



**EMODnet**



European Marine  
Observation and  
Data Network

# **EMODnet Thematic Lot n°3 – Seabed Habitats**

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**Centralisation Phase**

**Report detailing the construction of the Essential Ocean Variable data product "Mangrove cover and composition" [D3.12]**



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# Generating an Essential Ocean Variable composite product on Mangrove cover

This document gives an overview of the procedure used to create a spatial data layer displaying mangrove cover from the existing library of habitat maps on the EMODnet Seabed Habitats map viewer and other open data sources. This layer presents the attempt to map areal extent of mangrove cover Essential Ocean Variable (EOV) in the Caribbean Sea, including jurisdictional waters of EU Member States and UK.

## 1 Mangrove Cover and Composition

### 1.1 Background and definition

Mangroves are coastal wetland habitats formed by tree and shrub species that tolerate the saline conditions of the intertidal zone. Mangroves create an important and diverse intertidal wetland habitat e.g., by providing a sheltered nursing habitat for various species, functioning as carbon storage, and sheltering the coasts from erosion and storm fluxes (Aburto 2018.) Mangroves functions as biodiversity hot spots and supports the adaptation to climate change due to their fast response to the changing environment and their opportunistic nature (Spalding & Leal 2021).

### 1.2 Area of interest

The Caribbean Sea, including the jurisdictional waters of EU Member states and the UK, has been selected as the area of interest as some data from the area is represented in the existing library of habitat maps of EMODnet Seabed Habitats. The area covers some EU overseas territories and outermost regions from France (Martinique, Guadelupe, Saint-Martin, Saint-Barthélemy), UK (British Virgin Islands, Anguilla, Montserrat), and the Netherlands (Sint Maarten, Aruba, Curaçao, Bonaire).

## 2 Method

### 2.1 Data selection

The mangrove cover composite product has been built based on spatial data collated from the following sources (order reflects priority):

- (i) The EMODnet Seabed Habitats library of individual coastal wetlands and seabed habitat maps from survey;
- (ii) Global Mangrove Watch (Bunting et al. 2022) (available via The UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) [Ocean Data Viewer](#)), based on remote sensing analysis;

Other potential data sources were considered including the World Atlas of Mangroves and Global Distribution of Mangroves USGS (2011) available via UNEP-WCMC. However, these datasets are much older (temporal range covering years 1999-2003) whereas the Global Mangrove Watch data ranges up to 2020. Furthermore, we were advised by UNEP-WCMC that the World Atlas of Mangroves dataset has now been superseded by the Global Mangrove Watch data. Based on these remarks we chose to only include the Global Mangrove Watch and the individual habitat map data contained within EMODnet Seabed Habitats.

## 2.2 Data standardisation and compilation

We used data from two different sources, as listed above. The EMODnet Seabed Habitats library contained coastal wetlands data from French jurisdictional waters, provided by IFREMER. We included the “Intertidal forests” Ramsar class to represent the mangrove habitat. The rest of the Caribbean is covered by data from Global Mangrove Watch (GMW). Both datasets were in vector (polygon) format and were combined in ArcGIS with the Merge -tool.

The attribute table (Table 1) was standardised to match the structure of the existing EMODnet Seabed habitats EOVS layers.

Table 1: Attribute table format

Field name	Type	Description
map_id	string	Unique identifier of the dataset
hab_origin	string	Original habitat as listed in the source dataset
Eunis_code	string	Eunis classification system code
Eunis_name	string	Eunis habitat name
Anxi_code	string	Habitats directive habitat code
Anxi_name	string	Habitats directive habitat name
Ai_subtype	string	Habitats directive habitat subtype
Ospar_hab	string	OSPAR habitat type
habsubtype	string	OSPAR habitat sub-type
determiner	string	Organization that determined the dataset
Det_date	string	Date of determination of the original habitat
source	string	Source of the datasets

## 2.3 Decision rules when dealing with overlaps

EMODnet Seabed habitats library of habitat maps data (i) are high-resolution vector maps from the surveys. The Global Mangrove Watch data (ii) is gridded earth observation-based vector data. The high-resolution vector maps from survey were considered higher confidence data than the GMW data. In the areas where coastal wetland maps and Global Mangrove Watch data overlapped, the coastal wetland data was prioritized and the overlapping features from Global Mangrove Watch data were removed.

## 2.4 Data gaps

This composite product combines mangrove datasets of different origin in the Caribbean Sea to give a snapshot of the extent of the mangrove cover. However, it cannot be assumed to show the exact extent of the mangrove habitats as the spatial accuracy of remote sensing products and methods always has limitations. It is also possible that there are additional high-resolution datasets that are not yet part of EMODnet Seabed Habitats and we will look to expand these data holdings through continued collaboration in the Caribbean Sea (See future insights section).

## 2.5 Change over time

The used datasets and method does not allow to make any projections of mangrove cover change. However, Global Mangrove Watch has done an areal extent change analysis of mangroves between 1996-2020.

## 3 Output

The final map of mangrove cover EOVS is shown in Figure 1. The dataset is freely available from EMODnet (Add link once available).

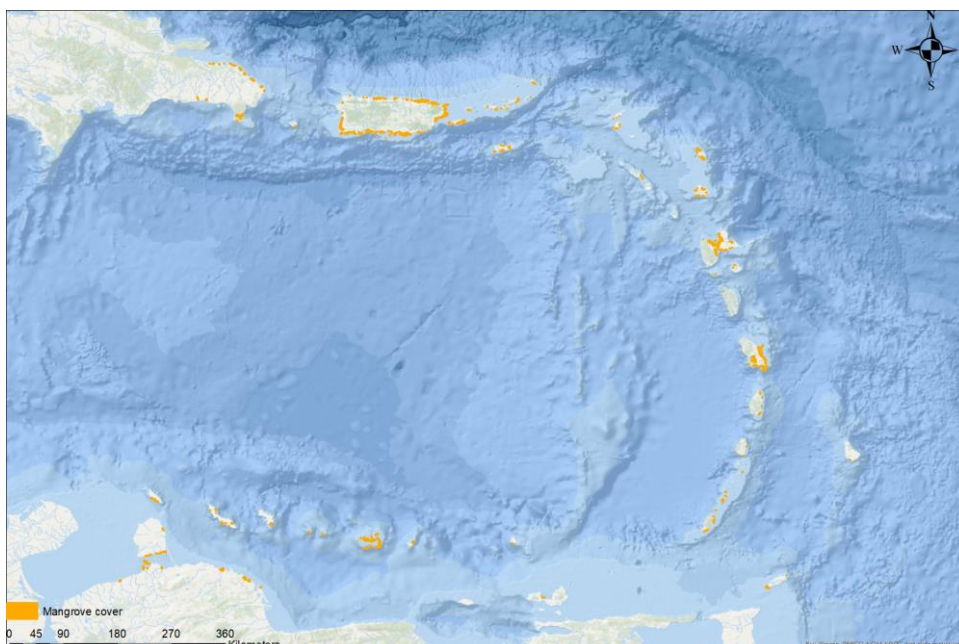


Figure 1. Map of the mangrove cover EOVS dataset

## 4 Future insights

For the future development of the mangrove cover composite product we recommend to:

1. Continue to collate local mangrove cover and composition vector datasets.
2. Utilize more variables from Global Mangrove Watch datasets (especially mangrove height and biomass, if possible).

## 5 References

Aburto, O. 2018. Essential Ocean Variables (EOV) for Biology and Ecosystems: Mangrove cover and composition. The Global Ocean Observing System. Available online: [https://www.gooscean.org/index.php?option=com\\_oe&task=viewDocumentRecord&docID=17514](https://www.gooscean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17514)

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