OSPAR Action on Ocean Acidification[1]

What is OSPAR?

OSPAR is the mechanism by which 15 Governments and the European Union cooperate to protect the marine environment of the North-East Atlantic, including marine areas beyond national jurisdiction. The 15 governments are: Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom. OSPAR's mandate is set out in the OSPAR Convention, which places a general obligation on its Contracting Parties to take measures to tackle pollution and protect the OSPAR Maritime Area against the adverse effects of human activities. Through OSPAR, Contracting Parties collaborate to take action to secure the vision of a clean, healthy, and biologically diverse North-East Atlantic that is used sustainably. OSPAR's work is guided by the ecosystem approach to management of human activities in the marine environment.

The ocean that surrounds us is what unites the OSPAR Contracting Parties. It is part of our history, cultural heritage, our economies and our way of life and leisure. We rely on it for food, to help regulate our climate, for energy and raw materials, as a source of recreation and inspiration and to support millions of jobs across our region. The OSPAR Maritime Area has approximately 162 000 km of coastline and covers over 13.5 million km^2. It is home to a vast range of marine biodiversity and contains globally important populations of many marine species.

The maritime area covered by the OSPAR Convention is set out in the figure below.

Figure 1: OSPAR Maritime Area. Region I: Arctic Waters; Region II: Greater North Sea; Region III: Celtic Seas; Region IV: Bay of Biscay and Iberian Coast; Region V: Wider Atlantic. Credit: OSPAR Commission.

[1] This document provides a high-level outline of some of the work of the newly established OSPAR Working Group on Changing Ocean Climate and Ocean Acidification (WG COCOA).

The North-East Atlantic Ocean is at risk

The evidence is clear. Scientists around the world concluded that the health of the ocean, including the North-East Atlantic, is at risk and that urgent action is needed to address the loss of biodiversity and the functioning of marine ecosystems. Through e.g., the Kunming-Montreal Global Biodiversity Framework and United Nations Sustainable Development Goals' targets, there is now a dedication to ensure local, regional, and global targets are met for the protection of the ocean and ecosystems at large. OSPAR's own assessments of the state of the North-East Atlantic support this conclusion. Major challenges include chemical pollution, eutrophication, marine litter, over-exploitation of living and non-living resources, incidental by-catch, non-indigenous species, underwater noise, and damage to the seabed (e.g., from fishing practices and introduction of man-made platforms). Climate change and ocean acidification are increasingly emerging as a cause of anthropogenic pressures, such as rising sea levels and loss of dissolved oxygen. Increased levels of atmospheric carbon dioxide are causing the ocean to become more acidic. All these changes are severely impacting on the species and habitats that share our seas, with significant risks for productivity and the long-term viability of ecosystems.

OSPAR is aware that the effects of climate change and ocean acidification are apparent throughout the OSPAR Maritime Area and that consequential pressures on the marine environment are set to grow. Therefore, OSPAR is committed to monitoring and assessing the nature, rate and extent of climate change and ocean acidification and reducing their impacts on the marine environment, particularly on species, habitats, ecosystem functioning and ecosystem services, and to considering appropriate ways of responding. Where relevant, consideration of the impacts of climate change and ocean acidification, as well as the need for adaptation and mitigation, will be integrated into OSPAR's work and products.

Quality Status Report (QSR) 2023

OSPAR produces periodic Quality Status Reports. These are major holistic assessments of both the state of the environment of the North-East Atlantic, and OSPAR's progress in achieving its goals. As part of the Quality Status Report 2023, OSPAR, through its Intersessional Correspondence Group on OA (ICG-OA), has completed an assessment of ocean acidification in the North-East Atlantic, concluding that ocean acidification is occurring throughout the OSPAR Maritime Area, but that the rates of change vary strongly both between (sub)regions and within (sub)regions (due to differences in local drivers such as riverine input, seabed processes and human activities). A growing body of literature that was reviewed indicates both direct and indirect ocean acidification impacts on organisms, habitats, ecosystems, and ecosystem services, which often coincide with other stressors. Model projections indicate that ocean acidification trends, as well as its associated chemical and ecological impacts, are expected to continue, and even accelerate under high emission scenarios, at least throughout the 21st century. OSPAR's Climate Change Expert Group (CCEG) has additionally produced an assessment of climate change, providing a cross-cutting view on greenhouse gas emission-related disturbances to the marine environment.

North-East Atlantic Environment Strategy (NEAES) 2030

The North-East Atlantic Environment Strategy (NEAES) 2030 is the means by which OSPAR's 16 Contracting Parties will implement the OSPAR Convention until 2030. It sets out collective objectives to tackle the triple challenge the ocean is facing: biodiversity loss, pollution, including marine litter, and climate change and ocean acidification. Its implementation is part of OSPAR's contribution to the achievement of the United Nations 2030 Agenda for Sustainable Development and its Sustainable Development Goals. The Strategy sets out OSPAR's vision in terms of strategic and operational objectives. It is based around four themes: clean seas; biologically diverse seas; productive and sustainably used seas; and seas resilient to climate change and ocean acidification. The Strategy also emphasises the importance of regional cooperation and that OSPAR will continue to play a leading role in addressing global ocean issues.

OSPAR's NEAES 2030 is centred around 12 Strategic Objectives with underlying operational objectives. Some of these are tangentially of relevance to ocean acidification or vice versa. Four strategic objectives explicitly deal with ocean acidification and climate change (see Table 1). These objectives deal with restoration of degraded habitats, raising awareness (also through monitoring and reporting), establishment and management of Marine Protected Areas (MPAs) and measures to protect and conserve endangered species and habitats, and mitigation of climate change and ocean acidification. OSPAR measures to reduce non-climate related pressures, such as pollution, will also contribute to building resilience to climate change and ocean acidification. By working towards achieving these strategic and underlying operational objectives, OSPAR aims to contribute with scientific information and technical advice to the OA Alliance's efforts to enhance our current understanding on ocean acidification effects on species, ecosystems and physico-chemical changes in the OSPAR regions.

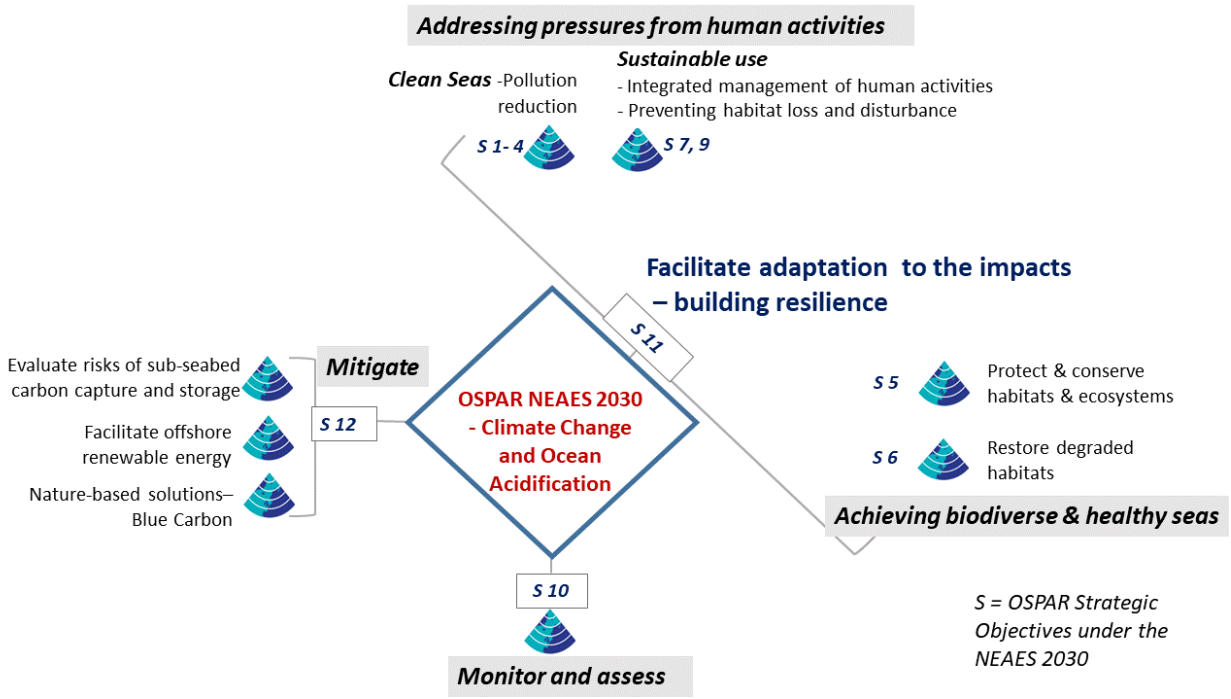

Figure 2: OSPAR activities on climate change and ocean acidification related to the NEAES 2030. Credit: OSPAR Commission.

Implementing the NEAES 2030 and OSPAR's work on Ocean Acidification

OSPAR has set up a Working Group on Changing Ocean Climate and Ocean Acidification (WG COCOA) that is tasked with delivering the NEAES 2030 with regards to climate change and ocean acidification.

As shown in Table 1, OSPAR is committed to take ocean acidification impacts, mitigation, and resilience to climate change and ocean acidification into account across all aspects of its work. In addition, but also overarching, OSPAR's WG COCOA is dedicated to performing a number of tasks directly related to ocean acidification as part of OSPAR's NEAES 2030 Implementation Plan.

The main elements of OSPAR's future work concern monitoring and assessment of ocean acidification:

- OSPAR plans to implement a coordinated long-term monitoring programme for ocean acidification variables, taking appropriate geographical coverage and scale, monitoring frequency and duration into account. This includes working on streamlining data storage and flows (taking visibility and discoverability into account), working on quality assurance tools, and developing guidelines for sampling and measuring methodologies. Aligning biological monitoring with monitoring of carbonate chemistry (in space and time) to improve biological impact assessments is also of specific interest.
- OSPAR plans to deliver an (updated) assessment of ocean acidification trends in the OSPAR Maritime Area and the associated impacts on organisms, habitats, ecosystems, and ecosystem services to feed into the next OSPAR Quality Status Report assessment. Part of the process working towards this update is a review of the content and approaches chosen in the 2023 QSR Assessment to identify areas for improvement.

In addition, WG COCOA will perform tasks concerning scientific networking, dissemination, and outreach to the public, and supporting other working groups in OSPAR with climate and ocean acidification-related products:

- OSPAR plans to have WG COCOA interact intensively with external bodies, groups, and initiatives, mostly but not exclusively scientific ones, including the International Council for the Exploration of the Sea (ICES), IOC-UNESCO as custodians of the Sustainable Development Goal 14.3 indicator and the European Union working groups on the Marine Strategy Framework Directive. Through this network, OSPAR aims not only to have the most recent scientific insights but also to offer scientists a forum to interact directly with policy makers. Examples of interaction with OSPAR's ICG-OA include the Global Ocean Acidification Observing Network (GOA-ON) and the Copernicus Marine Environment Monitoring Service (CMEMS), who have contributed significantly to OSPAR's ocean acidification assessment.
- WG COCOA members will actively reach out to the scientific community, policy makers as well as the general public to disseminate information. This can take the form of presentations at conferences, manuscript submissions to scientific journals or, for example, leaflets explaining ocean acidification in the North-East Atlantic and the associated challenges in plain language.
- WG COCOA will explore the potential to produce maps of (cumulative) risk of change in ocean acidification and climate change variables under future scenarios in order to inform recommendations and actions by other OSPAR groups (working for example on protecting or restoring habitats or establishing MPAs).

- WG COCOA will explore the feasibility of developing (widely applicable) indicators for ocean acidification and climate change impacts.

WG COCOA will interact with the committees and subsidiary groups in OSPAR that deal with topics such as the offshore industry, radioactive substances, chemical pollution, and eutrophication, impacts of human activities, and biodiversity. This interaction needs to assure that the cross-cutting nature of climate change and ocean acidification-related impacts, actions and challenges are properly reflected in OSPAR's work and products.

Table 1: Strategic and associated operational objectives in the NEAES that deal explicitly with ocean acidification

Strategic Objective 6: Restore degraded benthic habitats in the North-East Atlantic when practicable to safeguard their ecosystem function and resilience to climate change and ocean acidification	
S6.O1	By 2023 OSPAR will identify habitats suitable for restoration, and develop a common knowledge base on the most appropriate and effective methods for restoration of degraded habitats.
S6.02	By 2025 OSPAR will develop a regional approach, including relevant qualitative and/or quantitative targets for restoration of degraded habitats suitable for restoration, and will then implement actions to achieve the targets as appropriate.
Strategic Objective 10: Raise awareness of climate change and ocean acidification by monitoring, analysing and communicating their effects	
S10.O1:	By 2025 OSPAR will implement a coordinated long-term monitoring programme for ocean acidification variables.
S10.O2	By 2023 OSPAR will develop assessments of ocean acidification and climate change and will take the impacts of ocean acidification and climate change into account in relevant OSPAR indicators and assessments.
S10.O3	In 2023, and every 6 years thereafter, OSPAR will assess the current and projected impacts of climate change and ocean acidification on the OSPAR maritime area and its uses, to inform the development of national and international actions.
Objective 11: Facilitate adaptation to the impacts of climate change and ocean acidification by considering additional pressures when developing programmes, actions and measures	
S11.O1	By 2025 OSPAR will develop a coordinated management approach to strengthening ecosystem resilience, including to the consequences of climate change and ocean acidification.
S11.O2	By 2023, and every six years thereafter, OSPAR will assess at a regional scale the OSPAR network of marine protected areas in respect of the resilience of marine biodiversity to climate change, with the aim of ensuring that the network provides a good representation of species and habitats and that its spatial design and management regime remains relevant.

S11.O3	From 2021 OSPAR will ensure that revisions to the OSPAR list of threatened and/or declining species and habitats and status assessments take account of any relevant impacts of climate change and ocean acidification.
S11.O4	From 2021 OSPAR will consider the additional pressures from climate change and ocean acidification both now and under future climate conditions in its regular review of measures and actions and update them as appropriate.
Strategic Objective 12: Mitigate climate change and ocean acidification by contributing to global efforts, including by safeguarding the marine environment's role as a natural carbon store	
S12.O1	By 2025 OSPAR will develop a regional approach to applying nature-based solutions for carbon storage and implement specific measures to protect and restore relevant carbon sequestration and storage habitats, such as seagrass beds, kelp forests and saltmarshes.
S12.O2	By 2025 OSPAR will take nature-based carbon storage into account when reviewing the criteria for the designation of marine protected areas, and reviewing the OSPAR List of threatened and/or declining species and habitats.
S12.03	By 2024 OSPAR will review the results of monitoring that is undertaken in relation to carbon dioxide storage to assess whether the monitoring techniques deployed are adequate to demonstrate that carbon dioxide streams are retained permanently in the storage complex. By 2026 OSPAR will evaluate the effectiveness of OSPAR measures to ensure that carbon dioxide streams are retained permanently in the storage complex and will not lead to any significant adverse consequences for the marine environment, human health and other legitimate uses of the maritime area.
S12.O4	By 2023 OSPAR will develop common principles and by 2024 develop guidance to promote and facilitate sustainable development and scaling up of offshore renewable energy in a way that cumulative environmental impacts are minimised
Cross-cutting issues	
SX.O2	By 2024 OSPAR will initiate discussions on the development of a practical approach for regional-scale ecosystem-based management, including through the 'Collective Arrangement21' and in cooperation with fisheries management bodies and other competent organisations, in order to strengthen ecosystem resilience to climate change and to safeguard the marine environment, its biodiversity and ecosystem services.