Collecting quality data to support sustainable fisheries

Workshop Report

16th – 22nd June 2017

PROJECT PARTNERS

Review process

Version	Date issued	Prepared by	reviewers	Date to complete
Draft 1	20/08/2017	Dan Edwards and Alice Doyle	Paul Brickle, Paul Brewin	25/08/2016
Draft 2	05/09/2017	Dan Edwards	Amanda Gregory	06/09/2017
Final Draft	07/09/2017	Dan Edwards		

ACKNOWLEDGEMENTS

We would like to thank everyone who supported the workshop and the T2T partnership in any way including the project partners and participants.

CONTENTS

BACKGROUND AND CONTEXT

PROJECT DESCRIPTION

This project is a part of a Territory to Territory (T2T) partnership between the Falklands Islands Government (FIG) ,the Government of Montserrat (GoM) and the South Atlantic Environmental Research Institute (SAERI) to share knowledge and skills from the South Atlantic to the Caribbean and other UK Overseas Territories. This skill and knowledge transfer will focus on information management and marine spatial planning. The project is facilitated by the Joint Nature Conservation Committee (JNCC), with additional funding from the UK Government's Conflict, Stability and Security (CSSF) Fund to enable UK Overseas Territories colleagues from Anguilla, British Virgin Islands, Turks and Caicos, and an additional participant from Honduras, to participate in the regional training.

AIMS

1. Build the skills capacity for fisheries data collection in Montserrat and in other Caribbean territories.
2. Encourage good practise in fisheries data collection on Montserrat.
3. For other UK OTs and states in the Caribbean region to consider adopting a high-tech low cost approach to the mapping of fisheries activity.
4. To encourage collaboration between the fisheries departments of UK OTs in the Caribbean.

OBJECTIVES

1. Demonstrate value of iVMS mapping approach to fishery managers and stakeholders, enhanced by use of other mobile technologies.
2. Identify and assess needs/barriers in other UK OTs relating to adoption of high tech approach to fisheries mapping.
3. Develop understanding of the importance of good quality scientific fisheries data amongst Government of Montserrat staff and local fisher representatives.
4. Provide training in fisheries biological sampling and data collection.
5. Describe FAD fishing in Montserrat and discuss data collection, monitoring and management options.

ACTIONS

These objectives will be achieved through a collaborative approach between JNCC, FIG, SAERI and the Government of Montserrat

1. Demonstrate technology used in Montserrat (Succorfish iVMS, Catch App, RFID scanners) to other fishery managers in the region.
2. Present existing iVMS data from Montserrat linked to catch and effort data to show landings and preliminary activity maps.
3. Identify additional data processing and output requirements in order to make adoption of the above data collection technology informative, useful and valuable.
4. Hold training workshop teaching basic principles of fisheries science and data collection.

5. Hold training workshop teaching best practise in biological sampling of fish landings.
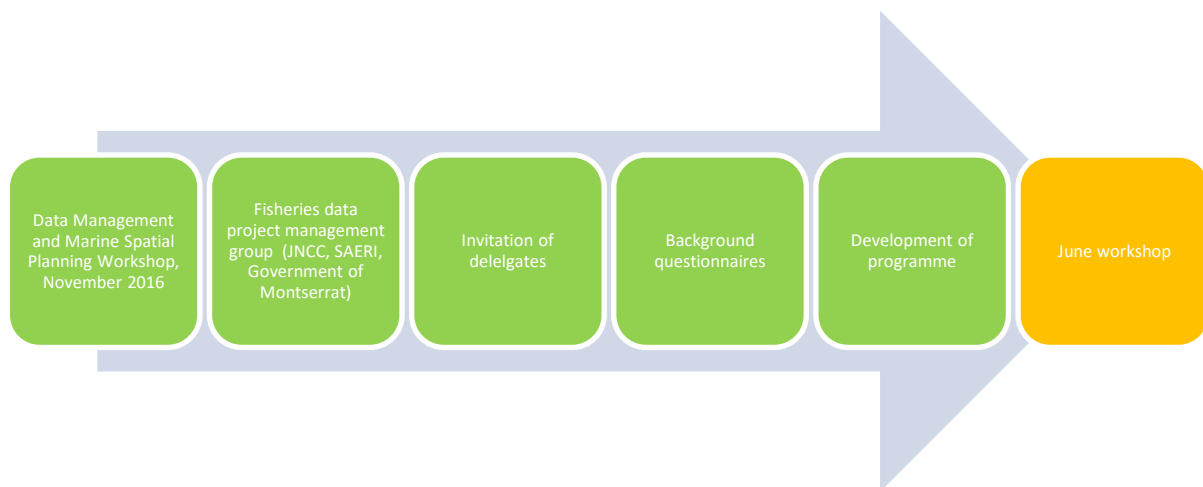
i. Template manual for biological fisheries data collection in Caribbean.
ii. Understanding of potential issues in further adoption of high tech approach to artisanal fisheries management in other territories, willingness to adopt, and regional user requirements of a data analysis toolkit to generate outputs from data gathered.
iii. Strengthened collaborative relationships between the fisheries departments of UK OTs in the Caribbean.

BACKGROUND MEETINGS

This workshop stemmed from the scoping workshop held in Montserrat in November 2016. A number of priority areas were identified with the date gaps in fisheries data being seen as key priority for Montserrat (workshop report).

In synergy with this, through tailored training, JNCC are seeking to maximise and emphasise each project to enable the OTs long-term use of newly available data to support natural capital and environmental management. A series of background meetings were held to ensure that the workshop programme was tailored to the needs of the participants, and that preparatory work enabled best use of the time during the workshop week.

| Data Management and Marine Spatial Planning Workshop, November 2016 | Fisheries data project management group (JNCC, SAERI, Government of Montserrat) | Invitation of delegates | Background questionnaires | Development of programme | June workshop |

QUESTIONNAIRE RESPONSES

Invited delegates were asked to complete a questionnaire about their fishing fleet, current data collection programmes and data needs to inform the development of the workshop content. The questionnaire is provided in Annex 1. Representatives from British Virgin Islands, Turks and Caicos Islands, and Honduras provided responses.

The workshop began with a formal opening ceremony. An outline of the opening ceremony programme is provided in Annex 2.

The detailed workshop programme which includes daily objectives is outlined in Annex 3; the full list of participants is outlined in Annex 4.

All presentations are available online.

UNDERSTANDING THE NEEDS OF CARRIBEAN UK OTS (INCLUDING HONDURAS)

Attendees from outside of Montserrat gave brief presentations to introduce delegates to the fisheries in their territory covering activities, data collection, management aims and issues/barriers faced to achieving these.

Anguilla

There is no legislative basis for the collection of catch and effort data in Anguilla, which has meant successful data collection has been dependent upon good will and strong relationships with the fishing community. At times this has been hard to maintain, as it is felt that the goals of the Department of Fisheries and Marine Resources have been poorly understood. Moving forward, it is hoped that the revision of legislation will mandate fishers to provide the necessary data. One key management aspiration is to be able to meet international (EU) standards, particularly in food hygiene.

British Virgin Islands

The British Virgin Islands data collection currently includes landings and length weight frequency sampling, supplemented with data from recreational fishing tournaments. There is some targeted sampling of conch, red hind, Caribbean spiny lobster, turtles, and some others. Management aspirations on the island include revision of existing management plans and legislation, updated stock assessments, using electronic alternatives for data collection and submission, increased analysis of data to support management decisions, and an increase in co management with fishers, all leading to an increased contribution of the fisheries sector to national GDP. Key barriers faced

include the geography of the islands, limited fisheries and enforcement personnel, and a limited resource capacity for data analysis.

Turks and Caicos Islands

Data collection was largely focused on export species and included landings data as well as some biological monitoring data. Management is informed by a Fisheries Advisory Committee and a Scientific Authority Committee. Management concerns include poaching/illegal fishing practises, ineffective enforcement leading to ineffective management and climate change resulting in habitat change. A lack of formal landing locations mean that data collection on local exploitation was poor (data collection is focused at the point of export), meaning that the value of the resource was not accurately measured. A lack of skilled personnel has mean ineffective enforcement and difficulty in collecting good quality scientific data. Managers seek to develop and implement consistent, accurate and up to date data collection and management practises, that can realise the political will for evidence based decision making.

Honduras

In Honduras, large fishing vessels are fitted with satellite VMS, and some trials have been undertaken with artisanal vessel tracking similar to that deployed in Montserrat. In addition, an App has been developed to improve data collection in small scale fisheries. The App, Ourfish, is designed to operate on a fisher's smartphone, enabling the fisher to easily collect data on catches, income and expenses. It makes extensive use of photographs of species and visual aids for data entry, overcoming the problem of a low level of literacy amongst some fishers. A similar approach may be suitable in the Caribbean where a wide variety of names exist for the same species, with the same names applying to different species (e.g. Old Wife) in different areas within the region.

WORKSHOP OUTCOMES

UNDERSTANDING FISHERIES DATA

This section targeted GoM employees with current or potential future involvement in the fisheries department along with key local fisheries stakeholders, and sought to develop a basic understanding of the principles of fisheries science and the importance of fisheries data for effective decision making.

The first breakout session sought to underpin the reasoning behind the collection of fisheries data. Participants were asked a series of questions to ascertain their understanding of the concepts presented in the morning session and establish how individuals from different stakeholder groups value fisheries. This session highlighted the different views and values placed on fisheries from a broad community of stakeholders. The key themes from this session were carried forward and woven into the 'Biological sampling in the context of fisheries management' sessions which followed. The questions and summarised discussions are given in table 1 below.

Table 1 Questions and key discussion from first breakout session on valuing fisheries.

What do you personally consider to be the most important objectives of fisheries management?
- Sustainability (Biological, Economic and Ecosystem)   - Economic Efficiency   - Protection (Resource and Ecosystem)
How important do you consider economic efficiency as a fisheries management objective?
Very important. This is key to ensuring a sustainable livelihood for fishermen and other stakeholders. Fish is an important resource for small islands, providing a healthy source of protein.
How important do you consider resource protection as a fisheries management objective?
Critical. Effective resource management should ensure sustainability. We should legislate how to effectively use our resources – this would ensure that fishermen are fully aware of what they are entitled to do.
How important do you consider fairness as a fisheries management objective?
There should be a balance between conservation and fishing. Fairness is important so that all parties can benefit.

During the second breakout session, delegates used the recent attempts to develop a FAD (fish aggregating device) fishery on the island as a case study for considering the types of fisheries data required by managers to assess the effectiveness of the initiative. As part of this exercise participants were asked initially to identify the motivation for developing a FAD fishery and to consider what the Government and the fishers hoped to achieve with such development. Participants were then asked to consider what information was needed to understand whether the FAD fishery was successful in achieving these outcomes, and finally to consider where this information could be found and how it could be gathered. As well as familiarising the participants with the rationale for fisheries data collection, the outputs of this exercise should be useful for the Government of Montserrat in developing a management plan for the FAD fishery. The outputs from this exercise are summarised in Table 1 below.

Table 2. Aims and data requirements for management of Montserrat's developing FAD fishery

Aims
- To increase the value of pelagic fisheries (more landings)   - To divert some fishing pressure away from the inshore reef fishery   - To improve safety at sea (fishing predictable locations)   - To improve fuel and time efficiency (reduce costs)   - To increase the availability of fresh fish (more landings, less reliance on imported fish)   - To increase the quality of fresh fish (better species)   - Diversifying income/food supply (more resilient)   - Develop sport fishing/tourism

• Create habitat for spawning fish

What data is needed to assess achievement of those aims?
• Baseline data on catch of large pelagic fish without FAD • Compared to catches of pelagic fish on the FAD • Baseline fuel and time costs of pelagic fishing (per unit of catch) • Fuel and time cost of FAD fishing around the FAD (per unit of catch) • Quantities of bait caught around FAD
How can the relevant data be collected?
• Standard landings data collection interview • Reporting mechanism for those not interviewed (e.g. phone call, WhatsApp, email) • Targeted survey (masters students?)

BIOLOGICAL SAMPLING

Delegates were shown demonstrations of the best practise methods of taking length and weight data from biological samples, how to find sex and visually assess fish gonads for maturity, and how to correctly remove, store and label otolith samples whilst correctly recording the associated data. Delegates were provided with a wide range of species samples and had opportunity to practise processing specimens and recording data, with help and guidance available. The entire group were fully engaged in the practical work and had opportunity to both handle specimens and complete the data collection sheets. Whilst becoming effective and efficient at assessing sex, maturity. Otolith extraction is only something that comes with practise and experience; however, delegates have developed a foundation knowledge upon which they can build.

The plenary discussion focused on how to develop a sampling programme, using Montserrat as an example and comparing to other islands situations. Much of the focus was on ways in which fisheries staff could build the resource capacity (both the human resource and skills) to undertake additional sampling. It was highlighted that in Montserrat there were now several government staff who had been trained in biological sampling and data collection, and that if there was cross departmental support it might be possible to harness this for a few hours each month or quarter.

Discussion initiated a good transfer of knowledge between territories, and a good exchange of potential solutions with some having previous experience with solving similar issues to those others were currently experiencing. A key example comes from Turks and Caicos, where the establishment of a fish market had provided a central point used by the fishing community, which, though focusing

landings into one area, enabled effective sampling of catches and the collection of data. In Montserrat specifically, it was suggested that the use and further development of the existing fish market could facilitate this opportunity for data collection.

The findings of these discussions will inform the drafting of a template sampling manual to be provided to delegates.

iVMS

The live operation of iVMS technology was successfully demonstrated, along with preliminary outputs of data collected in Montserrat, with delegates expressing a high degree of interest in the approach. Whilst the benefits of iVMS were widely appreciated and a wide range of uses for the data were identified, the group drew attention to the potential difficulties in getting buy-in from the fishing communities. The additional safety benefits offered by iVMS were perceived as a major advantage in this area, with fishermen from Montserrat noting that this aspect was perceived very favourably amongst their community and had helped to generate buy in. However, if safety is to be one of the key advantages of this approach that is marketed to the fishing community, then the issue of GSM coverage around other islands must first be considered. Whilst Succorfish M2M report that they have only encountered one entirely "dead" spot in trials in Montserrat (under a cliff face), this specific technology has not been trialled elsewhere. Concerns were expressed about the hardware costs involved, however all fishery managers were interested in further considering an iVMS approach to fisheries mapping.

RFID tags

The use RFID technology was slightly less well received with delegates noting the additional burden operation of the technology could place upon the fishers, but recognising the benefits that the approach had in measuring effort in static gear fisheries. It was noted that the technology could be integrated with pot tagging and licensing to potentially effect pot limit effort-regulation within the fishery, as well as providing a disincentive for fish pot theft within the fishing communities. There was also recognition of the potential value of RFID tag use in the large open pelagic fishery, where catches are large but infrequent with vessels exerting effort over large areas of ground. However, the requirement for the RFID scanning unit to be manually turned off and on at the beginning and end of each fishing trip, and the potential for this to drain down the accompanying iVMS battery, was perceived to be a significant risk.

Succorfish Catch App

The Succorfish Catch App was initially developed for use by inshore fishermen whilst at sea in the UK, but has been trialled in Montserrat for use with an iPad tablet in landings data collection interviews between Government of Montserrat fisheries staff and fishers. Unfortunately, this change of purpose left some fields unused, some terminology incorrect, and required some amount of training for the data to be entered correctly. Use is not intuitive and could be improved with a few specific alterations in design. Nevertheless, delegates recognised benefits in regards to streamlining data entry and relieving some of the administrative burden that data entry placed upon department capacity. Further advantages noted included a reduction in data entry errors and the ability to set conditional fields. iPads are at the upper end of the tablet market, and it was suggested that cheaper android tablets might be more appropriate for use in a rugged fisheries environment.

The use of similar apps provided to the fishing community for the collection of other data, for example on key bycatch species or sightings, was suggested, and examples of uses elsewhere were cited. One key challenge noted for the development of any similar technology in the Caribbean was the wide range of different names given to species across islands, with the same names referring to different species in some cases, and it was suggested that the use of pictures of species might be more universal. It was also noted that many fishermen in the region do not own a smart phone and such hardware would also need to be provided.

 Barriers to adoption

The key barrier to adoption identified by delegates was participation by the fishing community. In the absence of any legislation requiring the installation and operation of iVMS units, then participation by the fishing vessel operators is entirely voluntary and dependent upon individual's good will and depends on a good working relationship between fisher and the data collecting body. Preliminary work would be required in other islands to generate buy in amongst vessel operators and identify suitable participants, and to be effective this should be clear about the aims of collecting such data, the terms of use of the data, and should emphasise the advantages to the fishing community in sharing such data.

DATA ANALYSIS TOOLKIT

Due to time constraints and a shifting programme, the workshop session scoping requirements for a data analysis toolkit was postponed from its initial position in the daytime schedule and instead held as smaller breakout groups during the biological sampling session and during the evenings.

Whilst the workshop programme was advocating the expansion of fisheries data collection in the region, there was a noted lack of human and skills capacity within those fisheries departments present for maximising the

value of such data through effective, flexible reporting and analysis. Existing reporting and analysis was generally undertaken through government statistics departments, and focused on minimum reporting requirements. It was recognised that a user-friendly toolkit for interacting with the fisheries data could unlock more of its potential for informing local fisheries management by generating tailored and informative reports and charts for analysis.

The development of such a toolkit for use by several territories could be most easily achieved if data is stored and managed in a common structure and format, thereby allowing the application of the same processing routines to each territories data. Participants voiced support in principle for adopting a common database for catch and effort data across the region; in the past, territories had used the CARIFIS database developed by CRFM, however, this software being now obsolete, it has left some fisheries departments with no functioning regional fisheries database. Some have developed alternative solutions in MS Access, whilst others have no database solution and are storing data in MS Excel spreadsheets.

Potential licensing for new database software was raised as a concern, although it was noted that all governments represented have Microsoft licenses and some experience with Microsoft products. Alternatively, it was suggested that open source database software, such as PostgreSQL, offer a free solution that would be available to any users.

It was noted that there can be resistance from government IT departments towards the adoption of new software, particularly by just one department. Effective involvement of key IT personnel in the development of any database and toolkit was identified as important in reducing and eliminating this resistance.

A range of potential useful outputs from such a toolkit were identified, including catch and effort reports, landings reports, temporal analysis activities, sampling analysis, and spatial mapping of catch, effort and sampling activities.

DELEGATE FEEDBACK

Workshop participants were asked to complete a feedback form at the end of the event. The quantitative results are presented below in Table 2.

Table 3 Number of respondents rating aspects of workshop

	Excellent	Good	Average	Poor
What was your overall impression of the workshop	11	5	0	0
What did you think of the presentations	5	11	0	0
How would you rate the mix of presentations and discussions	6	10	0	0
How would you rate the facilities for the workshop	3	5	7	1

Out of 16 respondents, 11 said that their expectation from the workshop had been met, and 5 failed to give an answer. None said the event had failed to meet their expectations.

Contact will be made for follow up feedback from delegates in 6 months querying if skills learned have been helpful in ongoing work.

ADDITIONAL WORK

CATCH AND EFFORT DATA COLLECTION IN MONTSERRAT

The GoM fisheries department were provided with electronic weighing scales and plastic fish baskets to improve the accuracy of the landed weight data collected. Data collectors received off-site training in how landings should be weighed and recorded. Unfortunately, due to time constraints and a lack of fish landings at the available time, limited training in the field could be provided. It is felt to be unlikely that the data collectors will adopt any new methodology for data collection without some further field training and supervision, and the continuation of any reformed programme will depend on strong ongoing line management. Training in this area is key and remains a priority as poor data collection with respect catch in effort in the fishery means anything else downstream including fisheries statistics, mapping catch and effort, economic assessment, stock assessment remains questionable and jeopardises fisheries management and local, region and international commitments.

Effort data within the fleet is not being surveyed. However, it was learned through discussions with port staff that a log is maintained of who enters and leaves the port area. Potential exists for this information to inform estimates of effort originating in Little Bay, or for port security staff to add data about the vessels being used by fishers as they enter the port. Recording times of departure and return may provide an even more refined estimate of vessel effort.

IVMS DATA GROUND TRUTHING

Observer data were collected on vessel fishing activity for use in ground truthing iVMS data. Data were gathered over 6 fishing trips from 3 different vessels, and for 5 of the 7 types of fishing gears used in Montserrat. Due to time pressures and competing demands, there was no opportunity to gather data from vessels engaged in either longline or spear fishing activity.

NEXT STEPS

HIGH-TECH LOW COST APPROACH TO FISHERIES MAPPING

There is sufficient wider interest amongst overseas territory government's delegates in the use of iVMS for mapping fishing activity that JNCC should continue to seek hardware that is able to operate effectively, and once the technology is finalised to seek to assist other represented territories in

undertaking fisheries mapping projects. However, experience in Montserrat has demonstrated that there are still some issues with the current technology, and it is important that these are correctly rectified before the technology is deployed further. This is especially important if safety is a key benefit of the technology being offered to participating fishers, as repeated failure of technology may lead to a loss of faith in the approach and reduced or less effective participation. It is unclear when the technology will be ready for wider deployment.

FISHERIES DATA TOOLKIT

Small fisheries departments need assistance in unlocking the full potential value of the data that they already collect, and will require additional assistance to benefit from any expansion in their data collection programmes. The development of common data collection and management structures offers the potential to improve and streamline data flows, and would enable the application of a common suite of tools to easily produce some standard reports and data products by those with limited database knowledge. JNCC will investigate potential funding sources for the scoping and development of such a data collection, management and analysis toolkit in partnership with the territories present.

BIOLOGICAL SAMPLING

JNCC will provide those fisheries departments in attendance with a template biological sampling manual and sample data collection sheets to facilitate delegates commencing their own biological data collection regimes. Remote support for this should come from JNCC in the form of reviewing and quality assuring proposed sampling programmes and providing advice where required. JNCC will follow up progress with fisheries departments after 6 months to assess progress.

Fisheries staff on Montserrat have been provided with additional equipment (gloves, forceps, scalpels, knives, measuring boards, electronic weighing scales) to fully enable the commencement of routine biological sampling. However, a programme has not yet been initiated. It is recommended that the fisheries department commences sampling activities as soon as possible to fully benefit from otolith sample processing facilities offered by the Falkland Islands Government under the territory to territory partnership with the GoM. There is existing capacity within the fisheries department sufficient to undertake this additional sampling, however, if this can't be realised then it is recommended that support be requested from additional staff within the government of Montserrat who have undergone the training.

Over 33 otoliths were extracted from biological specimens as part of this training programme, along with data on specimen's weight and length. These samples will be sent to SAERI for preparation and

analysis as part of the T2T partnership, and will provide part of the knowledge base for future analysis and assessment of Montserrat's stocks.

CATCH AND EFFORT DATA COLLECTION ON MONTSERRAT

The catch data collection interview sampling programme on Montserrat needs further work to bring it up to standard. Existing practises leave room for error and inaccurate or misreporting. However, to effectively implement a quality data collection programme some key changes in the terms/patterns of employment and work of the data collectors are required. These include adjusting working hours and days to ensure coverage over the weekends when a majority of landings occur, and facilitating travel to enable data collection to take place at the landing sites. Until such changes are in place then any additional training and supervision in data collection will be of limited benefit.

Following the review of other pending advice on fisheries data management and integration as part of the T2T partnership project, the GoM should seek to develop and implement a renewed data collection strategy for fisheries, to include the collection of fleet effort metrics.

Collecting quality data to support sustainable fisheries

This training-workshop is delivered through the:

A Territory to Territory Partnership Project

Questionnaire

Date: 9 – 15-June 2017

These questions are designed to build a picture of your fishing fleet, how it is composed and how it operates. There are also questions about any existing data collection/sampling protocols, whether you feel these are sufficient and, if not, what areas could be improved. Your responses will help us to refine the scope of the workshop and make it as useful as possible for participants.

1) How many vessels currently operate in the fishery? (please provide further detail if you wish, e.g. spatial scale, seasonality etc)

2) What are the main gear types in operation? (please provide as much detail as you wish, e.g. description, selectivity, whether vessels use different gear types, seasonality, gear conflict etc)

3) What are the main species targeted? Is bycatch an issue in the fishery?

4) Please indicate your opinion on the following statements (tick the appropriate box):

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Fishing is important to the economy of my country					
Fishing is an important part of the culture of my country					
A profitable fishery is a high priority in my country					

Environmental concerns relating to fishing are a high priority in my country					
Social considerations relating to fishing are a high priority in my country					
Fisheries policy in my country is influenced by relations with other countries					

5) Broadly, what are your fisheries management aims?

6) Please provide a summary of current fisheries data collection measures, including any vessel monitoring and biological sampling.

7) Please indicate your opinion on the following statement:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Current fisheries data collection measures in my country are sufficient to achieve fisheries management aims					

8) What are the main successes/opportunities for fisheries management in your country?

9) What are the main gaps/challenges for fisheries management in your country?

Name:

Email:

Collecting quality data to support sustainable fisheries

**Territory to Territory Partnership
between
The Falkland Islands Government Institute SAERI
and
The Government of Montserrat**

Draft Opening Ceremony Opening Agenda

Time	Title	Presenters
09:00am – 09:05am	Playing of National Song	
09:05am – 09:10am	Opening Prayer	Bishop Melroy Meade
09:10am – 09:15am	Welcome remarks	Chairperson - Permanent Secretary MATLHE Mrs Daphne Cassell
09:15am – 09:25am	Brief Remarks	SAERI Director Dr Paul Brickle
09:25am – 09:35am	Feature Address	Hon. Minister MATLHE Claude E. S. Hogan
09:35am – 09:40am	Vote of Thanks	Director of Agriculture Ms Melissa O'Garro

Transfering knowledge and skills from the South Atlantic UK Overseas Territory to Montserrat and the Wider Caribbean Region (WCR).

DAY 1: UNDERSTANDING FISHERIES DATA

OBJECTIVES FOR **THE DAY**

- To develop a better basic understanding by the data collectors of the fundamental importance of fisheries data; how it influences biological understanding of stocks, the management of fisheries, wider government policy and local economics.

Time	Topic	Speaker/Lead
09:00 –09:10	**Welcome and introduction**	**Alwyn Ponteen (Session Chair)**
09:10 – 09:50	An introduction to fish biology	Alice Doyle (JNCC)
09:50 – 10:30	An introduction to fisheries management	Alice Doyle (JNCC) / Paul Brewin (SAERI)
10:30 – 11:00	**Break**	
11:00 – 11:15	Valuing Montserrat's fisheries (1)	Honourable Joseph Farrell (Opposition Member of Parliament)
11:15 – 11:30	Valuing Montserrat's fisheries (2)	Alphege Browne (Statistics Department, GoM)
11:45 – 12:30	Biological sampling in the context of fisheries management (theory and interactive session)	Alice Doyle (JNCC) / Robin Ramdeen (Sustainable Fisheries Group)
12:30 – 13:30	**Lunch**	
13:30 – 14:00	Catch app demonstration	Data Collectors (Montserrat)/Alwyn Ponteen
14:30 – 15:15	FADs (video and discussion)	Captain John Howes
15:15 – 15:45	Summary of lessons learned and discussion	Alice Doyle (JNCC)
15:45 – 16:00	Montserrat Fisheries monitoring & assessments 2015-2017	Lennon Thomas (Sustainable Fisheries Group) & Robin Ramdeen (Blue Halo Initiative)

DAY 2: HIGH TECH LOW COST SOLUTIONS FOR FISHERIES MANAGEMENT

OBJECTIVES OF THE DAY

- Opening Ceremony
- Introduction to low cost, high value technologies for fisheries data collection
- Demonstration of technologies available
- Presentation of preliminary results from data collection in Montserrat

Time	Topic	Lead/Presenter
09:00 – 09:45	Opening ceremony at the Montserrat Cultural Centre	
09:45 – 10:15	**Break**	
10:15 – 10:45	Welcome and introductions	**Alwyn Ponteen (Session Chair)**
10:45 – 11:15	Context to Montserrat project	Alwyn Ponteen (GoM) / Dan Edwards (JNCC)
11:15 – 12:30	Introduction to technologies	Tom Rossiter (Succorfish)
12:30 – 13:30	**Lunch**	
13:30 – 14:00	Walk to Port Authority	
14:00 –15:30	Live Demonstration @ Port Authority • IVMS • RFID • Catch App	Tom Rossiter (Succorfish)
15:30 – 16:00	Results for Montserrat	Dan Edwards (JNCC) / Alwyn Ponteen (GoM)
16:00 – 16:15	Summary and close	Dan Edwards (JNCC)

DAY 3: REGIONAL DATA PROCESSING NEEDS

OBJECTIVES FOR THE DAY

- Scoping regional needs for data analysis tool kits for fisheries data
- Biological sampling: Developing skills, expertise and strategies
- Developing custom biological sampling protocols

Time	Topic	Lead/Presenter
09:00 – 09:15	Re-cap Day 2 and run through agenda for Day 3	**Dan Edwards (Session Chair)**
09:15 – 09:45	Responsible fishing for the Caribbean	CRFM representative
09:45 – 10:30	Fisheries of the Caribbean	OT delegates (10min Sessions)
10:30 – 11.00	**Break**	
11:00 – 11:30	Fisheries on Montserrat	Alwyn Ponteen (GoM)
11.30 – 12:00	Biological sampling protocols	Alice Doyle (JNCC)
12:00 – 12:30	Building a sampling programme that works	Alice Doyle (JNCC)
12:30 –13:30	**Lunch**	
13:30 – 14.15	Case studies	Alice Doyle (JNCC)
14:15 – 16:00	Scoping your fisheries data analysis toolkit	Dan Edwards (JNCC)
16:00 – 16:15	Summary and close	Dan Edwards (JNCC)

DAY 4: PRACTICAL SKILLS IN BIOLOGICAL SAMPLING

OBJECTIVES FOR THE DAY

- To develop practical skills in biological sampling procedures (fish identification, measuring lengths and weights, removal of otoliths, scales, sex and maturity).

Time	Topic	Lead/Presenter
Venue: Montserrat Fish Market		
09:00 – 09:30	Introduction to day	Alice Doyle (JNCC)
09:30 – 10:30	Practical 1 Lengths and weights	Alice Doyle (JNCC) Dan Edwards (JNCC) Paul Brickle (SAERI) Paul Brewin (SAERI)
10:30 – 11:00	**Break**	
11:00 – 12:30	Practical 2 Sex and maturity	Alice Doyle (JNCC) Dan Edwards (JNCC) Paul Brickle (SAERI) Paul Brewin (SAERI)
12:30 – 13:30	**Lunch**	
13:30 – 15:45	Practical 3 Otolith removal and additional sampling	Alice Doyle (JNCC) Dan Edwards (JNCC) Paul Brickle (SAERI) Paul Brewin (SAERI)
15:45 – 16:00	Summary and close	Dan Edwards (JNCC)

Participant name	Organisation	Number of days participating
Alwyn Ponteen	Chief Fisheries and Oceans Governance Officer, MALTHE, Government of Montserrat	4
Lyandra Lee	Fisheries Data Collector, MALTHE, Government of Montserrat	4
Javiere Adams	Fisheries Data Collector, MALTHE, Government of Montserrat	4
Lavern Rogers-Ryan	GIS Manager, MALTHE, Government of Montserrat	4
Dyonne Duberry	IT Manager, MALTHE, Government of Montserrat	4
Sheldon Carty	Local Fisher/Customs and Excise, Government of Montserrat	4
John Lee	Local Fisher/ Montserrat Fire and Rescue Service	4
Raphael White	Local Fisher/Disaster Management Coordinating Agency, Government of Montserrat	4
Racquel Syers	Local Fisher/Montserrat Volcano Observatory, Governmetn of Montserrat	3
John Howes	Local Fisher	4
Alphege Browne	Statistician, Statistics Department, Government of Montserrat	4
Lennon Thomas	Sustainable Fisheries Group, University of California Santa Barbara	1
Robin Ramdeen	Waitt Institute/Blue Halo	2
Charlicia Grear	MALTHE, Government of Montserrat	4
Tavis Weekes	MALTHE, Government of Montserrat	1
Shaquann Wade	MALTHE, Government of Montserrat	4
Eurlanzo Jeffers	MALTHE, Government of Montserrat	4
Trevorne Pond	Student, Montserrat Secondary School	4
Lloyd Williams	Manager, BVI Fishing Complex, Ministry of Natural Resources and Labour, British Virgin Islands Government	3
Abbi Christopher	Ministry of Natural Resources and Labour, British Virgin Islands Government	3
Orlando Salisbury	Data Technician, Dept. of Fisheries & Marine Resources, Government of Anguilla	3
Remone Johnson	Fisheries Officer, Dept. of Fisheries & Marine Resources Government of Anguilla	3
Roddy McLeod	Environmental Officer, Dept. of Environmental and Coastal Resources, Government of Turks and Caicos Islands	3

Luc Clerveaux	Environmental Officer, Dept of Environmental and Coastal Resources, Government of Turks and Caicos Islands		3
Jimmy Walter Andino Mejia	Center for Marine Ecology, Honduras		3
Dan Edwards	JNCC		4
Paul Brewin	SAERI		4
Alice Doyle	JNCC		4
Paul Brickle	SAERI		4
Tom Rossiter	Succorfish M2M		4

Dr Paul Brickle

Director, South Atlantic Environmental Research Institute

Paul has a BSc (Hons) in Marine Biology from the University of Newcastle upon Tyne. He also has an MSc and PhD from the University of Aberdeen, Scotland in fisheries biology and zoology respectively. He is currently the Director of the South Atlantic Environmental Research Institute (SAERI). Paul's interests include the ecology and oceanography of the southern Patagonian Shelf, particularly the reproductive biology, age and growth, population dynamics and the population structure of marine species inhabiting the waters of this region. He also has a keen interest marine parasites and their use as biological tags for investigating the population structure and migration of fish hosts. Paul continues to be a part of a number of trophic studies of marine fish around the Falkland Islands and is interested in the environmental and fisheries impact on trophic structures in communities. Paul is also interested in shallow marine ecology, community ecology and biogeography of small isolated islands

Dan Edwards

Fisheries Data Officer, Joint Nature Conservation Committee

Dan grew up in a fishing family and went to sea from a young age and spent over 6 years working in the fishing and aquaculture industries in the UK, Ireland and Australia. After completing his studies in Marine Resource (Fisheries) Management at the University of Aberdeen, Dan co-developed a participatory mapping methodology, FisherMap, for recording the spatial use of the sea by inshore fishermen in England. Dan moved to Scotland in 2009 as the Local Coordinator of a regional inshore fisheries management group for the Scottish Government, and subsequently worked on the ScotMap project mapping the fishermen's use of the sea in Scotland. Dan joined JNCC in 2013 as the Fisheries Data Officer where he specialises in the analysis of spatial fisheries data.

Dr Alice Doyle

Marine Fisheries and Species Advisor, Joint Nature Conservation Committee

Alice is a marine/fisheries ecologist, working as Marine Support Officer to both the Fisheries and Marine Species Advice teams at JNCC for just over 1 year. Originally from the Republic of Ireland, Alice completed a BSc (hons) in Zoology from the University College Dublin and a MSc in Marine Biology from the University College Cork, before pursuing a PhD in fish physiology in Scotland. This project was heavily involved in improving the biological understanding and science-based management of important commercial fish stocks in Scottish waters. Alice successfully defended her PhD thesis in December 2016. Outside work, Alice spends much of her spare time on or near the sea, and is an active volunteer with the Scottish Marine Animal Stranding Scheme and the ORCA surveyors network, both of which feed into the assessment of marine mammals in UK waters

Dr Paul Brewin

Consultant Fisheries Scientist, South Atlantic Environmental Research Institute.

Paul is a marine biologist/fisheries ecologist based in the Falkland Islands where he is contracted to SAERI for providing fisheries and marine ecology science and management advice. Paul is from New Zealand where he gained his PhD at Otago University, and later carried out post-doctoral research at University of California San Diego studying seamount ecology and impacts of fishing on high-seas

seamounts. While based in the Falklands, Paul's fisheries career started by managing the science and management of the toothfish deep-water longline fisheries for the Falkland Islands Government and later, for the Government of South Georgia and the South Sandwich Islands, contributing to both fishery's Marine Stewardship Council's certification for sustainability. In his spare time, Paul is a keen diver and is a volunteer member of the Shallow Marine Surveys Group which undertakes SCUBA based marine ecology and fisheries research, advocacy, and public outreach in the South Atlantic UK overseas territories.