

Integrating Mangrove Ecosystems into NBSAPs

Through 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, The Nature Conservancy, Cambridge University, 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 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.



**GLOBAL
MANGROVE
WATCH**



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Mangroves in National Biodiversity Strategies and Action Plans (NBSAPs)

Mangroves are critical ecosystems for biodiversity, providing habitat for 341 threatened species around the world¹. 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, mollusks, crustaceans, and other species in their pools and channels around the roots². 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 bivalves³. 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 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 has been estimated that mangroves prevent every year more than US\$ 65 billion in property damages reduce flood risk to 15 million people⁴. 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.

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 trees to stop severe depletion of mangrove forests. Increasing the protection of these coastal ecosystems under the Convention on Biological Diversity (CBD) could benefit biodiversity action, 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 Leal, Maricé and Spalding, Mark D (editors), 2022 The State of the World's Mangroves 2022. Global Mangrove Alliance.

⁴ Spalding, Mark D and Leal, Maricé (editors), 2021 The State of the World's Mangroves 2021. Global Mangrove Alliance.

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**⁵ represents a critical opportunity for countries to capture enhanced mangrove action and for strengthening commitments made under other international and national processes. 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

⁵ [15/6. Mechanisms for planning, monitoring, reporting and review](#)

Using the Global Mangrove Watch for NBSAPs

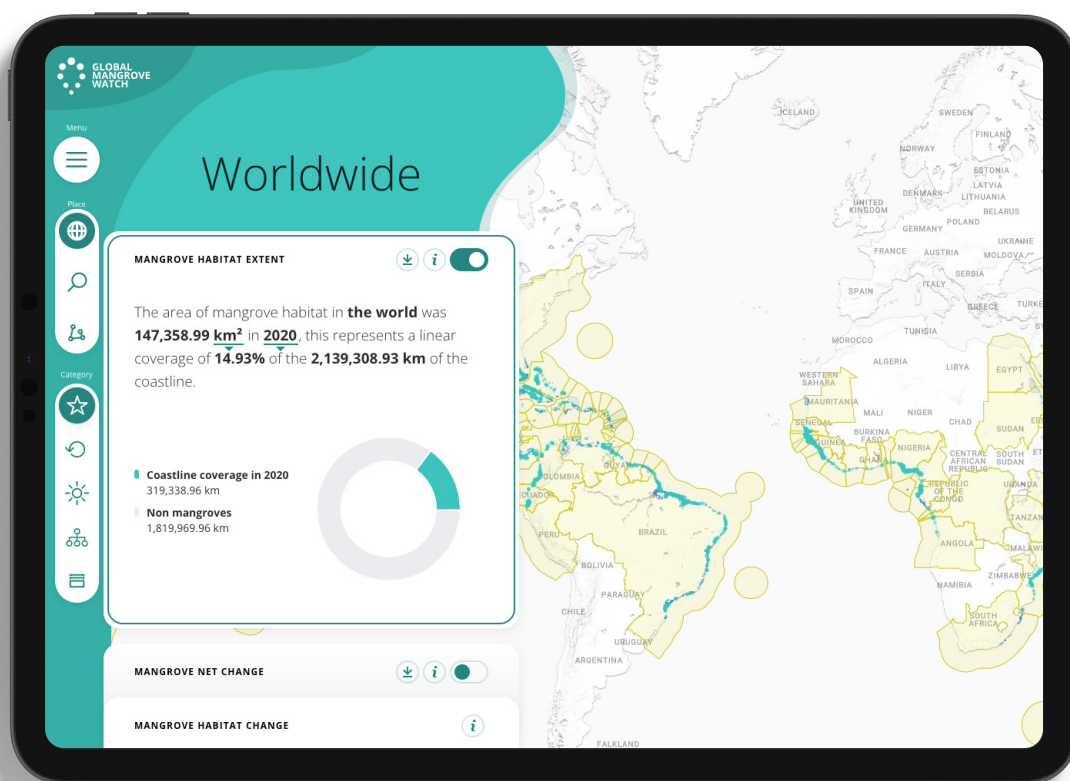
The [Global Mangrove Watch](#) is an online platform that provides remote sensing data and tools for global monitoring of mangroves, in scientific collaboration with Wetlands International, Aberystwyth University, soloEO, The Nature Conservancy, Cambridge University, JAXA, NASA and a host of partners.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

Scientific developments and the increasing availability of mangrove data provide a starting point for policymakers. The GMW is a free, easy-to-use, and scientifically robust tool for governments to move towards accurately integrating mangrove commitments into NBSAPs, which need to be finalized at the latest by COP16 in 2024. In addition, GMW can be used for other biodiversity related Multilateral Environmental Agreements like the Ramsar Convention on Wetlands and the Convention on the Conservation of Migratory Species of Wild Animals (CMS), and for climate related International Treaties like the UNFCCC's Paris Agreement where Nationally Determined Contributions (NDC) and other national reporting mechanisms, like National GHG inventories, are based on domestic needs and priorities.

NBSAPs, and other national reports, can be strengthened with GMW data 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, above and below ground carbon stocks, and mangrove height as an indicator of coastal protection, biomass and aboveground carbon. This 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 some countries in Africa, North and South America and Asia, but it will soon become available for other regions. Lastly, the GMW provides valuable information to better understand data on carbon storage that can be used to directly calculate how much carbon is currently being stored in the mangrove's aboveground biomass and its soil.

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:

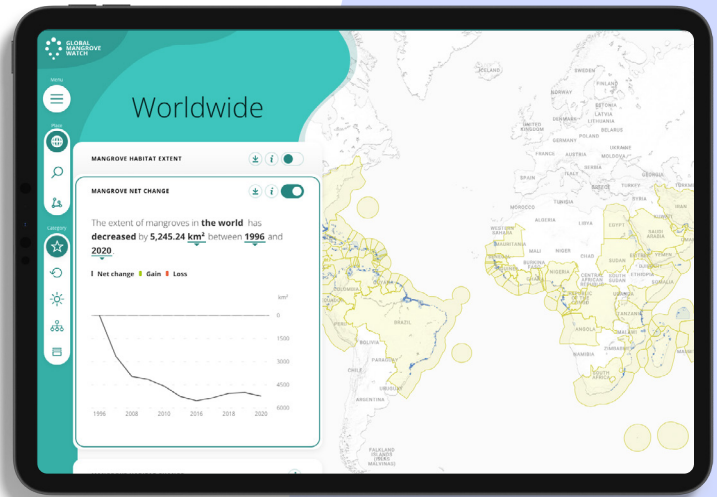


Mangrove Habitat Extent

The GMW mangrove extent layer describes the national aerial 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 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. This layer will inform **Indicator A.2 under Goal A: "Extent of selected natural and modified ecosystems"** of the Kunming-Montreal Global Biodiversity Framework.

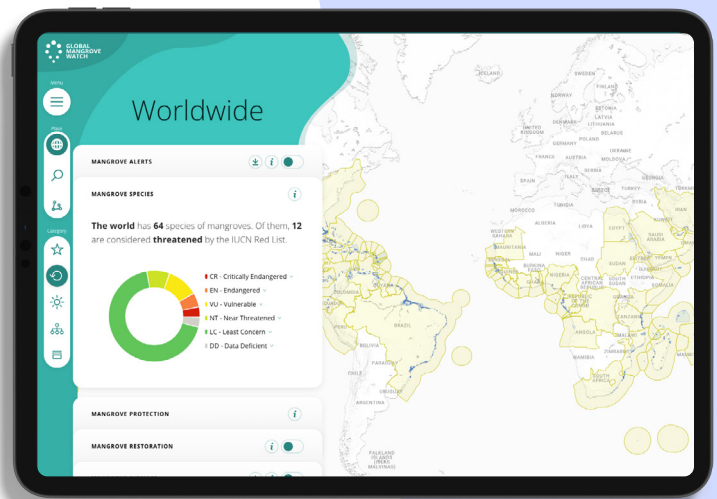
Mangrove Net Change

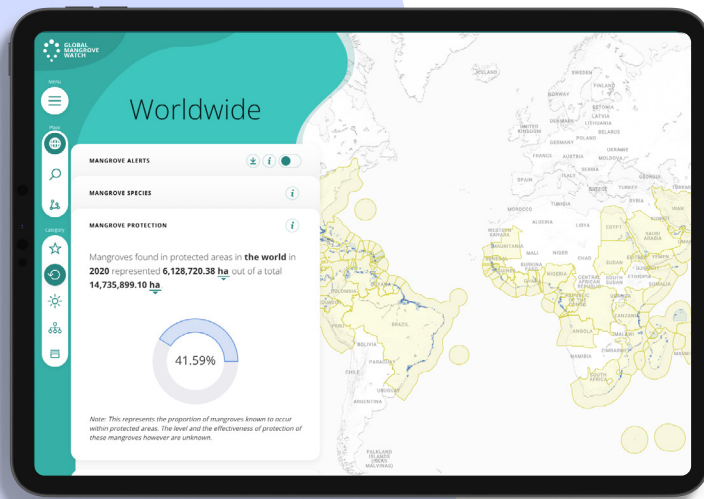
The Net Change layer describes the change in the aerial extent of mangrove habitat (km²) in the years 1996, 2007-2010 and 2015-2020. This layer enables governments to track how the extent of mangroves has changed over time for the purpose of inventory reporting, establish a baseline for setting national 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, as this is often a critical component of the pre-feasibility stage of a blue carbon market project. This information can support **Target 1** on spatial planning, and **Target 2 and 3** on ecosystem restoration and conservation, respectively, of the Kunming-Montreal Global Biodiversity Framework.



Mangrove Species

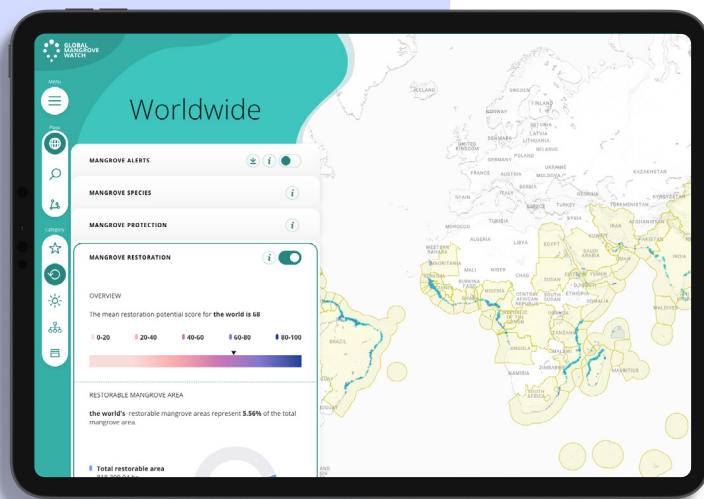
The Mangrove Species layer describes the total number of mangrove species and the total number of mangrove species within each IUCN Red List category by country. The number of threatened species reflects the number of endangered and critically endangered mangroves species. This layer can inform governments trying to better understand patterns of mangrove biodiversity and threatened species at a country or regional scale. Due to the country-level nature of the data, it is best used for comparison among countries or regions. This is directly related to **Target 4** of the Kunming-Montreal Global Biodiversity Framework on species conservation.





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 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.

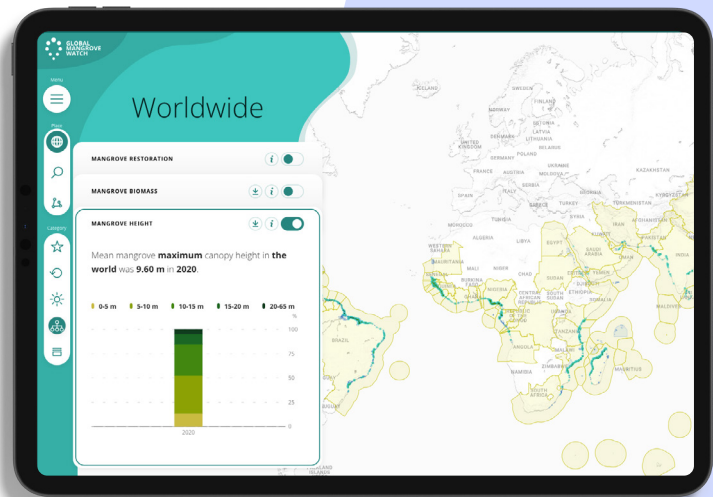


Mangrove Restoration

The Mangrove Restoration layer provides guidance as to 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 could contribute 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.

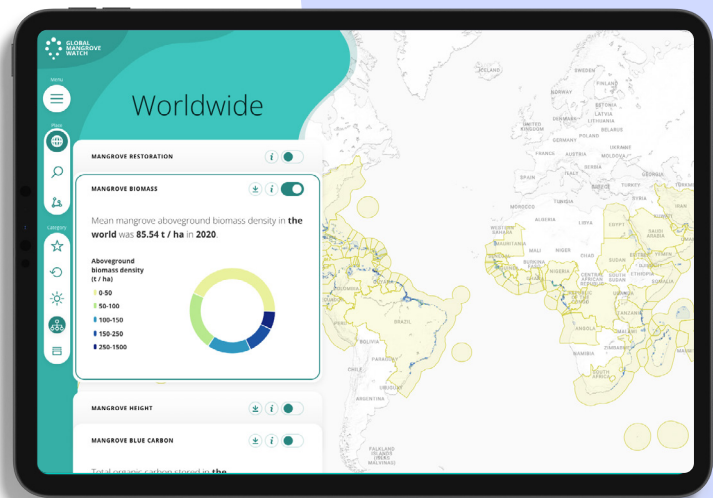
Mangrove Height

The Mangrove Height layer describes the mean mangrove maximum canopy height (m) of mangrove habitat in a specific location at different times. Canopy height can be used as an indicator of coastal protection in vulnerability assessments. An anomaly in canopy height can indicate mangrove degradation. Canopy height is also one of the strongest predictors of biomass and carbon in forested ecosystems. 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 Biomass

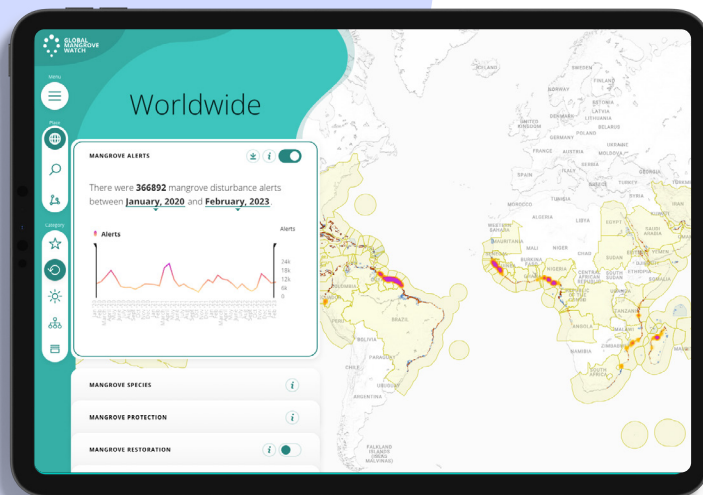
The Mangrove Biomass layer is derived from the Mangrove Height layer. It describes the aboveground biomass (AGB) density in metric tons per hectare (t/ha) of mangrove habitat in a specific location at different times. Mangrove biomass can serve as an indicator of carbon storage and can be used to directly 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. Similarly, this layer can be useful for governments to monitor restoration sites. 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 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 data⁶. With this tool, governments can review carbon stocks, and include the contribution of national mangrove forests towards their national target-setting, monitoring, and reporting, particularly for **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.



Mangrove Disturbance Alerts

The Mangrove Disturbance Alerts pinpoints areas that are experiencing rapid mangrove loss that can be detected over the course of a month. The Alert layer is shown as a cluster of points, with colors 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 percent⁷, 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 help them plan interventions in impacted areas.

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

⁷ Global Mangrove Watch: Monthly Alerts of Mangrove Loss for Africa: <https://www.mdpi.com/2072-4292/15/8/2050>

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.

While the Global Mangrove Watch 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. Future iterations of the GMW will enable further sharing of field studies and the peer-to-peer transfer of information. Similarly, synergies among NBSAPs and the planning and implementation mechanisms of the other biodiversity-related conventions, the three Rio Conventions, other relevant multilateral environmental agreements, and the Sustainable Development Goals (SDGs) should be identified and utilized to maximize efficiency and coherence.

Conclusion

The protection, restoration and sustainable use of coastal and marine ecosystems, such as mangroves, and the species and ecosystem services that they provide, are an integral component of the collective global action needed for biodiversity conservation.

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 help ratcheting up national, regional, and collective ambition on coastal biodiversity and enhancing mangroves' protection, restoration and sustainable use for nature and people. By using the GMW, countries can retrieve data to describe mangrove extent and areas of vegetation, changes over time, trends and threats. Similarly, countries can access information on mangroves tree species at a country scale, carbon storage and ecosystem services.

globalmangrovetwatch.org

The Global Mangrove Watch is also a valuable resource for policymakers to assess collective global progress on mangrove conservation and restoration towards the long-term goals and targets on marine ecosystems of the Kunming-Montreal Global Biodiversity Framework.

Targets, actions and policies in updated NBSAPS must be aligned with the goals and targets of the Global Biodiversity Framework, which the GMW can inform. 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"), and it could be a valuable source for reporting on mangrove extent and changes under the Monitoring Framework for the Kunming-Montreal Global Biodiversity Framework.

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:

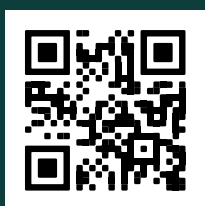
<https://www.iucn.org/sites/default/files/2022-07/guidance-on-mangrove-indicators-in-post-2020-global-biodiversity-framework.pdf>⁹

⁸ Guidance on Mangrove Indicators in the Post-2020 Global Biodiversity Framework

⁹ As of 2023, this document is being updated to reflect the recently adopted Kunming-Montreal Global Biodiversity Framework

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.

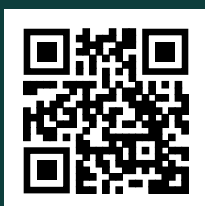


For more information on the legal and governance approaches and enabling conditions relating to mangroves:

<https://www.mangrovealliance.org/wp-content/uploads/2019/11/Tangled-Roots-and-Changing-Tides.pdf>

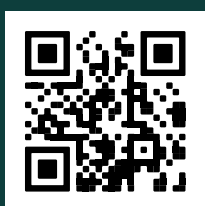


For further reading on how the Global Mangrove Watch can support the inclusion of mangrove ecosystems into Nationally Determined Contributions (NDCs): https://www.mangrovealliance.org/wp-content/uploads/2022/11/Global-Mangrove-Watch_NDC-Policy-Brief_v5.pdf



For further reading on how the Global Mangrove Watch can support reporting under 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 NBSAP with common elements outlined: [https://www.cbd.int/doc/nbsap/Annex%201%20\(NBSAP%20guidance\).pdf](https://www.cbd.int/doc/nbsap/Annex%201%20(NBSAP%20guidance).pdf)

The Mangrove Breakthrough

Launched at COP27, the Mangrove Breakthrough is a Community of Action dedicated to protecting, sustainably managing, and restoring 15 million 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.

To learn more about the Mangrove Breakthrough: Nature-based solutions:

[Mangroves - Climate Champions \(unfccc.int\)](https://unfccc.int/mangroves-climate-champions)

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

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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.