

<b>Title</b>
<b>Assess and predict integrated impacts of cumulative direct and indirect stressors on coastal and marine biodiversity, ecosystems and their services</b>
<b>Funding Instrument</b>
Horizon Europe
<b>Code</b>
HORIZON-CL6-2021-BIODIV-01-04
<b>General information</b>
<p>The European Environment - State and Outlook 2020<sup>[1]</sup> (EEA, SOER) underscore the fact that the current trajectories of social and economic development are destroying the ecosystems that ultimately sustain humankind. The Mapping and Assessment of Ecosystems and their Services: An EU Ecosystem assessment (Maes et al., 2020)<sup>[2]</sup> points out the knowledge gaps in marine data and highlights that the data coverage in space and time is still insufficient to provide an exhaustive assessment of the condition of marine ecosystems and their services in Europe (incl. the outermost regions and overseas territories). The Marine Strategy Framework Directive (MSFD) Implementation Report (2020)<sup>[3]</sup> underlines the lagging targets and actions to reach the Good Environmental Status in European seas. Consistently with the knowledge review in the latest IPCC SROCC<sup>[4]</sup> and IPBES GA<sup>[5]</sup> reports, shifting onto sustainable pathways requires urgent rapid and large-scale reductions in human and environmental pressures, going far beyond the current reductions. Europe is not making enough progress in addressing environmental challenges, that natural capital is not yet being protected, conserved and enhanced in accordance with the ambitions of the Seventh Environment Action Programme (7th EAP<sup>[6]</sup>).</p> <p>Pressures on marine and coastal biodiversity and ecosystems are increasing at a faster rate than the efforts to protect them. Adding to human direct pressures, the integrity of these ecosystems and their capacity to deliver a wide range of multiple essential services and benefits to people is already and will be further undermined by the effects of climate and environmental changes which occurs faster in the ocean (like warming, stratification, sea level rise, extreme events, pollution, eutrophication, deoxygenation, and acidification).</p> <p>There are still many stressors whose negative effects are not well defined, as their effects may only appear upon interacting with others stressors, creating unknown synergies. Identifying and defining direct and indirect anthropogenic and environmental stressors and their interactions should be the first step towards correctly quantifying their effects and feeding the models (forecast).</p> <p>With increasing industrial use of the ocean space, there is a growing need for the development of tools for impact monitoring. Conceptual and numerical models are crucial tools to understand how multiple factors interact and could affect non-linear systems such as natural ecosystems. They cannot be fully substituted by observations and monitoring, but empirical data is essential to validate model results and provide levels of uncertainty.</p> <p>Models but also design and use of biodiversity scenarios are important approaches to perform 'what if' scenarios, in order to forecast potential impacts of different management options affecting the status of stressed ecosystems under evolving environmental conditions.</p>

[1]The European environment — state and outlook 2020 (EEA SOER 2020 <https://www.eea.europa.eu/soer>)

[2]Maes et al., 2020

[3]COM(2020)259 - MSFD Article 20 implementation report ([https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index\\_en.htm](https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm))

[4]Special Report on the Ocean and Cryosphere in a Changing Climate (<https://www.ipcc.ch/srocc/>)

[5]Global Assessment Report on Biodiversity and Ecosystem Services (<https://ipbes.net/global-assessment>)

[6]The 7th Environment Action Programme (EAP)( <https://ec.europa.eu/environment/action-programme/>)

## Objectives

In order to facilitate and speed up the development of measures and holistic ecosystem-based management approaches that promote the sustainability of coastal and marine ecosystems and enable them to deliver services and be resilient to rapid climate and environmental changes, proposals are expected to address all of the following aspects:

- Develop a systemic approach for the integrated impact assessment of cumulative direct and indirect stressors on coastal and marine ecosystems processes and services (from benthic to pelagic systems, from food to human health) and assessment of the state of coastal and marine ecosystems “health” or condition, and resilience to cumulative pressures.
- Characterise, measure, and understand the combined impact of different types of pressures or perturbations (chemicals and energy pollution, bioaccumulation, invasive species, extraction activities, river inflows and supplies of sediments and nutrients, hypoxia, pH, warming, etc.) on coastal and marine biodiversity and ecosystems condition (biotic communities, structure, biotope, and functions) from small cells to large ecosystems cells, from invertebrates to predators, and considering sex segregation of species determined by environmental parameters, in space and time including estimates of the extinction risks of species and structures, which might play key roles in the functioning of an ecosystem and in the conservation of marine biodiversity.
- Increased understanding of the biological mechanisms that determine the response of organisms and ecosystems to environmental changes (including components of stability, such as resistance, resilience and recovery), as well as the limits of their response adaptation capacity (tipping points), and the implications for the management of aquatic areas, habitats and species
- State of the Art Biologging technology and molecular methods, in combination with knowledge on oceanographic processes to understand the effects of agents of change on the ecology and population dynamics through different levels of marine food chains.

- Rationalise and advance strategies for monitoring European populations of marine species at the top of food chains, especially those that can indicate important changes in the oceanic environment, and have life histories that make them especially susceptible to change.
- Integrate existing and new biodiversity data and knowledge from multiple origins, including other EU (Horizon 2020 and previous framework Programmes), international and national research projects. Proposals should take into account all the relevant knowledge and data from the IPCC, IPBES, JRC, LIFE projects, EEA, MAES, the IUCN Guidelines and other relevant initiatives.
- Develop technologies, methods and models that can quantify and forecast how cumulative anthropogenic perturbations can affect ecosystem's sustainability, productivity and resilience against environmental stressors.
- Where relevant, creating links, contributing to and using the information and data of the European Earth observation programme Copernicus, the Group on Earth Observations (GEO) and the Global Earth Observation System of Systems (GEOSS), European Space Agency Earth Observation Programme and in particular the flagship actions on biodiversity and ocean health of the EC-ESA Joint Earth system science initiative, is expected.
- Contribution to enhancing the overall societal and public understanding of link between marine biodiversity and ecosystem functioning and human health through education and training (school & adult education, citizen science platforms)
- Cooperate with the EC Knowledge Centre for Biodiversity by providing and harnessing data and applying an integrated conceptual framework and with other relevant existing platforms and information sharing mechanisms<sup>[7]</sup>.
- Opportunities for cooperation with the Biodiversity Partnership<sup>[8]</sup> (HORIZON-CL6-2021-BIODIV-02-01) and other relevant Horizon Europe missions and partnerships, as well as synergies with relevant projects in Destination 'Fair, healthy and environmentally-friendly food systems from primary production to consumption' (aquaculture, fisheries), Destination 'Clean environment and zero pollution' (pollution), 'Land, ocean and water for climate action' (climate) and Destination 'Resilient, inclusive, healthy and green rural, coastal and urban communities' (land sea connection, coastal areas) should be identified. Proposals should outline a plan on how they intend to collaborate with other projects selected and with the mentioned initiatives, by e.g. participating in joint activities, workshops, common communication and dissemination activities, etc. Applicants should allocate the necessary budget to cover the plan. Relevant activities of the plan will be set out and carried out in close co-operation with relevant Commission services, ensuring coherence with related policy initiatives.

[7]BISE, Oppla, NetworkNature and their joint work streams.

[8]<https://www.biodiversa.org/1759>

[Link with CMA Goals](#)

**Goal I:** Healthy marine and coastal ecosystems / **Priority 1:** Ensure the protection and sustainability of the marine ecosystem

Deadline for submission

06 October 2021

Project duration

N/A

Financial allocation

10 million euro

Partnership

Bulgaria, Romania, Georgia, Moldova, Turkey, Ukraine

Eligible partners/key conditions

**Admissibility conditions:** described in [Annex A](#) and [Annex E](#) of the Horizon Europe Work Programme General Annexes

Sector of activity

Marine biodiversity, Marine and Coastal protection

Further Info

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl6-2021-biodiv-01-04;callCode=null;freeTextSearchKeyword=fish;matchWholeText=true;typeCodes=0,1,2;statusCodes=31094501,31094502;programmePeriod=2021%20-%202027;programCcm2Id=null;programDivisionCode=null;focusAreaCode=null;destination=null;mission=null;geographicalZonesCode=null;programmeDivisionProspect=null;startDateLte=null;startDateGte=null;crossCuttingPriorityCode=null;cpvCode=null;performanceOfDelivery=null;sortQuery=sortStatus;orderBy=asc;onlyTenders=false;topicListKey=topicSearchTablePageState>