

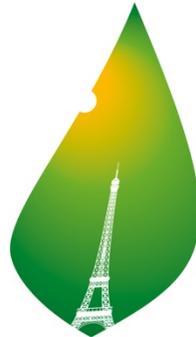


Ocean Conservancy®



International Alliance to
Combat Ocean Acidification

Incorporating Ocean Acidification into Nationally Determined Contributions Pursuant to the Paris Climate Agreement



COP21-CMP11
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UN CLIMATE CHANGE CONFERENCE

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University of Washington School of Marine and Environmental Affairs, Unpublished Report

Protecting the Ocean is Critical to Achieving Climate Goals

The ocean has enormous potential to buffer the planet from many impacts of climate change because it absorbs excess heat and carbon dioxide, which helps regulate the Earth's climate. However, this benefit has a cost: climate-related changes are already damaging our oceans – from oyster die-offs to coral reef bleaching – and coastal communities around the world are feeling the effects. As ocean systems are damaged by climate, they are less able to continue taking up heat and carbon dioxide, exposing us to more harm from climate change over time.

The ocean has:

- Absorbed 28% of carbon dioxide generated by human activities since the 1750s
- Absorbed 93% of the excess heat resulting from increased greenhouse gases since the 1970sⁱ

As a result of absorbing this CO₂, ocean acidity has increased by 30 percent and is expected to double over pre-industrial levels by the end of this centuryⁱⁱ, as the ocean continues to absorb the carbon dioxide generated by human activities. In addition, the atmosphere stores over half of the carbon dioxide generated each year by human activities, causing both the atmosphere and ocean to warm and layering stress upon stress on ocean ecosystems. Studies conducted worldwide already show significant impacts on fisheries and marine ecosystems from ocean acidification and warming, and these impacts are expected to worsen in the future.

The science is clear that we must act immediately to reduce carbon emissions to help spare ocean systems and ourselves. In 2015, 195 countries signed the Paris Climate Agreement committing to meaningful action to reduce greenhouse gas emissions. A healthy ocean can better help us to deliver on these climate goals as well as enable human and natural communities to withstand the now unavoidable impacts of climate change.

Why Include the Ocean in NDCs?

Nationally Determined Contributions (NDCs) are at the heart of the Paris Agreement and will be the way its long-term goals are achieved. Each country's NDC outlines its efforts to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive NDCs. Each NDC reflects the country's ambition for reducing emissions, taking into account its domestic circumstances and capabilities.ⁱⁱⁱ

Given their role in outlining countries' ambitions and plans for climate action, NDCs provide a framework for including ocean commitments within countries' climate mitigation and adaptation plans. Using NDCs as platforms to enhance ocean–climate ambition will highlight the ocean's role in combatting the impacts of climate change and will also allow countries to better measure vulnerability and potential resource loss. Strong ocean elements in NDCs can:

- Increase ambition to reduce GHGs, given the double imperative of ocean and climate systems.
- Increase focus on near-shore mitigation and adaptation actions—including protecting carbon sequestration by coastal and submerged vegetation –as they have a particular benefit to at-risk ocean resources.
- Protect critical ecosystems and biodiversity through protected areas and reserves that conserve and protect marine biodiversity and vulnerable ecosystems, which can sequester carbon and provide adaptation benefits to coastal communities.
- Acknowledge ocean warming as a critical factor in stronger and more frequent major weather events.

Why Focus on Ocean Acidification?

Ocean acidification occurs globally and can contribute to disruptions in national economies by altering links between human communities and the natural environment.

Ocean acidification has the potential to impact:

Food Security

- Decreasing or shifting fish stocks from acidification and warming pose a threat to many of the estimated 2.9 billion people who rely on fish for more than 20% of their animal protein. (FAO Report 2017)

Tourism Economies

- Ocean acidification and warming damage coral reefs, which generate \$36 billion in global tourism per year. ^{iv}

Shoreline Protection

- Ocean acidification degrades coral and oyster reefs that protect coastlines from storm waves, which themselves are stronger and higher because of climate change.

Aquaculture

- Ocean acidification challenges shellfish production and aquaculture, a growing sector worldwide, which yielded 90.4 million tonnes of product globally and more than USD \$144 billion in revenue in 2014. ^v

Recommendations for Including Ocean Acidification within NDCs

The following recommended foundational elements provide a useful starting point for national governments seeking to incorporate actions to address and mitigate ocean acidification in their updated NDCs. Note these actions should be planned and taken in conjunction with other mitigation and adaptation actions, particularly those connected to the ocean, in order to maximize benefits.

Incorporate OA Impacts into Existing Targets

- NDC language should establish a clear link between emissions reductions targets and mitigation goals, and how ambitious targets and goals benefit the oceans.

Assess Threats to Key Resources

- Evaluate the potential impact of ocean acidification on economically and culturally important marine species and resources, and the communities that depend on them.

Establish Baseline Measurements

- Develop or engage with an existing monitoring system that is capable of detecting changes in both water quality and coastal ecosystems due to carbon dioxide pollution. Monitor for changes in pH, aragonite saturation, deoxygenation, and other indicators.

Build Adaptive Capacity

- Describe actions under way or soon-to-be-implemented that will mitigate the impacts of ocean acidification on shorelines, marine ecosystems, and coastal communities.

Include Funding Goals

- Identify existing or planned funding sources that will help implement ocean acidification-focused actions incorporated in the NDC, such as the monitoring and research activities mentioned above.

Actions that Can Support Implementing Ocean Acidification-Focused NDC Goals

Supporting scientific investigation and organizing inclusive processes to set community-wide common goals have proven effective at driving forward action on OA. Several of the activities that governments are already carrying out support achievement of OA-focused NDC goals. Below is a sample of the ways in which leaders are taking action on OA, and how these actions support the above recommendations.

- Enhance collaboration and coordination among national entities and activities focused on ocean and coastal issues.
- Join international knowledge-exchange networks focused on OA, including Global Ocean Acidification Observing Network, the International Ocean Acidification Coordinating Center, and the International Alliance to Combat Ocean Acidification.
- Identify key ecological, cultural, and economic marine resources and species and their likely vulnerability to OA.
- Identify locations where OA interacts with other ocean stressors and specially managed areas to inform monitoring and management.
- Develop methods to incorporate OA and warming into existing short- and long-term resource management.

- Assess and enhance current observing and monitoring capabilities to permit detection of OA and attribution to specific causes.
- Evaluate the OA risks and benefits of every underway or planned coastal climate mitigation and adaptation effort (e.g., protection and restoration of wetlands, submerged aquatic vegetation, or coral reefs; built infrastructure and dredging).
- Support testing and implementation of local OA mitigation strategies (e.g., shell recycling, co-culture of shellfish and aquatic vegetation, water chemistry amendment).
- Develop budget mechanisms to support OA research and monitoring by secure revenue streams (e.g., bonds, taxes).
- Offer financial incentives to support coastal businesses engaged in adaptation planning to address OA (e.g., grants, loans, tax credits, or cooperatively owned entities).
- Develop coordinated funding strategies to support community adaptation planning for OA (e.g., bonds, tax mechanisms, loans).

ⁱ Magnan et al., 2015 policy brief: https://www.iddri.org/sites/default/files/import/publications/pb0415_am-et-al._oceans-and-climate.pdf

ⁱⁱ Levis, S., Peters, G. P., Klein Goldewijk, K., Friedlingstein, P., Levy, P., Van der Werf, G. R., . . . Stocker, Benjamin. (2013). The global carbon budget 1959–2011.

ⁱⁱⁱ <https://unfccc.int/process/the-paris-agreement/nationally-determined-contributions/ndc-registry>

^{iv} Spalding, Burke, Wood, Ashpole, Hutchison, & Zu Ermgassen. (2017). Mapping the global value and distribution of coral reef tourism. *Marine Policy*, 82, 104-113.

^v Clements, J. C., & Chopin, T. (2017). Ocean acidification and marine aquaculture in North America: potential impacts and mitigation strategies. *Reviews in Aquaculture*, 9(4), 326–341. <https://doi.org/10.1111/raq.12140>