OCEAN OF SOLUTIONS

to tackle climate change and biodiversity loss

ocean-climate.org
The Ocean & Climate Platform is an international network of more than 90 organisations from civil society - including NGOs, research institutes, foundations, local authorities, international organisations and private sector entities - united around a key message: “a healthy ocean for a protected climate”.

The Platform aims to promote scientific expertise and advocate for a better recognition of ocean-climate-biodiversity issues by national and international decision-makers. At the science-policy interface, the Platform supports policymakers in need of scientific information and guidance in the implementation of public policies.

In addition, the Platform provides a forum for exchange and reflection: where stakeholders can build a common and holistic approach to the challenge of protecting marine ecosystems and tackling climate change. Drawing on its members’ expertise, the Platform brings light to concrete solutions, based on the latest available science, to preserve the ocean, its biodiversity and the climate.
The ocean at the heart of climate and biodiversity interactions

Central to climate and biodiversity interactions, the ocean plays a key role in regulating the climate system and in providing life support to all species on Earth. In 2019, the conclusions of the IPCC Special Report on the Ocean and Cryosphere clearly put forth the interconnection between the ocean, climate and biodiversity, specifically highlighting the crucial role marine ecosystems play in mitigating and adapting to the effects of climate change. The very same year, the IPBES Global Assessment Report on Biodiversity and Ecosystem Services identified climate change as one of the five direct drivers of change in nature, noting that its effects “are accelerating in marine [...] ecosystems” including, for example, coral reefs. There is no getting around it: climate change is ocean change. As a result, we must simultaneously address the decline in ocean health, climate change and biodiversity loss to successfully overcome the greatest challenges of our time.

The ocean sits at the crossroads of all major challenges facing humanity today, and climate change and biodiversity loss are no exception. The ocean is fundamental to the sustainable world we must build as it ensures food security, human well-being, decent jobs, energy transition, a fruitful economy, a healthy ocean and a protected climate. At the heart of this “life-supporting package”, the ocean greatly contributes to the 2030 Agenda, providing solutions and opportunities to draw a sustainable path between protection and production. In that regard, Sustainable Development Goals (SDG) 14 “Life Below Water”, which aims to “conserve and sustainably use the oceans, seas and marine resources for sustainable development”, sets out a global plan to restore respect and balance to humanity’s relationship with the ocean.

[Image 196x79 to 540x472]

Figure 1. SDG 14 connections with other SDGs (Adapted from IRD)

Driving ambition to set the ocean on a path to recovery

They [the Conventions on Climate and Biodiversity] represent first steps in the processes of addressing two of the most serious threats to the habitability of our planet. Signing them will not, in itself, be sufficient. Their real importance will depend on the extent to which they give rise to concrete actions and are followed quickly by protocols containing the special measures required to make them fully effective and the finances needed to implement them.

Maurice Strong, Secretary General of the Earth Summit, 1992

As early as 1992, world leaders were advocating for concrete actions and stressing the importance of creating the enabling conditions to implement such actions. This message remains particularly meaningful and powerful today. Now more than ever, it is essential to increase global efforts and allocate more resources towards initiatives that address both the impacts of climate change and the loss of biodiversity. Long-term objectives cannot overshadow short-term action. Internationally set goals and targets under the Paris Agreement and upcoming Post-2020 Global Biodiversity Framework are ambitious. If we are to succeed in limiting global warming to 2°C, we must live in harmony with Nature and urgently implement measures to speed up the transition towards sustainable societies and territories.

To swim the talk, the Ocean & Climate Platform aims at mobilizing civil society across sectors and around the globe to drive bold actions to set the ocean on a path to recovery, requisite to tackle climate and biodiversity challenges. It is our common responsibility to act ambitiously to strengthen ocean-based solutions, recognizing the incredible potential of marine and coastal ecosystems in acting as buffers against the impacts of climate change. For instance, natural coastal ecosystems such as coral reefs and salt marshes have the ability to significantly reduce wave heights. Likewise, mangroves are able to block storm surges (i.e., the rise in sea level during storms) and dampen waves, which protects people and infrastructures near the shore.

While much of recent attention has focused on the vulnerability of the ocean, marine ecosystems and the populations that rely on them, we must not forget that the ocean also is a powerful source of untapped solutions and innovation. Such solutions are slowly emerging from a diverse range of sectors, providing key opportunities for concrete action.

The present report “Ocean of Solutions to tackle climate change and biodiversity loss aims to share accessible, reliable, scalable and replicable ocean-based solutions to address the climate and biodiversity crises. Complementary to the Platform’s policy recommendations “A healthy ocean, a protected climate”, this report is the result of the experiences and commitments of the members of the Ocean & Climate Platform in safeguarding the ocean and marine resources. More than 50 organisations put forth one of their flagship initiatives to encourage transformative change at all levels. It provides a pivot from ‘problem’ to solution, responding to policy requests and societal needs.

[Image 594x1 to 1192x843]
**Ocean of Solutions Report: Overview of Projects**

The projects featured in the Ocean of Solutions report are ocean-based initiatives, building on the best available science, and developed to safeguard biodiversity, while mitigating and/or adapting to the effects of climate change. These solutions were classified under four broad categories:

- Protecting and restoring coastal and marine ecosystems
- Promoting research, developing scientific approaches and innovation
- Enhancing the transition towards low-carbon societies, territories and economies
- Education, awareness-raising and advocacy

**Protecting and Restoring Coastal and Marine Ecosystems:**
- Conservation International: Vida Manglar
- International Union for Conservation of Nature (IUCN): Blue Natural Capital Financing Facility
- Ténaka: Blue Carbon Program
- The Nature Conservancy (TNC): Increasing Coastal Wetlands Ambition in Climate Commitments - A case study from Seychelles
- Superior Council of Scientific Investigations (CSIC): MPA-Engage
- Mediterranean Protected Areas Network (MedPAN): Interreg Med MPA NETWORKS
- French national museum of natural history (MNHN): East Antarctic Marine Protected Area
- Sulubaaï Environmental Foundation: Sea Academy: for a sustainable management of the marine resources of Shark Fin Bay (Palawan, The Philippines)

**Promoting Research, Developing Scientific Approach and Innovation:**
- Blue Seeds: Financing mechanisms: a guide for Marine Protected Areas
- French Office for Biodiversity (OFB): Artisan
- Ramsar Convention: Adaptive management of the Camargue’s former saltworks
- The Sea People: Yaf Kenu, Raja Ampat reef restoration project
- Coral Guardian: Blue Center
- Scientific Centre of Monaco (CSM) and Oceanographic Institute - Foundation Albert 1st, Prince of Monaco
- International Alliance to Combat Ocean Acidification (OA Alliance): Ocean Acidification Action Planning
- International Atomic Energy Agency (IAEA): Ocean Acidification Action Planning
- Ocean Conservancy: Shores Forward
- Community of Agglomération de La Rochelle: La Rochelle Territoire Zéro Carbone (Blue Carbon axis)
- Nouvelle-Aquitaine Regional Council: Coastal and estuarine marshes regional aid regulation
- Institut France-Québec Maritime (IFQM) and Innovations bleues: The Ocean, a global common

**Enhancing the Transition Towards Low-Carbon and Resilient Societies:**
- Under The Pole: Deephope
- Océanapolice: Objectif Plancton
- Tara Foundation and the French Facility for Global Environment (FFEM): Ocean Plankton, Climate and Development
- L'ILO Programme Esprit de Velox: Esprit de Velox
- Polar Ocean (Ocean Polaire): Polar Pod
- Hydrographic and Oceanographic Service of the French Navy (SHOM): Homonom: Observation and Modelling of Sea-Levels
- Mercator Ocean International: EU Copernicus Marine Service Ocean Reporting
- The French National Centre for Scientific Research (CNRS): Blue Climate Initiative (Biodiversity and Nature-Based Solutions Working Group)
- Future Earth: Ocean Knowledge Action Network
- French National Research Institute for Sustainable Development (IRD): SOOT-SEA: Impact of Black Carbon in South-East Asia
- French National Institute for Ocean Science (IFREMER): New Innovative 1.618 Programme Esprit de Velox
- French National Research Institute for Sustainable Development: SOOT-SEA: Impact of Black Carbon in South-East Asia

**Raising Awareness, Mobilizing Citizens and Promoting Ocean Literacy:**
- University of Brest (UBO): BLUE DiplomaSEA
- Ethic Ocean: Species Guide for seafood buyers
- World Ocean Network: Mr.Goodfish
- Institut Marin Seaquarium: ReSeaclon, fishermen and territory against marine litter
- Expédition Méd: Plastic Free Mediterranean Sea - Exhibitions for Education
- Aquarium Tropical de la Porte Dorée: Ocean Festival (‘Fête de l’océan’)
- Tour des deux Amériques solidaire en voilier: T2A Expedition
- Neographic Digital: Blue Box, The first immersive nomadic & engaged experiences
- Nausicaa: In The Eye Of The Climate
- Global Ocean Forum: Roadmap to Oceans and Climate Action Initiative
- Institut Français de la Mer (IFM) and Innovations bleues: The Ocean, a global common

© Ivan Bandura
Coastal and marine ecosystems, which include marine living organisms and natural habitats, are essential for people and nature. These ecosystems offer a wide range of vital services to local populations, from livelihoods to coastal protection. The ocean protects millions of people, including by nurturing marine life, detoxifying land-based pollutants and supplying food, while contributing to climate mitigation and adaptation.

The ocean and marine ecosystems are key to mitigate climate change by sequestering and storing greenhouse gases (GHG) emissions. For example, blue carbon ecosystems (i.e., mangroves, seagrasses and salt marshes) act as carbon sinks, absorbing approximately one-quarter of the total annual anthropogenic emissions. For instance, blue carbon ecosystems continue to provide key services to our health and well-being, moving towards a just and equitable transition.

These mitigation and adaptation strategies can result in multiple co-benefits that will contribute to achieving the sustainable development goals. For instance, the ocean supports hundreds of millions of jobs in tourism, fishing and transportation. Coastal and marine ecosystems therefore have a significant economic value. In that regard, coral reefs alone contribute $11.5 billion a year to global tourism, benefiting more than 100 countries and providing food and livelihoods to local people.

This first section showcases initiatives that effectively protect and restore coastal and marine ecosystems, therefore helping the ocean to continue providing vital ecosystem services and related socio-economic benefits humanity depends on.

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Cone-fourth of the total annual anthropogenic emissions (i.e., mangroves, seagrasses and salt marshes) act as carbon sinks, absorbing approximately one-quarter of the total annual anthropogenic emissions of carbon dioxide. Ocean-based mitigation solutions include avoiding the loss and degradation of blue carbon ecosystems, as well as restoring them. They are crucial to deter long-term climate and ocean change (i.e., ocean acidification, ocean warming and deoxygenation), and their irreversible impacts.

Besides, the ocean also provides essential adaptation solutions to reduce and cope with the adverse effects of climate change on coastal and marine ecosystems. These ecosystems often serve as the first line of defence in protecting low-lying communities from extreme weather events and rising sea-levels. Such is the case of coral reefs, which can be powerful levers to support resilience at the local scale. On that front, local communities must be included in the effective design and implementation of the strategies that ensure coastal and marine ecosystems continue to provide key services to our health and well-being, moving towards a just and equitable transition.

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The Vida Manglar blue carbon project addresses the expansion of agricultural lands, unsustainable tourism infrastructure, and increased logging, by conserving and restoring about 11,000 hectares of natural mangroves forests. The project is an inter-institutional and regional community initiative, which seeks certification of actions related to the reduction of carbon emissions due to unplanned deforestation (AUDP) and the conservation of coastal wetlands (CIW).

**OBJECTIVES**

Vida Manglar hopes that through efforts, like Cispatá, they will not only help to preserve and restore blue carbon ecosystems, but develop learnings that can be shared with other like-minded communities and countries in support of a global endeavor to conserve and restore coastal blue carbon ecosystems - ambitious and tangible steps forward in demonstrating how nature-based solutions can contribute to our economy and protect the planet.

**MAIN ACTIVITIES**

The main activities consist in mangrove restoration, avoided deforestation and biodiversity conservation of three key species - Manatees, Needle crocodiles and Otters – all while providing direct and indirect benefits to 4,000 people living in or around the project area (e.g. food, firewood, coastal protection and livelihoods). Conservation International uses Cispatá mangroves (i.e. the sale of carbon offsets) to develop a long-term sustainable financing strategy for the region. This will provide a degree of financial security, and the initial funding needed to develop a sustainable ecotourism program and improve fishing practices in the region.

**RESULTS & IMPACTS**

Overall, the project is planned for 30 years (2015-2045), and Vida Manglar expects to reduce a total of 939,296 tCO2e. The project is receiving credits for reducing deforestation in about 7,561 ha of mangrove forests, but the funding generated by the sale of credits (via the international voluntary market) will contribute to finance the management and protection of the entire 11,000 ha MPA.

**MITIGATION & ADAPTATION**

- Promote the restoration of mangroves through a carbon crediting project;
- Conserve key biodiversity in the area and enhance mangroves’ carbon sequestration capabilities;
- Build local communities’ capacities, including the adaptation to the impacts of climate change.

**WHAT MAKES IT INNOVATIVE**

The Vida Manglar project is the first in the world to use the new Verified Carbon Standard (VCS) blue carbon modules to generate credits from a blue carbon ecosystem, it is the first REDD+ project in Colombia developed with mangroves, and the project is achieving Climate, Community & Biodiversity (CCB) benefits.
OBJECTIVES
Blue Natural Capital projects aim to protect, restore and enhance natural ecosystems to better support climate change adaptation and mitigation efforts whilst conserving biodiversity and other vital coastal and marine natural resources. In line with that, the BNCFF supports the development of sound, investable blue natural capital projects with clear ecosystem service benefits, based on multiple income streams and appropriate risk-return profiles. The BNCFF assists project partners in assessing, preparing and structuring opportunities into bankable investments. This helps to reduce the risk of natural capital investments.

MAIN ACTIVITIES
The main activities are: (1) preparing a pipeline of investable projects in natural coastal systems; (2) ensuring a sound environmental and social vetting process to measure and inform on positive impacts and minimize potential risks; (3) advising on best practices and standards for sound implementation of Nature-based Solutions in coastal environments; (4) supporting project developers towards the development of bankable investment opportunities based on blue natural capital; (5) providing technical assistance to project developers; and (6) developing blue prints based on BNCFF funded projects.

RESULTS & IMPACTS
The BNCFF supports 7 projects: (1) Blue carbon ecosystem conservation projects in Indonesia, Kenya and Zanzibar; (2) “Net-works” (project to collect fishing nets and to sustainably produce seaweed); (3) “Selva Shrimp” in Indonesia (aquaculture project); (4) “Blue Alliance for the Oriental Mindoro Marine Protected Areas” in the Philippines; and (5) “SeatechEnergy” in Indonesia (seaweed farming project).

MITIGATION & ADAPTATION
• Through the protection, restoration and conservation of coastal ecosystems the BNCFF supports climate change adaptation and mitigation efforts whilst conserving biodiversity and other vital coastal and marine natural resources.

WHAT MAKES IT INNOVATIVE
The BNCFF project adapts a holistic approach combining inclusive economic growth with ecosystem conservation, and has the potential to bring the necessary paradigm shift in society. It aspires to use an innovative, blended financing model to access different revenue streams and attract new investors.

Funding sources: Public and philanthropic
Budget: 2.54 M CHF (2.13M €)
Scale: Global
Geographical location: Global
Partner(s): Ministry of Environment, Climate and Sustainable Development, Government of Luxembourg, Total Foundation
Project duration: 2018 - 2021

TENAKA Tenaka Blue Carbon Program
Tenaka is a social business whose mission is to help corporations willing to shift to regenerative businesses, i.e. committing to promote net-positive business for Planet and People. Alongside the Coral Restoration Program, the Tenaka Blue Carbon Program is now focusing on mangrove restoration at scale through carbon compensation mechanisms and scientific impact measurement tools.

OBJECTIVES
Tenaka is to restore 12ha of damaged mangrove forests in 2021, which will sequester more than 10,000 tons of CO2. This program will also benefit more than 13,000 different species of marine and terrestrial wildlife, and will be carried out by more than 30 different scientific and local partners. If Covid-19 allows it, Tenaka will also work alongside local schools with the objective of bringing +600 students onsite to help with plantation and scientific monitoring activities, while learning more about the crucial role of mangrove forests.

MAIN ACTIVITIES
Tenaka mainly conducts blue carbon ecosystem restoration and awareness-raising activities. The plantation activities are split between the nurseries, where mangrove seedlings are raised during 6 to 12 months, and the plantation site where the mature seedlings are to be planted. Scientific monitoring is a key activity to be carried out by our scientific partners alongside volunteers and students.

RESULTS & IMPACTS
The Tenaka Science® platform uses data visualization tools to make scientific and impact measurements data available to Tenaka’s clients and their communities. Key data incorporated in the Impact Reporting hinge around biodiversity metrics, CO2, and associated greenhouse gases sequestration.

MITIGATION & ADAPTATION
• Regenerate coastal habitats to mitigate the climate crisis, as the impacts of carbon sequestration by these habitats is 3 to 5 times more important than terrestrial forests;
• Enhance adaptation co-benefits for local population (e.g. biodiversity, jobs, livelihoods, protection against climate disaster);
• Provide local solutions for the adaptation of coastal communities (i.e. among the most vulnerable to the climate crisis).

WHAT MAKES IT INNOVATIVE
Tenaka believes businesses have the power to regenerate ecosystems and have a duty to repair damages made to the ocean. The model is set to convince companies in many different fields to invest in ecosystem restoration.

Funding sources: Private (tailor-made Corporate Responsibility Programs)
Scale: Subregional
Geographical location: Malaysian Borneo
Partner(s): DoDo brand (Kering group) and Dataiku
Project duration: 2020-2025

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Protecting and restoring coastal and marine ecosystems

THE CRYSTAL CLEAR RESTORATION

Tenaka Blue Carbon Program

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Nature-based Solutions in coastal and marine ecosystems: a focus on blue carbon

Nature-based Solutions are defined by the IUCN as “actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits.”

Building on this definition, Nature-based Solutions in coastal and marine ecosystems (coastal and marine NbS) are actions to protect, sustainably manage and restore coastal and marine ecosystems in ways that address societal challenges effectively and adaptively. Coastal and marine NbS are based on the ability of coastal and marine ecosystems to sequester CO2 (i.e., blue carbon ecosystems), and/or their ability to foster adaptation and resilience of communities and ecosystems, by acting as buffers against climate change impacts while improving livelihoods.

In that regard, “blue carbon” ecosystems (i.e., mangroves, saltmarshes and seagrasses) stand out, as they are most effective in mitigating climate change, while offering vital services to local populations. Indeed, despite covering only 2% of the total ocean area, coastal ecosystems account for approximately 50% of the total carbon sequestered in ocean sediments. For instance, it is estimated that mangrove habitats alone store around 6.4 billion tons of carbon at a global scale.

Adopting and scaling-up Nature-based Solutions to protect and restore coastal and marine ecosystems, especially blue carbon ecosystems, can therefore act as a multi-purpose solution and contribute to ambitious climate action. Leading countries, such as Chile, Costa Rica, Fiji, Seychelles and Senegal, have started to include coastal and marine NbS into national climate strategies in view of achieving the objectives of the Paris Agreement.

The Nature Conservancy (TNC)

Seychelles has committed to fully map the extent of seagrass and mangrove habitats within its Economic Exclusive Zone, in turn ascribing a value to the carbon stored within such habitats. The Seychelles is committing to protecting coastal wetlands and will integrate blue carbon values of seagrass meadows within its next Nationally Determined Contribution and increase ambition by putting in place protections for at least 50% of Seychelles seagrass and mangrove ecosystems by 2025, and 100% of seagrass and mangrove ecosystems by 2030.

OBJECTIVES

The project objectives are twofold: (1) Generate data on blue carbon ecosystems in Seychelles by applying the latest remote-sensing methods and carbon assessment techniques to develop a field-validated map of the extent of seagrass meadows and associated carbon stocks in Seychelles waters; and (2) Include ambitious blue carbon targets into the Nationally Determined Contribution.

MAIN ACTIVITIES

Main activities include: (1) supporting the creation of a field-validated map of the extent of seagrass meadows and associated carbon stocks in Seychelles waters, by using the latest remote-sensing methods and carbon assessment techniques; and (2) supporting the drafting of the Seychelles’ updated 2021 NDC to signal wider ambition and to identify clear and transparent contributions. The project also contributes to including the carbon stock value of these seagrass ecosystems in other future mitigation policies.

RESULTS & IMPACTS

Seychelles has recently announced its commitments to protect at least 50% of Seychelles seagrass and mangrove ecosystems by 2025, and 100% of seagrass and mangrove ecosystems by 2030, subject to external support, reflecting their value for mitigation, adaptation and resilience. These targets, by going beyond reporting of carbon stocks in blue carbon ecosystems, will solidify Seychelles’ leadership in coastal wetland protection and inspire other states to make similar commitments.

MITIGATION & ADAPTATION

Integrate blue carbon targets in the Seychelles’ Nationally Determined Contribution;

Increase resilience from coastal communities;

Enhance strong mitigation co-benefits from blue carbon ecosystems.

WHAT MAKES IT INNOVATIVE

Despite growing recognition of the values provided by seagrass, the extent of their coverage is far less well known. Various localized mapping efforts have occurred globally, but no country has committed to mapping at the scale its full EEZ, which in the case of Seychelles represents a significant undertaking.
Engagement through participatory approaches; and (4) mainstreaming developed and upgraded climate policies in the Mediterranean Sea.

RESULTS & IMPACTS
Development of socio-ecological vulnerability tool and trainings; (webinars with >100 participants), development of 11 harmonized monitoring protocols and training (webinars >50 participants); development of citizen science strategies for MPAs and training (webinar >100 participants); consolidation of T-MED-Net platform: >8 million temperature samples secured; development of the Marine Heat Wave tracker near real time in the Mediterranean; temperature data visualization services at local, ecoregion and regional scales, 23 MPAs in the network, >70 sites running monitoring activities, >1000 mass mortality records in the mortality events database

MITIGATION & ADAPTATION
- Identify actions to address adaptation and mitigation of the ecological and socio-economic systems;
- Upgrade climate policies in the Mediterranean Sea and increase the effectiveness of MPAs;
- Develop adaptation plans in Mediterranean MPAs;
- Enhance knowledge on marine ecosystems to better face the impacts of climate change.

MAIN ACTIVITIES
MPA-Engage’s main activities are: (1) improving the knowledge on marine ecosystems and their inter-linkages with human activities to face the impact of climate change; (2) fostering the implementation and development of standardized tools for monitoring schemes (e.g. vulnerability assessments, monitoring schemes and adaptation plans in Mediterranean MPAs and small-scale and recreational fishery sectors); (3) promoting stakeholder engagement through participatory approaches; and (4) mainstreaming developed and upgraded climate policies in the Mediterranean Sea.

OBJECTIVES
The overall objective of the MPA-Engage project is to support and promote the role of Mediterranean MPAs as nature-based solutions for the implementation of adaptation and mitigation actions. The project will produce adaptation plans for 7 MPAs and will put the Mediterranean Sea at the forefront of marine conservation in the face of climate change. To do so, MPA-Engage will involve the main stakeholders of each MPA: managers, socio-economic actors – recreational diving sector and artisanal fishing, local and regional authorities, research institutions and the general public.

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- Upgrade climate policies in the Mediterranean Sea and increase the effectiveness of MPAs;
- Develop adaptation plans in Mediterranean MPAs;
- Enhance knowledge on marine ecosystems to better face the impacts of climate change.

MAIN ACTIVITIES
The project’s main activities include: (1) Designing a new collaborative process to strengthen and connect networks at national and regional levels on key topics; (2) Setting up concrete actions through 9 pilot projects in 7 countries; (3) Building skills and capacities of MPA managers. It provides sustainable solutions to key challenges requiring a supra-MPA approach, considering MPA management effectiveness. Small scale fisheries management, Mobile species conservation and sustainable financing.

OBJECTIVES
The project aims to boost the effectiveness of MPAs through strong, active and connected networks of MPA managers. It provides sustainable solutions to key challenges requiring a supra-MPA approach, considering MPA management effectiveness. Small scale fisheries management, Mobile species conservation and sustainable financing.

MAIN ACTIVITIES
The network’s main activities include: (1) Designing a new collaborative process to strengthen and connect networks at national and regional levels on key topics; (2) Setting up concrete actions through 9 pilot projects in 7 countries; (3) Building skills and capacities of MPA managers; (4) Building strong alliances of sites sharing similar challenges; (5) Developing a new Post 2020 Roadmap for Mediterranean MPAs and a coordinated MPA voices with shared recommendations to support pro-MPA policy-making.

RESULTS & IMPACTS
Pilot projects have started to test methodologies to improve fisheries management, sustainable financing and mobile species conservation. First training modules have been implemented for MPAs. National and regional thematic networks of MPA managers have started to be reinforced and connected. The process to develop a Post 2020 Mediterranean MPA Roadmap has started.

MITIGATION & ADAPTATION
- Effectively manage marine protected areas to strengthen their role as marine spatial management tool, therefore supporting ecosystem-based adaptation and mitigation.

WHAT MAKES IT INNOVATIVE
MPA-Engage seeks to enhance and improve the management of Mediterranean MPAs to face climate change and ensure their role as effective nature-based solutions. It also creates specific adaptation plans that most MPAs do not have.

WHAT MAKES IT INNOVATIVE
Networks of MPA managers enable working on MPAs with a new dynamic. Networking activities facilitate exchanges, capitalization and increased knowledge. Through joined forces of networks and a dynamic bottom-up approach linking experience on the ground and decision-making processes, MPA voices are coordinated to support policy making at all levels.
OBJECTIVES
The objectives are: (1) To include every type of habitat and ecosystem (and the associated biodiversity) that occurs in the East Antarctic; (2) To conserve the biodiversity of the East Antarctic; (3) To protect key ecosystem processes, habitats and species, including nursery grounds for Antarctic krill, Antarctic toothfish, and silverfish; (4) To provide references for studies that show the impacts of fishing and ecosystem changes (e.g. climate change); (5) To allow the MPA to be used for research and monitoring; (6) To allow activities consistent with providing for multiple uses within the individual MPAs when those activities will not impact on the objectives of these MPAs.

MAIN ACTIVITIES
Main activities include: leading scientific expeditions (e.g. 2007-2008 CEAMARC expedition, and 2009- 2017 REVOLTA expeditions); planning marine protected areas deployment (e.g. 2011 MPA-workshop in Brest); and drafting policy recommendations (e.g. First EAMPA design submitted at CCAMLR Scientific Committee in 2011). First presentation to the Commission of the EAMPA draft Conservation Measure in 2013. A reduced version of the EAMPA draft Conservation Measure is presented to the Commission in 2014 and Major reassessment of EAMPA Conservation Measure in 2019.

RESULTS & IMPACTS
In 2011, CCAMLR adopted a framework for establishing marine protected areas in the form of a conservation measure and in doing so, the Commission committed to creating a representative system of MPAs in the CCAMLR area. Besides, scientific progress were made, such as refining the work on the bioregionalisation of East-Antarctica and on the Ecocoregionalisation of D’Urville Sea using demersal fish D’Urville Sea bird colonies included in the CCAMLR Ecosystem Monitoring Program to monitor Climate Change effects on long term biological series of observations.

MITIGATION & ADAPTATION
• Protect key ecosystems, including nursery grounds for krill.
• Create an area linked to other MPAs around Antarctica where human exploitation will be reduced.
• Enhance scientific monitoring to help assess species resilience in the face of Climate Change.
• Study the impacts of fishing and ecosystem changes (e.g. climate change).

WHAT MAKES IT INNOVATIVE
The Southern Ocean is a data poor area and designing MPAs in such an area has proved to be difficult. To overcome this issue, the MNHN developed, in collaboration with other funding partners, proxies to habitat diversity and the associated biodiversity. A reduced set of variables proven to be sufficient to describe ecoregions, pelagic and benthic.

RESULTS & IMPACTS
Many activities were delayed because of the COVID-19 pandemic. However, to date the MPAs have been voted with the villages, the schools are involved in the educational program and the Sea Academy is now building the necessary facilities to start the restoration program. Expected results within 3 years include: (1) 5 new MPAs (150 ha) managed by Sandoval, Silanga and Depla barangays; (2) 600 ha of marine environment watch; (3) 120,000 juvenile fish released in each MPA; (4) 150,000 juvenile culture fish in each barangay; (5) 600 children participant of the Sea Academy educational program; and (6) 7 created jobs with job training for local people.

MITIGATION & ADAPTATION
• Provide a sustainable model of development to maintain and restore the degraded coastal ecosystems;
• Reduce the fishers and destructive pressures on coastal ecosystems;
• Provide local jobs to avoid local people moving to cities etc;
• Organize activities like mangrove planting and clean up with local communities.

OBJECTIVES
The overall goal is to restore the marine biodiversity and restock the fish populations of Shark Fin Bay for the benefits of local populations. The main stake is food security since local populations critically depend on marine resources for their protein income. The objectives are: (1) to preserve ecosystems by creating 3 participative marine protected areas (MPAs) of 150 ha each; (2) to restore coral reefs and fish populations inside the MPAs and expecting spill-over effect; (3) to teach and train students and adults for a sustainable management of marine resources; (4) to share the experience and replicate it in Palawan and South Asia.

MAIN ACTIVITIES
Scientific monitoring uses passive acoustics, photogrammetry, environmental DNA, combined with the standard visual census protocol to evaluate MPAs. Besides, activities for the restoration of marine ecosystems include managing artificial reefs where the reefs were damaged by blast fishing and capture-raising-release of wild post-larvae to repopulate the fish communities, as well as raising some of the common post-larvae captured for local food consumption. In addition, the Sea Academy educational program is offered to the school to bring students in the marine ecosystems and provides adapted courses and activities to discover their marine environment.

WHAT MAKES IT INNOVATIVE
This project creates a network of participative MPAs, it involves public and private funds and partners. It has a complete approach through protection, restoration and education activities, and provides in a very short term all the tools for the local population to keep the activities running. It is easily replicable.
Towards climate-smart designs of Marine Protected Areas:

Marine Protected Areas (MPAs) are an area-based management tool with biodiversity conservation as primary objective. In addition to restoring fish abundance and biomass, they provide a wide range of other long-term ecological and socioeconomic benefits, such as habitat protection, export of eggs, larvae and adults in fishing grounds and increase in fishing yields. As such, MPAs play a key role in rebuilding marine populations and habitats, which contribute to the resilience of both marine populations and coastal communities to climate change.

The effectiveness of MPAs at delivering positive outcomes is mitigated by various drivers. MPAs’ level of protection, management, age and size play key roles. In particular, bigger and older MPAs and those being fully or highly protected are the most effective.

MPA effectiveness will also be affected by future ocean conditions. Climate-smart MPAs should be designed in ways to cope with future climatic conditions. This is achieved for example by choosing the MPAs location based on climate vulnerability criteria, or by creating networks of MPAs which account for future changes in the ocean’s connectivity and migration corridors. Implementing such designs requires improved dialogue between the scientific community, policymakers and local stakeholders, including Indigenous and local knowledge holders.

Additionally, MPAs serve as an invaluable source of information by providing a reference to how marine ecosystems react to climate change in the absence of human disturbance. By phasing out additional anthropogenic pressures, they can be used by the scientific community as “sentinels of climate change, laboratories to monitor the effects of climate change and areas where to develop new management tools”.

* Lester et al. (2009). Biological effects within no-take marine reserves: a global synthesis.
* Roberts (2017). Marine reserves can mitigate and promote adaptation to climate change.
* Bárbara Horta e Costa (2016). A regulation-based classification system for Marine Protected Areas (MPAs).

* McLeod (2009). Designing marine protected area networks to address the impacts of climate change.

OBJECTIVES
The Artisan project aims to increase the resilience of territories to climate change. To that end, it has three main priorities: (1) Demonstrate and showcase the potential of nature-based solutions; (2) Raise awareness and build stakeholders capacity; (3) Support adaptation nature-based solutions projects in France (including overseas). The project targets elect representatives, local authorities, engineering and consulting firms, economic stakeholders and civil society.

MAIN ACTIVITIES
Main features of the project include: (1) A pilot site in Martinique to restore Mangroves to limit marine submersion; (2) A national network on coastal issues looking at risks of submersion, erosion and impacts of climate change on fisheries; (3) The diagnosis of impacts of climate change on fisheries and aquaculture and the link with nature-based solutions; (4) A methodological guide on tourism (including coastal tourism) with regards to nature-based solutions; and (5) All other aspects that could come back from the ground thanks to the national network.

RESULTS & IMPACTS
The French Office for Biodiversity has selected the 10 pilote sites, and identified key stakeholders. It has designed the main features of the project. Related events will be convened including forums, award ceremonies and workshops.

MITIGATION & ADAPTATION
- Develop nature-based adaptation solutions to increase the resilience of territories to climate change;
- Place marine biodiversity at the heart of French climate mitigation and strategies;
- Enhance the potential mitigation co-benefits of adaptation nature-based solutions;
- Raise awareness about climate impacts on coasts and coastal communities.

WHAT MAKES IT INNOVATIVE
Through the promotion of nature-based solutions, the Artisan project strengthens adaptation strategies, while providing mitigation co-benefits. It places biodiversity at the heart of French climate adaptation and mitigation strategies, enhancing synergies between climate and biodiversity action.

OBJECTIVES
The overall goal is to implement adaptive management to sea-level rise, ensuring co-benefits to biodiversity and human well-being and safety. The objectives are to (1) Implement and test Nature-based Solutions approaches in the restoration process of coastal zones affected by erosion and sea-level rise; (2) Ensure a scientific approach of the restoration processes enabling transfer of experiences to other coastal areas facing similar challenges.

MAIN ACTIVITIES
Activities include: (1) Restoring a more natural hydrological functioning that reconnects the surrounding hydro-systems; (2) Restoring the natural ecosystems characteristic of coastal lagoons and sandy coasts; (3) Maintaining or increasing the carrying capacity for breeding colonial waterbirds; (4) Implementing adaptive management to sea-level rise; and (5) Contributing to sustainable developments, including facilitating the development of green tourism and recreational activities.

RESULTS & IMPACTS
Ecological, economic and social evaluations were carried out. Results include the very fast restoration of landscapes; the dissipation of wave energy during storms (by the re-connected lagoons, allowing low pressure on the inland protection dykes); the important quantity of sand entering the lagoons during storms (acting as buffers against future storms).

ADAPTATION
- Offer a large-scale adaptive response to coastal erosion and sea-level rise by implementing nature-based solutions.

WHAT MAKES IT INNOVATIVE
The project is an example of how humans can help to reverse a disturbance using nature-based solutions and adaptive restoration until nature recovers its functionality and resilience. It is a unique large-scale experiment (6,500 ha) in Europe for the implementation of Nature-based Solutions applied to coastal areas threatened by erosion and sea-level rise.
THE SEA PEOPLE

Yaf Keru, Raja Ampat reef restoration project

Yaf Keru is a community-based reef restoration programme designed to convert former fishermen into coral gardeners. Restoration effort is focused on former bomb fishing grounds and specifically aims at improving substrate stabilisation to prevent burial of pristine primary reefs found below. The programme has an educational purpose with coral gardeners capable of educating both local community members and marine park visitors about ocean literacy and services provided by coral reefs. Yaf Keru means ‘Coral garden’ in Papuan language.

OBJECTIVES
The main objectives are to: (1) Establish a skilled team of 10-20 Coral gardeners and provide sustainable and restorative livelihoods for 50-100 community members; (2) Restore up to 3ha of degraded rubble slopes per year and establish the entire ecological functioning of healthy coral reefs within 3 years; (3) Establish a 500ha no-take zone around the project to improve local food security; (4) Provide educational and participative services to local tourism operators as a means to achieve financial sustainability; (5) Use the programme as a platform for field research and coral ecology studies.

MAIN ACTIVITIES
Main activities are mainly: scientific activities (e.g. environmental assessment, substrate stabilisation, coral transplantation, participative science and conservation, social consultations) and awareness-raising activities (i.e. educational events, ecological and diving training, awareness and socialisation campaigns, crown of thorns culling campaigns).

RESULTS & IMPACTS
1400m² of reef have been restored in front of a local tourism village. 14000+ coral fragments transplanted of at least 61 scleractinian species. The pilot provided training and salaries to 15 local community members. At present, the programme can sustainably cover 1 permanent position for a local project manager. In terms of education, the coral awareness campaigns have reached 1000 local villagers and more than 10,000 marine park visitors.

MITIGATION & ADAPTATION
- Maintain and enhance the resilience of coral reefs by developing the re-generation process and promoting sustainable practices among marine park stakeholders;
- Select a large range of heat-stress resistant coral species in the programme;
- Provide alternative livelihoods designed to reduce the anthropogenic pressures and impact caused by illegal extractive practices.

WHAT MAKES IT INNOVATIVE
Yaf Keru is designed to be in the World’s top 1% programmes of its kind in terms of scale and longevity. It is highly cost effective (150K euros/ha) and brings a permaculture approach to the field. Whilst reef restoration can have a significant ecological output, it also provides both a socio-economic and socio-cultural lift to the local community.

Coral Guardian

Blue Center

Based on its experience in Indonesia and in response to the climate emergency, Coral Guardian launched a training program in 2019, called the Blue Center, which enables any project leader or organization to benefit from the theoretical, practical or financial support to launch a participatory marine conservation project. Several candidates have requested support from Coral Guardian in the implementation of their project. Two projects are already implemented in Indonesia and in Spain, and other projects are being reviewed.

OBJECTIVES
The overall goal is to support project leaders in developing participatory marine conservation projects around the world. The three priorities are to (1) protect and restore coral ecosystems, to (2) raise awareness on coral issues among local and international communities; and to (3) contribute to expanding scientific knowledge related to coral ecosystems.

MAIN ACTIVITIES
The main activities conducted under this project are communication with the different project leaders to guide the coral restoration activities (e.g. training programmes), scientific monitoring of the restoration areas, and the development of awareness programmes. The implementation of these activities varies depending on the context, and is managed in collaboration with local organisations.

RESULTS & IMPACTS
Two projects have been developed since the launch of the Blue Center. The first project began in 2015 in Indonesia and joined the Blue Center in 2019. This project has seen 40000 corals transplanted, a local team of 8 full time employees, a return of around 5 times more species of fish and 50 times more fish in the restoration area. A new project based in Spain joined the Blue Center in 2020, but it remains too early to have measurable results of the impact of the project. Worldwide, Coral Guardian has raised awareness among over 400000 people.

MITIGATION
- Restore coral ecosystems to bring biodiversity back;
- Mitigate coastal erosion to help ecosystems adapt to a changing environment.

WHAT MAKES IT INNOVATIVE
The project is unique in its participatory approach. Project leaders are given the knowledge and skills to develop their own conservation project. Each project involves local and international actors to raise awareness at all levels. Each project includes scientific monitoring activities that contribute to its adaptive management.
OBJECTIVES
The aims of the World Coral Conservatory are: (1) To create a unique repository of living coral colonies (1000 species); (2) To contribute to protecting coral reef biodiversity; (3) To provide researchers from all over the world with referenced and trackable biological material; (4) To use the available biological resources for assisted evolution approaches to increase stress tolerance and recovery; (5) To provide comprehensive information on corals and coral reefs to the general public and stakeholders in order to educate and enable people to participate in the collective effort of coral reef conservation.

MAIN ACTIVITIES
There are four main activities in this project: (1) on-land nursery for conservation, (2) basic and applied research to better understand coral biology and make corals more resilient and tolerant to global change, (3) reef restoration thanks to assisted-evolution, and (4) education and raising-awareness on protection of coral reefs.

RESULTS & IMPACTS
Since March 2019, 17 worldwide aquaria have been recruited as vaults for the coral biobank. Moreover, the CSM and the Oceanographic Institute have federated similar projects around the world and created the Global Coral Biobank Alliance with the Great Barrier Reef Legacy, the Florida Reef Tract project and the Smithsonian Conservation Biology Institute in Hawaii. At last, the scientific consortium comprises 6 international institutions (genetics, physiology, assisted-evolution). The project was published in PloS Biology, and the first collection of corals is planned for the second semester of 2021.

ADAPTATION
- Better understand coral resilience, recovery and tolerance to global changes;
- Develop assisted approaches to enhance coral resilience and tolerance to global changes;
- Enhance the ecosystem services provided by corals.

OBJECTIVES
The International Alliance to Combat Ocean Acidification (OA Alliance) brings together governments and organizations from across the globe dedicated to taking urgent action to protect coastal communities and livelihoods from the threat of ocean acidification and other climate-ocean impacts. The OA Alliance helps decision-makers better understand climate impacts to marine resources and implement actions that reduce impacts and increase biodiversity, adaptive capacity and resiliency.

RESULTS & IMPACTS
Maine’s Ocean and Coastal Acidification Partnership explores kelp farming as a strategy for remediating OA and improving shellfish cultivation. California’s Ocean Science Trust explores the potential co-benefits of restoring and conserving seagrass beds and kelp forests, examining the role seagrass play remediating impacts of coastal acidification. Mook Sea Farm & Taylor Shellfish Farms are exploring adaptation strategies including buffering of seawater to ensure that the oysters & shellfish they grow are able to withstand impacts. State of Oregon will be co-locating oceanographic monitoring alongside existing biological sampling in Marine Reserves.

MITIGATION & ADAPTATION
- Better understand and respond to the threat of ocean acidification and other climate-ocean stressors and impacts;
- Call for emissions reductions and ocean adaptation actions under international climate frameworks;
- Promote a mix of approaches to mitigate anthropogenic carbon emissions and local land-based contributions that exacerbate ocean acidification alongside adaptation strategies that build resilience in the face of future change.

WHAT MAKES IT INNOVATIVE
It is the first time that a project aims of having 1000 species on-land nurseries (mainly aquariums) to save coral biodiversity. This will create a coral ID card for each species and will allow to build “super corals”. The project will ensure the ability to maintain improved coral stocks that will allow the restoration of coral reefs, giving these corals a better survival rate.

WHAT MAKES IT INNOVATIVE
As the science, research & observed impacts of ocean acidification continue to grow, the OA Alliance supports governments, increasing knowledge exchange and expertise on the substance and process for developing local, regional and national responses in the face of cumulative ocean change.
Ocean acidification has emerged as one of the 21st century’s major global threats to marine ecosystems, and is the specific focus of SDG Target 14.3. As world-wide research activities on ocean acidification and related stressors continue to develop, there is a clear need for effective global scientific cooperation. Hub for global ocean acidification activities, the OA-ICC is working to build a strong ocean acidification research community across the globe, providing access to training, tools, resources and opportunities for regional and international networking and collaboration.

OBJECTIVES
The OA-ICC overall objective is to promote international collaboration on ocean acidification, while building and enhancing global capacity to address this issue. Its priorities are to promote and coordinate science, capacity building (and technology transfer) and communication related to ocean acidification. The target audience extends from ocean scientists to policy makers, and can include any group or individuals interested in ocean acidification and Ocean Change.

MAIN ACTIVITIES
The IAEAs OA-ICC organizes training courses for its Member States and provides access to data and resources to advance ocean acidification research. The Centre promotes the development of data portals, standardized methodologies and best practices - compiles and centralizes information. The OA-ICC works to raise awareness of the issue among various stakeholders and inform about the role that nuclear and isotopic techniques can play in assessing its impacts. To achieve these objectives, the OA-ICC works with many international partners and supports global and regional ocean acidification networks.

RESULTS & IMPACTS
Most broadly, since its inception the OA-ICC and its partners have reached more than 700 scientists stemming from more than 100 Member State countries through capacity building, communication and science activities.

MITIGATION & ADAPTATION
• Contribute to preserving the ocean’s ability to take in 25-30% of the atmospheric CO2;
• Develop blue carbon as a climate mitigation strategy.

WHAT MAKES IT INNOVATIVE
The OA-ICC is a world-renown international project that has attracted sizable and sustained funding and has creatively found ways to engage and bring together partners from around the world on all aspects of ocean acidification and Ocean Change.

PROMOTING RESEARCH, DEVELOPING SCIENTIFIC APPROACH AND INNOVATION
Climate change is ocean change. As a result, ocean science is an integral part of addressing the adverse impacts of climate change, the loss of marine life and the degradation of marine and coastal habitats, by delivering timely information about the state of the ocean. Effective ocean action requires sound knowledge and the latest available science to ensure a sustainable future.

Ocean science has made great progress over the last century in exploring, describing, understanding and enhancing our ability to predict changes in the ocean system, as well as to define interconnected pathways for sustainable development. Innovative technologies have widely contributed to this progress, as data collection from ocean monitoring and observing systems has allowed scientists to observe modifications of ocean properties. Ocean monitoring and observation are essential to bridging remaining knowledge gaps and supporting evidence-based decisions.

Moreover, new scientific approaches, such as participatory sciences, are now flourishing, while new indicators are also emerging. For instance, public participation in ocean data collection has contributed to acquiring more data for example on sea-level evolution, marine litter, whale tracking and water quality.

In that regard, the UN Decade of Ocean Science for Sustainable Development (2021-2030) provides a common framework to ensure that ocean science can fully support countries’ actions to conserve and sustainably use the ocean. There is a need to conduct oceanography differentially to meet the societal needs identified for the Decade (i.e., a clean, healthy and resilient, sustainably harvested, safe, predicted and transparent ocean) and get “The Ocean we Need for the Future we Want”.

The UN Decade is an opportunity to empower decision-makers and boost capacities, building momentum for the accumulation and open-sharing knowledge to implement ocean-based solutions to climate change and biodiversity loss. The Decade will strengthen the international cooperation needed to develop the scientific research and innovative technologies to better connect people and the ocean.

This second section outlines initiatives that promote research and innovation, therefore developing new scientific approaches and enhancing scientific knowledge. These initiatives contribute to providing ocean science, data and information.

DEEP OCEAN STEWARDSHIP INITIATIVE (DOSI)

Building Climate Change into Management of the Deep Sea

This project examines the deep-sea manifestation and impacts of climate change and how this might guide biodiversity conservation and environmental management of the deep ocean under increasing direct human disturbance from resource extraction. This includes the use of climate science and earth system climate projections, coupled circulation-connectivity models and habitat suitability modeling to inform deep-sea strategic planning, impact assessment and monitoring, protected area design, and application of the precautionary approach.

OBJECTIVES

The goal is to (1) understand how climate change will affect the functioning and resilience of deep-sea ecosystems targeted for resource extraction (mining, fishing, oil and gas) and (2) to use this understanding of climate impact to inform management so as to maintain the provision of ecosystem services and promote sustainability of the deep-ocean.

MAIN ACTIVITIES

(1) Modeling to address projected change in environment, connectivity and habitat suitability at the seafloor in regions targeted for deep-seabed mining; (2) Workshop bringing together climate modelers, deep-sea biologists, resource and policy experts, to prepare policy briefs and peer-reviewed publications; (3) UN Engagement (side events, interventions, briefs, text critique) with UNFCCC, International Seabed Authority, Biodiversity Beyond National Jurisdiction, UN Ocean Conference; (4) Raised public awareness: via (a) National Academies Bevelle Talk 2019 and (b) Online Course developed by DOSI for Small Island Developing States in the West Pacific.

RESULTS & IMPACTS

Impacts include: (1) Raised awareness among policy makers; (2) Recognition of climate as a cumulative impact in ISA environmental Guidance, (3) Incorporation of climate issues in brackets in Biodiversity Beyond National Jurisdiction (BBNJ) treaty text; (4) Scientific Policy briefs for the International Seabed Authority and BBNJ treaty; (5) Interventions and side events for BBNJ, International Seabed Authority and UNFCCC (COP 25, Ocean Dialogue) - uptake of climate issues in draft treaty text and seabed mining regulations; (6) FAO technical report on deep sea habitats, fish and fisheries; (7) Peer reviewed publication in Global Change Biology.

MITIGATION & ADAPTATION

- Significantly enhance our understanding of climatic impacts on deep-sea ecosystems;
- Manage the deep sea for climate resilience by protecting the carbon services it provides;

Budget: 30,000 USD

Funding sources: Philanthropic

Scale: Global

Geographical location: International deep sea/seabed

Leading partner(s): Teiaroa Society

Other partner organisation(s): Deep Ocean Observing Strategy, FAO Deep sea group

Project duration: 2017-2020

SDG

DEEPHOPE

UNDER THE POLE

Coral reefs are in immediate danger and their biodiversity is threatened. Compared to shallow reefs, the Mesophotic Coral Ecosystems (MCEs), below 30m and characterized by the presence of light-dependent corals, remain a mystery. DEEPHOPE focused on French Polynesian MCEs between 0 and 12m in depth. The objectives were to characterize MCEs (abundance and diversity), understand adaptation and acclimatization process of corals with depth, and whether deep corals act as a refuge and source of larvae for shallow reefs.

OBJECTIVES

The DEEPHOPE program is addressing several critical scientific goals relevant to MCEs: (1) Identify MCEs in French Polynesia and unravel their unique coral diversity and abundance; (2) Evaluate the contribution of MCEs to the replenishment of threatened coral populations in shallow reefs; (3) Understand the role of the microbiome in the colonization capacity of corals in the mesophotic zone; (4) Get new insights into the coral adaptation and/or acclimatization to deep environments; and (5) Develop innovation and raise awareness at the service of better knowledge and conservation of the ocean.

MAIN ACTIVITIES

Main activities include: Expeditions performed by a collaboration between UNDER THE POLE and scientists to discover Polynesian MCEs; More than 900 dives between 0 and 12m on 11 islands of the 5 Polynesian archipelagos to discover and study mesophotic corals; Collection of 6,029 samples of mesophotic corals, including 1,813 samples between 30m and 172m, on 22 different sites; An international scientific collaboration (France, US, Australia, etc.); Scientific and wide public communications on the program results; Raising awareness in schools of French Polynesia and Brittany.

WHAT MAKES IT INNOVATIVE

This initiative brings climate expertise to the world of deep-sea biology, international policy and resource management—necessary for ocean sustainability. It raises concern about effects of resource extraction on biodiversity-based carbon services in the deep sea—heightening growing understanding of the biodiversity-climate nexus.

Budget: Approximately 2 M €

Funding sources: Public and private

Scale: Regional

Geographical location: French Polynesia (11 islands)

Leading partner(s): CRIOBE and CNRS

Other partner organisation(s): RID IAEA, Labex Coral, Observatoire Océanologique de Banyuls sur Mer, University of La Sorbonne, Museum of Tropical Queensland, California Academy of Sciences, Pennsylvania State University

Project duration: 2018-2021

SDG

RESULTS & IMPACTS

With the constitution of the largest collection of mesopshotic corals in the world, discovery of coral species and genera never reported for French Polynesia, study of coral biological limit, and finding of high diversity of upper mesopshotic areas, DEEPHOPE enables a new vision for the functioning and preservation of coral reef. A paper was published in ISME on the discovery of the deepest photosynthetic coral in the world at 172m (Rouze H et al. 2021), as well as 1 paper submitted (bleaching with depth), 30 articles in newspapers, 15 web-docs, 1 international documentaries (81 M. spectators), 50 international events. 1500 children were sensitized in Polynesia and Brittany.

ADAPTATION

- Improve preservation and conservation actions by providing new knowledge on areas of key conservation interests and/or of high resilience, e.g. changing the vision of coral reefs from a 2D to a 3D view by integrating depth.

WHAT MAKES IT INNOVATIVE

"Scientifically, the DEEPHOPE project will mark the history of our understanding of coral reefs thanks to the intense program of deep dives led BY UNDER THE POLE. It will never be possible to talk about coral reefs again without considering this life in the depths, which can form a lifeline for shallow reefs." (Dr. L. HÉDOUIN - CRIOBE / CNRS)
**Objectif Plancton**

The participative-science programme Objectif Plancton is based on the long-term monitoring of planktonic communities and on a synoptic vision of their distribution in coastal ecosystems. Set up by Océanopolis, this initiative involves people from scientific research, civil society and scientific mediation. Understanding the mechanisms that control the dynamics of coastal planktonic biodiversity is essential for predicting and anticipating the responses of these communities to global changes, and also the impacts on ecosystem services.

**RESULTS & IMPACTS**

Objectif Plancton started collecting the relevant data, as well as organizing events for people to take part in sample gathering. The analysis of the Objectif Plancton data collected over the last two years is underway. Scientists are beginning to evaluate possible correlations between environmental variables (e.g. currents, salinity, high nutrient concentrations) and high phytoplankton biomasses, or the presence of particular species. As for the diversity of planktonic species, they were able to begin to inventory them and determine which ones predominate in each of the 3 study sites.

**MITIGATION & ADAPTATION**

- Better understand the various disturbances (natural and anthropogenic) which can lead to the erosion of biodiversity in order to be able to act to mitigate the pressures;
- Better understand the consequences of this erosion on the functioning of marine ecosystems and the services they provide to society;
- Conduct long-term observation to detect changes related to anthropogenic disturbances such as nutrient inputs, climate change or fishing pressure.

**MAIN ACTIVITIES**

The scientific activities of Objectif Plancton focus on the diversity and dynamics of planktonic communities on a spatial, seasonal and multi-annual basis, as well as on the functioning of biogeochemical cycles in coastal ecosystems. The data are collected by sea users, who take samples simultaneously at different locations in the same ecosystem, three times a year. Objectif Plancton is deployed on three coastal sites: the bays of Brest, Lorient and Concarneau. This programme is also an eco-citizen initiative, based on scientific research and supported by a mediation approach. It contributes to creating new links between science and society.

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**TARA OCEAN FOUNDATION & THE FRENCH FACILITY FOR GLOBAL ENVIRONMENT (FFEM)**

**Ocean Plankton, Climate and Development**

**OBJECTIVES**

The project includes: (1) setting up an international training program on planktonic ecosystem which integrates young researchers and structures new partnerships with developing countries; (2) developing new models and indicators for a better understanding of this ecosystem, including the planktonic organisms, aiming to generate better predictions of climate change impacts and sustainable management of resources; and (3) sharing knowledge on the richness and fragility of this ecosystem for greater consideration into the ocean’s governance mechanisms, particularly the negotiating process on marine biodiversity in areas beyond national jurisdiction.

**MAIN ACTIVITIES**

The Ocean Plankton, Climate and Development project consists of scientific studies (e.g. initiating the development of new models and indicators, and observing the functions, vulnerabilities, adaptation and acclimatization of planktonic ecosystems), capacity-building (e.g. integration of young researchers into the Tara Oceans consortium), governance (e.g. organization of science-to-policy workshops during international ocean-related conferences, publications of policy briefs based on the Tara Oceans results) and awareness-raising activities (e.g. communication material on the importance of planktonic ecosystems).

**RESULTS & IMPACTS**

6 young researchers (Argentina, Brazil, Chile, Senegal and Togo) have been included and trained to analyze methodologies and new technologies on planktonic ecosystems. They have contributed to the publication of major scientific articles. The results contributed to develop innovative tools for better prediction of fish stocks and identification of high biological important areas in the high seas. The project also developed new research networks with Chile, Brazil and Senegal, and provided recommendations on technological advances, genetic resources, importance of science for governance, capacity building, and sharing knowledge with developing countries.

**MITIGATION & ADAPTATION**

- Provide the best high-level science on plankton ecosystem functioning and services, for consideration of marine microorganisms climate regulation role in international negotiations;
- Enhance scientific knowledge to contribute to mitigation and adaptation strategies, especially for developing countries;
- Provide ocean governance recommendations to developing countries in order for them to defend best policies at the international level.

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**WHAT MAKES IT INNOVATIVE**

Objectif Plancton is unique! To our knowledge, there is no series of observations and process studies that simultaneously address the issue of small-scale spatial variability and temporal dimension (intra-annual and multi-annual). The aim is to predict changes in coastal ecosystems that feed an economy linked to tourism, aquaculture or fishing.
### 1.6.8 PROGRAMME ESPRIT DE VELOX

**Esprit de Velox**

**Esprit de Velox** is a new generation of vessel that combines research, conservation, and education. It is designed to support sustained human and non-human perspectives, and to promote a holistic understanding of the ocean. The project aims to strengthen ocean science through a positive-impact exploration vessel.

**Project duration:** 2021-2024

**Budget:** 102 million €

**Funding sources:**
- Industrial investments
- Private and public support

**Scale:** Global

**Geographical location:** All over the ocean

**Partner(s):** None

**MAIN ACTIVITIES**

**OBJECTIVES**

- Esprit de Velox offers a high contribution to the UN Decade of Ocean Science.
- It promotes sustainable living with the Ocean.
- It will contribute to understand the Ocean’s key role in the climate system and its fragility.
- It fosters new partnerships among worldwide scientists, innovators, and artists.
- It welcomes stakeholders on board to interact, promote and defend the Ocean through socio-ecological solutions.
- It carries out research from high seas to the shore (explore, monitor, understand ecosystems).
- It provides scientific information on the Life Sciences of the Earth and related risks.

**RESULTS & IMPACTS**

- The design of Research Vessel Esprit de Velox (wind-based propulsion, CO2-free island grid, recyclable composite structure) is underway.
- The team has been working to lay the ship sail the Ocean in 2024, for its maiden voyage around North Atlantic.
- Esprit de Velox has also been designing its scientific programme: Destination Ocean (Objectif Océan).
- It will be developed and enriched on the long-term (on a 40-year period) and in the context of the UN Decade of Ocean Science, on interdisciplinary, international, and holistic bases.
- Its Scientific, Artistic and Technical Board: The Esprit de Velox Society, is expected to be completed by the end of 2021.

**MITIGATION & ADAPTATION**

- Carry out research from high seas to the shore (explore, monitor, understand ecosystems).
- Welcome stakeholders on board to interact, promote and defend the Ocean through socio-ecological solutions.
- Foster new partnerships among ocean scientists from all disciplines.
- Encourage cooperation between ocean science and energy/industry transition.

**WHAT MAKES IT INNOVATIVE**

Esprit de Velox embodies responsible research all over the Ocean on a positive-impact vessel that embodies a discrete exploration. The Destination Ocean research programme promotes a systemic understanding of the Earth biosphere, enhancing new collaborations between natural and social sciences, arts and indigenous knowledge.

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**OCÉAN POLAIRE**

**Polar Pod**

**Polar Pod** is a research vessel that will conduct on-site studies all year round. The Southern Ocean requires our full attention. The POLAR POD is a revolutionary manned floating laboratory that can withstand the unique and severe on-site conditions.

**Project duration:** 2024-2026

**Budget:** 45 M€

**Funding sources:**
- Public and private

**Scale:** Global

**Geographical location:** Southern Ocean

**Partner(s):** 43 scientific institutions from 12 countries

**MAIN ACTIVITIES**

**OBJECTIVES**

- To conduct on-site studies all year round.
- Océan Polaire has designed the POLAR POD, a revolutionary manned floating laboratory.
- The Southern Ocean is the largest ocean data gap at the global scale, due to the remoteness of the area and its inherent energetic environment.
- Major player in the climate and biodiversity reserve, the Southern Ocean requires our full attention.
- The POLAR POD is inspired by FLIP, the US oceanographic platform, still active after 60 years in the service of research.
- The POLAR POD will be towed horizontally to the study area and tilted vertically by filling seawater ballast tanks.
- Driven by the circumpolar current, it will be a satellite around Antarctica.
- POLAR POD will allow the acquisition of data and long-term observations that will be transmitted to researchers, oceanographers, climatologists, biologists.
- This expedition will animate in real time a large international educational project on the Life Sciences of the Earth and the Environment in collaboration with the IUCN.

**RESULTS & IMPACTS**

- The Polar Pod is a research vessel that will help monitor and study air-sea exchange, census of marine life by acoustic, wave dynamics, eddies of the current, impacts of acidification on plankton, microplastics, ocean floor noise, satellite measures of the ocean, etc. It will make a “world tour” between 50° and 60°S within approximately 3 years.

**WHAT MAKES IT INNOVATIVE**

- The architecture of POLAR POD is a new state-of-the-art ecological floating laboratory that can withstand the unique and extreme conditions of the Southern Ocean, while ensuring that the Southern Ocean is certified by Bureau Veritas and by the Central Security Commission of Merchant Marine. Drifting along the Antarctic Circumpolar Current and supplied by renewable energy, this platform is a “Zero Emission” vessel.

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Homonim: Observation and Modelling of Sea-Levels

OBJECTIVES
The priorities of the Homonim project are: (1) to develop and continuously improve capabilities of surge and wave models down to local scales; (2) to supply Météo-France with modeling chains suitable for the operational forecast of storm surges and waves and for early-warning system implementation; and (3) to make available up-to-date information for stakeholders involved in anticipation and crisis management and for the general public.

MAIN ACTIVITIES
The main activities conducted under this project cover: the development of hydrodynamic models; studies on parameterization and physical model validation; the development of regional and embedded configurations of surge and coastal wave models from regional to local scales with current/wave coupling; and operational implementation.

RESULTS & IMPACTS
Results include (1) the extension of tide gauge network (6 stations) with data supply to GLOSS IOC; (2) the improvement of the numerical schemes and bottom friction parameterizations of the surge model that doubled grid resolution on the coast, improved results accuracy (-15% reduction of the mean error on storm surge peak height) while maintaining operational skills; (3) the full overhaul of the French domestic operational forecasting capabilities for surge and coastal wave (sub-kilometric to 100m resolution alongshore); (4) the implementation of similar operational capacity on overseas territories; (5) the setup of an operational surge forecast chain.

ADAPTATION
• Better predict and anticipate natural hazards to reduce coastal risks;
• Provide geographic information and data on marine and coastal areas to improve warning systems.

WHAT MAKES IT INNOVATIVE
Homonim adopts an integrated approach from academic developments of models (hydrodynamic and very high resolution digital terrain model) to operational implementation for real-time use in an early-warning system for storm surge and storm tide (vigilance vague/submersion operated by Météo-France).
THE FRENCH NATIONAL CENTRE FOR SCIENTIFIC RESEARCH (CNRS)

Blue Climate Initiative

The Blue Climate Initiative is a multi-year program engaging innovators, community leaders, scientists, investors and global experts to harness research and innovation to accelerate ocean-related strategies to combat climate change while protecting the ocean. In doing so, the Blue Climate Initiative is unlocking solutions on urgent challenges like renewable energy, sustainable food supplies, improved human health, flourishing biodiversity, stewardship of the ocean’s resources, and vibrant ocean economies.

OBJECTIVES

The Blue Climate Initiative accelerates ocean-based strategies to address the climate crisis. Its biodiversity and nature-based solutions program aims to answer the following question: How can innovations in designing, implementing and scaling nature-based solutions help to address climate change and improve ecosystem health? The three main priorities are: (1) A healthy and restored climate; (2) An understood and protected ocean; and (3) Resilient, thriving and equitable communities. In identifying solutions, the Blue Climate Initiative pairs scientific research with bottom-up, community-driven strategies for ocean innovation.

MAIN ACTIVITIES

The Blue Climate Initiative’s biodiversity and nature-based solutions program identifies transformational opportunities that could enable marine nature-based solutions to be deployed at a scale that would make a substantive contribution to climate change mitigation and adaptation. The opportunities may be in identifying new types of nature-based solutions, but particularly may be in creating new mechanisms that facilitate the scaling of solutions from local to regional or global. The Initiative’s activities include strengthening policy, education and outreach, scientific research, financing and capacity-building.

RESULTS & IMPACTS

The nature-based opportunities identified to date and reflected in a broadly disseminated publication include: (1) Leveraging the data revolution to build resilient reefs in the face of increasing climate change; (2) Supporting Indigeneous stewardships; (3) Making the high seas a marine protected area; (4) Change in social norms: creating new narratives and perspectives to foster and mobilize ocean action; (5) Blue carbon ecosystem finance; and (6) Financing coastal risk reduction. The Initiative also issued a Community-Award for Ocean-related Climate Solutions which provides support for science-based and community led programs.

MITIGATION & ADAPTATION

- Identify transformational opportunities to enable marine biodiversity conservation initiatives and nature-based solutions to help address climate change and increase ecosystem health;
- Promote contextual opportunities that enable co-benefits for communities;
- Promote opportunities that reflect local values and that are co-produced with local stakeholders;
- Encourage the embedding of justice in the identification and implementation of opportunities.

FUTURE EARTH

Ocean Knowledge Action Network (KAN)

The Ocean KAN is an international network of ocean practitioners (e.g. academics, stakeholders, businesses, NGOs) with the vision of achieving a healthy, functional, understood and resilient ocean supported by an inclusive global knowledge network providing information and action for the benefit of current and future human communities.

OBJECTIVES

- Bring networked knowledge to action and solutions to address the most pressing problems for the ocean and communities that rely on it, including climate change;
- Connect networks and develop partnerships to support mitigation and adaptation strategies.

WHAT MAKES IT INNOVATIVE

The Blue Climate Initiative brings together a diverse community of stakeholders to identify promising ocean-related transformational opportunities and to implement selected opportunities. The Initiative will hold a Blue Climate Summit in 2022 in the heart of the Pacific, bringing together 300+ key stakeholders to take action and help turn the dial.

WHAT MAKES IT INNOVATIVE

The Ocean KAN can rely on Future Earth’s community, and support from global projects like the Scientific Committee on Oceanic Research, Intergovernmental Oceanographic Commission of UNESCO and World Climate Research Programme to produce new inter- and transdisciplinary knowledge and to transfer science into action. It convenes people globally, from all scientific fields, as well as stakeholders and ocean practitioners.
**RESULTS & IMPACTS**

The project developed optical sensors technology for marine and atmospheric black carbon, and produced 8 scientific publications. High black carbon concentrations in South East Asia’s coastal waters; Atmospheric and fluvial fluxes controlled by the monsoon regime; Modifies aggregation processes and the fate of marine aggregates; Alters the structure and activity of phytoplankton and bacterial communities; Modifies export and recycling capacities of the surface ocean. The project also raised awareness through organizing an exhibition “Black Carbon: The dark side of human activity”, and a side-event at the 8th Asia-Pacific Forum on Sustainable Development.

**MITIGATION**

- Elevate the black carbon issue into policy and decision-making agenda;
- Raise awareness on the complexities and impacts of the black carbon issues;
- Foster productive dialogue between scientists, policy makers, individuals and communities;
- Encourage actions for reducing black carbon emissions, and co-emitted climate and health pollutants;
- Inform the establishment of an adequate legislative environment for black carbon emissions control.

**MAIN ACTIVITIES**

Main activities include: (1) Monitoring concentrations, chemical characteristics and fluxes of black carbon in South East Asia’s deltas to determine loads to the ocean; (2) Determination of how black carbon interacts with biological chemical-physical marine processes via experimental approaches using reference and naturally occurring black carbon; (3) Scientific results (8 publications); (4) Outreach of the evidence, actionable policy guidance and raising awareness for policy makers, individuals and communities; (5) Training and empowerment activities for local actors.

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**FRENCH NATIONAL INSTITUTE FOR OCEAN SCIENCE (IFREMER)**

**Fifty years of ecological changes: Regime shifts and drivers in a coastal Mediterranean lagoon during oligotrophication**

The project is a 5-decade study explaining the oligotrophication trajectory of Thau lagoon, a Mediterranean coastal lagoon which supports traditional shellfish farming activities. The study aims to determine how the decrease in nutrient inputs resulted in major ecological changes in the lagoon, by analyzing five decades of time-series of observations on pelagic and benthic autotrophic communities.

**RESULTS & IMPACTS**

The study aims to determine how the decrease in nutrient inputs resulted in major ecological changes in Thau lagoon, by analyzing five decades of time-series (1970-2018) of observations on pelagic and benthic autotrophic communities. Ifremer hypothesizes that the process of oligotrophication has led to ecosystem regime shifts and to changes in the drivers of summer anoxia, making the ecosystem more resistant to climatic stress caused by high summer temperatures.

**MAIN ACTIVITIES**

Ifremer studied and observed the pelagic (nutrients and phytoplankton) and benthic (macrophytes and sediment) compartments. Considering anoxia crises as indicators of ecosystem resilience and resistance, Ifremer analysed biological and meteorological data, eutrophication status and shellfish production to identify the triggers of summer anoxia over the 49-year period.

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**WHAT MAKES IT INNOVATIVE**

Despite massive fluxes to the ocean, black carbon-induced alteration of several biogeochemical marine processes and very long lifetime of black carbon in the ocean, SOOT-SEA is the first initiative linking five particle air pollution with marine processes and the consequences on marine resources, biogeochemistry and ocean-climate interactions.

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**WHAT MAKES IT INNOVATIVE**

The use of extensive datasets collected between 1970 and 2018 makes it possible to effectively assess and evaluate the effects of public policies. Ifremer highlights how the improvements of wastewater treatment systems gradually led to oligotrophication of the Thau lagoon.
**LOW-CARBON AND RESILIENT SOCIETIES**

Enhancing the transition towards low-carbon and resilient societies allows for sustainable growth, climate change mitigation, and water quality improvements. It requires strong partnerships involving governments, NGOs, cities, and investors to shift towards a decarbonized economy that is more respectful of Nature.

These initiatives play a crucial role in developing solutions to ensure the implementation of sustainable practices in all ocean-based industries that impact the ocean and coasts (i.e., shipping industry, fisheries, ocean energy, coastal tourism). Such practices mainly aim to reduce GHG emissions from ocean-based industries, as well as put an end to the overexploitation of marine resources and to implement ocean-based solutions to transition towards decarbonized societies. This helps the ocean maintain its ability to generate socio-economic services, which is particularly relevant in the context of building back better after the COVID-19 pandemic.

This section showcases a wide range of initiatives that contribute to reducing human pressures on coastal and marine ecosystems while achieving the decarbonization of societies and territories. Such initiatives play a central role in enhancing resilience for people and nature.

Many ocean-based industries have the potential to outperform the growth of the global economy in terms of additional value and employment. If compared to the world’s top 10 economies, the ocean would rank seventh with an annual value of goods and services of US$2.5 trillion. Protecting and restoring coastal and marine ecosystems is therefore crucial to secure these socio-economic services, which is particularly relevant in the context of building back better after the COVID-19 pandemic.

This third section showcases a wide range of initiatives that contribute to reducing human pressures on coastal and marine ecosystems while achieving the decarbonization of societies and territories. Such initiatives play a central role in enhancing resilience for people and nature.

Ocean Conservancy supports cities’ environmental sustainability efforts through expert consulting, engaging with technical and community-led networks, and securing funding for projects. This includes working on carbon mitigation plans, promoting water and energy efficiency, education and awareness, and restoring the ocean to its former health.

**RESULTS & IMPACTS**

Working with 3 municipal and county governments, impacting over 1.5 million residents; Funded a study in the Miami River to assess marine debris and pollution, with the end goal of driving legislative action that increases circular materials management, protects marine wildlife and improves water quality. Worked with partners and local youth to complete a plastic-use survey of local businesses in Miami Beach.

**MITIGATION & ADAPTATION**

- Build momentum for the protection of seagrass beds and mangrove forests.
- Work with local governments to conserve coastal and marine environments.
- Assist local governments in implementing low-impact development practices.

**WHAT MAKES IT INNOVATIVE**

Shores Forward is unique in its overall approach of aiming to affect change at the state, government level by inspiring authentic and outcomes-driven support from local government leaders for ocean conservation, climate mitigation, sea level rise preparedness, and sustainable growth.

**OBJECTIVES**

By empowering local government leaders to improve their cities’ environmental sustainability, Ocean Conservancy aims to create a wave of momentum at the municipal level that will affect change and inspire ocean-climate action at not just the local level in Florida, but at the state and federal level as well. The main priorities for Shores Forward are:

1. Improve water quality for Florida residents.
2. Prepare for impacts of sea level rise on natural and built coastal environments.
3. Reduce impacts of built environment on natural systems.
4. Reduce carbon footprint in partner cities.

**MAIN ACTIVITIES**

Ocean Conservancy works with local governments, as well as other external partners, on the following types of activities:

- Funding studies on the life cycle of plastic and other waste found in urban waterways to inform policies that can improve circularity, protect marine wildlife, and improve water quality.
- Organizing and funding citizen science and monitoring projects that will reduce single-use plastic pollution and in turn protect marine wildlife and reduce businesses’ carbon footprint.
- Funding grade-school environmental education curricula to increase engagement and competency in issues affecting marine wildlife, climate change, and water quality.

**OCEAN CONSERVANCY**

**Shores Forward**

Ocean Conservancy initiative partnering with local government leaders to protect Florida’s ocean and coasts. Through this partnership, Ocean Conservancy supports cities’ environmental sustainability efforts through expert consulting, engaging with technical and community-led networks, and securing funding for projects. This includes working on carbon mitigation plans, promoting water and energy efficiency, education and awareness, and restoring the ocean to its former health.

**Budget:** €250,000 USD

**Funding sources:** N/A

**Scale:** Local

**Geographical location:** Florida, USA

**Partner(s):** None

**Project duration:** Since 2019

**SDG:**

- SDG 13: Climate action
- SDG 14: Life below water
- SDG 15: Life on land

**MITIGATION & ADAPTATION**
La Rochelle coasts are particularly vulnerable to coastal erosion and sea-level rise, two phenomena triggered by climate change. To address these vulnerabilities, La Rochelle strives towards carbon neutrality by 2040. To that end, La Rochelle aims to both reduce its emissions (30% of reduction by 2030) and to capture and store CO2. This includes preserving coastal ecosystems to maximize blue carbon sequestration in the urban community of La Rochelle.

OBJECTIVES
The overall goal is to protect coastal wetlands so that La Rochelle can increase its carbon storage capacities and achieve carbon neutrality in long term. The project will (1) recognize the value of wetlands; (2) sustainably manage to preserve wetlands' carbon storage potential; and (3) promote innovation to efficiently and artificially store CO2 in the metropolitan area of La Rochelle (e.g. culture of microalgae on the facades and roofs of buildings).

MAIN ACTIVITIES
La Rochelle assessed the carbon storage potential of coastal wetlands locally. It developed coastal management support tools, enhancing the protection of the coastline and raising awareness, mobilizing citizens and promoting ocean literacy around blue carbon. It also supported research and development to create artificial carbon sinks in town. La Rochelle supported other territories in their transition, sharing best practices and experiences (replicability of the project around of blue carbon).

RESULTS & IMPACTS
The project raised awareness on blue carbon issues (e.g. Climate & Ocean exhibition at La Rochelle’s Maritime Museum), and promoted dialogue between key stakeholders (e.g. research centers, local authorities, reserve managers and local associations) and citizens. The project will assess the carbon value of coastal wetlands locally, and enhanced scientific research (e.g. funding research, collecting and analyzing data).

MITIGATION & ADAPTATION
- Develop solutions to increase the carbon storage capacity of coastal ecosystems by restoring and preserving these ecosystems while taking into account the human activities and development of the city.

WHAT MAKES IT INNOVATIVE
The project considers the potential of negative CO2 emissions of aquatic ecosystems. It also promotes the collaboration between academic researchers and local authorities, bridging the science-policy gap. To achieve carbon neutrality by 2040, the project will integrate different axes: mobility of citizens, building, data, energy consumption, citizen participation, economy.

The aim of the project is to develop nature-based solutions to adapt to coastal threats. Priorities include avoiding marine submersion, restoring fish stocks and managing coastal zones to both protect marshes and organise leisure activities.

MAIN ACTIVITIES
- Maintain and preserve coastal marshes;
- Promote economic, recreational and touristic activities with limited impacts on coastal ecosystems;
- Optimize the role of coastal marshes in the prevention of coastal risks, e.g. submersion;
- Promote the sound governance of water-level management.

RESULTS & IMPACTS
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WHAT MAKES IT INNOVATIVE
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INSTITUT FRANCE-QUÉBEC MARITIME (IFQM)

ARICO: Co-construction of Adaptation Scenarios to Coastal Risks of Maritime Territories

In a context of climate change and of concentration of human and built stakes on the coasts, the risks of coastal erosion and sea flooding are constantly increasing, both on the French and Quebec coasts. Interdisciplinary and partnership research between scientists is required to overcome these challenges. This Franco-Quebec research project focuses on the co-construction between researchers and societal actors of socio-ecological-economic scenarios of adaptation to these risks.

OBJECTIVES
The overall goal of the project is to better understand and reinforce the adaptive capacity of coastal populations and territories subject to coastal risks by co-constructing, with the stakeholders, scenarios for the adaptation of these coastal territories to climate change. One of the original features of the project is to be based on a triple exchange, (1) between two territories, France and Quebec, (2) between two disciplinary sectors, natural sciences and human and social sciences, (3) and between several fields of knowledge, (i.e. management professionals and inhabitants).

MAIN ACTIVITIES
The IFQM and its partners will address, in collaboration with the professionals of coastal risk managements, three interlocked levels of the problem: (1) understand the global vulnerability of coastal territories, through a study of the underlying natural and social dynamics; (2) analyse public policies, social dynamics and the use of management tools on the two territories (France and Quebec); (3) characterize and analyse the adaptive capacity and the resilience of coastal communities in on-the-ground workshops; and (4) co-construct socio-ecological-economic scenarios for the adaptation of coastal territories and communities.

RESULTS & IMPACTS
Despite the COVID-crisis delaying the work, two international and interdisciplinary workshops took place in October 2020 and March 2021, and PhD and master students started working on the project. The expected results are multiple. In addition to the development of adaptation scenarios, several tools will be realized, including vulnerability indicators, digital data platforms, timelines and story maps, serious games to be transferred to other sites.

MITIGATION & ADAPTATION
• Co-construct with field actors (professionals and residents) adaptation scenarios for the coastal territories and communities.

CONSERVATOIRE DU LITTORAL

ADAPTO: Towards adaptive coastal management

A daptop project, supported by LIFE EU Program, explores solutions to the impacts of climate change on the French coasts by advocating an adaptive coastal management. Experimental approaches are implemented on 10 pilot sites by using a frame of reference and analyzing the context of each region (risk management, landscape, economy, social perception, etc.) and by implementing tools (3D modelling, landscape analysis, etc.), so to build adaptation projects at territorial scale with local stakeholders (local authorities, managers, users).

OBJECTIVES
Adapto aims to (1) Provide a better understanding of the dynamic nature of the coastline and the need to adapt to it (2) Create methodological tools allowing to initiate, support and assess nature-based adaptation solutions in coastal areas (3) Develop knowledge about these solutions and their acknowledgment at all levels (4) Define the role of natural environments in the organization of an effective land-sea interface in relation to adaptation to climate change and (5) Allow the state of the art to progress through concrete actions in various environmental contexts representative of the diversity of ecosystems and coastal areas in Europe.

MAIN ACTIVITIES
Different kind of actions are planned: (1) Experimentation of adaptive soft management process and methods on pilot sites: scientific and technical studies and monitoring, meeting with local stakeholders for project designing through scenarios, implementation works (renaturation, relocation, restoration); (2) Pedagogy and communication: on-site animations, educational actions towards schoolchildren, (3) Capitalisation and experience-sharing: national and international workshops/fields visits in France or Europe, website and social medias, newsletter, publications on pilot sites, etc.

RESULTS & IMPACTS
Results vary from one site to the other. In general, main achievements include: developing decision-support tools, raising awareness among schoolchildren, analyzing users’ social perception, developing an ecological quality indicator, mapping coastal natural habitats and studying the projection of coastlines. Since the 10 pilot sites cover most of the European coastal environments (low and sandy Atlantic coasts, polderised low Atlantic coasts, Mediterranean barrier beaches, Mediterranean salt marshes, mangroves), it will be possible to replicate the ADAPTO process and methods in other similar French or foreign sites.

ADAPTATION
• Build with local stakeholders various scenarios integrating the impacts of climate change on the coast (e.g. sea level rise and the increasing frequency of extreme weather events).
• Implement the chosen solution on the field, ADAPTO will give demonstrative examples highlighting the interest and feasibility of an adaptive soft management of coastline facing climate change issues.

WHAT MAKES IT INNOVATIVE
An openness to methodologies of other disciplines and sectors and increased collaboration are the basis of a resolutely interdisciplinary and intersectoral approach to our work.
ADAPTING CITIES TO CHANGING COASTLINES

The Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing Climate, published in 2019, states that if greenhouse gas emissions are not drastically reduced, sea level could rise by more than a metre by 2100. Associated extreme weather events could become more frequent and severe, and are projected to occur at least once a year compared to once a century historically. Worldwide, shoreline erosion and submersion, alongside other impacts induced by sea level rise, are already occurring, posing critical threats to people, infrastructures, economies and ecosystems. Adapting coastal cities and territories to these changes is paramount.

A COLLABORATIVE INITIATIVE TO DESIGN SOLUTIONS TO SEA-LEVEL RISE

In response to this pressing challenge, the Ocean & Climate Platform launched Sea’ties. Rooted in science and aimed at elected representatives, administrators and all stakeholders involved, Sea’ties is an international initiative with the objective to facilitate the development of public policies and the implementation of adaptation solutions for coastal cities threatened by sea-level rise. The initiative will compile and disseminate scientific knowledge as well as provide a forum for the exchange of information and experience, to foster the emergence of good practices. Its action is deployed in 5 regions: Europe, North Africa, West Africa, the West Coast of the United States and the Pacific.

SEA’TIES: Sharing solutions with coastal cities to tackle sea level rise

Sea’ties partners with a wide range of cities and territories, and is therefore enriched by a diversity of climatic, geographic, social, economic and political contexts. The initiative primarily focuses on medium-sized cities. Indeed, although they have fewer financial resources than megacities, medium-sized cities can be more flexible, which makes them a particularly fertile testing ground for the design and implementation of adaptation solutions. Sea’ties will draw from worldwide experiences and concrete returns of action to produce recommendations enabling the implementation of two types of solutions, intertwined and complementary: technical solutions, aiming at directly reducing risks (technologies such as defensive work, nature-based solutions, accommodation solutions and managed retreat), alongside solutions related to sharing knowledge and developing a risk culture (through education and awareness campaigns as well as financial and regulating tools).

A VISION FOR SUSTAINABLE SOLUTIONS

To sustainably adapt cities to sea-level rise, Sea’ties promotes the combination of different solutions tailored to the specific context of each territory. Beyond technical solutions, cooperation, dialogue and the mobilisation of all stakeholders – civil society, scientists, businesses and elected representatives, are essential to achieve appropriate and equitable adaptation to sea-level rise.

- Through the development of a digital tool, the diversity of solutions already implemented across the globe will be collected and promoted to inspire decision-makers, planners and administrators to boost action.
- Based on a multidisciplinary scientific approach, the latest research findings will be synthesized and disseminated to highlight the main challenges related to socio-economic governance and the knowledge gaps in data production.
- In each region, workshops will be held to reinforce cooperation between all stakeholders and address the needs for cross-sector collaboration, community engagement and sharing knowledge, lessons learnt and good practices.
- Sea’ties will advocate for the integration of adaptation to sea-level rise into public policy and provide recommendations informed by science and practical experience.

PARTNERS

FINANCIAL SUPPORT
With a global capacity of about 500 MW (71 turbines) the Fécamp wind farm is located within a EU Natura 2000 area, 13 km off the Normandy coast, in the English Channel water. It aims at producing wind-based renewable energy, while limiting the impacts on marine biodiversity. To that end, the implementation area was chosen to minimize the effects on biodiversity and specifically birds. It will produce low carbon footprint energy for the use of 770,000 people.

**OBJECTIVES**

The overall goal is to produce clean energy, with a limited impact on biodiversity (e.g. no oil spilling, no water discharge). In collaboration with local stakeholders, the priority in building up the project was to minimize the impacts of the windfarm on biodiversity, landscape and fisheries.

**MAIN ACTIVITIES**

wpd conducted environmental surveys (e.g. using radar, uav microphones, boat, drone, GPS tagging, scientific fishing, benthos sampling). It selected an area of less constraint on biodiversity, wpd also modeled the wind farm effects on waves and current, on underwater noise, and adapted their technology to minimize these effects as much as possible.

**RESULTS & IMPACTS**

wpd and its partners won the tender in 2011. The project has been designed thanks to the analysis of environmental surveys and consultation with local stakeholders. The exact implantation region was subsequently chosen.

**MITIGATION**

- Develop marine renewable energy (MRE), with the aim of mitigating our reliance on nuclear power plants.

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**Eoloscope offshore**

**OBJECTIVES**

The goal of the Eoloscope offshore tool is to move towards the implementation of exemplary offshore wind farms and to combine strong citizen participation and support with a high level of consideration for biodiversity and the environment. Therefore this tool aims at deepening citizens’ knowledge and facilitating dialogue between associations, territorial actors, and economic actors.

**MAIN ACTIVITIES**

FNE mobilised its members and experts to produce a toolkit with both a booklet and a multi-criteria analysis grid. The first version of Eoloscope offshore has been presented to local NGOs and state institutions as well as private companies working on MRE. It is part of FNE’s awareness campaign to help citizen decision making regarding wind farms. The first version of the Eoloscope offshore is available on the FNE website and printed editions of the tool have also been distributed locally.

**RESULTS & IMPACTS**

The Eoloscope offshore tool led to a position themselves during a public debate concerning a wind farm project in Brittany (“Floating wind turbine in the South of Brittany”). Thanks to this tool, citizens improved their technical skills, and made their own assessment of the project’s impacts. The toolkit facilitated the democratization of the decision making process, and promoted citizen participation, by developing dialogue between relevant stakeholders.

**MITIGATION**

- Develop effective tools to promote and support the deployment of offshore wind farms, producing renewable energy while protecting marine biodiversity.

**WHAT MAKES IT INNOVATIVE**

The project was designed in close public concertation, including fishermen. It was also supported by NGOs at local and regional levels, and took into consideration local needs and landscapes. The project is unique in the sense that it was close concert with local stakeholders.

**WHAT MAKES IT INNOVATIVE**

This initiative facilitates the dialogue between associations, territorial actors and economic actors. In addition, the tool makes information about wind farm project implementation and sustainability available to citizens and other relevant actors.
OBJECTIVES
The objective is to provide cohabitation opportunities for MRE companies and fishermen. The project aims to develop innovative solutions to local issues and disagreements between the two types of users. It goes beyond maritime spatial planning tools, with the objective to deepen the existing dialogue - while achieving the relevant SDG.

MAIN ACTIVITIES
Main activities include: (1) Identifying and analyzing the representations of each stakeholder; (2) Facilitating exchanges including by sharing views; (3) Sharing available knowledge on climate and biodiversity with each stakeholder; (4) Finding areas of agreement and disagreement; (5) Identifying relevant solutions to be developed in subsequent collaborative projects; (6) Producing common tools for all, including to describe climate and biodiversity issues in terms of MRE and fisheries; (7) Disseminating project outcomes.

RESULTS & IMPACTS
At this stage, a cartography of fishing techniques and companies has been developed and a reflection on the positioning of the different actors was launched. The aim is to find ways of including fishermen in offshore wind energy projects. Planned areas of work: Map the actors of the fishing industry; Analyze the data; Organize exchanges between the different actors; Share environmental knowledge; Research the evolution of the fishery to include wind farms. The project answers the following questions: What makes it innovative? How can a co-management group be set up? How can the different actors be involved in the collaborative process? How can the project lead to the development of innovative solutions?

MITIGATION
- Develop renewable sources of energy to mitigate climate change, in accordance with the decree related to the multi-year energy programming (PDE) published in April 2020;
- Enhance collaboration between the fishing industry and marine renewable energy (MRE) to boost their compatibility, thus proposing solutions to move towards sustainable development.

PELA-Méd is a local pilot development program run for and by fishermen. It aims to help them upskill so they can transition towards sustainable fishing and respond to the economic and environmental issues faced by fisheries in the Var region as listed below: Improving fishing stocks, in particular for target species potentially impacted by climate change; Sharing knowledge of overfished species and the impact of fishing; Fighting against IUU fishing, either undeclared or unregulated; Creating economically viable models for fisheries.

OBJECTIVES
PELA-Méd’s ambition is to: (1) Evaluate fishing stocks across target species; (2) Implement a shared and flexible management of fishing stocks based on co-management principles; and (3) Improve fishing monitoring and checks.

MAIN ACTIVITIES
The main activities in relation to each objective are: (1) Knowledge: define sampling protocols and strategies, collect data (to be done by fishermen) and analyze it, share scientific publications and results; (2) Shared management: cooperate workshops, co-construction of a new program of fishing governance in the region, shared and flexible management (decisions taken jointly by fishermen, scientists, administrators of these protected areas and NGOs involved with the co-management group); (3) Monitoring: deploy full time sworn guards – hiring, training (compulsory and specific to the territory) and certification. The PELA-Méd program managed to: Involve local professional fishermen in the pilot committee (11 prud’homies out of 13 committee members). Take an initiation trip for a delegation of 10 fishermen from 9 prud’homies: Evaluate 2 species (edible urchin and red mullet) with the strong involvement of fishermen. Draft a bio-economic study about the economic dependence of fisheries on species and jobs; Involve state services, local government members, protected area administrators and fishermen in the project; organize a seminar on the implementation of sworn guards in the Mediterranean Sea.

ADAPTATION
- Provide new narratives and arguments to fisheries and its stakeholders in fishing practices;
- Enable fisherman to adapt their techniques in the context of climate change (e.g. fishing seasons, spawning season, fluctuation of the spawning and fish stocks);
- Improve ecosystem resilience by adapting fishing to the fluctuation of fish resources;
- Contribute to protecting marine biodiversity in the Port-Cros National Park’s and its neighboring area.
In the context of fish stock depletion, Our Fish is working to end overfishing and restore a healthy ocean ecosystem. Our Fish engages with stakeholders and decision-makers on the adverse effects of overfishing, as well as on the opportunities related to sustainable fishing practices, including mitigation and adaptation to climate change components. This advocacy work is conducted at the European level.

Objective
The overall goal is to frame ending EU overfishing as decisive action on the biodiversity and climate emergency. In that regard, this project has two main objectives: (1) Produce a new series of published scientific papers on the potential benefits of sustainable fisheries to climate mitigation and adaptation; (2) Provide important information to policy-makers, NGOs, industry and governments at a critical stage in the development of actions to address the climate and biodiversity crises by providing specific data on the climate impact of ending overfishing.

Main Activities
Our Fish is working with scientists from across the world to publish a series of scientific papers that investigate how sustainable fisheries management contributes to climate mitigation and adaptation. This pioneering science has been presented during a symposium with 3 webinars and a workshop. The resulting scientific papers will be published in an online journal that is freely available. Our Fish mainly conducts advocacy and communication work, including by organizing media and advocacy meetings.

Results & Impacts
The series of scientific papers will include at least 10 new papers that explore how fisheries management can benefit climate mitigation and adaptation. These will be published by the end of 2021, and will include a biodiversity and climate checklist in accordance with the EU Green Deal. A Symposium presenting the initial findings, was attended by over 900 people, including a workshop that involved policymakers from six different countries and the EU. Our Fish’s work has initiated the education of policymakers and decisionmakers to the importance of a healthy ocean to climate action, which is resulting in more policy documents highlighting this issue.

Mitigation & Adaptation
• Increase public and political understanding of how to manage fisheries to improve mitigation and adaptation solutions to climate change;
• Facilitate the introduction of EU policies and processes to implement these solutions.

What Makes It Innovative
This initiative is drafting new research papers, explaining and quantifying the climate benefits of sustainable fisheries. It is also driving the development of EU policies to put an end to overfishing and its adverse effects on climate and biodiversity.

D uring the 20th century, humans increasingly exploited the living resources of the ocean. Today, the world’s fish stocks are under considerable pressure, with 33% of the global fish stocks being overexploited. This is a major concern, not only for future global food security, but also for the social and economic well-being of the coastal communities that rely on fish consumption. Close to 3.3 billion people depend on aquatic resources for sustenance, and millions depend on the fishing sector for economic and social benefits. In addition to overexploitation, the growing impacts of climate change further threaten fish stocks.*

In response to these increasing threats, stakeholders from leading governments and from civil society have been drawing pathways to reconcile exploitation and conservation, therefore strengthening the resilience of ecosystems. Innovative and more respectful fishing practices are emerging, especially through ecosystem approaches, which widely contributes to developing climate-smart fisheries. Climate-smart fisheries aim to improve efficiency in the use of natural resources to produce fish and aquatic foods, in order to respect fish stocks and protect ecosystems. They ensure the maintenance of aquatic systems and therefore allow coastal and marine ecosystems to continue contributing to sustainable development goals. Climate-smart fisheries also offer effective ways to reduce the vulnerability of the fishing sector and enhance climate adaptation.

Internationally agreed targets and goals have been adopted to further encourage the adoption of sustainable and climate-smart fishing practices, including by intensifying efforts to eradicate illegal, unreported and unregulated (IUU) fishing and eliminating subsidies that contribute to overfishing.* In line with this, the targets 14.4 and 14.6 of Sustainable Development Goal (SDG) 14 ‘Life below water, respectively call for the end of overfishing and for the ban of harmful subsidies.


Moreover, this initiative has been developed in accordance with the EU Green Deal and the Ocean and Climate Platform’s goals and targets, and is in line with the EU’s and the UN’s climate and biodiversity targets and commitments.
The SeaGreen project utilizes large-scale sargassum standrings for the production of compost for regenerative agriculture to generate carbon credits. The recent annual inundation of sargassum in the Caribbean is severely disrupting coastal tourism, the fishing industry, and endangering coastal ecosystems including seagrass meadows, mangrove forests, and coral reefs. The approach involves removing harmful sargassum and converting it into compost to promote soil building and food security while preserving existing blue carbon sinks.

RESULTS & IMPACTS

In 2020, the pilot project provided impressive results: 100 tonnes of sargassum harvested, 100 tonnes recycled organic waste from resorts in Punta Cana, 150 tonnes of compost produced, 12 farmers in Miches, two gardens in Punta Cana, the development of a new low impact sargassum harvesting technique, soil regeneration, the introduction of bio-intensive farming to local communities, and the training of many farmers and operators. The project sequestered about 198.4 tonnes CO2e in 2020 through avoided landfill emissions (i.e. sargassum was composted rather than being hauled to the landfill), and is establishing a new pilot site in St. Kitts and Nevis.

OBJECTIVES

(1) Work with tourist resorts and coastal communities to unlock the potential of sargassum-based agricultural products to mitigate climate change through the generation of carbon credits while fostering sustainable economic development and local food production; (2) Support scientific and industrial research on the environmental, economic, and social benefits of utilizing nuisance sargassum as agriculture-enhancing products; (3) Coordinate training workshops and other learning activities related to the responsible harvest and transformation of sargassum into compost, mulch, and other environmentally-friendly products for use in organic agriculture.

MAIN ACTIVITIES

The focus of the SeaGreen project is to provide sargassum-based organic compost and bio-intensive agricultural training to smallholder, women farmers and commercial growers throughout the Caribbean. Carbon-insetting is a method for sequestering and storing carbon in a way that reduces a company’s carbon footprint while also enhancing its value chain. Using sargassum seaweed as an organic agricultural input allows tourist resorts to keep beaches clean for guests while also building soils and increasing local food production. The high-value, organic produce in turn can be sold back to resorts, which promotes sustainable economic development.

MITIGATION & ADAPTATION

- Avoid landfill emissions and increase cleanup activity;
- Support soil-building and eliminate the need for petroleum-based synthetic fertilizers;
- Prevent the degradation of coastal blue carbon sinks and enhance coastal resilience.

PAUL RICARD OCEANOGRAPHIC INSTITUTE (IOPR)
NAIADE: New Innovative Feed for Sustainable & Environment-friendly Aquaculture

While aquaculture is used as an alternative in the face of the pressure exerted by industrial fishing on fisheries resources, it makes use of products derived from the intensive fishmeal industry. Farmed fishes are mainly fed on small pelagic fishes transformed into meal. For the purpose of sustainable development and the preservation of fish stocks, it is today necessary to develop different ways of feeding farmed fishes. This project was created to develop a sustainable alternative based on insect proteins to put an end to the vicious circle of overfishing and stock depletion, whilst also reusing food and agricultural waste in a circular economy approach.

OBJECTIVES

The main aim of the project is to develop a new feed for marine aquaculture based on sustainable protein foodstuffs, which would make it possible to reduce the pressure on wild fish stocks and reserve them for human consumption. This will involve assessing the adaptation of fishes to a new alimentary bolus from the physiological and morphological points of view, and analysing their growth rate in comparison with a classic feed constituted of fishmeal. Priorities are: (1) the production of a traceable feed; (2) the production of sustainable farmed fishes; and (3) the replicability of the model and development of local supply circuits.

MAIN ACTIVITIES

There are four phases. Phase 1: Test various feed compositions (experimental phase) to test several feed compositions by varying the percentage of proteins; Phase 2: Establish circular economy loops (soldier fly production, waste recycling, feed production, outlet for aquaculture fish-feed); Phase 3: Establish a network of local actors and producers for the composition of the feed; Phase 4: Reflect on the implementation of a traceability sign for the food (quality label). Phase 5: Produce farmed fish and analysis of nutritional qualities and economic analysis of the costs of production.

RESULTS & IMPACTS

Since the beginning, with Phase 1 from 2018 to 2020, the following milestones have been achieved: (1) the structuration of a group of experts, actors and professionals on the matter; (2) the elaboration and testing of a first aquaculture feed using mealworms; (3) the hire of an aquaculture engineer at the Institute to strengthen the team; and (4) the construction of a marine station, with a wing dedicated to researching and teaching those aquaculture practices.

MITIGATION & ADAPTATION

- Cut the emissions related to the industrial fishing (for the fish flour) and transport of the production;
- Protect the wild fish stocks, thus enhancing the ocean’s capture capabilities;
- Allow the aquaculture not to rely on wild fish stocks, volatile due to climate change, meteorological events (Nino/Nina) and overfishing.

WHAT MAKES IT INNOVATIVE

Currently, most tourist resorts in the Caribbean are removing nuisance sargassum at great cost and shipping it to landfills. The SeaGreen approach, “carbon insetting,” allows resorts to pursue carbon neutrality goals while also contributing to their value chain by creating new markets for high-value, organic produce that tourists increasingly demand.

WHAT MAKES IT INNOVATIVE

The project develops low-carbon, low-tech and high efficiency aquaculture proposing insect proteins as fish feeds. It provides an opportunity to enhance collaboration and cooperation with diverse stakeholders, including through the creation of a regional center of relevant skills and expertise.
The Blue Charter

In 2003, the French shipowner’s association created its Blue Charter, the concrete illustration of its long-standing efforts in favour of high-quality, safe shipping that is respectful of people and the environment. Since then, French shipowners have illustrated their desire to go even further by introducing new commitments to the Charter that reflect their ambition. In 2020, the Blue Charter was incorporated into Armateurs de France’s articles of association, making membership of both the organisation and the Charter inseparable.

OBJECTIVES

The Blue Charter has three main priorities: (1) Placing people at the heart of company’s concerns; (2) Acting to protect the environment; and (3) Maintaining the highest level of safety.

MAIN ACTIVITIES

The Blue Charter provides many options for action, including: vessels atmospheric emissions and underwater noise reduction; speed and conduct optimization; fight against marine mammals’ collision and the transfer of invasive species; promote the introduction of technologies with a limited environmental impact of maritime transports; actively contribute to discussions with marine environment associations; but also apply rules of corporate governance consistent with safety requirements and support crew safety training throughout their careers.

RESULTS & IMPACTS

All members of the association agreed to comply to the Charter, and to provide transparent information on the condition for its application. Every year, Armateurs de France rewards a member who has distinguished himself on the three priorities of the Blue Charter with the Blue Charter Trophy. In addition, the Blue Charter invites its shipping company members to participate in other projects showcasing their commitment such as the Green Marine Europe Label in which Armateurs de France and its members are very invested. For the first time in 2020, Green Marine Europe has awarded the label to six French shipowners.

MITIGATION

- Contribute to shipping regulatory developments at national, European and international levels;
- Represent and promote very active French shipowners on environmental issues in order to create momentum for action within the international shipping community;
- Create green alternatives for the shipping sector (LNG, hydrogen, wind, etc.);
- Participate in projects to reduce pollution from ships (QWIO project, GME label, SAILS charter, etc.).

The French Maritime Cluster

Coalition for the Eco-Energy Transition of Maritime Industries

The global Climate goals by 2050 demand technological, economical and organisational ruptures for the whole logistic and mobility chain. The eco-energy transition is based on new energy models: energy mix & technologies; energy efficiency; while protecting biodiversity. There is a need for a cross-industry approach, working together to define a common based science approach on Life-Cycle Assessment (LCA) of these new energy models. The Coalition will then prioritize R&D and projects and synchronize roadmaps to reach these goals.

OBJECTIVES

The Coalition aims to define a shared vision of the new energy models to achieve “decarbonization & 0 emission” 2050 Goals. This is based on a global vision of sea, coastal and port activities, and the connections with shore activities and territories challenges. Thus, the Coalition has decided to use new methods and tools, and created a digital platform with 3 dimensions: information; decision making; collaboration. This French initiative has been launched in order to contribute to european and international initiatives and to propose the T2EM Platform.

MITIGATION & ADAPTATION

- Help the maritime (i.e. sea, coastal, port) stakeholders to reduce their impacts on biodiversity through the development of new energy models;
- Develop a new mix of solutions to mitigate climate change, transforming stakeholders’ assets and operations to reach the global Climate Goals by 2050.

WHAT MAKES IT INNOVATIVE

Armateurs de France is the first French professional organisation which has included its sustainable development commitments in its articles, making membership of both the organisation and the Charter inseparable. It is therefore an incentive to be proactive and to go beyond regulation (on the environment, safety and social aspects).

RESULTS & IMPACTS

Launched in 2019, the Coalition now gathers 13 companies, 10 federations, 2 competitiveness poles and several scientific organisations. Since then, the Coalition assessed the potential of energy solutions, and developed a solutions’ repository. All the information was gathered and aggregated in the first version of the “T2EM Platform”. The Platform was developed by the Coalition, and hosts the database and the first decision-making tools. The Coalition also created working groups to delve deeper into specific issues.

WHAT MAKES IT INNOVATIVE

The French Maritime Cluster is developing digital tools to support and synchronize the main efforts from both public and private stakeholders, and tools to simulate and approve the solutions. The next step would be a European and international dimension of this Platform.
Green Marine Europe is a voluntary environmental certification program that helps shipowners to inform their partners and reduce their environmental footprint, through the evaluation of several criteria (Greenhouse gas, SOx and NOx emissions, underwater noise, waste management, ship dismantling, etc). It was launched in April 2020 by Surfrider Foundation Europe, in partnership with Green Marine in Canada, thereby creating a mechanism that supports them in improving their environmental performance on a European scale.

**OBJECTIVES**

The overall goal is to support shipowners towards a green transition, by communicating on their better environmental practices going beyond the existing regulation. To be certified, candidates must annually measure their environmental performance using the program’s self-assessment guides, then submit their results to an external verification that is carried out by an independent verifier accredited by Green Marine Europe, as well as agree to publish their individual results. The label also involves all the actors of the maritime supply chain, by working with shipyards, shippers, terminal operators, ports and technology solutions’ providers.

**MAIN ACTIVITIES**

In the frame of Green Marine Europe, Surfrider Foundation monitors the regulation related to shipping issues, in order to implement it in the certification requirements. It also organizes and facilitates the steering, advisory committees and all the governance bodies of the label. Surfrider Foundation trains the verifiers that evaluate shipowners and runs the recruitment of new candidates, referring to key indicators. Finally, it organizes the reveal event and certifies the laureates every year.

**RESULTS & IMPACTS**

The Green Marine Europe label counts more than 150 participants in total (i.e. shipyards, ports, terminal and shipyards), and shipowners have to improve their performance from year to year. In 2020, the label certified 6 shipowners for the first year: Corsica Linea, Brittany Ferries, La Méridionale, Socatra, GNV and Orange Marine. More than 150 people followed the event online for this reveal event.

**MITIGATION & ADAPTATION**

- Anticipate new environmental regulations for the shipping industry
- Promote the reduction of GHG emissions from ships and ports
- Reduce the risk of introducing and propagating aquatic invasive organisms and pathogens
- Promote the reduction of marine pollution (e.g. cargo residues, ship recycling)
- Promote the reduction of impacts on marine biodiversity (e.g. underwater noise)

**WHAT MAKES IT INNOVATIVE**

The Green Marine Europe label is the only certification program that covers every type of pollution of a fleet, from atmospheric emissions to ship dismantling. It is also the only program interested in tackling underwater noise issues. Green Marine Europe tries also to reduce marine pollution with a global approach with the whole supply chain.
Since 2018, the United Nations have been conducting negotiations for a treaty on conservation in the high seas known as BBNJ (Biodiversity Beyond National Jurisdiction). In line with this, the University of Brest developed a serious game that aims to train stakeholders in charge of implementing the future BBNJ treaty and to raise awareness among citizens about high seas challenges. The game adopts a systemic approach to ocean sustainability.

OBJECTIVES
BLUE DiplomaSEA is a serious game. The overall goal is to offer a capacity building tool to the experts that will implement the future BBNJ treaty and to post-graduate students in marine and coastal science. The objectives of the game are to: (1) Dive into the stakes of protecting marine biodiversity in the high seas; (2) Feel the challenges related to international governance (e.g. social justice, geopolitical and cross sectoral coordination); (3) Provide a space for negotiation; (4) Develop transversal skills (e.g. cooperation, dialogue, mutual understanding).

MAIN ACTIVITIES
The game is to be played between 5 and 15 participants endorsing various roles at play in high seas: fisheries, maritime transport, deep sea mining, NGOs, science, etc. Players take decisions based on a predefined set of actions in a series of rounds. Each action impacts the three pillars of sustainable development. The overall objective is to build a balanced use and conservation of the high seas through negotiation. Following the playing session (2 to 3 hours), a 1-hour debriefing session is recommended for the participants to better understand the stakes of international governance in the high seas.

RESULTS & IMPACTS
Before designing the game, the University organized design-thinking workshops with scientists, mediators and game-designers. The University has created a first prototype and tested it with students. The prototype will be finalized and a digital version will be developed. The simulation game BLUE DiplomaSEA is still under development, and the University expects it to be ready by 2022. The University of Brest has created a first prototype for a board version. It will be available in an open source version by summer 2021. A digital version will be developed in the future.

WHAT MAKES IT INNOVATIVE
This tool provides a playful way to train students and practitioners to the high seas challenges.

RAISING AWARENESS, MOBILIZING CITIZENS AND PROMOTING OCEAN LITERACY
Stopping the loss of marine biodiversity and preserving the regulating role of the ocean in the climate system will require transformative change in lifestyles and behaviours. To that end, the entire society must adopt more sustainable production and consumption practices. Only well-informed citizens will make this transformative change possible. As recalled by Sylvia Earle “the greatest threat to the ocean, and thus to ourselves, is ignorance” and, admittedly, the vast majority of people are not aware of how daily lives are directly and indirectly dependent on the ocean, and vice versa.

For that reason, it is essential to further share ocean knowledge within societies and boost stakeholders’ experience of coastal and marine ecosystems (e.g. aquariums, exhibitions, school trips). That is the role of several actors: research institutes, foundations, museums, associations and aquariums, who act as mediators with the great public, thus bridging the gap between science and society.

On that front, ocean literacy, i.e. the understanding of the ocean and our relationship with it, allows society to understand critical issues associated with ocean-related topics and challenges (e.g. climate change, biodiversity loss, health, energy transition, food security). Awareness-raising and educational activities provide stakeholders the necessary knowledge to better consider the ocean, hence responding to growing societal demands and needs for accessible and reliable information.

Such activities place primary importance on the cultural services provided by the ocean (i.e. recreational, aesthetic, artistic, religious and spiritual dimensions), promoting its related values, meanings, practices and knowledge. In many parts of the world, the ocean already plays a central role in shaping cultural beliefs and identities. This singular relationship between human and sea, which greatly contributes to protecting the ocean and its resources, must be preserved and strengthened.

This final section presents initiatives deployed to inform and educate both the general public and other relevant stakeholders, such as decision-makers, on ocean challenges, therefore supporting transformative change and the adoption of more sustainable practices, lifestyles and behaviours.

Species Guide for seafood buyers

The Species Guide for seafood buyers presents the main species of fish, molluscs, crustaceans and algae that are consumed in France, Belgium and Switzerland, and establishes purchasing recommendations for professionals who buy and sell seafood and want to ensure a sustainable supply. The Guide advocates for sustainable seafood supply, and low-carbon fishing practices to adapt to marine life depletion and to the effects of climate change.

OBJECTIVES

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RESULTS & IMPACTS

This Guide is seen as a key tool among the seafood industry and it helps the seafood buyers to change their practices (chefs and restaurants, catering sector, cooking schools, fishmongers, retailers, suppliers...) to improve the sustainability of the seafood they buy for their clients. About 1,000 guides are published every year and around 5,000 users through online tools.

MAIN ACTIVITIES

Marine resources are not unlimited. We know about their fragility because of environmental changes and fishing pressure. 54% of stocks are overexploited in the world, fishing techniques that have a major impact on ecosystems remain, and illegal fishing practices persist. The objective of this Guide is to help professionals in the fishing and aquaculture sector (fish wholesalers, importers, fishmongers, supermarket buyers, chefs, etc.) to obtain sustainable seafood supplies in order to fight against the dramatic decline of marine resources.

Mr. Goodfish is a programme on the sustainable consumption of seafood products, launched under the umbrella of the World Ocean Network, by three aquariums: Nausicaa – Centre de la Mer, in France, the Acquario di Genova in Italy and the Aquarium Finisterrae in Spain. Mr. Goodfish provides information tools (e.g., mobile app) designed to help seafood professionals and consumers choose the “right fish.” Experts recommend a list of seafood products that can be purchased by consumers.

OBJECTIVES

More than 50% of fish stocks are fully fished, 34% are overfished and more than 6% are underfished. Mr. Goodfish therefore aims to promote fish consumption from fully fished stocks and underfished stocks to reduce the pressure on the overfished stocks. Following Mr. Goodfish’s advice and purchasing a species at least once a year could save 18,000 tons of threatened species. The priority is that the fish industry and consumers join forces to save the economy of fishery.

MAIN ACTIVITIES

Mr. Goodfish publishes recommendations to promote sustainable consumption of seafood products based on the status of fish stocks, the size and season. The recommendations are established quarterly by an expert committee that brings together the main fishing industry stakeholders: scientists, fishers, wholesalers, processors, fishmongers, restaurateurs, distributors and consumer associations. They meet every 3 months to provide specific recommendations for each of the following regions: Channel and North Sea, Brittany and Atlantic and Mediterranean Sea. Mr. Goodfish creates specific tools adapted to each professional group to promote its recommendations.

WHAT MAKES IT INNOVATIVE

The Species Guide is seen as the key tool to help seafood buyers to implement a sustainable seafood policy, and is designed to analyse the entire production chain.
INSTITUT MARIN DU SEAQUARIUM

ReSeaclon: fishermen and territory against marine litter

The ReSeaclons project was born from the meeting of Triveo and the Seaquarium Marine Institute. Catalyst of marine conservation projects, the Seaquarium Marine Institute seized the opportunity to collaborate with Triveo, a recycling company, on its new technology to reduce marine litter in its region. The TRIVEO technology, which is still under development, aims to collect plastic waste from marine environments to recycle it into small objects (compression and friction processes). The ReSeaclons project therefore aims to answer the following question: how to collect marine plastics from the sea, and to do it sustainably?

OBJECTIVES

The ReSeaClons project aims to assess the feasibility of developing a waste collection and treatment chain, with the objective of protecting marine environments at the local level. The main priorities are to consider maritime spatial planning issues (including the involvement of fishermen), assess human and material costs, test and improve the Triveo-technology, and to do market research. Priorities also include raising awareness on marine litter issues to the general public to change human behaviours.

MAIN ACTIVITIES

The Seaquarium Marine Institute deals with collection management (e.g. logistics, collection, storage and sorting) and raising awareness activities. It works on a collection site that were identified with four key stakeholders: (1) fishermen, (2) local authorities, (3) the Cleaner Blue eco-barge, and (4) local NGOs. The Seaquarium Marine Institute assesses the environmental, technical and societal impacts and progress of the ReSeaClons project, using circular economy principles and models.

RESULTS & IMPACTS

The Triveo engineers further refined the Triveo technology, bringing technological solutions to the existing issues. Fishermen got very much involved in the project, collecting the plastic stuck in the nets on a daily basis. The collective effort proved to be effective, providing an opportunity to enhance the dialogue across sectors and actors. Citizens also took part in the project, mainly through beach cleaning activities (e.g. 1.6 tonnes of plastics collected in April 2019). Artists and scientists also joined the project. The Seaquarium Marine Institute is receiving demand for new projects on local fisheries and marine litter.

WHAT MAKES IT INNOVATIVE

The project involves all local stakeholders: authorities, fishermen, NGOs, industry representatives, artists; joining forces to achieve common goals. TRIVEO also brings in new innovative technology, that will soon be translated into the ReSeaClons project.

EXPÉDITION MED

Plastic Free Mediterranean Sea: Exhibitions for Education

The project "Plastic Free Mediterranean Sea - Exhibitions for Education" is an environmental awareness program, carried out by Expédition MED together with three partner countries: Algeria, Morocco and Italy. These travelling exhibitions will trace the sources, origins and impacts of plastic waste, while presenting sustainable and adapted alternative solutions to the general public in the Mediterranean Region.

OBJECTIVES

The overall goal is to disseminate knowledge on a large scale around the issues of plastic pollution to Mediterranean populations. Expédition MED's objective is to create travelling educational and scientific exhibitions on the issue of pollution, identifying the origin of the waste in order to target the sources of emissions and to support the implementation of sustainable solutions, therefore changing human behavior. The exhibition also provides an opportunity to strengthen ties with partner countries, enhancing cooperation through concrete and joint actions.

MAIN ACTIVITIES

Expédition MED carries raising awareness activities, disseminating knowledge through itinerant exhibitions jointly organized with Algeria, Morocco and Italy. Main activities therefore are creating educational scientific exhibitions. Other activities also include beach cleaning. Once waste is collected, it is then analyzed to produce comparable data. The data will subsequently be presented in the exhibitions, as well as in scientific publications. This program involves local populations in the protection of the environment through collaborative science.

WHAT MAKES IT INNOVATIVE

Expédition MED is conducting joint actions with key partners to build a large-scale awareness project. These itinerant exhibitions will inform and raise awareness at a very large scale, changing human behavior in several Mediterranean countries to stop plastic pollution including in the Mediterranean Sea.
The Aquarium Tropical organises an Ocean Festival (scientific and artistic workshops, thematic tours, shows for children, concerts) in close collaboration with key partners from the conservation and education communities every year. The Ocean Festival aims to promote scientific knowledge and raise awareness among the general public, showing visitors and participants the diversity, richness, beauty but also fragility of oceanic biodiversity.

OBJECTIVES
The overall goal of the Aquarium Tropical is to show the richness of ocean biodiversity, while alerting visitors on the threats it faces and showcasing initiatives to protect marine environments. The Aquarium’s priorities are to reach a wide audience (general public and schoolchildren), to develop a diversified cultural program that is playful and adapted to all ages (e.g., scientific and artistic workshops, concerts, theater), to show the variety of actors involved in the study and preservation of ocean biodiversity, and to propose ways for the public to contribute individually to its protection.

RESULTS & IMPACTS
More than 25,000 people were able to enjoy the activities offered during the Ocean Festival at the Tropical Aquarium between 2017 and 2019. In 2020 the 4th edition was broadcast online due to the pandemic. It brought together more than 20,000 people during 2 broadcasts of 2 hours each.

MAIN ACTIVITIES
The Aquarium Tropical will broadcast the “SPLUJ” sound-show, created by Teatl Piba and Ifremer, to immerse the audience in the deep sea through an audio show in the dark. The young public will be able to listen to the show. Good fishing, bad pickaxes, on sustainable fishing. Scientific speakers will guide small groups of visitors throughout the aquarium to teach them about the different on-site ecosystems (e.g., seahorses, marine mammals, alligators, predators of Amazonia, cichlids of Madagascar, electric fishes, coral reefs, mangroves). Exceptional backstage visits of the Aquarium will also be proposed.

WHAT MAKES IT INNOVATIVE
The Ocean Festival is the only annual event dedicated to the ocean in Paris. Parisians can understand why and how to protect the ocean. The Aquarium showcases species conservation programs and raises awareness to the general public, thus gaining the attention and interest of the audience for the protection of ocean ecosystems.

Funding sources: Public

Scale: Regional

Geographical location: Paris, France

Partner(s): The French National Museum of Natural History (MNHN), Ifremer, theatre companies

Project duration: 3 days every year since 2017

Budget: about 50,000 € /year

T2A Expedition

The expedition consists of sailing along the American coast to (1) conduct scientific research on the ocean, climate and biodiversity, and related interactions; and (2) share scientific knowledge on these issues in each leg of the expedition. The expedition will raise awareness on causes, effects and available solutions among the general public (including school children) and local authorities and representatives.

OBJECTIVES
The overall goal is to change mindsets and behaviors regarding the ocean, climate and marine biodiversity. The expedition has three main objectives: (1) Reduce overconsumption of seafood wherever it is economically possible; (2) Adapt to the effects of climate change and reduce related risks; (3) Transform human behavior to adopt a sustainable and responsible way of life (e.g., reduction in the fossil fuel consumption, adoption of clean energies, waste management, plastic recycling, coastal protection).

MAIN ACTIVITIES
The expedition conducts awareness-raising and educative activities, including: organisation of conferences for the general public (400 attendees expected), schools and local media, planning and facilitation of events, and production of documentaries, videos, and illustrated books. Some artists are joining the expedition. It also leads to the production of documentaries, books, and scientific research activities, such as participatory science research (e.g., temperature, shoreline and salinity measurements, and samples), making databases available to the scientific community (e.g., videos to assess the evolution of the 20-meter zone) and conducting interviews of people living along the coast.

RESULTS & IMPACTS
The association conveyed approximately 15 conferences on «Ocean and climate: your future depends on it». The expedition was seen by hundreds of people through the media and three major trade fairs. 100 sailors and 39 divers who will take turns on board have been recruited, and training cruises have been conducted. The expedition was seen by hundreds of people through the media and three major trade fairs. 100 sailors and 39 divers who will take turns on board have been recruited, and training cruises were set up in the Mediterranean Sea to allow around a hundred people to discover life on board the vessel.

WHAT MAKES IT INNOVATIVE
The expedition aims to spread ocean knowledge, enabling people to anticipate the consequences of climate change and biodiversity loss, allowing them to adapt their behavior accordingly.

Funding sources: Private

Scale: Global

Geographical location: South America, Central America, North America, Caribbean, France, Morocco, Canary Islands, Cape Verde, Antarctica, Arctic, Greenland

Partner(s): 10 partners including the Phenomer Laboratory (Ifremer) and the Locean Laboratory of Oceanography and Climatology

Project duration: 2022 - 2026

Budget: 1,185k€
Blue Box is an innovative room of 48 m² containing panoramic video projection, 3D sound, body interaction and hologram. It can be easily implanted via its mountable/dismountable structure to democratize culture by bringing it to the public. The first exhibition “Memory of the Future” aims to raise awareness and engage players on a global and urgent subject, global warming and the impact of rising sea level. It will encourage them to act on their behavior and thus, on an individual scale, on the future of our planet.

OBJECTIVES

The objective of the Blue Box is to democratize culture by bringing it to the public in an innovative form combining cognitive sciences, art and new technologies, to anchor a truly positive experience in memory. Being committed to the preservation of the oceans and the environment, the first exhibition, “Memory of the Future”, aims to plant the motivation to act on their behavior and thus, on an individual scale, on the future of our planet.

MAIN ACTIVITIES

Neographic Digital conducts awareness-raising activities through the Blue Box project. Its research focuses on the combination of innovative levers from the cognitive sciences to optimize the impact of content and messages. It proposes a new narrative, an innovative pedagogy, accessible to the greatest number and respecting the health rules related to the Covid-19.

RESULTS & IMPACTS

Neographic Digital designed an innovative tool to promote behavioral change to the general public and developed its first exhibition “Memory of the Future”. The team is working in partnership with several organizations, including Maud Fontenoy Foundation and Surfrider Foundation Europe. Neographic Digital also volunteers time to protect the ocean through awareness-raising action and events.

WHAT MAKES IT INNOVATIVE

Blue Box is the first mobile immersive experience, and is the result of the coming together of expertise in the fields of interactive design and video production. Moreover, it combines technological and pedagogical levers never before harmonized. Research and development is also a large part of this project, which is open to new perspectives such as the potential integration of olfactory.
The Roadmap to Oceans and Climate Action

The Roadmap to Oceans and Climate Action (ROCA) is a global multi-stakeholder initiative involving governments, international agencies, NGOs, scientific institutions, private sector entities, and subnational authorities to advance the ocean and climate agenda (especially in the UNFCCC, the UN Ocean Conference, and in other United Nations fora), and at the national level in all countries. ROCA was launched at the UNFCCC COP 22 in Marrakech, Morocco. The ROCA works to implement the Strategic Action Roadmap on Oceans and Climate: 2016-2021, first discussed at the Oceans Day at COP 21 in Paris 2015.

ROCA is led by the Global Ocean Forum, the Intergovernmental Oceanographic Commission of UNESCO, the Ocean Policy Research Institute of the Sasakawa Peace Foundation, Japan, and the Oceano Azul Foundation, Portugal.


The ROCA initiative aims to promote the application of Blue Economy approaches with emphasis on low-carbon solutions and economic benefits to developing countries and Small Island Developing States (following SDG target 14.7). The Assessing Progress on Ocean and Climate Action reports cover developments in fostering the low carbon Blue Economy, for example, initiatives that focus on: (1) advancing the development of marine renewable energy; and (2) addressing potential threats and dangers to the blue economy sector from climate change and environmental challenges and increasing climate resilience through Blue Economy.

OBJECTIVES

The objective is to promote a renewed vision of the Ocean as a source of benefits for all humanity for which each person, individually and collectively, is responsible, and to urge every person, every community, every State and the international community to act accordingly.

MAIN ACTIVITIES

Ocean as Common conducts awareness-raising activities. It mobilizes international and national decision-makers to strengthen international ocean governance, and engage with NGOs, companies and the general public to change human behaviour and further protect the ocean. The Ocean as Common initiative also raises funds to support stakeholders in implementing concrete action.

RESULTS & IMPACTS

In 2019, Emmanuel Macron, President of France, has declared that the "Ocean as a global common" is a key pillar of the French maritime strategy. In addition to its call for the ocean, the Ocean as Common initiative also implemented several awareness-raising programmes, including the Swim For the Ocean and Blue Friday campaigns.

WHAT MAKES IT INNOVATIVE

The Ocean As Common project calls for a renewed vision of the Ocean, beyond the usual notions of appropriation and sharing, as well as those of freedom and sovereignty. It reminds us that the uniqueness of the waters requires a global vision and that if the Ocean is a benefit for all, we can all act for its good state, wherever we are.
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