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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

Fifty-fifth Session of the Executive Council
UNESCO, Paris, 14–17 June 2022

Item 4.1 of the Provisional Agenda

**STATUS OF THE IMPLEMENTATION OF THE UNITED NATIONS DECADE OF OCEAN
SCIENCE FOR SUSTAINABLE DEVELOPMENT (2021–2030)**

ADDENDUM

Outcomes of 2nd Decade call for actions and scope of 3rd call

This document summarises the process followed in the analysis of submissions to the Call for Decade Actions No. 02/2021 and describes the Decade Actions that were endorsed as a result of this Call. The remaining submissions will be analysed in coming months.

[Annex 1](#): Endorsed Decade Programmes

[Annex 2](#): Endorsed Decade Contributions

[Annex 3](#): Endorsed Decade Projects

[Annex 4](#): Registered UN-led Decade Actions

1. The First Decade Call for Actions (No. 01/2021) was open from 15 October 2021 to 31 January 2022 and was the second of a series that will be launched every 6 months as part of the Ocean Decade. It solicited the following types of Decade Actions:

- **Ocean Decade Programmes:** The Calls for Decade Actions that will be launched every 6 months throughout the Decade will vary in their thematic and/or geographic focus at the programmatic level. Priorities for each Call will be determined based on the results of gap analyses as well as opportunities to contribute to global or regional policy frameworks and initiatives. At the programmatic level the current Call for Decade Actions No. 02/2021 has a primary focus on programmes that contribute to Ocean Decade Challenge 1 – Marine Pollution, Challenge 2 – Multiple stressors on ecosystems, or Challenge 5 – Ocean-climate nexus. This includes regional programmes with a focus on one or more of these Challenges. Programmes that contribute primarily to other Ocean Decade Challenges can complete an Expression of Interest form to allow guidance to be provided on their suitability for the current Call for Decade Actions.
- **Ocean Decade Projects:** At the project level the Call is soliciting initiatives that respond to one of the following:
 - Potentially forming part of one of the 26 endorsed Decade Programmes participating in the Call for Decade Actions.
 - Submission to the joint Ocean Decade – [AXA Research Fund “Towards more resilient coastal livelihoods”](#)
 - Submission to the joint Ocean Decade – MeerWissen Initiative [Call for Proposals for African-German marine research partnerships on “Nature-based Solutions in Africa”](#).
- **Ocean Decade Contributions** of in-kind or financial resources to support Ocean Decade coordination or Action costs. Detailed information on different support mechanisms, as well as the **resource** needs of existing endorsed Decade Actions can be obtained by contacting the Decade Coordination Unit. There is no deadline for the submission of contributions as part of this Call.

2. The Call for Actions resulted in 38 programme submissions from 19 countries, and 134 project submissions from 29 countries. In addition, over 50 submissions were received to the AXA Research Fund Joint Call and close to 20 submissions were received to the MeerWissen Joint Call.

3. During the period that the Call was open, one other sponsored and joint Call for Decade Actions was developed with ArcticNet, these submissions as well as submissions received to an earlier joint Call with Fisheries and Oceans Canada have been assessed in parallel to the submissions to Call for Decade Actions No. 02/2021 and are also reported in this document.

4. Submissions for contributions in the form of Decade Collaborative Centres and Decade Implementing Partners were also received and analysed and are reported here.

5. Finally, twelve UN-led Decade Actions were registered and are reported here.

6. A rigorous multi-step, iterative review process was carried out within the limits of existing resources of the IOC Secretariat to evaluate the submissions received to Call for Decade Actions No. 02/2021. Programme submissions were reviewed by the Decade Coordination Unit and an informal expert working group presented to the Decade Advisory Board in two meetings in March and May 2022. Project submissions were reviewed by relevant programmes and the Decade Coordination Unit. Submissions to the joint Calls were analysed initially via the engagement of the Decade Coordination Unit in the partners’ evaluation processes, followed by a final review by the Decade Coordination Unit. Decade Collaborative Centre and Decade Implementing Partner

submissions were analysed following the process set out. The due diligence process described in Memo IOC/VR/21.117/JB/AC/ic was followed for all submissions considered for endorsement.

Endorsed Decade Actions

- **Decade Programmes:** Based on the process described above, the Executive Secretary endorsed four Decade programmes. These programmes are listed in Annex 1.
- **Decade Contributions:** Based on the process described above, the Executive Secretary endorsed five contributions that were recategorized from programme and project submissions as well as two Decade Collaborative Centres and three Decade Implementing Partners. These contributions are listed in Annex 2.
- **Decade Projects:** Based on the process described above, the Executive Secretary endorsed 58 Decade projects. These projects are listed in Annex 3.
- **UN-led Decade Actions:** Five Decade Actions were registered by UN partners. These Decade Actions are listed in Annex 4.

Treatment of remaining submissions to Call for Decade Actions No. 02/2021

7. The analysis of remaining submissions from the Call for Decade Actions No. 02/2021 in the form of over 90 pipeline projects will continue in coming months. All proponents have been notified of the status and next steps in the treatment of their submission.

ANNEX 1: ENDORSED DECADE PROGRAMMES

This Annex presents each of the Decade programmes have been endorsed. It provides information on the lead partner and the summary of the Decade Action provided by the proponent. The comments and recommendations of the Decade Advisory Board on each programme can be found in meeting notes for [Decade Advisory Board Meeting No. 01/2022](#).

Unique ID	Name of the Action	Lead Institution	Summary Description
8.2	Global Ocean Negative Carbon Emission	Xiamen University	Securing mitigation and adaptation solutions to climate change is an urgent requirement. The ocean has the potential to store globally significant amounts of CO ₂ , but approaches to enhance carbon sequestration require development and evaluation. Global-ONCE will undertake and facilitate the science required to evaluate and implement eco-technological interventions, including learning from paleo-oceanic carbon processes to predict the future, restoring impacted marine ecosystems, fostering nature-based systems of land-sea integrated management, upwelling manipulation, microbial-driven comprehensive carbon sequestration, adjustment of nutrients, DO and pH. Global ONCE will 1) develop an international network of field stations and research facilities, 2) co-design interdisciplinary collaborative research, 3) develop an evaluation framework for mitigation and adaptation approaches, 4) co-ordinate capacity building and 5) facilitate equitable policy, governance and societal understanding.
11.2	Global Ocean Decade Programme for Blue Carbon	The University of St Andrews	GO-BC will enhance understanding of the ocean-climate nexus and generate new knowledge and solutions to mitigate the effects of climate change. Recognising the multiple roles BC ecosystems play beyond mitigation, including adaptation and resilience to the effects of climate change, allows GO-BC to address climate responses comprehensively, while supporting people and biodiversity. GO-BC actions will go beyond the traditional focus on coastal ecosystems to deliver new outcomes across estuarine-coastal-open ocean environments. GO-BC will address SDGs 13, 14 and 17 through enhanced scientific cooperation at all levels, including: (1) codesign and implement new research to promote Nature-based Solutions for better ocean sustainability; (2) enhance global to regional collaborative efforts; (3) coordinate capacity building in blue carbon science; and (4) communicate and deliver outputs to policy makers and communities.
18.2	Ocean to climate Seamless Forecasting system	First Institute of Oceanography (FIO), Ministry of Natural Resources	The goal of the OSF programme is to dramatically improve our forecasting capability for the ocean and climate. OSF builds on very recent observational and computational breakthroughs. During its implementation, satellites will be launched, new-generation drifting buoys will be deployed, transformative theories on air-sea interactions will be formulated, and a seamless ocean-to-climate forecasting system will be developed. The overarching goals of OSF are to (1) understand the ocean-climate nexus, (2) enhance observation capabilities using novel technologies, (3) integrate observations with cutting-edge ocean-to-climate models, (4) provide public services and products through developing a multi-hazard early warning system, and (5) exchange advanced knowledge and theories on ocean science and ocean management with the young generation, especially to those in SIDS, LDCs and LLDCs.
20.2	Healthy Rivers, Healthy Ocean	Global Water Partnership Organization	The seas, surface waters, and groundwater supports life and the economy. However, their health is critically threatened. There is a systemic gap between the ocean and freshwater management communities. As a result, there is insufficient political and financial investment in safeguarding the services that the water systems, from the source to the sea, provide. The disconnects in policy development and implementation among basin, coastal, and marine areas lead to management failures, which result in issues such as pollution, alterations in sediment flows, and habitat fragmentation etc., with severe impacts on freshwater and marine ecosystems. The lack of concerted action between the ocean and freshwater communities for the achievement of SDG 6 and SDG 14 leads to a missed opportunity for an integrated response. The HRHO programme is designed to assist in addressing disconnects and systemic gaps and enable accelerated source-to-sea action at regional, national, and sub-national levels

ANNEX 2: ENDORSED DECADE CONTRIBUTIONS

This Annex presents each of the endorsed Decade contributions.

Unique ID	Name of the Action	Lead Institution	Summary Description
In-kind or financial contributions			
4.2	Center: Chemical Currencies of a Microbial Planet	Woods Hole Oceanographic Institution	One-quarter of the carbon derived from photosynthesis on Earth cycles rapidly through a pool of seawater metabolites generated by the activities of microbes. These molecules help govern the global carbon cycle, provide life-supporting nutrients, and support the function of marine food webs that ensure a vital and healthy ocean. The Center for Chemical Currencies of a Microbial Planet (C-CoMP) will leverage recent advances in analytical and data sciences, incorporate new ocean sampling technologies and an open-science framework, and engage educators and policy-makers to promote a deeper understanding and appreciation of the chemicals and microbial processes that underpin ocean ecosystems and other microbiomes that affect our daily life.
27.2	Inundation Signatures on Rocky Coastlines	Williams College	Understanding the records of coastal wave inundation is fundamental for long-term risk analysis but it is still not possible to know inundation magnitude and frequency with any accuracy, or to know the difference between effects of past storms vs tsunamis. These long-lived deposits provide the main records of prehistoric events, so reconstructions are crucial to provide predictions or future inundation regimes. The Inundation Signatures on Rocky Coastlines (ISROC) Research Coordination Network will unite researchers around the world to 1. Define the research gaps; 2. Extend and train the community of researchers; 3. Develop standards for gathering and archiving data; 4. Develop cyberinfrastructure for researchers to upload and access data; and 5. Create opportunities for collaboration and exchange. Information transfer, and providing data and interpretations to local stakeholders, is a primary goal.
28.2	Global Fund for Coral Reefs	United Nations Multi-Partner Trust Fund Office	The Global Fund for Coral Reefs deploys and unlocks funding across a blended 'Investment Ecosystem' under a 'protect-transform-restore-recover' approach. Through a coalition of actors in each ecosystem, programming focuses on reducing local drivers of degradation and increasing resilience through a supported pipeline of investable 'reef-positive' interventions (e.g., revenue generating MPAs, mariculture, plastic waste management, sustainable fisheries). Emphasis is placed on LDCs and SIDS in South Asia, the Pacific, the Caribbean and the Indian Ocean, in addition to other priority geographies, where climate-resilient coral reefs support high levels of biodiversity and provide critical ecosystem services. Programmes have already launched in Fiji, Philippines, The Bahamas, Papua New Guinea, Kenya and Tanzania. Currently, the pipeline for 2022 includes more than 20 additional countries.
148.2	Sea Grant International	NOAA	Central to the Decade is the need for stakeholders to co-develop and co-deliver transformative, multi-disciplinary ocean science while linking and aligning scalar-specific initiatives to broader priorities. However, in research programs that lack bottom-up mechanisms, important local issues are lost to larger national or subnational institutions, and needed info is never generated or not applied. Valuable research may be published, but never properly transitioned to managers and policy-makers. In addition, local and indigenous knowledge that could guide research programs is often lost in top-down models. The National Sea Grant College Program is a proven model to engage universities, government agencies, and stakeholders acting in partnership to promote research, education, and outreach/extension related to marine issues. This project would share the model with international partners and encourage the establishment of similar programs through workshops and learning exchanges.
150.2	National Sea Grant College Program	NOAA Sea Grant	For over 50 years the National Sea Grant College Program (Sea Grant) has generated and delivered actionable science to tackle the most pressing challenges facing our marine and coastal communities and environments and will continue to do so in support of the Ocean Decade priorities. Sea Grant's key to success lies in the synergistic interplay of research, extension, and education initiatives, representing a rich knowledge-to-action network that empowers coastal stakeholders with science-based information, products, and services to inform decision-making and help solve pressing societal problems.

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Decade Collaborative Centres			
804	Decade Collaborative Centre for the Northeast Pacific Ocean (DCC NEPO)	Tula Foundation	Decade Collaborative Centre for the Northeast Pacific Ocean (DCC NEPO) , largely spanning the west coast and offshore regions of North America, hosted by the Tula Foundation in British Columbia, Canada. The Tula Foundation has a strong network of research and observing partners working throughout this highly productive ocean basin and has actively been building relationships with Indigenous peoples and local communities, industries, and governments. Stakeholders in this region are becoming very engaged in the Ocean Decade and a DCC will be critical to supporting and promoting co-designed ocean science for sustainable development.
805	Ocean Visions – U.N. Decade Collaborative Centre for Ocean-Climate Solutions (DCC OCS)	Ocean Visions, Georgia Tech, and the Georgia Aquarium	Ocean Visions – U.N. Decade Collaborative Centre for Ocean-Climate Solutions (DCC OCS) , hosted by a partnership between Ocean Visions, Georgia Tech, and the Georgia Aquarium, and will be housed within the Georgia Aquarium in the United States. Ocean Visions is leading the way in the co-design of ocean-based solutions to climate change, spanning from carbon dioxide removal and sequestration to ocean alkalinity enhancement. This DCC will support endorsed and emerging programmes working within the ocean-climate nexus that have an interest in developing, testing, and eventually scaling these solutions to mitigate the worst effects of climate change.
Decade Implementing Partners			
801	Heirs to Our Ocean Decade Implementing Partner	Heirs to Our Ocean	<p>Heirs to Our Oceans (H2OO) is a US based charity with a mission to help youth understand the role they can play in creating a healthier, safer world for all. Through capacity developing events, workshops, and initiatives H2OO works with youth from around the world to help them develop their knowledge and skills needed to tackle the challenges facing the world through intersectional solutions.</p> <p>Through previous work with the US National Decade Committee, H2OO has developed a toolkit and guidelines for implementing Ocean Decade Youth Advisory Councils. These are groups of youth who engage with the Decade at the national level to support the catalysation of Decade Actions, and other local initiatives contributing to the Decade. As a DIP, H2OO would act as a consulting body for National Decade Committees to use as a resource as they set up their own Youth Advisory Councils.</p> <p>Additionally, H2OO serves as a mechanism through which to engage a broad audience of youth, amplify the voices of youth in the context of the Decade, and offer capacity development in areas crucial to movement building, such as public speaking training, leadership skills workshops, and providing organisational support for youth summits</p>
802	EurOcean Decade Implementing Partner	EurOcean	<p>EurOcean supports European marine science and technology advances. They engage in marine science communication and dissemination activities, promote research achievements and initiatives, create opportunities for developing ocean science and technology, and nurture partnerships and collaborations to help our community to make better and more informed decisions. EurOcean provides comprehensive databases of information on topics related to marine science and technology in Europe with priority given to three main domains: Marine Knowledge Management, Marine Research Infrastructures, and Ocean Public Outreach and Awareness activities.</p> <p>As a Decade Implementing Partner, EurOcean will provide:</p> <ul style="list-style-type: none"> • Networking events, conferences, workshops, and webinars with relevant stakeholders in the European marine science arena. Consortia for related R&D projects and actively engages in such projects. • Communication and dissemination of marine science activities to reach not only some of the most influential stakeholders but also the general public in European countries. • Ocean Literacy activities. • Timely and reliable data, information, and knowledge, through our databases, awareness activities, studies, and reports.

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			<p>• Open databases (RID–Research Infrastructures Database and KG-Knowledge Gate) which keeps data relevant to the marine scientific community in Europe.</p> <p>The EurOcean team will also liaise with the DCU on a quarterly basis to identify further opportunities. Additionally, they will support communications through their extensive network, on behalf of the Decade.</p> <p>Many of EurOcean’s activities are already aligned with the Ocean Decade. They will continue this alignment and direct implementation of Ocean Decade activities through a dedicated human resource.</p>
803	National Institute of Oceanography and Fisheries (NIOF) Decade Implementing Partner	National Institute of Oceanography and Fisheries (NIOF)	<p>NIOF as a Decade Implementing Partner (DIP) in coordination with IOC-UNESCO will support the fulfillment of the latter’s responsibilities and obligations in relation to capacity-building, marine scientific research, and international cooperation for the development of marine technology, as well as the implementation of the strategic directions identified in the Decade of Ocean Science for Sustainable Development (2021-2030).</p> <p>The NIOF (DIP) will coordinate the planning and implementation of the training activities in such a way as to stimulate and advance the conduct of marine scientific research by, and for the benefit of, IOC-Africa member states and to foster cooperation in marine scientific research and technological development. Encourage and facilitate cooperation with IOC-Africa member states in respect of marine scientific and technological development.</p> <p>Promote international cooperation in marine scientific research in the Area. Conduct of NIOF (DIP) research programmes related to the latest developments and trends concerning activities in the North Africa area. Provision of training programmes in marine science and technology, as well as in techniques for marine scientific research, that are designed to facilitate the full participation of IOC-Africa member states in activities in the Area, including, where appropriate, training programmes to be provided onboard our research vessels. Organization of conferences, seminars, workshops and symposiums relating to marine scientific research in the North Africa area. Prompt dissemination of the results of marine scientific and technological research in easily accessible publications. Technical cooperation with other States, especially with IOC-Africa member states.</p> <p>NIOF offers training initiatives on board the research vessels (RV/Yarmouk and RV/Salsabil) for early career scientists from Africa, adjacent islands and Middle East countries.</p>

ANNEX 3: ENDORSED DECADE PROJECTS

Unique ID	Name of the Action	Lead Institution	Summary Description
Call for Decade Actions No 02/2021			
2.2	Science Without Borders®: Conserving the Tropics	Khaled Bin Sultan Living Oceans Foundation (KSLOF)	Humanity depends on healthy and diverse ecosystems. Mangroves, seagrasses, and coral reefs host some of the highest biodiversity on Earth. They provide habitat, food, and breeding grounds for marine life, and food, income, and protection to communities. However, these fragile ecosystems are rapidly being degraded. The Living Oceans Foundation spent 10 years mapping and surveying the world's reefs, collecting an array of data, conducting outreach and education activities, and establishing a baseline status of the world's reefs and nearshore habitats. The Science Without Borders® project will leverage this dataset for conservation, using it to improve the monitoring and management of coral reefs, seagrass beds, and mangrove forests. Using our network of in-country partners, this project will allow us to bring science, outreach, and education programs to SIDS and LDC's, engage communities, improve ocean literacy, and develop science-based solutions to conserve tropical marine ecosystems.
6.2	Plastic Drawdown	Common Seas	Plastic Drawdown (PD) is a proven rapid assessment tool to help countries develop an evidence-based policy response to ocean plastic pollution when data is limited. We want to use PD to help 10 new countries understand their plastic waste flows, identify policy interventions, and announce evidence-based strategies that reflect their needs and have stakeholder support. PD was developed in consultation with 27 governments, resulting in a rapid, cost-effective, collaborative and user-friendly approach to support policy development, particularly in low and middle-income countries with limited data and a significant plastic problem. Our vision is to support ambitious but resource-constrained decision-makers to deliver effective national strategies that address the full life cycle of plastics with actions spanning the value chain, adapting our approach to meet country-specific requirements. We also want to disseminate the lessons learned from these 10 countries to support action elsewhere.
7.2	Sustained Data for a Changing Ocean	Ocean Observatories Initiative	The Ocean Observatories Initiative (OOI) provides sustained ocean observations and data delivery that researchers around the globe are using to identify, quantify, and ultimately assess ongoing changes in the global ocean. Commissioned in 2016, OOI is a long-term project to collect ocean data for 25 years or more. This longevity makes it possible to measure and observe short-lived episodic events and longer-term changes in the ocean. OOI currently consists of five instrumented arrays that continually measure more than 200 different parameters. The arrays gather physical, chemical, geological, and biological data from the air-sea interface to the seafloor. These data are freely available to anyone with an Internet connection. The arrays also function as test beds for new sensor technology to help advance the state of the art in ocean observation. Endorsing OOI as a UN Ocean Decade Program will ensure these data have a global reach, providing a foundation for ocean-related policies.
16.2	The EMS centre - model system for future oceans	Leon H. Charney School of Marine Sciences, University of Haifa	The EMS is one of the most rapidly changing ocean basins impacted by climate change and extensive anthropogenic pressures. The EMS is used as an early warning and model system to examine ecosystem resilience and sensitivity. The Helmholtz International Lab EMS-FORE, based in Haifa, combines GEOMAR's unique experience in investigating biogeochemical processes in global oceans with Haifa's knowledge of the functioning of the EMS and in situ observational platforms. We will use world class facilities of the partners, multiple technologies for ocean observations, experimental manipulations and model-data fusion, research cruises, moorings and deployments of ROVs, AUVs and gliders, novel cameras and chemical sensors, and adaptive marine ecosystem models. Education of a new generation of early career scientists, PhD and MSc students forms a key aspect of EMS FORE, joint cruises, workshops and summer schools. We invite researchers internationally to become involved in our activities.
22.2	Hope for Reefs	California Academy of Sciences	Hope for Reefs is a major initiative at the California Academy of Sciences that aims to reverse the rapid decline of Earth's coral reefs in this generation. Over the next five years, we will advance high-impact interventions—from establishing sustainable fisheries and marine protected areas to on-the-reef restoration—all implemented with

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			local communities and cross-sector stakeholders. We will scale a successful model for community reef monitoring to the national level; increase capacity for rapid response to catastrophic events impacting reefs; and apply new technologies to map, monitor, forecast, and regenerate reef health. We will also leverage our world-class education programs and Steinhart Aquarium to inspire and train a diverse cadre of future reef scientists while supporting a global youth corps of emerging environmental leaders advocating on behalf of coral reefs.
25.2	Crustal Ocean Biosphere Research Accelerator	Bigelow Laboratory for Ocean Sciences	Remote crustal ocean environments are currently targeted for emergent human uses such as deep-sea mining and carbon sequestration, but there are fundamental knowledge gaps surrounding our understanding of the magnitude of ecosystem services provided by life in crustal ocean habitats as well as their resilience to perturbations. The Crustal Ocean Biosphere Research Accelerator (COBRA) will bring together an international team of interdisciplinary academic and government scientists, private institutions, policy makers, and other stakeholders to coordinate efforts to achieve objectives of mutual benefit that will catalyze new knowledge and inform decision making related to the crustal ocean biosphere. In parallel, this endeavor will train the next generation of leaders in ocean exploration, science, and policy through innovative virtual expedition leadership training programs that promote team science collaboration, diversity, equity, and inclusivity.
30.2	Allen Coral Atlas: Global Coral Reef Monitoring	Arizona State University's Center for Global Discovery and Conservation Science	The Allen Coral Atlas is a game-changing coral conservation tool powered by Arizona State University and developed in partnership with Planet, University of Queensland, the Coral Reef Alliance and Vulcan, and coral reef scientists, universities, NGOs and private entities. Its goal is to assist stakeholders ranging from local communities to regional and national governments to reach their coral reef conservation goals. With the Atlas, coral conservationists, reef managers and scientists have access to information that has never before been available at this scale, including high resolution coral reef habitat maps, real time bleaching monitoring, and expanding monitoring innovations. More information at www.allencoralatlas.org
31.2	Marine forest restoration:a coastal gardening plan	Underwater Gardens International	Active restoration has emerged as one of the preferred tools that may boost sequels of marine protected areas and other conservation measures. Restoration acts promote biodiversity, enhance carbon sequestration and accelerate coastal and offshore resilience. Yet, we still lack a program that combines conservation and restoration under a unified setting considering local citizen socio-economic parameters. BLUE CITIZEN proposal represent a novel restoration approach in which (1) restoration is depicted with ubiquitous properties (2) a profession of “gardeners of the sea” is created and endorsed (3) the project targets the restoration of the most neglected marine biome, the Marine Forests;(4) new ecoengineering aspects are applied; (5) the plan is performed on land and in the sea, from shallow, mesophotic to continental shelf areas; (6) a novel approach for C sequestering is applied and (7) involvement of citizens and local stakeholders with a business plan is developed.
34.2	Deep-Ocean Genomes Program	Woods Hole Oceanographic Institution	The Deep-ocean Genomes project will use cutting edge next generation sequencing technologies and comparative genomics methods to obtain fundamental new knowledge of the organization, evolution, functions, and interactions of life in one of Earth’s least-understood regions, the deep ocean.
38.2	Pacific Coral Reef Action Science and Knowledge	Secretariat of the Pacific Regional Environmental Programme	This action will provide the science needed to support Pacific Island Countries to build resilience of coral reefs. Many challenges face Pacific Islands Small Developing states to effectively manage the ¼ of the world’s coral reefs under their jurisdiction. The Pacific Island Coral Reef Action Plan which sets out 8 key action areas where regional cooperation and international partnerships can support regional efforts to manage threats to coral reefs. The action will galvanise international science partners to share knowledge, resources and technology to avoid loss of this crucial marine biodiversity resource. The Action will form a group of projects under the following themes identified in the plan. 1. Optimise Capacity Building 2. Forster traditional knowledge 3. Coordinate education and awareness 4. Streamline regional and local collaboration 5. Conserve Habitat and biodiversity 6. Science for habitat restoration 7. Coastal fisheries management 8. Apply research and monitoring
42.2	WCO Biomolecular Observing Network	Marine Biological Association	The Western Channel Observatory – Biomolecular Observing Network (WCO BON) will build on the successes of over a century of continuous biological observations (including 20 years of DNA sampling) by combining with innovative autonomous solutions for sampling, data capture and development of predictive capability through

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			biological digital twins. The observatory covers almost 1,000 km ² of coastal ocean in the Western English Channel adjacent to the city of Plymouth; home to three world-leading marine research organisations. Biomolecular observations will help map key biodiversity knowledge through temporal and spatial monitoring, with the bigger challenge of determining the biological functional capacity of this immense evolving marine genomic reservoir. Our ambition is to achieve integrated global biomolecular observations and data sharing through networks of excellence and capacity development. Its predictive capability will ultimately revolutionise sustainable ocean management.
47.2	Mayotte observatory for research and response	IFREMER	The MARMOR project will provide the French scientific community with the mobile and cabled equipment required to advance the study of the earth deformation, seismicity, tsunamis, volcanism, and of several key environmental issues in ocean and coastal areas, by extending the on land observations capabilities into the marine domain.
51.2	Maré de Ciência (Tide of Science)	Universidade Federal de São Paulo (UNIFESP)	Maré de Ciência (Tide of Science) works on the interface between science, public policies and society, promoting ocean literacy based on dialogue, knowledge exchange, and engagement. We work on ocean sciences in the context of the 2030 Agenda and the Sustainable Development Goals, in line with the goals of the UN Ocean Decade - contributing to ocean literacy awareness for different sectors of the society, integrating ocean literacy values and principles to behavior change towards more sustainable actions. We value participants as the protagonist of the production of knowledge and the joint construction of the processes, the activities are not designed to be for the audience but with the audience. This initiative integrates science, education and outreach, and is co-design between the university, public authorities and civil society. It breaks the vision of knowledge and research only within universities and shows that quality and impact science is done with everyone together.
54.2	Interoperability Architecture for a Digital Ocean	SINTEF Ocean	As initiatives around the globe begin to enhance ocean-oriented digital capacity, we have unprecedented opportunities to power digital twinning. Currently there are many initiatives that work toward or in support of a Digital Twin of the Ocean, e.g. the EU Digital Twin Ocean system, NOAA's National Centre for Environmental Information, the IOC Ocean Data and Information System ODIS, the IOC Ocean Best Practice System OBPS, the Ocean Data Action Coalition and the UN Data Coordination Group. DITTO's Priority Activities are a) Articulate and advance a common understanding of Digital Twins of the Ocean architecture. b) Advance a number of "use case" prototype Digital Twin applications across the spectrum from science, engineering and operations; and c) Encourage the formulation of DITTO related Decade Projects. Motivated by this, we propose to coordinate ongoing initiatives to address priority activity a) and work towards an interoperability architecture for the Digital Twins of the Ocean.
64.2	Naples Ecological REsearch Augmented observatory	Stazione Zoologica Anton Dohrn	The augmented observatory NEREA (www.nerea-observatory.org ; https://www.imeko.org/publications/tc19-Metrosea-2019/IMEKO-TC19-METROSEA-2019-20.pdf) is an initiative for integrating and augmenting the Marechiaro LTER (Long Term Ecological Research, active since 1983) in the Gulf of Naples with moorings, stand-alone seabed platform, regular short cruises across gradients (polluted vs pristine sites, vertical dimension, oligotrophy/eutrophic) and question-driven process studies, using both innovative (genomics, imaging-both HD and acoustic cameras, microplastics sampling) and traditional techniques (including trace elements analyses). The NEREA project is thus designed to promote and to apply multidisciplinary approaches, from the sampling strategy, to the development of new indicators for ocean health and of new models of the ocean microbiomes.
65.2	The Cozumel Coral Conservatory	Living Sea Sculpture	The Cozumel Coral Conservatory (CozCC) is a unique place to preserve and grow corals uniting science, technology, engineering, arts, and math (STEAM). A diverse coalition of all ages, including nonprofits, universities, individuals, private entities, and governmental institutions, are working to protect, monitor, and rehabilitate the Mesoamerican Barrier Reef in Cozumel, Mexico. The CozCC aims to increase coral coverage, marine biodiversity, and shore protection in the Villa Blanca Reef tract through recognized best practices and groundbreaking innovation while offering novel opportunities for ocean engagement, science education and employment made possible through trans-disciplinary collaboration. Natural coral heads, as well as artistic and functional artificial reef

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			structures and sculptures, populate the seafloor in this shallow reef. The CozCC bridges quantitative science and the originality of hands-on creation to scale coral restoration and strive for a balanced, healthy ocean.
66.2	Hakai Institute Biomolecular Observing Network	Tula Foundation	HI-BON is a highly coordinated network of partners across British Columbia, Canada who are using long-term genetic-based assessments of marine biodiversity to create baselines, track changes through time, and provide local-scale biodiversity data in remote areas. The taxonomic focus of this research is broad, with core initiatives quantifying the diversity of fish, invertebrates, and microbes. Biomolecular sampling began at the Hakai Institute in November 2014 and has now grown to a large-network of over 20 partners collecting monthly samples across the BC coast. Our network emphasizes: 1. Standardization of biomolecular monitoring approaches in BC, with the goal to align with global OBON standards. 2. Building capacity by developing community partnerships to enhance spatial and temporal coverage. 3. Open data and contribution to a broad coalition of partners across regional and global communities (i.e. GOOS) to assist in conservation and sustainable management of BC waters and beyond.
76.2	NE Pacific Coastal Biodiversity Action Network	Tula Foundation	NEPac-BAN will foster cross-boundary biodiversity science for action-oriented marine conservation and management. The Project will generate a Network of ocean practitioners, including scientists, Crown, and Indigenous decision makers, community members, educators and communicators, to co-design marine life observing for biodiversity science.. NEPac-BAN is structured around taxonomic groups (Nodes) and a Synthesis Hub that will tackle cross-cutting themes by integrating across the tree of life to address challenges facing the NE Pacific coastal ocean. The network will co-develop a) Essential Biodiversity and Ocean Variables for the NE Pacific; b) best practices and capacity for biodiversity observations and data management; and c) biodiversity analysis for conservation and restoration actions. These components form an Action Cycle to advance understanding and improve management outcomes by leveraging existing strengths and creating spaces for exchange across the Canada-US border.
77.2	Somos OceanoS: ocean stories for conservation	Sea Around Us, University of British Columbia	"Somos OceanoS 2030" (SOS2030) promotes the perspectives of communities on marine management and raises awareness of the ecological, social and economic value of various Marine Protected Areas (MPAs) across the world through accessible science communication. SOS2030 is a holistic project that will work with three different Ocean Decade programmes, the Marine Life2030, the Early Career Ocean Professionals and the Empowering Women. The project will deliver transboundary and transdisciplinary ecosystem knowledge in places identified as "paper MPAs" (Relano et al. forthcoming). SOS2030 advocates for marine conservation, sustainable resource management and effective MPA governance through community engagement, science communication and knowledge sharing. A pilot project is presently taking place in an MPA in northern Patagonia. A documentary will be produced highlighting local environmental challenges such as industry pollution, mass tourism and unregulated fishing.
86.2	Arctic Deep Observation for Multi- sphere Cycling	Second Institute of Oceanography, Ministry of Natural Resources	About 95% of the ocean's carbon is stored in intermediate and deep waters. The intense dynamic processes of the mid-ocean ridge in the Arctic Ocean results in abundant hydrothermal and cool crustal circulation, which has significantly affected the "slow carbon cycle" of the deep ocean. This project aims to establish an innovative multinational cooperation pattern involving multiple stakeholders, to conduct multidisciplinary and multiscale research on the mass and energy exchange in the lithosphere, cryosphere, hydrosphere, and biosphere of the Arctic Ocean. The project involves assessing the impact of matter cycling between different spheres of the carbon cycle and ecosystem, developing models to predict the response of the Arctic Ocean to global change, and providing solutions and regional management schemes. This project also includes the construction of a transparent database, the optimization of logistics capabilities, and the creation of opportunities for early-career scientists.
89.2	One Ocean Hub Research Programme 4	University of Strathclyde	OOH RP4 is a strand of the One Ocean Hub (www.oneoceanhub.org), an international programme of transdisciplinary research for sustainable development. Focusing on the human right to science through capacity building for deep sea science in the South-East Atlantic, OOH RP4 will advance understanding of offshore marine biodiversity through new deep-water surveys in one of the world's most poorly known ecosystems. It will advance

Unique ID	Name of the Action	Lead Institution	Summary Description
			knowledge of environmental changes on deep-sea biodiversity and develop new methods to assess impacts of multiple stressors on deep-water vulnerable habitat-forming species found in Vulnerable Marine Ecosystems and Ecologically or Biologically Significant Areas. It will ensure uptake of science by co-producing novel modelling methods to visualise and predict the distribution of species and habitats and of multiple threats to stimulate various management scenarios.
92.2	Better Biomolecular Ocean Practices	Monterey Bay Aquarium Research Institute (MBARI)	Methodological information is essential to understand the biomolecular data it generates (its limitations, strengths, and the ability to integrate and compare it with other datasets). However, in the biomolecular community, this information is often buried in publications that lack sufficient detail and are neither machine readable nor actionable. Within the IOC-UNESCO OBPS system, we have started an effort to exhume and empower these critical information artifacts. Under OBON, we propose building upon and expanding those efforts into a project for the digitisation of omics protocols from long-term observatories around the world using machine-readable templates and metadata. This will leverage and advance activities to develop protocol templates and metadata specifications, while working with strategic OBON partners in ocean observing and contributing to OBON's aims for capacity sharing and inter-programme coordination (OBON - OceanPractices).
93.2	PlaSTic On beaches: 3D-distRibution and weathering	Clermont-Auvergne INP	Recent global plastic pollution models predict that two thirds of the plastic mass released from land into the ocean since 1950s is likely to have stranded around the world's shoreline. Yet, our knowledge of the fate of beached Marine Plastic Debris (MPD) remains limited. We propose a novel approach based on repeated field-surveys of surface and buried MPD and studying physico-chemical transformations induced by MPD aging on Hawaiian beaches, which are known hot-spots for MPD due to their proximity to the North Pacific Garbage Patch. Repeated field-survey data of surface and buried MPD on beaches will generate dynamic 3D maps of beached MPD which will provide a better understanding of beach attributes that evoke MDP trapping, accumulation and mobility. Following the aging of plastic debris when stored on beaches will reveal dominating MPD transformations and rates, including fragmentation rates, which will provide key information to model fate of MPD.
100.2	Urbanized coastal sustainability under GCCscenario	Instituto de Investigaciones Marinas y Costeras -IIMyC- (Universidad Nacional de Mar del Plata -UNMDP- and Consejo Nacional de Investigaciones Científicas y Técnicas - CONICET-)	Through an inter-institutional strategy we will investigate the relationship between urbanization and other anthropic disturbance (e.g. recreation, agriculture and livestock, ports, recreational and artisanal fishing) and environmental variations due to climate change on ecosystem functions (e.g. biogeochemical cycles, biological productivity) and services (e.g. fishing, tourism, conservation, nutrients and pollutant filtering/retention, sequestration of atmospheric CO ₂ , prevention of coastal erosion) of the coastal Buenos Aires Province (Argentina). This is the most urbanized coast of Argentina (1.2 million people that doubles during the summer). We want to contribute to the conservation and sustainable use of these ecosystems, providing scientific information and advice to stakeholders. Citizen science and participation of stakeholders are key for the success. Formation of high quality human resources (MSc, PhD and, non-degree courses) will be a by-product of this project.
102.2	MetaZooGene: Metabarcoding Zooplankton Diversity	University of Connecticut	MetaZooGene ML2030 will work toward a global vision for integrative molecular – morphological taxonomic analysis of marine zooplankton biodiversity. The overarching goal is to promote and facilitate DNA barcoding and metabarcoding to characterize local-to-global patterns of biodiversity and biogeography of zooplankton. Applications include monitoring of ecosystem health, rapid detection of impacts of climate change, characterization of food webs, and identification of introduced and non-indigenous species. Deliverables include taxonomically-comprehensive global-scale DNA sequence reference databases for barcode gene regions (see https://metazoogene.org/database) required for species identification. Recommendations for best practices will be documented in review papers in peer-reviewed open access journals. Capacity-building goals will be met through symposia for early career scientists and those from developing countries, to be held in association with international conferences.

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108.2	Ocean Tracking Network	Ocean Tracking Network, Dalhousie University	The OTN global partnership draws on regional networks (e.g., those of S. 12, plus others including the Gulf of Mexico (iTAG) and South America (MigraMar)) and participants from Academia, government, Non-governmental organizations, industry, Indigenous groups, local stakeholders to develop the scientific infrastructure and data systems needed for researchers to co-design studies to track the movements, survival, distributions, habitat use and migration pathways of valued marine animals critical to food security and socioeconomic well-being in coastal communities. Data generated is curated and distributed according to partner-accredited data policies, FAIR principles, and respecting Indigenous ownership rights using our internationally accredited data system (Associate Data Unit of the IOC's International Oceanographic Data and Information Exchange). Knowledge generated is communicated to help inform policy development, management decisions and to empower all stakeholders.
109.2	Seabed Mining & Resilience To EXperimental impact	National Oceanography Centre	Our project aims to provide the critical scientific understanding and evidence base to reduce the risks of the developing deep-sea mining industry for polymetallic nodules. Our project team have secured access to data and test plans, to allow detailed experimental evaluation of impact and recovery from realistic mining disturbance on a decadal scale of vital relevance to understanding the long-term sustainability of deep-sea mining. The project aims to better understand the ecosystem in the Pacific abyss and how the different components interact and interconnect.
110.2	Synergistic Observing Network for Ocean Prediction	OceanPredict Observing System Evaluation Task Team (Meteorological Research Institute Japan Meteorological Agency)	SynObs is being proposed as a common comprehensive Decade Project to the three Decade Programmes, ForeSea, CoastPredict, and Observing System Co-Design. SynObs will seek to extract maximum benefit from combining various observation platform measurements, typically satellite and in situ observation data, or combinations of coastal and open ocean platforms for ocean/coastal predictions. SynObs aims to identify the optimal combination of the different ocean observation platforms through observing system design and evaluation, and to develop assimilation methods which can enable drawing synergistic effects from these combinations. Targets of SynObs include open-ocean, such as global, tropical, mid-latitude, arctic and subarctic oceans, as well as coastal-sea, and biogeochemical observing systems.
121.2	Ocean Twilight Zone Project	Woods Hole Oceanographic Institution	The Ocean Twilight Zone Project is an established project within the TED "Audacious Projects" portfolio. We seek endorsement of the OTZ Project under the previously endorsed Decade Programme number 189 entitled "Joint Exploration of the Twilight Zone Ocean Network. The Ocean Twilight Zone Project has three pillars: 1) rapidly advance scientific understanding of the twilight zone, 2) dramatically improve public awareness of the deep ocean and inform policy development and 3) develop low-cost pervasive technologies and build capacity for further studies of the mesopelagic ecosystem.
126.2	Integrated coastal ocean observing and predicting	Euro-Mediterranean Centre on Climate Change Foundation	The Core project "PredictOnTime" will deliver new predictive capacities, services and products for the global coastal ocean based on innovative integrated observing systems and forecasting systems implemented and tested at selected Pilot areas. The PredictOnTime Action will deliver a relocatable, easy to be deployed, cost effective observing and forecasting system of systems as well as best practices. The observing and forecasting systems will be deployed and tested with users and stakeholders in Pilot coastal areas in more than 20 nations in the global coastal ocean. We will focus on observing and predicting natural extreme events in the global coastal ocean on due time and with the appropriate accuracy so that impacts on natural and human resources and assets will be minimized. We will develop and consolidate the citizen science observing capacities and support through the new predictive capability the innovative and sustainable applications for coastal solutions/services.
127.2	Future Coastal Ocean Climates	National Oceanography Centre	FLAME will generate innovative, high-resolution, downscaled decadal to centennial projections of future coastal ocean climates and the impacts on coastal ecosystems, hazards, services and resources at the local-regional scales necessary for informed decision making. It will achieve this by making a step-change in regional Earth System Model process fidelity and climate downscaling approaches, and by providing new projections, downscaling, predictive and hazard assessment tools. FLAME sets a high-level framework to be collectively pursued throughout the Decade, aiming to inform future IPCC reporting. Partners here will target specific polar,

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			temperate, subtropical and tropical regional coastal oceans where initial progress will be made. It will use CoastPredict, other Decade programmes and partner stakeholder networks to turn advances in understanding and predictive ability into actionable products that can inform climate change adaptation and mitigation solutions.
129.2	Southern Ocean Flux Capability Working Group	Southern Ocean Observing System	The Southern Ocean has been identified as the prime region for net global uptake of heat and carbon dioxide. While air-sea fluxes determine this uptake, existing air-sea flux products vary significantly, and a number of studies have suggested that infrequent storm-related events may play a significant role in governing net air-sea exchanges. The core aim of SOFLUX is to reduce uncertainties in our understanding of air-sea and air-sea-ice exchanges. SOFLUX facilitates the implementation of an observing system of essential ocean variables (EOVs) to support investigations on dynamics and change in Southern Ocean air-sea fluxes, the development of priority measurements, standardized methodologies for collecting and archiving data, the optimal design of field programs and remote sensing systems, strategies for implementing field observations, and support for development of assimilation and gridded flux products.
131.2	Connecting communities to Atlantic Ocean observing	National Oceanography Centre	Ocean observing is a necessary service to fulfil our collective stewardship responsibility and understand the effects of climate change on human life, economic, and environmental wellbeing. To fully realize this service, we must expand our view of the value of ocean observing and move towards a sustained observing system to deliver crucial information to stakeholders and policymakers. AtlantOS supports Atlantic basin scale implementation by identifying and fostering collaborative partnerships among user communities and ocean observing and data networks. AtlantOS is actively building formal relationships with international bodies and AtlantOS-connect will facilitate engagement with national and regional entities, connecting observing networks and providing visibility to the common challenges, needs and opportunities of Atlantic communities.
132.2	Fisherman Weather Field School (SLCN)	Agency for Meteorology Climatology and Geophysics (BMKG)	Fisherman Weather Field School is an ocean literacy programme that provides education for fishing communities to support understanding of the information provided by weather and ocean climate services. Targeted users include traditional fishermen, aquaculture fishermen, salt pond farmers, and related stakeholders in fisheries and coastal communities. This programme enhances the level of understanding of maritime weather and climate forecasting and information thereby improving safety. It also increases fishers' understanding and awareness of the importance of maritime observation equipment which are essential to produce accurate maritime weather and climate information for their safety when conducting their maritime activities. Their participation in protecting the ocean observation equipment installed on the ocean is crucial to prevent vandalism. This project has proven to be successful in Indonesia and a pilot is proposed to replicate the initiative in Fiji and the Philippines.
136.2	Enhancing capacity development in the TAC Region	UNESCO IOC Regional Secretariat for the Caribbean and Adjacent Regions Sub-Commission IOCARIBE	During the TAC Region Webinars capacity building was identified at the forefront and a cross-cutting subject. It was recognized that developing local expertise with lasting benefits can lead to transformative change in CD. It was also recognized that the lack of access to knowledge, equipment and opportunities are relevant barriers to achieving regional sustainable development. Implementing blue economy policies is recognized as critical to achieving the SDGs and delivering smart, sustainable, and inclusive growth. It was identified during the Kick-Off Conference that the region must develop local initiatives related to raise awareness on blue economy knowledge, and that promoting engagement among stakeholders and local expertise is relevant to address this need. It is critical to create an enabling environment for experience exchange on ocean public policy targeting local blue economy initiatives, and to enhance knowledge about the blue economy (including deep-sea uses) in the Region
138.2	Integrating Coastal Hazard Warning Systems for TAC	UNESCO IOC Regional Secretariat for the Caribbean and Adjacent Regions Sub-Commission IOCARIBE	Participants in TAC workshops recommended the Co-Design, Co-Production and Co-Delivery of Integrated Multiple Coastal Hazard Early Warning System and Services for the Tropical Americas and Caribbean (TAC). The project will prioritize the integration of existing and new coastal hazards early warning systems and services considering four components: Monitoring and Warning, Risk Knowledge, Warning Dissemination and Communication, and Response Capabilities, supported by capacity development. Linkages to regional and international efforts and national and local priorities would be maximized and strengthened. Many ocean-related hazards and their impacts would be considered, including Tropical Cyclones , Climate Change, Tsunami,

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			Sargassum, Wastewater, Oil Spills, and Coral Bleaching, mindful of the impacts and lessons from COVID-19. Regional, national and local impacts will be identified and common features of the underlying infrastructure elements will be enhanced and optimized.
140.2	MACHC-IOCARIBE Seabed 2030 Project	UNESCO IOC Regional Secretariat for the Caribbean and Adjacent Regions Sub-Commission IOCARIBE	The priority Project outcome is to create an accurate, observation-based bathymetric map of the Tropical Americas and Caribbean Region through multi-sector partnerships and collaboration. This map is essential for the sustainable use of critical ocean resources and to inform and improve forecast capabilities, disaster risk reduction and response, environmental management and scientific investigation activities. A diverse region that has rich biodiversity and marine resources, many economies are dependent on coastal and marine tourism. The region is also extremely vulnerable to climate change and natural hazards. Extreme weather events are common in the region with nine Category 3 hurricanes and above occurring in 2019-2020. Currently 23% of the region is mapped according to the GEBCO 2021 Grid, an increase of 3% since 2020 when the IOCARIBE and the MACHC initiated this joint Project. This progress is highly encouraging given the pandemic circumstances.
142.2	NOAA Harmful Algal Bloom Forecasting	NOAA National Centers for Coastal Ocean Science	NOAA's Harmful Algal Bloom (HAB) forecasts alert coastal managers to blooms before they cause serious damage. Short-term (up to twice weekly) and longer-term seasonal forecasts identify potentially harmful levels of developing algal biomass, including projected bloom location, size, direction, and severity in a particular region. NOAA continues to issue HAB forecasts by region, which are based on understanding the causes of HABs and how they respond to changing weather, physical ocean conditions, and in-situ environmental factors. NOAA additionally funds research in support of operationalizing several pilot regional HAB forecasts for continued prevention and mitigation.
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74	Ocean Generation, Ocean Intelligence	Ocean Generation	"Ocean Intelligence" breaks down the seemingly irreconcilable human dilemmas which create Ocean threats into understandable, affordable and practical actions that people can take all over the world to restore a sustainable relationship with the Ocean.
81	Global Ocean Biodiversity Initiative	Global Ocean Biodiversity Initiative	GOBI is an international partnership of organisations committed to advancing the scientific basis for conserving biological diversity in the marine environment. In particular, GOBI contributes expertise, knowledge and data to support the Convention on Biological Diversity's efforts to identify and promote ecologically or biologically significant marine areas (EBSAs) by assisting a range of intergovernmental, regional and national organisations to use and develop data, tools and methodologies. GOBI also undertakes research to generate new knowledge that will enhance environmental protection, management and sustainable use of specific areas in the ocean.
106	MIGRAVIAS: Connecting Marine Protected Areas (MPAs) through ocean swimways to protect migratory routes and critical habitats of endangered species.	MigraMar	The status of many endangered migratory marine species has continued to deteriorate over the last twenty years despite regulatory measures and the creation of marine protected areas. The Swimways Initiative, MIGRAVIAS, aims to reverse these trends by providing tangible protection for species that move along predictable routes and building resilience to climate change. MigraMar will work with national governments to identify and protect at least seven swimways (MigraVias) that link Marine Protected Areas across the Eastern Pacific region. This initiative involves transboundary collaboration in data collection, analysis, management, enforcement, and sustainable and equitable use of the benefits generated.
Co-branded Call: ArcticNet			
AN01	An ecosystem approach to quantifying behavioural and energetic impacts of anthropogenic disturbance to Arctic	Dalhousie University	Arctic marine mammals are living in a rapidly changing environment. However, the impacts of increasing human activity on northern whale species and populations is poorly understood. Specifically, the loss of pristine conditions from anthropogenic sources of noise is anticipated to lead to varying levels of impact ranging from acoustic masking and behavioural disturbance to extreme cases of hearing loss and death. Furthermore, risk of serious injury or mortality from increased vessel traffic in the Canadian Arctic is of growing concern for whale species. We are seeking to employ a multi-faceted research approach using an experimental control study to quantify acoustic impacts of vessel noise and sonar exposure on Arctic whales and assess ship strike risk. Combining aerial

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	whales (Arctic whales and underwater noise)		behavioural observations (drones) with underwater biologging technology (long term and coarse scale satellite telemetry tags with time-depth recorders logging 2D movement over horizontal and vertical planes and short-term high-resolution biologgers recording 3D dive behaviour and received sound), prey field mapping (oceanographic sampling) and vessel location and noise data (AIS), we will determine how: 1) anthropogenic noise impacts Arctic whale behaviour and vocalizations (call and echolocation rates)?; 2) diving behaviour affects vessel strike risk; 3) we can mitigate impacts to reduce risk of disturbance, injury and mortality. The outcomes of our research will directly support risk mitigation actions by the Department of National Defense regarding using sonar in the Arctic and will contribute to Fisheries and Oceans Canada adaptive responses to marine shipping and environmental impacts on Arctic whales. Our project will create stronger Indigenous partnerships and engage coastal communities by assessing cumulative effects of marine shipping and fishery activities on Arctic whales
AN02	Rapidly changing ecosystem dynamics in the Arctic Ocean's Last Ice Area (RED-AO)	University of New Brunswick and Université Laval	The Arctic Ocean (AO) is a key component of Earth's climate, acting as a coolant by contributing ~10% to the global oceanic carbon pump. Its capacity to remove carbon dioxide (CO2) from the atmosphere comes from its cold waters that favour CO2 dissolution and its highly productive continental shelves that help sequester this carbon. Yet, the AO is warming at an unprecedented rate and the local and global consequences of its rapid evolution remain uncertain. The Last Ice Area (LIA), north of Canada and Greenland, is the last sanctuary of multiyear sea ice in the AO. The LIA includes the Lincoln Sea, which hosts unique endemic sea ice-dependent ecosystems. However, the physical, chemical, and biological properties of the Lincoln Sea remain nearly undocumented. RED-AO aims at improving understanding of how global change influences ecosystem functioning and biogeochemical cycling in northern Baffin Bay and the Lincoln Sea—an emblematic refuge of climate change. This project proposes a pioneer oceanographic expedition during which for the first time, sea ice, hydrography, biogeochemical cycling of nutrients and contaminants, and marine ecosystems will be observed simultaneously. It will provide a comprehensive baseline for conservation efforts and allow us to study key processes related to past, present, and future climate-induced changes. This project will strengthen both the conservation and sustainable resource harvesting of this fragile region by helping to i) create and manage permanent marine protected areas supported by indigenous governments, and ii) support ecosystem -based management of commercial fisheries led by indigenous groups in the eastern Canadian Arctic.
AN03	Future Arctic Mobilities: Informing transportation adaptation through climate observations and model projections of changing snow and ice (Future Arctic Mobilities)	York University	The coastal and inland communities distributed across the Canadian Arctic depend on safe, accessible, and affordable transportation routes to support regional economic development, and to underpin sustainable livelihoods, culture, and food security. In the winter, transportation requires sea ice, freshwater ice, and snow to be thick enough to sustain the weight of snowmobiles and trucks. In the summer, navigational routes and harbours in the ocean need to be sufficiently free of sea ice to permit safe shipping activity. Climate change has decreased the duration, extent, and thickness of the cryosphere in the Arctic, including sea ice, freshwater ice on lakes and rivers, and snow cover. This loss of reliable, and safe transportation conditions has direct implications for mobility in the Arctic, both marine and overland. In this project, we aim to forecast the availability of suitable marine shipping routes and overland winter trails and ice roads under global warming scenarios of 1-4°C above pre-industrial (1850-1900) times. We have assembled a strong transdisciplinary team to develop climate mobility projections for local communities, in order to better inform local adaptation efforts. Ultimately, our goal is to provide climate model projections of key cryosphere variables (snow, freshwater ice, sea ice) and their drivers (temperature, precipitation) at the regional and community-level scales across the Canadian Arctic that can be used to better understand the impacts, risks, and adaptation options available to support safe local and regional marine and overland mobilities.
AN04	Weather and aajurait (lead) monitoring for sea ice safety during the break-up season	Carleton University	The sinaa (floe edge) and aajurait (leads) are important spring hunting and tourism destinations for the communities of Ikpiarjuk (Arctic Bay) and Mittimtalik (Pond Inlet), Nunavut. However, these areas are also dangerous and prone to break-off events with a combination of wind, current, and temperature changes, or unexpected weather events. Break-off events are not well-understood or modelled using scientific methods, and

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	(Sea ice safety during break-up)		changes in the Arctic climate are making assessment of travel safety on sea ice using Inuit Qaujimagatuqangit more challenging. Our project builds on existing SmartICE monitoring underway in each community, but is specifically targeted to address community concerns around predicting break-off events. We will bring together Inuit Elders, hunters, and youth, along with natural and social scientists, to learn from both Inuit Qaujimagatuqangit and instrumental monitoring. Together, we aim to improve the predictive ability of landfast ice models, and support travel safety and decision-making. By establishing new observational systems for weather, current, and sinaa monitoring in each community, as well as workshops to interpret and assess model products, our project will evaluate the feasibility of this approach to support real-time decision-making for safe spring ice travel. Furthermore, project partner SmartICE will explore how such observational systems and landfast ice models may be relevant to other communities across its extensive monitoring network.
Co-branded Call: MeerWissen Initiative			
MW01	Mangroves as Nature-based Solutions to Coastal Hazards in Eastern Ghana	Helmholtz-Zentrum Hereon GmbH; Department of Marine and Fisheries Sciences, University of Ghana; Institute of Environment and Sanitation Studies, University of Ghana	MANCOGA will use mangroves to develop a robust and participatory Nature-based Solution (NbS) to hazards such as climate change, flooding, coastal erosion and pollution in Ghana. It will also cover aspects of blue carbon, ocean acidification and biodiversity loss. The ultimate aim is increasing community resilience and affluence. MANCOGA will develop a decision support system building on existing structures and incorporating state-of-the-art technology, including the development of a Digital Twin.
MW02	Oceanographic and Ecological Data for Nature-based coastal Protection in Tunisia	Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (AWI) and University of Sfax (US)	The overall objective is to provide sustainable, cost-effective data and an ecologically sound alternative to facilitate the adaptive governance of erosion risk in Tunisia's most vulnerable coastal areas. The project will be carried out through a living lab approach involves cost-effective intertidal seagrass transplantation. Pilot sites will be used to monitor if this Nature-based solution approach could protect the coastline against further erosion processes. This project aims to serve as a blueprint for other beaches and coastal areas in Tunisia.
MW03	Participatory Modeling for Nature-based Solutions in the WIO-Region	Leibniz Centre for Tropical Marine Research (ZMT); Institute of Marine Sciences (IMS) University of Dar es Salaam; Ministry for Fisheries and Blue Economy Madagascar (MBFE)	PaMo-NBS will provide policy makers with decision support tools to improve the implementation and planning of nature-based solutions and to identify needs and scenarios of an optimised use of local ecosystems for and with local communities in the Western Indian Ocean region. The primary outcome of this project will be the development of a decision support system that will give local decision makers the opportunity to engage coastal communities. The project aims to produce both a framework for local policy makers and coastal communities to develop a shared understanding of the role of the interconnected socio-ecological systems in providing NbS as well as concrete examples of pilot studies.
MW04	Nature based Solutions for Mitigation of Watershed pollution: Cross-habitat	Helmholtz Institute for Functional Marine Biodiversity at the University of	The overall goal of this collaborative project is to assess the status of tropical (Tanzania) and temperate (South Africa) seagrass-reef ecotones and more specifically the role of seagrass meadows for reducing watershed pollution through nutrient, pollutant and pathogen removal for natural reef habitats and aquaculture, thereby improving livelihoods of local communities. The project aims to assess the strength of biogeochemical connectivity

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	facilitation by coastal seagrass meadows	Oldenburg (HIFMB-UOL); Institute of Marine Sciences (IMS) University of Dar es Salaam, Tanzania; Institute for Coastal and Marine Research (CMR) Nelson Mandela University, South Africa	between seagrass and adjacent reef habitats under different environmental conditions. Both field surveys and experiments will help to unravel underlying mechanisms through which seagrasses can enhance water quality and thereby benefit local communities that rely on healthy reef-communities for food production and tourism
Co-branded Call: Fisheries and Oceans Canada (DFO)			
UN2021-002	WYTEC Blue - Women & Youth Technical Capacity for the Blue Economy: Growing Technical Capacity amongst Women and Youth in Canada & West Africa for a Safe, Secure and Sustainable Blue Economy	DOTCAN Institute	Project aims to strengthen and connect emerging capacity of a small-island developing state and partner institutions in western Africa with Canadian multi-sectoral expertise. Project is focused on a primarily virtual training program with objectives related to advancing a sustainable blue economy through ocean technology, maritime security, and business development. Pilot cohort will focus on women and youth participants.
UN2021-003	Ocean School Global Community Project: Building Ocean Literacy through Community Engagement	Dalhousie University	Project seeks to develop content that illustrates how global communities are innovating to solve ocean challenges. Project seeks to define and prototype a new approach to build capacity in knowledge creation, sharing, and education and to empower communities (in the Canadian Arctic and Peru) via the Ocean School platform using a variety of tools and methods, which will be available in 4 languages. The project has the potential to expand to other countries/regions in the future once framework is established.
UN2021-004	First Nations – Trusted Crowd-Sourced Bathymetry & Capacity Building in British Columbia, (FN-TCSB&CBBC)	CIDCO	Project will use crowd-sourcing approach to collect hydrographic data in remote areas of BC coast. Objectives will be achieved by building capacity of Indigenous communities through engagement, training, and knowledge transfer. A similar project was previously conducted in the Canadian Arctic.
UN2021-005	Monitoring ecological resilience in Northern Fisheries inshore regions through community-based environmental genomics	eDNAtec	Focused on eDNA technologies, this project will conduct a baseline biodiversity assessment, inform habitat models for key economic species, and empower local communities to get involved in their own biodiversity management through citizen science approaches and student training via co-op programming. A framework will be developed to support future collaboration and research.
UN2021-014	X-Oceans: Enhancing Ocean Literacy in Youth in Rural	St. Francis Xavier University	Project aims to enhance existing resources and implement an innovative educational curriculum (K-12) that will inform and educate rural communities to understand and value the ocean through hands-on experiences.

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	Northeastern Nova Scotia		
UN2021-025	Blue Carbon as a Canadian Climate Change Solution: Modelling the Mitigation Potential of Kelp Under Future Climate Change Scenarios	University of Victoria	This project aims to quantify the blue carbon potential of kelp ecosystems in Canada and will provide a quantitative assessment of the future extent of kelp forests, and their potential to mitigate climate change. This project represents the first Canada-wide estimates of kelp distribution.
UN2021-026	Mapping and Improving High-Value Habitat influenced by Derelict Fishing Gear in the Salish Sea	Malahat Nation	This project will map areas of derelict fishing gear and damaged habitats, followed by efforts to remove gear. Methods incorporate both natural and Indigenous knowledge, as well as community engagement components.
UN2021-030	Advancing Indigenous Partnerships in Ocean Science for Sustainability: A contribution to the United Nations Decade of Ocean Science for Sustainable Development	Ocean Networks Canada Society	This project will develop and coordinate a team to help prioritize and facilitate Indigenous ocean science priorities within Canada for the Decade. Initiative would also work to promote and publicize the Decade within coastal Indigenous communities.
UN2021-031	Advancing Ocean Literacy for the UN Decade in Canada	Ocean Networks Canada Society	The project support to the Canadian Ocean Literacy Coalition to advance ocean literacy with the context of national and international efforts in this field. It will measure ocean literacy through the development of a new measurement framework and improve the diversity of stories and voices within Canada's ocean science community.

ANNEX 4: REGISTERED UN-LED DECADE ACTIONS

Unique ID	Name of the Action	Lead Institution	Summary Description
UN21	Accelerate Marine Spatial Planning in the Western Pacific	IOC Sub-Commission for the Western Pacific, IOC/UNESCO	The proposed Action will capitalize on the MSPglobal and its results, and further promote and accelerate MSP in the Western Pacific, with a view to assisting member states in the region in achieving SDG 14 and the 2030 Agenda as a whole.
UN22	Stem the tide of Asia's riverine plastic emission into the ocean	IOC Sub-Commission for the Western Pacific (WESTPAC), IOC/UNESCO	River is recognized as a major source of marine plastic waste. It was estimated that more than half of marine plastics comes from Asia's rivers. This Decade Action aims to generate timely and reliable riverine plastic data to inform waste management and policy recommendations, support technology innovation and promote behavior change, with a view to arresting worsening riverine plastic and microplastic pollution.
UN23	Accelerating capacity development transformations in the Western Pacific - Regional Network of Training and Research Centers (RTRCs) on Marine Science	IOC Sub-Commission for the Western Pacific (WESTPAC), IOC/UNESCO & UNESCO Bangkok	The proposed Action -RTRCs will accelerate transformations in capacity development, develop and sustain required capacity for sustainable development in the Western Pacific, through the establishment of Regional Training and Research Centers (RTRCs), and provision of regular training and research opportunities to young researchers and other ocean stakeholders from the region and beyond.
UN24	Explore the strongest ocean current in the Western Pacific: the 2nd Cooperative Study of Kuroshio and Adjacent Regions – from its sciences to human well beings	IOC Sub-Commission for the Western Pacific (WESTPAC), IOC/UNESCO & UNESCO Bangkok	The Kuroshio is the strongest current in the Western Pacific, with significant environmental, social and economic values. The CSK2 will understand its changing conditions in global warming, and develop knowledge and services to serve societal needs, including, but not limited to, weather forecasts and climate predictions, fishery and aquaculture management.
UN25	An Ocean Data and Information System supporting the UN Decade of Ocean Science for Sustainable Development	International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC).	Development of an open-source data and information system that will link existing ocean information systems around the world, and enable more efficient discovery of data, information and knowledge products.