Sediment management: a European perspective

Piet den Besten
Centre for Water Management
Rijkswaterstaat, Netherlands
Content

- Background of Dutch-German exchange (DGE plus)
- What is needed for adequate sediment management?
- Examples of sediment management
- Sediment management part of a more holistic approach
DGE: Exchange on sediment/dredged material management

- since 1999: informal bilateral platform
- regulatory authorities from:
  - Netherlands
  - Germany
  - United Kingdom (since 2005)
  - France (since 2005)
  - Belgium (since 2006)
What have DGE/DGE$_{\text{plus}}$ members in common?

- Big and/or common river systems (Rhine, Meuse, Ems, Scheldt, Seine, Thames, Humber);
- An adjacent coastal area/North Sea;
- Important (sea) ports in which considerable amounts of sediment are moving (settling, resuspending) permanently;
- A need for dredging (maintenance, construction works, sand and gravel extraction, remediation of hot spots) of up to 50 million m$^3$/year.
Adequate sediment management = understanding the system

- Sediment is a connecting matrix
- Effects of sediment in the system
  - Quantitatively (for morphology, shipping, ecology …)
Realignement project Chowderness
Sediments should be kept in the system!

- Subtidal placement of fine material
- Water column recharge
Adequate sediment management = understanding the system

- Sediment is a connecting matrix
- Effects of sediment in the system
  - Quantitatively (for morphology, shipping, ecology …)
  - Qualitatively: sediment contamination
Contaminated sediments a problem?

- Ecosystems are dependent on sediments
- Sediment organisms play a key role
- Benthos = food for higher species
- Biodiversity
- Food chain poisoning

Sediments can act as a source for contamination of other compartments:
- Ground water
- Surface water

WFD goals

Socio-economic effects
Adequate sediment management = understanding the system

- Sediment is a connecting matrix
- Role / effects of sediment in the system
  - Quantitatively (for shipping, ecology …)
  - Qualitatively
- Scale of necessary measures
- Effectiveness
- Understanding the relations …
Sediment quality and quantity

Many relations!!

Landscape
Heritage/archaeology
Flood defence
Agriculture/forestry
Planning
Industry/residential
Recreation
Navigation
Floodplains & marshes
Water quality
Maintenance and capital operations
Structures (weirs, bridges, locks)
Habitats (including Fisheries)
Geo-morphology

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Many relations!!
Adequate sediment management = adequate legislation

On EU level:
- Water Framework Directive
- Groundwater daughter directive
- EU Waste Directive
- Soil Strategy / Soil Framework Directive
Adequate sediment management = adequate legislation

- On National level
  - Integrated approach for sediment management & handling of DM
  - Spatial planning
  - Rules for relocation within the system
- Matching with ......
  - Food quality legislation
  - Marine Strategy
Adequate sediment management = adequate tools

- Water system modelling
  - Sedimentation
  - GIS for sediment quality
- Risk assessment tools (water system level vs site-specific)
- Diagnostic tools
- Tools for decision making
  - Cost-benefit analysis
  - Re-use options depending on sediment characteristics
- etc
The ‘areas of risk characterization’ approach (Elbe)

River Basin Objectives

Areas where objectives are not met

Substances of Concern

Regions of Risk

Areas of Risk

Areas of Concern

Measures
Adequate sediment management = looking for innovative concepts for re-use
Belgium: solutions for the Fasiver pollution through stakeholder involvement

- Contaminated site turned into a treatment site for dredged material
- Dewatered and treated dredged material used to raise the level of the site to make it ready for building
- Soil and groundwater contamination cleaned up
- Site available again for industrial initiatives
- Achieved through a Public Private Partnership
Protection against dike burst / flooding: space for water in Rhine/Meuse
Risk reduction: contaminants in confinement within a terp
Adequate sediment management = adequate communication & stakeholder involvement
England: Wallasea Wetland Creation Project

Interpretation board

Web camera tower being erected
Management of sediment quality = water management

- Sediment quality is a secondary management objective
- Paradigma shifts, e.g.
  - From chemical approach to water system quality based on (ecosystem) services
  - From technical solutions to achievable solutions
  - From ‘owned problem’ to a stakeholder process
  - From (beta-)science-driven to an integration in river basin plans
River basin management aimed at ‘services’:

- Accomodate and transport of water
- Accomodate nature
- Shipping
- Agriculture
- Fisheries
- Recreation
- Drinking water
- Hydropower production
Relation water system quality – sediment management

- Space for water $\rightarrow$ morphology $\rightarrow$ depth
- Shipping $\rightarrow$ morphology $\rightarrow$ depth
- Ecological objectives $\rightarrow$ morphology $\rightarrow$ depth
- Ecological objectives $\rightarrow$ sediment quality
- Fisheries
- Recreation $\rightarrow$ sediment $\rightarrow$ water quality
- Drinking water
Conclusions

- Adequate sediment management requires that ‘various conditions are optimized’

- Sediment management = water management

- Relations between sediment quantity / quality issues and water system services need to be clarified
Thank you for your attention