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## Towards the definition of a standard protocol for the estimation of CO<sub>2</sub> fixation by *Posidonia oceanica* meadows in the Mediterranean Sea (SeaForest Life Project)

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*Posidonia oceanica* (L.) Delile meadows are considered as the most productive ecosystems of the Mediterranean basin, sequestering and storing significant amount of blue carbon in their rich organic sediments and in their living and non-living biomass and these meadows are identified as a priority habitat type for conservation under the Habitat Directive (Dir 92/43/CEE). Despite the importance of the ecosystem services it provides, this habitat is disappearing at a rate four times as high as that of terrestrial forests, experiencing an alarming reduction due to the impacts of human activities in coastal areas, especially in the north-western side of the Mediterranean Sea. To face this issue, the SeaForest Life project foresees the quantification of carbon deposits and their rate of change related to habitat degradation specifically focusing on the effects caused by boat's anchors and moorings. The project is realized in the Archipelago of la Maddalena National Park, the Asinara National Park and the Cilento, Vallo di Diano and Alburni National Park, for which ad hoc management plans of mooring are going to be adopted to reduce the impact of this practice on the seagrass meadows. As a first step, an updating of habitat 1120\*'s cartography in each of the Marine Protected Areas engaged in the project have been fulfilled, using high definition multispectral imagery. Furthermore, monitoring of the areas with the highest attendance of the anchorages was carried out through the use of medium resolution satellite multi-spectral images using the infrared band, to identify and quantify the degradation and the state of conservation of the *P. oceanica* meadows present in the investigated areas. The updated cartography has been used to implement the InVEST Coastal Blue Carbon (CBC) which attempts to predict the sequestration, storage and, when degraded, the emissions of carbon by coastal ecosystems, so representing a useful tool for the analysis of the ecological and economic effects of the degradation processes (boats anchoring) and mitigation measures (anchor management plan and eco friendly moorings). Up to now, the InVEST-CBC model has estimated a CO<sub>2</sub> loss due to boats anchoring equal to 2300 tCO<sub>2</sub>/year, using stock and flow data in soil and biomass obtained from the results of the Life Blue Natura project and *P. oceanica* samples collected in the Cilento National Park. In the future, the results of the model will be improved with data collected in the other two project areas, also through the use of innovative instrumentation. Moreover, the scenarios with the implementation of the mooring management plans will be analyzed in the

three study areas. The dataset obtained by the model is being used to define a standard protocol for the estimation of CO<sub>2</sub> fixation by *P. oceanica* meadows in the Mediterranean Sea. Such protocol will be fundamental for the realization of a national IT-based platform for a voluntary based carbon market to sell and acquire the carbon credits generated by the SeaForest Life project activities, to be extended to all the Mediterranean countries and to be scaled up to new protected marine areas.

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