

# Beneficial Sediment Use and Nature-Based Solutions: opportunities for sustainable and circular developments

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**Introduction:** Societal challenges and trends, such as increased population densities, economic pressures in cities and coastal areas, increased pressure on natural habitats, and threats of climate change (e.g., sea-level rise and more frequent and severe storm events) require innovative and sustainable approaches to support life, human development and healthy natural ecosystems. Such sustainable approaches should manage environmental resources carefully and maximize the use of local materials, thus promoting a circular economy that beneficially uses and reuses raw materials, reduces greenhouse gas (GHG) emissions, promotes the cost-effective management of natural or managed habitats, and promotes greater coastal resilience to climate change such as sea-level rise and coastal storms.

Annually, billions of cubic meters of sediment material are dredged globally to maintain commercial and recreational navigation in aquatic environments. These dredged sediments offer a natural source of raw material that must be managed sustainably (e.g., cost effectively while also protecting or preferably improving the natural environment).

A key question addressed in this paper is how to maximize the sustainable and beneficial use of dredged sediments, avoiding sediment disposal as waste material?

Beneficial use of sediments is not new. Technological experience goes back at least three decades [1]. Yet, uptake to date is lacking. The recent societal climate and international commitments, with pressure on natural resources (e.g. sediments), restoration and biodiversity and circularity provide key opportunities to beneficial use that goes beyond the mere technical solutions.

**Methods:** The recently concluded CEDA Working Group on Beneficial Sediment Use [2] and the ongoing PIANC Working Group 214 collected the past and recent experience with Beneficial Use with focus on how to maximize opportunities for within the current societal climate. Special focus is given to nature-based solutions and environmental restoration. Various case studies were collected, categorized and made available to the community through the CEDA work. Two workshops with key stakeholders were

organized by the PIANC WG in Australia and Brussels. A follow-up workshop in a developing Country was post-poned due to the recent COVID development. A survey is recently shared with the PIANC, CEDA, WEDA and SedNet network to collect insights within the broad community of experts and stakeholders on barriers and enablers for beneficial use. Deltares and Netics are working together with 19 of the 21 Dutch Water Regional Authorities to setup a quantitative tool to measure the circularity of dredge sediments projects.

**Results and discussion:** The technologies and technical experiences regarding beneficial use are established since few decades. Even though beneficial use of contaminants still poses some technical challenges, barriers of beneficial use are mainly related to cost, legislation and perceptions.

Yet, the current societal climate, with push for sustainable, nature-based and circular solutions seem to provide new opportunities for beneficial use. More and more examples appear where synergies across various government levels, connection of supply and demand, value on circularity and business cases that include a broader range of benefits make beneficial sediment use attractive and logical.

This presentation will provide an overview of the recent developments with example of at least one case study and of the new circularity tool for dredge sediments.

**References:** [1] PIANC (2009) *Report 104 – Dredge Material as a Resource – Options and Constraints*. [2] CEDA (2019) *Sustainable Management of the Beneficial Use of Sediments. Information Paper. [Online]* Available at: <http://www.dredging.org/media/ceda/org/documents/resources/cedaonline/2019-05-BUS-ip.pdf>