

Project Update – November 2014

Sediment Pressures and Mitigation options for the River Rother (SMART)

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This project is designed to reduce levels of siltation and pollution of water ways in the River Rother catchment through suitable mitigation options focused upon the causes of the soil erosion. An investigation will be made into potential pollution sources by firstly identifying key monitoring stations in the catchment. Already, 9 such stations have been decided upon. Sediment tube traps have been installed in these locations and will be used to evaluate the amount of sediment flowing through that particular water body and the components of the sediment. These 9 locations are along the main River Rother itself, as well as on some of the tributary streams into the Rother to help identify sources of pollution.

Areas where it is possible for sediment to enter the river will be sampled to attempt to match up the components with the sediment in the tube traps. Historical data is also required to compare the amounts of sedimentation found in the sediment tube traps and will allow for comparison of current amounts of sedimentation. Cores have been taken from 4 lakes in the catchment; Mill Pond, Furnace Pond, Inholmes Copse and Hammer Pond.

Methods

So far the methods which have been decided upon include:

- Sediment tube traps have been installed in nine locations in the catchment. They hold 10 litres of water and allow water to flow through a 4mm hole upstream and a small hole downstream. As the water enters through the 4mm hole, the water velocity will reduce by a factor of 600 which reduces the speed of the sediment, allowing the sediment to drop to the bottom of the tube, being trapped ready for collection every two months (Walling *et al.*, 2006).
- River bed disturbance sampling. In the nine monitoring stations where the sediment tube samplers reside, disturbance experiments will also be carried out. Using a tube and a stick, the volume of water is measured within the tube and the sediment on the river bed then gets disturbed for one minute. Whilst

the sediment is suspended in the water, 2.5 litres of water is collected (Lambert and Walling, 1988).

- Coring of sedimentary archives will be carried out on lakes and floodplains. Using either a Mackereth or Russian corer, sediment of 80 – 210cm depth will be taken from the chosen sites (Foster *et al.*, 1998).
- Sediment source fingerprinting will be carried out in potential soil erosion areas where there is likely to be connectivity to water bodies. The samples will be analysed to identify matching properties to sediment collected in the river and its tributaries (Foster *et al.*, 1998; Collins *et al.*, 2010).
- Once samples are collected, they will be weighed, dried in the oven at 40°C, weighed again before being disaggregated using a pestle and mortar. They will then be analysed for; geochemical properties, mineral magnetism, elements, gamma emitting radionuclides, particle size and organic matter (Foster *et al.*, 1998; Collins *et al.*, 2010; Schuller *et al.*, 2013; Walling *et al.*, 2008).
- With the analysis of the properties of potential sediment sources, it may be possible to map the sedimentary pathways from source to sink. The locations of each sample will be mapped and compared with other samples in the local area such as nearby fields (Chapman *et al.*, 2003).

Sediment tubes and disturbance

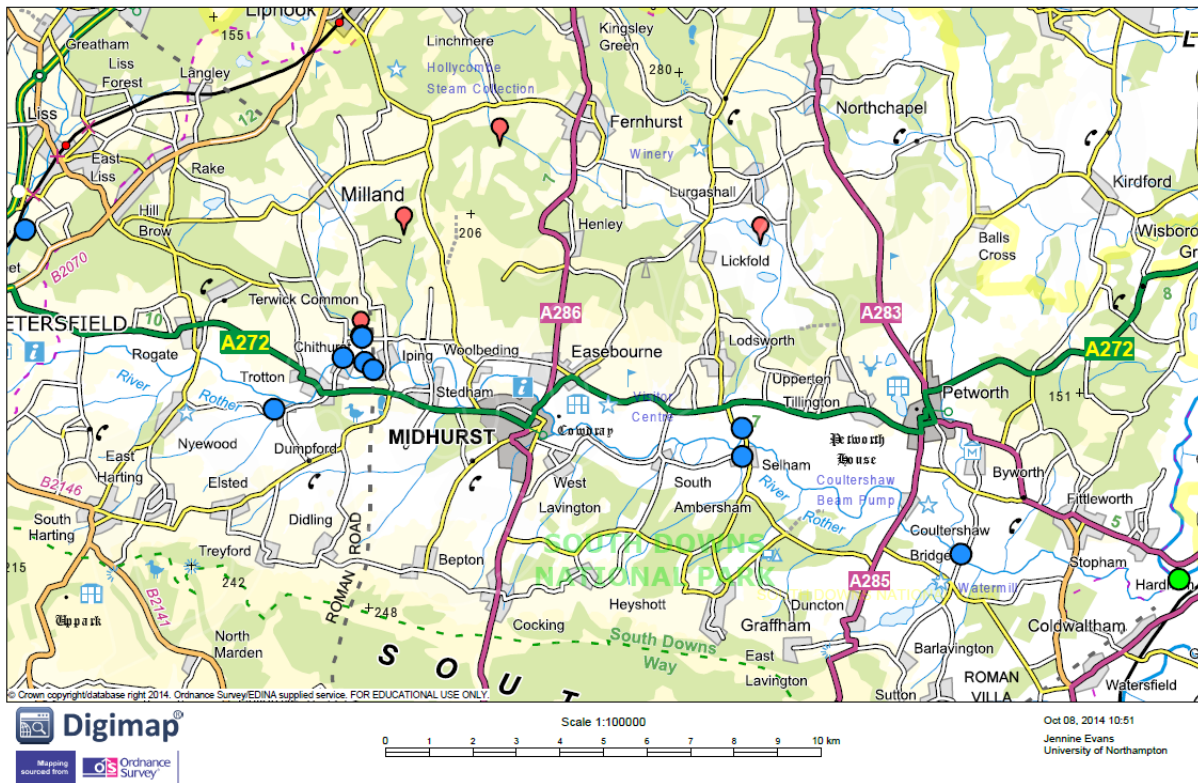


Figure 1: Map of the Rother Catchment with indicators of study sites. Blue circles: sediment traps, green circle: Hardham monitoring station, red indicators: lakes for core sampling (University of Edinburgh, 2014).

N.B The South Downs National Park Authority (SDNPA), Environment Agency (EA) and the Arun and Rother Rivers Trust (ARRT) are working in partnership to restore the River Rother into ecologically favourable condition. The SDNPA are funding this project along with the University of Northampton. The project team is grateful to all the landowners and estate managers who have allowed access to the river and for the installation of monitoring equipment.





Coring sedimentary archives





An example sediment tube trap