CARICOM Fishery Research Document No. 11

Report of the Subproject Specification Workshops for

1.1.2 Data and Information Systems

and

1.1.4 Licensing and Registration Systems

ABSTRACT

This report documents the activities and results of the Subproject Specification Workshops. However, as the main goal of this pair of workshops was to specify the course and outcome of each subproject over the next three years, it was necessary to obtain additional input from some countries, subsequent to the workshops. Thus, this final report of the workshops reflects the conclusions of the workshops as well as subsequent discussions and planning conducted with each country's Fisheries staff.

CARICOM Fisheries Management Unit, Belize City, Belize
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PREFACE

During June 17-27, 1992 the Subproject Specification Workshops for these two activities were held at the Cave Hill, Barbados campus of the University of the West Indies (Program attached as Appendix 1). Participants in the workshop, listed in Appendix 2, took part in one or more of the three sessions. Participants were welcomed to Barbados and the workshop by Mr. Patrick McConney, Chief Fisheries Officer, on behalf of the Permanent Secretary. Jamaica was not represented at this workshop due to the delay in their signing of the Contribution Commitment Agreement.

This report documents the activities and results of the workshops. However, as the main goal of this pair of workshops was to specify the course and outcome of each subproject over the next three years, it was necessary to obtain additional input from some countries, subsequent to the workshops. Thus, this final report of the workshops reflects the conclusions of the workshops as well as subsequent discussions and planning conducted with each country's Fisheries staff.

DATA COLLECTION AND INFORMATION SYSTEMS WORKSHOP

Introduction

Monitoring catch, effort, and investments of capital and personnel, is fundamental to evaluating the performance of a fishery. This information allows the fishery manager to monitor changes in fishing activity and to evaluate changes in the biological and economic status of the resource. Even if the conventional fishery models utilizing catch and effort data cannot be applied, monitoring of trends in these variables can, in a relatively short time, provide important information on the response of the fishery to management measures. Coupled with information on fish prices and operating costs, these data allow analysis of the economic efficiency of fishing vessels and of the industry in relation to the economy as a whole.

Administration costs severely limit management systems in CARICOM Member States. Therefore, data collection systems to be sustained after the Program must be as simple and inexpensive as possible. To this end, the tools and principles described in Mahon and Rosenberg (1988) which were used in 1987 at the "OECS/ICOD Workshop on Fishery Data Collection Systems for Eastern Caribbean Islands" were reviewed and adopted for use in this workshop. This approach seeks to utilise all possible sources of data, including data already being collected for other purposes, and to spread the responsibility of data collection through the industry wherever possible.

During the Subproject Initiation Mission it was recognised that not all countries were at the same point in development of Fisheries Data Collection systems. In particular, the

participants in the 1987 OECS/ICOD Workshop had already designed data collection systems that were appropriate for their individual cases (Mahon and Rosenberg, 1988). The countries that had not participated in that workshop were more variable with respect to data collection systems, and in general, did not have a systematic overview of their data collection needs. As a result, the Data Collection and Information Systems workshop was conducted in two parts. During the first part, the countries which had not participated in the 1987 workshop spent 3½ days to learn and evaluate the data collection principles and apply the process used in the 1987 workshop. The second part of the workshop involved all 12 participating countries for three days. There was a review of all the data collection system designs and any progress made in implementation of them. Then, a preliminary implementation plan and schedule for the next three years was established for each country in the form of a 'to do' list. This included plans for the utilisation of the resources contributed through CFRAMP.

During the implementation phase the Data Managers at the CFMU will play leading roles in providing ongoing assistance to individual countries. At the end of a full year of data collection, there will be an in-country review of the systems to evaluate the quality of the data that are contained in the system and the resulting outputs. This review will involve extensive exploratory data analysis and report evaluation.

The OECS Fishery Report No. 2, entitled Fishery Data Collection Systems For Eastern Caribbean Islands, was used extensively throughout the workshop. The background papers describing fisheries data collection in general and the approach to designing data collection systems were used extensively during the first session. The country-specific reports formed the basis of planning for the relevent countries in the second session.

I. Data Collection Systems for Belize, Guyana, and Trinidad and Tobago.

The first part of this workshop was focused on countries which had not participated in the 1987 workshop. The goals were to provide background and training in fisheries data collection systems and to design or review fisheries data collection systems for Belize, Guyana, and Trinidad and Tobago. Although the focus was on these three countries, personnel from a number of the other countries attended to benefit from the training being presented.

Computer Literacy

Training sessions in DOS, WordPerfect and Lotus were conducted using the computer network facility where each participant worked on their own microcomputer, following step by step instructions. One session was used to introduce DOS. It covered the basics of file management such as naming, copying, finding, and erasing, as well as diskette formatting and creating and naming directories and subdirectories. Another session introduced WordPerfect 5.1, where participants learned how to access WordPerfect, create, edit and print documents, page and line formatting, e.g. indents, tabs and line spacing, and the session concluded with some advice on document management. Two interactive Lotus training sessions were held for those with little or no experience in Lotus. The first session covered getting into Lotus 123, a description of the different parts of the screen, entry of "values" and "labels" and how they differ, and some simple functions. Copying and moving cell values and formulas were demonstrated. @SUM, @NOW and some other basic functions were used. Formatting of cell values with particular emphasis on date and fixed decimal formats was introduced. The participants also learned how to save and retrieve files and how to access on-line help. The second session developed further the use of functions and formulas. The difference between relative and absolute addressing was demonstrated. Cell formatting and the help facility were reviewed. A full explanation of how to generate graphs was given including most of the items in the graph menu. The difference between "naming" a graph and "saving" a graph was discussed.

Statistical Sampling

A brief introduction to statistical sampling concepts and theory was given. The session did not attempt to go into formulae or procedures. The intent was to emphasize the need for properly designed sampling plans and the effects of poor design on the quality of the estimates obtained. The properties of statistically sampled estimates were compared to census estimates and non-statistically sampled estimates. The sources of bias in each type of estimate were identified. The use of randomization to remove bias was discussed.

An exercise in statistical sampling was conducted to estimate the total biomass of the workshop participants. Three methods of obtaining estimates were used. Simple random sampling and stratified random sampling were compared to the census results. The savings from sampling, due to reduced data collection effort, were discussed as well as the means of best allocating sampling effort. Cluster sampling was described, although no exercise was conducted. The appropriateness of cluster sampling for allocating sampling by landing sites was stressed.

Rosenberg's paper "Introductory Sampling Notes" in the OECS Fisheries Report No.2 was used as a source document.

Elements of Fisheries Data Collection

The essential elements of data collections systems, such as frame surveys and product pathways, were described and appropriate data collection instruments for various circumstances identified. While the primary data needed was agreed to be catch, effort and price, the need for and means of detailed biological sampling were also discussed. The discussions drew heavily on the material in "Developing Fishery Data Collection Systems For Eastern Caribbean Islands" by Mahon and Stamatopoulos and on "Units of Fishing Effort in Eastern Caribbean Fisheries" by Mahon (both papers in OECS Fishery Report No. 2). The approaches discussed were applied in the design of a data collection system for the fictitious island of St. Lessant (OECS Report No. 2).

A Data Collection System Design Exercise: The St. Lessant Fishery

The Example

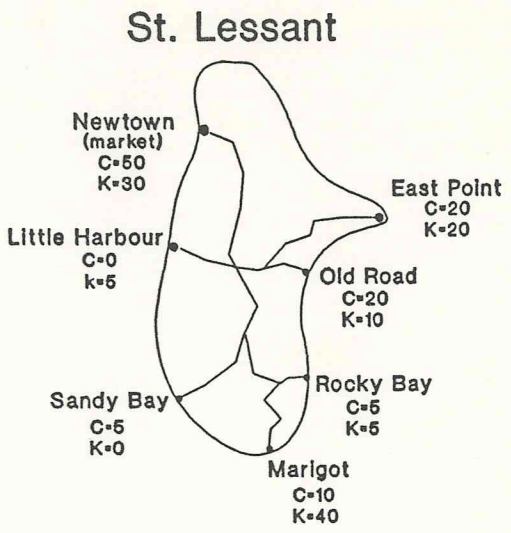
At the 1987 OECS/ICOD workshop (OECS Fishery Report No. 2), a fictitious sample fishery was used to present a systematic approach to designing a data collection system (R. Mahon & C. Stamatopoulos, "Developing Fishery Data Collection Systems for Eastern Caribbean States" in OECS Fishery Report No. 2). The workshop reviewed this methodology and the example fishery. However instead of presenting the sampling plan in the example, the workshop participants divided into working groups to attempt to develop a plan.

Path diagrams and some of the frame survey information for this fishery are given in Mahon and Stamatopoulos. To give the problem a little more authenticity we provided a map of St. Lessant, shown below.
The map shows the 7 landing sites along with the number of vessels of each type at each site. St. Lessant's fishermen are split between two fisheries - one directed at conch and lobster and one for demersal species. Path diagrams were provided for both. The workshop divided into three groups. Each group was asked to decide what data collection tools should be used and to design a sampling program. Participants were told to note any required information that was not provided and to make reasonable assumptions about such items.

Group 1.

The first group assumed that there was a tariff charged for landings at the market that was based on weight. Thus records would have to be kept that would indicate total landings at this site. They also assumed that the conch fishery was concentrated in the northern area.

This group decided to use purchase slips to determine sales to restaurants and hotels and sampling to estimate other landings. They also chose to concentrate sampling at the 4 larger landing sites. These are dispersed around the island and account for 80 of the 110 keel boats and 50 of the 110 canoes. They planned to use one sampler working 5.5 days per week. 4 days each week would be spent collecting and entering data from the four sampled landing sites. The sites to be sampled would be assigned at random. The other 1.5 days per week would be used to collect and enter data from purchase slips. Sampling was required at the Newtown market in order to obtain effort information. The market's own data would be used to check on the total catch estimate.



K = number of keel boats
C = number of canoes

Group 2.

The second group also assumed that the single data collector was mobile and could handle data input. Almost all fish landed at the market was sold to the market. Thus the market should have records for most of the landings in Newtown. The lobster and conch was sold to hotels or exported. The high seasons for the lobster/conch and demersal were at different times of the year.

The group decided to assign 70 of the data collector's 100 sampling days to sampling the landing sites. This would be the primary source of data for the demersal fishery. The market would not be sampled but data would be taken from market purchase slips. Sampling would be concentrated during the high season. Effort data for the conch/lobster fishery would be collected at landing sites when possible.

For the conch/lobster fishery, the catch data would be obtained from purchase slips from hotels and restaurants and from export data. 30 days per year would be set aside for collecting this data.

Group 3.

Group 3 assumed that each keel boat had twice the catching capacity of a canoe. They used this to determine a "canoe equivalent" level for each landing site. This in turn was used to put landing sites into primary, secondary and tertiary categories:

Primary	Secondary	Tertiary
Newtown	East Point	Sandy Bay
Marigot	Old Road	Rocky Bay
		Little Harbour

They also assumed that the data collector would have to handle processing and that the catch was higher in the first half of the year. Thus they assigned 50 days of data collecting between January and June and 25 days between July and December. The other 25 days would be used for data processing.

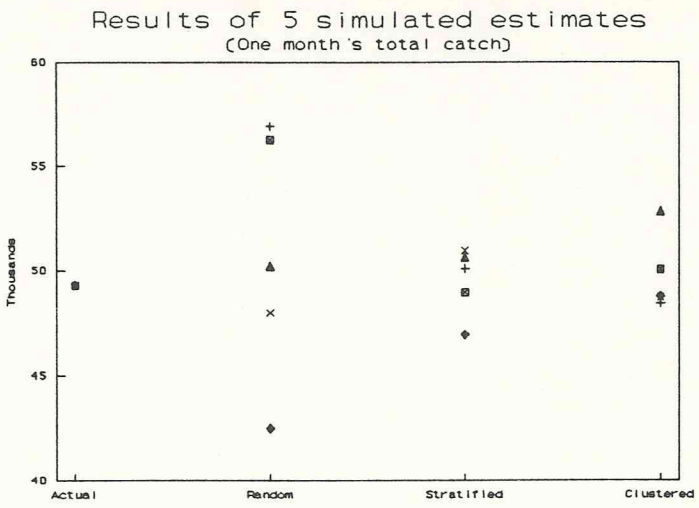
This group assigned sampling days to sites based on the "canoe equivalent" values of each site. They assumed that the samplers would be able to census the data on sampling days. They also were going to use purchase slips from hotels and restaurants and export warrants. This group had developed their own alternative path diagrams.

Sampling Example

The St. Lessant fishery was also used to provide an example of how different sampling schemes can affect catch estimates. Data was generated for 1 species for 30 days. It was assumed that, on average, the keel boats would catch twice as much fish as the canoes. Catches for the 110 keel boats were generated by selecting random numbers distributed uniformly between 0 and 20 (pounds). Catches for the 110 canoes were generated by selecting random numbers distributed uniformly between 0 and 10. Hence the daily catch should average about 1650 pounds.

These catches were then "sampled" using three schemes. In the first scheme a random sample of 10 boats were selected each day and their catch was "bumped up" to estimate total catch by multiplying by 22 (=220/10). In the second scheme 5 boats of each type were selected each day providing a stratified sample. The total catch of each vessel type was then estimated based again on average catch per vessel and then these values were summed. In the third scheme, the landing sites were used as clusters. Since in the other two schemes we assumed any 10 boats could be sampled regardless of landing site, we should be able to (on average) obtain a larger sample if we concentrate on a small number of sites on any single day. We made the assumption that we could handle 2 sites on any day and could sample up to 10 boats at a landing site if that many were available.

In all cases we assumed that we got an accurate weight of the fish landed from sampled boats. For the cluster scheme, 2 sites were chosen at random. If there were no more than 10 boats at a site, all were sampled; otherwise 10 boats were selected at random from those landing at the site. Each sampling scheme was run five times. The next figure shows the estimated monthly catch for each set of samples along with the "actual" catch. The effectiveness of the stratified scheme is evident. However this method would be impossible to use in practice as it would be impossible to get to vessels randomly selected from any landing site. The clustered samples are not as random. However the loss of randomness is made up for by the higher level of sampling made possible by concentrating on few sites. The values shown in the figure are listed in the following table:

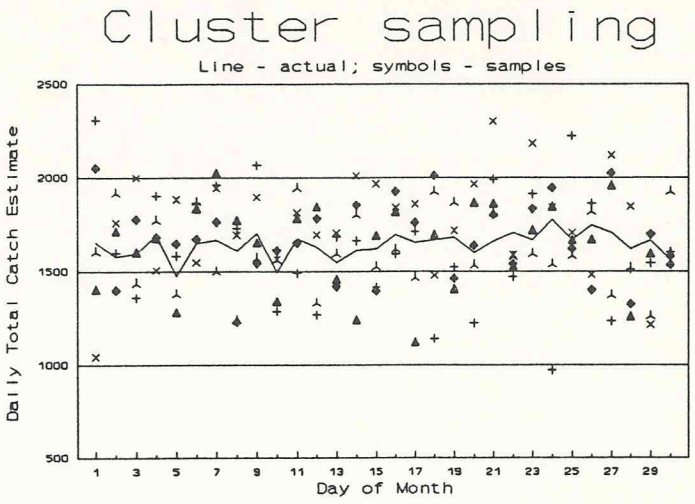


St. Lessant Results: Total monthly catch

Scheme	Actual	Random	Stratified	Clustered
Sample 1	49298	56277	48978	50042
Sample 2	49298	42501	46961	48785
Sample 3	49298	50167	50576	52766
Sample 4	49298	48005	50959	48735
Sample 5	49298	56927	50093	48450
Average		50776	49513	49756
Stand. dev.		5378	1439	1602
Variance		28924135	2070983	2566720

This figure shows the estimated daily catches that made up the monthly total for the clustered scheme. Even though the monthly total estimates are close to the "actual" total and the variance of these estimates is reasonable, estimates of the total catch on a single day can still vary widely from the daily "actual" catches. In general, a good sampling scheme can produce reasonable estimates of aggregate catches. However the accuracy of detailed estimates will still depend on sample size. With small samples, daily catch estimates will

still contain a high level of inherent variation.



Country Reports

The participants from Belize and Guyana each presented detailed descriptions of the fisheries and the present data collection systems in those countries (Appendix 3 and 4, respectively). After discussion and review, the participants were divided into working groups to prepare draft data collection systems for those two countries.

Trinidad and Tobago, while not having participated fully in the 1987 workshop, has had an extensive data collection and management system designed and partially implemented through an FAO-sponsored project. The fishery and the data collection system were presented to the workshop (Appendix 5) and discussion concentrated on CFRAMP's role in assisting with implementation of data collection systems.

Participants from St. Vincent and the Grenadines and St. Lucia presented updates on the data collection systems in place in those two countries (Appendix 6 and 7, respectively). In each case there have been significant changes from the data collection systems designed in the 1987 workshop.

II. Specifications For CFRAMP Data Collection and Information Systems Subproject

The second session began after the arrival of the balance of the participants from the OECS countries and Barbados and started with a rapid review of the present state of data collection systems or plans in each of the countries. The main purpose of this session was to define the specific activities that would be pursued under this subproject. These activities, and the associated plans, fall into two types. Country-specific plans will be implemented primarily at the individual national level, utilizing both local and CFRAMP resources. Program-level plans are those that are program-wide in scope, either to meet a common need at the national level or to address a regional need. Implementation of program-level plans is dependent primarily on CFRAMP resources. In addition, although the country-specific plans

are at the national level, a program-level CFRAMP Staff Implementation Plan is needed to coordinate the activities of program staff.

The resources available from CFRAMP to contribute to the data collection systems were identified. The most important area was seen as personnel, either by providing additional personnel or upgrading the training of existing staff. Personnel needed to support the data collection subproject was seen as being in three different capacities, data collectors, data entry operators and data collection supervisors. The data collector would be primarily concerned with the actual recording of data at landing sites and markets. Some data collectors may be involved in data entry although required computer skills would be minimal. A data entry operator generally would not be involved in the actual acquisition of data but would be responsible for entering and checking data submitted by data collectors. A data collection supervisor is a less well defined role but essentially would be responsible for the overall process of data collection and data management. This could require that such a person collect data, enter data, supervise data collectors or data entry operators, manage the computer, maintain data quality control, manage the allocation of sampling, or any number of other relevant tasks. Other areas that CFRAMP resources could be used for were to provide mobility, e.g. scooters, for data collectors, communications and supplies.

Development of implementation plans for this subproject was begun during the Subproject Specification Workshop and were recorded in the form of a 'To Do' list intended to describe the present state of data collection activity in each country and the planned course of CFRAMP's activity in that area. Due to time constraints and the need for additional information, the plans were not developed to a final form during the workshop.

During two missions (14-31 October, 1992 and 3-16 January, 1993) the CFRAMP Data Managers met with the Fisheries staff in each country and finalized the country-specific implementation plans that follow. These plans are intended to concentrate on the setting up or augmenting of field data collection systems. Detailed plans for data management, reporting and analysis will be developed during subsequent missions as the data collection systems come on stream.

There are three distinct areas of responsibility utilized in these implementation plans. Data Collectors (DC) operate at landing sites or market facilities. They are responsible for the initial acquisition of data by observing landings and recording weights landed, species composition, effort measures and other specified information. Data Entry Operators (DEO) are primarily responsible for entering data into the computerized database. In the course of this they will also monitor data sheets for completeness and consistency. The Data Collection Supervisor (DCS) is responsible for the overall completeness and quality of the information in the database. This is achieved through training and monitoring both the DC and DEO as well as reporting and analysis of the database. While these three areas of responsibility are used in the plans they are not necessarily complete job descriptions as the staff may have other responsibilities as well. Particularly in small Fisheries Divisions, a single individual may have two or even all three areas of responsibility. It is expected that

DCS will usually be assigned to an experienced member of the Fisheries staff. To assist implementation of new data collection activities a set of sample data collection forms was developed (Appendix 8). These include Fisheries Landings Statistics (Table A8.1), Fisheries Data Collector Daily Summary (Table A8.2) and Fisheries Length Frequency Sheet (Table A8.3).

Country-Specific Implementation Plans

1. ANTIGUA

The objective of this plan is to provide data and scientific analyses necessary to assist Resource Managers in making informed resource management decisions. The specific objectives of the plan are to augment and support the current catch and effort data collection by sample-based estimation for all species landed, and to enhance data storage and management using a computerized system.

The current data collection system represents, a partial implementation of the system designed at the 1987 OECS Data Collection Workshop. The present staff consists of eight part-time data collectors, seven in Antigua and one in Barbuda. It is believed that the current system may not be generating accurate statistics and is in need of overhaul.

There are two major landing sites with market facilities, three processing plants and eighteen other sites (Table 1.1). Data are collected at eight sites, seven by sampling and a census at Mill Reef by an existing staff of eight part-time data collectors. Logbooks are being introduced at Catamaran Club for sport fishing vessels.

Method

Two full-time data collectors will be used to augment the existing staff of eight part-time data collectors. The Division plans to reduced its existing complement to two full-time and two part-time data collectors within one year of the implementation of this plan. This would be economically viable for the Government to maintain the data collection program on expiration of CFRAMP funding.

The landing sites have been grouped into six geographical areas (Table 1.1). The three sites in the St. John's group are the primary landing sites, while the other four groups are less significant. Sport fishing vessels and processing plants are treated as autonomous data collection units.

Vessel Landing Sites

The two full time data collectors will census catch and effort at one landing site in St. John's and one elsewhere daily. The sites to be censused on a particular day will be determined by the Data Collection Supervisor. This Supervisor will be responsible for training data collectors and ensuring that accurate and reliable catch and effort data is collected, using the revised data collection form and summary sheet (Table A8.1 & A8.2).

One part-time data collector will continue to sample Codrington (in Barbuda) and the other to census landings at Mill Reef Club.

Sport Fishing Vessels

A logbook system will be implemented to capture catch and effort data from sport fishing vessels. Discussions have been held with the Sport Fishermen's Association, the logbook designed, printed and awaiting distribution by the Association. The Division has agreed that the data can be submitted anonomously.

Processing Plants

The Division will investigate the possibility of conducting a census of catch and effort data at three processing plants in the country. This may require support in terms of designing an appropriate data collection receipt to be used in transactions between plant personnel and fishermen.

Data Management and Reporting

The Trip Interview Program (TIP) will be reviewed by Fisheries Division staff for managing the data to be collected. Database training will be required for the Data Entry Operator and the Data Collectors, some advanced database training will be appropriate for the Data Collection Supervisor and Chief Fisheries Officer. The Division will investigate the possibility of the National Computer Agency conducting these training activities, failing which CFRAMP will fund training at an acceptable private institution.

Activities

1. Begin computer training of relevant Division Staff.

2. Promote and train 2 Fisheries Cadets (non-establishment) to full-time data collectors. CFRAMP will fund the difference in salaries for up to three years during which time the Fisheries Division will seek to have the positions established. Upgrade the salary and training of the existing cashier to be the data entry operator.

3. CFRAMP will fund a Data Collectors travel allowance for use of private vehicles to sample sites outside St. Johns, and the Data Collection Supervisor will require transport to visit Barbuda approximately monthly.

4. Design sampling plans for the full time data collectors. This will be the responsibility of the Data Collection Supervisor with assistance from CFRAMP staff.

5. Implement data collection plan using changed forms.

6. Implement logbook system for sport fishing vessels.

7. Investigate the means of conducting a census at processing plants.

8. Expand data collection activities in Barbuda by increasing direct sampling of landings. This will require more hours per week than the current Data Collector works.

9. Monitor all Data Collectors and Data Entry Operators for accuracy and diligence. Institute data quality control procedures.

10. CFRAMP will assist staff in generating reports from the Data Collection System.

Requirements

	Year 1	**Year 2**	**Year 3**
Human Resources			
Data Collectors	$14,000.	$14,000.	$14,000.
Part-Time D. Collector (Barbuda)	6,000.	6,000.	6,000.
Data Entry Operator (Salary upgrade)	2,600.	2,600.	2,600.
Transportation			
Travel allowance (DC)	6,600.	6,600.	6,600.
Travel allowance (DCS)	2,400.	2,400.	2,400.

Office Supplies

Diskettes			
ID badges	200.		
Total (EC$)	**$28,800.**	**$28,600.**	**$28,600.**
Total (US$)	**$16,200.**	**$16,100.**	**$16,100.**

Schedule

Begin computer training	February '93
Recruit new Data Collectors	March '93
Train Data collectors	March '93
Design sampling plans	February '93
Implementation of collection plan	April '93
Implement logbook system	April '93
Investigate processing plants d.c.	September '93
Revise Barbuda d. c. activities	April '93
Institute quality control procedures	July '93
Report generation from D.C.System	September '93

Table 1.1. Inventory of fishing vessel types by landing sites in Antigua.

Landing Site	Vessel Type	Area	Sloop	Launch	Open Outbd	Open Cabin	Sport Fisher	Total Boats	Total Fishers
St. John's -3 sites		1	32	18	35	27	5	117	304
Cedar Grove		2			4			4	7
Beachcomber Hotel		2		1	5	1	5	12	19
Shell Beach		2			4	1		5	9
Fitches Creek		2			3			3	5
Parham		3	1	1	14	2	2	20	25
Seatons		3			9	1	1	11	21
Willikies		3		1	7	2		10	22
Mill Reef		4			8	2	1	11	19
Willoughby Bay		5			6			6	11
St. James Club		5		2	6	1	1	10	17
Falmouth Harbour		5	1		6	4	13	24	44
Urlings		6	2	1	7	4		14	41
Crab Hill		6			3			3	8
Valley Church Bay		6			5			5	12
Jolly Harbour		6			4			4	14

2. BARBADOS

Fish catches are landed at three fisheries complexes and various beaches, primarily on the west and south coasts of Barbados. This plan augments current catch and effort data collection by census or sample-based estimation for all species landed, and enhances storage and manipulation of this data using a computerized system. The plan will require additional personnel, training for existing and new staff, and additional physical resources. CFRAMP will be able to supply these needs for at least two years.

Fish landing sites have been divided into three categories, depending on the facilities available, however these categories may not reflect the numbers of boats that use a landing site (Table 2.1).

Primary landing sites	Markets controlled by the Department of Markets and characterised by buildings, market clerks, and other facilities.
Secondary Landing Sites	Facilities under the control of the Fisheries Division with sheds housing concrete slabs for cutting fish and a caretaker/data collector.
Tertiary Landing Sites	Various beaches and bays having minimal or no facilities and no personnel to monitor landings of fish.

Method

Landings at Primary Sites

Currently, a census is conducted at all Primary sites using market toll receipts. Catch weight is recorded by species group for each vessel landing. Wholesale and retail prices by species group, and quantities and prices for fuel and ice purchased by vessels are also recorded. These data are collected by market clerks employed by the Department of Markets and daily summaries of catch and fish prices are forwarded to the Fisheries Division.

Under this plan the Fisheries Division will obtain the actual landing records of each vessel. The design of the data form will be changed (Table 2.2) to allow more detailed effort information to be captured. Additionally, a random sampling program will be implemented by the Fisheries Division to capture the species composition of the species groups reported by the Department of Markets (see below).

Coordination between the Fisheries Division and the Department of Markets, through the Permanent Secretary, will be required for changes to the data forms and training of Market Clerks in data collection.

Table 2.2. Sample of new data form for Barbados Fish Markets.

Fish Market Tolls

Bridgetown Fisheries Complex ☐ Speightstown Fish Market ☐ Oistins Fish Market ☐

Registration No.	Boat Name	Class

Date	Days Fished	Area Fished	Gear(s) Used

Species	Number of fish	Weight KG	Unit Charge c/KG	Toll
Flying Fish				
Dolphin				
Wahoo				
King Mackeral				
Sharks				
Albacore (Yel. Fin)				
Other Tuna				
Sailfish				
Swordfish				
Marlin Wh / Bl				
Brim -Queen Snap				
Other snapper				
Jacks				
Cavally				
Bonito				
Inshore Pot Fish				
TOTALS				

RECEIVED from _____ the sum of

_____ dollars

and _____ cents being toll paid on

_____ kgs. of fish as allocated above.

_____

Senior Superintendant of Markets

Landings at Secondary Sites

Presently, a summary of daily catch weight by species group is compiled at secondary sites by Caretaker/Data Collectors employed by the Fisheries Division. As the existing system does not record the individual vessel landings, new data collection forms will be introduced to capture catch and effort information by vessel instead of the summaries currently recorded.

For data collection purposes, two tertiary sites, Six Men's Bay (19 day boats) and Shallow Draught (17 day boats and 1 ice boat), will be treated as secondary sites through the provision by CFRAMP of Caretaker/Data Collectors at these locations. The Fisheries Division will recruit the two Caretaker/Data Collectors above, as well as a new Caretaker/Data Collector for the secondary site at Read's Bay, which is presently without one. All sites with 10 or more day boats will then be covered by a census of individual landings.

The change in data collection at the secondary sites will impose a greater degree of responsibility on the present Caretaker/Data Collectors. Many of them have been accustomed to a very casual approach, which is not consistent with obtaining accurate and detailed data. To minimize conflict with the existing Caretaker/Data Collectors and to increase the accuracy of information from secondary sites, CFRAMP will fund a responsibility allowance of Bd$30 per month to be paid to all Caretakers/Data Collectors.

Catch Sampling Program

A sampling program will be established to collect the species composition of the data from the primary and secondary sites, where data are collected in species groups; and the catch and effort at the tertiary landing sites.

No statistics are collected at tertiary sites currently. This plan will institute the random sampling program of tertiary sites. The data collector will record catch and effort of individual vessels by species where possible, or species group if necessary. The sampling program will require visits to landing sites all around Barbados and hence, a small motorcycle and associated safety equipment will be purchased by the Fisheries Division with funds provided by CFRAMP.

Primary and secondary sites will also be included in the random sampling program. The Data Collector will randomly sample landings at these sites to obtain species composition for the species groups being reported by the Market Clerks or Caretaker/Data Collector at the site.

Data Collection Supervisor

A data collection supervisor will be identified to assume responsibility for ensuring the accuracy of the information being collected. This will include supervising and training data collectors, supervising the data entry operator, and managing the random sampling program. Because of the importance of the Data Collection Supervisor in implementing this plan, an experienced official to assume this supervisory position is necessary. To achieve this, CFRAMP will provide funding for the addition of one full-time employee to Fisheries Division. This new individual will spend part of their time on data collection duties on the catch sampling program and part to backfill for the duties of the existing staff member assigned as data collection supervisor.

Data Management and Reporting

Emphasis in the first phase of this plan is focused on data collection from individual vessels and compilation. The program TIP (Trip Interview Program) is being considered for data management and will be reviewed using existing data from the census and sampling programs. A Data Entry Operator will be hired by the Fisheries Division with funds provided by CFRAMP and trained in the use of the program.

Activities

1. Institute the change of the existing market data collection forms. The new forms should be bound in books, in triplicate, with all copies pre-numbered. The Market Clerks will still give the top copy to the fishermen, the second copy will be submitted to the Fisheries Division and the third copy will be retained, in the book, by the Market.

2. Hire a Data Collector and two Caretaker/Data Collectors to participate in the sampling and census programs. Implement a training program for all Data Collectors and Market Clerks to ensure accuracy and timeliness of the information.

3. Design and establish a random sampling program for the tertiary sites which takes into account the seasonal and daily variations in the fisheries.

4. Implement databases and reporting systems, including training users. This would involve an analysis of existing systems.

5. Hire and train a Data Entry Operator.

6. Determine the feasibility of using purchase slips to census direct purchases by hotels, restaurants, supermarkets etc. This is intended to provide data on catch that goes

directly to these units bypassing the other capture points and it is important that fish not be double-counted.

Requirements

Personnel

	Education	Year 1	Year 2
Data Collector (1)	CXC General A'level (Sci)	20,000.	20,000
Data Entry Clerk (1)	CXC General	15,000.	15,000
Caretakers (2)	local knowledge	3,500	3,500
Responsibility Allowance		3,300	3,300
National Insurance Scheme (9.75%)		4,100	4,100

Transportation

1 small motorcycle or Travelling allowance for personal vehicle	4,400.	

Field Supplies

Scales Species identification kit	1,000.	
Overall Cost (BDOS)	**$51,300.**	**$45,900.**
Overall Cost (US)	**$25,650.**	**$22.950.**

Schedule

Design sampling program	October '92
Design data forms	October '92

Hire Personnel

Data Entry Operator	January - March '93.
Data Collector	November '92
Data Caretakers	November '92

Training

Data Entry & Management	March '93.
Data Analysis	April - August '93.
Reporting	July - August '93.
Data Collection	November - December '92

Purchase of equipment & supplies — October - November '92

Table 2.1. Inventory of fishing vessel types by landing sites in Barbados

Landing Site	Site Type	Class I Moses	Class II Day Boats	Class III Ice Boats
Tent Bay	S	1	18	-
Martin's Bay	T	7	1	-
Bath Beach	T	2	-	-
Conset Bay	S	4	28	-
Skeete's Bay	S	3	13	-
Long Bay	T	1	1	-
Foul Bay	T	6	4	-
Crane Beach	T	0	2	-
Silver Sands	T	8	1	-
Oistins F. C.	M	4	71	19
Dover Beach	T	3	1	-
St. Lawrence Beach	T	12	5	-
Burke Beach	T	15	4	-
Bridgetown F.C.	M	23	101	55
Shallow Draught	T	32	17	1
Pile Bay	S	7	11	-

Landing Site	Site	Class I	Class II	Class III
Prospect	T	4	-	-
Fits Village	T	10	5	-
Paynes Bay or	S	21	8	-
Brooklyn Beach	T	6	-	-
Holetown or	T	18	2	-
Porter's Beach	S	11	10	-
Mt. Standfast	T	7	-	-
Read's Bay	T	7	-	-
Lower Carlton Beach	M	19	10	-
Road View Beach	T	13	19	-
Speight's Town	S	14	16	-
Six Men's Bay	T	7	-	-
Half Moon Fort	T	2	-	-
Stroud Bay	T	10	5	-
Cove Bay		277	353	75
Browne Beach				
Total				

3. BELIZE

Catches of lobster and conch are landed primarily at cooperatives while finfish landings are more widely distributed. The following plan is intended to obtain catch and effort by census or sample based estimation for all species landed. It will require additional training, personnel and resources which CFRAMP will be able to supply for approximately two years.

Method

When the implementation is complete, a census of the catch and effort for landings at cooperatives will be obtained from purchase slips and sampling at the cooperatives while landings elsewhere will be estimated entirely from sampling by data collectors. As there will be data collectors operating on a routine basis there is opportunity to obtain biological samples, such as length frequencies, in conjunction with the landings data.

Landings at Cooperatives

The Fisheries Department will have to collect purchase records from the cooperatives on a regular basis, enter the data into a computerised database, and maintain checks of the data being obtained for accuracy. The four major cooperatives are now using a purchase slip that is capable of capturing all the relevant data for catch and effort although the slips are not usually filled in completely. This can be corrected by educating the cooperative personnel in the importance and uses of the data. The forms used by the remaining cooperatives may have to be replaced and routine submission of data to the Fisheries Department instituted.

Sampling of finfish catches will also be needed to estimate species composition, as the co-ops record finfish catches by species category only. Sampling at the cooperative landings sites will be conducted by a data collector to obtain catch weight of each species, effort details, and information on discarded catch. Length frequency samples of selected species can also be taken however these are of secondary importance and may not be collected in the initial stages.

Although much of the shrimp caught at sea is landed at the cooperatives and can be recorded there, use of a logbook or observers on the shrimp trawlers would capture detailed catch, effort, location, and bycatch data that are unavailable at a landing site.

Landings not at Cooperatives

A fisheries data collector will have to conduct random sampling for catch and effort at markets or other major landing sites. Sampling will be by landing site clusters and the information collected will include catch by species, effort, and area fished (Tables A8.1 & A8.2). As at the cooperatives, there is potential to expand sampling to include biological information in the future (Table A8.3).

An annual survey will be made of households in fishing villages to estimate the catch of fish consumed by fishermen and their families for subsistance and which is not recorded by the sampling of markets and landing sites.

Activities

1. Education, aimed at cooperatives and fishermen, about the aims and importance of fisheries data collection. In particular, training the cooperative staff to fill out the purchase slips fully and correctly. This will be undertaken by the Fisheries Department with CFRAMP to underwrite the costs.

2. Hire and train a data collector to be stationed at the Fisheries Department in Belize City. The data collector will initially be responsible for sampling for species

composition of finfish catch at the cooperatives and for catch, effort, and species composition at three primary landing sites.

3. Establish routine submission of purchase slips from the cooperatives and entry of the data into a computerized database. There is also a backlog of purchase slips that are available for data entry.

4. Investigate the need for a logbook system to monitor the joint venture shrimp trawlers or other licensed foreign fishing vessels. If such a system is required, design a logbook and institute use of logs as a condition of license. This may require legislative or regulatory changes.

5. Hire and train a data entry clerk.

6. Establish data collection away from Belize City. The data collector will visit cooperatives, markets, and landing sites in and around Corazol, Dangriga and Punta Gorda approximately every two months.

Requirements

Human Resources	Year 1	Years 2+
Data Collector	12,000	12,000
Data Entry Operator	12,000	12,000
Data Collector Training	700	
Transportation		
Scooter or Motorcycle	4,500	
Fares and subsistence	6,800	8,000
Field/Office Supplies		
Computer Supplies	200	200
Posters/Advertising	2,300	500
Printing forms/slips	1,000	200
Sampling Equipment	650	250
Total (Bz$)	**40,150**	**33,150**
Total (US$)	**20,075**	**16,575**

Schedule

1. Education and promotional campaign to begin in January 1993. Preparation and printing of the display materials and advertisments requires 2-3 weeks.

2. Recuitment of Data Collector to begin in December 1992. Training can begin immediately the individual is on staff, including background in fisheries management, fisheries biology, and computer literacy. CFRAMP will assist in developing a program for field training of data collectors.

3. Recruitment of Data Entry Operator to begin in December 1992. Training should also provide a clear understanding of the entire process of data collection and management.

5. Data entry of back records from cooperatives can be started as part of the Data Collectors and Data Entry Operators training. Familiarity with the entire process of data collection and management is an important means of ensuring that accurate and legible records are collected.

6. In the last quarter of 1992, in preparation for the renewal of foreign fishing licenses, determine if logbooks are going to be required and, if necessary, prepare appropriate regulations and forms.

7. Household survey conducted by the Fisheries Department to estimate catches for the subsistance of fishermen, their families and communities which do not pass through any sampled market or landing site. There may be statistics collected by other Departments which could provide useful information for this. If CFRAMP's assistance is required for survey design or logistical support, the survey should be scheduled for the second quarter of 1993.

Critical Assumption

1. The majority of the data for the most valuable fisheries is dependent upon the positive participation of the cooperatives. Their education about, and acceptance of, the importance of their expanded role in data collection, and thus management of the fisheries, is critical to the long term viability of this data collection system.

4. DOMINICA

The objective of this plan is to provide data and scientific analyses necessary to assist Resource Managers to make informed resource management decisions. The specific objectives of the plan are to augment and support the current catch and effort data collection by census and sample based estimation for all species landed, and to enhance data storage and management using a computerized system.

The landings of finfish catches are widely distributed around the island of Dominica. These landing sites are sub-divided into tertiary, secondary and primary sites based on facilities available and number of fishing vessels. There are eight tertiary landing sites, six secondary sites and fifteen primary landing sites where fish catches are landed (Table 1). The current data collection system involves a census at four tertiary and one secondary sites, and sampling at fourteen other sites for catch and effort data. This data is collected by vessel trip and stored as daily totals on the computer using Lotus spreadsheets, quality checks are performed on incoming data sets and reports generated include aggregations by boat, gear, trip and species. The Division has over four years of data stored on its existing system.

The present staff include one Data Supervisor, eleven Data Collectors, three part time Data Entry Operators.

Methods

The major emphasis within the first year of CFRAMP will be to enhance the data management, analysis and reporting capability of the Fisheries Division staff.

Landing Sites

The current program will be increased to obtain catch and effort data from four additional landing sites: Salisbury, Capauchin, Calibishie and Stowe. Census of landings will be conducted where site facilities are upgrade to permit such. CFRAMP will fund over the next two years four new Data Collectors. Mr. Guiste will be responsible for training the new Data Collectors and supervising the data collection program.

Data Management and Reporting

The existing practice of storing the data in Lotus will be phased out. The new system will utilize a database software/application (TIP) for data entry and storage, spreadsheet and statistical software for analysis and reporting. A decision on the data management software will be made by March 1993, and a dual system will be in effect until the existing data set is

transfered. CFRAMP will fund one full time Data Entry Operator salary, this will be utilized to upgrade the existing Operators to full time positions.

Training in Dbase and Lotus will be required for the Chief Fisheries Officer, Data collection Supervisor and three Data Entry Operators to strengten the existing skills in the manipulation of databases to produce results. Training in the use of statistical software will be required for the Data Collection Supervisor.

Activities

1 Begin computer training of relevant Division staff.

2. Recruit and train new Data Collectors.

3. Design the expansion of the Data Collection system to include the four additional landing sites. This will be the responsibility of the existing Data Collection Supervisor.

4. Implement expanded data collection activities.

5 Monitor Data Collectors and Data Entry Operators for accuracy and diligence.

6. CFRAMP will assist staff in analysis of data and report generation from the Data Collection System.

Requirements

	Year 1	**Year 2+**
Human Resources		
Data Collectors (4)	19,200.	19,200.
Data Entry Operator (1)	19,200.	19,200.
Office Supplies		
Note books, charts, guides	500.	
Field Supplies		
Pocket calculators, clipboards	600.	
Total (EC$)	**$39,500.**	**$38,400.**
Total ($US)	**$15,200.**	**$14,800.**

Schedule

Begin computer training of relevant Division staff	February '93.
Recruit and train new Data Collectors	March '93.
Design expansion of the Data Collection system.	February '93.
Implement expanded data collection activities	March - April '93.
Monitor Data Collectors and Data Entry Operators	Ongoing.
Training in analysis of data and report generation	July '93.

Table 4.1. Inventory of fishing vessel types by landing sites in Dominica (1992).

Landing Site	Class	Vessel			Total
		Canoe	Keel Boat	Fbg	Vessels
Scotts Head	T	78			78
Newtown	T	19	39		58
Pottersville	T	23	27	1	51
Fond Cole	S	2	20		22
Mahaut	P	18	20	1	39
Layou	P	10	6		16
St. Joseph	P	9	5	1	15
Salisbury	P	13	3		16
Coulibistre	P	12	5	5	22
Colihaut	S	18	1	1	20
Dublanc	S	13			13
Portsmouth	T	19	31		50
Capauchin	T		10		10
Calibishe	S	2	10		12
Veille Case	S		15		15
Delaford	P	2		1	3
Marigot	T		17	1	18
Atkinson	P	8	1		9
Saint Sauveur	T	13	4		17

Landing Site	Class	Vessel			Total
		Canoe	Keel Boat	Fbg	Vessels
Petite Savane	P	5			5
Fond St. Jean	T	5	19		24
Stowe	P	5	3		8
Castle Bruce	P	4	6		10
Soufriere	T	14	4	1	19
Salybia	P	6			6
Tarou	P	2	2		4
Massacre	P	8	8	1	17
Bioche	S	22	1		23
Mero	P	6	1		7
Rosalie	P	7	1		8
Anse de Mai	P		9		9
Woodford Hill	P		9		9
Toucarie	P	3	10		10
Wesley	P	2	3		5
Tan Tan	P	4	3		7
Pointe Mitchel	P	12	2		14
Thibaud	P		5		5
Total		**362**	**308**	**13**	**683**

5. GRENADA

The objective of this plan is to provide data and scientific analyses necessary to assist Resource Managers to make informed resource management decisions. The specific objectives of the plan are to augment and support the current catch and effort data collection by census or sample based estimation for all species landed, and to enhance data storage and management using a computerized system.

The landings of finfish catches are widely distributed around Grenada and the Grenadines (Table 5.1). These landing sites have been divided into three categories. Government Market Sites are referred to as primary landing sites and each has a resident market clerk (Finlay et al, 1988). Sites without markets but with substantial catches landed are referred to as secondary landing sites. Tertiary Landing Sites refers to processing plants and trading vessels where catches are landed directly.

Methods

Landings at Primary Sites

Currently a census is conducted at each of the primary landing sites. Catch by species group by weight is recorded in a notebook for each vessel landed. Information from this notebook is summarized weekly on two pre designed sheets for the Fisheries Division. One form captures weekly catch by weight by species, while the other captures catch weight by days fished for each vessel. This system could be prone to disaggregation errors and the possibility of double counting landings transferred from one market to another.

This plan will continue the census at the market with a redesigned data collection form (Table 5.2). These forms will be bound with one carbon copy. The copy be retained by the market clerk and the original form will go to Fisheries Division, from which the data would be entered into the TIP database. The new form will capture the data by species rather than species group and include more detailed information on effort. The Fisheries Division will monitor only vessel landings and not vendor transfers to eliminate the possibility of double counting.

Fisheries Division will be responsible for the introduction of the new form and training the market clerks.

Landings at Secondary Landing Sites

These sites are not sampled currently. A sampling program will be established to collect catch and effort data at these sites. CFRAMP will provide assistance and training for Fisheries Division Staff in designing sampling programs. The sampling program will require two data collectors, who will visits sites all around Grenada. A census of all vessels landed on that day for the selected sites will be conducted. The Data Collectors together with a monthly travelling allowance will be funded by CFRAMP.

Over the Side Sales

Most of the fishermen in the Grenadines, sell their catch directly to trading vessels at sea. Total weight of fish is declared to Customs Department by these vessels prior to their journey to Martinique. This information is communicated to the Fisheries Division.

A joint two phase sampling program with St. Vincent is proposed to capture catch and effort data for fish traded over the side. Initially the Data Collector would spend four days per month making monitoring sweeps through the sampling zone to locate and identify all trading vessels present. After such a sweep, one or more of the trading vessels will be randomly selected and the Data Collector will obtain the catch and effort data from the

vessels selling directly to the selected trader(s) on subsequent days. The St. Vincent Data Collector will be located on Union Island.

This program will require an agreement between both Governments.

Large Vessel Logbooks

Use of a logbook system to collect detailed catch, effort and area information from the new multipurpose boats which primarily longline for pelagics will be investigated. As these boats are capable of spending extended periods of time at sea even rough estimates of effort such as boat-day can only be obtained from the captain.

Landings at Tertiary Sites

Currently landings direct to processors are not captured. A new form will be designed to capture census catch by species by weight and effort data at these sites (Table 3). The form will be used as a receipt and will be numbered and bound in triplicate, the original will be given to the fisherman, one copy to the Fisheries Division and the remainder with the Processor.

Data Management and Reporting

Fisheries Division has a wealth of catch by species groups by weight data from the markets. This data will be used to train staff in the use of the Trip Interview Progam (TIP), which will be used for data storage and management. Database training will be required for the Data Operator and other users of the system. The Division will investigate the possibility of a package training program to be funded by CFRAMP.

Activities

1. Implement the changed data collection sheets at all primary landing sites. Discussion will be conducted between Fisheries Division personnel and the Market Supervisors as well as the Market Clerks to allow for input in the new design.

2 Hire two Data Collectors to participate in the sampling program. Implement training programs to ensure understanding of the system, accuracy and timeliness of information.

3. Conduct training in the design of sampling programs, design and implement sampling program for secondary sites.

4. Implement census at tertiary landing sites using new forms.

5. Hire Data Operator. Implement training program in database management software including TIP.

6. Implement computerized databases and reporting systems including training users to operate the system.

7. Identify fishing zones for pelagic and demersal stocks for management purposes.

8. Conduct discussions with St. Vincent Fisheries Division to prepare for an agreement at the Government level for the implementation of the trading vessels sampling program.

9. Design and implement a logbook system for vessels which stay at sea for extended time periods.

Requirements

	Year 1	**Year 2+**
Human Resources		
Data Collectors (2)	$24,000.	$24,000.
Data Entry Operator (1)	9,000.	9,000.
Transportation		
Private vehicle allowance ($800. per month)	9,600.	9,600.
Office Supplies		
Filing cabinets (8@$800)	6,400.	
Files, folders etc.	1,000.	
Printing	1,000.	
Total	**EC$51,000.**	**$42,600.**
	US$19,700.	**$16,400.**

Schedule

Design sampling program	October - November
Design data forms	October
Hire Personnel	December - January ('93)
Training	
Data collection	January
Data Entry & Management	November - January
Data Analysis/Reporting	March '93
Implement revised census program	January '93
Implement sampling program	January '93
Implementation of Trading vessel sampling program	March '93
Purchase of equipment & supplies	November - December

Table 5.1 Inventory of fishing vessel types by landing sites in Grenada

Landing Sites	No. of Vessels	Status
Grenada:		
St. George's Carenage	34	P
St. George's Melville St.	62	P
Happy Hill/Moliniere	6	S
Beausejour/Brizan	6	S
Woodford/Black Bay	7	S
Marigot	11	S
Grand Roy/Palmiste	8	S
Gouyave	83	P
Victoria	21	P
Dusquesne	16	P
Sauteurs	34	P
Levera	10	S
Conference Bay	11	S
Grenville	47	P
Soubise	32	S
Marquis	6	S
Mahot/Crochu	22	S
Requin	10	S
Corinth/Content/Lasagesse	7	S
Westerhall/Petit Bacaye	18	S
Woburn	17	S
Lance Aux Epines	3	S
True Blue	7	S
Calliste	31	S
Grand Anse	10	S
Grenadines:		
Carriacou:		
Harvey Vale	7	S
L'Esterre	18	S
Hillsborough	8	S
Winward	22	P
Belmont	7	S
Petit Martinique:		
Madam Pierre		S
Paridise	28	S
Total	609	

P Primary Landing Site
S Secondary Landing Site
Note: An additional 26 vessels from the Grenadines supply trading vessels.

Table 5.2. New Market Data form for Grenada.

Grenada Fisheries Division **Daily Market Log**

Market	Date	Clerk

Vessel Name												
Reg. No.												
Area Fished												
Gear Used												
Species	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price	Qty	Price
Comments												

6. GUYANA

There are two major sectors to the fisheries of Guyana, the industrial trawler fleet and the inshore, artisanal fleet. The trawler fleet is primarily directed towards prawns and seabob and most catches of finfish are incidental. The inshore artisanal fleet takes a greater proportion of finfish catch along with seabob and whitebelly shrimp.

Landing sites fall into three categories, industrial processing plants, inshore fisheries complexes, and minor sites (Table 1, Figure 1). The shrimp trawlers land their catch directly at the industrial processing plants. These plants also process catches landed directly from artisanal vessels or purchased from other landing sites. The inshore fisheries complexes have landing stages, boat ramps, repair and supply facilities and ice makers. They are operated by fishermen's cooperatives who charge for use of the facilities and sell supplies, ice, and fuel. Minor landing sites have no fisheries infrastructure but are located in a stream or sluice through the seawall. There has been a trend for fishermen to move their landing sites from the minor sites to cooperatives or complexes.

A frame survey is to be conducted this year will be used to determine numbers of vessels landing catches at individual sites rather than numbers based at a site.

A significant barrier to implementing the data collection system is the lack of staff, and the low motivation of staff due to inadequate salaries.

Method

Industrial Fleet

Catch and effort data for the industrial fleet will be collected using a vessel logbook. In addition, random trip interviews will be used to verify completion of the logbooks and to ensure the captains understand the data correctly. The logbook is designed to allow either daily or set-by-set recording of data. The logbooks will not provide species composition for the prawns.

A processing plant log will record weight caught by size grade category for each landing for prawns and seabob. This still will not separate the pink, brown and pink-spotted prawn species, although white prawns are usually sorted out.

Artisanal Fleet

A logbook system that had been operated in the artisanal fleet will be reinstituted. The logs will record catch and effort on a daily or set-by-set basis. Data collectors and fisheries field assistants will collect the log book sheets at the landing sites and conduct trip

interviews at randomly selected sites to verify correct completion of the logs. The data collection system will operate within each region and sampling effort will be allocated to landing sites on the basis of the number of vessels at the sites and the distribution of gears (Table 6.1). The data collector will be responsible to record the vessel identification for all vessels landing that day, interview the captain, and examine the logbook. In the case that the logbook is not being completed the data collector should complete a log entry for the trip during the interview. As with any census, the logbook system is likely to produce underestimates of catch and effort as there is no means to quantify missing log records. An extension program to promote the use of the logbooks and to train captains in filling them out, will be conducted. A means of identifying individuals not providing logbooks will be needed so that the data can be adjusted to account for them. CFRAMP will assist in designing and implementing a database for this purpose. Implementation of the computerised licensing and registration system will provide tools, such as issuing only short-term conditions of license, for difficult cases.

An education program will be undertaken to promote cooperatives adopting a weight-based toll system at the landing sites with complexes, or cooperative facilities. The present system of flat monthly fees or landing fees creates no incentive, or need, to record landings data. A major positive element for the cooperatives in such a program would be the utility of such information to improve their ability to market their catch. When cooperatives adopt weight-based toll systems the Fishery Division will supply data collection forms to them. The forms will be used to record catch and effort for each landing at the cooperative.

Activities

1. Fisheries Division to recruit new staff for data collector positions. A salary supplement will be offered as a means of attracting and motivating data collection staff.

2. Fisheries Division to identify a Data Collection Supervisor. This individual will receive additional training in technical aspects of data collection and management, personnel management, and a clear overall knowledge of the role of data collection in the Fisheries Division.

3. CFRAMP to fund computer training courses which will introduce DOS, WordPerfect and LOTUS. In addition courses in introductory and intermediate training Dbase will be provided for data management staff.

4. CFRAMP to fund purchase of motorcycles, supplies and photocopier for Fisheries Division. Cost estimates will be provided by Fisheries Division to CFRAMP prior to purchases. Invoices will be paid by CFRAMP.

Requirements:

A total of sixteen personnel are required to implement this plan, six of these positions are currently filled, while the vacant positions will be filled expeditiously by the Fisheries Division. Only one position, the Data Entry Operator, is not currently on the establishment and will require CFRAMP funding for the salary. In addition, because the low salaries offered make it difficult or impossible to recruit new staff or retain existing staff, CFRAMP will provide funds to supplement the salaries for all sixteen positions. The need for and amount of salary supplements will be reviewed and as adjusted as the Government of Guyana proceeds with their salary adjustments. Data collectors based in the regions will require mobility to reach remote landing sites. Small motorcycles and associated equipment will be provided for regions 2, 3, and 6. Supplies for sampling, forms for data recording and management, and office support for the data collection system will be funded by CFRAMP.

	Number	Year 1 US$	Year 2+ US$
Personnel			
Fisheries Officer	6	6,264.	6,264.
Fisheries Field Asst	7	4,333.	4,333.
Data Collectors	2	1,142.	1,142.
Data Entry Operator	1	857.	857.
Transportation			
Motor Cycles	3	6,000.	
Field Supplies		1,300.	500.
Office Supplies		4,000.	1,000.
Total US$		**24,000**	**14,500**

Schedule

Begin staff computer training	November '92
Design and analyse frame survey	November '92 - March '93
Recruit new staff	November - December '92
Field training	March '93
Artisanal log book system	
Education re: cooperatives need AFI Complex log book	March '93

Table 6.1. Inventory of fishing vessel types by landing sites in Guyana

Landing Site	Status	Pin Seine	Chinese Seine	Gillnet	Caddell Line	Other	Total
Region 2							
Charity /Pomeroon							
Jacklow				2			2
Marlborough				4			4
Phoenix Park				1			1
Better Hope				3			3
Success		4		22			26
Darthmouth				1			1
Exmouth				2			2
Paradise				4			4
Devonshire Castle				1	3		4
Hampton Court					2		2
Windsor Castle			5	2			7
Sparta			5	1			6
Danielstown			5	3			8
Lima			5	10			15
Richmond			1				1
Cotton Field					1		1
Reliance					1		4
Three Friends						1	1
Affiance				1		1	2
Little Alliance						1	1
Queenstown				3			3
Abram Zuil				4			7
Cullen						2	3
Perserverence						1	1
Golden Fleece				3			3
Zorg				3			3
Johanna Cecelia				1			1
Maria's Lodge				1			1
Adventure				3			3
Region 3							
Goed Intent			8	1			9
Bagotville			1		11		12
La Grange					2		2
Goed Fortuin			30				30
Pouderoyen			5				5
Vreed-En Hoop				2			2
Windsor Forest			12		1		13
Hague					6		6
Anna Catherina			3		1		4
Leonora			5				5
Zeeburg			25				25
De Kendren				2			2
Vergenoegen				8			8
Philadelphia				2			2
Ruby		1		1			2
Hyde Park		2					2
Bonasika				2			2
Morasheee				6			6
Fort Island				6			6
Lanaballi				22			22
Hogg Island				10			10
Wakeanaam Island							
San Souci				1			1

Landing Site	Status	Pin Seine	Chinese Seine	Gillnet	Caddell Line	Other	Total
Belle Plain					2		2
Zeelandia				2			2
Maria's Pleasure				3			3
Fredricburg						2	2
Arthurville						1	1
Region 4							
Grove-Stelling Road			8				8
Grove-Jimbo Bridge						1	1
Bagotstown			5				5
Houston-Gr. G/Town Co-op			30	75	10	3	118
Kitty			5				5
Liliendaal		1	6				7
Ogle			18				18
Better Hope			37		3		40
Montrose			15				15
La Bonne Intention					6		6
Mon Repos					7		7
Lusignan				7			7
Annandale				4			4
Strathspey				3			3
Melanie Damishana		4					4
Enmore				15	4		19
Golden Grove		2		1			3
Hope				5	1		6
Green Field				10			10
Unity			24	24			48
Lancaster			24	45			69
Mahaica-Pvte Wharf				12			12
Mahaica-Bridge				10			10
Region 5							
Blairmont			3				3
Rosignol			5	9	17		31
# 2 Dam		1					1
# 9 Dam				1			1
# 11 Dam			1	2			3
# 12 Dam			5		1		6
Bath Settlement		2					2
Hopetown		2					2
Bush Lot				41			41
# 29 Dam		1					1
Belladrum		3					3
Little Abary-Dundee				19	1		20
Central Mahaicony -Bridge		1		1			2
Region 6							
# 79				33		8	41
# 78				1			1
# 66				45			45
# 65			10				10
# 64			14				14
# 55		2		1			3
# 43		4		21	5		30
Wellington Park		5		4	1		10
Adventure				4			4
Whim		4		1			5
Letter Kenny/Bloomfield		1			7		8
Rose Hall		6		5			11
Albion		4		18	2		24
Sheet Anchor			25				25
New Amsterdam			14	2	2		18
Islington			10				10
Kortubraat			8	9			17

7. MONTSERRAT

Data collection from the fisheries of Montserrat is simplified because they are concentrated at two primary landing sites, Plymouth and Carr's Bay. In addition, the fishing fleet is few in number, 51 vessels in 1991, ranging from rowboats to deep sea fishing boats (Table 7.1). Fishing's contribution to the GDP is now approaching 1%.

Method

The data collection system will focus on the two primary sites, conducting a census of landings five or six days per week. In addition, sampling will be conducted at other landing sites several days per month. A new landings form and sampling summary will be used to record the data (Table A8.1, Table A8.2).

Plymouth

The ice seller/data collector based at the Fisheries office will record catch by species (or species group), effort, vessel ID, and other pertinent data from fishermen landing at the fishery shed and elsewhere in town. Seine fisheries for scad and jack may use several boats and nets in a single set. The catch shall be recorded as a single landing but it is important to record the total number of vessels involved in making the catch.

Carr's Bay

A part-time data collector resident in Carr's Bay will record the same data as in Plymouth for landings in Carr's Bay. Because of the restricted landing area and consistent fishing patterns, it should be possible to directly observe all, or almost all, of the landings.

Other Sites

Frequency of landings at sites between Plymouth and Carr's Bay has declined as boats based at those sites are taking their catch to one of the two primary landing sites. In addition, there has been a reduction in the numbers of boats based at the minor landing sites. Site sampling by fisherman interviews at one or more minor sites per month will be used to monitor the fishing effort associated with landings at these sites.

Data Management

The Fisheries Officer will review TIP, the Trip Interview program, for use as the primary data entry and data management tool. One, or more, staff members will be trained in the use of TIP if it is adopted. CFRAMP will be developing standardized reports for catch

and effort statistics and staff will be trained to produce ad hoc reports as needed. The Fisheries Clerk will be responsible for checking and entering the data.

Activities

1. Train ice seller/data collector for Plymouth including species identification, data collection procedures, and data entry using TIP.

2. Recruit and train data collector for Carr's Bay. Training in species identification and data collection procedures.

3. Train existing staff in computer literacy, i.e. Introduction to DOS, Dbase and LOTUS/WordPerfect if required. Fisheries Officer and Secretary should be trained for data entry using TIP. Fishery Officer will need additional training for report production using TIP and FOXbase (Dbase).

4. Design and institute sampling program for minor landing sites.

Requirements

		Year 1.	Year 2+
1.	Data collector	$10,000	$10,000
2.	Field/Office supplies	$ 4,000	$ 3,000
	Total (EC$)	**$14,000**	**$13,000**
	Total (US$)	**$ 5,200**	**$ 4,800**

Schedule

Computer training		Feb.-Mar. 93
-Fisheries Clerk	Intro. to DOS	
-Fisheries Officer	Intro. to WP	
	TIP	June 93
Recruit D.C. for Carr's Bay		Feb. 93
Train both D.C. with new forms		Mar. 93
Review/Revise data collection procedures		June 93

Table 7.1. Inventory of fishing vessels by landing sites in Montserrat (P = Primary site, M=Minor site)

Landing Site	Site Type	Vessel Types				
		Rowboat	Open	Cabin	Launch	Deep-Sea
Little Bay	M		1	2		1
Carr's Bay	P		12			
Bunkum Bay	M		6			
Old Road Bay	M	1	8	2	2	
Isle's Bay						
Plymouth	P	3	13	5	3	1
Sugar Bay	M					
Kinsale	M		6	1		
German's Bay	M	1	1			
Total		5	47	10	5	1

8. ST. KITTS/NEVIS

There is no current data collection system in St. Kitts and only a partial system in Nevis. Data collection in both islands is severely constrained by lack of personnel. The data collection system designed in the 1987 OECS workshop will form the basis to work towards in CFRAMP's activities. The data collection systems being implemented with CFRAMP funding are designed to be sustainable by the governments upon the cessation of CFRAMP funding. To this end, and to ease the transition from external (CFRAMP) to internal funding, CFRAMP will fund the system entirely for the first year and fund half the expenses in the second and third year. The government will fund half the costs in the second and third years and the full cost beginning in the fourth year.

Method

St Kitts

Basseterre

The landings are concentrated in Basseterre West, particularly near the farmers market. A census of landings on this beach will be conducted by full-time data collector to be funded by CFRAMP. Landings in this area include an average of six or seven boats from Nevis each day. Landings at the beach in Basseterre East will be sampled by the Fisheries Assistant as part of the beach sampling program.

Other Landing Sites

A second CFRAMP-funded data collector will conduct a beach sampling program to census daily landings at major landing sites (Table 8.1). Sampling effort will be allocated by number of boats landing at each site. The allocation may have to be adjusted based on results of the sampling, as the initial allocation is based on the 1987 figures in the OECS Fisheries Report No. 2.

Landings at minor sites (Table 8.1) will not be sampled directly but effort (i.e. frequency of landings) will be monitored on a regular basis by interviewing fishermen. It is expected that all the minor sites can be monitored in a single day, given transport is available.

Data Management

In addition to duties sampling the landings at Basseterre East, the Fisheries Assistant will be responsible for data entry and producing data reports. The Assistant Fisheries Officer will take the duties of Data Collection Supervisor to monitor the performance of all three samplers (two data collectors and one fisheries assistant) and to monitor the data entry and reporting.

Nevis

Charlestown

A full-time data collector will be funded by CFRAMP to census all landings at the Charlestown beach. Because of the low fraction of the catch that goes to the Nevis Fishermen Coop market, and the risk of double counting of landings, the market slips will not be included as part of the basic statistics data collection system.

Other Landing Sites

A second CFRAMP-funded data collector will conduct a beach sampling program to census daily landings at major landing sites (Table 8.1). Sampling effort will be allocated by number of boats landing at each site. The allocation may have to be adjusted based on results of the sampling, as the initial allocation is based on the 1987 figures in the OECS Fisheries Report No. 2. Special attention may be required at Indian Castle as fishing there is generally conducted only one day per week (Saturday). The site should be monitored for effort throughout the week, but for the initial allocation of sampling effort, it will only be sampled on Saturdays and the expansion will be based on one fishing day per week.

Landings at minor sites (Table 1) will not be sampled directly but effort (i.e. frequency of landings) will be monitored on a regular basis by interviewing fishermen. It is expected that all the minor sites can be monitored in a single day.

Data Management

The Fisheries Assistant will be responsible for data entry and reporting as well as supervising the data collectors.

Activities

1. Computer training for Fisheries Division staff as needed, primarily for proficiency in DOS and Database use. Fisheries Divisions to provide CFRAMP with students names, course programs and costing.

2. Fisheries Divisions to recruit two data collectors in each island.

3. Data collectors, including Fisheries Assistant in St. Kitts, trained in catch estimation, data recording, fisherman interactions and given an understanding of the broader context of fisheries management. If feasible, both data collectors in each island should alternate between conducting the census at the main landing site and the site sampling around the island. Cross training ensures continuity in the data collection system should a data collector have to be replaced. Primary responsibility for training will lie with the data collection supervisor, however CFRAMP will assist if requested.

4. CFRAMP staff will visit on a regular basis to provide assistance and monitor progress.

Requirements

		Year 1	Year 2	Year 3
1.	Data collectors - 4	$40,000	$20,000	$20,000
2.	Transport costs - bus fares	$ 2,000	$ 1,000	$ 1,000
	Total (EC)	**$42,000**	**$21,000**	**$21,000**
	Total (US)	**$15,600**	**$ 7,800**	**$ 7,800**

Schedule

1.	Computer/Data Management training	Feb. 93 (ASAP)
2.	Recruit data collectors	Mar. 93
3.	Train data collectors/Fisheries Assistant	Mar.-Apr 93
4.	Begin Data Collection/Data entry	Apr. 93
5.	Government to pay half costs	Apr. 94-95
6.	Government assumes full cost	Apr. 96 onwards

Table 8.1. Inventory of fishing vessel types by landing sites in St. Kitts and Nevis based on data from 1987 in OECS Fishery Report No. 2.

Landing Site	Number of boats	Data collected
St Kitts		
Deep Bay	18	Sample
St. Paul's/Heldon's	6	Monitor
Newton Ground	3	Monitor
Sandy Point	15	Sample
Halfway Tree	4	Monitor
Verchilds/Lamberts	4	Monitor
Old Road Town	20	Sample
Challengers	3	Monitor
West Farm	9	Monitor
Lime Kiln	15+*	Sample
Basseterre West	30*	Census
Irishtown		
Basseterre East	20*	Sample
Newtown		
Conaree	11	Sample
Nevis		
Long Haul Bay	21	Sample
Newcastle	15	Sample
Jones Bay	6	Monitor
Cotton Ground	11	Sample
Jessup's	15	Sample
Charlestown	71	Census
Indian Castle	23	Sample

* numbers estimated

9. ST. LUCIA

The implementation plan for CFRAMP's data collection subproject in St. Lucia will be focused on modifying and improving the system already in place. St. Lucia has a fisheries data collection system in place at present which collects catch, effort and biological data at 11 sites. The sites are defined as primary, secondary, or tertiary depending on the number of vessels and facilities based at the site. A primary site has a large number of vessels in addition to market, storage and ice facilities. Secondary and tertiary sites have no substantial infrastructure and differ only in the number of vessels based at them. The markets do not charge tolls on landings and so do not collect information on the catch entering the market.

Method

Sites with data collectors

With some minor modifications to the design and changes in practice the present data collection system is capable of capturing the basic catch and effort data, in considerable detail if desired, and length frequency data for selected species.

The distribution of data collectors will be adjusted based on the recent frame survey update. The data collectors at the two tertiary sites, Praslin and Savannes Bay, will be discontinued and new data collectors will assigned to Anse-la-Raye and Canaries, each having 30 vessels or more (Table 1).

The sampling practices of the data collectors will be revised to add some additional data elements and to formalise the recording of others. This will be done by the introduction of new data collectors field sheets (Table A8.1 and A8.2) and training for the data collectors in their use.

New data elements to be collected are the name or number of vessels sampled, and the type of sample weight. Vessel identification will remain problematic for the near future but reintroduction of vessel registration, with a requirement to display the vessel number on the hull, will make this straight-forward in future. The type of sample weight will record the means used to obtain the weights recorded on the data sheet. If the data collector observed the weighing of the catch then it is recorded as SW (scale weight), if weight was visually estimated by the data collector it is recorded as VE, and if weights were obtained from the fisherman they are recorded as FE (fisherman estimate).

The recording of vessel name or number for all vessels landing on a given day is necessary to estimate total effort for the day and is critical for estimating accurate raising factors to determine total catch. As much information as possible should be recorded, even

if actual catch weights are not available. Data collectors will be trained to record the landing of vessels that they are not able to sample, including landings prior to their arrival, or during a meal break. In addition, if it is necessary that they leave the landing site before all the vessels have returned for the day, they should record the numbner of vessels still at sea at when they leave. This requires a detailed knowledge of the fishing practices at the site and, when some months of data are available, a study should be made to determine if such absent effort is being recorded elsewhere.

The low pay scales for data collectors have made it difficult to attract and retain suitable data collectors. CFRAMP will fund a salary increment for all the data collectors which should be introduced in association with the new sampling requirements and training. The Fisheries Department pay scale for data collectors will be retained as basic pay and the increments will be added in the form of performance or responsibility bonuses. The Fisheries Department will train the data collectors in the new sampling requirements and to use the new forms during the next quarterly training workshop for data collectors.

Other sites

The landings at the remaining sites will be estimated based on frame survey or registration information and catch rates at sampled sites. Activity at these sites will be monitored by extension officers and other staff during other activities.

Data Management and Reporting

Emphasis will be placed on compilation and management of existing data. The Trip Interview Program (TIP) will be reviewed by Fisheries Department staff for data management. Database training will be required for the Data Entry Operator and Fisheries Assistant to provide the necessary skills to manipulate databases and produce reports. The salary for the Data Entry Operator will be provided by CFRAMP for a period of 2 years.

Activities

1. Fisheries Department will arrange training in introductory and intermediate database use from local sources. Invoices will be paid by CFRAMP for approved training.

2. Fisheries Department will introduce new data collection forms and procedures at next training workshop. CFRAMP will provide funds, if necessary, to hold the workshop as scheduled and to print a stock of new forms.

3. CFRAMP will provide funds for responsibility allowances for data collectors.

4. CFRAMP to provide funds for Data Entry Operator salary

All these activities can begin in November 1992. The training in database use may have to wait for appropriate course offerings.

Requirements

Personnel	Year 1	Year 2+
Data Entry Operator salary	9,600	9,600
Data Collector workshop	500	
Severance Pay for redundant D.C.	4,700	
Responsibility Allowances	14,100	14,100
Office Equipment and Supplies		
Printing new data forms	2,000	
Identification Guides etc	1,800	
Total Cost (EC)	**32,700**	**23,700**
Total Cost (US)	**12,100**	**8,800**

Table 9.1. Distribution of fishing vessels and data collectors in St. Lucia.

Landing site	Data Collector	Transom Boats	Canoes	Fiberglass	Total
Anse-la-Raye	N[1]	4	24	3	31
Banannes	N	26	15	3	44
Canaries	N[1]	6	20	3	29
Castries Market	Y	13	24	13	53
Choisuel[2]	Y		48	0	48
Dennery[2]	Y		30	2	32
Esperence	N	7	2	4	13
Gros Islet	Y	14	12	9	35
Laborie[2]	Y		32	8	40
Marisule	N	6	1	1	8
Micoud[2]	Y		11	1	12
Praslin[2]	Y[3]		6	2	8
River Doree[2]	N		12	0	12
Rosseau	N	6	1	0	7
Savannes Bay	Y[3]	0	10	2	12
Soufriere[2]	Y		70	0	70
Vieux Fort[2]	Y		57	14	71

[1] Data collector to be assigned under Implementation Plan
[2] Frame survey not yet updated in 1992
[3] Data collector to be removed

10. ST. VINCENT

The overall objective of this plan is to provide data and scientific analyses necessary to assist Resource Managers to make resource management decisions. The specific objectives of the plan are to augment and support the current catch and effort data collection by census or sample-based estimation for all species landed, and to enhance data storage and management using a computerized system. In its second phase the data collection program will be expanded to capture length frequency, sex ratio, and age composition (Ryan, 1992). The plan will require training for existing personnel, and additional resources which CFRAMP will supply for at least two years.

The landings of finfish catches are widely distributed around St. Vincent at the Kingstown market, various beaches, bays and trading vessels at sea (Morris et al., 1988). Catches of lobster and conch are either sold directly to the hotels and supermarkets or to trading vessels at sea. Fisheries landing sites have been divided into seven geographical zones. Within each zone landing sites are sub-divided for the allocation of sampling effort into primary, secondary and tertiary based on the number of boats and volume of landings.

Method

Landings at The Kingstown Market

Currently, a census is conducted at this site using the fish landing toll slips. Catch weight is recorded by species for each vessel landing. These data are transcribed from the toll slips to a notebook by market clerks employed by the St. Vincent Fish Marketing Corporation. Fisheries Division staff in turn transcribe the information from the notebook to data collection forms and subsequently it is entered into a LOTUS spreadsheet.

Under this plan a fourth copy of the toll slip will be required, to be submitted to the Fisheries Division, from which the data will be directly entered into TIP or the Rbase application. The design of the toll slip will be changed to include more detailed effort data (Table 10.1). The sampling program at this site will be discontinued and the sampling effort reallocated.

Coordination between the Fisheries Division and the St. Vincent Fish Marketing Corporation, through the Permanent Secretary, will be required for changes to the toll slip forms and training of Market Clerks to collect the additional information.

Landings at Other Sites

The current sampling program (Ryan, 1992 this report) will continue collecting catch and effort data, however, the geographical zones given in Ryan (1992) will be redefined.

The sites in Zone 4 will be split, with three of them added to Zone 1 and the data collector currently employed for Zone 4 assigned to sample the expanded Zone 1. The two remaining sites in Zone 4 only account for two or three fishing vessels between them. There has not yet been a data collector working in Zone 5, which contains 19 fishing vessels operating from three landing sites on the northern end of St. Vincent. As there are few vessels in Zone 5 a part-time data collector, working 10-12 days per month, will be used to sample landings in that area.

Data collectors in Zones 6 and 7, the northern and southern Grenadines respectively, will operate by boat from Bequia and Union Island. They will sample the landings at sites on the various islands in their zones as well as monitoring and sampling fish purchased by trading vessels in over the side sales. Initially they will allocate sampling effort equally between sampling at landing sites and sampling at sea however, this may be modified based on the information collected.

The sampling procedures will follow Ryan (1992). In each sampling zone, sites will selected at random and catch, effort, and species composition data collected from all vessels landing. The Data Collector will be required to complete a daily summary sheet (Table A8.2), in addition to the existing data collection forms. This will identify all vessels which landed including before or after their visit to the site and will provide a means of verifying that data has not been lost.

Over the Side Sales

Many fishermen, particularly in the Grenadines, sell their catch directly to trading vessels at sea. To monitor this activity, the data collectors located at Bequia and Union Island will observe over the side sales at sea and, if possible, implement a sampling program for catch, effort and species composition data at sea. As this will require access by boat to the waters of the Grenadines, a boat will be purchased for the data collector in Bequia and funds to operate this and the boat at Union Island provided.

The trading vessels pose an additional problem for sampling of catches as there is no fixed sampling frame which can be used when calculating raising factors. This will require a two phase sampling approach to first determine the number of trading vessels in the sampling zone, and secondly to estimate the catch and effort of the fishing vessels selling their catch over the side. Initially the data collectors will spend four days per month making monitoring sweeps through the sampling zone and locating and identifying all trading vessels present. The day after such a sweep, one of the trading vessels will be selected and the data collector will obtain the catch and effort data from the vessels selling to the selected trader. To ensure an element of randomness, the trading vessel to be sampled will be chosen by selecting the first vessel encountered, starting from the location in the previous days sweep of a randomly selected vessel

Grenada has an interest in information regarding over the side sales in the northern Grenada waters and would work jointly with St. Vincent in a monitoring program that included that area. Under an approriate agreement between the two governments, the monitoring sweeps by the Union Island boat will include the Grenada Grenadines. Such a coordinated program to monitor trading vessels throughout the Grenadines would ensure that catches from each countries waters were properly reported and provide a means of verifying reports made by the trading vessels on their departure from the area.

Large vessel logbooks

Use of a logbook to collect detailed catch, effort and area information from the new multipurpose boats which primarily longline for pelagics will be investigated. As these boats are capable of spending extended periods of time at sea even a rough estimate of effort such as boat-day cannot be obtained except from the captain.

Data Management and Reporting

Emphasis will be placed on the compilation and management of existing data. The Trip Interview Program (TIP) will be reviewed by Fisheries Division staff for data management. Database training will be required for the Data Operator and the relevant Fisheries Officer to provide the skills necessary for the manipulation of databases to produce reports.

Activities

1. Implement the change of the toll slips. The new slips will be bound in books, in quadruplicate instead of triplicate, with all copies pre-numbered. The additional copy will be submitted to the Fisheries Division. The market clerks will be trained to correctly collect the additional information being sought on the new forms.

2. Review TIP and the existing computerized databases and reporting system to select one to meet the Division's needs, implement changes as required and train users to utilize and maintain these systems. Review and upgrade as necessary the computer facilities of the Fisheries Division.

3. Reassign present Zone 4 data collector to the new Zone 1.

4. Fisheries Division to recruit a part-time data collector for Zone 5 and a full-time data collector for Zone 7. The full-time salary will be met by not refilling the zone 1 data collector position and CFRAMP will fund the part-time position for two or more years.

5. Design and implement an education program, aimed at fishing communities about the aims and importance of fisheries data collection. This will be undertaken by the extension staff of the Fisheries Division.

6. Acquire one 25 foot vessel, safety equipment and operator training. Fisheries Division to provide CFRAMP with rationale and cost estimates for an appropriate vessel. CFRAMP will provide funds for purchase and operation of this and existing vessel for two years.

6. Design and implement a logbook system for vessels which stay at sea for extended periods of time.

Requirements

Personnel	**Year 1**	**Years 2+**
Part-time Data Collector for zone 5	6,000	6,000
Bridge funding for data collectors salaries for Oct.-Dec. 1992	17,000	
Field Equipment and Supplies		
25 ft. vessel with two outboard engines and safety equipment	30,000	
Operating costs for 2 vessels	6,000	6,000
Office Equipment and Supplies		
Posters and Educational materials	2,000	500
New Toll Slips and log sheets	2,000	
Total Cost (EC)	**63,000**	**12,500**
Total Cost (US)	**23,300**	**4,600**

Schedule

Design data forms	October 92
Review sampling program	October 92
Bridge allocation	November 92

Training	
Data Operator	To be discussed
Fisheries Officer	
Purchase Vessel	January 93
Purchase other equipment and supplies	November 92

References

Morris, K., J. Cruikshank and R. Mahon. 1988. Fisheries Data Collection System for St. Vincent and the Grenadines. pp. 150-163, In: R. Mahon and A. A. Rosenberg [ed.]. Fishery Data Collection Systems for Eastern Caribean Islands. OECS Fishery Report No. 2

Ryan, R. 1992. Fisheries Data Collection in St. Vincent and the Grenadines. The Report of CFRAMP Data Collection and Information Systems Sub-project specification Workshop Report, Barbados. pp xx.

11. TRINIDAD/TOBAGO

Trinidad and Tobago is in the midst of implementing a new fisheries data collection system which was designed with the assistance of the FAO (see country section in this report). The system, when complete, will utilize 18 full-time and 6 part-time data collectors in Trinidad and 4 full-time and 4 part-time data collectors in Tobago. Data entry will be done by existing office staff, using software written specifically for Trinidad and Tobago.

Method

The activities of CFRAMP, with respect to the data collection system, will be aimed at providing assistance in implementation, through training, monitoring, and advising. In addition, CFRAMP will provide assistance towards management of the fisheries information contained in the FISMIS bibliographic database.

Activities

Training and monitoring of field data collectors will be an ongoing process. As new data collectors are engaged they must be given their initial orientation and training and then, over time, they must be monitored, corrected, and given additional training. Given the numbers of data collectors involved, training and monitoring will be a full-time job, at least

initially. To do this CFRAMP will fund a Data Collection Supervisor in each island. These persons will require skills in field data collection, data entry and data management, and personnel management. Additional monitoring and advice can be provided by CFRAMP staff as part of their regular missions throughout the region.

Basic computer literacy is at a relatively high level in the Fisheries Division in Trinidad however there is need for training in Introduction to DOS and dBase for data entry staff from Economics and Marketing and DOS and dBase, at basic and possibly advanced levels, for the Data Collection Supervisor. Following CFRAMP's approach elsewhere, funding will be provided for suitable computer training courses available locally, either through educational institutions or offered commercially. The Marine Affairs Section in Tobago has little computer expertise and Introduction to DOS and WordPerfect are needed for at least three staff (DCS, Secretary and FO) and dBase (basic and advanced) for the DCS and FO.

The Fisheries Division, in conjunction with IDRC, has developed the FISMIS bibliographic database for Caribbean regional fisheries information. Although the need for this kind of information is regional in nature, plans for meeting that need are included here as a country-specific activity because of the extensive commitment already made by Trinidad and Tobago to FISMIS. A separate plan (next section) details the operations of CFRAMP with respect to FISMIS.

Requirements

Personnel	Year 1	Years 2+
Data Collection Supervisors 1 Trinidad, 1 Tobago @ $35,000	$70,000	$70,000
Transportation		
Private vehicle allowance for DCS 2 @ $5,000	$10,000	$10,000
Total (TT)	**$80,000**	**$80,000**
Total (US)	**$18,800**	**$18,800**

Schedule

Complete FISMIS/CFRAMP plan	February 1993
Computer training for staff	March 1993 (if needed)

Recruit DCS and FISMIS Assist.	March 1993
Training for DCS	April-May 1993

CFRAMP Fisheries Bibliographic Information Plan

Bibliographic information, the catologuing of published data, reports and papers, pertaining to fisheries in the CARICOM region is an important element of a countries fisheries database. The Trinidad Fisheries Division, in conjunction with IDRC, has developed the FISMIS bibliographic database for Caribbean regional fisheries information. CFRAMP supports the further development of the database and the distribution of the database to all the participating countries. As a component of the Data Collection and Information Systems subproject, a position located in the Trinidad Fisheries Division, will be funded by CFRAMP for an individual with training in fisheries or biology to assist in locating, classifying and entering documents into the FISMIS database. The particular skills sought are to complement the existing staff members skills in library science and information management. In addition, CFRAMP will underwrite the cost of distribution and updating the database to the other 11 participating countries. CFRAMP will also provide funds to offset the costs of servicing requests for documents from the Fisheries Divisions of the CFRAMP participating countries.

Requirements

	Year 1	Year 2+
Personnel		
FISMIS Assistant	$40,000	$40,000
Supplies		
Distribution kits for FISMIS	$1,500	
Updates		$1,000
Country request costs	$4,000	$4,000
Total (TT)	**$45,500**	**$45,000**
Total (US)	**$10,700**	**$10,600**

Enhanced Activities

The plan outlined above is intended to enable CFRAMP participants to contribute to, and benefit from, FISMIS while supporting the current level of activity by the Fisheries Division in Trinidad. Additional inputs from CFRAMP could substantially increase the benefits from FISMIS in a number of areas.

1. Acquisition of new materials

2. CD-ROM subscriptions

3. Clerical level staff position

4. Linkages to other fisheries databases, particularly in Latin America.

CFRAMP Staff Activities To Implement Data Collection and Information System Plans

To conduct the activities outlined in these plans, the CFRAMP Data Managers will be adopting a strategy of travelling to each country to meet with the Fisheries staff every three to four months. During the coming year each of the planned visits will have the following specific activities and goals. In addition, they will provide opportunities for any training, monitoring or other assistance from CFRAMP required by the Fisheries staff and consultations with the Data Management Officer at the OECS Fisheries Unit to coordinate activities, particularly training. The indicated timing of the missions is approximate, and will depend on circumstances throughout the year.

Mission 1. Field Data Collection and Data Entry - April/May 1993

1. Review progress in staffing of new positions (Data Collectors, Data Collection Supervisors, Data Entry Operators). Staffing is primarily the responsibility of the government but CFRAMP can assist with terms of reference and evaluation of training needs.

2. Review progress in training, particularly with respect to computer skills at local training facilities. Provide training in the use of TIP for data entry and in coordination of data flow from the field to data entry.

3. Provide training for DCS in field data collection and TIP and conduct trial data entry if necessary.

4. Ensure logistical needs are fully met such as sampling and recording equipment (forms, clipboards, etc.), transportation arrangements (allowances, scooters), and a sampling plan to randomize data collection sites (if needed).

5. Establish training plan for field data collectors if they are new on staff, or if the new procedures are a significant departure from their previous duties. Training will be provided utilizing regional experts, in particular, the OECS Fisheries Unit may be called on in OECS countries.

Mission 2. Data Management and Reporting - July-August 1993

1. Review progress on all activities from Mission 1 and provide assistance as needed.

2. Provide training in data quality control at all stages of the data flow and particularly for the DCS. Institute formal archive and backup procedures for database.

3. Install and test trial reports such as monthly catch and effort by landing site. Determine what statistical reports are currently required and what are desirable in future. Collaborate with OECS Data Management Officer on all aspects of statistical reporting in OECS countries.

4. Present and discuss draft of regional database proposal including a subregional component for the OECS countries. This will include determining what data is to be maintained in a regional database, what access to the database will be available, and what mechanisms for data submission will be used.

Mission 3. Regional Database and Biological Data - November 1993

1. Review progress on all activities from Missions 1 and 2, and provide assistance as needed.

2. Install and test standardized reports determined in Mission 2 and provide training in ad hoc report generation.

3. Determine how to manage the biological data and data collectors that will be part of the Resource Assessment Subprojects. Specifically, decide if they will be integrated into the statistical data collection system or will operate somewhat autonomously.

4. Install and test database program to generate regional and subregional database submission(s) and institute routine submissions to those database(s).

Mission 4. February 1994 (and subsequent missions at about four month intervals)

1. Review progress on all activities from all previous Missions and provide assistance as needed.

2. Complete all objectives of previous Missions until routine collection of fisheries statistics is fully operational in all countries.

By the end of the third or fourth mission described above, all countries should be in a position to collect, summarize and report their own National fisheries statistics, and to submit data to a CARICOM regional fisheries statistics database.

Other Items and Recommendations

A number of discrete items which were discussed are summarized below. These summaries do not reflect the entire discussions but rather, focus on specific recommendations and actions arising from them.

Regional Data Access Guidelines

It was agreed that during the first year, CFRAMP was to prepare a draft policy governing access to data held by CFRAMP. An initial proposal, for review by the countries, should be prepared based on the policies governing other regional or international agencies responsible for national statistics and the relevant legislation in the CARICOM countries. The draft policy will have to address issues such as level of detail, formats, procedures for access and security, purposes, and distribution. When complete, the revised draft policy will be submitted to the Program Review Committee in 1994.

Trip Interview Program

A presentation was made by Susan Gold and Stephen Meyers of U.S. National Marine Fisheries Service and Caribbean Fisheries Management Council respectively, describing the role and use of Trip Interview Program (TIP) in managing the U.S. fisheries.

Participants were able to try the program in the computer lab and experiment with some of the capacities available. There was some concern expressed that TIP exceeded the needs of the data collection systems designed for most of the countries, however it was also noted that the additional capabilities could prove useful in the future. As presented, TIP did not provide adequate reporting capability in terms of standard monthly compilations of statistics and the additional capabilities needed were discussed.

There is a need for a trial period during which countries using TIP will be identifying problems and, in consultation with the CFMU, developing solutions. Already several areas needing coordination have been identified such as species coding, vessel type coding and gear descriptions. A set of standard reports which provide the basic information pertinent to fisheries management, such as monthly summaries, needs to be developed. A new release of TIP is under development now which will include changes to meet CFRAMP's specifications. Interactions between CFRAMP participants and the developers of TIP will be through the Data Managers at the CFMU.

Vessel and Gear Categories

A need was identified to standardize definitions of a set of vessel categories which will be comparable between countries if national data are to be combined into regional groupings. CFRAMP is to coordinate with Fisheries Divisions and the OECS Fisheries Unit in preparing descriptions and names of vessel types. A similar need exists for gear categories and will be addressed through the same mechanism.

Species guides

There was a discussion of the need to develop species identification guides for Caribbean fisheries that were appropriate for use in the field. Draft terms of reference for a consultant to prepare species guides were tabled and reviewed (Appendix 9) and were recommended for implementation by CFRAMP.

LICENSING AND REGISTRATION SYSTEMS WORKSHOP

Introduction

This workshop was organized and hosted by the Caricom Fisheries Management Unit (CFMU). The meeting was held at UWI, Cave Hill Campus, Barbados on 25 & 26 June, 92. The sessions were attended by 28 participants (Appendix 1).

Caricom Fisheries Resource Assessment and Management Program (CFRAMP) Role in Caribbean Fisheries.

Participants were informed about the role of CFRAMP in Caribbean Fisheries and given a general overview of licensing and registration issues.

The goal of CFRAMP is to promote the management and conservation of fishery resources of CARICOM countries, and to permit exploitation of these resources on the basis of sustainable yield.

The program plans to achieve this goal by enhancing the basic information and institutional capability to manage and develop fishery resources.

The CFRAMP Data Collection and Licensing & Registration sub-projects represent two approaches to assist in the capture, management and analysis of the relevant data. The objectives of the Licensing and registration systems subproject are:

* To establish systems in countries where they do not currently exist.

* To strengthen systems in countries where they do exist.

The objectives of the workshop were:

* To review existing and proposed licensing and registration systems

* To draft workplans for implementing new or revised systems in participating states.

Overview of Licensing and Registration In Fisheries Management

Participants were informed of the role of Licensing and Registration systems in managing their fisheries resources, including linkages with Data Collection systems.

Resource Management Goals

The purpose of managing any resource is the achievement of society goals and objectives through the use of appropriate policy and regulatory instruments. Examples of society fisheries goals are:

* Maximize catch for food. Consumers obtain fish to supplement their protein diet or as an inexpensive meal.

* Maximize the economic returns from the fishery. Attempt to catch as much of the stock as the effort will allow.

* Maximize net foreign exchange earned. Governments may encourage increased landings because it results in decreases in foreign exchange spent (from reduction of imports) and possibly increases in foreign exchange earned (from increases in exports).

* Employment creation. Governments may offer incentives to increase direct and indirect employment within the sector, especially during periods of high unemployment.

* Conserve marine life and habitats for education, recreation and tourism.

* Preserve marine life to avoid economic and/biological extinction of particular species.

Resource Management Needs

Fisheries management requires an understanding of the biological, social, financial, and economic environments as prerequisites for achievement of management goals and objectives:

Biological:

What commercial resources (explored and unexplored) exist, in what quantities, at which location, at what time of the year and why? How sensitive are they to various fishing efforts?

Social:

Fisheries personnel should have an idea of the number of persons involved by type of fishery, by role in fishery (fishermen, processor, vendor, etc.), by location. Fisheries Officers should know who are the natural leaders at each landing site, have a fair idea of how these participants live, why they fish a particular species, etc. This will provide

important information on the human variable to be considered in developing any fisheries management plan.

Financial and Economic:

What consumer needs (local, commercial, foreign) drive (make demands on) your fishery?

What is the value of the existing effort (boats and gear, etc.), type of financing involved (owner, cooperative, government or commercial), the number of employment positions including those linked to the fishery by average income per position?

How much revenue is generated by the fishery including value added by processing and packaging? Need to be aware of the process that the product goes through on the way to the consumers. This information will give planners an idea of how their proposed plans are likely to affect the profitability of existing investment in the fishery.

Planning:

Governments view of and plans for the industry should be known. For example, is the goal to reduce imports of fish products (import substitution), or to earn foreign exchange or both.

Can we maximize the returns from the fishery? Is effort constant or varying? Do we need to export, or increase the value added of our exports to maximize the returns?

Can the fishery sustain the existing effort over time including investment in vessels, landing facilities and processing plants etc?

What is happening with our local and foreign environmental groups and their likely impact on the fishery?

What would be the likely impact of reducing the fishing effort on the social, financial and economic environments?

What would be the likely impact of maintaining or increasing the fishing effort on the biological, the economic and social and financial environments in the short and long run?

Registration and Licensing:

Through registration fisheries divisions can aim to document the character of the potential effort of the fishery. Registration is the process of documenting, classifying and enumerating the physical resources utilised in fishing. A good registration system should contain information about:

The total number of fishers, their role in the fishery, an idea of their current social and economic status, their educational background and family size.

The total number of vessels, by type, by fishery, by location, by gear involved.

The total number of markets including processing plants and hotels by location and type.

The total number of aquaculture establishments by species, location, size, production capability.

Licensing is a tool for monitoring and regulating the actual effort of the fishery. An annual licensing system should indicate the maximum potential effort - number of vessels, fishers and gear - that should be involved in the fishery for that year. It provides fishery officials an opportunity to set the maximum effort for that time period based on management objectives. A license is permission to fish according to certain fishery objectives such as holding or reducing the level of fishing, and is therefore a potentially powerful management tool.

Advantages of implementing a Registration and Licensing system:

An appropriate registration and licensing system should:

1. Provide the Fisheries Division with accurate information on the number of vessels and number of fishers involved in fishing by location. This information could be used to design more interactive educational and public relation programs.

2. Assist in identifying vessels and their owner(s) for legal and surveillance purposes, and to facilitate the disbursement of incentives.

3. Identify and strengthen the linkages between catch, effort, processing, marketing and aquaculture systems.

4. In collaboration with the Data Collection sub-project allows for the design of more effective management strategies by identifying and focusing on persons who depend on the sector for their livelihood. This should include persons involved in marketing, processing and aquaculture. Any management measure will impact on these persons, and since their compliance would determine its success or failure, they should be involved in the planning phase.

5. Through the licensing system facilitate regulation and monitoring of the implementation of any management strategy.

6. Generate through the Registration and Licensing System the revenue to defray or minimize increases in administrative costs of implementing the system.

7. Strengthen relations between the fisheries and planning, finance and statistical divisions of Government in terms of exchange of reliable data. Additionally, relations with private sector agencies should improve.

8. Create a cadre of fisheries personnel with a better understanding of the relationships between the various environments within fisheries; the need for accurate data and the means to collect, analyze and interpret this data; and the ability to use computers to achieve their objectives.

Costs of Implementing a Licensing and Registration System

The additional costs attributed to the implementation of the Licensing and Registration system relate to :

1. Training of personnel to use the system. This will be borne mainly by CFRAMP.

2. Initial cost of capturing the data. If an existing annual licensing and registration system is operational, the data could be captured in a renewal cycle.

3. Costs involved in changing existing regulations.

A successful LRS would require commitment from member states in terms of, the will to do identified tasks, allocation of personnel, and in some cases meet small increases in expenditure in the early phase to be able to maximize the benefits identified.

Suggested Issues for discussion:

The need for a registration system or a licensing system or both?

Should registration be voluntary or compulsory?

Should registration of vessels be limited to those above a certain length?

Should changes to the present system be required, what would be involved in terms of policy, legalities, costs?

Would the system be able to pay for itself?

Should inspection be included as part of the registration and/or licensing process or as a prerequisite for vessel licence?

Discussion Paper - Contributed by David V. Robin

The following paper was presented by David V. Robin (Fisheries Surveillance Coordinator OECS Fisheries Unit). This paper traced the history of the OECS efforts at harmonisation of Fisheries Regimes, including reports on projects undertaken in support of the process, such as the Management of Local Fishing Vessels Registration and Licensing Programmes. It concluded with an identification of issues to be considered when designing a computerised registration and licensing system.

Some Considerations for the Development of a Computerised Fishing Vessel Registration and Licensing Database Applicable for use by OECS Member States - An Overview of The Process of Harmonisation of Fisheries Regimes in The OECS

Introduction

Recognising the limitation in their capacities to implement the requirements of the United Nations Convention Law of the Sea, 1982, (UNCLOS), OECS Member States decided on a course of coordinated action in the area of fisheries management and development and requested the assistance of the FAO Fisheries Law Advisory Programme in drawing up harmonised fisheries legislation and regulations for all of the Member States.

In response to this request, a series of three workshops was organised by the OECS Secretariat with the assistance of the Advisory Programme over the course of the period April 1983 to September 1984. All the workshops were attended by both fisheries and legal experts from the OECS member countries. The first workshop, held in Castries on the island of St. Lucia, came up with a rough draft of harmonised fisheries legislation; the second, held in St. John's, Antigua and Barbuda, in September 1983, refined the draft and drew up harmonised fisheries regulations. The third workshop, set again in Castries, St. Lucia, further refined the draft regulations and considered a series of projects that would give flesh to the legal framework of regional cooperation, including a project for the establishment of a regional Fisheries Unit.[1] The harmonised fisheries legislation has been enacted in most Member States since the mid-1980's and the OECS Fisheries Unit has been established since early 1987.

At their first workshop in St. Lucia, the countries discarded the notion that harmonised legislation necessarily meant uniform legislation. They decided instead that harmonisation, for them, meant ensuring that the legislation adopted for each country would be compatible with that of its neighbours on certain critical points. In the OECS context, these "harmonisation points" were viewed as licensing and control of foreign fishing operations, fisheries management and development planning, adoption of fisheries conservation measures, collection of statistics and sanctioning of fisheries offenses, with particular reference to foreign fishing operations. On matters other than harmonisation issues,

countries would be free to take their own line, though the workshops did recognise the potential value of building up common administrative experience in the handling of provisions; a factor that should not be overlooked in the special circumstances of the OECS countries with their scarcity of trained manpower and high level of interchange of professional staff.[2]

In addition to the passage of harmonised statistics, most Member States have also made harmonised regulations.

The Harmonisation of Fisheries Monitoring Control and Surveillance Activities

Several programmes and projects identified as necessary for the development and management of fisheries have been undertaken on a sub-regional basis to give further support to the harmonisation of fisheries regimes. Included among these is the OECS Fisheries Monitoring Control and Surveillance (MCS) programme, developed during 1987-88. This programme as initially conceived included components such as:

I. An OECS Regional Register of (Foreign) Fishing Vessels.

II. An OECS Fishing Vessel Observer Programme.

III. Implementation of Legislation.

IV. A Regional Aerial and Surface Fisheries Surveillance Programme.

V. An OECS Coastal Watch Programme.

VI. A Foreign Fishing Licensing Programme.

VII. Establishment of a Regional Information Centre.

Changes which have occurred within the fisheries sector since the harmonisation of OECS fisheries regimes and the enactment of the harmonisation of fisheries legislation have resulted in the constant refinement of management requirement in all areas including MCS. Perhaps the most significant and revolutionary area in the fisheries management concept in the OECS has been the Authority's (Heads of Government) endorsement in June, 1991, of a recommendation to extend OECS Common Fisheries Surveillance Zones, established by agreement in February 1991, to Common Zones for fishing by vessels owned by nationals of OECS Member States.

This decision of the Authority, created the need for new monitoring and control measures in respect of local (OECS) fishing vessels. Accordingly, the draft provisions of the Regional

Register of Fishing Vessels has been adjusted to ensure that it serves as a control compliance tool for local fishing vessels. A Mission commissioned by the OECS in July 1991, to review the operations of the harmonised fisheries legislation, to assess its effectiveness and to see what further action may be required to promote fisheries management and development in the OECS member countries, recommended the inclusion of new harmonised provisions to govern:

(i) inspection, certification, registration and marking of local fishing vessels; and

(ii) minimum safety standards for local fishing vessels based on size categories (Classes) commensurate to a proposed OECS Fishery Vessel Insurance Scheme.

The Mission also made recommendation for the implementation of the local licensing provision of the legislation and further recommended that the local licence issued by the vessel's flag State should be a factor in determining eligibility for gaining access to the Zones in the case of larger vessels.

An OECS workshop on the Review of the Harmonised Fisheries Legislation held in the Commonwealth of Dominica in March to April 1992, supported the Mission's recommendations. The workshop also agreed that registration in good standing on the Regional Register should be a pre-condition for gaining and maintaining access to the Zones.

Management of a Local Fishing Vessels Registration Programme

Given the legal consequences which can flow from a vessel registration programme, much consideration was given to the question of whether the programme should be managed by national Fisheries Divisions or by the merchant marine authority in the member countries. Run by fisheries management, the Scheme is expected to realise the following advantages:

I. Tighter control by fisheries management.

II. Lower registration costs to fishermen. (For instance the minimum fee per transaction in one Member State is in the order of US$250.00).

III. The size fishing vessel most prevalent in the OECS could be specifically catered for. (The 15 GT cut off point for mandatory registration under the Merchant Shipping Act in most States is above the size of most fishing vessels in the sub-region).

Based on the above, it was decided that the local fishing vessel registration programme should be run be fisheries management. It was also agreed that appropriate authority be provided in the harmonised fisheries legislation for the undertaking of the programme. The

legislative provisions will be based on those already enacted by St. Vincent and the Grenadines and which are similar to Barbados'.

At the present stage of deliberations, it is envisaged that the local fishing vessel registration process will work as follows:

1. Inspection to determine if vessels are seaworthy (including meeting the minimum safety standards) and suitable for use as a fishing vessel.

2. A Certificate of Seaworthiness will be issued to the owner in respect of vessels which pass the inspection.

3. Vessels in respect of which a Certificate of Registration has been issued, will be registered.

4. Upon completion of registration and payment of prescribed fees, a Certificate of Registration will be granted.

5. Registered vessels shall be marked based on the following uniformed identification marking system which is in keeping with the FAO Standard Specifications for the Marking and Identification of Fishing Vessels:

   (i) Vessels which have been allocated an International Telecommunication Union (ITU) radio call sign will use their call sign as their hull marking;

   (ii) Vessels which have <u>not</u> been allocated an ITU radio call sign will be marked with its flag State's ITU allocated characters followed by a hyphen and a three digit number. The three digit number after the hyphen will be allocated progressively from 001 through 999 in accordance with the order of registration of the vessel on the Register;

   (iii) in both cases (above) these markings will be followed by a hyphen and a landing operating/site designator to be assigned by the Member State.

   The assigned marking shall be maintained in the prescribed manner.

All details of registration and transactions shall be documented in a Register which shall be maintained by the Chief Fisheries Officer. The contents of the Register will include description of vessels, the identification number of vessels, the name(s) and address(es) of owner(s), the place of mooring or beaching of vessels, details of mortgage or liens over vessels, change of ownership of vessel and de-registration of fishing vessels.

The draft harmonised statute governing registration makes provisions for the functioning of the Register. It also provides that:

(1) the Register be used as **prima facie** evidence of facts contained therein in all proceedings under the Fisheries Act;

(2) random inspection be carried out by designated personnel to determine whether vessels are seaworthy and fit for fishing; and

(3) penalties against persons who are convicted of offenses against this particular section of the Act.

Registration is meant to be a one time process throughout the life of the vessel. It is designed to capture information relating to the vessel and its characteristics. The inspection phase ensures compliance with safety and hygiene standards. For the purpose of ensuring safety standards, draft regulations outlining harmonised minimum safety standards based on size category (classes) have now been prepared.

Management of Fishing Vessel Licensing Programme

Zones Agreement and the proposed new Common Fishing Zones "will make it imperative for all Member States to implement licensing schemes. Regional Cooperative Surveillance Schemes cannot function unless Surveillance Officers can distinguish vessels authorised to fish from those not authorised to fish. Reciprocal fishing schemes such as that proposed by the OECS region, pre- supposes the proper authorization and identification of fishing vessels from each of the countries that form part of such schemes".[3] To use the local fishing licence issued by vessel's flag State as a criterion for access to the OECS Common Fishing Zones in the case of larger vessels, reinforces this point. As a result, the OECS Member States are now focusing on implementation of the local Fishing Vessel Licensing Schemes.

Information documented in respect of local fishing vessels licences will include, the names of the vessels; description of vessels; registration numbers; period of validity of the licences; terms and conditions of the licences, suspension or cancellation/termination of licences (including notification); transfer of licences; fees, royalties etc. payable; fees reimbursed to licensee; and, penalties for vessels used in contravention of the section of the Act governing licensing.

Although registration of local fishing vessel will proceed licensing as a matter of course, it is quite conceivable that these two functions will be combined to the greatest degree practicable, to ensure the best possible use of limited available human resources.

For the licensing of foreign fishing vessels, the information required to be documented will exceed that which will be required for the licensing of a local fishing vessel. This is primarily so because the information which will be available for the local vessel registration process will not be available for the foreign vessels. Ultimately, the information captured for local as well as foreign vessels will be similar. For local vessels, it will be captured in two parts, registration and licensing, whereas for foreign vessels it will be licensing only. In the case of foreign fishing vessels, information regarding the Access Agreement which is a prerequisite to the granting of a licence must also be included.

Considerations When Designing a Computerised Registration and Licensing Database

Any computerised database which is designed to capture fishing vessel registration and licensing information for the OECS Member States, must address the national requirement as well as the regional requirements. The regional requirements include those of the OECS Fisheries Data Management and Information Programme and the MCS Programme. Of paramount importance will be the linkages between the national registration and licensing programmes and the Regional Register of Fishing Vessels. Local fishing vessels operating under the OECS Common Fishing Zones Regime will be required to be registered in Good Standing on the Regional Register to gain and maintain access to areas of the Zones which are outside of the jurisdiction of their flag State. To be eligible to hold a licence to fish in the waters of any Member State, all foreign fishing vessels will be required to be registered in Good Standing on the Regional Register of Fishing Vessels.

To streamline the information management process and avoid duplication of effort, information which is common to the national and regional databases should be presented in identical formats. For local (OECS) vessels this will in essence be the registration and licensing information as these vessels will be required to be registered and licensed in their flag State as a pre-condition to registration on the Regional Register. For foreign vessels certain information not captured under the national licensing procedures will be required for the purposes of the Regional Register.

As the Regional Register is primarily a control compliance tool, the database should capture suspension or withdrawal of vessels' Good Standing status as well as suspension of Captains. It is important that this information be shown historically as enforcement action may also be taken against repeated offenders.

As registration will be a one time process throughout the life of a vessel, the database must have the capability to record changes made to the initial information. These changes should provide a history of the particular vessel from registration to de- registration.

Licensing information too, should be shown historically. This information would be very critical if it becomes necessary to reduce effort in any particular fishery. Its availability will enable fisheries management to determine who are the traditional users of the particular resources and accord to them preferential "access" in such circumstances.

CFRAMP Workshop Country Reports on Licensing and Registration

Registration and licensing systems in each participating countries were reviewed to determine current status vis a vis the concepts and definitions identified in the Overview and the feasibility of implementing such a Licensing and Registration system. All the countries had some type of vessel registration or licensing system operational. Some of the countries had voluntary registration or licensing systems for fishers while others had no system in place. The OECS countries were in the process of changing their legislation to implement a harmonised vessel and fishers registration and licensing scheme.

Participants presented an update on the status of Licensing and Registration systems in their respective country.

Antigua and Barbuda

Under the new Harmonised Fisheries Act (May, 1991), all fishing vessels are required to be registered annually. This registration is conditional upon a vessel inspection and payment of a fee. The registration fee is EC$300. per annum for vessels between 30 feet and 300 feet in length and EC$1000. for vessels in excess of 300 feet. The effective period is between January 02 to December 31. During inspection all removable parts are marked with the registration number in an effort to establish legal ownership.

A modification of the FAO specification is being used with a format of V2-A-99 where A designates a landing site and 99 is vessel number within landing site. In cases where a radio is on a vessel the radio call sign is used rather than the FAO specification.

Barbados

The Fisheries Division has a computerized Registration system operational. There are three classes of vessel based on length <6 metres, $>=6$ and $<=12$ metres and >12 metres. A certificate of Registration is issued on registration of vessel with an annual endorsement thereafter. The endorsement is conditional upon an annual inspection. Subsidies are offered as an incentive to registration while a list of delinquent vessels are submitted to the Coast Guard. The fishing year is from October to August.

Licensing of fishermen is catered for the Act but this is not operational.

Vessel markings is based on the parish and a sequential number.

Belize

Fisheries Division has an annual registration system. All vessels and fishermen must be registered and are required to produce proof of registration on request. Fishermen guilty of an offence can have their registration suspended. A license is required to export fish products.

Vessels are required to carry their registration number on the hull.

Dominica

Registration of fishing vessels and fishermen which began in October, 1991 is 90 percent complete. Inspection is done at registration and a number is assigned using a variation of the FAO specifications. For example **J7-999-AAA** where J7 is country code, 999 is a sequential number within a landing site and AAA is an alpha code for landing site.

Registration qualifies fishermen for insurance. A fee of EC$6.00 is charged for fishermen registration.

A problem was identified in vessel registration. Should landing site be changed the registration number changes. This increases the difficulty of tracing the vessel history.

Grenada

A registration and licensing system for fishing vessels has been in existence since mid 1970's. The 1986 Act require all fishing vessels to be registered in terms of ownership, principal dimensions and description of vessel.

Current vessel markings is 9-999 where the first digit represent the fishing zone and the remaining numbers are sequential registration numbers.

A voluntary fishermen registration took place in 1983/84.

Guyana

The Act require all fishing vessels to be registered once to be renewed only for changes in ownership. Information recorded includes ownership, dimensions and propulsion. Fisheries Division is the main registry with the regional offices as the sub-registry.

Vessel fishing licenses are issued annually with a fee structure based on size of vessels and type of fishery. This licence is conditional upon maintaining and submitting vessel log

books. At present all the industrial fleet and 50 percent of the artisanal fleet are covered in this system. The accuracy of the data from the log books have been questioned.

An annual fishers registration is required by law with vessel owners liable for all crew members. Fish "pens" are licensed along with vessels in the chinese seine fishery. If the vessel is sold the licence for the "pens" are included.

A processing plant licensing (registration) system was reactivated in 1988 to monitor plant capacity. This license requires prior approval from Housing Authority, Public Health and the Analyst Department for freezing.

An annual licensing system exist for exporting fisheries products. On application a probationary period is defined during which a license is granted on a shipment by shipment basis.

St. Kitts & Nevis

Registration is the responsibility of Customs Department. Information gathered includes vessel name, owner and color. The registration numbers are assigned sequentially with a prefix C for St. Kitts and N for Nevis.

A voluntary fishermen registration is operational.

St. Kitts and Nevis plan to enact harmonisation laws in 1993.

St. Lucia

A new annual vessel licensing system has been in place since 1990. This system captures basic vessel characteristics and assigns a variation of the FAO specification in the format J6-AN-DENA. Eighty-eight percent of the vessels have been licensed to date.

A fishermen registration and ID card system was started in January, 1992.

The system has been viewed with suspicions by the fishermen.

St. Vincent

The Fisheries Division has responsibility for inspection and registration of fishing vessels. Information is currently being collected.

Trinidad & Tobago

The Director of Maritime Services has responsibility for registration of vessels >24 metres and/or fishing in international waters.

The Shipping Act of 1987 require all vessels to be registered. The Fisheries Division has responsibility for registration of fishing vessels <=24 metres. The Division is currently reviewing the registration process from a national to a county based system for example TF-CA-0000 where TF represents country code, CA county code (eg. Caroni) and 0000 consecutive number within the county.

A voluntary fishermen registration is operational. This registration entitles individuals to duty-free purchase of engines and rebates on the purchase of fuel for fishing.

Introduction to Prototype Computerized Licensing and Registration System

Participants were introduced to a licensing and registration prototype software currently under development at the CFMU in Belize. This prototype called **LRS** is designed to assist fisheries officials in monitoring and regulating the fishing fleet by means of registration, licensing or both. The software is designed in a number of distinct processes. **Fishers registration** database which document socioeconomic information about persons involved in the fishing sector. **Vessel registration**, which records the information relevant to the vessels specifications, ownership and seaworthiness and gear. **Fishing licenses**, which grant permission to conduct specific fishing activities. **Legal History**, which keep track of illegal activities charged against fishing vessels and fishers. **Aquaculture registration**, which record information about aquaculture establishments. **Plant registration**, which record information about fish processing plants.

Participants reacted favourably to the prototype while suggesting the following items for inclusion in the LRS application:

Fishers Database:

Length of time in fishery report.
Legal history for foreign fishers.
Co-op membership #.
Marital Status common law.
Reasons for leaving the industry.

Vessels Database:

Concessions, value of concessions.
Propulsion type, engine serial #, year of construction.

Fishery type should cater for combinations.
Storage capacity and storage type.
Instead of appearance use description.
Cater for transhipment using trading vessels.
Port of registry, landing site, base of operation.
Mortgages.
Application to the regional register, access to common fishing zones.

Legal Database:

Officer ID #.
Arresting Officer & ID #.
Officer making charge & ID #.

Aqua Database:

Species raised, imported, date, origin, certification date.

Plant Database:

Legal history.
Equipment type and capacity.
Planning permission #.
Date Inspected.

Workshop Recommendations Regarding Licensing and Registration

The workshop identified a number of activities for implementation by participants.

1. That countries needed a compulsory registration and licensing system for fishers and vessels. That CFRAMP should be ready to distribute **LRS** by the end of September, 1992. The countries would test the software for applicability between October and December, 1992 and based on discussion with the relevant agencies determine the legislative, policy and economic requirements for implementation.

2. That countries should investigate changing the Merchant Fishing Act to designate registration of fishing vessels below a certain size to Fisheries Division where this is not the practice. For vessels above the minimum size the agency responsible for vessel registration should consult with the Fisheries Division prior to granting registration.

3. That CFRAMP should recognize the need for social, socioeconomic and economic databases and seek to develop these such that there is compatibility with TIP and LRS. Discussion should be held with P. Espuet.

4. That countries should ensure that their Licensing and Registration System should have compatibility with systems of other related national agencies.

5. The role of fisheries personnel in vessel inspection should be recognized and a training program be developed to increase the competence of officers. Additionally, the legal implications of fisheries personnel declaring a vessel seaworthy be investigated by the Chief Fisheries Officer for input into the training program.

6. That Countries and CFRAMP should work towards official implementation of LRS by February, 1993.

7. That CFRAMP should recognize The OECS Countries effort at harmonization should aim to support their regional system where needed, while supporting countries with their national LRS.

CARICOM FISHERIES RESOURCE ASSESSMENT
AND MANAGEMENT PROGRAM

Welcome to the CFRAMP

Data Collection and Information Systems

and

Licensing and Registration Systems

Workshops

June 17-27, 1992

University of the West Indies
Cave Hill, Barbados

CFRAMP Workshop Program

There will be breaks each day at about 1030 and 1500, and lunch from 1230 to 1330.

Data Collection Systems - Part 1.

17 June

0900-1030	Opening Session Opening Remarks Introduction of Participants Overview of Program Introduction to Computer Facility
1045-1230	Elements of Data Collection Systems Frame Surveys Product Pathways Fisheries Data Tools Biological Sampling Incentives to cooperation
1330-1515	St. Lessant Data Collection System Design Introduction to St. Lessant Design working groups
1530-1630	Review of designs
1630-1700	Fishing Zones discussion

18 June

0830-1030	Sampling Theory in Fisheries
1045-1230	Introduction to LOTUS
1330-1515	St. Vincent Data Collection Project Report
1530-1700	Belize Fishery description
1700-1845	Introduction to DOS

19 June

0830-1030	Guyana Fishery description
1045-1230	Design working groups - Belize and Guyana
1330-1515	Open session - report preparation and computer exercises
1530-1700	"
1700-1845	Introduction to WordPerfect

20 June

0830-1030	Trinidad and Tobago Fishery description
1045-1200	Species guides discussion Species grouping and coding LOTUS training

21 June No planned activity

Data Collection Systems - Part 2.

22 June

0900-0930	Welcome of participants
0930-1000	Introduction of participants and agenda
1000-1030	Data Collection Systems in OECS/Barbados - changes and needs since OECS W/S.
1045-1230	OECS/Barbados
1330-1500	OECS/Barbados
1515-1630	Belize, Guyana, T&T
1630-1730	Species Guides
1730-1830	Introduction to DOS and WordPerfect

23 June

0830-0930	CFMC Data Collection - S. Meyers
0930-1130	TIP Presentation - S. Gold
1130-1230	Reporting Needs - Basic reports, raising factors and ad hoc queries
1330-1500	Computer lab exercise with TIP
1515-1700	Review and Discussion of TIP - Recommendations

24 June

0830-1015	Regional Data Access
1030-1100	CFRAMP's Contributions
1100-1230	Implementation plans for CFRAMP activities
1330-1500	"
1515-1700	Review of plans
1700-1730	Species Guides

Licensing and Registration Systems

25 June

0830-1030	Overview of Licensing and Registration issues
1045-1230	OECS Harmonised Legislation and Regulations - David Robin Fishing Vessel Marking schemes - FAO Report
1330-1730	Country Discussions

26 June

0830-1030	Demonstration of prototype L&R system
1045-1230	L&R systems implementation plans
1330-1515	Review of L&R implementation plans
1530-1730	Closing Session - final review and wrap-up

Appendix 2. List of Participants

Antigua/Barbuda
- Ms. Diann Black
  Graduate Fisheries Assistant
- Mr. George Looby
  Fisheries Assistant

Barbados
- Mr. Colvin Taylor
  Fisheries Assistant
- Mr. Stephen Willoughby
  Fisheries Officer

Belize
- Ms. Stephanie Auil
  Fisheries Officer
- Mr. Troy Garcia
  Fisheries Inspector
- Mr. Jose Perez
  Assistant Fisheries Officer

Dominica
- Mr. Harold Guist
  Data Collection Supervisor
- Mr. Nigel Lawrence
  Fisheries Development Advisor

Grenada
- Mr. James Finlay
  Chief Fisheries Officer
- Mr. Justin Rennie
  Fisheries Officer

Guyana
- Mr. Shawn Francis
  A/Fisheries Officer
- Mr. Terrence Phillips
  Principal Fisheries Officer

Montserrat
- Mr. John Jeffers
  Fisheries Officer

St. Kitts/Nevis
- Mr. Paul Lloyd
  Fisheries Assistant
- Mr. Joseph Simmonds
  Fisheries Officer
- Mr. Thoms Wilkes
  Extension Officer

St. Lucia
- Mr. Rufus George
  Fisheries Officer
- Ms. Williana Joseph
  Fisheries Assistant
- Ms. Feria Narcisse
  Data Inputter

St. Vincent/Grenadines
- Ms. Cheryl Jardine
  Fisheries Clerk
- Mr. Raymond Ryan
  Fisheries Officer
- Mr. Leslie Straker
  Fisheries Assistant

Trindad/Tobago
- Mr. Krishna Gooriesingh
  Fisheries Economist
- Mr. Mervyn LaCroix
  Director of Fisheries

OECS Fisheries Unit
- Mr. Peter A. Murray
  Data Management Officer
- Mr. David Robin
  Fisheries Surveillance Coordinator

National Marine Fisheries Service (USA)
- Ms. Susan Gold
  Computer Programmer/Analyst (SEFC)
- Mr. Stephen Meyers
  Fisheries Statistician (CFMC)

CFRAMP
- Mr. Paul Fanning
  Data Manager/Analyst
- Dr. David Gray
  Consultant
- Dr. Robin Mahon
  Senior RAU Leader
- Mr. Garret Manwaring
  Data Manager/Analyst

APPENDIX 3. THE BELIZE FISHERIES AND CURRENT DATA COLLECTION

The purpose of this document is to compile information on the Fisheries of Belize, relevant to designing a Data Collection System, and following the procedures of Mahon and Stamatopoulos (1988), to provide a preliminary description of such a system. We anticipate that considerable refinement will be required as the system is implemented, and that continuous revision will be required as the system generates. New information, and in response to changes in the Fisheries.

INTRODUCTION

Important factors distinguishing the Belizean fisheries are the existence of a strong Cooperative system and fisheries that are strongly commercialized and export-oriented, relative to other Caribbean countries. At least eighty percent of the registered fishermen are members of fishermen's cooperatives which buy, process, and market fisheries products on behalf of their members. Legislation restricts exports of fisheries products to the registered cooperatives and so the majority of lobster, conch, shrimp, and higher-valued finfish (snappers and groupers) are sold to the cooperatives. The lesser valued finfish are sold at the local market.

The majority of Belizean fishermen target the highly-valued lobster and conch, while finfish is usually taken in a by-catch or secondary fishery. There is a shrimp fishery under a joint venture between the cooperatives and Honduran fishermen, who provide the boats and the expertise. There are also a few fishermen who catch shrimp with cast nets along the rivers and in the river mouths.

Approximately 2,060 fishermen registered to fish in 1989, using 760 boats of two major types. Sloops, equipped with both sail and motor, will generally make trips of about eight days, camping on the fishing grounds while out. Skiffs are motor-powered, usually with outboards, and make daily trips to their fishing grounds.

The most popular gears are the traps and hooks (used by divers) to catch lobster. Conch is also caught by divers (who use their hands). The hand line and sling are used to catch finfish. In addition, weirs are used in northern fishing grounds. These weirs target brackish water fish, a few demersal and some inshore pelagic fish.

The three atolls offshore, and the patch reefs inside the reef crest (Figure A3.1), are the major fishing grounds for lobster, conch, and finfish. The shrimp trawlers fish in the lagoon between the Belizean mainland and the reef crest.

THE FLEET AND FISHING ACTIVITY

There are three general vessel Categories in the fleet. The types of fishing activity pursued by each vessel type are shown in Table A3.1.

SLOOPS	There are approximately 300, outboard and sail powered vessels of this type. These vessels usually make trips of 8 - 12 days duration. They carry ice in insulated boxes, there are four to five dug-out boats (canoes or dories) on board, and has a crew of five men. They are involved in most types of fishing activities but mostly Lobster and Conch are targeted.
OPEN BOATS	There are about 500 of these craft which are outboard powered, and made of wood or fibreglass. These boats make one day trips. There is a crew of three and involved in most types of fishing activities. Like the sloops they mostly target Lobsters and Conch.
SHRIMP TRAWLERS	These are only present in Belize when the Shrimp season is opened. They work on Joint Venture with the different cooperatives and there are about eleven trawlers that comes to Belize. A net is used to sweep the bed of the fishing area to catch the Shrimp. There is a crew of eight. These boats make two weeks trips. They are relatively large (10.7 meters) with inboard diesel engines, freezing hold, depth sounders and radio.

CURRENT DATA COLLECTION

Staff Complement	Fisheries Officer
Purchase receipts	These are issued only at the Cooperatives
Log Books	Log books are not presently in use, although sloops could be required to fill out logs.
Exports	All fishery export requires a permit. These permits provide a record of exports. The export sheets are easily gotten from the Supplies Control Board.
Production Sheets	These are collected from the cooperatives. These are a monthly inventory of types and pounds of fish caught and processed for export and local sale.

Fleet Inventory	Boat registration is required annually. The forms request information on boat size, propulsion and gear.
Fishermen Census	All fishermen are required to register annually. The forms request information on the person's name, age, address, fishing experience, membership in co-operative, boat owner or crew. Despite this there is no detailed information on the numbers full and part time fishermen at each landing site.
Fishing Zones	There are no designated zones for catch reporting.

FISHERIES AND FISH DISTRIBUTION

A brief description of each Fishery type follows. The disposition patterns of catch from each fishery type are shown in Figure A3.2 (A-F).

SHALLOW AND DEEP DEMERSAL FISHES:

Demersals are taken primarily by hand lines which are fished primarily on the reef shelf. Catches are taken by spears or traps. The quality of the catch ranges from miscellaneous reef fish (such as Grunts, small Snappers, which are more commonly taken in shallow areas i.e. Barrier Reef, Reef Patches and Atolls). To the larger Snappers and Groupers (more commonly taken in Deep Areas and on the Drop off).

LOBSTER

The Lobster Fishery is the largest fishery (57% by value). They are taken mainly in traps, but there is also some diving using hook sticks. The traps are rectangular (4.5 X 3.5 X 1.5) made from Pimento. They are fished throughout the country.

CONCH

Conch are taken by divers (free diving) is one of the largest fishery and disposition path is the same as Lobster.

PELAGICS

Pelagics are taken mostly by hand lines, they are also taken by trolling and diving using a spear gun. Seine and cast nets are also used to take smaller Pelagics.

BRACKISH WATER FISH

These are mainly Mullets and Bass they are found in Lagoons and at the mouth of the Belize River, they are taken mainly by Cast nets and Seine.

SHRIMP

Shrimp are grown by Aquaculturists and are also caught by fishermen by Joint Venture boats from Honduras. These boats trawl for Shrimp. A small amount of Shrimp are also caught by local fishermen using Cast nets.

TURTLES

Turtles are taken on beaches and in nets. They are fished primarily in Placencia and Monkey River in the South.

RECREATIONAL

Sports Fishing is done primarily in San Pedro, Caye Caulker and Placencia they target mostly larger Pelagics and these are taken by lines been trolled to and from fishing grounds. Hand lines are also used for catching smaller Pelagics and Demersal Fishes.

TABLE A3.1. Vessel and Gear Structure of Belize Fisheries

Fishery	Gear	Sloop	Open Outboard	Shrimp Trawler
Demersals	Traps	X	X	
	Lines	X	X	
	Nets	X		
Lobster	Dive	X	X	
	Traps	X	X	
Conch	Dive	X	X	
Pelagics	Traps	X	X	
	Lines	X	X	
	Nets	X		
Shrimp	Trawls			X

Figure A3.1 Fishing Grounds of Belize

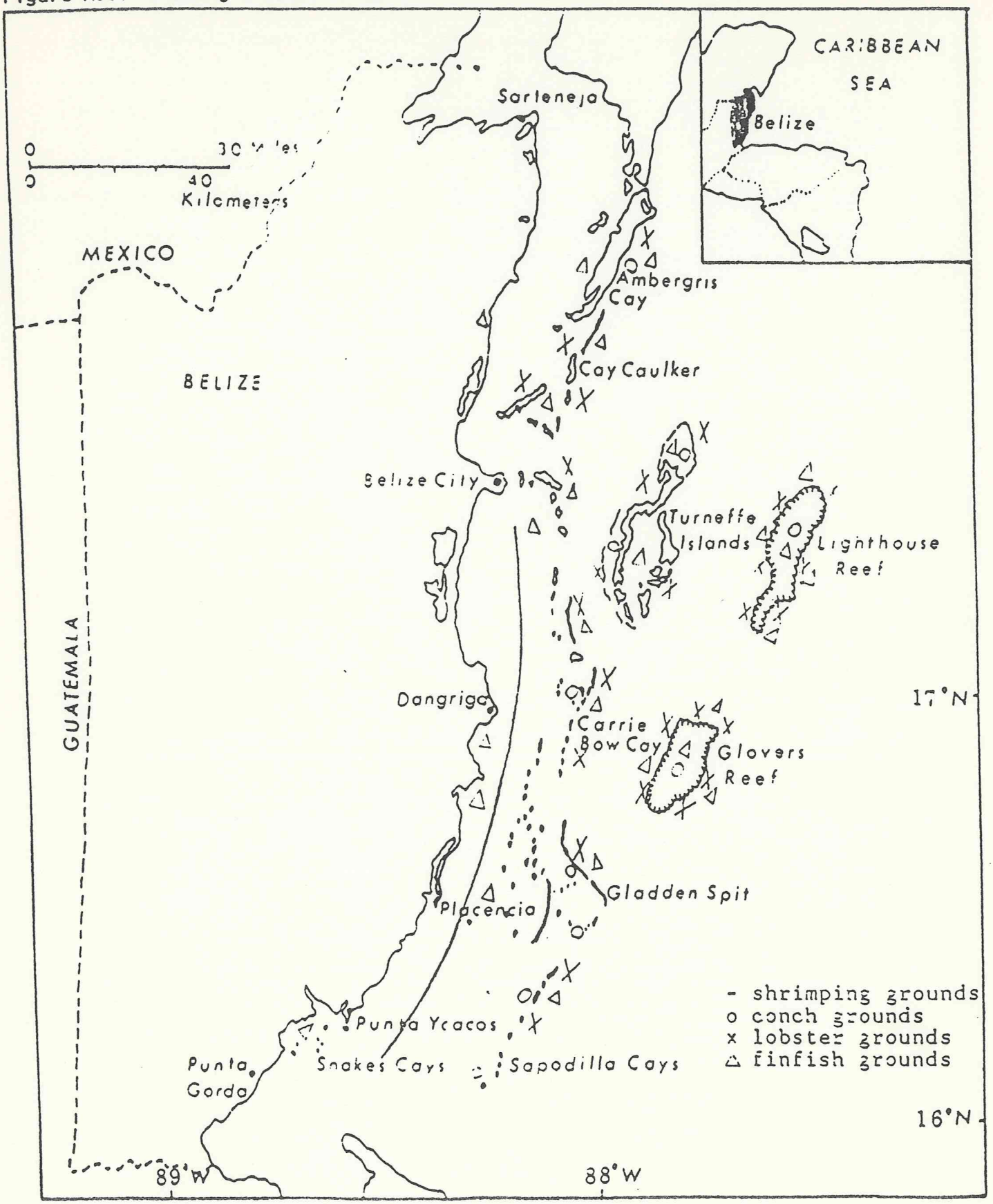
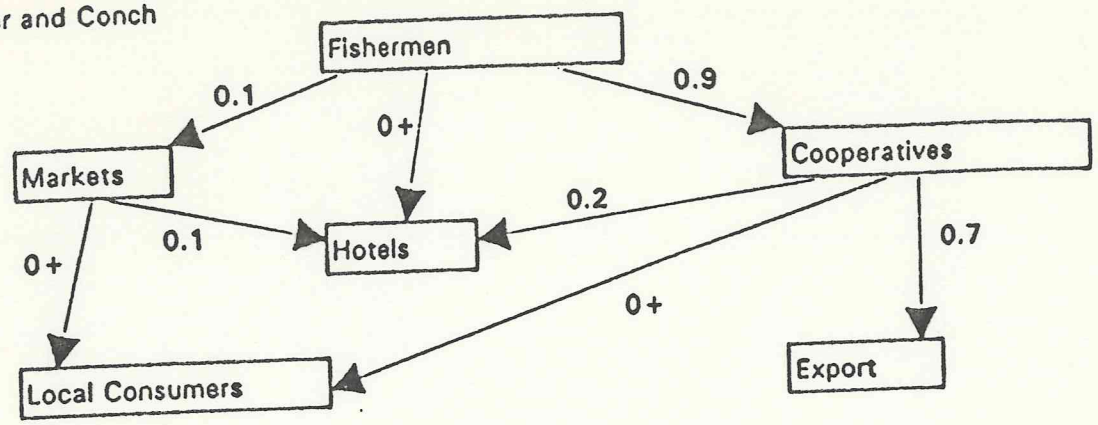
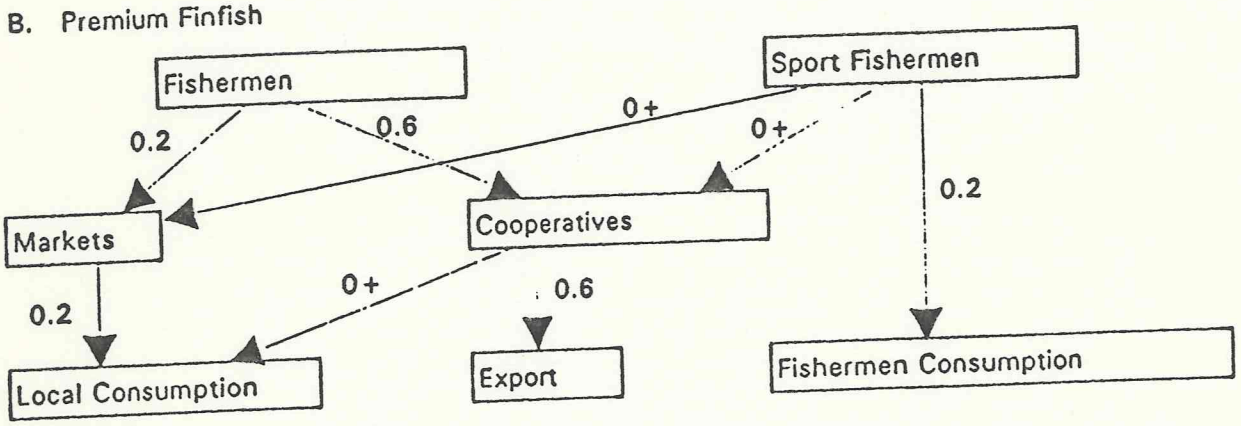


Figure A3.2. Fishery product distribution pathways in Belize

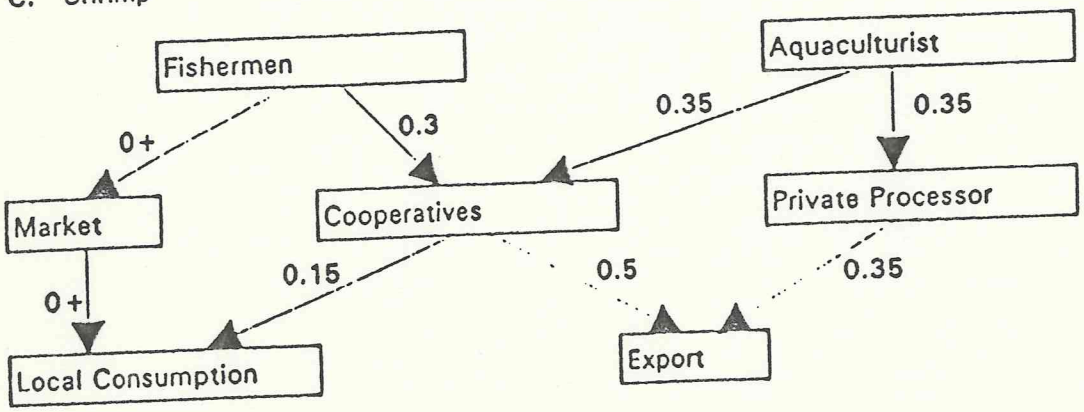
A. Lobster and Conch



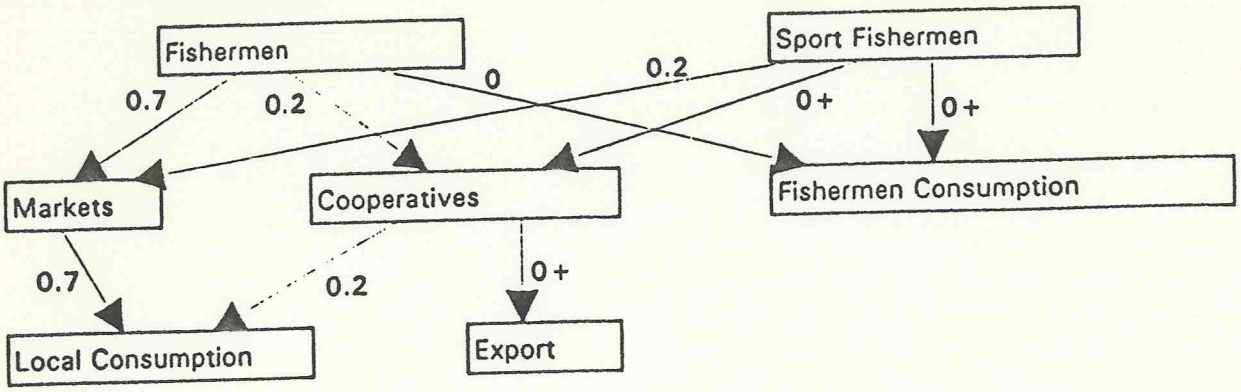
B. Premium Finfish



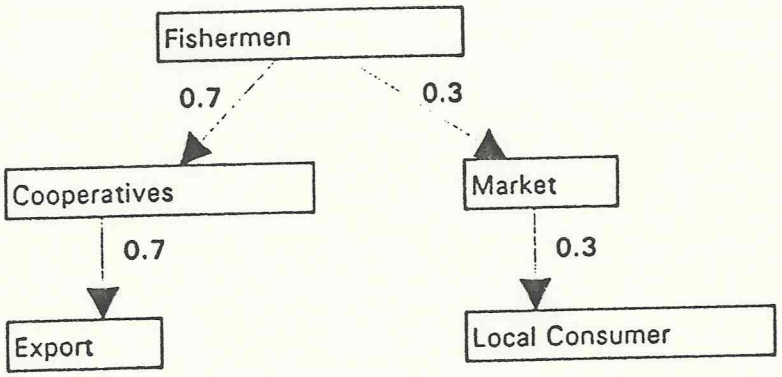
C. Shrimp



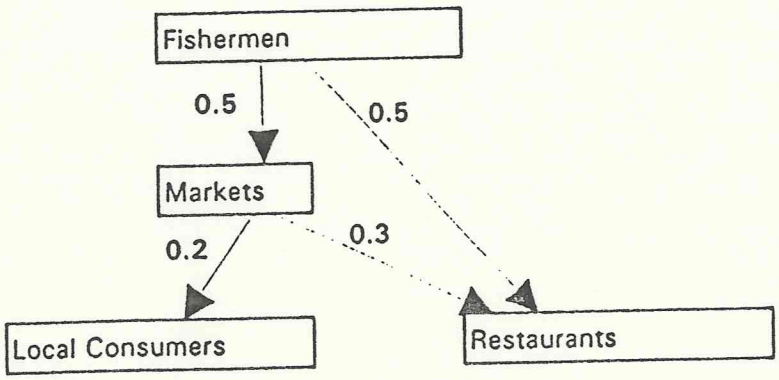
D. Lesser Valued Finfish



E. Sharks



F. Turtles



Appendix 4. Fishery Data Collection System For Guyana

by

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The purpose of this document is to compile information on the fisheries of Guyana relevant to designing a data collection system, and following the procedure of Mahon and Stamatopoulos (1987), to provide a preliminary description of such a system. We anticipate that considerable refinement will be required as the system is implemented, and that continous revision will be required as the system generates new information, and in response to changes in the fisheries.

FISHERIES AND FISH DISTRIBUTION

A brief description of each fishery type follows. The disposition patterns of the catch from each fishery type are shown in Figures 1-7.

Prawn: Prawns are caught by the industrial trawler fleet in all seasons throughout the shelf area. These vessels freeze the prawn tails at sea after removal of the heads during trips that range between 35 and 45 days. The gear used is a double rigged shrimp trawl.

In recent years the prawn catch has ranged between 1500 and 1900 tonnes per year (tail weight). All catch is landed at the industrial processors. Most of the processed prawn catch is exported with about 5% staying in the domestic market (including the hotel and restaurant trade). There is a licence requirement that each vessel land about 15 tonnes of finfish bycatch per year. This regulation is designed to limit discards. This finfish is handled as described below (Figure 1).

Seabob: Seabob are caught by both the industrial trawlers and by the artisanal fleet (chinese seine). In this fishery the catch is iced and not frozen and capacity can be reached in this time. The chinese seine fishery is tidal - boats fish one tide and return to port. Sometimes two trips are made in one day depending on demand.

The catch is split about one third from the chinese seine fleet and two thirds from industrial trawlers. Recent catches have been in the range of 2000 - 3000 tonnes. The catch of the industrial trawlers is landed at the industrial processors with most of the final product being exported. The chinese seine catch is mainly sold through vendors to consumers. Some is sold to the industrial processors and some to cottage processors who produce a dried product (Figure 2).

Whitebelly Shrimp: The shrimp fishery is prosecuted by the chinese seines and catches the small whitebelly shrimp in nearshore areas. Recent catches have been in the range of 1000 - 1500 tonnes.

The artisanal fishermen sell this catch to vendors and both industrial and cottage processors. The industrial processors produce a frozen product mainly for export. The cottage processors produce a dried product for both export and domestic markets (Figure 3).

Finfish - Artisanal Small Boat: This fishery takes place in the nearshore and estuarine areas by vessels under 9 meters in length making one or sometimes two tidal trips per day. The main species caught include bangamary, bashaw, snook, gillbacker, cuirass and other catfish.

Most of this catch is sold through vendors to the domestic market. Some is processed by the cottage processors into smoked (catfish) or salt (other species) product. Recently some has been bought by the industrial processors to be frozen for export. Recent catches have been about 10,000 tonnes (Figure 4).

Finfish - Artisanal Large Boat (expect shark): This fishery includes gillnet, handline and circle seine vessels. The gillnet vessels range from nearshore up to 35 - 40 kilometres off shore. The circle seine vessels operate nearshore in the Corentyne River area. The handline fishery takes place further out along the shelf slope (60 - 100 km). The gillnet catches include grey snapper, sea trout, snook, tarpon, and gillbacker. The circle seine fishery is directed at bashaw but also catches snook and various catfish. The handline fishery is directed at red snapper and grouperl. Most of the catch is sold to the industrial processors to be frozen for export. Recent catches have been about 20,000 tonnes (Figure 5).

Finfish - Industrial Trawlers: The catch of finfish by the industrial trawlers has been about 10% of the total finfish catch, ranging beetween 2000 and 3000 tonnes. Main species caught are bangamary, bashaw, sea trout, lane snapper, cavalli. There is a bycatch of prawn handled as described above.

Most of this catch, though landed at the industrial processors makes its way into the domestic market through vendors or cottage processors (Figure 6).

Shark: This is part of the artisanal gillnet fishery. Most of the catch is sold to cottage processors who produce a salted product for export and domestic sale. Recent catches have been a small but increasing proportion of the total finfish catch (Figure 7).

THE FLEET AND FISHING ACTIVITY

The fleet can be broken down into three main groups: industrial trawlers, small artisanal boats, large artisanal boats.

The industrial trawlers are about 21 meters in length and are of steel construction. The gear used is a double rigged shrimp trawl with two pairs sometimes used at together. There are 59 US vessels, 6 Japanese and 54 domestically owned.

The small artisanal fishing boats are narrow, flat bottomed "Guyana boats" ranging in length from 6 to 9 meters. They are powered by sail and/or outboard motor with fishing trips lasting about 12 hours. Sometimes two trips are made in a day depending on demand. These vessels are used for the chinese seine, pin seine and caddell line fisheries.

The large artisanal boats fall into two subgroups - open Guyana boats of 10 - 15 meters powered by outboard motors, and decked keel boats of 15 - 18 meters powered by inboard engines. The former use gillnets or circle seines; the latter, gillnets or Chackalall and Dragovich (1979).

The industrial trawlers land their catches at the industrial plants, the Greater Georgetown Cooperative Wharf and other wharves in the Demerara River.

The artisanal boats land their catch at the artisanal fish port complexes and at more than 100 smaller landing sites scattered along the coast.

There are 8 new fish port complexes built since 1987 with one more planned. These are managed and operated by the fisherman's cooperative within whose boundary they fall. Facilities, available to members and non-members include boat, ramp, wharf, ice, storage and repair facilities. Landing at these facilities presently account for less than 50% of the artisanal catch, this proportion is expected to grow as more of them become fully operational.

CURRENT DATA COLLECTION

Personnel: Principal Fisheries Officer
2 Fisheries Officer
Agricultural Assistant (Fisheries)
2 Fisheries Field Assisstants
Data Collector

Transport: One 4 X 4 pickup truck.

Industrial Fishery:

Vessel log books - each trawler must complete a vessel log as a condition of licence. These record catch and effort by species by day. Coverage is complete but there is concern for the quality of the data. Boat owners without plants supply monthly production summaries.

Plant log Book - The plants also complete log books as a condition of their plant licence. These records catch per trip species and vessel. They also report summary information on the fish purchased from artisanal fishermen and their export sales.

Export - Plants have annual export licences and report monthly export sales. Other exporting is done by individual shipment licence. Customs and exise figures are compared to these to determine usage.

Artisanal Fishery:

Vessel log books - Vessel logs are given to all licence holders but at present they are not generally completed or submittted. From 1982 to 1985 they were collected through the coops with about a 50% rate of return.

Frame surveys - Complete frame surveys of the artisanal fishery are carried out every 5 to 7 years. The last survey was completed in 1987. Another is planned for later this year (1992).

Catch estimates - Total artisanal catch is estimated by multiplying an estimated per vessel catch by gear by the number of vessels of the gear type determined from the frame survey.

THE DATA COLLECTION SYSTEM

Data collection tools

For Guyana, the main data collection tool willkl be the vessel log books. There are several reasons for this. Presently, all industrial trawlers complete logs of all fishing activity. Many of the artisanal fishermen have also used log books in the past. Therefore there has been a reasonable amount of experience with the tool and for the industrial fishery it is accepted as part of the licensing procedure.

Though there are many landing sites, each has a limited geographical extent. A single sampler could monitor all landings in a day and have access to catch for more detailed sampling.

Once landed the artisanal catch is widely dispersed and could not be tracked. Thus the best access to the catch and effort information is through vessel logs and at landing sites.

Operation Plan

It would be possible to base the catch and effort data on a complete census using vessel logs in both the industrial and artisanal fisheries.

In the industrial fishery, there is already complete coverage by vessel log books. There appears to be some problems with quality. Since the log book must be submitted to obtain a licence, it is felt that some boat owners complete them just before submission and not during the fishing operation. Some means of monitoring and more frequent submission will be required. The plant logs already provide one cross check on the total reported catch by tghe vessel and species group.

As in the 1982 to 1985 period the coops could be used as central collection sites for log books from the artisanal fishery. Again there will be a requirement for monitoring and training. Since there is a flat monthly fee for the use of facilities at the coop run complexes, there is not presently a requirement to routinely weigh landings. If this could be done, there would be a regular check on the total weight reported in the log.

For independent artisanal fishermen who do not use the fish port complexes, there would be a requirement for monitoring and the collection of log books.

A process would then be required to collect the log books from plants, vessel owners cooperatives and independents and to monitor the quality of the data submitted.

At all landing sites the catch information can be monitored at acccuracy. A visual check would also confirm that the species breakdown was resonable. At most landing sites, this check could probably be done for all landings on a single day. A team of two or three might be required to handle all landings at the Greater Goergetown Wharf.

As a more detailed check, landings could be weighed by species. For many of the landing sites, it would not be possible to complete a detailed weighing of all landings in one day and a random sample would have to be taken.

The plant logs can be used to provide the high level check for industrial vessels. With training this could also be regularly done by the coops for artisanal boats landing at the port complexes. For the small sites this would have to done by Fisheries Department staff or trained data collectors. As staff are trained, the set of landing sites could be subdivided between samplers.

Therefore the monitoring and collection system could take the following form:

- At regular intervals landing sites are randomly selected for monitoring. The frequency of inclusion in the sample should be set differently for plants, port complexes and other sites depending on the quality of regular local monitoring.

- From this trip schedule is developed. Sites not selected could be visited to pick up log book records.

- At each selected site, a complete census would be done of the vessels landing during the day to visit. Total catches would be weighed and the species breakdown would be estimated by eye.

- At regular, but less frequent intervals, full species weights would be taken. This would require a subsampling scheme to select a random sample of landings. The scheme would have to take into consideration the expected number of landings at the site visited.

DISCUSSION

Because of the controlled landing sites and experience with log books, setting up a sampling procedure for Guyana should not be difficult. It will be important to develop a

good sampling scheme for the random selection of landing sites and subsamples of landings when required. The success of the proposed plan depends on the availability of enough resources to allow a high enough frequency of monitoring to ensure adequate quality of log book data.

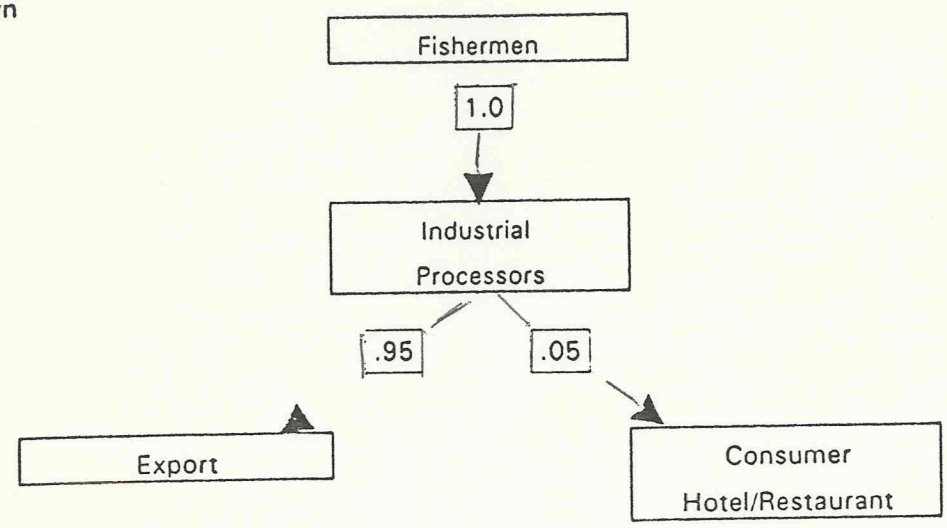
REFERENCES

Chackalall, B. and A. Dragovich. 1979. Artisanal Fishery in Guyana. pp. 43-55. Contribution no. 82-16M, Southeast Fisheries Center, National Marine Fisheries Service, NOAA, Miami, USA.

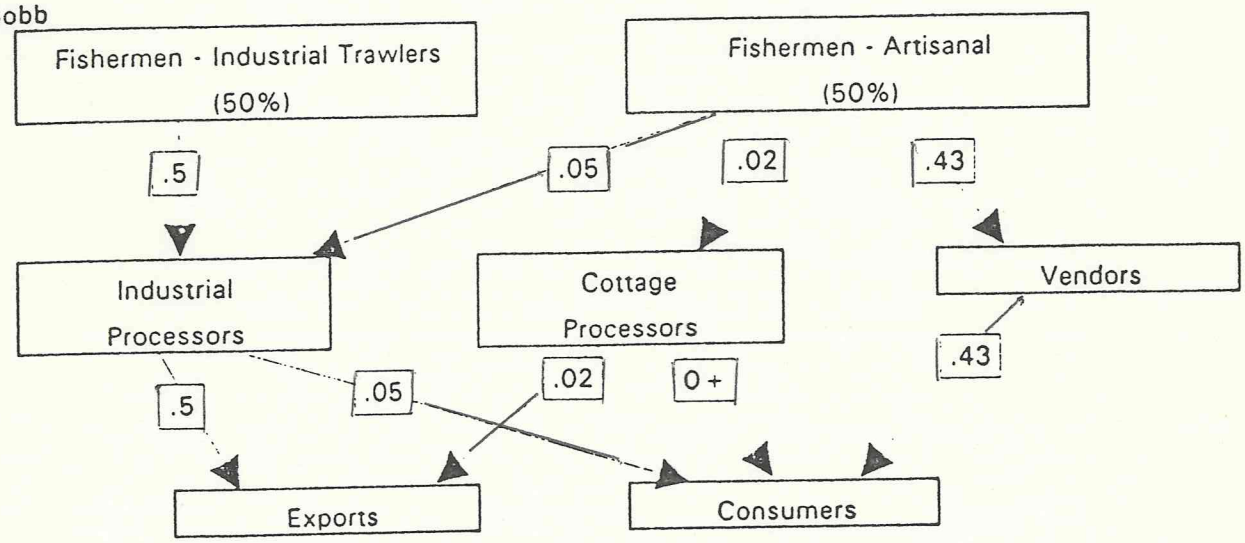
Mahon, R. and C. Stamatopoulos. 1988. Developing data collection systems for eastern Caribbean islands. pp. 6-17, In: R. Mahon and A.A. Rosenburg (ed). Data Collection Systems for Eastern Caribbean Islands. OECS Fishery Report No. 2.

Figure A4.1 Fisheries Product Distribution Pathways in Guyana

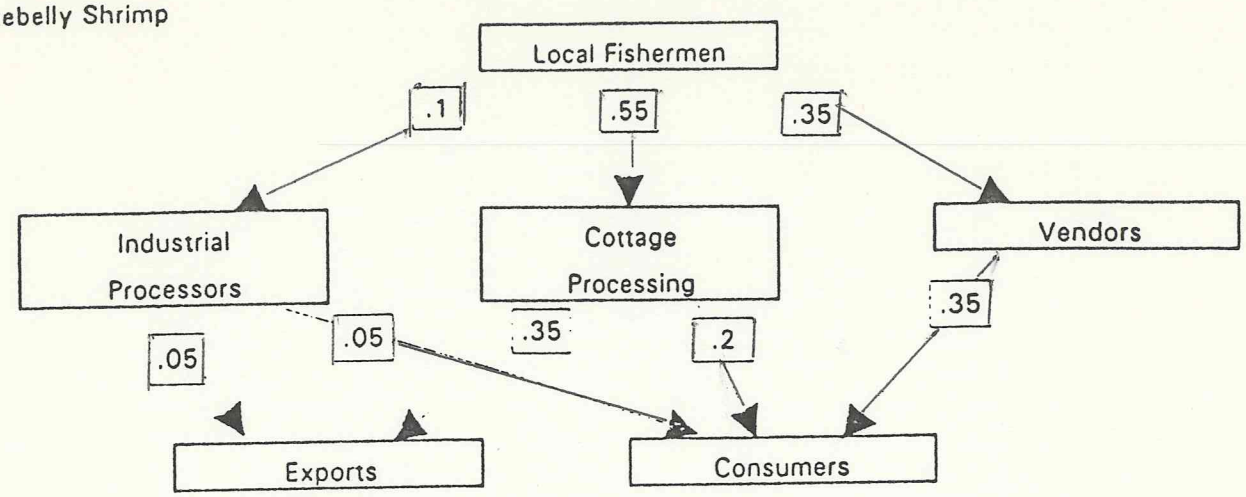
1. Prawn



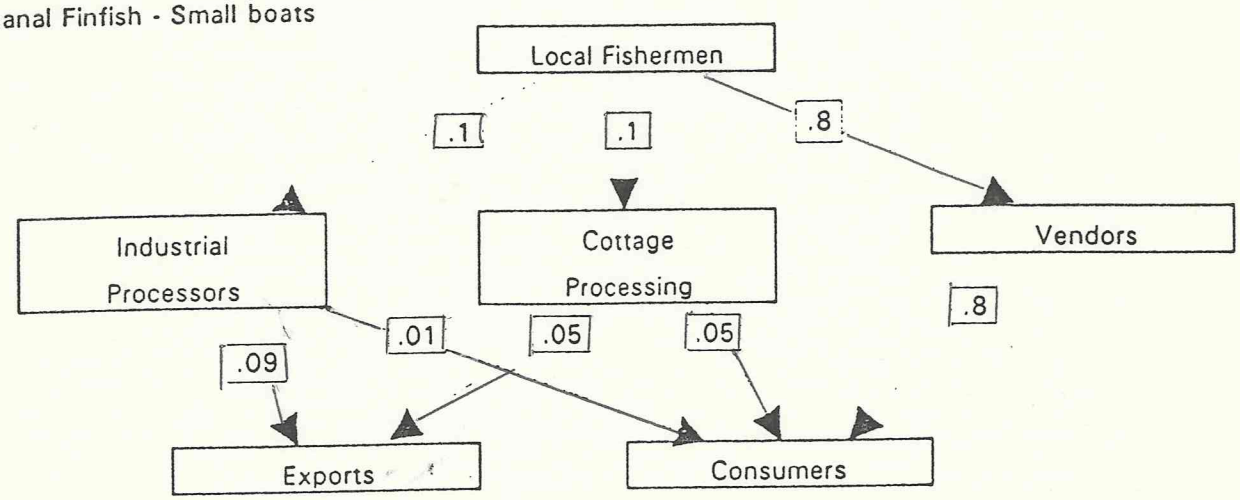
2. Seabobb



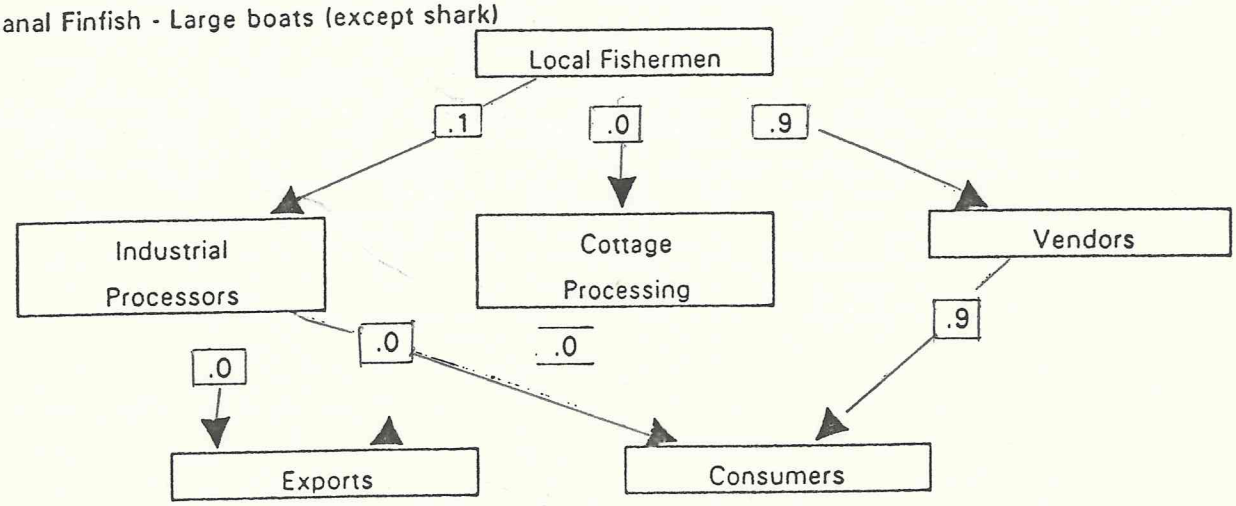
3. Whitebelly Shrimp



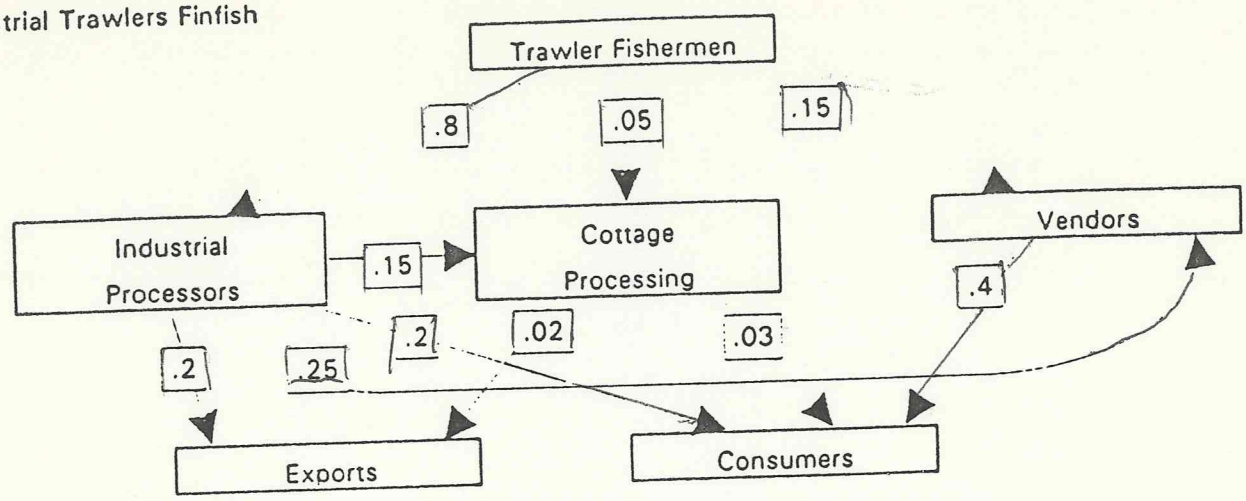
4. Artisanal Finfish - Small boats



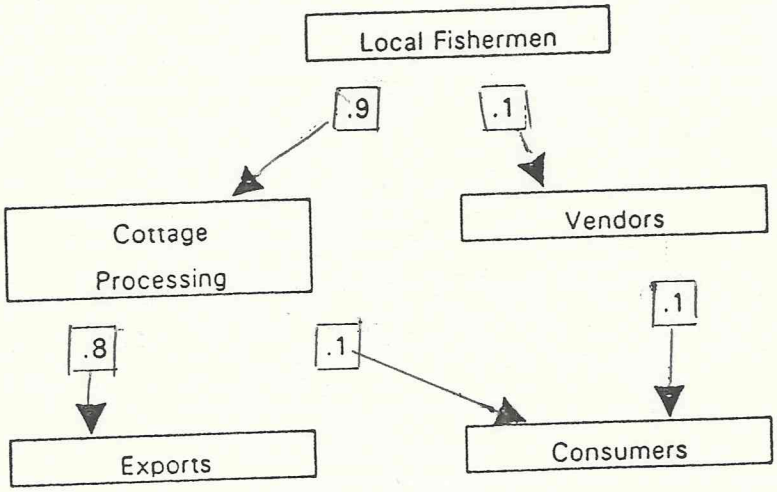
5. Artisanal Finfish - Large boats (except shark)



6. Industrial Trawlers Finfish



7. Shark



TRINIDAD AND TOBAGO
CATCH AND EFFORT DATA COLLECTION SYSTEM

This paper on the data collection system of Trinidad and Tobago will be divided into two sections. The first section will cover a brief description of the components of the fishing industry and the existing data collection system and the second section will deal with the proposed system which is now being implemented for Trinidad and a proposed system for Tobago.

THE FISHING INDUSTRY OF TRINIDAD
FISH AND FISH DISTRIBUTION

A brief description of each fishery type follows:

Shallow and coastal pelagics : The main species consist mainly of Carite, Kingfish and Cavalli (see Appendix 1) and these are caught mainly by Gillnets, Hand lines and to a much lesser extent Beach seines using artisanal vessels(pirogues).

Offshore and deepsea pelagics: The main species consist of swordfish, Kingfish,Cavalli, Shark and Tuna and are caught by pelagic longlines using commercial and multipurpose vessels.

Coastal Demersal: The main species consist of Redfish, Croakers,Salmon are caught by demersal gillnets, longlines, handlines and to a much lesser extent beach seines. The vessels used are artisanal vessels (pirogues)

Offshore and deepsea demersals: The main species are Redfish (snapper), grouper and tilefish and these are caught using demersal longline. The vessels used are commercial longliners and multipurpose vessels.

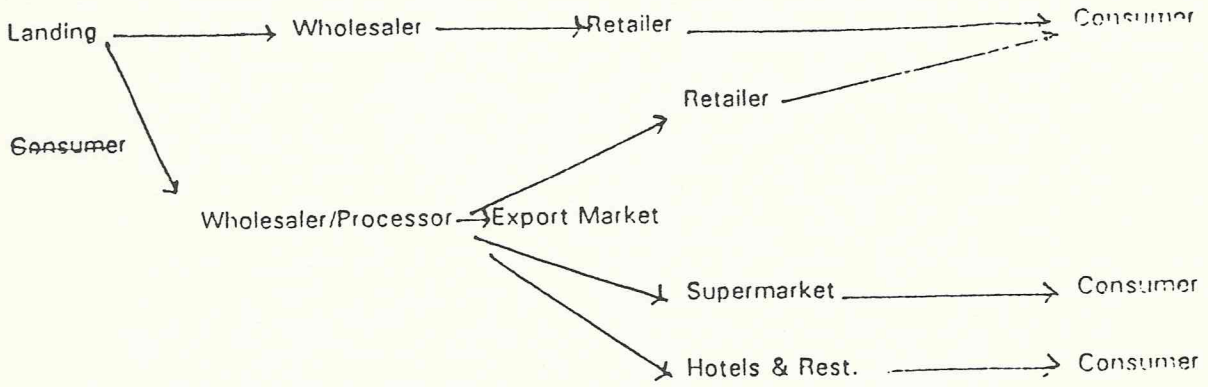
Shellfish: The main specie of shell fish, Shrimp is caught using trawlnets. The vessels used are artisanal in shallow coastal areas and commercial trawlers in deeper waters.

FISH DISTRIBUTION SYSTEM

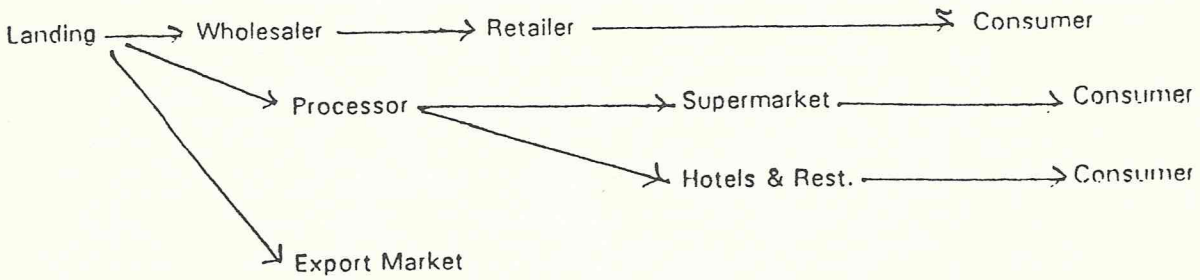
The major portion of local landings which is consumed locally is sold as fresh fish in the round. There are three wholsale fish markets where wholesaling activity takes place, these are Port-of-Spain, Orange Valley and San Fernando.

San Fernando and Orange Valley also operates as a retail fish market. The marketing channels between the fisherman and the consumer are given below

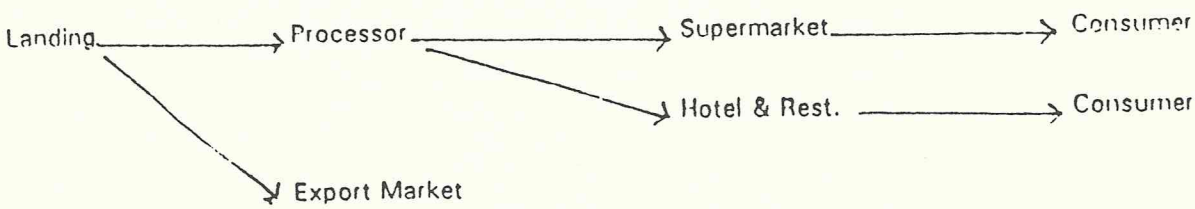
LOCAL ARTISANAL



LOCAL COMMERCIAL



FOREIGN COMMERCIAL



THE FLEET AND FISHING ACTIVITY

The fishing fleet of Trinidad consists mainly of artisanal type open vessels powered by outboard motors. However there are commercial type vessels which consist of multipurpose fishing vessels (pots and longlining) longliners and trawlers. Foreign vessels which fish offshore for both demersal and pelagic species are included.

The local artisanal fleet engage in linefishing, longlining, gillnetting, other net fishing (including seining) and trawling.

LOCAL ARTISANAL FLEET - TRINIDAD

GEAR	TRINIDAD # VESSELS	TOBAGO # VESSELS
Flyingfish Netting	-	39
Line fishing	482	139
Longlining	40	0
Gillnetting	379	14
Other Net fishing	53	25
Shrimp Trawling	151	0
Pot Fishing	48	22
Diving	12	5
Unknown	190	15
TOTAL	1355	259

The local commercial fleet engage in longlining, pot fishing and trawling. The long lining vessels fish for both demersal and pelagic species. The trawlers are mainly directed at the shrimp fishery and consist of large vessels of sixty feet and longer and vessels of between forty and sixty feet. Multipurpose vessels fish for pelagic and demersal species using fish traps (pots) and longlines.

LOCAL COMMERCIAL FLEET

GEAR TYPE	TRINIDAD	TOBAGO
Trawling Large	22	0
Trawling Medium	8	0
Longlining	7	0
Multi-purpose	14	1
TOTAL	51	1

LOCAL RECREATIONAL FISHING

The local recreational fishing fleet range from open artisanal vessels powered by outboard motors to fully equipped cabin cruisers 50 feet in length. These vessels engage mainly in line fishing and gillnetting. The extent of their fishing activity can be classified as part-time fishermen.

LOCAL RECREATIONAL FISHING FLEET - 413 FISHING VESSELS IN TRINIDAD AND 24 IN TOBAGO

FOREIGN FLEET

The foreign fleet which is based permanently in Trinidad consists of Tiwanese vessels which fish mainly for Tuna which is exported.

TIWANESE TUNA VESSELS 12

OTHER FOREIGN FISHING

Fishing by foreign vessels (Venezuelan) is conducted under the Trinidad and Tobago and Venezuela Fishing Agreement. Line fishing is conducted by these vessels on the North and East Coast for demersal and pelagic species and trawling on the South Coast for shrimp.

Fishing is also done by foreign flagged vessels in which Trinidad and Tobago nationals have an interest.

LANDING SITES

There are 103 landing sites in the Country. The Main Landing beaches are:

Port of Spain	National Fisheries (commercial vessels)
Carenage	Maracas
Las Cuevas	Blanchisseuse
Matelot	Toco
Salibya	Manzanilla
Ortoire	Guyaguagare
Moruga	Erin
Icacos	Fullerton
Bonasse	Otaheite
San Fernando	Carli Bay
Orange Valley	Brickfield

See Map on Attachment A.

FISH PROCESSING

There are ten (10) fish processors operating in Trinidad. The largest fish processing facility is presently owned by the Government of Trinidad and Tobago and is situated at Sea Lots Port-of-Spain. The other nine fish processors are comparably small operations.

CURRENT DATA COLLECTION SYSTEM

Data is presently collected from 15 landing sites. On ten beaches data is collected from each fishing vessel on a boat by boat basis every day On another five fishing beaches data is collected every other week.

The information collected included:

(1) The registration number of the fishing vessel
(2) Fishing area
(3) Number of crew
(4) Time left to go fishing
(5) Time returned from fishing
(6) Species caught by quantity recorded by weight
(7) Prices paid by purchaser for each specie
(8) Date of record

This information collected is entered on printed forms supplied by the Fisheries Division. The completed forms are submitted to the Fisheries Division on a Fortnightly basis (see Attachment).

Recently Log books were introduced to commercial vessels (trawlers) and shortly will be extended to other commercial vessels.

LANDING BEACHES WHERE DATA IS COLLECTED FULLTIME

Maracas	Blanchisseuse
San Fernando	Erin
Icacos	Fullerton
Bonasse	Orange Valley
Port of Spain	Cumana

LANDING BEACHES WHERE DATA IS COLLECTED PART TIME

Carenage	Otaheite
Moruga	Mayaro
Manzanilla	

See Attachment A

DRAFT OUTLINE OF REVISED BEACH LANDINGS CATCH AND EFFORT SYSTEM FOR TRINIDAD

Preamble:

In a review of the existing system, it was determined that generally adequate data were being collected at the sample landing sites, but no provision existed which allowed these data to be used to estimate the landings at the other landing sites. As such the national catch and effort statistics being produced are substantial under-estimates. In addition the analysis of the data has not yet been computerised, which in turn has prevented the timely production of statistical tables required for fishery management and development purposes.

The revised system, which is summarised in the following sections, is designed to provide estimates of the catches (by species and gear type category) and fishing efforts, separately for all landing sites. The computer software needed to operate the system has been written, and is presently being tested. Its design also provides for summarising the historical data collected under the existing system.

The commencement of data collection associated with the revised system is proposed for January 1, 1992; in which case the first tables of catch and effort statistics from this system should be available before the end of February. The entry of historical data onto computer files has commenced, and tables of statistics should be available in early January.

Landing Sites:

As a precursor to designing the revised system, a census was undertaken in November, 1991, to determine the number and characteristics of the fishing units at all landing sites. Using these data, nine (9) groups of landing sites were identified (see Attachments A and B). This was done with the objective of having landing sites in each group which were similar in respect to the gears being used, species caught and catch rates.

In respect to each of these groups, one (1) or more landing sites were chosen, at which catch and effort data are to be collected. The total number of these sample landing sites is 24, which represents some 31 percent of the total of 77 landing sites around Trinidad. (The number of sample landing sites within the present system is 14.)

Manpower Requirement:

The design of the revised system envisages the employment of 24 data collectors; 18 full-time and 6 part-time. The number of data collectors presently employed is 9 full-time and 5 part-time. In the absence of the necessary additional staff, it would be necessary to re-group the landing sites. This would be associated with a substantial decrease in the quality of the final estimates of catches and efforts.

Data is expected to be collected on each of the five (5) working days per week. An exception to the above, is in respect to those Group 1 landing sites, at which there are recreational fishing units (eg. Yacht Club, Power Boats, Island Home and Alcan). At these sites, data are to be collected for a selection of days in each week which includes weekend days. This is in recognition that much of the recreational fishing is done at weekends.

At 9 of the sample landing sites (Toco, Matelot, Balandra, Salybia, Ortoire, Manzanilla, San Fernando Yacht Club, Carli Bay and Brickfield), the number of fishing units as identified by the census are relatively modest. At these sites the use of part-time data collectors is proposed, in which case the data are to be collected during alternate weeks.

The data collectors are required to remain at the landing site for the full duration of each sample day, in order that a record be kept of all the landings made on these days.

Data Requirement:

Wherever possible, catch and effort data are to be recorded in respect to all the landings on each sample day. This extent of coverage is being achieved under the existing system.

At those sites where total enumeration proves impractical, an appropriate sampling regime is to be introduced, whereby catch and effort data are to be collected for a representative sample of the landings, on each sample day. The total number of landings in respect to each gear type separately is also to be recorded (on the same data form).

The design of the form for recording data and an example of a completed form, are given in Attachments C and D. In recording the names for each species type, the data collectors would attempt to use the common names given in Attachment E. The recording of landed weights, is to be according to the species type groupings as determined by the sorting practices of the fishermen themselves. Likewise, in recording gear types, the data collectors would refer to those types given in Attachment F.

Data Analysis:

The completed data forms would be expected to be available within the Fishery Statistics and Economics Section in Port of Spain within two weeks of the month in question. This would allow the data editing and entry into the computer to be completed during the next three (3) weeks, followed immediately by the production of the summary tables of statistics. The latter is subject to the availability of adequate numbers of data entry staff and computer entry sites.

The proposed procedures of analysis are as depicted in the example shown in the Attachment G. The first stage (Column A) involves grouping the landed weights by species for each gear type; also grouping the associated number of landings, and the landed weight per landings; all in respect of the sample fishing units.

The estimates of the landed weights and number of landings in respect to all the fishing units landing on the sample days (Column B) requires multiplying the values for the sample units by raising factors (RF). A separate raising factor, defined as follows

RF = (total number of landings)/(number of sample landings)

is to be used in respect to each gear type.

Estimates for all the days in the month (Column C) requires multiplying the values for the sample days by the following raising factor.

RF = (total days in the month)/(sample days in the month)

The assumption here is that the landings on the sample days adequately represent the landings for all days.

The next stage is to make estimates for each of the non-sample landing sites, within the same group of landing sites (Column D). This can be done by multiplying the monthly estimates for the sample sites by the raising factor

RF = (fishing units at non-sample site)/(fishing units at sample site (s))

The data required for estimating this raising factor are available from the census of fishing units undertaken in November, 1991.

System Output Tables:

Tables of statistics would be produced from the computer output, following the end of each month. Following the end of each year, these would in turn be used in producing an annual compilation of tables, which could then be printed for subsequent distribution. The tables that might be included in the annual compilation are given as follows:

Monthly tables for each gear type separately and combined

(a) landed weight by species type for each landing site; including number of landings by landing site
(10+ tables)

(b) landed weight per landing by species type for each sample landing site
(10+ tables)

Annual tables for each gear type separately and combined

(c) landed weight (species combined) by month for each landing site
(10+ tables)

Annual tables for each gear type and landing site combined

(d) landed weight by species type and month.
(1 table)

System Operating Costs:

The additional cost above that for the existing catch and effort system is $TT 177,974.

	Revised System	Existing System
Office Staff	164,096.00 (8)	164,096.00 (8)
Field Staff - Full Time	334,873.00 (18)	165,927.00 (9)
Field Staff - Part Time	56,447.00 (6)	47,419.00 (5)
Vehicle Maintenance	11,000.00	11,000.00
Office Supplies	10,000.00	10,000.00
Miscellaneous	9,000.00	9,000.00
TOTAL	585,416.00	407,442.00

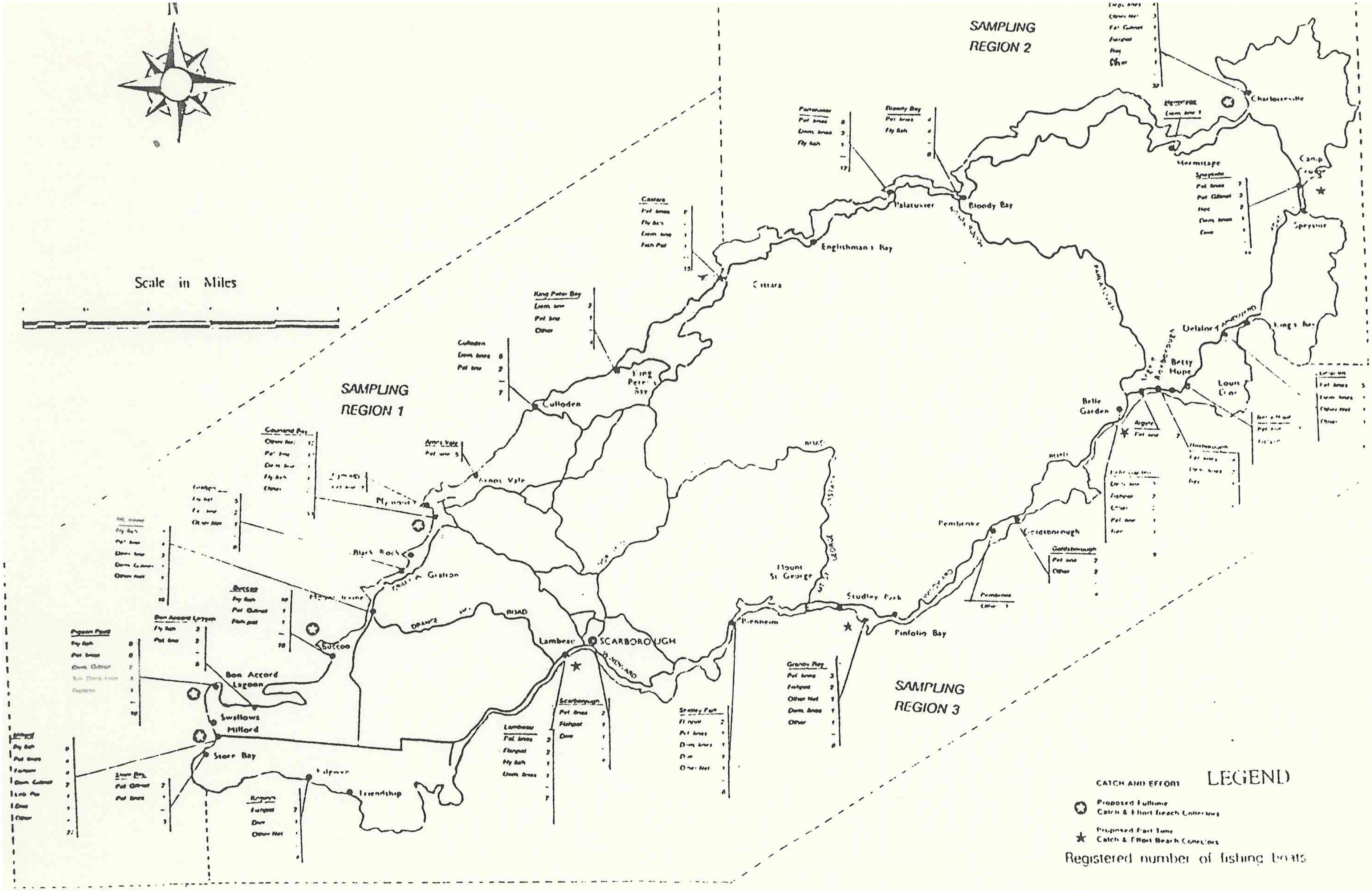
Note: Staff numbers are shown in brackets.

Census of Fishing Units:

In an earlier section it was mentioned that to get estimates for the non-sample sites, from the observed data for the sample sites, the total number of fishing units at all landing sites is required. This information is currently available from the census of fishing units undertaken in November, 1991. It would be necessary to update these census data, however, by repeating the census at roughly annual intervals.

Species/Size/Age Sampling System:

The catch and effort system proposed here, is not intended to provide the detailed species composition of the landings, nor the sizes or ages of the fish in the catches, nor catches per unit effort (other than catch per landing). These data are to be derived from a separate species/size/age sampling system, which will be described in a separate document.


N
Scale in Miles
SAMPLING REGION 1
SAMPLING REGION 2
SAMPLING REGION 3
Charlotteville
Hermitage
Camp Fort
Speyside
Bloody Bay
Englishman's Bay
Castara
Culloden
King Peter's Bay
Arnos Vale
Black Rock
Plymouth
Buccoo
Bon Accord Lagoon
Swallows
Milford
Store Bay
Friendship
Lambeau
SCARBOROUGH
Mount St George
Studley Park
Pinfold Bay
Pembroke
Goldsborough
Belle Garden
Betty Hope
Delaford
Kings Bay
LEGEND
CATCH AND EFFORT
Registered number of fishing boats

SAMPLE LANDING SITE AND DEPLOYMENT OF DATA COLLECTORS

GROUP	TOTAL NO. OF LANDING SITES	NO. OF SAMPLE LANDING SITES	IDENTITY OF SAMPLE LANDING SITE	NO. AND TYPE OF DATA COLLECTOR
1	27	3	Yacht Club Carenage Sea Lots	(3) Full time Full time Full time
2	10	4	Blanchisseuse Maracas Toco Matelot	(4) Full time Full time Part time Part time
3	3	2	Balandra Salybia	(2) Part time Part time
4	11	4	Guyaguagare North Manzanilla Ortoire Plaisance	(4) Full time Part time Part time Full time
5	7	1	Grand Chemin	(1) Full time
6	4	1	Erin	(1) Full time
7	16	3	Bonasse Fullerton Icacas	(3) Full time Full time Full time
8	14	2	Otaheite San Fernando San Fernando - Yacht Club	(3) Full time Full time Part time
9	11	3	Orange Valley Brick Field Carli Bay	(3) Full time Part time Part time

Landing Site	Date day month year	Date Collection Start Time	End Time

Registration No.										
Trip Start Date										
Trip Start Time										
Trip End Time										
Gear Type										

(Indicate Whether Weights in kg or lb)

1. Carite										
2. Kingfish										
3. Cavalli										
4. Red Fish										
5. Herring										
6. Shark										
7. Shrimp										
8. Salmon										
9. Moonshine										
10. Paoua										
11. Ancho										
12. Jacks										
13. Bonito										
14. Mullet										
15. Cro Cro										
16. Jashua										
17. Flying Fish										
18. Grouper										
19. Tuna										
20. Lobster										
50. Mixed Fish										
51. Unknown										

Landing Site ERIN Date 7-1-9 Date Collection Start Time 02:00 End Time 17:00

Registration No.	S 1509	H 292	S 803	S 1967	S 1859	S 1650	S 1768	S 1857	N/A	S 752
Trip Start Date										
Trip Start Time	16:00	17:00	06:00	06:00	06:00	07:00	07:00	04:00	06:00	05:00
Trip End Time	02:00	16:00	16:00	14:00	17:00	14:00	16:00	14:00	14:00	15:00
Gear Type	FILLET	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS

(Indicate Whether Weights in kg or lb)

1. Carite				64			31			
2. Kingfish										
3. Cavalli										
4. Red Fish										NO FISH CAUGHT
5. Herring										
6. Shark										
7. Shrimp										
8. Salmon										
9. Moonshine										
10. Paoua										
11. Ancho	420			92						
12. Jacks										
13. Bonito										
14. Mullet										
15. Cro Cro										
16. Jashua										
17. Flying Fish										
18. Grouper										
19. Tuna										
20. Lobster										
50. Mixed Fish										
51. Unknown										

COMMON NAMES OF FISH SPECIES

1. Carite
2. Kingfish
3. Cavalli
4. Red fish
5. Herring
6. Shark
7. Shrimp
8. Salmon
9. Moonshine
10. Paoua
11. Ancho
12. Jacks
13. Bonito
14. Mullet
15. Cro Cro
16. Jashua
17. Flying fish
18. Grouper
19. Tuna
20. Lobster
50. Mixed fish
51. Unknown

LISTING OF GEAR TYPES

1. Trawlnet (Type 1)
2. Trawlnet (Type 2)
3. Monofilament Pelagic Gillnet
4. Monofilament Demersal Gillnet
5. Multifilament Pelagic Gillnet
6. Multifilament Demersal Gillnet
7. Beach Seine
8. Italian Seine
9. Other Nets
10. Banking
11. A la Vive
12. Switchering
13. Troll line
14. Pelagic Longline
15. Demersal Longline
16. Pots (Fish and Lobster)
17. Other Gears

EX VESSEL FISH PRICE REPORT

Name of Collector: _____

Landing Site: _____ Month: _____

	Week 1	Week 2	Week 3	Week 4	Average Price
Sample Date					
	DD/MM/YR	DD/MM/YR	DD/MM/YR	DD/MM/YR	
1. Carite					
2. Kingfish					
3. Cavalli					
4. Redfish					
5. Herring					
6. Shark					
7. Shrimp					
8. Salmon					
9. Moonshine					
10. Pacua					
11. Ancho					
12. Jacks					
13. Bonito					
14. Mullet					
15. Cro Cro					
16. Jashua					
17. Flying Fish					
18. Grouper					
19. Tuna					
20. Lobster					
50. Mixed Fish					
51. Unknown					

Appendix 6. The Fisheries Data Collection System For St. Lucia

Sarah Jennings-Clark and Williana Joseph
Department of Fisheries
Saint Lucia

This document aims to update the information on the fisheries data collection system operating in St. Lucia, highlighting changes made to collection and compilation methodology in the last year.

THE FISHERY

Shallow and deep water demersals

Hand lines are mostly utilised for catching bank species (snappers, groupers) along with certain coastal demersals such as triggerfish. The traditional bamboo fish trap has been largely replaced by wire mesh traps, maintaining the Antillean Z-style construction. Mesh size is predominantly 1¼", with a number of 1" mesh traps also being used. New fishery regulations now require a transition to 1½" minimum mesh size. Trammel nets also become an illegal gear under the new fisheries regulations.

Lobsters

Mainly caught with the Antillean fish traps described above and by skin divers using hook. It is illegal to catch lobsters with the use of spearguns, although this practice does continue to a certain extent. A closed season for lobsters extends between May 1st and August 31st. Berried, moulting, and undersized (i.e. carapace length less than 95mm) are also protected by law.

Conch

These animals are mostly taken by scuba divers in depths ranging from 50-80 ft. Shallow adult populations have already been heavily fished, but fishing effort has remained relatively low, with the number of persons involved in the industry remaining small (less than 20 divers). This industry appears to be exploiting only adult conch at present. Illegal demand for juveniles is, however, increasing within the souvenir trade.

Coastal Pelagics

Beach seines are utilised to catch coastal pelagic (e.g. gars, balahoo, jacks, young skipjack, tuna) in several deeply indented bays around the coast of St. Lucia, but more so on the west coast.

Migratory Pelagics

These species make up about 70% of annual landings, and are mainly caught with surface trolling by hand. Most activity occurs towards the east of the island and in the channels in the north and south, with distinct seasonality (catch being high between January and June each year). Experimental longlining is now being aimed at targeting the larger mid-water and bottom pelagics.

Turtles

The open season for sea turtles extends from November 1st to March 31st each year. The local fishery is relatively small. with meat being utilised for food and shells sold to the tourist trade. Size limits exist for the several species, and these have recently been increased. Turtle eggs and nesting turtles are protected year round, although illegal slaughter and egg collection are continuing problems. A complete moratorium on turtle fishing is being considered.

Seamoss

With declines in wild stocks, seamoss cultivation has become a popular commercial activity, mostly in the south of the island. New regulations require permits in order for wild stock harvest or culture activities, and closed areas are now likely to be established to allow for wild stock rehabilitation.

Sea Urchins

After a ten year moratorium following population collapse during the early 1980's, a highly controlled system of limited exploitation has been undertaken. A number of permits are issued annually to responsible urchin divers who operate under strict conditions and assist in pre- and post-harvest population surveys.

Recreational Fishing

No data is formally collected from this fishery, despite its gradual expansion as the tourism sector advances. Local recreational fishermen of the St. Lucia Game Fishing Association do take length frequency and weight information on their catches for entry into a U.S. database. The Department is now in the process of collaborating with this organization so as to receive continual data from this source. Sport fishing businesses will be required to operate under license within the new fisheries regulations, thus data submission will be one of the requirements of such licenses.

Foreign Fishing

Information on foreign fishing activities is still limited. The occurrence of Martinique fishermen fishing for demersals within the EEZ continues, along with reports of a prolific illegal export trade in conch, lobsters, and sea urchins from St. Lucia to this french territory. Vincentian fishermen continue a small level of exploitation of pelagics within St. Lucian waters. Several Barbadian vessels have been found adrift in national waters. A number of Venezuelan vessels have been seized while illegally fishing for bank demersals and pelagics. During the past few years there have been no reports of U.S. swordfish boats within the EEZ, although this may well be still occurring.

THE FISHING FLEET

The predominant wooden dug-out canoes (5-8m) and smaller transoms are gradually being replaced by fibreglass pirogues. The majority of boats are powered by outboard engines. There are some 473 fishing vessels, operated by 1420 full-time and 520 part-time fishermen.

MARKETING FACILITIES

The thirteen major landing sites can be classified as primary. secondary and tertiary (see Fig. 1). The establishment of the St. Lucia Fish Marketing Corporation (with outlets in Dennery and Vieux Fort and headquarters in Castries) has resulted in many of the pelagics and bank fishes being caught by areas such as Laborie, Choiseul, Canaries, Anse-La-Raye, Micoud, and Gros Islet now being landed and sold in Castries, Vieux Fort and Dennery. Most fishing communities spend the first half of the year targeting migratory pelagics, and then concentrate on demersal species during the "low season". Some sites, such as Banannes) tend to concentrate on demersal fishing all year round, but the recent prevalence of pot theft has discouraged many sites from continuing in this fashion. To better facilitate the sale of fish, a Japanese-funded project has set up market facilities and upgraded landing facilities within many fishing communities.

PROCESSING

The St. Lucia Fish Marketing Corporation undertakes primary processing of fish for wholesale to hotels and supermarkets and retail sale to the public. The Department of Fisheries is investigating additional processing techniques (e.g. smoking, salting, prickling, etc.).

THE DATA COLLECTION SYSTEMS

Eleven data collectors are currently employed by the Department of Fisheries to collect catch and effort data and length-frequency information at major landing sites. Persons are employed to work eleven eight-hour days every fortnight, with at least one day given over to data transcription. Unfortunately, poor salaries have had a negative effect on workers dedication, and this is often reflected in the quality of data acquired. As a move to improve data quality, the Department has recently initiated several activities:

1) Quarterly training workshops for data collectors where species, gear types and fishing methods are taught. The workshop also provides an ideal opportunity to discuss any problems encountered by the collectors, and to initiate improvements within the data collection system.

2) Monthly working sessions with the data collectors by Departmental officers to review data being handed in and the collector's field techniques for sampling and measuring fish catches. This allows for immediate correction of any data or technique errors.

3) A continuous recording system has been set up to log the dates when forms are received, allowing early detection of data omissions for any landing site and preventing missing months of valuable data.

4) The employment of a full-time data inputter who is also being trained to detect errors on raw data sheets, to use computer error-scanning programs, and to provide tables/figures on demand.

5) M. Gobert and M. Domalin of ORSTROM (Martinique) have collaborated with the Department in producing error-detection and correction programs for use with the local database. Errors such as incorrect species and landing site codes, incorrect gear/species combinations, multiple entries, data omissions, and incorrect boat number sequences can now be easily corrected.

6) In addition to the yellow (catch and effort) and blue (length frequency) forms traditionally used by collectors, a weekly report form has been introduced. This allows for detailed daily information (e.g. severe weather conditions, strong currents, community activities) which may help to explain low levels of fishing effort. In

addition, daily estimates of the number of boats at sea (even on the Collectors day off, sick days and public holidays) are also recorded on this form. Thus, the form is aimed at gaining a better interpretation of annual fishing effort and improving the ability to extrapolate from sampled catch to estimate annual landings.

7) The small length frequency samples used previously, where data collectors measured one small, medium and large fish from each species, have been replaced by attempts to get total length frequency samples of the most common species in the catch.

8) Due to difficulties data collector experience in acquiring accurate information on the areas being fished, the Department developed a simplistic zoning system to categorize all catches according to area fished. For pelagics, two zones were identified: one to the east and one to the west. For demersals and coastal pelagics, three zones were identified: a central-west zone, a north-north-west to east zone, and a south-south-west to east zone (see Fig. 2). Zones were selected based on knowledge of the shelf width, the known fishing areas, and the movements of fishermen from landing sites to fishing grounds. The advantage of these zones is that fishermen are required to give less specific information on where they fished and this will hopefully yield more reliable information.

Notes on Figures 1, 2 and 3 from the 1987 OECS country profile:

Figure 1: The Laborie Filleting plant is no longer operational. A far larger proportion of the catch is now funnelled through the St. Lucia Fish Marketing Corporation.

Figure 2: Approximately half of the total conch landings are illegally exported to Martinique (according to a study done in Martinique, 5 tonnes of adult conch reach this french market each year). All lobster imports are done through the St. Lucia Fish Marketing Corporation. No lobster exports have been authorized for the past few years.

Figure 3: The appears to be an error in the two upper boxes, where fishermen should be in the central box and consumers at the top. A considerable market is now provided for seine fish (sardines) by the Departments prawn culture facility and a few local prawn farmers.

Summary of Needs

Despite a long established data collection system in St. Lucia, it has been recognised that some steps have to be taken to improve the quality of data and our ability to generate better estimated landings from the catch samples throughout the year. In many ways, the degree of our success is largely dependent on "quality" of the data collector. In the past, collectors have depended on a salary of between US$100.00 and US$200.00 per month. This is in the lower part of the range for government daily paid workers.

It is anticipated that the high quality data required for CFRAMP provides an ideal opportunity to upgrade the salaries offered for the job of fisheries data collection. This will allow the Department to acquire competent data collectors (either from existing personnel or from new recruits). It is hoped that an ability to provide the government with better estimates of total fishery production and sound management recommendations will justify government taking over the responsibility of the salary supplements initially paid by the CFRAMP project.

Thus, the requirements of St. Lucia in terms of financial assistance during the CFRAMP project include salary supplements for the existing eleven data collector posts, raising their salaries to a minimum of EC$15.00 (US$5.76) per day. Supplements above this minimum level reflect the intensity of landings between the various sites, thus the required financial assistance is as follows:

Annual costs:

1. Data Collector salary supplements

Landing Site	EC$/month Present salary	EC$/month Proposed salary	EC$/month Increment
Castries	300.08	550.00	249.92
Bannanes	481.58	560.00	78.58
Gros Islet	287.32	330.00	42.70
Soufriere	466.18	550.00	83.82
Choiseul	394.24	484.00	89.76
Laborie	287.32	400.00	112.68
Vieux Fort	398.42	616.00	217.58
Micoud	345.40	440.00	95.00
Praslin	287.32	330.00	48.68
Dennery	552.42	660.00	107.58
			1126.22
		US$	417.11
		Annual cost US$	5005.50

2. New Data Collectors to be added for two years

Landing Site	EC$/month Proposed salary		
Canaries	330.00		
Anse-La-Raye	330.00		
	Annual cost	US$	3046.00
	Total Annual Cost	US$	8051.50

Additional Costs:

Identification materials for each collector (x13) plus D.O.F.:

Reef Identification Book (P. Humann)	@ US$28.00
3 Fish Charts (e.g. tunas, sharks, bank species)	@ US$15.00 each
Weighing scales (kitchen scales and spring balance)	@ US$45.00
Total	US$1652.00

In addition, the problem of poor species identification substantiates the urgent need for proper identification references for reef fishes, migratory pelagics, bank species, and coastal pelagics. Good colour photos (whether in book or chart form) need to be available to each data collector. In the short term, it is envisaged that CFRAMP will need to provide funds for the purchase of available books and fish charts. In the long term, it is hoped that the project can compile a colour reference for the Caricom region.

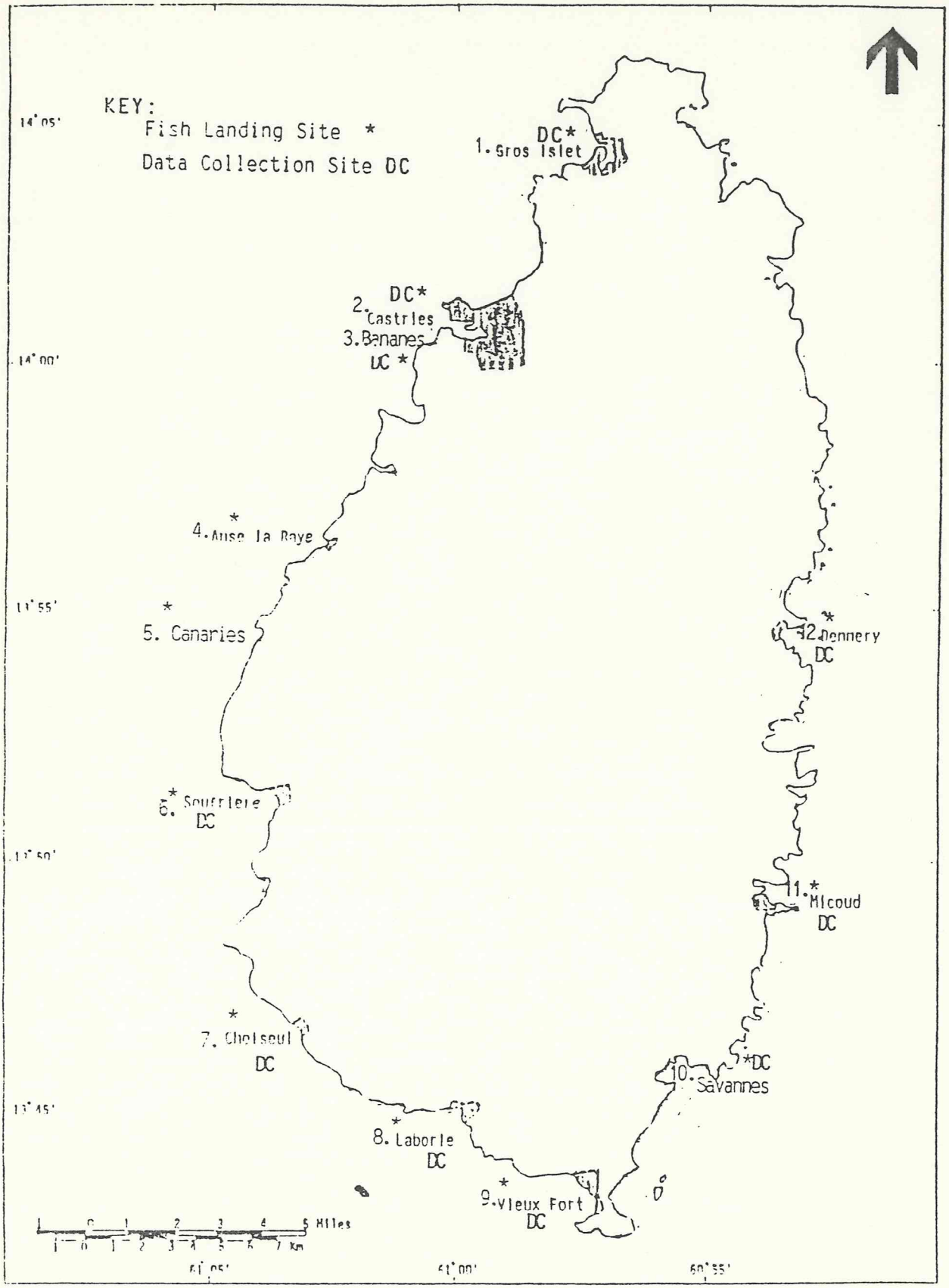
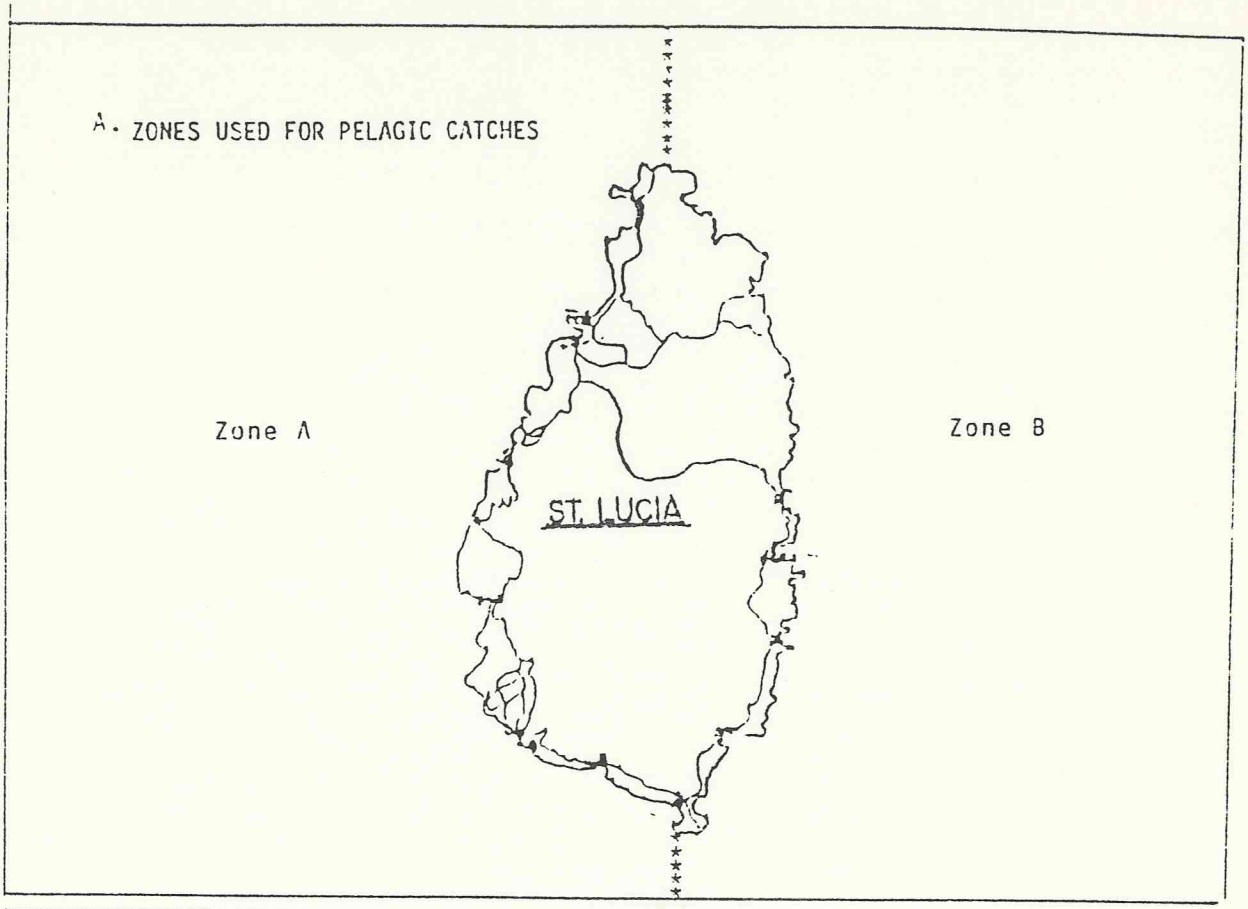


FIGURE 1. The Fish Landing Sites and Data Collection Points for Saint Lucia.



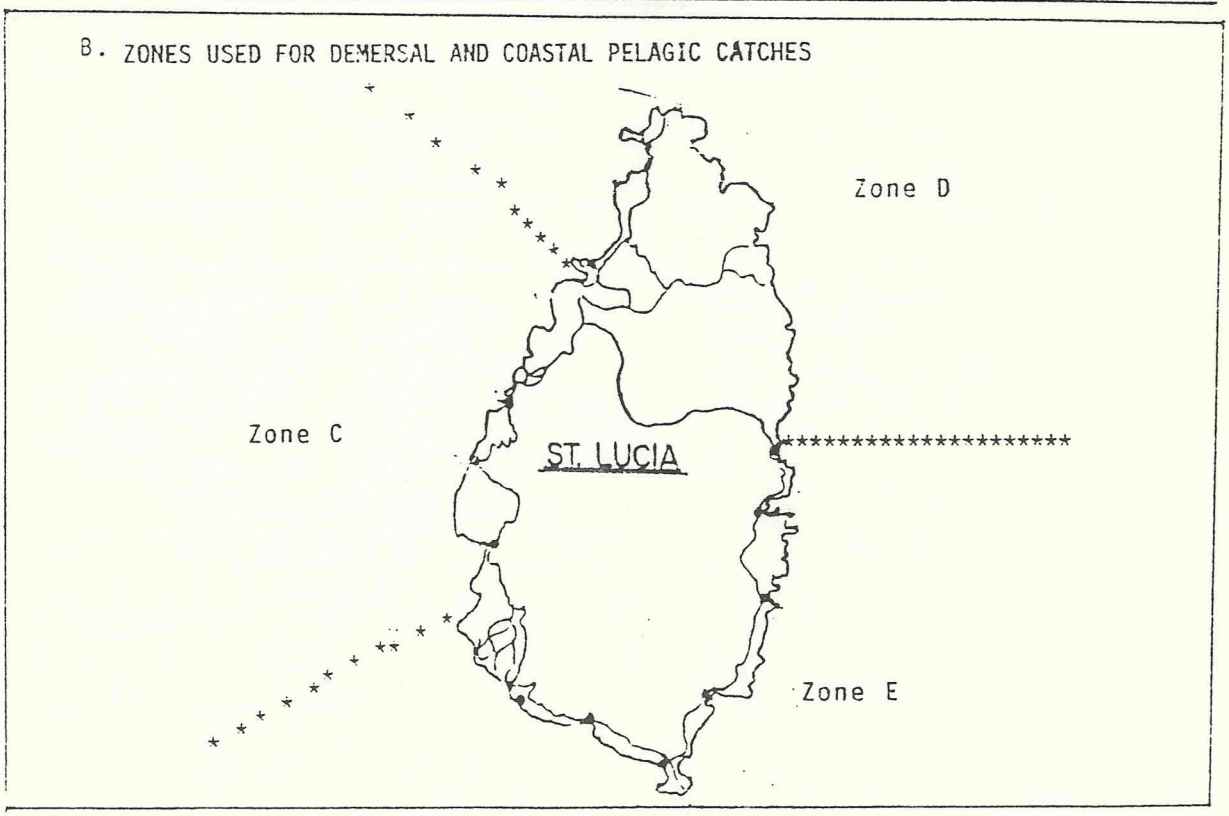
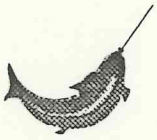


FIGURE 2. Zones Used for Chategorizing Area Fished.

Appendix 7. St. Vincent Data Collection System Update



FISHERIES DATA MANAGEMENT IN ST. VINCENT AND THE GRENADINES

Presented at Data Management Subprojects Specification Workshop

BY Raymond Ryan
F.O. St.Vincent
June, 1992

FISHERIES DATA MANAGEMENT IN ST. VINCENT AND THE GRENADINES

1.0 BACKGROUND

The data management program in St. Vincent and The Grenadines (SVG) is still in its preliminary stages. As data collection is a necessary prerequisite to stock assessment, the process of stock assessment has been impeded.

Prior to 1991, Data Collection in SVG has been primarily limited to of exports and landings at the New Kingstown Market (NKFM). An export figure is obtained from export licenses granted by the Ministry of Trade and Tourism. A total landing figure is easily obtained at the NKFM, since all fish must be weighed in order to collect a landing toll for use of the landing facilities.

Consistent with limited staff and facilities of the fishery Division some information has not been obtained. In particular, the amount of fishing, the catch per unit effort and the biological characteristics. As development of this sector is now planned, the need for information in order to properly implement the development plan necessitates the development of the data management program.

As an integral part of the data collection and management system a sampling programme covering all the missing categories of data will be fully implemented.

2.0 OBJECTIVES

The general objective is to provide data and scientific analyses necessary to assist our resources managers to make resource management decisions. The specific objectives are:

(i) to implement a fish sampling programme which will provide catch effort data, length frequencies, individual weight (size frequency), sex ratio and age composition.

(ii) In order to accomplish objective (i) it will be necessary

(1) To obtain equipment for implementation of sampling programme.
(2) To train data collectors to: (a) take unbiased samples, (b) measure different types of lengths (standard length, fork length, total length), (c) distinguish sexes, (d) learn species code and general usage of the data collection forms.

3.0 METHODOLOGY/WORKPLAN

3.1 Data collection tools (from Mahon and Rosenberg, 1988)

The path diagrams (Figures 1, 2 in Appendix i) show which path segments will be intercepted, and which tools will be used. This information is summarised in Table 1. The data collection tools required are:

a) A sampling program for catches going directly to consumers and onto trading vessels
b) A census for fish passing through the market in Kingstown
c) Purchase slips for hotels, restaurant, supermarkets and charter boats
d) Export records for fish leaving the island
e) Various procedures for estimating foreign catches.

Table 1. Fish disposition pathways and data collection tools (C=catch, E=effort).

Fishery	Path	Tool				
		Sample	Census	Receipt	Logbook	Foreign
Quality	1			C/E		
pelagics and	2	C/E	C/E			
demersals	3				C/E	
	4					C/E
Demersals	1	C/E	C/E			
and seine	2			C/E		
	3					C/E
Lobster	1	C/E				
and conch	2			C/E		
	3					?
	4					C/E

3.2 Completed Activities

3.2.1 DATA COLLECTORS

As part of the development of data management and the related stock assessment, six new Data collectors were recruited. Each of these six persons, along with one existing person from the Division, would be responsible for data collection in a given area. These Data Collectors were trained to take accurate and unbiased data during an orientation period conducted by existing Division personnel. An outline of the orientation program is given in Appendix ii and Appendix iii.

3.2.2 DATA COLLECTION

There is a low level of infrastructural development at many landing sites. The status of each site is indicated by the number of vessels and are allocated as follows:

Primary sites= 40 or more vessels
Secondary sites= 10 to 40 vessels
Tertiary sites= less than 10 vessels

Landing sites of SVG have been divided up geographically into seven zones (Table 2) for the purpose of data collection and extension work. A census was conducted at each of the landing sites running from November 12th to December 31st, a period of 36 days. During this period, only Data Collection Sheet 1 (Appendix iv) was used in a program which allowed a census of the catch to be taken at the landing sites (Appendix v). The Data Collectors only moves to a second landing site after all vessels have ceased fishing activities. The new data collection program is expected to provide maximum information given the present infrastructure and personnel.

3.3. Present Activities

3.3.1 Sampling for catch effort data

A sampling programme for estimating catch and fishing effort has been devised and is considered adequate for all landing sites. In the case of Kingstown an additional record, a total census, would be continued. The seven zones designated for extension work and data collection (Table 2). A Data Collector has been assigned to each zone. In each cluster, landing sites will be stratified according to status, and selected at random from each stratum (Table 2) for sampling on a particular day.

Information will be taken from all boats at random eight hour periods between the hours of 6:00 am and 7:00 pm. These eight hour periods are divided into two four-hour periods with a one hour break for lunch (Table 3). Random selections of days and time are

TABLE 2

ALLOCATION OF TIME AMONG STRATA FOR ST. VINCENT AND THE GRENADINES ASSUMING A TOTAL OF 24 SAMPLING DAYS IN EACH SAMPLING AREA

GEOGRAPHICAL DIVISIONS	LANDING SITES	STATUS	DAYS/MONTHS	PERCENTAGE SAMPLING
ZONE 1	KINGSTOWN	1	12	50
	LOWMAN'S	3	2	8
	CAMPDEN PARK	2	4	17
	QUESTELLES	3	2	8
	CLAREVALLEY	2	4	17
ZONE 2	BUCCAMENT	2	4	19
	LAYOU	2	4	19
	BARROUALLIE	1	14	58
	KEARTONS	3	1	4
	WALLIABOU	3	1	1
ZONE 3	TROUMACA	3	2	8
	DARKVIEW	3	2	8
	ROSEBANK	2	8	34
	CHATEAUBELAIR	2	8	34
	FITZHUGES	3	2	8
	PETITBORDEL	3	2	8
ZONE 4	GREAT HEAD	2	10	42
	INDIAN BAY	3	2	8
	CALLIAQUA	2	10	42
	BIABOU	3	2	8
ZONE 5	OVERLAND	3	6	25
	SANDY BAY	3	6	25
	OWIA	3	6	25
	FANCY	3	6	25
ZONE 6	FRIENDSHIP BAY	3	2	
	PAGET FARM	3	2	
	ADMIRALITY BAY	2	8	8.3
	LOWERBAY	3	2	8.3
	LA POMPE	3	2	8.3
	TRADING VESSEL	3	2	8.3
	BALECEAUX	3	2	8.3
	MUSTIQUE	3	2	8.2
	SAVAN	3	2	8.3
ZONE 7	TRADING VESSEL	3	3	
	CANOUAN			
	GRANDBAY	3	1	
	CHARLES BAY	3	1	
	MAYREAU	3	1	
	TOBAGO CAYS	3	1	
	PETIT ST. VINCENT	3	1	
	UNION ISLAND			
	CLIFTON	2		
	ASHTON	2		

TABLE 3

TIME TABLE FOR DATA COLLECTORS
MAY 1992.

ZONES	1		2		3		4		5		6		7		DATE
	LS	TI	LS	TI	LS	TI	LS	TI	LS	TI	LS	TI	LS	TI	
	KIMA	B	LAYO	C	TROU	C	GRBA	C		D	ADBA	C	CLIF	C	2ND
	KIMA	B	BARR	D	ROBA	C	CALL	C	SABA	D	ADBA	C	ASHT	C	4TH
	CLVA	C	BARR	D	CHAT	D	GRBA	D	BIAB	C	TVES	D	CLIF	D	5TH
	CLVA	B	BARR	B	TROU	B	CALL	B	BIAB	D	TVES	B	SALI	B	7TH
	KIMA	B	BARR	B	PEBO	C	CALL	C	BIAB	B	PAFA	C	TVES	D	8TH
	KIMA	C	BARR	C	CHAT	D	GRBA	D	OWIA	B	FRBA	D	ASHT	D	9TH
	LOWM	C	BUBA	B	DARK	B	GRBA	C	OWIA	D	ADBA	B	TVES	B	15TH
	CAPA	D	WALL	C	ROBA	B	CALL	C	SABA	D	SAVA	B	ASHT	B	16TH
	QUES	B	LAYO	C	FITZ	B	CALL	D	FANC	C	LOBA	B	GNBA	B	17TH
	CLVA	B	BARR	C	ROBA	C	CALL	B	OWIA	D	BRIT	C	CLIF	C	23TH
	KIMA	B	BARR	B	FITZ	B	CALL	D	FANC	C	FRBA	B	CLIF	B	24TH
	KIMA	D	BUBA	C	ROBA	C	GRBA	B	SABA	B	ADBA	C	ASHT	C	25TH
	KIMA	D	LAYO	C	CHAT	D	CALL	D	FANC	D	BALE	D	ASHT	D	16TH
	KIMA	C	BARR	C	CHAT	D	BIAB	D	OWIA	D	BALE	D	TOBA	D	17TH
	CLVA	D	KEAR	D	ROBA	C	INBA	C	SABA	C	PAFA	C	CLIF	C	18TH
	CLVA	C	LAYO	D	ROBA	D	GRBA	D	SABA	D	LAPA	D	TVES	D	19TH
	CAPA	C	BUBA	B	PEBO	D	CALL	D	OVAL	D	LAPA	D	CHBA	D	21ST
	KIMA	C	BUBA	D	CHAT	D	GRBA	B	OVAL	D	LOBA	D	ASHT	D	22ND
	QUES	D	BARR	C	CHAT	B	GRBA	B	FANC	B	ADBA	B	CLIF	B	23RD
	KIMA	C	BARR	C	ROBA	D	GRBA	D	FANC	D	BRIT	D	CABE	D	24TH
	KIMA	C	BARR	C	ROBA	D	INBA	D	OWIA	D	ADBA	D	ASHT	D	25TH
	CAPA	C	BARR	C	CHAT	D	CALL	D	SABA	D	ADBA	D	CLIF	D	26TH
	LOWM	B	BARR	C	DARK	B	GRBA	B	OVAL	B	SAVA	B	ASHT	B	28TH
	CAPA	D	BARR	C	CHAT	B	BIAB	B	OWIA	B	ADBA	B	CLIF	B	29TH

B - Session 1 600 - 1000
Lunch 1000 - 1100
Session 11 1100 - 1400

C - Session 1 800 - 1200
Lunch 1200 - 1300
Session 11 1300 - 1700

D - Session 1 1000 - 1400
Lunch 1400 - 1500
Session 11 1500 - 1900

LS - Landing Site TI - Time

made using the computer program Systat. A total of twenty four numbers (X) are entered and four sets of twenty four probabilities (A, B, C, D) are generated (Appendix vi). The day which corresponds with the largest probability is assigned to primary site within the zone considered. If no primary sites are present in the zone under consideration, the day which corresponds with the largest probability is assigned to a secondary site. The remaining days are assigned to the other sites in alphabetical order, starting with the largest probabilities until each site has its allotted days (Table 2). Estimates of catch effort data will be obtained separately from each boat.

In St. Vincent, Barrouallie is the only primary site outside of Kingstown requiring sampling. The secondary landing sites are Campdem Park Bay, Buccament Bay, Clare Valley Bay, Chateaubelair Bay,Calliaqua, GreatHead Bay and Petit Bordel. The remainder are tertiary sites.

In the Grenadines there are three categories of landing sites: trading vessels, which are sampled in the same way as landing beaches; secondary sites, which include Admiralty Bay on Bequia and Clifton and Ashton on Union Island; and tertiary sites, consisting of all the remaining areas. The sampling schedules for each zone will be drawn separately. In the Grenadines sampling will be handled by an extension officer and a data collector, stationed on Union Island and Bequia respectively. In St. Vincent, sampling is handled by five data collectors. However, as data become available the effort may be reallocated according to the amount of catch landed. After the exploratory analysis, some restratification on a geographical basis may be required.

3.3.2 Census at the Kingstown Market:

It is anticipated that the primary data source for the census at the NKFM will be the landed toll receipts given to fishermen rather than summarized data provided by the market attendants. This additional record will be used as a comparison with data obtained from the sampling program.

3.4 FUTURE PLANS

3.4.1 Computer Programs

For data management it is expected that the TIP program and possibility D-base will be used in the future. The TIP program will be tailored to meet the needs of the Vincentian Fisheries. A modified version of the OECS data base will be used on an interim basis until the more extensive TIP is obtained. Inquiries have been made into the program SAS (Statistical Analytical System) for scientific analysis of data. In particular, stock assessment. SAS has been recommended as a very versatile statistical program.

3.4.2 Fishing License and Registration

Fishing license and registration of fishing vessels will also be implemented in the near future. It will then become mandatory for fishermen to provide the Data collectors with the required information.

3.4.3 Communication

A radio communication system will be installed in the near future. This system will enable vessels at sea to send information directly to the Division's computer system or to personnel at the division.

3.4.4 Purchase receipts at hotels, restaurants, supermarkets, chartered boats

The above Purchasers of fish are to be requested to complete a purchase slip. These will be picked up monthly by the data collectors and extension officers. These, purchase receipts will be introduced via meetings with Individual owners/managers of hotels, restaurants, chartered boats. It is anticipated that these meetings will indicate the importance and outline the usage of these receipts.

3.4.5 Logbooks:

A logbook will be developed for obtaining information from boats which have the capacity to fish over a long period. This will remove the need for thawing of fish for data collection purposes and will accommodate the Japanese built fishing vessels due to arrive in February, 1992.

3.5 Exports:

The current export permits and health certificates (Appendix viii) will continue to provide precise information on the composition and weight of species exported.

3.6 Foreign Fishing:

St. Vincent and the Grenadines will implement various procedures for documenting foreign fishing effort. These procedures may include, completion of logbook, data taken by observer on board foreign vessel and the landing of catch in Vincentian ports.

3.7 Sampling for biological data:

It is anticipated that the sampling program, once implemented, will allow a continuous flow of length frequency data. Sampling will be stratified according to Landing Site type (primary, secondary, tertiary), Time period, Gear type, and Species type.

Each sample of biological data must consist of at least thirty-three fishes to allow valid analysis, consequently the 2% of annual catch may be adjusted for some species. An estimate of the annual catch will be obtained from the landings at Kingstown market using a conversion factor. The conversion factor will be calculated by comparing figures obtained from the census at the New Kingstown Fish Market (NKFM) and the sample program for all landing sites. Samples will be taken twice monthly during which Data Collection Sheet 2 (Appendix ix) will be filled in.

A mobile team will be used to cover all geographical areas. Sampling is not restricted to particular landing sites as the species composition of landed catch varies throughout the country. The species to be sampled are listed in Appendix x. For example, the predominant species landed at Kingstown are jacks (Selar crumenopthalmus) and Robin (Decapturus macarellus) while Snappers (Lutjanus spp.) predominates at Greathead Bay.

3.8 Public Education

In order to effectively implement the data collection program it is necessary to solicit the assistance and cooperation of the general public, in particular the fishing communities. The news media and meetings with fishermen coops will be used to educate the public as to the reasons and importance of data collection. This task will be handled by the extension staff.

4.0 COMMENTS

1) The data collection programme is expected to capture data from all aspects of the fishery through both census and strategic sampling.

2) One factor which is critical to the accuracy of data is the continuity of data collection. Data collectors may be absent from work from time to time. In cases where data collectors are ill the following are steps which can be taken:

   a) The data should be taken by another person such as an Extension Assistant. For this to be effective should have a clear understanding of the data collection process

   b) A less desirable alternative to (a) is to obtain data from a reliable fisherman, who would also collect data from other boats. The selection of a fisherman should be done by the data collector if the possibility exists.

   c) The least desirable option is for data collectors to question fishermen about their fishing activities during the his or her absence.

The second and third option are less desirable they create avenues for misreporting as fishermen are not trained to collect data and in many cases have their own self interest at heart.

3) There may be avenues for a reduction in sampling effort, however this should only be done at the end of the year 1992 to allow analysis of under the present system. A change in the sampling regime may introduce inconsistencies which may be costly and time consuming. The commercial fishery provides some or most important information which, with analysis can lead to allow proper management. In this regard, there should be a minimum of five: (two in the Leeward, two in the Windward and one in Kingstown) data collectors in St. Vincent based in Kingstown with access to a boat for transportation purposes. Two data collectors should be based in the Grenadines, one person being responsible for each zone, similarly there must be one boat at the disposal of each data collector.

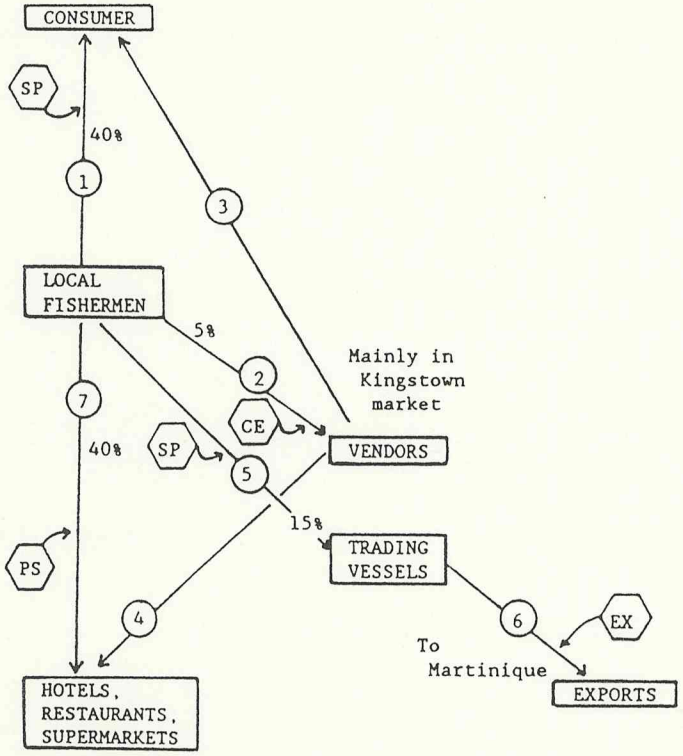


Figure 1. Path diagram of the disposition of demersal fish taken by trap and line, and seine fish from St. Vincent. Percentages indicate the relative amounts moving along each path segment. Proposed data collection tools are shown in hexagons (PS-purchase slips, SP-sampling program, CE-total census, EX-export forms).

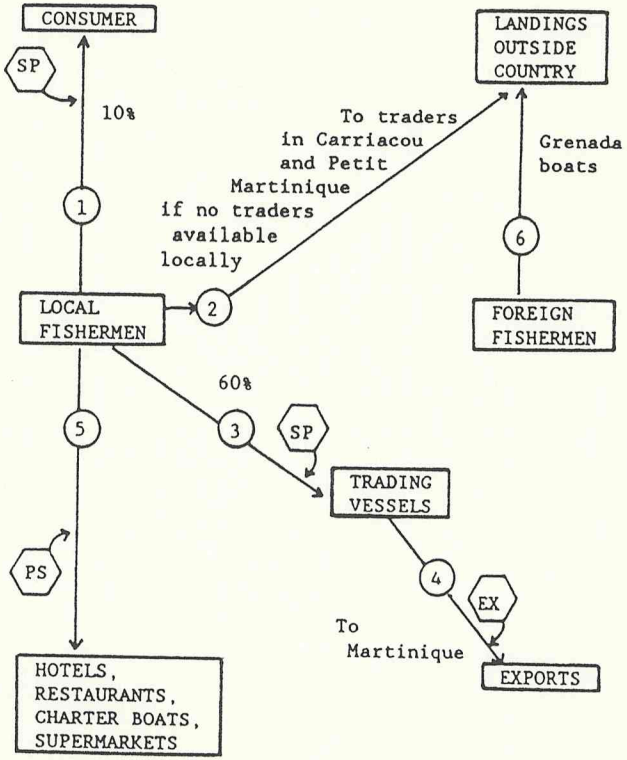


Figure 2. Path diagram of the disposition of demersal fishes taken by trap and line, seine fishes and reef pelagics from the St, Vincent Grenadines. Percentages indicate the relative amounts moving along each path segment. Proposed data collection tools are shown in hexagons (PS-purchase slips, SP-sampling program, CE-total census, EX-export forms).

Appendix ii. ORIENTATION FOR DATA COLLECTORS
-DRAFT-

This document summarizes an approach to data collection orientation, including suggestions from some members of the Fisheries Division staff. It is intended as a first draft.

ELEMENTS OF THE ORIENTATION:

1) THE FISHING INDUSTRY AND ROLE OF THE FISHERIES DIVISION
2) IMPORTANCE OF DATA COLLECTION
3) SPECIES IDENTIFICATION
4) VESSEL TYPE IDENTIFICATION
5) GEAR TYPE IDENTIFICATION
6) EXPLANATION OF THE FISHERIES ACT
7) HOW TO USE THE DATA COLLECTION SHEET
8) TRANSPORTATION/TIMETABLE
9) METHODS OF DATA COLLECTION
10) READING MATERIALS
11) EVALUATION

ELEMENT DESCRIPTIONS:

THE FISHING INDUSTRY AND ROLE OF THE FISHERIES DIVISION

A brief, but thorough, introduction to the Fisheries and the Fisheries Division. Suggestions on what the data collectors should know are; What is the Fisheries Division? What is its purpose? How is it structured? How does it function? What are its facilities? ETC...

A clear understanding of the mandate of the Fisheries Division, from the beginning, will help the data collectors more easily explain to the fishermen where they are coming from.

IMPORTANCE OF DATA COLLECTION

An overview of where the data collectors fit into the scheme of the Fisheries Division and what the data is to be used for. Data collectors should also be given a job description.

The Data Collection Sheet will be introduced to the data collectors here, but will be discussed in detail later on in the

orientation. Information gathered by the data collectors has many important uses, such as:

- -stock assessment
- -fisheries management and development (determining which species to fish, where stocks are located, what restrictions should be applied, is commercial development possible, etc...)
- -policy development by the Central Planning Unit
- -determination of whether fisheries is profitable
- -regional information for the OECS data bank; allowing St. Vincent and the Grenadines to participate in the regional data collection process
- -ecological information
- -providing information to the fishermen and the wider community about fishery resources.

Again, a clear understanding of why the data is being collected and how it is to be used, will enable data collectors to provide credible answers to the fishermen at the landing sites.

SPECIES IDENTIFICATION

Data collectors must be familiar with all species they are likely to come in contact with. An emphasis will be placed on learning this in the orientation. It is important for the data collectors to fill in the 'Species Breakdown' section on the Data Collection Sheet as quickly, and accurately, as possible. Data collectors should not be relying on the fishermen to provide accurate information about the species.

Suggested methods of teaching the data collectors species identification are as follows:

- -in a classroom setting, giving an overview of fish physiology, and how to identify fish by colour, size, physical features etc...
- -taking colour photos of fish (on a white background with a ruler for sizing) and mounting them on pages with written descriptions below
- -providing copies of Straker's Field Manual

-introducing the data collectors to the Fish Market and showing them how to use the techniques of identification they have learned on real fish; pointing out the different species.

There has been concern with how to determine whether the data collectors have taken in the information, and to what extent. One suggestion on how to test this is to set up a lab 'exam' in which various fish are collected from the market and put on ice in the lab. Data collectors would then have to correctly identify each species, and explain the process of identification they used. This exam should carry some weight. Before being put into the field, the data collectors must past this identification exam. If they do not, they must take another one. If they never pass the exam, a close look at their suitability for the job should be taken.

VESSEL TYPE IDENTIFICATION

Data collectors will also have to be familiar with fishing vessel types. A handout could be design with pictures of the different vessel types and a written explanation below. Vessels landing at Kingstown could also be pointed out.

GEAR TYPE IDENTIFICATION

Similar to vessel type identification, data collectors should know the various types of gear used. A handout could also be designed for gear type.

EXPLANATION OF THE FISHERIES ACT

Data collectors should be knowledgable of the Fisheries Act, illegal gear, conservation areas etc... so they can report any illegal activities to the Fisheries Division office. Copies of the Act should be made available.

HOW TO USE THE DATA COLLECTION SHEET

A detailed explanation of how to fill out the collection sheet is needed. The importance of filling in the whole form, how to measure total catch, what is expected in the comments section, what supplies are needed, etc... are all topics to be covered. It would also be useful discuss how to get a dialogue going with the fishermen, and what the most efficient way of filling out the form is. A list of landing site, vessel type, and gear type codes should be provided.

TRANSPORTATION/TIMETABLE

Data collectors will need an orientation on both transportation, and timetabling, i.e., what landing site they should be on during which day, and for how long. Expectations (the high level of work, number of forms per day, amount of travelling) of the data collectors must be established from the beginning. Data collectors must also be held accountable for their work. On site checks could be made by office staff periodically, perhaps when the second data collection form (dealing with length, age, etc,...) is needed.

The data collection process put into effect now could be considered an experimental period to the end of 1991. A more solid and long term schedule could follow after a review of this experimental period.

METHODS OF DATA COLLECTION

This section of the orientation will be conducted mainly on site. However, a short introduction to could be given in a classroom setting. It has been suggested that an office staff

member accompany each data collector during her/his first week on the job. The staff member could provide valuable insight into how to establish a dialogue with the fishermen, and how to deal with problems that arise.*

It was also suggested that a message be put on the radio about the data collectors and their purpose to raise community awareness.

It is important for the data collectors to recognize that some fishermen, although not highly educated academically, have great knowledge of the fishing industry. This knowledge should be recognized and respected by the data collectors. Many fishermen are experienced, hard-working, and successful operators.

It has been suggested that in order for the data collectors to get a sense of the real fishing industry, they must have some experience themselves. Data collectors could spend a week with the fishermen out in the boats. In this way, the collectors would not only become part of the community, but would have a greater understanding of the fishermen's point of view.

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*There is concern that some extension assistants, for example, have no experience in dealing with fishermen. One proposed solution to this is to send the extension assistants out to a landing site, before the data collectors, to gain some experience. During this visit, the extension assistant could also explain to the fishermen that a data collector will be arriving shortly, and what the idea is behind the data collection. This might help ease the transition of the data collector into the fishing community. There has been some positive and negative feedback about this idea within the Fisheries Division.

READING MATERIALS

Extra reading materials could also be assigned. A list of topics to include are as follows:

-history of fishing in St. Vincent, and the Caribbean
-1991 Fisheries Profile
-the data collection section in the FAO manual
-the Fisheries Development Project summary
-information on species identification
-marine biology in general

EVALUATION

In view of the possible high rate of staff turnover, and the orientation having to be repeated, an evaluation of the process is of value. Data collectors could be asked to fill out an evaluation form which would list all of the elements of the orientation and ask if the sessions were useful or not. Fisheries Division staff could also comment on which parts of the orientation were effective, and suggest any changes. Revision of the orientation process could then be undertaken.

Appendix iii. RESPONSIBILITIES AND TIMELINE FOR ORIENTATION

ELEMENT OF ORIENTATION	RESPONSIBILITIES/ MATERIALS NEEDED*	DATE/TIME FOR PRESENTATION	PRESENTER
Explanation of Fisheries Division	-intro. to fisheries talk	Day 1 30 min.	K.M.
Importance of Data Collection	-talk on importance and intro. to form	Day 1 30 min.	J.J.F. R.R.
Species Identification	-copies of Straker's field manual -taking photos of different species and preparing handouts -preparing a classroom session on fish physiology and identification -intro. to fish market and identification tour -setting up a lab exam and going over the proper identification afterward	Rest of Day 1, Day 2, Test on Day 3	L.S. R.R. E.B. A.D. M.B. E.B.
Vessel Type Identification	-preparing a handout outlining vessel types -going over handout and pointing out boats in Kingstown harbour	Day 3 30 min.	M.B. A.D.
Gear Type Identification	-preparing a handout outlining gear types -going over handout	Day 3 15 min.	R.K. A.D.
Explanation of Fisheries Act	-providing copies or handout on the Act -giving a talk on Act	Day 3 20 min.	K.M.
Data Collection Sheet	-explaining how to use to form -providing lists of landing site, vessel, and gear codes	Day 4 30 min.	R.R. C.J.

ELEMENT OF ORIENTATION	RESPONSIBILITIES/ MATERIALS NEEDED*	DATE/TIME FOR PRESENTATION	PRESENTER
Transportation/ Timetable	-providing details in these areas	Day 4	??
Methods of Data Collection	-preparing a short classroom session on what to expect	Day 4	R.R. R.B.
	-assisting data collectors on site	First week of work	??
	-setting up a period of fishing experience for the data collectors	Prior to first week of work	A.D.
Reading Materials	-gathering and handing out extra reading materials	Throughout orientation	A.F. R.K.
Evaluation	-preparing an evaluation form	End of Orientation	?ALL?

* Details under the RESPONSIBILITIES/MATERIALS NEEDED column are not definitive. It is hoped that presenters will add their own ideas to come up with further methods of teaching.

Appendix iv

FISHERIES DIVISION
DATA COLLECTION SHEET

Sample No: ____ Sample Date: DD ____ MM ____ YY ____

Collector's Initial: ____ Landing site code: ____

Vessel Name: ____ Vessel Type Code: ____

Vessel Registration No: ____ Crew Size: ____

Fisherman's Name: ____ Total Catch: (lbs) ____

Departure time: ____ Return time: ____
Date: ____ Date: ____

Gear Code: ____ ____ Hrs. Fished ____

COMMENTS:(Weather pattern, Special events, Gear damaged)

Species Breakdown:

COMMON NAME	CATCH (LBS)	PRICE (EC$)
TOTAL/DAY		

N.B. Put * if in doubt of common names

Appendix V

Boats and weight of fish per landing sites for December 1991			
Landing sites	Weight of Fish (lbs) sampled	No. of boats	Effort (hrs)
ZONE 3			
PEBO- Petit Bordel	288	9	177
CHAT- Chateaubelair	212	3	63.45
DARK- Dark View	1379	5	36.15
FITZ- Fitzhughes	840	5	30.3
ROBA- Rose Bank	183	12	209.4
ZONE 4			
INBA- Indian Bay	295	1	52
GRBA- Great Head Bay	1202	6	221
CALL- Calliaqua	1574	5	204.3
ZONE 1			
KIMA- Kingstown Market	9909	23	30
LOWM- Lowmans	132	2	2.3
QUES- Questelles	610	3	6.05
CLVA- Clare Valley	781	4	42.42
ZONE 2			
BUBA- Buccament Bay	925	3	42.15
LAYO- Layou	947	4	51
BARR- Barroulie	867	7	46
ZONE 5			
TVES- Trading Vessel	428.5	8	69.3
PAFA- Paget Farm	53	2	54
ADBA- Admirality Bay	300	1	2.3
LPBE- La Pompe			9
FRBA- Friendship Bay			38
TOTAL	20925.5	103	885.12

		X	A	B	C	D
CASE	1	1.000	0.508	0.620	0.948	0.159
CASE	2	2.000	0.180	0.243	0.400	0.023
CASE	3	3.000	0.385	0.295	0.504	0.506
CASE	4	4.000	0.769	0.658	0.423	0.274
CASE	5	5.000	0.515	0.042	0.641	0.203
CASE	6	6.000	0.967	0.737	0.661	0.914
CASE	7	7.000	0.912	0.886	0.365	0.662
CASE	8	8.000	0.290	0.848	0.189	0.132
CASE	9	9.000	0.815	0.823	0.399	0.081
CASE	10	10.000	0.330	0.815	0.828	0.184
CASE	11	11.000	0.593	0.910	0.739	0.617
CASE	12	12.000	0.014	0.378	0.634	0.466
CASE	13	13.000	0.346	0.019	0.004	0.696
CASE	14	14.000	0.613	0.030	0.006	0.639
CASE	15	15.000	0.918	0.405	0.789	0.276
CASE	16	16.000	0.407	0.468	0.151	0.525
CASE	17	17.000	0.806	0.697	0.452	0.829
CASE	18	18.000	0.459	0.262	0.063	0.614
CASE	19	19.000	0.193	0.682	0.344	0.136
CASE	20	20.000	0.604	0.065	0.036	0.820
CASE	21	21.000	0.229	0.455	0.192	0.546
CASE	22	22.000	0.252	0.547	0.571	0.643
CASE	23	23.000	0.595	0.727	0.645	0.185
CASE	24	24.000	0.054	0.472	0.020	0.179

MINISTRY OF TRADE AND AGRICULTURE

FISHERIES DIVISION.

Health Certificate for fish, crustaceans, molluscs and echinoderm (live or dead) fresh, chilled or frozen.

A. Commercial Name (s) .....

.....

.....

Scientific Name (s) .....

.....

.....

.....

Preservation Method .....

Net Weight.....

B. Name of Exporter .....

Address of Exporter .....

C. Country exported to.....

Date .....

Method of transportation .....

Name of Carrier.....

Flight/Voyage No (if any) .....

Name of Consignee .....

Address of Consignee .....

I ..... the exporter/agent of the above mentioned goods, do hereby declare that the information given above is correct.

Date this ..... day of 198

The above-mentioned sea foods have been examined by the Fisheries Division of the Ministry of Trade, and Agriculture and found to:

be fit for human consumption.

contain no additives such as dyes, preservatives, or any chemical agent prohibited by legislation from use in this country.

be free of salmonella in 25G.

contain acceptable levels of clostridium (less than 1,000 spores/g.)

Fisheries Officer

108-A13

Saint Vincent and The Grenadines,

APPLICATION FOR EXPORT LICENCE.

(Under the Imports and Exports Control Regulations, 1939)

To The Accountant General.

I/We _____ of _____

hereby apply for a licence to export the goods specified in the Schedule on the back hereof to _____

Country of destination.

Name and Address of Consignee _____

Name and Address of Ultimate Consignee _____

_____

Date. 2. I/We desire to export the goods on or about _____

_____ by _____

Name of Vessel. 3. Price and terms of payment _____

Full particulars to be given. _____

_____

4. I declare that the foregoing particulars are true and correct.

Date _____ _____

No. Signature of Applicant

EXPORT LICENCE.

Licence is hereby granted to _____ to export the goods specified in the Schedule on the back hereof, subject to the conditions restrictions and limitations stated hereunder.

CONDITIONS.

1. This Licence shall remain in force until the _____ day of _____ 19___

2. Payment to be effected in _____

3. _____

_____ _____ _____

Accountant General.

The Treasury,
Saint Vincent, W.I

Date _____ _____

Figure 7. The forms required for the export of fish and fishery products

Appendix ix

FISHERIES DIVISION
DATA COLLECTION SHEET (II)

Species Sample Form

Vessel name _____ Vessel type code _____

Collectors initial _____ Sample date DD MM YY _____

General area fished _____ Specific area fished Lat Long _____

Gear code _____ Mesh size _____ Hook size _____

Sample No.	Common Name	Specific Name	Length range Max. Min	Weight Ind.Tol	No. of fish	Sex	Age

Appendix x. Species to be sampled at the major landing sites using Data Collection Sheet 2.

Common name	Scientific name
*Balahoo	Hemiramphus balao
Barrcuda	Sphyraena barracuda
Bigeye tuna	Thunnus obesus
Black jack	Caranx lugubris
*Blem	Etelis oculatus
*Bonito	Thunnus atlanticus
Cavalli/Horse eye	Caranx crysos
Cavalli/Green back	Caranx latus
Dodger	Decapterus punctatus
*Dolphin	Coryphenea hippurus
Gar	Tylosurus acus
*Grouper	Ephinephelus spp
Grunt	Pomadasyidae spp
*Jacks	Selar crumenophthalmus
*Kingfish	Acanthocybium solandri
*Little tuna	Euthynnus alleteratus
Nurse shark	Ginglymostoma cirratum
Ocean gar	Istiophorus albicans
*Robin	
Red hind	Epinephelus spp
Salmon	Elagatis bipinnulatus
Shark	Carcharhinus
*Skipjack	Katsuwonus pelamis
*Red Snapper	Lutjanus purpureus
Spratt	Harengula pensacolae
Squadron/blue	Tetrapturus albidus
Squadron/white	Makaira nigricans
Squirrelfish	Holocentrus ascensionis
Swordfish	Xiphias gladius
*Lobster	Panulirus argus
*Conch	Strombus gigas

*Species predominant in present landings. These species will be used to initiate the biological sampling program.

Training of data collectors will be done during the official orientation period (appendix 2), by existing staff members. It will be necessary to obtain the following equipment:
(1) Balances (2) Knives (3) sample bags (4) Labe (5) Caliper
(6) Measuring boards (7)Sand paper for polishing ear ossicles i.e very fine

Appendix 8. Sample Data Collection Forms (Photoreduced 75%)

Table A8.1 Fisheries Landing Statistics

Fisheries Landings Statistics **Field Data Sheet**

Entered	Checked
Date	Date
By	By

Landing Site _____ Date _____

Data Collector _____

Landing Number							
Boat ID							
Time - Departed							
Time - Returned							
Area Fished							
Gear - Primary							
Gear-Secondary							
Number of sets							
Depth fished							
Weight type (O/E/F)							
Catch by Species							

Comments:

Table A8.3 Fisheries Length Frequency Sheet

Fisheries Length Frequency Sheet

Landing Site	Date	Data Collector

	Landing Number		Landing Number		Landing Number	
Length	Species		Species		Species	
5						
6						
7						
8						
9						
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
0						

Appendix 9. Proposal for Preparation of Species Identification Field Guides

Although there is a variety of publications which can be used to identify species in the laboratory, and several popular guides which are useful in the field (Attachment A9.1), there is a need for a set of field guides for use by data collectors and other technical field staff. These should be small, simple to use and sufficiently inexpensive that they can be made available to all field staff.

Three guides are proposed, one each for:

- Pelagics;
- Reef fishes, lobsters and conch;
- Demersal fishes and shrimp of the Guyanas/Brazil region.

Technical Notes

- Guides should be similar in technical format to the pelagics guide by Russo (1981). That is, they should include dichotomous keys in tree form, with figures which indicate the major distinguishing features. There should be a primary key to families and separate keys for each family.
- There should be brief descriptions of the common species giving ways of distinguishing these from the species they are most likely to be confused with. These descriptions should also address any problems which will arise in identifying juveniles.

Production Notes

- Production on water-resistant paper is desirable if it can be afforded
- Colour is desirable for the guide to reef fishes but is not required for the other two guides.
- a small (6"x9") or similar is preferable to a letter size format.

Implementation Plan

CFRAMP will:

- Determine basic costs of production options;
- Develop terms of reference for consultants;
- Prepare draft species lists for inclusion in the guides;
- Engage consultants;
- Monitor preparation of guides;
- Arrange production and distribution.

Consultants will:

- Prepare draft guides per the terms of reference for review by CFRAMP and countries representatives;
- Revise draft per the responses to the draft and prepare final copy.

Participating Countries will:

- Review proposed lists of species for inclusion in the guides;
- provide or identify data sources for use in the guides;
- Review and test draft guides.

Draft Terms of Reference for Consultants

Guide to Large and Coastal Pelagics

Using the guide by Russo (1981) as the basis for a new guide:

- Compare the information therein with other ID material to determine if it is accurate, and if there are additional or better distinguishing features which should be used;
- Review and revise species descriptions accordingly;
- Determine which additional species are required in a new guide to make it complete for large and coastal pelagics (e.g. jacks, flyingfishes, scads);
- Incorporate these species into the guide, including keys, figures and descriptions;
- Produce a draft for review by participating countries;
- Incorporate responses to draft and produce a final version.

Dr. Russo has indicated his willingness to provide assistance in the form of original drawings, documentation, etc.

Guide to Reef Fishes, Lobsters and Conches and
Guide to Demersal Fishes and Shrimp of the Guyanas/Brazil Region

Following the layout of the guide by Russo (1981), and with reference to existing ID guides and manuals:

- Prepare dichotomous keys to the families of reef fishes/ demersal fishes on the lists provided by CFRAMP
- Prepare dichotomous keys for each fish family, for lobster, for conch and for shrimp;
- Prepare detailed descriptions of the most commonly encountered species from lists provided by CFRAMP;
- Produce a draft for review by participating countries;
- Incorporate responses to draft and produce a final version.

Attachment 1: Some field guides and identification manuals

Allen, G.R. 1985. FAO Species Catalogue. Vol. 6: Snappers of the world - an annotated and illustrated catalogue of Lutjanid species known to date. FAO Fisheries Synopsis No. 125, Volume 6: 236 pp.

Fischer, W. 1978. FAO Species identification sheets for fishery purposes: western central Atlantic (fishing area 31) Vols I-VII. FAO Rome.

Greenberg, I. 1986. Guide to corals and fishes of Florida, the Bahamas and the Caribbean. Seahawk Press: 64 pp (6840 SW 92 St., Miami, FL 33156)

Miyake, M. and S. Hayasi. 1978. Field manual for statistics and sampling of Atlantic tunas and tuna-like fishes. ICCAT, Madrid: 149 pp.

Robins, C.R. and G.C. Ray. 1986. A field guide to the Atlantic coast fishes of North America. Houghton Mifflin Co., Boston: 354 pp. (2 Park St., Boston, MA 02108)

Russo, J.L. 1981. Field guide to fishes commonly taken in longline operations in the western north Atlantic Ocean. NOAA Technical Report NMFS Circular 435: 51 pp. (out of print).

Appendix 10. Revised Implementation Plan for Guyana

This appendix reports the revised plan adopted for Guyana on the basis of objections from CIDA pertaining to topping up of Government salaries. The objectives and activities remain unchanged however CFRAMP's contributions will be in the form of two years of salaries for three non-establishment positions. It is recognised that these positions will not be sustained beyond the CFRAMP funded period. The completion of two years data collection and computerisation will provide both a baseline view of the fisheries during that interval and a substantial training and transfer of expertise to the permanent staff of the Guyana Fisheries Division. Both of these outputs will be valuable in the longer term management of Guyana's fisheries.

There are two major sectors to the fisheries of Guyana, the industrial trawler fleet and the inshore, artisanal fleet. The trawler fleet is primarily directed towards prawns and seabob and most catches of finfish are incidental. The inshore artisanal fleet takes a greater proportion of finfish catch along with seabob and whitebelly shrimp.

Landing sites fall into three categories, industrial processing plants, inshore fisheries complexes, and minor sites (Table 1, Figure 1). The shrimp trawlers land their catch directly at the industrial processing plants. These plants also process catches landed directly from artisanal vessels or purchased from other landing sites. The inshore fisheries complexes have landing stages, boat ramps, repair and supply facilities and ice makers. They are operated by fishermen's cooperatives who charge for use of the facilities and sell supplies, ice, and fuel. Minor landing sites have no fisheries infrastructure but are located in a stream or sluice through the seawall. There has been a trend for fishermen to move their landing sites from the minor sites to cooperatives or complexes.

A frame survey is to be conducted this year and will be used to determine numbers of vessels landing catches at individual sites rather than numbers based at a site.

A significant barrier to implementing the data collection system is the lack of staff, and the low motivation of staff due to inadequate salaries. As it is not possible to supplement the current government salaries to overcome this barrier CFRAMP will be funding a data collection system to obtain a two year snapshot of the Guyana fisheries statistics. If and when the government salaries become sufficiently attractive to recruit the necessary personnel to the existing establishment positions the plan outlined below will form the basis of a sustainable data collection system.

Method

Industrial Fleet

Catch and effort data for the industrial fleet will be collected using a vessel logbook. In addition, random trip interviews will be used to verify completion of the logbooks and to ensure the captains understand the data correctly. The logbook is designed to allow either daily or set-by-set recording of data. The logbooks will not provide species composition for the prawns.

A processing plant log will record weight caught by size grade category for each landing for prawns and seabob. This still will not separate the pink, brown and pink-spotted prawn species, although white prawns are usually sorted out.

Artisanal Fleet

A logbook system that had been operated in the artisanal fleet will be reinstituted. The logs will record catch and effort on a daily or set-by-set basis. Data collectors and fisheries field assistants will collect the log book sheets at the landing sites and conduct trip interviews at randomly selected sites to verify correct completion of the logs. The data collection system will operate within each region and sampling effort will be allocated to landing sites on the basis of the number of vessels at the sites and the distribution of gears (Table 6.1 in main report). The data collector will be responsible to record the vessel identification for all vessels landing that day, interview the captain, and examine the logbook. In the case that the logbook is not being completed the data collector should complete a log entry for the trip during the interview. As with any census, the logbook system is likely to produce underestimates of catch and effort as there is no means to quantify missing log records. An extension program to promote the use of the logbooks and to train captains in filling them out, will be conducted. A means of identifying individuals not providing logbooks will be needed so that the data can be adjusted to account for them. CFRAMP will assist in designing and implementing a database for this purpose. Implementation of the computerised licensing and registration system will provide tools, such as issuing only short-term conditions of license, for difficult cases.

An education program will be undertaken to promote cooperatives adopting a weight-based toll system at the landing sites with complexes, or cooperative facilities. The present system of flat monthly fees or landing fees creates no incentive, or need, to record landings data. A major positive element for the cooperatives in such a program would be the utility of such information to improve their ability to market their catch. When cooperatives adopt weight-based toll systems the Fishery Division will supply data collection forms to them. The forms will be used to record catch and effort for each landing at the cooperative.

Activities

1. Fisheries Division to recruit new staff for data collection positions. Salary levels will of the current establishment positions make attracting and motivating data collection staff very difficult. If, and when, government salary reform proceeds these positions will assume the ongoing tasks of the data collection system outlined above.

2. In the interim, a Data Entry Operator and two Data Collection Supervisors will be funded by CFRAMP to operate the basic elements of the planned data collection system for a period of two years.

3. CFRAMP to fund computer training courses which will introduce DOS, WordPerfect and LOTUS. In addition, courses in introductory and intermediate training Dbase will be provided for data management staff.

Requirements:

A total of sixteen personnel are required to fully implement this plan, six of these positions are currently filled, while the vacant positions will be filled as expeditiously as possible by the Fisheries Division. Only one continuing position, the Data Entry Operator, does not currently exist as an establishment position. Data collectors will require vehicle for mobility to reach landing sites. Small motorcycles and associated equipment will be provided in Georgetown and regions 2, 3, and 6. Supplies for sampling, forms for data recording and management, and office support for the data collection system will be funded by CFRAMP.

	Number	Year 1 US$	Year 2+ US$
Personnel			
Data Collection Supervisor	2	4,000.	4,000.
Data Entry Operator	1	900.	900.
Training workshop	1	2,000.	
Transportation			
Motor Cycles	4	8,000.	
Field Supplies		1,300.	500.
Office Supplies		4,000.	1,000.
Total US$		**20,200**	**6,400**

Schedule

Begin staff computer training	November '92
Design and analyse frame survey	November '93 - March '94
Recruit new staff	November - December '93
Field training	January '94
Artisanal log book system	January '94
Education re: cooperatives need AFI Complex log book	March '93

Appendix 11. Implementation Plan for Data Collection in Jamaica

The fisheries Sector in Jamaica can be divided into artisanal and industrial fisheries, with further subdivision into inshore (coastal shelf) and off-shore fisheries (Pedro Bank, Morant Bank and deep sea). The official records indicate approximately 20,000 fishermen with 9,000 vessels are involved in fisheries. The major commercial groups are conch, lobster and reef fish. Fish is landed at approximately 184 beaches around Jamaica however, the majority of the landings occur in the south eastern coastal areas including Kingston (Figure 1).

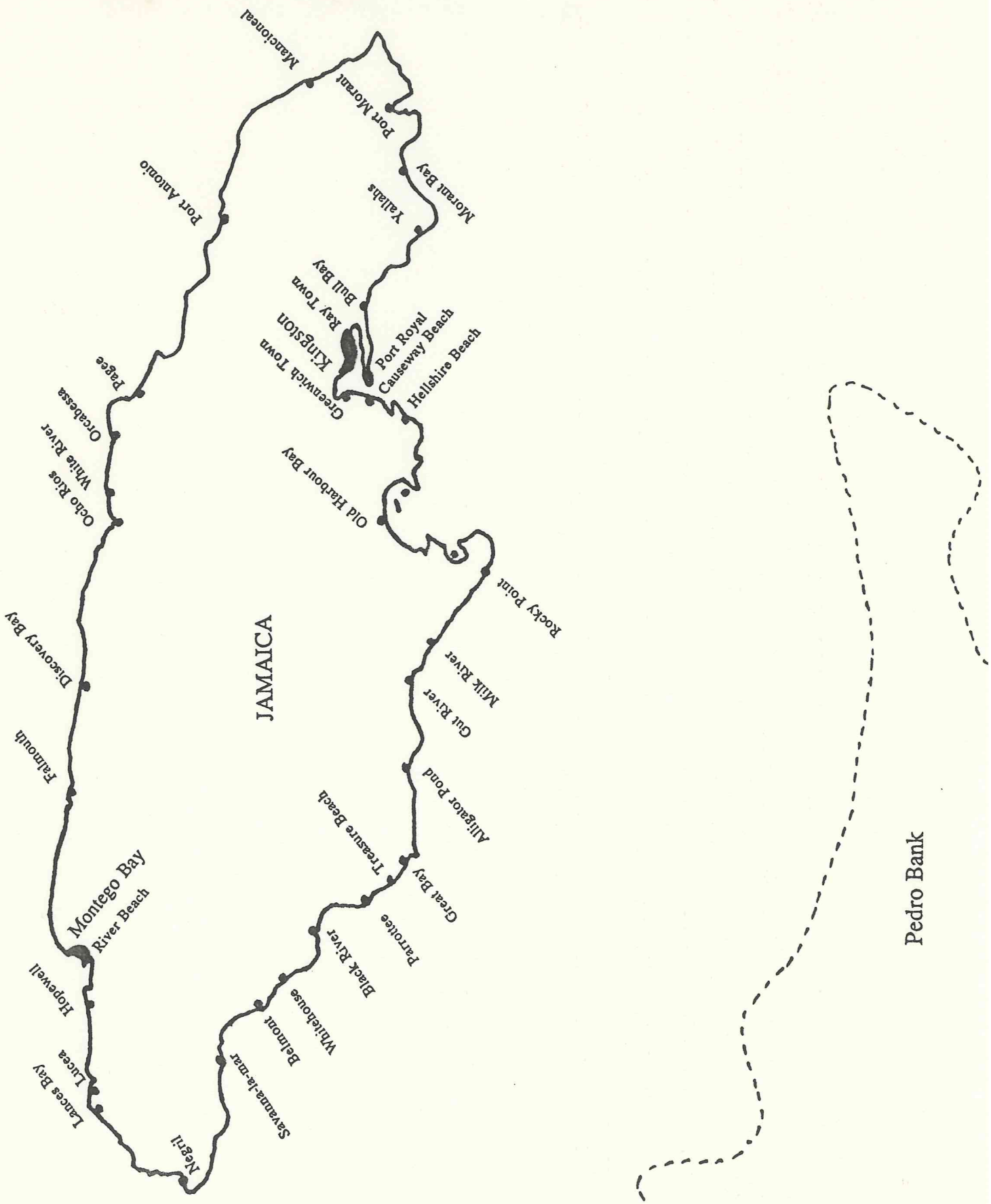
The artisanal fishermen sell the majority of their finfish catch directly to middlemen or consumers, with most of the conch and lobster going to processing plants or hotels. The off-shore artisanal fishermen sell most of their catch to "Packer Boats" or Carrier vessels (both referred to as Packer boats for this plan), with minor amounts going directly to the consumer. The industrial fishermen land their catch directly at the processing plants.

At present, catch and effort data is not collected by the Fisheries Division on a systematic basis. The last Government fisheries industry survey was done in 1981. Additional information is available from research projects done by University of the West Indies and other research groups. The Fisheries Division is in need of a systematic data collection scheme to provide, on a timely basis, the information required to make informed decisions for managing Jamaica's fisheries resources. Additionally, the Division should, by using its licensing and registration system, determine the fisheries potential effort. This plan, developed by the Fisheries Division and CFRAMP, is intended to obtain catch, effort and species (species group) data by census or sample based estimation. It will require additional resources and training for relevant staff which CFRAMP will be able to supply for approximately two years. Additionally, it will require commitment from the Government of Jamaica, in particular the Fisheries Division, and a positive response from the fishers to achieve any measure of success.

Method

There are two main elements of the plan, a census of catch and effort for fish landed at processing plants and for fish purchased by Packer boats on the Pedro and Morant Banks or elsewhere; and a sampling program for catch and effort data from selected major landing sites. In addition, an education campaign aimed at the fishermen will be needed to implement the plan. This campaign should illustrate the data collection activities, the objectives and the legal basis, to highlight how the fishermen will be affected in the short and long term.

Figure 1. Significant fisheries landing sites in Jamaica.



Processing Plants

The Fisheries Division will supply and collect landing logs from the processing plants on a regular basis. The processors will log the effort and landed weight by species, or species group, for each vessel landing at a plant.

Industrial Vessels

A daily fishing log will be supplied and collected by the Fisheries Division from all industrial vessels. The logs will record daily catch and effort by species or species group.

Packer Boats and Carrier Vessels

A purchase log will be filled out at sea as purchases are made. The information will be recorded on forms supplied and collected by the Fisheries Division.

In each case the logs will be entered into a computerized database, and subjected to quality control checks. This system will require ongoing negotiation and close managing to ensure an acceptable level of accuracy can be maintained.

Other Landing Sites

Fisheries Data Collectors (i.e. Fisheries Instructors will conduct sampling for catch and effort at other selected landing sites. Sampling will be by landing site clusters and the information collected will include catch by species or species group, effort, and where possible area fished.

Data Management and Reporting

The data collected will be stored and managed in a computerized database. Staff will be trained in the use of the TIP software. CFRAMP will assist in developing standardized reports for catch and effort statistics and staff will be trained to produce ad hoc reports as needed.

Resources

Operation of a data collection system for Fisheries Statistics will be closely linked to that of the Licensing and Registration system. Both systems will depend on core of existing Fisheries Division staff based in Kingston and a contingent of data collectors based at landing

sites elsewhere in the country. In Kingston, the Chief Fisheries Instructor will, among other duties, fulfil the role of the data collection supervisor. In addition there will be a Data Manager, a Data Entry Operator and six more Fisheries Instructors whose duties will include working as data collectors. These data collectors will monitor the Industrial sector logbook program, the Packer/Carrier logbook program, the Kingston area Artisanal landings and the registration and licensing of fisher and fishing vessels.

The staff based out of Kingston, under the current structure of the Fisheries Division, includes 12 field Fisheries Instructors located at beaches and landing sites around the country. Currently the main emphasis of their activities is on selling subsidised fuel to fishermen. These staff constitute a significant fraction of the Fisheries Divisions complement however the anticipated demise of the subsidised fuel program makes it likely that their posts will be abolished in the near future. As a result, although an effective data collection system could be built utilizing these Fisheries Instructors, planning must include the contingency that some or all of the existing staff may be lost. As a result, planning for this subproject considers two scenarios, as follows.

1. The Ministry of Agriculture continues to operate fuel out-stations and all, or most, of the existing field Fisheries Instructors will be available for data collection duties on a part-time basis.

2. The government managed fuel program is terminated and all of the existing field Fisheries Instructors are terminated by abolition of post.

The first case requires a major revitalization of the data collection elements of the Fisheries Instructors job. The most important means of achieving a functional data collection system will be by regular visits to the field Fisheries Instructors by supervisory staff) i.e. CFI). Reliable access to transport and adequate time from the other duties of the supervisory staff are the resources needed to do this.

In the second case a complete new data collection system will be required to monitor the artisanal fishery outside Kingston. An additional three new Data Collector, funded by CFRAMP, will be assigned to monitor landings at the most important landing sites in areas remote from Kingston (e.g. Manchioneal, White House, Old Harbour Bay). Although project, rather than establishment, positions they would be staffed according to the current salary scale for the Fisheries Instructors.

Under both scenarios the landings at the unmonitored sites will have to be estimated from catch rates by vessel type at the monitored sites and the number of vessels of each type operating at the site (obtain from the Registration database). Fisheries Instructors will routinely check the numbers of vessels operating at landing sites. The more monitored sites there are, i.e. the more field data collectors, the greater will be the precision of estimates based on catch rates.

There is a need for a Data Manager whose duties will include technical support of both the data collection and licensing and registration databases. The Data Manager and the Data Collection Supervisor will have to coordinate their activities very closely. The division of labour between them will depend in large degree on the Data Collection Supervisor's time available from other duties. The Data Manager should be able to assume the responsibility for a significant degree of field work, particularly in training of data collectors.

This plan assumes that the existing situation, i.e. scenario 1, will continue for some period of time. During the time they continue to function, the field Fisheries Instructors can conduct a higher sampling intensity program than will be possible under the second scenario.

The process of reinstituting data collection at the fuel out-stations will be conducted by the Chief Fisheries Instructor. The data collection form in use will be redesigned by the Fisheries Division and CFRAMP to capture catch by species and measures of effort.

The Fisheries Division will be responsible for recruiting new CFRAMP-funded staff and training them as soon as possible. While most of this responsibility falls to the CFI, the data manager should be able to provide considerable assistance in this area from the start.

Activities

1. The Fisheries Division and CFRAMP, in consultation with the Packer Boat operators, will design a purchase log to be used at Pedro Cayes.

2. The Fisheries Division and CFRAMP, in consultation with Industrial boat operators, will design a purchase/capture log to be used in the Pedro Bank fisheries.

3 The Fisheries Division and CFRAMP, in consultation with the owners of the processing plants, will design a production log to collect catch and effort data for landings at the plants.

4. The Data Manager will be trained by CFRAMP in TIP, LRS and fisheries reporting. The Data Manager will be responsible for training the Data Collection Supervisor and the Data Entry Operator in the relevant data entry, data management and reporting activities. In addition, the Data Manager and the Data Entry Operator will work with counterparts from the permanent staff to ensure that in the event they cannot be absorbed by the Fisheries Division, their skills and capabilities are retained after CFRAMP funding expires.

5. CFRAMP will provide training for Data Collection Supervisor and Data Manager preparing them to conduct training for Data Collectors. Training for Data Collectors will include catch estimation, data recording, fisherman interactions and an understanding of the broader context of fisheries management . CFRAMP will fund a staff workshop for training data collectors.

6. Fisheries Division with CFRAMP assistance will implement a sampling program for selected landing sites utilizing all available field Fisheries Instructors (establishment and CFRAMP-funded). Plans for this activity may have to be modified depending on circumstances with the current fuel selling program.

7. CFRAMP will assist Data Manager to determine (using LRS) the potential effort i.e. the number of fishermen and vessels by landing site. This is contingent on a very substantial effort being made to computerise the register of fishers and vessels with LRS.

Requirements

Personnel	Year 1	Year 2+
Data Manager Salary	J$154,000	J$154,000
DM car upkeep allowance	J$ 44,000	J$ 44,000
Data Entry Operator	J$ 55,000	J$ 55,000
Data Collector salary (3@J$55,000)	J$165,000	J$165,000
Travelling and Subsistence	J$ 12,000	J$ 12,000
Training Workshop	J$ 10,000	
Supplies and Equipment		
Printing (Forms and Logs)	J$ 15,000	J$ 7,000
Field equipment (clipboards etc.)	J$ 4,000	J$ 1,000
Office supplies (files, disks, etc)	J$ 3,000	J$ 2,000
	J$462,000	J$440,000
	US$ 21,000	US$ 20,000

SCHEDULE

Fisheries Division initiate recruiting staff	Sep./93
Continue consultations re. Packer/Carrier logs	Oct./93
Continue consultations re. Industrial logs	Oct./93
Staff (especially DM and DEO) training	Oct./93
Data Collectors workshop and begin sampling	Nov./93
Introduce log systems	Dec./93

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