

## Mangroves are vital

### The Importance of Mangroves

Mangroves provide vital natural protection against erosion and extreme weather events. Their complex root systems anchor sediments, reduce coastal erosion and shield communities from hurricanes, tsunamis, and storm surges. By buffering high waves and tides, they play a crucial role in safeguarding vulnerable coastlines, especially in the face of climate change. Furthermore, blue carbon ecosystems, including mangroves, store approximately 50% of the carbon stored in ocean sediments, despite covering less than 0.5% of the seabed. This makes them disproportionately important for carbon sequestration and climate mitigation.



*Mangrove roots (creative commons)*

Mangroves play a crucial role in maintaining the health of oceans and coastal ecosystems in numerous ways. They act as natural filters, trapping pollution and sediments from rivers and rainwater before these contaminants reach the oceans. This helps protect coastal waters and coral reefs from harmful runoff. Beyond environmental benefits, mangroves also support local communities by reducing the economic impact of natural disasters. Their interconnected relationship with nearby ecosystems - such as coral reefs and seagrass beds - enhances marine biodiversity by supplying essential nutrients and filtering sediments. Mangroves provide a unique habitat for diverse flora and fauna, including fish, shellfish,

birds, and other wildlife. Many fish and marine organisms rely on mangroves as nurseries and safe shelters for their young before migrating to the open ocean. This critical function helps sustain fish populations and preserve biodiversity in marine ecosystems.

In short, mangroves are vital to the health of oceans and coastal areas, providing not only natural protection but also significant ecological and economic benefits.

### **Mangroves at Risk**

Despite their immense value, mangroves are under serious threat and require urgent restoration. Over the past few decades, 35% of global mangrove forests have been lost, primarily due to human activities such as coastal development, aquaculture - particularly shrimp farming - deforestation, and pollution.

Mangroves continue to disappear at an alarming rate of 0.16% to 0.39% per year, endangering their long-term survival. According to the International Union for Conservation of Nature (IUCN), nearly 40% of the world's remaining mangroves are at risk, especially in developing regions where they are frequently cleared for agriculture and infrastructure projects.

Climate change further compounds these threats, with rising sea levels, increased storm frequency, and shifting weather patterns jeopardizing mangrove ecosystems worldwide. Without immediate action, we risk losing one of the most valuable natural defenses for our coastlines and marine biodiversity.

### **The Complexity of Mangrove Management**

From a legal and administrative perspective, mangroves exist in a complex and often unstable landscape, making their classification and governance challenging. Different state administrations typically adopt one of two main viewpoints: some regard mangroves as wasteland or unclaimed land with open access, while others recognize them as valuable socio-ecosystems governed by multiple jurisdictions, with different components managed by various public authorities. These unclear boundaries hinder effective management and weaken the ecosystem services that mangroves provide to local communities.

Case studies by Climate Seeds highlight the complexities of mangrove land tenure. While mangroves are often state property, requiring government involvement in their management, local communities also hold traditional rights to the land and its resources. Governments can grant concessions to companies and individuals for activities such as agriculture, aquaculture, and forestry, further complicating conservation efforts. Although legal frameworks exist to protect mangroves, their management is typically divided among multiple regulatory bodies, creating administrative bottlenecks that impede effective action.

These legal uncertainties have significant implications for carbon sequestration projects, which rely on stable governance and land tenure clarity to secure financing and ensure long-term success. In many countries, mangrove ownership falls within a mix of state control, customary community rights, and overlapping regulatory authorities. Establishing clear legal frameworks is essential for securing conservation funding, ensuring transparency, and fostering sustainable management. The willingness of governments to protect mangroves in exchange for financial incentives depends on factors such as economic pressures, political priorities, and the reliance of local communities on mangrove resources.

In many cases, well-structured financial incentives can serve as a powerful tool to encourage mangrove conservation, particularly in regions where economic pressures drive deforestation and coastal development.

### **Incentivizing Mangrove Conservation**

Program for Payments for Ecosystem Services (PES) have proven effective in various countries, providing financial incentives to landowners and communities for preserving and sustainably managing environmental resources like mangroves. These programs recognise the vital ecosystem services mangroves provide, including:

- Carbon Storage
- Protection against floods and storms
- Biodiversity Conservation

Successful PES initiatives demonstrate that governments are more likely to support conservation efforts when economic incentives are involved. To enhance mangrove protection, governments and international organisations must allocate more resources, such as subsidies for sustainable management and restoration projects. In support of these efforts, our foundation has established ONCRA, a validation and certification platform designed to facilitate the recognition and funding of sustainable mangrove conservation initiatives.

### **Who We Are**

Climate Cleanup is a non-profit foundation and social enterprise funded by members and well-aligned partners. Our mission is to reverse climate change by removing 1,500 gigatons of CO<sub>2</sub> from the atmosphere with Nature-based Solutions. We do this by fostering systemic conditions for a regenerative economy that enhances nature.

To reverse climate change, humanity needs to reduce emissions and remove carbon from the atmosphere and oceans. The restoration or conservation of mangroves, seagrasses, or seaweed ecosystems are examples of nature-based solutions. Oceans and coastal areas are a great source of life and have major potential in storing CO<sub>2</sub>.

Effective removal starts with calculating and measuring the amounts of blue carbon removed—this is what we did with the development of an Ocean Stored Carbon metric. Based on this protocol, the carbon removal of OSC projects can be calculated, enabling governments to quantify and monetize the carbon they remove.

### **What We Do**

We decided, based on scientific research, that there was a need for a certification protocol. This Certification Protocol outlines the criteria that operators or groups managing Ocean-Stored Carbon (OSC) projects must meet to obtain Open Natural Carbon Removal Accounting (ONCRA) certification. The protocol defines the general requirements for projects and operators, the quantification used to determine the amount of biogenic carbon stored in projects (OSC metric), and the reporting and verification standards. ONCRA emphasises radical transparency and open data, ensuring that smallholders can participate without upfront costs. This inclusive approach fosters trust in carbon removal efforts and provides tools, protocols, and services that make carbon accounting and monetization accessible to all, enabling small and medium-sized removers to enter the carbon market.

The development of the first OSC metric was made possible through funding from our network of ambassadors at the Climate Cleanup Foundation, with support from the INNO Fund (WWF). Our broader systemic goal in creating this metric is to accurately measure carbon storage, assign a monetary value to carbon removal for operators, and facilitate transition finance for these activities. This approach ensures that carbon storage efforts are effective, fair, and transparent, helping to overcome economic barriers and drive the shift towards a green and blue economy.

### **Our Impact**

Mangroves play a crucial role in terms of carbon sequestration. With their high productivity and carbon storage capacity, mangroves are globally significant carbon sinks, responsible for 14% of the total carbon sequestration by the global ocean.

As part of our efforts to quantify different types of blue carbon, we successfully calculated the stored carbon in the mangrove restoration project at Lac Bay, located in the southeastern part of Bonaire, an island in the Dutch Caribbean. This shallow bay is part of a protected Ramsar site, where mangroves thrive and play a crucial role in the ecosystem. This bay is home to three species of mangroves, with red and black mangroves being the most dominant. However, the bay faces growing challenges due to overgrazing by roaming livestock and land-use changes in the surrounding areas. These factors are accelerating sediment accumulation, which is gradually filling the bay and threatening the health of the mangrove ecosystem. Restoring the Lac Bay mangroves is possible through effective management strategies. One potential solution is to reopen old channels to restore natural water flow throughout the mangrove area. Local organizations, such as Mangrove Maniacs

in partnership with STINAPA, are actively working on these restoration efforts. The restoration of mangroves provides numerous ecosystem benefits, including enhanced biodiversity, improved coastal protection, better water quality, and significant carbon sequestration. As Climate Cleanup, we calculated the carbon stored in this restoration project, using it as a pilot example for our ONCRA metric. The project is now prepared for certification.

### **Our Goal**

Our goal is to extend the ONCRA certification and calculation method to mangrove ecosystems around the world, enabling them to benefit from this transparent, open, and non-profit approach, grounded in the Oxford Principles. This will help amplify the global impact of mangrove restoration and conservation efforts.

Our mission with this new project is:

- To calculate and certify at least three additional mangrove projects in underserved regions, such as West Africa. In countries like Nigeria, Guinea-Bissau, Senegal, and Gambia, mangrove forests are under increasing pressure from agricultural expansion, logging, industrialisation, and urban growth in coastal areas. Similarly, in East Africa—Mozambique, Tanzania, and Madagascar—mangroves face threats from uncontrolled logging for timber and fuel, as well as the impacts of climate change, including rising sea levels.
- We believe that developing a holistic certification system for mangroves and presenting it to governments as a valuable policy tool will set important precedents. This will enable fair, open certification for the voluntary carbon market and strengthen its role as a powerful policy instrument.
- We work closely with trusted partners, leveraging existing knowledge and experience. Our approach is to drive systemic change by acting as an effective “trim tab”—making a meaningful impact without wasting time or energy.
- As a small NGO based in Europe, we rely on our international network and are committed to finding the best local partners to ensure the successful and timely delivery of the project with flexibility and agility.

In short, we aim to fund the carbon storage calculation and certification of three mangrove projects in underserved areas, creating lasting environmental and social benefits.