# REPORT OF THE TRAINING WORKSHOP ON DATA COLLECTION AND IMPROVEMENT IN THE CARIBBEAN REGION

## 1. Introduction

The International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for data compilation, assessment and management of tuna and tuna-like species in the Atlantic Ocean.

In recent years, ICCAT has conducted regional training workshops in South America Madrid and western Africa aimed at capacity-building for collection of fisheries data, improved awareness of the reporting requirements by ICCAT, and training on assessment methodologies.

During 2008 the ICCAT SCRS recommended that additional training on data collection be conducted through a workshop in the Caribbean region. Tunas and tuna-like species are important resources for many Caribbean states several of which are members of CARICOM. Among these states there are contracting, and Co-operating Parties to ICCAT, but also some states that are only associated to ICCAT through observer participation in ICCAT provided by CARICOM. This report presents a summary of the results of that workshop, which was organized by ICCAT with the local support of the CRFM (Caribbean Regional Fisheries Mechanism), acting on behalf of CARICOM) and which was generously hosted by the Government of Guyana in Georgetown during February 16-20 2009.

During the opening ceremony chaired by Dr. Dindyal Permaul, Permanent Secretary, Ministry of Agriculture on behalf of the Minister of Agriculture of Guyana Ms Susan Renton and Mr Papa Kebe on behalf of CRFM and ICCAT expressed their thanks to the host country for hosting the workshop and to participants and instructors.

## 2. Participation and venue

Participants from each CRFM Member State were invited to the workshop. Participants were also informed of the objectives of the workshop and topics to be covered in the training sessions. Each participating country was asked to provide a country profile summarizing the characteristics of its pelagic fisheries and data collection systems. Participants were also asked to provide information on their computer skills so as to better design the workshop material and schedule.

A total of fourteen participants (Annex I) attended the workshop including representatives of Barbados, Belize, Dominica, Grenada, Guyana, St. Lucia, St Vincent & Grenadines, Trinidad & Tobago, The Turks and Caicos Islands (UK OT) and the CRFM Secretariat. M. Ortiz and D.J. Die were the instructors nominated by the ICCAT Secretariat. The workshop was held at the Grand Coastal Hotel in Georgetown, Guyana, at a conference room with wireless nternet and a computer projector. The secretariat provided a laptop computer that was set up as a file server to share documents. All participants brought their own notebooks PC. The secretariat was represented by Mr Papa Kebe and Takaaki Suzuki.

The workshop agenda was presented to the participants at the start of the week and was revised (Annex II).

## 3. Preparation of document

This document was prepared with contributions of all participants and reviewed during the workshop prior to adoption. Below is the list of section rapporteurs:

| *Rapporteur* | *Sections and Annexes* |
|---|---|
| Suzuki T. and P.Kebe | 1, I and II |
| Die D.J. | 2, 3, 6, 8 and 9 |
| Parker C. | 4 (Barbados) |

| | |
|---|---|
| Lanza V. | 4 (Belize) |
| Theophille D. | 4 (Dominica) |
| Phillip P. | 4 (Grenada) |
| Hubert-Medar P. | 4 (St Lucia) |
| Jardine-Jackson C. | 4 (St, Vincent and the Grenadines) |
| Ferreira L. | 4 (Trinidad and Tobago) |
| Lockhart K. | 4 (Turk and Caicos I.) |
| Ortiz M. and P. Kebe | 5 |
| Singh-Renton | 7 |

## 4. Country profiles

Country profiles were presented by all countries and are included in Annex III. In the next few paragraphs brief summaries of these documents are presented.

*Barbados*

The Barbados fishing fleet is comprised of a wide range of vessel types ranging from small open vessels to surface longline vessels. While all vessels may take the large pelagic species of interest to ICCAT, at least incidentally, the vast majority of billfish and tuna species landed in Barbados is taken by the longline fleet. Fish are landed at a number of locations around the island, ranging from beaches with no market infrastructure to fully equipped markets. Fish landings are recorded at all market sites and since the entire longline and iceboat fleets are based at the markets, the landings of large pelagic species are considered to be comprehensively covered. Large tuna, billfish, small tunas and shark species are not recorded at the species level, while wahoo and swordfish are recorded separately. Information from logbook records provided by some boat owners is used to derive sample species composition, which are used as indices to disaggregate the island's total large tuna catch to the species level. However, boat owners do not record billfish catches to the species level and due to the difficulty in identifying billfish species from the landed trunks, it has not been possible to disaggregate the billfish catch. Introduction of standardized logbooks, reintroduction of dockside interviews of boat captains and catch sampling by data collectors are three methods proposed to address these reporting gaps.

*Belize*

Belize's fishing fleet of tuna, tuna-like species and shark operating in the ICCAT Convention area consists of 14 vessels operating on the high seas. All of these vessels operate from Trinidad and Tobago except for two that operate from Uruguay. These vessels target yellowfin tuna, bigeye tuna, swordfish, albacore, blue sharks and mako sharks and land their catches in Trinidad and Tobago and Montevideo, Uruguay. Data collection system consists of a detailed fishing log and fishing vessel voyage report. One of the major problems which Belize faces in respect to data collection is the submission of size data and discards. Artisanal vessels from Belize rarely catch pelagic species because they target reef fish.

Since 2008 one vessel has been licensed to fish for sharks within the EEZ of Belize but 12 miles offshore from the territorial waters of Belize and in the high seas. Although not presently working, this vessel will be required to report all its catches if it were to operate in the future.

*Dominica*

The Dominican fisheries industry comprises of small open vessels ranging from less than ten to about thirty feet in length powered by outboard engines. Three specific fisheries exist; the demersal fishery, the small coastal pelagic fishery and the large migratory pelagic fishery. Most vessels participate within all of these fisheries as fleets and gear utilized are multi-purpose.

Regarding landings, catches prior to 1995 were from the use of hand line, trolling or, in the case of yellowfin tuna and swordfish, from small surface longlines. After 1995, with the introduction of moored FADs, surface longlines were used less, disappearing from use from 2002. Drop lines are used to catch large tunas, marlin and swordfish around moored FADs, but wahoo, kingfish, skipjack and blackfin tuna are targeted using hand lines and trolling. The use of FADs makes the fishery more economical because fishers use less fuel per fishing trip.

Concerning data management, information on fish species (by name, where possible), gear used, number of boats sampled, is collected for a sample of landing days. Some computerized landing data has been lost over the years and could be entered again in the computer, as the original data books are still available. Data collectors require retraining in fish identification methods specially to better identify pelagic fish species.

*Guyana*

Guyana's fishery is artisanal and operates within the EEZ. The only fishery that targets a specific resource group is the shrimp fishery. The finfish fishery targets a mixture of species, but few of these are pelagic fish that are under ICCAT management. The most common large pelagic species caught are mackerels and sharks. Most of the sharks caught in Guyana are not classified by species because they are landed dressed.

*Grenada*

Grenada fisheries comprise a number of fisheries types, namely: offshore pelagic, coastal pelagic, demersal, diving and sport. The vessels and persons involved in the offshore pelagic and demersal fisheries are the same. The majority of these vessels are small wooden pirogues, artisanal in nature, that change their mode of operations by simply changing their gear i.e. they are not always involved in the offshore fishery. Although attempts were made to introduce moored FADs to enhance fishing opportunities, local fishers have not adopted this technique to any large extend. All of these fisheries are conducted (their operations) within or just outside the territorial waters (12 nm) and catches are landed at various local landing sites, most of which are located on the west coast. Total annual landings are approximately five million pounds of which about seventy-five percent are large offshore pelagic. Of these landings, approximately one million pounds are exported, mainly to the USA (mainly yellowfin tuna) and French Martinique (mainly demersal species), the rest is consumed locally. Fisheries management in Grenada suffers because of constraints with the data collection, collation and assessment of stocks. At present, the Fisheries Division lacks a data manager, data collectors and data entry staff and as a result there is no comprehensive data management system in place. Only landings and some effort are recorded at the markets and no detailed sampling or other monitoring programs are in place to allow for stock assessment and proper fisheries management.

*Saint Lucia*

The most common gears used in the pelagic fishery are trolling and handlines. Fishing trips are opportunistic, as no specific fish species is targeted. Fishing trips normally last five to eight hours (these trips are recorded as one day trips). The collection of biological data has not been sustained after the termination of externally funded projects. Catch and effort data are collected for every other returning vessel, over a fifteen day period, which is randomly selected on a monthly basis. Information such as area fished, species caught, gear used, hours fished, total vessels out, etc are recorded, and then submitted monthly to the data section of the Department of Fisheries.

Although the success rate of fish captured from the FADs has been high, this information was not being captured by the DOF. In a recent effort to capture data on fish caught by FADs, all data collectors have been sensitized of the need to include this aspect of fish capture in the interview process. Although the current available fish landing data dates back to 1995, there may be earlier

records of fish landings data available electronically (in RBASE) that needs to be recovered, if the computer containing that data is located.

*Saint Vincent and Grenadines*

St. Vincent and the Grenadines has an artisanal fishery fleet of 700 vessels of which approximately 400 are involved in the catch of tuna and tuna-like species. There is also a "high seas fishing fleet" consisting of about 34 vessels which fly the flag of St. Vincent and the Grenadines and operates in the Northern and Southern Atlantic. The main port of these vessels is Trinidad and Tobago. The main catch of these vessels include swordfish, albacore, blackfin tuna, yellowfin tuna and the other small tunas.

*Trinidad and Tobago*

Several fleets operating out of Trinidad and Tobago exploit ICCAT species. The local fleets include artisanal (4-10m) and semi-industrial (14m average length) multi-gear fleets in each of the islands, a semi-industrial (14-23m) longline fleet in Trinidad, and recreational fleets in each island. Data are collected for these fleets through port sampling, a trip reporting system, and sampling at game fishing tournaments. Data gaps exist, however, for the Trinidad semi-industrial multi-gear fleet, as well as the Tobago recreational fleet. Additionally Tobago landings represent only sample landing and have not been raised to represent total catches. The more dominant species in the landings of the local fleets include Serra Spanish mackerel, King mackerel, yellowfin tuna, and smooth-hound sharks.

Trinidad and Tobago has implemented a Swordfish Certificate of Eligibility (COE) for export of Swordfish to the United States of America, as well as the Statistical Document Program in keeping with ICCAT's guidelines.

A National Monitoring Committee on Foreign Fishing and Related Matters, established by the Government of Trinidad and Tobago in 1991, monitors the operation of foreign fishing vessels in the waters under the jurisdiction of Trinidad and Tobago including those that use Trinidad and Tobago for transshipment and/or landings to ensure compliance with the resolutions of international organizations and the regulations of national entities. The Government of Trinidad and Tobago through the Ministry of Agriculture has signed a Memorandum of Agreement (MOA) with the National Fisheries Company (1995) Limited, which operates a transshipment facility in Port of Spain. This MOA will facilitate co-operation with respect to the collection of data and reporting on transshipment operations and vessels engaged in IUU fishing activities. An officer has been hired by the Fisheries Division to function in this capacity.

*Turks and Caicos*

The Department of Environment and Coastal Resources (DECR) of the Turks and Caicos Islands (TCI) has been collecting ICCAT information on recreational/sport fishers since 2003. Local commercial catch of deep slope and reef fish supplies the local markets, while in 2006/07 small number, non-targeted, ICCAT species started to be landed and sold to local restaurants for tourists. Even though ICCAT species are a non-significant fishery to the TCI at the present time, it will continue to collect information as the fishery grows.

## 5. Review of ICCAT statistics for participating countries

The representative of the ICCAT secretariat, Papa Kebe, provided a summary of data submission obligations by contracting and cooperating parties, structure of statistical forms to be filled by national statistical correspondents, and structure of ICCAT databases for task I and II data. This was followed by a review of Task I and Task II data to identify important data issues concerning the countries of the region. Countries were informed that substantial corrections of task I already submitted to ICCAT

need to be documented in a SCRS paper and all corrections need to be justified with a message (email or mail) to the ICCAT secretariat.

Few reports of task II size data exist for the region. This is partially due to the lack of opportunities to sample longline vessels that land outside the country where they are flagged. Additionally some historical fishery data are available in print form and not electronically and as a result have not been submitted to ICCAT.

The following specific data issues were identified during the workshop:

| | |
|---|---|
| Barbados | Update gear definition (UN) for all major tuna spp of ICCAT DB |
| | Need to search for 2004/05 catch of ALB, BET, BLM |
| | Replace carry-overs with catch data SWO (2003/05) |
| Belize | This artisanal fleet has a small bycatch of sharks but these are typically of the species associated with reefs. |
| Dominica | Confirm the catch of major tuna spp for 1990-2003 period |
| | Need to identify gear definitions for catch reported. |
| Grenada | Catches reported as UN gear should be reviewed |
| St Vincent and the Grenadines | Large catches of YFT, ALB, BET started to be reported in 2000, and yet no reports exist prior to 2000. It is known that this fishery was active prior to 2000, and that it is likely that catches were reported to ICCAT under the NEI flag list. SVG scientist should try to get the 1990-1999 catches of this fleet from the Companies directly so as to possibly reassign corresponding catches from NEI to St Vincent and the Grenadines. |
| St Lucia | Update all UN gear catch to TR, that is the main gear for major tuna spp. |
| | Change BFT catch series to black fin tuna, likely a miss-coding of data report. |
| Trinidad & Tobago | Review of the recreational catch series for 1990-2007 |
| | Check catch of BET 1991 and ALB 1992 |
| | Tobago catches need to be raised from sample to total catch |
| | Provide estimates of species break down for unclassified billfish reports |
| Turks & Caicos | Review recreational catch series for BUM from 2003 |
| | Review SWO catches because they are likely to be BUM |

It is recommended that the above changes and revisions of data be submitted by countries to the ICCAT secretariat before the September 2009 SCRS meeting.

In addition the group discussed several issues related to the provision of data through ICCAT forms. The group discussed the difficulties faced for artisanal fleets that target multiple species and use several types of gear, sometimes within the same trip. It was suggested to countries that they should generally pick the most commonly used gear, or alternatively, if there is no dominant gear, and all gears usually operate on the surface of the sea, catches can be reported under the generic term "surface gear". It is essential, however, that statistical correspondents use the comment section in the form to clarify the mix of gears used and/or mix of species caught/targeted. Participants noted that the unit of effort was difficult to establish for these fleets. It was pointed out that simple measures of effort (number of trips, number of fishing days) can often be provided when more detailed measures (number of hooks, or fished hours) are not collected.

## 6. Training

Instructors covered a range of topics during the workshop, including:

a) A description of ICCAT species present in the region, their historical catches and the spatial distribution of those catches. A summary of stock status for those stocks assessed by ICCAT was also provided.

b) A description of the process of providing data to ICCAT through the various forms, including the task I, task II catch and effort and task II size data.

c) A look at advanced EXCEL features for data manipulation, data management and statistical analysis. These included, pivot tables, filters and solver. Examples of how to use these tools for the estimation of length-weight and length-age relationships were provided.

d) An introduction to Non linear regression and maximum likelihood and a demonstration of how to implement these within EXCEL with the help of SOLVER and POPTOOLS.

e) A description on how to raise sample catches to total catches for simple random and stratified random surveys. This included learning how to calculate the appropriate sampling design given various constraints on the sampling level or the desired level of precision.

f) A brief introduction to basic assessment models and reference points including estimation of maximum sustainable yield, yield per recruit and spawning per recruit.

All presentation material used by instructors was provided to participants electronically during the workshop.

## 7. Assistance required by countries

A number of suggestions were made to improve the provision of data to ICCAT. These suggestions are described herein

a. Countries require ID cards for several ICCAT species, especially for sharks, and small tunas.
b. Additionally information is required to distinguish species of billfish when fish have been landed head-off and gutted.
c. A compendium of local names for fish that are managed by ICCAT and their corresponding scientific name is required.
d. Several countries would benefit from help to establish observer programs for their larger longliners (St. Vincent and the Grenadines, Trinidad and Tobago and Belize). A large number of these vessels land in Port of Spain, and so it may be possible to establish a common ICCAT observer program for vessels of several countries. It was noted that it would be best to establish a port sampling program of the landings of such vessels, including collection of length or weight frequency data, as a precursor to the observer program and also for nurturing the required level of collaboration with vessel owners.
e. An observer program would also be of benefit to Barbados for its local longline fleet.

f. In accordance with SCRS recommendations, biological sampling programs of tunas and tuna related species can be established and samples can be processed at local laboratories (for example Trinidad &Tobago's Regional Age and Growth Laboratory) with financial assistance from ICCAT. It is recommended that local scientists participate in these biological sampling programs in coordination with SCRS and CRFM.

g. It was recommended that scientists participate in the SCRS meetings, and ICCAT should consider providing financial support for such participation when required.

h. Several countries identified the existence of historical data records that were not available in electronic form, and it was recommended that a data recovery activity be developed and implemented for those fisheries related to ICCAT spp of interest.

i. It was recommended that ICCAT CPCs and local scientists develop proposals to seek ICCAT support for items d-h.

j. A call was made for further training of local scientists in stock assessment methods particularly in standardization of CPUEs, production modeling, bootstrapping and size-based methods.

k. Cooperation and assistance are required for implementation of VMS for the high seas fleet of ICCAT CPC that have not yet implemented this technology.

l. Assistance is required to improve the collection of recreational fisheries data in relation to ICCAT species, particularly scientific assistance from the SCRS to develop programs and monitoring methods for such fisheries.

Participants were asked to rank the importance they gave to each of these activities. Each country was asked to identify the three highest priority items from the list. The result is table 1 where it can be seen that there is no clear regional consensus for any particular item, but some items seem to be of greater priority for a larger group of countries than others.

**Table 1 showing participating States' highest three priorities for ICCAT assistance tasks identified in section 7 of the main report. These priorities were numbered 1, 2 and 3, to reflect the first, second and third priorities respectively. Explanatory footnotes are provided where necessary.**

| ASSISTANCE REQUESTS | COUNTRY | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Barbados | Belize | St. Vincent and the Grenadines | Trinidad and Tobago | UK (The Turks and Caicos Islands) | Guyana | Dominica | Grenada | St. Lucia |
| a) Species ID cards, esp. sharks & small tunas | **1**[1] | **2**[i] | | | | **1** | | **1** | **1** |
| b) Guide for distinguishing billfish carcasses by species | | | | | | | | **2** | |
| c) Compendium of local names and corresponding scientific names | | **3** | | | **1** | **2** | | **3** | |
| d) Observer program for large longliners, beginning woth port sampling program for T&T transshipment port | | **1** | **1** | **2** | | | | | |
| e) Observer program for Barbados' local longline fleet | [ii] | | | | | | | | |
| f) Biological sampling programs, and processing of samples by local labs | | | | **3** | | | **3** | | **2** |
| g) Scientists to participate in SCRS meetings | [ii] | | | | | | | | |
| h) Recovery of historical data records for species of interest to ICCAT | | | | | | | **2** | | **3** |
| i) ICCAT CPCs and local scientists to develop proposals for d-h | **2**[2] | | **2** | | | | | | |
| j) Additional training in data analysis, e.g. CPUE standardization | **3** | | **3** | | | **3** | **1** | | |
| k) Implementation of VMS for ICCAT CPCs in need of it. | | | | **1** | | | | | |
| l) Improvement in monitoring of recreational fisheries of interest to ICCAT | | | | | **2** | | | | |

[1] Barbados and Belize considers tasks a) and b) as linked, because they combine to promote a more coherent and comprehensive approach for dealing with all relevant species identification issues

[2] In identifying its second priority Barbados clarified that the proposals of interest pertain to implementation of tasks g) and e).

## 8. Documents presented at the workshop

Die D.J. 2009. Status and identifications of ICCAT species. Unpublished manuscript. University of Miami, USA. 21 p.

Die D.J. 2009. Sample surveys. Unpublished manuscript, University of Miami, USA. 7 p.

Ferreira, L., L. Martin, and R. Redman. 2009. Trinidad and Tobago country profile. Unpublished manuscript, Fisheries Division, Ministry of Agriculture Land and Marine Resources, Trinidad and Tobago. 9 p.

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Jardine-Jackson C. and K.P.K. Isaacs. 2009. St Vincent and the Grenadines country profile. Unpublished manuscript, Fisheries Division in the Ministry of Agriculture, Forestry and Fisheries, St. Vincent and the Grenadines. 1 p.

Lockhart K. 2009. Turk and Caicos Islands country profile. Unpublished manuscript, II. Department of Environment and Coastal Resources, Ministry of Natural Resource, Turk and Caicos Islands. 2 p.

Lanza, V. and Maaz J.R. 2009. Belize country profile. Unpublished manuscript, International Merchant Marine Registry and Fisheries Department of the Ministry of Agriculture and Fisheries, Belize. 2 p.

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Peters I. and Baird G. 2009. Guyana country profile. Unpublished manuscript Fisheries Department Ministry of Agriculture, Guyana. 2 p.

Phillip P. 2009. Grenada country profile. Unpublished manuscript, Division, Ministry of Agriculture, Forestry & Fisheries, Grenada. 3 p.

Theophille D. 2009. Dominica country profile. Unpublished manuscript, Fisheries Division, Ministry of Agriculture, Fisheries and Forestry, Dominica, 2 p.

## 9. References

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ICCAT Guidelines for data submission

http://www.iccat.int/Documents/Comply/MANUAL_SUB_ENG.pdf

ICCAT. 2004. Glossary of fishing terms. Unpublished manuscript , ICCAT, Madrid 24 p. http://www.iccat.int/Documents/SCRS/Other/glossaire.pdf

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Restrepo V.R. 2007. Reference points. Unpublished manuscript, ICCAT, Madrid, 7 p.

Restrepo V.R. 2007. Maximum likelihood estimation. Unpublished manuscript, ICCAT, Madrid, 24 p.

Restrepo V.R., G. G. Thompson, P. M. Mace,W. L. Gabriel, L. L. Low, A. D. MacCall, R. D. Methot,

J. E. Powers, B. L. Taylor, P. R. Wade, and J. F. Witzig. 1998. Technical guidance on the use of precautionary aproaches to implementing national standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. Unpublished manuscript, National Marine Fisheries Service, US. 54 p.

## 10. List of Annexes

I. List of participants
II. Final agenda of workshop
III. Country profiles

## 11. Acknowledgments

Funding for the workshop was provided by ICCAT. Additional funding was provided by the Governor's Office of the Turk and Caicos Islands to support the participation of the UK OT participant. Some logistical assistance for the organization was kindly provided by the Government of Guyana and the CRFM.

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</table>

## ANNEX II. WORKSHOP AGENDA

### TRAINING WORKSHOP ON DATA COLLECTION AND IMPROVEMENT IN THE CARIBBEAN REGION

***(Georgetown, Guyana – February 16-20, 2009)***

### T I M E T A B L E

| | Monday 16 | Tuesday 17 | Wednesday 18 | Thursday 19 | Friday 20 |
|---|---|---|---|---|---|
| MORNING<br>8:30 – 12:30<br><br>(Coffee break 10:30 – 11:00) | **Opening** (Guyana govt.)<br>**Introduction of participants** (participants)<br>**Meeting arrangements** (ICCAT Sec)<br>**ICCAT requirements on data reporting** (ICCAT Sec) | Presentation of Country Profiles (participants)<br>Data collection Use and Importance for management of ICCAT sp (instructors) | *Solver add-on regression,*<br>*Basic statistics and regression with Excel*<br>*Preliminary analysis of fisheries data, quality control and random sampling protocols review* | *Characterization of large pelagic fisheries (instructors)*<br>*Sampling and data collection for pelagic fisheries.* | **Review of country profiles and data collection systems** (participants) |
| LUNCH 13:00 - 14:30 | | | | | |
| AFTERNOON<br>14:30 – 18:00<br><br>(Coffee break 16:00 – 16:30) | **Status of data reporting** (ICCAT Sec)<br>**Filling out ICCAT forms for data submission** (ICCAT Secretariat)<br>*Catch/distribution, status and identification of major ICCAT species (instructors)* | *Fisheries Data import and manipulation in Excel*<br>*Review of current ICCAT database for the Caribbean Region*<br>*Introduction to Filtering and Pivot tables*<br>*(instructors)* | *Exercises in Excel*<br>*Solver exercise aplications. Length and weight relationships.*<br>*Growth models and parameter estimates* | *Introduction to Maximum likelihood concept.* | **Discussion: strategies for improvement of data collection and reporting** (participants)<br>Report writing & recommendations Future training<br>**Closing** |

**ANNEX III. COUNTRY PROFILES**

# I. Country Name : Barbados

# II. Institute/Agency responsible for collecting data

Agency name: Fisheries Division, Ministry of Agriculture
Statistical Correspondent or Contact person: Christopher Parker

# III. Inventory of fisheries

The Barbados commercial fishing fleet may be divided into four main categories of fishing vessel. Apart from a few of the very largest vessels, the hulls of most Barbadian fishing vessels are constructed of either wood, glass reinforced plastic (GRP) or GRP coated wood.

The first category of commercial fishing vessel includes the group of small open boats (locally referred to as "moses"). Moses are powered either by oars or outboard engines. The average length of the moses currently registered in the Barbados fleet is 5.3m (range 2.2m to 12.6m) and the average engine power is 40 HP. In 2007 there were 498 registered moses. Over the period 1998 to 2007, moses accounted for a negligible proportion of annual tuna and billfish catches (<1%) but around 10% of annual wahoo landings.

All of the other fishing vessels in the local fleet are decked. The first category of decked vessel is known as the launche or dayboat since each fishing trip for these vessels typically last less than a day. The average length of dayboats registered in the Barbados fleet is around 7.8m (range 3.7m to 12.2m) and the average engine power is around 75 HP. Dayboats are typically propelled by inboard diesel engines but a number of the smaller dayboats now use outboard engines. In 2007 there were 240 dayboats registered. The contribution to the island's large pelagic catch over the period 1998 to 2007 was similar in magnitude to that of the moses, with dayboats landing around 2% of the annual tuna and billfish catches and 20% of wahoo.

The next group of decked fishing vessels is referred to as "iceboats". These vessels are built along the same lines as the dayboats but have iceholds and make longer fishing multiday trips (5 to 7 days, typically). The average length of iceboats currently registered in the Barbados fleet is just over 11.2m (range 6.7m to 16.8m) with an average engine power just less than 200 HP. Many of the iceboats are in fact converted dayboats. In 2007 there were 168 iceboats registered. Iceboats accounted for an annual average of around 10% of annual billfish catches and between 15 and 20% of annual tuna catches but nearly 60% of the annual wahoo landings over the period1998 to 2007.

The last group of commercial fishing vessels is the longliners. Although a number of these vessels are custom-built a number are converted "iceboats". The main difference is of course that the surface longline is the main gear used by these vessels that target the large pelagics. Large pelagics are taken on handlines or troll lines by all other vessels in the commercial fleet. The average length of the longliners currently registered in the Barbados fleet is just over 14.2m (range 11.6m to 21.3m) and the average engine power is around 320 HP. There are currently 36 longliners registered. Longliners accounted for from 80% to 90% of the island's annual tuna and billfish catches but only just over 10% of annual wahoo landings over the period 1998 to 2007.

There are currently around 29 recreational fishing vessels in Barbados. A number of these vessels operate as charter fishing vessels mainly taking tourists out for short fishing trips (less than a day) for large pelagics. The Fisheries Division does not routinely monitor the landings or fishing activities of these vessels.

# IV. Data collection systems

There are around 30 locations around the island where fish may be landed (Fig. 1). These areas range from simply beaches where no permanent infrastructure for the marketing of fish exists to well-equipped markets. Nearly all iceboats and all longliners operate from the two largest of these market facilities, namely the Bridgetown Fisheries Complex located in the capital city and the Oistins Fishing Complex, where necessary amenities such as adequate docking facilities and ice suppliers are located. Tolls are charged for the use of the facilities. The tolls are calculated on the basis of type and weight of fish. As such, when landed the fish are divided into a number of main categories and weighed for the calculation of the toll. Once completed the toll books containing the toll receipts which include the weights, types of fish and the identity of the vessel that made the respective landings are passed on to the Fisheries Division where the information is computerized. By

law all commercial fishing vessels must be registered with the Fisheries Division and vessel details are stored in a computerized database.

From 2005, the Fisheries Division started to use the Caribbean Fisheries Information System (CARIFIS), produced under the auspices of the CARICOM Regional Fisheries Mechanism (CRFM). In additon to this, a complementary custom-designed vessel and fisher registration database programme (Fisheries Information System for Barbados- FISBARB) was developed in-house at the Fisheries Division. By linking the two databases through unique hull numbers assigned to the vessels, it is possible to accurately link current vessel information with catch records. This system also has the advantage in being able to accurately link historic records with the contemporaneous vessel information.

As the vast majority of the island's catch of large pelagics is made by iceboats and longliners, and since these vessels operate from the monitored market sites, it is considered that most of the landings of these species are adequately recorded. However, tunas and billfishes are not separated and weighed separately by species at the market. Swordfish and wahoo are however recorded separately. Ratios of the species for a sample number of landings within a year are periodically calculated from trip logbook information collected from boat owners on a voluntary basis and this information is extrapolated for the total catch. It should be noted that yellow fin tuna typically accounts for nearly 90% of the annual tuna landings in Barbados. However, even the boat owners do not maintain adequate, if any, records of the billfish catch at the species level. Given the difficulty in identifying billfish species from the dressed carcasses at dockside, it has remained a daunting task to quantify landings of the individual billfish species.

## V. Data storage and analysis

Number of people for data input: 1
Hardware available: Computer network
Software used: Carifis, FISHBARB, Stonefield Query for reporting.

## VI. Observations

Simple recording errors at landing sites make it difficult or impossible to trace some catches to respective vessel. This reduces the number of records that may be used for catch and effort reporting and parsing of total catch to the different fleets and gears (e.g. handline and longline). However the calculation of total landings for the island is unaffected.

More refined effort information (number of fishing hours, gear sets etc.) are not currently collected. Two approaches to get this information are possible. The first is the use of catch logbooks and the second is interviewing fishers at dockside. Draft logbook formats are being developed and it is planned that a dockside interview and biological sampling programme will be revitalized following training of a data collector. This programme should also provide the appropriate information that may be used to disaggregate billfish landings to the species level.

The majority of the recreational fleet mainly operates out of the Careenage where there is no official presence to record landings systematically. Some sample based programme must be developed to quantify these landings.


Figure 1: Map of Barbados with landing sites.

# I. Country Name : Belize

# II. Institute/Agency responsible for collecting data

Agency name: [1]International Merchant Marine Registry of Belize (IMMARBE)/
[2]Fisheries Department of the Ministry of Agriculture and Fisheries
Statistical Correspondent or Contact person: Mrs. Valerie Lanza[1] and Mr. Julio Maaz[2]

# III. Inventory of fisheries

| No. | Type | Main Port or Area | No. of Fishing Vessels | Vessel types, sizes | Fishing gears | Main target species | Annual Catches (Year 2008) |
|---|---|---|---|---|---|---|---|
| 1 | Artisanal | N/A | N/A | N/A | N/A | N/A | N/A |
| 2 | High Seas | Trinidad and Tobago<br><br>Montevideo, Uruguay | 11<br><br>2 | GT:91.74<br>LOA: 27.00<br><br>GT: 350-360<br>LOA: 38-40 | Long Line<br><br>Long Line | Albacore<br>Yellowfin<br>Bigeye<br><br>Swordfish<br>Mako Shark<br>Blue Shark | 57.455 m/t<br>1157.60 m/t<br>70.367 m/t<br><br>31.550 m/t<br>1.60 m/t<br>182.455 m/t |

# IV. Data collection systems

*Artisanal*

Not Applicable (Conch and Lobster Fishery predominantly).

*High Seas Fisheries*

Fishing vessel Owners/Operators are required to submit data on their fishing operations based on our format for such reporting, which includes a detailed Fishing Log and Fishing Vessel Voyage Report showing information regarding positions/dates, sets, catches by species including weights, size, start time, number of hooks etc., details of discards and bycatches etc., species unloaded, names of ports or details of transshipments if any. Reports are required to be submitted after each fishing trip/voyage.

One of the main problems encountered with this form of reporting system, despite our very simple and detailed format, is getting our owners/operators to understand the importance of such reporting as well as the submission of the information which we require on these forms, however, due to the language barrier of the crew on board some of these vessels, there are instances where incomplete or inaccurate data are submitted. Additionally, despite instructions for the daily completion of our detailed fishing log, this is not being done by some vessel owners until the vessels return to port, where the catches of the vessel is compiled and is then extrapolated on a day to day basis before being submitted to us.

Nonetheless, it must be noted that the daily activities of these vessels are also cross referenced with our vessel monitoring system to ensure position accuracy as well as days at sea and at port.

## V. Data storage and analysis

*Artisanal*

Not Applicable (Conch and Lobster Fishery predominantly)

*High Seas*

Number of people for data input: There is currently only one person tasked with the responsibility for the data entry of all our log-book data submitted by our fishing vessels.

Hardware/Software available: Our data is currently entered into a Microsoft spreadsheet utilizing Windows XP. However, we are currently in the process of implementing a separate computer program for such data.

Problems encountered: As with all manual data entry, human error is one of the main problems which we encounter at this stage. Additionally, we do encounter problems in transposing these data into data required by the relevant RFMOs

## VI. Observations

Belize has advanced considerably in respect to the monitoring, control and surveillance of its fishing vessels. Prior to 2003 Belize had no such controls or measures in place. However, after the introduction of our High Seas Fishing Act in 2003, we implemented a licensing, monitoring and catch reporting system. In so doing, Belize took into consideration the data requirements or all RFMOs and as such developed a functional system, which we have developed over the years and will continue do so as the need arises. It is our intention to eventually implement an electronic data reporting system for all our fishing vessels operating on the high seas.

# I. Country Name : Commonwealth of Dominica

# II. Institute/Agency responsible for collecting data

Agency name: Fisheries Division, Ministry of Agriculture, Fisheries and Forestry
Statistical Correspondent or Contact person: Derrick Theophille

# III. Inventory of fisheries

| No. | Type | Main Port | Number of Vessels | Vessel types and sizes | Fishing gear | Main target species | Annual catch (2007)(kgs) |
|---|---|---|---|---|---|---|---|
| 1. | Artisanal | None | 444 | Types: Canoe, Keel, FRP Sizes: <10ft to 40ft | Handline, Troll line, Longline, Fishing rod, Gillnet, | Yellowfin Tuna, Dolphinfish, Blackfin Tuna, Blue Marlin, Skipjack Tuna | SKJ 31,807 kgs BLF 29,147 kgs BUM 58,474 kgs YFT 103,276 kgs Other 546,243 kgs |

# IV. Data collection systems

a. Logbook and regular reporting from vessel: Not done
b. Port sampling: 9 data collection persons. Sampling method: sampling in space and in time. Data collected: fish catch (weight in pounds), boat effort (trips). Problems encountered: reluctance of fishers to allow data collection, un-motivated data collectors
c. Market sampling: Not done
d. Others: None

# V. Data storage and analysis

a. Number of persons for data input: 1
b. Hardware available: 1 computer
c. Software used: Microsoft Office Access 2007, Microsoft Office Excel 2007
d. Problems encountered: Data analysis personnel have limited training, multiple roles

# VI. Observations

Data collection is carried out at 13 of the island's 26 landing sites. There are about 1000 persons who operate as fishers (boat owners, crew, and captains). Fishing is done on an artisanal basis, although some fishers do supply local hotels, supermarkets and restaurants. The industry has changed from a mainly coastal fishery (coastal pelagic and reef fish on smaller canoes) to an offshore fishery, targeting large tunas, marlin and dolphinfish. Fishers presently use mainly keel boats and fiberglass-reinforced plastic (FRP) vessels. Most keel type vessels are built locally, while FRPs are both built locally or are imported from the neighboring islands. The offshore fishery was supported largely by the larger, sturdier keel and FRP vessels and by the introduction of the Fish Aggregating Devices (FADs). FADs allowed fishers to burn less fuel and improve chances of catches.

# I. Country Name : GRENADA

# II. Institute/Agency responsible for collecting data

Agency name: Fisheries Division, Ministry of Agriculture, Forestry & Fisheries
Statistical Correspondent or Contact person: Paul E. Phillip

# III. Inventory of fisheries

| No. | Type | Main port or area | Number of fishing vessels | Vessel types, sizes | Fishing gears | Main target species | Annual catch (tons) |
|---|---|---|---|---|---|---|---|
| 1 | Artisanal | St. George's<br>Gouyave<br>Victoria<br>Duquesne<br>Grenville | 626 | *Trolling Vessels/ Open Pirogues (Type I Long-liner)* 5-7.5 m./15-85 HP (OBM)<br><br>*Decked Pirogues (Type II long liner)* 7.5-9 m./2X40-60 HP (OBM)<br><br>*Launches (Type III long liner)* 9.5-18.5 m./130-350 HP (IBM) | Trolling lines, long-lines, hand-lines | YFT<br>SKJ<br>BET<br>SAI<br>BUM<br>SWO<br>SHK | 633.1<br>25.9<br>9.8<br>174.4<br>49.3<br>26.5<br>22.3 |
| 2 | Industrial | | | | | | |
| 3 | Sport | St. George's | 20 | Vary greatly in size and power | Trolling lines, Rod & reel | St. George's | 20 |

# IV. Data collection systems

At present, Grenada does not have a sampling programme. During the 1990s sampling was done with training from ICCAT personnel, however, the data collectors were allowed to leave for one reason or other, and never replaced. New administration seems to want to change this approach.
Only landing and effort data are collected at markets island-wide. These include:
Primary landing sites (sites with landing facilities, storage facilities, market, etc) – 7
Tertiary landing sites (processing facilities) – 3

# V. Data storage and analysis

Number of people for data input – 1
Hardware available – 1 computer
Software used – Microsoft excel
Problems encountered: No data collectors. For economic reasons, the last government had a freeze on employment. As a result many vacancies were not filled. The result, not enough staff to get the work done.

# VI. Observations

Table 1: Types of vessels in Grenada's Off-shore fishery include the following:

| ***Vessel type*** | ***Construction Material*** | ***Approximate length (m.)/Power*** | ***Approximate Numbers*** | ***Fishing Practices*** | ***Comments*** |
|---|---|---|---|---|---|
| ***Trolling Vessels*** | Wood/FRP | 5-7.5 m./15-85 HP (OBM) | 86 | Hand lining/bottom parlang, Trolling, Diving, | These vessels are usually multipurpose vessels that can change their type of operation dependent on season or availability of fish. This is done by changing gear. |
| ***Open Pirogues (Type I Long-liner)*** | Wood/FRP | 5-7.5 m./15-85 HP (OBM) | 350 | Hand lining/bottom parlang, Trolling, long lining, Diving. | These vessels are usually multipurpose vessels that can change their type of operation dependent on season or availability of fish. This is done by changing gear. |
| ***Decked Pirogues (Type II long liner)*** | FRP | 7.5-9 m./2X40-60 HP (OBM) | 100 | Hand lining/bottom parlang, Long lining | Some of these vessels are multi-purpose in nature and also seasonal in operations. |
| ***Launches (Type III long liner)*** | Wood/FRP/Steel | 9.5-18.5 m./130-350 HP (IBM) | 70 | Hand lining/bottom parlang, Long lining | These vessels usually have their gear fixed and some are mechanical. |
| ***Sport Fishing Vessels*** | Wood/FRP | Vary greatly in size and power | 20 | Usually trolling off-shore for big game fish and deep sea species. | Most of these vessels are for personal use , however, some are chartered to sports fishers visiting the island. |

| | |
|---|---|
|  |  |
| Trolling Vessel | Type I long-liner |
|  |  |
| Type II long-liner | Type III long-liner (wood) |
|  |  |
| Type III Long-liner (steel) | Type III long-liner (FRP) |

# I. Country Name : GUYANA

# II. Institute/Agency responsible for collecting data

Agency name: Ministry of agriculture fisheries department

Statistical Correspondent or Contact person: Nigel Dharamlall

# III. Inventory of fisheries

| Type | Main port or area | Number of fishing vessels | Vessel types, sizes | Fishing gears | Main target species | Annual catch (kg) |
|---|---|---|---|---|---|---|
| Artisanal<br><br>1129 | Houston | 186 | 40-50ft<br><br>25-30ft | GNPcc/ inb, GNN-nylon | Target species not available, but there is an incidental catch of pelagic species | 2007<br>Shark 987,793<br>KGM 325,591<br>BRS 276,591<br><br>2006<br>Shark 2,551,631<br>KGM 168,305<br>BRS 376,684<br><br>2005<br>Shark 2,916,293<br>KGM 245,445<br>BRS 521,947 |
| | Rosignol | 39 | 40-50ft<br>22-30ft | GNPcc /inb Caddell | | |
| | #66 Fishport Complex | 110 | 40-50ft | GNPcc | | |
| | Parika | 10 | 40-50ft<br>25-30ft | GNPcc, GNN | | |
| | | | | | | |
| Industrial | | 146 | 19-20m | Trawl | | |
| | | | | | | |
| Semi-industrial | | 75 | 14 -15m | Hooks & Lines GNPcc, Traps | | |

# IV. Data collection systems

The Data Collection Sampling Programme is currently being reviewed to ensure effective implementation and management, thereby contributing to the analytical requirements of international trade. Data is currently collected from the processing plants on a monthly basis.

# V. Data storage and analysis

Data is being inputted into EXCEL software and is stored on floppy disk and memory sticks. The Department is building capacity to facilitate storage and analysis of data. Additional staff is being recruited to enhance the management system.

# VI. Observations

- Guyana has Co-operating Party status to ICCAT and one of its obligations is to submit an annual statistical report on data related ICCAT species to that organization.
- There is need for training and capacity building to enhance the data collection system.
- The observation programme is being reviewed for implementation. Resource constraints affected an efficient system.

- The Department is collaborating with the Guyana Coast Guard to implement effective monitoring and surveillance system.

*Additional Notes:*

- Guyana's fishery is artisanal and fishes are caught within the EEZ. The finfish fishery is non target specific. The industrial fishery is specific in that it target shrimp while the semi-industrial fishery targets the red snapper.
- Most of the sharks caught are not classified since they are landed dressed (only trunks). The head, fins and bladders are detached from the animal at sea.
- Sharks are exploited mainly with gillnets gears. There are three sizes of gillnets that catch the shark species. These are the two, six and eight inch mesh sizes. These gear types are non-specific and catches all species of fish.
- The gillnet polyethylene gear (6-8 inch mesh size) is responsible for capturing about 90 % of the sharks landed in Guyana. Sharks are harvested all year round. However during July – January there is an increase in landings of sharks as landings of the main target species, gray snapper, are lower during that time.
- Other gear types that catch sharks are caddell lines (manual longline), handline, trawl nets and pin seine.

# I. Country Name : SAINT LUCIA

# II. Institute/Agency responsible for collecting data

Agency name: Department of Fisheries, Ministry of Agriculture, Lands, Forestry and Fisheries

Statistical Correspondent or Contact person: Patricia Hubert-Medar

# III. Inventory of fisheries

| No. | Type | Main port or area | Number of fishing vessels | Vessel types, sizes | Fishing gears | Main target species | Annual catch 2008 (kg) |
|---|---|---|---|---|---|---|---|
| 1 | Artisanal | Gros Islet<br>Castries<br>Anse La Raye<br>Soufriere<br>Choiseul<br>Laborie<br>Vieux Fort<br>Micoud<br>Dennery | 45<br>39<br>20<br>71<br>42<br>36<br>133<br>20<br>66 | Pirogue<br>25ft x 6ft<br><br>Transom<br>18ft x 5ft<br><br>Canoe<br>23ft x 5ft | Trolling lines, hand lines | Pelagics | SHARKS<br>CCL - 722<br>NGB - 163<br>GNC - 2133<br>0CS - 120<br>CCT - 2149<br>TIG - 2212<br>SPR - 208<br>SMA - 284<br>Unclass. - 414<br>Carpet - 345<br><br>TUNAS<br>BHM - 386<br>BUM - 21710<br>SAI - 311<br>ALB - 1457<br>YFT - 72222<br>LTA - 104<br>BLF - 136965<br>KGM - 206<br>SSM - 63<br>SKJ - 141033<br>CER - 16<br>SMT - 316<br>SWO – 939<br>WAH - 308 |

# IV. Data collection systems

The first fisheries data collection system for the island was implemented in 1979. Since then, the system has been refined in response to the numerous changes in the fisheries sector with the ultimate goal of providing sound management advice.

Over the past decade, limited biological information on major single species fisheries has been collected on a consistent basis. Therefore other collection programmes had to be implemented to assess the status of the stocks.

The main aim of the data collection system is to monitor the status of the stocks that are being exploited. However, it focused mainly on gathering data and performing simple analyses. The full potential of the system has yet to be realized due to administrative, financial and human resource constraints.
One of the task of the Department of Fisheries (DOF) is to collect data on catch, effort and biological data, registration of fishermen and vessels, registration of scuba diving establishments, sports fishing vessels and spear gun fishers, in addition to licensing of fishing vessels. However, due to human resource and financial limitations the DOF is unable to capture all the data required.

The Department's current data collection system for capturing fish landing data is based on a stratified random sampling system of three major spatial strata: primary, secondary and tertiary landing sites based on the number of vessel operating, the fishery types and the volume of fish landed (W.B. Joseph, unpublished b). Of the 22 landing sites (table 2.) from which the fishers operate, catch and effort data are collected from ten on a permanent basis. In past years, funding was provided for biological data collection of various fish species through the Government of St. Lucia in collaboration with various agencies such as "CRFMP". However, the collection of such data has not been sustained after the termination of these externally funded projects.

Table 2. Fish landing sites and category

| Site | Category | Site | Category |
|---|---|---|---|
| **Anse la Raye** | S | Marigot | NS |
| Banannes | S | 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 samplesite

At each of the sites being sampled, catch and effort data are collected for every other returning vessel, over a fifteen day period, which is randomly selected on a monthly basis. Information such as area fished, species caught, gear used, hours fished, total vessels out, etc are recorded and submitted monthly to the data section of the Department of Fisheries.

The island's coastal waters are divided into two zones or fishing areas for coastal and offshore pelagics, (A and B) and three zones for near shore and bank species (C, D and E). The data collectors indicate the area fished based on these zones. (Fig. 1.) In an effort to ensure the quality of the data collected the data collectors are monitored regularly by the Department's personnel.

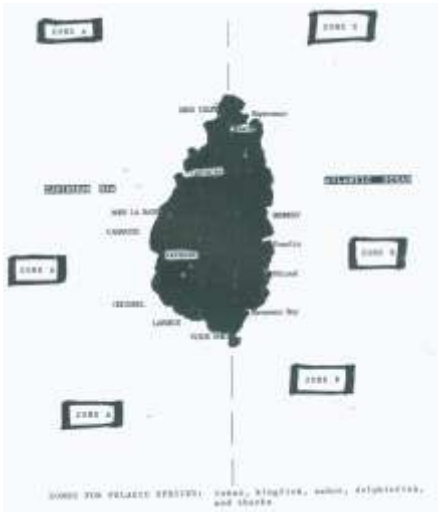

Fig 1. fishing zones/fishing areas:

When data collectors submit catch and effort data, the data entry clerk first screens the data in the presence of the data collector in order to correct all errors and omissions. The data are then entered by the data entry clerk into the Trip Interview Programme (TIP) in batch form by month, recording the interview number on each corresponding sheet.

A second integrity check is carried out by the Fisheries Assistant in of the data unit after the data has been entered into the program (TIP), to ensure that the information is accurate and corresponds to the hard copy data sheets. Inconsistencies are recorded and later corrected by the clerk.

Under the Fisheries Act No. 10 of 1984 and Fisheries Regulations no. 9 of 1994 every fisher must be registered and every fishing vessel registered and licensed. Information obtained at the time of registration is entered into the Licence and Registration System (LRS). Data entry into this system is carried out by the Fisheries Assistant. Periodically, integrity checks are carried out by the Fisheries Assistant to ascertain the accuracy of the data in this database.

With the present sampling system, data are received on time and thus can be checked and entered regularly. This enables the Department to be current with information on the sector in terms of fish landings and effort. Financial constraints do not allow for biological data collection.

## V. Data storage and analysis

*Data storage*

For catch and effort data, once a batch of data has been entered, it is stored on diskettes (using Winzip) and on the Department's intranet. After the inconsistencies from the integrity check are corrected, two copies of data are backed up on diskettes using Winzip and stored on site and off site. The intranet copy is updated after corrections are made. For all other data, the information is stored as hard copy and on the Department's intranet.

*Data analysis*

Annual total landings are estimated using the query and reporting features of TIP as well as EXCEL. The following format is used: A raising factor (RF) is calculated for each site every month using the number of vessels observed out fishing each month, the number of sampling days and the number of fishing days each month for sampled sites. For non-sampled sites, RF is calculated using a formula which includes the number of registered vessel by category, and the main type of fishing activity conducted. The sampled landings are then extrapolated for each month by the RF for sampled sites. However, RF for non-sampled sites are based on a factor used in comparison with a similar site.

Summaries of landings and effort by species by site by day by gear can be generated for areas sampled. Total landings by species and groups of species as well as by fishery have also been generated. It is hoped that more detailed analyses will be performed in the future, as data personnel seek further training in this area.

VI. Observations

*Data unit structure*

The data unit comprises three staff members. Two Fisheries Assistant; one who is responsible for the overall day to day running of the data section, as well as compilation of annual total fish landings, supervision of the data unit including data collectors among other duties. And the other is responsible for the registration and licencing of fishing vessels and the registration of fishers as well as entering data into the Licencing and Registration System (LRS) and compilation of figures for total fishers and vessels registered. A Data Entry Clerk who is responsible for entering fish landing data into the Trip Interview Programme (TIP).

*Fishery*

The major fisheries resources of St. Lucia comprise demersal, coastal pelagic and offshore pelagic fisheries. Although there is some year-to-year variability in the level of focus placed on these fisheries resources at different times of the year. Saint Lucian's fishery can be divided into two main seasons: a "high' season which extends from December to May when significant landings of offshore migratory pelagics occur and a "low" season which extends from June to November when mostly demersal fishes are landed. However, the main "pot-fishing" season (when fish traps are used) extends from June to February (Gorbert & Domalian, 1995; Andre-Bigot, 1995).

*Fish Aggregation Devices*

Fish Aggregation Devices (FADs) are deployed at sea to attract fish causing the congregation of offshore pelagic migratory fish in one place. This device reduces the effort required to catch pelagic fish by decreasing the amount of fuel and time required to capture fish. This results in lower fuel cost to fishermen.

FADs are generally a floating apparatus, to which a pole having a photosensitive light, a flag and a radar reflector is attached; to prevent collision with marine vessels. A FAD is kept in a general area by being anchored in place through the use of hundreds of meters of rope, chain and cables, connected to truck tires or drums filled with concrete. FADs are generally placed at approximately 60 feet below the sea surface. Kites, coconut branches or artificial seaweed are attached to attract small fish, which in turn attract bigger fish, creating a food chain with the fisher at the top of this chain.

Over the last ten (10) years the Department of Fisheries (DOF) has deployed many FADs in waters adjacent to fishing communities. The DOF has also educated major fishing communities about the benefits of FADs and practices that should not be undertaken while fishing near the FADs.

Although the success rate of fish captured from the FADs has been high, this information is not currently being captured by the DOF. In a recent effort to capture this data, all data collectors have been sensitized of the need to include this aspect of fish capture in the interview process. The zone fished has also been adjusted to reflect this information. It is expected that data capture will reflect the contribution of FADs to fish landings in Saint. Lucia.

# I. Country Name : St. Vincent and the Grenadines

# II. Institute/Agency responsible for collecting data

Agency name: Fisheries Division in the Ministry of Agriculture, Forestry and Fisheries

Statistical Correspondent or Contact person: Cheryl Jardine-Jackson and Kris Isaacs

# III. Inventory of fisheries

| Type | Main port or area | Number of fishing vessels | Vessel types, sizes | Fishing gears | Main target species | Annual catch (tons) 2007 |
|---|---|---|---|---|---|---|
| Artisanal | St.Vincent | 700 | Pirogues (7-10 m)<br><br>Double Enders (3- 9 m)<br><br>Longliners (11 – 16 m)<br><br>Bow & Stern ( 3 – 6m) | Handline<br>Longline<br>Gillnet<br>Beach Seine | Bottom Fish<br>Offshore Pelagics<br>Small Coastal Pelagics | SKJ 87.7<br>YFT 3197.5<br>BET 566.9<br>SAI 22.5<br>SWO 61.6<br>Othr 42.2 |

# IV. Data collection systems

Data collection is done by 5 Data collectors, collecting catch and effort data throughout the state. This is done at least 20 days in any given month.

# V. Data storage and analysis

Number of people for data input: 2
Hardware Available: 2 Dell Desktop Computers
Software Used: Microsoft Excel, CARIFIS

# VI. Observations

St. Vincent and the Grenadine's Data collection program was revised in 1992 and that system is being utilized up to present day. Other than the catch and effort data, information is also collected on boat's registration.

The catch and effort data follows a stratified sampling methodology. In this approach, the sampling frame (all the identified fish landing sites in the country) is first partitioned into groups or strata and then sampling is performed within each stratum.

# I. Country Name : Trinidad & Tobago

# II. Institute/Agency responsible for collecting data

Agency name: [1]Fisheries Division, Ministry of Agriculture, Land and Marine Resources, Trinidad and Tobago
Department of Marine Resources and Fisheries, Tobago House of Assembly

Statistical Correspondent or Contact person: Louanna Martin[1]

# III. Inventory of fisheries

| **Type** | **Main port or area** | **Number of fishing vessels** | **Vessel types, sizes** | **Fishing gears** | **Main target species** | **Annual catch (kg) (Year 2007, except Tobago which is 2005)** |
|---|---|---|---|---|---|---|
| Artisanal multi-gear (Trinidad) | Trinidad | 978 | Wooden, fibreglass or fibreglass-coated open vessels; 7-10m length | A-la-vive (surface line, live bait), trolling, switchering (a baited stationary line), Gillnets (monofilament & multifilament nets) | *Scomberomorus brasiliensis*, *S. cavalla* | BON 14,578<br>WAH 433<br>KGM 566,042<br>BRS 1,413,383<br>SKJ 13<br>TUN 133,305<br>BUM 6,770<br>SWO 44<br>CCE 229<br>TIG 41<br>CCL 19,689<br>GNC 1,317<br>SPN 7,470<br>SDV 645,119<br>Shark 382,323 |
| Artisanal / Semi-industrial/ Industrial trawlers (Trinidad) | Trinidad | 150 (of which 10 Semi-industrial 27 industrial ) | Artisanal: 7-11.6 m length; Semi-industrial: 9.3-12.2 m length; Industrial: 10.9-23.6 m length,30-96 GRT; | Trawl net | Shrimp | |
| Semi-Industrial Multi-Gear (Trinidad) | Trinidad | 23 | 8-23m length; avg 14m | Fishpot<br>A-la-vive | *S. cavalla* | N/A |
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Semi-Industrial Longline (Trinidad) | Trinidad | 19 | 14-23m length (13 vessels <20m); 100>GRT >50 | Pelagic longline | *Thunnus albacares, Thunnus obesus, Xiphias gladius* | WAH 390<br>BLF 145<br>ALB 18,456<br>YFT 614,824<br>BET 27,328<br>SAI 12,998<br>BLM 237<br>BUM 13,533<br>WHM 12,099<br>SWO 28,517<br>THR 975<br>TIG 8<br>SMA 990<br>LMA 1,053<br>MAK 31<br>BSH 421<br>SPN 171<br>Shark 9,972 |
| Artisanal (Tobago) | Tobago | 309 | 4-10m length | Trolling, a-la-vive, palangue, beach seine, gillnet, banking | *Thunnus albacares , Thunnus alalunga, Katsuwonus pelamis, Sarda sarda* | BON 1,335<br>WAH 3,389<br>KGM 363<br>BRS 174<br>BLF 5,010<br>SAI 49<br>Shark 262 |
| Semi-Industrial (Tobago) | Tobago | 10 | 10-18 m length | Gillnets (monofilament); FADs (Fish Attraction Devices); Trolling, a-la-vive, palangue | *Thunnus albacares, Thunnus alalunga, Katsuwonus pelamis, Sarda sarda*, flyingfish | |
| Recreational | Trinidad Tobago | N/A | Pirogues: 9-11 m;<br>Cabin Cruisers: 10-11 m;<br>Power Boats: 6-8 m. | a-la-vive, trolling, switchering | Tournaments target a wide range of species including kingfish, wahoo marlin (tag and release), tunas | Tournaments only:<br>WAH 1,787<br>KGM 659<br>BLF 6<br>YFT 76<br>BET 6<br>TUN 29<br>BUM 757<br>CCE 19<br>SMA 39 |

## IV. Data collection systems

*Artisanal Multi-Gear (Trinidad) / 2. Artisanal, Semi-Industrial, Industrial Trawlers (Trinidad)*

Landings and Effort Data: Port Sampling

Landings and effort data are recorded at 23 landing sites out of some 65 landing sites around Trinidad. These data are collected by Catch and Effort Data Collectors who live close to the landing sites and record information on fishing vessels daily, as the vessels return from fishing. Data collected for each vessel include: Vessel Registration Number; Times departed and returned; Number of crew; Gear type used; Weights of "species" landed (may be grouped by local names); Ex-Vessel price per "species", and Area Fished. The Data Collectors record the data for some 20 days (selected at random) in a month and submit the forms monthly to the Fisheries Division. All landings for this fleet represent live weights.

The coast of Trinidad is sectioned into zones based on similarities in fishing operations. Each enumerated site is assumed to be representative of artisanal fishing activity within a zone. Data collected at an enumerated site are raised to obtain estimates of landings and effort at the site for all fishing days in the month (including non-enumerated fishing days). These raised data are then used to estimate the total landings and effort for enumerated as well as non-enumerated sites in a zone. This second raising is based on results of a census of fishing vessels conducted periodically to determine the number of boats at each landing site.

Landings from the recreational fishery are partly captured by this data collection system since some recreational fishermen and their vessels are registered with the Fisheries Division and hence their vessels are captured in the vessel census.

With regard to data quality control, the data entry staff of the Statistical Unit cross check the forms submitted by the Catch and Effort Data Collectors with the notebooks also submitted by the Catch and Effort Data Collectors. In addition data entry staff conduct trips to the beaches to clarify any queries with the Collectors and they interview the Collectors each month to establish the total number of fishing days on the beach. Finally, Catch and Effort Data Collectors are required to participate in an annual workshop with the aims of: reviewing past work, sharing their experiences, updating field techniques and procedures, presenting the results of the previous year's data collection, examining problems in data collection and discussing the implementation of solutions to address these problems.

Some of the problems encountered with this data collection system include the following: data are recorded by species groups, and not individual species, in most cases; some fish species may have different names at different landing sites; data on discards are not captured; data gaps occur when Data Collectors are on leave; due to limited resources the vessel census is not conducted as regularly as would be desirable.

Biological Data

During 1992 and between 1995 and 1997 length frequency, maturity, and age and growth data were collected for King mackerel (*Scomberomorus cavalla*) and Serra Spanish mackerel (*Scomberomorus brasilensis*) and some species of shark (*Carcharinus porosus, C. limbatus, Rhizoprionodon lalandii, Sphyrna lewini*, and *S. tudes*). The data were captured *monthly* for the major gears of the artisanal fishery that catch and target the two mackerel species (gillnets and pelagic handlines).

Biological data collection (length frequency) for Serra Spanish mackerel and King mackerel resumed in March 2004 and continued in 2006 and 2007.

*Semi-industrial Longline (Trinidad)*

Landings and Effort Data: Trip Reporting System

In late 2001 a trip reporting system was implemented. Vessel owners submit the information to the Fisheries Division upon completion of fishing trips. The long-term aim is a logbook system. Presently, vessel captains are generally unable to cope with a logbook system. The longline fleet landings for which no corrections are made all represent dressed weights. All other landings for this fleet represent live weights. Some of the problems with this data collection system include the following: late or non-submission of trip reports by some owners; misinterpretation with respect to depth range (depth of water) and depth fished (depth at which gear is set); unwillingness of vessel owners to divulge the geographic co-ordinates of fishing.

With the technical assistance of ICCAT (in April 2001), in the person of Mr Papa Kebe, Systems Analyst, it was determined that in the absence of a logbook system the best available sources of data to estimate historical landings would be export data and domestic sales. Total landings for the period 1993 – 2000 were determined by summarizing total exports and domestic sales. This information was accessed directly from each local owned local flagged vessel and from data collected by the Fisheries Division at the National Fisheries Company Limited for local owned foreign flagged vessels. By-catch data were also collected and included in the estimates of historical landings. The data derived from the ICCAT technical assistance program represent revised historical landings for the Trinidad & Tobago longline fleet for the period 1993 – 2000.

Since 2000, exporters were required to itemize by species (scientific name) the fish to be exported. Export data for large pelagic fish and fishery products are collected from local exporters through the mandatory submission of an "Export Return Form" which records the actual quantities and values of fish exported (total weights and values) for each export licence issued. The "Export Return Forms", accompanied by supporting documentation including: Customs Forms, Pack Out Sheets (*which capture individual weights of fish exported*), CARICOM Invoices and a copy of the licence under which the fish is shipped, must be submitted to the Fisheries Division before approval for another export licence is granted.

*Semi-industrial multi-gear (Trinidad)*
Catch data for this fleet are not available.

*Artisanal / Semi-industrial (Tobago)*
Landings and Effort Data: Port Sampling
In Tobago landings and effort data have been collected between 1979 and 1983, in 1988, and from 1995 to the present. There are about 32 landing sites on the island. Currently, five persons are involved in the collection of catch and effort data at eight landing sites. Data are collected four days per month at three sites (Charlotteville, Mt Irvine and Castara); six days per month at three other sites (Plymouth, Roxborough and Studley Park) and eight days per month at two sites (Pigeon Point and Buccoo Point). Types of data collected include: Boat registration number; Departure and arrival times of vessels; Fishing method; Fishing area; Species and quantity landed; Price per pound; Name of port or landing site of operation; Number of active and sampled boats. Tobago data are sample data (not raised) and represent live weights. An estimate of coverage for the Tobago fleet is not available at this time.

Problems encountered with the collection of catch and effort data include the following: fisherfolk are sometimes unwilling to release information; registration information (name and/or number) may not be present or clearly visible on vessels; data collectors often unable to access remote landing sites due to lack of transportation; some fish species may have multiple names.

Biological Data
Biological data collection took place between 1990 and 1995.

*Recreational (Trinidad & Tobago)*
Some six or seven game fishing tournaments are held annually. The Fisheries Division records the lengths and weights of all fish landed at these tournaments. In addition to tournaments, landings from the recreational fishery in Trinidad are partly captured by the data collection system for the artisanal multi-gear fleet since some recreational fishermen and their vessels are registered with the Fisheries Division and hence their vessels are captured in the vessel census. Catch and effort data are not collected for the recreational fleet of Tobago.

## V. Data storage and analysis

*Artisanal Multi-Gear (Trinidad) Artisanal, Semi-Industrial, Industrial Trawlers (Trinidad)*
Number of people for data input: 9
Hardware available: 1 server, 11 Desktop Computers
Software used: ORACLE Relational Database Management System.
Problems encountered: no in-house expertise in Oracle programming and hence database development and maintenance is costly.

*Semi-industrial Longline (Trinidad)*
Number of people for data input: 1
Hardware available: 1 Desktop Computer
Software used: MS Excel

*Artisanal / Semi-industrial (Tobago)*
Number of people for data input: 1
Hardware available: 1 Desktop Computer
Software used: The software utilized and data fields computerized have varied over the last ten years. Initially the Trip Interview Program introduced under the CARICOM Fisheries Resource Assessment and Management Programme CFRAMP was utilized to computerize catch and effort data. Since 2005 data have been computerized using MS Excel. Trip report data are computerized along with selective data fields from the catch and effort data sheets (species, catch quantity, boat number and date).

Problems encountered: Due to financial and human resource constraints the database system has been utilised for data entry only. Difficulties are experienced with data manipulation.

*Recreational (Tournaments)*

Number of people for data input: 1
Hardware available: 1 Desktop Computer
Software used: MS Excel

# VI. Observations

*Semi-industrial Longline (Trinidad)*
Trinidad & Tobago, through the Maritime Services Division of the Ministry of Transport, established in 1987 a register for vessels operating in international waters. Subsequent to this, a number of local owners of foreign flagged vessels sought to register their vessels locally. Additionally, local owners of foreign flagged vessels have sought national registration of their vessels because of problems they experienced in obtaining the "Atlantic Swordfish Certificate of Eligibility" from the flag states of their vessels, that is required to export swordfish to the United States

In June 1999, Trinidad and Tobago implemented a Swordfish Certificate of Eligibility (COE) for export of Swordfish to the United States of America. This was consistent with ICCAT's minimum size requirements for the export of Swordfish. Trinidad and Tobago has now implemented the Statistical Document Program in keeping with ICCAT's guidelines.

*Tobago*
Some of the data collected during the 1980s and early 1990s may have been destroyed by a fire at the old office building or lost during relocation to a new building. This could be the reason for any inconsistencies in the data.

There have been improvements in data collection and storage over the years. Eight sites are currently sampled compared with three sampled between 1988 and 1990. There are currently five data collectors while the number fluctuated between one and three in the 1990s. Scheduling is more standardized facilitating more regular and frequent site visits. Data are also inputted in a more standardized and clearly understood format.

*Foreign Fishing including Transshipment*
A National Monitoring Committee on Foreign Fishing and Related Matters (NMCFFRM), composed of representatives of relevant Ministerial Agencies, a Quasi-government Research Institution, an umbrella environmental Non-governmental Organization and a Game Fishing Association, was established by the Government of Trinidad and Tobago in September 1991. The Terms of Reference include:
1. To monitor the operation of all foreign fishing vessels in the waters under the jurisdiction of Trinidad and Tobago, including their compliance with the terms and conditions of access;
2. To monitor the characteristics of foreign fishing vessels, including the fishing gear, that use Trinidad and Tobago for transshipment and/or landings to ensure compliance with the resolutions of international organizations, the regulations of national entities that have influence on Trinidad and Tobago's fishing industry etc;
3. To bring to the attention of the Minister responsible for Fisheries, information on fishing and allied activities that may adversely affect the conservation and management of the living marine resources of Trinidad and Tobago;
4. To board and inspect vessels and/or undertake any tasks falling under the purview of the Committee.

Cabinet of the Government of the Republic of Trinidad and Tobago approved the implementation of a Memorandum of Agreement between the Ministry of Agriculture and the National Fisheries Company (1995) Limited, which operates a transshipment facility in Port of Spain. Among the areas of co-operation specified in the Agreement are:
1. Data collection and reporting on transshipment operations,
2. Reporting of vessel sightings and at sea transshipments,
3. Port inspection and identification of vessels engaged in IUU fishing activities, and
4. Ensuring compliance by transshipment companies.

A Transshipment Monitor was hired in December 2004. Duties of the position include: the observation of operations at transshipment ports, the monitoring of foreign fishing vessel use of transshipment ports particularly as this relates to IUU fishing activities and the compilation of transshipment-related data. Data are being complied in collaboration with transshipment companies.

*Blue and White Marlin*

With respect to Blue marlin and White marlin, the catch stated for the Reference Year (1996) in the Blue marlin section is billfish catch, as reported to the Secretariat in 2000, and therefore the figure includes catches of White marlin. Against the above background, Trinidad and Tobago is expected to present a paper which will provide the necessary data and information that will facilitate application of a more appropriate breakdown of our reported billfish catches in order to update the Task I and Compliance tables.

# I. Country Name : Turks and Caicos Islands

# II. Institute/Agency responsible for collecting data

Agency name: Department of Environment and Coastal Resources; Ministry of Natural Resource

Statistical Correspondent or Contact person: Kathy Lockhart

# III. Inventory of fisheries

| Type | Main Port or Area | Number of Fishing Vessels | Vessel types, sizes | Fishing Gears | Main Target Species | Annual Catch (kgs) |
|---|---|---|---|---|---|---|
| Sport or Recreational | Providenciales | | | Rod/reel | Tuna Wahoo | 2007<br>BIL(724)<br>TFT(1022)<br>SWO(86)<br><br>2006<br>YFT(94)<br>BUM(2093)<br><br>2005<br>WAH(117)<br>YFT(25)<br>BRS(17)<br>BUM(923)<br>BIL(23)<br>SKH(75)<br>OFT(64)<br><br>2004<br>BUM(2435)<br>WAH(16)<br><br>2003<br>WAH(28)<br>YFT(225)<br>SHK(195)<br>BUM(108) |
| Commercial | South Caicos | | | Electronic reel | Tuna | 2007<br>YFT(2256)<br><br>2006<br>YFT(35) |

# IV. Data collection systems

1. Recreational --Logbook on each of the sport fishing vessels within the tournament. At the end of each day the sheets would be provided to the tournament supervisor and then forwarded to the TCI Government. Problems have often occurred as the tournament is a catch and release and often there is assumptions on weight.

2. Commercial—Logbook were located on each of the vessels. Every fish landed is reported within the log book. The logbook is supplied to the commercial processor (owner) and then relayed to the TCI Government. There are problems as to the translation of the logbook. Often the fisher's are not fluent in the English language and have differing names of the fish.
3. Commercial—Port Sampling has just been started in the 2009 fishing year. Once a month the boats are checked for a variety of fish. If any ICCAT species are documented they are individually weighed and measured. Difficulty is found when there is only one data collector for the landing locations.

## V. Data storage and analysis

Number of people for data input: 1
Hardware available: 1 desk top computer
Software used: Excel
Problems encountered: Limited man-power and skills

## VI. Observations

Historically both Spiny Lobster and Queen Conch have been the commercially exploited species with the TCI. In most recent years, fishers have been exploring the vitality of the scale fish industry for local consumption. ICCAT Species have never been a priority fishery for the local people of the Turks and Caicos. However in 2006, a small number of processors discovered a local market for visiting tourist within Providenciales. With limited man-power and funding within the fisheries industry only one individual has been responsible for data collection of all the different fisheries including conch, lobster, scale fish and ICCAT.