



European
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Marine Environment

*Research and
Innovation*

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Marine resources for sustainable 'blue growth'

As the last frontier on planet Earth, our seas and oceans are still relatively unexplored, but they have long been exploited extensively for mineral and biological resources, and more recently for oil and gas. With marine-based scientific activities and 'blue growth' now widely seen as sources of new economic prosperity, the need to better manage and protect our European waters is more urgent than ever.

On the whole, human activities tend to degrade ecosystems, an effect exacerbated by climate change. Nowhere is the pressure on marine ecosystems felt more intensely than in our coastal areas.

Today, over 50% of the world's population lives within a day's walk of the coast. Most activities are free and unorganised; valuable resources such as fish and minerals are generally treated as common property and are used for subsistence, recreation or economic development.

A key challenge for the EU is to ensure that the use of marine resources is sustainable. With both citizens and policy-makers now keen to maximise the responsible use of our seas and oceans, it is clear that holistic, ecosystem-based strategies are the best way forward.

Research priorities

The EU's Seventh Framework Programme (FP7) is funding research and innovation on **ecosystem-based integrated coastal and ocean management**, with the purpose of balancing environmental and economic concerns while not forgetting the important social issues, such as jobs and cultural heritage.

At the same time, EU-supported research is working to **protect vulnerable habitats**, assessing and mitigating the impact of both natural and man-made forces on European marine ecosystems such as coral reefs and lagoons. Funded projects are policy-driven, aimed at advancing our knowledge in key areas to meet specifically defined goals.

In the context of integrated marine management and governance, the EU wants to be able to make decisions based on the best knowledge and science. To make this happen, scientists and researchers, policy-makers and authorities at all levels must work more closely together.

Working together to develop a **marine European Research Area** is another key specified priority for EU marine research, with projects specifically aimed at getting all concerned parties to work in a more effective way.

With oceans covering over 70% of the world's surface, the sustainable management of the seas and oceans is a challenge that goes beyond any borders, not only for Europe, but for the world as a whole.

By improving how we manage our coastal zones, by protecting natural habitats, and by including all players and stakeholders in the process, the EU is doing its part to ensure the long-term sustainability of our seas and oceans.



Ecosystem-based integrated coastal and ocean management

The dynamic processes that occur within the world's seas and oceans result in diverse and productive ecosystems, which have been and remain highly important for human populations. The economic productivity of coastal zones in particular far exceeds that of similarly sized inland areas.



Knowledge is power: Knowseas

The EU-funded Knowseas project is working on two key levels now considered of relevance for EU policies: the Regional Sea Scale and Member State Economic Exclusive Zones (EEZs).

The project is providing a comprehensive scientific knowledge base and practical guidance for the application of the ecosystem approach on the sustainable development of Europe's regional seas.

The results of the Knowseas project, along with others like Pegaso and MESMA, will support integrated strategies to be used by governments, local authorities and other decision-makers, to better plan and manage the sustainable development of European marine areas.

Europe's four regional seas – the Baltic, Black, Mediterranean and Northeast Atlantic – have all suffered environmental degradation as a result of human activity. The ongoing sustainable exploitation of the marine and coastal environments is therefore an enormous challenge.

What is required, more than anything else, is new knowledge, based on direct observation and exploration, employing the latest tools and technologies. At the same time, better management approaches must be developed and applied based on the best sociological, economic and political theories.

Working together

The EU supports research in all of these areas. A primary overarching goal is integration, meaning the drawing together of all relevant scientific and cultural disciplines, economic sectors, levels of government and different countries, to develop better approaches on how we manage our seas and coastal zones.

The EU-funded **Pegaso** project is one example, working to identify instruments and build capacity for implementing the principles of Integrated Coastal Zone Management in Mediterranean and Black Sea countries. On a slightly broader scale, the **MESMA** project is looking at marine spatial planning, encompassing both coastal and adjacent regions.

Protecting vulnerable habitats

Deep-sea coral reefs, like those located off the west coast of Ireland, are a prime example of habitats that need to be safeguarded, possessing a rich diversity of life, but surprisingly fragile and still under threat from harmful fishing practices such as bottom trawling.

These and many other marine habitats are under threat, but a clear, complete and accurate scientific assessment of the state of our marine ecosystems is still a work in progress. Unfortunately, it is just this kind of complete and accurate assessment that is urgently needed in order to make the right decisions about protecting these precious assets.

The EU is supporting important work aimed at mitigating harmful impacts, whether natural or man-made, on some of Europe's most vulnerable marine ecosystems.

Understanding the whole problem

The **CoralFISH** project is looking at the relationships between cold-water corals, fish and fisheries in the North Atlantic and the Mediterranean. It will give both researchers and decision-makers new tools to determine ecological status and to predict and monitor the impact of human activities, all of which will feed into the development of new bio-economic management models. It will also provide valuable information for the adoption of appropriate Good Environmental Status (GES) indicators in the deep sea in compliance with the Marine Strategy Framework Directive.

A truly integrated approach to sustainable development is a prerequisite for protecting vulnerable marine habitats. Another good example is the EU-funded **FORCE** project, a joint ecosystem-based study bringing together researchers from both the social and natural sciences to help save Caribbean coral reefs. Together they are working to understand ecological and social processes

and developing tools to help practitioners, stakeholders and governments plan for more effective coral reef management.



Saving Europe's most precious aquatic resources: Lagoons

Many of Europe's lagoons, for example the Venetian Lagoon in Italy or the Aveiro Lagoon in Portugal, are particularly vulnerable to the effects of extreme weather events now being associated with climate change. But they are also subject to the direct impact of human activities on their ecosystems and biodiversity.

*The main objective of the EU-funded **Lagoons** project is to help develop an integrated, science-based strategy for the management of lagoons. It draws together the perspectives of researchers, policy-makers and other stakeholders, representing both land-based and sea-based interests.*

Work being carried out under this key initiative will help to underpin the integration of the EU Water Framework Directive, the Habitat Directive and other key European policy schemes.

Joining forces: developing a marine European Research Area

Among the key goals of the EU's Framework Programme for Research and Innovation is getting Europe to work together in a more effective way. For many, identifying common scientific priorities and establishing a coordinated approach to funding are good places to start.



A new platform for change: SEAS-ERA

*Europe needs an integrated, policy-oriented structure to promote knowledge and expertise in marine-related areas. The EU-funded **SEAS-ERA** initiative is developing a European Marine and Maritime Research Agenda, aimed at improving co-operation and coordination and promoting the harmonisation of national and regional research programmes.*

SEAS-ERA brings together the main marine research funding organisations of 19 countries in three marine regions – the Atlantic, Mediterranean and Black Sea – and it is working closely with a similar group concerned with the Baltic Sea. The project will set up a pan-European marine research forum to develop and implement common research strategies as well as programmes for European sea basins and European global marine research.

European seas and oceans constitute important assets. The European Integrated Maritime Policy stresses the need to achieve the full economic potential of oceans and seas in harmony with the marine environment. But to get there, a clear definition of research needs and priorities is required, and the more effective integration of knowledge and resources, all of which will ultimately lead to better and more beneficial policy-making.

The EU is working hard to promote new, interdisciplinary skills and innovation capacities, and to see their integration across marine and maritime research disciplines.

Specifically, the use of existing research infrastructures needs to be optimised, knowledge and technology transfer should be supported, and synergies at national and regional levels should be developed and fostered. Crucially, funding must be made available to create a critical mass of researchers who can address pressing scientific and economic issues.

The **Euromarine** project is a good example of this kind of effort. It gathers key representatives from the European marine scientific community, comprising a rich and diverse source of expertise available to respond to marine-related societal issues as they arise, from environmental concerns to public well-being and economic sustainability.

Project List

ARCH - Architecture and roadmap to manage multiple pressures on lagoons
<http://www.arch-fp7.eu/>

BONUS - Joint Baltic Sea research and development programme (BONUS)
<http://www.bonusportal.org/>

CAREX - Coordination action for research activities on life in extreme environments
<http://www.carex-eu.org/>

CASPINFO - Caspian environmental and industrial data & information service
<http://www.caspinfo.net/>

CLEANSEA - Towards a clean, litter-free European marine environment through scientific evidence, innovative tools and good governance

Coconet - Towards coast to coast networks of marine protected areas
<http://www.coconet-fp7.eu/>

CoralFISH - Assessment of the interaction between corals, fish and fisheries, in order to develop monitoring and predictive modelling tools for ecosystem based management in the deep waters of Europe and beyond
<http://www.eu-fp7-coralfish.net/>

DEVOTES - Development of innovative tools for understanding marine biodiversity and assessing good environmental status

DS3F - The Deep Sea & Sub-Sea-floor Frontier
<http://www.deep-sea-frontier.eu/>

ECO2 - Sub-seabed CO₂ storage: Impact on marine ecosystems
<http://www.eco2-project.eu/>

EELIAD - European eels in the Atlantic: Assessment of their decline
<http://www.eeliad.com/>

EURO-BASIN - European Union basin-scale analysis, synthesis and integration
<http://www.euro-basin.eu/>

EUROMARINE - Integration of European marine research networks of excellence - Euromarine
<http://www.euromarineconsortium.eu/>

FORCE - Future of reefs in a changing environment: An ecosystem approach to managing Caribbean coral reefs in the face of climate change
<http://www.force-project.eu/>

GREENSEAS - Development of global plankton database and model system for eco-climate early warning
<http://www.greenseas.eu/home>

HERMIONE - Hotspot ecosystem research and man's impact on European seas
<http://www.eu-hermione.net/>

KNOWSEAS - Knowledge-based sustainable Management for Europe's seas
<http://www.knowseas.com/>

LAGOONS - Integrated water resources and coastal zone management in European lagoons in the context of climate change
<http://lagoons.web.ua.pt/>

MARCOM+ - Towards an integrated marine and maritime science community
<http://www.marinemaritimescienceforum.eu/Pages/default.aspx>

MarineTT - European marine research knowledge transfer and uptake of results
<http://www.marinett.eu/>

MEECE - Marine ecosystem evolution in a changing environment
<http://www.meece.eu/>

MESMA - Monitoring and evaluation of spatially managed areas
<http://www.mesma.org/>

MicroB3 - Biodiversity, Bioinformatics, Biotechnology
<http://www.microb3.eu/>

ODEMM - Options for delivering ecosystem-based marine management
<http://www.liv.ac.uk/odemmm/>

PEGASO - People for ecosystem based governance in assessing sustainable development of ocean and coast
<http://www.pegasoproject.eu/>

PERSEUS - Policy-orientated marine Environmental Research for the Southern European Seas
<http://www.perseus-net.eu/site/content.php>

SALSEA-Merge - Advancing understanding of Atlantic salmon at sea: Merging genetics and ecology to resolve stock-specific migration and distribution patterns
<http://www.nasco.int/sas/salseamerge.htm>

SEAS ERA - Towards integrated European marine research strategy and programmes
<http://www.seas-era.eu/np4/homepage.html>

STAGES - Science and Technology Advancing Governance of Good Environmental 196 Status

VECTORS - Vectors of change in oceans and seas marine life, Impact on economic sectors
<http://www.marine-vectors.eu/>

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Research and Innovation policy

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