Developing a framework for reducing sediment erosion and contamination at a river catchment scale and with the aims of reducing the need for dredging and improving the quality of sediments for re-use: Using Sediment as a Resource (USAR)

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Introduction: The dredging of sediments from harbours and other waterways is often necessary to maintain their economic and logistical function; however the dredging process, as well as the disposal of waste sediments, presents a number of challenges. Not only is dredging and sediment disposal expensive and time-consuming, it is disruptive to local habitats and often has negative impacts on water quality, carbon storage and recreational assets.

As part of the European Interreg 2 Seas Programme, 'Using Sediment as a Resource' (USAR), Westcountry Rivers Trust (WRT) is working with partners from the UK, Netherlands, Belgium and France to pilot novel approaches to beneficial reuse of dredged sediments and to reduce the volume that is disposed at sea or in landfill sites. As part of a 'reduce, reuse, recycle' approach WRT will develop a strategy to reduce the amount of soil being lost to rivers from farmland and to identify areas within river catchments that contribute to the contamination of sediments, thus limiting options for reuse. Contaminants may include nutrients, metals, pesticides and faecal matter. WRT will collaborate with local Harbour Authorities to develop sediment recycling strategies and to prepare for the implementation of the innovative sediment recycling practices piloted by other USAR partners.

Methods: There are two key elements of this project; firstly to identify sources of sediment erosion and contamination across a river catchment using a combination of spatial analysis with GIS, erosion-risk modelling and ground surveys; and secondly to work with local stakeholders in Devon and Cornwall, to consider the potential for sediment re-use by determining sediment characteristics, contaminant levels and local dredging needs. Using local case studies, these two elements will be incorporated into a more generic framework for assessing sediment issues across a river catchment and identifying opportunities for re-use.

A wide range of datasets will be used to assess the risk of sediment erosion and contamination, including Sentinel satellite data to determine land cover type and Lidar imagery to examine land topography and flow pathways. Models will be used to explore hydrological connectivity and in-channel erosion risk. Furthermore, innovative use of a range of water quality monitoring tools – including spot testing, passive sampling devices, continuous data loggers and laboratory analysis – will play a key role in ground-truthing the model outputs and providing a detailed picture of pollution sources and pathways. The modelling and monitoring in tandem will help us to target land management advice and practical interventions, where they will be most effective.

Results: The outputs from this project will help local stakeholders, including – but not limited to – Harbour Authorities, to assess the sediment characteristics of their local river catchment and identify opportunities for improving the suitability of recovered sediments for beneficial re-use.

Discussion: By engaging with local groups and investigating novel approaches to sediment re-use, this work aims to contribute to the increased adoption of best practice in the field of sediment management, including a reduction in offshore dumping, increased beneficial re-use, and potentially a reduced need for dredging in the first place.

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