2011. The results are available in a separate report.

AQUACULTURE

Currently there is only one aquaculture project. This project is privately owned and the owner is researching the growing of tilapia in ponds near the ocean, using seawater. This project began in 1999.

SNAPPER (St. Kitts and Nevis Aquaculture Pilot Project and Environmental Research) is a private entity run and coordinated by Dr. Barrington Brown, which has made positive strides through its 11 years of existence.

The Department of Fisheries has attached an officer to the SNAPPER program. Together Dr. Brown and Assistant Fisheries Officer, Sam Heyliger, have made positive impact in the production of tilapia.

A major development of SNAPPER was the transfer of brackish water to 100% Atlantic salt water where tilapias are reared from fry stage to grow out stages. Another significant result is that the fish is now breeding is 100% seawater.

Within the area of aquaculture, Ross University of Veterinary Medicine has expressed an interest in assisting with the development of SNAPPER in providing some pathological analyses support to the project. SNAPPER is now established as a research development and implementation entity. In the upcoming years aquaculture will be a very vital and important area in our fisheries sector due to the fact that aquaculture reduces pressure on our marine resources. For further information an online search can be done using keywords “growing tilapia in Atlantic seawater”.

Research and training

Research has been conducted on the potential of Shell Fish Aquaculture in St. Kitts and Nevis. The activity is basically a joint venture with St. Kitts Fisheries Department and Ross University School of Veterinary Medicine. The operation is conducted and led by John Brake, Marine Biologist.

Brief rundown of the operation:

Bags of small synthetic mesh are attach to a line that is anchored to the bottom of the sea with concrete blocks and lead to the top of the ocean surface by a buoy. The line has marks that

indicate the different depths in the water where each bag is attached to different marks showing the depth in the water and left for a period of two months before they could be removed for observations. The data collected from the bags was very informative as it assisted in determining the type of shell fish that would attach themselves to the bags at different depths in the water basically telling us where you would find the different types of shell fish. Other data also collected included size, temperature of water, and time of the year that the shell fish would be most plentiful. This project ended in 2010 with no conclusive results.

4. A New Era

During the first quarter 2010 the Fisheries Department was renamed the Department of Marine Resources. This new title saw the scope of responsibilities for the once fisheries department broadened. This gave rise to a new vision and operational/management framework. The Vision for the Department of Marine Resources will introduce into the Federation a revolutionary concept of Ecosystem management. It will take into account governance issues, fiscal, social and moral responsibilities in the management of our marine resources. This vision visualizes St. Kitts and Nevis as one (working towards the same goal of sustainability).

This will necessitate the move away from resource management by target species to the management of the ecosystems in which these species thrive. In other words, emphasis will be placed on the entire life cycle of the species being targeted and introduce management systems that will enhance the sustainability of the species at every stage of development.

This new vision will see greater emphasis being placed on habitat management and protection rather than actual activities to increase landings. The premise is if the primary source of production is protected and enhanced, this will increase secondary production thus increasing landings.

However, it is of utmost importance that there is collaborative effort between two key stakeholders namely, the Department of Marine Resources and the Ministry of Tourism. Our terrestrial space is much smaller than our marine space, thus, as the marine resources are a major part of our tourism product it is of vital importance that early collaborative efforts and systems be established.

Similarly, all other stakeholders should be given sufficient opportunity to contribute to the new ecosystem management process.

The new focus will see the establishment of:

a) Marine parks
b) Marine Reserves
c) Fishing priority areas
d) Artificial Reefs
e) Permanent Moorings
f) Vessel monitoring system
g) Revamped licensing system
h) Regular patrols
i) Monitoring and enforcement systems

It is envisioned that these efforts will eventually redound to increased landings within the medium term. These will also enhance the tourism product and add impetus to the fiscal standing of the government on a whole and the departments in particular.

Running concurrently with the establishment of the aforementioned, will be the establishment of Aquaculture/Mari-culture ventures which will add a non-traditional facet to the entire ecosystems

concept. This will increase the availability of fresh fish; provide employment and foreign exchange in an area where once nothing existed before.
However, to give full effect to this new approach some legislative amendments will have to take place.

5. Fisheries Legislation

Primary legislation:
The Fisheries Act (1984) and the Fisheries regulations (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 fishing.

Fishery Organizations and Partners
As the department pursues its new Ecosystem Approach to Fisheries Management a number of alliances will be forged with a number of Governmental and NGOs. These will include the following.

- Sandy Point Fishermen Cooperative Society (St. Kitts)
- *Old Road Fishermen Marketing Supplies Cooperative Society* (St. Kitts)
- *Dieppe Bay Fishermen Cooperative Society* (St. Kitts)
- *Nevis Fishermen's Marketing and Supplies Cooperative Society* (Nevis)
- *Customs and Excise-* ; control of seafood imports/export.
- *Physical Planning Unit* - management and development of the coastal zone
- *Department of Cooperative* - support and administration for the cooperatives.
- *The Ministry of Tourism*

With the new structure for the management of our Marine Resources in place headed by a Director of Marine Resources, the Department will undertake to engage all relevant institutions local, regional and international as it develops and implements its plans and policies.

Table 2: Summary of species caught by gear type from 1995-2010 in pounds.

MAJOR SP.	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
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	7,081	6,305	10,100	15,200	11,200	6,630
Trigger fish (*Balistidae*)	6,470	15,060	4,970	11,360	13,930	2,850	2,690	17,230	13,460	20,230	22,770	14,065	16,250	23,530	20,840	9,340
Grunts (*Pomadasyida*)	2,380	22,290	3,140	7,400	6,050	140	2,120	7,660	11,660	15,930	20,765	10,050	10,380	11,340	9,640	7,740
Squirrel fish (*Holocentridae*)	6,380	18,990	11,330	17,290	19,380	7,090	7,100	14,900	4,490	11,530	23,886	13,205	15,860	21,990	19,080	17,420
Snappers (*Lutjanidae*)	8,940	20,400	10,370	17,800	32,710	42,760	20,510	34,680	73,640	86,070	73,425	36,140	47,630	53,190	49,620	54,570
Goat fish (*Mullidae*)	6,080	21,300	2,570	5,500	3,210	40	0	860	220	1,050	11,295	1,390	3,000	1,470	2,900	1,580
Parrot fish (*Scaridae*)	15,930	42,330	11,590	18,200	16,540	4,460	15,570	18,220	26,030	44,820	39,285	21,630	25,220	30,330	28,110	24,570
Groupers (*Serranidae*)	16,900	39,140	21,820	24,780	25,260	13,790	7,540	21,050	30,500	42,090	31,882	33,030	51,320	55,390	58,860	26,350
Lobsters (*Panulirus argus*)	11,530	26,240	8,880	45,420	32,090	11,850	33,790	21,180	5,440	8,430	57,890	28,970	21,380	32,990	47,850	46,680
Mixed								173,210	123,740	139,290			89,290	138,720	118,660	104,400
SUB TOTAL	85,160	230,470	83,910	167,020	164,100	85,280	90,310	316,750	294,450	381,690	288,279	164,785	290,430	384,150	355,560	299,280
Seine Net																
Gars (*Belonidae*)	27,390	58,820	57,240	132,670	128,130	132,190	82,050	76,010	119,220	164,710	126,442	104,310	108,140	105,740	109,060	67,360
Bollyhoo (*Exocoetidae*)	47,280	119,000	49,670	83,250	48,820	47,760	105,140	92,520	41,430	129,840	80,921	56,650	66,400	51,310	49,380	49,680
Jacks (*Selar crumenophthalmus*)	0	0	36,050	44,800	79,000	70,790	56,200	90,510	34,000	790	21,700	31,840	1,850	8,500		0
Dolphin (Coryphaena hippurus)								1,440	100	0			10,310	4,300	470	150
Tuna/Mackerel (Thunnus/Scombridae)								13,700	26,420	11,910			9,880	3,050		6,000
Mixed								15,560	1,340	12,810			6,840	24,360	14,150	14,200
SUB TOTAL	74,670	177,820	142,960	260,720	255,950	250,740	243,390	289,740	222,510	320,060	229,063	192,800	203,420	197,260	173,060	137,390
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	77,830	32,960	58,180	96,850	44,740	18,850
Tuna/Mackerel (*Thunnus/Scombridae*)	2,030	7,680	5,780	22,020	20,650	6,250	9,680	9,790	14,290	17,180	29,546	16,210	7,590	28,200	6,640	10,300
SUB TOTAL	7,920	36,930	48,840	96,990	49,270	63,500	67,250	95,890	49,040	75,370	107,376	49,170	65,770	125,050	51,380	29,150
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	263,320	120,230	131,380	153,810	107,970	147,390
Mixed	28,280	74,950	32,190	47,070	67,840	48,720	280,690	0	0		67,708	84,925				
TOTAL	225,120	583,690	352,430	620,170	583,050	516,210	784,260	773,710	662,550	913,790	955,746	613,910	690,980	832,070	687,970	613,210

Table 3: Percentage contribution to total catch by resource type.

Year	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
% conch contribution	0.129219972	0.10882489	0.126351332	0.077994743	0.078861161	0.131651847	0.130849463	0.101678924
% Reef fish	0.378287136	0.394850006	0.238089833	0.269313253	0.28145099	0.165204084	0.115153138	0.409391116
% Coastal Pelagic	0.331689765	0.304648015	0.405640836	0.420400858	0.43898465	0.485732551	0.310343509	0.374481395
% Offshore Pelagic	0.035181237	0.063269886	0.138580711	0.156392602	0.084503902	0.123011952	0.085749624	0.123935325
Year	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
% conch contribution	0.145724851	0.149563904	0.275512532	0.195843039	0.190135749	0.184852236	0.156939983	0.240358115
% Reef fish	0.444419289	0.417699909	0.301627211	0.268418824	0.420316073	0.461679907	0.516824862	0.488054663
% Coastal Pelagic	0.335838805	0.350255529	0.239669326	0.314052548	0.29439347	0.2370714	0.251551666	0.224050488
% Offshore Pelagic	0.074017055	0.082480657	0.112347841	0.080093173	0.095183652	0.150287836	0.074683489	0.047536733

NATIONAL REPORT OF SAINT LUCIA

Prepared by the Department of Fisheries

This report has been updated from earlier versions prepared for previous annual CRFM Scientific Meetings. As such it has benefited from the input of a number of past and present staff of the Department of Fisheries, including: Williana B. Joseph, Patricia Hubert-Medar, Sarita Williams-Peter, Allena Joseph, Yvonne Edwin, Nansha Medard, Kate St Mark.

1. Overview of the Saint Lucia Fisheries Sector

The Ministry of Agriculture, Lands, Forestry and Fisheries, through its Department of Fisheries, is responsible for the management and development of the fisheries sector. It works with a range of other government agencies and non-government organisations and institutions, including fisher cooperatives which are based in most fishing communities.

The Government of Saint Lucia is committed to the conservation and sustainable use of its fisheries resources for the long-term benefit of the people of Saint Lucia.

2. Fisheries Management Objectives

- To contribute to the attainment of self-sufficiency and food security.
- To sustainably optimise the net incomes of the fishers and the communities involved in fisheries, and related economic activities.
- To sustainably optimise employment opportunities for those dependent on fisheries and aquaculture for their livelihoods.
- To maintain or restore populations of marine and freshwater species at levels that can produce optimum sustainable yields.
- 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 sustainably optimise the amount of fish protein available for domestic consumption.
- To improve on fisheries infrastructure and promote the use of appropriate fishing technologies with a view to sustainably optimise catch.

3. Description of the Fishery

The fisheries resource of Saint Lucia comprises demersal, coastal pelagic and offshore pelagic species. Although there is some year-to-year variability among these resources in terms of fishing seasonings, the fishing year of Saint Lucia can 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.

The offshore pelagic fishery contributes to approximately 65% of the annual landings for the period 2010 (Department of Fisheries, 2010) 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) and billfishes (Istiophoridae, Xiphiidae) (Figure 1).

Table 1: Total landings (tons) and percentages of landings for 2010

Species	TUNAS	DOLPHIN-FISH	WAHOO	SNAPPER	F_FISH	SHARK	LOBSTER	CONCH	OTHER	TOTAL
Total Landings	612.85	351.77	199.03	71.10	109.35	8.51	19.20	28.29	400.48	1800.58
Percentage% landings	34.0	19.5	11.1	3.9	6.1	0.5	1.1	1.6	22.2	

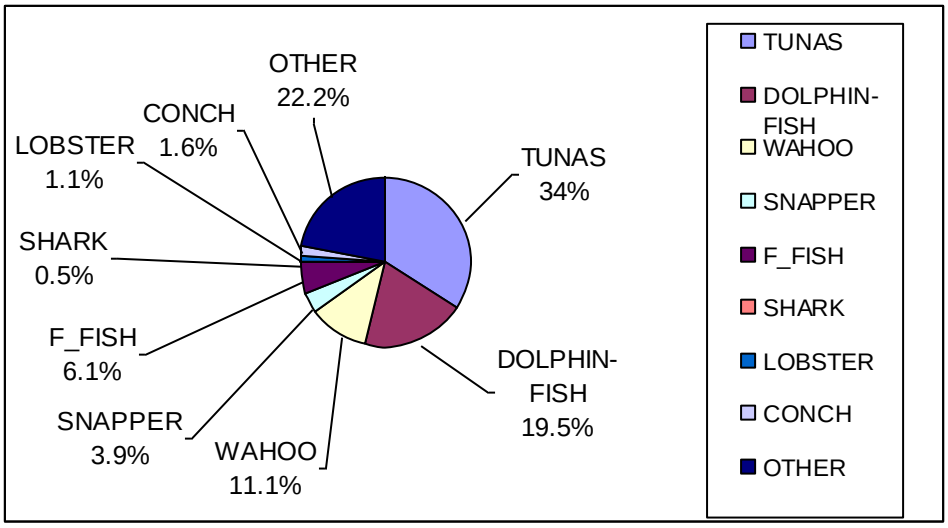

Figure 1: Percentage of landings for different families 2010.

The coastal pelagic fishery comprises of an array of species including: flyingfish (*Hirundichthys affinis);* ballyhoo (Hemiramphidae spp.); barracudas (Sphyraenidae spp.); herrings (Clupeidae spp.); jacks (Carangidae spp.); needlefishes (Belonidae spp.).

The demersal fishery lands the most highly priced and valuable species for the local, tourism and export sectors, species landed includes: snappers (Lutjanidae spp.); groupers (Serranidae spp.); Caribbean spiny lobster (*Panulirus argus)*; Caribbean queen conch (*Strombus gigas).* The contribution of this fishery to the total annual landings reflected 22% of the annual landings and has been decreasing over the years. The decreased landing trends observed in the demersal fishery can be attributed to the increased pressure on the offshore fishery during this period and possibly the movement of some fishers into the tourism industry.

Overview of Fleet
The vessels range from 3-25m in length and are powered by engines ranging from 5hp – 350hp. On average, vessels are 7-8m long and are propelled mainly by 75 horse power outboard engines.

Due to the multi-species nature of the St. Lucia fishery, most vessels are generally equipped with the following gear types: trolling lines; flying fish nets; longlines (palangres); gillnets; handlines; and fishpots (traps).

The Department of Fisheries' database comprises of 618 registered fishing vessels (Department of Fisheries, 2010). Additionally, in 2002, the fishing vessel fleet was reclassified under the following categories: canoes, pirogue, transom, shaloop, whaler, longliner and other. Table 2 illustrates the fleet categories that are presently used and the vessel figures as of December 31, 2010.

Over the years, fibreglass reinforced pirogues (FRP) have been gradually replacing the traditional canoes. According to the Department of Fisheries' Licensing and Registration database, the traditional canoe fleet represented 36.8% of the total fishing fleet in 2000, in 2010 that percentage dropped to 13%. Whereby, pirogues represented 45.3% of the total fishing fleet in 2000, and in 2010 the percentage has increased to 76%. Therefore, it is evident that there has been an inverse relationship between the traditional canoes and the fibreglass pirogues.

Table 2: Fishing vessel fleet for the period ending December 31, 2010.

Vessel Category	Canoe	Pirogue	Transom	Shaloop	Whaler	Longliner	Other	Total
Total	81	468	36	18	4	9	2	618

Fisheries Statistics and Sampling Plan
The catch and effort sampling plan is based on a stratified random sampling regime of three major strata: primary, secondary and tertiary landing sites. This classification is based on the number of vessels operating at the site, the fishery types and the volume of fish being landed.

The island's fishery operates out of 22 landing sites. However, catch and effort data is presently collected from nine landing sites. These sampled sites include: Anse La Raye, Gros Islet, Castries, Soufriere, Choiseul, Vieux Fort, Micoud, Laborie and Dennery (see Table 3).

Data is collected from every other returning vessel for fifteen randomly selected days of each month. Information collected includes: area fished, species caught, gear used, hours fished, fuel consumed and total vessels out. This data is then submitted monthly to the Department of Fisheries. Additionally, information is collected on area fished: the island's coastal waters are divided into two fishing zones for offshore pelagic and three fishing zones for nearshore and bank species.

Table 3. Fish landing sites and their category

Site	Category	Site	Category
Anse la Raye	S	Marigot	NS
Banannes	NS	Marisule	NS
Canaries	NS	Micoud	S
Castries	S	Monchy	NS
Choiseul	S	Praslin	NS
Cul De Sac	NS	River Doree	NS
Dennery	S	Roseau	NS
Gros Islet	S	Savannes Bay	NS
Laborie	S	Soufriere	S
Other minor sites in Vieux Fort area	NS	Vieux Fort	S

S = Sample site
NS= Non sample site

Lobster Fishery

Panulirus argus is the most 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 size limit of 95 mm. The majority of Caribbean lobster landings come from traps that are set at depths in excess of 30 m (Luckhurst & Auil-Marshalleck, 1995). However, a more recent research study indicated that traps were set within a 5-50m depth. Previously, lobsters were fished with trammel nets that are now banned from the island's fishery; nevertheless, they are still used illegally on a small scale. Caribbean spiny lobsters are also illegally fished with spearguns by recreational fishers.

The fishery is economically significant and sustains the livelihood of pot fishers of the coastal communities, particularly during the low period. It is regulated within a seven-month fishing season that extends from August 2 to February 28 or 29 every leap year both days inclusive.

The management objective for the lobster fishery is to rebuild the stocks and to ensure sustainable use of the fishery resources.

Fisheries legislation and regulations

The primary legislation governing management of the lobster fishery are 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 moulting. It is also illegal to spear, hook a lobster, or remove the eggs from a lobster. In 2001, the Department of Fisheries with assistance from FAO, embarked on an initiative to review and revise the existing fisheries legislation. The following are proposed amendments regarding lobster management:

I No person shall:

- *Attempt to catch or catch lobster with the use of SCUBA and/or Hookah*
- *Keep any lobster confined to a holding pot during the closed season; and*
- *Disturb, damage, take from the fishery waters, have in his possession, purchase, import, expose for sale, or sell any lobster from the 1st day of March to the 1st day of August in every year, or during a closed season as declared by the Minister by notice published in the Gazette and in a newspaper which is printed or circulated in the State.*

II *All establishments engaged in the sale and trade of lobsters and their products shall declare their lobster stocks to the Department of Fisheries by mid March of every year. All establishments engaged in the sale or trade of lobster shall dispose of all lobsters within one month from the allocated close season.*

Conch Fishery

The Queen conch, *Strombus gigas* (Linaeus, 1758) is one of the nearshore species fishery of Saint Lucia. Presently, nearshore stocks have been over exploited, resulting in divers moving to deeper depths. 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 survey of vessels targeting conch resources which was conducted in 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. The report also indicated that conch vessels target, on average, three areas on a rotational basis and were mainly landed at two landing sites: Gros Islet, located at the north of the island; and Laborie on the south west coast. Moreover, conch is more heavily targeted in the north of the island than the south (Joseph, 2003).

Conch is exploited commercially all year by over 40 fishers in depths ranging from 11 m to 43 m and fishers operate mainly out of fibreglass pirogues ranging in length from 7.02 m – 8.45 m which are powered by outboard engines of 115 – 250 hp. Joseph (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. While most conch fishers undertake more than three dives a week and land an average of 300 conch 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 (Joseph 2003). Joseph (2003) further indicates that two divers enter the water per trip and each diver undertakes between three to four dives (inclusive of decompression dive). However, subsistence exploitation occurs in shallower areas, but the extent is unknown.

The management objective for the fishery is to rebuild the conch stocks, especially nearshore and to ensure sustainable use of the resource.

Fisheries legislation and regulations

The Fisheries Regulations No. 9 of 1994 provides 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.

The Department of Fisheries with assistance from the Food and Agriculture Organization (FAO) has embarked on an initiative to review the fisheries legislation. The following are amendments regarding conch in the proposed revised fisheries legislation:

(1) *No person shall -*

I. *take from the fishery waters, sell, purchase, or at any time have in his possession any immature conch; or*

II take from the fishery waters, expose for sale, purchase or at any time have in his possession any conch during the closed season for conch or taken from a closed area for conch as specified by the Minister by notice published in the Gazette and in a newspaper which is printed or circulated in the State

III. take from the fishery waters, have on board any fishing vessel or land any conch out of its shell.

(2) In this Regulation -

- *"conch" includes the whole or any part of any conch;*
- *"immature conch" means a conch with -*
  - *a shell with a lip thickness of less than 5 millimetres**;***
  - *a total weight of less than one kilogramme or*
  - *a shell which does not have a flared lip.*

Large Pelagic Fishery

This fishery, like the other fisheries in Saint Lucia, is primarily conducted from fibreglass open pirogue boats, with mainly trolling lines. The offshore pelagic fisheries contributed to just over 75% of the total annual fish landings by weight (Department of Fisheries, 2010) which is made up of a number of migratory species such as dolphinfish (*Coryphaena hippurus)*; mackerel (*Scomberomorus* spp.*)*; Wahoo (*Acanthocybium solandri)*; blackfin tuna (*Thunnas atlanticus)*; yellowfin tuna (*Thunnus albacares)*; Skipjack tuna (*Katsuwonus pelamis)*; sharks (various families);

The catch is highly seasonal, with the majority of activity and landings occurring between December to June, however peak landings occur between January to April each year. This fishery is active at all landings sites, but is more prominent at Dennery located on the east coast and Vieux Fort in the south of the island. The offshore pelagic fishery through the introduction of new fishing technologies such as the Fish Aggregating Device (FADs) and new fishing techniques such as longlining has contributed to increased landings.

Unlike the near shore 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.

The management objectives for this fishery, as outlined in the Fisheries Management Plan of 2006, 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

The landings trends for large pelagics have remained progressive over the last few years (see Table 4). This increasing trend in pelagic landings may be contributed to the efforts undertaken by the Department of Fisheries to promote the fishery as an alternative to the near shore fishery and the increased use of Fish Aggregating Devises (FADs).

Table 4: Total and Large Pelagic Landings (tons) from 1995-2010 (Source: Department of Fisheries)

Year	Total Fish Landings (tons)	Total Large Pelagic Landings (tons)
1995	981	594
1996	1315	872
1997	1311	928
1998	1461	870
1999	1718	1227
2000	1860	1277
2001	1967	1082
2002	1608	975
2003	1447	918
2004	1520	1053
2005	1386	844
2006	1440	986
2007	1509	1056
2008	1809	1021
2009	1856	1145
2010	1801	1164
Average	**1561.81**	**1000.75**

4. Fisheries 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, closed seasons and creation of marine reserves. A list of relevant fisheries related legal instruments is given in Annex 1.

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 (St. Lucia Department of Fisheries, 2006). 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 (St. Lucia Department of Fisheries, 2006).

The Department of Fisheries is cognizant of the need to ensure that proper management regimes are in place to guide the management and development of the fisheries sector. In light of such, the Department of Fisheries with technical assistance from the Food and Agricultural Organisation, in 2001, reviewed the existing legislation with the aim of revising the legislation to encompass many of the new fisheries management paradigms. Many consultations and meetings were undertaken

with stakeholders resulting in a proposed new Fisheries Act and Fisheries Regulations. At present the legislation is at the Attorney General Office for review.

Other Fisheries-related Legislation:

- *Forest, Soil and Water Conservation Ordinance* (1945): controls use of mangroves.
- *Crown Lands Ordinance* (1946): established the Crown Land Committee to review and make recommendations on the allocations/use of crown lands.
- *The Minerals Vesting Act* (1966): deals with the exploitation of minerals.
- *Land Development (Interim) Control Act* (1971): established a Development Control Authority to review and determine development plans.
- *Fishing Industry (Assistance) Act No. 33 of 1972 and Fishing Industry (Assistance) Regulations No. 25 of 1973:* provides for the granting of assistance to the fishing industry.
- *Pesticides Control Act* (1975): controls use of pesticides.
- *Public Health Act* (1975) *and Regulations:* provides regulatory oversight for sewage, industrial and solid waste disposal.
- *Saint Lucia National Trust Act of 1975:* deals with the preservation of areas of natural beauty/ historic interest, including submarine areas.
- *Wildlife Conservation Act* (1980): deals with the control of protected species.
- *Tourism Industry Development Act* (1981): promotes tourism development.
- *Water and Sewage Authority Act* (1984): regulates sewage treatment and disposal.
- *The Maritimes Areas Act No. 6 of* 1984: addresses some aspects of marine pollution.
- *Solid Waste Management Authority Act* (1996): makes provision for a Solid Waste Management Authority and details their function.
- *National Conservation Act (*1999): controls, maintains and develops beaches and protected areas.
- *Oil in Navigable Water Act* (cap 91): covers some aspects of oil pollution within the marine environment.
- *Fisheries (Snorkelling Licence) Regulations No. 223 of 2000:* regulates commercialised snorkelling activities.

Annex 1

Primary Fisheries Legislation of Saint Lucia:

- The first official legislation in Saint Lucia was the Turtle and Fish Protection Ordinance Cap. 45 of 1911, which was replaced by the Turtle, Lobster and Fish Protection Act No. 13 of 1971. The latter was in turn replaced by the *Fisheries Act No. 10 of 1984.* The Fisheries (Turtle, Lobster and Fish Protection) Regulations No. 67 of 1987 were then established, which were replaced by the *Fisheries Regulations No. 9 of 1994.*

- *Fisheries Act (No. 10 of* 1984) *and Regulations (No. 9 of 1994),* which are based on the OECS harmonized legislation, cover 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. This Act also 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 and creation of marine reserves. It gives the Minister responsible for fisheries the authority to create new regulations for the management of fisheries as and when necessary.

- In 2001, technical assistance was provided by the United Nations Food and Agricultural Organisation to review the existing legislation, to take into account more recent international fisheries agreements and the national requirements for fisheries management and development.

A number of consultations were held with stakeholders and a proposed new Fisheries Act and Fisheries Regulations were developed. The draft Act and Regulations are in their final stages and have been submitted for finalisation by the Attorney General.

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NATIONAL REPORT OF TURKS AND CAICOS ISLANDS

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1. Introduction

The Turks and Caicos Islands (TCI) fisheries have been through fairly recent changes from natural phenomenon (storms) and economic effects (economic downturns). However, the TCI has continued its commercial and recreational fishing activities to attempt to stabilize its economy and wellbeing of the TCI people. Data collection has continued with all of the fisheries, however with a decrease in funding, no further data collection schemes have evolved. However, the TCI is still committed to continuing its work on data collection to better assess all the fisheries of the TCI.

Currently the TCI continues to commercially export both Spiny Lobster and Queen Conch; and domestically capture fin fish for the purpose of domestic use. Local consumption through restaurants and hotels is of estimated quantity by the TCI Government. The DECR has made attempts to gather the information, but with limited man-power and funding, financial resources have previously been allocated in other necessary areas.

2. 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, but currently used only for the purpose of capture of fin fish. The vessels most often utilized in the TCI are small retrofitted V-hull boats ranging in length from 18 ft-20 ft with a 85-115 hp out board engine. After the 2008 hurricane season, large vessels rigged with electronic reels and/or traps have been repaired, but are limitedly used. Often owners of the vessels find difficulty in obtaining a "Turks Islander" to be a deck hand, which is required by law.

Commercial fishermen from the TCI often work more than one fishery at a time. Using only free diving methods with no underwater breather apparatus, fishers are found diving in depths ranging from 3 meters to 30 meters. The normal day for a fisher entails leaving the dock between 7:00 and 8:00 a.m. and return between 4:00 and 5:00 pm, considered 1 boat-day. Commercial fishermen are found to be opportunistic in their catch. During the open season of lobster, fishermen largely capture spiny lobster and land them whole. In both fishing years of 2009-2010 and 2010-2011, fishers have tended to work the Spiny Lobster fishery throughout the season and at the end turn to the queen conch fishery. At the completion of both the Spiny Lobster and Queen Conch fisheries, fishers again re-prioritize capture and actively work the fin fishery for the local market.

Within the past ten years, the commercial fisheries have directly employed an average of 365 fishers per year. In 2010/2011 fishing season, the number of commercially licensed persons was at 288. Similarly the number of commercially licensed vessels average at 158 licensed vessels but in 2008-2009 there were 126 commercially licensed vessels.

When referring to the catch & effort, effort is measured by the number of days at sea and catch is measured in pounds. The larger individual boats carry between 5-12 men on the vessel each day. Smaller vessels carry between 1-3 people on board.

3. National Fisheries Policy and Management Objectives

Policy Summary

Although protection of fisheries resources is implicit in the overall development strategy of the TCI, the importance of the fisheries sector in present and future development and the fragility of the resource base warrant the establishment of a specific policy for the industry.

Currently Fisheries Policies and Legislation is under review. Various recommendations to amend the legislation have been made to the Governor's Council. Until Legislation or Policy has been changed it remains as previous documented in National Reports.

The Fisheries Policy aims to ensure the sustainable use of the living marine resources and ecosystems through increased cooperation and collaboration with all the stakeholders for the improved welfare of the people of the TCI. It is founded on the belief that all natural marine living resources of the TCI, as well as the environment in which they exist and in which mariculture/aquaculture activities may occur, are national assets and the heritage of all the people, and should be managed and developed for the benefit of present and future generations in the country.

The long-term vision of the Government of the TCI includes:

- Pursuance of well-informed strategic, economic and financial policies, which promote sustainable development and a decent standard of living for the people of the TCI.
- Achievement of greater functional and geographical diversification of economic activity, so as to reduce the TCI's economic vulnerability and to spread the benefits of economic growth more widely among its inhabitants.
- Implementation of policies and strategies to protect the interest of the TCI Islanders, thereby empowering them to derive optimum benefits from the development of the TCI.
- Initiation of measures contributing to the fusion of a dignified and confident nation at peace with itself and the world, a nation whose people believe in themselves and who, in their entrepreneurial, professional and other daily pursuits, and energized by dignity and national pride.
- Provision of sound health and educational services, which are available to all.
- To use our natural resources wisely, being fair to present and future generations.

Management Objectives

- Ensure that the catch in any one-year does not exceed the Maximum Sustainable Yield.
- Restore and maintain populations of marine species to sustainable levels.
- Conserve local populations of endangered species and ensure sustainable harvesting and trade.
- Promote and enhance scientific research capabilities in order to obtain relevant information on the fisheries resources such as carrying capacity, stock status, etc.
- Enhance income generation by a factor of 15% by improving and creating market opportunities for fish and fish products at the national, regional and international levels.
- Ensure that the benefits from the exploitation of the fisheries resources are optimised by Belongers.
- Promote diversification in resource exploitation of the TCI fisheries.
- Streamline, monitor and regulate the importation of marine products.
- Establish mechanism to reduce overcapitalisation in the fishing industry.

- Develop and seek opportunities for resource users to obtain financial assistance /credit from credit agencies.
- Achieve environmental and developmental awareness of marine resources in all sectors of society from primary school through adulthood.
- Ensure that post harvest handling, processing and distribution of fish and fishery products is carried out in a manner that maintains quality, nutritional value.
- Develop and implement food processing and handling guidelines/regulations for quality assurance.
- Improve the manpower and resources of the Fisheries Division to ensure effective monitoring, control and surveillance of fishing activities.
- Promote and maintain a "Zero Tolerance" in enforcement of the legislations.
- Develop and Implement strategies to deter and combat Illegal, Underreported and Unreported (IUU) fishing in the waters of the Turks and Caicos Islands
- Improve stakeholder participation in the management of the marine resources.
- Achieve inter and intra-agency collaboration on the matters that may affect the fisheries resources and associate habitats.
- Improve relationship with other Overseas Territories in the management of the marine resources and the environment.
- Improve TCI's collaboration and participation in regional and international initiatives in the management of the fisheries resources.
- Promote talks to delineate and conclude maritime boundaries discourse between the TCI and The Dominican Republic as well as The Bahamas.
- Develop and implement mariculture/aquaculture guidelines and regulations.
- Promote and encourage mariculture/aquaculture of indigenous species of invertebrates and fish as a means of diversifying income and diet.
- Achieve environmental and developmental awareness of marine resources in all sectors of society from primary school through adulthood.

4. Research

Monitoring Activities

The economic downturn and limited man-power of the Department of Environment and Coastal Resources has caused difficulty in maintaining and increasing any monitoring activities of the TCI. The following activities continue:

- Catch and effort data for scale fish is being collected at the landing docks and processing facilities. Fish are measured by standard length, fork length and total length and reported with species name. A weight is collected if time allows. Captains are then interviewed for the number of days at sea, number of crew, location, etc.
- Export data for fish is collected for personal export only. Scale fish is not exported on a commercial scale.
- Data on large and coastal pelagic species are collected during local fishing tournaments. This data is stored and shared with international monitoring organizations such as ICCAT and the FAO.
- Catch data from confiscated international vessels poaching in the waters of the Turks and Caicos Islands are also monitored. These vessels usually fish on the Mouchoir Bank, and in waters which local fishers do not utilise except in the case of scale fish. By monitoring the

catches from these vessels, the Department anticipates the use of these data to assess the status of the fish stocks in these areas.

- The Department is also actively monitoring the number of persons, number and sizes of vessels, sizes of engines, and gear types being used in each fishery through the licensing system so as to determine "effective effort" exerted on the respective fisheries.

The following are activities the DECR would wish to continue upon obtaining proper funding:

- The Department of Environment and Coastal Resources (Fisheries Sub-unit) has collected local consumption data of marine products to determine the seafood consumption rate. The data is available but not completely analyzed.
- Although the Department has conducted numerous socio-economic surveys in the past, this research approach for the most part has been underutilised. Many of the socio-economic surveys have been in collaboration with individuals and or institutions, looking at the following:
    - Social Capital
    - Resource utilisation
    - Local consumption

5. Legislation and Management Regulations

- Fisheries Protection Ordinance. Cap. 104: This is the main legislation which provides the legal basis and regulations for managing the fishery resources of the Turks and Caicos Islands. (Strongest Legislation based for monitoring, enforcement and surveillance)

Other Fisheries Related Legislation

- Fishery Limit. Cap. 105: Defines the Territorial Waters and Economic Exclusion Zones (EEZ) of the Turks and Caicos Islands.
- National Park Ordinance. Cap. 80: Provides the legal basis for the establishment and management of marine protected areas such as National Parks, Marine Reserves, and Sanctuaries.
- Coastal Protection Ordinance: This legislation combines several pieces of legislations, such as the national parks ordinance, fisheries protection ordinance and others to provide protection for the coastal zone.
- Endangered Species Bill: This legislation is currently in draft form. On completion, it will provide the legal basis for protection of endangered species in the Turks and Caicos Islands. (Will provide the backing for monitoring of exports such as CITES)
- Wild Birds Protection Ordinance. Cap. 84: Allows for the management of ancillary species in order to protect biodiversity
- Mineral (Exploration and Exploitation) Ordinance. Cap. 79: Provides for the protection of the marine habitat from direct mining impacts or from indirect terrestrial mining activities.

NATIONAL REPORTS - OBSERVERS

NATIONAL REPORT OF MARTINIQUE and GUADELOUPE

1. Fishery and Fleet description

During the year 2008 and 2009 in Martinique, 1084 and 1098 boats were registered as commercial fishing boats and in Guadeloupe 878 and 903 respectively. Within the same years, 85% and 82 % (916 & 896) of the vessel fleet were active in Martinique and in Guadeloupe 90% and 86 % (794 & 778) were active. Most of the boats are between 5 to 9 m total length. The 7 to 9 m boats are more frequent in Martinique (figure 1). During the last decade, the number of 7 to 9m boats increased in Guadeloupe while the number of 5 to 7 m boats decreased (figure 2). The average length of the boats is similar between the two French Antilles, but the average engine power is higher in Guadeloupe (139 kW *vs* 80). The total power of the fleets had increased steadily from 56,788 to 87,420 kW in Martinique between 1993 and 2009 and at the same time, from 84,240 to 125,874 kW in Guadeloupe. The average age of the boats are 16 years in Martinique and 11 years in Guadeloupe.

Dolphinfish, Flyingfish and Blackfin tuna are mainly targeted using the following:

- High sea hand lines and trolling lines for large pelagic fishes
- Trolling lines and drifting vertical lines around FADs for large pelagic fishes
- High sea drifting nets for flyingfish (Martinique only)
- Nets for flyingfish during High sea lines for large pelagic fishes (Martinique only)

Flyingfish are not targeted by the commercial fishing boats of Guadeloupe. This is practiced mainly by high sea fleets. Related to the typology made by Ifremer, 10 different fleets are distinguished (table 1) totalling 464 boats in Guadeloupe and 435 in Martinique (2008).

The boats of these high sea fleets share their activities between high sea and the insular shelves. An example of the seasonality of the different activities is given for Martinique in 2008 (figure 3). The seasonal activity of the high sea hand and trolling lines which are targeting mostly dolphinfish between December to June, impacts others activities which are higher from July to November. The total number of trips per year on the insular shelves is higher than at high sea (figure 4). The drifting nets for flyingfish are used on the west coast of Martinique inside the 24 NM limit. FADs are mainly exploited inside the 24 NM while high sea hand and trolling lines are fishing outside the 24 NM (figures 5 & 6).

Fishing around Moored Fish Aggregating Devices (FADs) took place in Martinique and Guadeloupe during the 90's and seems to have changed the activity and the seasonality of the high sea fishing. The data from enquiries made in 1979 and 1989 show a high proportion of boats practising high sea lines during the first half of the year and a sharp decline in the second half of the year. In 2006, this seasonality is less definite. The high sea boats share their activities between high sea lines and FADs. Fishing is practised all year long; as a result some of the high sea boats stay offshore between June and December (figure 7).

2. Statistics and Sampling

A Fisheries Information System (FIS) conceived by Ifremer is being implemented in Guadeloupe and Martinique since the beginning of 2010 after a pilot project was undertaken in 2008 in Guadeloupe and May 2008 to December 2009 in Martinique. The FIS is a permanent, operational

and multidisciplinary national network (figure 8) for the observation of marine resources and their associated uses.

The methods used are the following:

- *Phone investigation*: stratified sampling plan based on a simple stratified random sampling of the vessel each week to reconstitute trip and inactivity on 7 days. Stratification (25 stratums) made out of length, gradient and zone of fishing of the vessel. In Martinique, 75 interviews are made per week and 60 in Guadeloupe.
- *Sampling at landing points*: sampling strategy of harbours with at least 10 vessels between Monday to Friday.

The pilot studies give first preliminary figures on the extrapolated landings of these islands but this data has to be validated. The scattering of the landing points around Guadeloupe and Martinique (more than 100 in each island) makes the monitoring of the fishing activities difficult. The use of two methods to estimate the number of trips gave results up to 2 times less than those obtained in Martinique by a previous study 20 years ago (Gobert, 1989). A field survey has been launched in Martinique in order to address this issue.

The annual estimates of the landings are presented in table 2 for Martinique (2009 & 2010) and table 3 for Guadeloupe (2008) with their confidence intervals. The CPUE are given in the same tables. For Martinique some of small Blackfin tunas (2 kg or less) are in a category called "non identified *Thunnini"*. In this unidentified *Thunnini* the proportion of Blackfin tuna is unknown. The weights of the fish are recorded as round whole for the Flyingfish and *Thunnini* and gutted for the Dolphinfish and Blackfin tuna.

Estimates of catch rates per trip obtained during stratified random surveys in 2008-2009 in Guadeloupe and Martinique were used to reconstruct the total annual catch by assuming that these catch rates represent average catch rates for the fishery through the entire historic period. Annual catch was calculated as the product of the catch rate and the number of boats per year.

Annual catch estimates for 2008, the period for which there is more reliable data, range from 393 to 561 t (metric tons) per year, which represents an estimate of 474 t (metric tons) for Dolphinfish in Guadeloupe and 12 to 17 t for Blackfin tuna (estimate 14 t).

In Martinique, for 2009 estimates range from 23 to 64 t (estimate 40 t) for Dolphinfish and from 9 to 29 t (estimate 18 t) for Blackfin tuna.

The final estimates of historical harvest for both islands therefore start from a small catch rate around FADs of 3 tons of Dolphinfish and 1 ton of Blackfin tuna in 1985, made in Martinique to 377 t of Dolphinfish and 20 t of Blackfin tuna for both islands in 1997, to the present estimate of between 416 to 625 t of Dolphinfish and 21 to 46 for Blackfin tuna in 2008 (tables 4 & 5).

For other gears, the estimate of historical catches cannot be determine because of the lack of information on the evolution of the number of boats and the change in the fishery as there was significant increases of engine power and the achievement of FADs fishing.

In 1987, the estimates of annual landings in Martinique done by Gobert (1989) were up to 370.4 t for Flyingfish and 247.8 t for Dolphinfish. The high sea lines number of trips was estimate at 24,477 and the catch per trip for Dolphinfish at 10.12 kg. Several assumptions could explain the high difference of CPUE value between 1987 and 2009 which includes increasing engine power which allows the boats to search in wider area and differences in abundances however no assertion

can be given. As a consequence, it seems hazardous to try to build historical data series for high sea lines.

The monthly catches per trip show peaks of CPUE in March-April for Dolphinfish and Flyingfish and between June and September for Blackfin tuna. The curve of the unidentified *Thunnini* CPUE has several peaks which suggest a mixture of species with different seasonality (tables 6 & 7).

Limited data is available on length frequencies in Martinique (table 6) for dolphinfish in 1986 & 1987 (fig. 8) and for blackfin tuna in 1986 & 1987 (figure 9) and 2008 & 2009 (figure 10). The blackfin tuna length frequencies indicate two predominant modal classes, one less than 30 cm fork length and the other between 45 to 60 cm. According to Doray *et al.* (2004), young blackfin tuna probably leave the vicinity of Martinique to undergo a trophic migration at 7 to 8 month-old, and thereafter comes to breed in the Lesser Antilles area. The lengths of Dolphin fish are between 24 and 128 cm (figure 11).

3. Research

Research projects on FADs sustainable development were conducted in Martinique by Ifremer. A Lesser Antilles project named MAGDELESA was proposed to start in October 2011. An ongoing project is conducting a diagnostic in Martinique and Guadeloupe of the contamination of the fishing fauna by chemical products and especially by the chlordecone: a pesticide used in banana plantations. Other organizations are working mostly on coral with the objective to protect this ecosystem and the associated resources. The implementation of the FIS will bring the necessary information needed to conduct research on biodiversity of the marine fauna of the French West Indies.

4. Legislation and Management Regulations

There are no special legislation and management regulations for commercial fishing of Dolphinfish, Blackfin tuna and Flyingfish. In Guadeloupe, recreational fishing is limited to 3 fish per trip and person on board. Regulation measures on FADs have been taken in Martinique and Guadeloupe. Limit of total power and gross tonnage is separately imposed for the commercial fleets of Guadeloupe and Martinique.

Literature cited

Doray M., B. Stéquert and M. Taquet, 2004. Age and growth of blackfin tuna (*Thunnus atlanticus*) caught under moored fish aggregating devices, around Martinique Island. Aquat. Living Resour. 17, 13-18.

Gobert B., 1989. Effort de pêche et production des pêcheries artisanales martiniquaises. Document scientifique n° 22, 95 p.

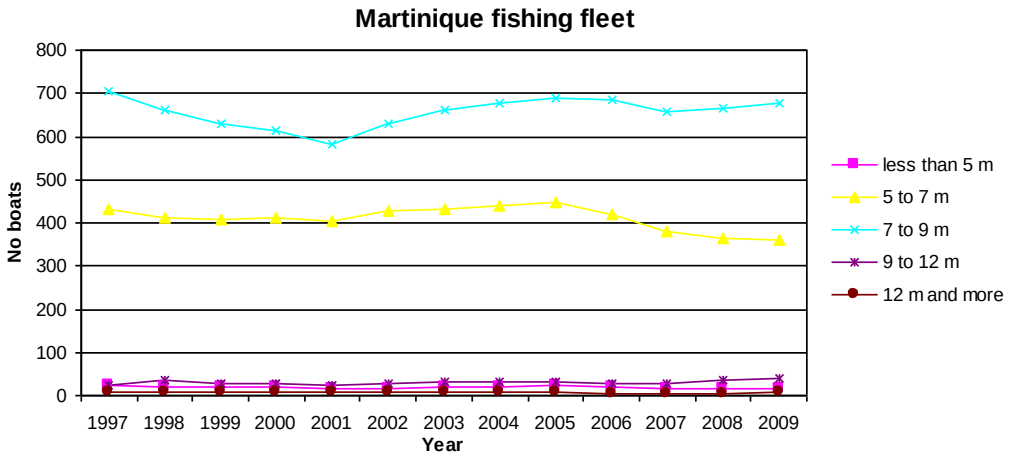

Figure 1. Length frequencies of the fishing fleet of Martinique (1997 to 2009)

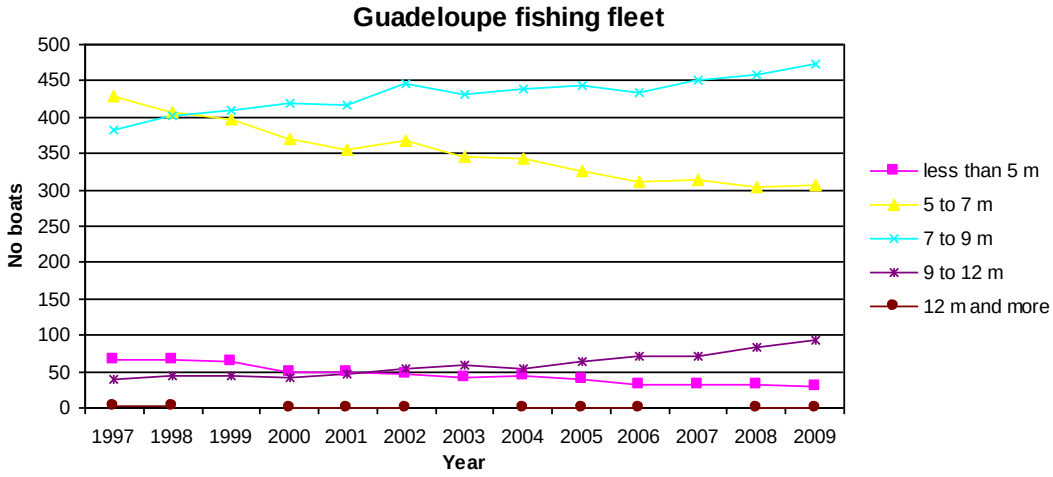

Figure 2. Length frequencies of the fishing fleet of Guadeloupe (1997 to 2009)

Fleets / Number of boats (2008)	**Guadeloupe**	**Martinique**
FADs	63	85
FADs - Traps	73	87
FADs - Nets	25	39
FADs - others lines	37	16
FADs - Polyvalent fixed gears	104	61
High sea hand and Trolling lines	12	17
High sea hand and Trolling lines - Traps	41	77
High sea hand and Trolling lines - Nets	24	12
High sea hand and Trolling lines - others lines	13	3
High sea hand and Trolling lines -Polyvalent fixed gears	72	38
Total	**464**	**435**

Table 1. High sea fishing fleets of Guadeloupe and Martinique (2008)

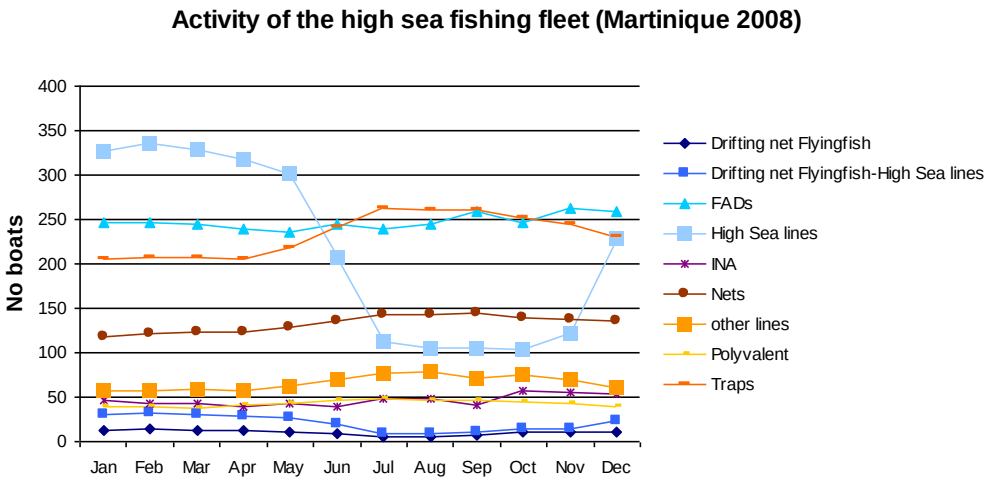

Figure 3. Seasonality of the high fishing fleet of Martinique – number of boats per month and metier (2008)

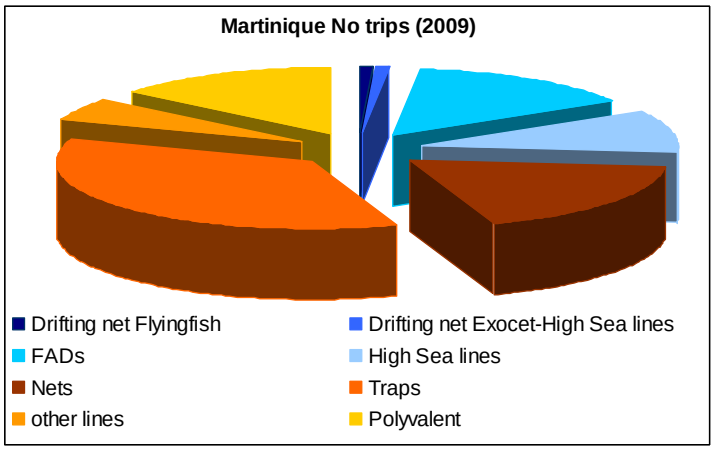

Figure 4. Number of trips per metier of the high sea fishing fleet of Martinique (2009)

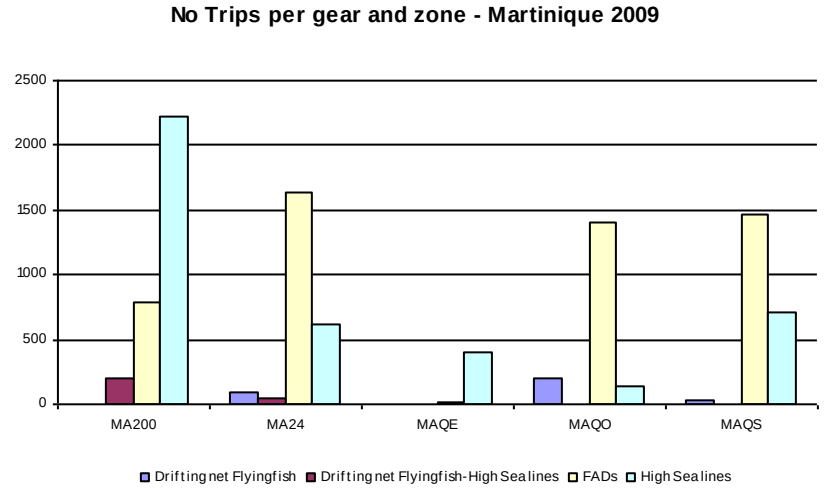

Figure 5. Number of trips per zone of the high sea fishing fleet of Martinique

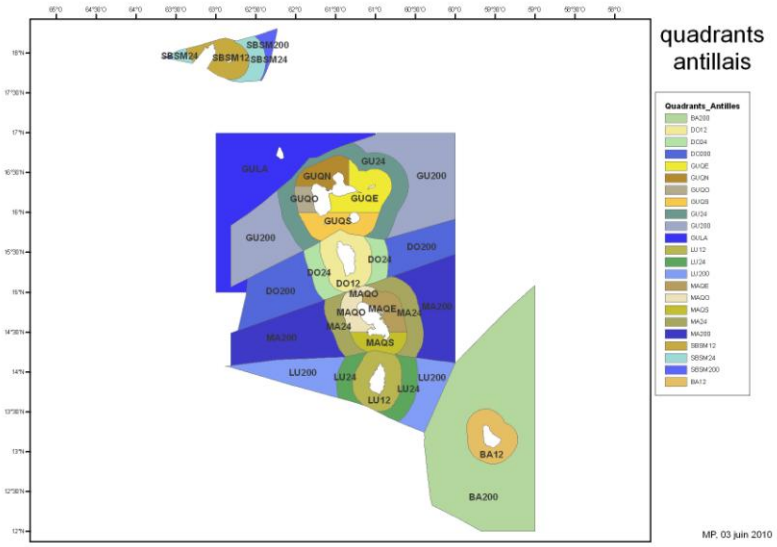

Figure 6. Map of the zone used by the FIS of Ifremer

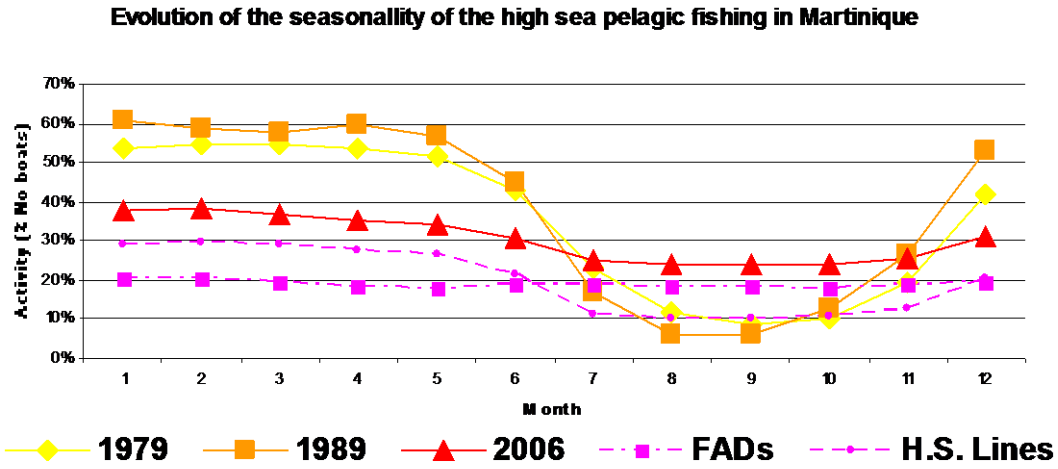

Figure 7. Evolution of the seasonality of the high sea pelagic fishing in Martinique

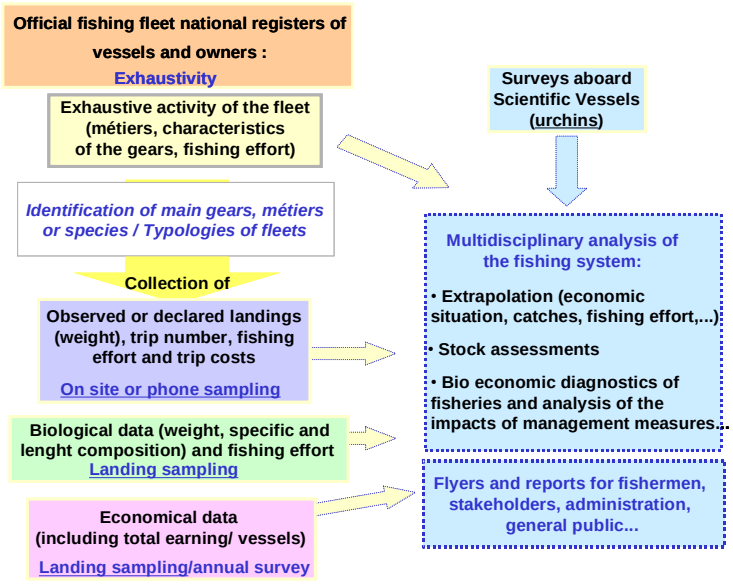

Figure 8. Organisation of the FIS of Ifremer

Metier	No trips Martinique	Martinique 2009 - Landings (kg) Flyingfish	Dolphinfish	Blackfin tuna	Small thunnini (<+2 kg)	Martinique 2009 - CPUE (kg) Flyingfishe	Dolphinfishe	Blackfin tuna	Small thunnini (<+2 kg)
Drifting net Flyingfish	2 571	34 199			170	13.30			0.07
FADs	6 088	612	40 406	17 571	49 773	0.10	6.64	2.89	8.18
High Sea lines (+Drifting nets)	6 388	4 434	192 806	9 442	13 459	0.69	30.18	1.48	2.11
other lines	595		472	242			0.79	0.41	
Total estimate		**39 577**	**234 689**	**28 913**	**69 823**				
Low		*14 407*	*144 417*	*13 939*	*34 251*				
High		*81 445*	*351 159*	*50 801*	*126 930*				

(a)

Metier	No trips Martinique	Martinique 2010 - Landings (kg) Flyingfish	Dolphinfish	Blackfin tuna	Small thunnini (<+2 kg)	Martinique 2010 - CPUE (kg) Flyingfish	Dolphinfish	Blackfin tuna	Small thunnini (<+2 kg)
Drifting net Flyingfish	1 816	67 607				37.23			
FADs	6 120	308	12 334	9 066	46 253	0.05	2.02	1.48	7.56
High Sea lines (+Drifting nets)	4 709	3 786	124 268	5 794	19 525	0.80	26.39	1.23	4.15
other lines	304			881	551			2.90	1.81
Total estimate		**84 674**	**153 136**	**17 215**	**66 140**				
Low		*44 248*	*104 207*	*7 892*	*49 504*				
High		*138 177*	*217 540*	*29 842*	*85 475*				

(b)

Table 2. Number of trips, catches and CPUE per gear used to target the fishes for Martinique 2009 (a) and 2010 (b) – Data to be validated.

Metier	No trips Guadeloupe	Guadeloupe 2008 - Landings (kg) Flyingfish	Dolphinfish	Blackfin tuna	Guadeloupe 2008 - CPUE (kg) Flyingfish	Dolphinfish	Blackfin tuna
Decked boat	559		119 752			214.23	
FADs	14 110	88	474 231	14 030	0.01	33.61	0.99
High Sea lines (+Drifting nets)	8 055	248	553 711	1 177	0.03	68.74	0.15
Total estimate		**336**	**1 147 694**	**15 207**			
Low		*1 209*	*945 883*	*12 567*			
High		*2 408*	*1 397 258*	*18 016*			

Table 3. Number of trips, catches and CPUE per gear used to target the fishes for Guadeloupe 2008 – Data to be validated

Year	Low Dolphinfish Landings	High Dolphinfish Landings	Dolphinfish Landings estimates	Low Blackfin tuna Landings	High Blackfin tuna Landings	Blackfin tuna Landings estimates
1985	1	4	3	1	2	1
1986	1	4	3	1	2	1
1987	5	13	8	2	6	4
1988	5	13	8	2	6	4
1989	5	13	8	2	6	4
1990	5	15	9	2	7	4
1991	6	17	10	2	8	5
1992	6	17	10	2	8	5
1993	7	18	12	3	8	5
1994	7	20	13	3	9	5
1995	7	20	13	3	9	5
1996	9	24	15	3	11	7
1997	12	33	21	5	15	9
1998	15	41	26	6	19	11
1999	16	46	29	7	21	13
2000	18	50	31	7	23	14
2001	20	55	35	8	25	15
2002	21	59	37	8	27	16
2003	21	59	37	8	27	16
2004	22	61	39	9	28	17
2005	24	67	42	9	31	18
2006	24	67	42	9	31	18
2007	23	66	41	9	30	18
2008	23	64	40	9	29	18
2009	**23**	**64**	**40**	**9**	**29**	**18**

Table 4. Estimates of historical catch (t) of FADs fishing for Dolphinfish and Blackfin tuna in Martinique

year	Low Dolphinfish Landings	High Dolphinfish Landings	Dolphinfish Landings estimates	Low Blackfin tuna Landings	High Blackfin tuna Landings	Blackfin tuna Landings estimates
1985	0	0	0	0	0	0
1986	0	0	0	0	0	0
1987	0	0	0	0	0	0
1988	0	0	0	0	0	0
1989	20	28	24	1	1	1
1990	49	70	59	1	2	2
1991	59	84	71	2	2	2
1992	89	126	107	3	4	3
1993	187	267	226	6	8	7
1994	197	281	238	6	8	7
1995	207	295	249	6	9	7
1996	275	393	333	8	12	10
1997	295	421	356	9	12	11
1998	305	436	368	9	13	11
1999	334	478	404	10	14	12
2000	354	506	428	10	15	13
2001	374	534	451	11	16	13
2002	374	534	451	11	16	13
2003	374	534	451	11	16	13
2004	374	534	451	11	16	13
2005	374	534	451	11	16	13
2006	374	534	451	11	16	13
2007	364	519	439	11	15	13
2008	**393**	**561**	**474**	**12**	**17**	**14**

Table 5. Estimates of historical catch (t) of FADs fishing for Dolphinfish and Blackfin tuna in Guadeloupe

Year	Spieces	Gear	Jan	Feb	Mar	Apr	May	Jun	Jul	Agu	Sep	Oct	Nov	Dec
2009	Dolphinfish	FADs	5.82	18.50	6.85	16.21			5.40	3.14	1.71	1.17	0.51	2.46
2009	Dolphinfish	High Sea lines (+Drifting nets)	9.53	23.20	56.20	38.07	35.23	19.94	7.63		0.60		7.86	17.50
2009	Blackfin tuna	FADs	0.88		1.71	1.67	0.77	3.00	9.50	4.29	6.97	0.81	1.26	
2009	Blackfin tuna	High Sea lines (+Drifting nets)	3.82	0.00	0.93	0.65	1.92	1.55	6.73	13.40	2.30		6.43	
2009	Thunnini	FADs	1.35	3.64	4.52	3.43	4.00	4.00	0.60	19.71	7.83	2.47	6.89	12.83
2009	Thunnini	High Sea lines (+Drifting nets)	3.82		0.29	2.95		0.09	2.97	10.20	8.00	13.67	1.79	4.00
2009	Flyingfish	Drifting net Flyingfish	13.33	1.00	35.69		25.70	1.38		15.00				
2009	Flyingfish	High Sea lines (+Drifting nets)				0.18	4.46	3.41						7.50
2010	Dolphinfish	FADs	0.42	4.58		2.22	3.63	3.86	1.68		1.50	0.22	1.32	2.67
2010	Dolphinfish	High Sea lines (+Drifting nets)	29.12	15.62	16.60	56.25	30.31	3.17	16.50					4.57
2010	Blackfin tuna	FADs		3.58		1.11	1.95	0.74	0.89	2.44	1.07	1.93		0.24
2010	Blackfin tuna	High Sea lines (+Drifting nets)	5.38		2.09		0.37							
2010	Thunnini	FADs	8.05	3.26	9.23	9.67	11.08	3.75	6.31	7.00	5.05	12.42	11.36	4.89
2010	Thunnini	High Sea lines (+Drifting nets)	4.49	9.45	2.13	0.42	0.89	5.56	0.83	3.00		35.00		4.86
2010	Flyingfish	Drifting net Flyingfish	63.50	16.89	83.70	8.67	23.00	6.25	0.10			56.96	4.50	63.53
2010	Flyingfish	High Sea lines (+Drifting nets)	0.51	0.01	1.59	3.33	2.69							

Table 6. Estimates of average catch per trip (kg) for Dolphinfish, Blackfin tuna, and flyingfish per main gear – Martinique 2009 & 2010

Year	Gear	Jan	Feb	Mar	Apr	May	Jun	Jul	Agu	Sep	Oct	Nov	Dec
2009	DCP	661	423	568	505	207	29	331	483	599	803	804	672
2009	Drifting net Flyingfish	281		951	269	209	138	117	58	240			308
2009	High Sea lines (+Drifting nets)	786	1338	1277	1400	433	304	367	110	92	155	85	42
2010	DCP	268	321	200	385	320	785	691	682	510	756	554	649
2010	Drifting net Flyingfish	164	207	140	210	80	139	31	36	36	181	338	252
2010	High Sea lines (+Drifting nets)	521	754	1138	438	1136	314	92	18	0	30	15	252

Table 7. Estimates of the number of trips per month for the main gears witch target Dolphinfish, Blackfin tuna and flyingfish – Martinique 2009 & 2010

Type of Length	FL (cm)					TL (cm)		
Year	2008			2009		1986	1987	
Gear	FADs	H.S. Lines	Other lines	FADs	H.S. Lines	H.S. Lines	H.S. Lines	Deep trolling Lines
Dolphinfish	53	60	0	0	0	286	597	9
Blackfin tuna	190	19	11	46	11	186	287	216

Table 8. Number of length frequencies data available in Martinique for Dolphinfish and Blackfin tuna

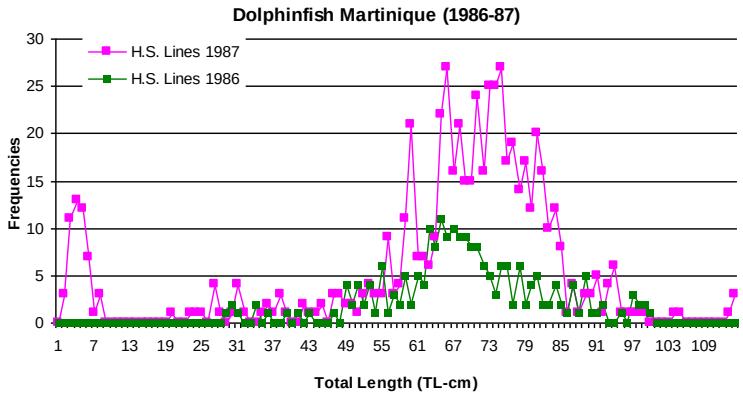

Figure 8. Total length (TL – cm) frequencies of Dolphinfish in 1986 and 1987 in Martinique

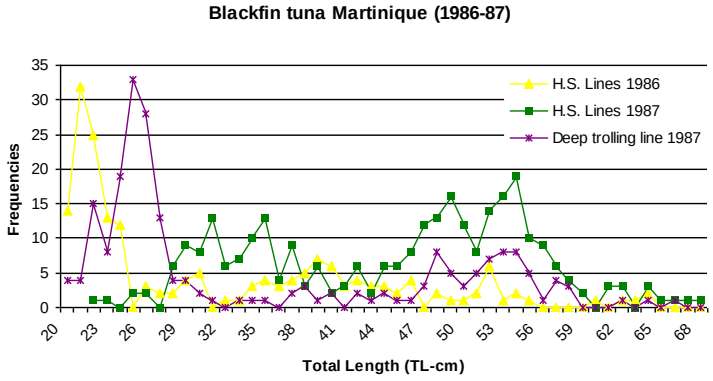

Figure 9. Total length (TL – cm) frequencies of Blackfin tuna in Martinique (1986-87)

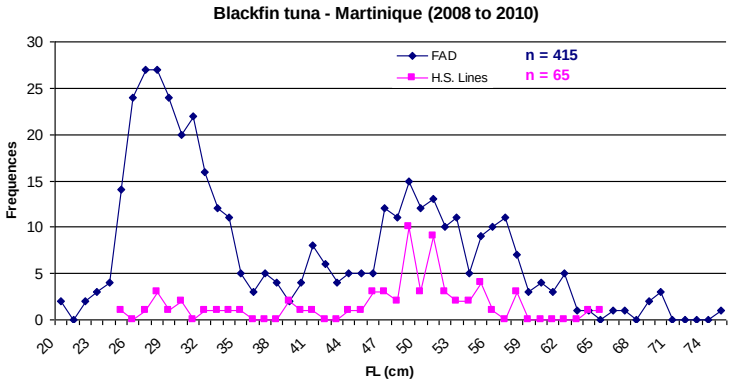

Figure 10. Fork length (FL – cm) frequencies of Blackfin tuna in Martinique (2008-10)

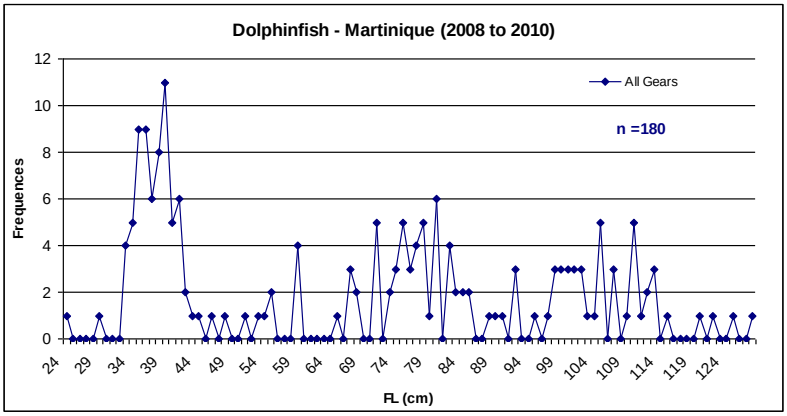

Figure 11. Fork length (FL – cm) frequencies of Dolphinfish in Martinique (2008-2010)