

# Sed Net



## Moving Sediment Management Forward



## The Four SedNet Messages

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# Introduction

SedNet is a European network aimed at incorporating sediment issues and knowledge into European strategies to support the achievement of environmental status objectives and at developing new tools for supporting sediment management.

SedNet started in 2002 as a Thematic Network funded by the European Commission. The original initiative was focused on contaminated sediment and led to recommendations for river basin sediment management. The scientific knowledge generated by the original initiative has been published in four books.

Since 2005, SedNet has continued independently with partners from organisations representing science, management and administration. SedNet broadened its scope to cover all aspects of sediment, from the river to the sea.

SedNet has organised eight international conferences. Two Round Table events brought together international experts from several European river basins.

Based on this experience and associated discussions, the SedNet core group identified four key messages related to sediment management and these are presented in this brochure. Case studies from European rivers which exemplify the key messages can be found on the SedNet website.

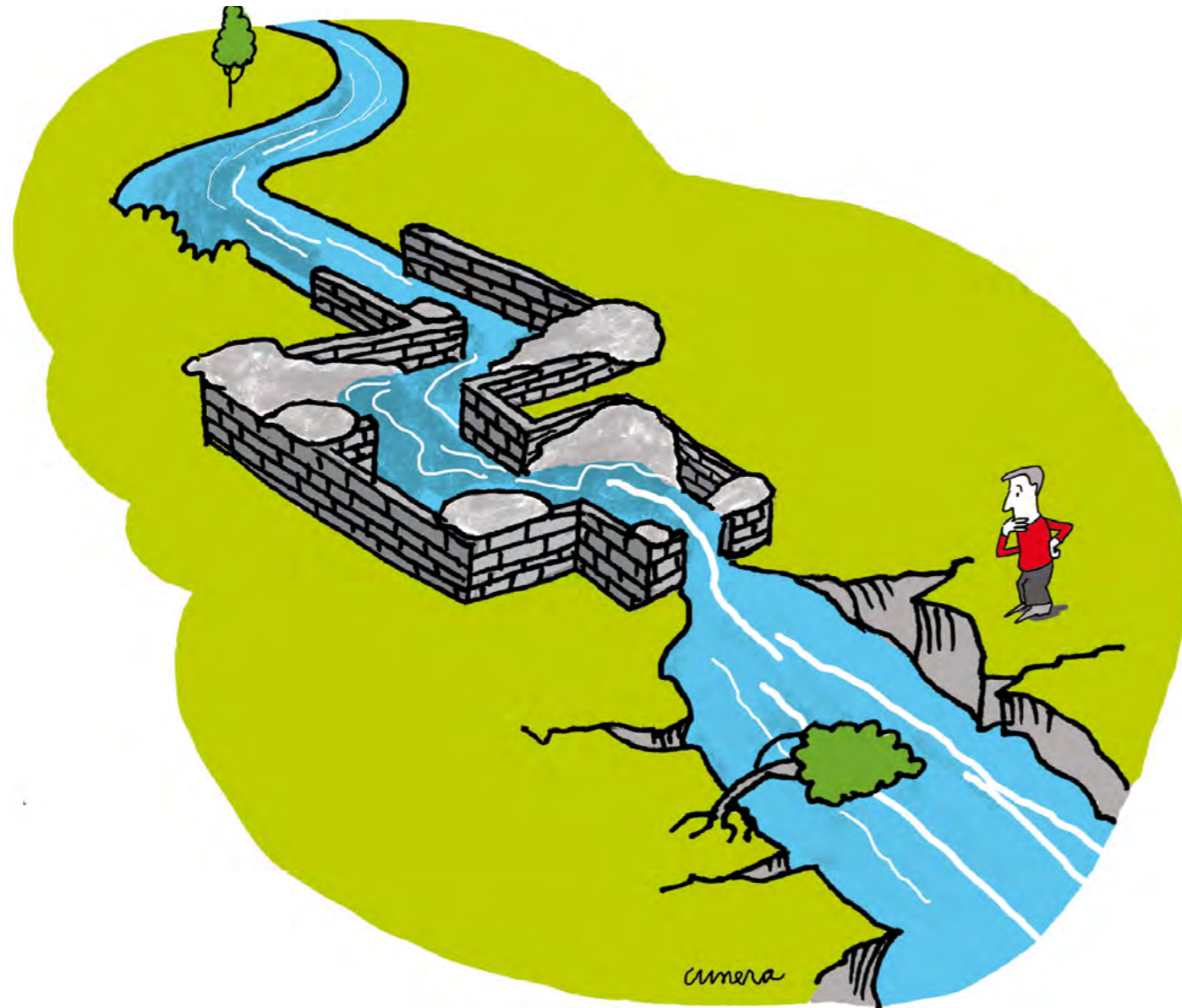
The four key messages can be condensed to one overarching message: Sediments are an integral part of nature and aquatic systems; they are an important resource which needs protection and targeted management.

This brochure was prepared to promote the four key messages at European and national level. The reader is encouraged to make use of it. Enjoy reading the brochure, and SedNet will be happy to discuss sediment management directly with you!

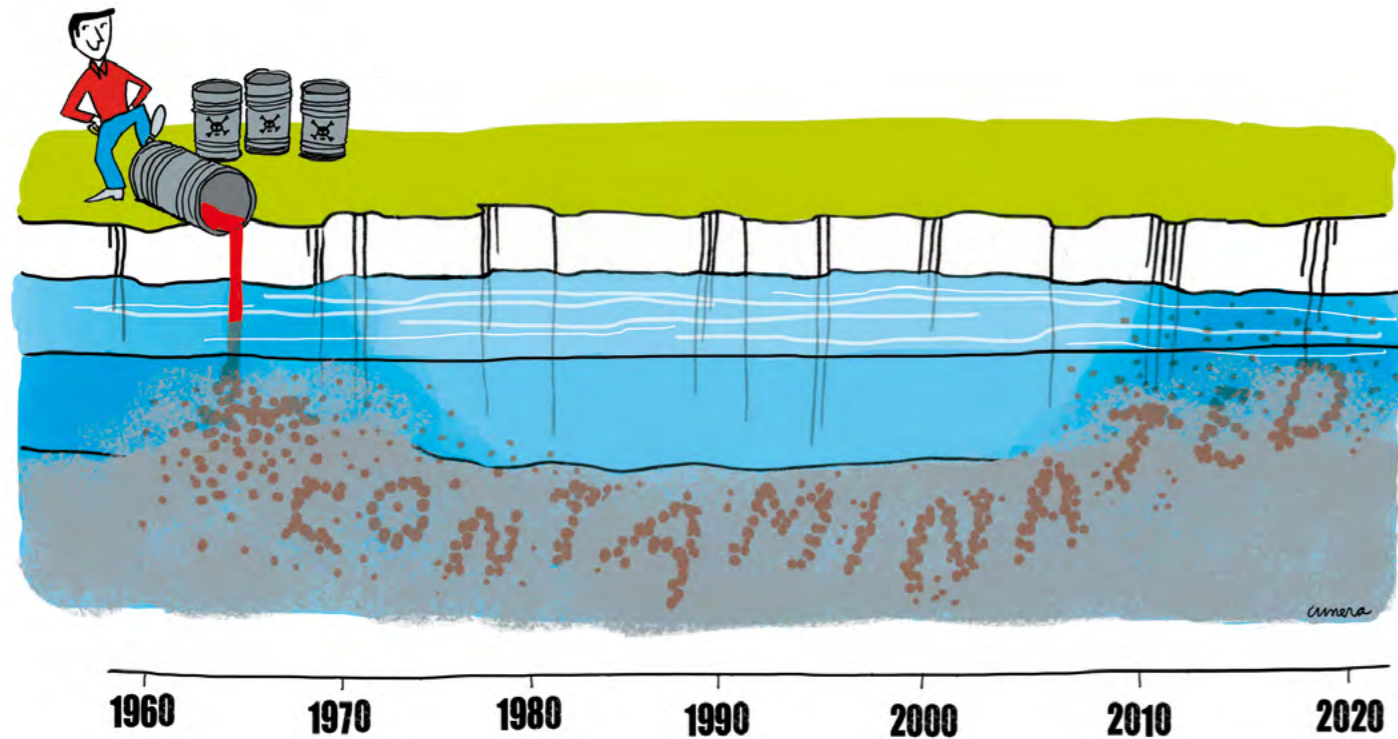
# SedNet messages

## 1. Sediment quantity and hydromorphology

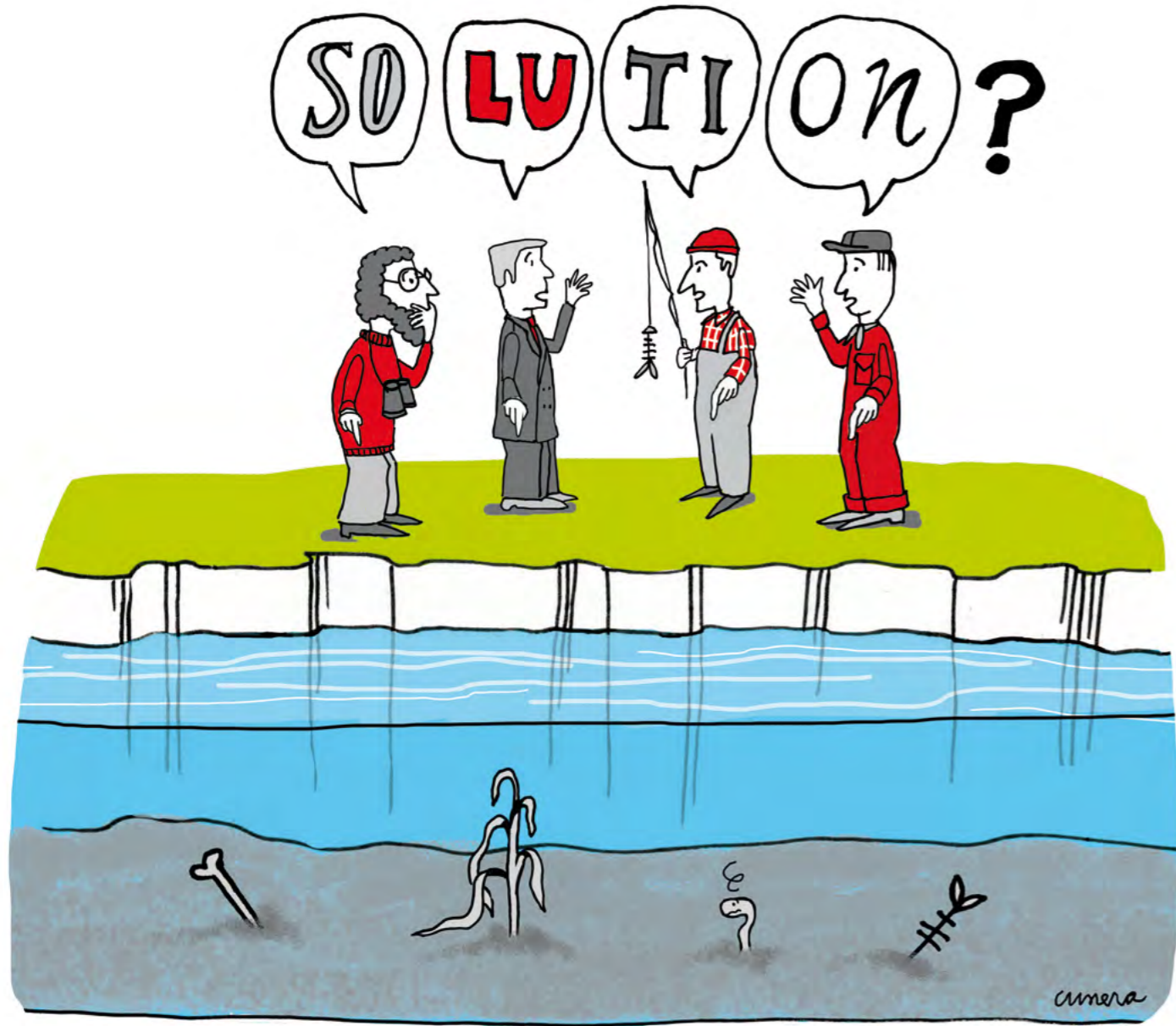
Sediment transport is a vital component of the natural hydromorphological regime. Human management of most European rivers means that the natural sediment transport processes have been substantially modified, sometimes with dramatic consequences for the stability of rivers and coastlines. The European Water Framework Directive calls for the restoration of good hydromorphological status *inter alia* by reconnecting aquatic systems. This demands careful risk assessment before any management measures are taken. We need better understanding of both current status and potential impacts to ensure that hydromorphological assessments are reliable and intervention measures are appropriate.



## 2. Sediment quality and remobilization



Contaminated sediment can have adverse effects on people, the environment and the economy. Because sediment is moved through the river basin to the sea, such effects can occur not only locally but also far from the source of the contamination. Remediation and protection measures therefore need to be integrated into river basin management plans. To ensure that management is effective, we need better understanding of the underlying processes of remobilization, phase transfer, availability of contaminants and their transport, particularly under extreme conditions. Action is needed not only on source control but also to deal with 'legacy' contamination. This is especially important in areas where contaminated sediment is likely to be remobilized during extreme (e.g. flood) events – not least because such events are likely to become more frequent in many river basins due to climate change.



### 3. Sediment and river ecology

Sediment is a fundamentally important component of aquatic ecosystems. Achieving a sustainable balance between the development of waterways and meeting ecosystem objectives (i.e. to reach good ecological status and protect ecosystem functions) will depend on constructive dialogue between various stakeholders, better policy coordination and effective transboundary cooperation.



## 4. Dredged material management

A sustainable approach in relation to the management of dredged material requires a change of focus: rather than considering dredged material as a waste, dredged sediment needs to be seen as a resource. Issues of perception remain one of the biggest challenges to those promoting sustainable dredged material management. EU level support will be important in helping to change attitudes and to promote sustainable dredged material management within the existing legislative framework for Member States.

# Outlook

As sediment is an integral part of nature and aquatic systems, proper sediment management needs both recognition in existing management plans and integration into the new ones yet to come. Management plans are compiled under the European Habitats Directive, the Marine Strategy Framework Directive, and especially the Water Framework Directive. Whereas plenty of experience and knowledge is available on the technical side, more research is needed to improve our understanding of the complex processes controlling sediment behaviour.

## Integration of sediment in river basin management

Where human activities interfere with sediment quantity or quality, sediment management becomes necessary. If we are to manage sediment for environmental objectives (e.g. for maintaining habitats) and/or for the needs of society (e.g. dredging for maintaining navigation), this should be undertaken with a full awareness of impacts on nature and society within the river basin.

A coherent conceptual model at river basin scale would be the best basis for considering the various functions and uses of sediment, operating at different spatial locations within a river basin and operating at different time scales. It thus seems logical to link sediment management to river basin management and, where appropriate, to the Water Framework Directive (WFD). This could make use of approved mechanisms for elaborating plans and for the necessary early engagement with a wide range of stakeholders.

Effective sediment management requires a holistic approach taking into account (1) system understanding both in terms of quality and quantity, (2) the integrated management of soil, water and sediment, (3) upstream-downstream relationships, and (4) supra-regional and transboundary collaboration.

## Understanding sediment processes at catchment scale

Sediment processes at catchment scale are complex because of the episodic nature of sediment transfer, storage times within the system etc. Sediment transport in rivers is mainly dependent on the river discharge, which can vary considerably. Sediment transport and hydromorphology are closely interrelated; the latter is a central aspect of the status of a river in WFD context. There is a need to further develop approaches based on process understanding for sediment management at catchment scale.

As sediment contamination can persist long term, it can affect both the environment and human uses long after its original source was active. The quantitative and the qualitative aspects of sediment management are closely interrelated. Contaminants are being transported with the particles. Thus, sediment and contaminants undergo the same transport processes, but, in addition, chemical processes may alter contaminants, and may make them more or less bioavailable.

## Protecting sediment-related ecosystem functions and services

Sediment being an integral part of our waters plays a crucial role in goods and services provided by freshwater and marine ecosystems. Ecosystem goods and services are affected when sediment quantity and quality characteristics change. Examples are nutrient cycling, habitat substrate, resource, energy dissipation in the hydrological cycle, soil formation in inundation areas and delta regions, beach nourishment, recreation, and so on. Therefore sustainable sediment management should protect healthy ecosystem functioning.

## Dredged material management

Dredging is necessary to maintain and develop ports and harbours, navigable waterways, reservoirs for drinking water or energy production, etc. Both dredging and dredged material disposal may affect the environment. The overall management goal of any project should be to achieve a sustainable solution, where use is being made of the sediment for natural and/or human uses. Working with nature means to manage the dredged sediments within the system, or to use them in order to conserve natural resources. All associated risks and benefits of a project should be weighed and balanced, be it nature, economy, or society.

## Sediment management and climate change

Future changes in sediment management can be expected due to the risks posed by climate change. Changes due to sea level rise, seasonal changes in precipitation and extreme events may induce changes in erosion, of discharge patterns and sedimentation patterns. Also, changing physical and chemical conditions may mean that sediment-bound contaminants will behave differently in the future.

The contribution of dredging and dredged material management to adaptation measures for climate change is expected to increase. Examples are beach nourishment of coastlines and flood management measures in river basins.

## Future work of SedNet

Plenty of experience has been gained within the first management cycle of the Water Framework Directive, and plans have to be made for the second cycle in the years 2014/2015. The Marine Strategy Framework Directive will be made operational in the next few years. Against this background, SedNet plans again to bring together experts from European river basins to exchange experiences and further elaborate concepts with a focus on the practical aspects of management. More conferences are intended to continue the policy-management-science discussions.

SedNet will keep on putting sediment management on the European agenda, monitor relevant European developments and identify when action is needed in relation to sediment-related European policies and research programmes.

To make this most effective and in order to support both natural and human uses, SedNet will be very open for everybody to collaborate to further develop river basin sediment management, both conceptually and practically.



An aerial photograph of a river delta system. The river flows from the top left towards the right, branching into several smaller channels. The land is a mix of green vegetation and brown, eroded soil. A large, white, stylized logo for 'SedNet' is overlaid in the top left corner. Below the logo, a circular arrangement of white stars is superimposed on the landscape.

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[www.sednet.org](http://www.sednet.org)

