

# The CoCoNet solution for management and access heterogeneous marine datasets and metadata

Valentina Grande, Federica Foglini CNR-ISMAR (Bologna, Italy)  
 Artem Kruglov, Oleksandr Leposhkin, Oleksandr Neprokin, Richard Lisovsky UkrSCES (Odessa, Ukraine)

## The CoCoNet Project

The aim of the project was identify groups of putatively interconnected Marine Protected Areas (MPAs) in the Mediterranean and the Black Seas, shifting from local (single MPA) to regional (networks of MPAs) and basin (network of networks) scales. The identification of physical and biological connections with clear the processes that govern patterns of biodiversity distribution. This enhances policies of effective environmental management, also to ascertain if the existing MPAs are sufficient for ecological networking and to suggest how to design further protection schemes based on effective exchanges between protected areas. The coastal focus was widened to offshore and deep sea habitats, comprising them in MPAs networks. These activities also individuated areas where Offshore Wind Farms (OWFs) might become established, avoiding too sensitive habitats but acting as stepping stones through MPAs. Two pilot project areas (one in the Mediterranean Sea and one in the Black Sea) tested in the field the assumptions of theoretical approaches.

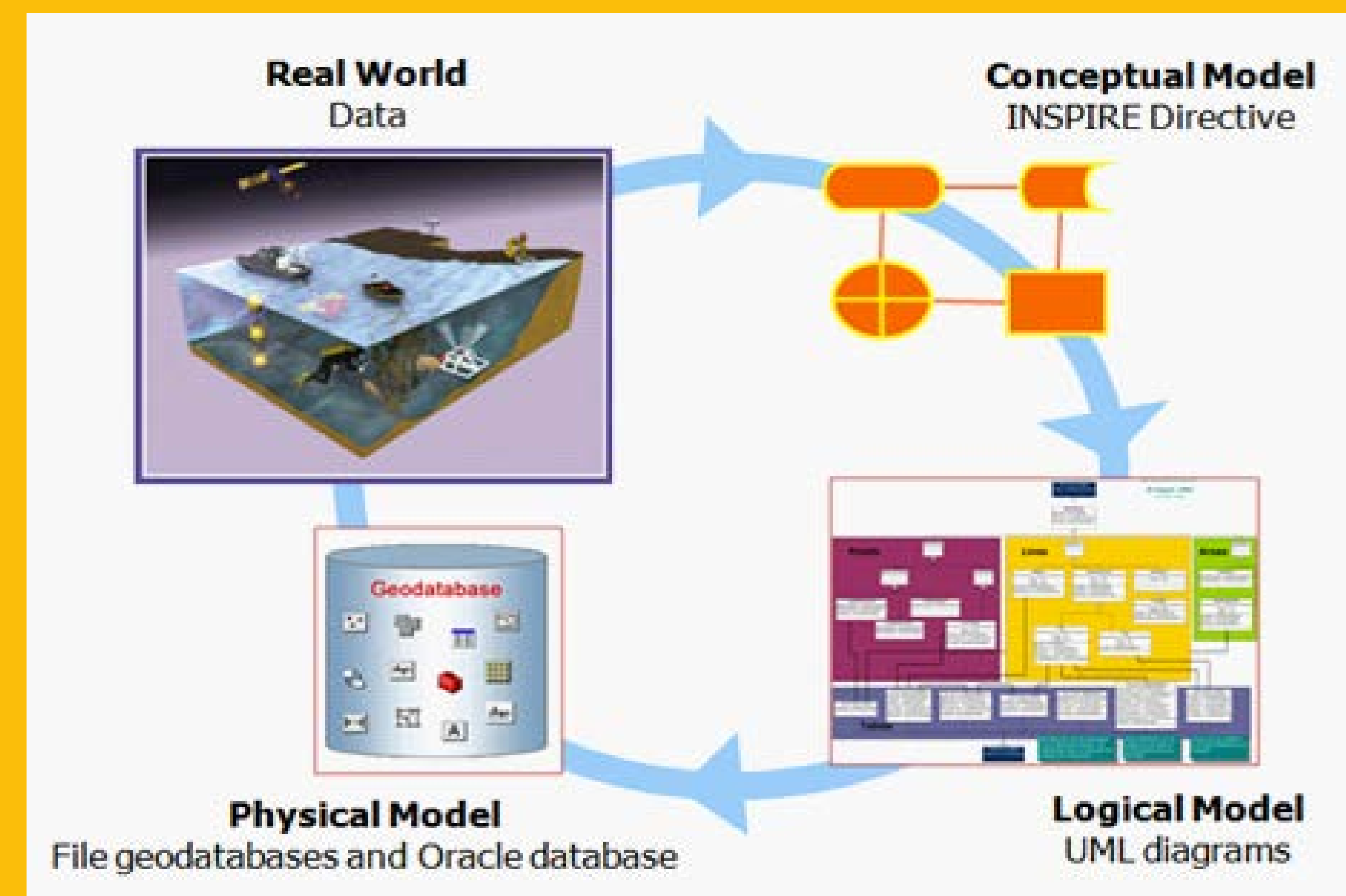


Figure 2. CoCoNet geodatabase layers integrated in the WebGIS.

Figure 1. CoCoNet workflow, from the real world to a physical model.

## The database

In the lifespan of the project the WP9 collected a big amount of data from different sources and disciplines (real world). The data are organized and stored in 11 ESRI File geodatabases (see Figure 2) created in ArcGIS (physical model) and implemented as UML diagram with Microsoft Visio (logical model) starting from the INSPIRE Directive (conceptual model). Other 3 geodatabase have been developed for the pilot project areas: HabitatMapping, Connectivity and a more detailed version of the geodatabase Oceanography. The 14 geodatabases converge in a unique Oracle database and are accessible through a WebGIS portal.

## The WebGIS platform

We implemented two CoCoNet WebGIS platforms: 1) at basin scale for the Mediterranean and Black Seas ; 2) at mesoscale for the pilot project areas. The platforms have been developed through the software ArcGIS Server 10 and the Moka CMS. The Moka CMS GIS (Content Management System GIS) is the core of the GIS infrastructure. The CMS is a tool for creating GIS application using cartographic object organized in a catalogue. The CoCoNet WebGIS platforms are free accessible from a webpage at the link: <http://coconetgis.ismar.cnr.it>. The platforms allow to browse the data with the navigation tools and the TOC. The user can identify the single object in the map with the identification tools, query the contents in the tables with the advanced search, print a map and download the layers according to the data policy of the project.

Figure 3. CoCoNet WebGIS platform at basin scale and its functions. In the table, an example of the identify function with the related tables on the left and the contents on the right. Here, all the information about the protected site and also the name of the metadata file.

| Field                    | Value                                   |
|--------------------------|---|
| SiteName                 | Arcipelago Toscano National Park        |
| OriginName               | Parco nazionale dell'Arcipelago Toscano |
| Country                  | Italy                                   |
| Status                   | Designated                              |
| IUCNcategory             | II - National park                      |
| LegalFoundationDate      | 1989                                    |
| LegalFoundationDocume nt | D.M. del 21 luglio 1989                 |
| ManagementPlan           | Not Reported                            |
| ResponsibleAuthority     | Ente Parco Nazionale Arcipelago Toscano |
| Zoning                   | Yes                                     |
| NoTakeRegulation         | Part of                                 |
| SiteType                 | Partly marine                           |
| MarineAreaHa             | 0                                       |
| MarineAreaPercentage     |   |
| TotalAreaHa              | 0                                       |
| LinkInfo                 | <a href="#">Go to the link</a>          |
| Metadata                 | FS_NationalProtectedSites.xml           |
| BeginLifespanVersion     | 06/07/2015                              |
| EndLifespanVersion       |   |
| SiteDesignation          | National Park                           |
| DesignationType          | National                                |

## Conclusion

The integrated geodatabase has been a fundamental tool to produce the guidelines to design, manage and monitor networks of MPAs and the final charts (see Figure 4). The CoCoNet Data Model is one of the first current application of the INSPIRE conceptual data model to marine environmental data. The Geodatabase architecture is effective to homogenize, integrate, manage and analyze data coming from a wide variety of data sources in the marine environment. The WebGIS provides easy tools for data visualization, retrieving through advanced search, downloading and printing.

The geodatabase, through the WebGIS system, represents the linking tool for all partners, regions and thematic research involving the entire consortium in topics such as data provision and integration, GIS products, GIS interpretation, data archiving and data exchange.

The use of SeaDataNet standards and repository, for implementing and storing CoCoNet Metadata, increases the access to these data resources from a wider marine scientific community across Europe.

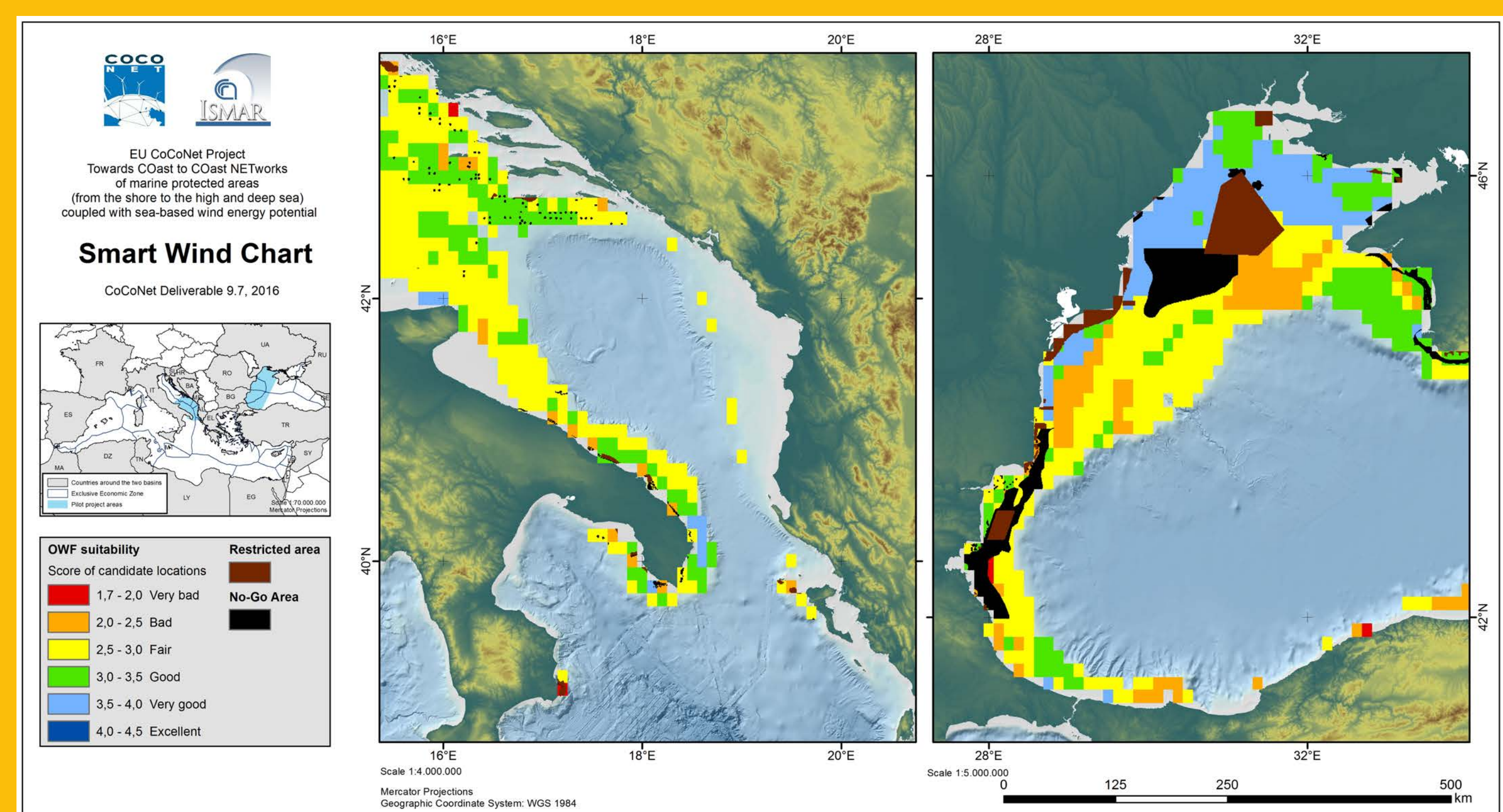
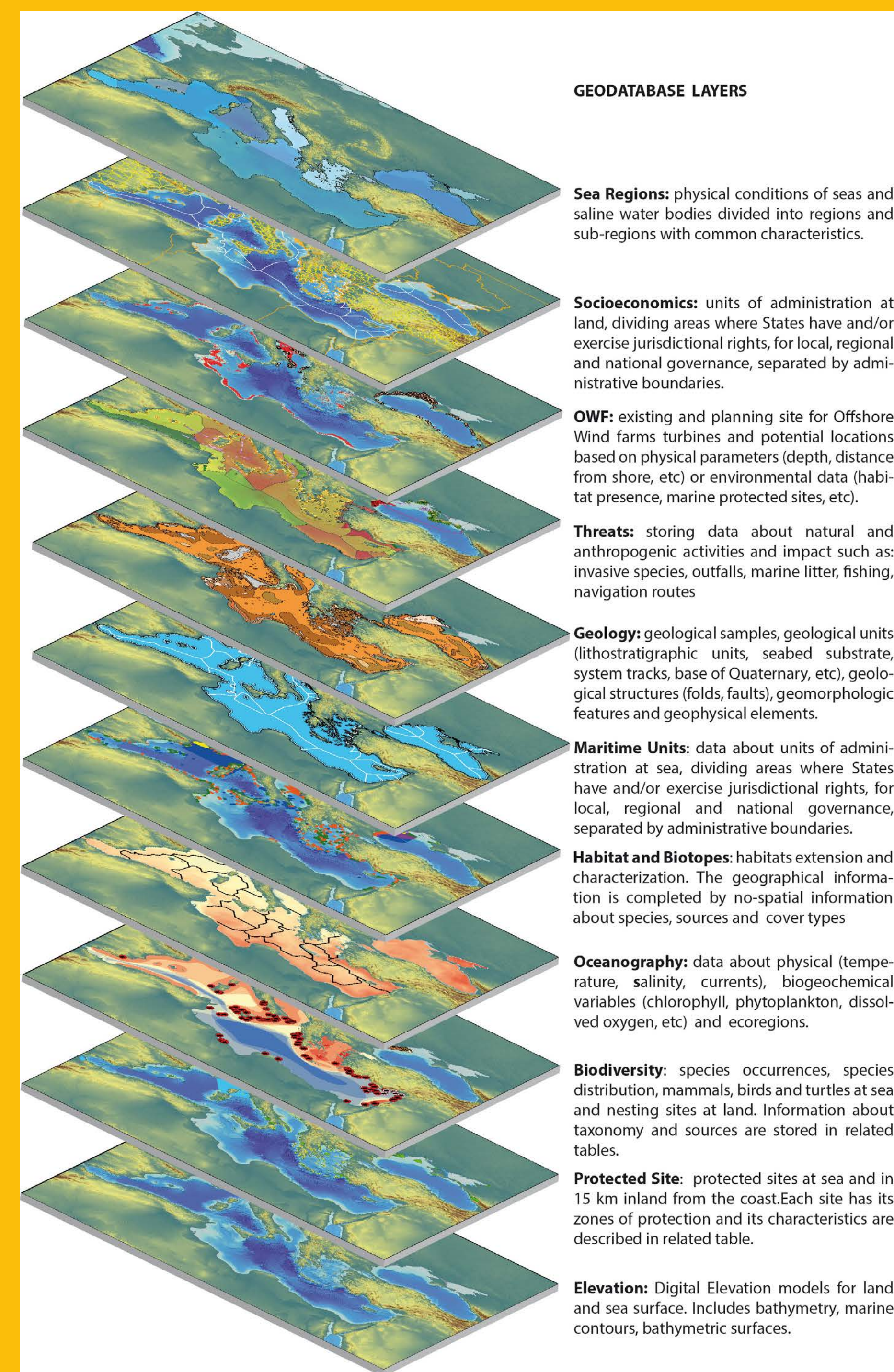


Figure 4. Final chart for the OWFs of the two pilot project areas.



## The Metadata portal

Each layer in the WebGIS platforms is described by a metadata file. We created the metadata with Mikado software according to the SeaDataNet vocabularies and published them through the SeaDataNet portal (<http://www.seadatanet.org/Metadata>).

A metadata file for each layer, created with ArcCatalog according to the ISO 19139, is stored in the CoCoNet metadata portal ([http://gp.sea.gov.ua:8082/geoportal/catalog/main/home\\_page](http://gp.sea.gov.ua:8082/geoportal/catalog/main/home_page)).

Here, more detailed information about the datasets provided by each partner is available.