

# EVALUATION AND ASSESSMENT OF THE MARINE ECOSYSTEM SERVICES WITHIN THE NATURA 2000 NETWORK IN SPAIN

EXECUTIVE SUMMARY  
JANUARY 2020

LIFE IP INTEMARES

Integrated, innovative and participatory management  
of the Natura 2000 Network in the Spanish marine  
environment





## Authors:

Fernando Santos Martín<sup>1</sup>, Alberto González García<sup>1</sup>, Susana García Tiscar<sup>1</sup>, Paloma Alcorlo<sup>1,2</sup>.



## Coordination and revision:

The Biodiversity Foundation of the Ministry for Ecological Transition and the Demographic Challenge

## Publishes:

The LIFE IP INTEMARES project, which is coordinated by the Biodiversity Foundation of the Ministry for the Ecological Transition and the Demographic Challenge, aims to achieve effective management of the marine sites of the Natura 2000 Network, through science and with the active participation of the sectors involved.

Participating partners are the Directorate-General of Biodiversity, Forests and Desertification of the ministry itself, the IEO, CEPESCA, SEO / BirdLife and WWF-Spain. The project receives financial contributions through the European Union's LIFE program, among other sources of funding.



## Date of publication:

30/07/2020

## Acknowledgements

This report constitutes the result of research carried out during the years 2018 and 2020 by the Autonomous University of Madrid. Throughout this process different people and institutions have collaborated in different ways. In particular, the authors would like to express their gratitude to the following people:

---

<sup>1</sup> Laboratory of Socio-ecosystems, ecology department, Autonomous University of Madrid.

<sup>2</sup> Research center for Biodiversity and Global Change

- **Miguel Ángel Mateo Mínguez** for sending us the carbon sequestration and storage data in marine phanerogams obtained through the LIFE BLUE NATURA project and for advising us on aspects related to the dynamics of carbon in phanerogams.
- **Manuel Ruiz Fernández** for providing us with the map of seagrass beds in Spain and advising us on everything relating to this database.
- **María Sainza and Santiago Cerviño-López** of the IEO in Vigo for providing data on the biological parameters necessary to model the population dynamics for the studied fish species.
- **Juan Manuel Lestón Leal**, Department Head of the Fisheries monitoring center of the Sub-Directorate General of Control and Inspection of the Ministry of Agriculture, Fisheries and Food (MAPA) for facilitating the satellite tracking inventory of the blue boxes of Spanish fishing vessels.

## EXECUTIVE SUMMARY

This report is the result of almost two years of work evaluating and assessing the marine ecosystems services of the Natura 2000 Network in Spain. The work is part of the LIFE IP INTEMARES project ([http // https://www.intemares.es/](http://www.intemares.es/)) whose main objective is to achieve an effectively managed network of marine sites within the Natura 2000 Network, and with the active participation of the sectors involved and research as the basic tools for decision-making. To achieve this general objective, it has been considered necessary to carry out an evaluation and assessment of the marine ecosystem services within the Natura 2000 Network, in order to estimate the impact that these sites have on human well-being at a state level. These results are expected to be useful for the integrated management of the entire network of marine protected areas in Spain, as well as for the subsequent phases of the LIFE IP INTEMARES project.

This evaluation is in turn linked, conceptually and methodologically, to the “The Millennium Ecosystem assessment of Spain” ([http // www.ecomilenio.es](http://www.ecomilenio.es)) that has been carried out since 2009 and that has been financed by the Ministry for the Ecological Transition and the Demographic Challenge through the Biodiversity Foundation.

The general objective of this evaluation has been to analyze the existing relationships between marine ecosystems and their supply, regulation and cultural services in connection to protected natural sites in order to guarantee that decision-making processes integrate the diversity of values associated with these sites. To fulfill this objective, the methodology developed at a national level for the evaluation and assessment of ecosystems and their services has been applied to the specific case of the marine Natura 2000 Network in Spain. Specifically, the following main lines of action have been set up: (1) preparation of a methodological framework for the assessment and mapping of marine ecosystem services; (2) analysis of the status and trend of marine ecosystem services; (3) spatial representation of marine ecosystem services at a state level; (4) analysis of different future scenarios with implications for ecosystem services; and (5) dissemination and communication of the results. For the modeling of these ecosystem services three different models of the InVEST V 3.8.9 program (<https://naturalcapitalproject.stanford.edu/software/invest>) were used. The models used were: (1) *Visitation and recreation*, understood in this report to be tourism and recreation; (2) *Coastal Blue Carbon*, understood to be carbon sequestration and storage and, therefore, climate regulation and (3) *Fisheries*, understood to be food supply of animal origin (fishing).

Therefore, the evaluation and assessment of the marine ecosystems services within the Natura 2000 Network in Spain can be considered to be a fundamental instrument in aiding decision-making in the Natura 2000 Network since it aims to show the current state of the marine ecosystems and their services, analyzing the consequences that the different policies that are promoted at European, state and / or regional level have had on biodiversity and ecosystems in the study area.

With regards to the main results, the following conclusions should be highlighted:

1. The ecosystem services provided by the marine Natura 2000 Network are essential for human well-being. The marine Natura 2000 Network is a fundamental element of Spain's natural capital since it provides a large number of essential ecosystem services to ensure our well-being. Of the services evaluated in this study (recreational activities, marine carbon sequestration and fishing extraction) it was found that at least 57.6% (Recreation 47%, Carbon 82%, Fishing 44%) of the total supply of services from marine ecosystems occur within the spaces of the Natura 2000 Network, while this network represents only 7.9% of Spain's total maritime domain.
2. It is necessary to include ecosystem services as fundamental elements in the management and conservation of the Natura 2000 Network.
  - a. The economic valuation of the marine ecosystem services demonstrates the high value of the natural capital of marine areas. For example, the economic value of the carbon sequestration of seagrass beds throughout Spain has been estimated at around 10 billion euros (which represents 0.7% of the national GDP) of which almost 3.4 billion euros come from within the Natura 2000 Network. It is important to highlight this information that until now has not been taken into account as a decisive element in the management and conservation of the marine Natura 2000 Network.
  - b. The sequestration of carbon stored by seagrass beds represents almost 70% (231 million tons) of the annual emissions in all of Spain. The total supply of this service is stored in beds close to the coast, which in turn creates important commitments with other ecosystem services (eg recreational, fishing extraction). It is also important to highlight that 82% of marine carbon sequestration comes from within the Natura 2000 Network, while this area only represents only 7.9% of the national maritime surface.
  - c. The mapping of fishing extraction services has been a great challenge and required methodological innovation, this has led to new information becoming available that can be used in designing management and conservation strategies, both with regards to species, and to specific sites. Specifically, this information may be of great interest in analyzing the management models used in the marine Natura 2000 Network since 44% of the fishing extraction (excluding traditional gears) is carried out within the network.
3. Given the existing heterogeneity and the lack of information in some cases, the management of each marine protected area must be adjusted to the characteristics of each study area and ecosystem service

- a. The results of the modeling of future scenarios of ecosystem services show a high level of heterogeneity, both spatially (marine subdivisions), and temporally (time horizon of the scenarios). This suggests that it is important to reflect individually on the sustainable management models of each of the ecosystem services, with the assumption that each subdivision will face different situations and challenges in the future.
- b. The evaluation and mapping of the Spanish marine ecosystem services has shown that there is a high level of heterogeneity between the different marine subdivisions. This result suggests that there is a need to design different management strategies that take into account the intrinsic characteristics of each marine subdivision, as well as the inclusion of ecosystem services as a fundamental element for the management and conservation of the marine Natura 2000 Network.
- c. The mapping of the marine ecosystem services developed in this work has provided spatial information that to date had not been developed at a national level in Spain. This information can represent a significant methodological advance, both for the design of national marine strategies, and also for more specific elements relating to the management of the marine Natura 2000 Network. For example, an analysis of the results shows that there is a large difference in the provision of ecosystem services between coastal (less than 12 miles) and marine areas.
- d. The evaluation and mapping of recreational services shows that they are a fundamental element in the management and conservation of coastal areas. In addition, the spatial and seasonal variability to which the supply of this service is subjected makes it necessary to draw up specific and appropriate management plans for each case study. In addition, with regards to the management of this service it is especially important to carry out a supply and demand analysis in order to understand sustainability thresholds.
- e. After an exhaustive review of the official databases on marine ecosystems in Spain, notable information gaps have been detected. For example, the necessary biological and fisheries data has not been found for some of the analyzed species. It is also worth noting the lack of information on some of the marine subdivisions, the Canary islands being a case in point.