



# Marine Spatial Planning in Mauritius

## Regional Workshop on Harmonization of Marine Spatial Planning

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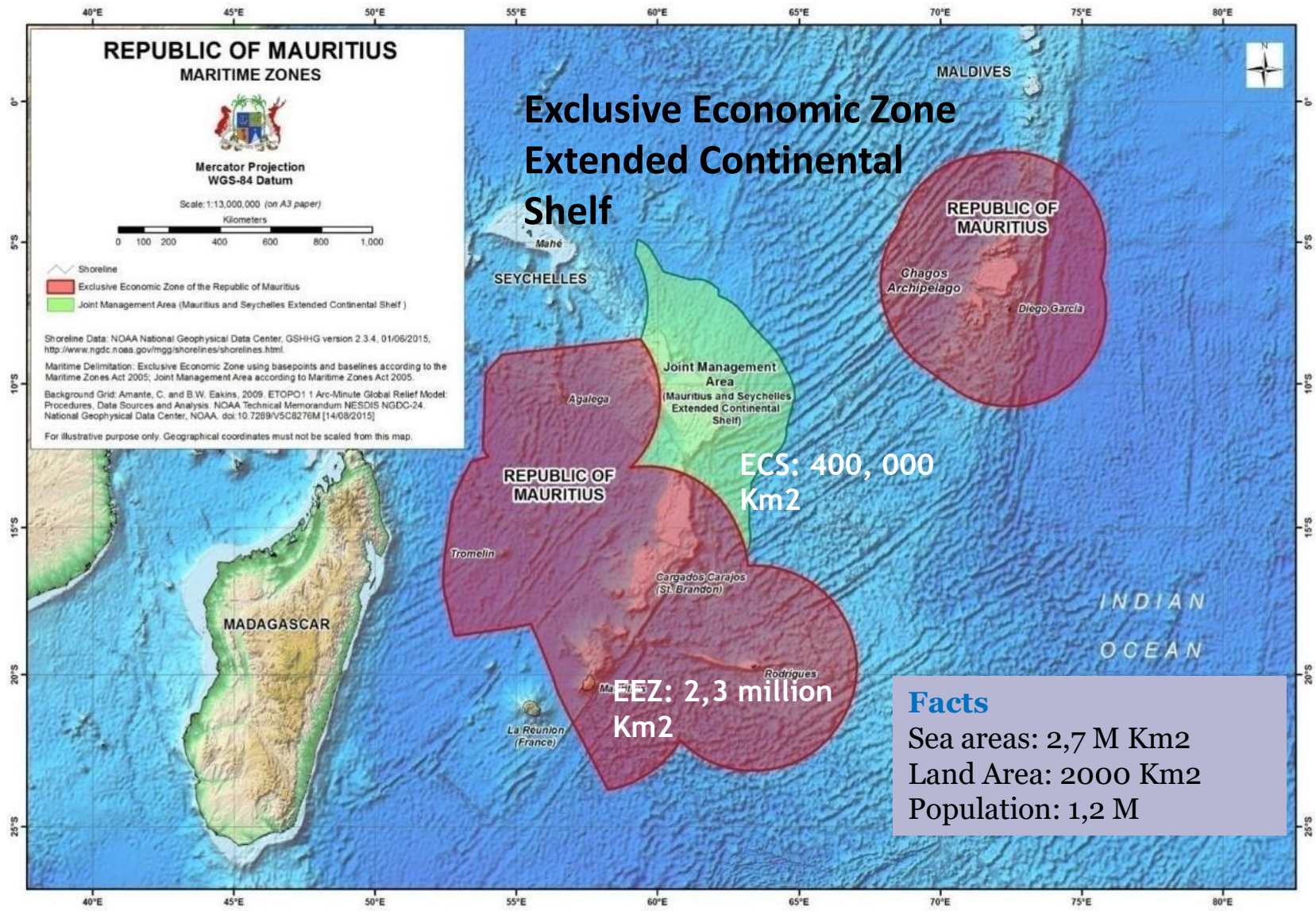
28 March 2019



# Marine Spatial Planning

- Introduction – Status of implementation in Mauritius
- Existing zoning & Regulated Zones
- MSP in Action: Review of Aquaculture Sites
- Ocean Observatory - Data Catalogue
- MSP & SDG14

# Republic of Mauritius



# Activities in the Maritime Space

| Activity                                                                                                    | Maritime zones                                                           |
|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Investment Projects (DOWA, Marina, Fish-farm, Biotech)</li> </ul>    | <ul style="list-style-type: none"> <li>Coastal Zone, EEZ, ECS</li> </ul> |
| <ul style="list-style-type: none"> <li>Surveying, Exploration and Charting</li> </ul>                       | <ul style="list-style-type: none"> <li>Coastal Zone, EEZ, ECS</li> </ul> |
| <ul style="list-style-type: none"> <li>Leisure/Tourism: Swimming zones, Diving, Water sports</li> </ul>     | <ul style="list-style-type: none"> <li>Coastal Zone</li> </ul>           |
| <ul style="list-style-type: none"> <li>Oceanographic surveys / Instrument Deployments / MetOcean</li> </ul> | <ul style="list-style-type: none"> <li>Coastal Zone, EEZ</li> </ul>      |
| <ul style="list-style-type: none"> <li>Impact Assessment</li> </ul>                                         | <ul style="list-style-type: none"> <li>Coastal Zone</li> </ul>           |
| <ul style="list-style-type: none"> <li>Port activities, shipping, maritime lanes</li> </ul>                 | <ul style="list-style-type: none"> <li>Coastal Zone, EEZ</li> </ul>      |
| <ul style="list-style-type: none"> <li>Fisheries</li> </ul>                                                 | <ul style="list-style-type: none"> <li>Coastal Zone, EEZ</li> </ul>      |
| <ul style="list-style-type: none"> <li>Conservation – MPA, PSSA, ESA</li> </ul>                             | <ul style="list-style-type: none"> <li>Coastal Zone, EEZ, ECS</li> </ul> |



# The Need for MSP

- Enlarge economic space
- Sustainable use of space
- Avoid conflicting use of space
- Prioritise key strategies to preserve/restore the marine ecosystem
- Reduced application time for permits/licence of new development/projects
- Increased coordination between government agencies, resulting in reduced time for decision-making

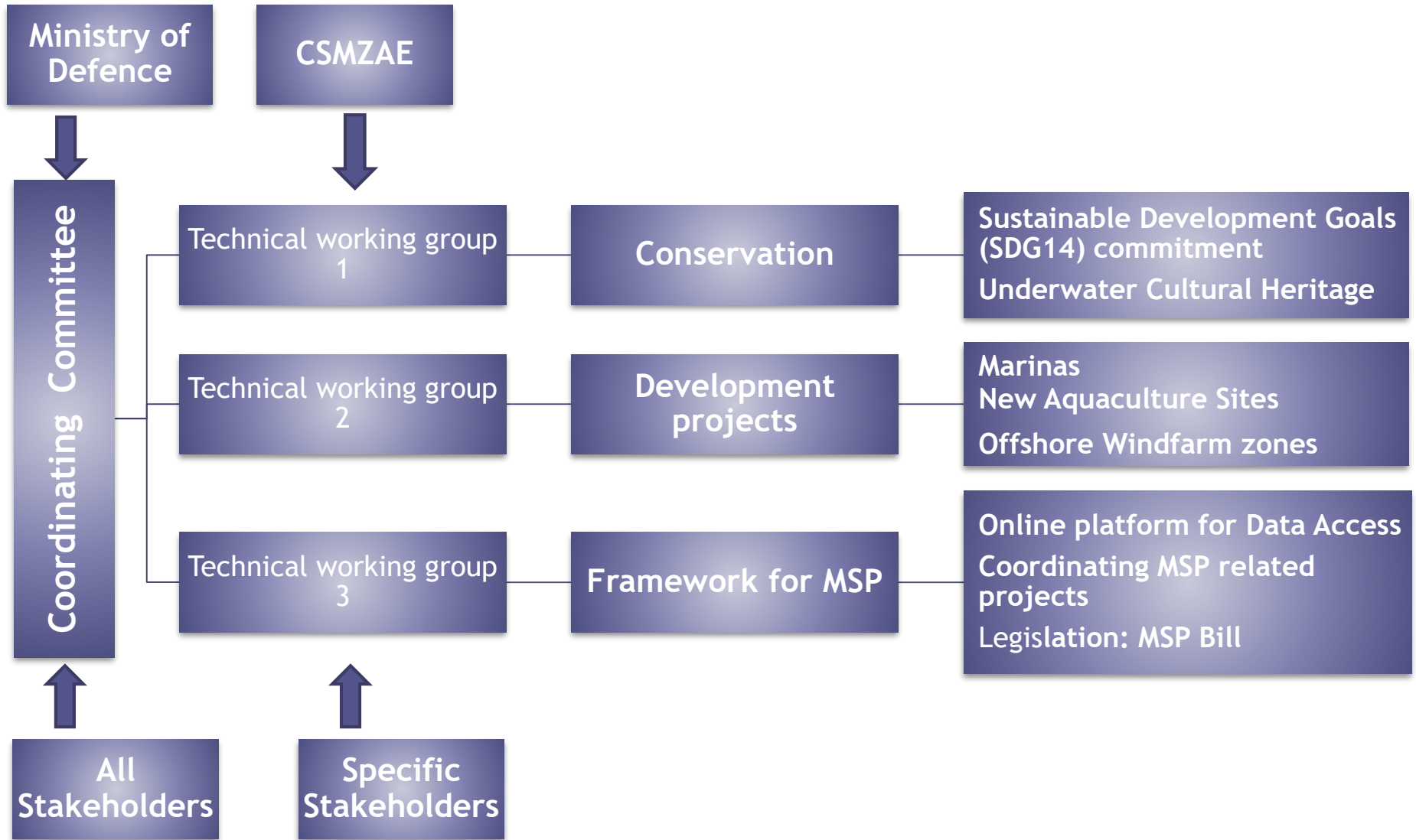
# Legislations in the Maritime Space

- **MARITIME ZONES ACT (2005)**
  - Maritime Zones (EEZ Outer Limit) (Amendment of Sch.) Regulations 2008
  - Maritime Zones (Economic Activities) (Amendment) Regulations 2017
  - Maritime Zones (Conduct Of Marine Scientific Research) Regulations 2017
  - Maritime Zones (EEZ Outer Limit Lines) Regulations
  - Maritime Zones (Baselines And Delineating Lines) Regulations 2005
  - Maritime Zones (Coordinates of Outer Limits of Extended Continental Shelf in the Mascarene Plateau Region) Regulations 2012
  - Land-Based Oceanic Industry (Prescribed Area) Regulations 2015
  - Maritime Zones (Economic Activities) Regulations 2014
- **The Fisheries and Marine Resources Act 2007**
  - Maritime Zones (Fishing Licences) Regulations No 23 of 1978
  - Fisheries and Marine Resources (Marine Protected Areas) Regulations 2001
- **Environment Protection Act 2002 (Amended 2008)**
  - EIA, ICZM

# MSP in Mauritius: Establishment of Authority

- Government cabinet decision for CSMZAE to elaborate and host the MSP for the Republic of Mauritius (December 2016)
- Governance Structure: A Coordinating Committee was set up and Chaired at Ministry of Defence and Rodrigues
- Establishment of working groups - focused on current issues

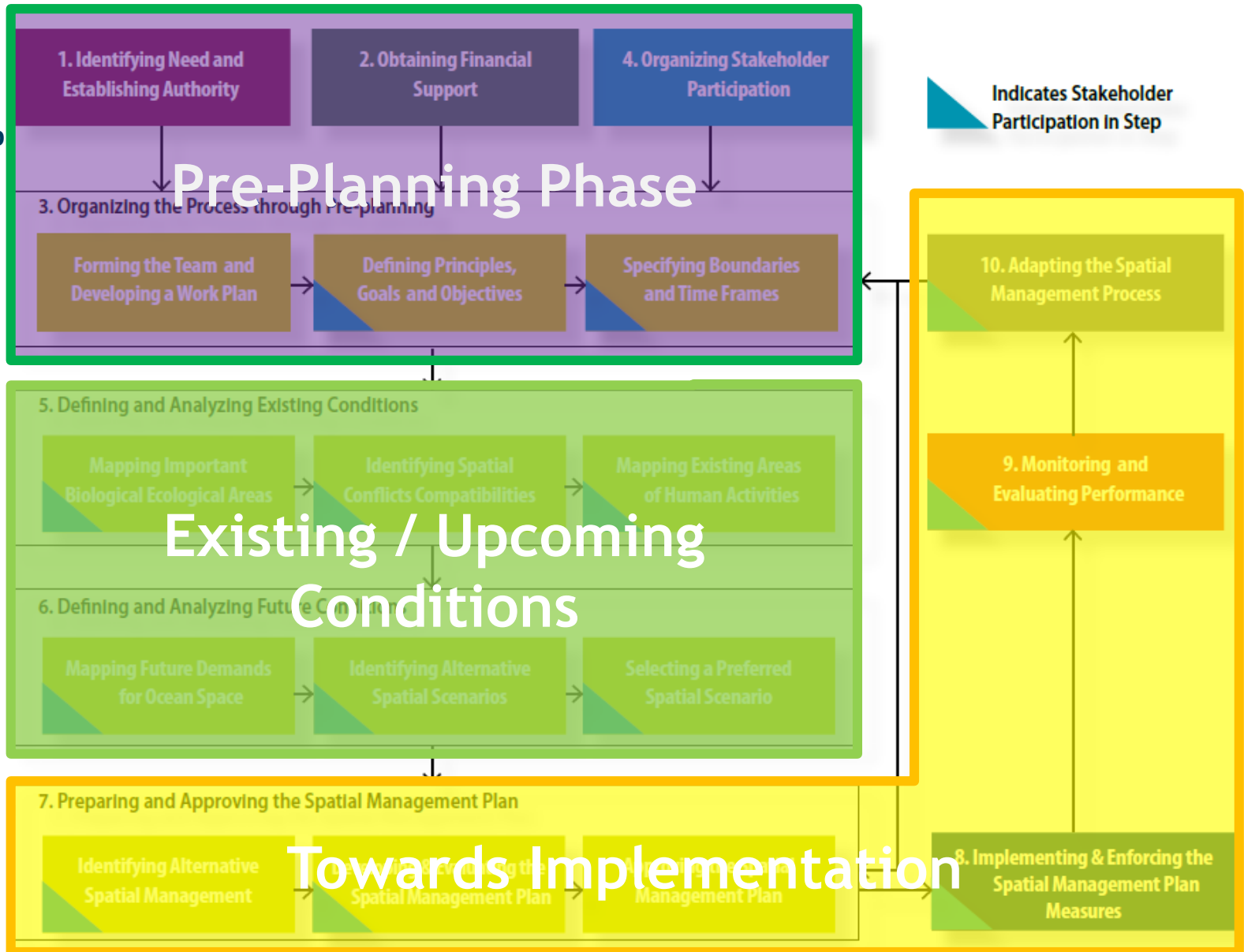
# Structure of MSP in Mauritius





# Overview of the MSP process

A Step-by-Step Approach



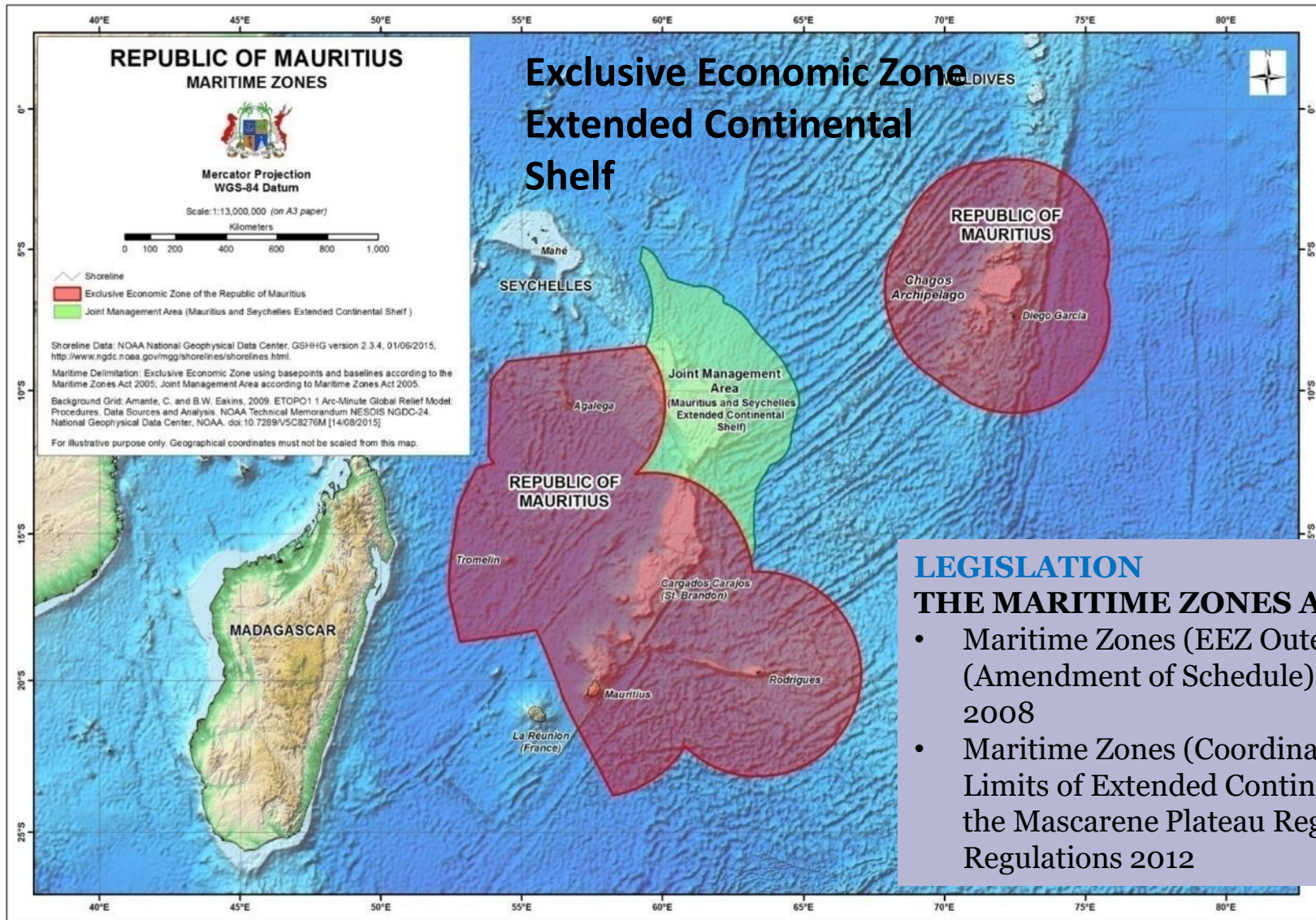
(IOC / UNESCO)

# Marine Spatial Planning

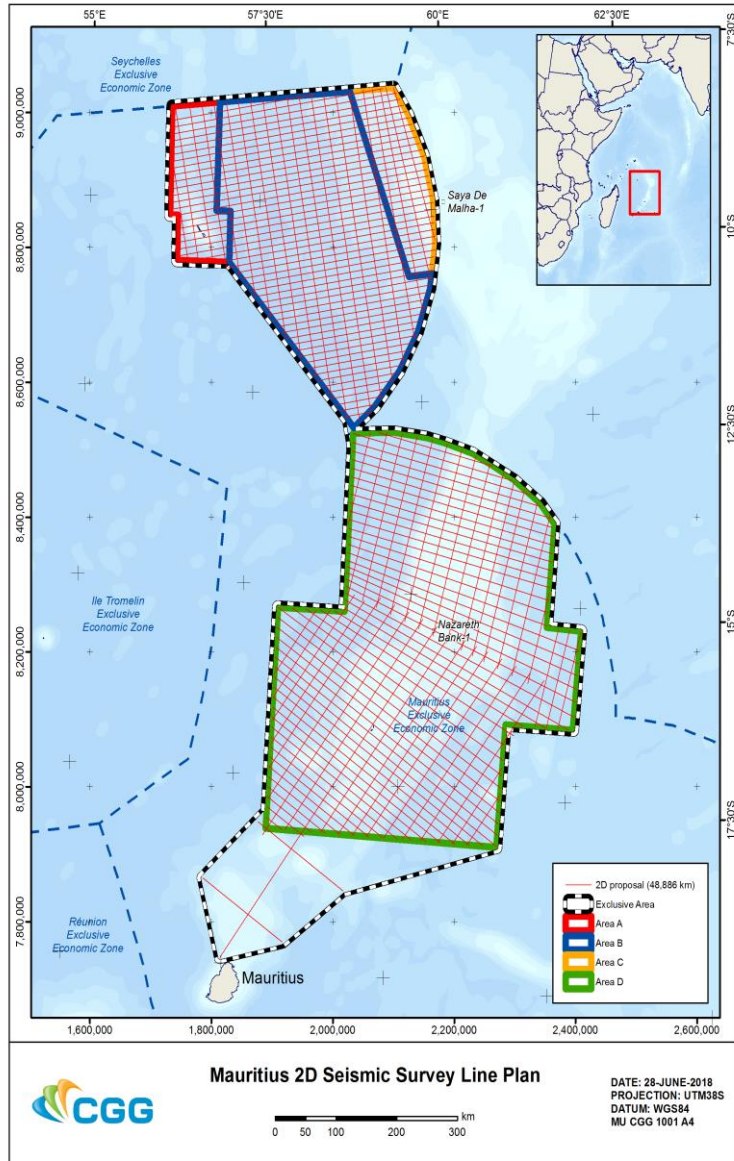
- Introduction - Status of implementation in Mauritius
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# Example: Regulatory Boundaries

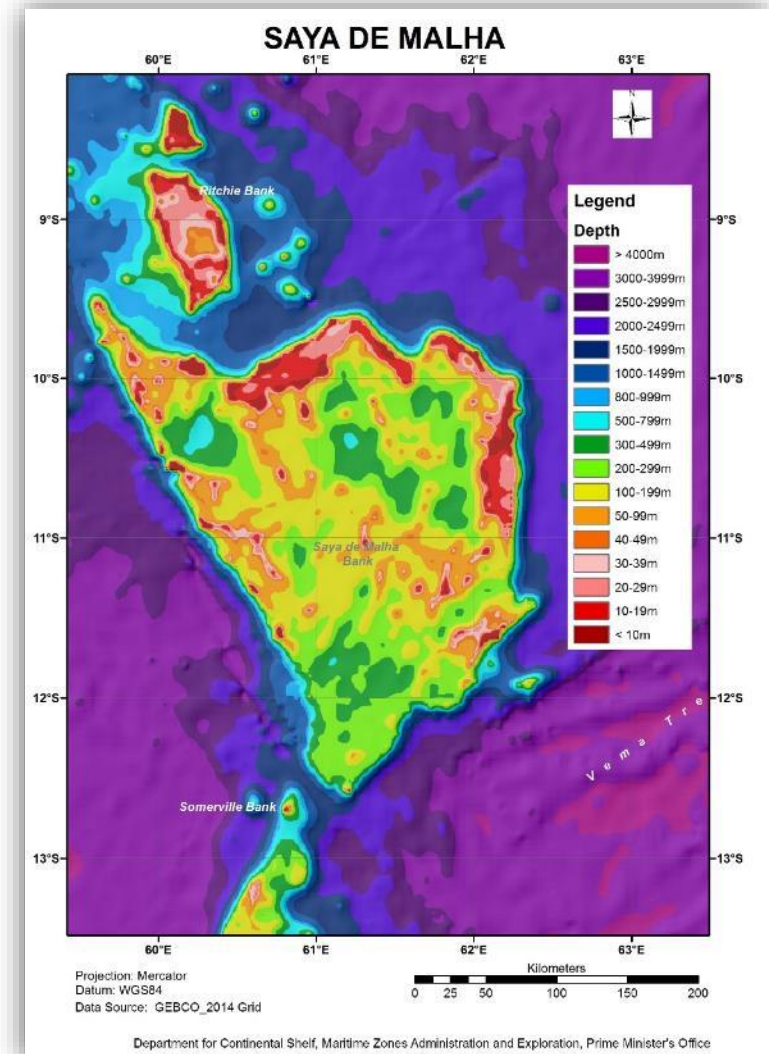


# Example: Zoning for Seabed Exploration Areas – Multi-Client Survey

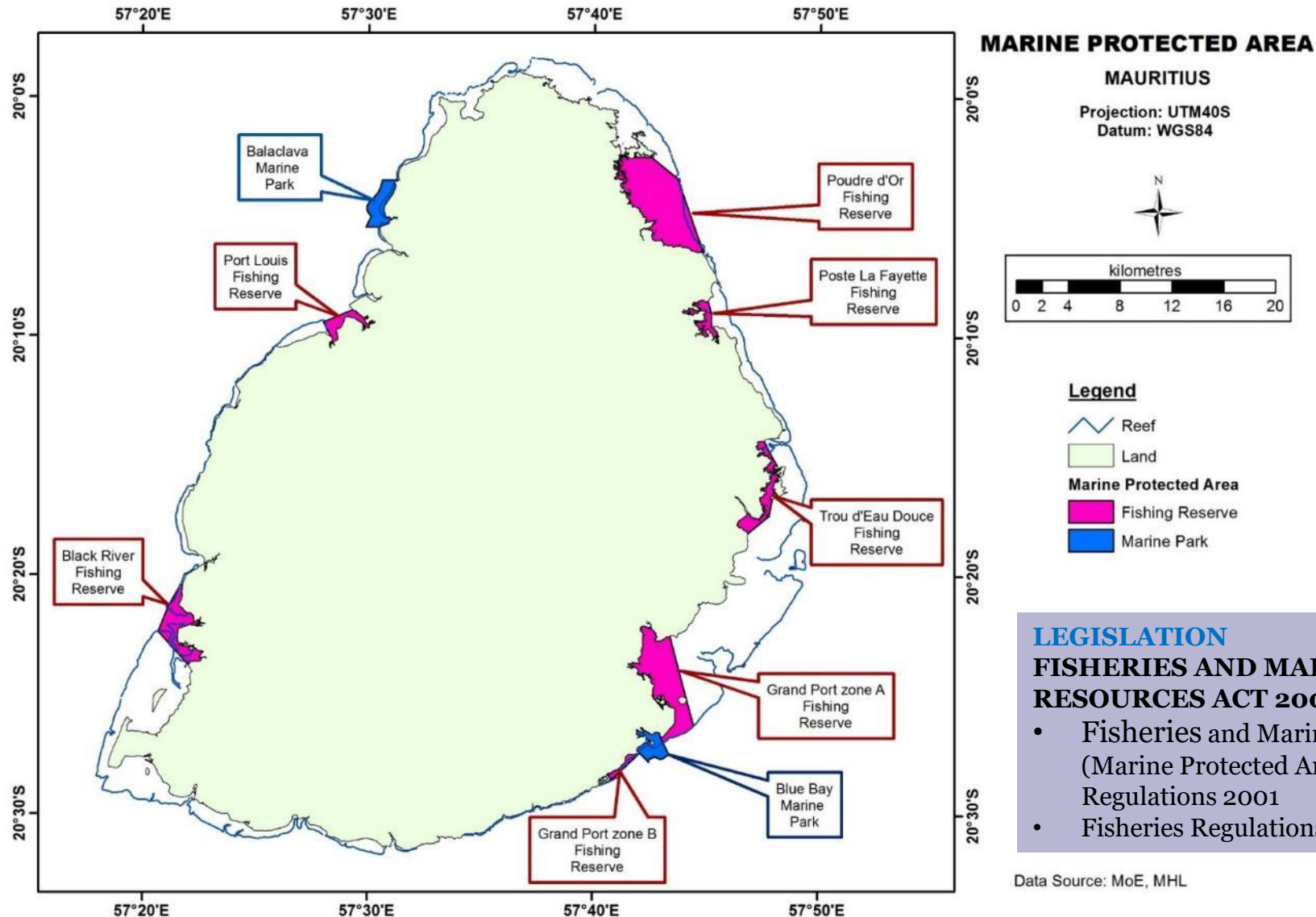


# Joint Management Area Demonstration Project

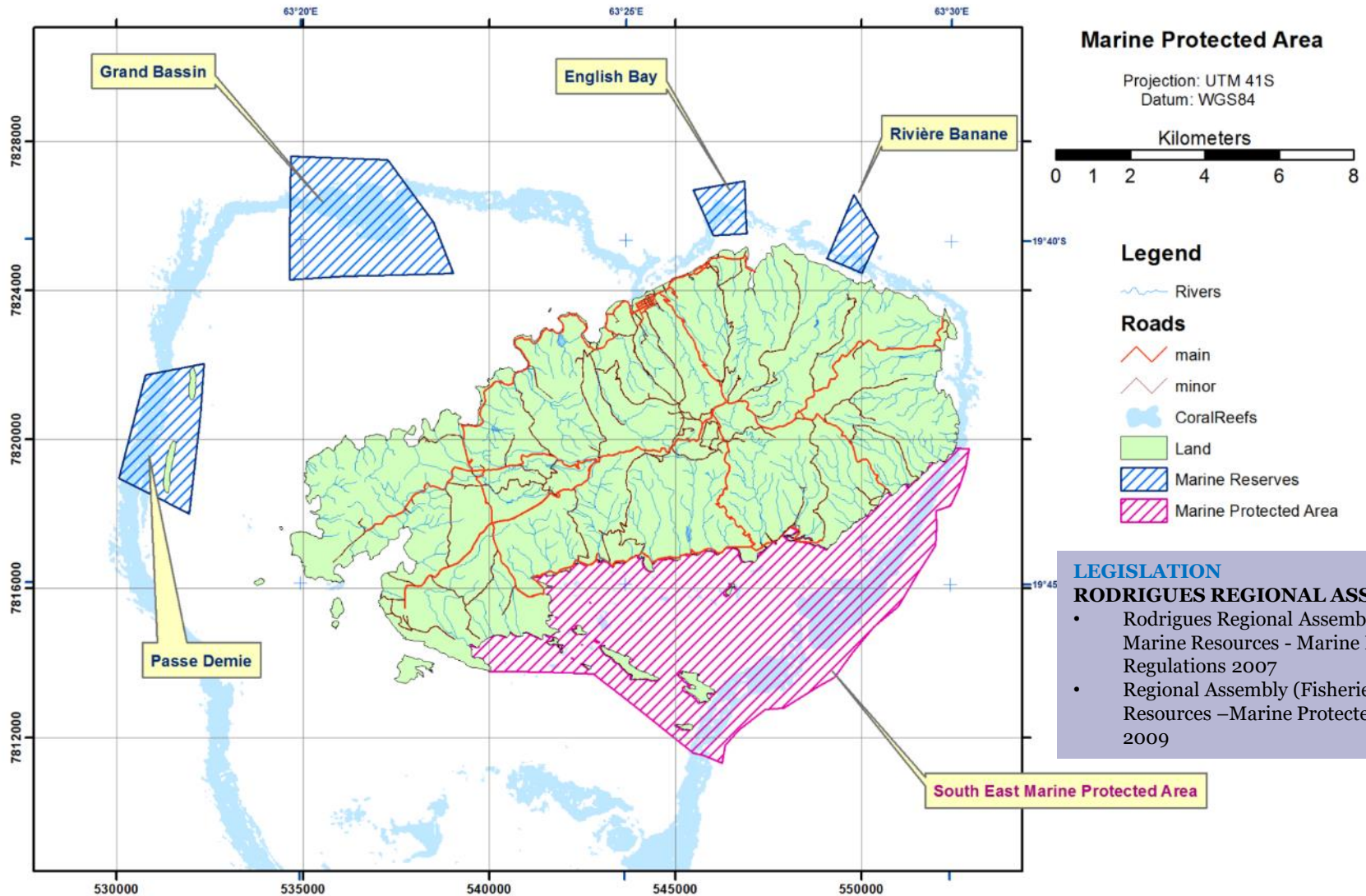
**11 January 2018** – Agreement signed between Mauritius-Seychelles Joint Commission on the Extended Continental Shelf and UNDP for the implementation of a **joint database system that will facilitate the management of the joint area**



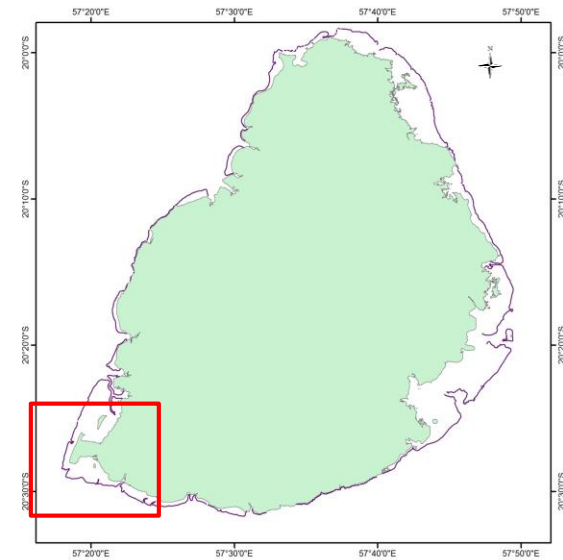
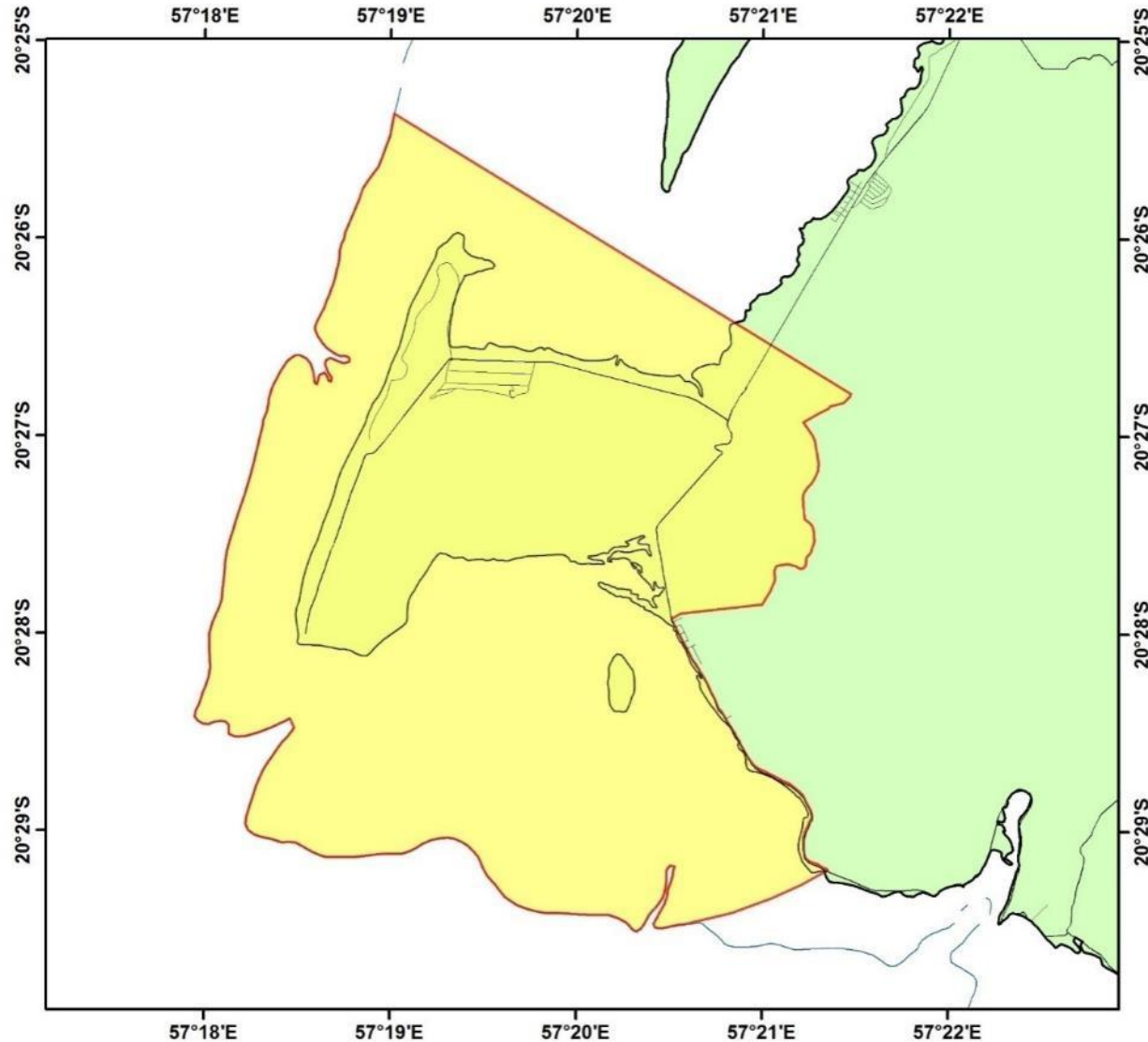
# Example: MPA and fishing reserves



# Example: Conservation areas in Rodrigues



# Example: UNESCO Heritage Site - Le Morne



**LEGISLATION**  
**LE MORNE HERITAGE TRUST FUND**  
**ACT 2004**

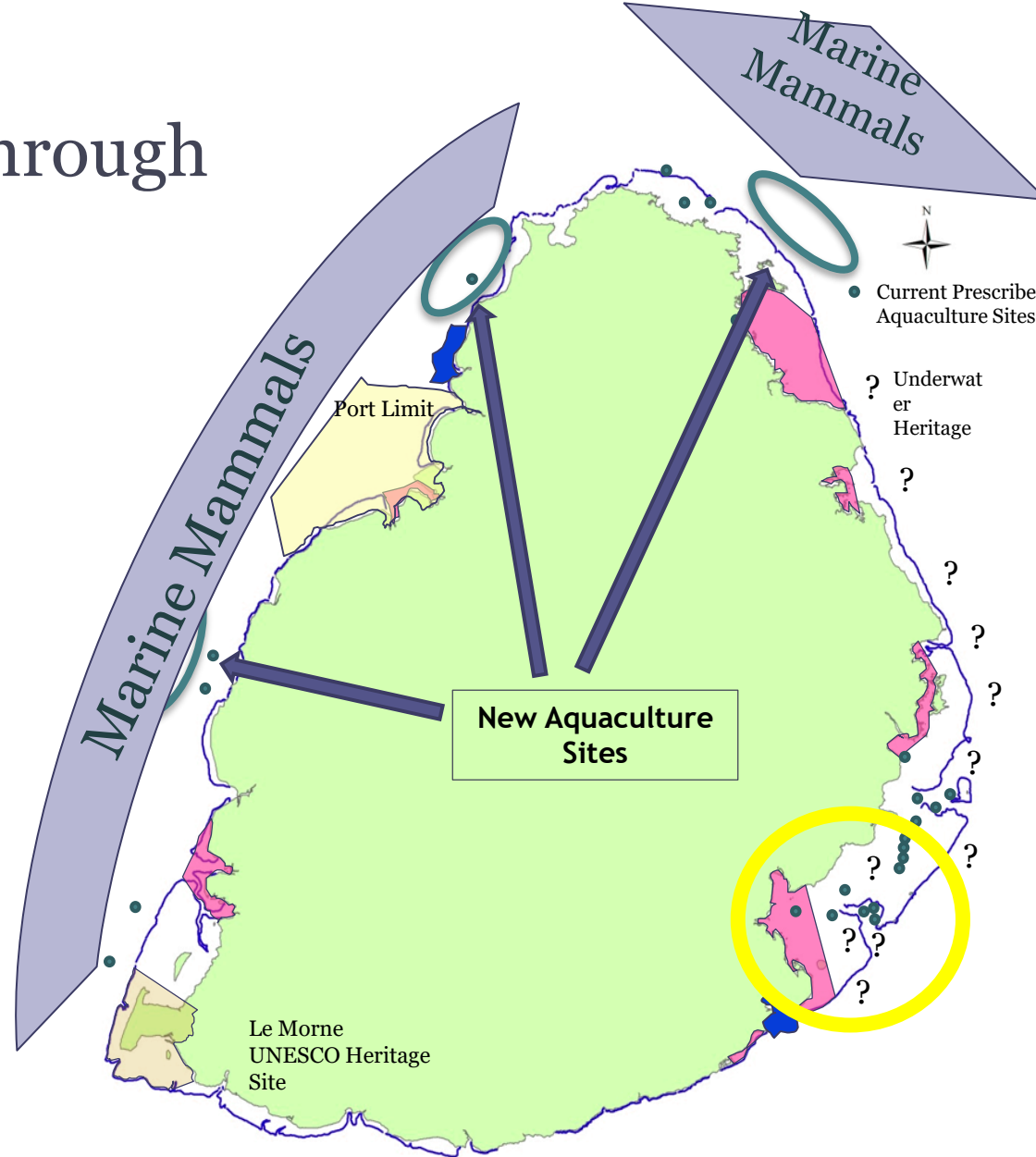




# MSP in Action: Concerted Approach through Working Groups

## Review of Existing aquaculture sites

- Passes
- Fishing reserves
- Conflicting with tourism activities



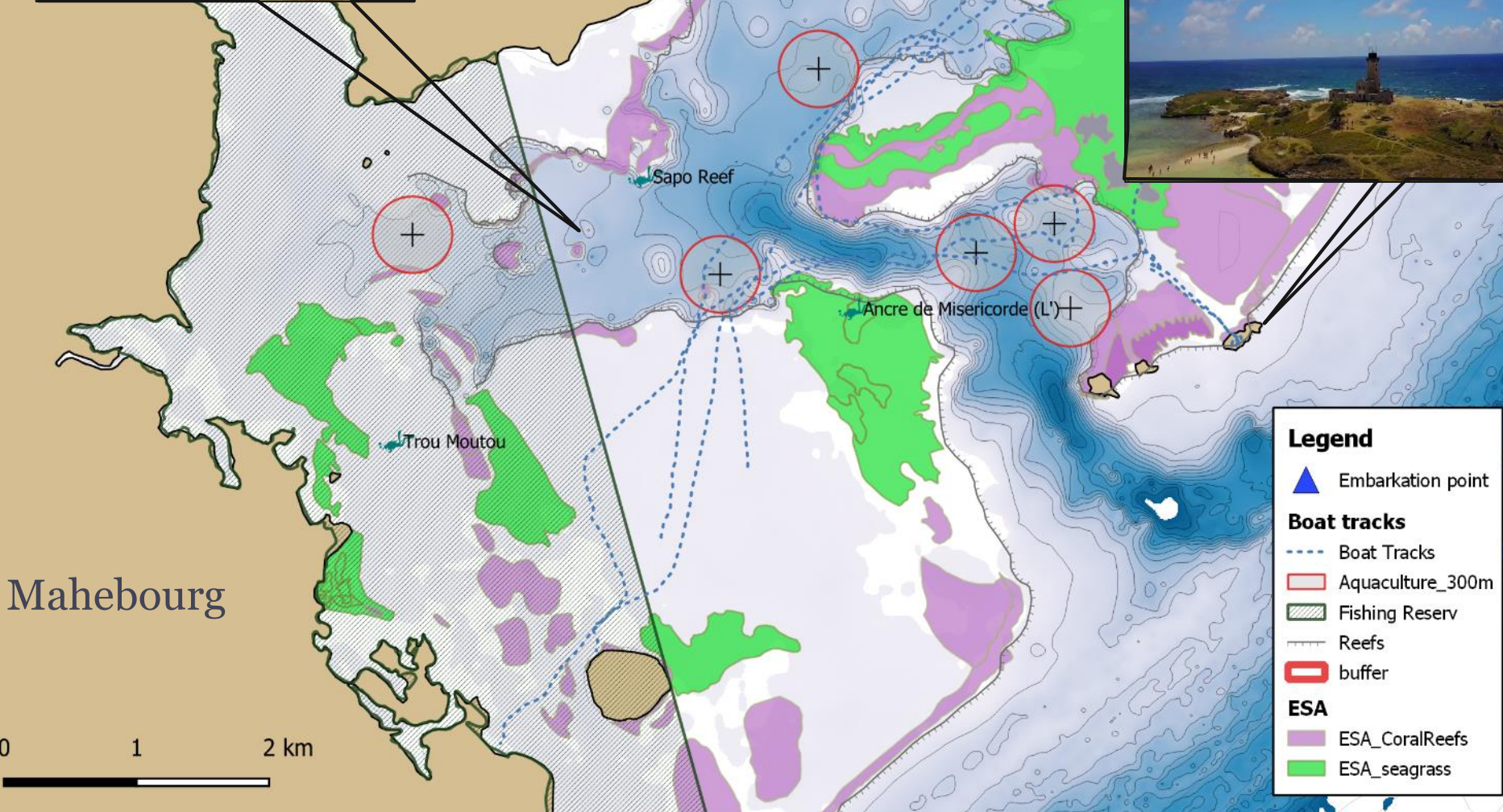
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# MSP in Action: Aquaculture Sites

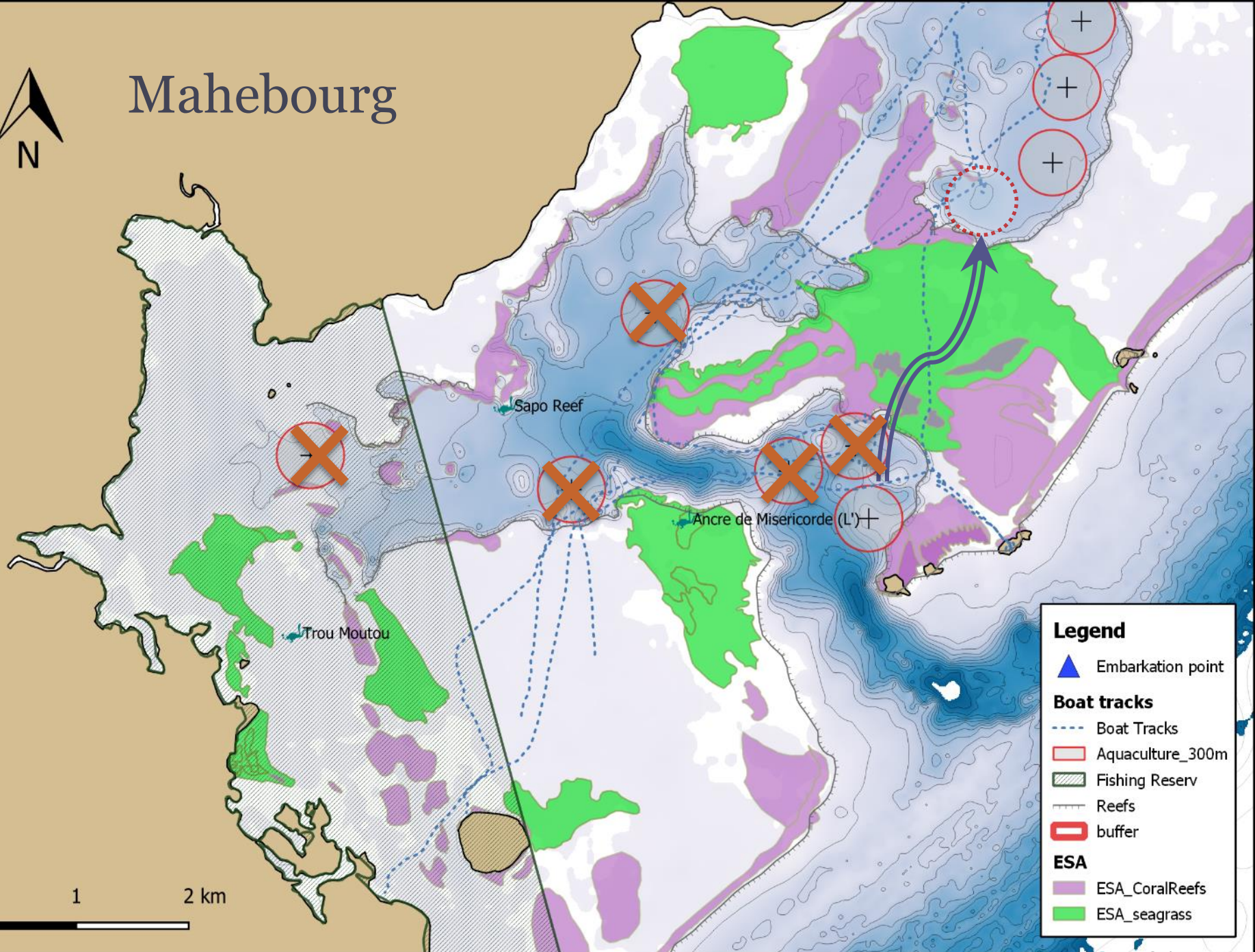


**Legend**

- ▲ Embarkation point
- Boat Tracks
- Aquaculture\_300m
- ▨ Fishing Reserv
- ⋯ Reefs
- buffer
- ESA**
- ESA\_CoralReefs
- ESA\_seagrass



# Mahebourg



**Legend**

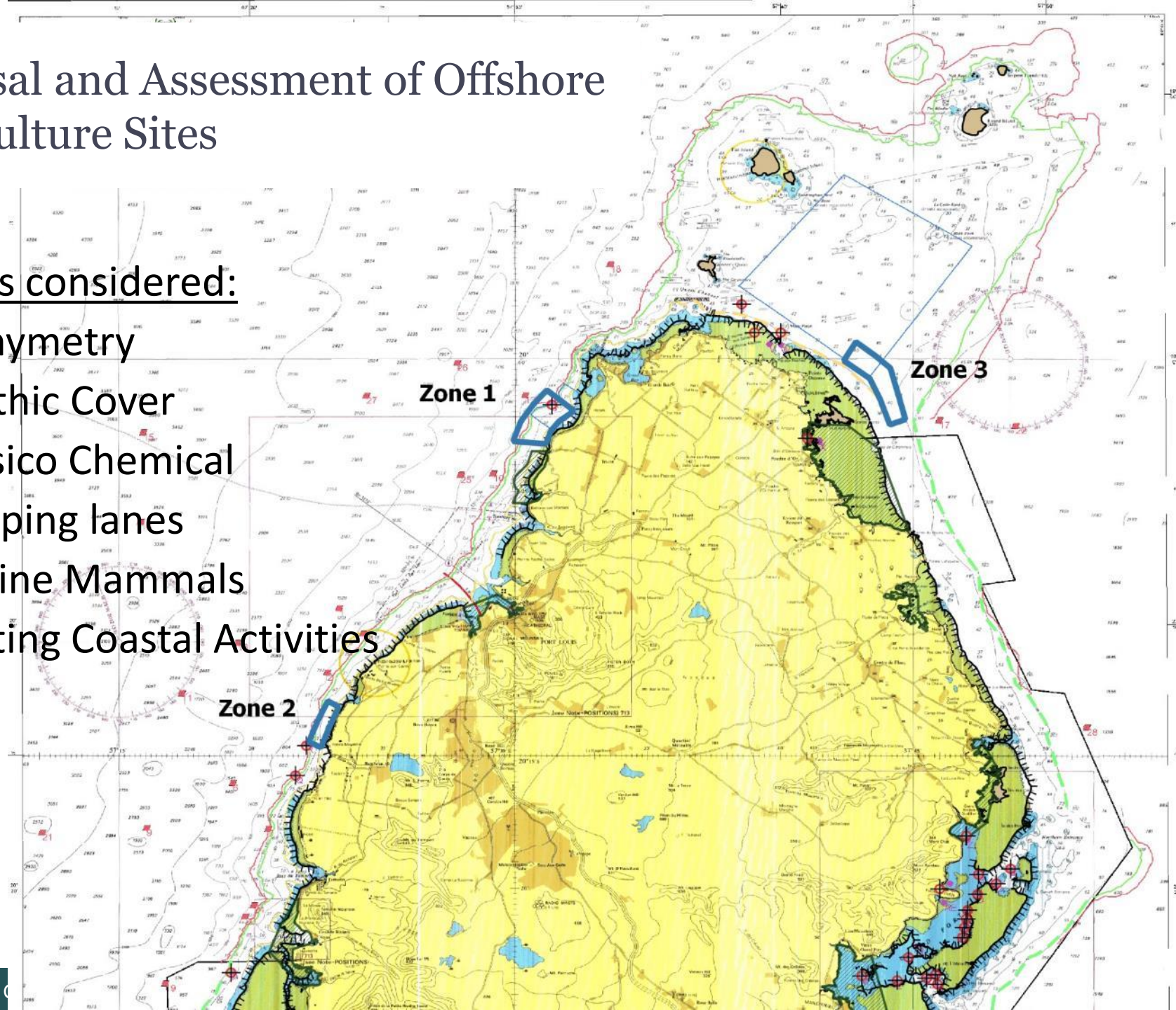
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- buffer
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- ESA\_CoralReefs
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# Proposal and Assessment of Offshore Aquaculture Sites

## Factors considered:

- Bathymetry
- Benthic Cover
- Physico Chemical
- Shipping lanes
- Marine Mammals
- Existing Coastal Activities



# Preliminary Survey

Nov 2018 – Feb 2019



# Preliminary Survey

Nov 2018 – Feb 2019



# Summary of Observations

| Zone  | Site                                       | Depth     | % Hard Coral | % Soft Coral | Amount Fish Species | Biodiversity | Morphology                         | <u>Aquaculture Developpement</u>    |
|-------|--------------------------------------------|-----------|--------------|--------------|---------------------|--------------|------------------------------------|-------------------------------------|
| Zone1 | Site1-TAB<br>(West Rose Garden)            | 47 to 55m | 30%          | 10%          | 4                   | Moderate     | Coral, sand and rubble             | <b>NO</b>                           |
| Zone1 | Site2-TAB<br>(Rose Garden)                 | 38 to 45m | 80% to 95%   | 0%           | 12                  | Low          | Coral and narrow sand canyons      | <b>NO</b>                           |
| Zone1 | Site3<br>(Pointe aux <u>Biches</u> )       | 30 to 40m | 2.5%         | 0.5%         | 15                  | Low          | Sand and big rocks                 | <b>YES</b>                          |
| Zone2 | Site4-Bambous<br>(In Front MOI)            | 31 to 34m | 2%           | 0.1%         | 20                  | Moderate     | Flat rock, sand and large boulders | <b>YES</b>                          |
| Zone2 | Site5-Bambous<br>(Pointe <u>Moyenne</u> )  | 31 to 32m | 1%           | 0.1%         | 27                  | Moderate     | Sand and big rocks                 | <b>YES</b>                          |
| Zone3 | Site6-Oscome<br>(Poudre d'Or)              | 30 to 35m | 20% to 25%   | 5% to 10%    | 33                  | Moderate     | Coral and sand                     | <b>YES<br/>(If deeper than 35m)</b> |
| Zone3 | Site7-Oscome<br>(In Front <u>Bemache</u> ) | 33 to 36m | 5% to 10%    | 5% to 10%    | 15                  | Low          | Coral and sand                     | <b>YES</b>                          |
| Zone3 | Site8-Oscome<br>(In Front <u>Oscome</u> )  | 30 to 35m | 3%           | 2% to 3%     | 25                  | Low          | Coral and sand                     | <b>YES</b>                          |





# Marine Spatial Planning

- Introduction - Status of implementation in Mauritius
- Existing zoning & Regulated Zones
- Ocean Observatory – Online Data Catalogue
- MSP & SDG14

# Ocean Observatory – Online Platform

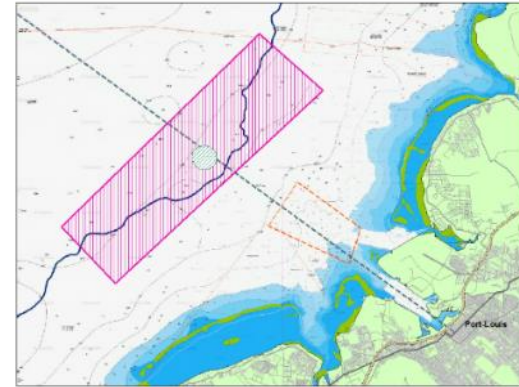
Global Ocean Observing System



E-Observations



E-System &  
E-Catalogue



E-Planning

# Setting up of an online platform: GeoNode Webpage

**Ocean Observatory** Data ▾ Maps About ▾  [Sign in](#)

## Republic of Mauritius Ocean Observatory

A platform for GIS data to support Marine Spatial Planning initiative for the Republic of Mauritius, including ocean exploration and sustainable development.

[Get Started »](#)

- MARITIME BOUNDARIES
- OCEAN USES
- PHYSICAL OCEANOGRAPHY
- MARINE BIOCHEMICAL
- MARINE GEOLOGY AND GEOPHYSICAL
- SATELLITE OCEANOGRAPHY
- MARINE RESOURCES

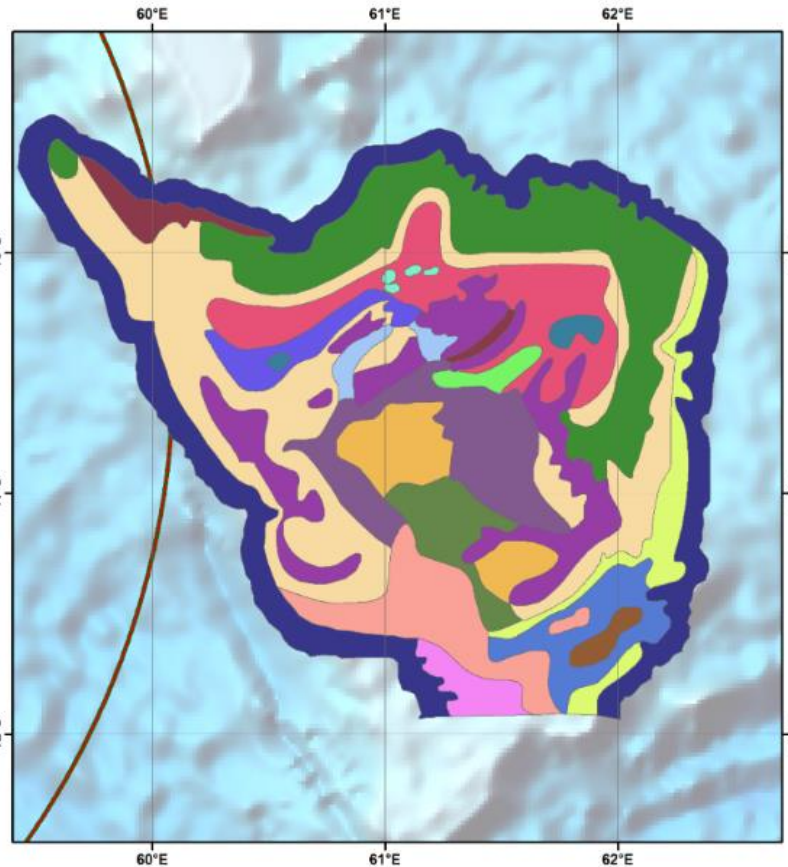
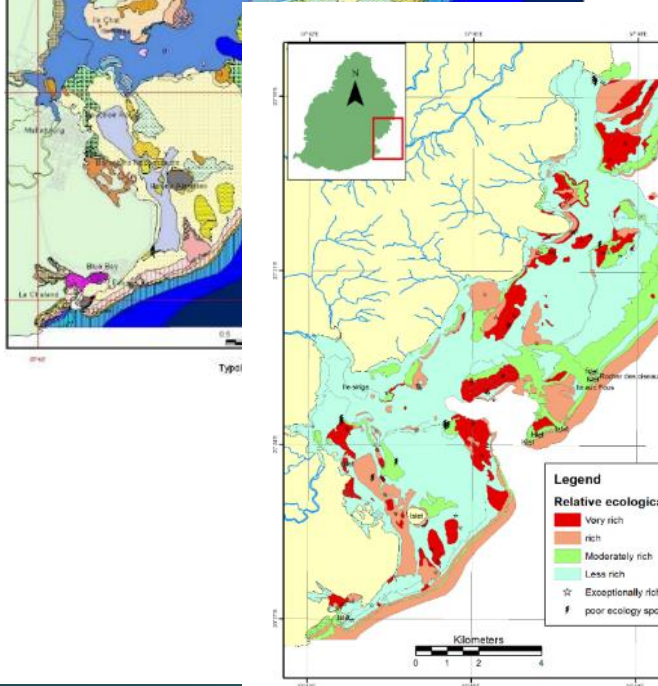
[Explore Layers](#) [Explore Maps](#) [Create Map](#) [Upload Data](#)

[Developers](#) | [About](#) | Powered by GeoNode *version 2.8rc11*



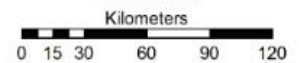
# Data Catalogue – Ecosystem/Habitat

- Ecological Richness
- Environmentally Sensitive Areas (ESA - UNDP)
- Key Biodiversity Areas (SDG14)



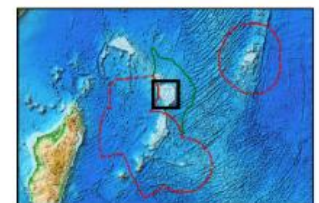
Landscape of Saya de Malha Bank

Mercator Projection  
WGS84 Datum



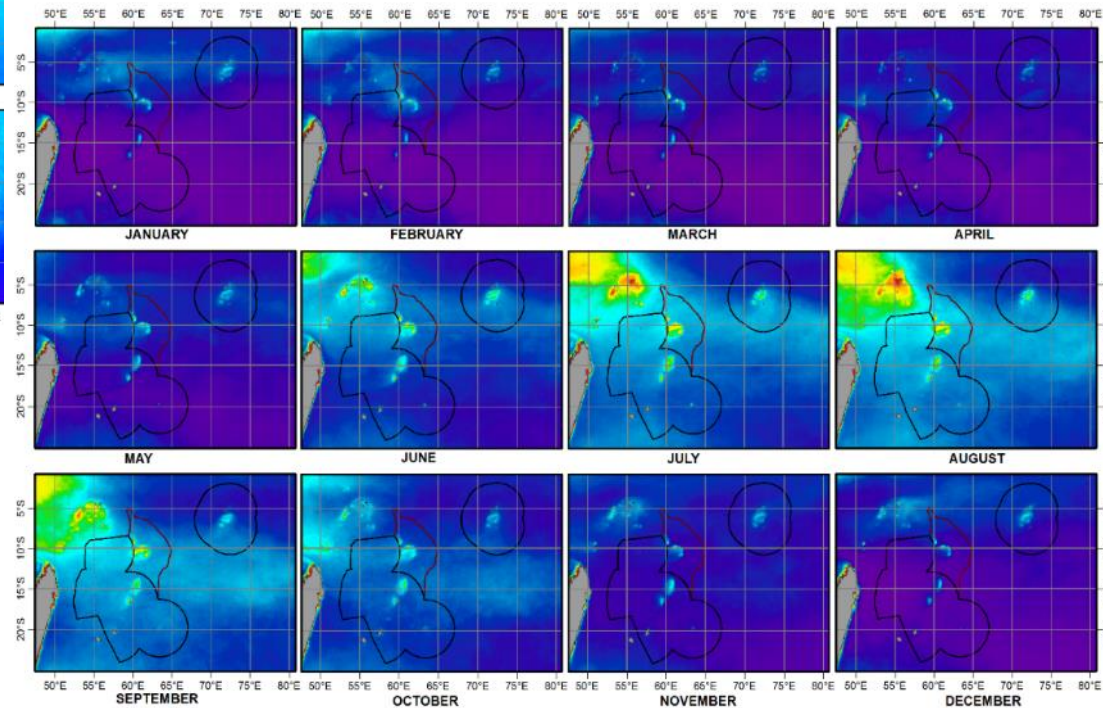
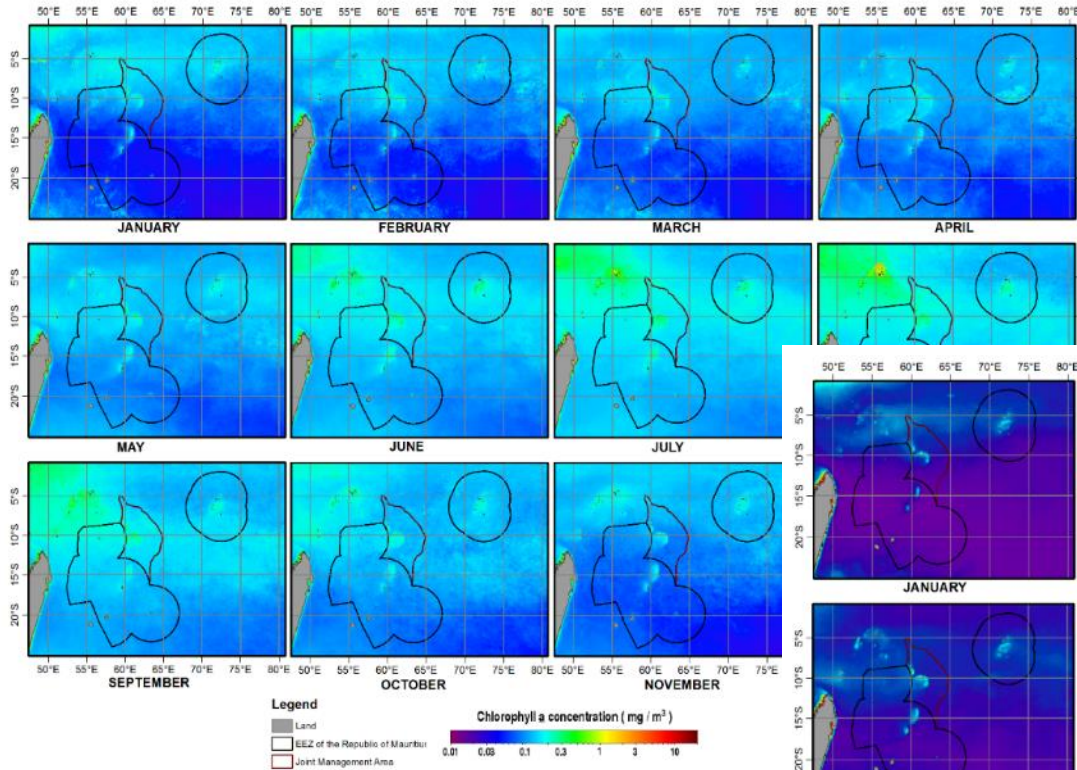
**Legend**

- Landscape of submerged circular reef**
    - Upper terrace. Bottom consists of frust. mass - gravel - pebbles.
    - Low terrace. Bottom consists of sand - gravel foraminifera - algae ground.
    - Slopes and foot of reef. Bottom consists of foraminifera - algae sand.
    - Shelves of reef. Bottom consists of silt - sand.
    - Shallow gulches. Bottom consists of silt - sand.
  - Landscape of shallow corral lagoon**
    - Bottom accumulative flat. Bottom consists of fine-dispersed silt.
    - Bottom accumulative flat. Bottom consists of silt.
    - Bottom accumulative flat. Bottom consists of sand - silt.
    - Bottom accumulative flat. Bottom consists of sand - silt and fine-dispersed silt.
    - Intralagoon coral mounds and ridges. Bottom consists of coral - algae gravel and pebbles.
  - Landscape of deep corral lagoon**
    - Bottom-dwelling accumulative flat. Bottom consists of silt - sand.
    - Bottom-dwelling algal flat. Bottom consists of foraminifera sand.
    - Bottom-dwelling algal flat. Bottom consists of mollusk algae sand.
  - Landscape of the reef top**
    - Limestone flat. Bottom consists of thin layer foraminifera sand.
    - Limestone flat. Bottom consists of gross calcareous - algae sand.
    - Limestone flat. Bottom consists of rock with thin layer algae - foraminifera sand.
    - Limestone flat. Bottom consists of foraminifera sand.
    - Foraminifera sand.
    - Intralagoon reef. Bottom consists of coral limestone limestone with gravel - pebbles algae ground.
  - Landscape of slopes.**
    - Slopes with steep slope. Bottom consists of sand.
- OZ of the Republic of Mauritius  
 Joint Management Area



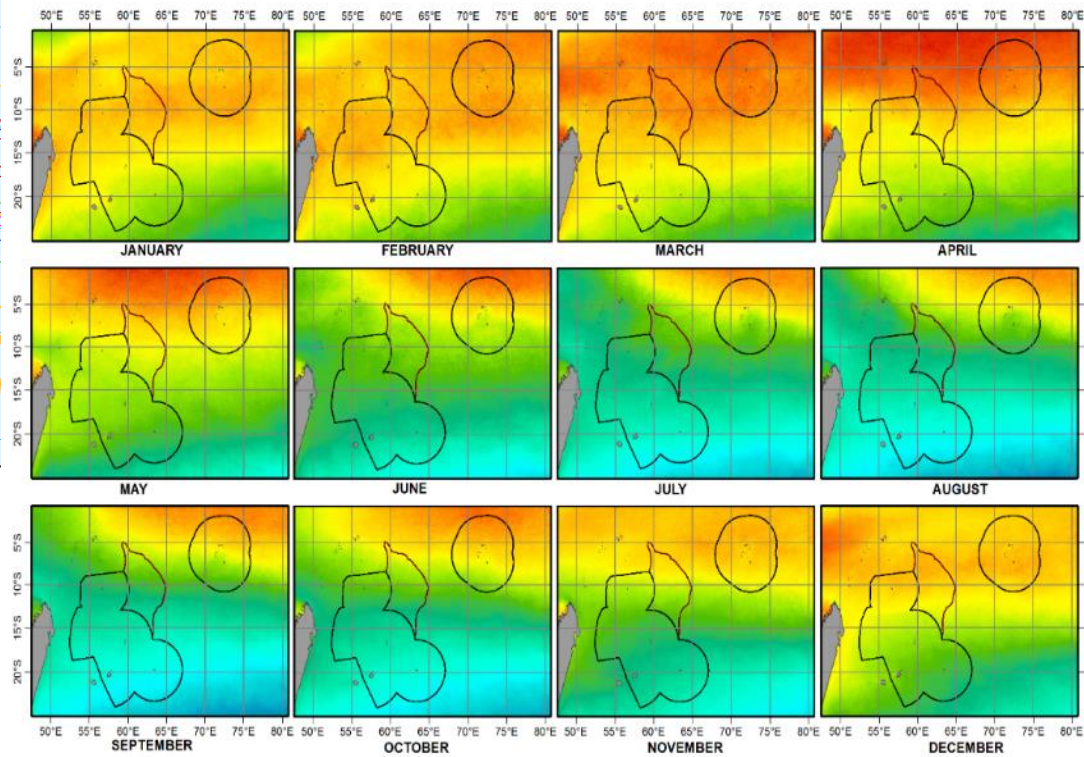
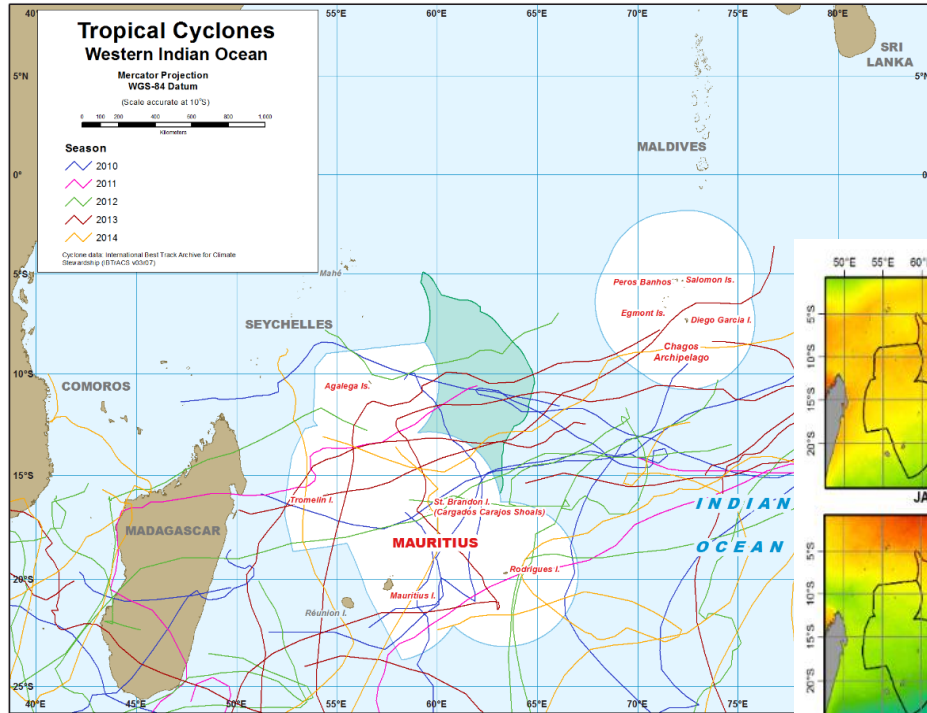
# Data Catalogue – Biological Oceanography

- Primary Production (Monthly, Annual)



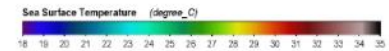
- Chlorophyll Concentration (Monthly, Annual)

# Data Catalogue – Physical Oceanography



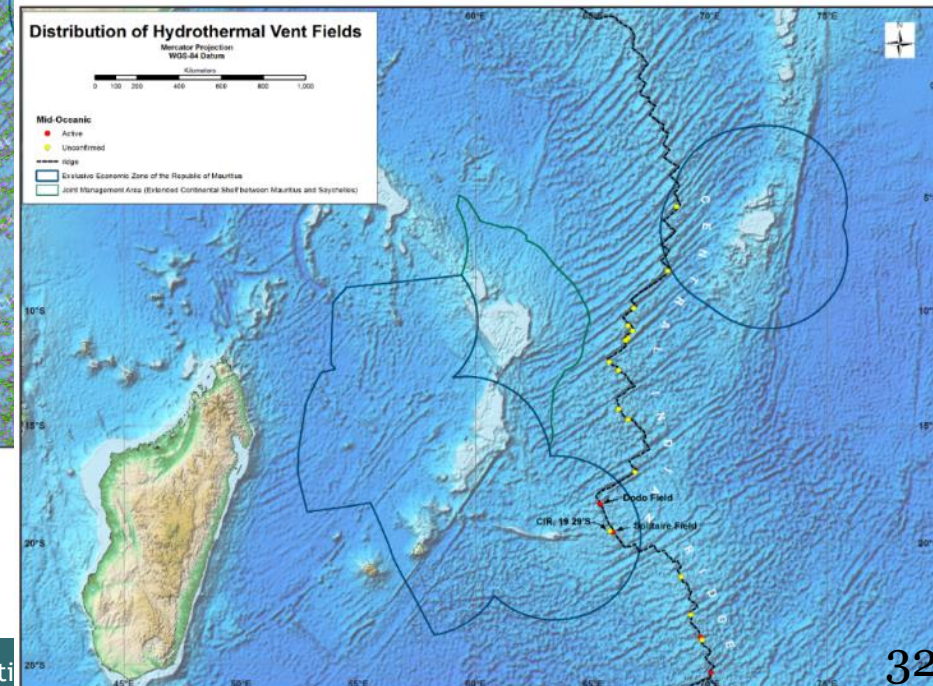
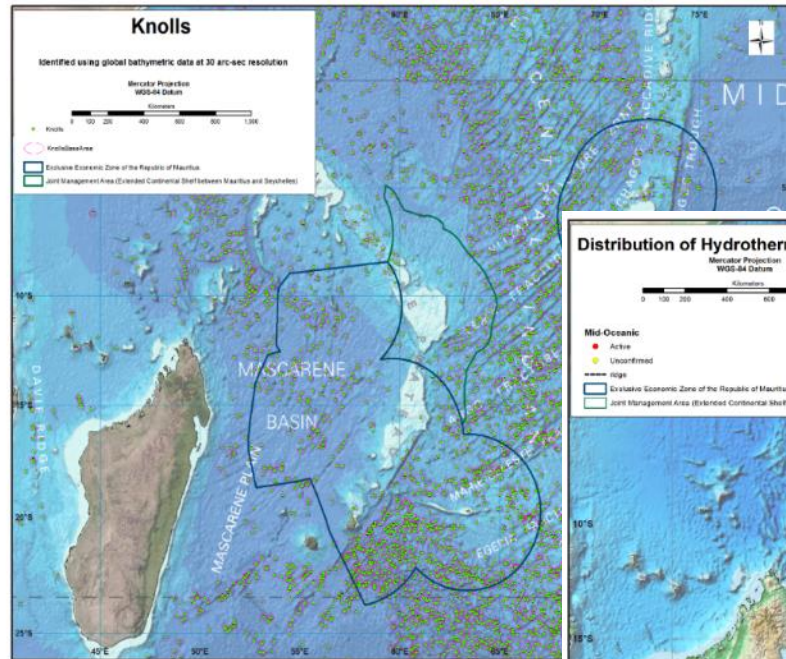
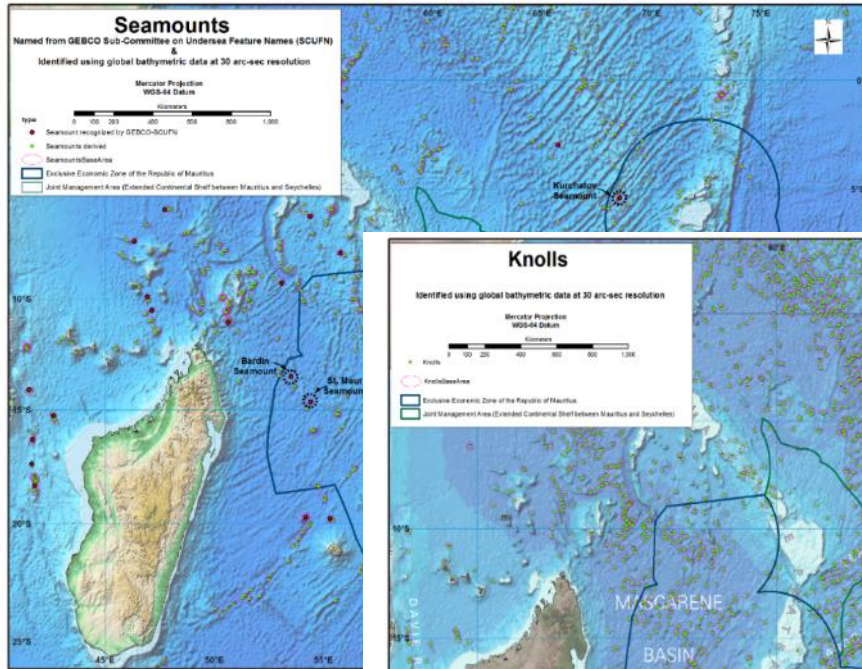
## Legend

- Land
- EEZ of the Republic of Mauritius
- Joint Management Area



1. SST (Monthly, Annual)
2. Current (Monthly, Annual)
3. Salinity
4. Cyclone tracks

# Data Catalogue – Geophysical Data



1. Bathymetry
2. Seismic
3. Gravity

1. Seamounts
2. Knolls
3. Hydrothermal Vents

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# Working Group on SDG 14

- SDG 14.5 – “to conserve by 2020 at least 10 % of **coastal and marine areas**, consistent with national and international law and based on the **best available scientific information**”..
- In order to choose and achieve the 10% conservation goal, **Key Biodiversity Areas** (KBAs) are to be identified
- How can KBAs be identified?
  - Coastal areas : Depth criteria - Shallow areas: 200m or 50m?
    - => Too vast and Nansen Cruise has shown less richness than expected on Saya de Malha
  - KBA **World Database on Key Biodiversity Areas and Birdlife International** => coverage incomplete and not up-to-date
  - Compile KBA at national level from existing data (literature, surveys, cruise)



# Compiling KBA at national level from existing data

## Sources:

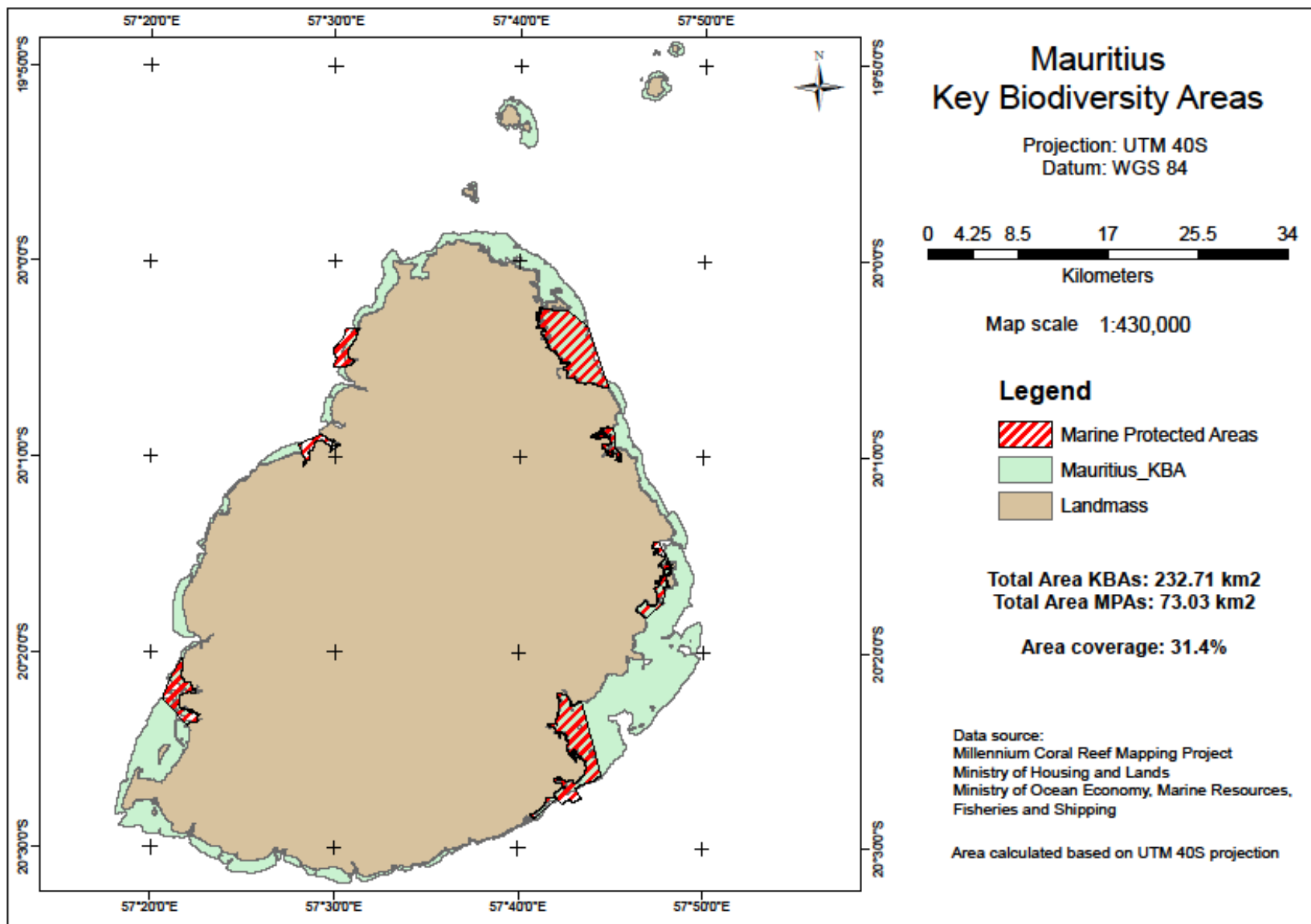
- Environmentally Sensitive Areas (ESAs) - 2009 – Used as baseline
  - UNDP working on an updated ESAs dataset (ESA 2020)
- Mauritius Environment Outlook Report (2011)
- Coral Reef Atlas (Andrefouet et al 2009)
- Digest/AFRC (2016) - Marine Protected Areas (MPAs)
- MSDA “survey” on Marine Mammals (Coastal)
- EAF-Nansen May-June 2018 –Saya de Malha and Nazareth Banks
  - Identification of hotspots and ground truthing for remote sensing methods

## Needed:

- Forereef (detailed), Updated bird areas (IBA’s), High Seas (Fisheries, Marine Mammals), Seamounts



# Mauritius



# Mauritius




## Rodrigues Key Biodiversity Areas

Datum: WGS84  
Projection: UTM 41S

0 1.252.5 5 7.5 10  
Kilometers

Map scale 1:170,000

### Legend

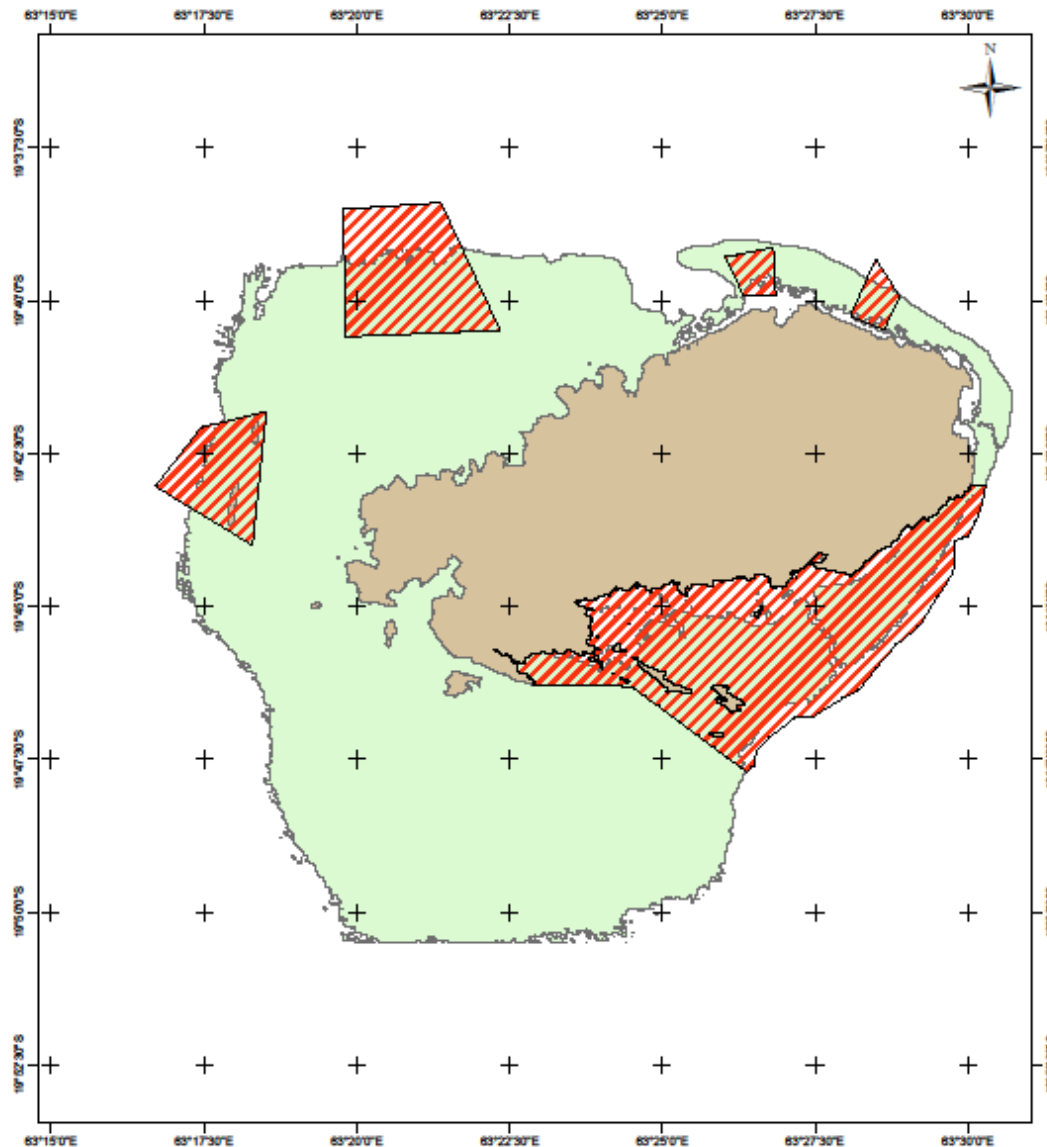
-  Marine Protected Areas
-  Potential KBAs
-  Landmass

Potential KBAs total area: 190.7 km<sup>2</sup>  
MPAs total area: 66.3 km<sup>2</sup>

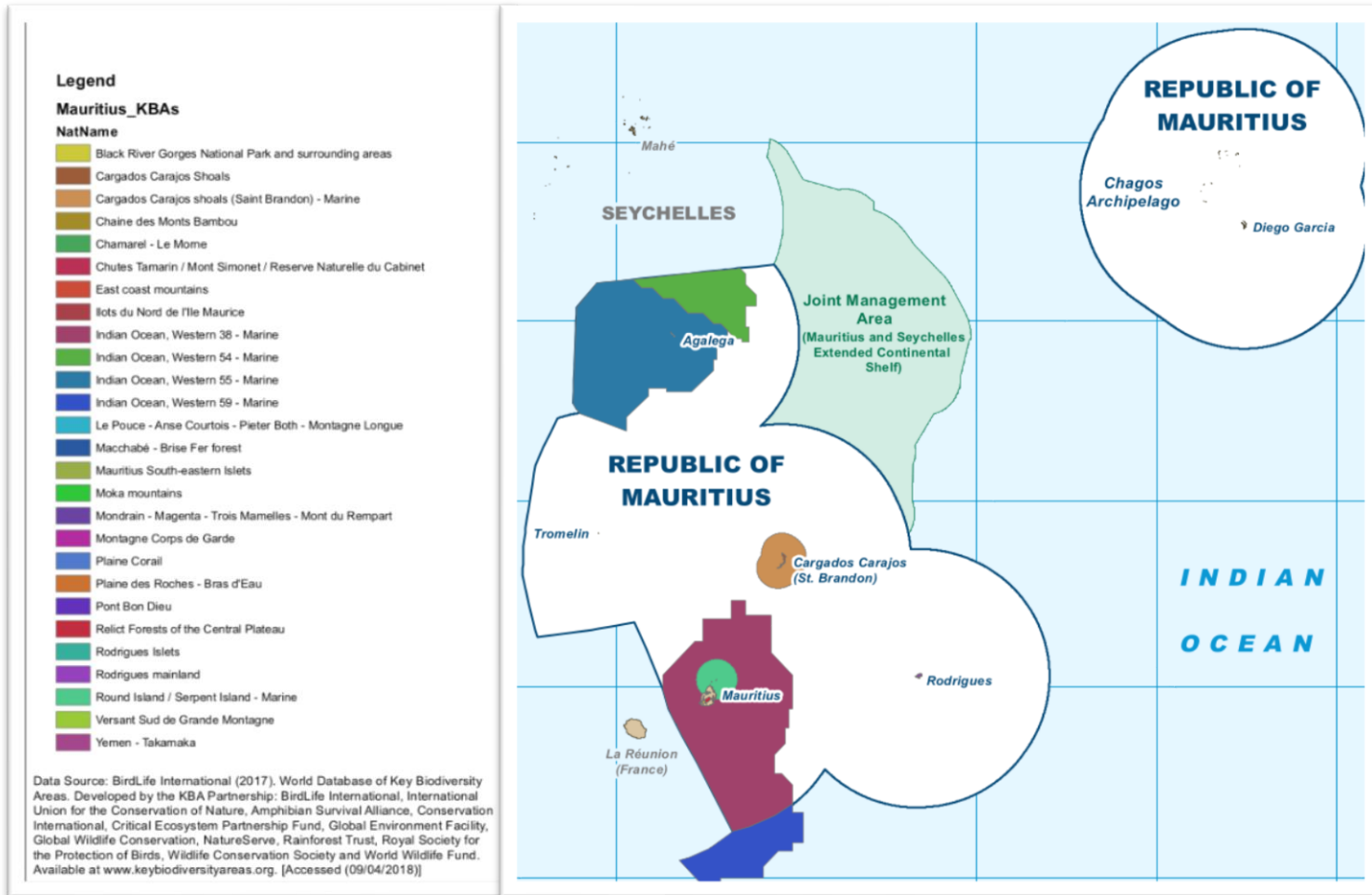
Area coverage: 34.8%

Data source:  
Ministry of Housing and Lands  
Rodrigues Regional Assembly  
Department of Environment

Area calculated based on UTM 41S projection



# World Database on Key Biodiversity Areas



# Summary

## Coastal Areas

| Source                                                             | Data         | Mauritius (km <sup>2</sup> )                                  | Rodrigues (km <sup>2</sup> ) | Agalega (km <sup>2</sup> ) | St Brandon & other banks (km <sup>2</sup> ) | High Seas | Total      | % Area cover |
|--------------------------------------------------------------------|--------------|---------------------------------------------------------------|------------------------------|----------------------------|---------------------------------------------|-----------|------------|--------------|
| <b>ESA Report (2009)</b>                                           |              | 232                                                           | 190                          |                            |                                             |           | <b>700</b> |              |
| <b>MCRMP</b>                                                       |              |                                                               |                              | 28.2                       | 248.6                                       |           |            |              |
| <b>Marine Mammals</b>                                              |              | Humpback and sperm whale activities Included in Coastal Areas |                              |                            |                                             |           |            |              |
| Statistic Environment Digest (2016) – (AFRC and Forestry Services) | MPAs and VMC | 72                                                            | 68                           |                            |                                             |           | <b>140</b> | <b>20 %</b>  |

## High Seas

|                   |                               |                                                                                              |                                            |
|-------------------|-------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Fish Areas</b> | AFRC + NANSEN                 | Fisheries sustainably managed (permits and catch control) across EEZ but Surveillance Issues |                                            |
| <b>Bird Areas</b> | IBA                           | Managed though fisheries                                                                     | <b>VMC for St Brandon and Round Island</b> |
| <b>Seamounts</b>  | Rely on opportunistic Surveys | Little information exist                                                                     |                                            |



# Conclusion - Challenges of MSP process

- Contribution and responsibilities of each institution to MSP
- Consensus and Mutual Agreement amongst stakeholders
- Lack of data and vastness of EEZ
  - Forereef, High Seas (Fishries, Marine Mammals), Seamounts
  - Surveillance and enforcement
- Upgrading the legal and regulatory framework
- Areas Beyond National Jurisdiction (ABNJ)



# Marine Spatial Planning in Mauritius

Thank You