

# **SEDIMENT MANAGEMENT—AN ESSENTIAL ELEMENT OF RIVER BASIN MANAGEMENT PLANS**

Axel Netzband<sup>1</sup>

## **ABSTRACT**

The European Sediment expert network SedNet organized a Round Table workshop on River Basin Sediment Management. This becomes necessary to combine the objectives of the EU Water Framework Directive with the needs of uses like navigation and hydropower generation.

**Keywords:** Dredging, sediment management, river basin, conceptual model, Water Framework Directive

## **INTRODUCTION**

SedNet is the European expert network aimed at incorporating sediment issues and knowledge into European strategies to support the achievement of a good environmental status. It started in 2002 funded by European Commission Directorate General Research as a Thematic Network. Since 2005 SedNet is run independently from the EC funded by several institutions from European countries. It brings together experts from science, administration and industry. It interacts with the various networks in Europe that operate at the national or international level or that focus on specific fields (such as science, policy making, sediment management, industry, education).

Sediment is an essential, integral and dynamic part of our river basins. Where human activities interfere with sediment quantity or quality, sediment management becomes necessary. One of SedNet's main recommendations is to conveniently integrate sustainable sediment management into the European Water Framework Directive (WFD) related policy, legislation, and implementation process. The WFD foresees to develop River Basin Management Plans on a supra national basis aiming at a good ecological status, or potential, until the year 2015. This is to achieve good ecological status or potential and to support the well being of the European economy at the same time.

## **ROUND TABLE DISCUSSION**

In November 2006 SedNet organized a Round Table Discussion with delegates from the European river basins Danube, Douro, Elbe, and Humber / UK estuaries representing river commissions, user groups, and scientists. The ongoing work on the river Rhine sediment management plan was presented by a member of the sediment group of the International Commission for the Protection of the River Rhine.

### **River Basins: Similarities and Differences**

The current member states of the EC have 96 River Basin Districts, 27 of them crossing international boundaries. However, a recurring theme in discussions of the case studies was that each case was unique, for scientific, socioeconomic and political reasons, and there was great concern that a "one size fits all" European approach is not imposed upon all areas. Sediment quality (due to contaminants and nutrients) was a focus of concern in three of the case studies, and there was a recognition of the need for better understanding and control of current and historical sources of contaminants, even when this involved international and cross-regional cooperation.

However, more discussion focused on issues of sediment balance. Often in the same river basin, different areas had opposite sediment quantity issues - activities such as dredging and reservoir flushing were causing ecological impacts such as smothering, habitat loss and light attenuation, whilst downstream sediment lack was causing erosion or loss of wetlands and other critical habitat or coastal protection. There was clear recognition that there is a need to better understand sediment sources, dynamics and their interactions with both human management and ecosystem functioning and services. At the same time, there was recognition that human intervention such as dredging could not cease, and that solutions needed to be both ecologically and economically sustainable. In all the case studies, there was a recognition that this would require creative communication and collaboration between various sectors, and that, although not all objectives were achievable, win-win situations must be sought.

### **System Understanding**

Different uses and ecological targets are connected through sediments. While sediment challenges become evident in defined areas these have to be tackled on a broader scale, from water bodies to regions to whole catchment areas. There are clear differences between riverine areas and the coastal zone / estuaries. There is a

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<sup>1</sup> Chairman SedNet Steer Group. c/o Hamburg Port Authority, Neuer Wandrahm 4, D-20457 Hamburg, Germany. T: +49-40-42847-2791, F: +49-40-42847-2794; Email: [Axel.Netzband@hpa.hamburg.de](mailto:Axel.Netzband@hpa.hamburg.de)

definite need to respect a wide variation in sediment processes. Because of a highly dynamic environment both quantity and quality issues need a good system understanding to support management plans. There is a clear need to better understand sediment sources, dynamics and their interactions with both human management and ecosystem functioning and services.

Sediment management may be necessary to maintain hydro morphological alterations like dams, river deepening, etc. Also flood protection and sediment management are interrelated. Giving more room to rivers means extended inundation areas with subsequent sedimentation. Because contaminants can be bound to particles sediment transport (quantity) and quality issues can not be separated.

### **Management Plans**

As each river basin has its specific characteristics and challenges sediment management will have different focal points in each. A "one size fits all" approach would not be an adequate solution. Sediment management has to fulfill objectives, is needed to secure human activities, and will be subject to different legal requirements. To balance all this Sediment Management Plans should be developed. The institutional provisions of the Water Framework Directive, like River Basin Management Plans, can provide the necessary platform and instruments. An integration of requirements of different European directives and EU policies is a challenge for river basin managers and users.

Management plans, guidance and frameworks have to consider the high natural variability of sediment dynamics and shall not compromise the ability of the system to respond. An adaptive management will be needed which allows for variations in a given range. It is evident that this has to be site specific. It also has to be acknowledged that acting in often highly dynamic systems will contain an element of uncertainty.

Plans for integrating requirements of flood protection, navigation, and nature preservation are known from estuaries like the Elbe, the Scheldt, and the Seine. In the UK a maintenance dredging protocol has been developed for dredging under the Birds and Habitats Directive, which has both support from ports and environmental NGOs. It can be seen as part of the solution for environmental problems in coastal areas and estuaries. This could also be developed for WFD requirements.

To enable specific uses or to protect the marine environment from sediment contamination a special programme of measures may be necessary. For contaminated sediments a three-step strategy has been developed to identify areas of risk and to classify them according to their potential impact at river basin scale, which is currently applied for the Rhine and the Elbe. Because of river basin wide contamination problems affecting uses like agriculture or dredging transition concepts may be needed, which would allow to exceed certain standards temporarily. Exemptions should be linked to remediation measures.

Sediment environmental quality standards (SEQS) should only be regarded as high level screening values. The main reason therefore is that different types of sediment matrices and different contaminant levels are of varying importance at different locations.

The WFD economic instruments may be needed in sediment management. To solve contamination problems cost-sharing in the river basin may help as financial instrument. Because of possible immense costs and community wide importance financial support from the side EU Commission may be needed.

Also future research will be necessary. There is a need to collate available data to identify knowledge gaps and enhance understanding, linking sediment management to environmental and climate change issues, without compromising the ability of the system to respond.

Next to that, it was felt that the EU should not only fund problem identification, but also problem solving processes. Sediment issues should be discussed between different Directorate Generals in Brussels, like for instance DG Environment, DG Transport and DG Health.

### **REFERENCES**

The detailed Round Table outcome report under the title "Sediment Management – an essential element of River Basin Management Plans" as well as more information is available for free download on [www.SedNet.org](http://www.SedNet.org)