Environmental aspects of dredging and dredged material management

CEDA

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Central Dredging Association CEDA

CEDA is an independent international professional association for all those involved in any kind of activity related to dredging and dredged material management and who live and work in Europe, Africa and the Middle-East.

Members of CEDA

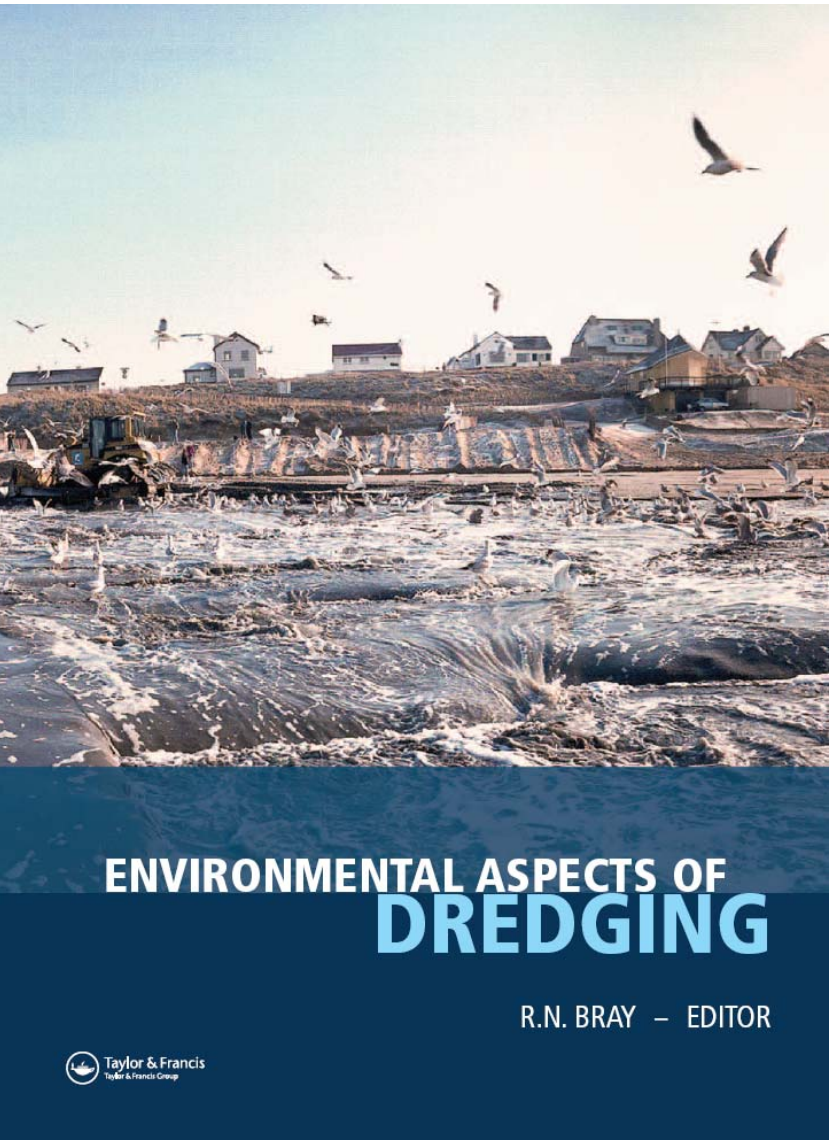
- Those who need to dredge: port authorities, government organisations, public works
- Those who provide dredging service: dredging companies
- Those who design and build dredgers: shipyards
- Consultancies
- Educational and research establishments
- Associations
- Services: insurers, brokers, bankers, lawyers
- CEDA does not represent the interest of any particular branch.

Aims of CEDA

To Generate and Disseminate Knowledge

For more information about CEDA

www.dredging.org



IADC / CEDA Publication:

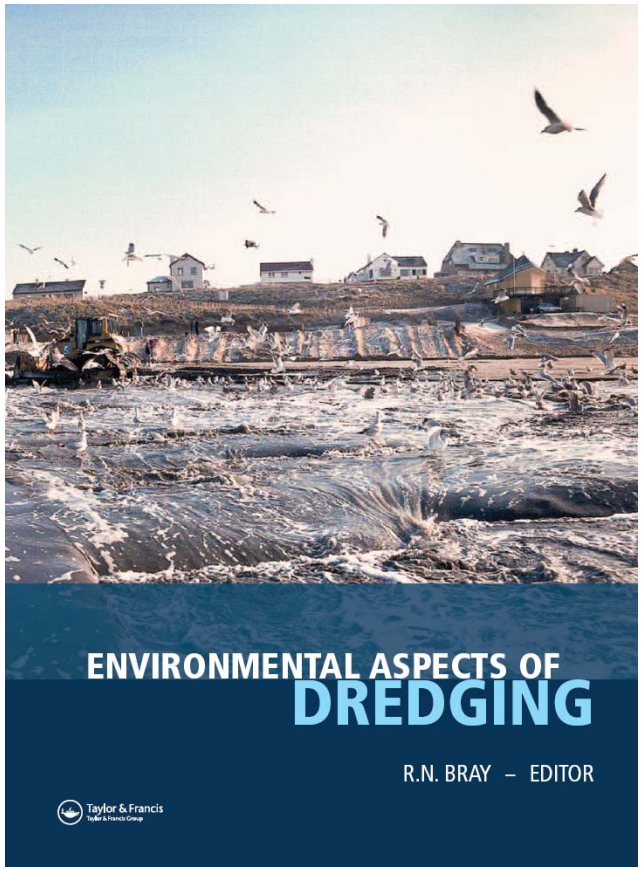
Environmental Aspects of Dredging

What can you expect from the book?

- A balanced view
- Comprehensive information + sources for further research
- It leads the reader through a state-of-the art environmental evaluation process
- It DOES NOT FAVOUR either the promoter or the opponent of dredging works

It is an aid to engineers, government agencies and port authorities, civil engineering consultants and contractors involved in planning and designing dredging works.

Practical details



Publisher:	Taylor & Francis
Publication:	August 2007
Pages:	Approx. 400
Price:	£79 ; US$ 149.95
Discount:	25% for members
Format:	Format: hard copy e-book

Danube riparian countries will receive complimentary copies

Training Seminars: Environmental Aspects of dredging

- Technical University Delft postgraduate programme
- International Maritime Organisation (IMO) + United Nations Environmental Programme under the London Convention Technical Co-operation programme
  - 1998: Cape Town, South Africa
  - 2002: Kingston, Jamaica
  - 2004: Mombassa, Kenya
  - 2006: Dalian, China

To present the environmental seminar in your own country please contact CEDA.

Need for dredging

- Capital works → creation of new or improved facilities, such as harbour basins, deeper navigation channels, etc.
  - navigation
  - infrastructure
  - coastal engineering
  - mining industry
  - offshore industry
- Maintenance for navigation
- Land reclamation
- Flood management
- Clean up
- Drainage and water supply

Environmental impacts

- (Short-term) effects of the dredging activity:
  - suspended sediment leading to turbidity;
  - overflow from hoppers;
  - loss of dredged material during transport (hopper, pipeline);
  - smothering or loss of benthic fauna at placement site.
- Decison-making on dredging needs a site specific assessment to determine if there are unacceptable effects and if they can be sufficiently mitigated or compensated

Monitoring turbidity relative to background

Mitigation of potential environmental impacts

- Improve accuracy
  - dredging thin layers and reduce dredging volume
  - improved onboard automation and monitoring
- Reduce turbidity
- Reduce spill, loss
- Minimise dilution, increasing density

Examples of mitigation measures

Measures on board the dredger

- specially designed cutter heads, degassing systems, monitoring
- careful navigation in shallow water
- limit overflow
- avoid spillage from open barges/hoppers

Measures at the dredging site

- silt screens
- complete enclosure of the dredging equipment

Measures at the placement site

- underwater diffuser
- seasonal restrictions/tidal restrictions

Environmental Grab Dredger

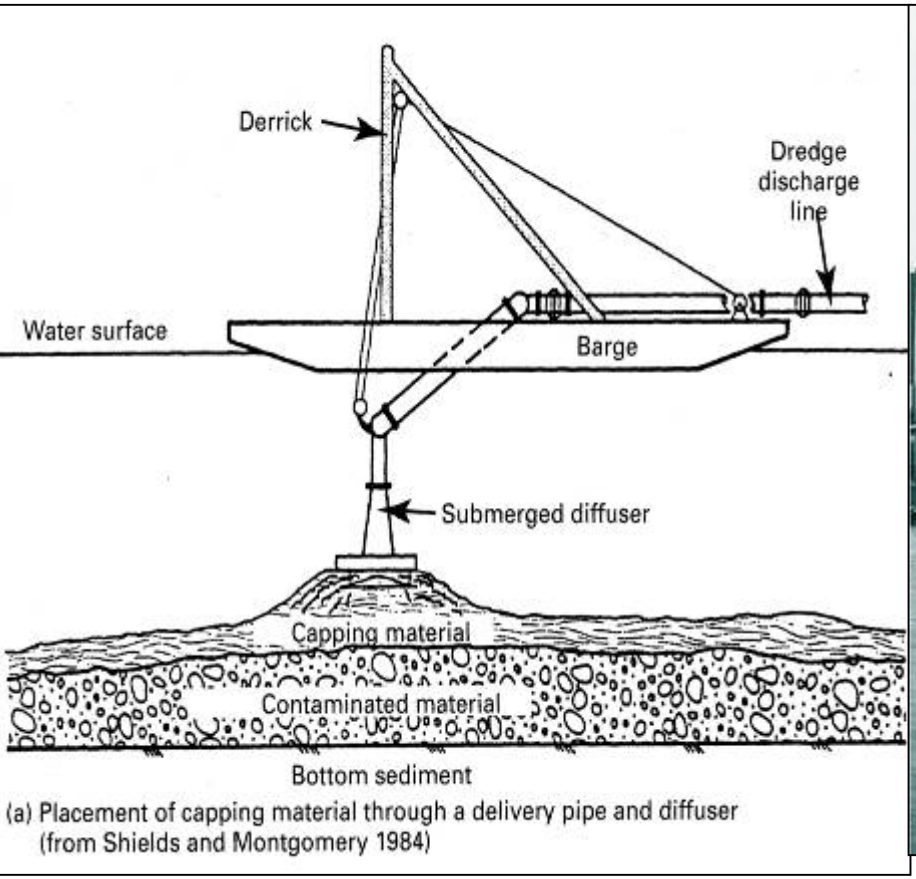
- Horizontally closing grab, sealed off when closed

Silt screen

- Silt screen
  - around dredger / around site
  - limited effectiveness
  - difficult handling
  - applicable in special cases

Diffuser

- Horizontal flow
- Outlet speed reduced to 0.5 m/s



(a) Placement of capping material through a delivery pipe and diffuser (from Shields and Montgomery 1984)

Management options for destination of dredged material (DMAF)

- Relocation in the aquatic system preferred option to maintain sediment balance
- Use directly or after treatment
- Un/semi confined aquatic placement
- Confined disposal facility

Relocation into the river

Classification and dewatering fields

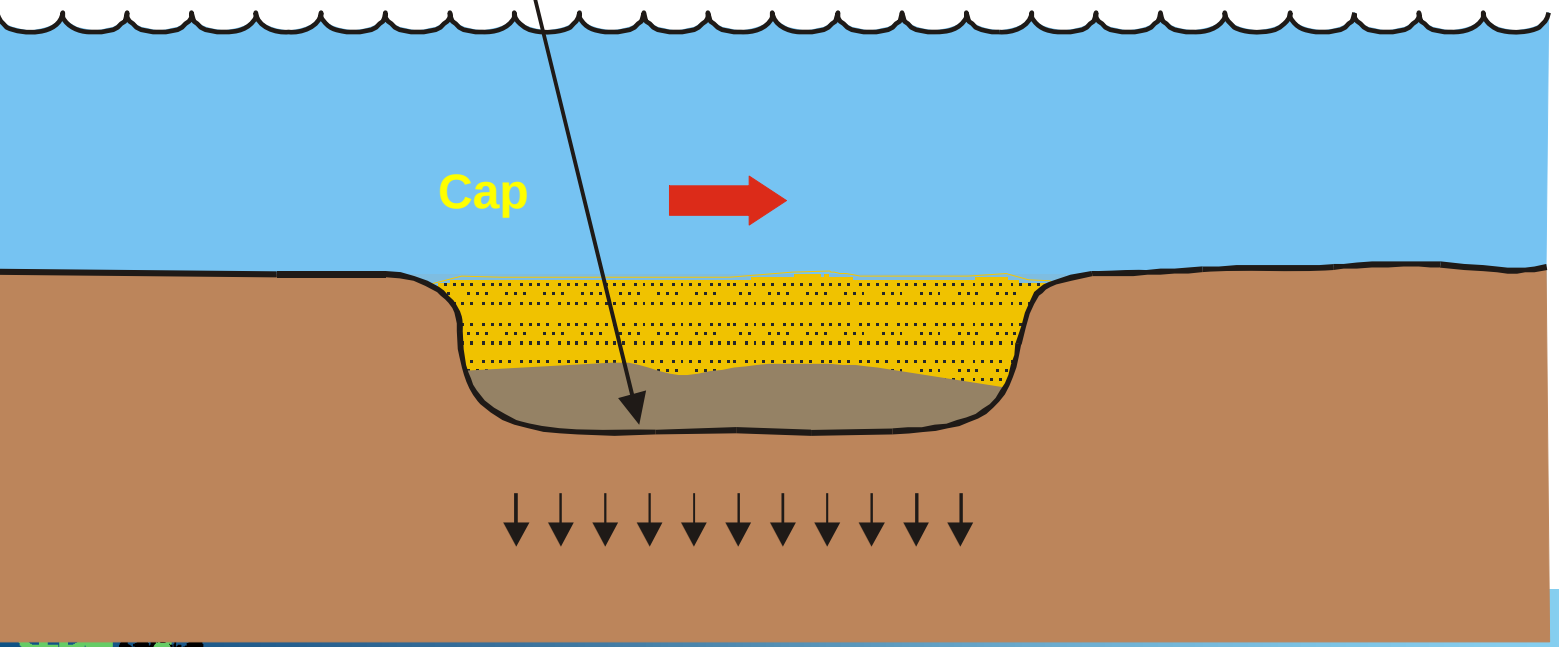
Dyke construction test field

1.20 m of treated dredged material, covered with 0.30 m clay

Filling Pits with dredged material

Ecological improvement

Contaminated Dredged Material



Confined Disposal

CDF: Placement in engineered containment structure isolating the dredged material from the adjacent waters

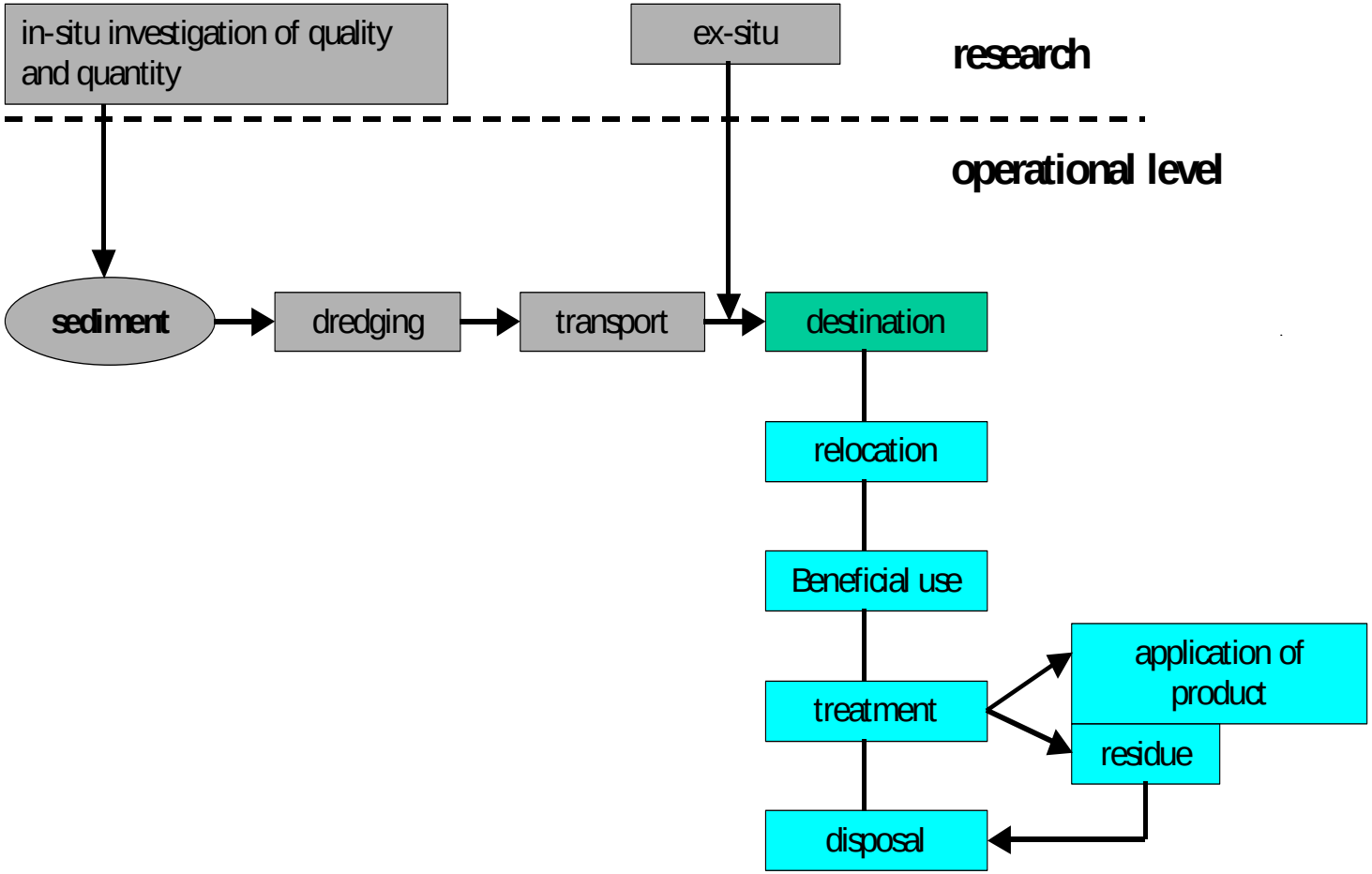
- Sub-aquatic
- Upland

Mm3

NL IJsseloog 23 Mm3

Germany Feldhofe 20 Mm3

Dredging chain



Important cost factors

- Consider which part of the dredging chain is included
- Environmental restrictions are important for the dredging method & production rate
- Scale of the operation mob/demob costs
- Logistics/transport
- Costs for destinations show a sharp increase from relocation and disposal to treatment and use

Lessons learned from dredging

- Dredging is of increasing importance, not only for the economy but also for the environment
- Each dredging project is unique. Take local conditions into account.
- Dredging activities have certain impacts, which can be mitigated to a certain extent.
- A number of environmentally friendly dredging techniques are available.
- Imposing restrictions increases the costs. Balance between economy and the environment.
- Dredging can be undertaken for different purposes, such as navigation, flood management and environmental enhancement. A holistic approach is needed to combine these objectives.


Thank you for your attention