Supporting the implementation of the Ramsar Convention on Wetlands

Through the Global Mangrove Watch

Updated version, 2025

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, The Nature Conservancy, JAXA, NASA and a host of partners.

The Global Mangrove Watch represents a critical tool, based on the most accurate science, for Ramsar Contracting Parties, in support of national wetlands inventories, Ramsar Information Sheets (RIS) for Wetlands of International Importance, monitoring of sites' ecological character, mangrove management and restoration, and reporting to the Ramsar Convention on Wetlands and other international agreements through National Reports.

GLOBAL MANGROVE WATCH

GLOBAL MANGROVE ALLIANCE

Mangroves under the Ramsar Convention on Wetlands

Wetlands are critical resources for global biodiversity, water security, and carbon storage, but their global extent has declined by 35% from 1970 to 2015.

The opportunity to halt the loss and degradation of wetlands - and to realize their restoration potential - is increasingly expressed across global conventions on climate change, biodiversity, and disaster risk reduction. These efforts align with the core work of the Ramsar Convention on Wetlands, which promotes international collaboration for the protection of critical wetland resources, and the improved management and wise use of all wetlands.

Mangroves are categorized under the Ramsar Classification System for Wetland Type as *Intertidal Forested Wetlands*, type l. There are approximately 147,000 km^2 of mangroves remaining worldwide. Between 1996 and 2020, a net 5,245.24 km^2 of mangrove forest was lost, a 3.4% decline[1]. Prior to 1996, the rate of mangrove loss was significantly higher, although global estimates of mangrove extent from that period are less precise.

Nature-based Solutions (NbS), including the protection, conservation and restoration of mangroves and other blue carbon ecosystems, are central to achieving the commitments set out in the Ramsar Strategic Plan 2025 to 2034. Mangroves represent a powerful investment delivering returns in carbon storage, biodiversity protection, and climate resilience.

Mangroves prevent more than $65 billion in property damage from storms annually and reduce flood risk for some 15 million people each year. They are amongst the most efficient natural systems for carbon capture and storage, currently holding carbon equivalent to over 21 billion tons of CO_2[2].

The Ramsar Convention on Wetlands acknowledges the critical role of mangroves in providing essential ecosystem services and supporting livelihoods, including flood and drought protection, food provision, biodiversity conservation, and their indispensable function as carbon sinks.

[1] Global Mangrove Extent Change 1996-2020: Global Mangrove Watch Version 3.0
[2] The State of the Worlds Mangrove Report 2022: https://www.mangrovealliance.org/wp-content/uploads/2022/09/The-State-of-the-Worlds-Mangroves-Report_2022.pdf

Mangroves under the Ramsar Convention on Wetlands cont.

Mangrove ecosystems are applicable across numerous areas under the Convention:

- Ahead of each ordinary meeting of the Conference of the Parties (COP), Contracting Parties have to submit detailed National Reports to measure implementation of the Convention and for sharing information on wetland conservation measures.
- Target 12 of the Ramsar Strategic Plan 2016–2024 includes the restoration of degraded wetlands, prioritizing wetlands that are relevant for biodiversity conservation, disaster risk reduction, livelihoods, and climate change mitigation and adaptation.
- Resolution XIII.14 encourages the conservation, restoration, and sustainable management of coastal blue carbon ecosystems, such as mangroves. This same resolution encourages Contracting Parties to the Ramsar Convention on Wetlands with coastal blue carbon ecosystems in their territories to collect and analyze data and map them. This process aims to update their coastal wetland inventories and threats, inform international awareness of the global extent of these ecosystems, estimate the carbon storage, and update their national greenhouse gas inventories.
- Resolution XIV.17 on the protection, conservation, restoration, sustainable use and management of wetland ecosystems in addressing climate change encourages Parties to strengthen their knowledge base and policy-relevant information on the extent and condition of wetlands. This includes assessing progress in the implementation of wetland protection, conservation, restoration, sustainable use and management activities, and improvements to the services they provide, including but not limited to those related to climate change mitigation, adaptation and resilience.
- Starting in 2018, Ramsar Contracting Parties have been required to report on the change in the extent of water-related ecosystems over time (SDG 6.6.1), which includes mangroves[3]. Recognizing the value of Earth Observation datasets for addressing the information needs of Contracting Parties to the Convention, Ramsar provided Technical Guidance on remote sensing tools that can be used for wetland inventory and the assessment and monitoring of change in wetlands[4].

300-350

(out of 2,532)[5]

of Ramsar Sites include mangrove ecosystems.

3 Ramsar Convention on Wetlands, 2018
4 Ramsar Technical paper 10, 2018
5 Ramsar Sites Information Service

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.

The GMW is a free, easy-to-use, and scientifically robust tool supporting governments in moving towards accurately integrating mangrove commitments in their national plans, based on their own domestic needs and priorities.

The GMW gives universal access to near-real time information on mangrove status and extent, and critical mangrove values. This responds to information needs by Contracting Parties to the Ramsar Convention on Wetlands as well as other global frameworks.

Through the GMW, governments can track the changes in mangrove extent against national and international goals, estimate carbon storage of mangrove ecosystems at a national scale, and track mangrove commitments at the international level.

The GMW provides Ramsar Contracting Parties - particularly those without national mangrove monitoring systems - with reliable and accessible data on their mangrove resources.

This supports:

- National wetland inventories
- Preparation of Ramsar Information Sheets (RISs)
- Monitoring of ecological character at designated sites, mangrove management and restoration efforts
- Reporting obligations to the Ramsar Convention on Wetlands and other international frameworks through National Reports, and supporting data synergies across environmental agreements.

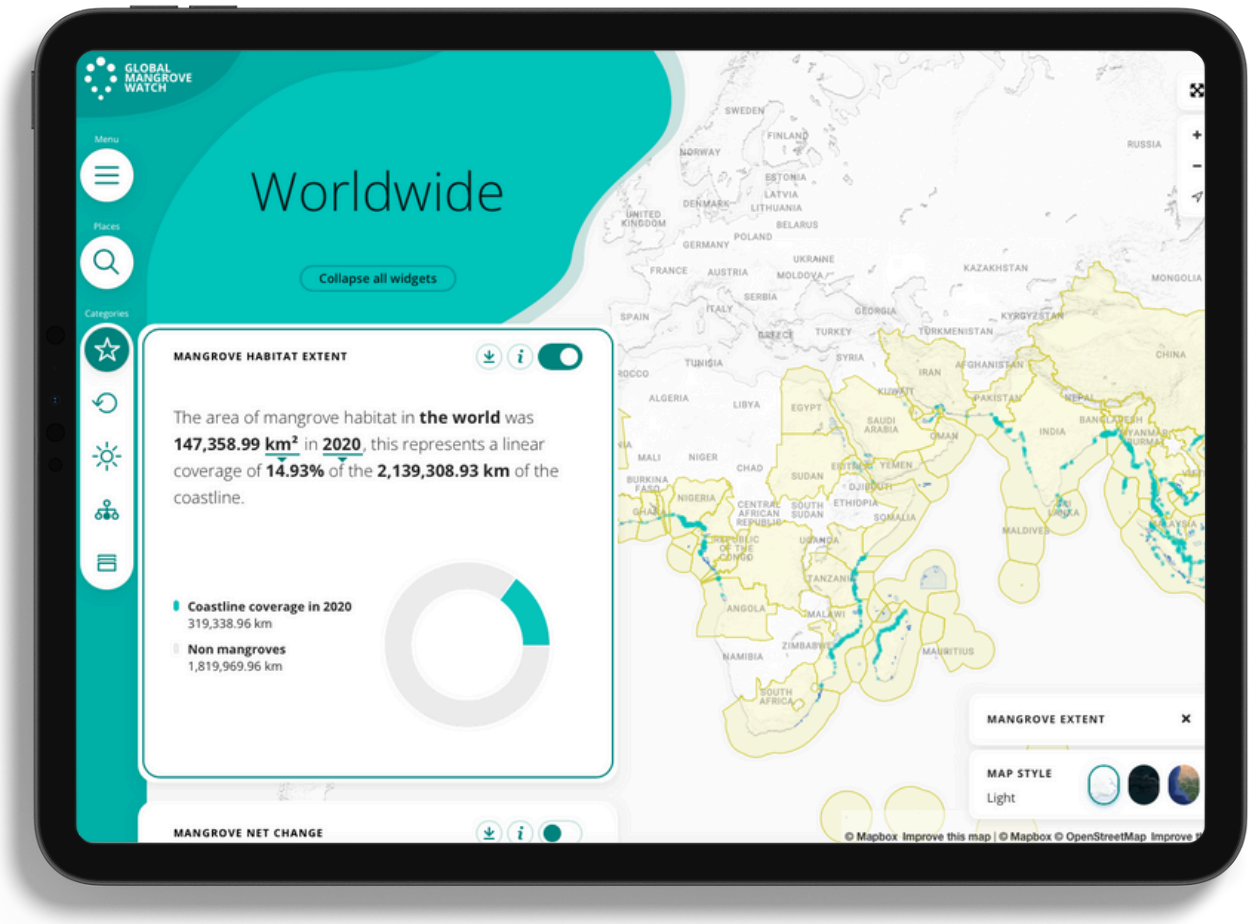
The GMW has contributed data to Ramsar's Global Wetland Outlook and supports reporting under Sustainable Development Goal (SDG) indicator 6.6.1, which tracks changes in the extent of water-related ecosystems over time.

In addition, the GMW Climate and Policy Dashboard provides country-specific insights into the integration of mangroves into national and international policy commitments. It shows, at a glance, whether countries have included blue carbon ecosystems in their Nationally Determined Contributions (NDCs) under the UNFCCC, recognized mangroves in their national forest definitions, and indicated implementation of the IPCC Wetlands Supplement in their greenhouse gas accounting.

Collectively, these tools support governments in strengthening their national greenhouse gas inventories, improving policy coherence, and fulfilling reporting requirements under global environmental agreements.

How to use the Global Mangrove Watch

The following GMW tools can be used to support countries in accurately integrating their mangrove ecosystems into their commitments and reporting for the Ramsar Convention on Wetlands:



Mangrove Habitat Extent

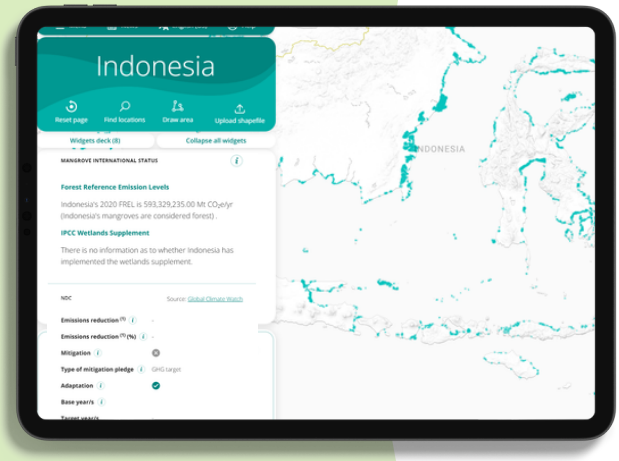
The GMW mangrove extent layer describes the national areal extent of mangrove habitat (km2) and the length of coast with mangrove forests, in the years 1996, 2007-2010 and 2015-2020. This layer allows governments and other stakeholders to track the progress of mangrove extent against national and international goals, setting a baseline for reporting progress and establishing targets for Ramsar 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 commitments. Besides the annually updated layer with 25m resolution, the 2020 layer is also available in High Resolution (10m).

Mangrove Net Change

This layer describes the change in the areal extent of mangrove habitat (km^2) 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 data[6]. With this tool, governments can review carbon stocks, and include the contribution of national mangrove forests towards NDC targets.



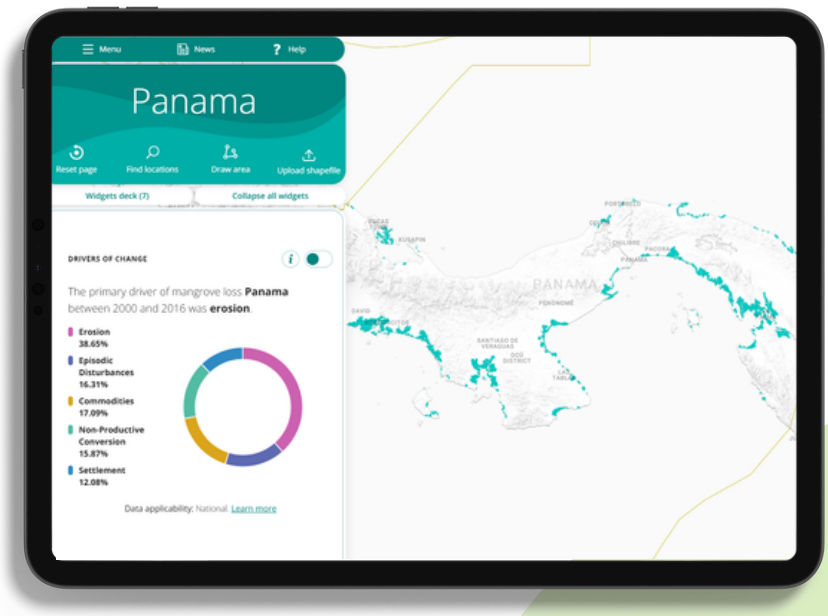
Mangrove international status

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.

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

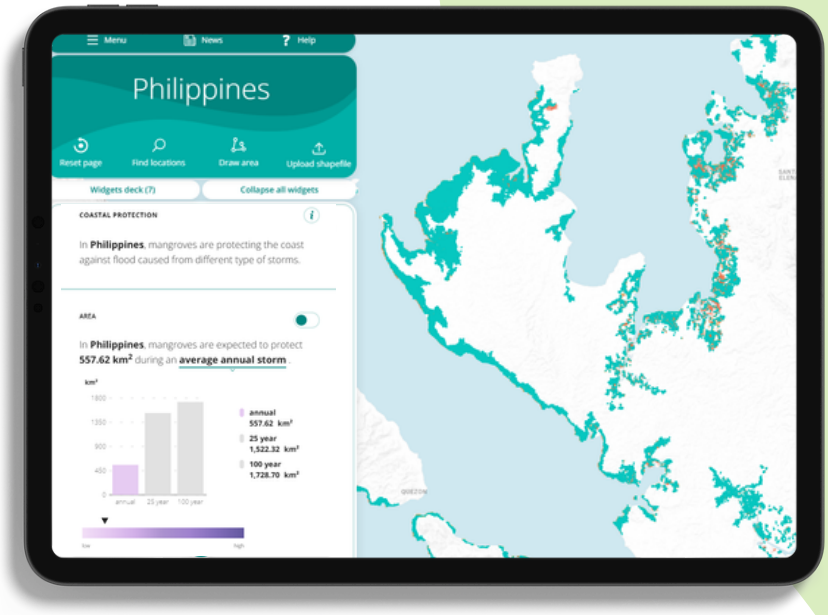
Drivers of Mangrove Change

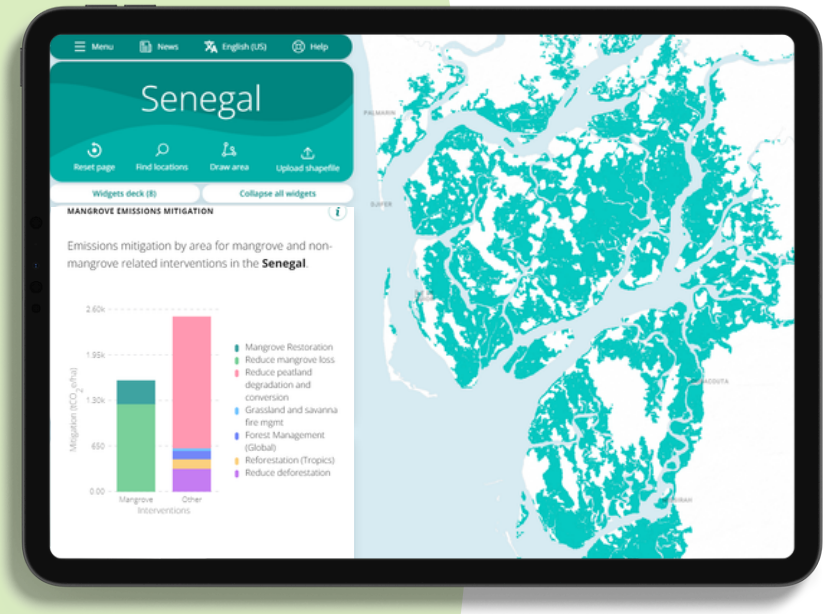
This dataset provides provides estimates of the extent of mangrove loss, land cover change, and its primary anthropogenic or climatic drivers between 2000-2016. The layer provides percentages of lost mangroves that can be attributed to each loss driver by country. Loss drivers include commodity production (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

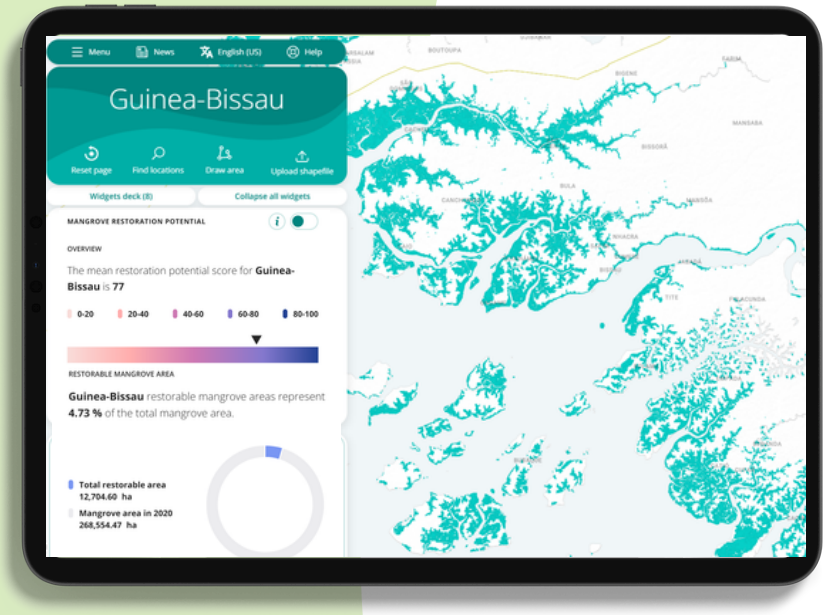
Mangroves play a vital role in protecting coastlines from damage due to waves and tropical storms, easing risks of erosion and flooding to coastal communities. The data displayed in this widget quantifies, on a global scale, the socioeconomic benefits provided by mangroves in preventing damage from storms, 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 .





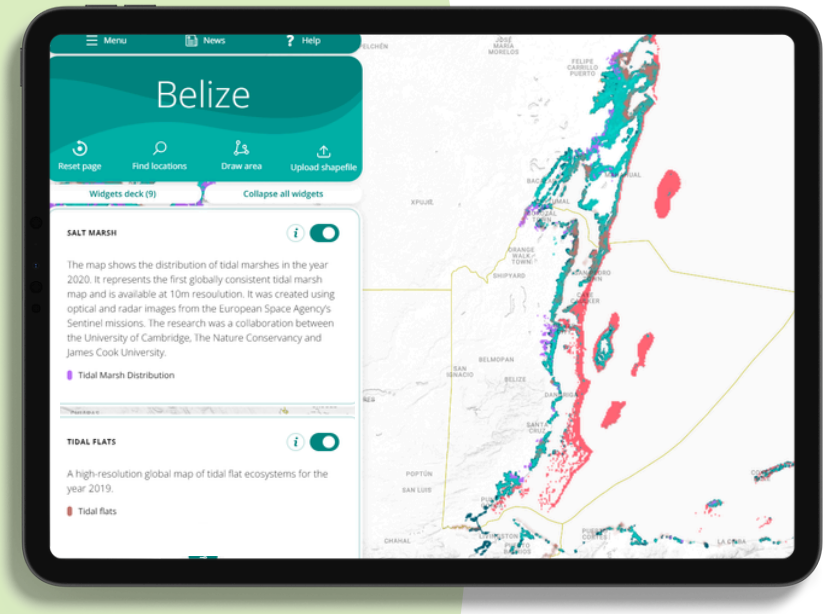
Mangrove Emissions Mitigation

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.



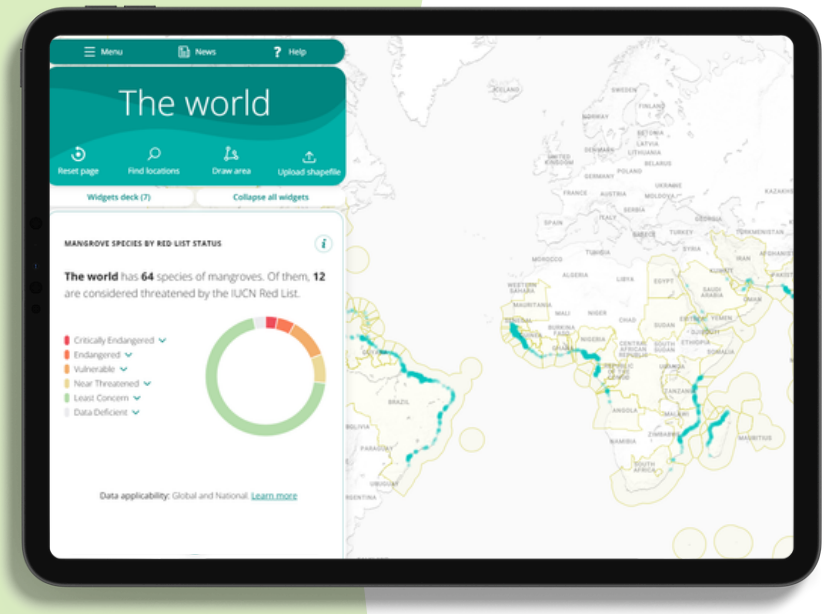
Mangrove Restoration

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. 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.



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 of the GMW

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 GMW update offers a global mangrove map at 10-meter resolution. This makes the GMW useful not only at national but also at local levels for conservation and management. While GMW supports mangrove inventory, assessment, and monitoring, local knowledge and in situ data remain essential for producing context-specific results.

A new feature - the GMW National Dashboard - provides additional mangrove-related resources for selected countries. These are often complementary to GMW data and valuable for national policy contexts, though they may not be consistent across countries.

Conclusion

Nature-based Solutions – including the protection, conservation and restoration of mangrove and other blue carbon ecosystems – are an integral component for achieving the conservation and sustainable use of all wetlands through local and national actions and international cooperation.

The Global Mangrove Watch represents a critical tool, based on the most accurate science, to support countries in the process of setting targets, implementing commitments, and reporting progress to the Convention in support of national wetlands inventories, mangrove management, and restoration – as we move towards ratcheting up national and collective ambition on the protection and improved use of wetland ecosystems.

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.[1]

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.[2]

NDC Taskforce

Building upon the success of the Mangrove Breakthrough to receive the endorsement of 37 governments to date, the Mangrove Breakthrough NDC Task Force aims to provide technical support 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] Global Mangrove Extent Change 1996-2020: Global Mangrove Watch Version 3.0
[2] https://www.mangrovealliance.org/wp-content/uploads/2022/09/The-State-of-the-Worlds-Mangroves-Report_2022.pdf

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 Mangroves Report 2024:
https://www.mangrovealliance.org/wp-content/uploads/2024/09/SOWM-2024-HR-1.pdf

For further information on the submission of National Reports to Ramsar Convention:
https://www.ramsar.org/sites/default/files/documents/library/key_rec_2.01e.pdf

For more information on Resolution XIII.14 on promoting conservation, restoration and sustainable management of coastal blue-carbon ecosystems:
https://www.ramsar.org/sites/default/files/documents/library/xiii.14_blue_carbon_e.pdf

For more information on Ramsar's Fourth Strategic Plan 2016-2024:
https://www.ramsar.org/sites/default/files/hb2_5ed_strategic_plan_2016_24_e.pdf

For further information on the use of Earth Observation (EO) data for wetland inventory, assessment and monitoring:
https://www.ramsar.org/sites/default/files/documents/library/rtr10_earth_observation_e.pdf

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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.