

Science for Environment Policy

The economic benefits of carbon storage in the Mediterranean Sea

Carbon storage in the Mediterranean Sea could be worth up to €1722 million a year, a new study has found. The researchers performed a combined ecological-economic assessment, finding that the sea takes up an estimated 17.8 million tonnes of CO₂ every year, providing important climate change mitigation.

Marine ecosystems are essential for human life. They provide a host of ecosystem services on which society depends. One of the most important is carbon storage. Marine systems are thought to absorb approximately 2 billion tonnes of carbon every year, corresponding to around 25% of human emissions. The ability of the ocean to store such large quantities of CO₂ prevents the gas from contributing to the greenhouse effect and slows down climate change.

One way to measure the importance of ecosystem services is via their economic value. While many ecosystem services have been measured like this, the monetary value of marine carbon sequestration is as yet unknown. As a result, market prices do not account for it, falsely suggesting that this service has zero value. Because many public and private sector decisions are made based on market information, the unquantified value of carbon sequestration could lead to poorly informed decisions about the management of marine and coastal areas.

Therefore a team of researchers, part-funded by the EU [MedSea](#)¹ project, estimated the economic value of marine carbon sequestration, using the Mediterranean Sea as a model. The researchers performed a combined ecological-economic assessment of carbon sequestration, consisting of a cutting edge biogeochemical model alongside European Commission estimates of the social cost of carbon emissions, which approximate the economic damages caused by increased CO₂ emissions.

The researchers applied the model to the Mediterranean Sea under current conditions. Their results showed that the sea takes in an estimated 17.8 million tonnes of CO₂ each year. Most carbon storage occurs in four countries waters (Algeria, Greece, Italy and Spain), which account for around 84% of total carbon sequestration in the Mediterranean Sea, despite representing little over half of its total surface. Regions in the west of the Mediterranean Sea take in more carbon due to a combination of factors, including the changing properties of water, biological activities and a temperature gradient that affects the solubility of CO₂.

The researchers believe the current value of carbon sequestration over the entire Mediterranean basin amounts to €337.3 million every year. Of this, €281.4 million can be attributed to phytoplankton uptake, while the rest occurs through physical processes. While there is some uncertainty in these estimates, the researchers state that their approach provides a robust valuation of carbon sequestration services over the Mediterranean basin, which is, if anything, conservative.

This study is the first to put a price on the carbon sequestration services provided by the Mediterranean Sea. More broadly speaking, it contributes to the growing understanding that human life is dependent on the ocean. In time, the method could be expanded to other regional seas and eventually all seas on Earth. The researchers recommend the use of this model and the information it provides when making environmental management decisions.



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