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5th International SedNet Conference 27th-29th May 2008

Urban Sediment Management and Port Redevelopment / Sediment in River Basin Management Plans

The 5th International SedNet Conference was hosted and co-organised by the Norwegian Geotechnical Institute. It took place in Oslo, Norway. More than 50 presentations were given and about 40 posters were shown. The conference was attended by 180 sediment experts from 19 countries.

The first part of the conference was dedicated to the main title. Sediment in rivers, harbours and marine coastal zones in urban areas is often historically contaminated. Contamination originates from industrial activities, dockyard and harbour operations as well as discharges of municipal wastewater and urban surface water run-off. This 'legacy of the past' complicates the redevelopment of harbour areas and the waterfront of cities for housing or commercial purposes. A proper sediment management strategy is required that takes into account environmental risks associated with contaminated sediment as well as the identification of appropriate remediation options for use in the urban environment. Furthermore, European legislation increasingly requires the involvement of stakeholders, who may have conflicting viewpoints and concerns. How to manage such complexity? What challenges with regard to the management of contaminated sediments have been met and what experiences gained in port redevelopment cases in urban areas?

The second part of the conference was dedicated to the state-of-the-art on sediment management in river basin management planning. By this conference part a European discussion was continued which was started in 2006 in Venice with the SedNet Round Table Discussion "Sediment Management – an essential element of River Basin Management Plans".

At the end of each session, the session chairman summarized the highlights or conclusions. It is foreseen to give a more in-depth summary in the Journal of Soils and Sediments in 2009.

Surveys (chairman Aivo Lepland, Geological Survey of Norway)

- The importance of fine, clayey fractions became clear.
- Combination of high-resolution acoustic techniques with sediment core data provides insights for reliable assessment of thickness and volume of sediments.
- Sediment Profile Imaging (SPI) is a promising and quick tool for environmental monitoring of the seabed and capping.
- Modelling of sediment spreading during dredging and deposition of dredged materials using hydrodynamics and sediment properties; verifications from the field are still required.

Solutions (chairman Audun Hauge, Norwegian Geotechnical Institute)

- Capping is becoming a widely used remediation technique.
- Focus on developing active caps.
- Stabilization and solidification of dredged material in land reclamation gives good results.
- Special recipes must be found for each situation.

Case Studies (chairman Marc Eisma, Port of Rotterdam Authority)

- For management of contaminated sediments in fjords with ongoing contaminant sources dredging is not the solution. Thin layer capping with sandy material is a better option.
- "Remediation efficiency" tools can be useful for both pre-design assessment and post-construction monitoring of engineered caps.
- Capping of contaminated sediments has the potential to severely alter the soft bottom fauna community structure.
- Incorporating contaminant budget principles has been a good tool for communicating the progress and status of remediating activities for environmental authorities and stakeholders.
- Design and construction aspects of remediation projects offer numerous insights and lessons for other projects of any scale.

Sediment Quality Standards (chairman Piet den Besten, Centre for Water Management, NL)

- SQS require the incorporation of a huge number of scientific considerations (most of them valid, but making the work very complex).
- As a consequence, use of SQS in the near future will still leave a lot of uncertainties.
- Earlier evaluations of strong and weak points of the application of SQSs (e.g. Pellston workshop : Use of Sediment Quality Guidelines and Related Tools for the Assessment of Contaminated Sediments: Proceedings from the Pellston Workshop on Use of Sediment Quality Guidelines and Related Tools for the Assessment of Contaminated Sediments, 18-22 August 2002, Fairmont, Montana, USA. Editor Richard J. Wenning, SETAC, 2005 (ISBN 1880611716, 9781880611715).) seem to have been ignored. Concerns about the use of SQSs reported earlier are:
 - The ability to adequately predict the presence or absence of chronic toxicity to sediment-dwelling organisms under field conditions;
 - The ability of SQSs to predict effects caused by accumulation in foodchains;
 - Doubts whether SQSs can be used to demonstrate cause-effect relationships;
 - Concern whether SQSs based on particular endpoints can be used to predict other toxicity endpoints and mechanisms.
- The linkage between SQSs and management objectives (WFD!) should be made clear (and be the joint product of stakeholders).
- Application of SQSs as trigger values (in tiered approaches) is a way of getting around scientific discussion on the uncertainties of those SQS values.
- A risk assessment framework based on the use of SQSs could also consist of two sets of SQS values: a high value, above which there will be no discussion about necessity of measures, and a lower value triggering further research.
- The scientific community has shown many times the advantages of tiered approaches (with also the use of biological and ecotoxicological parameters).
- Communication is needed about existing experience in EU countries with specific methods how to derive SQSs and the way these are used in risk assessment or in pass/fail quality assessment steps. More insight is needed in the benefits and in the disadvantages of these frameworks, thus enabling a better EU-wide discussion on the perspectives of a (rigid) sediment management system based on SQSs.

Emerging Issues (chairman Jos Brils, Deltares, NL)

- Effective management not only requires a good understanding of the biophysical system, but also of the social system, and specifically of the dynamic and complex interaction between both systems. Hence, all stakeholders should be involved.
- Spatial planning, such as port revitalisation, is a good opportunity to also address (contaminated) sediment issues. Hence, a 'sediment check' – like the water check ('Watertoets') in the Netherlands – should become obligatory in spatial planning.

Science for River Basin Management (chairperson Susanne Heise, BIS TU Hamburg-Harburg)

- Sediment management objectives need to be driven by regional risk reduction aiming at improvement on river basin scale.
- For regional risk reduction, research gaps need to be reduced and they comprise quality as well as quantity issues, as well as linking scientific assessment to decision support systems for stakeholders.
- Important quality issues:
 - □ remobilization of contaminants from sediments
 - □ biological activity may have secondary effects by gas-production
- Important quantity issues:
 - □ what happens during flood events e.g. with retention areas in terms of resuspension and setting of material (models may help us understand and generalize)
- Decision support systems comprising tiered approaches, developed by scientists in cooperation with stakeholders are useful tools which are both economic and support sound science.
- Extensive projects like Risk-Base and others stress the importance of RBM but integration of field-specific expertise and regional oriented perception still remains a challenge.

River Basin Management – Fundamentals (chairman Peter Heininger, Federal Institute of Hydrology, Germany)

- River basin in many respects represents the most appropriate unit for sediment management decision making.
- Sediment management in terms of quality and quantity should receive due attention in River Basin Management Plans including programmes of measures. Exceptions from including sediment management into the plans should be justified.
- As the plans of the 1st management cycle are now well developed it is time to analyse critically whether sediment management has been accounted for to the necessary extent. Conclusions for the 2nd and 3rd cycles have to be drawn.
- There is a strong need for developing decision support tools for sediment management, e.g. to assist in balancing the costs and benefits of management options.
- Efforts towards a better linking of river and coastal/marine management should be further intensified. The marine strategy aims at a "good environmental status" whereas the WFD aims at a "good ecological status". This seems to be a progress in thinking.
- A general knowledge base on risk assessment approaches and merging the concepts, approaches and models for specific risks (e.g. contamination, erosion) into a common scheme of integrated risk assessment at a river basin scale is required.
- Geochemical mapping (monitoring), particularly of overbank sediments, may be a powerful tool to better understand particle bound fluxes and thus to develop management plans.

River Basin Management - Aspects of sediment quality (chairman Igor Liska, ICPDR, Austria)

- Sediments play an essential role in urban river basins, however this is often neglected in the management policies. Water quality in municipalities is influenced by the presence of sediments and this has to be taken into consideration in preparation of river basin management plans.
- Contaminated sediment remediation must be supported by an effective system of assessing the risks related to the manipulation with a dredged material to avoid any adverse impacts on the status of the water bodies.
- High annual throughput of sediment remediation projects necessitates availability of appropriate expert and management systems for risk assessment of dredged material; these expert systems should include quality assurance aspects to guarantee compliance with the standards.

In his concluding speech, Axel Netzband, chairman of SedNet, remarked that SedNet has the aim to give attention to the issues that have come forward at the Oslo conference. The conference clearly showed that SedNet's scope now is much broader than the original one. Not only are contaminated sediments in inland waters the main topic, but also sediment quantity management, and the scope reaches from the source of a river to the marine environment. **SedNet is open for a very broad discussion and therefore would appreciate more active members. Anyone who is interested in playing an active role in SedNet is requested to contact the SedNet secretariat (marjan.euser@tno.nl).**

EC Best Paper 2008 Award

At the end of the conference, the Environment Commission (EC) of the Central Dredging Association, CEDA, presented its 2008 Award for a contribution to the literature on dredging and environment at the SedNet conference. CEDA EC has established this award to stimulate the dissemination of good quality information related to dredging and the environment, including technical, regulatory and managerial aspects of dredging operations and dredged material management. The Prize is €1000 in cash and the publication of the full paper in Dredging and Port Construction Magazine. The winning abstract was 'The Oslo Remediation Project' by Torild Jørgensen of the Oslo Port Authority. The prize was handed over by Anders Jensen, vice-chairman of the CEDA EC.

For the **Final conference program**, the **list of participants**, abstracts, slides and a photo impression of the event see <http://www.sednet.org>.

Workshop Sustainable Sediment Management - A systems approach from a resilience point of view organised by the project team of Living with Sediments on 30th May 2008 hosted by the Norwegian Geotechnical Institute, Oslo, Norway

The Frisian story as an example

author: Wim Haalboom, Province of Friesland, the Netherlands

On the 30th of May, following the SedNet conference, the Living With Sediment project team organized a special session hosted by the Norwegian Geotechnical Institute, Oslo, Norway in Oslo. About 40 participants took part in the discussion to set out changes that are needed to implement a systems approach of sustainable sediment management (on river basin scale). Important issues such as: How to deal with the different geographical scales (local, regional, national, international)? How to involve stakeholders (which also includes scientists)? were discussed based on case studies from all over Europe. In this article we focus on the Frisian Story as an example. The complete report of the session can be found on <http://www.levenmetbagger.nl/> and <http://www.sednet.org>.



Wim Haalboom presented an example how the province of Friesland, in the northern part of Holland, approached sediment-management in the "Dredging Action Program". The main issues that this program wanted to address were: illegal dumping, shallow water, reduction of water quality and biodiversity and lack of opportunities for water recreation and economy. In this program all important stakeholders worked together to solve the issues concerning sediment in Friesland. Stakeholders were government organisations such as municipalities and water boards and, for example, boating organizations, farmers and nature organisations.

To describe the resilient nature of the "Dredging Action Program", the concept of a learning cycle was used, which consists of the four following 'building blocks':

1. Common system understanding

The province of Friesland represents a lot of sediment. It *is made by man out of* sediment behind and before high dykes.

In the "Dredging Action Program" a lot of energy was spent on understanding the geophysical system as it is. For this reason a website was created together with the stakeholders that gives an overview of the sediment present in the system, the urgency to dredge (both from a quality and quantity point of view) and possible locations for landfills. The website is open to the public:

<http://www.baggerinformatie.nl/>

2. View on the system in the future and possible threats

Together with the stakeholders the view of the system in the future was described as follows:

- Deepening the waterways for boating, drainage + other functions of the surface water
- Dredged materials in no way cause risk or damage to the surroundings
- Quality of the water system increases (both biodiversity and clear water in Friesland even in urban areas);
- Reusing dredged material when economically & technically viable;
- Enough income from tourism + structural responsibility for maintaining the system;

An important threat was that regions like Friesland have to deal with the societal aspects of dredged material. In Holland they call it "bagger", like "mudder" in Norway. The words themselves even have a negative connotation. The project focussed on the beneficial aspects of dredged materials for society.

3. Interventions in the system: implementing actions

To reach the desired system in the future 750.000 m³ of sediments have to be dredged each year for the coming 25 years. How was the dredged material used in Friesland? Reuse of sediment in infrastructure and agriculture is one of the instruments.

4. Monitoring and evaluation

The results are monitored and prove to be significant. Concerning the quantity that was dredged: in four years – thanks to extra money gained in the "Frisian Lakeprojekt" - the amount of dredged sediment was doubled, from 400.000 m³ in 2002 to 750.000 m³ in 2007.

The experience in Friesland proved that dredging is not only effective to increase water depth, but also improve water quality, shown by parameters such as turbidity and total amount of phosphates before and after dredging.

Conclusion

The conclusion of the Friesland case is that the results of the measures that were taken in Friesland give hope. Through the resilience lens, Friesland seems to be able to incorporate both the societal and geophysical aspects of a complex sediment issue in its decision-making process. But until now there is still a lack of coordinated policy to solve sediment problems in the future.

During the discussion in the workshop the 'political weight' of a societal issue is perceived as an important factor for success. The Friesland project has been in action for 10 years. However in daily practice one strives to take decision, but there are many constraints (budget, political pressures, time frames, funding, natural intervention) to do it as suggested by in the resilience approach. The most important question is how do you adapt the resilience concept to daily practice? An important step in doing this is to identify that 'slow problems' ask for 'slow processes' and not quick fixes in isolated projects. However, politics often does not allow for thinking in slow processes. This mirrors the politicians' assumptions about the (natural) system(s) involved: they can know it, they can control it and they can communicate about it. These assumptions bend back on the need for (more) transparency and trust in science-policy processes. Perhaps this is the next step towards systems approach of sustainable sediment.

A more extensive version of this article with pictures/illustrations can be found on

http://www.sednet.org/download/Sustainable_sediment_management_the_Frisian_story_.pdf

5th SETAC World Congress

On August 3rd to 7th, 2008, the 5th SETAC world congress was held in Sydney with more than 1000 registered participants. Sediments were an important issue, which was reflected by 6 sessions that dealt with the topics of characterization, ecotoxicology, chemistry, conceptual approaches to sediment risk assessment, risk characterization and remediation and bioavailability of organic contaminants in sediments. Altogether 55 contributions (posters and presentations) dealt with sediments. A meeting of SEDAG, the Setac sediment advisory group, during the congress was visited by 20 participants. The current activities of SEDAG comprise the start-up of 8 work groups that over the next years will be temporary projects in order to extensively elaborate on a specific task. Any interested people who would like to commit themselves to the tasks below are invited to state their interest in SEDAG in the SETAC community forum (no membership of SETAC required) and to contact the WG leaders which will soon be published on the SEDAG website <http://www.setac.org/node/35> :

Emerging Contaminants; PAH; Quality in Developing Countries; Understanding and pre-paring for the response of sediment-contaminant systems to natural and anthropogenic disturbances; climate change sediment impacts on ecological condition and the development of sediment targets for testing in the catchment; managing sediments in an ecosystem-based framework, considering ecosystem structure, function and services; Harmonization of methods; bioavailability of particle bound contaminants in changing aquatic environments.

SedNet at EU Water Research Day in Zaragoza

At the EU Water Research Day that was held on 8 September 2008, SedNet was referred to in the invited key-note lecture of Prof. Damia Barceló, SedNet member and leader of one of the SedNet working groups in the first years of SedNet. Besides the lecture of Damia Barceló also several other highly interesting presentations and lectures were given, a.o. the lecture of Prof. Tony Allan on "Integrated water resource management, governance and policy". Prof. Allan received the 2008 Stockholm Water Prize laureate, which can be regarded as the Nobel prize for water research. Furthermore, SedNet was (re)presented at this event with a poster, SedNet booklet and brochures by the former SedNet coordinator Jos Brils. More information on this event - a.o. the abstracts of the key-note lectures - are available via:

http://circa.europa.eu/Public/irc/rtd/eesdwatkeact/library?l=/european_research/

Impact factor of JSS

On 18 June 2008, JCR (Journal Citation Reports) published the new Impact Factor 2007 as well as the Immediacy Index 2007: * Impact Factor 2007 - J Soils Sediments (JSS) The Impact Factor of *4.373* ranked JSS as *No. 1* in the ISI Soil Sciences category (1 of 30). Immediacy Index 2007 - J Soils Sediments (JSS) The Immediacy Index of *0.622* ranked JSS as No. 4 in the ISI Soil Sciences category (4 of 30).

See <http://www.scientificjournals.com/jss>

New study on "Assessment of risks from particle bound substances in the Elbe River Catchment"

The study was performed by the Consulting Centre for Integrated Sediment Management, Hamburg Technical University, Hamburg, Germany, on behalf of the Hamburg Port Authority and the Elbe River Community. Its objective is to identify and quantify the risk from contaminated sediments in the German Elbe basin for catchment uses like habitat, human health and nutrition, agriculture and navigation. On the basis of sediment and suspended particulate matter (SPM) data from the last 10 years, (i) substances of concern, (ii) areas of concern, and (iii) areas of risks were identified. Risks were assessed by comparing SPM data with the respective sediment quality guidelines. In order to quantify the extent of contaminant reduction, necessary to reduce the risks to an acceptable level, and to prioritize the relevance of the different subcatchments for the basin wide contamination, loads of particle bound contaminants rather than concentrations had to be calculated and put in relation to each other at high and low water discharges. The Czech part of the Elbe, Mulde and Saale contributed most to the overall contamination.

The study can be downloaded at <http://bis.tutech.de/cms/?page=downloads> and <http://www.tideelbe.de/170-0-Elbe-Schadstoffe.html> where also the summaries of this study and a preceding one can be found in English, German, and Czech. and http://fgg-elbe.de/joomla/index.php?option=com_content&task=view&id=44&lang=de

German Working group on "Sediments and Water Quality"

The Gesellschaft Deutscher Chemiker (GDCh) is the largest chemical society in continental Europe with members from academia, industry and other areas. The society was founded in 1949 but builds on a long tradition that began in 1867 when its first predecessor organization, the Deutsche Chemische Gesellschaft was founded in Berlin. The work of the society is structured by divisions and working groups, among them the Waterchemical Society. Under the umbrella of the Waterchemical Society in 2002 a working group on "Sediments and Water quality" was established. A meeting of this group was held in April 2008 in Leipzig. Sediments in drinking water storage reservoirs was one of the main topics on the agenda.

Sediments in drinking-water storage reservoirs seen as a microbiological and chemical archive

Concentrations of dissolved nutrients and of many redox-sensitive compounds in the interstitial water of sediments are about three orders of magnitude higher than in the free water column, provided they occur in both media in comparable amounts. This applies also to episodic occurrences of planktonic easily degradable organic substrates (hydrogen donors) that are suppliers of bacteria. The mass fluxes across the sediment/water interface are decisive for the water quality, particularly in deep, stratified stagnant waters. Thus, it was to be expected that in the Saidenbach drinking-water reservoir (Ore Mountains, Germany) a steep concentration gradient of dissolved reactive phosphate exists, just like in reversed orientation one of nitrate. Most of the nitrate is used-up by bacteria as a source of bound oxygen. Moreover, in the interstitial water of sub-surface sediments layers (3 to 5 cm deep) of the Saidenbach reservoir, total depletion of sulphate was often observed. This is a consequence of the relatively scarce import of sulphate from the catchment, where sulphur-deficient baserocks (gray gneiss) prevail, while desulphurizing bacteria (sulphate reducers) are omnipresent. In a mesotrophic drinking-water storage like the Saidenbach reservoir, the content of dissolved reactive phosphorus in the interstitial water of the 2-5 cm-deep sediment layers does not exceed 0.1 mg/l and may thus serve as an indicator of the trophic status. Regarding the re-dissolution, the microbial sulphate reduction has been identified as the main driving force (since the classical investigations by OHLE). Accordingly, a great portion of the total phosphate in the considered sediment horizons to 5 cm depth is soluble by reduction (extraction with bicarbonate-dithionite). The sulphide content in the Saidenbach reservoir, however, is even in its maximum still below 0.4 mg/g dry matter and is thus less than half the level in the Muldenberg reservoir that is located near the ridge of the Ore Mountains. The ammonium content in the interstitial water increases with sediment depth steadily to 3 mg/l, while alkalinity rises just above 2.5 mmol. This indicates, on the one hand, high microbial activity and, on the other hand, an increasing restriction of the transport within the sediment. The discrepancy between the high N load in the catchment and the moderate enrichment of N in the sediment is particularly wide in the Saidenbach reservoir and suggests a very high denitrification potential of the sediment in a drinking-water reservoir. Moreover, it is striking that the Mn content in the interstitial water of the Saidenbach reservoir (in 2 cm sediment depth) rises to 12 mg/l, however, it exceeds already in the dry-matter sediment 6 mg/g (dry matter). The microbial component in the Mn re-solution has been little studied so far, in contrast to its role in the redox transformations.

Thanks to the better discern ability of the concentration distributions in sediments in comparison with that in the free water column (provided sufficient data are available), the sediments of drinking-water reservoirs prove to be an important source of information in the assessment of the trophic status and estimates about the future developments of water bodies with decreasing or increasing external nutrient loads.

In summary, one may state that the results presented here in brief, represent in fact an insight into the biogeochemical cycles of carbon, nitrogen, phosphorus, and sulphur, the fluxes of which may be interpreted also with a view to mass balances and extended to record turnover rates.

Contact: Prof. Dr. Isolde Röske; TU Dresden; Institute of Microbiology; 01062 Dresden – Germany (Isolde.Roeske@tu-dresden.de)

EU Directives and sediments

1. Revision of waste directive: non-hazardous sediments are not regarded as waste

In June 2008 the European Parliament adopted a legislative resolution, amending the Council's common position for adopting a directive of the European Parliament and of the Council on waste. The revised directive takes into account many of the changes proposed by the European Parliament. In summary, the directive:

- Sets new recycling targets to be achieved by the Member States by 2020, including recycling rates of 50% for household and similar wastes and 70% for construction and demolition waste;
- Strengthens provisions on waste prevention through an obligation for Member States to develop national waste prevention programmes and a commitment from the Commission to report on prevention and set waste prevention objectives;
- Sets a clear, five-step "hierarchy" of waste management options according to which prevention is the preferred option, followed by reuse, recycling, other forms of recovery and with safe disposal as the last recourse;
- Clarifies a number of important definitions, such as recycling, recovery and waste itself. In particular, it draws a line between waste and by-products and defines when waste has been recovered enough – through recycling or other treatment - to cease being waste.

Non-hazardous sediments are excluded from the scope of the directive. The text is: "Without prejudice to obligations under other relevant Community legislation, sediments relocated inside surface waters for the purpose of managing waters and waterways or of preventing floods or mitigating the effects of floods and droughts or land reclamation shall be excluded from the scope of this Directive if it is proved that the sediments are non-hazardous."

The directive is not formally in force yet. For the full text see

<http://www.europarl.europa.eu/oeil/FindByProcnum.do?lang=2&procnum=COD/2005/0281>

Further information:

DG ENV waste policy homepage <http://ec.europa.eu/environment/waste/index.htm>

2. Surface Water Protection against Pollution under the Water Framework Directive

The decision process concerning the revised text of the Environmental Quality Standards Directive is nearing its end. The revised text of the Environmental Quality Standards Directive has been adopted at the plenary session of the European Parliament on 17 June and will be adopted at the next European Council meeting. After publication in the official journal, the directive will enter into force in 2010 earliest. This gives the member states roughly 18 months to implement the text.

The proposed Directive, which is required to support the Water Framework Directive, will set limits on concentrations in surface waters of 41 dangerous chemical substances (including 33 priority substances and 8 other pollutants) that pose a particular risk to animal and plant life in the aquatic environment and to human health. The proposal will contribute to the Commission's Better Regulation initiative by replacing five older directives, allowing their repeal.

The text of the directive can be found in the (very long) document:

[http://www.europarl.europa.eu/RegData/seance_pleniere/textes_adoptes/provisoire/2008/06-17/P6_TA-PROV\(2008\)06-17_EN.doc](http://www.europarl.europa.eu/RegData/seance_pleniere/textes_adoptes/provisoire/2008/06-17/P6_TA-PROV(2008)06-17_EN.doc)

See further on <http://ec.europa.eu>

3. Marine Strategy Framework Directive: sediments hardly mentioned

At 25/06/2008 the Marine Strategy Framework Directive was published. Its entry into force is 15/7/2008.

<http://eur-lex.europa.eu>

Final meeting of the Siosed Project “Integrated multidisciplinary assessment of sediment translocation and re-use in the Venice lagoon”

Sediments are the precious building material for habitat reconstruction in the Venice lagoon. The management of sediments, even with very low contamination, is a very complex issue due to the ecosystem characteristics, the intense anthropogenic pressures, rigid legislation. At present, sediment eroded from intertidal areas to the channels is lost to the Adriatic Sea through the three outlets of the lagoon. An increase in dredging to maintain waterways and to construct mobile gates for high tides protection results in the need to relocate larger volumes of dredged material. Whenever sediment contaminant levels do not exceed established sediment quality criteria, there is an opportunity to re-use dredged sediment for environmental purposes and habitat restoration. The SIOSED project was launched by Magistrato alle Acque (Venice Waters Authority) through its Concessionary, Consorzio Venezia Nuova, in 2005, in order to provide a further multifaceted evaluation of the ecological effects of movement and placing of dredged sediment. The working team was international: Thetis S.p.A. (Venice) was supported by Scripps Institution of Oceanography (La Jolla, CA, USA), the Institute of Marine Science-CNR (Venice), the National Institute of Oceanography and Geophysics– OGS (Trieste) and SELC (Venice).

The project was mainly based on a pilot experiment in which small sub-tidal banks were built and monitored for their inherent characteristics as well as for their effects on the surrounding environment. Integrative assessment of the effects of the newly built banks on the local ecosystem, and of the physical, chemical and biological changes occurring within the banks, was performed using a multi-disciplinary approach which combined ecotoxicological, geochemical, microbial, ecological and physical analyses.

The meeting will not only summarize the main scientific results of each research line but discuss the integration of all research lines and links with the management decision framework.

Further information and the programme: <http://www.thetis.it/>

Danube becoming cleaner but more work needed, ways new survey by ICPDR

The Danube and its tributaries are becoming cleaner, the International Commission for the Protection of the Danube River (ICPDR) announced recently, presenting the scientific results of the Joint Danube Survey 2 (JDS2) - possibly the world's biggest river research expedition ever.

"The JDS2 was a major undertaking that fulfilled its planned expectations," said Sasa Dragin, ICPDR President and Minister for Agriculture and Water of Serbia. "It was intended to provide a good snapshot of the conditions of the Danube River and its tributaries, and it did just that."

The findings confirm that the cooperation among Danube countries to reduce pollution is bringing positive results. Progress has been made in many areas since the Joint Danube Survey 1 of 2001. Water quality is generally improving, but more work is needed. People can swim in parts of the Danube River Basin, but not everywhere. People can eat fish without health risk, but further investigation of mercury concentrations is needed in some areas.

The Danube still contains significant natural populations of plants and animals. The first ever systematic survey of the river's "hydromorphology" (the physical characteristics of its shape, boundaries and content) identified large areas that remain in good natural condition. Positive efforts that have been made to restore damaged natural areas, such as floodplains near Vienna and in the Danube Delta, need to continue if a good ecological condition of the river is to be achieved everywhere.

At the same time, the survey confirms that a further reduction of nutrients and organic pollution is needed. The Danube continues to show signs of degradation downstream of major cities and in a number of important tributaries because of poor municipal waste treatment. Efforts to establish waste water treatment plants in the basin, particularly in cities such as Budapest, Belgrade and Bucharest, need to be accelerated. Some countries need to intensify the pollution control efforts by industry on major tributaries. Overall, the reduction of pollution from agriculture (both nutrients and pesticides) must continue. Some toxic hot-spots also require more active attention.

Areas for further research and investigation were also identified. This includes levels of mercury in some samples, particularly in fish, as well as the sources of pollutants in some tributaries. The large number of non-native fish and other organisms in the Danube also require further assessment.

"More intensive discussions with stakeholders - such as the navigation and agriculture sectors, hydropower and the detergent industry - about measures to reduce particular pressures are needed," says ICPDR Executive Secretary Philip Weller "The cooperative climate that exists among many stakeholders for addressing the problems needs to be maintained."

See further www.icpdr.org/jds/about

New Working Group on Estuaries and Coastal Zones

In spring 2008 the EU Commission / DG Environment set up a Working Group on "Estuaries and Coastal Zones" with the task of elaborating a guidance document on the implementation of the EU nature legislation and the Water Framework Directive in Natura 2000 sites located in estuaries and coastal zones, with particular attention to port-related activities and dredging

The establishment of NATURA 2000 under the Habitats Directive in estuaries and coastal zones has proven to be controversial in many Member States. There have been concerns especially among port authorities, who fear that such designations would impose restrictions in relation to their activities and to infrastructure development. On the other hand, Member States are currently actively preparing for the designation of Natura 2000 sites as Special Areas of Conservation at the national level. In that context important work is ongoing in relation to the establishment of conservation objectives and instruments having regard to the need of reconciling nature conservation requirements and socio-economic development objectives in Natura 2000 estuaries or coastal areas.

There is an important demand from Member States and stakeholder organizations to further clarify certain aspects of estuarine management, such as dredging activities, as well as to exchange information on experience and good practice in relation to the conservation, management and sustainable use of estuaries. The Commission therefore decided to develop further guidance on the implementation of the EU nature conservation legislation and the EU Water Framework Directive in estuaries and coastal zones, with particular attention to port-related activities and dredging. Some general guidance will be given for the requirements of the Marine Strategy and Floods Assessment

and Management Directives.

The exchange of experience and good practice examples is seen as the most appropriate means for facilitating and improving the implementation of the respective legislation. There are several relevant ongoing/recent/completed initiatives such as the Paralia Nature, New!DELTA (Interreg III B) and TIDE projects, which involve experts and stakeholders, including port operators, from different Member States. Some Member States have also developed national guidance in relation to the assessment of particular activities, such as maintenance dredging protocol in NATURA 2000 sites in the UK or the GEODE recommendations for determining estuary management objectives for dredging operations in France.

The Working Group is comprised of experts from interested Member States, scientific experts, representatives of key stakeholder groups (including ESPO and European dredging association), NGOs, as well as Commission services (DG ENV, TREN, FISH). SedNet is represented through its chairman Axel Netzband from the Hamburg Port Authority. The outcome of the Working Group (Guidance Document) is intended to be ready by the end of 2008.

4th European Centre for River Restoration Conference on River Restoration, San Servolo Island, Venice, 16-21 June 2008

Workshop WS3: How much sediment is needed for a well functioning river system?

Coordinated by: Sue White, Cranfield University and Jos Brils, Deltares/TNO

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 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 in the UK (Collins & Anthony, 2008) 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)?

The workshop in Venice set out to address these themes through a sharing of experience and practice from an international group of participants. Key points from the workshop were:

- In Europe, White and her team (White et al, 2005 and Becvár, 2006) have looked at sediment load in relation to flow exceedance values for 44 major river basins. Those rivers which are not predominantly groundwater fed show a clear tendency to transport the majority of sediment in high flows. On average for the European rivers studied, 62.9% of sediment moves in the top 10% of flows. The exact percentage changes from year to year, from river to river and even from location to location on one river. **Monitoring should reflect this, but does not**

currently do so.

- Work has been done in the USA on characterising sediment concentration in relation to different flow exceedance values. Analysis has been done by ecoregion and by stable versus unstable reaches (Simon et al, 2004, Simon & Klimetz, 2008, Simon & Klimetz, in press). **It is clear that great variation in sediment concentration is seen for rivers in different environmental contexts and this must be borne in mind when considering sediment "target values"** (see for example, Cooper et al, 2008).
- Sediment is just one of a number of stressors which affect the ecological status of our water bodies. An integrative approach is needed if we are to achieve WFD goals. **Sediment MUST be included in this integrative approach.**
- We do not understand the cause-effect linkages between sediment and ecosystem health. Should we be looking at dose-effect response relationships? Or is it more important to think about exposure duration? Can we define an exposure time for which a certain sediment concentration should not be exceeded for a certain river or location? **Further research is needed on the sediment quantity related implications for ecosystem functioning.**
- Sediment is a natural and necessary part of healthy functioning aquatic systems. The problems largely arise when there are anthropogenically driven changes in sediment supply, which can either increase or decrease load. **Work is needed to enable quantification of natural versus anthropogenic sediment flux.**
- Sediment has historically largely been considered as an end of catchment issue (the catchment sediment yield or sediment flux) in relation to e.g. sedimentation of reservoirs, dredging. **We need a much clearer understanding of sediment budgets across river basins, including variability in supply over the short, medium and long-term** (see for example White et al, 2006; Walling and Collins, 2008).
- There is little evidence that historical monitoring of sediment concentration internationally has provided the information required to make informed management decisions on sediment management in relation to ecosystem functioning. **Well designed and focused monitoring is required in which sediment forms part of an integrated monitoring programme.**
- The predicted changes in climate for much of the world suggest that the channel forming flow is likely to change in the short to mid-term. This means that many rivers will begin to remobilise, cutting into deposited alluvial material in flood plains. Such river bank erosion will enhance sediment concentrations at least locally and will change sediment load and flux budgets. **The implications of changing river flow patterns on sediment supply and transfer are not well understood and require further research.**
- The focus of this workshop was largely on sediment quantity. However, it was acknowledged that we probably know even less about the role of sediment in binding, storing, releasing and recycling pollutants. **The remobilisation of historical sediment deposits and associated contaminants from floodplains was considered to be a particular issue of concern.**

For references: see http://www.sednet.org/download/ECRR_workshop_report_SedNet_2008.pdf

Final symposium of the joint BMBF Research Project "SeKT - Definition of reference conditions, control sediments, and toxicity thresholds for limnic sediment contact tests"

Against the background of the implementation of the European Water Framework Directive (WFD) there is currently a high demand for research and development regarding the application of tools to detect potentials in sediments to cause ecotoxicological damage. Sediment contact tests are suitable tools for sediment risk assessment, as they simulate realistic exposure scenarios, considering the bioavailability of sediment bound contaminants. The joint research project SeKT – the acronym stands for the German word 'SedimentKontaktTests' (= sediment contact tests) – was initiated with the aim to compare recently developed or standardized sediment contact tests in terms of their variability and practical applicability in sediments with a wide range of properties. The test battery (bacteria, fungi, nematodes, oligochaetes, fish and plants) included test organisms that represent different trophic levels and cover a broad variety of uptake routes for contaminants. By defining reference conditions and toxicity thresholds, the project wanted to sharpen existing tools leading to a better interpretation of sediment toxicity data for an environmental risk assessment and helping to better imply sediment toxicity testing into routine monitoring programs.

To round out the SeKT project, a symposium will be held in Koblenz, Germany, **from November 12th to 14th** in the Federal Institute of Hydrology (BfG). This symposium will not only summarize the outcome of the project, but connect the results with important issues in environmental monitoring (block 1), method standardization (block 2), water management (block 3), and ecotoxicological science (block 4). Within 1.5 days, stakeholders and scientists from various European countries and

different disciplines, will present their view of and discuss the relevance of sediment contact tests in the context of environmental risk assessment and the EU WFD.

The coordinator of the SeKT-project and convener of the symposium is Dr. Ute Feiler from the BfG (feiler@bafg.de).

Further information and programme: <http://sekt.bafg.de>; www.bafg.de

Draft Handbook for Developing Watershed Plans to Restore and Protect Our Waters (EPA 841-B-05-005)

This draft guide to watershed management was produced by the EPA Office of Water. Its purpose is to help various organizations develop and implement watershed plans.

This handbook contains in-depth guidance on quantifying existing pollutant loads, developing estimates of the load reductions required to meet water quality standards, developing effective management measures, and tracking progress once the plan is implemented.

To access the handbook, get instructions for submitting comments, and viewing the related archived internet seminar, see http://www.epa.gov/owow/nps/watershed_handbook/

Upcoming events

2008:

1-3 October 2008: CEDA Dredging Days 2008: Dredging Facing Sustainability, Antwerp, Belgium. www.dredgingdays.org

1-4 October 2008: International conference on the implementation of the European Water Framework Directive, Sibiu (Romania). Organised by the International Network of Basin Organizations (INBO). <http://www.inbo-news.org/>

12-14 November 2008: Final symposium of the joint BMBF Research Project "SeKT - Definition of reference conditions, control sediments, and toxicity thresholds for limnic sediment contact tests", Koblenz, Germany. : sekt.bafg.de; www.bafg.de

13-15 November 2008: EU Groundwater Policy Developments – Good Status Objectives and Integrated Management Planning, Paris, France. www.groundwater2008paris.fr

15-17 November 2008: International Conference on Hydrology and Climate Change in Mountainous Areas, Nepal. www.soham.org.np

2009:

2-5 February 2009: Fifth International Conference on Remediation of Contaminated Sediment, Jacksonville, Florida, USA. Abstracts are due on 30 June 2008 www.battelle.org/conferences/sediments

14-16 September 2009: 3rd International Conference on Estuaries and Coasts, Tohoku University, Sendai, Japan. donko.civil.tohoku.ac.jp/icec2009/index.html

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