



Terms of Reference

A Guide for Assessing and Managing Environmental Restrictions on Dredging and Disposal Operations

1. Background

Previous EnviCom Working Groups (WG) have developed procedures for the biological assessment of dredged material evaluating whether sediments to be dredged are appropriate for use beneficially or require special handling, as related to navigation and port infrastructure, providing a scientific basis for making beneficial use decisions based on sound science. These reports did not address specific tools, steps, and practices needed to address restrictions currently being placed on dredging and dredging placement / disposal operations. A new effort is proposed to fill this gap by developing a practical guide through which a full range of management actions for reducing environmental risks associated with dredging operations are identified, evaluated, selected, and implemented. The approach will inform decision makers managing environmental risks associated with dredging activities associated with navigation infrastructure projects and identify opportunities to increase positive effects.

Release of sediments and sediment-borne constituents during dredging and dredged material disposal activities may stress aquatic biota in various ways. Sources of potential stress include exposure to elevated suspended sediment concentrations and turbidity, and entrainment during dredging operations. Elevated suspended sediment concentrations – and the resulting turbidity - may affect fish spawning, disrupt anadromous fish migrations, and physical disturbance of habitat by increased sedimentation rates.

Dredging windows are a common management (mitigation) practice used to minimize or avoid these dredging-related stresses on resident and transient biota. Dredging windows are times during which dredging and dredged material disposal are allowed, whereas seasonal restrictions are periods during which these activities are prohibited. Seasonal restrictions are imposed based upon the assumption that potential detrimental exposures could cause significant harm during these predetermined periods. Such time-of-year constraints are associated with many navigation channels globally. These constraints complicate contracting schedules (constricting them), availability of dredge plants, and safety issues, substantially inflating the cost of dredging.

2. Objective

The objective of the proposed WG is to provide a technically sound risk-based approach to establishing dredging restrictions for waterborne transport infrastructure projects applicable in both coastal and inland waterways. The approach will draw from existing approaches and best practices worldwide and be written using understandable terms. It will build on the WG175 report and show decision makers how to effectively manage risks associated with dredging operations or choose alternative approaches. The WG will work closely with other proposed WG related to Working with Nature (WwN) and ecosystem goods and services (EGS) to ensure consistency among the WGs.

A methodology is required to inform risk management decision making for the environmental risks associated with dredging operations pertinent to navigation infrastructure. The WG should provide a practical methodology for managing the likely effects of dredging in the context of natural variations in time (short to long term) and space, (e.g., floods, storms, near field/far field), other activities that cause resuspension of sediments (e.g., commercial shipping, storm runoff, etc.) and the ability of the identified habitats or species to recover from or compensate for effects, i.e., temporary as opposed to permanent effects (e.g., Building with Nature species response curves). The WG should present case studies, summarizing the management actions taken that appropriately and effectively managed the dredging risk.

Managing project risks involves considering multiple processes (e.g., physical, chemical, biological, socioeconomic, etc.) operating over broad spatial and temporal scales. Large uncertainties related to these processes prevent clear projections about the future performance of risk management actions. The effectiveness and choice of the management of risk involves both large economic and environmental costs, and is further complicated by the diverse range of policies, perspectives, risk attitudes and personal values that drive risk management decision making.

The resulting risk management framework and supporting methodologies will provide a decision support foundation for environmental risk management. Building on accepted, tested methods and tools developed in the fields of risk assessment, risk management, and decision analysis, the approach is designed to determine plausible dredging windows protective of the environment while avoiding unnecessary or even adverse restrictions.

3. Related Reports

The dredging restrictions report will appropriately integrate current knowledge from existing reports and frameworks, such as those recently developed by the PIANC EnviCom Permanent Task Group 3 on Climate Change (PTGCC). It will build on the existing PIANC EnviCom Working Group 104 report "Dredged Material as a Resource: Options and Constraints" (2009) and the PIANC EnviCOM WG 175 report "A Practical Guide to Environmental Risk Management (ERM) for Navigation Infrastructure Projects." Other relevant sources of information include:

- CEDA Information Paper. 2010. Dredged Material as a Resource: Options and Constraints (June)
- National Research Council (NRC). A Process for Setting, Managing, and Monitoring Environmental Windows for Dredging Projects. Marine Board, Transportation Research Board, Special Report 262. National Academy Press, Washington, D.C. 2001.
- IADC. 2016. Facts about Adaptive Management Practices.
- CEDA Information Paper. Environmental Turbidity Limits (in progress)

4. Scope

The EnviCom WG will develop a report that develops a practical and structured management process (framework) through which management actions for reducing environmental risks associated with dredging operations are identified, evaluated, selected, and implemented. The process developed should describe available approaches and methods for comparing and evaluating alternative risk management actions to inform decision-making. It should make clear that projects can differ significantly, thus deferring risk management decisions from simply copying requirements from other projects without substantiating their effectiveness. The process developed should, where possible, be compatible with the WwN concept taking into account existing methods for managing environmental risks while providing an open, deliberative, and transparent decision-making process. The management process should:

- Define the concepts of risk and risk-informed decision making;
- Present an integrated approach / framework to dredging requirements that is practical and implementable;
- Address such topics as uncertainty (e.g., short-term event-based related to infrastructure operations), long-range risks (e.g., climate change), residual risk, sustainability, resiliency, and collaborative processes;
- Review available methods that support risk-informed decision making so that the uncertainties associated with managing environmental risk of dredging operations are recognized and addressed;
- Present risk-informed decision making as a process of shifting toward more sustainable practices for achieving multiple project benefits (i.e., environmental, social and economic) so that the uncertainties associated with managing dredging risks are recognized and addressed;
- Discuss the role of sustainability and life-cycle analysis in the context of risk management of dredging operations; and,
- Incorporate adaptive management principles and practices, as appropriate.

In developing the approach, elements addressing issues associated with expert knowledge of the system, including an understanding of the ecosystem, project components and their different construction techniques as well as stakeholder participation should be included as a means of developing a practical approach for addressing environmental restrictions on dredging.

5. Intended Product

The report shall comprise:

- An introduction to dredging restrictions and how they fit into the existing knowledge base from PIANC, CEDA, WEDA, IADC, and others;
- Discussion of progress and approaches developed through Engineering With Nature® and Building with Nature programs being promoted elsewhere;
- A connection with the EGS WG for identifying, characterizing, and substantiating the environmental and other benefits of WwN projects.
- A description of the approach / framework developed; the method should address the steps and timing needed to meet project objectives in an ecosystem context. The approach must show how stakeholders can be included in the process and identify and exploit triple win solutions by systematically integrating social, environmental and economic considerations into decision making and actions at every phase of a dredging project.
- Potential impediments to applying the process and ways in which these can be overcome.

- A focused international survey of existing environmental risk management approaches under consideration of legislative demands.
- An easily understood description of two or more case studies where determining whether restrictions should be placed on dredging activities was informed by a science-based approach as successfully applied in practice.
- A summary of existing PIANC, CEDA, IADC and other publications to ensure the process developed is practical and integrates current knowledge.

6. Working Group Membership

Members of the WG should include representatives from the target audience, i.e., consultants, resource agencies, regulators and contractors, waterways managers, environmental non-governmental organizations, and Port Authorities who are tasked with making decisions. The range of expertise should cover at least practical port design and construction knowledge and experience, geomorphology, physical processes, biology, ecology and hydraulic as well as hydro-ecological modeling. One or more regulators should be included to represent the regulatory perspective. To attract the interest of regulators and resource agencies that sit outside PIANC and to more completely cover wide-ranging regulatory jurisdictions, the WG will hold meetings in strategic locations in the form of workshops where local and regional regulators / NGOs / resource agencies can be invited to attend. Such workshops will achieve better outcomes, ensure wider representation, and result in a report that is as widely applicable as possible.

7. Relevance to Countries in Transition

The primary audience in both developed and developing countries would be project designers, waterways managers, contractors, ecologists, civil engineers, planners, regulators and environmental stakeholders who have an influence on the decision-making responsibility pertaining to placing restrictions on dredging operations. The report will be written in a manner easily understood in both developed and transitional countries.

8. Climate Change

The dredging restrictions report will consider the role, influences, and implications of climate change and will integrate current knowledge from reports produced by the PIANC Permanent Task Group on Climate Change (PTGCC).