**POST-IMPLEMENTATION BENEFITS AUDIT REPORT**

**OF**

**DEPARTMENT OF AGRICULTURE**
**FISHERIES AND OCEAN GOVERNANCE UNIT**
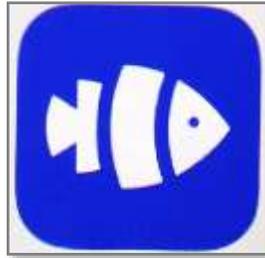


**FISHCANA**
**FISHERIES DATA MANAGEMENT SYSTEM**

Office of the Auditor General
July 2022

**FISHCANA**

**FISHERIES DATA MANAGEMENT SYSTEM**

This is a report of an Information Technology Audit of Post-Implementation Benefits conducted by the Office of the Auditor-General

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Auditor-General (Ag)
Office of the Auditor-General
July 2022

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# ABBREVIATIONS

| | |
|---|---|
| CRFM | Caribbean Regional Fisheries Mechanism |
| DITES | Department of Information Technology and e-Services |
| DoA | Department of Agriculture |
| FOG | Fisheries and Ocean Governance |
| FOGU | Fisheries and Ocean Governance Unit |
| FT | Fisheries Technician |
| GDP | Gross Domestic Product |
| GOM | Government of Montserrat |
| ICT | Information and Communication Technology |
| ISAE | International Standard on Assurance Engagements |
| ISSAI | International Standard of Supreme Audit Institutions |
| IUU | Illegal Unreported Unregulated |
| JNCC | Joint Nature Conservation Committee |
| MPA | Montserrat Port Authority |
| MALHE | Ministry of Agriculture, Lands, Housing and Environment |
| OAG | Office of the Auditor General |
| OCTA | Association of the Overseas Countries and Territories |
| OTs | Overseas Territories |
| SAERI | South Atlantic Environmental Research Institute |
| T2T | Territory to Territory |
| UK | United Kingdom |

# PREAMBLE

## Vision Statement

"To be a proactive Supreme Audit Institution that helps the nation make good use of its resources."

## Mission Statement

"The O.A.G is the national authority on public-sector auditing issues and is focused on assessing performance and promoting accountability, transparency and improved stewardship in managing public resources by conducting independent and objective reviews of the accounts and operations of central government and statutory agencies; providing advice; and submitting timely Reports to Accounting Officers and the Legislative Assembly."

## The Goal

"To promote staff development, enhance productivity, and maintain a high standard of auditing and accounting in the public sector, thereby contributing to the general efficiency and effectiveness of public finance management."

# AUDITOR GENERAL'S OVERVIEW

As technology advances, the Government of Montserrat's (GOM) Ministries and Departments have become increasingly dependent on computerised information systems to carry out their operations to process, maintain, and report essential information. The GOM requires current and accurate fisheries data to make informed decisions regarding the exploitation and development of Montserrat's fishery resources and fishing industry. The JNCC commissioned a fisheries data-management system for the Montserrat Fisheries and Ocean Governance Unit.

The fisheries data management software, FISHCANA, is owned by JNCC; but legally, Montserrat's fishermen, and not the GOM, own the collected fisheries data that are entered and stored in the FISHCANA database. The GOM has never sought or obtained permission from the fishermen to collect, to store, to use, and/or to disseminate the fisheries data.

In relation to the software itself, we found that the FISHCANA system is well-designed and very user-friendly with simple modules composed of dropdown menus with options. The FISHCANA system is not being adequately utilised for the collection of fisheries data, owing to software and hardware related issues. Furthermore, data collection is ineffective and inaccurate as the process in place is unreliable. Of concern to us is that the legal framework in place does not give the requisite authority for the collection of fees for the registration and certification of fishing vessels and of fishermen. 134 registration applications for 89 fishermen and 45 fishing vessels have been pending since 2017.

As a result of this, the Office of the Auditor General has determined that all fishing activities and operation of fishing vessels in Montserrat's waters are technically illegal. We note that the Fisheries Unit has been seeking to update the fisheries law for a number of years. Other findings include: (a) technicians working 5 days a week, from 8am to 4pm, (b) the other landing sites are not being monitored, (c) periodic data collection is being performed, (d) limited cooperation from some of the fishermen, and (e) insufficient transportation to adequately carry out tasks.

We have highlighted other findings and provided a number of recommendations that we feel would benefit relevant stakeholders, once they are implemented. We wish to record our thanks to all who provided information, clarifications, or extend courtesies during the course of this review.

Marsha V.E. Meade
Auditor-General (Ag)
21 July 2022

# EXECUTIVE SUMMARY

## Overview

As a result of volcanic eruptions during and since year 1995, the Government of Montserrat lost historical data and documents that were largely paper-based (aerial photography, statistics, scientific papers, and associated data) and the existing data still remain vulnerable to damage or loss from inclement weather or more volcanic activity. More recently, the Fisheries and Ocean Governance Unit, along with other Caribbean countries in the region, lost all of its historical fisheries data that were being housed by the Caribbean Regional Fisheries Mechanism's database CARIFIS (Caribbean Fisheries Information System). The CARIFIS database stopped working in late 2012/early 2013, owing to conflict caused by a software update. The Joint Nature Conservation Committee in partnership with the UK Government initiated two projects at MATLHE, aimed at improving Montserrat's capacity to store, to manage, to use and to analyse data. One of the projects was the development of the fisheries data collection database system, FISHCANA, for national and international reporting and support of Marine Spatial Planning.

## Key Observations and Findings

- The FISHCANA system on the iPads and the centralised database on the server, is very user-friendly with straightforward modules comprising dropdown menus with options, text fields, contained buttons for the easy input of fisheries data, and application and information security controls. The database can be accessed via a web browser from any ICT device once there is internet or Wi-Fi access.

- Currently, the FISHCANA system is not being utilised for the collection of fisheries data, owing to software and hardware related issues, such as: (i) the FISHCANA iOS on all three iPads was not synchronsing with the server whenever the Fisheries Technicians attempted to upload and store the collected fisheries data into the database; (ii) the Reporting module does not properly filter and/or query the fisheries data, for analysis; and (iii) the sole iPad equipped with Wi-Fi access sustained damage to its screen, therefore viewing and input of the data were difficult.

  As a result, the Fisheries Technicians (FT) have reverted back to the traditional part manual, part computerised method of collecting and recording the local fishers' catch and effort data, which are also being manually inserted into the FISHCANA database.

- FISHCANA is owned by JNCC; but legally, the collected fisheries data that is entered and stored in the FISHCANA database and used for analysis, is owned by the fishermen not the Government of Montserrat. The Fisheries and Ocean Governance Unit has indicated that it

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never formally asked for the fishermen's permission, since the advent of the FISHCANA project.

- The *CAP 9.01 Fisheries Act* of 2013, does not enable the Chief Fisheries Ocean Governance (FOG) Officer to perform his duties effectively in regards to the registration and certification of fishermen and of fishing vessels, as there are no prescribed fees.  Therefore, all fishing activities and the operation of fishing vessels in Montserrat's waters are technically illegal. However, the Fisheries Unit is currently in the process of updating this law with the guidance of an overseas legal consultant.

- The collection of fisheries data is ineffective and inaccurate. It is not being done properly for a number of reasons: for e.g., (1) poor collection protocols, (2) lack of cooperation by some of the fishers, (3) transportation issues, (4) data is not being collected from the other three landing sites, or during the weekends, when a lot of the fishermen go to sea.

## Recommendations

Aside from the FISHCANA Fisheries Data Management software issues being resolved by the owner, JNCC, if effective and high-quality data-collection is to be achieved by the FOGU, the following and other key changes need to be considered and actioned:

- **Collaboration of duties**. To ensure greater efficiency in the collection of data by the technicians, we suggest that two FTs should be present to collect the fisheries data at the major landing site. While one is measuring and/or weighing the catch, the other officer would be recording the information.

- **Adjusting of the FOGU's working hours**. Consideration should be given for the implementation of a rotation shift system for the weekends to ensure that the FTs capture more robust, high-quality and comprehensive fisheries data.

- **Dedicated transportation for the FOGU**.  In order for the FTs to effectively and efficiently execute the required tasks for the proper collection of fisheries data (conduct interviews, visit the other landing sites, and data sampling), sizeable pieces of equipment and tools are to be transported. Therefore, it is important that the JNCC pickup truck be used exclusively by the FTs and the vehicle should be kept at the Little Bay Market parking lot for easy access during working hours.  A second vehicle is required to ensure data collection at other landing sites.

## Audit Conclusion

The Office of the Auditor General has determined that the FISHCANA software for the management of fisheries-related data is very well designed and user friendly.   However, because this bespoke software has been adversely affected by a number of internal and external contributory factors, it is not being fully utilised for all of the intended purposes and expected benefits for which it was developed.  To get full value for money from the software, several problems must be solved: that is, (a) to secure the data on MALHE's data gateway server by resolving and reforming the storage issue, to ensure that the fisheries data is readily accessible for analysis, (b) to streamline and to improve the flow of data from being collected at the landing site to being entered into the fisheries database, (c) to lessen the time taken for data entry, (d) to improve the quality of the collected data by reducing data entry errors.

However, once the software, hardware, environmental, interpersonal and other impacting factors are addressed, FISHCANA has the potential to be a very effective tool for the efficient collection, secure storage, and analysis of Montserrat's data for fisheries.

## Subsequent Event

Two of the three iPads were retrieved by the contractor in late June 2022, in order to resolve the above-mentioned issues. However, towards the conclusion of the audit in early July 2022, the third iPad (with the damaged screen) could not be accounted for, by Management.

# CHAPTER 1      INTRODUCTION

## Background

1.1      [1,2]All of Government of Montserrat's (GOM) Ministries and Departments are dependent on data.  Consequently, any loss of data would significantly impact the daily running of the island's public services and their ability to recover quickly.   For example, the volcanic eruptions (during and since year 1995) caused major losses of historical data and documents, which were largely paper-based (aerial photography, statistics, scientific papers, and associated data).  Only a small amount of the remaining data has been digitised.  Therefore, the data still remain vulnerable to damage or loss from inclement weather or more volcanic activity.  As another example, the Department of Agriculture (DoA) Fisheries and Ocean Governance Unit (FOGU) lost its archives, when the Caribbean Regional Fisheries Mechanism's (CRFM) database CARIFIS (Caribbean Fisheries Information System) stopped working circa late 2012/early 2013, after a conflict caused by a software update.  This resulted in the large-scale loss of historic fisheries data that had been collected by Montserrat and by several other Governments in the region.

1.2      In addition, great volumes of data were being generated by various sources and activities: e.g., (a) past and new projects funded by the UK & by the European Union, (b) international university researchers, and (c) Non-Governmental Organisations. Oftentimes, these data were in various formats and standards that were incompatible with the GOM's data management systems. Furthermore, the quantities of data generated started to exceed the static data management capacity of the Government's system to store, to collate and to manage the data. As a result, the GOM was unable to gain complete access to, or to benefit fully from, the new data, and this situation placed the GOM at a great disadvantage in terms of managing Montserrat's marine and terrestrial environments. The stakeholders involved were unable to make effective decisions concerning infrastructure development, land-use planning, and maximising domestic food production, based on accurate and current information.

1.3      Consequently, the Joint Nature Conservation Committee (JNCC) in partnership with the UK Government initiated two projects at the former Ministry of Agriculture, Trade, Lands, Housing, and the Environment (MATLHE), now MALHE, (whose portfolio includes the Fisheries Division), aimed at improving Montserrat's capacity to store, to manage, to use and to analyse

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[1] *A Review of the Ecology and Economics of Montserrat's Marine Resources, June 2015, Sustainable Fisheries Group, UC Santa Barbara*

[2] *Overseas Territories Environment and Climate Fund Final Report, Building Data Gateway for the Caribbean OT of Monserrat, May 2019, Department for Environment Food & Rural Affairs, Foreign & Commonwealth Office, & UK Government*

data.  One of the projects was the development of FISHCANA, a database system for fisheries, both for national and international reporting and for the support of Marine Spatial Planning.

## Management's Responsibility

1.4      Management is responsible for achieving the objectives of the FISHCANA fisheries data management system project.   More specifically, the role of management is to ensure that the project's outputs are advantageous to the users and beneficiaries of the FISHCANA software.

## Auditor's Responsibility

1.5      Our responsibility is to express an independent conclusion on the Post-Implementation Benefits audit of the Department of Agriculture's Fisheries and Ocean Governance Unit's FISHCANA Fisheries data management system, based on our audit.  Our work was conducted in accordance with International Standards of Supreme Audit Institutions (ISSAI) 100 and International Standard on Assurance Engagements (ISAE) 3000. These principles require that we comply with ethical requirements and plan and perform the audit in order to obtain reasonable assurance whether tried and true policies, plans, procedures, and internal controls exist and are functioning effectively, proper records have been and are being kept, and all the necessary information and explanations for the purpose of our audit have been obtained.

## Audit Mandate

1.6      The Office of the Auditor General (OAG) is mandated through the Montserrat Constitution Order of 2010 to perform audits in any matter related to the public sector and in the public interest.  This mandate is supported by International Standards of Supreme Audit Institutions (ISSAI) 1, 200, 300, 400, and it is further strengthened by the Public Finance (Management and Accountability) Act (PFMAA) of 2008 and by the Public Finance (Management and Accountability) Regulations (PFMAR) of 2009.

## Audit Standards and Guidelines

1.7      The standards and guidelines used to assess the FISHCANA software included the use of International Standards of Supreme Audit Institutions (ISSAI) 3000, 4000, and 5300.

## Audit Objectives

1.8      The aims of this Post-Implementation Benefits review were to:

A.   Determine if the implementation of the FISHCANA software met the Fisheries and Ocean Governance Unit's work objectives and delivered the anticipated benefits.

B.   Establish if changes were made to the FISHCANA software since it was implemented.

**C.** Establish if there are any plans for future enhancements to FISHCANA.

## Audit Scope and Methodology

1.9      The study covered the years 2012 to 2020, and focused on the examination of the Post-Implementation Benefits of the FISHCANA software.   The Auditor monitored the audit in the field and may have amended any area of the audit scope in consultation with the Auditor General, so as to maximise the efficiency of the audit.

1.10      Several techniques were utilised to gather information and to validate the beneficial achievements for implementing the FISHCANA software. These included, but were not limited to: (a) interviewing past and present key stakeholder(s) at the Department of Agriculture and the Fisheries and Ocean Governance Unit; and key persons from the Department of Information Technology & E-Government Services (DITES), the Joint Nature Conservation Committee (JNCC), and Rovika Inc.; (b) inspection of documents; (c) review of data; and (d) observation of the software in order to gather in-depth information about FISHCANA.

1.11      Following our audit, we discussed the findings of this study with the Permanent Secretary, Ministry of Agriculture, Lands, Housing and Environment; Director, Department of Agriculture; Chief Fisheries and Ocean Governance Officer; the Fisheries Technicians, and other stakeholders. We took their views into consideration when finalising this audit report.

# CHAPTER 2     DEPARTMENT OF AGRICULTURE

## Background

2.1     [3,4]The Department of Agriculture (DoA) is within the Ministry of Agriculture, Lands, Housing, and Environment (MALHE) (formerly the Ministry of Agriculture, Trade, Lands, Housing, and Environment), and is responsible for:

- direction and implementation of policy
- laws and policies related to agriculture and fisheries
- conservation, management and sustainable utilisation of natural resources
- provision of professional advice on natural resources.

2.2     The DoA provides services such as agriculture (crop and livestock), fisheries, policy, and legislation and compliance, including: agricultural and fisheries awareness and promotion; production and marketing support services; technology transfer; pest management; environmental management (e.g. soil conservation of farmlands); management of agricultural and fisheries development programmes; policy advice; compliance checks; and legislative reviews.

2.3     The DoA's long-term goal is to re-develop Montserrat's agriculture (crop, livestock, aquaculture and fisheries) and the other natural resource sectors through traditional and emerging techniques and technologies, in order to meet the local demand.  It also aims to target specific markets for exports of fresh commodities and value-added products, thereby promoting food- security, sustainable livelihoods, and both earning and saving foreign exchange.

## Montserrat's Fisheries Sector

2.4     [5]Culturally, Montserrat's fishing sector is an important source of food-security although its contribution to the island's Gross Domestic Product (GDP) is marginal. There are approximately one hundred (100) known full-time, part-time, occasional and recreational fishers, who target over two hundred (200) species of fish and invertebrates.   Most of them do not depend solely on fishing as a source of income and fish only once or twice a week; several of the fishers are members of the Montserrat Fishers and Boaters Association and the Montserrat Fishermen's Cooperative.

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[3]https://www.gov.ms/government/ministries/ministry-of-agriculture-lands-housing-environment/department-of- agriculture/

[4]Fishery data   collection and   integration strategy for   underpinning sustainable fisheries   management in Montserrat   DRAFT report, Prepared for Fisheries and Oceans Governance Unit - Department of Agriculture, Government of Montserrat, May 2018, JNCC, SAERI and UK Government

[5]Caribbean Natural Resources Institute climate adaptation in the fisheries of Anguilla and Montserrat Assessment of vulnerability to climate change in Anguilla and Montserrat fisheries sectors, 2018

2.5    Since the move from Plymouth to the northern part of the island, the main fish landing site is at Port Little Bay where the majority of the fishermen are now located.  A small number of fishers do operate from Carr's Bay and others infrequently use landing sites such as Bunkum Bay and Isle's Bay.  The majority of Montserrat's fishermen fish within a three-mile radius of the coast where they target mainly reef fish and coastal pelagics; the rest fish outside of Montserrat's territorial waters near Antigua, Nevis, and Redonda.  The most commonly landed species is the Needlefish  (or gar fish); the other important species landed in terms of volume include reef fish such as red hind, triggerfish, and squirrelfish, and coastal pelagic species such as ballyhoo. Although lobsters are only caught as bycatch in fish pots, they are the most valuable species in terms of unit price.

2.6    The main methods of fishing used by the fisherfolk in Montserrat are fish pots/traps, drop lining, spearfishing, shore fishing, trolling, hook and line, gill net, and beach seining.

*Table I – Types of fishing gear used and fish species caught by Montserrat's fishermen[6]*

| Type of Fishing Gear | Reef/Demersal Fish Species | Coastal Pelagic Species | Pelagic Species |
|---|---|---|---|
| Traps/pots | Red Hind | Needlefish/Gar | Wahoo |
| Beach Seine | Queen Trigger | Ballyhoo | Dolphin fish |
| Gill Nets | Doctorfish | Crevalle Jack | Tuna |
| Hand Lines | Blue Tang | Bigeye Scad | Kingfish |
| Longlines | Snappers (various) | Bar Jack | |
| Fish Gun | Longjaw Squirrelfish | | |
| Rod and Reel | Honeycomb Cowfish | | |
| | Coney | | |

2.7    There is a high demand for local fish, therefore most of the fishers sell their fish directly to the citizens and local businesses (hotels and restaurants) immediately upon landing their catches. Montserrat does not export its fish products; however, large amounts of frozen fish and other seafood products such as shrimp and conch are imported each year.

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[6]*DRAFT Fisheries Data Collector Manual, Fisheries Unit, Department of Agriculture, Government of Montserrat, January 2018*

## Fisheries and Ocean Governance Unit

2.8     The Fisheries and Ocean Governance Unit (FOGU) is a division within the DoA that is responsible for the conservation and oversight of the fisheries and aquatic resource in Montserrat's sovereign waters. The division is mandated under the revised 2013 *CAP 9.01 Fisheries Act*, which outlines the key national policies and regulations that influence fisheries management in Montserrat. Segments of *Section 3*, *Regulation of Fishing*, relates specifically to this Post-Implementation Benefits audit.

2.9     The FOGU's current organisational hierarchy has the following four (4) job positions:

• Chief Fisheries and Ocean Governance Officer (formerly Fisheries Officer).

• Senior Fisheries and Ocean Governance Officer. The former corresponding position has been vacant for more than two (2) decades.

• Fisheries and Ocean Governance Officer (formerly Fisheries Assistant). The position has been vacant since the last person retired in 2014.

• Two (2) Fisheries Technicians (formerly Data Collectors).

## Observations

2.10     **Additional Fisheries Technician on staff**.  There are currently three (3) persons working as Fisheries Technicians (FT). The new FT was contracted in 2019 as the Fisheries Assistant (Temporary); this substitute employee's job functions and fixed salary, falls within the capacity and salary range of a FT.  The job position of Fisheries Assistant is, however, still officially vacant.

# CHAPTER 3    FISHERIES DATA MANAGEMENT SYSTEM

## Project Summary

3.1    After the CARIFIS database crashed in year 2012, the Fisheries and Ocean Governance Unit was faced with the challenge of having to replace the regionally-used Caribbean database for the storage, querying and reporting of local fisheries data. The collection and documenting of Montserrat's fisheries data was partly manual and partly computerised, which was very time-consuming and increased the risk of data-entry inaccuracies from human error. This included the recording of the fisheries data in notebooks or on pieces of paper, which was then transferred onto *Fishing Vessel Catch and Effort Forms* before inserted into an Excel spreadsheet. In addition, *Fisheries Monthly Summary Sheets* were written up at the end of each month.

3.2    The JNCC commissioned a five-year Fisheries Data Integration Strategy for Montserrat in year 2017, as part of a Territory to Territory (T2T) partnership between the GOM and the Falklands Islands Government; one of the recommendations was to improve the island's fisheries-data collection and management.  Therefore, to enhance the FOGU's data management capacity to digitally store, analyse, query and report Montserrat's ocean-resources data, the JNCC and UK Government funded the development of a fisheries data-management software by a local software company Rovika Inc.   The company was contracted to develop a platform that would enable the FOGU's staff to perform these tasks; the application software was named FISHCANA.[7]

## Project Deliverables

## Aim

3.3    [8,9]The GOM requires current and accurate fisheries data to make informed decisions regarding the exploitation and development of Montserrat's fishery resources and fishing industry; hence, this was the main reason that the JNCC commissioned a fisheries data-management system for the Montserrat Fisheries and Ocean Governance Unit. The fisheries data management system was to resolve and to reform the storage issues, and to secure fisheries data and to make them available for analysis.  The project deliverables specified that technology was to be used to streamline and to improve the flow of data collected at the landing site to the fisheries database, to lessen the time taken for data-entry, and to improve the quality of the collected data by reducing data-entry errors.

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[7]*https://jncc.gov.uk/*
[8]*Montserrat Fisheries Data Management System Project Proposal, Annex A,  July 2014*
[9]*Memorandum of Understanding (ARWVIS LTD) and (The Ministry of Agriculture Trade Lands Housing and the Environment) Relating to The Development of a Digital Fisheries Data Management System (Pilot Project) Project Nemo for the Montserrat Fisheries Unit/Department of Agriculture 2015*

## Objectives

3.4    The project's overall objective was to design, to develop, and to implement a well-designed integrated fisheries database and application (app on tablet) that preserved a lot of the structure of the paper form that was long used to collect data from interviews with fisherfolks regarding their landed catches. It should enable the efficient and easy collection, collation, analysis and reporting of Montserrat's biological and landings data and support sustainable fishery practices:

- by storing the fisheries data under the following elements:-
  – fisheries landings interviews
  – fishing vessel effort
  – port movements entrance/exit logs
  – fishing vessel licensing and ownership register
  – register of fishermen
  – biological samples
  – landings subsamples
  – inshore vessel monitoring systems.

- is based on open-source coding with a web-based interface for front-end users to facilitate manual data-entry, review and editing (e.g., review inputs, highlighting potential errors, edit, delete, etc.), running of queries, and the generation of reports; it would also facilitate the export of raw data in *.txt* or *.csv* file format; for example, historical landings data.

- is linked to an iOS (iPhone Operation System) application on iPad tablets that will enable the immediate input/collection of fisheries data (fishing effort, landings, and biological data (lengths, weights, counts).

## Project Cost and Outputs Schedule

3.5    [10,11]The overall cost for the FISHCANA project was £18,000, and the system was to be completed in six (6) months; the proposed dates for its commencement and completion were from early October, 2018, to early February, 2019.   The entire project was to be conducted in stages with set milestones for the delivery of outputs as outlined below:

- **Beginning of October, 2018** - A document detailing the design of the fisheries database, the relationships between data, information about levels of users, and other necessary technical specifications.

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[10]*Montserrat Fisheries Data Management System Project Proposal, Annex A, JNCC, July 2014*
[11]*Department for Environment Food & Rural Affairs, Foreign & Commonwealth Office, & UK Government, Overseas Territories Environment and Climate Fund Final Report, May 2019*

- **Beginning of November, 2019** - A document specifying the design and functionality of the user interface, as well as technical specifications and requirements of the software.

- **Mid-December, 2018** - Development of the database to be completed.

- **Mid-January, 2019** - The user-interface developed as per specifications, tested and reviewed by end-users; and adjustments made if required.

- **February 2019** - The final user-interface developed and ready for implementation together with the database and iOS data-collection application.

- **End of February 2019** - Submission of a user's manual.

- **Mid-March 2019** - Train end-users (Fisheries Unit's staff, the MATHLE's IT staff, the DITES staff, and the Statistics Department's staff) to use the fisheries data-management system.

## Implementation

3.6     The local contractor installed the iOS data-collection application on two (2) iPads owned by the FOGU, and tested the system to ensure its successful functional deployment.   The testing phase was from February to March, 2019, when the system went live and the FOGU's staff was to report to Rovika Inc. any problems or glitches encountered.   Initially, FISHCANA was being stored on Rovika Inc.'s cloud-based server with the intention for it to be relocated to the MALHE's server after being in use for 3 to 6 months without any issues.   Rovika Inc. was then to coordinate with the MALHE's IT personnel to implement the FISHCANA database and web application on the MALHE's server.

*Figures I & II - Frontal and back view of one of the Fisheries and Ocean Governance Unit's iPads*

**Observations**

3.7 **Pros and cons of the FISHCANA system**. The FISHCANA system on the iPads and the centralised database on the server are very user-friendly with straightforward modules composed of dropdown menus with options, text fields, and contained buttons, for the easy input of fisheries data.   The database can be accessed via a web browser from any ICT device location once there is internet or Wi-Fi access on the ICT device being used.   The iOS FISHCANA application on the iPads has an offline mode when there is no Wi-Fi or internet connectivity, which is usually not available at the fishermen's landing sites.   This feature allows the collected fisheries data to be stored locally on the ICT devices until internet connectivity is restored, and the offline records can be uploaded to the database on the server.   This is done by synchronising the iPads with the server using the Sync button.

3.8 The software has application controls that ensure (i) that all of the required data fields are completed before another action can be executed, and (ii) that incorrect data are not entered. Successfully completed steps and data-fields are highlighted in **green**, and/or has a green ✓; blank fields that require data (e.g., codes, type of gear, species combinations, et cetera) are highlighted in **red**, and have a red **x**.   The respective associated notifications and directives are also displayed in either green or red, as shown in the screenshots below on pages 19 and 20. In addition, there is the capability of editing the information in completed interview-forms, or completely destroying duplicated interview-records.

3.9 There are also information-security controls in place; for instance, whenever a user logs into FISHCANA, the system records (1) the user's name, date, and time of last sign-in, (2) the Internet Protocol (IP) address of the user's ICT device, and (3) the status of the user's account in FISHCANA. When they are created and successfully completed, new *Interviews* are numbered sequentially, along with the current year and the start and end date/time that the information was inserted into the online form and saved to the FISHCANA database.   The name of the FT who created an *Interview* is displayed at the top right-hand corner of the online form.

3.10 In addition, persons who use the system, are assigned to security-groups in accordance with their job-roles; the three user-roles are as follows:

• **Fisheries Technician** – able to create/add/review completed landing interview-forms; before uploading the data to the database on the server user; and can make edits to, or destroy (delete), the Interview-forms if necessary.

• **Administrator** – in addition to the FT's role, able to create/lock users' accounts, to edit users' information, to change roles, and to manage passwords.

• **Statistician** – this view-only user-account was created specifically for the Statistics Department of Montserrat, for the sole purpose of retrieving fisheries data.

3.11    On the downside, there is still the likelihood of human error if the FTs do not exercise diligence when inserting the fisheries data into the database.

*Figures (III) to (VI) – Examples of FISHCANA user modules and forms*

## Effort Interview 520/2021

Edit  Destroy

East
Fishing zone

Fish Pot          0
Gear              Number of gears

Jan 07 2021, 5:00 AM    Jan 07 2021, 9:30 AM
Started at              Ended at

## Catches

New catch

| Species | Weight (lbs) | Retail price | Samples | | | |
|---|---|---|---|---|---|---|
| Blue Tang Surgeonfish | 20.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Doctor Fish | 25.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Dog teeth snapper | 3.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Queen Triggerfish | 10.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Longjaw squirrel fish | 8.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Jolt Head Porgy | 2.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Schoolmaster | 10.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Pulma Porgy | 6.0 | $10.00 | 0 | Samples | Edit | Destroy |
| Honey Comb Cowfish | 20.0 | $5.00 | 0 | Samples | Edit | Destroy |

## New Species

Please review the problems below:

Name *

Marlin ✓

Scientific name *

Istiophoridae ✓

ASFIS Code *

✗

Asfis code can't be blank and Asfis code is the wrong length (should be 3 characters)

Taxo Code *

✗

Taxo code can't be blank and Taxo code is the wrong length (should be 10 characters)

ISSCAAP Code *

✗

Isscaap code can't be blank and Isscaap code is the wrong length (should be 2 characters)

Fishery type

Fish Aggregating Device (FAD) ✓

Species report category

Ocean Pelagics ✓

Create Species    Cancel

# CHAPTER 4      FINDINGS AND RECOMMENDATIONS

**FISHCANA Software Findings**

4.1      **Issues with iPads and FISHCANA software.**  At the time of our audit, the FISHCANA fisheries data management software, was not operating at its optimum and was not being used for the express purpose it was designed and developed.  As a result, none of the three (3) iPads were being utilised to collect the fisheries data, due to the reasons highlighted below:

(i)      In year 2020, two of the three iPads were sent to the contractor, Rovika Inc, for updating. However, these devices were not returned to the Fisheries Unit until early in year 2021. The contractor had to be contacted several times by the DoA before the devices were returned in August, 2021.  The immediate use of the iPads was further delayed, as the devices were returned without their USB charging cables, and replacements were not purchased until several weeks after the devices were given back to the FOGU.

(ii)     The FISHCANA iOS on all three iPads was not synchronsing with the server whenever the Fisheries Technicians attempted to upload and store the collected fisheries data into the database.

(iii)    The Reporting module does not properly filter and/or query the fisheries data, for analysis.

(iv)    The sole iPad equipped with Wi-Fi access sustained damage to its screen when it was accidentally dropped by one of the FTs during an interview, several months prior to the audit. Consequently, the viewing and the input of the data were difficult and the damaged iPad was relinquished to Management for repairs.

4.2      The JNCC is responsible for paying the contractor, Rovika Inc., for any services rendered; and the overseas entity indicated that payment is reliant on how quickly the JNCC can source the necessary funding.

**Subsequent Event.**  Two of the three iPads were retrieved by the contractor in late June 2022, in order to resolve the above-mentioned issues. However, towards the conclusion of the audit in early July 2022, the third iPad (with the damaged screen) could not be accounted for, by Management.

4.3      **Issue encountered with the hosting of FISHCANA on MALHE's data gateway server.** The development of the FISHCANA software, was part of a JNCC's *Building a Data Gateway for Montserrat* project. The project was designed to increase data management capacity within the Ministry of Agriculture, Land, Housing and Environment (MALHE), for the Geographical Information Systems and Fisheries Ocean and Governance Units.

4.4      The collective main aims of this data gateway project were to:

• facilitate data sharing;

• enable the collection of data once for use many times;

• store and retrieve data effectively;

• protect data from future extreme events;

• meet sustainable management goals by integrating data;

• support Montserrat's national reporting to regional and international agreements;

• help stakeholders understand the value of Montserrat's natural environment.[12]

4.5     Originally, the intention was for FISHCANA to be run from the MAHLE's Geographical Information Services Unit's (GISU) server, which is being hosted by the GOM's IT Department, DITES.  Transferal of the database and web application from Rovika Inc. to MALHE's data gateway server was successful; however, a conflict occurred between the FISHCANA and the GISU's web applications. It was discovered that both applications were inadvertently using the same ports on the GISU's server; therefore, without a proxy server to direct requests to the correct respective URLs (Uniform Resource Locators), oversight of the FISHCANA system had to be returned to Rovika Inc.

4.6     Notably, DITES does not have access to the data stored on the GISU's server, because it is managed and maintained remotely by the South Atlantic Environmental Research Institute (SAERI).  The government's I.T. Department is only responsible for providing a steady and reliable source of power to maintain the network link between the server and the GISU, and for securing the server in inclement weather or other emergencies.

4.7     **Potential data access risk**. There is the potential risk of the DoA/FOGU not being able to access the FISHCANA software and the fisheries database being run from, and maintained on, Rovika Inc.'s cloud server. This can occur if the entity goes out of business, or fails to maintain the software.

4.8     **Ownership of FISHCANA software and database.** The fisheries data management software, FISHCANA, is owned by JNCC; but legally, Montserrat's fishermen, and not the GOM, own the collected fisheries data that are entered and stored in the FISHCANA database.  It was stated that the GOM has never sought or obtained permission from the fishermen (before the volcanic activity) to collect, to store, to use, and/or to disseminate the fisheries data.  In addition, the present Fisheries Unit has confirmed that it never formally requested the fishermen's permission to use their data, since the advent of the FISHCANA project.

4.9     **Incomplete training of end-users**.   There are conflicting reports regarding the training of the Fisheries Technicians to operate FISHCANA.  The software contractor maintains

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[12]*Overseas Territories Environment and Climate Fund Final Report, Building Data Gateway for Caribbean OT of Montserrat, September 2018 – March 2019,*

that training was provided; reference was also made to this in the final report of the Data Gateway project.  However, in actuality, only one of the FTs was in receipt of direct training from Rovika Inc., and that FT, in turn, provided only cursory instruction to a co-worker. The co-worker, through personal initiative and practice, was self-taught to operate the system fully.

**Subsequent Event.**  A one-day refresher training seminar with the contractor was organised by the Department of Agriculture, for the Fisheries Technicians, on 21 June 2022.  However, the session had to be postponed due to circumstances beyond the department's control.

## Recommendation

4.10   **Resolution of FISHCANA storage issue on MALHE's data gateway server.**  Effort should be made by the DoA and FOGU, to consult with Rovika Inc. and DITES, to ascertain:

- the extent of the problem that prevented FISHCANA from being stored and maintained on MALHE's data gateway server; and

- the measures that can be executed to resolve and reform the problem.

4.11   Notably, the resolution of this storage problem on the MALTHE's data gateway server, will also address and eliminate the data access risk, posed by the continued hosting of FISHCANA on Rovika Inc.'s cloud server.

## Other Related Findings

4.12   [13,14,15]**Impact and cause of poorly collected fisheries data**. Montserrat's fisheries data is used by regional and international bodies, the SDM, and GOM as the evidence-basis for research, statistics, or MALHE's/DoA's management objectives regarding the sustainability of fish and fishing; effective consultation; and increased potential economic development through new fisheries.  For the fisheries data to be beneficial it needs to be of high-quality; the higher the quality of the data, the more favorable it will be for decision-making purposes and the integrity of research.   If the data is not collected properly, it will result in distorted and misleading findings; unreliable information; and compromised decisions regarding public policy recommendations.  Notably, the fisheries data is not a true reflection of the actual annual yield of fish products (reef fish, coastal pelagics, invertebrates) being caught in Montserrat's fishing zone.

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[13]*https://www.lotame.com/why-is-data-quality-important/#:~:text=Improved%20data%20quality%20leads%20to,in%20consistent%20improvements%20in%20results.*
[14]*https://ori.hhs.gov/education/products/n_illinois_u/datamanagement/dctopic.html*
[15]*Fishery data collection and  integration strategy for underpinning sustainable fisheries management in Montserrat DRAFT report,  Prepared for Fisheries and Oceans Governance Unit - Department of Agriculture, Government of Montserrat, May 2018, JNCC, SAERI and UK Government*

4.13    The following factors were identified as having an adverse impact on the accurate collection and recording of Montserrat's fisheries data:

4.14    **Challenges in the physical environment.** The physical environment at Port Little Bay present certain challenges for the efficient and effective collection of fisheries data as the Fisheries Technicians:

- are not allowed to collect the fisheries data when large container boats or ships are docked and are off-loading cargo at the jetty;

- are only allowed to drive down to the pier to unload their data collection gears (i.e. large fish baskets, measuring boards and scales), but cannot park inside the Montserrat Port Authority's (MPA) compound, due to security protocols in place. Therefore, they have to park in the Marine Village's car park, and walk back and forth between the car park and the jetty.  As a result, the FTs ceased carrying the sizeable pieces of data collection gear to Port Little Bay's pier; and

- generally, it is customary for some of the fishermen to stop at the Little Bay Market, before going out onto the main road to sell the fish to citizens, restaurants, and businesses. Therefore, if an opportunity was missed to collect the catch and effort data at Port Little Bay, the Fisheries Technicians would do it at this point.   However, these stop-overs do not occur all of the time as stopping is reliant on the disposition of the fishermen, the urgency to sell the catch, or the weather conditions.  Moreover, there are times when some of the catch is sold to waiting customers at the Marine Village, before the fishers arrive at the Little Bay Market.

*Figures VIII & IX – Examples of the large and currently un-used fisheries data collection equipment*

*Figure X – Example of how some of Montserrat's local fishermen ice their catches[16]*



4.15    **Periodic data-collection.** The FTs collect the catch and effort data only from Monday to Friday during working hours (8 a.m. to 4 p.m.); therefore, fisheries data are not collected from fishermen docking after 4 p.m.   The FOGU's staff also does not work during the weekends when the majority of fishing activities occurs.

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[16]*Robert Lee, OCTA Consultant, Overseas Countries and Territories Innovation Project Report, Montserrat Marine and Fisheries Sectors, January 2017*

4.16     **Other landing sites are not monitored.** The FTs do not visit the other landing sites (Bunkum Bay, Woodlands Beach, and Isle Bay) for a number of reasons to include: (a) the long distance to reach them; (b) travelling to and from these locations at the most southern parts of the island requires access to more than one vehicle; and (c) it is also very difficult to know and to monitor when the fishers depart from, and arrive at, these landing sites.

4.17     **Limited cooperation from the fishermen.** The consent and the cooperation of the fishermen are essential to the data-collection process, they are voluntary, and they are also reliant on the existence of a good working relationship between the fishermen and Fisheries Technicians. Notably, the majority of the regular fishermen are not willing to allow their catch to be weighed and/or measured.   Most times, to get the cooperation of the fishermen, the FTs have to assist with the landing of the catches (offloading and rinsing off the fish), for the handful (5 – 7) of fishers that are willing to assist.

4.18     The fishermen who are openly opposed to the data-collection process are reportedly apprehensive that the collected data will be used against them; specifically, they fear the taxation of their supplementary earnings gained from fishing.   For the majority of fishers, fishing is not their sole livelihood, and they are involved in other income-earning activities such as livestock rearing, construction, employment in bars and restaurants, or are employees within the Civil Service.[17] In such circumstances, the FTs estimate the number, the size, and the weight of the fish and/or invertebrates, which are sometimes concealed.

*Figure XI – Montserrat fishermen at Port Little Bay landing site[18]*



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[17]*Sustainable Fisheries Group, UC Santa Barbara, A Review of the Ecology and Economics of Montserrat's Marine Resources, June 2015*
[18]*https://hub.jncc.gov.uk/assets/879ac41b-63a0-4981-afce-9d1e47b4da7d*

4.19   **Transportation issues.**  The main landing site at Port Little Bay is some distance from the FOGU's office.   A second-hand pickup truck was provided by the JNCC some years ago, explicitly for the (ongoing) Turtle Project in Montserrat, which falls under the remit of the FOGU.  However, instead of being stationed at the Little Bay Market parking lot, the vehicle is parked at the MALHE's compound in Brades, reportedly for security reasons.  It was reported that the pickup truck is used by various employees of the MALHE and the DoA; as a result, the FTs have to walk to Port Little Bay, or resort to driving their private vehicles.

*Figure XII – JNCC donated pickup truck parked at the MALHE's compound in Brades (Nov. 2021)*



4.20   **Illegal, Unreported and Unregulated fishing.**   In year 2017, a consultant's report from the OCTA (Association of Overseas Countries and Territories) stated that, *"…The IUU undermines fisheries management, takes away economic benefits from legal fishers, targets endangered, threatened and protected and other high value species…is probably taking place in Montserrat's Exclusive Fishery Zone…undertaken along the maritime boundaries with Guadeloupe, Antigua and St. Kitts and Nevis…Montserratian fishers have reported seeing other vessels in Montserrat's waters…At present, Montserrat does not have defined strategy to combat IUU…"[19]*

4.21   A former Fisheries Officer indicated that Illegal, Unreported and Unregulated (IUU) fishing, was an issue when Plymouth was the former capital city of Montserrat, and assistance from the police launch was readily available.   However, since the capital was relocated to the north, the Royal Montserrat Police Service (RMPS) Marine Unit has not actively assisted the FOGU with the monitoring and combatting of IUU fishing committed by foreign fishing vessels encroaching in Montserrat's exclusive fishing zone.  This is because the RMPS's organisational

[19]*Robert Lee, OCTA Consultant, Overseas Countries and Territories Innovation Project Report, Montserrat Marine and Fisheries*

policies and procedures for the Marine Unit do not make allowances for non-emergency situations.   When the Marine Unit detains foreign IUU fishers in Montserrat's waters, only the catch is confiscated; legal action is not/cannot be taken against the offenders.

4.22     Notably, all of Montserrat's local fishermen are currently technically involved in IUU fishing, as there are no set fees for the registration, licensing, and certification of Montserrat's fishers and fishing vessels (both local and foreign); this includes recreational and sport fishing.

4.23     **Monitoring of fishermen and fishing vessels.** The fishermen who leave from Port Little Bay are actively monitored by the FOGU in two ways:

- The FTs review the MPA's guardhouse logbook on a daily basis to note the date/time, names and fishing vessel of the fishermen who went out to sea.   From the information obtained from the MPA's logbook, the FTs, who are already familiar with the daily fishing routines of most fishermen, can sometimes estimate their return. They strategically wait on nearby beaches to observe the approaching fishing vessels, before proceeding to Port Little Bay to estimate the catches. There are a few accommodating fishermen who will call to alert the Fisheries Technicians via their personal cellular phones 15 to 20 minutes ahead of their return.

- The Head of the FOGU also utilises a Vessel Monitoring System (VMS) to monitor the locations and the movements of the local fishing vessels. The system uses satellite and cellular based communications from onboard transceiver units; the transceiver units send position-reports that include vessel identification, time, date, and location, and are mapped and can be displayed on the end-user's computer screen, or Android phone.[20]  The Head of the FOGU indicated that so far twenty-four (24) fishermen have the transceiver units mounted onto their fishing vessels.

*Figure XIII – VMS satellite imagery of fishing activity around Montserrat*



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[20]*https://www.fisheries.noaa.gov/node/696*

4.24    The JNCC provided each of the FTs with a cellular phone to receive VMS position-reports when the fishing boats depart, and also 20 minutes prior to their arrival at, Port Little Bay. However, the cellular phones were eventually abandoned after a glitch in the delivery of the message alerts, as the position reports of the returning fishers, were being received 2 to 3 days after being sent.

4.25    Currently, only the Head of the FOGU actively monitors the fishing vessels, and frequently receives relatively up-to-date real-time message alerts from the VMS satellite surveillance system on his personal phone and laptop.   At times, fishers call to report various emergencies at sea or to request help to locate the position coordinates of fishing boats that have escaped their anchor moorings and gone adrift.

4.26    **No prescribed fees for registration, licencing and certification of fishers and fishing vessels in Fisheries Legal Framework.**  It has been several years since the Chief FOG Officer has issued any fishing licences to fishermen or certificates of registration for fishing vessels, because the *CAP 9.01 Fisheries Act* of 2013 does not stipulate the required prescribed fees.  At the time of the audit, there were notably 134 registration applications for local fishermen (89) and local fishing vessels (45), pending authorisation by the Chief FOG Officer since 2017.  As a result of this, all fishing activities and operation of fishing vessels in Montserrat's waters are technically illegal.

4.27    The Fisheries Act has been under revision for a few years by the DoA/FOGU Management in collaboration with the Director of the Department of Environment and the Attorney General's (AG) Chambers.   However, a revised edition of the Act was never submitted to the Cabinet or before the Legislative Assembly, mainly because of insufficient manpower available at the AG's Chambers to dedicate enough time towards providing the DoA/FOGU with legal guidance.  During our audit, the DoA/FOGU contracted the services of an overseas legal adviser who is well-versed in fisheries laws and regulations, and came highly recommended by the CFRM and the OECS Commission.   Towards the conclusion of our audit, the Chief FOG Officer confirmed receipt of the final draft of both the new *Fisheries Aquaculture Bill* and the proposed *Fisheries Aquaculture Regulations*; the next step in the process will be for the policymakers to sanction this document officially.

4.28    **Internal departmental issues.**  During the course of our audit, the following issues were observed and/or raised by both the DoA's staff and the FOGU's staff:

i)    **Non-acceptance of the FISHCANA technology.** It was reported that one of the FTs has never accessed the FISHCANA system via iPad or desktop computer, and has utilised only the paper-based method of data collection. This FT remains resistant and inflexible about using the technology that was provided by the JNCC/UK Govt, specifically to perform the required fisheries data-collection tasks.

ii) **Low productivity.** It was observed that only one FT is performing the task of transferring all of the fisheries data from the forms or WhatsApp messages, into the required logbook, and then into FISHCANA.  This includes fisheries data, spanning from year 1993 to the present, that were already entered into CARIFIS; notably this task is the responsibility of all three (3) of the FTs.   All of the FTs are required to input data on a daily basis into the FISHCANA database; however, this directive is not being followed.

4.29    **Biological sampling.** Full biological sampling of the various species of fish caught in Montserrat's fishing zone has not been conducted since the training workshop in 2018, although the FOGU's employees were taught best practices in methods of:

- taking length and weight data from biological samples
- how to identify the sex of fish and how to visually assess fish gonads for maturity
- how to correctly remove, store, and label otolith samples
- correctly recording the related data on data-collection sheets

and were furnished with a manual and the required equipment to perform routine biological sampling (gloves, forceps, scalpels, knives, measuring boards, and electronic weighing scales).[21]

4.30    Although this type of data is essential for conducting assessments of the stock of each species in Montserrat's waters, in conjunction with the catch and effort data, the DOA indicated that biological sampling is not a common activity as it:

(i)   involves taking away valuable fish to be dissected from the fishermen, who are reluctant to voluntarily give up the fish, as the sampling process destroys the fish and will lessen their potential earnings; and

(ii)  the procedure is costly as the sample(s) has to be packaged and shipped overseas for analysis.

4.31    Therefore, the procedure has to be specifically requested; for example, by an overseas agency conducting research and request information from the FOGU about a particular species of fish/fishes.

4.32    **Business Continuity practices**. The FOGU manually records the daily fisheries and ocean resource related activities or incident(s) that occurred on a given day in a Fisheries Data Book, along with the Fisheries Catch and Effort data sheets that the FTs must  fill out. Examples of the types of information recorded in the Fisheries Data Book and also inputted into FISHCANA are:

- rough sea days
- no catches, owing to adverse weather conditions
- moorage reports (i.e. a boat was taken out of the water for repairs, etc.)

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[21]*T2T Montserrat Collecting Quality Data to Support Sustainable Fisheries, JNCC Workshop Report, 16th – 22nd June 2017*

- catch and effort (i.e. species, poundage, size, no catch, etc.)
- engine problems.

**4.33   Alternate method of providing Fisheries and Ocean Resource data.** WhatsApp text messaging is being used as an alternate method of relaying the fisheries data by one of the FTs and by a few of the fishermen who fish during the weekends. Their fisheries information is messaged to the FT assigned (unofficially) with the responsibility of populating and updating the FISHCANA database.

**4.34   The Statistics Department's user-account in FISHCANA is inactive.** The Statistics Department Montserrat (SDM) confirmed that it never used its user-account to access the FISHCANA database, since the pilot/testing phase of the FISHCANA project, because the Fisheries Unit provides the Statistics Department with the data on a monthly basis.  However, an inactive user-account poses a risk to FISHCANA's security. User-accounts that have been dormant for a long time, or have never been used to log into an ICT device, are known as "stale" user-accounts, and these types of accounts offer an opportunity for malicious attackers to compromise electronic systems and networks, and to conceal themselves from I.T. staff.[22]

**4.35   Fishing licences**. The MALHE, the DoA and the FOGU have already designed the photographic identification fishing licence in preparation for the official resumption of the registration process of Montserrat fishermen (*refer to Appendix V, on page 41)*.

## Recommendations

**4.36   Effective, high-quality data collection.** For effective and high quality data collection to be achieved, the following key changes[23,24,25] need to be considered and actioned:

i)  **Collaboration of duties.** To ensure greater efficiency in the collection of data by the technicians, we suggest that two FTs should be present to collect the fisheries data at the major landing site. While one is measuring and/or weighing the catch, the other officer would be recording the information.

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[22]*https://www.sikich.com/insight/inactive-user-accounts-risks-and-best-practices/*
[23]*T2T Montserrat, Collecting quality data to support sustainable fisheries Workshop Report, 16th – 22nd June 2017*
[24]*Sustainable Fisheries Group, UC Santa Barbara, A Review of the Ecology and Economics of Montserrat's Marine Resources, June 2015*
[25]*Prepared by Alwyn Ponteen – Chief Fisheries and Ocean Governance Officer, Improving the Collection, Management, and Use of Marine Data in Montserrat, 17 May, 2019*

ii) **Adjusting of the FOGU's working hours.** Consideration should be given for the implementation of a rotation shift system for the weekends to ensure that the FTs capture more robust, high quality and comprehensive fisheries data.

4.37 **Dedicated transportation for the FOGU.** In order for the FTs to effectively and efficiently execute the required tasks for the proper collection of fisheries data (conduct interviews, visit the other landing sites, and data sampling), sizeable pieces of equipment and tools are to be transported. Therefore, it is important that the JNCC pickup truck be used exclusively by the FTs and the vehicle should be kept at the Little Bay Market parking lot for easy access during the working hour. A second vehicle is required to ensure data collection at the other landing sites.

4.38 **Implementation of the inspection and certification of small fishing boats.** The inspection and certification of small fishing vessels is very important for the purpose of safeguarding against health and safety hazards fishermen can encounter at sea. Therefore, the DoA and FOGU should consider:

• contracting the services of a Marine Quantity Surveyor (MQS); and

• forging an alliance with the Montserrat Port Authority and the Montserrat Maritime Administration (MMA), to provide qualified, experienced, person(s) to perform the required inspection of the fishing vessels. The MQS, or qualified/experienced person from the MMA, can be responsible for issuing the certificates of registration for seaworthy vessels; and it is imperative for provisions be made for this undertaking in the revised Fisheries Act; and

• providing for the regular renewal of registration, including inspection of boats, at least annually to ensure (a) the continued seaworthiness of vessels, (b) the safety of conditions of work for fishers/employees, and (c) the updating of data regarding ownership of vessels, operations, and fisherfolk employed.

4.39 **Finalisation of the Fisheries Technician Manual.** The Fisheries Technician Manual is a very important organisational tool, as manuals define policies and procedures that (a) provide guidance for daily activities (e.g., internal controls, and risk management); (b) set the expectation for employees' behaviour (regulatory compliance and employee training); (c) ensure consistency; and (d) maintain the quality of output.[26,27] Therefore, we recommend that the 2018 draft of the manual be reviewed and finalised.

4.40 **Deactivation of the Statistics Department's dormant user account.** Best practices and standards stipulate that stale accounts should be either removed or disabled, after

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[26]*https://blog.bit.ai/writing-a-policy-and-procedure-manual/*
[27]*https://calibrecpa.com/accounting-audit/importance-policy-procedure-manuals/*

a set period of time elapsed.[28]  Considering that it has been over two years since the SDM accessed its user account in FISHCANA, we are recommending that FOGU's management deactivate this inactive user account, until the SDM will actually require and use this access to the fisheries database.

[28]https://www.sikich.com/insight/inactive-user-accounts-risks-and-best-practices/

# CHAPTER 5    CHANGES AND FUTURE INITIATIVES

5.1    The JNCC and the FOGU have no future plans to insert supplementary modules into, or to further modify, the FISHCANA system.  However, it is important to note that the JNCC's initial intention was for the FISHCANA fisheries data-management system to be used by other Caribbean islands in the region, as a replacement for CARIFIS.   At the conclusion of our audit, there was no indication by the organisation that this was still the intention.

# CHAPTER 6    AUDIT CONCLUSION

6.1    The Office of the Auditor General has determined that the FISHCANA software for the management of fisheries data is well-designed and user friendly.  However, because this bespoke software has been adversely affected by a number of internal and external contributory factors, it is not being fully utilised for all the intended purposes and expected benefits for which it was developed.  To get full value for money from the software, several problems must be solved; that is: (a) to secure the data on MALHE's data gateway server, by resolving and reforming the storage issue, to ensure that the fisheries data is readily accessible for analysis, (b) to streamline and to improve the flow of data from being collected at the landing site to being entered into the fisheries database, and to (c) lessen the time taken for data entry, (d) to improve the quality of the collected data by reducing data entry errors.

6.2    However, once the software, hardware, environmental, interpersonal, and other impacting factors are addressed, FISHCANA has the potential to be a very effective tool for the efficient collection, secure storage, and analysis of Montserrat's data for fisheries.

# CHAPTER 7      MANAGEMENT RESPONSE

**EXECUTIVE SUMMARY**

**Overview**

Hardcopy data was kept and was reentered into excel systems. The data entered in CARIFIS, which became obsolete, was backed up in excel. Thus the reason to have this placed into FISHCANA in addition to the data currently in hard copy.

## 4.1  Issues with iPads and FISHCANA software

The information on the iPad was being synced in the early implementation, but after the upgrades this did not happen and also to date. This was reported to Rovika to be fixed but the issues persisted.

## 4.8  Ownership of FISHCANA software and database

The Fisheries Act CAP 9.01 mandates that the GOM determines what data is to be accurately collected. Reference is made to Part 5 Section 29 as follows:

(1) The Governor acting on the advice of Cabinet may enter into agreement with foreign countries and organizations concerned with fisheries activities, for the exchange of scientific information, fishing statistics and other data relevant to the conservation of fishery resources.

(2) The Chief Fisheries Officer shall collect and keep data relating to fishing and related activities within the fishery waters, and any conservation measures taken in relation to the fishery waters.

(3) Data kept pursuant to subsection (1) shall be open for inspection during official working hours and any person may make copies of the data upon payment of the prescribed fee.

## 4.20  Illegal, Unreported and Unregulated fishing

It is unclear what illegal fishing by vessels outside Montserrat in Montserrat's waters has to do with Montserrat's fishing data and FISCANA. The Fisheries Act CAP 9.01 does in fact cover registration and certification of Montserrat fishers and their fishing vessels.

## 4.23  Monitoring of fishermen and fishing vessels.

Other vessel owners have inquired about acquiring VMSs. GOM intends to make a further 15 devices available pending funding.

### 4.36  Effective, high-quality data collection

**Collaboration of duties**

This approach is agreed for biological sampling only, but for regular catch and effort recording, one technician is adequate. In any case, on some occasions several technicians are present for these activities.

**Adjusting of the FOGU's working hours**

This is welcomed, but would require additional budget for travel and overtime compensation.

### 4.37  Dedicated transportation for the FOGU

If the JNCC vehicle is to be used exclusively for the FOGU, then GOM would need to simultaneously provide another vehicle for the other Ministry activities along with the other one recommended for other landing sites.

### 4.38  Implementation of the inspection and  registration of small fishing boats

It is correct that there is no trained person within the Ministry for the inspection of fishing vessels. However, the Ministry can engage such a trained person to do this.

Whereas, the licencing and registration data should be entered into FISHCANA, the absence of this does not affect the timely collection and storage of data or the functioning of the FISHCANA database pertaining to other key and main fisheries activities.

### 4.39  Finalisation of the Fisheries Technician Manual

Only one technician was formally trained to input data into FISHCANA. Another technician was eventually informally trained. With regard to the third Technician, there is no particular resistance to using the technology, but the Technician was being asked to input years of old data which was already inputted into two other automated systems which was accessible. The Technician is willing to use FISHCANA going forward. Despite the fact that this technician has not used FISHCANA, the relevant data was being recorded by that technician and was inputted by another technician over the period.

The job description of the FTs is generic and include data collection. However, their individual duties carried out have been varied based their particular skills, capabilities, strengths and weaknesses.  For example, some FTs are more proficient at fish estimation, data capture in the field, fish sampling & identification and monitoring of vessels. Therefore, the Unit functions quite effectively with the assignment and flexibility of duties aside from only inputting data into FISHCANA.  Nonetheless, MAHLE will seek to have the other FTs frequently exposed to data entry.

### 5.1

FISCANA currently does not produce any reports on the data which is inputted and does not synchronize with the iPads. This should be recommended for future changes in order for the software to meet the original objectives.

**Appendix I**

It is not certain the purpose of the Appendix 1 showing past and proposed hierarchy or job positions which is apparently an excerpt from a CARICAD report. It is to be noted that MALHE is not proposing any changes to the Nominal Roll which is currently adequate as follows:

1  Chief Fisheries and Ocean Governance Officer

1  Senior Fisheries and Ocean Governance Officer

1  Fisheries and Ocean Governance Officer

2  Fisheries Technicians


**Permanent Secretary**
**Ministry of Agriculture, Lands, Housing and the Environment**
**18 July 2022**

# CHAPTER 8     TABLE OF FINDINGS AND RECOMMENDATIONS

| FINDING | RECOMMENDATION | MANAGEMENT RESPONSE |
|---|---|---|
| **4.1 Issues with iPads and FISHCANA software**<br><br>I.  In year 2020, two of the three iPads were sent to the contractor, Rovika Inc, for updating.  However, these devices were not returned to the Fisheries Unit until early in year 2021.  The contractor had to be contacted several times by the DoA before the devices were returned in August, 2021. The immediate use of the iPads was further delayed, as the devices were returned without their USB charging cables, and replacements were not purchased until several weeks after the devices were given back to the FOGU.<br><br>II.  The FISHCANA iOS on all three iPads is not synchronsing with the server whenever the Fisheries Technicians attempted to upload and store the collected fisheries data into the database.<br><br>III.  The Reporting module does not properly filter and/or query the fisheries data, for analysis.<br><br>IV.  The sole iPad equipped with Wi-Fi access sustained damage to its screen when it was accidentally dropped by one of the FTs during an interview, several months prior to the audit. Consequently, the viewing and the input of the data were difficult and the damaged iPad was relinquished to Management for repairs. |  | The information on the iPad was being synced in the early implementation but after the upgrades this did not happen to date. This was reported to Rovika to be fixed but the issues persisted. |

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| **4.5 Issue encountered with the hosting of FISHCANA on MALHE's data gateway server**<br><br>Originally, the intention was for FISHCANA to be run from the MAHLE's Geographical Information Services Unit's (GISU) server, which is being hosted by the GOM's IT Department, DITES. Transferal of the database and web application from Rovika Inc. to MALHE's data gateway server was successful; however, a conflict occurred between the FISHCANA and the GISU's web applications. It was discovered that both applications were inadvertently using the same ports on the GISU's server; therefore, without a proxy server to direct requests to the correct respective URLs (Uniform Resource Locators), oversight of the FISHCANA system had to be returned to Rovika Inc. | **Resolution of FISHCANA storage issue on MALHE's data gateway server**<br><br>Effort should be made by the DoA and FOGU, to consult with Rovika Inc. and DITES, to ascertain:<br><br>• the extent of the problem that prevented FISHCANA from being stored and maintained on MALHE's data gateway server; and<br><br>• the measures that can be executed to resolve and reform the problem.<br><br>The resolution of the storage problem on the MALTHE's data gateway server, will also address and eliminate the data access risk, posed by the continued hosting of FISHCANA on Rovika Inc.'s cloud server. | |
| **4.7 Potential data access risk**<br><br>There is the potential risk of the DoA/FOGU not being able to access the FISHCANA software and the fisheries database being run from, and maintained on, Rovika Inc.'s cloud server. This can occur if the entity goes out of business, or fails to maintain the software. | | |

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| **4.8 Ownership of FISHCANA software and database.**<br><br>The fisheries data management software, FISHCANA, is owned by JNCC; but legally, Montserrat's fishermen, and not the GOM, own the collected fisheries data that are entered and stored in the FISHCANA database. It was stated that the GOM has never sought or obtained permission from the fishermen (before the volcanic activity) to collect, to store, to use, and/or to disseminate the fisheries data. In addition, the present Fisheries Unit has confirmed that it never formally requested the fishermen's permission to use their data, since the advent of the FISHCANA project. | | The Fisheries Act CAP 9.01 mandates that the GOM determines what data is to be accurately collected. Reference is made to Part 5 Section 29 as follows:<br><br>(1) The Governor acting on the advice of Cabinet may enter into agreement with foreign countries and organizations concerned with fisheries activities, for the exchange of scientific information, fishing statistics and other data relevant to the conservation of fishery resources.<br><br>(2) The Chief Fisheries Officer shall collect and keep data relating to fishing and related activities within the fishery waters, and any conservation measures taken in relation to the fishery waters.<br><br>(3) Data kept pursuant to subsection (1) shall be open for inspection during official working hours and any person may make copies of the data upon payment of the prescribed fee. |
| **4.9 Incomplete training of end-users.**<br><br>There are conflicting reports regarding the training of the Fisheries Technicians to operate FISHCANA. The software contractor maintains that training was provided; reference was also made to this in the final report of the Data Gateway project. However, in actuality, only one of the FTs was in receipt of direct training from Rovika Inc., and that FT, in turn, provided only cursory instruction to a co-worker. The co-worker, through personal initiative and practice, was self-taught to operate the system fully. | | |

| OTHER RELATED FINDINGS | RECOMMENDATION | MANAGEMENT RESPONSE |
|---|---|---|
| **4.12 Impact and cause of poorly collected fisheries data.**<br><br>Montserrat's fisheries data is used by regional and international bodies, the SDM, and GOM as the evidence-basis for research, statistics, or MALHE's/DoA's management objectives regarding the sustainability of fish and fishing; effective consultation; and increased potential economic development through new fisheries. For the fisheries data to be beneficial it needs to be of high-quality; the higher the quality of the data, the more favorable it will be for decision-making purposes and the integrity of research. If data is not collected properly, it will result in distorted and misleading findings; unreliable information; and compromised decisions regarding public policy recommendations. Notably, the fisheries data is not a true reflection of the actual annual yield of fish products (reef fish, coastal pelagics, invertebrates) being caught in Montserrat's fishing zone.<br><br>4.13 The following factors were identified as having an adverse impact on the accurate collection and recording of Montserrat's fisheries data: | **4.36 Effective, high-quality data collection.**<br><br>For effective and high quality data collection to be achieved, the following key changes need to be considered and actioned:<br><br>i) **Collaboration of duties**. To ensure greater efficiency in the collection of data by the technicians, we suggest that two FTs should be present to collect the fisheries data at the major landing site. While one is measuring and/or weighing the catch, the other officer would be recording the information.<br><br>ii) **Adjusting of the FOGU's working hours.** Consideration should be given for the implementation of a rotation shift system for the weekends to ensure that the FTs capture more robust, high quality and comprehensive fisheries data. | This approach is agreed for biological sampling only, but for regular catch and effort recording, one technician is adequate. In any case, on some occasions several technicians are present for these activities.<br><br><br>This is welcomed, but would require additional budget for travel and overtime compensation. |
| **4.14 Challenges in the physical environment.**<br><br>The physical environment at Port Little Bay present certain challenges for the efficient and effective collection of fisheries data as the Fisheries Technicians:<br><br>• are not allowed to collect the fisheries data when large container boats or ships are docked and are off-loading cargo at the jetty<br><br>• are only allowed to drive down to the pier to unload their data collection gears (i.e. large fish | **4.39 Finalisation of the Fisheries Technician Manual.**<br><br>The Fisheries Technician Manual is a very important organisational tool, as manuals define policies and procedures that (a) provide guidance for daily activities (e.g., internal controls, and risk management); (b) set the expectation for employees' behaviour (regulatory compliance and employee training); (c) ensure consistency; and (d) maintain the quality of output. Therefore, we recommend that the 2018 draft of the manual be reviewed and finalised. | |

baskets, measuring boards and scales), but cannot park inside the Montserrat Port Authority's (MPA) compound, due to security protocols in place.  Therefore, they have to park in the Marine Village's car park, and walk back and forth between the car park and the jetty.  As a result, the FTs ceased carrying the sizeable pieces of data collection gear to Port Little Bay's pier

- generally, it is customary for some of the fishermen to stop at the Little Bay Market, before going out onto the main road to sell the fish to citizens, restaurants, and businesses. Therefore, if an opportunity was missed to collect the catch and effort data at Port Little Bay, the Fisheries Technicians would do it at this point.   However, these stop-overs do not occur all of the time as stopping is reliant on the disposition of the fishermen, the urgency to sell the catch, or the weather conditions. Moreover, there are times when some of the catch is sold to waiting customers at the Marine Village, before the fishers arrive at the Little Bay Market.

**4.15  Periodic data-collection.**

The FTs collect the catch and effort data only from Monday to Friday during working hours (8 a.m. to 4 p.m.); therefore, fisheries data are not collected from fishermen docking after 4 p.m. The FOGU's staff also does not work during the weekends when the majority of fishing activities occurs.

**4.16  Other landing sites are not monitored.**

The FTs do not visit the other landing sites (Bunkum Bay, Woodlands Beach, and Isle Bay) for a number of reasons to include: (a) the long distance to reach them; (b) travelling to and from these locations at the most southern parts of the

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| island requires access to more than one vehicle; and (c) it is also very difficult to know and to monitor when the fishers depart from, and arrive at, these landing sites. | | |
| **4.17 Limited cooperation from the fishermen.**<br><br>The consent and the cooperation of the fishermen are essential to the data-collection process, they are voluntary, and they are also reliant on the existence of a good working relationship between the fishermen and Fisheries Technicians. Notably, the majority of the regular fishermen are not willing to allow their catch to be weighed and/or measured.  Most times, to get the cooperation of the fishermen, the FTs have to assist with the landing of the catches (offloading and rinsing off the fish), for the handful (5 – 7) of fishers that are willing to assist.<br><br>The fishermen who are openly opposed to the data-collection process are reportedly apprehensive that the collected data will be used against them; specifically, they fear the taxation of their supplementary earnings gained from fishing.  For the majority of fishers, fishing is not their sole livelihood, and they are involved in other income-earning activities such as livestock rearing, construction, employment in bars and restaurants, or are employees within the Civil Service.  In such circumstances, the FTs estimate the number, the size, and the weight of the fish and/or invertebrates, which are sometimes concealed. | | |
| **4.19 Transportation issues**.<br><br>The main landing site at Port Little Bay is some distance from the FOGU's office. A second-hand pickup truck was provided by the JNCC some years ago, explicitly for the (ongoing) Turtle Project in Montserrat, which falls under the remit of the FOGU. However, instead of being stationed | **4.37 Dedicated transportation for the FOGU.**<br><br>In order for the FTs to effectively and efficiently execute the required tasks for the proper collection of fisheries data (conduct interviews, visit the other landing sites, and data sampling), sizeable pieces of equipment and tools are to be transported.  Therefore, it is important that the | If the JNCC vehicle is to be used exclusively for the FOGU, then GOM would need to simultaneously provide another vehicle for the other Ministry activities along with the other one recommended for other landing sites. |

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| at the Little Bay Market parking lot, the vehicle is parked at the MALHE's compound in Brades, reportedly for security reasons. It was reported that the pickup truck is used by various employees of the MALHE and the DoA; as a result, the FTs have to walk to Port Little Bay, or resort to driving their private vehicles. | JNCC pickup truck be used exclusively by the FTs and the vehicle should be kept at the Little Bay Market parking lot for easy access during the working hour.  A second vehicle is required to ensure data collection at the other landing sites. | |
| **4.20    Illegal, Unreported and Unregulated fishing.**<br><br>*"…The IUU undermines fisheries management, takes away economic benefits from legal fishers, targets endangered, threatened and protected and other high value species…is probably taking place in Montserrat's Exclusive Fishery Zone…undertaken along the maritime boundaries with Guadeloupe, Antigua and St. Kitts and Nevis…Montserratian fishers have reported seeing other vessels in Montserrat's waters…At present, Montserrat does not have defined strategy to combat IUU…"*<br><br>A former Fisheries Officer indicated that Illegal, Unreported and Unregulated (IUU) fishing, was an issue when Plymouth was the former capital city of Montserrat, and assistance from the police launch was readily available. However, since the capital was relocated to the north, the Royal Montserrat Police Service (RMPS) Marine Unit has not actively assisted the FOGU with the monitoring and combatting of IUU fishing committed by foreign fishing vessels encroaching in Montserrat's exclusive fishing zone.  This is because the RMPS's organisational policies and procedures for the Marine Unit do not make allowances for non-emergency situations. When the Marine Unit detains foreign IUU fishers in Montserrat's waters, only the catch is confiscated; legal action is not/cannot be taken against the offenders. | | It is unclear what illegal fishing by vessels outside Montserrat in Montserrat's waters has to do with Montserrat's fishing data and FISCANA. |

Notably, all of Montserrat's local fishermen are currently technically involved in IUU fishing, as there are no set fees for the registration, licensing, and certification of Montserrat's fishers and fishing vessels (both local and foreign); this includes recreational and sport fishing.

**4.23    Monitoring of fishermen and fishing vessels.**

The fishermen who leave from Port Little Bay are actively monitored by the FOGU in two ways:

- The FTs review the MPA's guardhouse logbook on a daily basis to note the date/time, names and fishing vessel of the fishermen who went out to sea.   From the information obtained from the MPA's logbook, the FTs, who are already familiar with the daily fishing routines of most fishermen, can sometimes estimate their return. They strategically wait on nearby beaches to observe the approaching fishing vessels, before proceeding to Port Little Bay to estimate the catches. There are a few accommodating fishermen who will call to alert the Fisheries Technicians via their personal cellular phones 15 to 20 minutes ahead of their return.

- The Head of the FOGU also utilises a *Vessel Monitoring System* (VMS) to monitor the locations and the movements of the local fishing vessels. The system uses satellite and cellular based communications from onboard transceiver units; the transceiver units send position-reports that include vessel identification, time, date, and location, and are mapped and can be displayed on the end-user's computer screen, or Android phone.  The Head of the FOGU indicated that so far twenty-four (24) fishermen have the transceiver units mounted onto their fishing vessels.

Other vessel owners have inquired about acquiring VMSs. GOM intends to make a further 15 devices available pending funding.

The JNCC provided each of the FTs with a cellular phone to receive VMS position-reports when the fishing boats depart, and also 20 minutes prior to their arrival at, Port Little Bay.  However, the cellular phones were eventually abandoned after a glitch in the delivery of the message alerts, as the position reports of the returning fishers, were being received 2 to 3 days after being sent.

Currently, only the Head of the FOGU actively monitors the fishing vessels, and frequently receives relatively up-to-date real-time message alerts from the VMS satellite surveillance system on his personal phone and laptop. At times, fishers call to report various emergencies at sea, or to request help to locate the position coordinates of fishing boats that have escaped their anchor moorings and gone adrift.

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| **4.26 No prescribed fees for registration, licencing and certification of fishers and fishing vessels in Fisheries Legal Framework.**<br><br>It has been several years since the Chief FOG Officer has issued any fishing licences to fishermen or certificates of registration for fishing vessels, because the *CAP 9.01 Fisheries Act* of 2013 does not stipulate the required prescribed fees.  At the time of the audit, there were notably 134 registration applications for local fishermen (89) and local fishing vessels (45), pending authorisation by the Chief FOG Officer since 2017. As a result of this, all fishing activities and operation of fishing vessels in Montserrat's waters are technically illegal.<br><br>The Fisheries Act has been under revision for a few years by the DoA/FOGU Management in collaboration with the Director of the Department of Environment and the Attorney General's (AG) Chambers. However, a revised edition of the Act was never submitted to the Cabinet or before the Legislative Assembly, | **4.38 Implementation of the inspection and registration of small fishing boats.**<br><br>The inspection and certification of small fishing vessels is very important for the purpose of safeguarding against health and safety hazards fishermen can encounter at sea. Therefore, the DoA and FOGU should consider:<br><br>• contracting the services of a Marine Quantity Surveyor (MQS); and<br><br>• forging an alliance with the Montserrat Port Authority and the Montserrat Maritime Administration (MMA), to provide qualified, experienced, person(s) to perform the required inspection of the fishing vessels. The MQS, or qualified/experienced person from the MMA, can be responsible for issuing the certificates of registration for seaworthy vessels;  and it is imperative for provisions be made for this undertaking in the revised Fisheries Act; and<br><br>• providing for the regular renewal of registration, including inspection of boats, at | It is correct that there is no trained person within the Ministry for the inspection of fishing vessels. However, the Ministry can engage such a trained person to do this.<br><br>Whereas, the licencing and registration data should be entered into FISHCANA, the absence of this does not affect the timely collection and storage of data or the functioning of the FISHCANA database pertaining to other key and main fisheries activities. |

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| mainly because of insufficient manpower available at the AG's Chambers to dedicate enough time towards providing the DoA/FOGU with legal guidance. During our audit, the DoA/FOGU contracted the services of an overseas legal adviser who is well-versed in fisheries laws and regulations, and came highly recommended by the CFRM and the OECS Commission. Towards the conclusion of our audit, the Chief FOG Officer confirmed receipt of the final draft of both the new *Fisheries Aquaculture Bill* and the proposed *Fisheries Aquaculture Regulations*; the next step in the process will be for the policymakers to sanction this document officially. | least annually to ensure (a) the continued seaworthiness of vessels, (b) the safety of conditions of work for fishers/employees, and (c) the updating of data regarding ownership of vessels, operations, and fisherfolk employed. | |
| **4.28 Internal departmental issues.**<br><br>During the course of our audit, the following issues were observed and/or raised by both the DoA's staff and the FOGU's staff:<br><br>i) **Non-acceptance of the FISHCANA technology.** It was reported that one of the FTs has never accessed the FISHCANA system via iPad or desktop computer, and has utilised only the paper-based method of data collection. This FT remains resistant and inflexible about using the technology that was provided by the JNCC/UK Govt, specifically to perform the required fisheries data-collection tasks.<br><br>ii) **Low productivity.** It was observed that only one FT is performing the task of transferring all of the fisheries data from the forms or WhatsApp messages, into the required logbook, and then into FISHCANA. This includes fisheries data, spanning from year 1993 to the present, that were already entered into CARIFIS; notably this task is the responsibility of all three (3) of the FTs. All of the FTs are required to input data on a daily | **4.39 Finalisation of the Fisheries Technician Manual.**<br><br>The Fisheries Technician Manual is a very important organisational tool, as manuals define policies and procedures that (a) provide guidance for daily activities (e.g., internal controls, and risk management); (b) set the expectation for employees' behaviour (regulatory compliance and employee training); (c) ensure consistency; and (d) maintain the quality of output. Therefore, we recommend that the 2018 draft of the manual be reviewed and finalised. | Only one technician was formally trained to input data into FISHCANA. Another technician was eventually informally trained. With regard to the third Technician, there is no particular resistance to using the technology, but the Technician was being asked to input years of old data which was already inputted into two other automated systems which was accessible. The Technician is willing to use FISHCANA going forward. Despite the fact that this technician has not used FISHCANA, the relevant data was being recorded by that technician and was inputted by another technician over the period.<br><br>The job description of the FTs is generic and include data collection. However, their individual duties carried out have been varied based their particular skills, capabilities, strengths and weaknesses. For example, some FTs are more proficient at fish estimation, data capture in the field, fish sampling & identification and monitoring of vessels. Therefore, the Unit functions quite effectively with the assignment and flexibility of duties aside from only inputting data into FISHCANA. Nonetheless, MAHLE will |

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| basis into the FISHCANA database; however, this directive is not being followed. | | |
| **4.29  Biological sampling.**<br><br>Full biological sampling of the various species of fish caught in Montserrat's fishing zone has not been conducted since the training workshop in 2018, although the FOGU's employees were taught best practices in methods of:<br><br>• taking length and weight data from biological samples<br>• how to identify the sex of fish and how to visually assess fish gonads for maturity<br>• how to correctly remove, store, and label otolith samples<br>• correctly recording the related data on data-collection sheets<br><br>and were furnished with a manual and the required equipment to perform routine biological sampling (gloves, forceps, scalpels, knives, measuring boards, and electronic weighing scales).<br><br>Although this type of data is essential for conducting assessments of the stock of each species in Montserrat's waters, in conjunction with the catch and effort data, the DoA indicated that biological sampling is not a common activity as it:<br><br>(i)  involves taking away valuable fish to be dissected from the fishermen, who are reluctant to voluntarily give up the fish as the sampling process destroys the fish and will lessen their potential earnings; and<br><br>(ii)  the procedure is costly as the sample(s) have to be packaged and shipped overseas for analysis. | | |

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| Therefore, the procedure has to be specifically requested; for example, by an overseas agency conducting research and request information from the FOGU about a particular species of fish/fishes. | | |
| **4.32 Business Continuity practices**.<br><br>The FOGU manually records the daily fisheries and ocean resource related activities or incident(s) that occurred on a given day in a Fisheries Data Book, along with the Fisheries Catch and Effort data sheets that the FTs must fill out. Examples of the types of information recorded in the Fisheries Data Book and also inputted into FISHCANA are:<br><br>• rough sea days<br>• no catches, owing to adverse weather conditions<br>• moorage reports (i.e. a boat was taken out of the water for repairs, etc.)<br>• catch and effort (i.e. species, poundage, size, no catch, etc.)<br>• engine problems. | | |
| **4.33 Alternate method of providing Fisheries and Ocean Resource data.**<br><br>WhatsApp text messaging is being used as an alternate method of relaying the fisheries data by one of the FTs and by a few of the fishermen who fish during the weekends. Their fisheries information is messaged to the FT assigned (unofficially) with the responsibility of populating and updating the FISHCANA database. | | |
| **4.34 The Statistics Department's user-account in FISHCANA is inactive.**<br><br>The Statistics Department Montserrat (SDM) confirmed that it never used its user-account to access the FISHCANA database, since the | **4.40 Deactivation of the Statistics Department's dormant user account.**<br><br>Best practices and standards stipulate that stale accounts should be either removed or disabled, after a set period of time elapsed. Considering | |

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| pilot/testing phase of the FISHCANA project, because the Fisheries Unit provides the Statistics Department with the data on a monthly basis. However, an inactive user-account poses a risk to FISHCANA's security.  User-accounts that have been dormant for a long time, or have never been used to log into an ICT device, are known as "stale" user-accounts, and these types of accounts offer an opportunity for malicious attackers to compromise electronic systems and networks, and to conceal themselves from I.T. staff | that it has been over two years since the SDM accessed its user account in FISHCANA, we are recommending that FOGU's management deactivate this inactive user account, until the SDM will actually require and use this access to the fisheries database. | |
| **4.35  Fishing licences.**<br><br>The MALHE, DoA and FOGU have already designed the photographic identification fishing licence in preparation for the official resumption of the registration process of Montserrat fishermen. | | |

**Permanent Secretary**

**Ministry of Agriculture, Lands, Housing and the Environment**

**18 July 2022**

# APPENDICES

# APPENDIX I – MALHE's DoA/FOGU past and proposed future hierarchy of job positions[29]

| Position | Number |
|---|---|
| Director of Agriculture | 1 |
| Chief Veterinary Officer | 1 |
| Principal Agricultural Officer | 1 |
| Chief Fisheries Officer | 1 |
| Veterinary Officer | 1 |
| Veterinary Assistant (Snr) | 2 |
| Agricultural Officer | 2 |
| Fisheries Officer | 1 vacant post |
| Extension Officer | 1 |
| Extension & Irrigation Technician | 1 |
| Fisheries Assistant | 1 vacant post |
| Animal Husbandry Technician | 1 |
| Senior Clerical Officer | 1 |
| Clerical Officer | 1 |
| Animal Husbandry Assistant | 4 posts; 1 vacant |
| Data Collector | 2 posts |
| Plant Propagator | 1 |
| Nursery Worker | 1 |



Hon. Minister MATLHE

Permanent Secretary MATLHE

Director of Agriculture

Chief Fisheries and Ocean Goverance Officer

Fisheries and Ocean Scientific Research Officer

Fisheries and Ocean Technician

Fisheries and Ocean Observer

Fisheries and Ocean Observer

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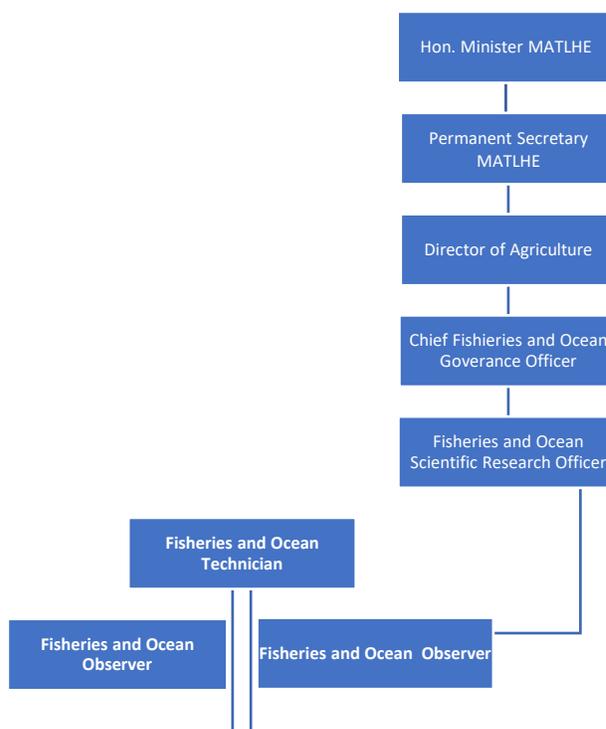
[29]*Agricultural Strategy and Marketing Plan (ASMP) for Montserrat, Submitted by CARICAD, October 2016 to September 2021*

# APPENDIX II – CARICAD'S SWOC Analysis of Montserrat's Ocean Resources and Fisheries

## SWOC ANALYSIS 3:  OCEAN RESOURCES AND FISHERIES

| STRENGTHS | WEAKNESSES | OPPORTUNITIES | CHALLENGES |
|---|---|---|---|
| • Existence of dedicated unit for fisheries and marine matters<br><br>• Growing interest from among persons below the age 50 years<br><br>• Effective collaboration with regional and international agencies. | • Low number of staff with the <u>desired level</u> of competencies<br><br>• Outdated and inadequate legal instruments<br><br>• Small recurrent budget for programmes<br><br>• Absence of fisheries infrastructure<br><br>• Inadequate fisheries management system | • Existence of a legal framework for ocean management and governance<br><br>• Strong demand for fish<br><br>• Regional and international support for imported fisheries management<br><br>• Opportunity to create greater participation among women in the sector<br><br>• Opportunity to collaborate with fisheries association<br><br>• The opportunity to proactively develop legislation and regulations for aquaculture<br><br>• The use of emerging techniques and opportunities<br><br>• To establish marine protected areas<br><br>• Technical assistance from external sources<br><br>• Extend territorial sea from 3nm to 12nm | • Sometimes contentious issues relating to neighbouring territorial waters<br><br>• The nature of the physical environment makes it difficult to collect and collate data and information accurately<br><br>• The absence of critical technical skills such as scuba diving, marine biology etc<br><br>• Dormant fisheries cooperative<br><br>• Unknown impact of climate change<br><br>• Appearance of invasive species<br><br>• Pollution from land and sea-based activities<br><br>• To accelerate compliance with FAO Code compliance<br><br>• Illegal unreported fishing |

# APPENDIX III – FOGU's shortcomings highlighted by JNCC & SAERI[30]

- *Developing Fishery Data Collection Systems for eastern Caribbean Islands (Mahon, 1991).* To meet an identified priority for fishery data collection, a data collection program was designed for Montserrat, including use of total censusing of catches across 90-95% of landed catch and a sampling program, and the use of purchase slips from retailers for unobserved landed catch.

- *Draft Fisheries Management Plan (GoM, 2006)* Action Plan to address Key Issues i) Inadequate data Monitoring systems, ii) Insufficient information on fishery resource status, iii) lack of data on fisheries costs/revenues.

- *Review of the Data Collection and Management Systems of the Marine Fisheries in Montserrat (Medley, 2008).* Section 5: Recommended Data Collection, including i) recoding of landings by species, ii) estimates of CPUE, iii) estimates of sampling error, iv) directly measure catch rather than estimate weight, v) biological sampling.

- *Diagnostic and Analytical Review of the Environmental Governance Systems of Montserrat (CaribInvest (West Indies) Limited, 2012)* "A general constraint identified by stakeholders which is impacting on their ability to manage Montserrat's coastal and marine resources is the paucity of information on and about the resources. The collection of more baseline data on the country's coast and marine resource is therefore needed."

- *Reconstruction of the total marine fisheries catches for Montserrat (Ramdeen et al, 2012).* Identified large under-reporting of fish catches.

- *Montserrat: Marine and Fisheries Sectors (Association of the Overseas Countries and Territories (OCTA), 2017).* Executive Summary: i) The fisheries data collection and analyse needs to be greatly improved, ii) data-collection staff do not normally work on weekends when the fishers are most active, iii) "The present system of data recording...... is archaic, labour intensive and time consuming and leaves too much room for errors......", iv) DCs must collect length and weight frequency data.

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[30]*JNCC & SAERI, Fishery data collection and integration strategy for underpinning sustainable fisheries management in Montserrat, May 2018*

# APPENDIX IV - Montserrat's Fishing Zones[31]



Government of Montserrat Fishing Zones, coral reef habitat and shipping destinations

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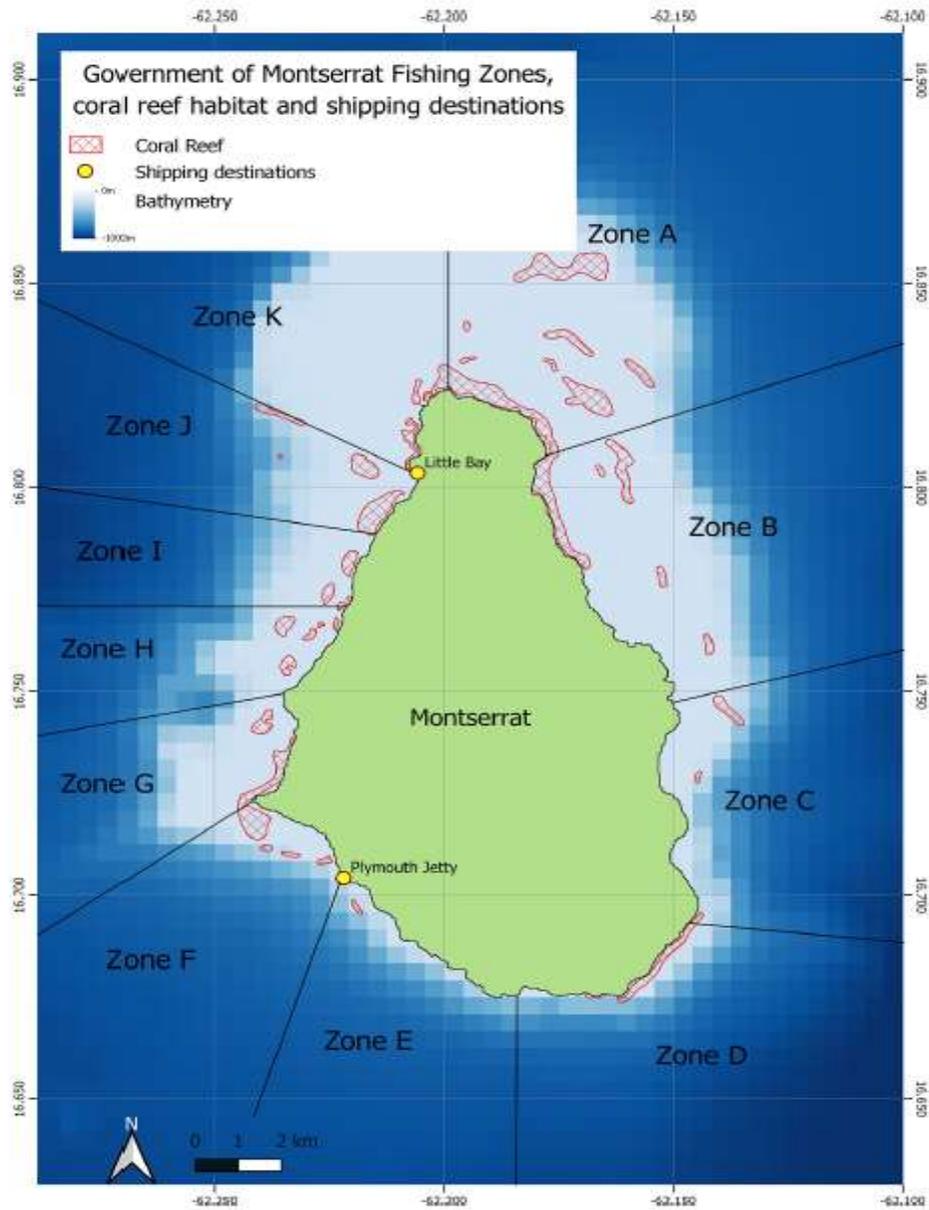
[31]*Using Evidence From Voluntary Fisheries Data Collection Programmes to Support Marine Spatial Planning and Resolve Multiple-Use Conflicts Frontiers in Marine Science, July 2021, Volume 8, Article 635890*

# APPENDIX V – MALHE's Photo ID Fishing Licence Template