DSS Tool to Facilitate Decision Making of Sediment Impacts on Sensitive Marine Receptors

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A typical approach in marine environmental assessments and monitoring programs is the use of numerical models to predict the magnitude and duration of sediment impacts resulting from marine dredging works on sensitive marine receptors. Assessment of predicted or actual impacts may be based on comparison of the model results of the dredging program with known tolerance limits and locations of key sensitive marine receptors in the study area. The process of combining all of these different sources of data together for impact assessment is tedious and time-consuming. DHI is developing a Decision Support System (DSS) tool to facilitate the decision making process. The tool is built from existing software tools (DHI's MIKE and ESRI's ArcGIS), and is designed with the end-user in mind. The tool basically:

- Categorises the sediment concentration results into impact zones, based on established tolerance limits of a given key receptor type in the study area; and
- Produces maps integrating the impact zones with other key visual elements, for user-specific scenarios, allowing for effective communication of anticipated impacts to relevant decision makers and the general public.

As the tolerance limits of sensitive habitats will be different in different areas, and may also be refined in a given area may over time, the DSS tool is customised to allow the end-user to change the input values. Examples of the tool's applications are presented.

The influence of light and tidal exposure on primary production in the tropical seagrass *Zostera capricorni* and *Halophila ovalis*

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The growth, survival and depth penetration of seagrass is directly related to light availability, which drives photosynthesis. The amount of light reaching seagrass beds is highly variable and can be easily disrupted by human activities, such as dredging. Dredging results in increased turbidity and decreased light penetration to the seagrass beds, invariably influencing overall productivity and seagrass health. To better understand seagrass light requirements and resilience to environmental stressors such as dredging requires knowledge on seagrass photophysiology and the impact air exposure during a tidal cycle has on photosynthesis. Oxygen, fluorescence and bio-optical properties were measured over a tidal cycle in seagrass beds of *Zostera capricorni* and *Halophila ovalis* in Gladstone Harbour to provide insight into the variability in carbon production in intertidal seagrass meadows. Both species showed an increase in photosynthetic activity with increased irradiance as the tide receded. However, sensitivity to desiccation was observed during air-exposure with a significant decline in photosynthesis irrespective of increased light availability. Understanding the complex dynamics of seagrass photosynthesis over a tidal cycle will help in the mitigation of dredging-related light loss to Gladstone seagrass meadows.
