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**THE CRFM META-DATA BASE CONTRIBUTION TO
THE CARIBBEAN LARGE MARINE ECOSYSTEM
(CLME) PROJECT INFORMATION MANAGEMENT
SYSTEM (IMS) COMPONENT**

**CRFM Secretariat
Belize**

CRFM Technical & Advisory Document – Number 2012/ 13

The CRFM Meta-data Base Contribution to the Caribbean Large Marine Ecosystem (CLME) Project Information Management System (IMS) Component.

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TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS	v
1. INTRODUCTION.....	1
1.1. Overview of the Information Management System (IMS) –Regional Ecosystem Monitoring Program (REMP).....	1
1.2. Design and Development of the IMS	2
1.2.1. Proposed Key Activities	2
1.2.2. Expected Outputs	2
2. METHODS.....	3
2.1 Column A to C – “Type of information”.....	3
2.2 Column D – “Title”	3
2.3 Column E – “Description”	4
2.4 Column F – “Web Link”	4
2.5 Column G to AD – “Species or Functional Group”	4
2.6 Column AE – “Author”	4
2.7 Column AF - “Publication Date”	4
2.8 Column AG – “Relevant Contact Name”	4
2.9 Column AH – “Relevant Contact E-mail”	4
2.10 Column AI – “Relevant Contact Phone Number”	4
2.11 Column AJ – “Regional, National, or Site specific”	4
2.12 Column AK to BA – “Country Code”	4
2.13 Column BB & Column BC – “Latitude (N = +; S = -)” & “Longitude (E = +; W= -)”	4
2.14 Column BD – “CRFM Publication Type”	4
3. RECOMMENDATIONS	5
4. REFERENCES	6
APPENDIX A: DEPICTION OF THE CRFM IMS META-DATA BASE CONTRIBUTION	7

LIST OF ACRONYMS AND ABBREVIATIONS

CLME	–	Caribbean Large Marine Ecosystem
CRFM	–	Caribbean Regional Fisheries Mechanism
EAF	–	Ecosystem Approach to Fisheries
EBM	–	Ecosystem Based Management
FAO	–	Food and Agriculture Organization of the United Nations
GEF	–	Global Environmental Facility
GIS	–	Geographic Information System
IMS	–	Information Management System
IMS-REMP	–	Information Management System & Regional Ecosystem Monitoring Program
JICA	–	Japan International Cooperation Agency
LME	–	Large Marine Ecosystem
LMR	–	Living Marine Resources
REMP	–	Regional Ecosystem Monitoring Program
SAP	–	Strategic Action Programme
TDA	–	Transboundary Diagnostic Analysis
UNDP	–	United Nations Development Programme

1. INTRODUCTION

1.1. Overview of the Information Management System (IMS) –Regional Ecosystem Monitoring Program (REMP)

The primary objective of the Caribbean Large Marine Ecosystem (CLME) project is to assist participating countries in achieving the sustainable management of their shared Living Marine Resources (LMR), most of which are believed to be either fully or over exploited (Sherman & Hempel 2008, CLME 2012). In order to identify the primary obstacles to this objective, an initial Transboundary Diagnostic Analysis (TDA) was conducted which identified three perceived region-wide transboundary areas of concern (UNDP/GEF CLME Project, 2011):

- **Unsustainable exploitation of fish and other living resources;**
- **Habitat degradation and community modification; and**
- **Pollution**

The full TDA analyses, which were completed in 2011, have served as the scientific guiding framework upon which reforms under the Strategic Action Programme (SAP) are being developed at the time of writing this report. Such reforms are expected to include, but may not be limited to, conservation measures, changes to national and regional governance, fisheries regulations, and control measures on pollution. The final SAP analysis is due to be completed by December 2012.

The partner countries of the CLME project all recognize the need to apply the Ecosystem Based Management (EBM) approach in order to effectively manage their shared LMR. However, in applying such an approach, a method of both gathering and managing the large array of required data is paramount. It has been envisioned that two interconnected components, the Regional Ecosystem Monitoring Program (REMP) and the Information Management System (IMS), will meet this need. The REMP has been envisioned as a suite of ecosystem status indicators which will monitor the state of the marine environment. Monitoring will be carried out in relation to three priority areas: fisheries, biodiversity and habitat degradation. The IMS represents the system tasked with receiving data from the REMP, while organising, analysing and sharing it among the many stakeholders and managers of the region. Although the two components have distinct goals and objectives, the REMP and IMS must be directly connected and be able to dynamically respond to one another (*i.e.* data from the REMP will be passed to the IMS and the effective management of data by the IMS will be essential in directing the successful operation of the REMP) (CLME, 2012). An additional principle, central to the CLME project is the idea of a dynamic system, able to identify where effective monitoring and management currently takes place, where redundancies occur and where gaps in information exist. It is expected that the IMS-REMP will facilitate this objective as well.

As outlined by the CLME project (CLME, 2012), the IMS will act as a portal in which the various organisations facilitating the REMP will provide links to their own data repositories so that managers at all levels of governance in the wider Caribbean will have a common location at which they may share information and remain well informed so that effective management decisions are facilitated.

A five-module approach to assessment and management of LMEs has proven useful in applying EBM across numerous other LME projects. Such an approach uses a suite of indicators classified into five categories (Sherman *et al.*, 2009):

- **Primary Productivity;** which provides an estimate of the productive capacity of all other upper trophic levels important to human consumption. Measurements of primary productivity are most often conducted via satellite imagery (e.g. SeaWiFs).
- **Fish and fisheries;** monitoring changes in fish biodiversity and abundance via standardized methods etc.
- **Pollution & ecosystem health;** such as measurements of pollution outflows and coral reef extent etc.
- **Socioeconomics;** such as the contribution of fishing to livelihoods, importance of healthy marine ecosystem for tourism etc
- **Governance;** measuring the effectiveness of multiple scales of national, regional and local jurisdictional frameworks.

This five-module approach provides a general framework over which efforts to gather and store data can be focused. When considering the data pertinent to the IMS-REMP it is also important to consider the results of the CLME project TDAs (outlined above) and the three REMP focal areas (fisheries, biodiversity and habitat degradation).

1.2. Design and Development of the IMS

An operationalised framework for the development and designed of the IMS has been agreed on and consists of seven key activities and eight expected outcomes (CLME, 2012):

1.2.1. Proposed Key Activities

- Identify the appropriate data and information system for the CLME IMS.
- Identify sources of information and create a regional meta-database required to support an ecosystem approach to fisheries (EAF/ EBM) in the Wider Caribbean Region (e.g. fisheries, environmental, biological, pollution and socio-economic data and information).
- Include the outputs of the pilot and case study activities.
- Develop an operational user-friendly platform for the gathering/delivery of GIS data and other relevant information.
- Identify and analysis of potential CLME IMS users and development of a training programme on IMS importance, use and accessibility.
- Develop draft agreements on information and data exchange with identified CLME partner organizations.
- Describe the IMS system development and testing protocol.

1.2.2. Expected Outputs

- A baseline report on sources of information and a regional meta-database on fisheries, environmental, biological, pollution and socio-economic data and information.
- A meta-data description of the data and information to be included in the CLME IMS. This will include the results (data and information) produced by the pilot projects (lobster and reef fish) and case studies (flyingfish, large pelagics, shrimp and groundfish and governance framework).
- A comprehensive report on future relevant information that should be an integral part of the REMP and the monitoring and evaluation framework.
- System development and testing protocol.
- An operational data and information system, including an operational user-friendly platform for the gathering/delivery of GIS data and other relevant information.
- Assessment of potential CLME IMS users and development of a training programme on IMS importance, use and accessibility.

- Guidelines on information and data sharing with CLME partner organizations.
- Develop draft agreements on information and data exchange with identified CLME partner organizations.

It is understood that there already exists a wide array of research initiatives addressing goods and services provided by the CLME. However, much of this information is scattered, centralized in a number of areas or otherwise in a form which is not easily accessible. It is envisaged that the development of the IMS will initially concentrate on existing information and initiatives to develop a baseline assessment of the key components and changes they are undergoing (CLME, 2012). Currently, a link to the trial version of the IMS is available on the CLME project website (<http://www.clmeproject.org>) which came online in June 2012. The CLME team is currently compiling a meta-data base with links to the data held at a broad array of relevant organisations (including the CRFM). This process will allow the incorporation of pertinent data before the REMP component commences, providing a snapshot of what is currently known and allow for an initial understanding of the situation in the CLME. CRFM has committed to this process by compiling an initial meta-data base of published information available online with the intent that further meta-data will be added in the foreseeable future, representing one way in which CRFM intends to continue to support the CLME project and future related work.

2. METHODS

In preparing the IMS meta-data base no explicit standardised methodology was provided. However, guidance from the FAO and consultation with the CLME project provided a general overview of the important features to be included. Publications available online from the CRFM web site were examined and separated into subsections where applicable to better describe the publication and to be sure that all relevant data was captured in the meta-data base. As a result multiple entries for individual publications were produced. Below is a methodology which describes the layout of the CRFM IMS meta-data base contribution. At present, this contribution has been prepared as an excel dataset contained in a file titled ‘CRFM_IMS_Input.xlsx’, currently held and managed at the office of the CRFM Secretariat:

2.1 Column A to C – “Type of information”

- The type of information is defined based around the LME 5 module approach:
 - Fisheries:** reports or sections within reports which contain explicit data about fisheries (e.g. levels of landings for particular species and country) and deal with fisheries in general.
 - Socioeconomic:** reports that contain Socioeconomic data or deal with socioeconomic issues
 - Governance:** reports that contain governance data or deal with governance issues.
 - Pollution & Ecosystem:** reports that contain data relating to the Caribbean ecosystem and/or pollution impacts but are not connected with fisheries (e.g. levels of pollution at various outflows or extent to which Lionfish invasion is progressing)
 - Advisory:** reports which advise best practices and do not provide direct/ relevant data
 - Advisory/ Fisheries :** this category was created to specifically identify fisheries information that does not supply direct fisheries data but rather deals with concepts/ technical information/ advise for best practices etc.

2.2 Column D – “Title”

- The Title of the report study

2.3 Column E – “Description”

- The description of the report or a specific sub-section within the report. Functions also as a keyword repository.

2.4 Column F – “Web Link”

- Hyperlink to the document online.

2.5 Column G to AD – “Species or Functional Group”

- Identifies the species or taxonomic group or functional group addressed in the report or the particular sub-section of the report.

2.6 Column AE – “Author”

- The author(s) of the report.

2.7 Column AF - “Publication Date”

- Date that the document was published.

2.8 Column AG – “Relevant Contact Name”

- Person or organisation who can be contacted regarding data from a report or sub-section within a report (Note: this may not be the author of the report).

2.9 Column AH – “Relevant Contact E-mail”

- E-mail of “Relevant Contact Name”

2.10 Column AI – “Relevant Contact Phone Number”

- Phone number of “Relevant Contact Name”

2.11 Column AJ – “Regional, National, or Site specific”

- The Scale at which the report or sub-section functions.

2.12 Column AK to BA – “Country Code”

- The country(s) dealt with in the report or sub-section of a report. Codes corresponded to the classification system presented by the world atlas <http://www.worldatlas.com/aatlas/ctycodes.htm>

2.13 Column BB & Column BC – “Latitude (N = +; S = -)” & “Longitude (E = +; W = -)”

- Default regional coordinate = 15.029686, -73.87207
- Default national coordinate values: AIA (18.218 -63.041), ATG (17.347 -61.779), BHS (24.467 -77.959), BLZ (16.952 -88.616), BRA (-8.146 -47.197), BRB (13.151 -59.568), DMA (15.429 -61.282), DOM (18.931 -70.027), GLP (16.194 -61.545), GRD (12.141 -61.699), GUY (6.490 -58.645), HTI (18.952 -72.29), JAM (18.062 -77.388), KNA (17.298 -62.754), LCA (13.913 -60.963), MSR (16.747 -62.194), MTQ (14.647 -60.974), SUR (4.215 -55.898), TCA (21.841 -71.895), TTO (10.844 -60.985), VCT (13.005 -61.241), VEN (10.099 -66.709), VGB (18.416 -64.534)
- The relevant latitude/ longitude for the report or sub-section of the report using decimal degrees where negative latitude is South and negative longitude is West. If dealing with the entire CLME then the default regional coordinates were assigned (see above). If dealing with a specific country then the default national coordinate values were applied (see above). If site specific then appropriate coordinates for that site were applied.

2.14 Column BD – “CRFM Publication Type”

- The publication/document classification used on the CRFM website (i.e. CRFM Fisheries Reports, CLME workshop documents, CRFM/ JICA Dissemination reports, CRFM Research papers, CRFM technical and advisory documents, Regional validation Workshop).

3. RECOMMENDATIONS

The meta-data base outlined above represents an initial contribution and is intended to grow and evolve as more information is added and becomes available in the future. It is intended that this output will be continually updated by the CRFM and internal consultation is being conducted to seek out areas where this initial meta-data base may be improved so as to benefit the intended users of the IMS (including CRFM). So far, recommendations for improvement of the CFRM meta-data base contribution have included a request for sub-categories of 'type of information' to better identify the type of data and information contained in reports and to improve the efficiency of anticipated online searches. For instance, currently 'Socioeconomic' is one heading. However this could be broken down into a number of sub categories to better identify the data (*e.g.* sectors of the economy in question). Currently, fisheries data entries incorporate the relevant functional groups (*i.e.* fish species) into a category. Such a system might be applied to the socioeconomic data (*e.g.* regional markets, global markets, artisanal fisheries economy etc.). The inclusion of an abstract, where this has been included in reports, has also been seen as a potential improvement to the meta-data base. This would allow for the displaying of the abstract after a search has been conducted and before following links to any data or publications. Scholarly search engines such as Web of Science could be used as a model. In addition to the above outlined recommendations, as a potential user of the IMS, it is important to consider what CRFM broadly expects of the IMS in the future. This question will largely depend on the role of the CRFM in the proposed future framework for regional governance in the Caribbean which, at the time of this report, is still in the relatively early stages of development. Such considerations will be incorporated in future discussions of CRFM's continued contributions to the CLME project and its proposed Strategic Action Programme for guiding the way forward.

4. REFERENCES

- CLME. 2012. Sustainable Management of the Shared Living Marine Resources of the Caribbean Large Marine Ecosystem (CLME) and Adjacent Regions. Internet - http://www.clmeproject.org/documentos/PP_CS/ToRs_CLME_IMS_REMP.pdf
- Sherman, K. and Hempel, G. (Editors) 2008. The UNEP Large Marine Ecosystem Report: A perspective on changing conditions in LMEs of the world's Regional Seas. UNEP Regional Seas Report and Studies No. 182. United Nations Environment Programme. Nairobi, Kenya.
- Sherman, K., Aquarone, M.C. and Adams, S. (Editors) 2009. *Sustaining the World's Large Marine Ecosystems*. Gland, Switzerland: IUCN. 142pp.
- UNDP/ GEF CLME Project. 2011. Sustainable Management of the Shared Living Marine Resources of the Caribbean Sea Large Marine Ecosystem (CLME) and Adjacent Regions: Caribbean Large Marine Ecosystem Regional Transboundary Diagnostic Analysis. 148pp.

APPENDIX A: DEPICTION OF THE CRFM IMS META-DATA BASE CONTRIBUTION

Below are three screen shots of the CRFM IMS meta-data base contribution as it appears in the file: 'CRFM_IMS_Input.xlsx'. All 56 data fields (columns) are shown along with a sample of 12 of the 494 data records (rows). Some redundant data fields have been minimized for display here.

Type of Information (Socioeconomic, Pollution&Ecosystem, Fisheries, Governance, Advisory)	Type of Information	Type of Information	Title	Description
			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of Belize. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of Grenada. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of Jamaica. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of Montserrat. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of St. Kitts and Nevis. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of St. Lucia. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of Turks and Caicos. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Advisory/ Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of Martinique. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011. CRFM Fishery Report - 2011 - Volume 1, Suppl. 1 ISBN #978-976-8165-46-6	The National Fisheries Report of Guadeloupe. Including description of Fisheries and Fleet, National fisheries policy and Management Objectives, Research and Legislation and Management Regulations
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011 - CRFM Fishery Report - 2011 - Volume 2 ISBN #978-976-8165-45-9	Bahamas Spiny Lobster Fishery Report
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011 - CRFM Fishery Report - 2011 - Volume 2 ISBN #978-976-8165-45-9	Report on Small costal Pelagic including review of available new data and information o the fishery interest, review of national reports, fisheries trends, pertinent technical studies completed to date and management developments
Fisheries			Report of Seventh Annual CRFM Scientific Meeting, St. Vincent and the Grenadines, 16 - 24 June, 2011 - CRFM Fishery Report - 2011 - Volume 2 ISBN #978-976-8165-45-9	Eastern Caribbean Flyingfish Fishery Report. Including management summary, stick statu management advice, stats and research recommendations,

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	
1	Publication Date	Relevant Contact Name	Relevant Contact E-mail	Relevant Contact Phone #	Regional, National, or Site specific	Country Code #1	Country Code #2	Country Code #3	Co	Ca	Co	Ca	Co	Ca	Co	Ca	Co	Ca	Co	Ca	Co	Ca	Co	Ca	Co	Ca	Co	Ca
																						Latitude (N = +; S = -)	Longitude (E = +; W = -)	CRFM Publication Type				
2	2012	Belize Fisheries Department	species@btl.net	501-223-2623	National	BLZ																16.951724	-88.615723	CRFM Fishery Reports				
3	2012	Grenada Ministry of Agriculture, Forestry & Fisheries	agriculture@gov.gd	473-440-2708	National	GRD																12.141376	-61.699219	CRFM Fishery Reports				
4	2012	Jamaica Ministry of Agriculture, Fisheries Division	dof.jamaica@yahoo.com	876-927-1731-50	National	JAM																18.062312	-77.387695	CRFM Fishery Reports				
5	2012	Montserrat Ministry of Agriculture, Lands, Housing and The Environment	malhe@gov.ms	664-491-2546	National	MSR																16.746688	-62.193604	CRFM Fishery Reports				
6	2012	Sam Heyliger, St. Kitts and Nevis Ministry of Agriculture, Fisheries, Co-operative, Lands and Housing.	fmusk@caribsurf.com	869-465-8045	National	KNA																17.298199	-62.753906	CRFM Fishery Reports				
7	2012	Sarah George, Chief Fisheries Officer, Ministry of Agriculture, Food production, fisheries and rural development	sarah.george@maf.gov.lc	768-468-4136	National	LCA																13.91274	-60.963135	CRFM Fishery Reports				
8	2012	Kathy Lockhart, Turks and Caicos Department of Environment and Coastal Resources	kjlockhart@gov.tc	649-946-2857	National	TCA																21.841105	-71.894531	CRFM Fishery Reports				
9	2012	CRFM secretariat	crfm@btl.net	501-223-4443	National	MTQ																14.647368	-60.974121	CRFM Fishery Reports				
10	2012	CRFM secretariat	crfm@btl.net	501-223-4443	National	GLP																16.193575	-61.54541	CRFM Fishery Reports				
11	2012	CRFM secretariat	crfm@btl.net	501-223-4443	National	BHS																24.467151	-77.958984	CRFM Fishery Reports				
12	2012	CRFM secretariat	crfm@btl.net	501-223-4443	Regional	AIA	ATG	BHS	BF	BL	DI	GI	GL	H	JA	M	KN	LC	VC	SU	TT	TC	14.902322	-68.334961	CRFM Fishery Reports			
13	2012	CRFM secretariat	crfm@btl.net	501-223-4443	Regional	AIA	ATG	BHS	BF	BL	DI	GI	GL	H	JA	M	KN	LC	VC	SU	TT	TC	13.83808	-59.545898	CRFM Fishery Reports			