IOC 55th Executive Council

3.3 PRESENTATION OF THE PILOT IOC STATE OF THE OCEAN REPORT
[IOC/EC-53/SR, item 3.1; IOC-31/SR, item 3.2)]

Working documents:	IOC/EC-55/3.3.Doc(1)	Pilot Edition of the 'State of the Ocean Report' (2022) compiled and coordinated by IOC-UNESCO
Reference:	IOC/INF-1393 Rev.	Revised Concept proposal for an 'IOC-coordinated State of the Ocean Report' (IOC StOR)

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StOR Pilot edition:

‘one cannot manage what one cannot measure’

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StOR Pilot edition:

The pilot edition of the State of the Ocean Report (StOR) was proposed and developed to demonstrate the feasibility of keeping the world up to date on the current state of the ocean

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StOR Pilot edition:

Building on examples from IOC-led or joint initiatives, the report is structured around the initial Challenges of the UN Decade of Ocean Science for Sustainable Development, 2021–2030

65 authors

40 reviewers

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Pilot edition of the State of the Ocean Report - StOR

- The pilot edition of the StOR reveals that although society is aware in principle of what is happening in the ocean, and what should be done about it ('established' facts), the quantitative description of the ocean is drastically incomplete and, as a result, current knowledge is insufficient to effectively inform solutions to the ocean issues that humanity is facing.

- The pilot edition of the StOR also reveals a lack of reliable benchmarks in many aspects of ocean knowledge
- Most sections in the report tend to be descriptive and qualitative
- There is, therefore, an urgent need for a quantitative description of the state of the ocean, with stablished benchmarks and the capacity to report changes

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- This pilot edition of the StOR is imperfect, but since its conclusions are important, there is a need to continue this work.

- Future editions of the StOR will report on progress (or lack of) wherever possible, and will continue to establish benchmarks on the state of the ocean across the globe.

- This pilot edition of the StOR includes the following examples structured around the initial Challenges of the UN Decade:

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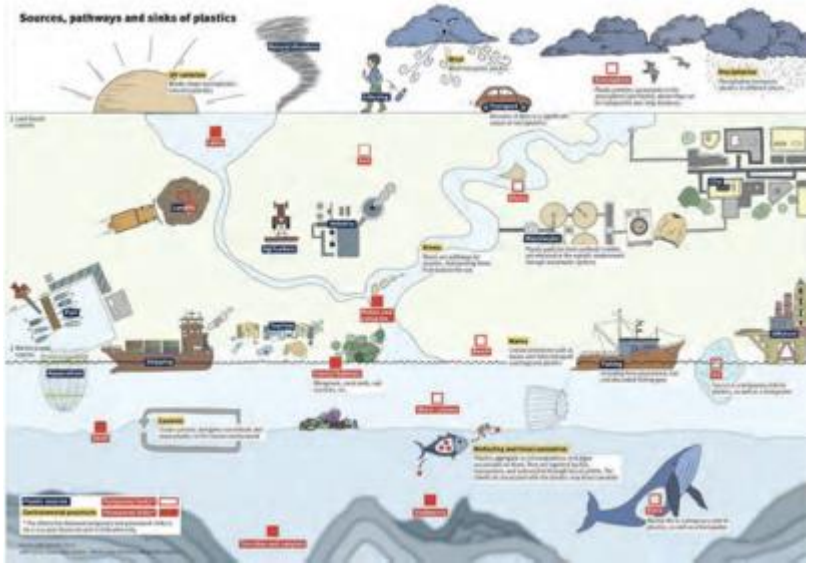
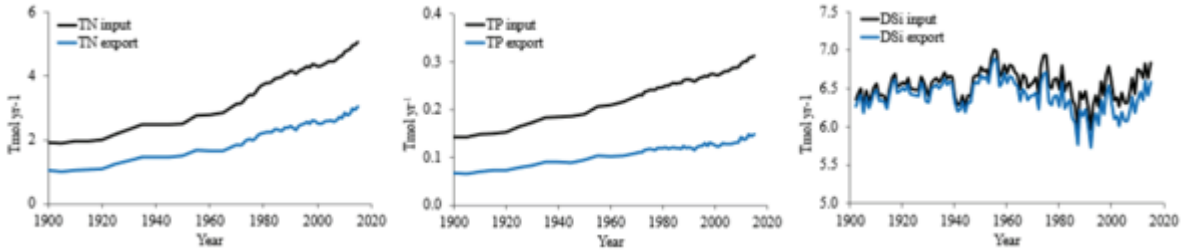
Challenge 1: Understand and beat marine pollution

- There is indisputable evidence of the continued, widespread and unabated increase of land pollution in the ocean.
  N, P and plastics pollution are reviewed.
- A resourced and systematic approach to observations and synthesis of ocean pollution is urgently required.



Schematic showing the multiple sources and fate of plastic litter and microplastics in the ocean. *Source:* UNEP and GRID-Arendal. 2021



Global total N and total P and DSi input into rivers and export to coastal waters. *Source*: N and P data are from Beusen et al., 2022 and DSi data are based on Liu et al., 2020, using a modified model version.

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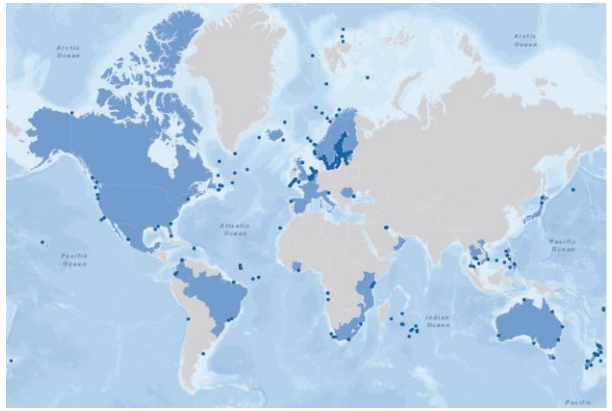
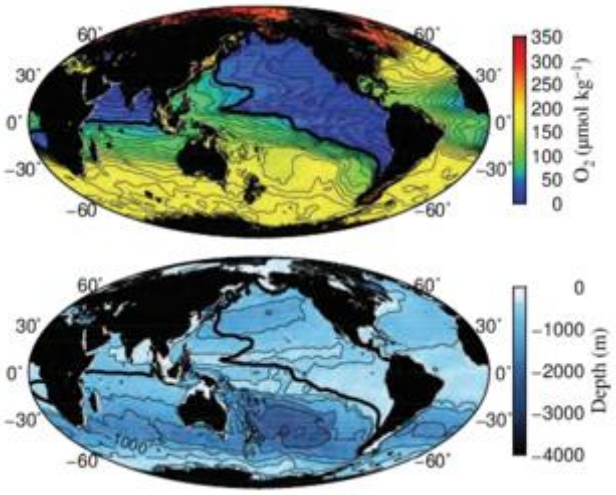
Challenge 2: Protect and restore ecosystems and biodiversity

- Analysis of marine ecosystems and biodiversity focused on ocean acidification, deoxygenation, evolution of phytoplankton, and progress in quantitative knowledge of marine life.
- Current observation systems and data holdings show a complex pattern of variability and change.
- The adjective ‘incomplete’ (IPBES, 2019) best describes the current state of knowledge of ocean ecosystems.



Map illustrating surface ocean carbonate chemistry measurement locations received for 14.3.1 ocean acidification reporting: Countries which submitted data are colored in blue and dots indicate the location of measurements.



Top: Minimum mean O2 content (µmol kg-1) found in the ocean irrespective of depth. Contour interval is 10 µmol kg-1. Bottom: Depth (m) of minimum O2 content. Contour interval is 500 m. Heavy contour lines represent boundaries of ocean areas with O2 content less than or equal to 50 µmol kg-1. *Source*: Garcia et al., 2018.

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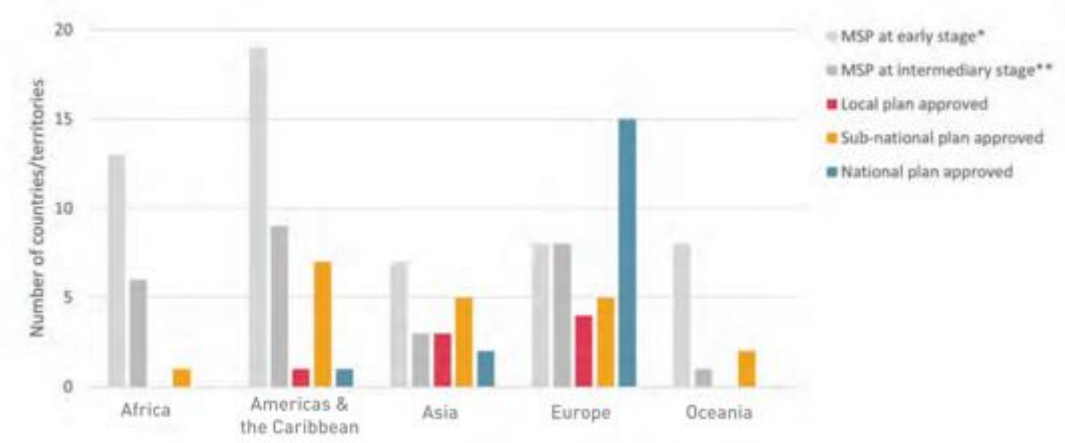
Challenge 4: Develop a sustainable and equitable ocean economy

- A brief review of current levels of understanding in the economics of MSP and ocean observation.
- Knowledge in this area is in its early stages and fragmented – the methodological approach is not yet in place.



MSP around the world according to the stage of the MSP process by April 2022. *Source*: IOC-UNESCO.

Ocean observation value chain: From ocean observations to public benefit. *Source:* European Marine Board, 2021. (CC BY 4.0). Adapted from Virapongse, et al. 2020. (CC BY 4.0)

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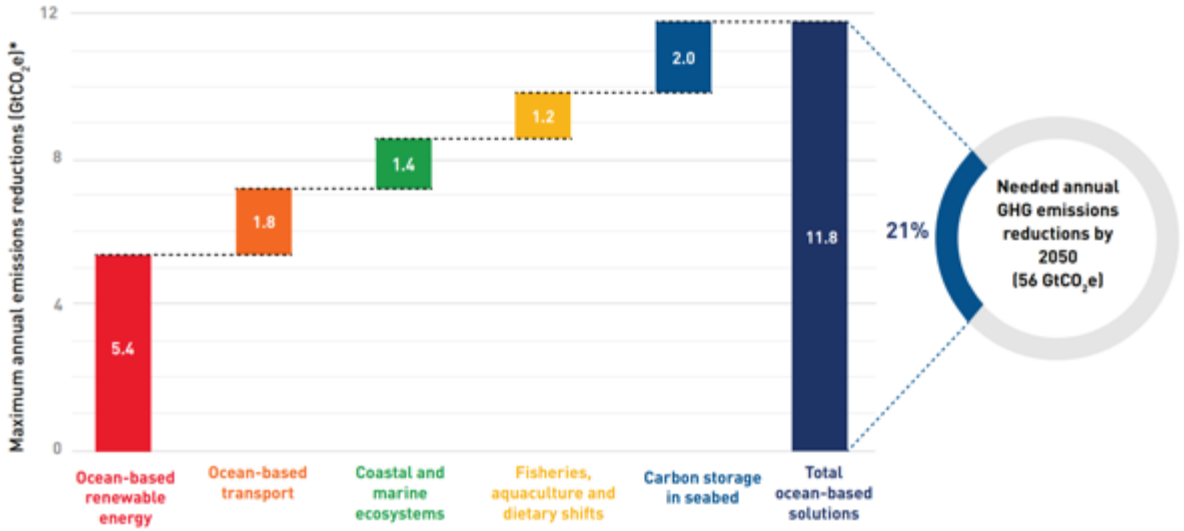
Challenge 5: Unlock ocean-based solutions to climate change

- The pilot StOR considers one significant area of climate change solutions – the coastal blue carbon ecosystems.
- The full StOR will explore other solutions.
- Improved protection and management of coastal blue carbon ecosystems can reduce current total carbon emissions by up to 2%.



Potential contribution of five areas of ocean-based action to mitigating climate change in 2050 (maximum GtCO2e). *Source:* Hoegh-Guldberg et. al, 2019. c World Resources Institute.

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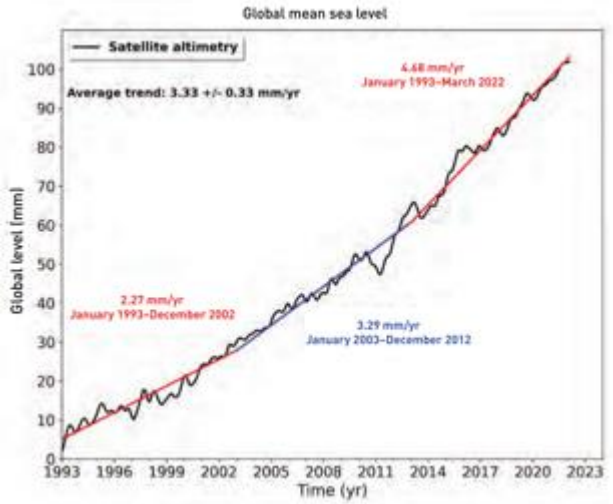
Challenge 6: Increase community resilience to ocean hazards

- Analyses of sea-level rise, warning systems for storm surges and tsunamis, and harmful algal blooms: coastal resilience is under threat.
- A comprehensive risk assessment and management system will become a key factor in the sustainability of coastal communities.



Global mean sea level rise from satellite altimetry from January 1993 to March 2022 (black curve). The red and blue straight lines indicate successive global mean sea level trends. Altimetry data from AVISO https://www.aviso.altimetry.fr *Source:* Cazenave and Moreira, 2022.

World map of distribution events associated with paralytic shellfish toxins (red) combined with that of the occurrence of *Alexandrium* causative organisms (blue). *Source:* based on data obtained from the HAIS Data Portal https://data.hais.ioc-unesco.org*/*.

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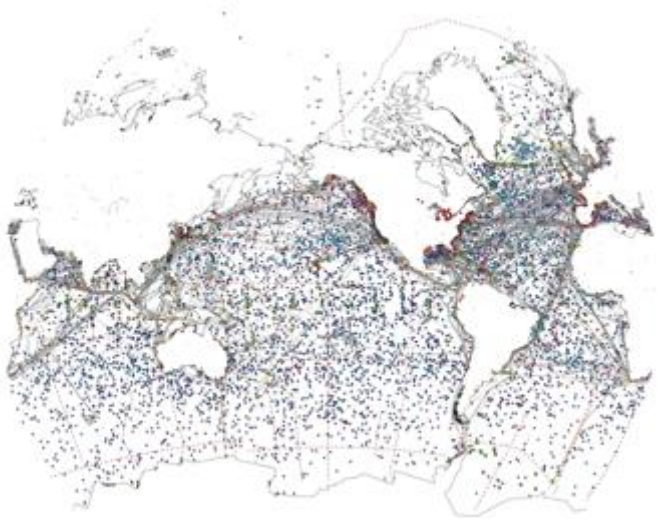
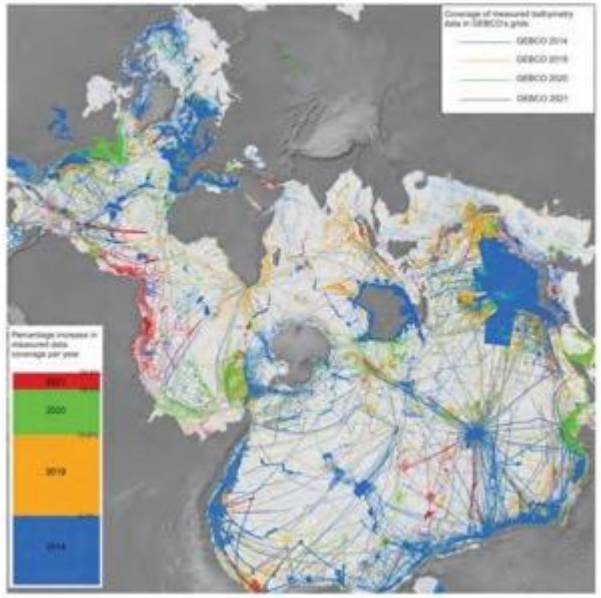
Challenge 7 & 8: Expand the Global Ocean Observing System and create a digital representation of the ocean

- Review of the state of in situ ocean observations under GOOS, progress in using the FAIR principles of observing data management, status of ocean data sharing under IODE, and progress in seabed mapping.
- Major gaps in coverage and the observation system is not able to provide data where it is most needed.
- The world of ocean science is at the beginning of an ocean data revolution. The IODE network is the foundation of the current ocean data holding system



In situ **Global Ocean Observing System.** ***Source*****: OceanOPS in June 2021**



Spilhaus projection showing percentage increase in the coverage of the seafloor mapped in GEBCO's gridded data sets from 2014 (the last GEBCO release before Seabed 2030) to 2021. ***Source*****: GEBCO/Seabed2030.**

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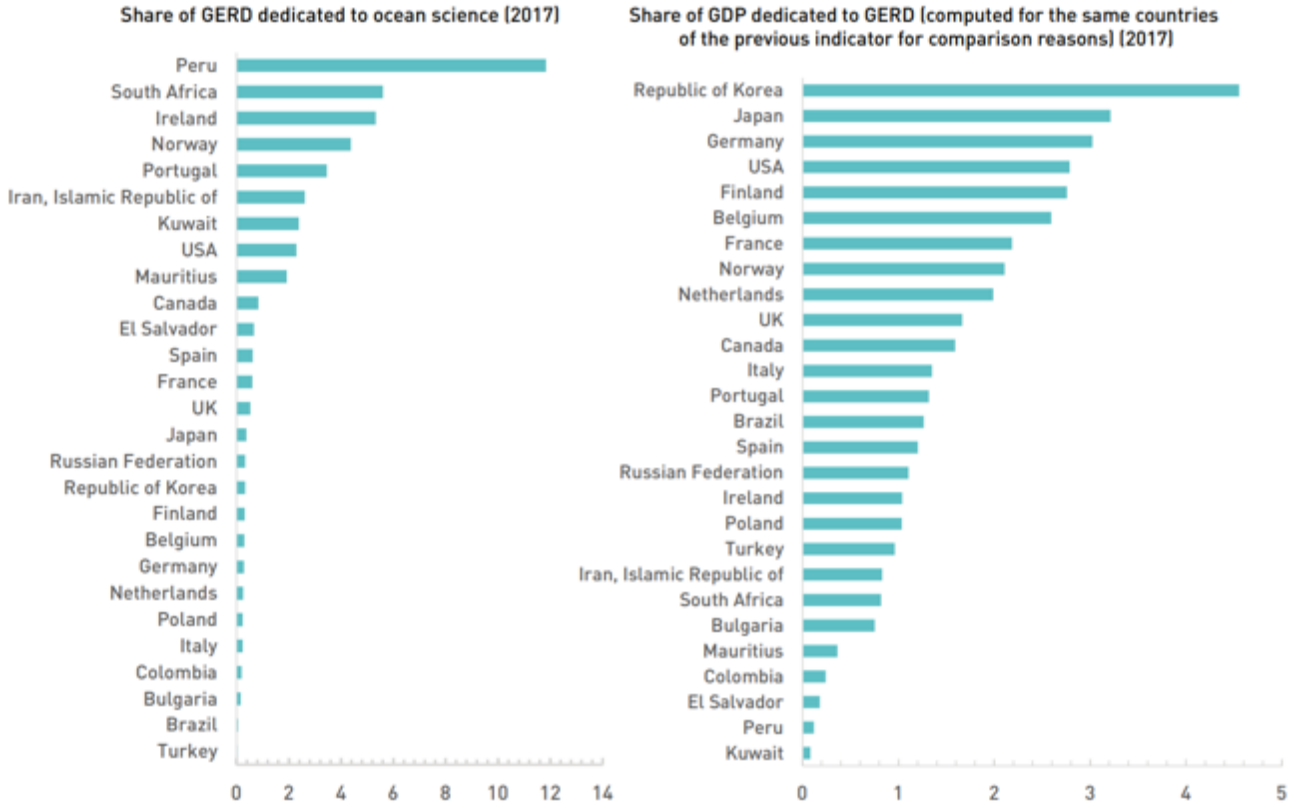
Challenge 9: Skills, knowledge and technology for all

- All conclusions on the various Decade Challenges indicate an urgent need to increase the capacity of ocean science to successfully contribute to sustainable development.
- SDG 14.a.1 indicator – *% of globally averaged national research budget allocated for ocean science* – 1.7%, lies behind the difficulties in ascertaining the state of the ocean.



Estimates of ocean science funding as a share of GERD and GERD as a share of GDP in 2017. *Sources:* IOC-UNESCO, 2020; Data adapted from the GOSR2020 questionnaire and UNESCO Institute for Statistics database.

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Challenge 10: Change humanity's relationship with the Ocean

- All the issues noted above are the direct consequence of too little ‘understanding of our influence in the ocean and its influence on us’ - one of the Ocean Literacy definitions.
- Major qualitative advances have recently been made in Ocean Literacy, with the increased availability of toolkits, a readiness to embrace ocean teaching as part of sustainable development in schools, trainings, surveys, strategies, networks, etc.

Ocean Literacy Principle #1	The Earth has one big ocean with many features.
Ocean Literacy Principle #2	The ocean and life in the ocean shape the features of Earth
Ocean Literacy Principle #3	The ocean is a major influence on weather and climate
Ocean Literacy Principle #4	The ocean made the Earth habitable
Ocean Literacy Principle #5	The ocean supports a great diversity of life and ecosystems.
Ocean Literacy Principle #6	The ocean and humans are inextricably interconnected.
Ocean Literacy Principle #7	The ocean is largely unexplored.

The seven principles of ocean literacy

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- A key conclusion is that ocean knowledge is generally able to identify issues but falls short of these being comprehensive and, hence, actionable – ‘one cannot manage what one cannot measure’.
- The overall aim remains – to produce a brief, accessible, one-stop overview of the current state of the ocean, and to mobilize global society to act towards ‘the ocean we need for the future we want’ as a contribution to sustainable development, and in particular to SDG 14
- To achieve this, the StOR must be more encompassing.
- For subsequent editions, the IOC will invite contributions from UN agencies and professional organizations, turning the StOR into a pan-UN publication.

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The way forward is to:

► broadly communicate the findings on the continued lack of quantitative knowledge about the ocean;

► continue to promote and develop the UN Ocean Decade as the prime platform to transform ocean science, so that it can effectively contribute to sustainable development;

► act to create a theoretical basis for sustainable ocean planning and management, within and beyond areas of national jurisdiction, focusing on ocean economy, climate and biodiversity, and develop corresponding implementation plans in consultation with key stakeholders; and

► strengthen the ocean science-policy interface.