Integrating Mangrove Ecosystems into NDCs

With the Global Mangrove Watch

Updated version, 2024

The Global Mangrove Watch (GMW) is an online platform that provides remote sensing data and tools for global monitoring of mangroves, in scientific collaboration with Wetlands International, Aberystwyth University, soloEO, TNC, JAXA, NASA and a host of partners.

The Global Mangrove Watch represents a critical tool, based on the most accurate science, to support countries in the process of implementing, updating or revising their NDCs, and ratcheting up national and collective ambition on the potential of mangrove ecosystems for climate action.

GLOBAL MANGROVE WATCH

GLOBAL MANGROVE ALLIANCE

Mangroves in Nationally Determined Contributions

Coastal and marine Nature-based Solutions (NbS), such as the protection and restoration of mangroves and other blue carbon ecosystems - namely seagrasses and tidal salt marshes, are integral to achieving the goals of the Paris Agreement.

Per hectare, healthy mangroves and their underlying soils sequester carbon at higher rates than terrestrial forests, making them critical allies for global climate action. Recent estimates demonstrate that preventing just 1% of mangrove loss globally results in 200,000,000 tons of carbon stored, while restoration of losses since 1996 could safeguard carbon in soil and aboveground biomass equivalent to 1.27 gigatons of CO2 – equating to over 520 million barrels of oil, or the annual emissions of 49 million cars in the USA.1

Mangroves are one of three marine ecosystems recognized by the 2013 Wetlands Supplement for their measurable contribution to countries' emission reduction strategies.

Additionally, mangrove ecosystems help frontline communities adapt and build resilience to a changing climate by protecting against extreme weather events and sea level rise, and supporting sustainable livelihoods such as fisheries.

Countries with coastal wetlands can include commitments to protect and restore their mangroves for their mitigation or adaptation benefits within their Nationally Determined Contributions (NDCs) under the Paris Agreement.

The Paris Agreement requires each Party to submit progressively ambitious NDCs over five-year cycles, known as the "Ambition Cycle", making NDCs its primary implementation mechanism.

This "Ambition Cycle" presents a unique opportunity for countries to enhance mangrove action and strengthen commitments under other international and national processes. Integrating mangroves in NDCs signals national policy priorities to the global community, driving resources and action for their protection and restoration.

[1] https://www.mangrovealliance.org/wp-content/uploads/2022/09/The-State-of-the-Worlds-Mangroves-Report_2022.pdf

Mangroves in Nationally Determined Contributions cont.

The potential of coastal coastal and marine NbS should complement, not substitute, the critical need for countries to decarbonize other sectors, such as energy and transport.

Coastal and marine NbS offer a largely untapped opportunity to enhance ambition and action in NDCs. As of October, out of 148 countries that have submitted their NDCs, only 97 have included coastal and marine NbS.2

Identifying and closing gaps in data, national reporting systems, and domestic policy frameworks are crucial elements for including mangrove-positive commitments in NDCs.3

The Global Mangrove Watch (GMW) provides Parties with critical resources to support the integration of mangrove commitments into new and revised NDCs facilitating local and national relevance and collectively increasing ambition and action on mangroves and other blue carbon ecosystems.

[2] Lecerf, M., Herr D., Elverum, C., Delrieu, E. and Picourt, L., (2023), Coastal and marine ecosystems as Naturebased Solutions in new or updated Nationally Determined Contributions, Ocean & Climate Platform, Conservation International, IUCN, Rare, The Nature Conservancy, Wetlands International and WWF.

[3] https://static1.squarespace.com/static/5c7463aaa9ab95163e8c3c2e/t/5eebd558e9401b71cc31ab6a/1592513885741/Blue_Carbon_NDC_Guidelines_single.pdf

Using the Global Mangrove Watch

The Global Mangrove Watch (GMW) is an online platform that provides remote sensing data and tools for global monitoring of mangroves, in scientific collaboration with Wetlands International, Aberystwyth University, soloEO, TNC, JAXA, NASA and a host of partners.

It gives universal access to near real-time information on where and what changes there are to mangroves worldwide, and highlights critical examples of the value of mangroves.

The GMW is a free, easy-to-use, and scientifically robust tool to support governments in moving towards accurately integrating mangrove-positive commitments into NDCs and other national reporting mechanisms like GHG inventories, based on their own domestic needs and priorities.

The GMW is the primary global source of information on mangrove status and extent. Its Climate and Policy Dashboard offers national status reports on integration of mangroves into international policy commitments, information on mangrove blue carbon, emissions mitigation, and carbon market potential.

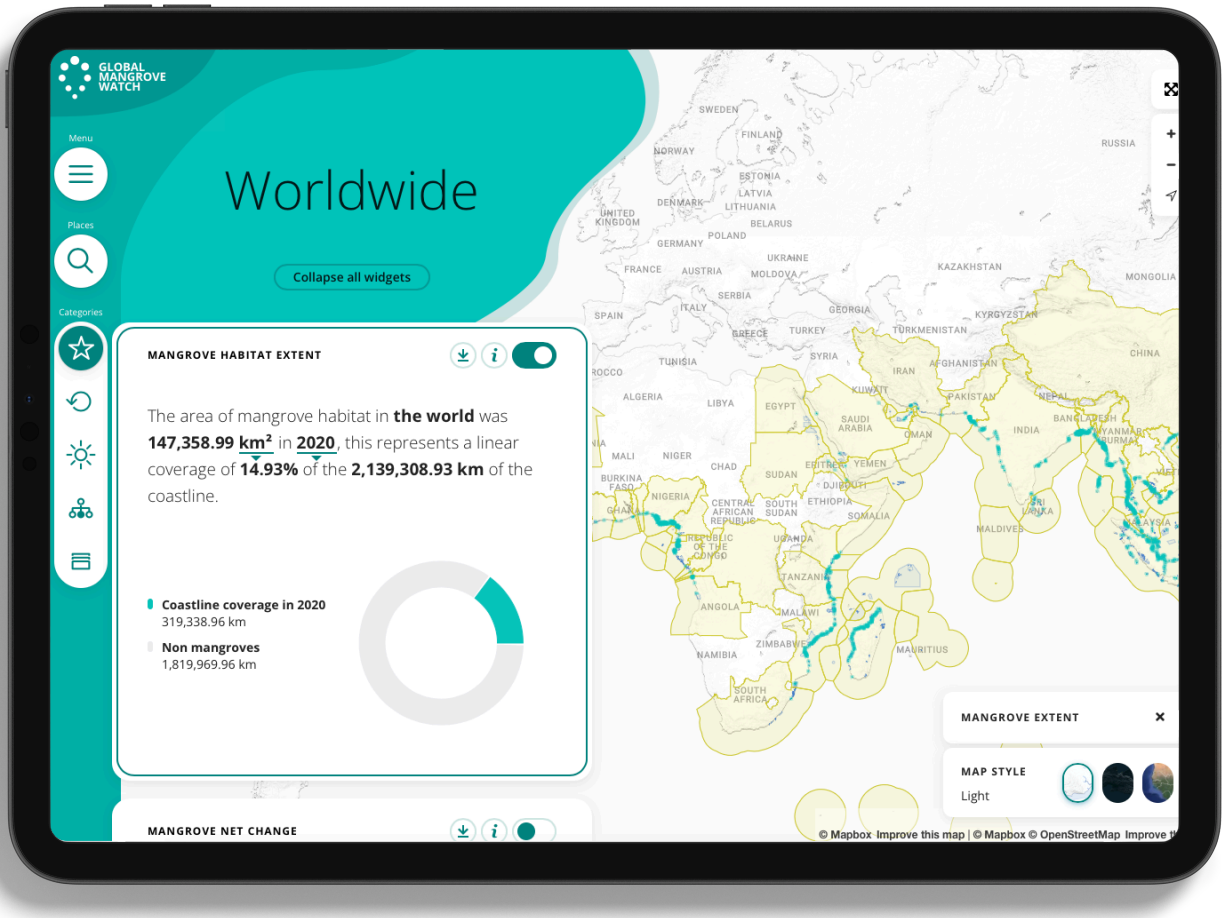
Within its different layers and widgets, the dashboard also offers government crucial information for developing and implementing national and international mangrove policies. An example is the ”Mangrove International Status” widget, which provides crucial information of a country’s NDC, such as the inclusion of mitigation and/or adaptation commitments, emissions reduction in absolute value, emissions reduction compared to a baseline, type of mitigation pledge, and base and target years.

It also shows if mangroves are considered in the national forest definition, and if a country has specified implementing the 2013 IPCC Wetlands Supplement. Collectively, these elements support the improvement of a government’s national GHG inventory and other reporting requirements like the Biennial Transparency Report.

Governments can utilize GMW data as a scientific baseline for setting and reporting on national commitments- for example, using GMW data to assess the current extent of mangroves in their territories under protection, and calculate the national carbon storage of their mangroves. Furthermore, the capacity of the Global Mangrove Watch to provide data on both baseline habitat cover and historic change, can provide Governments the baseline to consider a country’s blue carbon investment potential - for example, by estimating the mangrove forest area that can qualify for blue carbon financing.

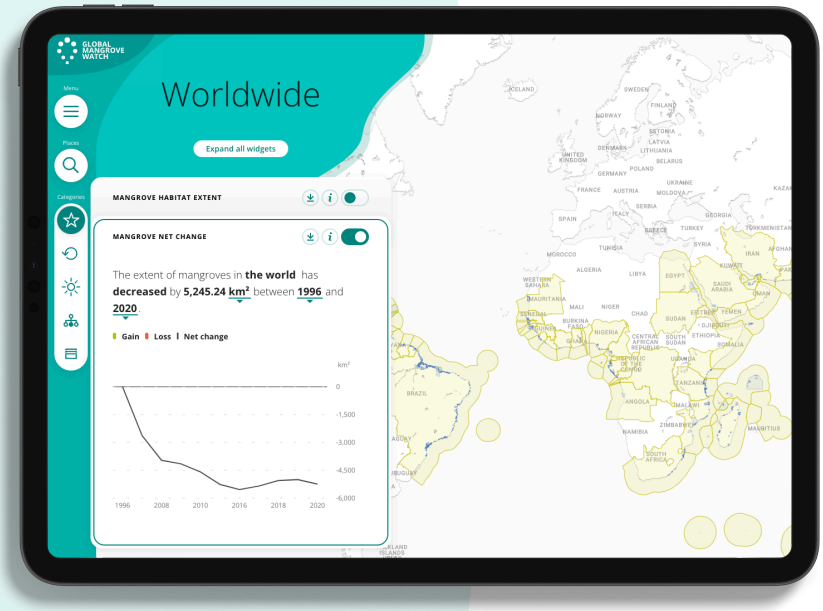
How to use the Global Mangrove Watch

Governments can use the following GMW tools to include mangrove ecosystem management activities into their new or updated NDCs and reporting:



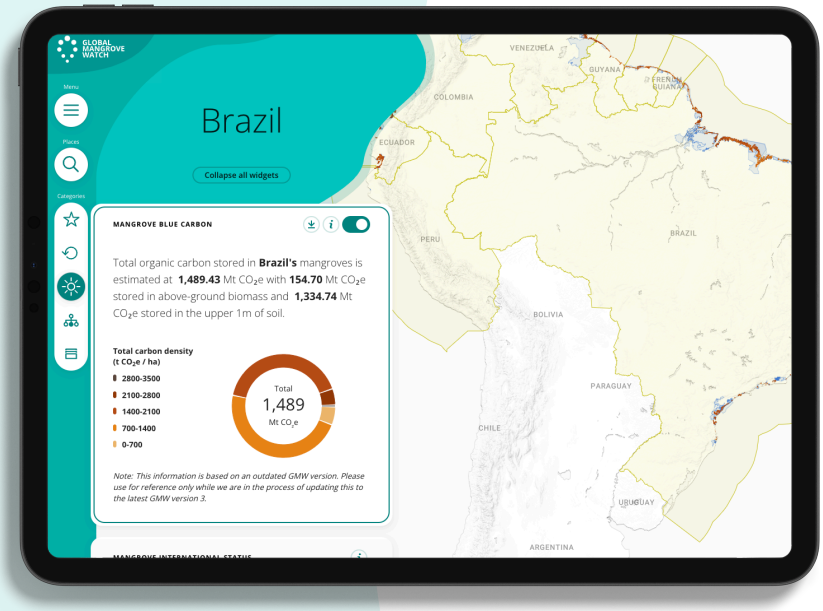
Mangrove Habitat Extent

The GMW mangrove extent layer describes the national areal extent of mangrove habitat (km2) and the length of coast with mangrove forests, in the years 1996, 2007-2010 and 2015-2020. This layer allows governments and other stakeholders to track the progress of mangrove extent against national and international goals, setting a baseline for reporting progress and establishing targets for the UNFCCC or other conventions. This layer also allows governments to know the location and extent of these ecosystems in their countries, allowing them to better articulate relevant priorities and actions for mangrove management activities in their future NDCs. Besides the annually updated layer with 25m resolution, this layer is also available in a **High Resolution (10m) layer.**



Mangrove Net Change

This layer describes the change in the areal extent of mangrove habitat (km2) in the years 1996, 2007-2010 and 2015-2020. This enables governments to track how the extent of mangroves has changed over time for the purpose of inventory reporting, establish a baseline for setting national commitments, and visualize the national impact of conservation and restoration efforts. The loss rate and net change are also critical components necessary to understand blue carbon investment potential in addition to climate mitigation potential.

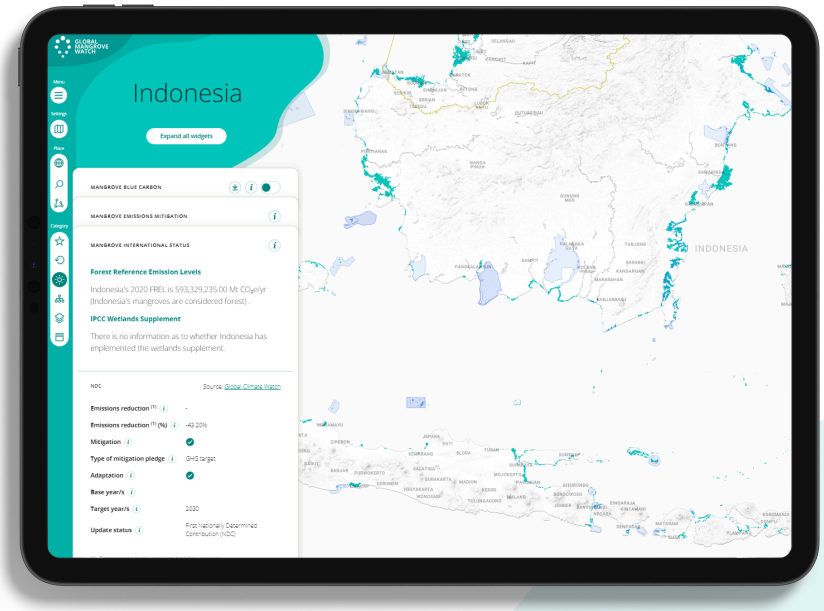


Mangrove Blue Carbon

With an established understanding of habitat coverage and change, governments need to know how much carbon these ecosystems store. This layer describes the quantity and density of carbon stored in mangrove biomass and soil at national and global scales with the best available science from a combination of remotely sensed measurements, and regionally-specific models, validated in-situ field data4. With this tool, governments can review carbon stocks, and include the contribution of national mangrove forests towards NDC targets.

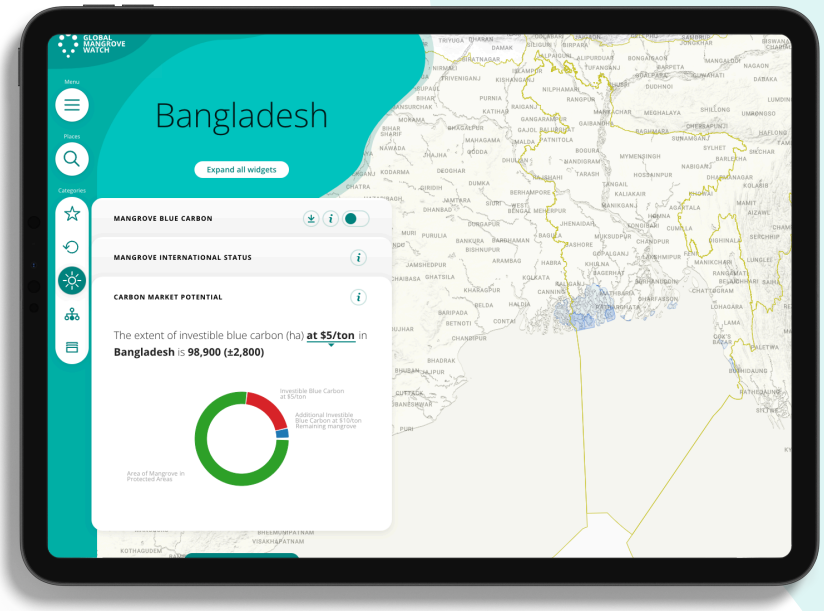
[4] Simard et al. (2019), Sanderman et al. (2018), and Bunting et al. (2018).

Mangrove international status



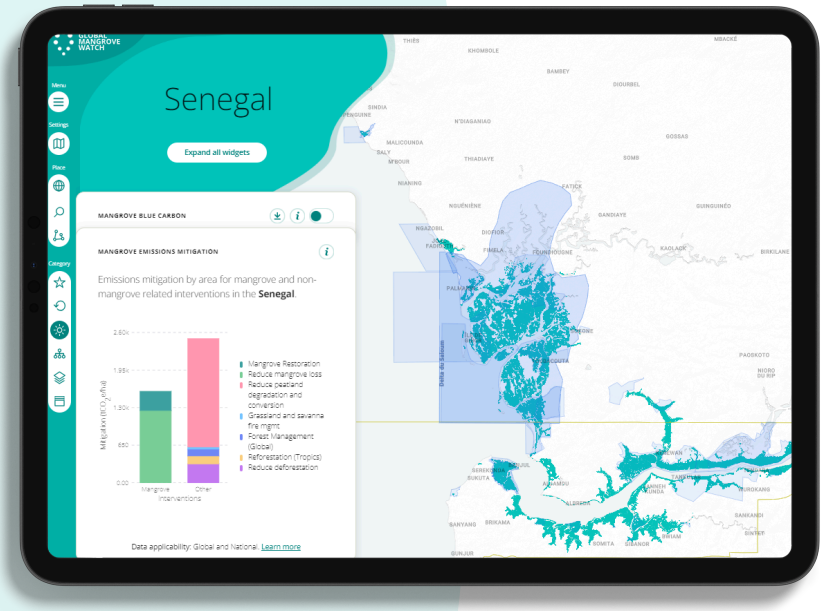
This layer of the GMW provides national status reports on international policy commitments offering at-a-glance data on (1) whether this is the country's first NDC or an update; (2) its emission reduction compared to the baseline; 3) inclusion of adaptation and/or mitigation in the NDC; 4) type of mitigation pledge: GHG emissions target, non-GHG target or both; the target year for achieving these objectives and the base year for comparison; 5) implementation of the 2013 IPCC Wetlands Supplement; and (6) inclusion of mangroves in its national forest definition for REDD+ engagement. Collectively, this information helps governments identify opportunities to enhance coastal and marine NbS in future NDC revisions.

Carbon market potential



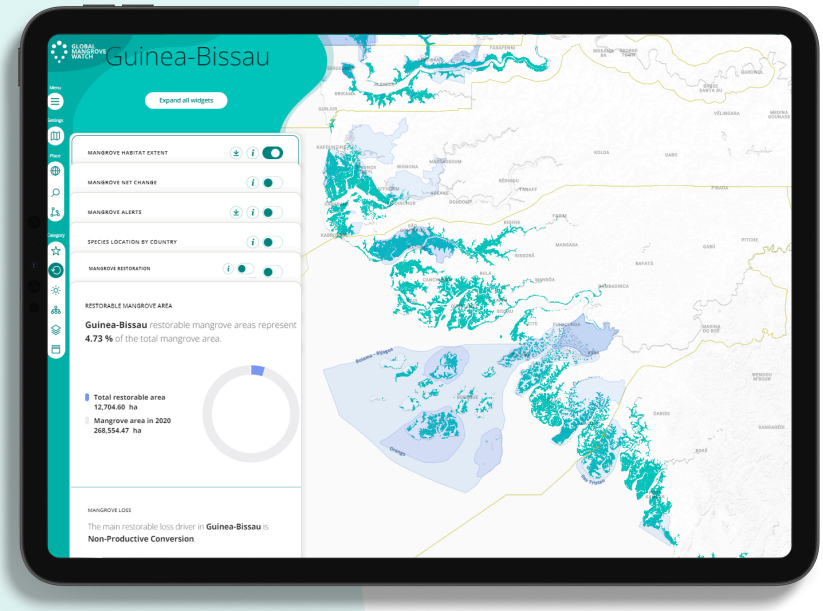
NDCs are one of many entry points for securing climate finance, including the potential for carbon-related actions, making it important for countries to track investible carbon areas (defined as those under imminent threat of loss or decline if left unprotected by a conservation intervention) that can be protected through carbon financing. Through the GMW, governments can estimate the area of mangrove forest that can qualify for blue carbon financing that is financially sustainable for over 30 years, based on prices of $5/ton and $10/ton5 (noting that market price may change over time). This information can be used to better understand the potential of blue carbon finance at a national scale, while keeping in consideration NDC ambition and evolving decisions around Article 6 in the Paris Agreement that may impact carbon market engagement potential.

[5] Numbers based on Zeng et al. (2021)



Mangrove Emissions Mitigation

This layer describes the emissions mitigation potential by area for mangroves compared to other mitigation interventions in the land use sector, e.g. forests, grasslands, or peatlands. It informs governments how avoiding or reducing mangrove loss and degradation as well as restoration can contribute to a countries emissions reductions targets.

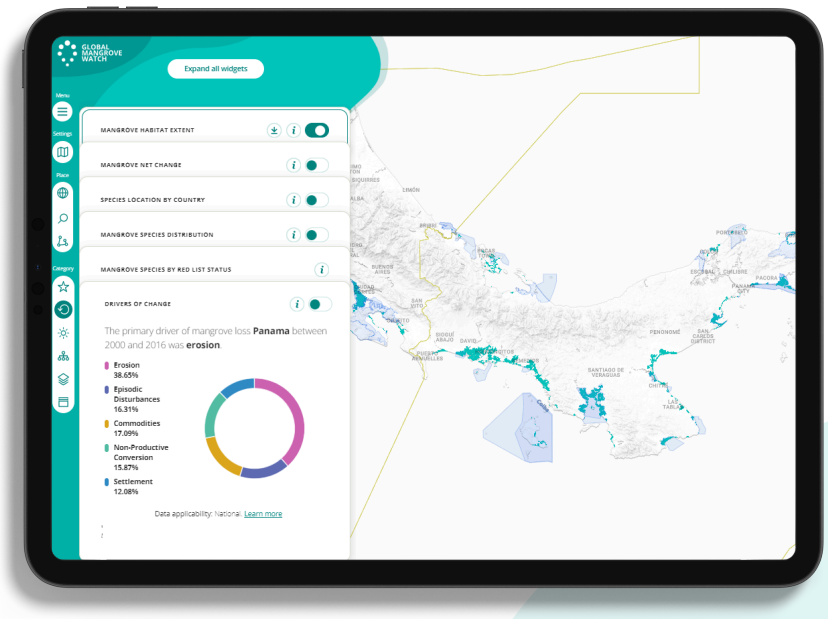


Mangrove Restoration

There are now well-established techniques for mangrove restoration, but it is not something that can be undertaken everywhere. This mapping tool provides guidance on areas that have the greatest potential for mangrove restoration. These are the locations where mangroves once thrived, and where conditions are suitable for restoration. This tool provides information at broad landscape scales and also calculates what ecosystem services might be gained from their restoration. Once decided, practical restoration planning always requires local knowledge of ecological, social and economic circumstances in order to ensure successful, long-term outcomes. It also shows the main restorable loss driver, for example, commodities or non-productive conversion.

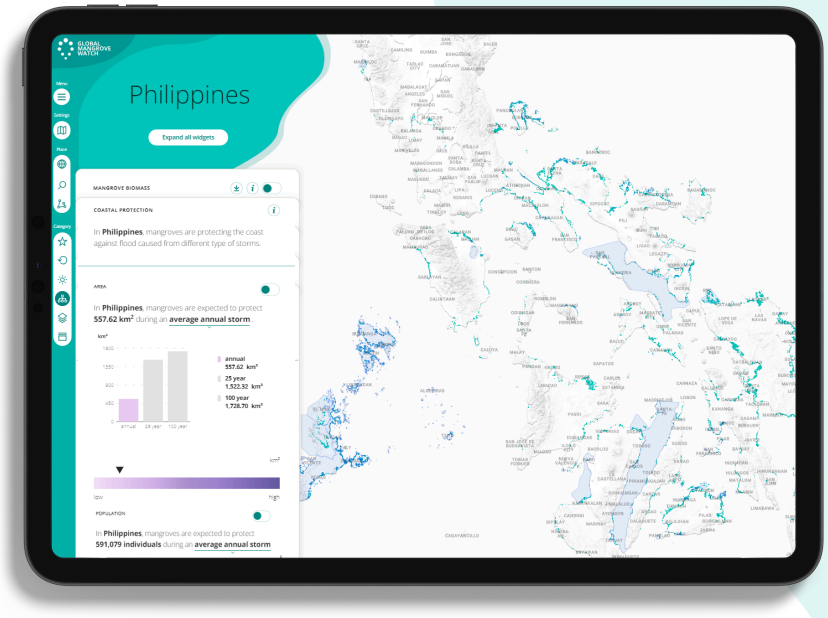
Drivers of Mangrove Change

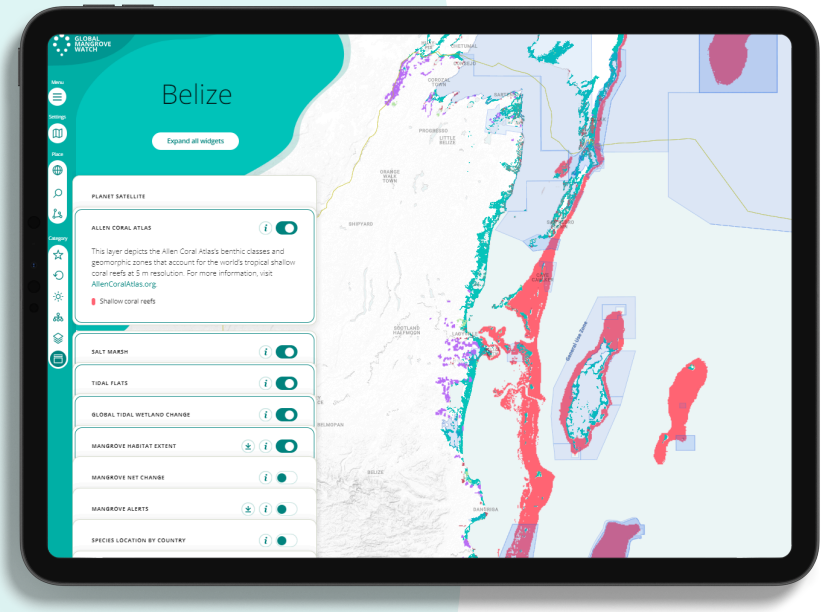
This dataset provides provides estimates of the extent of mangrove loss, land cover change, and its primary anthropogenic or climatic drivers between 2000-2016. The layer provides percentages of lost mangroves that can be attributed to each loss driver by country. Loss drivers include commodity production (agriculture, aquaculture), settlement, erosion, extreme climatic events, and non-productive conversion. Often, multiple threats interact to cause an even greater impact. It is critical for a country to address the key drivers of mangrove loss in its NDC in order to achieve mitigation and adaptation targets.



Mangrove Coastal Protection

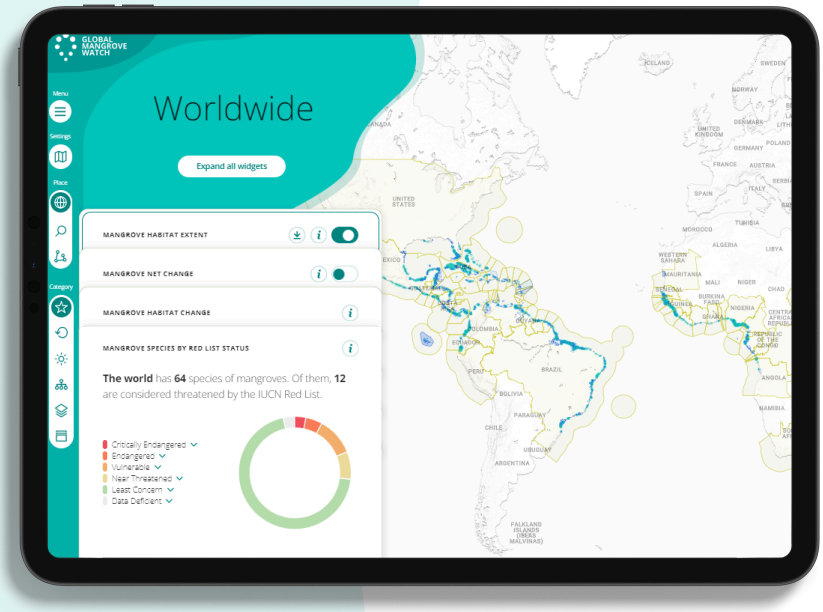
Mangroves play a vital role in protecting coastlines from damage due to waves and tropical storms, easing risks of erosion and flooding to coastal communities. The data displayed in this widget quantifies, on a global scale, the socioeconomic benefits provided by mangroves in preventing damage from storms, using three metrics: the number of people, total land area, and property values protected from flooding for three different scenarios of storm intensity (annual, 25-year, and 100-year). This information can be used to include actions in NDC's to incentivise conservation initiatives that protect and restore the mangrove areas most critical for coastal protection .





Bordering ecosystems

Data sources about bordering ecosystems has been added in 3 new Bordering Ecosystems layers, offering the location and areal extent of coral reefs, salt marshes and tidal flats bordering mangroves, as well as a layer Global Tidal Wetland Change to detect change (loss and gain) in mangrove, tidal flat and saltmarsh ecosystems simultaneously. These layers provide governments with context to mangrove information and wider integration of coastal and marine nature-based solutions in a country's NDC.



Mangrove Species by Red List Status

The Mangrove Species layer describes the total number of mangrove species combined with their IUCN Red List status. The number of threatened species reflects the number of endangered and critically endangered mangroves species. This layer can inform governments trying to better understand patterns of mangrove biodiversity and threatened species at a country or regional scale, and to enhance synergies between National Biodiversity Strategies and Action Plans (NBSAPs) and NDCs.

In addition, the GMW offers governments two new layers on endangered and critically endangered mangrove species, checked against the IUCN Red List: **Species location by Country**, showing the number of countries where a threatened mangrove species occurs and **Species Distribution**, showing the number of mangrove species per country.

Finally, **the IUCN Red List of Ecosystems,** an assessment on an ecoregional level, is now available, based on GMW data and local expert knowledge.

Benefits & limitations

The Global Mangrove Watch provides an effective means for periodic mapping and monitoring of mangroves over national, regional and global scales, in a uniform manner, with consistent data and classification algorithms for all areas and time frames.

This enables a more consistent and accurate comparison of extent between different countries and regions, as well as analysis of change trends over time, than comparing data obtained from different sources.

The latest update of the GMW provides a world map with **10 meters spatial resolution**. At these resolutions, the maps are also relevant at local scales, for supporting conservation and management. While the GMW can provide important input to mangrove inventory, assessment and monitoring, knowledge of the local context and collection of in situ data remains critical for ensuring locally relevant outputs.

A recent functionality added to the platform is the **GMW National Dashboard**, which contains other key resources about mangroves for select countries. This information are often complementary to the GMW data layers and can be very important In the context of a national policy, however, they are not consistent with data from other countries.

Conclusion

Nature-based Solutions – including the protection, conservation and restoration of mangrove and other blue carbon ecosystems – are an integral component of reaching the 1.5°C target laid out by the Paris Agreement.

The Global Mangrove Watch represents a critical tool, based on the most accurate science, to support countries in the process of implementing, updating or revising their NDCs, and move towards ratcheting up national and collective ambition on the potential of mangrove ecosystems for climate action. The GMW is also a valuable resource for international policymakers to assess collective global progress on mangrove restoration and blue carbon action towards the long-term goals of the Paris Agreement.

Currently, the GMW maps are used as the official UN indicator to assess mangrove progress towards SDG 6.6.1 (“change in the extent of water-related ecosystems over time”).

The GMW has also been proposed as the official dataset for reporting mangrove extent and changes under the UNFCCC Global Stocktake to support the world’s collective progress towards achieving the Paris Agreement.

The Mangrove Breakthrough

Launched at COP27, the Mangrove Breakthrough is a Community of Action dedicated to protecting, sustainably managing, and restoring 15million hectares of mangrove cover by 2030 by catalyzing a $4 billion shared global goal. The Mangrove Breakthrough provides a platform for state and non-state actors to work together towards this shared ambition, aligning with and complementing each other.

The Global Mangrove Watch (GMW) platform is the leading source of geospatial information related to mangroves worldwide and the evidence-based informing tool for the Mangrove Breakthrough.

The GMW will be used as the monitoring tool for the Mangrove Breakthrough providing the most up to date information on mangroves, as a basis for development of strategies and investment plans.

NDC Taskforce

Building upon the success of the Mangrove Breakthrough to receive the endorsement of 28 governments1 to date, the Mangrove Breakthrough NDC Task Force aims to transform those endorsements into mangrove-positive NDC commitments in the lead up to the 2025 NDC cycle.

To learn more about the Mangrove Breakthrough NDC Task Force contact azimmer@pewtrusts.org.

To learn more about the Mangrove Breakthrough: Nature-based solutions: Mangroves - Climate Champions (unfccc.int)

https://www.mangrovealliance.org/news/the-mangrove-breakthrough/globalmangrovewatch.org

1 Australia, Barranquilla (Colombia), Belgium, Burundi, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Germany, Guinea Bissau, Jamaica, Liberia, Mozambique, Norway, Pakistan, Palau, Panama, Quintana Roo (Mexico), Rio de Janeiro (Brazil), Senegal, Sierra Leone, South Korea, Spain, The Gambia, UAE, UK, Yucatán (Mexico)

Further Reading

The Global Mangrove Alliance is a world-wide collaboration between NGOs, governments, academics and communities working together towards a global vision for scaling up the recovery of mangroves through equitable and effective expansion of mangrove protection and restoration, in order to build a host of opportunities for coastal peoples and biodiversity around the planet.

For more information about the Global Mangrove Alliance and the state of the world's mangrove ecosystems, see the State of the World's Mangroves Report 2024.
www.mangrovealliance.org/wp-content/uploads/2022/09/The-State-of-the-Worlds-Mangroves-Report_2022.pdf

There are numerous further UNFCCC processes, bodies, and ongoing negotiations where countries may advance efforts to address ocean-climate challenges and strengthen recognition of the role of coastal and marine nature-based climate solutions. This document by GMA partners summarizes many key entry points:
https://www.iucn.org/sites/default/files/2023-06/unfccc-ocean-climate-options-2023.pdf

For more information about the opportunities for blue carbon in NDCs and technical guidance on the inclusion of coastal wetlands within new and updated NDCs:

Full Guidelines
static1.squarespace.com/static/5c7463aaa9ab95163e8c3c2e/t/5eebd558e9401b7 1cc31ab6a/1592513885741/Blue_Carbon_NDC_Guidelines_single.pdf

Executive Summary
static1.squarespace.com/static/5c7463aaa9ab95163e8c3c2e/t/5f27860f8dd86201 c1337f2d/1596425746332/BCI+NDC_ExecSum_Final_singles.pdf

For an analysis on the distribution of existing NDCs that integrate blue carbon ecosystems as climate mitigation or adaptation solutions:
ocean-climate.org/en/cop26-and-beyond-engaging-countries-to-further-include-coastal-and-marine-ecosystems-in-national-climate-commitments/

For an analysis of blue carbon and mangroves in NDCs and the relative strength of those commitments:

faircarbon.org/content/fc/bluecarboninndcsmap

For further reading on options for ocean-based sectoral mitigation targets, policies, or measures for countries to include in new or updated NDCs:

files.wri.org/d8/s3fs-public/2021-04/enhancing-nationally-determined-contributions-opportunities-ocean-based-climate-action.pdf?VersionId=zEIY0PuwHyP_zzc7UGjt.QFF4ooK0Vmu

For additional reading on the inclusion of broader natural climate solutions into NDCs:

www.conservation.org/docs/default-source/publication-pdfs/guide-to-including-nature-in-ndcs.pdf?sfvrsn=99aecda2_2

For further information on the ocean and the UNFCCC Global Stocktake:

www.iucn.org/sites/default/files/content/documents/2021/the_ocean_and_the_unfccc_gst.pdf

For more information on mangrove's investment potential:

Global potential and limits of mangrove blue carbon for climate change mitigation (nus.edu.sg)

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The Global Mangrove Watch (GMW) platform is the leading source of geospatial information related to mangroves worldwide and the evidence base informing the Global Mangrove Alliance (GMA). The Global mangrove Watch (GMW) was established in 2011 under the Japan Aerospace Exploration Agency's (JAXA) Kyoto & Carbon Initiative by Aberystwyth University, soloEO and the International Water Management Institute, with the aim to provide open access geospatial information about mangrove extent and changes to the Ramsar Convention on Wetlands. Today, The Nature Conservancy, Wetlands International, Aberystwyth University, and soloEO are working with JAXA, NASA and a host of partners to develop the Global Mangrove Watch Platform.