dredging: the environmental facts

WHERE TO FIND WHAT YOU NEED TO KNOW

Dredging, a vital process
Technically speaking, dredging is the relocation of underwater sediments and soils for the construction and maintenance of waterways, dikes and transportation infrastructures, and for reclamation and soil improvement. But dredging is more. It is a valuable tool for the benefit of mankind, for social and economic development, and for environmental restoration.

Dredging for sustainable development
Dredging for infrastructure projects has been characterised by some as man-made modification of nature, lacking awareness or underestimating the effects on the entire ecological system. Today, however, increasingly, a holistic approach is being applied to ensure overall and long-lasting sustainable development.

Dredging must be safe & sound
In the past decade technological developments, research activities and operational experiences, combined with new risk-based approaches and integrated management, have led to an enormous expansion of knowledge about good dredging practices.
This wealth of information is stored on databases, and used for developing guiding principles to serve all those involved in dredging and dredging-related issues.

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BALANCE ECONOMY AND ECOLOGY

The overall management goal should be to achieve a sustainable solution, subject to sound environmental, social and financial impact evaluations, weighing and balancing all the associated risks.

PARTNERING PAYS

Identifying and involving all potential stakeholders and affected parties from the conceptual stage onwards through to the completion of the project is essential. Communicating clearly and competently on the physical, environmental, social and financial effects of a project should always be regarded a key success factor.

SOURCE CONTROL IS ESSENTIAL

The dredging community is often able to remediate contaminated sediments. Even when this is possible, a high priority should always be given to source control. Successful implementation of prevention strategies will require collaboration amongst all players from source to sink.

CHARACTERISATION OF DREDGED MATERIAL IS VITAL

An evaluation of the physical, chemical and biological characteristics of the sediment is necessary to determine: potential dredging methods; use, disposal or treatment options; potential impacts; extent of biological and/or chemical testing; and monitoring needs.

SEDIMENT MANAGEMENT

Sediments are natural elements in any river basin as well as the seabed. Although dredging interferes with the natural cycle of sedimentation and re-suspension, nowadays the environmental focus has shifted towards a "river basin approach", i.e taking into account all activities in a total view. It shifts the scope from the management of dredged material to complete river basin sediment management. It integrates the economic need for dredging, the beneficial use of the material, the reduction of the effects of dredging and disposal, as well as source control.

DREDGED MATERIAL IS A RESOURCE

Most dredged material is clean sediment. It should be recognised as a resource, as part of the ecological system. Options for beneficial use are numerous: they vary from coastal nourishment, land or wetland creation, and soil improvement to dike building and use as construction material. Dredged material should be used, whenever possible, to maximise the benefit to both the project and the beneficial use.

ASSESSMENT & MITIGATION OF ENVIRONMENTAL IMPACTS

Environmental impact assessment is an important pre-requisite to dredging initiatives. Such an assessment is used to establish and, where necessary, to explore options to mitigate possible effects of dredging or disposal on the physical environment, wildlife, habitats, fisheries, archaeology and many other interests

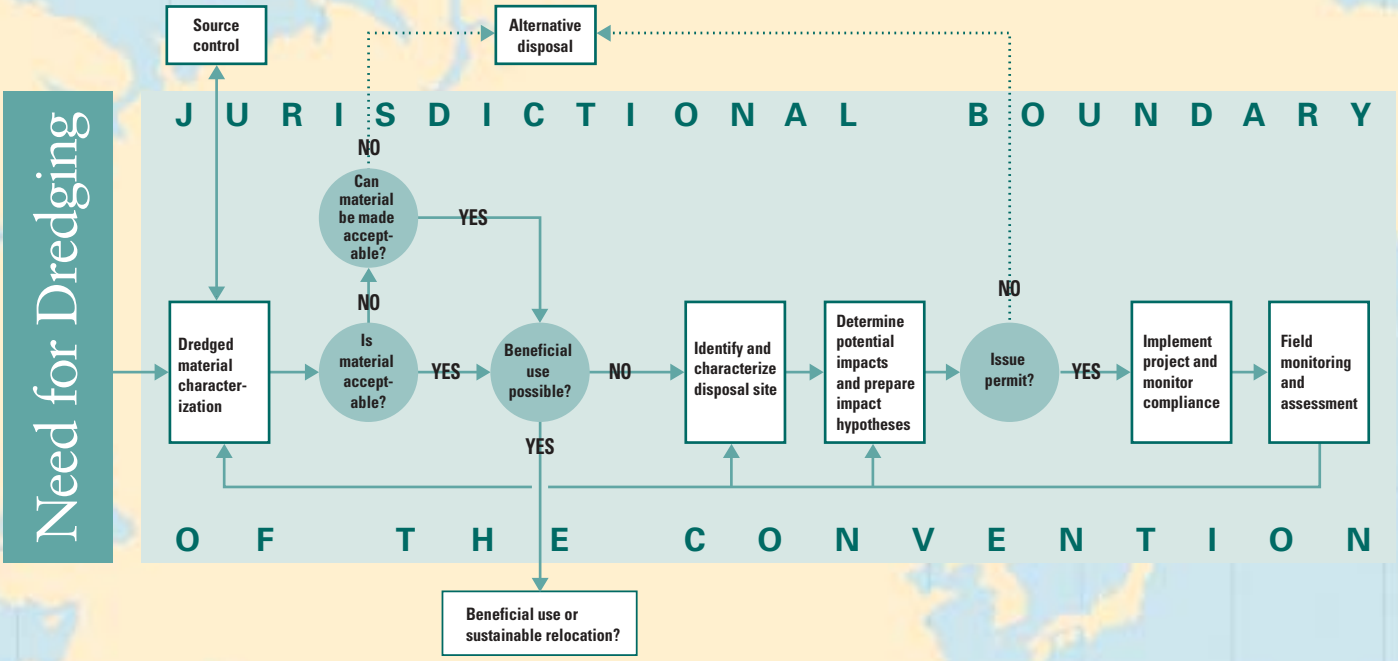
CONSIDER THE NEED FOR SUSTAINABLE RELOCATION

Marine or fluvial sediments normally contribute to the sustainability of natural eco-systems. Their role in river, estuarine and coastal zone processes should be respected wherever possible. Removing marginally contaminated sediment from an ecosystem may actually, in specific cases, be more detrimental than relocating it. Consequently, an environmental impact analysis is crucial, especially when considering sustainable river and coastal management.

Front cover:
Left to right: in a restored nature preserve in the Everglades clean water has brought back fish and birds; the profiling grab is used for dredging polluted bed materials in ports and waterways; computer modellingis an integral part of the environmental monitoring of dredging projects: information is stored in a comprehensive database.

DREDGING REGULATORY FRAMEWORK

The aquatic disposal of dredged material in the sea is controlled globally through the London Convention and a number of regional conventions. Each individual country regulates placing dredged material on land and in its own inland waters. Within the conventions and through PIANC, CEDA and IADC, several frameworks have been developed for the assessment and management of dredged material. The overall essence of these frameworks is presented in sequence in the diagram shown here.



LEARN BUT DO NOT COPY

PIANC, IADC, CEDA and UNEP issue many relevant publications. But be alert: every situation is unique! The examples and case studies given in these publications are in most cases specific for a certain set of conditions. Readers should learn from them but should not copy them. Copying measures and solutions may lead to inappropriate solutions and unnecessary extra costs without any added social or environmental benefit.

KNOW WHERE TO FIND INFORMATION

The networks and publishing organisations — PIANC, IADC and CEDA — are fully committed to facilitating the design and implementation of environmentally, economically and socially sound dredging and reclamation projects by gathering and disseminating relevant, factual, good quality information. The World Organisation of Dredging Associations is similarly committed. The production of various integrated guidance documents on these aspects of dredging seeks to achieve this objective. Publications and references to websites can be found on the following page.
UNEP through the UNEP/GPA Coordination Office and UNEP World Conservation and Monitoring Centre provide information on policy and action to conserve the living world.

Inside pages 2-3: Top to bottom: in south Florida, a man-made wetland has resulted in a balanced ecosystem of plants and wildlife; samples from a Becker coring device are used to analyse soft materials on the seabed during and after dredging; people watch with interest at a dredging site in South America; dredging helps maintain beautiful beaches for recreation; a cutter suction dredger modified with a submerged diffuser can reduce dispersion of contaminants; ports are an economic necessity and can be deepened in an environmentally sound way: an aerial view of the harbour of Rotterdam.

FINDING FURTHER INFORMATION ON DREDGING

Responsible dredging and disposal practices are in everybody's interest. The following organisations are actively involved in promoting responsible dredging and disposal practices. Each of these organisations is able to provide further information to help you understand the processes and the facts about dredging and disposal. If you have any questions about dredging or disposal, we encourage you to contact one or all of them.

IADC – International Association of Dredging Companies
Mission: To inform the world about the fundamental need for dredging and the beneficial economic, social and environmental effects of dredging. To promote fair practice conditions and fair competition within the dredging industry and to improve the international business climate for the private dredging industry.

Contact: IADC Secretariat, PO Box 80521, 2508 GM The Hague, The Netherlands. Phone: +31 70 352 3334 Fax: +31 70 351 2654 E-mail: info@iadc-dredging.com www.iadc-dredging.com

IAPH – International Association of Ports and Harbors
Mission: One of IAPH's missions is to promote the development of the international port industry, by inter alia, helping to define international regulations, standards and guidelines covering the environment, including dredging.

Contact: IAPH Head Office,7th Floor, South Tower, New Pier Takeshiba, 1-16-1 Kaigan, Minato-ku, Tokyo 105-0022, Japan. Phone: +81 3 5403 2770 Fax: +81 3 5403 7651 E-mail: info@iaphworldports.org www.iaphworldports.org

PIANC – International Navigation Association
Mission: PIANC aims to be the foremost professional organisation for the promotion, management and sustainable development of navigational inland, coastal and ocean waterways, embracing ports and harbours, logistics, infra-structure and coastal zones, all for the safe and efficient operation of all types of commercial and recreational vessel.

Contact: PIANC Secretariat, Graaf de Ferraris Building – 11th Floor, Blvd. du Roi Albert II, 20 – Box 3, B-1000 Brussels, Belgium. Phone: +32 2 553 71 61 Fax: +32 2 553 71 55 E-mail: info@pianc-aipcn.org www.pianc-aipcn.org

UNEP/GPA. The Global Programme of Action for the Protection of the Marine Environment from land based activities.
The GPA provides conceptual and practical guidance to national and regional authorities in devising and implementing sustained action to prevent, reduce, control and/or eliminate marine degradation from land-based activities(www.gpa.unep.org)

WODA ENVIRONMENTAL POLICY ON DREDGING

"The World Organisation of Dredging Associations (WODA) recognises that carefully designed and well-executed dredging conducted in an environmentally sound manner contributes to a stronger economy. WODA believes that dredging projects can be conceived, permitted, and implemented in a cost-effective and timely manner while meeting environmental goals and specific regulatory requirements. WODA is committed to the development and implementation of appropriate environmental safeguards and performance guidelines for construction, maintenance, mining and remedial dredging. Beneficial use of dredged materials is encouraged. Open lines of communication among stakeholders, such as port interests, dredging contractors, regulatory agencies, other business interests, environmental interest groups, and the public, should be standard elements of any project. WODA encourages investment in and expeditious transfer of new technologies, and the development of new, more efficient techniques for improving the evaluation and safe handling of dredged material".

World Organization of Dredging Associations **(WODA)** is composed of Eastern Dredging Association (EADA), Central Dredging Association (CEDA), and Western Dredging Association (WEDA). The three associations share the mission of WODA:

CEDA, Radex Building, Rotterdamseweg 183c, 2629 HD Delft, The Netherlands, Phone: + 31 (0)15 268 2575 Fax: + 31 (0)15 268 2576 E-mail: ceda@dredging.org www.dredging.org

EADA Secretariat,c/o Port Klang Authority, Mail Bag Service 202, 42009 Port Klang, Malaysia, Fax: + 603 316 70211 E-mail: david@pka.gov.my www.woda.org

WEDA Executive Offices, P.O. Box 5797, Vancouver, WA 98668-5797 USA. Phone: +1 5360 750 0209 Fax: +1 360 750 1445 E-mail: weda@comcast.net www.wesda.westerndredging.org

PERTINENT LITERATURE

Bray, RN, AD Bates and JM Land (1997). Dredging, a Handbook for Engineers, 2nd edition, Arnold Publishing, London, Sydney, Auckland.

IADC/CEDA (1996-200), Environmental Aspects of Dredging,
Guide 1: Players, Processes and Perspectives (1996)
Guide 2: Conventions, Codes and Conditions (1997)
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Guide 5: Reuse, Recycle or Relocate (1999);
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Guide 7: Frameworks, Philosophy and the Future (2000).

IADC/IAPH (2004) Dredging for Development 5th edition, RN Bray, Editor.

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PIANC (1997) Handling and Treatment of Contaminated Dredged Material from Ports and Inland Waterways, Report of PEC Working Group 17.

PIANC (1997) Dredged Material Management Guide, EnviCom Special Edition.

PIANC (1999) Management of Aquatic Disposal of Dredged Material, EnviCom Working Group 1.

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PIANC (2002) Environmental Guidelines for Aquatic, Nearshore and Upland Confined Disposal Facilities for Contaminated Dredged Material, EnviCom Working Group 5.

PIANC (2003) Ecological and Engineering Guidelines for Wetlands Restoration in relation to the Development, Operation and Maintenance of Navigation Infrastructures, EnviCom Working Group 7.

PIANC (2005) Generic Biological Assessment Guidance for Dredging and Disposal, EnviCom Working Group 8.

PIANC (2005) Management, Reclamation of Dredged material and End Use of Existing Confined Disposal Facilities, EnviCom Working Group 11 (expected).

UNEP-GPA (2004) Key Principles for Port and Harbour Development.

Dredgeline – the on-line bibliographical reference database on dredging literature, www.dredgeline.net

Paralia Nature, www.imiparalianature.org

European Sediment Network, www.sednet.org

UNEP - Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, www.gpa.unep.org

US Army Corps of Engineers Dredging Operations Technical Support, http://el.erdc.usace.army.mil/dots

ACKNOWLEDGEMENTS

This booklet was made possible through the kind cooperation of the PIANC EnviCom members.

Marsha Cohen, editor and coordinator. Sondra Adams, graphic designer.

Typeset and printed by Opmeer Drukkerij bv, The Netherlands

ISBN 90-75254-14-8