



# BLUE CARBON AND NATIONALLY DETERMINED CONTRIBUTIONS

the  
**BLUE  
CARBON**  
initiative

## Guidelines on Enhanced Action

A guide on how countries may include blue carbon  
in their Nationally Determined Contributions



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Mangrove, Waigeo passage. © Conservation International/photo by Sterling Zumbrunn

# INTRODUCTION

Coastal ecosystems are some of the most productive on Earth. They are home to a wealth of biodiversity and provide us with essential ecosystem services, such as coastal protection from storms and nursery grounds for fish. Their role in sequestering and storing “blue” carbon from the atmosphere and oceans is also increasingly being recognized by policymakers. The three coastal wetlands types — mangroves, seagrasses and tidal marshes — commonly referred to as blue carbon ecosystems, provide a full spectrum of mitigation, adaptation, and resilience benefits. Additionally, these ecosystems provide coastal communities globally with fisheries, livelihoods and numerous cultural values. **An estimated 151 countries around the world<sup>1</sup> contain at least one of these coastal wetland ecosystems, and 71 countries contain all three.**

This report is intended to support countries seeking to promote and preserve these climate benefits by providing technical guidance on the multiple avenues by which coastal wetlands can be included within new and updated Nationally Determined Contributions (NDCs) to the Paris Agreement, and can thus contribute to countries’ raised ambition.

Given the multiple justifications for the inclusion of coastal wetlands in NDCs and considering varying levels of data availability and national capacities, policymakers will find contained in this guidance a spectrum of options. This document presents a “tiered approach”, similar to that employed by IPCC guidance, to demonstrate how a variety of motivations and starting points all represent viable pathways for the inclusion of coastal wetlands in NDCs.

Following an overview of the definitions, objectives, and context, the guidelines are comprised of five central pillars.

1. Options for Including Blue Carbon in an NDC
2. Adaptation: Blue Carbon in the Adaptation<sup>2</sup> Component of an NDC
3. Mitigation: Blue Carbon and Mitigation Targets
4. Greenhouse Gas (GHG) Reporting and Inventories for Blue Carbon
5. Implementation: Delivering on Blue Carbon NDCs

Within this document the term “guidelines” refers to practice recommended by the authors. Unless specifically stated, it does not refer to guidance as adopted within the formal decision-making process of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement or guidance from the IPCC. While recognizing the important role of adaptation as an entry point for many countries this guide focuses on mitigation.

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1 Herr, D. and Landis, E. (2016). Coastal blue carbon ecosystems. Opportunities for Nationally Determined Contributions. Policy Brief. Gland, Switzerland: IUCN and Washington, DC, USA: TNC.

2 Adaptation communications can be part of NDC but not necessarily — the Adaptation communication is mandated in such a way that it can be given as an integral part of the NDC or through a national communications, NAP, or transparency report.



# EXECUTIVE SUMMARY FOR POLICYMAKERS

## Why should coastal wetlands feature in NDCs?

- Nature-based solutions (NbS),<sup>3</sup> including protection, conservation and restoration of blue carbon ecosystems, are an integral component to the achievement of reaching the 1.5-degree Celsius objective laid out by the Paris Agreement.
- Countries with coastal wetlands — mangroves, seagrasses and tidal salt marshes — can recognize the values provided by these ecosystems as a potentially significant contribution to both the mitigation and adaptation goals of their NDC. This value is additional and complementary, not a substitute, to the critical need for countries to reduce their emissions from other sectors such as energy and transport.
- The potential climate benefits of coastal wetlands and blue carbon were under-represented in 2015 NDCs.
- NDC updates offer the opportunity for countries to increase ambition and improve resiliency by enhancing the role of nature, including blue carbon, as a climate solution for mitigation and adaptation.
- Protecting, conserving and restoring blue carbon ecosystems as an action within NDCs is a multi-faceted process and will vary in form and application across countries. The ‘ratchet’ or ambition mechanism whereby each NDC is required to be progressively more ambitious should facilitate increased progress from one NDC update to the next — from the NDC update in 2020 to the next in 2025, in 2030, and so on.
- There exists a starting point for any country to recognize the climate values of coastal wetlands within their NDC no matter the capacity level. However, comprehensively including (all) blue carbon habitats in an NDC carbon accounting framework requires rigorous planning and robust capacities, an exercise best undertaken through a “Blue Carbon Readiness” assessment. Some countries may already have undergone such assessment and possess relevant capacities, while others will need time to develop them. In either case, countries can use their NDCs and the NDC trajectory to outline their current and intended future blue carbon actions.
- While successful NDC design and implementation should involve deep engagement with affected communities, civil society and private sector actors, this is a task led by governments and their partners across departments and agencies. Staff within and working on behalf of government agencies are the intended primary audience for this guidance document.

<sup>3</sup> Nature-based Solutions (NbS) are actions that work with and enhance nature to help address societal challenges. Examples of NbS include restoring and protecting forests and wetlands in catchments, Bringing nature into cities, and coastal habitat restoration. NbS is often used as an umbrella term for other established nature-based approaches such as ecosystem-based adaptation (EbA) and mitigation (EbM), eco-disaster risk reduction (eco-DRR), Green Infrastructure (GI) and natural climate solutions (NCS). Cf. Seddon N, Chausson A, Berry P, Girardin CAJ, Smith A, Turner B. 2020. [Understanding the value and limits of nature-based solutions to climate change and other global challenges. Phil. Trans. R. Soc. B 375: 20190120.](#)

# Why Nationally Determined Contributions?

NDCs represent the primary implementation mechanism of the Paris Agreement, with each Party to the UNFCCC submitting progressively ambitious commitments over five- or ten-year cycles to achieve the Agreement’s long-term goals. This “ratchet mechanism” or “ambition mechanism” ensures continued enhancements over time, measured through “stock-take” exercises conducted between NDC submissions. (See Figure 1). It is important to note that NDCs are not intended to solely represent reiterations of existing national strategies and plans — NDCs allow governments to express, give direction and clearly state their future ambitions to address climate change.

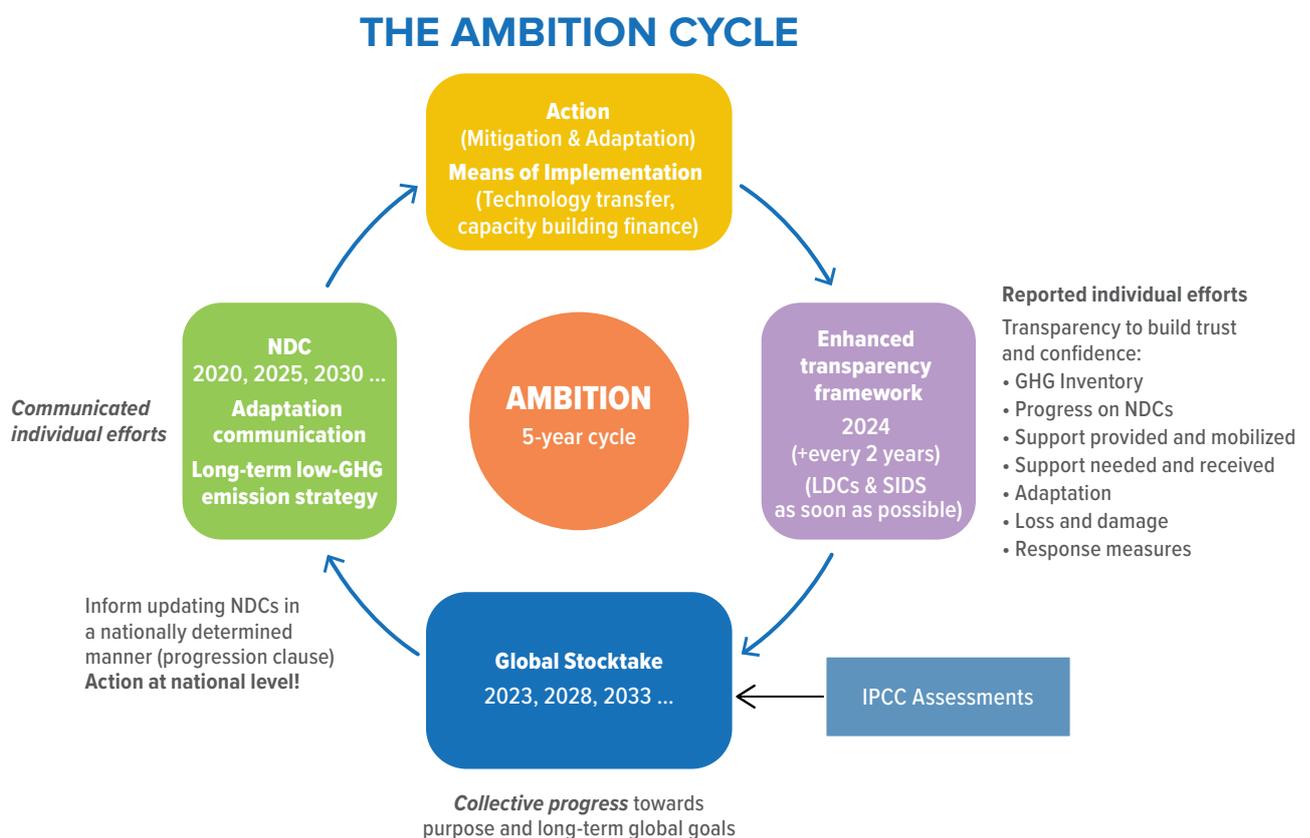
While conceived principally as mitigation instruments, in practice many Parties have understood NDCs to define a country’s specific climate change commitments in the broader sense, covering mitigation, adaptation and resilience priorities. This flexibility in the NDC architecture is at the core of what is often referred to as the “bottom-up” approach of the Paris Agreement, whereby each country defines the nature of their targets, the scope of their commitments, and the details of implementation specific to their NDC.

While the principal aim of these guidelines is to enhance the design of NDCs, the approaches described also have application to other parallel climate instruments, in particular, national Greenhouse Gas (GHG) inventories. Integration into the national GHG inventory is a useful step for blue carbon to be included in NDC mitigation targets and a necessary step for GHG accounting of the sector.

While a number of the first-round of NDCs referenced coastal wetlands,<sup>4</sup> predominantly relating to adaptation, very few recognized or quantified their significant mitigation potential.<sup>5</sup> In addition to being highly effective natural climate solutions for sequestration and storage of carbon, coastal blue carbon ecosystems become a major source of emissions when they are degraded or destroyed and the carbon they hold is emitted into the oceans and atmosphere. The ongoing loss of mangroves around the world alone accounts for 24 million tCO<sub>2</sub>eq. in emissions every year. In addition to the carbon emissions,

**FIGURE 1. The Ambition Cycle under the Paris Agreement**

(Source: Created by Joanna Post based on information/presentations by the UNFCCC secretariat)



Communicated individual efforts

Inform updating NDCs in a nationally determined manner (progression clause)  
**Action at national level!**

*Collective progress* towards purpose and long-term global goals

the degradation and destruction of coastal wetlands can severely impact the capacity of coastal communities globally to adapt to climate change related extreme weather events and sea level rise. Conservation, protection, restoration and sustainable management of these important ecosystems are therefore valuable climate actions.

## Motivations for Including Coastal Wetlands in NDCs

Political awareness of the climate values of coastal wetlands and other nature-based solutions has developed considerably since the first NDCs were submitted.<sup>6</sup> The specific motivations for the inclusion of coastal wetlands in NDCs will vary between countries and include:

**HIGH MITIGATION BENEFITS.** Coastal wetlands sequester carbon at higher rates, per unit area, than terrestrial forests, storing the carbon within both their biomass (leaves, roots, wood and stems) and carbon-rich organic soils. The global area covered by blue carbon ecosystems is equivalent to only 1.5% of terrestrial forest cover. Their loss and degradation are equivalent to 10% of CO<sub>2</sub> emissions from terrestrial deforestation because of their high carbon stocks per hectare.<sup>7</sup>

**HIGH ADAPTATION BENEFITS.** Coastal wetlands provide services essential for climate change adaptation, including protection from storm surges, flooding, sea-level rise, and coastal erosion<sup>8</sup>. Investment in these forms of “blue infrastructure,”<sup>9</sup> such as living coastlines, provides other essential ecosystem services such as food security, local livelihoods (small-scale fisheries) and biodiversity, and is often more cost-effective than “grey infrastructure,” such as seawalls and breakwaters.<sup>10</sup>

**NDC PROGRESSION.** The Paris Agreement encourages countries to move towards economy-wide mitigation targets, ultimately covering all economic sectors and emissions sources.<sup>11</sup> The integration of land sector emissions, including those from coastal wetlands, is a major milestone on this path.

**HIGH IMPLEMENTATION VALUE.** Including conservation, restoration and/or sustainable management of coastal wetlands in an NDC serves as a strong signal of national policy priorities, which in turn drives resources and actions. This is particularly important given the diverse range of sectors that impact coasts. NDC development encourages coordination between sectors and government departments, which can result in better identified policy levers for implementation.

**SUSTAINABLE BLUE ECONOMY.** Many countries have expressed interest in developing and maintaining sustainable blue coastal and ocean economies.<sup>12</sup> There is an opportunity for these governments and the private sector to work closely with coastal communities to align direct benefits with better management and protection of the ocean. Commitments to the conservation of blue carbon ecosystems also serve as a signal to multiple potential avenues for financial support and development of blue economies. Achieving a sustainable blue economy implies a model that promotes investment, stimulates coastal development, improves the quality of life and guarantees healthy and resilient oceans.

**CLIMATE FINANCE.** NDCs are one of many entry points for securing climate finance to support blue carbon related actions. Under the provisions of the Katowice Climate Package concerning climate finance reporting, both the donor and the recipient country must report how a particular financial support or flow contributes to the achievement of the recipient country’s NDC. Including the protection of coastal wetlands within an NDC is therefore an important staging post for a variety of potential climate funds.

4 Coastal blue carbon ecosystems. Opportunities for Nationally Determined Contributions. Policy Brief D Herr and E Landis — Gland, Switzerland: IUCN Washington, DC: TNC, 2016. Herr and Landis (2016) have traced 59 NDCs that include “coastal ecosystems” and/or the “coastal zone” as instrumental for their adaptation strategy. Twenty-eight NDCs include a reference to coastal wetlands recognizing their role for mitigation action.

5 See further Appendix 1: Natural climate solutions NCS in the 2015 NDCs.

6 The NDC Partnership — a platform designed to help countries plan and realize NDC implementation — has received 112 requests for support from 22 countries related to ‘oceans & coasts’ for their NDC Implementation Plans.

7 Estimating Global “Blue Carbon” Emissions from Conversion and Degradation of Vegetated Coastal Ecosystems. Pendleton et al. *PLoS ONE*, 2012.

8 Duarte, C. et al (2013). The role of coastal plant communities for climate change mitigation and adaptation. *Nature Climate Change*, 3 (961–968).

9 Thiele, T. et al (2020). Blue Infrastructure Finance. A new approach integrating Nature-based Solutions for coastal resilience (IUCN).

10 Thiele, T., Alleng, G., Biermann, A., Corwin, E., Crooks, S., Fieldhouse, P., Herr, D., Matthews, N., Roth, N., Shrivastava, A., von Unger, M. and Zeitlberger, J. (2020). Blue Infrastructure Finance: A new approach, integrating Nature-based Solutions for coastal resilience. IUCN, Gland, Switzerland.

11 Paris Agreement (2015), Article 4.3 and 4.4.

12 E.g., High Level Panel for Sustainable Ocean Economy [www.oceanpanel.org](http://www.oceanpanel.org).

There is a growing demand for carbon credits from a variety of voluntary and regulatory markets that presents an opportunity for blue carbon activities to generate and sell credits. Many of these are still under development<sup>13</sup>. For countries interested in blue carbon, this is a space worth watching as this opportunity evolves since there is a possibility of selling blue carbon credits and the possibility for financing.

**These guidelines are designed to speak to all 151 countries that contain coastal wetlands, irrespective of their level of economic development and regardless of the type and nature of the country's NDC commitments.**

There is no 'one-size-fits-all' NDC. An NDC for an industrialized country, such as Australia, will be different to an NDC for that of a small island developing state (SIDS), such as Fiji. NDCs are, by definition, determined by the individual countries with the common goals described in the Paris Agreement as tools of incremental change. As the Paris Agreement states: (Article 4.3):

*Each Party's successive nationally determined contribution will represent a progression beyond the Party's then current nationally determined contribution and reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.*

Particular differences between countries will also include national reporting systems associated with NDCs, notably GHG inventories. Some countries have comprehensive data on emissions and removals from coastal wetlands. Others do not. Reporting and planning capacities also vary between countries.

Thus, NDCs do not need to reflect a complete uniform blue carbon accounting framework or set of targets. Rather, they offer the opportunity for each country to move towards increasingly comprehensive blue carbon coverage and targets over time, as relevant to country-specific contexts, and aligned with the types of information necessary for clarity, transparency and understanding.



**There are specific actions for including blue carbon in NDCs and related actions available to all countries.** This guidance offers a tiered approach, represented by engagement levels for the inclusion of coastal wetlands in NDCs, similar to that employed by the IPCC Wetlands Supplement. This tiered approach accounts for the varying starting points, motivations and data and capacity levels among countries, as well as reflecting the broader stepwise nature of designing NDCs. Countries can identify their desired entry point and engagement level for including blue carbon and follow the guidance accordingly.

Considerations for how coastal wetlands might be included within NDCs include:

- Data completeness, existing capacities and clear identification of drivers (or origins) of habitat degradation and associated mitigation values within GHG inventories.

- Intra-governmental and policy coordination given the breadth of policies and governmental departments often involved in management of coastal wetlands.
- Funding and capacity implications of implementation.

## Which aspects of these guidelines are relevant to my country?

Depending on data availability and institutional capacity (broadly grouped as high; medium; low) for any given country, these guidelines present tiered suggestions as follows: Engagement Level 1 (i.e., initial actions); Engagement Level 2 (i.e., supplemental actions); and Engagement Level 3 (i.e., fully comprehensive actions).

These guidelines describe the merits of including coastal wetlands in NDCs at a variety of levels and how this can enhance the overall NDC ambition. Countries can use these guidelines to take incremental steps across levels toward fully including coastal wetlands in their NDCs. (See Table 1.)

Engagement Level	Example Status of Blue Carbon Data in Country
<b>Level 1</b>	<ul style="list-style-type: none"> <li>• No data available on coastal wetland change or associated GHG emissions, and/or</li> <li>• Coastal wetlands are not included in any conceptual document on adaptation, and/or</li> <li>• Coastal wetlands are identified for inclusion in the national plan.</li> </ul>
<b>Level 2</b>	<ul style="list-style-type: none"> <li>• Coastal wetlands included in adaptation component of NDC or other adaptation communication; and/or</li> <li>• Some advances towards quantifying mitigation value of coastal wetlands using IPCC guidance,<sup>14</sup> including as part of a mitigation approach or implementation plan; and/or</li> <li>• Progressing towards/currently using at least IPCC “tier 1” based GHG inventory reporting for coastal wetlands.</li> </ul>
<b>Level 3</b>	<ul style="list-style-type: none"> <li>• Comprehensive IPCC “tier 3” based inventory reporting for coastal wetlands.</li> <li>• Blue carbon solutions are a key component of adaptation and/or mitigation commitments.</li> </ul>

## Who should use these guidelines?

Primarily, these guidelines are designed for national policymakers and technical experts involved in NDC design and implementation, including GHG inventories and accounting experts. The guidance should also be applied in collaboration with other national priorities including those designed to meet economic objectives, such as coastal and ocean resource management, and coastal, wetlands and biodiversity conservation. As such, these guidelines can also support actions contributing to commitments to other international agreements such as, but not limited to, those under the Sustainable Development Goals (SDGs) (in particular SDG 14) Ramsar Convention (wetlands) and the Convention on Biological Diversity (CBD).

<sup>13</sup> Article 6 of the Paris Agreement establishes a broad framework for voluntary cooperation among Parties in delivering climate action through market and non-market approaches. The final guidance for international cooperation under Article 6 is still under debate, as it was the only element of the Paris Agreement “rulebook” on which countries were not able to reach consensus at the UNFCCC COP 24 in Poland in 2019.

<sup>14</sup> IPCC 1996 or 2006, but not yet incorporating the IPCC Wetlands Supplement, and addressing options for realizing this value (e.g. through an action or implementation plan).



A view of mangroves within Los Haitises National Park, Dominican Republic. © Olivier Langrand

# FIRST PILLAR

## Readiness Assessment & Options for Including Coastal Wetlands in NDCs

The following chapters provide guidance to identify entry points for inclusion of coastal wetlands and blue carbon values in NDCs and identify the required data to develop ambitious, but realistic, targets for these commitments.

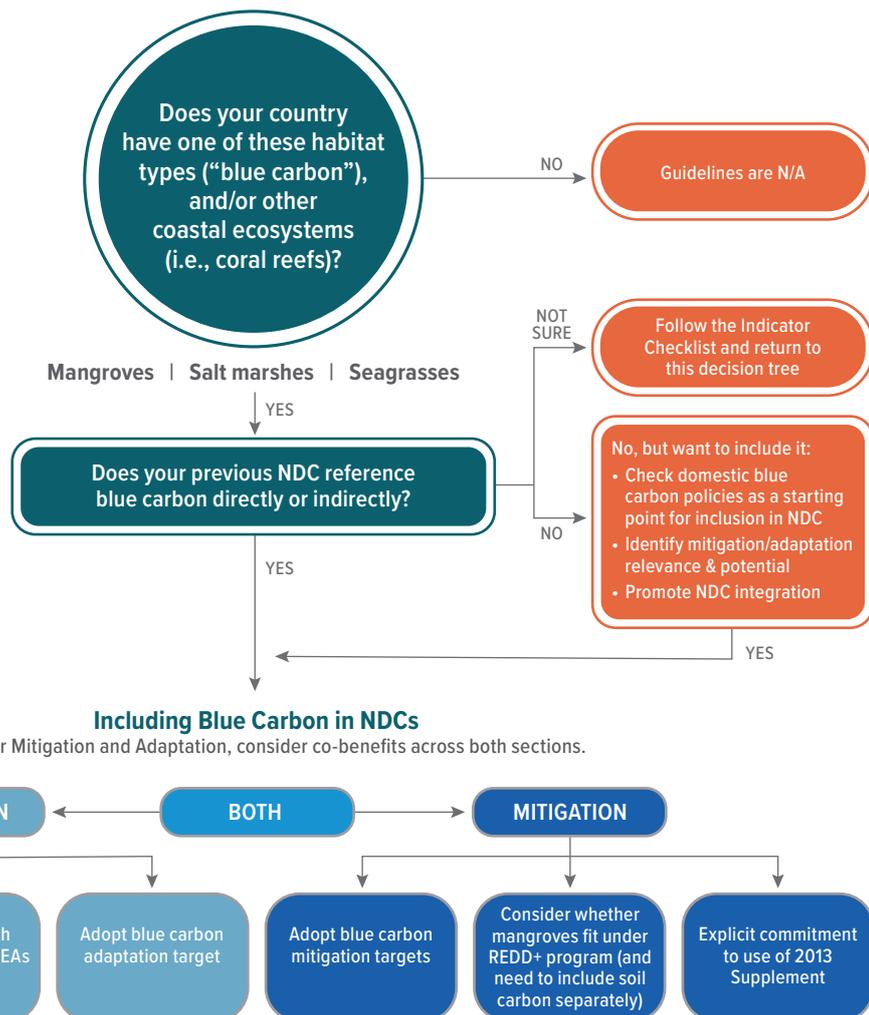
The broad variety of legitimate entry access points for including coastal wetlands within an NDC is both accommodating to different Parties’ motivation and capacity, but also potentially confusing. It is very possible that integration of blue carbon into an NDC will span multiple sections of the document.

For example, a country may choose to: focus within the adaptation section on a qualitative description of the values provided by one or a multitude of blue carbon ecosystems, or opt for dual targets in both the adaptation and mitigation sections for only a single blue carbon habitat type (e.g., mangroves). Alternatively, a county may commit to comprehensive quantitative accounting in GHG inventories for blue carbon broadly.

The decision-tree below poses a series of questions to determine where coastal wetlands can feature within an NDC. (See Figure 2.)

**FIGURE 2. Decision tree.**

*(Created by Courtney Durham, Tamara Thomas and Moritz Unger and inspired by Nature-based Solutions in Nationally Determined Contributions: Synthesis and recommendations for enhancing climate ambition and action by 2020. Gland, Switzerland and Oxford, UK: IUCN and University of Oxford.)*



## Readiness-Assessment

Once a Party has established the broader motivation to include coastal wetlands in its NDC, it can conduct a “readiness-assessment” — as further described in Appendix 1 — to identify the best starting point to include blue carbon coastal wetlands in their NDC. This is a technical exercise led by policy-makers to identify the opportunities for including coastal wetlands values within the policy architecture and capacity levels of their existing climate frameworks. The below checklist illustrates the kind of questions that will be relevant to this exercise. (See Box 1.)

### BOX 1. Check List: Identifying Existing and Potential Entry Points for Coastal Wetlands

- Does the national definition of forests include mangroves?
  - If yes, does it include mangrove of all heights? (i.e., dwarf mangroves)
  - If not, determine what heights are included in the definition.
- Does the GHG inventory include blue carbon data?
- Does the forest reference level include blue carbon habitats?
- Does the forest reference level account for soil organic carbon?

Note there may be existing indicators in previous NDCs that can help you situate future BC inclusions and/or elaborations. In some cases, they may be apparent and in others they may be ambiguous. Examples include:

- **Clear Indicators**

- NDC references to the IPCC Wetlands Supplement
- NDC refers to “blue carbon”
- NDC refers to “coastal wetlands”
- NDC refers to “mangroves” and/or “salt marshes” and/or “seagrasses”
- NDC refers to “coastal” or “marine” habitats
- NDC refers to coastal risks from flooding, sea-level rise, or other

- **Ambiguous Indicators**

- NDC includes “AFOLU” or “LULUCF” in its scope
- NDC references REDD+
- NDC references oceans or MPAs along coasts
- NDC references wetlands generally

Throughout the process, the identification of gaps — including data, capacity or domestic policy frameworks — should not be regarded as an obstacle to the objective of including blue carbon values into NDCs. Rather, a readiness assessment helps identify the appropriate entry point and therefore highlight country needs and improvements for blue carbon inclusion in future NDCs within the five yearly “ambition cycle” of the Paris Agreement. Usefully, the ambition cycle of the Paris Agreement provides opportunities to include or improve commitments and targets in NDCs, including for the blue carbon elements, every five years. Additionally, countries can choose to update their NDCs at any time, should they wish to take action at any point within an “NDC cycle”.

A readiness-assessment can be undertaken by any interested Party. It is not conditional on the completion of needs assessments for adaptation or available inventory data for mitigation. Rather, it is meant as the first step towards validated GHG emissions scenarios or mitigation/adaptation pathway assessments. This is a first step toward assessing the more appropriate pathway for the inclusion of coastal wetlands/ blue-carbon relative to a country’s domestic circumstance. It entails an investigation into quantitative data (among them, on current and projected emissions), but also into qualitative data. The investigation into drivers of, and impact on, degradation and into available policy and institutional formats will take center

stage. If one lacks an understanding of drivers, impact and viable response measures, it is hardly possible to set precise targets within an NDC. But again, any such lack will not forbid addressing blue carbon in an NDC in the first place. On the contrary, the commitment to comprehensive accounting (now or in the future) and the assurance to research the missing data and to develop bespoke targets and implementation formats (in line with Engagement Level 1 and Engagement Level 2, see Table 2 on the following page) seem the logical conclusion.

The table on the following page presents additional conditions to guide the inclusion of blue carbon in an NDC based on Engagement Levels in table 1 above. (See Table 2.) A full blue carbon readiness assessment may take multiple years and may even become a continuous exercise. It is important to keep in mind that it does not need to be complete for a country to address coastal wetlands in its NDCs. While the readiness assessment is taking place, a country may engage at Level 1 or Level 2.



**TABLE 2. Scenarios to Include Blue Carbon in NDCs**

Condition	Engagement Level
Existence of blue carbon habitats in the country; likely or potential role for mitigation or adaptation unclear	<p><b>Engagement Level 1</b></p> <ul style="list-style-type: none"> <li>• Use the decision tree (Figure 2) to perform a quick evaluation of how your country has included or will include blue carbon in its NDC</li> <li>• Undertake a commitment to include a measurable blue carbon mitigation and/or adaptation target by 2025</li> </ul>
Institutional arrangements for coastal wetlands are uncertain or conflicted	<p><b>Engagement Level 2</b></p> <ul style="list-style-type: none"> <li>• Focus on implementation and governance basics (see Pillar 5)</li> <li>• Consider planning for harmonized regulatory and legal frameworks to allow for implementation</li> <li>• Consider defining cross-government blue habitat conservation and restoration targets (mitigation and adaptation)</li> </ul>
Institutional arrangements for coastal wetlands are clear	<p><b>Engagement Level 3</b></p> <ul style="list-style-type: none"> <li>• Focus on implementation (see Pillar 5)</li> <li>• Design tailored policies, instruments and initiatives to advance conservation, restoration and/or sustainable management of blue carbon habitats for mitigation and adaptation.</li> </ul>
Data gaps: Habitat extension and carbon stocks (partially) unknown	<p><b>Engagement Level 1–2</b></p> <ul style="list-style-type: none"> <li>• Use the decision tree (Figure 2) to perform a quick evaluate of how your country has included or will include blue carbon in its NDC</li> <li>• Undertake a commitment to include a measurable blue carbon mitigation and/or adaptation target by 2025</li> <li>• Focus on blue carbon related GHG inventories and the gathering of field data to facilitate assessments and inventories.</li> <li>• Consult records and reporting for other policy mechanisms (including Ramsar) and international research platforms (for details, see Pillar 5)</li> <li>• Commit to the usage of the IPCC Wetlands Supplement for GHG inventories (see Pillar 4) in a future NDC (by 2025 or from 2025)</li> </ul>
Data gaps: Habitat extent known, but specific carbon stock assessments missing	<p><b>Engagement Level 2</b></p> <ul style="list-style-type: none"> <li>• Focus on inventories and apply default values (see Pillar 4)</li> <li>• Define coastal wetlands as falling within the NDC scope as of 2020</li> </ul>
Data gaps: Habitat extent known and carbon stock data available, but country-wide projections of change are unclear	<p><b>Engagement Level 2</b></p> <ul style="list-style-type: none"> <li>• Focus on formulating implementation targets for specific areas and habitats only (e.g., existing or planned MPAs), within the context of mitigation and/or adaptation</li> <li>• Focus on gathering field data</li> </ul>
Data gaps: Drivers of degradation are not well understood; regulatory impact unclear	<p><b>Engagement Level 2</b></p> <ul style="list-style-type: none"> <li>• Formulate tentative implementation targets (mitigation/adaptation) for blue carbon only</li> <li>• Focus on gathering field data</li> </ul>
Data gaps: Drivers are well understood, but regulatory and governance framework are not adequately understood	<p><b>Engagement Level 2–3</b></p> <ul style="list-style-type: none"> <li>• Focus on implementation and governance basics (see above)</li> <li>• Consider planning for a harmonized legal basis and/or habitat-specific institutional cooperation</li> </ul>
Drivers of degradation are well understood, and regulatory and land tenure gaps identified	<p><b>Engagement Level 3</b></p> <ul style="list-style-type: none"> <li>• Extrapolate ambitious and achievable targets for mitigation and adaptation (see Pillars 2 and 3)</li> <li>• Identify instruments of implementation</li> </ul>

# SECOND PILLAR

## Adaptation: Blue Carbon in the Adaptation Component of an NDC

The majority of this guidance is dedicated to the often multi-faceted task of recognizing the mitigation values of coastal wetlands within an NDC.

However, given the systematic relevance of blue carbon habitats for coastal adaptation and resilience in a large number of countries, and accounting for variation in levels of capacity and readiness to conduct mitigation assessments, many governments may first opt to acknowledge the adaptation benefits provided in their NDC. This can be a valuable exercise in not only recognizing these values, but also a potentially stepping stone in gathering the kind of information necessary to inform more in-depth mitigation assessments.

Blue carbon ecosystems provide a range of benefits for communities adapting to climate change, including improved protection from storm surges, flooding, sea-level rise, and coastal erosion.<sup>15</sup> The benefits of protecting, restoring and sustainably managing coastal ecosystems also ensure that other essential ecosystem services like food security, local livelihoods from small-scale fisheries or tourism, and biodiversity are protected.

Given the national context of adaptation needs and actions, a country has more flexibility in the structure of the NDC language and relevant components around adaptation than in the mitigation section. The adaptation section of an NDC could be represented as a qualitative statement of “why” coastal wetlands are important and “how” these values are being/will be protected, such as an outline of certain policy commitments. Alternatively, the adaptation section could consider existing adaptation policy instruments such as the Adaptation Communication (AC) or National Adaptation Plan (NAP) as a supplement.

For some countries, this will be an opportunity to communicate policies, institutional arrangements, and frameworks already in use and to align the NDC process with both international and domestic policy frameworks such as National Adaptation Plans (NAPs), Adaptation Communications and domestic policy architecture such as Coastal Zone Management plans. Synchronizing key priority sectors and activities like the protection, restoration and sustainable management of coastal ecosystems in the NAP, AC and/or NDC, demonstrates that these actions are critical to support the countries climate adaptation efforts and in many cases to achieve the Sustainable Development Goals. Specifying these actions also highlights the priority sectors and needs for further international climate finance. This can be done by using existing frameworks like the Ecosystem-based Adaptation (EbA) criteria developed by the Friends of Ecosystem Based Adaptation<sup>16</sup> used at the UNFCCC and CBD, which offers quantitative and qualitative information on climate and livelihood impacts and ecosystem health.

These indicators can be used to refine or define a country’s adaptation targets for its coastal areas. Additionally, highlighting coastal wetlands within the adaptation targets may be a suitable first entry point for countries focused on climate change impacts and are yet to quantify the mitigation value of their coastal wetlands. While further information and guidance are needed to fully align NDC workstreams with adaptation workstreams and gather quantifiable adaptation targets and impacts across these workstreams, experience and best practices for countries to learn from are becoming available (see Box2).

15 Duarte, C. et al (2013). The role of coastal plant communities for climate change mitigation and adaptation. *Nature Climate Change*, 3 (961–968).

16 <https://www.iucn.org/theme/ecosystem-management/our-work/ecosystem-based-approaches-climate-change-adaptation/friends-eba-feba>.

## BOX 2. Examples of How Countries Have Included Blue Carbon Ecosystems for Adaptation in NDCs

### ADAPTATION

#### Plans and Actions: Example Belize 2015

##### NDC presented with/prepares for

- National Climate Change Policy, Strategy and Action Plan (NCCPSAP)
- Sectoral vulnerability and adaptation assessments — six priority development sectors; namely, coastal development, agriculture, water, tourism, fisheries and health (in 4th National Communication)

##### Specific measures/actions foreseen in the NDC

###### Coastal and marine resources:

- Increase and strengthen the capacity of the *Coastal Zone Management Authority and municipal authorities to ensure developments within the coastal and urban areas of Belize include an adaptation strategy*;
- Implement mangrove restoration or sea and river defense structure to prevent coastal and riverine erosion and ecosystem disruption;
- Inclusion of adaptation strategies in management and development planning in all coastal and marine sectors;
- Review and strengthen planning legislation and building codes, especially as it relates to coastal development;
- Revise and streamline the current legislation and policies that relate to the management and regulation of development in the coastal zone to eliminate overlaps and close existing gaps;
- Forest protection and replanting of mangroves that are implemented for mitigation purposes are expected to protect the coastline against storm surges and erosion;

###### Tourism:

- Mainstream climate change in the Tourism Master Plan for Belize
- Support coastal planners and policymakers on adaptation strategies
- Promote environmental and responsible tourism (best practices)

###### Fisheries:

- Adopt new bill on fisheries, mangrove regulations and provisions on enhanced environmental impact assessment;
- Support mangrove and fisheries conservation
- Support management plans to protect wetlands and sea grass beds
- Monitor compliance with EIA regulation requirements for coastal mangrove alterations

###### Forestry:

- Maintain and restore healthy forest ecosystems by sustainable forest management, increasing afforestation and reforestation in order to increase the resilience of human communities

### ADAPTATION

#### Plans and Actions: Example Chile 2020

##### NDC presented with/prepares for

- 2021 Long-Term Climate Strategy (to define the objective, scope, goals and elements structuring the adaptation component)
- 2022 National Adaptation Plan (with 11 priority areas)
- 2022 First Adaptation Plan on water resources and coastal areas
- 2021–2028 Updates on Fisheries and Aquaculture
- 2027 Update on Coastal Areas

## Specific measures/actions foreseen in the NDC

### Oceans:

- Establishment of new marine protected areas in under-represented marine ecoregions and in coastal ecosystems for wetlands
  - Specific target 1: By 2030, protect at least 10% of under-represented ecoregions;
  - Specific target 2: By 2025, protect at least 20 coastal wetlands as new protected areas;
  - Specific target 3: By 2030, protect at least 10 additional coastal wetlands as protected area
- All marine protected areas created up to 2020 will have a management or administration plan in pace with specific focus on adaptation
  - Specific target 1: By 2025, 100% of marine protected areas created up to 2020 will hold management or administrative plans with adaptation focus
  - Specific target 2: By 2025, at least 40% of those plans will be implemented through monitoring, control, community involvement and threat control programs
  - Specific target 3: By 2030, 100% of marine protected areas created between 2020 and 2025 will receive the appropriate management or administrative plans
  - Specific target 4: By 2030, Management or administrative plans for 100% of marine protected areas created up to 2020 will be implemented through appropriate monitoring et al. programs
  - Specific target 5: Implementation of a methodology for the evaluation of management effectiveness for 100% of management plans
- Co-benefits of different ecosystems in marine protected areas will be assessed with respect to mitigation and adaptation
  - Specific target 1: By 2025, Three marine protected areas will have standardized metrics for the evaluation of their capacities for adaptation or mitigation to climate change
  - Specific target 2: By 2030, metrics for monitoring and verification of adaptation or mitigation capacities will be applied in at least 5 marine protected areas

### Wetlands:

- By 2025, peatland areas and any other types of wetland will be identified under a national inventory.

### Ecosystems:

- By 2021, a National Plan for the Restoration of Landscapes will be developed, which will consider restoration of 1,000,000 hectares of ecosystems, prioritizing those facing greatest social, economic and environmental vulnerabilities.

A core opportunity for including the protection, restoration and sustainable management of blue carbon ecosystems as a priority action for implementation also lies in recognizing the co-mitigation benefits. Acknowledging the co-mitigation value of these actions solidifies the importance of the blue carbon ecosystem and links it with the NDC reporting systems to ensure that the mitigation value is accounted for even if it is included as an adaptation action. It is not necessary to quantify mitigation values of adaptation actions such as blue carbon ecosystem related adaptation commitments to the full extent detailed in the mitigation guidance section below, but the acknowledgment of the mitigation co-benefit of coastal wetlands within an NDC also serves an important function.<sup>17</sup>

Blue carbon ecosystems provide climate adaptation benefits by protecting coastlines from storms, waves, erosion and flooding. Mangroves for example, have dense roots that reduce the energy and height of waves and storm surges, protecting coastal infrastructure and communities from storm damages. Salt marshes provide essential flood abatement in low lying coastal areas and seagrasses control sediment and improve water quality.

<sup>17</sup> For more information, see [https://www.nature.org/content/dam/tnc/nature/en/documents/Guide\\_to\\_Including\\_Nature\\_in\\_NDCs.pdf](https://www.nature.org/content/dam/tnc/nature/en/documents/Guide_to_Including_Nature_in_NDCs.pdf). Beasley, E., Schindler-Murray, L., Funk, J., Lujan, B., Kasprzyk, K., Burns, D. (2019). Guide to Including Nature in Nationally Determined Contributions: A checklist of information and accounting approaches for natural climate solutions. Conservation International, The Nature Conservancy, Land Use and Climate Knowledge Initiative, Environmental Defense Fund, National Wildlife Federation, Climate Advisers, Wildlife Conservation Society, Nature4Climate.



Sea grass on ocean floor, Indonesia. © Burt Jones and Maurine Shimlock

# THIRD PILLAR

## Mitigation: Blue Carbon and Mitigation Targets

### What are NDC mitigation commitments?

The Paris Agreement (Decision 1/CP.21) and the Katowice Climate Package of 2018, outline the key elements of the mitigation section in an NDC. While they do not pre-define the scope, content or level of ambition that an NDC offers, there is a requirement to “provide the information necessary for clarity, transparency and understanding”<sup>18</sup> (often referred to as “CTU” or “ICTU”). Box 3 outlines suggested ICTU items to include in an NDC<sup>19</sup> and provides advice for countries interested in integrating blue carbon. The ICTU is intended to ensure that NDCs are comparable while maintaining their national-level flexibility.

#### BOX 3. Information Items of NDCs and Relevant Entry Points for Blue Carbon

##### Suggested NDC ICTU Items & Blue Carbon Relevance

##### Quantifiable information on the reference point for blue carbon ecosystems (including, as appropriate, a base year)

- Base years are the most common reference points (reduction commitment measured against emissions in [1990] [2005] [other year]) or projected business-as-usual (“BAU”) emissions in a given future year (reduction commitment measured against [2025] [2030] [other]).
- Other reference points may include a reduction commitment for a certain sector; (e.g., Uruguay in its 2015 NDC committed to, inter alia, “avoid CO<sub>2</sub> emissions from [soil organic carbon] in 100% of the peatlands area of year 2016 (8.366 ha)” area-specific reference points may be chosen in line with information on existing structures, for instance, existing REDD+ programs or on Marine Protected Areas (MPAs).

##### Time frames and/or periods for implementation

- No specific requirements apply to date. In their first NDC, most countries opted for an implementation window until either 2025 or 2030. Those with an implementation window up to 2030 are not required to revise their NDC in 2020 though re-submission is possible; however, all Parties are urged to consider closing the “gap” between country efforts and climate needs, when submitting their NDC updates.<sup>20</sup>
- Timeframes are relevant for blue carbon ecosystems in particular given the long-term planning and MRV needs that are associated with carbon sequestration and storage in soils. This may pose a challenge for the NDC cycles but also encourages long-term planning.

##### Scope and coverage

- Sectors, categories, activities, sources and sinks, pools and gases are encouraged to be described with enhanced section on scope and coverage. This implies that the land sector, AFOLU, LULUCF or other specific lines for coastal wetlands could be included and reported as part of the NDC’s mitigation scope.
- For sectors a Party does include, the sources and sinks (categories, pools and gases) that are not considered in the national inventory report (even though IPCC estimation methods exist) must be highlighted, and the Party must give reason for the exclusion.

18 Article 4.8 Paris Agreement.

19 Decision 4/CMP.1, paragraph 7.

20 Cf. Decision 1/CP.21, paragraphs 23 and 24; Decision 1/CMA.2, paragraph 7.

### Planning processes

- Parties could elaborate on how actions on coastal wetlands are important adaptation actions will result in mitigation co-benefits by detailing specific projects, measures and activities to be implemented. Key sectors for elaboration, could include: national resources, water resources, coastal resources, agriculture and forestry.
- Mitigation co-benefits described in the adaptation section of the NDC can be described here with the clear linkage to the relevant adaptation action, and inclusion in relevant reporting

### Assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals

- Each Party must apply the 2006 IPCC guidelines for GHG inventories.
- Each Party is also “encouraged” to use the IPCC Wetlands Supplement. In practical terms, this means countries are invited to include wetlands in the scope and account for them in line with the IPCC Wetlands Supplement.
- For select REDD+ countries, some national or sub-national programs include mangrove forests and thus are included in the existing national MRV reporting systems. Note that the existing reporting may be limited to aboveground biomass, not the soil carbon stock, indicating that it would be useful to clarify specific line items in this section.

### How the Parties considers its NDC to be fair and ambitious in the light of national circumstances

- The section permits countries to support their NDC with a rationale based on considerations of equity and justice.
- It may include notions of social and environmental justice, as well as inter-generational and transnational justice.
- In terms of ambition, focusing on conserving and restoring coastal wetlands is an area in which developing countries can achieve emission reductions and sequestration benefits.
- Dedicating attention and resources to the health of coastal wetlands enhances the fairness and ambition of NDCs as these ecosystems are often essential for supporting local communities that are most exposed to a changing climate and increasing hazards.

### How the NDC contributes towards achieving the Convention’s objectives

- The global climate cannot be stabilized by well below 2 degrees C without comprehensive involvement of nature-based solutions, including the conservation and restoration of coastal wetlands.

**A reference can be made to Article 4 of Convention, in particular to the language on ocean/coasts.**

## What type of targets can be used to reflect mitigation action from coastal wetland management?

Notably absent from the ICTU list are the type of blue carbon related target a country chooses and the minimum requirements for the sectoral scope. All countries are required to formulate economy-wide targets over time, which would include land use and therefore coastal wetlands. Developing countries, however, retain the discretion whether and when to include more sectors as they move toward economy wide NDC targets.

When considering how to include a mitigation target for blue carbon in an NDC, it is important to distinguish between headline targets and specific or implementation targets. Coastal wetlands can be integrated in both types of target.

## TYPES OF TARGETS

NDCs can contain a variety of targets.<sup>21</sup> These could include, but are not limited to, GHG targets, sector-wide targets, and/or non-GHG targets.

**Headline Economy-wide targets (GHG and non-GHG)** relate to the (netted) total of contributions (net balance of emissions). For example, for countries that submit economy-wide GHG targets the headline target is along the lines of “40% in domestic emissions by 2030 compared to 1990 emissions” (European Union) or “26 to 28 percent below 2005 levels by 2030” (Australia). The headline target usually combines a total of a selection of sectors or subsectors. The Democratic Republic of Congo, for instance, has submitted the headline target of “17% of emission reductions below BAU for the following sectors: Energy, Agriculture, LULUCF”.

For economy-wide NDC targets, coastal wetlands are assumed to be covered, although this comes with two practical caveats. First, if emissions from coastal wetlands are not traced in the National GHG Inventory, there will be no NDC accounting. Secondly, even where countries generally report emissions from coastal wetlands, the figures may not be robust. To improve this countries are encouraged to clarify the specific value of coastal wetlands in the narrative section of the NDC.

**Sector-Wide Targets (GHG and non-GHG)** refer to the specific components of the NDC scope based on chosen sectors. For some countries, the coastal zone could be considered as a sector on its own and therefore contain specific targets related to a Party’s ambition therein. In many instances, when countries commit to account for the LULUCF sector, the extent to which coastal wetlands are included remains open.

In either scenario — economy-wide and sector-wide — an explicit reference to the IPCC Wetlands Supplement is encouraged. Where countries are still in the process of building the inventory to reflect wetlands’ emissions, a stepwise approach is appropriate. The commitment to use the IPCC Wetlands Supplement can be indicated in the NDC and then linked to the start of the new biennial reporting (BTRs) in 2024 or in the subsequent NDC revision process (2025, 2030, etc.).

Generally, sector-specific NDCs are more flexible in that a country that finds that its data sources and technical capacity are not yet suited to accommodate all coastal wetlands habitats, can limit the NDC scope to select habitat types (e.g., mangroves).

Example text for how an NDC can make explicit reference to coastal wetlands is provided below (*the text elements presented are examples only and do not represent an exhaustive list of design options*):

### Sample Language on Scope and Methodological Approaches (Economy-Wide Targets):

- “The NDC has an economy-wide scope, which includes the use of wetlands.”
- “[Party] will use the latest IPCC guidance for the preparation of its inventory and NDC accounting framework. This includes the application of the 2006 Guidelines for National Greenhouse Gas Inventories, as well as the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands, and the 2019 Refinement to the 2006 Guidelines for National Greenhouse Gas Inventories.”

### Sample Language on Scope and Methodological Approaches (Sector-Wide Targets; Stepwise Approach):

- The NDC scope includes Agriculture, Forestry and Land-Use, including in coastal wetlands... Party] will strive to use the latest IPCC guidance for the preparation of its inventory and NDC accounting framework. This includes the application of the 2006 Guidelines for National Greenhouse Gas Inventories. [Party] will consolidate and refine the current data in its [...] Biennial Update Report (BUR) and its first Biennial Transparency Report due in 2024 to ensure that [Party] reports and accounts for emissions and removals in accordance with the 2013 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands, and the 2019 Refinement to the 2006 Guidelines for National Greenhouse Gas Inventories...”

21 <https://www.wri.org/publication/ndc-enhancement-by-2020>.

**Implementation targets**, by contrast, can be linked to sector-wide targets or specific programs that countries identify as contributing to their headline target. These targets can still be expressed in tCO<sub>2</sub>eq. Japan, for instance, while presenting an economy-wide target, also defines a “target for removals [by LULUCF]”, namely 37 million tCO<sub>2</sub>eq., with specific windows for “forest carbon sinks measures” and agriculture (including revegetation). Uruguay sets an implementation target of “avoiding CO<sub>2</sub> emissions from SOC in 50% of the peatlands area of year 2016 (4.183 ha)”.

Alternatively, specific or implementation targets can be expressed in metrics other than tCO<sub>2</sub>, for example in area size for restoration activities. Sometimes CO<sub>2</sub> metrics and non-CO<sub>2</sub> metrics are mixed. For instance, Chile has committed to the “sustainable management and recovery of 200,000 hectares of native forests, representing GHG captures of around 0.9 to 1.2 MtCO<sub>2</sub>eq annually by 2030”.<sup>22</sup>

Building implementation targets into NDCs allows countries to illustrate with more precision how they want to reach the overall commitments. In this sense, they are part of the “planning” element in the NDC architecture.



For coastal wetlands, a specific implementation target presents the opportunity for countries to design concrete blue carbon actions while associating both mitigation and adaptation goals. Specific blue carbon targets allow a country to connect the climate change commitments with existing programs and initiatives outside the climate change framework.

There are myriad ways to formulate implementation targets. Useful common features include but are not limited to:

- specific policies and actions tailored to specific blue carbon habitats (e.g. coastal management and coastal zone planning policies)
- concrete objectives in terms of conservation (e.g. a target for slowing or even halting degradation of mangroves within five years)
- concrete restoration targets (e.g., reforestation of x hectares of mangroves).

**Example of options for draft language that could be included:**

## MITIGATION OPTIONS

- “[Party] will conserve existing coastal wetlands through the establishment of x hectares of marine protected areas. [Party] will also over the next five (5) years restore x hectares of previously removed or degraded mangrove forests. The measure is expected to generate x tCO<sub>2</sub>eq. in [reduced], and/or [avoided], and/or [newly sequestered] emissions.”

### BOX 4. Special Considerations for REDD+ Countries

REDD+ refers to Reducing Emissions from Deforestation and forest Degradation and is focused on conservation and sustainable management of forests and enhancement of forest carbon stocks. Many non-Annex I countries’ first experiences with developing GHG inventories for the LULUCF sector is through development of REDD+. An opportunity exists for lesson and capacity sharing in the development of blue carbon approaches, as the technical experts that developed forest inventories may be able to provide advice or guidance on capacity and technical needs to implement the IPCC Wetlands Supplement. A key blue carbon category — mangroves — is also covered by many national REDD+ programs, although the carbon dense mangrove soils are often excluded.

REDD+ countries with coastal habitats are therefore well placed to extend their NDCs to cover blue carbon habitats. When considering how to account for blue carbon ecosystems in their NDCs, the following steps may be taken:

- Determine whether mangrove forests already being accounted for in the NDC as part of REDD+:
  - Are mangroves part of my National Forest Definition?
  - Does the Forest Reference Level (FRL) include all mangrove carbon pools including soil carbon? If so, are there separate measures related to soil carbon stocks that can be included in the NDC?
  - Are there MRV/FREL or other GHG accounting methodologies and plans that are used in my REDD+ programs that can be applied to my blue carbon ecosystems?
- Determine which governmental Ministries or Departments are responsible for forests and coastal ecosystems collaborating to report on GHG emissions/reservoirs in order to streamline action for including in the NDC.
- Determine how data sources can be improved to more accurately and completely account for all carbon pools, specifically including soil organic carbon.



Atauro Island, Timor Leste. © Paul Hilton for Conservation International

# FOURTH PILLAR

## Greenhouse Gas (GHG) Reporting and Inventories for Blue Carbon

Countries that choose to include coastal wetlands in the mitigation section of their NDCs (whether by way of an economy-wide or a sector-wide target) must ensure that their inventories accurately report emissions and removals from coastal wetlands.

**TABLE 3. Key IPCC Guidance**

Key IPCC Guidance	
2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands	<p>The 2006 Guidelines provide a technically sound methodological basis for measuring national greenhouse gas inventories.</p> <p>The coverage of the 2006 IPCC Guidelines on wetlands is restricted to peatlands drained and managed for peat extraction, conversion to flooded lands, and limited guidance for drained organic soils.</p>
2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands	<p>The 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement) extends the content of the 2006 IPCC Guidelines by filling gaps in coverage and providing updated information reflecting scientific advances, including updating emission factors. It covers inland organic soils and wetlands on mineral soils, coastal wetlands including mangrove forests, tidal marshes and seagrass meadows and constructed wetlands for wastewater treatment.</p>
2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	<p>The 2019 Refinement provides supplementary methodologies to estimate sources that produce emissions of greenhouse gases and sinks that absorb these gases. It also addresses gaps in the science that were identified, new technologies and production processes have emerged, or for sources and sinks that were not included in the 2006 IPCC Guidelines.</p>

### What carbon data is required to reflect mitigation action from coastal wetland management in relevant mitigation target(s)?

#### 1. How do national GHG inventories support the NDC process?

Inventories of GHG emissions and sinks provide comprehensive tracking of GHG emissions and carbon stocks from human-caused sources (Box 4). They are an important tool for monitoring the efficacy of evidence-based climate mitigation policies (including NDCs), regulations and voluntary actions, and prioritizing future action across sectors. All Parties are also required to report greenhouse gas emissions under the Paris Agreement. At the same time, information gathered to build GHG inventories, particularly changes in land use, can also support tracking of climate adaptation policies, regulations and actions.

## 2. What is necessary for an inventory?

To prepare robust national GHG inventories that are comprehensive using the latest available data for blue carbon ecosystems, Parties need to first understand the extent of those habitats by mapping distribution of the ecosystems (see Box 5.). The government or research institute can then calculate the above and below ground carbon stocks using the IPCC Wetlands Supplement. A Party can also then develop a time series to estimate carbon gains and losses from relevant land use and land use change (LULUCF).

### BOX 5. Mapping Blue Carbon

- Mapping the extent and change of habitat coverage over time:
  - Governments need to know the location and extent of blue carbon ecosystems in their country. They also need to know how that has changed over time for the purposes of inventory reporting. For example, comparing how many mangroves existed in a baseline in 2005 compared to 2030).
- Estimating carbon stocks and emission factors
  - With an established understanding of habitat coverage and change, governments need to know how much carbon these ecosystems store, sequester, and/or release if lost or degraded. This will vary according to species, environmental and geomorphological settings. The depth of carbon in the soils below the ecosystem is also highly important to estimating blue carbon stocks and potential emissions.
- Estimating rate of carbon accumulation and loss (including different activity states)
  - Governments need to know how the carbon stock changes with different uses of and human impacts on blue carbon ecosystems. For example, if the land use is changed from a pristine mangrove to a settlement, what is the impact on carbon stock? And if it is restored from agriculture to a wetland, what is the impact on carbon stock?

The past decade has produced accessible global datasets and methodologies, including the IPCC Wetlands Supplement, to track this information and to permit countries — whatever the level of capacity — to substantially improve on their status-quo inventories and transparency approaches.

## 3. How can countries develop blue carbon data to be reported in inventories?

Blue carbon ecosystems are a covered land-use category under UNFCCC GHG reporting guidance in the AFOLU category. Within the UNFCCC GHG guidance these ecosystems are generally referred to as “coastal wetlands” rather than using the “blue carbon” terminology.

The 2006 IPCC Guidelines classifies all lands into six broad land-use categories: Forest Land, Cropland, Grassland, Wetlands, Settlement and Other Lands. The IPCC Wetlands Supplement, Chapter 4 on Coastal Wetlands, provides guidance more detailed on how to treat human-caused emissions and removals associated with specific human activities that affect wetlands. The guidance applies to terrestrial and coastal wetlands. Coastal wetlands in the IPCC Wetlands Supplement include all blue carbon ecosystems — mangrove forests, tidal marshes and seagrass meadows. Emissions factors and methodologies are provided for management actions including mangrove forest management practices, rewetting, revegetation and creation, aquaculture and drainage.



The Elkhorn Slough, Moss Landing, California, USA. © Keith A. Ellenbogen

## BOX 6. Inventory Reporting Under UNFCCC

### Paris Rules for GHG Inventories: Incoming Reporting Formats

The adoption of the Paris Agreement (COP 21 in Paris) and of the Katowice Climate Package (COP 24 in Katowice, Poland) created the Enhanced Transparency Framework (ETF)<sup>23</sup> which builds on the transparency arrangements of the UNFCCC, including national communications and biennial reporting, and defines fresh rules and procedures to “provide a clear understanding of climate change action... including clarity and tracking of progress towards achieving Parties’ individual [NDCs]” (Article 13.5 Paris Agreement). The ETF is centered on biennial reporting and technical expert reviews, common to all Parties, with flexibilities for least developed countries (LDCs) and small island developing states (SIDS). By 31 December 2024 at the latest, all Parties must move to reporting formats known as Biennial Transparency Reports (BTRs). Under the new reporting requirements, the use of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories is required for all Parties — with several areas of flexibility for LDCs and SIDS, in particular, and the use of the IPCC Wetlands Supplement is encouraged for all Parties.

While the transparency rules are common to all (with exceptions for LDCs and SIDS), developing countries can self-determine their ability to meet all reporting requirements and make adjustments.<sup>24</sup> Moreover, how Parties carry out the review and reporting or which accounting methodologies and indicators they use may to a large extent also be self-determined. Countries may use “nationally appropriate methodologies” to prepare their inventory reports, as long as these are consistent with the 2006 IPCC Guidelines and could also use self-identified indicators (quantitative or qualitative) to report on NDC progress.

### GHG Accounting: Current Reporting

Thus far, developed countries submitted inventory reports annually to meet the requirements of the UNFCCC and in reporting against targets such as the Kyoto Protocol or Cancun Agreements. Developed countries also submit National Communications every four years and Biennial Reports every two years. These reports cover emissions and removals of direct GHGs from five sectors: energy; industrial processes and product use; agriculture; land use, land-use change and forestry (LULUCF); and waste. Developed countries were “encouraged” to use the IPCC Wetlands Supplement (for inventories submitted from 2015 and beyond) and hence to include blue carbon ecosystems in their GHG inventories and associated reporting.<sup>25</sup>

As long as countries have not moved to the new reporting formats (see above), the previous rules on reporting continue to apply: National Communications (NCs) should be submitted by developing countries every four years. Biennial update reports (BURs) “should” be submitted by developing countries every two years from 2014 (consistent with the Party’s capabilities or level of support). GHG inventories are part of the NCs and BURs provide an update on this information.

The *IPCC 2019 Refinement to the 2006 Guidance* further refines the information in the IPCC Wetlands Supplement by providing new guidance for CO<sub>2</sub> and non-CO<sub>2</sub> emissions from *Land Converted to Flooded Lands and Flooded Lands Remaining Flooded Lands*, specifically to assess changes in the soil carbon pool. Such emissions may be important, for example, recognizing the emissions associated with aquaculture in wetland areas.

Importantly, the IPCC Wetlands Supplement and the 2019 Refinement follow the IPCC’s standard “tiered” guidance to GHG accounting for the different levels of capacity and respective starting points for each Party. The subsequent sections will provide guidance on how to utilize the IPCC Wetlands Supplement. Tier 1 includes default GHG emissions factors (emissions and removals) for a range of activities (Table 4). These default values allow a country to start accounting for the carbon stocks in that ecosystem on the basis of estimated habitat distribution data. Parties with greater capacity and technical assistance can build more sophisticated assessments through subsequent Tier 2 and Tier 3 assessments, which requires country-specific data.

23 The ETF was created by the Paris Agreement, and the rules/details were defined by the Katowice Climate Package — although not all of them are set in stone, some select items are still to be negotiated as they weren’t agreed at COP25.

24 Decision 18/CMA.1: Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement, Annex, sec. 4-6.

25 Practical Implications of the Katowice Climate Package for Developing Country Parties and Land Sector Reporting, February 2020 — Change Matrix table at the end of the document.

**TABLE 4. Greenhouse Gas Emission and Removals Considered in the IPCC Wetlands Supplement, Including Activities Covered and the Ecosystems that Are Included<sup>26</sup>**

Activity	Sub-activity	Vegetation Types Affected
<b>Activities related to CO<sub>2</sub> emissions and removals</b>		
Forest management practices	Planting, thinning, harvest, wood removal, fuelwood removal, charcoal production	mangrove
Extraction	Excavation to enable port, harbor & marine construction and filling or dredging to facilitate raising the elevation of the land	mangrove, tidal marsh, seagrass
	Aquaculture — construction	mangrove, tidal marsh
	Salt production — construction	mangrove, tidal marsh
Drainage	Agriculture, forestry, mosquito control	mangrove, tidal marsh
Rewetting, revegetation & creation	Conversion from drained to saturated soils by restoring hydrology & re-establishment of vegetation	mangrove, tidal marsh
	re-establishment of vegetation on undrained	seagrass
<b>Activities related to non-CO<sub>2</sub> emissions and removals</b>		
Aquaculture (use)	N <sub>2</sub> O emissions from aquaculture use	mangrove, tidal marsh, seagrass
Rewetted soils	CH <sub>4</sub> emissions from change to natural vegetation following modifications to restore hydrology	mangrove, tidal marsh

#### 4. What types of information are needed and when should it be applied?

To generate estimates of emissions and removals from wetlands inventory compilers will need to gather “activity data” and, where possible “secondary data” (such as soil type, climate zone, wetland type, size, water table level, vegetation composition and management practices). Guidance on data collection is provided in Chapter 2, Volume 1 of the 2006 IPCC Guidance.

It is good practice to focus on key categories, determining early in the process whether to estimate if human actions on blue carbon ecosystems (mangroves, tidal marshes and seagrass meadows) influence a country’s total emissions of GHGs. This could include determining overall GHG emissions (absolute level), trends over time, or the uncertainty in emissions and removals.

Activity data may be collected from in-country natural resource agencies or from national experts and supplemented if necessary, by internationally available data and default emissions factors for activities provided in the IPCC Wetlands Supplement. In the absence of unequivocal observational data, a country may also apply expert judgment to inform analysis of key categories and development of activity data (see 2006 IPCC Guidelines, ch2, vol 1, and Annex 2A.1 Sections 2.2 and 2.2.3).

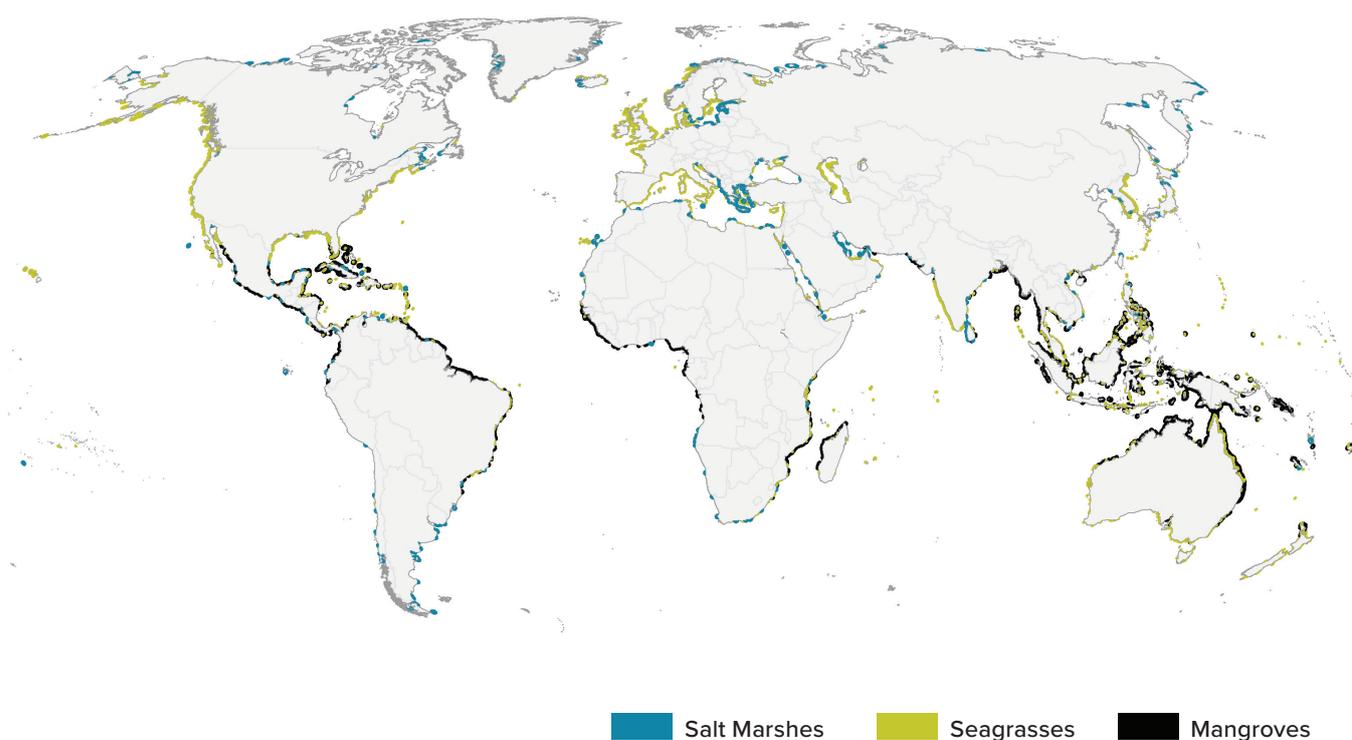
#### 5. What data can be used to determine entry-point? E.g. extent, carbon stocks, activity data

##### a. Mapping the Extent

Data about the *extent* of coastal blue carbon ecosystems is the most comprehensive of these dimensions.

At a national scale, satellite imagery is one of the most efficient approaches to mapping the extent of mangroves, with some countries already mapping mangroves as part of their forest inventory. Mapping technology is becoming increasingly sophisticated, including providing detail on species composition and associated carbon stocks. However, for inventory reporting purposes, historic

FIGURE 3. UNEP-WCMC compiled map.



maps/data are also required. Landsat and similar satellites that have been available for longer periods of time, offer free imagery that can provide baseline extent information. Newer technologies can be incorporated as they become available and cost effective.

General distribution maps on seagrass and salt marsh are now available.<sup>27,28</sup> However, technological and methodological challenges mean that assessments at a global scale of changes in cover remain in development.

#### b. Carbon stocks and emission factors

Global default emission factors for specific activities within mangroves, tidal marshes and seagrasses are available in the IPCC Wetlands Supplement as Tier 1 estimates. Country-specific emission factors will provide more accurate assessments and are part of the Tier 2 and 3 methodologies.

National assessments of the extent and carbon storage require a country to undertake a carbon sampling research program, designed in accordance with the country's needs and objectives. A country might decide to sample in several ecosystems to account for variation in type and location of ecosystems, as well as the different "states" and land uses. For example, sampling a deforested site, a site being reforested and a natural site will guide reporting on how ecosystems, and their carbon, change over time. Assessments of direct greenhouse gas emissions from a site in different states will provide even more accurate information for inventories, however the technologies to undertake these assessments are currently still in development.

A number of countries including Australia, the United States and Indonesia already have national research programs assessing coastal wetland carbon stocks in progress which inform policy and inventory development. While complete data sets are not necessarily available in all countries, often at least partial information exists or can be provided from existing information systems (see Table 4 and Box 6).

26 Table 4.1 Specific Management Activities In Coastal Wetlands — <https://www.ipcc-nggip.iges.or.jp/public/wetlands/>

27 Seagrass map: <https://data.unep-wcmc.org/datasets/7>

28 Saltmarsh map: <https://data.unep-wcmc.org/datasets/43>

### c. Activity data and change over time

“Activity data” refers to data on the magnitude of a human activity — on energy use, industrial production etc., as well as on land management — resulting in emissions or removals taking place during a given period of time.<sup>29</sup> Activity data is inherently country specific and data gathering, and research will need to be driven by the government. For example, it is important that a change picked up in remote sensing can be attributed to the right activity so that the right emission factor and method can be applied.

## 6. How can I utilize a step-wise approach?

Regardless of the pathway a country chooses, there is sufficient data globally at a tier 1 level for any party to begin reporting on relevant blue carbon ecosystems in the national GHG inventories. Several lessons have been learned from inventory reporting to date, and particularly reporting on coastal ecosystems. For example, there is significant value in gathering data and developing inventory accounting approaches that are refined over time. See Appendix 2 for more detail on global data sets.

### a. Suggested Processes for Including Blue Carbon in a GHG Inventory

Suggested Steps	Considerations
Undertake review of available data sets and technology (extent, emission factors, activity data)	<ul style="list-style-type: none"> <li>• Are Tier 1 data sets and technology available and appropriate for your country?</li> <li>• Are there national data sets available?</li> </ul>
Identify experts for a reference group or technical working group to guide the process	<ul style="list-style-type: none"> <li>• Involving scientists can support the government to identify data, better understand activities that impact these ecosystems and ensure any research meets the needs of inventory reporting.</li> </ul>
Develop a methodology for your circumstances	<ul style="list-style-type: none"> <li>• Review the IPCC Wetlands Supplement Chapter 4</li> <li>• Which activities/ecosystems are a priority? (consider available data, drivers of degradation)</li> </ul>
Continue to refine and test the approach	<ul style="list-style-type: none"> <li>• Absence of country-specific data does not preclude the application of IPCC default values but will increase the level of uncertainty.</li> <li>• As data becomes available, improve methods for calculating emissions and removals factors to a Tier 2 level.               <ol style="list-style-type: none"> <li>a. Country-specific data that would improve these factors include:                   <ol style="list-style-type: none"> <li>1) depth of soil impacted by drainage and excavation;</li> <li>2) biomass, carbon stocks,</li> <li>3) soil carbon stocks (depth of soils and soil carbon density),</li> <li>4) direct measurement of CO<sub>2</sub> emissions from converted wetlands,</li> <li>5) carbon stock change in reforested mangroves, and</li> <li>6) direct measurement of non-CO<sub>2</sub> emissions from aquaculture.</li> </ol> </li> <li>b. Seek out relevant existing analysis and datasets for developing Tier 2 emission factors, if needed</li> <li>c. Fund and conduct new experimentation to develop Tier 2 emission factors, if needed</li> </ol> </li> <li>• Engage process to develop Tier 3 models, if appropriate</li> </ul>

## b. Pathways to Improve Reporting of Mangroves in Forest Inventory (e.g, REDD+) & Incorporate Coastal Ecosystems in AFOLU Reporting

### BOX 7. Pathways to Improve Reporting of Mangroves in Forest Inventory (e.g., for REDD+) & Incorporate Coastal Ecosystems in AFOLU Reporting

#### Improve reporting of mangroves in forest inventory (e.g., REDD+)

Many tropical countries include mangroves in their national forest definition and have already made progress in measurement, reporting and verification. Often this has been driven by participation in REDD+.

Under REDD+, countries develop Forest Reference Levels (FRLs) which calculate GHG fluxes from forest land over time and make business-as-usual assumptions for the future. Not all FRL calculations include comprehensive GHG data for mangroves. The experience and expertise developed in REDD+ countries on building capacity for MRV and developing forest inventories as part of broader GHG inventory reporting may already include mangrove forests, and thus is important to understand if mangroves are already treated differently than the other blue carbon ecosystems in reporting and NDC mitigation targets.

Examples of how to utilize the experience of REDD+ to improve reporting of mangroves in National GHG Inventories include (i) to recognize the relevant deeper soil carbon pools and appropriate methodologies needed, and (ii) to identify the activities within or leading to conversion of mangroves and refer to IPCC Wetlands Supplement for estimating associated emissions (Table 4, above). On this basis, Parties can apply default (Tier 1) or country-specific soil datasets (Tier 2 or Tier 3) to complement the existing data.

#### Incorporate coastal ecosystems in AFOLU reporting

Tidal salt marshes, seagrasses, and mangrove forests that are not considered “forests” would fall under the *Wetlands* category of AFOLU reporting. Mangrove forests would be reported under Forest Land where they are part of the National Forest Definition.

For activities that result in conversion of wetlands to drained lands, emissions will be reported under the land category to which the wetlands are converted. The procedures for calculating emissions remain those outlined in Chapter 4 of the IPCC Wetlands Supplement. Restoration of coastal wetlands may be reported under Lands converted to Forest Lands for mangroves or Lands Converted to Wetlands for tidal marshes and seagrasses.

## 7. How are capacity constraints for reporting on coastal wetlands being addressed?

Only a handful of countries have begun reporting on coastal ecosystems within their GHG inventories. While developed countries have been reporting national data for many years under the UNFCCC and the Kyoto Protocol, reporting among developing countries is varied. Many developing countries only completed their first BUR in 2015. Submission numbers from the UNFCCC show 47 developing countries have completed their first BUR while only 34 have submitted multiple BURs.<sup>30</sup> This suggests a widespread lack of capacity. A key mechanism to support the development of inventories is the Capacity-building Initiative for Transparency (CBIT), in operation since December 2018 and supported by the Global Environment Facility.

As an indication of demand for inventory development driven by the reporting requirements under the Paris Agreement, the CBIT is now a \$63 million initiative that includes 41 national projects in Africa, Asia, Eastern and Central Europe (ECA) and Latin America and the Caribbean (LAC).<sup>31</sup> Many developing countries have also gained significant MRV experience reporting on forests and the land sector under REDD+. In this context, the Forest Carbon Partnership Facility’s (FCPF’s) Readiness

29 IPCC Glossary, [here](#).

30 <https://unfccc.int/BURs>.

31 <https://www.thegef.org/topics/capacity-building-initiative-transparency-cbit>.

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Fund has helped dozens of countries improve their inventories and national forest management systems. Using FCPF support, Cambodia, for instance, developed emission factors for flooded forests and different types of mangrove forests; Madagascar is currently conducting its second national forest inventory, which has been completed for the mangrove and spiny forest ecoregions; and El Salvador commissioned a range of studies to identify priority areas (protected areas, wetlands, biosphere reserves).<sup>32</sup>



Photos from "Mt. Panie" movie shoot, New Caledonia. © Shawn Heinrichs

**TABLE 6. Case Studies****United States of America — Developing the inventory**

- *All wetlands are recognized as managed lands*, mostly consisting of agricultural to tidal marsh transitions with restoration. Both Vegetated Coastal Wetlands and Unvegetated Open Water Coastal Wetlands were included, although sufficient data on seagrasses were not available as of 2018 (Crooks and Beers 2018).
- Accounting for transitions in land-use due to restoration activities (e.g., rewetting) is included. The reporting table shows areas of cropland, grasslands and other land categories converted to coastal wetlands.
- An interagency working group was created to facilitate effective collaboration between government offices, academics, and a consultant team responsible for the accounts.
- Coastal wetlands sequester 8.5 MMTCO<sub>2</sub> each year, but erosion releases 1–7 MMTCO<sub>2</sub> per year (Crooks and Beers 2018).

**United Arab Emirates — Accounting for mangrove and seagrass change with excavation and restoration**

- UAE included mangrove aboveground and belowground biomass in the GHG inventory within the forestry sector of LULUCF and calculated annual removal of about 1 million tonnes of CO<sub>2</sub> by the mangroves using the IPCC 2006 worksheets.
- They manually calculated potential emissions of 62 million tonnes of CO<sub>2</sub> from soils and biomass due to excavation and removal of seagrass and mangroves.
- This work resulted in a forest management policy change to avoid extraction activities because of evidence that removal of mangroves was contributing to GHG emissions.

**The Republic of Indonesia — Accounting under REDD**

- Indonesia has 22.6 percent of global mangrove cover (Giri et al. 2011) and has some of the most carbon rich mangroves in the world (Donato et al. 2011, Atwood et al. 2017). Indonesia also has substantial seagrass resources. The mangroves of Indonesia are highly threatened by aquaculture, which could account for a substantial part of Indonesia's LULUCF emissions (Murdiyarso et al. 2015).
- Indonesia includes mangroves within forestry, but currently does not include soil carbon in the GHG inventory process.
- Indonesia includes mangrove forests within their planned jurisdictional-scale REDD+ program under the Forest Carbon Partnership Facility's (FCPF) Carbon Fund.
  - There is a need to have consistency between REDD+ reporting and national inventory reporting.
- There are challenges as emission factors may vary spatially, among provinces and among species.

**Australia — Investigating inclusion of a range of activities (extraction)**

- Australia has reported coastal wetlands within its GHG inventory and reported mangroves within its forest category.
- Coastal wetlands are approximately 5 percent of national carbon stocks in the Forest sector.
- They are examining case studies for a range of activities, e.g., dredging of ports, harbors and marinas maintain navigable passages for boating and shipping and excavation due to canal estate development; and excavation for aquaculture.
- They convened a technical expert panel to provide advice on implementation of IPCC Wetlands Supplement.
- In the future, Australia plans to continue to incorporate new data to improve model values and identify and incorporate new activities to extend activity data coverage.



Salt marshes in Duxbury, Massachusetts, USA. © Conservation International/photo by Sarah Hoyt

# FIFTH PILLAR

## Guidelines for Implementation: Delivering on Blue Carbon NDCs

NDCs can send clear, up-to-date, and ambitious signals to the global community every five years, outlining country priorities, capacity considerations, and financing needs for successful implementation.

Aligned with the requirement for each NDC to demonstrate progressive ambition, each NDC is intended to be primarily forward looking — it is not expected to account solely for what a Party has achieved within a five-year cycle, but must reflect ambition for further future enhanced action to address climate change. The NDC is thus a two-sided instrument: to reflect what a country can and will do, based on its own capacities, using existing and/or new policies and plans, and what a country could do with additional support.

In order for the NDCs to deliver meaningful progress, it is important that Parties consider the capacity, institutions and stakeholders needed to implement the NDC commitments. To effectively meet the commitments of an NDC, consultation and collaboration with local stakeholders will be critical together with appropriate experts such as from coastal biodiversity, sustainable development fisheries, coastal management, and tourism sectors.

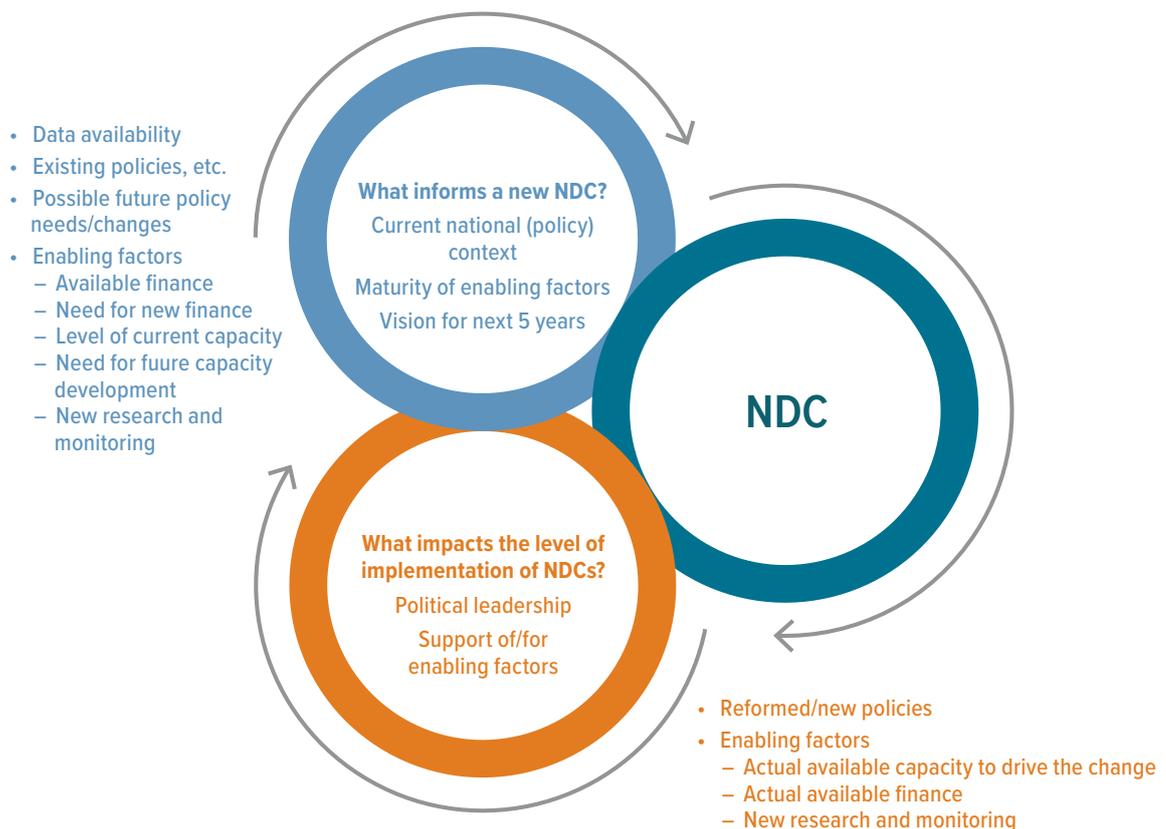
Importantly, coastal wetlands frequently span a diverse and complex regulatory landscape. Protection and/or restoration of coastal wetlands with climate mitigation and adaptation benefits will likely require engagement and collaboration from multiple ministries, agencies and departments. For example, management measures like spatial protection (i.e., Marine Spatial Planning), could be one element of a policy strategy. Other relevant policies and frameworks may need to be engaged or consulted such as agricultural and watershed management, development planning, and a multitude of land use regimes. Institutional arrangements and coordination are important to achieve these outcomes.

For the stated ambition in NDCs to deliver meaningful progress, it is important that Parties consider the implementation implications of the commitments. Several aspects stand out:

1. **REGULATORY ALIGNMENT.** As per previously described “readiness considerations”, establishing NDCs within and alongside existing national processes, plans, and policies will be fundamental to successful implementation. Policymakers designing updated NDCs that include coastal wetlands should set out to establish consistency across significant measures concerning climate and/or development like national or subnational development plans, adaptation plans and communications, coastal zone management plans, and beyond. Enhancing consistency and coordination across these measures, known as “mainstreaming”, can be essential for NDC implementation. For example, some actions may not be able to be undertaken if not funded through national development plans and budget processes. Moreover, it is prudent to design updated NDCs that are mindful of the necessary legal and regulatory frameworks required to achieve targets.
2. **CROSS-SECTORAL ENGAGEMENT.** NDCs do not exist in isolation — they must simultaneously align with other international and national priorities, and existing legislation and policies. To achieve this broader cross stakeholder coordination beyond Inter-Governmental Coordination is needed. While this pertains to government it also includes for example non-government agencies and academia. The driving goal for a country seeking to recognize some or all the values (e.g., mitigation/adaptation) that blue carbon provide within an NDC revision process, is how best to ensure coastal wetlands are conserved, restored and sustainably financed. Policymakers must therefore utilize NDCs to promote whole-of-government coordination and alignment around these activities. Close consultation and collaboration with experts from other policy fields, namely nature and biodiversity protection (e.g., CBD and Ramsar), fisheries and sustainable development (including SDG impact reporting) will be crucial.

3. **INTER-GOVERNMENTAL COORDINATION.** Embedding regulatory alignment within the relevant political architecture can be critical to ensuring the development of institutional memory. Inter-ministerial coordination structures, including institutional arrangements, that exist or will be necessary to create an effective structure for implementation should be designated. As coastal wetlands and measures protecting, restoring, and/or regulating them are inherently interstitial, involvement from all relevant ministries, agencies, and other policy-making groups should be coordinated.
4. **STAKEHOLDER BUY-IN.** Beyond policymakers, updated NDCs that include coastal wetlands can offer an opportunity to include all relevant stakeholders in the planning and implementation process. Relevant stakeholders can include local communities, indigenous groups, local and international NGOs, academia, the private sector, among others. It will be important to design how these relevant stakeholders participate. Existing legislation related to these processes can serve as an enabling condition, however, it should be adjusted to reflect the specific circumstances of these stakeholders. Promoting institutional arrangements as part of this process could also help support stakeholder engagement.
5. **FINANCING.** Importantly, financial considerations are likely to be central in designing updated NDCs with an eye towards implementation planning. Costing the various activities within the coastal wetlands' chapters of NDCs will be necessary for domestic budgetary processes and investment plans. Countries may also consider adopting national and subnational policies that create financial incentives for protecting and conserving blue carbon ecosystems, such as payments for ecosystem services programs, etc. Commitments to the conservation, restoration, and/or sustainable management of these ecosystems also serve as a signal to multiple potential avenues for financial support and development, including from international financing facilities like the Green Climate Fund and the Global Environment Facility. Next iterations of these guidelines may delve further into financial planning for NDCs including coastal wetlands.

**FIGURE 4.** Global and Regional Coordination for Blue Carbon NDCs



# The NDC Partnership

The NDC Partnership is a coalition of governments and international institutions working together to ensure countries receive the tools and support they need to achieve ambitious climate and sustainable development targets as fast and effectively as possible. Through the Partnership, members leverage their resources and expertise to provide countries with the tools they need to implement their NDCs and combat climate change to build a better future. Several members have been requesting support with blue carbon and NDCs offering a glimpse into the current status of country support needs and offers.

## 1. What kind of ocean & coastal support do countries need?

The needs of countries are reflected in the types of services being requested of the NDC Partnership. Countries needs range from support around regulation and knowledge product development to investments. The Dominican Republic for example, has requested support to ‘review current regulations, such as coastal land use, which are critical to adaptation in these highly vulnerable areas’. Sao Tome and Principe is requesting investment in ‘physical infrastructure and training to reduce risks and vulnerabilities in the fishery sector’. Namibia is seeking to develop and implement a tool to monitor intertidal biodiversity for the conservation of biodiversity in fisheries. One fifth of requests related to oceans and coasts relate to regulations while just over one third pertain to ‘budgeting and investment’. Requests for knowledge products comprise approximately 26% of the ocean and coast requests. These requests provide some insight into the progression of a given topic within the country. The fact that 22 countries have made a total of 112 requests related to ‘oceans & coasts’ for their NDC Implementation Plans highlights the increased focus of countries on coastal areas.

## 2. Does terminology matter?

In requests for support to the NDC Partnership related to NDC Implementation Plans<sup>33</sup> countries mention ‘oceans’ or ‘coasts’ more frequently than they mention key terms classically associated with Blue Carbon such as ‘mangroves, tidal salt marshes, or seagrass meadows’. Out of the 112 requests related to oceans and coasts, the words ‘mangrove’, ‘Blue Carbon’ or ‘blue solution’ appear only 16 times. For instance, Gabon has requested ‘legislation to strengthen and protect Mangroves’, and Jordan, in its request for support letter, requested technical assistance to protect coral and seagrass ecosystems at Aqaba through developing management approaches and policy mechanisms to conserve and integrate natural carbon sinks into climate mitigation policy. However, the majority of requests make reference to terms such as: coastal areas, coastal land use, shorelines and beaches, or ocean management strategies. Many of these requests include accompanying terms such as nature-based solutions or forestry. When requests include a cluster of these topics there are indications for a possible association to Blue Carbon. This highlights that while countries may not explicitly be mentioning Blue Carbon (or terms most typically associated with Blue Carbon) in their NDC Implementation Plans, countries are clearly thinking about coastal resilience and coastal planning. This provides a possible entry point for Blue Carbon.

At the time of publication, 48% of the requests the NDC Partnership receives related to ‘oceans and coasts’ are related primarily focused on adaptation, 43% have a cross-cutting focus applying to both adaptation and mitigation, while 9% of ‘ocean and coast’ requests focus exclusively on mitigation. This underscores that although coastal ecosystems offer immense mitigation potential, many countries are primarily approaching them primarily through an adaptation lens.

It is possible that in future rounds of NDCs more countries may include blue carbon in the mitigation section of their NDCs once the underlying enabling conditions have been built up.

For more information on specific country requests to NDC Partnership please visit [www.ndcpartnership.org](http://www.ndcpartnership.org).

33 Also sometimes referred to as Investment Plans or Partnership Plans.



Chira island, Costa Rica — Mangrove and Fisheries conservation in the Palito community that depends on the mangroves. © Conservation International/photo by Marco Quesada

# CONCLUSION

## Looking Ahead

Coastal wetlands — mangroves, seagrasses, tidal marshes — are a unique triple value climate solution, simultaneously offering benefits in adaptation, mitigation and resilience. It is rare to find a climate action that offers such a high return on investment across a variety of human and natural impacts. Through conservation, restoration and sustainable management of these ecosystems, countries have the opportunity to increase ambition towards achieving the Paris Agreement targets, build resilience along their coastlines, and secure a future for coastal biodiversity, food security, and livelihoods.

These guidelines provide technical direction for how countries can include coastal wetlands in their climate priorities and commitments through their NDCs. Most importantly, there are viable and immediate opportunities for all blue carbon countries to act and include coastal wetlands in their NDCs, even those countries with limited technical knowledge of the ecosystems scale or carbon value.

Explicitly including blue carbon in NDCs (in the adaptation and/or mitigation section) can act as a strong indicator that a country is ready to implement blue carbon actions, or that they are ready to accept support to build capacity to implement blue carbon solutions. For instance, implementing and developing partners who might be able to provide assistance to countries in producing needed studies and analyses to include blue carbon in forest inventories, mapping, or GHG inventories, would be alerted to these needs by the explicit mention of 'blue carbon' in a country's NDC.

NDCs are essentially nationally planning documents and the presence or absence of certain language (such as reference to blue carbon terms) sends strong signals to domestic policy instruments. Because blue carbon often straddles several sectors (forestry, coasts, agriculture), including specific reference to blue carbon in an NDC could help sectors increase their cross-sectoral coordination over time for better management of these ecosystems.

It is expected with an expanding number and diversity of countries including blue carbon for adaptation and mitigation in their NDCs, additional technical challenges and opportunities will be identified. Consequently, these guidelines will be revised and expanded over time to address these future challenges.

Once blue carbon ecosystems have been included in a country's NDC, the essential next step is implementing policies and actions to achieve those commitments. These actions will be highly varied, based on national circumstances and the stakeholders involved. In some countries, local and indigenous communities will lead site specific actions. In other countries market-based carbon crediting will support financing for blue carbon restoration, and in many locations national coastal policy could provide a mechanism for achieving NDCs. In all cases, inclusion of blue carbon in NDCs clearly states a commitment to these actions and hence will accelerate the financing, policy and science needed. Blue carbon ecosystems link local communities with national climate targets, global climate change with unique and endemic coastal species and the UNFCCC with the front lines of the impacts of a changing ocean and atmosphere. Expanding blue carbon is fundamental to the needed global climate action.

We look forward to producing a 2.0 version of these guidelines that will consider the experiences from the development of 2020 NDCs and the respective implementation period.

# APPENDIX 1

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## Readiness-Assessment Exercise

“Blue carbon readiness assessment” is the exercise that follows the tentative decision — made in accordance with the decision tree, Figure 2, page 11 — to include blue carbon in NDCs.

Working through this readiness assessment helps policymakers identify both the Engagement Level at which blue carbon integration within a specific NDC is most appropriate and the nature and level of ambition of any specific commitments to be made. “Readiness assessment” is best understood as a continuous or circular process to support the ‘ratchet’ or ambition mechanism whereby each NDCs is required to be progressively ambitious should facilitate increased progress from one NDC update to the next.

The blue carbon readiness assessment consists of three core themes or areas: (1) institutions and stakeholders, (2) information gathering, and (3) NDC design:

1. **INSTITUTIONAL ANALYSIS.** Identify blue carbon relevant roles, responsibilities, and policies:
  - Which entities (government, research, NGO, private sector, others) have a role related to coastal ecosystems. For example,
    - Which governmental agencies are responsible for management of these ecosystems or part of these ecosystems? For example, are these ecosystems managed through environmental development approvals, or for fisheries?
    - Are there research institutions that have undertaken studies or monitoring of these ecosystems?
    - Does the private sector have any data or undertake any management actions? For example, port developers often undertake environmental assessments of these ecosystems?
  - Bring identified entities together for coordination and consideration of the following steps (1–3 and maintain involvement for NDC design and implementation).
    - Initially a broad group can be convened including the main institutions holding blue carbon relevant data, stakeholders active in blue carbon ecosystems and agencies responsible for coastal policies.
    - Subsequently a smaller working group might develop input into an NDC.
2. **INFORMATION GATHERING.** Bring together as many of the above entities together as possible to discuss coastal ecosystems including:
  - Blue carbon data and information:
    - **Key question:** What data and information is available?
    - **Why:** Information on the location, extent and condition of the blue carbon ecosystems in a country is needed to evaluate whether and how to include these ecosystems in an NDC.
    - **Specific data that may be needed, depending on the pathway for blue carbon in an NDC:**
      - Coastal ecosystems value: it is well established globally that blue carbon ecosystems are important for protecting coastlines, storing carbon, and supporting fisheries and livelihoods. To establish how significant these ecosystems are for a specific country, one can may consider the extent of these ecosystems and the importance of industries that depend on these ecosystems, such as coastal fisheries, for your economy. One could also look for data related to mitigation and adaptation.
      - Coastal ecosystems for mitigation: To understand the mitigation value of your blue carbon ecosystems you will need to understand how much carbon is stored in these ecosystems and the distribution of these ecosystems. For example, mangroves in tropical areas tend to store more carbon than mangroves in arid areas. Larger areas of mangroves have higher potential mitigation value. Mangrove areas that have been (or are threatened by) significant rates of

degradation represent potential mitigation benefits to an NDC if this degradation can be reversed or slowed.

- Coastal ecosystems for adaptation: To understand the adaptation value of blue carbon ecosystems, data needed includes the extent of coastline, the coastline's vulnerability to storms and flooding and the proximity of communities to the coastline.
- Drivers of blue carbon ecosystem degradation:
  - **Key question:** Do you know if your blue carbon ecosystems are being impacted by any activities and can you quantify the type and extent of degradation or conversion?
  - **Why:** It is important to understand if your ecosystems are under threat. Including coastal wetlands in your NDC could help drive coordination and policy efforts to better manage the wetlands.
  - **More detail:** Drivers of loss vary with geography and local conditions but can include: clearing for development (ports, tourism, houses); cutting for firewood or building materials; aquaculture or agriculture. Can these impacts be quantified over time and/or the likely future impacts estimated?
- Policies and regulations:
  - **Key question:** What policies and regulations are in effect that manage, regulate or impact coastal ecosystems?
  - **Why:** You need to understand if you have policies and regulations in place, or that could be developed, that can be leveraged to better manage these ecosystems, particularly if you would like to harness their mitigation potential. From an adaptation perspective, it is also important to understand this to manage these ecosystems to protect shorelines and support fisheries and livelihoods.
  - **More detail/considerations:** For example, is it a requirement to undertake environmental impact assessments prior to development? Are there protected areas in place for some/all coastal ecosystems?

### 3. LOOKING FORWARD. Looking forward to explore NDC design.

- Risks:
  - **Data:** Finding information on coastal wetlands can be challenging but with an understanding of what is available you can identify a blue carbon pathway appropriate for your country NDC. You need sufficient data to be able to understand and manage your ecosystems under the pathway outlined and you need to be able to track progress over time. Higher tiers of data are necessary for different pathways. For example, if you develop a quantitative target (e.g., to increase mangrove coverage by 10 percent), you need to be able to estimate the mangroves at the start of the reporting period and at the end. If you outline that you will protect coastal ecosystems for adaptation purposes, it is worthwhile identifying how those ecosystems have supported that goal.
  - **Drivers of degradation:** If you don't have an understanding of the drivers of degradation, you risk underestimating the potential impact they might have on your ecosystems and hence on your NDC.
  - **Policies:** If you do not have sufficient policies and regulations that can be used to manage your ecosystems, you also risk effectively managing the ecosystems and hence of achieving your NDC.
- Projections:
  - Where possible, it is helpful to consider available data and trends, and policy and regulation levers to estimate the likely state of your coastal wetlands into the future and over the NDC period. At a basic level, key stakeholders may be able to indicate whether it is possible to manage degradation rates or threats to ecosystems through current policies or regulations. Consider also the economic pressures in your context. If stakeholders or data predicts continued rates of degradation, you will need to balance the potential to use the NDC to incentivize action and drive better policy and regulation impacts, against potentially outlining too ambitious a goal in your NDC.
- Managing the gaps identified through development of data, processes, systems, people and policies.
  - The readiness exercise is a good opportunity to identify gaps in the management of coastal wetlands and begin considering how to address these limitations and simultaneously increase the coverage of these ecosystems in the NDC process over time.

# APPENDIX 2

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## Data — A Starting Point

There are a few sources that may be useful in establishing where a country may have coastal wetland ecosystems, including estimates of carbon stored there. They could be used as Tier 1 baseline carbon estimates for inventory purposes but will need to be validated because:

- They are values derived from the global application of a model, the inputs of which may or may not be regionally or locally relevant.
  - They represent a specific point in time that (a) is not the baseline year, and/or (b) do not reflect current land-use patterns at the local level within a time series.
1. Coastal Carbon Atlas hosted by the Smithsonian Environmental Research Center. The atlas is based on a clearinghouse of blue carbon data made publicly available.  
<https://ccrcn.shinyapps.io/CoastalCarbonAtlas/>
  2. Global mangrove soil carbon: dataset and spatial maps (2017):  
<https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/OCYUIT>
    - a. Read — Sanderman J, Hengl T, Fiske G et al. (2018) A global map of mangrove forest soil carbon at 30 m spatial resolution. *Environmental Research Letters* 13: 055002. doi: [10.1088/1748-9326/aabe1c](https://doi.org/10.1088/1748-9326/aabe1c)
  3. Global Distribution of Mangroves USGS (2000): <https://data.unep-wcmc.org/datasets/4>
    - a. Read — Giri C, Ochieng E, Tieszen LL, Zhu Z, Singh A, Loveland T, Masek J, Duke N (2011). Status and distribution of mangrove forests of the world using earth observation satellite data (version 1.3, updated by UNEP-WCMC). *Global Ecology and Biogeography* 20: 154–159.  
doi: [10.1111/j.1466-8238.2010.00584.x](https://doi.org/10.1111/j.1466-8238.2010.00584.x)
  4. The Dryad database — publishes datasets for plant related papers, including mangrove; consider wood density, mortality and growth etc.: <https://datadryad.org/stash/>
  5. See list of global datasets included in the 2019 Refinements, Volume 4, Chapter 3 Appendix.
  6. The United Nations Environment — World Conservation Monitoring Centre (UNEP-WCMC):  
<http://data.unep-wcmc.org/>

Check GEDI products page: <https://gedi.umd.edu/data/products/>

Caution: This data may not be inventory ready but worth checking as another source of data for above ground biomass, especially for mangroves.

### General Support

7. The IPCC also has a Support Page that features a series of PowerPoint presentations available that discuss various aspects of implementing the 2006 Guidelines, including on the software available through the IPCC that may be useful, discussion on data collection and on treating uncertainty:  
<https://www.ipcc-nggip.iges.or.jp/support/support.html>
8. The IPCC inventory software page is at: <https://www.ipcc-nggip.iges.or.jp/software/index.html>

# GLOSSARY OF TERMS

This document uses the term ‘**blue carbon**’ in line with the usage by the Intergovernmental Panel on Climate Change (IPCC) in its recent report on the Ocean and Cryosphere:

Blue carbon means vegetated coastal ecosystems, in particular coastal wetlands such as mangroves, tidal salt marshes, and seagrass meadows.

For the purpose of this guidance document, the term ‘blue carbon’ is interchangeably used with ‘**coastal wetlands**’, i.e., “wetlands near the coast that are influenced by tidal and/or saline or brackish water. They may consist of mangrove, tidal salt marsh and seagrass vegetation and can have organic and mineral soils,” as defined by the IPCC Wetlands Supplement.

## Other Terms Used in the Guidance Document

- AFOLU** “**Agriculture, forestry, and other land use**” as defined by the IPCC in the 2006 guidelines for greenhouse gas inventories. AFOLU refers to all emissions and removals from/by soils and vegetation (also covered with the term “LULUCF”, see below) as well as non-soil related agricultural emissions (such as emissions from livestock and fertilizer use).
- BR** “**Biennial Reports**” or “**BRs**” are reporting tools under the Convention relevant for those countries listed in Annex I of the Convention, i.e., mostly industrialized countries. BRs must be submitted every two years (the first was due in 2014). BRs are meant to assess the national data — including inventory data — against principles of consistency, transparency, comparability and completeness.
- BTR** “**Biennial Transparency Reports**” or “**BTRs**” are common reporting tools applicable to all Parties of the Paris Agreement. BTRs identify key categories of emissions, ensure time-series consistency, provide completeness and uncertainty assessments, as well as quality control. The first BTRs are due in 2024. They must follow recent (2006) IPCC Guidelines. The use of the 2013 Supplement on Wetlands is encouraged, but not obligatory. BTRs will replace BRs and BURs under the Paris Agreement.
- BUR** “**Biennial Update Report**” or “**BURs**” are reporting tools under the Convention relevant for those countries not listed in Annex I of the Convention, i.e. mostly developing countries. BURs provide an update of the information presented in National Communications (NC), in particular on national GHG inventories, mitigation actions, constraints and gaps, including support needed and received. The first BUR should have been submitted by December 2014, or consistent with the Party’s capabilities or level of support, and every two years thereafter as a summary of their NC or a stand-alone report.
- CBD** “**Convention on Biological Diversity**”, as adopted in 1992 (Nairobi) and as entered into force in 1993.
- CMA** The term refers to the Conference of the Parties, the supreme body of the Convention, when it serves as the meeting of the Parties to the Paris Agreement (“**Conference of the Parties serving as the meeting of the Parties to the Paris Agreement**” or “**CMA**”). It is the main decision-making body within the Paris Agreement.
- Convention** The term refers to the “**United Nations Framework Convention on Climate Change**” (also referred to as “**UNFCCC**”) of 1992.

<b>CTU</b>	Information necessary for “ <b>clarity, transparency and understanding</b> ” (often referred to as “ <b>CTU</b> ” or “ <b>ICTU</b> ”), a concept laid out in the Paris Agreement to inform, among others, the design of NDCs
<b>EbA</b>	“ <b>Ecosystem-based Adaptation</b> ” or “ <b>EbA</b> ” uses the range of opportunities for the sustainable management, conservation, and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate change.
<b>IPCC</b>	“ <b>Intergovernmental Panel on Climate Change</b> ” or “ <b>IPCC</b> ” refers to the body with the objective to provide governments at all levels with scientific information that they can use to develop climate policies.
<b>LDCs</b>	“ <b>Least Developed Countries</b> ” or “ <b>LDCs</b> ” — LDCs are low income countries confronting severe structural impediments to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human assets. LDCs have exclusive access to certain international support measures in particular in the areas of development assistance and trade.
<b>LULUCF</b>	“ <b>Land Use, Land Use Change, and Forestry</b> ” or “ <b>LULUCF</b> ” refers to the human activities, through land use, land-use change and forestry (LULUCF) activities, that affect changes in carbon stocks between the carbon pools of the terrestrial ecosystem.
<b>MPA</b>	“ <b>Marine Protected Area</b> ” — It has specific meanings under domestic legal systems. For the purpose of the CBD, however, an MPA is defined as an area within or adjacent to the marine environment, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings.
<b>NbS</b>	“ <b>Nature-based Solutions</b> ” or “ <b>NbS</b> ”, coined by the International Union for the Conservation of Nature (IUCN) for “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”.
<b>NCS</b>	“ <b>Natural climate solutions</b> ” or “ <b>NCS</b> ” are activities that increase climate change mitigation from nature, such as conservation, restoration and land management, and may also include adaptation benefits of these activities.
<b>NDC</b>	A “ <b>Nationally Determined Contribution</b> ” or “ <b>NDC</b> ” documents national efforts towards achieving the objectives of the Convention, as submitted by a Party in accordance with the rules of the Paris Agreement.
<b>Party</b>	A party to the Convention or a party to the Convention and the Paris Agreement.
<b>REDD+</b>	“ <b>Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries</b> ” (collectively referred to as “ <b>REDD+</b> ” is a framework guiding developing countries efforts to reduce emissions from deforestation and forest degradation and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks).
<b>SIDS</b>	The term “ <b>Small Island Developing States</b> ” or “ <b>SIDS</b> ” refers to a distinct group of developing island states across the globe facing specific social, economic and environmental vulnerabilities and have specific rights and liberties under the UNFCCC.
<b>SOC</b>	<b>Soil Organic Carbon.</b>



Marsh, Karanambu. © Conservation International/photo by John Martin



the  
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initiative

