

Siltation and pressures on river habitats

The problem on global scale

The intensification of agricultural activities is a recognised contributory factor to the current rapid rate of soil erosion on a global scale. As well as being a valuable resource, topsoil also contains nutrients which can negatively alter the balance of freshwater ecosystems. Erosion by rivers is a natural process and the presence of sediment of all sizes is necessary to support healthy freshwater ecosystems. When fine sediment is over-supplied it can infill the spaces between river gravels and pebbles and lead to problems such as the loss in interspatial habitat, binding of polluting molecules and the de-oxygenation of the substrate. Siltation in rivers is intrinsically linked to the erosion of topsoil by wind and rain action but accelerated (we use the term ‘aggravated’) by land use and land management practices.

The UK problem

In the UK where much of our land surface is under agriculture and we have relatively high rainfall, we suffer from excessive rates of fine sediment run-off from our land surface into some river systems. This is partly because land-use practices, principally grazing, remove or reduce a field’s vegetative top cover, exposing the soil to the effects of wind, rain and river erosion. Climate change is also likely to exacerbate the situation as the more frequent heavy downpours which are predicted have more power to erode bare, pressured, areas of the landscape.

Legislation & the Water Framework Directive

A range of legislation and initiatives have been launched to try and tackle the problems of diffuse pollution from agriculture and reducing sedimentation. Nitrate Vulnerable Zones were set up because groundwater is highly susceptible to the accumulation of dissolved nitrate from fertilizers and animal wastes. Further water quality standards exist for pollutants such as phosphorus and ammonia and substances harmful to watercourses such as pesticides are controlled. The Catchment Sensitive Farming Initiative aims to manage farm operations to maintain production and protect the environment. However, the recent European Water Framework Directive requires the UK to ensure good ‘ecological status’ in all water bodies. The accumulation of fine sediment is cited as a reason for failing to reach this standard in some water bodies.

Difficulty of setting strict limits for silt

The sediment problem is difficult to define. Some rivers will naturally have muddy substrates and others may be typified by beds of large stones. River sediment sizes are related to factors such as gradient, rainfall, geology and historic land use. To define whether fine sediments are problematic requires an understanding of hydrology and river ecology. The physical form and function of the river bed and banks can indicate whether fine sediment is being oversupplied, as can biological measurements. Sampling juvenile fish populations through electrofishing and using indices of macro-invertebrates’ tolerance to siltation can indicate the ecosystems response to sedimentation. Fine sediment moves through the river system at varying rates under differing flow conditions, meaning that monitoring can be hit and miss.

Tyne Rivers Trust’s work to reduce erosion and siltation

We have an extensive programme of catchment management activities designed to reduce the amount of fine sediment and agricultural pollutants entering our watercourses. We use a strategic approach to select siltation ‘hot spot’ sources, working in areas where we can provide most benefit to silt-sensitive species such as the freshwater

pearl mussel, salmon and trout. Our ethos is one of 'assisted natural recovery' using green engineering, which is delivered by experienced local contractors. We do not attempt to tackle 'natural' erosion but we will carefully design river recovery packages where natural ecosystem function has been impaired by agricultural practices.