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Draft Terms of Reference for CEDA Working Group on Guidelines for Assessing and Evaluating Environmental Turbidity Limits for Dredging Operations (WGTEL)

Introduction

Dredging is often essential for the maintenance and development of ports, harbours and waterways to allow for safe navigation, remediation and flood management. The process, which generates large volumes of sediment, can be accompanied by the release of suspended sediments into the water column (sediment plumes). Excessive suspended sediment concentration has an impact on water transparency (turbidity) and it may obscure important habitats on the seabed. Reduction of these impacts is usually managed by limiting the amount of suspended sediments released at the dredging site, or the amount of suspended sediments entering sensitive areas.

In 2016, the CEDA Environment Commission (CEC) conducted a survey to investigate which environmental turbidity limits existed on dredging projects, how these limits were set, and how the environmental limits impacted the projects (financial and time-wise). Interestingly, the survey showed that compliance monitoring on average contributed about 1% – 5% to the cost of the dredging project.

The majority of the respondents indicated that they understood and supported the need for environmental turbidity limits. However, the replies also showed that a major part of the limits did not seem to be scientifically founded. Limits varied regionally, and per project, but did not seem to be linked to local sensitive receptors. Taking into account the generally high costs for compliance monitoring, the CEC raised the following question: *Is there a need for guidelines on how to set realistic and effective environmental turbidity limits for dredging?*

Generally, one of the most common impacts of dredging on marine ecology is light attenuation and/or sedimentation which can cause reduced growth, or abundance, of marine life. The light attenuation depends on many parameters, such as the grain size distribution, or the colour and physical characteristics of suspended material. Fine material has a stronger effect on light attenuation, compared to coarse material, since it stays in suspension more readily. However, the impact of excess light attenuation is also dependent on the background conditions (the natural situation) and the sensitive receptors in the area. In very turbid water the effect is different to that in clear water.

Understanding dredging

This is why using turbidity, or total suspended solid thresholds, from incomparable reference sites, or historical data from other sites, without a scientific basis, is often inappropriate, as the background conditions may be completely different.

CEC proposes the following Draft Terms of Reference for the Working Group on Guidelines for Assessing and Evaluating Environmental Turbidity Limits for Dredging Operations. The ToRs will be formally established by the Working Group at their first meeting.

Objective

The Working Group is tasked with preparing a CEDA information paper on guidelines for assessing and evaluating environmental turbidity limits for dredging. The aim of the information paper is to facilitate knowledge exchange on how to assess environmental turbidity limits generally, and which parameters should be included in the evaluation at a local level. The paper also seeks to provide support for legislators, and environmental authorities in setting the right thresholds and to encourage contractors and consultants to challenge existing limits which are not site-specific and/or scientifically based.

Scope

Issues to be addressed in the information paper include:

- Introduction: ecological, economic and social need for realistic limits
- Definition of turbidity (TSS, SSC, FTU, NTU)! and the link between all parameters
- Overview of the physics of suspended sediments on light attenuation and coverage, including the effect of different hydrodynamic conditions
- Overview of possible impacts of suspended sediments:
 - Primary sensitive receptors and their ecology (e.g. seagrass, corals, fish, marine mammals)
 - Anthropogenic sensitive receptors (e.g. water intakes, bathing water quality, aquaculture or similar, tourism, public opinion)
 - Secondary sensitive receptors (e.g. humans, birds, politics)
- Subjects for evaluation before setting limits:
 - Interaction with other impacts (oxygen depletion, contamination, nutrients, algal blooms, water temperature)
 - Evaluation of local hydrodynamic conditions
 - Evaluation of local sediment conditions (background turbidity, local and dredged sediment characterisation (including fines %, grain size, organic content, contamination)
 - Amount of dredged sediment relative to local turbidity conditions. Can the spill be measured at all?
 - Evaluation of local light conditions (e.g. variation in light intensity)
 - Evaluation of local sensitive receptors (e.g. presence, seasonal variation, health, reproduction cycle, predation pressure, diseases, algal blooms, temperature sensitivity, stress factors)
 - Evaluation of local political aspects (marine protected areas, national/regional borders)

- Characteristics of turbidity-generating activities (total fines load, planning in terms of duration/timing/intensity, seasonal windows, works methods and execution)

The thesis for the paper is as follows: Environmental turbidity limits for dredging operations should always be site-specific, and based on ecosystem functioning, in order to protect sensitive environmental receptors. By setting realistic limits, monitoring can be made more cost-effective and ecologically, and socially, relevant.

Deliverables

The Working Group will prepare one information paper that will provide an overview of the key aspects for environmental turbidity limits and guidelines for setting these limits. The Working Group will communicate about its milestones to the CEC and via social media.

Document length

Ten pages perhaps plus relevant case studies.

Timetable

WGTEL will have their first meeting on **14th of June 2018** at the CEDA HQ in Delft, the Netherlands, at which point the Draft Terms of Reference will be finalised and a Work Plan will be developed. The Working Group is expected to deliver their paper one year after their first meeting.

Membership

CEDA WGTEL is envisaged as an international group comprising experts with knowledge and experience with the use of turbidity as a parameter in dredging projects:

- environmental engineers and environmental managers;
- sediment transport modelers;
- turbidity measurement experts;
- biologists/ecologists that are familiar with turbidity;
- anyone who has set, worked with and evaluated turbidity limits.

References

- The Western Australian Marine Science Institution (WAMSI) dredging science node.