38. Carbon Sequestration

The prevailing science suggests that areas of the seafloor that are dominated by mud-grade sediments can potentially store significant amounts of organic carbon, acting as a carbon sink and forming a key part of the carbon cycle (e.g., Atwood et al., 2020; Lee et al., 2019). This carbon stock can be disturbed by anthropogenic activity (e.g., ORE development, benthic trawling) potentially causing resuspension and remineralisation of carbon that can be released back to the atmosphere, through the water column (Avelar et al., 2017; Sala et al., 2021). Initially, quantifying carbon stock levels and qualifying carbon flow processes in marine sediments (in particular mud) is a first order need in terms of managing their disturbance (Luisetti et al., 2019; Smeaton et al., 2021).

There is a paucity of direct study of the impact of ORE development on carbon stock. However, work to date suggests that, whilst there is disturbance of the seafloor at different life stages of development (i.e., construction and decommissioning), offshore wind farms can trap more organic carbon than they release through sediment disturbance (Heinatz et al., 2023). Further work is required to study the effects in an Irish context. Seabed trawling is known to have a more sustained impact on seafloor sediments (e.g., Oberle et al., 2016), In the Western Irish Sea Mud Belt (Coughlan et al., 2015). There is no available information on the effect of benthic trawling on seabed carbon stocks in the Irish Sea, however it is suggested to represent a significant risk to seabed carbon stocks because of the impact it has on seabed sediments (Luisetti et al., 2019).

The effective management of seabed areas in relation to sedimentary carbon disturbance will ultimately depend on the environmental settings as well as the chemical characteristics of the carbon (e.g. reactivity) (Epstein and Roberts, 2022; Smeaton and Austin, 2022). The resuspended carbon in the sediment could possibly make its way into the atmosphere and a lack of direct evidence should not prevent us making recommendations to offset the risk.

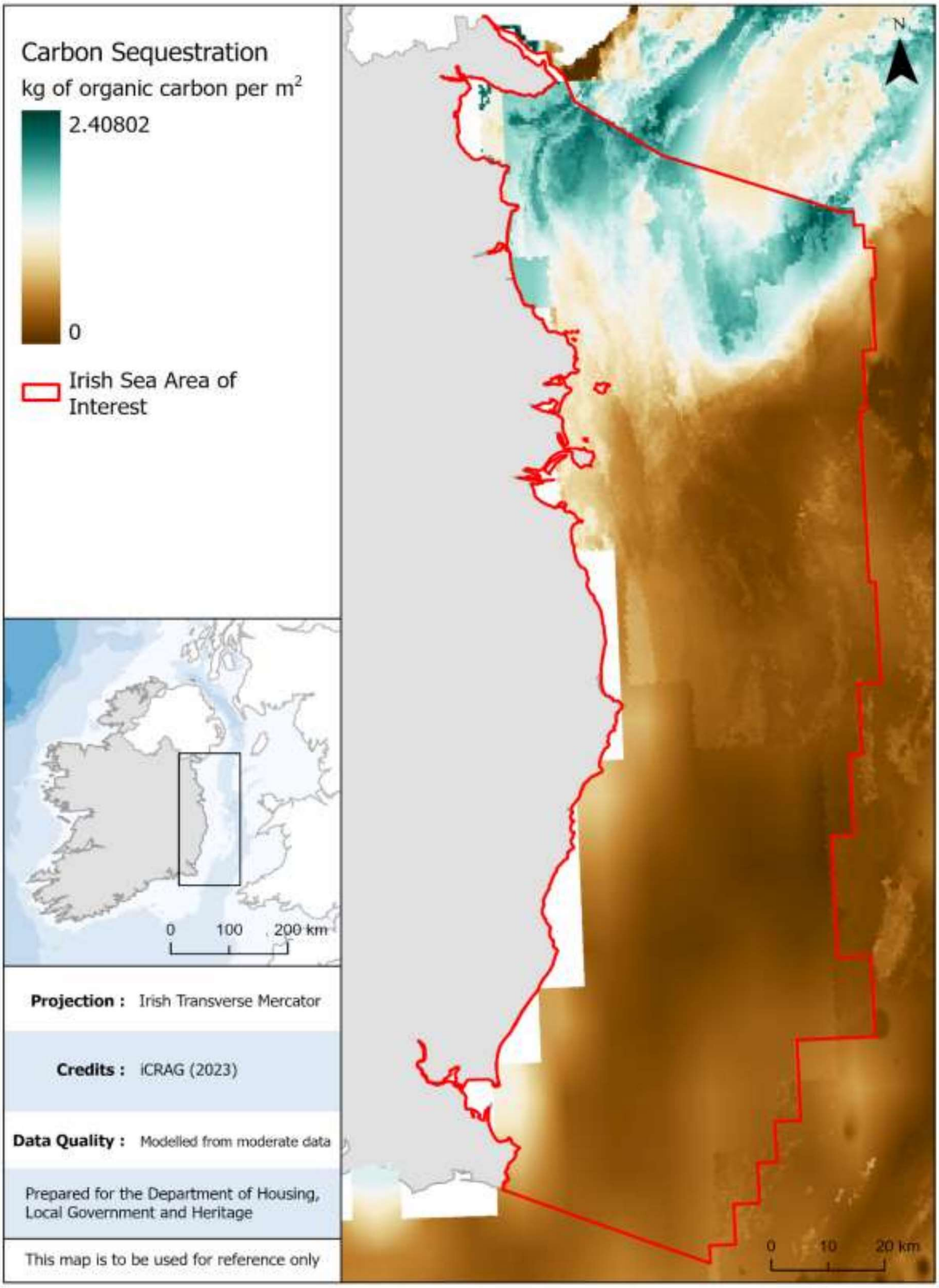

Figure 1. Modelled distribution of carbon content of sediments in the western Irish Sea.

Data sources and quality

Dataset Name	Data Owning Organisation	Dataset Quality	Metadata URL	Comments
Diesing Carbon Sequestration	Diesing	Modelled from moderate data		
Smeaton Carbon Sequestration	Smeaton	Modelled from moderate data		
Wilson Carbon Sequestration	Wilson	Modelled from moderate data		

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