

Developing a framework for reducing sediment erosion and contamination at a river catchment scale, with the aims of reducing the need for dredging and improving the quality of sediments for re-use

Using Sediment as a Resource (USAR)

Interreg  **2 Seas Mers Zeeën**
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ARMINES

Westcountry Rivers Trust

 Hoogheemraadschap van Schieland en de Krimpenerwaard

 Brightonsea Harbour Commissioners

 Waterwingen en Zeekanaal NV
weg van water

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 is developing a strategy to reduce the amount of soil being lost to rivers from farmland and identifying areas within river catchments that contribute to the contamination of sediments, thus limiting options for reuse. WRT is collaborating with local harbour authorities to develop sediment recycling strategies and preparing for the implementation of innovative sediment recycling practices piloted by other USAR partners.

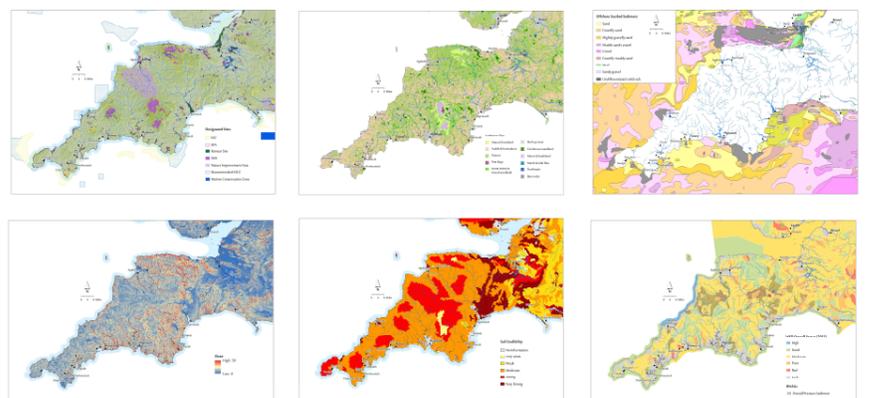
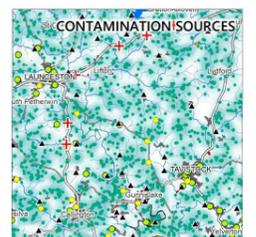
METHODS: There are two key elements of this project; firstly to identify sources of sediment erosion and contamination across a river catchment using a combination of spatial analysis, erosion-risk modelling and ground surveys; and secondly to work with local stakeholders to consider the potential for 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 framework for assessing sediment issues across a river catchment and identifying opportunities for re-use.

AIMS: By engaging with local groups and investigating novel approaches to sediment re-use, this project 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.

USING DATA & MAPPING TO TARGET CATCHMENT INTERVENTIONS

A wide range of datasets are being used to assess the risk of sediment erosion and contamination at a river catchment scale. This includes Sentinel satellite data to determine land cover type and Lidar imagery to examine land topography and flow pathways. Models are being used to explore hydrological connectivity and in-channel erosion risk. Furthermore, the innovative use of a range of water quality monitoring tools – including spot testing, passive sampling devices, continuous data loggers and laboratory analysis – plays 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.

An output of this project will be a decision-support tool that helps stakeholders assess the sediment characteristics of their local area and identify opportunities for improving the suitability of recovered sediments for beneficial re-use. It is necessary to first establish from where the accumulated sediments are derived; at some coastal sites, marine sediments may be more prevalent than terrestrial sediments, in which case catchment management would not be appropriate. The tool will highlight priority areas and drivers for sediment management and enable the user to access information from regional to site scales.



Regional maps showing a variety of datasets for the South West of England, including designated sites for wildlife, land cover type, offshore sea bed sediment, slope, soil erodibility and Water Framework Directive status.

DELIVERING BEST PRACTICE ON THE GROUND

There are a wide range of measures that can be implemented across a river catchment to alleviate local sediment-related issues. The effectiveness of these measures is dependent on the scale of the issue and the size of the upstream catchment. This project will use a series of case studies to investigate how different land-based interventions can be used to improve downstream sediment problems, i.e. accumulation or contamination.

The primary function of these interventions is either to prevent sediment erosion at source, disconnect sediment transport pathways, or to reduce the contamination of in-river sediments. Many of these interventions are tailored towards agricultural land practices, but other issues are also considered, such as road runoff and domestic point sources.



Sediment trap and infiltration drainage pond created to prevent sediment from agricultural land entering the local river



Riparian fencing erected to prevent livestock from entering the river and to encourage vegetation recovery



Field gateway blocked to disconnect runoff pathways and reduce soil erosion



A series of leaky dams constructed to slow water flow and encourage sediment deposition

WORKING TOGETHER TO LINK SUPPLY & DEMAND

In the South West of England, a common issue is the disconnect between sediment suppliers and sediment users. While a key aim of this project is to reduce the quantity of sediment accumulating in downstream locations in the first place, another goal is to improve the feasibility of re-using the sediment that is deposited. Often the easiest method for sediment removal is disposal at sea or in landfill sites; however, according to the EU Waste Framework Directive, this should be a last resort. One of the main difficulties for sediment re-use, is that users/buyers have very specific requirements relating to sediment character, such as composition, particle size or water content.

WRT aims to identify and catalogue as many sediment uses as possible and liaise with local stakeholders to explore the different options for sediment re-use in the area.



Westcountry Rivers Trust (WRT) staff work closely with local land owners and other stakeholders to make improvements to the land and water quality at a whole river catchment scale