DHI SOLUTION

ECOLOGICAL MODELLING
Applying MIKE ECO Lab for solving ecosystem challenges

Dynamic ecological modelling has been part of our core solutions for decades. Today, we offer state-of-the-art ecological modelling and software to solve challenges in aquatic ecosystems in combination with classical hydrodynamic modelling.

A DYNAMIC MODELLING TOOL

MIKE ECO Lab – our dynamic ecological modelling tool – is the basis for an ecosystem approach to environmental management. It allows quantitative, dynamic descriptions of water quality in the short- or long-term and includes nutrient dynamics, plankton, eelgrass, macroalgae and benthic fauna.

The different standard MIKE ECO Lab models are developed and optimised to address specific environmental challenges. These include including varying climatic conditions and varying complexities – from simple interactions to complex ecosystem models.

MIKE ECO Lab is the preferred solution for assessing factors such as:

- effects of nutrient loadings on the status of the aquatic environment
- strategies for wastewater treatment (nutrients and bacteria)
- causes and impacts of oxygen depletion events
- effects of cooling water discharges
- environmental impacts of constructing large infrastructures like harbours, bridges or tunnels
- impact of dredging on primary production and growth of benthic vegetation & mussels
- environmental consequences of developing new urban and industrial areas
- efficiency of action plans related to nutrient reductions and long-term effects of reduction scenarios
- risks in connection with algal blooms
- site selection, optimisation of production and Environmental Impact Assessments (EIAs) in connection with aquaculture production

Every ecosystem is unique. MIKE ECO Lab is a generic and open tool for easy

SUMMARY

CLIENT
- National and regional authorities
- Offshore industry
- Port and terminal constructors
- Consultants and constructors
- Aquaculture companies

CHALLENGE
- Need for ecosystem scale management
- Need to define and describe specific ecosystems
- Need to determine potential environmental impacts
- Need for reliable predictions of ecological impacts to assess measures and prioritise investments

SOLUTION
- Advanced Environmental Impact Assessments (EIAs) based on ecosystem modelling
- Integrating our understanding of ecological processes with our advanced hydrodynamic modelling
- Development of ecological models that can answer complex environmental questions.
- Science-based model development

VALUE
- Enabling ecosystem-based management
- Efficient management of the environmental resources
- Swifter and smoother project approval, commencement, progress and operation
- Assessment of environmental footprint

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Singapore Land reclamation

customisation to unique aquatic ecosystems based on existing models or by the development of new problem-specific models. Hence, if governing ecosystem processes are not included in already developed MIKE ECO Lab models, adjustments can be applied or even re-engineered. This makes it possible to focus the model on the specific issues of local ecosystems.

EIAS OF LARGE INFRASTRUCTURE PROJECTS

Today, EIAs of large infrastructure projects require quantitative estimations of the predicted environmental effects of construction and operation. Combining our hydrodynamic and ecological models allows for quantitative assessments of environmental impacts. MIKE ECO Lab has been applied to a number of EIAs throughout the world. Examples include the assessments of aquaculture production in Australia, land reclamations in Singapore and fixed links in Denmark. MIKE ECO Lab has been successfully applied and adapted to local conditions for overall evaluation of the accumulative impacts of construction and operation.

Over the past decades, eutrophication has affected coastal areas worldwide. Nutrient enrichment has caused impacts on water quality & benthic communities and it has changed the physico-chemical habitats for key organisms. The involved processes are spatially and temporally complex and dynamic. Using dynamic ecological modelling is the only adequate way to evaluate the effects of suggested environmental measures and plans as well as political decisions.

EVALUATING SPILL EVENTS

Spill events like overflows from sewer systems can impact human health or the environment by increased concentrations of bacteria, nutrients, toxic substance and so on. The fate of spilled water can have serious effects on the individual as well as economic consequences on various sectors like tourist industry and aquaculture. Ecological modelling of bacterial fate, for instance, has been used in a number of cases for defining bathing water quality and impacts of measures.

DECISION SUPPORT TOOL FOR ENVIRONMENTAL

In coastal areas eelgrass can be an important organism to include in the modeling

MANAGEMENT

Potential health risks in connection to treated or untreated waste water can be assessed by MIKE ECO Lab

Contact: info@dhigroup.com
For more information visit: www.dhigroup.com

The expert in **WATER ENVIRONMENTS**

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