Sediment plumes generated by dredging are a major concern particularly in areas where ecosystems are sensitive to reduction of light or sedimentation. An analysis of the physical environment and ecological features allow us to understand the natural system and the influence of dredging activities so that the effects on local ecosystems and the environment can be studied and controlled.

Sediment plume prediction supports dredging operators to choose adequate planning, selection of methods and equipment and design of control measures for good environmental performance and compliance.

**Approach**

IHC MTI performs plume dispersion predictions by using commercially available as well as in-house developed software and assesses the effects on local ecosystems. This approach allows us to determine the areas where turbidity mitigation is necessary for a sustainable dredging operation. Furthermore, IHC MTI advises its clients on the latest available and practicable technology to reduce turbidity. Equipment selection, design and modifications to existing equipment are often co-developed with the client.
Prediction of plume dispersion setup

1. Scope of the study
At an initial scoping phase, the boundary conditions and the parameters of the study are determined. Also, the modelling approach and software is selected and the required input information is defined.

2. Modelling of the sediment deposition
Commercial and/or in-house developed software is used to estimate the deposition or settlement rate of a particular sediment mixture flux. This study is required, for example, to assess the possible interference of sediment plumes with the operations at the seabed. Estimating the deposition rate of sediment is also used to assess the resilience of specific ecosystems to smothering by sediment plumes.

3. Modelling of the turbidity and sediment resuspension
Commercial and/or in-house developed software is used to estimate sediment dispersion rates, suspended sediment concentrations at the surface and at different water depths. This study is used, for example, to assess the impact of sediment plumes on light reduction, water quality, compliance with local legislation, among others.

4. Analysis of sediment plume dispersion in the near- and far-field of the dredging project
The modelling results are studied according to the defined scope (phase 1) and specific requirements of the client. In this phase it can be determined whether a sediment plume can be minimised by an adaptive management approach (taking into consideration ambient conditions such as wave and climate conditions) or if adjustment to equipment or a particular solution needs to be designed and implemented.

5. Assessment of effects and impact on ecosystems and the physical environment
In cooperation with the client, an ecological study of the project area will be performed. Based on the simulation results a general assessment of the potential impact of sediment plumes on particular ecosystems or species will be performed. If required, a fact-finding mission and a field test can be prepared.

6. Study of compliance with environmental regulations and standards
A compilation of local regulations and standards will be studied in cooperation with the client. The modelling results and analysis of the project local circumstances will allow to determine whether the project is likely to comply with applicable regulations.

7. Specialised design of alternatives for turbidity reduction
Based on the modelling results, the study of the effects and the impact on ecosystems and the study of compliance, particular prevention and control measures will be advised and designed in closed cooperation with the client. Control measures include: planning of project, dredging method and equipment selection, the modification of equipment, the design and construction of turbidity prevention or control equipment and management of the project on site.

Why IHC MTI?
Projects, equipment, people: that is what dredging comes down to. It is a challenge, even for experienced contractors, to find the right balance between the scope and constraints of a dredging project; the specification of the equipment being used; and the competences of the people involved. All of MTI Dredging Consultants’ services are based on these three pillars, which combine to determine the profitability of your operation.