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Blue carbon exchanges and storage moving from coastal to shelf environments: the role of human activities and management considerations.

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"Blue" carbon is defined as the particulate organic carbon stored in coastal and marine habitats and sediments. This component is typically considered to be associated with coastal environments, but there is also potential for offshore areas to be considered as long term carbon storage sites. These offshore marine habitats are therefore characterised in relation to their potential as carbon sinks, in terms of atmospheric CO_2 sequestration rate and the length of time of carbon storage.
Most of the UK's coast line is occupied by sand dunes, sandy beaches and salt marshes with carbon sequestration rates shown to be relatively high in salt marsh and mudflats. Statutory protection has helped to slow down the rate of loss of near shore and coastal habitats. Inappropriate coastal management together with coastal erosion and sea level rise continue to pose a severe threat to these areas. The role of UK offshore habitats as carbon sinks is less clear due to the difficulty in sample collection. As for coastal areas, these offshore areas support a range of commercial activities, e.g. trawling, dredging, windfarm construction or hydrocarbon production, and are concentrated on the UK's continental shelf. These commercial activities often involve chronic or acute sediment disturbance and therefore may interfere with carbon sink sources. For near shore habitats, sea grass meadows are the most active sources for blue carbon sinks, but their UK distribution needs to be improved mapping and C sink potential. The sediment distribution (e.g. muddy, coarse and sandy sediments) of the UK shelf, are likely to make an important contribution to the UK's carbon inventory.
There is a need to understand blue carbon sequestration and storage by coastal and shelf habitats, when considering the services provided by these habitats. Studies have quantified ecosystem services of coastal habitats, translating these services into monetary values of carbon stocks and flows. These values can then be applied to help inform decisions for marine and coastal ecosystems management. In the UK, the Climate Change Act 2008 provides a legal framework to deliver protection and enhancement of the marine environment, although there is minimal consideration of blue carbon sinks and on the services provided by these different habitats. This work assesses the main human activities and policies in the UK that encourage the sustainable us of coastal and marine ecosystems. Future adaptation and management practices may help the UK to maximise the use and protection of that blue carbon habitats provide. This UK example could help other countries with similar resources.