

# Groundwater modelling

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**An important tool for risk assessment  
and decision support**

# Groundwater services

**NIRAS provide services within a broad spectrum of different groundwater models, including numerical models and analytical models. Groundwater models can be applied for multiple purposes and support risk assessment and decision making.**

## Groundwater models

For numerical groundwater models, NIRAS are experts within MODFLOW and commercial products such as MIKESHE and FEFLOW.

The open source MODFLOW model allows full flexibility and is one of the most widely distributed codes for groundwater modelling worldwide. MODFLOW simulates groundwater flow, hydraulic heads, and surface water interactions. NIRAS support both the setup of groundwater models through user interfaces and solutions tailored for specific modelling tasks.

## Applications of Groundwater models

Groundwater models can support risk assessment and decision making and can be used within multiple different sectors, which includes.

- Groundwater resource evaluations for drinking water and agricultural irrigation

- Climate change adaptation and analysis
- Contaminant transport
- Saltwater intrusion
- Geotechnical projects
- Extraction of raw materials
- Aquifer thermal energy storage potential

## BEST - A decision support tool

BEST is a user-friendly platform build on top of a groundwater model, that allows the user to efficiently evaluate the impact of groundwater abstraction on water and nature.

BEST effectively combines existing data with a numerical groundwater model, reducing the workload for evaluating applications for groundwater use or extraction permits.

BEST streamlines water resource management and provides decision support for the authorities, water

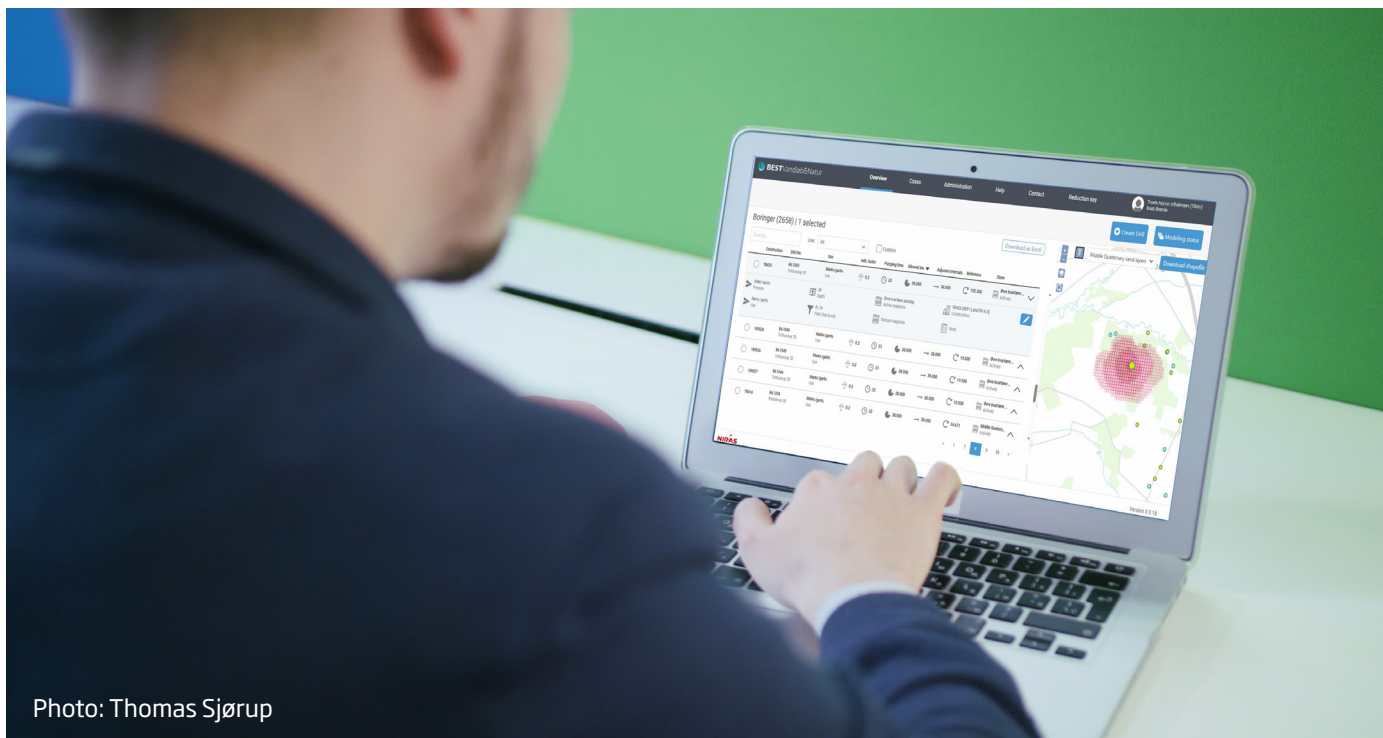
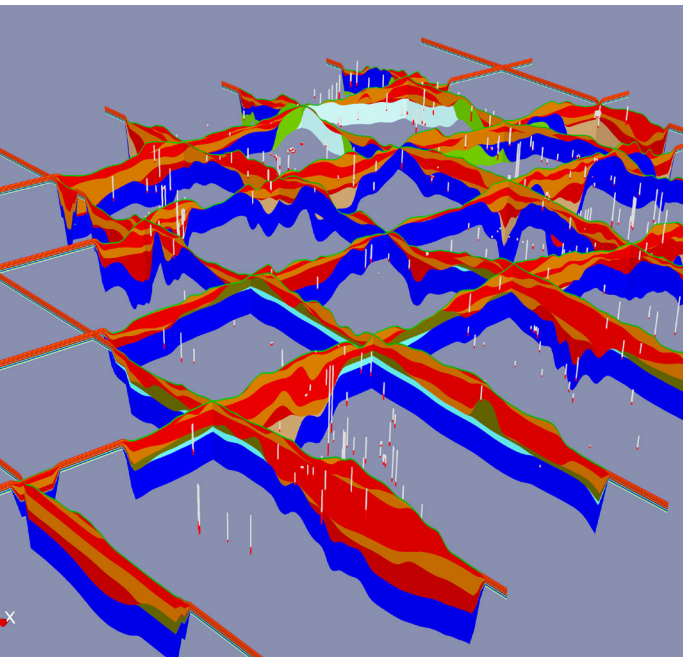
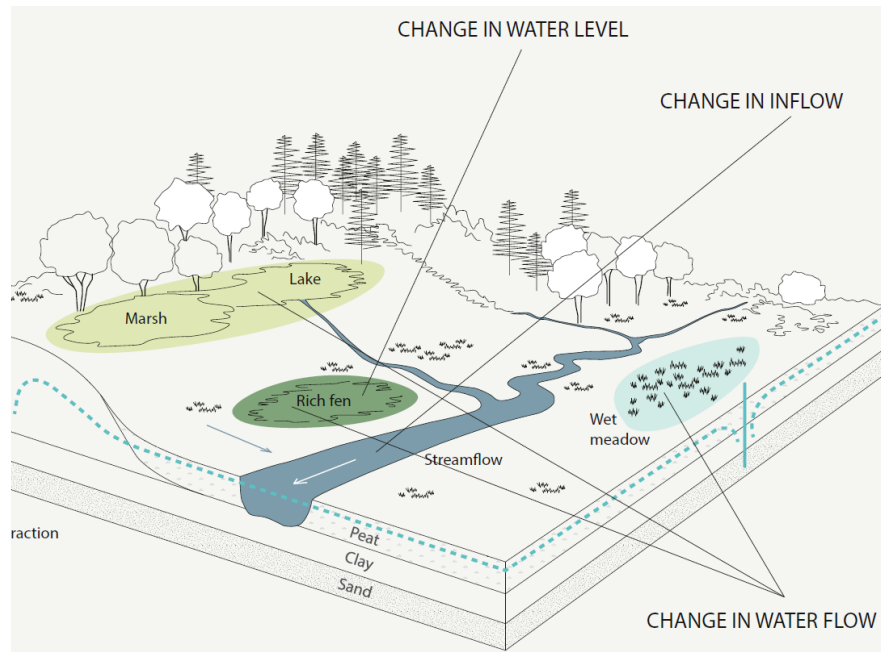


Photo: Thomas Sjørup



● Sand ● Quaternary clay ● Paleogene clay



utilities and their advisers, who work professionally with groundwater abstraction, water courses and protected wetlands.

BEST has a large potential as a decision support tool in those parts of EU, that primarily rely on groundwater for drinking water purposes. Moreover, the EU-countries have the same EU-regulations for Groundwater and Surface water, making it applicable across country boundaries.

Finally, the BEST decision support tool is recommended by more than 33 % of the Danish municipalities, covering 50 % of the area of Denmark.

**BEST advantages**

- A fast management process proving a stronger foundation for professional evaluation and sustainable management
- Combines available catchment data (e.g. geology, hydrology and biology) in one platform.
- Transform calculated responses from groundwater abstractions into impact assessment
- Qualifies critical impact on protected wetlands and watercourses
- Screening is applicable on both large- and small-scale watercourses and wetlands

- Uniformity in risk assessment across water suppliers

**Other uses of a groundwater model:**

- Risk assessment of groundwater resources against the threats from contaminated sites and human activities
- Prediction of high groundwater level from climate changes
- Future water management and assessment of possible new water extractions
- Hydrogeological mapping, utilization, monitoring and protection of groundwater.

NIRAS is a multiplanar consultant with 30 offices worldwide, 3000 employees and 90 groundwater experts. NIRAS is one of Denmark's best-qualified consultants in the field of sustainable utilization of groundwater resources. Please contact one of our groundwater modelling specialist below:

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