

European POSIDONIA SEAGRASS / COASTAL MARSHES as natural capital for mitigating CLIMATE CHANGE in Andalusia, Spain

Certain European coastal habitats such as marshes and seagrass meadows, including those of *Posidonia oceanica*, are significant carbon sinks (Fig 1). They are known as “Blue Carbon ecosystems” and is capacity that makes them important for **mitigating climate change**.

Despite their importance, coastal marshes and seagrasses are disappearing at a rate greater than terrestrial forests and its decrease on quality also affect its capacity to sequester and accumulate carbon.

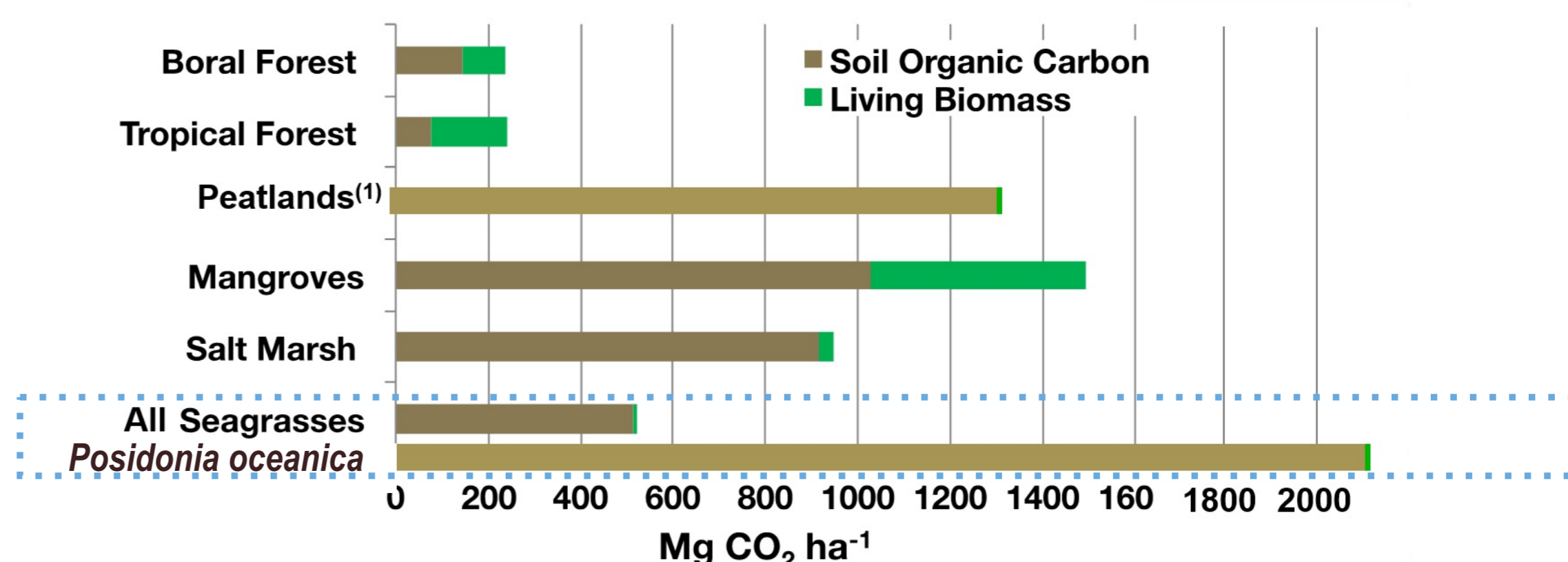
Recent studies have identified significant opportunities for actions to conserve, enhance or restore the carbon sequestration potential in these coastal ecosystems.

The incorporation of **Blue carbon programmes** into Mediterranean country’s climate change strategies still lacks knowledge on the extent of the capacity and variability of these ecosystems, the development of policy instruments such as carbon offsets frameworks, and the ability on how to best develop coastal environmental management frameworks at local and national scales.



Figure 1

Posidonia meadow: a ‘factory’ to sequester Carbon



Soil data: Top meter of sediment from Fourqurean *et al.* 2012; Pan *et al.* 2011; Pendleton *et al.* 2012 (modified by G. Pergent)
⁽¹⁾ Mean thickness (2 to 4 m)
⁽²⁾ Mean thickness (1 to 3 m)

P. oceanica is a unique seagrass in terms of the quantity of organic carbon that can be stored in its sediments. Its carbon fixation can be >1 ton C per ha and per year and its sink capacity could account for more than >1 million tons C per year at Mediterranean level. Initial estimates from few research studies indicate also that the carbon stock in the matte might reach >1 500 tons C per ha. The release of this carbon into the atmosphere intensifies the negative effects of climate change.

The **LIFE PROJECT BLUENATURA** is an innovative European project that aims to find the mechanisms, tools and the knowledge to address all these challenges in order to improve ecosystem management and restoration projects using carbon financing mechanisms. As a pilot study in the region, the results will be transferred to inform future initiatives for other regions as well as explore long-term sustainable climate mitigation or adaptation policies.

The Life project BlueNatura is working on:



A. Filling knowledge gaps on Blue Carbon ecosystems along the coast of Andalucía

B. Incorporating Blue Carbon ecosystems into climate strategies

C. Addressing existing policies and requirements to maintain healthy ecosystems





Coastal marshes and Posidonia seagrasses in Andalusia



Aprox. 24.000 ha. of coastal marshes in Cadiz Bay and Odiel Marshes.

Aprox. 7.000 ha. of *Posidonia oceanica* and other marine phanerogams (*Cymodocea nodosa*, *Zostera noltii*).

Andalucía has a major extension of coastal marshes and seagrass meadows along the Atlantic and Mediterranean coasts. The project is contributing to a better understanding of these carbon sink habitats in Andalusia, as well as to its characterization, state of conservation and evolution in the coming decades

The Life Natura Blue Andalucía project (LIFE 14 / CCM / ES / 000957) has a duration from 1 August 2015 to 31 December 2019.



Table 1. Global estimates for the EU

Detailed overall estimates relative to the Blue Carbon stored in the ecosystems formed by European saltmarshes and seagrass meadows is still limited. Taking into account the known extension of these ecosystems, global carbon stocks and fluxes associated to saltmarshes and seagrass meadows from EU with global studies, together with the most accurate study by the Project LIFE Blue Natura (LIFE14CCM/ES/000957) in the region of Andalusia (Spain), some initial estimates are provided below:

	Stocks		Sequestration	
	GtC/EU BC	GtCO ₂ /EU BC	MtC/yr EU BC	MtCO ₂ /yr EU BC
Seagrassess	2.0	7.5	3,0	11,0
Saltmarshes	0.1	0.3	0,8	2,8
Total EU BC	2.1	7.7	3,8	14,0

Table 1. Potential carbon and carbon dioxide (CO₂) sequester annually and store by European Blue carbon ecosystems (EU BC). Units: Gigatonnes (Gt).
Sources: Mateo et al 1997; Nelleman wet al 2009; Mateo et al 2006; Mateo & Serrano 2012; Pendleton et al 2012; Macowen et al 2017; LIFE Blue Natura 2018.

These estimates indicate that Blue Carbon Ecosystems in the EU store large stocks of organic carbon in their soils, comparable to those by forests. While the annual sequestration rates are low compared to temperate forests, the vast stocks of CO₂ accumulated over hundreds and thousands of years could be at risk of being released back to the atmosphere contributing to the total EU emissions.

Avoiding the loss of blue carbon ecosystems should be a priority for EU policies to avoid these emissions and to preserve the other key ecosystems services they provide. Conservation of blue carbon ecosystems in the EU could be economically sustainable by monetizing the avoided emissions through combined offset projects (additions + avoided emissions) if the blue carbon ecosystems of the EU where included in the National Carbon offset inventories.

There is a large gap in knowledge regarding the distribution of blue carbon ecosystems in the EU. Closing this gap and more accurately characterizing the global stocks and sequestration rates EU Blue Carbon ecosystems is further needed to support resource management, strengthen decision-making and facilitate tracking of progress towards the conservation and mitigation targets set by EU and world environmental agreements.



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