



The Newsletter of the Caribbean Regional Fisheries Mechanism - **Scientific Issue, June 2016**

This newsletter highlights activities conducted by the CRFM Secretariat, Member States and partner organizations during the period **September 2015 to June 2016**.

The Science of Fish Value - Some Tips from Iceland

by Susan Singh-Renton, Deputy Executive Director, CRFM Secretariat

Many CRFM states continue to harvest and sell fish as just fish, shrimp as just shrimp. The scales, bones, guts and shells are usually thrown away. But when we do so, are we throwing away other potential profits? And it's not just the fishing sector that should ask this important question.

I had the opportunity recently to visit Iceland, and to speak with some of the most successful entrepreneurs in the fishing business there. Fish was considered a very valuable resource for big business in Iceland, and almost every part of the cod, which is the main commercial fish caught in Iceland, was being turned into a marketable product, including animal feed, as well as cosmetic and healthcare products to name a few. But it was not always so. Just a few decades ago, the value of the Iceland fishing industry depended heavily on selling as much fish as possible and mostly as just fish. Of course, as seen in other parts of the world, this trend led to a situation of excessive fishing and in turn, a decline in the natural fish resources. When Iceland decided to limit fish catches and fishers were given specific quotas, this seemingly inhibiting measure proved to be the first positive step towards adding value to the catch. That is to say, the industry began to take greater care to keep fish in good condition to avoid loss of sales, and to explore and develop the commercial potential of other parts of the fish.

Following along this trend, Iceland Ocean Cluster was formed as a network of 12 businesses connected with the fishing and ocean industries back in 2012, to add value by connecting people and businesses together. The Cluster has since grown into an active network of 50 businesses, working with scientists to create value at key points in the industry chain – i.e. improved technology for fishing vessels, making them cleaner, greener, and easier to satisfy the market demands;



Fish skin, creating value as fashion leather.

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improved seafood processing technology for better product care and shelf-life, and creation of new commercial products from various parts of the fish to meet emerging market needs, such as leather for the fashion industry, specialty health foods, and special skincare and medical products.

Together with a change towards more sustainable fisheries management practices, Iceland's investment in value addition, which included significant investment in the science of fish value have doubled the profits

from its cod fishery despite the fact that commercial catches remain regulated by a strict quota system.

The Iceland success story has some good lessons, with the first essential one being more active regulations to ensure sustainable fish supplies before we lose any more value and profits. If CRFM States can achieve this for our fishing industries, and create the enabling environment for business investors, then we could take a rest from the race to fish, and instead let the science of value guide our quest for maximum profits.

Distribution of Queen conch (*Strombus gigas*) on the Pedro Bank, Jamaica: Descriptive and Predictive Distribution Models

By Ricardo A. Morris, Fisheries Division, Jamaica

Species distribution models (SDMs) are used to describe/predict the distribution of species across their habitat range based on particular environmental factors. SDMs have been extensively used for terrestrial species but are becoming increasingly popular in the marine realm due in part to increased access to broad-scale marine datasets derived from remote sensing. The potential value of SDMs in a management context is tremendous as it allows for better spatial appreciation of the linkages between commercial and ecologically sensitive species and their habitats. SDM outputs (habitat and distribution maps) therefore provide a useful tool for ecosystem-based marine spatial planning (MSP), including actions such as the designation of protected areas and fishery management zones, as well as identification and protection of critical habitats such as juvenile nursery areas.

The queen conch (*Strombus gigas*), a large gastropod mollusc, is one such species where the potential benefits of SDMs can be realized. The species is commercially important to the large-scale component of the fishing sector and also plays a vital ecological role, often being among the top benthic grazers of algae in their communities, thus helping to prevent smothering of coral reefs and other areas. It is also food for other marine animals such as the nurse shark (*Ginglymostoma cirratum*, spiny lobster (*Palinurus argus*) and octopus (*Octopus vulgaris*), thus contributing to the ecosystem food web and transfer of energy. Both adult and juvenile queen conch abundance and distribution may vary over time and space with changes in environmental/ ecological and biological factors. Queen conch, like other benthic species, at a given time, tends to occur in clusters associated with favourable conditions, particularly as these support feeding and/or reproductive activity.

Importantly as well, queen conch favoured habitat of shallow, sand-based substrate is often used by a range of stakeholders. This situation necessitates the use of both ecological and spatial management techniques to minimize conflicts associated with multi-sectoral use of the coastal zone and to ensure sustainability of queen conch.

The Pedro Bank, Jamaica, an offshore proximal bank located in the archipelagic waters approximately 80 km south of the main island, has one of the Caribbean region's richest and most productive queen conch populations. Managers of this resource also have to contend with multi-use issues in the area. Like other countries in the Caribbean with a sizeable queen conch stock, there is also a vibrant export-oriented conch fishery. Conch exports of Jamaica have averaged roughly 500 MT annually for the last decade. The conch fishery is very valuable to the economy, providing vital livelihoods and revenue to the country's coffers. The Pedro Bank is also important to a range of stakeholders; including those involved in fisheries, national security, conservation, transport and mineral exploration which are thought to have both direct and indirect impacts on queen conch and its habitat.

Using SDMs, an assessment was conducted to model the distribution of conch on the Pedro Bank. It included collection and compilation of underwater survey data collected in 2002, 2007, 2011 and 2015, along with environmental data such as substrate type, bathymetry (depth) and chlorophyll-a concentration. These data were obtained from the field as well as from a number of databases such as the General Bathymetric Chart of the Oceans (GEBCO), MODIS 4 km resolution ocean data, retrieved through the Goddard Earth Sciences Data and Information Services Center (GES-DISC), and the 2014 Pedro Bank Marine Spatial Planning Project.

The environmental factors chosen are among the most important drivers of distribution for the species. These data were then used to produce descriptive distribution models of the current distribution (Figure 1), as well as predictive models (Figures 2 and 3) estimating the potential abundance and habitat suitability for the species. The predictions of abundance were produced using the general additive mixed model (GAMM) which is a statistical technique particularly useful in modelling ecological data, while habitat

suitability was modelled using the computer programme Maxent which was developed in the early 2000's as a relatively simple method for modelling species distributions.

Figure 1 shows that overall conch abundance is highest in the south and southeastern edges of the bank which are shallowest and dominated by coral reefs, sand and sediment as well as seagrass. This is significant as these are generally the types of habitats where conch will feed and reproduce seasonally.

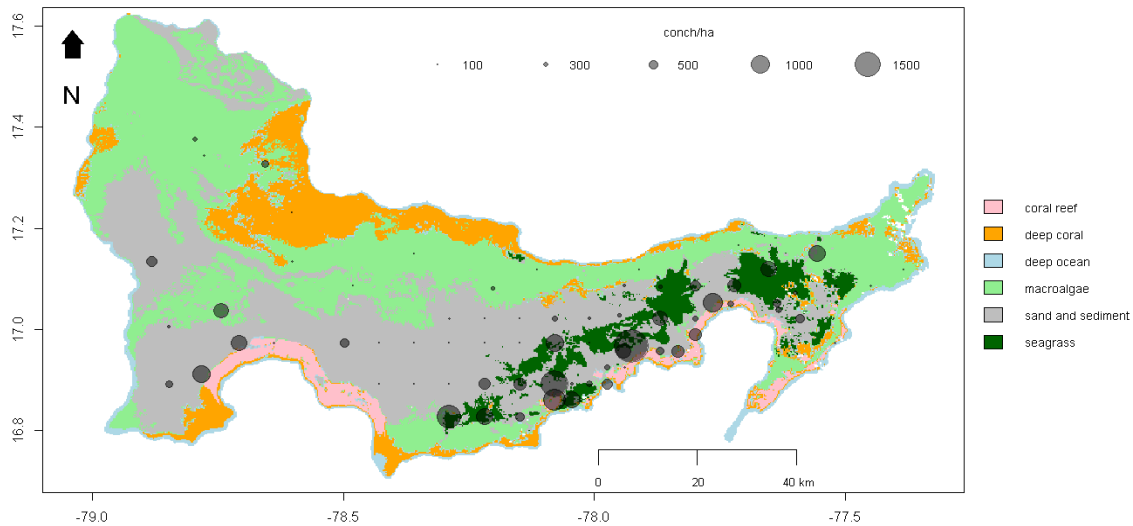


Figure 1. Broad scale habitat map of the Pedro Bank showing the current (2015) distribution and density (conch/ha) of conch. The map is based on remotely sensed data obtained during the 2014 Pedro Bank Marine Spatial Planning Project.

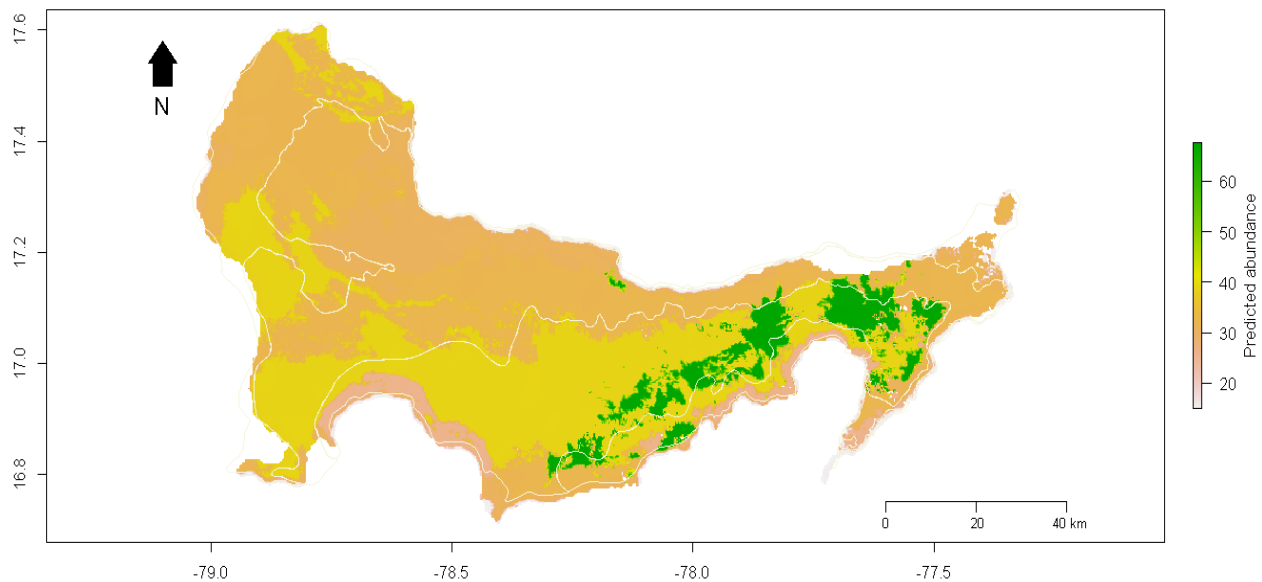


Figure 2. Map of predicted abundance of Queen conch on the Pedro Bank. Model produced using GAMM.

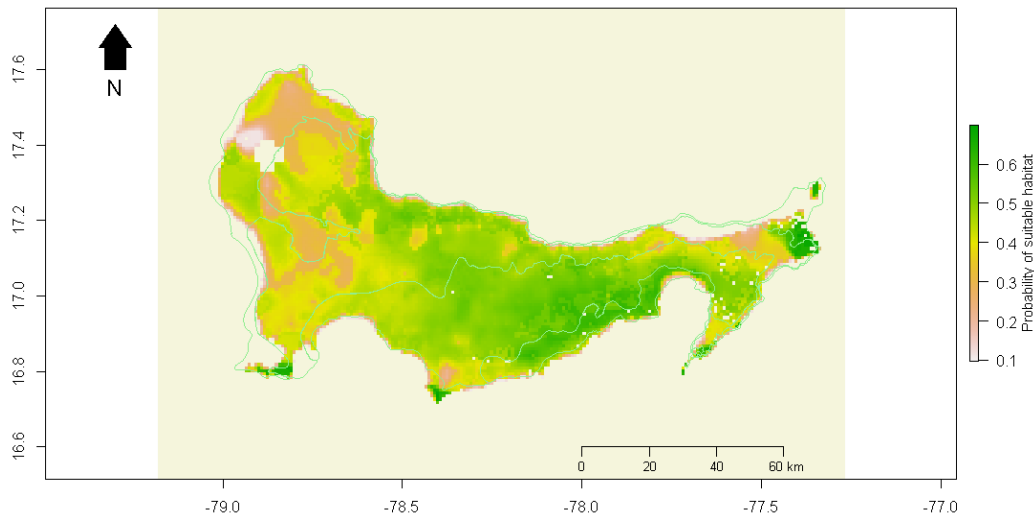


Figure 3. Map of predicted habitat suitability for Queen conch on the Pedro Bank. Model produced using the Maxent species distribution modeling programme.

Figure 2 not surprisingly, points to the same area in the south for highest predicted abundance. Figure 3, which depicts predicted suitability also shows a similar trend as Figure 2. In both cases predicted abundance levels and habitat suitability decrease from shallow to deeper waters. There are some predicted areas of high abundance and habitat suitability which did not show up as having highest abundance as in Figure 1, such as the centre of the bank. Such areas are important as they may indicate areas for follow-up research or further investigation.

In conclusion therefore it would be prudent for management to sustain and protect those areas of highest abundance and their corresponding habitat as well as to investigate further those deviations in the expected habitat and distribution trends. The information, especially if provided on a frequent basis, is invaluable to marine resource managers and planners concerned with sustainable resource development.

Collection, Management and Primary Analysis of Fisheries Data in the Commonwealth of Dominica

By Derrick Theophille, Fisheries Officer, Fisheries Division, Dominica

For over twenty years the small-scale artisanal fisheries of Dominica have been monitored using a field sampling programme that has been limited to catch and effort data and has rarely been used to inform fisheries management. The local fisheries sector is currently undergoing a number of changes. Many persons seek entrance into the sector, though the majority only operate part-time; invasive alien species are impacting traditional coastal fisheries; climate change is causing harm to the sector's infrastructure; and the major economic species are transboundary, requiring a coordinated regional response for effective management. This situation prompted a recent study to look at the available data and to construct a baseline for the sector that will help inform future management decisions.

Through reconstruction of catch and effort data, gaps

in the dataset were accounted for prior to conducting the analyses. The primary analyses involved the preparation of baseline information from the available data, such as total estimated catch for all ports and species groups from 1994 to 2014. The results indicated that since the beginning of the time period, the catch and catch rate for the sector has been on the decline (Figure 1). In particular, catches for coastal pelagics have reduced by 60% since 2000, due to a shift from coastal to offshore fishing, facilitated by subsidized development of the FAD fishery.

Additionally, a CPUE analysis was conducted for the local dolphinfish (*Coryphaena hippurus*) fisheries (Figure 2). The analysis included a look at previous assessments of that stock for the Caribbean Regional Fisheries Mechanism (CRFM) region and the use of linear regression models to describe the catch-rates.

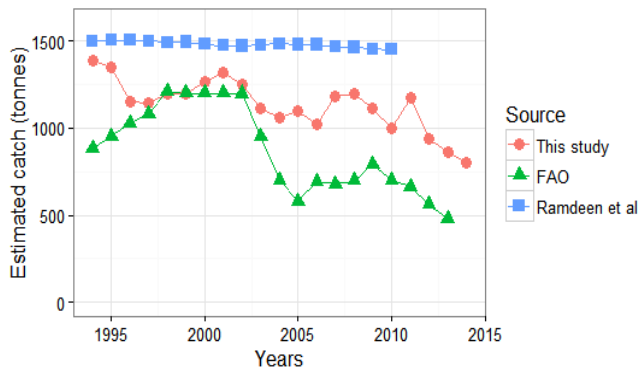


Figure 1. Comparison of total catch from this study, the FAO Fisheries Global Information System (accessed in January 2016) and a study by Ramdeen, Harper and Zeller of the Fisheries Centre, University of British Columbia.

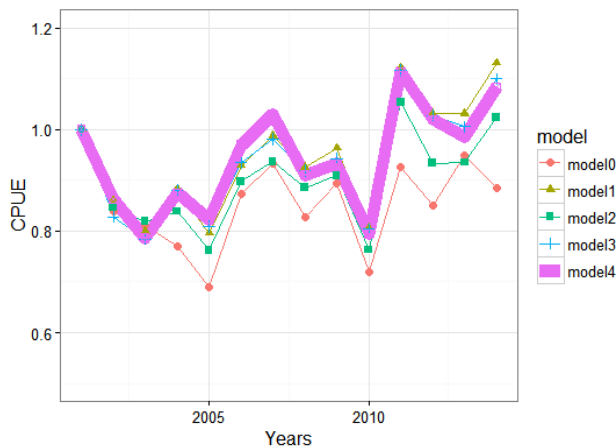


Figure 2. Dominica Dolphinfish CPUE trends generated using General Linear Models with different variables – model 0 (log trips and year); model 1 (log trips, year, month & port); model 2 (log trips, year, boat type & season from previous CRFM study); model 3 (log trips, year, month, port, boat type & gear); model 4 (log catch-rates, year, month, port, boat type & gear). Model 4 best explained the results.

While annual dolphinfish catches have increased slightly since 2001, the nominal catch rate has remained fairly stable over the period, at about 38 kg per trip. There doesn't appear to be signs of over-exploitation, although further analyses are required to confirm this. The dolphinfish analysis cannot speak for the entire multinational stock as the data is constrained only to that of Dominica.

One other major component of the work was to document the existing field sampling and data management arrangements of the Dominica Fisheries Division and explore options for improvement. While the data proved useful for the generation of information and analyses, it was evident that the field sampling programme was in need of a review. The sampling programme is largely unstructured resulting in some bias as to which fishers were most frequently interviewed. Additionally, biological data is necessary for more useful analyses and can be collected on a limited scale (individual lengths and weights) fairly easily for certain important species. The results of this local dolphinfish analysis can be added to the regional analyses conducted previously by the CRFM member states and build a more complete picture of the status of this multinational stock.

Annual analyses of this nature can be conducted for dolphinfish and other important species and should be supported by fishery-independent surveys as a means of verifying the state of fisheries assessed using data from field sampling interviews. This can include frame surveys and independent fishing trips. Fishers should also be encouraged to take a greater stake in the management of the sector. Reports of this nature can help express the need for greater cooperation and incentives towards more sustainable solutions to the problems facing the local fisheries sector.

Improvements in Data Collection in Saint Lucia

By Patricia Hubert-Medar, Department of Fisheries, Saint Lucia

Fisheries data are needed to evaluate the performance of fisheries which provides the platform for making rational decisions towards the sustainable management and development of a national and regional fisheries sector. Since the establishment of the first fisheries data collection system in 1979, Saint Lucia continues to improve fisheries data collection recognising that suitable and reliable fisheries data sets is a critical step to informing fisheries policy and management objectives.

Current Data Collection

Catch and effort data are collected at 50% of fish landing sites island-wide as part of a stratified random sampling procedure. Data collectors conduct sample interviews with the crew of fishing vessels returning from a fishing trip, recording the data into the prescribed field data booklet. They interview the crew of every other returning vessel, over fifteen randomly selected days within each month. The data collected is submitted monthly to the Department of Fisheries where it is entered into a specialised database.

The level of quality of the data collected is maintained through: 1) continuous training of the data collectors and field visits to observe practises and correct errors in sampling methodology; 2) preliminary screening of the field data booklet before the data is computerized; and 3) review of the data entered to ensure that the information is accurate and corresponds to data within the booklet.



Fish landing sites in Saint Lucia.

Improvements

A data collection system requires continuous improvement to meet the demands of a fast changing world. Staff rotations and loss raised an increased need for continuity in maintaining the data collection protocol. As such, in March 2016, the Department

detailed standard operating procedures for data collection. The data collection plan was also expanded to include the number of fish landing sites sampled – ensuring more reliable data as it limits the margin of error for estimations of landings at sites not sampled.

The Department also recognizes the need for improvements in other areas and has made strides to implement the following improvements: The collection of catch and effort data is done manually, on a scrap book which is later transferred to a field data collection booklet. A project request has been made to a donor agency that would assist with the purchasing of electronic devices (tablets) to allow for the capture, verification and digitization of data to be done in a more time efficient manner. This would significantly improve the timeframe in which total fish landing data becomes available to users. This improvement will eliminate the current digitization process and increase the time spent on quality checks. Currently the Department utilizes two outdated DOS- based programs: Trip Interview Program (TIP) and the License and Registration System (LRS) as the main data entry programs. These DOS-based programs were developed during the CARICOM Fisheries Resource Assessment and Management Program (CFRAMP) in the 1990s. To improve the quality of data and the ability to generate more sophisticated statistical analysis in a timely manner, the Department has contracted the services of a consultant to design and develop an information system that is modular, scalable and portable (not restricted to any operating environment). This will increase the accuracy, timeliness, richness and availability of information generated by the Department.

Limitation to improvements

Financial constraints have not allowed for the collection of biological data on species of interest. This is necessary to allow for more informed decision making with regards to the effective management and sustainable use of the fisheries.

Improving Data Collection and Data Quality in the Region

By June Masters, Statistics and Information Analyst, CRFM Secretariat & Marc Taconet, Chief of the Fishery Statistics and Information Branch, FAO

The CRFM Secretariat has been working with the Western Central Atlantic Fishery Commission (WECAFC) and the Fisheries and Resources Monitoring System (FIRMS) known as the WECAFC-FIRMS partnership, to improve data collection and data quality in the region. The WECAFC-FIRMS partnership is an

arrangement for the collection and distribution of information on fish stocks in the WECAFC area. Given that all 17 Member States of CRFM participates in WECAFC, provisions were made for extended collaboration with CRFM on this project. FAO provides the Secretariat for the FIRMS partnership.

A WECAFC-FIRMS Data workshop was held in Barbados on 19-21 January 2016. This workshop was attended by 13 countries including: 11 CRFM Member States and a representative from the CRFM Secretariat. The workshop was aimed at fostering support from WECAFC, CRFM, OSPESCA and their Member States towards providing the necessary data needed for stock assessments and implementation of adaptive management strategies in support of three priority Fishery Management Plans: Flyingfish, Queen Conch and Spiny Lobster. To this end, CRFM Member States and the CRFM Secretariat have been collaborating with and supplying data to WECAFC-FIRMS for the development of fisheries inventories for Flyingfish, Queen Conch, and Spiny Lobster. The inventories will be made available online for use by stakeholders in the region and elsewhere.



Participants at the WECAFC-FIRMS Data Workshop held in Barbados, 19-21 January 2016.

The CRFM region has also been collaborating with the WECAFC-FIRMS towards the development of a

regional database. The goal of the regional database is to provide data for stock assessments. During the process of developing the regional database, data collection and capacity weaknesses will also be identified and recommendations for support to national data collection and management will be made where necessary.

It should also be noted that the work of the WECAFC-FIRMS is proceeding in close partnership with other FAO fisheries data projects from which CRFM Member States benefit. One such project is the ongoing FAO Technical Cooperation Project (TCP) which aims to establish a functioning Fisheries Management Information System (FisMIS) for The Bahamas and which is an example of a national project to support data collection.

Next steps

The WECAFC-FIRMS regional pilot database activity is still ongoing, with expectations over the coming months to formulate project concept notes to strengthen selected national fisheries data collection and information systems, to harmonize logbooks and related data and information collection in the region, pilot development of a regional fisheries database, publish fisheries inventories relevant to the lobster, queen conch and flyingfish Fishery Management Plans, and add a Spanish language component to the FIRMS website in order to disseminate important fish stock inventories and fisheries information in Spanish. Extension of this activity to the OSPESCA sub-region has also been considered. The compilation of the fishery inventories for the three focused species is expected to be completed by the beginning of 2017 for several countries, and WECAFC-FIRMS factsheets have been published for some countries.

Member States' Experiences - Statistical Reporting to ICCAT

By Elizabeth Mohammed, Programme Manager, Research and Resource Assessment, CRFM Secretariat

Programme Year 2015-2016 saw renewed interest in improved and active participation of CRFM Member States in ICCAT's activities. The stated objective is to effectively influence ICCAT's decisions through strengthened overall national positions to secure the respective fisheries interests at negotiations. Consequently, the Executive Committee of the Caribbean Fisheries Forum approved a number of management-level and scientific-level priority targets and activities for implementation of the CRFM Pelagic Fisheries Working Group in 2015-2016. Among the scientific-level commitments was the improved

fulfillment of reporting obligations in respect of tuna and tuna-like fishery statistics. To facilitate this reporting two E-Tutorial Sessions were convened to build awareness and capacity on how to complete ICCAT's Task I (fleet characteristics; nominal catches) and Task II (catch and effort; size sampling) data forms. The respective training was delivered by the ICCAT Statistical Correspondent of Trinidad and Tobago.

Currently several CRFM States are Contracting Parties to the International Convention for the Conservation of Atlantic Tunas, either as independent states (Barbados, Belize, St. Vincent and the Grenadines

and Trinidad and Tobago) or through UK membership in respect of its Overseas Territories (Anguilla, Montserrat and Turks and Caicos Islands). In addition, both Guyana and Suriname are Non-Contracting Cooperating Parties. Here, we have documented the experiences of Belize and Trinidad and Tobago in meeting their statistical reporting obligations to ICCAT. We anticipate that other CRFM Member States listed above would in future share similar experiences and best practices.

Efforts, Challenges and Lessons Learnt in Statistical Reporting to ICCAT – the case of Trinidad and Tobago

By Louanna Martin, Fisheries Officer, Fisheries Division, Trinidad and Tobago

National statistics reported to the International Commission for the Conservation of Atlantic Tunas (ICCAT) can be used to allocate country quotas for the species under ICCAT's management, but also serve to give a fuller picture of the situation at hand and, even if provisional in nature, serve to foster meaningful engagement with the Commission towards the acceptance of statistics that are agreed upon. This situation is clearly demonstrated in the case of Trinidad and Tobago.

The country's first national report to ICCAT was submitted in 1993; its nominal landings were presented by the then CFRAMP, forerunner to the CRFM. The country kept up its reporting of nominal statistics, without any formal status with ICCAT, until a management recommendation adopted in 1995 eventually resulted in Trinidad and Tobago becoming a Contracting Party in 1999. This recommendation identified 1993 as the base year for the allocation of swordfish catch limits; not a good year for Trinidad and Tobago considering its reported landings of swordfish



Longliner moored at Alcan Bay.

for 1993 were 11t, while its reported landings for 1992 and 1994 were substantially higher at 562t and 180t respectively.

In 1996 the country was notified of US concerns over a discrepancy between the landings of northern Atlantic swordfish reported by Trinidad and Tobago and imports of swordfish recorded in the US trade data. The quantity of swordfish imports into the US was significantly higher than the catch limit assigned to Trinidad and Tobago and the country was described as not having responded effectively to requests for catch statistics. Trinidad and Tobago was advised of its possible "identification", with trade sanctions by ICCAT member countries likely to follow, as a result of the perceived lack of observance of ICCAT's rebuilding plan for the overfished northern Atlantic swordfish stock.



Blue marlin caught at a Game Fishing Tournament.

Trinidad and Tobago proceeded to attend the 15th Regular Meeting of the Commission in 1997 as an Observer, and there to outline measures adopted by the country to enhance its data collection and monitoring of its fleets. Trinidad and Tobago's efforts were recognised by the Commission and the country was encouraged by the Commission to continue improving its monitoring and control efforts.

The country's problems with swordfish were not over, however; in 1997 a new recommendation was adopted on the catch limits to be observed in 1998 and 1999. Again, Trinidad and Tobago's allocation as a result of the chosen base year was below its fleet's harvesting potential and would have further exacerbated its harvesting overage.

Additionally, the 1998 meetings of ICCAT's Standing Committee for Research and Statistics (SCRS) and Permanent Working Group for Improvement of ICCAT Statistics and Conservation Measures (PWG) highlighted Trinidad and Tobago for other suspected compliance infringements not related to the estimation of landings.

It was widely expressed that action would be taken against the country, but Trinidad and Tobago was actively pursuing membership status at that time. The Commission issued Trinidad and Tobago a Letter of Encouragement recognising that the country was taking its flag and port state responsibilities seriously and emphasising the importance of comprehensive data collection.

Trinidad and Tobago became a Contracting Party to ICCAT in March 1999 and in 2000 attended its first Commission Meeting, as an ICCAT Member State, at which it notified of the need to review its statistics reported to ICCAT and requested technical assistance from ICCAT to do so, through development of a coherent data collection system and revision of historical statistics. In 2001 the ICCAT Systems Analyst visited Trinidad and Tobago and made recommendations for upgrading the data collection system. The historical statistics were also revised; all data types were utilised including, catch, effort, imports, exports and industry data.

In 2001 Trinidad and Tobago's swordfish catch limits were increased based on the initially revised historical statistics and the data collection systems were updated based on the recommendations of the ICCAT technical assistance. In 2002 the country's fully revised statistics were accepted allowing Trinidad and Tobago to negotiate a substantially higher swordfish catch limit in line with its fleet's harvesting potential.

The case also highlights how continued engagement with ICCAT and efforts to improve both historical and current fisheries statistics and the respective statistical monitoring systems could work in a country's favour when it comes to allocation of catch limits; Trinidad and Tobago eventually also went on to negotiate increased catch limits for blue and white marlins due to improved statistics.

Belize's Experience with ICCAT Data Reporting By Robert Robinson, Belize High Seas Fisheries Unit, Ministry of Finance, Belize

Belize ratified the International Convention for Conservation of Atlantic Tunas on 19 July 2005 and has since been a full participant, as a Contracting Party, in the processes of the International Commission for the Conservation of Atlantic Tunas (ICCAT), the body charged with responsibility for implementation of the respective Convention.

Belize's High Seas tuna fleet currently consists of 13 vessels that target Yellowfin, Bigeye, Skipjack and

Frigate Tuna as well as Albacore and Swordfish; and recorded landings of these species totalling a little under 22,000 metric tons in 2015. Over the years, Belize has seen continued development in the data reporting requirements of this Regional Fisheries Management Organization (RFMO), and with each passing year, as new Conservation and Management Measures (CMMs) are developed, the data reporting obligations have increased significantly and some of the specific reporting formats have also changed. Nevertheless, the ICCAT Secretariat has been organized to provide the necessary guidance and other support to facilitate data reporting required of Contracting and Co-operating Parties to the Convention.

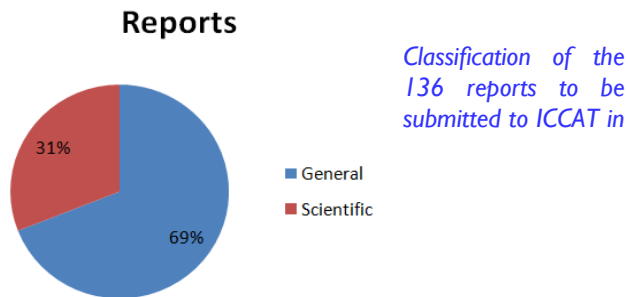
The Belize High Seas Fisheries Unit (BHSFU) is the competent authority for the management of Belize's High Seas Fisheries in accordance with the High Seas Fishing Act, 2013. This Unit is placed under the Ministry of Finance as a part of the International Financial Services Sector since all high seas fishing vessels are controlled by foreign interests.



Valarie Lanza (Director), Robert Robinson (Deputy Director) attending the ICCAT Annual Meeting in Genoa, Italy (Nov 2014).

The biggest challenge faced in data reporting is the collection of accurate data, as the BHSFU often encounters reports of species that are either misclassified or misreported; and officers who are tasked with the challenge of data collection must be prudent in scrutinizing catch reports and cross referencing them with historical catches as well as landing reports before the data can be accepted and aggregated. This task however, is only half the challenge as the data must then be analyzed by our ICCAT statistical correspondent and transposed to the appropriate ICCAT reporting form. Currently, there are 136 ICCAT reporting requirements to be fulfilled by various countries annually. Although, approximately

30% of these requirements pertain exclusively to Bluefin tuna fisheries, all Contracting Parties and Cooperating non-Contracting Parties (CPCs) are required to provide a report for all 136 reporting requirements; albeit 'NIL' reports are submitted for those requirements that are not applicable to the country's fisheries.



While ICCAT reporting requirements are onerous and tedious, the ICCAT Secretariat is very helpful in facilitating CPCs reporting by publishing a list of deadlines for annual reports which references the appropriate reporting form as well as the pertinent CMM, who is required to submit the report and the medium for submission of those reports. The ICCAT Secretariat is also available to provide guidance in the completion of any report that is required pursuant to a CMM. While most CMMs provide a multi-year plan for management of a particular resource, ICCAT has a compendium of 126 active CMMs, of which, several may face updating or be superseded by new ones at each annual meeting of the Commission. As these CMMs change and new ones are adopted, most times there are also changes in the reporting requirements. It is certainly a challenge keeping up with some of the new reporting formats, which are provided by the Standing Committee for Research and Statistics (SCRS) of the Commission. They carefully designed these reporting forms to collect pertinent data in accordance with the CMMs; but since more than 30% of the reporting requirements are scientific in nature, they often call for technical information that requires training or guidance from the SCRS to be completed correctly. However, the implementation of new CMMs is perhaps the greatest challenge of all. As a coastal developing State, it is difficult to identify and allocate scarce resources that are necessary to implement some of the CMMs that are adopted.

While the level of data reporting to this one RFMO is seemingly overwhelming, collecting data early in preparation for the compilation is very helpful in submitting timely reports. The availability of the

necessary data used in the completion of the ICCAT reports greatly aids the reporting process. It is also helpful to follow the ICCAT process so as to keep updated with the new requirements as they arise; this will allow any fisheries administration to adequately plan its methodology for gathering the necessary data from its fleet.

In conclusion, the importance of accurate data submission to ICCAT can hardly be over-emphasized as it contributes significantly to the effective management of our Atlantic tuna, billfish and elasmobranch resources as we aim to ensure the perpetual continuity of these fisheries.

Task II Size Data Reporting to ICCAT by Trinidad and Tobago

By Louanna Martin, Fisheries Officer, Fisheries Division, Trinidad and Tobago

With the exploitation of fisheries resources comes the responsibility to conserve and manage them. Barring the expression of these responsibilities the resources are virtually doomed to extinction. It is required that appropriate data be collected and analysed to estimate the health of fish populations. Based on this premise - and reminders from ICCAT- in 2010 Trinidad and Tobago sought assistance from the Commission to implement a data collection programme for the generation of Task II size data and received such under the Japan Project for the Improvement of Data and Management of Tuna Fisheries (JDMIP). The process began with identification of the need to implement the programme at ICCAT's Caribbean Data Training Workshop held in Guyana in 2009, at which participating countries had the opportunity to review their statistical contributions to the ICCAT database. In recognising the need to improve monitoring and control of compliance with ICCAT obligations, countries also considered options for improving national statistical monitoring systems. At the Workshop Trinidad and Tobago confirmed the need to implement a national data collection system to generate Task II size statistics and later notified ICCAT of the country's intention to request assistance at the 21st Regular Meeting of the Commission, held in Recife, Brazil.

A proposal was developed with assistance from the CRFM Secretariat and submitted to ICCAT in September 2010. The stated aim was to establish a one year sampling program to collect size data from the landings of the major tuna and tuna-like species of the

national longliners which would achieve acceptable and appropriate statistical coverage. The intention was that the Government of Trinidad and Tobago would provide the necessary resources to continue the sampling program upon termination of ICCAT's assistance.

Trinidad and Tobago and ICCAT signed a Memorandum of Understanding in December 2012 to initiate implementation of the programme. It began with a three-day training workshop in January 2013 which was run by Dr Freddy Arocha, then Professor of Fishery Biology at, Universidad de Oriente, Cumana, Venezuela and ICCAT Scientist. The workshop covered biological data collection techniques, biological sampling design, determination of sex and reproductive states, species identification, consideration of reporting and data collection forms and consideration of issues related to the assessment of tuna and tuna-like species. The workshop included classroom, laboratory and field sessions. In all, sixteen persons were trained: nine Trinidad-based, three Tobago-based and significantly, four Belize Fisheries Department personnel - two to be stationed in Trinidad at its trans-shipment port in Port of Spain.



Dr. Freddy Arocha describes the distinguishing features of various coastal and highly migratory pelagic species.

One of the more significant findings of the workshop was that the local industry processes the fish

differently from what is done in other countries. This identified the need to implement a separate study to allow for the estimation of factors for converting various forms of processed weights and lengths to the corresponding whole (round) weights and total or fork lengths for a number of species; this component commenced in February 2013. Specifically for estimating conversion factors, we have gathered over 2300 measurements for 19 species, including tunas, billfishes and sharks; and the data will soon be analysed.



Participants of the training workshop conduct an exercise in species identification.



Blackfin tuna specimens on display with sampling cards for the collection of key data.

To date more than 6800 length measurements for 25 species have been collected under the data collection programme for the generation of Task II size data; the data are stored in a Microsoft Access database. The programme has run into difficulty as a result of the loss of staff members and the current financial situation in the country, however Trinidad and Tobago intends to initiate submission of Task II Size data to ICCAT in 2016.

Monitoring and Evaluating Implementation of Regional Instruments for Improved Fisheries Management

By Elizabeth Mohammed, Programme Manager, Research and Resource Assessment, CRFM Secretariat

Assessing where we've been and where we are, in order to decide where to go, is a key component of monitoring and evaluating (M&E) implementation of regionally agreed instruments for the sustainable use, management and conservation of shared fisheries resources. Rather than a "big stick" approach, M&E is intended to critically assess our achievements against agreed objectives, to identify the challenges and gaps and to put forward feasible recommendations and guidelines for the way forward. The process is mindful that there may be need to adapt or modify original objectives and corresponding management measures to suit the changing ecological, social, economic, climatic and political conditions.

Since 2010 the CRFM has formally adopted eight regional fisheries management instruments, among them are the Sub-Regional Fisheries Management Plan for Flyingfish in the Eastern Caribbean (ECFF-FMP) which



was approved in May 2014 and the Regional Strategy for Control of the Invasive Lionfish (Regional Lionfish Strategy) which was approved in May 2013. In 2015-2016 implementation of these two instruments was evaluated through surveys directed at the Fisheries Division of CRFM Member States. The detailed findings are published in the CRFM Technical and Advisory Documents 2016/01 and 2016/02. Excerpts pertaining to data collection and the science to inform management decision-making are summarized below.

Flyingfish

In the case of the ECFF-FMP there were no appreciable improvements in national data collection systems to routinely record the range of data required for application of the ecosystem approach to fisheries (EAF) in the six countries of relevance (Barbados, Dominica,

Grenada, Saint Lucia, St Vincent and the Grenadines, Trinidad and Tobago). These data types include details concerning the catches, the fishing effort as well as the social, economic and ecological aspects of the fishery. Generally the countries did not report or share the most basic data necessary for fisheries assessment and management, such as total catches and fishing effort, with the CRFM. This situation has severely compromised the CRFM's ability to monitor implementation of at least five of the seven agreed management measures for the flyingfish fishery against the objectives and specific management targets agreed upon or to demonstrate its commitment to applying an ecosystem approach to fisheries (EAF) management of the eastern Caribbean flyingfish.

At the national level catches of flyingfish utilized as bait were generally not recorded and the differences in fishing effort and fishing capacity associated with the range of different vessel types involved in the fishery was not captured in the data of some countries. The national challenges to improving the respective data



Flyingfish caught in dipnet being loaded onto boat.

collection systems were not new; they had been identified since 1999 and included mainly resource limitations and inadequate cooperation of fishers. The lack of attention to addressing these challenges some 17 years after their identification was of concern. Although no research was conducted on the flyingfish or the respective fishery during the period evaluated, two regional projects were approved for implementation between 2015 and 2020 that would contribute significantly to the range of social, economic, ecological and governance research identified in the ECFF-FMP and to improving data collection, management, sharing and analysis for the fishery. These projects are the Caribbean Large Marine Ecosystem Project (specifically the sub-project on EAF for the eastern

Caribbean Flyingfish) and the Marine-Subcomponent of the Pilot Programme for Climate Resilience.

The study recommended that attention be given to building stakeholder awareness of, and support for, data collection, making more effective use of existing legislation to effect some of the agreed management measures to the extent possible, standardizing the unit of fishing effort across countries, building staff capacity in methods of data analysis, strengthening institutional linkages to capture the range of data necessary for application of the EAF and coordinating and integrating a number of regional projects that are simultaneously seeking to conduct research on the eastern Caribbean flyingfish and to improve fisheries data collection, management and analysis in order to maximize use of available resources and optimize the benefits to the countries. The evaluation concluded that since the flyingfish fishery is of greater socio-economic importance to Barbados, Trinidad and Tobago and Grenada compared to the other countries, any appreciable regional advancement in management of the fishery cannot be achieved without the active support of these three countries. The political will to bring about the necessary changes and to provide the requisite resources as well as the expedient and innovative action of the national fisheries authorities would be critical for application of the EAF to the eastern Caribbean flyingfish fishery in the long term.

Lionfish

In the case of the lionfish, national monitoring of lionfish populations and monitoring of the effectiveness of the control measures applied were the weakest areas identified in implementing the Regional Lionfish Strategy in the seven countries which responded to the survey (Belize, Dominica, Grenada, Montserrat, Saint Lucia, St Vincent and the Grenadines and Trinidad and Tobago). Only Belize and Trinidad and Tobago conducted periodic surveys for this purpose and only Grenada, Saint Lucia and Trinidad and Tobago reported formal processes for collection of data on lionfish catches and sightings, with standardized data collection/reporting forms. Although a number of universities conducted lionfish research the level of coordination of such research and whether resource managers had access to scientific information to inform the decision-making concerning lionfish management could not be ascertained. Although the Gulf and Caribbean Fisheries Institute plays a pivotal role in the sharing of information, including research and monitoring, on its Lionfish Web Portal and at its annual symposia, it was not evident that resource managers were aware of the

Web Portal or had accessed the scientific research presented at the annual symposia. There was little research on development of safe harvesting and post-harvesting strategies (conducted only in Dominica) and testing of lionfish for the occurrence of ciguatera (conducted only in Trinidad and Tobago). Of all CRFM Member States most extensive lionfish research was conducted in the Bahamas. Generally, research focused mainly on the economic and ecological impacts of the lionfish invasion, predation on lionfish, lionfish abundance and density, foraging behaviour, prey consumption as well as competition, habitat preferences and control strategies.



The invasive Lionfish – now at home on our Caribbean Coral Reefs.

The study recommended that cost-effective solutions for implementation of regular lionfish monitoring programmes be identified and the requisite training, data collection protocols and equipment be provided for effective monitoring. Additionally, academic and research institutions should ensure that the best scientific information is made available to resource managers to inform management decision-making on reef and slope fisheries and related ecosystems – and the control and management of lionfish should be treated holistically using an EAF approach. Countries should also take advantage of the opportunities presented through the Caribbean Fisheries Forum and the restructured CRFM Reef and Slope Fisheries Working Group to conduct the necessary lionfish research and to coordinate management/control measures regionally. They should also participate in other existing regional fora to share information and best practices in lionfish control and management.

Both evaluations of the status of implementation of the ECFF-FMP and Regional Lionfish Strategy demonstrated unequivocally that the success of regionally agreed instruments for the sustainable use, management and conservation of shared fisheries resources is inextricably linked to, and dependent on, demonstrated commitment at the national level, through concrete actions taken on the ground.

CRFM Welcomes Returning Scholars

By Pamela Gibson, Administrative Secretary, CRFM Secretariat

The CRFM continued to pursue implementation of its strategic objective, *Capacity Building and Institutional Strengthening*, through the provision of various training opportunities, facilitated under cooperative arrangements with international educational institutions. The Secretariat is pleased to welcome back Fisheries Officers Mr Derrick Theophille (Dominica) and Mr Larique Hackshaw (Antigua and Barbuda) from the six-month (September 2015 – March 2016) fellowship training programme at the United Nations University-Fisheries Training Programme (UNU-FTP) in Iceland. Mr Theophille pursued courses in Marine and Inland Waters Resources, Assessment and Monitoring (Stock Assessment), while Mr Hackshaw focused on Management of Fishing Companies and Marketing. Contact was maintained with the Fellows during the programme and positive programme reviews received. Mr Theophille has contributed an article to this edition of the newsletter based on his area of specialization.



Derrick Theophille delivers the final presentation of his paper in the presence of his peers, UNU-FTP staff and his supervisors.

In April 2016, 18 senior officials from 12 CARIFORUM States (CARICOM States plus the Dominican Republic), including the CRFM Secretariat's Deputy Executive Director, Dr Susan Singh-Renton, participated in a two-week Fisheries SPS Management Course, held at the UNU-FTP in Reykjavik, Iceland. The course was sponsored under the fisheries component of a programme on Sanitary and Phyto-sanitary Measures (SPS), approved under the 10th European Development Fund Caribbean Regional Indicative Programmes (10th EDF CRIP) and titled "Support to the Forum of Caribbean States in the implementation of the commitments undertaken under the Economic Partnership Agreement (EPA)". The course focused on key aspects of SPS measures, in particular how implementation could be

achieved through development of SPS guidelines, and how proper management of marine resources, pre- and post-harvest, could maximize economic and social benefits. The course also highlighted the development potential of fisheries through company visits and presentations on how the Icelandic fisheries have developed. Dr Singh-Renton has contributed an article to this edition of the newsletter based on her experiences at the course.



Trainees inspect various products from fish for the fashion, cosmetic and pharmaceutical industries.

Dr Kevin Walker (Jamaica) and Ms Alisa Martin (St Vincent and the Grenadines) also benefitted from training under the SPS programme, when they participated in a training course on Antimicrobial Use and Antimicrobial Resistance in Agriculture, at Ohio State University, Columbus, Ohio, from 07 to 18 December 2015.

The CRFM Secretariat also extends sincere congratulations to Mr Ricardo Morris (Jamaica) on the successful completion, in June 2016, of a Masters degree in Biology at the University of Iceland.



Mr Morris has contributed an article to this edition of the newsletter, which is based on his thesis titled: *Distribution of Queen conch (Strombus gigas) on the Pedro Bank, Jamaica: Descriptive and Predictive Distribution Models*.

The Secretariat takes this opportunity to acknowledge the efforts of all the officers and to wish them all the very best in the future.

Upcoming Events - July to November 2016

No.	Event	Date	Location
1.	CRFM/CARIFICO Meeting	6 July	Belize
2.	Workshop to review the draft CLME+ Communication Strategy	5-7 July	Miami, Florida
3.	FAO Committee on Fisheries (COFI) + RSN-6	9-15 July	Rome, Italy
4.	Training Workshop on Value Chain Approach in Fisheries	17-22 July	Suriname
5.	Caribbean Wildlife Law Enforcement (terrestrial & marine) Workshop	20-22 July	The Bahamas
6.	Workshop on Implementation of General Assembly Resolutions addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks	1-2 August	New York
7.	Special CNFO Workshop	25-26 August	Trinidad & Tobago
8.	2 nd Meeting of the Preparatory Committee for the Development of an International legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction	29 August – 12 September	New York
9.	CLME+ Project Executive Group Meeting CLME+ SAP Interim Coordinating Committee	6-7 September 8-9 September	Miami, USA
10.	Training (Fellowship) for Fisheries Personnel at the Australian National Centre for Ocean Resources and Security (ANCORS), University of Wollongong	17 September – 16 October	Australia
11.	CITES COP 17	24 September – 05 October	Johannesburg, South Africa
12.	Sustainable Ocean Initiative Global Dialogue with Regional Seas Organizations and Regional Fisheries Bodies on Accelerating Progress towards the Aichi Biodiversity Targets	26-29 September	South Korea
13.	ICCAT SCRS Species groups meetings	26-30 September	Madrid, Spain
14.	United Nations University – Fisheries Training Programme – 6-month fellowship	September 2016 – March 2017	Iceland
15.	Meeting of ICCAT Standing Committee on Research and Statistics	3-7 October	Madrid, Spain
16.	Caribbean Week of Agriculture	October	Cayman Island
17.	Special Meeting of the CRFM Ministerial Council	October	Cayman Island
18.	69 th Meeting of Gulf and Caribbean Fisheries Institute (GCFI)	7-11 November	Cayman Island
19.	Informal Consultations on the Sustainable Fisheries Resolution during the 71 st UNGA	7-15 November	New York, USA
20.	20 th Special Meeting of ICCAT Commission	14-21 November	Vilamoura, Portugal

EDITOR'S NOTE

This issue of the Newsletter provides information on the scientific, research and related activities of the CRFM conducted between September 2015 and June 2016. It includes articles of three returning scholars on modelling the distribution of Queen Conch of Pedro Bank, Jamaica; a primary analysis of fisheries data from the Commonwealth of Dominica; and a reflection on the business and management successes of Icelandic fisheries, facilitated through their sponsorship under CRFM's formal arrangements with international universities. Initiatives towards improved fisheries data collection, management and reporting in support of fisheries management in Saint Lucia and at the regional level are also documented. Trinidad and Tobago and Belize have also shared their experiences, lessons learnt and challenges concerning statistical data reporting obligations as Contracting Parties to the ICCAT. Progress in implementation of the Sub-regional Flyingfish Management Plan and Regional Lionfish Strategy is also documented.

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