Integrating Mangrove Ecosystems into NBSAP's

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

The Global Mangrove Watch represents a critical tool, based on the most accurate science, to support Parties to the Convention on Biological Diversity in the integration of mangrove commitments into their NBSAP's revisions and national reports, collectively catalyzing ambition and action on mangroves and other coastal ecosystems. This brief summarizes how the GMW can be used by governments to enhance their NBSAP's.

GLOBAL MANGROVE WATCH

GLOBAL MANGROVE ALLIANCE

Mangroves in National Biodiversity Strategies and Action Plans (NBSAPs)

Mangroves are critical ecosystems for biodiversity, providing habitat for 341 threatened species around the world[1]. Terrestrial wildlife, ranging from insects to tigers, live in the drier parts of the habitat. Mangroves are also the home and breeding ground for sea creatures, such as oysters, crabs, shrimp, molluscs, crustaceans, and other species in their pools and channels around the roots. It is estimated that mangroves support the production of nearly 600 billion young shrimp and fish species, and a 100 billion individuals of crabs and bivalves[2], which is critical for ensuring food security for communities around the world. These habitats also indirectly support the health of other biodiversity hotspots, facilitate crossover between ecosystems and may also act as final refuges for species left stranded by habitat loss.

Besides their crucial role for safeguarding biodiversity, mangroves protect the lives and livelihoods of millions of people. Mangroves protect food security, stabilize coastlines and protect coastal communities against sea-level rise, storms, and coastal erosion, hence, playing a critical role in communities' ability to adapt to climate change.

It is estimated that annually, more than US$65 billion in property damages from storms and reduced flood risk to some 15 million people is prevented by mangroves[2].

Additionally, healthy mangroves and their underlying soils sequester carbon at up to four times the rate of terrestrial forests on a per hectare basis, making them indispensable allies in the race to a net zero world[3].

Over 1 million hectares of mangroves have been lost since 1996. Although rates of mangrove loss appear to have slowed in recent decades, the world is far from halting the decline of mangroves and restoring what has been lost in the last 30 years. Actions must be scaled up to turn the tide on conserving and restoring these vital ecosystems to stop severe depletion of mangrove forests.

Accelerating mangrove conservation and restoration will advance progress towards targets 1, 2, 3, 4, 8, 10 and 11 of the Global Biodiversity Framework (GBF) and benefit climate change mitigation and adaptation, and their ecosystem services.

1 Spalding, Mark D and Leal, Maricé (editors), 2021 The State of the World's Mangroves 2021. Global Mangrove Alliance.

2 Leal, Maricé and Spalding, Mark D (editors), 2022 The State of the World's Mangroves 2022. Global Mangrove Alliance.

3 Donato, D. C., J. B. Kauffman, D. Murdiyarso, S. Kurnianto, M. Stidham, and M. Kanninen. 2011. Mangroves among the most carbon-rich forests in the tropics. Nature Geoscience. 2011;4(5):293-7.

Mangroves in NBSAPs cont.

National Biodiversity Strategy and Action Plans (NBSAPs) are the main instruments for implementing the Convention on Biological Diversity nationally and globally. Article 6 of the Convention requires contracting Parties to develop, implement, and regularly review NBSAPs. Through them, countries can integrate biodiversity conservation and sustainable use in sectoral and cross-sectoral activities. Integrating mangrove ecosystems into these plans can drive resources and action - globally and nationally - for mangrove protection and restoration.

The review and update of NBSAPs, or at least national targets, by 2024 reflected in Decision CBD/COP/DEC/15/6[4] represents a critical opportunity for countries to capture enhanced mangrove action and for aligning commitments made under other international and national processes. Through the most accurate and updated mangrove data, the Global Mangrove Watch (GMW) offers Parties to the Convention a critical resource to support the integration of mangrove commitments into their NBSAPs revisions and national reports, collectively catalyzing ambition and action on mangroves and other blue carbon ecosystems.

4 Decision CBD/COP/DEC/15/6: 15/6. Mechanisms for planning, monitoring, reporting and review

Using the Global Mangrove Watch for NBSAPs

The Global Mangrove Watch (GMW) is an online platform that provides remote sensing data and tools for global mapping and monitoring of mangroves, in scientific collaboration with Wetlands International, The Nature Conservancy, Aberystwyth University, soloEO, 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 that helps governments integrate mangrove-positive commitments into NBSAPs, which must be finalized by COP16 in 2024. GMW can also be applied to other biodiversity related Multilateral Environmental Agreements, such as the Ramsar Convention on Wetlands and the Convention on the Conservation of Migratory Species of Wild Animals (CMS). Additionally, it can be used for climate related International Treaties like the UNFCCC's Paris Agreement where Nationally Determined Contributions (NDC) and national reporting mechanisms, like GHG inventories are based on domestic needs and priorities.

NBSAPs, and other national reports, can be strengthened with GMW data such as on mangrove extent and change, mangrove species (those found within a country and those considered threatened under the IUCN Red List), proportion of mangroves in protected areas, restorable area of mangroves, above and below ground carbon stocks, and mangrove forest values for coastal protection. These data can be used to guide the implementation and the reporting of mangrove conservation and restoration, re-shaping the threats and pressures to mangroves.

The GMW also provides near-real time disturbance alerts that can be used by local authorities to plan interventions in impacted areas. As of 2023, this functionality is currently available for all of Africa, and selected countries in North and South America and Asia, and it will soon become available for other regions.

Lastly, the GMW provides valuable information to better understand how much carbon is currently being stored in the mangrove's aboveground biomass and its soil.

The Global Mangrove Alliance offers its support to assist governments in developing mangrove-positive NBSAP's commitments.

GMW as tool to inform GBF indicators

While revising or updating NBSAPs, headline indicators, complementary and other national indicators should be used to track contributions towards the goals and targets of the Kunming-Montreal Global Biodiversity Framework (GBF), taking into account national circumstances. The Global Mangrove Watch could inform the following GBF indicators:

- Headline Indicator A.0.1 on Extent of selected natural and modified ecosystems; Complementary Indicator a.9 on Continuous Global Mangrove Forest Cover, Complementary Indicator a.12 on Trends in mangrove extent; Complementary Indicator a.10 on Trends in mangrove forest fragmentation;

- Headline Indicator B.0.1 on National environmental economic accounts of ecosystem services; Headline Indicator 8.0.1 on National green-house gas inventories from land use and land use change; Complementary Indicator t7.1 on Above-ground biomass stock in forest8.

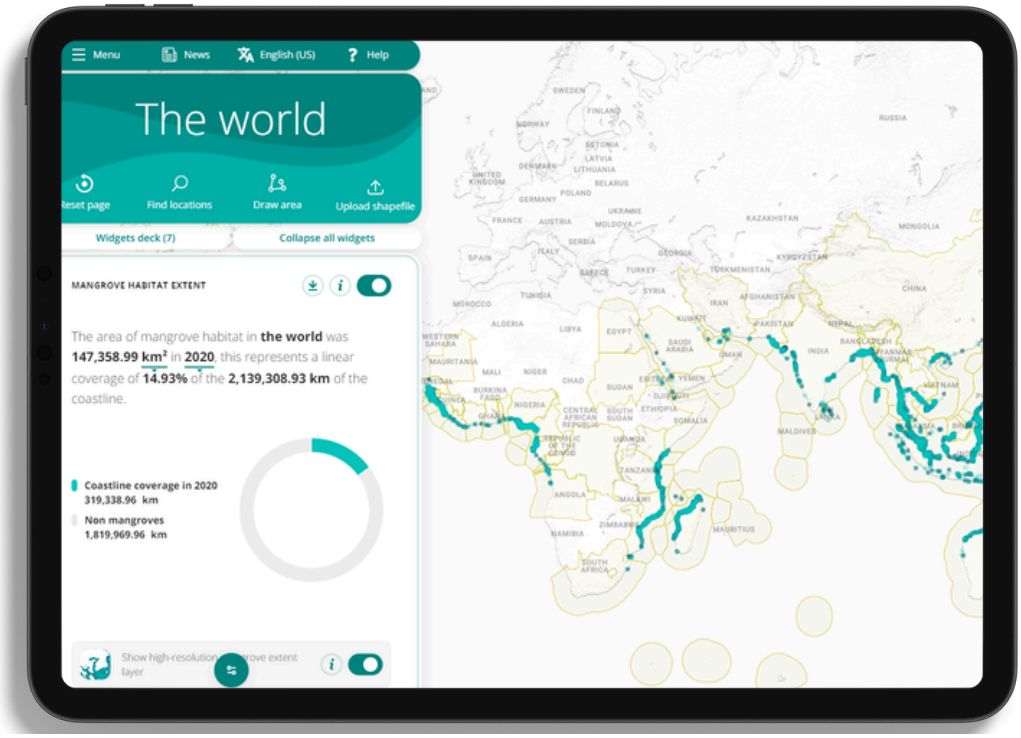
For more information on the contribution of mangrove ecosystems towards the achievement of multiple goals and targets of the Global Biodiversity Framework and on the scientific resources available to set national mangrove targets and support reporting – such as the Global Mangrove Watch:

https://www.iucn.org/sites/default/files/2022-07/guidance-on-mangroveindicators-in-post-2020-global-biodiversity-framework.pdf [5]

5 Guidance on Mangrove Indicators in the Post-2020 Global Biodiversity Framework. As of 2023, this document is being updated to reflect the recently adopted Kunming-Montreal Global Biodiversity Framework

How to use the Global Mangrove Watch

Governments can use the following GMW tools to include mangrove ecosystems in their national target-setting, monitoring, and reporting for biodiversity:



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 towards national and international goals, setting a baseline for reporting progress and establishing targets for CBD, UNFCCC and other conventions. Through this layer, governments can learn the location and extent of these ecosystems in their countries, allowing them to better articulate relevant priorities and actions for mangrove management activities for their national target-setting, monitoring, and reporting. Lastly, this data can also be used to establish targets for protected areas or OECMs in mangrove ecosystems. A High Resolution layer of mangrove extent at 10m is available for the year 2020 and change is mapped annually at 25m resolution. This layer informs **Indicator A.2 under Goal A: "Extent of selected natural and modified ecosystems"** of the Kunming-Montreal Global Biodiversity Framework.

This Mangrove Net Change layer can support **Target 1** on spatial planning, and **Targets 2 and 3** on ecosystem restoration and conservation, respectively, of the Kunming-Montreal Global Biodiversity Framework.

Mangrove Net Change [3]

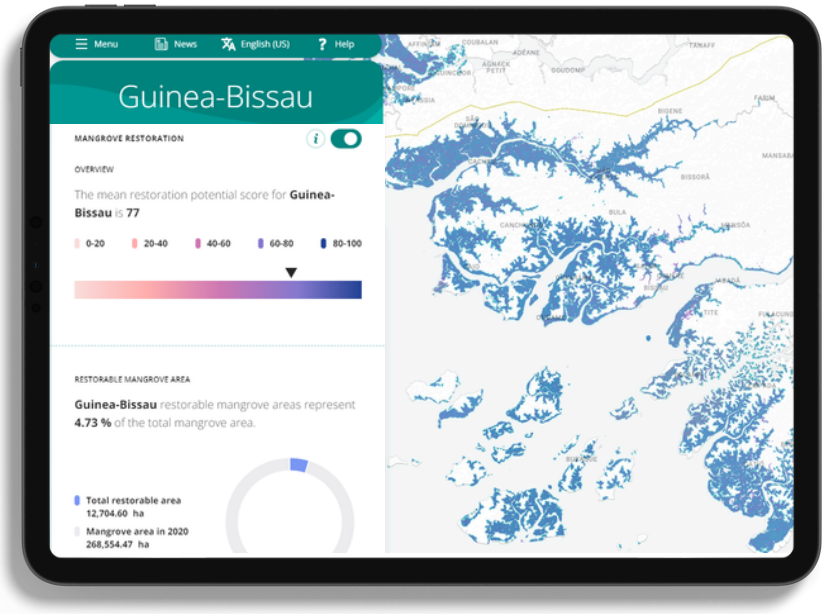
The Net Change layer describes the change in the areal extent of mangrove habitat (km2) in the years 1996, 2007-2010 and 2015-2020. This layer enables governments to 1) track how the extent of mangroves has changed over time for the purpose of inventory reporting, 2) establish a baseline for setting national commitments, and 2) analyse 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, as this is often a critical component of the pre-feasibility stage of a blue carbon market project.

Mangrove Species by Red List

The Mangrove Species layer describes mangrove tree species along with their IUCN Red List status, indicating the number of species by their status on the IUCN Red List. This layer can inform governments trying to better understand patterns of mangrove biodiversity and threatened species at a country or regional scale, and is directly related to **Target 4** of the Kunming-Montreal Global Biodiversity Framework on species conservation.

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 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.

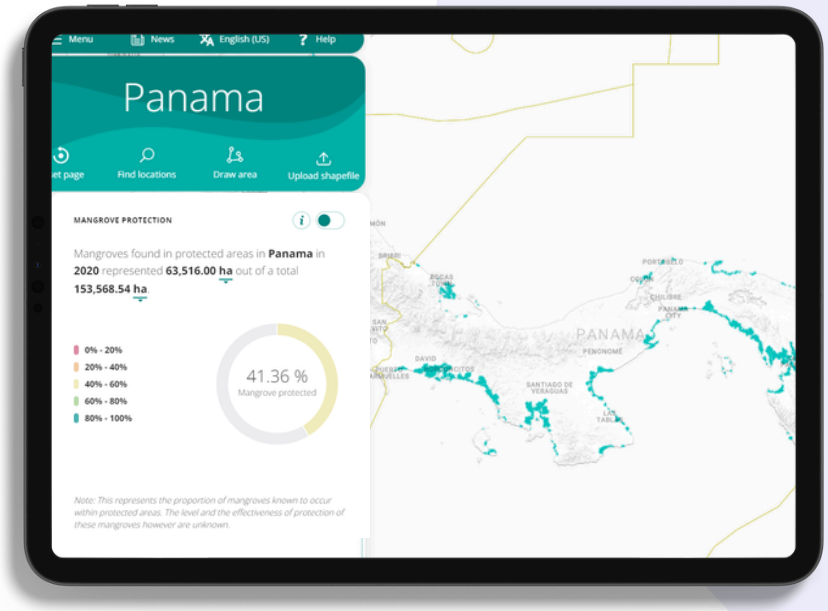
Mangrove Restoration



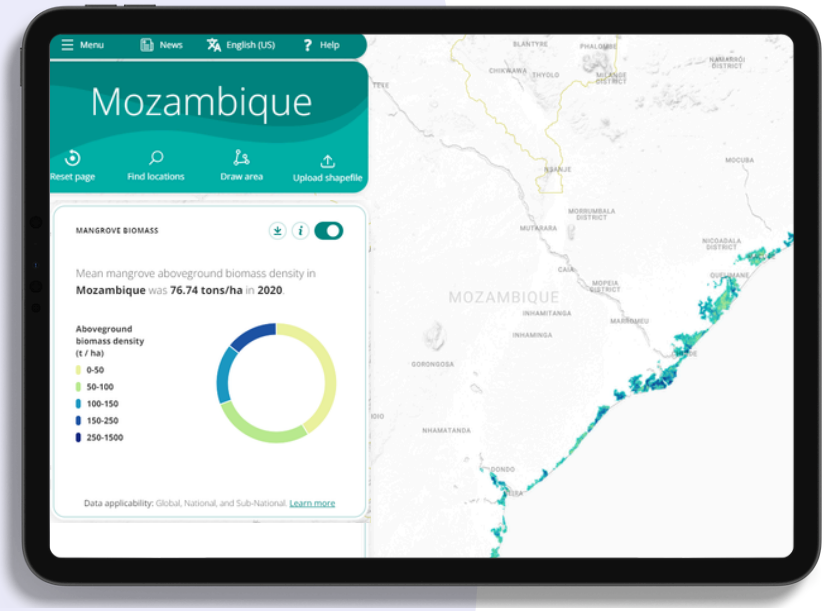
The Mangrove Restoration layer provides guidance on areas that have the greatest potential for mangrove restoration. This layer represents the maximum extent of mangroves over time, from 1996 to 2020, identified areas of loss, and a prediction of biophysical factors that most likely facilitate restoration. This mapping tool offers decision-makers the ability to know where restoration could be attempted by identifying locations where mangroves once thrived, and where conditions remain sustainable for restoration. Moreover, this layer calculates what ecosystem services might be gained from their restoration. It is important to keep in mind that this layer can be used for a first exploration for highest restoration potential, but that high quality on the ground data is needed before conducting any restoration interventions. Furthermore, this layer includes information on the drivers of mangrove loss.

This layer contributes to **Target 2** of the Kunming-Montreal Global Biodiversity Framework to ensure effective restoration of at least 30 percent of terrestrial, inland water, and of coastal and marine areas by 2030.

Mangrove Protection



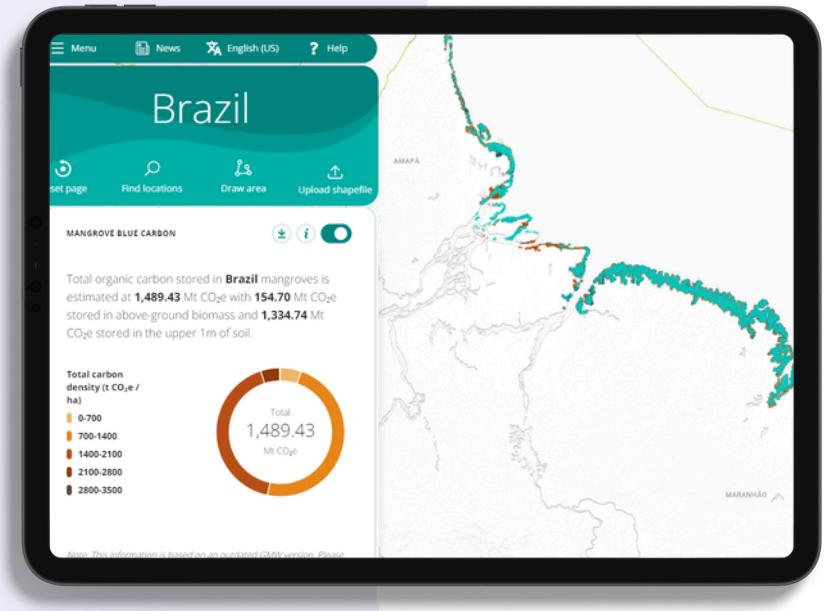
The Mangrove Protection layer shows the area and proportion of mangroves in protected areas per country.
This layer can inform governments on the proportion of mangroves known to occur within protected areas. However, the level of protection that protected areas offer to mangrove habitats varies, as does the degree to which they are effectively governed and managed. This layer contributes to **Target 3** of the Kunming-Montreal Global Biodiversity Framework to achieve effective conservation and management of at least 30 percent of terrestrial, inland water, and of coastal and marine areas by 2030.



Mangrove Biomass

The Mangrove Biomass layer describes the aboveground biomass (AGB) density in metric tons per hectare (t/ha) in a specific location. Mangrove biomass can serve as an indicator of carbon storage and can be used to directly calculate how much carbon is currently being stored in the mangrove's aboveground biomass. It can provide
governments an idea of the relative age of mangroves within the same area, with more mature forests exhibiting higher biomass.

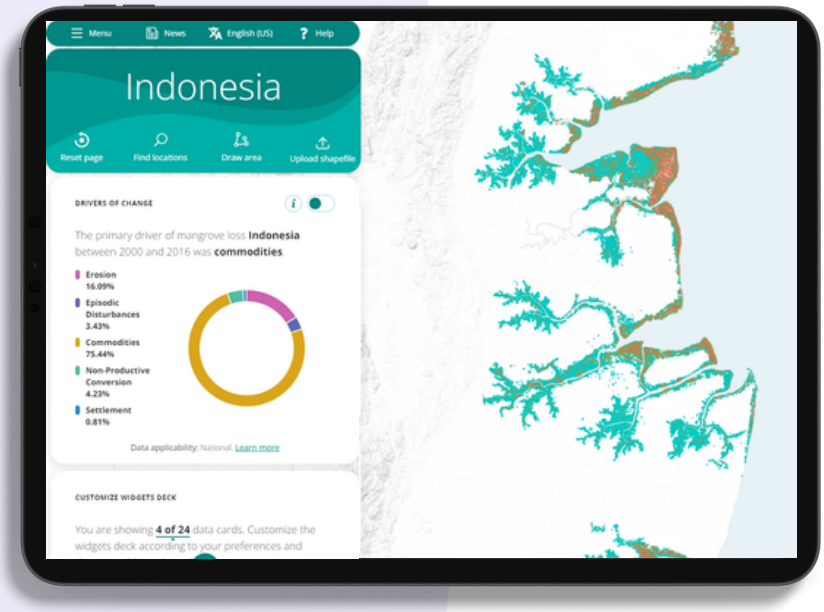
This layer could contribute to **Target 3** of the Kunming-Montreal Global Biodiversity Framework to achieve effective conservation and management of at least 30 percent of terrestrial, inland water, and of coastal and marine areas by 2030.



Mangrove Blue Carbon

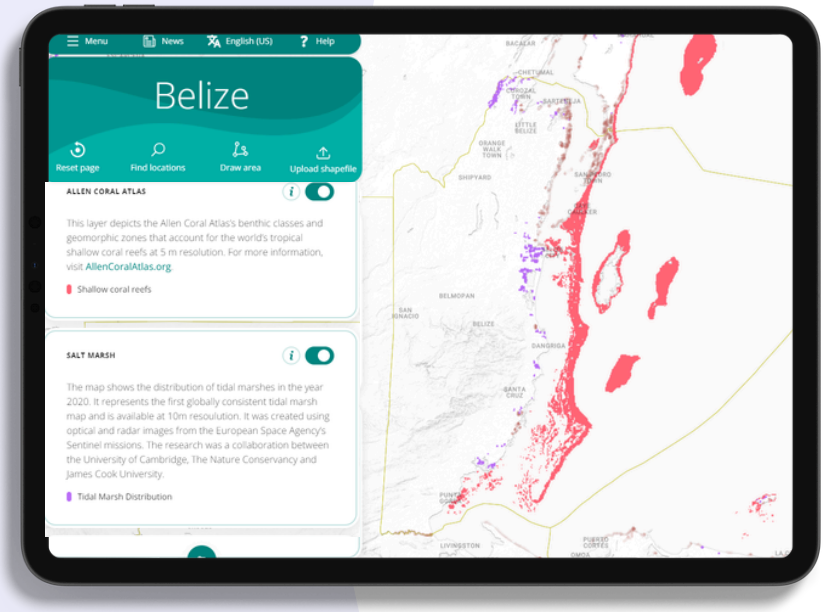
The Mangrove Blue Carbon layer describes the quantity of carbon stored in mangrove biomass and soil at national and global scales with the best available science from a combination of remotely sensed measurements, and regionally specific models. With this tool, governments can review carbon stocks, and include the contribution of national mangrove forests towards their national target-setting, monitoring, and reporting,

As such, this layer can in particular inform **Target 8** of the Kunming-Montreal Global Biodiversity Framework on the use of Nature-based Solutions and/or ecosystem-based approaches to minimize the impacts of climate change and ocean acidification, and **Target 3** on conservation and management of at least 30 percent of terrestrial, inland water, and of coastal and marine areas by 2030.



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 NBSAPs in order to achieve biodiversity targets.



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 Disturbance Alerts

The Mangrove Disturbance Alerts pinpoints areas that are experiencing mangrove loss. The Alert layer is shown as a cluster of points, with colours varying against a heat map indicating the number of alerts in an area. Individual points are placed on a 20-meter resolution. The mangrove loss alert system has an estimated overall accuracy of 92 percent[6], which makes the accuracy of the alerts higher compared to other alerts efforts. The alerts are updated monthly, from January 2020 to present, and past alerts can be reviewed through the platform.

As of 2023, this functionality is available for entire Africa and some countries in North and South America and Asia, but it will soon become available for other regions. These alerts can be used by local authorities and local conservation agencies to monitor mangroves and to help them plan interventions in impacted areas.

6 Global Mangrove Watch: Monthly Alerts of Mangrove Loss for Africa: https://www.mdpi.com/2072-4292/15/8/2050

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

The protection and restoration of coastal ecosystems, such as mangrove forests, is an integral component to collective global action on biodiversity as laid out by the Global Biodiversity Framework.

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 NBSAPs, and move towards ratcheting up national and collective ambition on the potential of mangrove ecosystems for climate and biodiversity action.

globalmangrovewatch.org

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 Global Biodiversity Framework.

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 on mangrove extent and changes under Headline Indicator A.0.1 under Goal A of the GBF and under the UNFCCC Global Stocktake to support the world’s collective progress towards achieving the Global Biodiversity Framework and the Paris Agreement.

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[7] and non-state actors to work together towards this shared ambition, aligning with and complementing each other.

The GMW 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 planning and 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.

To learn more about the Mangrove Breakthrough:

- Nature-based solutions: Mangroves - Climate Champions (unfccc.int)
- https://www.mangrovealliance.org/news/themangrove-breakthrough/

7 **The following governments have endorsed the Mangrove Breakthrough (2024):** Australia, Baranquilla (Colombia), Belgium, Burundi, Cordoba (Colombia), Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, Gambia, Germany, Guinea Bissau, Jamaica, Liberia, Mozambique, Norway, Pakistan, Palau, Panama, Quintana Roo (Mexico), Rio de Janeiro (Brazil), Senegal, Sierra Leone, South Korea, Spain, United Kingdom, United Arab Emirates, 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 on the legal and governance approaches and enabling conditions relating to mangroves: Tangled Roots and Changing Tides: **https://www.mangrovealliance.org/wp-content/uploads/2019/11/Tangled-Roots-and-Changing-Tides.pdf**

For further reading on how the Global Mangrove Watch can support the inclusion of mangrove ecosystems into Nationally Determined Contributions (NDCS): **https://www.mangrovealliance.org/wp-content/uploads/2022/11/Global-Mangrove-Watch_NDC-Policy-Brief_update2024.pdf**

For further reading on how the Global Mangrove Watch can support reporting under the Ramsar Convention: **https://www.mangrovealliance.org/wp-content/uploads/2022/11/Global-Mangrove-Watch_RAMSAR-Policy-Brief_v7.pdf.pdf**

For further guidance for revising or updating NBSAPs with common elements outlined: **https://www.cbd.int/doc/nbsap/Annex%201%20(NBSAP%20guidance).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.