



**THE MINISTRY OF DEFENCE AND RODRIGUES
OF THE REPUBLIC OF MAURITIUS
AND
THE INDIAN OCEAN RIM ASSOCIATION**



**Department for Continental Shelf, Maritime Zones
Administration & Exploration**

**TRAINING WORKSHOP ON
OCEAN OBSERVATORY DATABASE
MAURITIUS
23 NOVEMBER 2017**



REPORT

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Acronyms

AFRC	Albion Fisheries Research Centre
BOI	Board of Investment
IOC	Indian Ocean Commission
CISD	Central Information Systems Division
CIOS	Chair of the Indian Ocean Studies
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSMZAE	Department for Continental Shelf, Maritime Zones Administration & Exploration
EEZ	Exclusive Economic Zone
IIOE-2	Second International Indian Ocean Expedition
IORA	Indian Ocean Rim Association
MDG	Millennium Development Goals
MOI	Mauritius Oceanography Institute
MPA	Mauritius Ports Authority
MSDA	Mauritius Scuba Diving Association
MSP	Marine Spatial Planning
NCG	National Coast Guard
NDRRMC	National Disaster Risk Reduction and Management Centre
NGO	Non-Governmental Organisation
NHF	National Heritage Fund
NMFZEC	National Marine Functional Zoning Expert Committee Office
NOTC	National Ocean Technology Centre
NPCS	National Parks and Conservation Service
OIDC	Outer Islands Development Corporation
PMO	Prime Minister's Office
SDG14	Sustainable Development Goal 14
SOA	State Oceanic Administration
SU	Stanford University
TA	Tourism Authority
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UoM	University of Mauritius

ABOUT THE DEPARTMENT FOR CONTINENTAL SHELF, MARITIME ZONES ADMINISTRATION & EXPLORATION (CSMZAE)

The Department for Continental Shelf, Maritime Zones Administration & Exploration (CSMZAE) operates under the aegis of the Ministry of Defence and Rodrigues. Its mission is primarily to ensure the effective management of the maritime zones of the Republic of Mauritius and to delineate and establish its maritime zones in accordance with international laws and conventions. The CSMZAE is responsible for the formulation of policies in ocean affairs and for the establishment of legal and regulatory frameworks governing the sustainable management of the non-living resources in the maritime zones.

Its main objectives are, *inter alia*, to ensure orderly, safe and rational management of non-living ocean resources including the seabed area and the underlying sub-soil; ascertain sovereign rights for the purpose of exploring and exploiting our non-living ocean resources; carry out the delimitation of our maritime boundary as provided for, under international conventions; develop regulatory and operational framework to enable exploration and exploitation activities in our maritime zones and oversee upstream activities of any petroleum sector; rationalise and harmonise all ocean-resources related matters; regulate marine scientific research; and contribute to energy security and maritime safety. CSMZAE also has the responsibility of preparing the submissions for Extended Continental Shelf and a Marine Spatial Plan for the Republic of Mauritius.

The Department contributes primarily to the safeguard of our territorial integrity in carrying out Maritime Boundary Delimitation and ensuring through the establishment of appropriate legal frameworks our sovereignty over Mauritius' vast maritime zones.

In December 2016, the Government of the Republic of Mauritius agreed for the Department to elaborate a Marine Spatial Plan for the Exclusive Economic Zone (EEZ) of the Republic of Mauritius in view of the increasing demand for marine space in the EEZ for various purposes, particularly, fisheries and aquaculture, tourism and leisure. The main purpose of marine spatial planning is to identify the utilisation of marine space for different sea uses in accordance with national policies and legislation, while taking into consideration the preservation, protection and improvement of marine environment, including resilience to climate change impacts. It will also contribute to the effective management of marine activities and the sustainable use of marine and coastal resources through the creation of a framework for consistent, transparent, sustainable and evidence-based decision making. The elaboration of the Marine Spatial Plan is in line with the implementation of the 2030 UN Agenda for Sustainable Development and the Sustainable Development Goals (SDGs).

For more information see:

http://mdr.govmu.org/English/defence/Pages/CSMZAE_Vision_Mission.aspx

1 INTRODUCTION

The Training Workshop on “Ocean Observatory Database” was held at The Westin Turtle Bay Resort & Spa, Mauritius on 23 November 2017. It was hosted by the Department for Continental Shelf, Maritime Zones Administration & Exploration (CSMZAE) under the aegis of the Ministry of Defence and Rodrigues of the Republic of Mauritius in collaboration with the Indian Ocean Rim Association Secretariat.

The Training Workshop is one of the deliverables under the IORA Special Fund project, entitled “*Developing an Enhanced Ocean Observatory in support of Ocean Exploration and Development*”, which is currently being implemented by the CSMZAE. The objective of this project is to set the framework for data and information management, together with the evaluation of a legal framework to harness the full potential from marine resources in a sustainable and well-planned manner. The project also addresses the technical specifications for a full-fledged system, including the setting-up of a database for use within the CSMZAE and providing regulated access to the database online.



2 THE TRAINING WORKSHOP

2.1 Background

The ocean is considered as the next frontier for development. Shipping, aquaculture, fisheries, recreational activities, renewable energy and seabed exploration for hydrocarbon and minerals are among the sectors which could contribute to the development of the Ocean Economy. However, it is recognised that the need to balance the conservation and the protection of the marine environment with a sustained economic development of the marine resources is to be carried out through careful marine spatial planning. Achieving this balance requires understanding the long-term capacity of ocean ecosystems, identifying tools that communities, industry and government can use to adjust resource use, and providing access to this information. Oceanographic, geological, geochemical and geophysical data are essential for understanding marine processes and resources. These form the basis over which resource managers, environmental experts and potential investors make science-based decisions.

The Department for Continental Shelf, Maritime Zones Administration and Exploration, in collaboration with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Oceans & Atmosphere, Australia, is working on the project “Developing an Enhanced Ocean Observatory in support of Ocean Exploration and Development” to design the framework for a database (supported by *marine spatial planning*) to collect, store, organise and provide access to spatio-temporal data relevant to ocean exploration and development.

By integrating various sources of information and providing access to relevant knowledge, the database will serve both as a guide to identify gaps in existing information and data and as a baseline for environmental impact assessment. The database will also ensure that data meeting the needs of industry and government authorities can be easily accessed and analysed. By providing relevant information, the integrated database will also help to sustainably manage the area for informed policy decisions.

2.2 Objectives

This training workshop will bring together representatives of IORA Member States with policy/regulatory responsibilities and scientific/technical expertise relevant to Data Management and Exploration. The specific objectives of the workshop are as follows:

- (i) build knowledge of marine spatial planning approaches and how data can drive development of management options and the monitoring and assessment of management decisions;
- (ii) raise awareness on ocean exploration and development among the IORA Member States with a focus on data discovery, gap analysis and data management; and
- (iii) develop the exploration and exploitation of marine resources in a sustainable and methodological manner by providing a centralised information system for marine spatial planning.

3 AGENDA

Table 1: Agenda

Training Workshop on Ocean Observatory Database	
1300 – 1320	Marine Spatial Planning approaches in the context of SDG14
1320 – 1340	Key Values and pressures driving MSP in the region (introduction)
1340 - 1430	Options for management <ul style="list-style-type: none">• <i>What are the management tools that can be applied?</i>• <i>Which values are affected?</i>• <i>Which pressures should we be managing to reduce any adverse impacts and ensure sustainable use?</i>
1430 – 1515	Monitoring and assessment - how do we measure MSP approaches?
1515 – 1530	COFFEE BREAK
1530 – 1630	Information and data for MSP – Ocean Observatory Database, J. Hodge, CSIRO <ul style="list-style-type: none">• <i>How does data drive MSP?</i>• <i>Example of existing databases</i>• <i>Brief on features, examples, screen shots of the Ocean Observatory Database</i>• <i>What is metadata and how to use/create metadata</i>
1630 – 1645	Closing Remarks

4 PARTICIPANTS

The workshop gathered about 68 participants from IORA Member States and local participants from Mauritius, including NGOs. A detailed list of the workshop participants is provided in Table 3. The workshop represented a great opportunity to bring participants with diverse backgrounds on a common understanding of basic concepts related to database management and to marine spatial planning.

4.1 List of Trainers

The training workshop was facilitated by trainers from CSIRO:

1. **Mr Jonathan Hodge**, Team Leader, Coastal Informatics, Oceans and Atmosphere, Commonwealth Scientific and Industrial Research Organisation (CSIRO).

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<http://people.csiro.au/H/J/Jonathan-Hodge>

Jonathan Hodge is a science and IT project manager. He has a long history of involvement in the development and coordination of environmental information systems and geographical information systems. He also has a strong background in marine, coastal and ocean sciences with a particular focus on data collection and handling, including working with water quality data, satellite remote sensing data, complex model data and many other types of vector and raster data types. He has significant project management expertise on project ranging in budget from less than \$50,000 to greater than \$1,000,000. He is the team leader working on the implementation of the Ocean Observatory Database at the Department for Continental Shelf, Maritime Zones Administration & Exploration.

2. **Dr Piers Dunstan**, Project and Theme Leader, Commonwealth Scientific and Industrial Research Organisation (CSIRO).

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Piers Dunstan is a Team Leader with CSIRO Oceans and Atmosphere Flagship, with expertise on the identification, analysis, management and conservation of marine biodiversity and data systems to support these efforts. He is leading a CSIRO team working in the Pacific and Coral Triangle to assist countries to develop the technical capacity to improve the governance and management of oceans. This includes support for information management, geospatial analysis, and development of environmental policy. He has also worked extensively with the Convention on Biological Diversity (CBD) to provide scientific and technical expertise on Ecologically or Biologically Significant Areas (EBSA).

3. **Dr Mat Vanderklift**, Research Group Leader, Oceans and Atmosphere, Commonwealth Scientific and Industrial Research Organisation (CSIRO).

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<http://people.csiro.au/V/M/Mat-Vanderklift>

Mat Vanderklift is a marine ecologist whose research primarily focuses on coastal ecosystems. His research has encompassed tropical and temperate ecosystems in Australia, the USA and France. He currently leads the Ningaloo Outlook project, a 5-year \$5 million partnership between CSIRO and BHP Billiton that aims to provide science that will inform management of the Ningaloo Coast World Heritage Area. His other current research foci are the ecology of coral reefs and seagrasses and the organisms that rely on them, working with indigenous ranger groups in the Kimberley to inform management of Indigenous Protected Areas, and the ecology of turtles.

5 SUMMARY OF TRAINING SESSIONS

5.1 Introductory Remarks

Dr M. R. Badal

Dr Badal opened the training session by stressing the need for a specialised system for the proper understanding and management of ocean affairs in the maritime zones of the Republic of Mauritius. He further stated that such a centralised system would act as a repository for data, linking science across different agencies and thus promoting informed decision making at high level within the government.

Dr Badal also mentioned the exponential boost in marine spatial information in the recent years, thereby explaining the requirement for a specialised database system. He informed that the contract for such system has been awarded to consultants, from CSIRO, who would be responsible for setting up the database and for capacity building around it. He emphasised the importance of capacity building given that the information system would be continuously reinforced and populated with data throughout the coming years.

Mr J. Hodge

Mr Hodge gave an overview of the presentations that would follow. He briefly explained that the presentations would cover how ocean data and information fit into the MSP framework, and how MSP is an essential tool in reaching SDG14 goals.

5.2 Why MSP? IORA, Blue Economy, SDG14 and MSP

Dr Mat Vanderklift

Dr Vanderklift opened his presentation by discussing the vision of the blue economy which is to maximise the benefits of 3 pillars, namely the economic, social and environmental pillar, through the co-existence of different sectors. For instance, as further mentioned by the latter, sectors such as tourism and fisheries have to adapt to resource sharing, while emerging sectors such as aquaculture, ocean renewable energies and blue carbon, are required to resort to the optimum use of ocean space. Dr Vanderklift then provided an overview of the history of the MDG and the SDG14. He explained that the MDG are mostly social goals that have been thereafter complemented by the environmental goals of SDG14. Dr Vanderklift also pointed out that the 7 targets of SDG14 are not directly connected, with each target catering for individual issues such as ocean pollution and ocean acidification among others. In conclusion, he affirmed that the MSP framework is an essential tool in coherently addressing all the 7 targets, while working towards resource sharing, social expansion, environmental sustainability and better practice through innovative technology.

5.3 Integrated Oceans Governance & MSP: Practicalities and Options

Dr P. Dunstan

Dr Dunstan started his presentation by giving a brief on integrated ocean governance, indicating that such governance should be a transparent and an inclusive process. He explained that robust policy making emanate from a framework that allows for both the rationale and understanding of decisions taken within different agencies. With regards to decision making processes, Dr Dunstan emphasised the need to account for the complete set of basic values, namely economic, social and environmental value, across all relevant sea-based activities. He further explained that integrating associated acting

pressures as well as sustainable management measures into such a value framework would allow the synthesis, comparison and conversion of information into relevant elements for decision making.

In line with the values framework, Dr Dunstan also discussed the use of the Environmental and Livelihood Values Interrogation System (ELVIS) for deep sea mining activities in New Britain, Papua New Guinea. The latter elaborated on how ELVIS can be used for the impact assessment of existing and new developments. He described that this system maps out the distribution of the different values and illustrates how the values weigh against each other. As an example, Dr Dunstan presented the different ELVIS map products for New Britain, Papua New Guinea, namely the maps for natural resource use, generation for income, ecological values and social/cultural values. He then explained how such a web-based visualisation tool helps in identifying regions whereby the values are the least impacted during sea-based development. Dr Dunstan ended the presentation by asserting that MSP is vital for the continuity and sustainability of ocean based development, and hence essential for ensuring certainty to related business investments.

5.4 Interactive Exercise – Values, Pressures and Management Possibilities

Dr Dunstan facilitated an interactive exercise whereby participants were invited to draft a value framework for sea-based activities in the Indian Ocean region.

Trainer: Piers Dunstan

Interactive Exercise

- What are the key values associated with Tourism, Fisheries and Aquaculture in states in the IORA region.
 - Each table should identify 3 and report back
- What are the pressures that will impact those values.
 - Each table should identify 3 and report back
- How could these be managed to ensure long term sustainability.
 - Each table should identify 3 and report back

CATEGORIES	Ecosystem structure and process	Ecological regulation	Natural resource use	Socio-cultural benefits
TYPES	<ol style="list-style-type: none"> 1. Biological diversity 2. Rarity/uniqueness 3. Importance for ETD* species or habitats 4. Naturalness 5. Vulnerability or sensitivity 6. Connectivity 7. Productivity 	<ol style="list-style-type: none"> 1. Hazard reduction 2. Carbon sequestration 3. Purification or pollution control 4. Water regulation 	<ol style="list-style-type: none"> 1. Contribution to Human well-being 2. Contribution to Food security 3. Contribution to Income 4. Significant natural resource locations 	<ol style="list-style-type: none"> 1. Spiritual fulfilment 2. Cultural heritage 3. Recreation, tourism or aesthetics 4. Information services

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Table 2: Responses during the interactive session.

	<u>KEY VALUES</u>	<u>PRESSURES</u>	<u>HOW TO MANAGE</u>
FISHERIES	<u>Group 1</u> <ul style="list-style-type: none"> • Economic • Biological • Socio-cultural 	<u>Group 1</u> <ul style="list-style-type: none"> • Overfishing • Climate Change • Increase in Demand 	<u>Group 1</u> <ul style="list-style-type: none"> • Creation of MPA • Marine Spatial Planning • Policy Enforcement
	<u>Group 2</u> <ul style="list-style-type: none"> • Coral reef • Sandy beach • Underwater heritage 	<u>Group 2</u> <ul style="list-style-type: none"> • Mass Tourism • Coastal erosion • Anchorage 	<u>Group 2</u> <ul style="list-style-type: none"> • Zoning Regulation • Mitigation • Marine Spatial Planning
	<u>Group 3</u> <ul style="list-style-type: none"> • Sustainability • Security 	<u>Group 3</u> <ul style="list-style-type: none"> • Social • Environmental • Ecological 	<u>Group 3</u> <ul style="list-style-type: none"> • Consultation with public • Equitable resource sharing • Educate money-minded people
	<u>Group 4</u> <ul style="list-style-type: none"> • Social • Economical 	<u>Group 4</u> <ul style="list-style-type: none"> • Ecosystem explanation layout 	<u>Group 4</u> <ul style="list-style-type: none"> • Promote and control monitoring
	<u>Group 5</u> <ul style="list-style-type: none"> • Economic • Biological • Socio-cultural 	<u>Group 5</u> <ul style="list-style-type: none"> • Over-fishing • Level based pollution (nitrate fertilisers) • Climatic conditions/change • Coastal erosion 	<u>Group 5</u> <ul style="list-style-type: none"> • Marine spatial plan • Political willingness based on scientific research • Enforcement Policies • Understand the carrying capacity

	<u>KEY VALUES</u>	<u>PRESSURES</u>	<u>HOW TO MANAGE</u>
TOURISM	<u>Group 1</u> <ul style="list-style-type: none"> • Aesthetic • Economic • Environmental 	<u>Group 1</u> <ul style="list-style-type: none"> • Environmental Pollution • Beach Erosion • Poverty 	<u>Group 1</u> <ul style="list-style-type: none"> • National Policy • Enforcement of law • Reduction of usage of plastic materials • Increase awareness
	<u>Group 2</u> <ul style="list-style-type: none"> • Demersal Fish • Pelagic Fish • Fish migration route 	<u>Group 2</u> <ul style="list-style-type: none"> • Illegal fishing • Overfishing • Pollution 	<u>Group 2</u> <ul style="list-style-type: none"> • Law enforcement • Zoning regulations(MSP) • Mitigation
	<u>Group 3</u> <ul style="list-style-type: none"> • Sustainability • Equity in resource allocation • Diversification of portfolio 	<u>Group 3</u> <ul style="list-style-type: none"> • Social • Environmental • Ecological 	<u>Group 3</u> <ul style="list-style-type: none"> • Consultation with public • Equitable resource sharing • Educate money-minded people
	<u>Group 4</u> <ul style="list-style-type: none"> • Promoting economic development 	<u>Group 4</u> <ul style="list-style-type: none"> • Environmental impact 	<u>Group 4</u> <ul style="list-style-type: none"> • Legal framework
	<u>Group 5</u> <ul style="list-style-type: none"> • Underwater heritage • Natural Resources – reefs • Beaches • Socio-economic • Exploitation of Resources 	<u>Group 5</u> <ul style="list-style-type: none"> • Underwater heritage • Natural Resources- reefs • Beaches • Socio-economic • Exploitation of Resources 	<u>Group 5</u> <ul style="list-style-type: none"> • Marine Spatial Planning • Enforcement of policies • Political willingness based on scientific research

	<u>KEY VALUES</u>	<u>PRESSURES</u>	<u>HOW TO MANAGE</u>
AQUACULTURE	<u>Group 1</u> <ul style="list-style-type: none"> • Economic • Biological • Ecological 	<u>Group 1</u> <ul style="list-style-type: none"> • Less knowledge • New technology • New markets 	<u>Group 1</u> <ul style="list-style-type: none"> • National Policy • Enforcement of law • Reduction of usage of plastic materials • Increase awareness
	<u>Group 2</u> <ul style="list-style-type: none"> • Seaweed • Abalone • Oyster 	<u>Group 2</u> <ul style="list-style-type: none"> • Illegal fishing • Overfishing • Pollution 	<u>Group 2</u> <ul style="list-style-type: none"> • Law enforcement • Zoning regulations(MSP) • Mitigation
	<u>Group 3</u> <ul style="list-style-type: none"> • Food security • Site Planning • Bio Security 	<u>Group 3</u> <ul style="list-style-type: none"> • Social • Environmental • Ecological 	<u>Group 3</u> <ul style="list-style-type: none"> • Consultation with public • Equitable resource sharing • Educate money-minded people
	<u>Group 4</u> <ul style="list-style-type: none"> • Food security 	<u>Group 4</u> <ul style="list-style-type: none"> • Social • Threats to local species 	<u>Group 4</u> <ul style="list-style-type: none"> • Legal framework
	<u>Group 5</u> <ul style="list-style-type: none"> • Environment • Exploitation of Resources 	<u>Group 5</u> <ul style="list-style-type: none"> • Climatic Conditions • Land based pollution nitrates-fertilisers 	<u>Group 5</u> <ul style="list-style-type: none"> • Marine Spatial Planning • Resilient technologies • Public Involvement • Legislation

5.5 Information and data for MSP – Ocean Observatory Database

Mr J. Hodge

Consultant-Project Leader
CSIRO

Mr Hodge first discussed the Drivers, Pressures, States, Impacts and Response (DPSIR) framework which comprises the essential elements making up the MSP process. He then elaborated on how data can be integrated into the Marine Spatial Planning framework; further commenting that data has to meet the country's current needs and has to fit into its overall management framework. For instance he mentioned that data such as sea surface temperature would be useful for the monitoring of coral bleaching and aid in the planning of snorkelling activities in the tourism industry. In addition, Mr Hodge explained that the metadata that support the data information has to be useful, descriptive and complete. He also elaborated on data access, confidentiality, reliability and usage; pointing out that open data does not imply that the raw data has to be released but is instead available in the form of maps and graphs.

Mr Hodge gave an overview of GeoNode, an open-source software which will be used for the Ocean Observatory Database. He explained that Geonode serves as a web service for geospatial information system and allows data to be discoverable and easily used. He proceeded with a demonstration of the following functions available on the Geonode platform:

- Layer creation
- Layer upload and download
- Access and Permission
- Layer editing
- Metadata

As an example, he demonstrated how the EEZ of the Republic of Mauritius in ESRI Shape file format can be uploaded on Geonode.

5.6 Conclusion

The training workshop provided the participating IORA Member States and local participants with the knowledge, skills and capabilities in the field of database management and marine spatial planning so that they can better understand the development needs of an Ocean Economy.

This report and the presentations of the training workshop will be available on the website of the Department for Continental Shelf, Maritime Zones Administration & Exploration.

http://mdr.govmu.org/English/defence/Pages/CSMZAE_Vision_Mission.aspx

Annex 1 : List of participants

Table 3: List of participants

Name	Member State/ Organisation	Position/designation	Contact details
Commodore Sheikh Mahmudul Hassan	Bangladesh	Dean, Faculty of Earth and Ocean Science, Bangabandhu Sheikh Muiibur Rahman Maritime University Bangladesh	dean.feos@bsmrmu.edu.bd
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Table 4: Secretariat for the training Workshop

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Annex 2 : Participants during the training workshop

