

WS 3 - How much sediment is needed for a well functioning river system?

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Within the Water Framework Directive (WFD) there is little explicit mention of sediment and the role it may play in achieving good ecological and chemical status. However, at a round table event organised by SedNet (www.sednet.org) in 2006 river basin managers from 4 river basins around Europe (the Elbe, the Danube, the Humber and the Douro) identified sediment related issues as crucial to successful achievement of the WFD objectives. The issues in each river basin were different – from concerns about lack of knowledge of sediment budgets, to sustainable extraction rates, to remobilisation of contaminants in sediment deposits and the impacts of managed retreat to allow for increasing sea levels.

There is a need for more evidence (system understanding) to support sediment management decisions in relation to both WFD and other legislative drivers such as the Birds and Habitats Directive. A review of all UK river basins, carried out by ADAS identified that most passed the Fisheries Directive guideline value of 25ppm mean annual suspended particulate matter (a form of sediment) concentration – based on available data. However, it is known that many of these river basins have sediment related issues and problems. There may be at least three reasons for this:

1. Inadequate temporal scale of data – routine monitoring is at 4-week time steps, whilst bulk sediment transport is highly skewed to high flows.
2. Inadequate spatial resolution of data – data may not be collected at places most relevant for increasing our system understanding.
3. Meaningless guideline value in terms of whole ecosystem functioning - if any numerical target is to be set then it may need to take into account the highly dynamic nature of rivers. Furthermore it needs to be differentiated by river type, to be inclusive of the whole river ecosystem and may need to look at the continuum of sediment quantity gradient and biological response.

So, given the complexity of sediment supply and transfer, should we be monitoring sediment load at all – or should we first rather look more fundamentally at the role of sediment quantity – in relation to quality – in river system functioning (to increase our system understanding)?

This workshop aims to initiate a discussion on this issue, focussed on four themes:

1. When any River Restoration activity is carried out (e.g. removal of weirs to improve hydromorphological status) it is likely to change sediment flux at least locally. What effect does this have (positive or negative) on the functioning of the river system? (How) can we assess/monitor these effects?

2. Climate change and altered land management is already resulting in changes to flow regime in many areas. In some places the channel forming flow (normally taken as a 1 in 2 year flood) is increasing such that channels are remobilising and sediment which has been static for long time periods (often with associated historical contaminants) is being moved through the river system. Major flood events such as those seen repeatedly since 2000 throughout Europe are activating sediment deposits from floodplains, again with associated contaminant issues. What effect does this have on the system and – where needed - how can we mitigate or restore these?
3. Within the WFD there is also a requirement to define monitoring which is fit for purpose and which demonstrates good ecological status – should we monitor sediment flux at all for this purpose? If so, how and where?
4. Can we say for a particular river or location along a river, at a given moment in time, how much sediment is enough and how much is too much? Are we able to define criteria for this?

The outcome of the workshop will be a recommendation paper outlining the potential ways forward to advance the state-of-the-art in our understanding of the role that sediment quantity (and associated quality) plays in the functioning of river systems. This increased understanding will enable a better addressing of sediment related issues in the WFD.