Blue carbon habitats such as seagrass beds and saltmarshes are recognised as a substantial global carbon sink with rates of carbon burial that are much higher than in terrestrial ecosystems and which can be sustained for longer periods of time (Mcleod et al. 2011). For this reason, action taken to protect or restore them are increasingly seen as nature-based solutions that can help meet national climate targets (Latheef 2022). They also attract investors on the voluntary carbon markets, particularly as restoring these ecosystems often brings other co-benefits to nature and people (Economist 2022).

Most existing verified blue carbon restoration projects focus on mangrove restoration in the global South. The science and methodologies for blue carbon quantification available today can be applied to only two ecosystems in Europe: seagrass meadows and coastal (salt) marshes. There are two methodologies under the Verified Carbon Standard (VCS) relevant to these habitats, VM0033 and VM0024 (Hamerkop team 2021).

To date, there have been no verified blue carbon projects in Europe for several reasons. First, it has been too costly to apply the VCS methodologies in the European context, where coastal projects tend to be relatively small and labour costs are high. Seagrass and saltmarsh blue carbon projects are more costly to implement than mangrove projects because quantification through remote sensing is often impossible – below-ground or below-water vegetation and sediment are challenging to detect from space. Therefore, more expensive techniques must be applied for accurate carbon flux accounting (Conservation International 2022). Another reason is that little data on carbon in blue carbon ecosystems is available for many parts of Europe. This makes it difficult to establish project baselines to calculate the additional carbon benefits of interventions to protect or restore them (referred to as a project’s ‘additionality’).

Several blue carbon standard initiatives in Europe are currently under development. These may provide pathways for coastal restoration projects to generate and sell credits in a more affordable and streamlined way than verification through VCS.

This primer aims to provide an overview of existing blue carbon projects worldwide and developing blue carbon standards in Europe.
**Example blue carbon project: Virginia Coast Reserve’s Seagrass Restoration Project**

The Nature Conservancy (2021)

**Habitat:** seagrass meadows (*Zostera marina* native eelgrass)

**Methodology:** VM0033 (Tidal Wetland and Seagrass Restoration)

**Activities:** direct seeding

**Area:** 66,452 hectares

**Crediting period:** 2015 – 2045 with verification every 5 years

**Total estimated GHG emission removals:** 40,486tCO$_2$e

**Summary:** This US-based project to restore seagrass is the only blue carbon project currently in the VCS registry that is based in the developed world. The project aims to restore seagrass in areas where it became extinct in the 1930s by seeding suitable habitat plots with seeds collected from donor areas in the same region. Seeds are distributed in the autumn months from boats.

**Leakage:** considered not to result from project activities.

**Safeguards:** Concerns expressed by commercial clam growers that eelgrass expansion may limit clam cultivation opportunities. The area is publicly owned so no property rights are impacted.

**Co-benefits:** Project proponents believe that restored seagrass habitat can support bay scallops, which are food for several predators and are considered a delicacy by humans, although currently the population is too small to self-sustain.

**Monitoring:** Cover is monitored through multispectral aerial imagery during peak growing season, accounting for tidal stage, sun angle, turbidity, wind and other factors. Ground surveys done in the same year supplement these data.

**Emission reductions:** Emission reductions in the project are negligible for the first four years, after which they begin to grow exponentially peaking at 1,853 tCO$_2$e in year 2044.
UK Saltmarsh Code

The UK government has funded research and development work to create a UK voluntary code to attract private funding for saltmarsh restoration. The code is expected to make projects more cost-effective than if they were developed under VCS, which has relatively high administrative fees and a methodology (VM0033) with complex requirements for measurement, reporting and verification (International Union for Conservation of Nature 2022).

The code developers have assumed that most project development costs would be funded by grants or other donations, at least during the early stages of the saltmarsh carbon market: carbon revenues alone would not be sufficient to cover the substantial up-front expenses of saltmarsh restoration and make these projects investable. These costs can eventually be recovered by projects over 1000 hectares, however feasible sites for restoration in the UK are much smaller. Moreover, many UK saltmarsh sites have carbon sequestration rates that are too low as they are often in nature reserves and their initial level of degradation is not as high, which also hurts their profitability.

The developers expect to have a pilot code in 2024.

More info:

- Wetlands for Carbon Storage. WWT Route Map. (2022)
- The Ocean: Turning the Tide on Climate Change (2022)
- UK Blue Carbon Forum
- Saltmarsh Restoration Handbook (2021)
Label Bas Carbone seagrass methodology

France’s Label Bas Carbone (Low Carbon Label) is in process of adding a new seagrass methodology. The methodology is narrowly focused on meadows of a single species of seagrass, Posidonia oceanica. The methodology quantifies only carbon sequestration that has resulted from avoided seagrass habitat degradation. Eligible projects will reduce impacts caused by traditional anchoring of recreation boats (cement block and chain), in which chains drag on the seafloor uprooting vegetation (EcoAct n.d.). Projects can last 30 years and must be verified every 5 years. By narrowing the focus to one species and one type of threat, the aim is to cut down expenses for project development compared to VCS.

The methodology has been partly based on findings of LIFE Blue Natura project and developed in partnership with the Calanques national park which will become a pilot site. There are about 100 hectares of seagrass meadow in the park with restoration potential. General and conservative calculations based on Tier 1 data suggest that the site could sequester 850 tCO₂e over 30 years.

The Low Carbon Label is a national crediting scheme created in 2019 and available to French companies aiming to reduce their carbon footprint. Entities that seek to finance an emissions reduction project can register their interest on the government platform and subsequently publish verified emission reductions on a company page. The label also has a range of approved methods in the forestry and agriculture sectors.

More info:

Project méthode Label Bas Carbone protection herbiers de posidonie | vie-publique.fr
methodode_herbiers_posidonies_lbc_v07.pdf (developpement-durable.gouv.fr)

Projet de décision d'approbation d'une méthode "Label Bas Carbone" de protection des herbiers de posidonie | Consultations publiques (developpement-durable.gouv.fr)

Label bas carbone - Ministère de la transition énergétique (ecologie.gouv.fr)
Andalusian Carbon Standard for the certification of blue carbon credits

In the Spanish region of Andalusia, the regional government partnered with EU-funded project LIFE Blue Natura to quantify blue carbon in coastal areas and explore options to finance restoration of seagrass meadows and tidal marsh habitat through the voluntary carbon market.

The project has developed a calculator to quantify carbon removals in these two habitat types, along with a guidance document (in Spanish).

The regional government has created a voluntary carbon footprint registry (Sistema Andaluz de Compensación de Emisiones or SACE) where Andalusian companies can report their carbon footprint. As part of this platform, companies will also be able to fund carbon restoration projects to offset their emissions. The blue carbon projects deemed viable are listed in a catalogue by the regional government. Currently it includes two pilot sites:

Bahía de Cádiz: Two projects to restore two areas of tidal marsh (365ha in total) through improving water flow and natural recolonisation by Sporobolus maritima cordgrass. The estimated cost of restoration works is EUR345,000 for both projects, which does not include the costs of validation, verification, and monitoring. The estimated amount of CO₂ absorption is 106,367tCO₂e over the course of 50 years. The projects are within the Natural Park of Cadiz Bay protected area.¹

Cabo de Gata: The project will restore P. oceanica seagrass meadows on 11ha in the Natural Park of Cabo de Gata-Nijar protected area by removing traditional boat mooring structures consisting of concrete block and chain and installing advanced fixed mooring structures. This will stop degradation of seagrass caused by chains dragging on the seafloor and uprooting vegetation. The estimated cost of these works is EUR273,000, which does not include the costs of validation, verification and monitoring. The estimated amount of CO₂ absorption is 684tCO₂e over the course of 50 years.

More info:
LifeBlueNatura_Layman.pdf (life-bluenatura.eu)
E3_BLUE-CARBON-Estandard_eng.pdf (life-bluenatura.eu)
GHG Emissions Offsetting - Climate Change (juntadeandalucia.es)
Standard pilot

¹ Estándar Andaluz Carbono Azul - Proyecto Piloto BC.docx (juntadeandalucia.es)
Other blue carbon finance initiatives in Europe:

Seaforest LIFE: EU-funded project aiming to conserve and restore *Posidonia oceanica* seagrass meadows in two Italian regions and create a platform for local businesses to purchase carbon credits resulting from these activities. (Started 2018)

LIFE Wetlands4Climate: EU-funded project to improve management of coastal and saline wetlands in the Mediterranean and develop a methodology to quantify GHG sequestration in these habitats to include them in the voluntary carbon market. (Started 2020)

UK Seagrass Carbon Code: UK project to develop a national blue carbon code to encourage restoration of seagrass meadows. (Started 2022)
Future of blue carbon markets in Europe

Although the interest in blue carbon credits is growing rapidly in the private sector, the options to supply these credits are developing slowly (Verra introduced its first blue carbon methodology in 2020). The market will start to mature as more projects are developed around the world, building more awareness and pushing governments to include blue carbon in Nationally Determined Contributions (NDCs) and regulate legal issues around rights and ownership. In Europe, the demand for a blue carbon market has led to a number of national and sub-national initiatives to improve habitat knowledge and create simplified crediting schemes that facilitate over the counter transactions between companies and projects. Meanwhile rapid improvements in remote-sensing technologies and alternative tools can help calculate blue carbon inventories and flux in a way that would make project monitoring more affordable.

Other useful links:

High-Quality Blue Carbon Principles and Guidance

Manual for the Creation of Blue Carbon Projects in Europe and the Mediterranean

International Partnership for Blue Carbon

Blue Natural Capital

Blue carbon: The potential of coastal and oceanic climate action (mckinsey.com)
References


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Photo 2: Tim Ferrero

Photo 3: Paul Adams

Photo 4: Paul Adams

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