



Shining the Light on Blue Carbon

February 2021: I am delighted to have been part of Yacht Carbon Offset for 18-months now. Over this period I have been asked on many occasions to define the term ‘blue carbon’ and to explain why there is a lack of ‘blue carbon’ credits available in the carbon market. This short article will hopefully provide the answers to both of these questions. Please feel free to contact me to discuss in more detail.

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What is Blue Carbon?

Blue carbon is the carbon stored in coastal and marine ecosystems, such as mangroves, tidal marshes and seagrasses. These ecosystems capture (sequester) large quantities of carbon dioxide (CO₂) – a significant greenhouse gas - and store it away in both the plants, the roots, and soil deep below the ground. Put simply, blue carbon plays a vital role in our fight against climate change.

Where are Blue Carbon Ecosystems Found?

Blue carbon ecosystems are spread worldwide. They are known to be present across six of the world’s seven continents, although mapping of these ecosystems is by no means comprehensive.

Global Distribution of Blue Carbon Ecosystems



Source: The Blue Carbon Initiative

It is fair to say that a significant percentage of blue carbon ecosystems are located in the world’s poorer regions. Hence, it is not surprising that local communities often exploit the resources of the ecosystems as they struggle against poverty and strive for food security.

Exploitation of the ecosystems leads to degradation. Mangroves are cut down to make way for farming activities, marinas, coastal development and they are a source of timber for building and firewood. They are also threatened by pollution, sedimentation and climate change. The deforestation of mangrove forests is happening at an alarming rate globally and, as it occurs, the stored carbon is released back in to the atmosphere in the form of CO₂.



What Are the Benefits of Blue Carbon Ecosystems?

Blue carbon ecosystems bring a huge number of benefits to our planet.

Source: UNESCO



Carbon capture is, of course, a massively important role. Like other wood plants, the plants of blue carbon ecosystems use carbon to maintain and construct foliage, reproductive organs, stems, branches and root tissues. They also create storage reserves in soil and dead roots.

Importantly, coastal ecosystems are significantly more effective at sequestering and storing carbon dioxide on a per area basis per year than forests.

The reason for this efficiency is that blue carbon ecosystems store significantly more carbon below ground than terrestrial trees. The surrounding water and waterlogged soil prevents the breakdown of the stored carbon for significant periods of time and it can be locked away for hundreds, or even thousands, of years (unless of course the ecosystems are destroyed - see below). There is a reported 260 billion tonnes of carbon stored in blue carbon ecosystems, twenty six times more than the amount of carbon released through global fossil fuel emissions in 2019¹. Losing these ecosystems would significantly contribute to carbon emissions and fast accelerate climate change.

Beyond carbon sequestration, blue carbon ecosystems bring enormous benefits to the nearby coastal communities. They provide shoreline protection, thereby limiting coastal erosion. They filter and purify the water, leading to biodiversity and creating habitats for endangered species, such as seahorses and turtles, and create habitats for a huge variety of fish and shellfish. Seagrass ecosystems are reported to support around 20% of the world's fisheries². Both the fishing and the ecotourism that arises from blue ecosystems helps to build local communities. So, we don't have to look too hard to see the benefits!

What is Driving the Degradation of Blue Carbon Ecosystems?

Ecosystems are being lost at an alarming rate and we need to do all we can to protect them. Hundreds of thousands of hectares of coastal blue carbon systems are being destroyed per year³, largely due to direct and indirect human activity ("anthropogenic impact"). Factors such as de-forestation, increasing coastal population size, coastal development, agriculture and aquaculture, sedimentation and siltation all play a role, as do the effects of climate change, such as sea level rise and extreme weather events.



Source: Tom Worthington, Cambridge University (mosas stock photo)

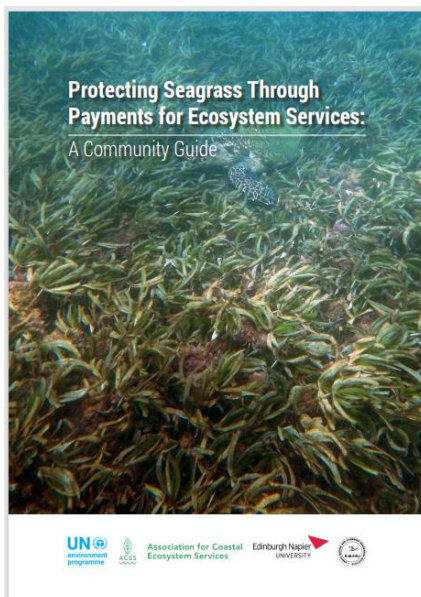
When ecosystems degrade, they not only fail to act as carbon sinks, but also contribute to carbon emissions by releasing stored carbon into the atmosphere. It is estimated that current rates of loss of ecosystems are releasing between 0.15 and 1.02 billion tons of carbon into the atmosphere each year³, contributing significantly to anthropogenic climate change.



Where are the Blue Carbon Credits?

Carbon credits are the basis of carbon financing, a funding tool that places a financial value on carbon emissions and allows individuals and organisations wishing to offset their own emissions to buy carbon credits earned from sustainable projects. To date, there are very few coastal and marine ecosystems projects issuing 'blue carbon' credits. The lack of blue carbon credit availability is due to a combination of factors, including the complexity of meeting the high standards for accreditation and the time and cost to complete the accreditation process.

The quality of carbon credits is assured by standard-setting organisations such as *The Gold Standard*, *The Verified Carbon Standard (VERRA)* and *Plan Vivo*. These organisations perform three basic functions: (1) they develop and approve standards that set criteria for the quality of carbon credits; (2) they review offset projects against these standards (generally with the help of third-party verifiers); and (3) in some cases, they operate registry systems that issue, transfer, and retire offset credits. The key carbon certification principles are: **Additionality** (does the project bring significant, positive benefits that wouldn't have happened if project didn't exist?); **Permanence** (will the project be maintained); **Leakage** (will the project prevent damaging activities from being shifted elsewhere? Is there a net carbon benefit?)



Meeting the rigorous accreditation requirements is complex and costly for any project. For blue carbon ecosystem projects these factors are magnified. Blue carbon projects typically focus on the restoration and conservation of existing habitats. These habitats are often extensive and support poor communities whose livelihoods depend on the ecosystem exploitation. To begin, the blue carbon project will first need to educate the dependent communities to change their ways, for example: to fish elsewhere or to change fishing techniques; to plant and grow alternative wood sources; etc. Convincing communities to change their lifestyle requires strong project coordinators, firm backing from the local community, trust, and ultimate commitment from all. It takes time and is a massive task, especially when the financial compensation and the social, natural and financial benefits of change are not immediate, or even guaranteed.

Source: Association for Coastal Ecosystem Services

Once the blue carbon project is established a well-managed structure needs to be put in place to ensure that carbon stored in the ecosystem can be quantified using scientific methods, and is maintained and preserved for many years to come. This will require technical and managerial expertise and a local governance framework. If there is a low level of education in the local communities, key positions may need to be recruited from outside the community – perhaps leading to resentment. Measuring and rigorous monitoring of the carbon capture of the ecosystem will need the support of strong scientific partners.

Compare this to a renewable energy project, built from tried and tested technology on a small amount land. The day-to-day lives of the local community are unlikely to be significantly impacted during construction, other than the potential employment created by the construction activity. Post construction, the benefit of power generation from a renewable energy source is immediate, in the form of reduced local pollution and improved facilities for the local community. The lack of complexity of a



renewable energy project means that many more projects of this nature reach the high standards of accreditation, making renewable energy carbon credits far more abundant than blue carbon credits.

The Light is Beginning to Shine on Blue Carbon

The good news is that the importance of blue carbon ecosystems in fighting climate change is increasingly recognised by scientists, natural resource managers and the public. This is leading to a drive and determination to develop blue carbon projects to help local people restore and conserve their natural coastal ecosystems.

The international community has begun to evaluate how these ecosystems can be more effectively included within existing policy frameworks, such as the Verified Carbon Standard mechanisms. Plan Vivo has accredited three mangrove projects to date: Mikoko Pamoja and Vanga Blue Forest in Kenya; Tahiry Honko in Madagascar. Mikoko Pamoja was the first of these projects, producing a small, but impactful, number of blue carbon credits since 2012 (around 2,000 credits per year).



Source: Global Mangrove Alliance

The benefits of Mikoko Pamoja to the local community - mangrove reforestation; enhanced livelihoods; job creation; community services (education water and sanitation) have been clear. Word of this success has spread to neighbouring communities and countries, with Tahiry Honko and Vanga Blue coming on stream in 2018 and 2020 respectively. The volume of blue carbon credits available from these projects are not going to change the carbon market today, but they will certainly be influencing the carbon markets of tomorrow.

Sources:

- ¹*Nature Climate Change: Protecting irrecoverable carbon in Earth's ecosystems*, 31 March 2020
- ²*World Seagrass Association publication 'Out of the Blue: The Value of Seagrasses To The Environment And To People, Summary for Policymakers'*
- ³*The Blue Carbon Initiative*, www.thebluecarboninitiative.org
- *Association for Coastal Ecosystem Services (ACES)*, www.aces-org.co.uk
- *Plan Vivo*, www.planvivo.org
- *Global Mangrove Alliance*, www.mangrovealliance.org
- *United Nations Educational, Scientific and Cultural Organization (UNESCO)*, www.unesco.org

About Yacht Carbon Offset

Yacht Carbon Offset provides an environmental carbon offset service to the superyacht industry. We allocate greenhouse gas emission reductions from projects that are relevant to the yachting community. These are typically renewable energy projects, such as solar, wind and geothermal technologies, located in coastal or island locations to reflect the maritime nature of our clientele e.g. Caribbean or coastal locations e.g. Caribbean or coastal locations. We are currently exploring options to offer our clients blue carbon credits that support marine ecosystem projects in the near future.