

The State of the World's Mangroves 2024

Executive summary

Introduction

Mangroves are critical ecosystems, bridging land, freshwater, and sea. They host tremendous diversity, and protect and provide for countless coastal communities around the world. This 2024 edition of The State of the World's Mangroves highlights the tremendous advances that have been made on multiple fronts to safeguard these ecosystems. It showcases progress in: science and understanding; collaboration and information sharing; practical management interventions; and the many policy, legal, and financial tools that will help to secure a better future for these ecosystems.



Local fishermen rely on the productive waters of the mangrove forest area near Sedau Village, Singkawang, West Kalimantan, Indonesia. © Reza Novriandi / Mangrove Photography Awards.



The state of mangroves

The latest world map (GMW v4.0), developed by the Global Mangrove Watch, provides a **sixfold improvement in spatial resolution, from 25 meters to 10 meters. It maps 147,256 km² of mangroves in 2020**, adding data for six new territories. At these resolutions, the maps are ever-more relevant, even at local scales, for supporting conservation and management.

The drivers of change to mangrove cover are explored in a summary of an important new study by the FAO. **For the first time, it is possible to separate out notable impacts. Conversion to aquaculture, oil palm plantations, and rice cultivation together explain 43% of mangrove losses between 2000 and 2020.** Natural retraction, influenced by climate change, sediment shifts, and sea-level rise, also significantly impacted mangrove areas. Regional breakdowns highlight very diverse patterns of change, with human impacts dominating change in Africa, Asia, and North and Central America.

While the FAO data corroborates previous GMW findings of declining rates of loss since 2010, the recently released IUCN Red List of Mangrove Ecosystems has found that **half of the world's mangrove provinces are considered threatened.** These assessments are strongly influenced by both past and projected future losses, but also take into account the threat that climate change, particularly sea-level rise and increased storm intensity, poses to mangroves.

The diversity of mangrove plants is given particular attention. **The IUCN Mangrove Specialist Group has begun work on developing an authoritative list of mangrove taxa, with an interim list of 82 taxa listed in this report.** Although there are challenges to developing this list, it is critical to future conservation and analyses, including a proposed new round of the IUCN species Red Listing process.

Mangroves should not be considered in isolation, and **the advent of a new global map of tidal marshes draws attention to the connections across ecosystems.** Habitat connectivity is also explored with seagrass meadows, tidal flats, and coral reefs. Integrating mangrove conservation with the protection of adjacent ecosystems is essential for maintaining the ecological integrity and resilience of coastal zones.

Connecting to local

Human links to mangroves are inherently local, and the GMA is making great strides to highlight the value of local ecological knowledge (LEK) in conservation and management. Building on a new GMA report, **the insights of LEK in understanding historical mangrove change, ecological processes, and management approaches are extensive.** Integrating such knowledge requires a full and equitable collaboration, actively involving LEK holders as partners in conservation and restoration efforts. Case studies from Madagascar, Colombia, Kenya, Brazil, and El Salvador highlight the significant impact of LEK on mangrove conservation.

Ecotourism guides are often experts on local flora and fauna. © Lammert Hilarides.

The importance of connecting across scales is further explored in consideration of platforms, including 'coastTrain' and the Coastal Carbon Network, that unite data from around the world. These are **enabling ever greater refinements in global models and maps, but also peer-to-peer support in our understanding of mangroves in local settings,** encouraging consistent and comparable measurement of mangrove extent, carbon stocks, fisheries production, and more.

Benefits of mangroves

The latest global model and map of mangrove soil carbon, supported by the GMA, has been combined with aboveground biomass estimates, confirming our understanding of the substantial carbon storage potential of these ecosystems.

Mangroves hold, on average, a remarkable 394 tonnes of carbon per hectare in their living biomass and in the top meter of soil. Some mangrove areas, such as those in the Philippines, have average values of over 650 tonnes per hectare.

Mangroves are home to a tremendous diversity of species, reflecting their close links both to adjacent waters and nearby rivers, and terrestrial ecosystems. **Over 5,700 plant and animal species, across 21 phyla, have been recorded in Indian mangroves alone.**

Flooding is the most frequently occurring natural disaster worldwide and is exacerbated by climate change. A new study by Delft University of Technology has, for the first time, used a 2D modeling approach to measure and map storm surge reduction by mangroves at present and in future climate scenarios. **Median values from 1-in-100-year storms show that mangroves reduce flood depths by 15-20%, and over 70% in some areas.**



A great blue heron taking flight at Big Cypress National Preserve in Florida. © Lammert Hilarides, Wetlands International.

Living with mangroves: a focus on food

Mangroves are among the world's most productive ecosystems. They **support all aspects of food security, and provide income, employment, and resources, such as livestock fodder, fiber, and fuelwood, for coastal communities.** Equally important, they enable a secure, year-round stability in this provisioning.

Fish and invertebrates from the mangroves are **critical protein sources** for humans and are also rich in other **essential nutrients.** **Non-aquatic food resources** include honey, as well as leaves and fruits from many trees. Mangrove species are also widely used in **traditional medicine.** Mangrove **timber and fuelwood** (both firewood and charcoal) have a long history which, if well managed, can be sustainable.

In contrast, the clearance of mangroves has often been driven by other forms of food production, including crops, pasture, and aquaculture, with insufficient consideration given to the direct impacts that such clearance may have on coastal communities.

A new model presented here has estimated the density of 37 commercially important fishery species, showing that **mangroves support nearly 800 billion young fish, prawns, bivalves, and crabs annually.** While the data provides only a partial picture, the study underscores the immense value of mangroves in sustaining global fish populations and invertebrate productivity.

The development of modern industrial shrimp aquaculture has driven mangrove loss on massive scales. Such conversion has slowed, but still continues in many places, despite vast and growing areas of abandoned or



unproductive ponds with no commercial value. There are now numerous successful cases of natural mangrove regeneration facilitated by community-led ecological restoration of unproductive aquaculture ponds, but greater efforts are needed. There is also a need to consider opportunities to move new aquaculture away from mangrove areas. In parallel, some communities are exploring methods of partial restoration by incorporating mangrove planting into degraded ponds to establish lower impact aquaculture systems that revive some ecosystem services.

Another key component to successful mangrove management is to enhance livelihood opportunities. There are already considerable livelihood options around mangrove fisheries, salt production, and timber harvesting, while new industries, like ecotourism in healthy mangrove ecosystems, can help diversify opportunities and income.

Saving mangroves

Globally, 40% of the world's remaining mangrove forests are in protected areas. For many countries, such as Brazil, Mexico, and Bangladesh, over 75% are protected. But for others, including Malaysia, Papua New Guinea, and Myanmar, less than 5% are covered. The GMA has set a target of doubling protection by 2030, but reaching 80% protection globally represents a huge challenge. In part, this will require a significant increase in the application of Other Effective Area-based Conservation Measures (OECMs). Such areas may not have conservation as a primary aim, but can still achieve secure and long-term biodiversity benefits. OECMs have the added advantage of enabling the integration of biodiversity into development sectors, like food and water security.

Effective monitoring is a vital component of reducing mangrove losses and the Global Mangrove Watch loss

alerts now provide monthly updates of loss hotspots for 50% of the world's mangroves. The alerts allow mangrove guardians to respond quickly when loss is discovered, providing the best chance for interventions to halt ongoing impacts and encourage rapid restoration.

Restoration efforts and opportunities, highlighted in previous reports, continue to grow, and the GMA has played a pivotal role in determining best practices that consider local ecological conditions, community involvement, and long-term sustainability. The six guiding principles for successful mangrove restoration provide a comprehensive framework for restoration projects. Community-based Ecological Mangrove Restoration, spearheaded by the Mangrove Action Project, is one proven method of restoration that adheres to the guiding principles.

The way ahead

Securing financing for mangrove conservation remains a challenge. Innovative financial mechanisms are essential to support on-the-ground actions, such as those outlined in the Mangrove Breakthrough Financial Roadmap and explored through the Blue Carbon Positive Business Model Activator (BC+). These mechanisms include sustainable financing models, carbon credits, mangrove insurance, and investment in community-based conservation projects.

Policy frameworks like the Kunming-Montreal Global Biodiversity Framework and the UAE Consensus also help to drive change. Mangroves are increasingly recognized at international conventions for their powerful climate adaptation and mitigation benefits, and ability to support multiple Sustainable Development Goals. The Mangrove Breakthrough has placed mangroves center stage, gaining support from 50 governments, with a goal of mobilizing US\$4 Billion to ensure the future of 15 million hectares of mangroves.

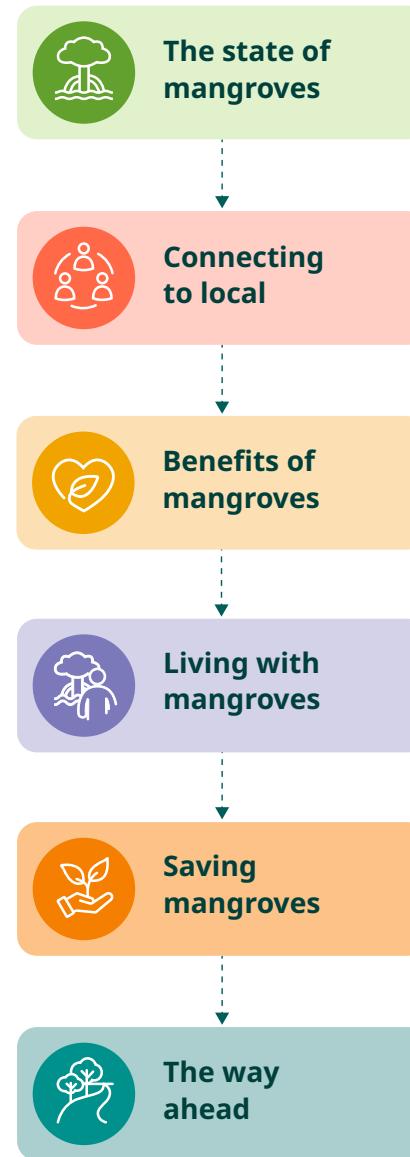


Figure 1: The main report sections. These icons and headings can be found on the top left of each double page spread, and can be used to navigate to those sections.

The Global Mangrove Alliance (GMA)

The GMA is the preeminent alliance driving conservation and restoration for the world's mangroves. Its 100+ member organizations are based across 30 countries and operate in many more. The GMA's goals to halt loss, double protection, and restore half of the world's mangroves by 2030 are deeply ambitious. But its aims resonate, while its roles in driving progress are many and multifarious. These roles include supporting science and tracking change; driving policy; supporting financial initiatives; training practitioners; and, through its many members, undertaking practical and effective conservation and restoration projects across the globe.

Success hinges on partnership and sharing, and throughout this report there are photo stories and case studies which, alongside the core texts, are all linked to this spirit of collaboration. The continued commitment to mangrove conservation will shape a brighter, more equitable, and sustainable future for all.



Gabriela, a local woman from Bahía Málaga, Colombia, collecting cockles or "piangua" as a vital food-source, a livelihood and a deep tradition binding local people to their mangroves. © Daniel Alvarez, Mangrove Photography Awards 2024, Revista puntos.