
Foster coordination and collaborative research with projects funded by Horizon Europe for the EC-ESA flagships.

Main ocean related topics of 2021-2022



1st ESA Ocean Science Cluster Collocation Meeting

Ivan CONESA ALCOLEA, EC DG Research & Innovation
Unit B4 Healthy Oceans & Seas

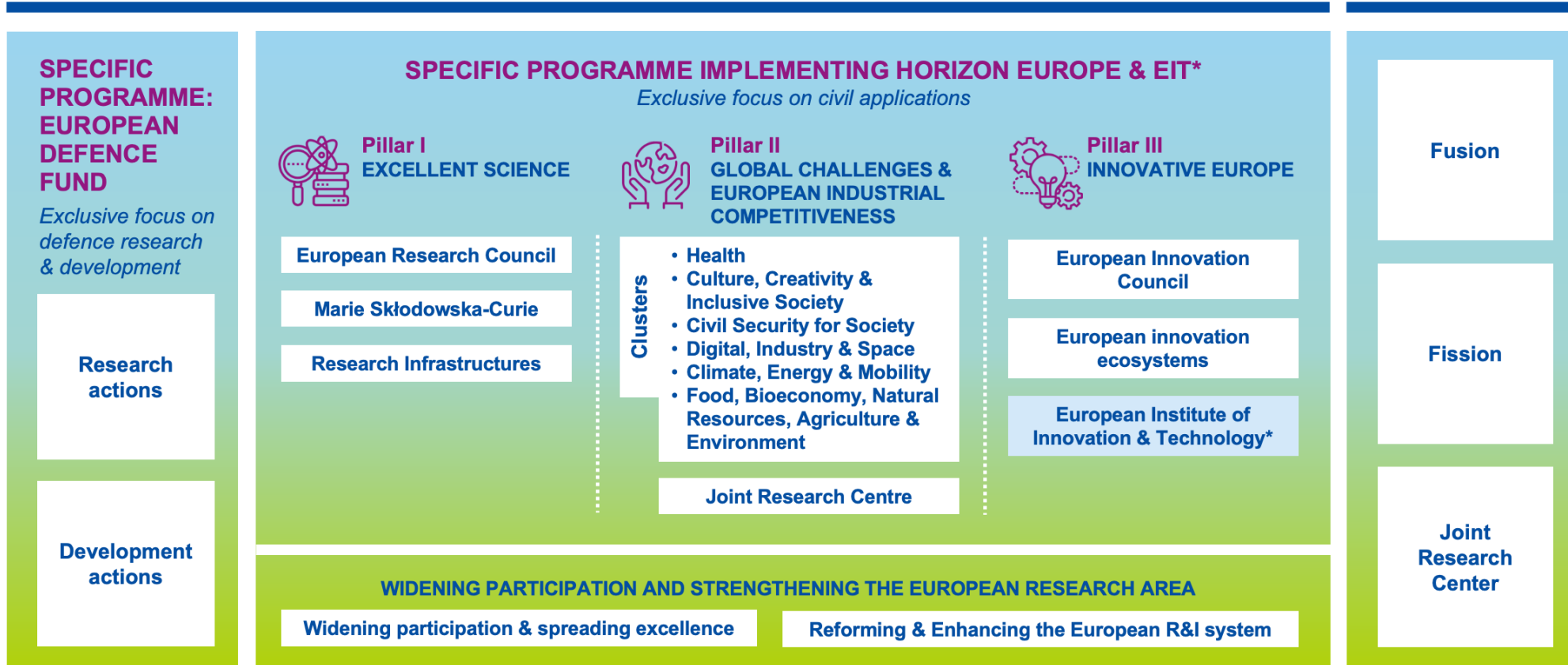
The European Green Deal and CL6 WP2021-2022



About Horizon Europe

HORIZON EUROPE

EURATOM



* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

Destination “Biodiversity and ecosystem services”

Destination “Biodiversity and ecosystem services”

Biodiversity and ecosystems services are back on a path to recovery, are preserved and sustainably restored through improved knowledge and innovation.

- Contribution to the EU biodiversity strategy for 2030 and interconnected GD policies and targets.
- Understanding biodiversity decline and addressing its main cumulative drivers. Valuing and restoring biodiversity and ecosystem services
- Expected impacts: The direct drivers of loss and their interrelations are better understood and addressed, Biodiversity and natural capital are integrated into public and business decision-making, Sustainability and tackles climate change & natural disasters through the deployment of nature-based solutions



HORIZON-CL6-2021-BIODIV-01-03

Understanding and valuing coastal and marine biodiversity and ecosystems services

POLICY CONTEXT

- EU Biodiversity Strategy for 2030, MSFD, WFD, MSP, CFP: reach the Good Environmental Status, Ecosystem-based management
- EU Strategy on Adaptation to Climate Change



EXPECTED OUTCOMES

- ✓ Fill the knowledge gap in 4D in marine & coastal **biodiversity traits, ecosystems processes and functioning for implementation** of marine and biodiversity policies
- ✓ **New methods and indicators** for regular and timely integrated observation & assessments of the health of marine biodiversity and its ecosystem services (**Good Environmental Status**)
- ✓ Full integration of **biological components** with physical and geochemical components required for **Ocean health prediction for better decision making**
- ✓ Science-based maritime spatial planning and identification of Ecologically or Biologically Significant Marine Areas & MPAs

HORIZON-CL6-2021-BIODIV-01-03



SCOPE

- Exploration of marine and coastal biodiversity at the level of species, intraspecific/genetic level, ecosystems functionalities, trophic-interactions and interconnections across temporal and spatial scales;
- New theoretical models of the **organisation and dynamics of marine biodiversity and ecosystems processes and functioning in space & time** (including primary production, food webs, biogeochemical cycles and abiotic environmental changes such T, pH)
- **Toward Ocean health prediction** (including climate change vulnerability), feed models for decision-making with integration of ecological components with physical and geochemical components in **4D**
- **Natural capital accounting from deep sea to coastal ecosystems,**



INDICATIVE BUDGET

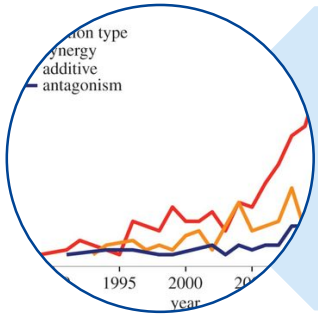
16 mln EUR per project
(16 mln EUR in total)



Important!

Inform EC Biodiversity Knowledge
Centre

Collaboration with other projects
Integrate existing and new data and
knowledge



HORIZON-CL6-2021-BIODIV-01-04

Assess and predict integrated impacts of cumulative direct and indirect stressors on coastal and marine biodiversity, ecosystems and their services

EXPECTED OUTCOMES

POLICY CONTEXT

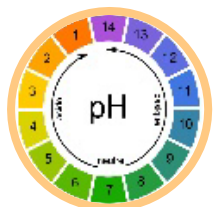
- EU Biodiversity Strategy for 2030, MSFD, WFD, MSP, CFP, HBD: reach the Good Environmental Status, Ecosystem-based management
- EU Strategy on Adaptation to Climate Change
- EU Action Plan 'Towards Zero Pollution for Air, Water and Soil'

- ✓ Improved systemic **understanding** and **modeling** of cumulative impacts
- ✓ Determining **pressure levels** that clearly equate to acceptable levels of environmental impact on the **Good Environmental Status**
- ✓ Policy makers and implementing authorities can **assess and predict impacts of multiple stressors** on coastal & marine ecosystems functioning and its services, invasive species, harmful algal and jellyfish blooms
- ✓ Holistic **Ecosystem based management** and policy measures for activities both at sea and on land

HORIZON-CL6-2021-BIODIV-01-04



SCOPE



- Develop a **systemic approach** to characterise, measure, and understand the combined impact of different types of stressors on coastal and marine ecosystems processes and services
- Characterise the **biological mechanisms that determine the response of organisms and ecosystems** to stressors and environmental changes
- Develop **technologies, methods and models** for assessment and forecast, ecosystem resilience and tipping points
- **Use and contributions to Copernicus**, the Group on Earth Observations (**GEO**), European Space Agency Earth Observation Programme including flagship actions on biodiversity and ocean health of the EC-ESA Joint Earth system science initiative
- Develop and disseminate **policy recommendations**



INDICATIVE BUDGET

10 mln EUR per project
(10 mln EUR in total)



Important!

Inform EC Biodiversity Knowledge Centre

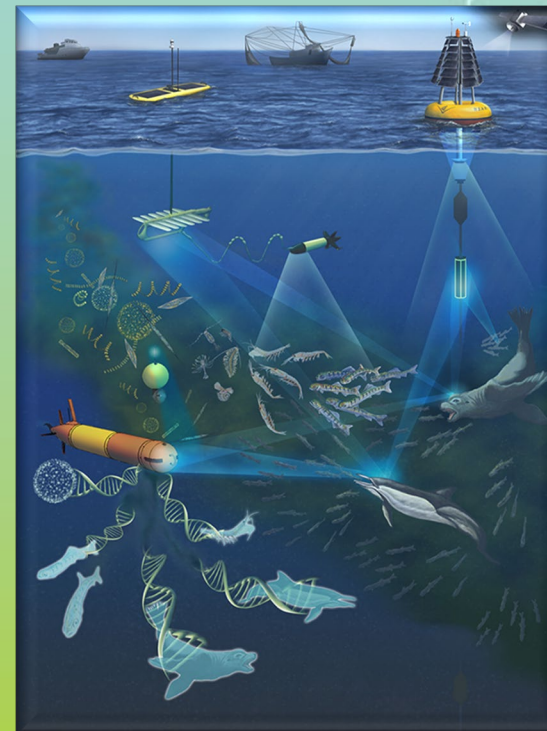
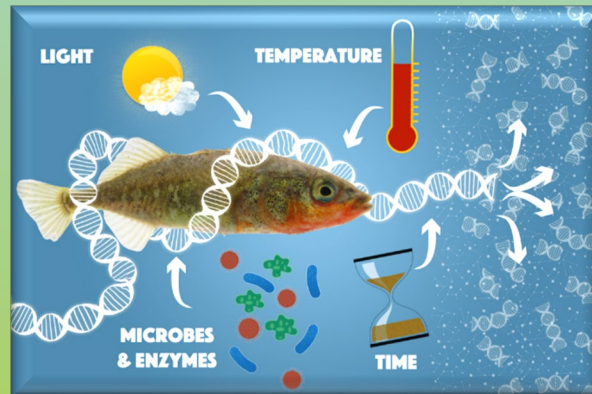
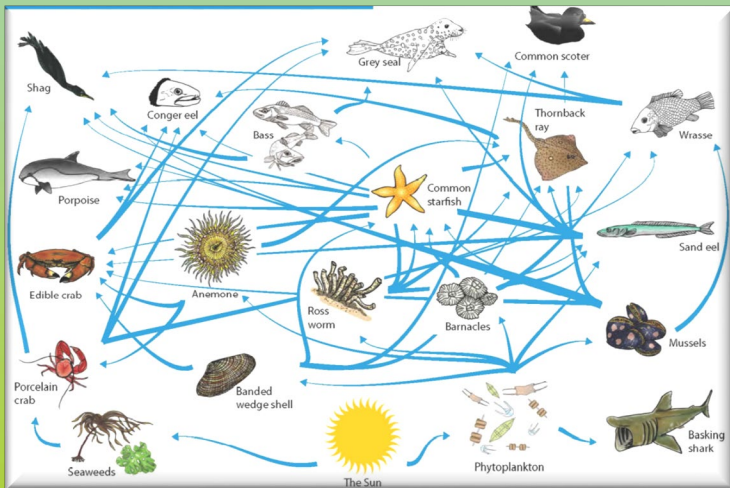
Collaboration with other projects

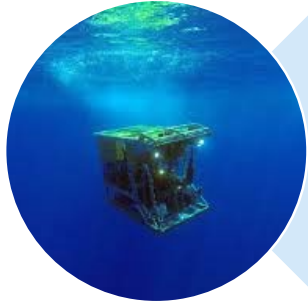
Integrate existing and new data and knowledge

HORIZON-CL6-2022-BIODIV-01-01

Observing and mapping biodiversity and ecosystems, with particular focus on coastal and marine ecosystems

Research and Innovation Actions



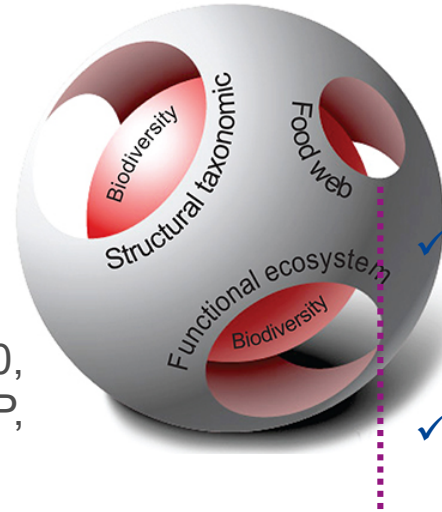


HORIZON-CL6-2022-BIODIV-01-01

Observing and mapping biodiversity and ecosystems, with particular focus on coastal and marine ecosystems

POLICY CONTEXT

- EU Biodiversity Strategy for 2030, MSFD, WFD, MSP, HBD, CFP, Sustainable blue Economy
- EU Strategy on Adaptation to Climate Change
- Science based implementation of science based policies



EXPECTED OUTCOMES

- ✓ 4D Observation & prediction of marine, coastal & freshwater **biodiversity traits**, for implementation of policies (incl. blooms & IAS,)
- ✓ Full integration of **biological / ecological components** with physical and geochemical components required for **Ocean health prediction for better decision making**
- ✓ “**Blue Carbon**” balance model for all marine/coastal ecosystems in **European EEZ** (use for NDC)
- ✓ **Contribute to the Global Biodiversity Observation Network** (GEOBON, MBON, GOOS)
- ✓ Regular and timely observation & assessments of the **Good Environmental Status** (MSFD)

HORIZON-CL6-2022-BIODIV-01-01



SCOPE

- **New data & proxies** of subsurface biotic components, Standardized minimum set of Essential Ocean and Biodiversity Variables for sustained observations of marine biodiversity and ecosystem functions. Feed for new models of prediction of biodiversity & ecosystems dynamics
- **New validated tools and their integration with existing ones** for observation, mapping and monitoring: *in situ*, autonomous unmanned vehicles, acoustic, eDNA, systems biology, meta-omics, citizen science frameworks, **satellite applications**
- Include **invasive alien species**, algal & jellyfish blooms
- Ecological and anthropogenic processes determining the fate of E, O₂, pH, nutrients (esp. carbon stocks & flux) in all marine and costal ecosystems of the European EEZ. Evaluate the “Blue Carbon” balance in the different marine ecosystems through high-resolution ecosystems mapping.
- Provide policy recommendations, plan for fast track integration and deployment of new aquatic **biodiversity observation in existing services (regional to global)**.



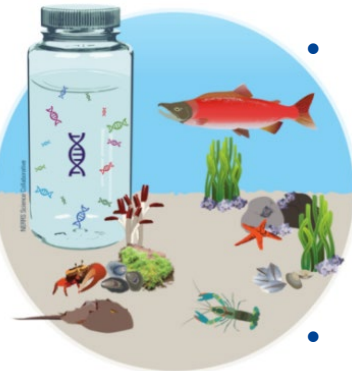
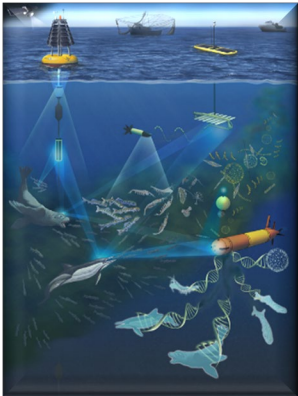
INDICATIVE BUDGET

4 to 14 mln EUR per project
(14 mln EUR in total)
2/3 to marine/coastal
1/3 to terrestrial/freshwater



Important!

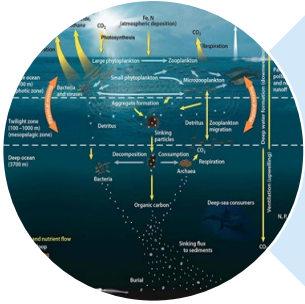
Contribute to Biodiversity & Ocean health flagships actions of EC-ESA Joint Earth system science initiative
Feed EMODnet
Collaboration with other projects
Inform EC Biodiversity Knowledge Centre



Destination “Land, ocean and water for climate action”

Destination “Land, ocean and water for climate action”

- There is growing awareness of the importance of ocean and polar regions as an integral part of the Earth’s climate system and of the need to ensure the integrity and resilience of these ecosystems.
- Expected impacts: Better understanding and enhancing the mitigation potential of ecosystems based on the sustainable management of natural resources.
- Advanced understanding & science and Improved adaptive capacity of water and soil systems and sectors including by unlocking the potential of nature-based solutions.



HORIZON-CL6-2022-CLIMATE-01-02

Understanding the oceanic carbon cycle

POLICY CONTEXT

- In support to the European Green Deal and its biodiversity and climate initiatives, strengthening the **ocean - climate nexus research** and our understanding of the **natural ocean carbon sinks** and their potential role in mitigating and adapting to climate change is needed, in an endeavour help identify lasting solutions to climate change by paying greater attention to nature-based solutions for healthy and resilient seas and ocean.

EXPECTED OUTCOMES

- ✓ Furthered **ocean exploration** and **increased understanding** and **predictability of the oceanic carbon cycle**
- ✓ Improved understanding of the **potential of the ocean and its ecosystems** for contributing to the **next generation of carbon cycling models**, such as those used IPCC to set global climate policy.
- ✓ Significant contribution to **closing the knowledge gaps in the ocean carbon cycle** and substantial contributions made to **key international assessments**, such as the IPCC, IPBES, WOA and other major regional and global initiatives.

HORIZON-CL6-2022-CLIMATE-01-02



SCOPE:

- Research the **oceanic carbon cycle**, its efficiency, climate sensitivity, and emerging feedbacks and understand the temporal and regional variability of the **natural carbon inventory in the ocean**.
- Research the **biological pump** and the **deep ocean carbon sink**. Explore the **efficiency and global magnitude of the biological pump**.
- Contribute to **ocean observations** and the Digital twin of the oceans by providing an **ocean carbon-modelling environment**.
- Improve the **sampling of regions and metrics for marine organisms** and estimate and quantify the **global CO2 sequestration potential** of protecting and restoring populations of invertebrates and vertebrates to previous levels.
- Deliver **quantification and predictability of the ocean carbon sink**; the **magnitude and sign of projections of future global ocean primary production**. Further the **regional predictive skill beyond five years**.
- Investigate **tipping points** and **irreversibility in the ocean carbon cycle**, the **biogeochemical feedbacks**, the changes in the 21st century, both globally and regionally, and how the **multiple stressors** will affect the primary production
- Make **policy recommendations**.



INDICATIVE BUDGET
15 mln EUR for one project
(15 mln EUR in total)



Important!

International cooperation,
multidisciplinary and ecosystem-
based approach
Make use of Copernicus and/or
Galileo/EGNOS
Collaboration with other projects



EUROPEAN UNION

EU MISSIONS



Concrete solutions for our greatest challenges

‘Restore our Ocean and Waters by 2030’



#MissionOcean

#EUmissions

#HorizonEU



Restore our Ocean and Waters by 2030

Mission objectives and targets

PROTECT AND RESTORE MARINE AND FRESHWATERS ECOSYSTEMS AND BIODIVERSITY

- Protect at least 30% and strictly protect 10% EU's sea areas
- Restore 25.000 km free flowing rivers
- Marine nature restoration targets (incl. degraded seabeds, coastal ecosystems)

PREVENT AND ELIMINATE POLLUTION OF OUR OCEANS, SEAS AND WATERS

- Reduce by at least 50% plastic litter
- Reduce by at least 30% microplastics
- Reduce by at least 50% nutrient losses, chemical pesticides

MAKE THE BLUE ECONOMY CARBON- NEUTRAL AND CIRCULAR

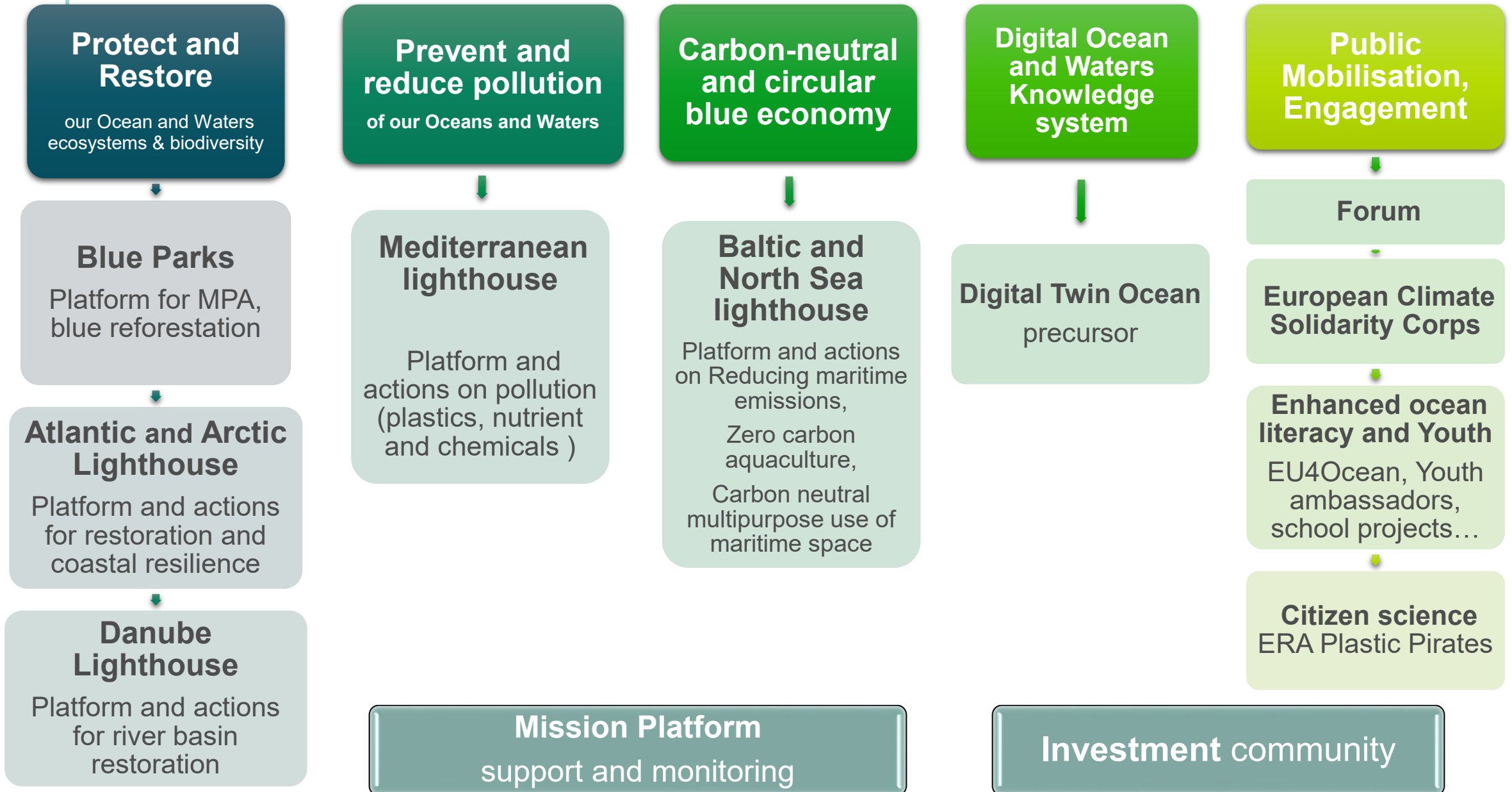
- Net zero maritime emissions
- Zero carbon aquaculture,
- Low carbon multipurpose use of marine space

ENABLERS

Digital Ocean and Waters Knowledge system

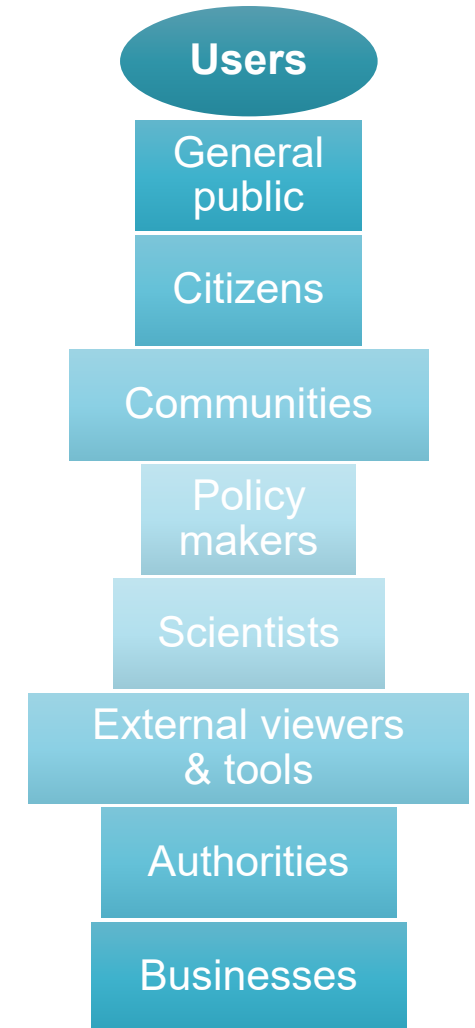
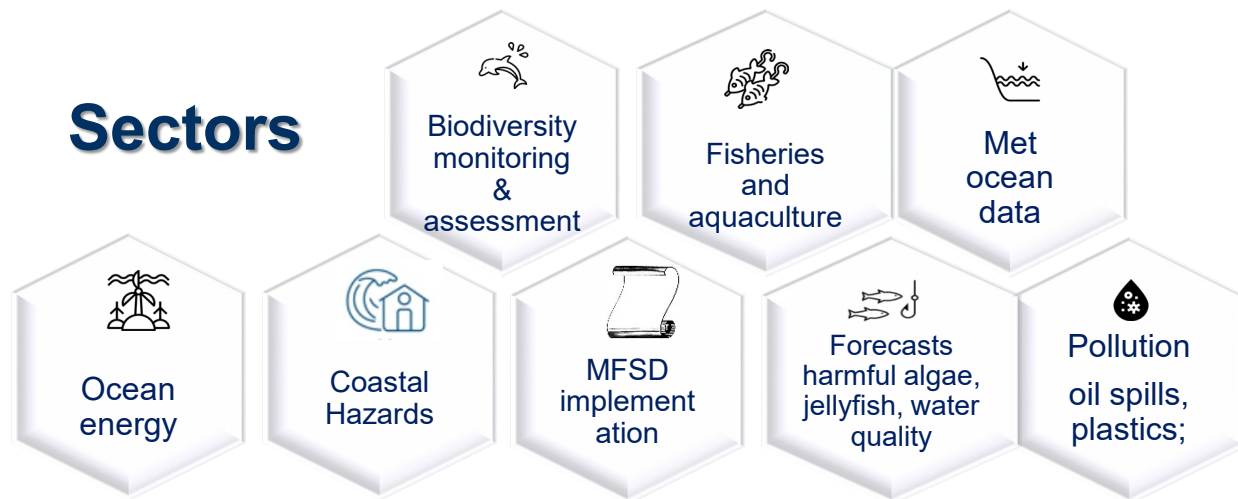
Public mobilization and engagement

Implementing the Mission - Outcomes 2022-2023



DTO context and purpose

- Europe: unrivalled infrastructures on marine observations, data, modelling and forecasting *but* not sufficiently interconnected, nor fit for digital age
- Need for user-driven powerful tools to strengthen ocean knowledge and ocean management - implementation of the marine Green Deal objectives



DTO content

Digital Knowledge System

RESTORE OUR OCEAN AND WATERS

BY 2030

Data analytics
Specifics
Local twins



Pan-EU
Twin
services



Digital
backbone



Ocean Data
Space



LIGHTHOUSES



Biodiversity



Zero
Pollution



Carbon
Neutral

USERS

Policymakers

Communities

Scientists

Business

Citizens

Youth

HORIZON EUROPE



European Partnership for a Climate Neutral, Sustainable and Productive Blue Economy



Sustainable Blue Economy Partnership

High-level SRIA

Rationale –
SRIA thematic
matrix structure –
proposed pillars

Pillar 1	Pillar 2	Pillar 3
A blue economy in harmony with nature	Blue economy solutions towards climate neutrality	A thriving blue economy for the people
Pillar 4 Integrated and responsive ocean governance		
KEY ENABLERS		
Digitalisation		
FAIR Data		
Infrastructures		
Ocean literacy		
Social innovation		
Sustainable finance		
Human capacity		

Follow us and keep up to date via:

HorizonEU

DG Research and Innovation: @EUScienceInnov @EU_H2020
<https://www.facebook.com/EUScienceInnov/>

Horizon Magazine: @HorizonMagEU

Horizon Europe website: <http://ec.europa.eu/horizon-europe>

European Innovation Council: <http://ec.europa.eu/research/eic>

European Research Council: <https://erc.europa.eu/>

