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Cartagena, Colombia, 8 December 2014

REPORT ON THE WORKSHOP OF GLOBAL CORAL REEF MONITORING NETWORK (GCRMN) FOR THE WIDER CARIBBEAN: REVIEW, IMPROVE AND REVITALIZE THE NETWORK AND THE NODES FOR MORE EFFECTIVE CORAL REEF MONITORING AND DATA MANAGEMENT, CURACAO, 6-8 AUGUST 2014

**Workshop of GCRMN for the Wider Caribbean: Review, improve and revitalize the network
and the nodes for more effective coral reef monitoring and data management
Curaçao, 6th - 8th of August 2014**

1. INTRODUCTION & CONTEXT

The Global Coral Reef Monitoring Network (GCRMN) of the International Coral Reef Initiative (ICRI), recently published a groundbreaking report "*Status and Trends of Caribbean Coral Reefs: 1970-2012*", in cooperation with UNEP and IUCN. In this report, edited by GCRMN science coordinator Jeremy Jackson, a number of startling conclusions are drawn from a region-wide assessment of forty years of coral reef data.

The report concluded coral reef monitoring in the Wider Caribbean is "scattered, disorganized, and largely ineffective". The weaknesses and inefficiency of the current coral monitoring network, is in part due to inconsistency in application of monitoring methods and approaches, the lack of information dissemination and limited funding throughout the region. The GCRMN in the Caribbean currently suffers from reduced functionality, at three levels of action: data collection, information archiving and dissemination, and internal network communication. Those weaknesses are often coupled with challenges of securing adequate funding as a means to support systematic and sustainable coral reef monitoring. This has potentially contributed to losses of information and capacity building due to major gaps in the exchange of approaches and expertise within the region.

To address these dysfunctions and the urgent need for more effective coral reef monitoring in the Wider Caribbean region, a workshop was convened in Curaçao during August 6th-8th 2014 with funding provided by UNEP-CEP, its SPAW-RAC and the Dutch Ministry of Economic Affairs. This event was organized under the leadership of these institutions, along with NOAA, the Waitt Foundation, the GCRMN science coordinator and the UNEP Coral Reef Unit.

Coral reef experts from different monitoring programmes, as well as from the sub-regional 'monitoring nodes' established in the past, and relevant regional and international organizations, came together to discuss how to better coordinate ongoing Caribbean coral reef monitoring and stimulate and support monitoring in areas that lack capacity for sustained monitoring efforts.

The Workshop aimed to support the region-wide coral reef monitoring, so far coordinated through the GCRMN and UNEP-CEP as focal point. The main goal was to revitalize and organize the coordination of coral reef monitoring conducted across the region by providing concrete solutions that would improve the network's capacities, through the following specific objectives: 1- Improve data collection & archiving; 2- Improve the network internal functioning for a better diffusion of information; 3 -Increase the support for regional and sub-regional cooperation .

In this context, the Workshop was structured as a series of interactive discussions and working groups sessions, followed by a set of key presentations made during the first morning (see Annex A & B for the detailed agenda and the list of participants).

2. OVERVIEW OF THE CURRENT REGIONAL SITUATION

This first session aimed to lay the foundations for the following work, by providing all participants with a general review and assessment of the current state of the GCRMN network and more generally, of the coral reef monitoring in the Caribbean. It allowed an understanding of the factors underlying the network dysfunction and it served as a basis for developing the following work sessions and helped identify and confirm priorities for the rest of the workshop.

In a presentation entitled "Lessons from the past for the future of Caribbean coral reefs" Jeremy Jackson presented the main results and recommendations of the Caribbean coral reef report, "*Status and Trends of Caribbean Coral Reefs: 1970-2012*"¹ that compiled all available survey data to understand the causes of the catastrophic decline in Caribbean coral reefs in the context of basic research over the past 40 years.

After a short historical background of the region, the results and ecological assessment of this report were presented. *The latter will not be developed further in this report, as only information relevant to the workshop objectives will be described here but all information can be found within the report.*

The main problems outlined by Jeremy Jackson were the following:

- **Data Analysis** : Much of data was not previously analysed and raw data were often provided instead by researchers
- **Data quality**: inconsistent metrics, formatting errors, lack of metadata (location, reef type, depth, date of observation)
Approximately a quarter of the data was unusable and it took the team 1.5 years to get data in standard format.
- **Data collection consistency** : out of a total of 90 sites, only 21 locations had data from all periods
- **Data sharing**: it was sometimes difficult or impossible to convince scientist to share their data

The GCRMN Caribbean report and the recently released FORCE (Future of Reefs in a Changing Environment) report offer important information for revitalizing coral reef monitoring in the region with a realistic and current approach.

- **A dysfunctional Caribbean GCRMN**

Global reef monitoring was a major theme when ICRI was launched during the United Nations Global Conference on Sustainable Development of Small Islands Developing States in Barbados in 1994. It was during this time that the Global Coral Reef Monitoring Network (GCRMN) was established to support ICRI's [Call to Action](#) and [Framework for Action](#). The GCRMN is supposed to work through a global network of stakeholders and within interacting [regional networks](#), with a structure of node coordinators at sub regional levels and local coordinators, in support of the management and conservation of coral reefs. It started from a modest beginning but with a good initial growth, thanks in particular to funding of the United States Department of State (main funder) and UNEP-CEP coordination.

¹ - Jackson JBC, Donovan MK, Cramer KL, Lam VV (editors). (2014) *Status and Trends of Caribbean Coral Reefs: 1970-2012*. Global Coral Reef Monitoring Network, IUCN, Gland, Switzerland.

Today, it has only modest funding sources and increasingly has to rely on voluntary contributions from many players.

In the last few years GCRMN functions have been reduced, with a stronger focus on communication and less on data. The Caribbean situation however is different and has focused on data and less on networking.

- **Experience sharing for an overview of the region**

Participants from several countries, representatives of regional coral reef organizations, as well as the *de facto* 'node coordinators', were invited to present a short review of the coral reef monitoring and the effectiveness of the network in their own sub region or area, describing in particular the following elements:

- *Current monitoring organization*
- *Data collection protocol (s) and core set of data collected*
- *Archiving methods*
- *Main strengths and weaknesses*
- *Concrete suggestions/ideas for improvement (see table 1)*

A synthesis with each area's details can be found in the table in Annex H - There are nearly as many different situations as locations, which highlights the heterogeneity and complexity of this region. In most sub regions, the monitoring networks are not functional or fully functional. Different situations exist: coordinating systems that used to be efficient but no longer are (INVEMAR for the northern South America sub-region where the communication stopped from 2008 as UNEP-CEP funding was no longer available), others were never established, or only cover part of an area (the Healthy Reefs Initiative HRI has a really strong network but was only set up for the Mesoamerican reef). Stronger systems exist among islands and archipelagos of the same nationality or political context/background. (*e.g.* France and Netherlands) but for the most part there is no real and proper cooperation nor exchanges between neighboring countries/territories (*e.g.* in the Eastern Caribbean)

Most of the sites share common weaknesses and needs, leading to similar main recommendations as developed in the table below. There was a clear consensus on the importance of revitalizing and formalizing the regional network, with the adoption of a simple and accessible regional data set and associated methods, the need for a central database, and improved communication within the region (with standardized reporting and regular meetings) but also externally, with the general public and governments in particular.

Table 1 - Some examples of suggestions of improvement for the coral reef monitoring in the region

Zone	Suggestions - area for improvement
Dutch Islands	<ul style="list-style-type: none"> - regular training - regional assistance teams for smaller islands
US (NOAA)	<ul style="list-style-type: none"> - integrated research planning (biophysical and human dimensions) - simple but scalable metrics and indicators - communication improvement: variable audiences, new tools
Northern Caribbean	<ul style="list-style-type: none"> - show to individual governments and institutions that data sharing benefits them. - adopt regional protocols - establish a central data depository - reintroduce status reports - relaunch GCRMN - restructure regional nodes - establish achievable goals with realistic time frames - establish GCRMN specific site(s) within each country - provide opportunities for public to participate
Southern America zone	<ul style="list-style-type: none"> - simplify the methodology to fulfill basic level of requirements (core set of data) - involve people who are not expert or professional trained - implement continuous methodology training - involve new institutions for more support - more involvement into regional initiatives
UK Overseas Territories	<ul style="list-style-type: none"> - need of funding - standardize methods for data collection, reporting, and archiving [best practices workshop (methods, protocol) / agreement upon key indicators to report] - communication across the region [core monitoring group (similar but perhaps more specialized than Coral-List Server) / Online data access for regulatory agencies and scientists/ outreach for general public and education programs]
Eastern Caribbean	<ul style="list-style-type: none"> - regional roving team (to collect and process region-wide data) - standardized methodology - establishment of a formal network, linked to positions - standardize reporting frequency and requirements
French West Indies	<ul style="list-style-type: none"> - revision of the structure of the French network GCRMN - official nomination of representatives in each island with clear terms of reference

3. DATA, METHODS AND ARCHIVING

Previous discussions and presentations reinforced the idea that the Caribbean region is an heterogeneous region, where level of coral reef protection and monitoring is very variable. The importance of unifying the efforts and the establishment of a solid foundation for this network was mentioned repeatedly among the participants (and beyond the scope of this workshop). In this context, it was crucial to have the field work as the basis for the work of the network. This involved the review and development of new proposals for data collection, analysis, dissemination and archiving.

The preliminary open discussion led to the organization of working groups, with the respective tasks and objectives of (i) defining a minimum core set of data to report and associated methods, and (ii) developing a model for the archiving of this data. Impelled by SocMon experts and with everyone approval, the Socio-economic aspects linked with coral reef ecosystems were also considered and integrated in the monitoring and regular reporting of reef status and network. The SocMon experts formed a third group of experts to work in parallel on this subject to produce a reference document on data and methods.

1. A defined core set of data and recommended methods

Data collection, being a pillar of the monitoring process, set off many discussions and debates during the three days of the workshop. Consequently, a second working group was established on the last day to work further on the methods. By working on a minimum core set of data to be collected, and their associated protocol, the methods and data sessions set the objective of defining a model for a simple, accessible, but also scientifically pertinent and sustainable monitoring, both from a regional and local perspectives.

The output of this work with detailed data and methods is attached to this report in the Annex D.

This section is to be reviewed during the coming months. Indeed, it can be difficult to reach a scientific consensus, particularly on methods, as each site and related expert has its own characteristics and means. The proposed model was designed on the basis of the previously mentioned objective but is intended to be discussed further.

While a few sites in the region already or nearly meet the proposed criteria, many other sites will need a boost or extra effort to "comply" with it. The network is meant to support those sites and others in the Caribbean by the best available means, in order for them to eventually achieve the proposed data set collection and circulate it to the network platform. Future projects in the Wider Caribbean relevant to coral reefs or with coral reef monitoring elements/components (e.g. GEF projects), will be encouraged to at least use the proposed "core set of data" for their assessments and monitoring activities in an effort to ensure a coordinated approach to coral reef data and assessments in the region.

2. The introduction of socio-economic data

The integration of socio-economic data in monitoring coastal ecosystems and coral reefs in particular, is a relatively recent phenomenon which is under development in the Caribbean region, but has not

been implemented in a regular and sustainable manner. GCRMN recognized the need for collecting socio-economic data in coral reef and coastal areas from 2000. The development of its Socio-economic Manual for Coral Reef Management was intended to improve the understanding of the social and economic conditions, contexts and motivations associated with the use of coral reef ecosystems.

Coral reef scientists and coastal resource managers are increasingly coming to the realization that coastal resources can not be effectively managed if biophysical scientific monitoring is the only focus. It is important that systematic monitoring of social science indicators be implemented in conjunction with biophysical monitoring. This will enhance the ability to make connections and inferences between observed changes in the coral reef ecosystem quality and human and social parameters. These elements were unanimously recognized during the meeting in which it was demonstrated necessary, even essential, to provide a system for the entire region to begin socio-economic monitoring.

Socio-economic (human dimensions) monitoring requires specific techniques, methods and training. Combined with the fact that coral reef managers and data collectors usually have a biological background and expertise, it was important for the workshop participants to propose a simple and scalable method. For the past ten years, a number of socio-economic assessments and monitoring programmes have been implemented at coastal management sites and communities throughout the Caribbean as components of Global Socio-economic Monitoring Initiative for Coastal Management (SocMon) projects implemented by the Centre for Resource Management and Environmental Studies (CERMES), at The University of the West Indies, Cave Hill Campus, Barbados (Pena et al. In press). SocMon is a simple, flexible participatory monitoring methodology developed specifically for coral reef and coastal management to enhance understanding of communities and their relationship to coastal and marine resources. SocMon is a globally networked, regionally adapted, practical methodology of socio-economic monitoring for coastal management. Socio-economic monitoring has been implemented in 12 countries in the region at 23 study sites, 16 of which have been Marine Protected Area (MPA) sites and seven at coastal community sites, particularly fishing villages (Pena et al. Forthcoming). It was therefore proposed that existing socio-economic protocols be examined to identify overlaps with the SocMon methodology.

The model of monitoring proposed will allow for collection of socio-economic data readily available from secondary data or observation without the need for significant human or financial investment from people on the ground.

More detailed or site-specific monitoring was also recommended for future adoption and implementation that will allow for more detailed analysis of the impacts of people on reefs and inter-relationships between people and coral reef ecosystems. Collection of these site-specific data will require some capacity building in SocMon (existing capacity in a number of countries where SocMon has already been implemented); the adoption of a core set of SocMon Caribbean variables to allow comparison of data among sites and study areas at the sub-regional and regional level; and affordable financial resources for sustained monitoring. The Global SocMon Initiative and the regional SocMon node for the English-speaking Caribbean, CERMES, will help in supporting sites wishing to develop socio-economic aspects of

The output of this work with detailed socio-economic data and methods is attached to this report in the Annex E.

3. A proposition for an open, independent, secure and interactive archiving system

In terms of data archiving the situation in the Caribbean is also very heterogeneous and scattered (annex H) . Several databases currently exists but none unifies the entire area.

Although there is a certain unity with networks like AGRRA or CARICOMP, generally each site or sub location has its own system of archiving, and all systems vary considerably in terms of development, access and security. These variables, along with a lack of collaboration and a centralized location for regional data, makes it difficult to assemble the data at the regional level, as stressed during the preparation of the GCRMN Caribbean report. The work of data collection turned out to be huge and very tedious for the authors: in an effort to obtain data, more than 1000 emails were sent, as well as difficulties experienced regarding data sharing and ownership...

Therefore it was one of the specific objectives to set up a central database for the region that will allow easy input of collected data, facilitate reporting and support information sharing and communication. One working group was dedicated to address this subject with the support of the Waitt Institute which offered to build and maintain such a tool.

Note: This generous offer was greeted with enthusiasm. However, the details of this offer will be further discussed, and other proposals, in particular from within the region, will be welcomed and considered.

4. The identification of network monitored sites

An important challenge was to find a balance between gathering as many monitored sites as possible eventually, and still keep the necessary scientific data quality to ensure reliable use of the latter. Facing the reality of limited funding, human resources and means, the main question was how to start getting countries and people to commit to monitoring of specific indicators and get them involved in the network.

Several proposals and ideas were launched, including the determination of Wider Caribbean GCRMN index sites if all indicators could not be measured at each site, the setting up of a complete list of countries' sites for future invitations and a broadly cast net to invite those who are willing and capable of monitoring. Consensus was reached on starting a list of sites which have already proved capable of fulfilling the network requirements.

Participants identified sites currently able to meet the prerequisites related to data and methods for bio-physical parameters, and for which access to socio-economic data would be relatively easy. The first tentative list includes the strongest 21 sites cited in the GCRMN Caribbean report (Annexe H) to which several other sites of the CARICOMP, AGRRA, Healthy Reefs For Healthy People networks may be added.

This list will be developed over the coming months before sending out invitations to join the network, and a second list of 'secondary sites' will also be started, to define priority areas and the necessary support required to achieve network prerequisites. Eventually, the long term objective is to gather all countries in the region with their respective main coral reef index sites.

4. PROPOSITION OF AN IMPROVED/NEW NETWORK STRUCTURE

The first days' discussions and sharing of participants' experience allowed for the identification of several specific structural parameters that could explain the failing of the previous GCRMN network. Those main elements, listed below, represent lessons learned upon which the participants drew to build a new organizational model.

The importance of institutions and individuals' involvement

Several examples within the Caribbean region showed that a lot of the communication and network collapsing came from the departure of individuals who were committed, and when their institution could not provide necessary replacement and dynamism. A network is defined above all by its members, therefore the involvement of the latter is a crucial element that must be taken in consideration.

The importance of not dividing the region into sub-zones that may create isolation and miscommunication

Instead, it can be better to gather relevant actors, with various but complimentary expertise and representation, not focusing on their geographical origin, for decisions processes and expert advice. On this lesson was based the proposal of a steering committee, replacing the previous sub regional nodes system, that will use and profit from everyone's assets and experience, as well as being representative of the region's heterogeneity and richness, in terms of geography, language, culture, governance and technical expertise

The importance of a coordinating actor, to act as a catalyst, to ensure an open and regular dissemination of information and to provide sustainability to the network.

From this, a new network model was proposed that, with the support of, and led by a Steering Committee and a regional coordinator, will be instrumental as an information and exchange platform for the whole region and all relevant actors. (Annex I)

It will allow partnerships and increased collaboration, promote exchange of expertise and support, and extend coral reef monitoring outreach through internal and external communication. Gaps and needs in the region will be more easily identified, and efforts will be directed towards reinforcing fund-raising and joining forces for co-financing. It will help in the development of concrete cooperative projects specifically addressed to build local capacity through training programs and expert support.

A steering committee and a regional coordinator

The proposed Steering Committee (see below) will be composed of a chair, a co-chair and several members from the people present at the Workshop. The composition of the Committee reflects the cultural and geographical diversity of the region, represents a variety of technical, scientific and policy expertise in order to fulfill the roles identified. Any individual member of the steering committee may be responsible for one or more of the previously described roles. This Steering Committee will also assist with internal and external communication of the regional network, address building of local capacity through training programs and expert support, and will try to engage all countries in the region to join this network. Members will meet regularly, on an opportunistic basis using other relevant regional meetings as a platform whenever possible.

To coordinate these efforts the UNEP/SPAW-RAC was designated as the Wider Caribbean GCRMN regional coordinator: Its representative will be a member and chair of the Steering Committee and work together with the latter to lead and provide guidance with respect to its specific roles. The regional coordinator will also help facilitate meetings' venues and necessary logistics, ensure communication within the network, and be a catalyst for encouraging collaboration among members. The SPAW-RAC, in co-ordination with UNEP-CEP, to the extent feasible will seek to provide the necessary means and resources to ensure the continuity and effectiveness of the regional coordinator mission.

The Steering Committee and regional coordinator Terms of Reference, including their specific roles, are detailed in the Annex J.

The current Proposed Steering Committee composition is the following:

Julie Belmont - SPAW-RAC – Regional Coordinator (on behalf of UNEP-CEP)
Melanie McField - Healthy Reefs For Healthy People - Meso-American reef
Peter Edwards (NOAA CRCP) / Maria Pena (CERMES, University of the West Indies, Barbados)-
SocMon – US/Caribbean
Paul Hoetjes – Caribbean Netherlands
Ruben Torres – Reef Check - Dominican Republic
Ayana Johanson - Waitt Institute - US
Mark Vermeij - CARMABI - Curaçao
Marcia Creary Ford- University of the West Indies - Jamaica
Jorge Cortés /Diana Gómez - University of Costa Rica/INVEMAR- Central South America zone
Angeliqe Brathwaite - Coastal Zone Management Unit, Government of Barbados
IFRECOR - French West Indies
Member-At-Large – Bob Stenneck- suggested

Note: substitutes can be nominated, in case of absence or incapacity of a member to provide his/her function.

5. CONCLUSIONS AND RECOMMENDATIONS

The considerable work and scientific effort made to produce the report "*Status and Trends of Caribbean Coral Reefs: 1970-2012*" has allowed, among other things, to identify issues in the coral reef monitoring organisation of the region. Following this assessment, a quick reaction and a strong motivation appeared at the regional level for a common search for solutions. The objective of the work described in this report was therefore to handle and improve the cooperative processes between the stakeholders and experts of the region, with for ultimate goal to improve the coral reef monitoring and data management, including dissemination. As noted above, this is a delicate and complicated regional cooperation exercise in the light of this region's heterogeneity.

The Workshop has laid the first stone towards achieving a better network, by proposing a new and improved model and its associated technical guidelines and concrete solutions. The support required to develop this model towards a functional and reliable system is a challenge given the number of countries involved and the limited resources at site level for most of them. It will be important to

keep in mind the regional dimension at all times, and it will require commitment and consensus, in order to get as many actors as possible to adhere and therefore create a real cooperative effort, standardized monitoring and consistent information flow.

In addition to considerations at the local level, it is crucial for stakeholders to include consideration within a regional context, taking into account existing ecological connections, but also socio-economic aspects and the heterogeneity of the region. Regional and sub regional organizations such as UNEP-CEP and SPAW-RAC, AGGRA, HRI or CARICOMP will therefore have a major role to play to mobilize coral reef actors at national and local levels.

In this context, a tentative workplan has been developed to prioritise actions following the Workshop, with achievable goals within realistic time frames for developing the network over the coming 2 years (Annex K). Additionally, Annexes D to G outline the recommended core data set, methodology, data management platform and suggested sites. Annexes I and J outline the Workshop recommendations with regard to network structure and management.

The Caribbean region is the first of the global GCRMN to start this 'network revitalization' work. This effort will hopefully also provide a basis for other regions facing similar problems.

6. ANNEXES

- A) Original Agenda
- B) List of participants
- C) Acronyms & links

- D) Proposed data & methods
- E) Guidelines for Socio economic data
- F) Concept for a Data management platform
- G) Tentative list for Network Monitored sites
- H) Overview of the region - Table synthesis
- I) Network structure diagram
- J) Proposed Terms of Reference for the Steering Committee and Regional Coordinator
- K) Upcoming tasks