

## What is Blue Carbon and How Does it Help Climate Change?

Blue carbon is the often least discussed natural carbon sink, yet one of the [most important](#). Tropical rainforests, savannah grasslands, and continental forests are typically mentioned when discussing carbon absorption by biological systems. While each of these ecosystems plays an important role, blue carbon systems are the king of carbon absorption. Coastal ecosystems such as mangroves, tidal marshes and seagrasses make up the major blue carbon sinks.

However, while these environments are incredibly efficient in absorbing carbon, they are underappreciated and are often cleared for urban development. This has led to a call for added conservation measures for blue carbon-related ecosystems.

### Mangroves



Source: [Pexels](#)

It can be hard to visualize the importance of an ecosystem - especially one that occurs on [0.1%](#) of the planet's coasts. Tropical rainforests, which also occur within mangroves' distribution zone, are easy to imagine. The Amazon, Central Africa and South East Asia evoke images of towering trees and thick forests

that scientists and activists are actively trying to protect and conserve due to their abilities to [absorb carbon](#). However, smattered across the coasts of tropical nations are mangroves, environments that provide a range of [ecosystem services](#). These include erosion reduction, protection from storms, reduction of wave action, fish nurseries and the world's highest carbon sequestration rates.

A mature mangrove forest can [absorb](#) between 6 to 8 tons of CO<sub>2</sub> equivalent per hectare, compared to just above 2 tons of CO<sub>2</sub> equivalent for tropical rainforests. Mangroves are the most efficient natural carbon sink on the planet. When considering that tropical rainforests are known to absorb the most CO<sub>2</sub> of all terrestrial forests, mangroves emerge as an unexpected environmental [powerhouse](#). Across global tropical ecosystems, mangrove forests are being increasingly protected and replanted to aid in protecting local environments and helping reduce carbon emissions.

## Tidal Marshes



Source: [Pexels](#)

Like mangroves, tidal marshes are critical coastal ecosystems that occur in specific environments and provide tangible benefits to local food, land, and water security. Marshes are found along rivers and coasts that flood and drain depending on tides. They are also referred to as intertidal zones. These zones help

filter pollutants, maintain water quality in coastal areas and act as an important wildlife ecosystem for migratory birds, fish, shellfish, and other marine species. Another coastal biological hotspot, tidal marshes, also have an important role in absorbing carbon.

Their sequestration rate is [equivalent](#) to mangroves - 6 to 8 tons of CO<sub>2</sub> equivalent per hectare - but they have a wider geographical spread. These environments are also subject to increased protection and conservation interest as their ecosystem services become more acknowledged. Blue carbon programmes involving carbon offsetting and direct conservation monitoring are [gaining steam](#) on the international stage as countries seek to maximize carbon sequestration.

## Seagrasses



Source: [United Nations](#)

Seagrasses are another core ecosystem that provides far more benefits to local and global environments than previously thought. Not to be confused with seaweed, seagrasses resemble their terrestrial namesake and are the only flowering plant that grows in marine environments. Found in temperate and tropical waters, seagrasses help stabilize the substrate, provide shelter for fish and other species, and are the primary food source for marine mammals like dugongs and manatees.

This, in addition to a carbon absorption rate twice as large as tropical forests, make it an essential addition to blue carbon climate mitigation programmes. Seagrasses account for less than [0.2%](#) of the world's oceans, but they sequester approximately 10% of the carbon buried in ocean sediment annually. Often found in conjunction with at least one of the above ecosystems, protecting seagrass meadows, marshes or mangroves will conserve the other and help maintain or compound the services they provide.

## Combining Nature Based Solutions and Renewable Energy

The demand for ecosystem-focused climate change mitigation programmes is growing. Communities are becoming more aware of the opportunities that nature has to absorb carbon and the services it provides. [Dan Crockett](#), a blue carbon specialist at the Blue Marine Foundation, explains: “First, there is a global trend towards the need for nature-based solutions to the climate crisis. Second, there have been many breakthroughs in our understanding of oceans and the way they sequester and store carbon.”

An increase in nature-based solutions like blue carbon can work together with renewable energy projects to reduce carbon emissions and create the low-carbon future that governments and communities seek to implement. Coastal ecosystems around the world can be central actors in the transition to sustainable development. Their protection from urban development, fisheries operations and human interactions is necessary.