Ecotopes
event current situation
100 years

Ecotopes
mean current situation
0 years

Legend

- dry hardwood forest
- hardwood forest
- softwood forest
- wet softwood forest
- wet hardwood forest
- marsh forest
- hardwood shrub
- softwood shrub
- herbaceous rough
- wet herbaceous rough
- herbaceous swamp
- floodplain hayfield
- wet hayfield
- meadows & agriculture
- aspen plantation
- lake

- Rivers
- Retention areas

In Croatia HABITAT is used in combination with SOBEK hydrological and water quality to assess impact of water management strategies on vegetation composition and habitats of species. The study is focused on the controlled detention area of Lonjsko Polje along the river Sava. Results of the modeling show that a long inundation duration following a flood event is shown to lead to major shifts in the vegetation composition.

Legend

- Shore (low)
- Shore (high)
- Pioneer dune
- High dune
- Green beach
- Subtidal

Project 'Sand engine'. HABITAT is used to calculate the future vegetation composition along the Delftland coast in the Netherlands using a new technique for sand distribution. Top left (situation at t=0 year), right (t=50 year).
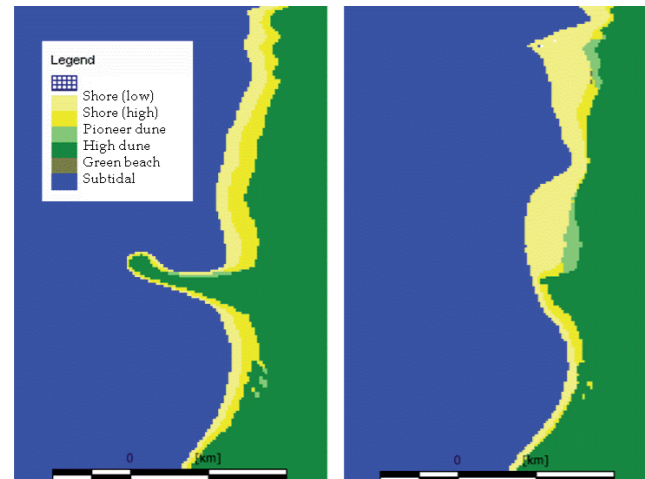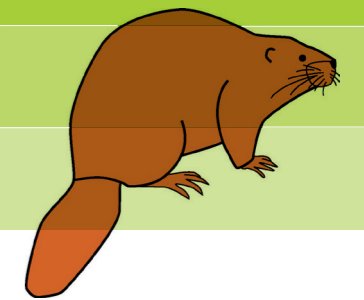
Development

HABITAT is continuously developing and in the future it will be expanded with an uncertainty analyses module and a dynamic functionality. The latter makes it easy to calculate time series and model the effects of water flow, water level dynamics and succession stages. Also the knowledge database is actively updated with recent knowledge.

Deltares
Enabling Delta Life

Habitat
Spatial Analysis Tool

Habitat analysis
Habitat analyses are important for studying the ecological functioning of water- and land systems. Knowledge about species and interactions between species is vital in this process. In a world with increasing environmental pressures, it is important to quantify these impacts. Knowledge about the effectiveness of measures can be used to develop policy on spatial planning and water- and ecosystem management in order to realize ecological goals.
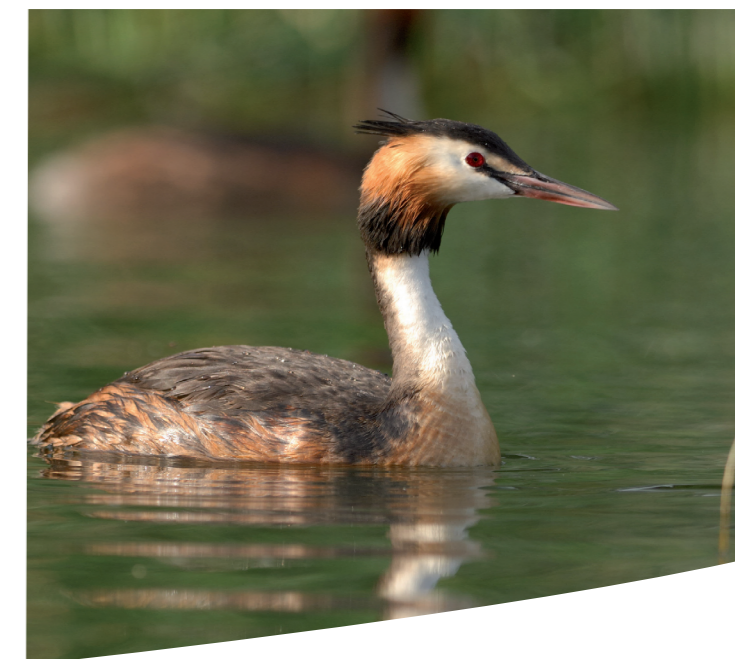
The tool HABITAT
HABITAT is a spatial analysis tool that can be used to analyze the availability and quality of habitats for individuals or groups of species and to map spatial units (e.g. ecotopes). Furthermore, HABITAT can be used to predict potential damage and/or risks for different kinds of land use caused by human interventions, extreme events and autonomous developments.

HABITAT studies
Examples of (inter)national HABITAT studies are:
- An analysis on the effects of climate change in European freshwater systems.
- Determination of the effects of water level fluctuations on the habitat suitability of macrophytes, zebra mussels, birds and vegetation composition in the area of Lake IJssel, the Netherlands.
- Developing a water management strategy to reduce CO_2 emission from large peat areas.
- Determination of the effects of cooling-water on the habitat suitability of corals in Az Zour, Kuwait.
- Examining the consequences of cyclic rejuvenation of floodplains for the habitat suitability of species.
- Determination of the effects of natural and anthropogenic pressure on key-species and WFD habitats in the Ems- Dollard estuarium, the Netherlands.

- Developing a water management strategy to reduce flooding risks and stimulate nature development in the Sava river, Croatia.

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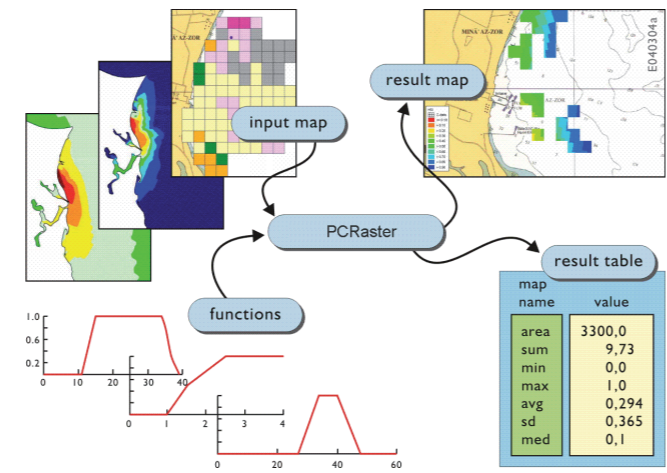
PCRaster
http://pcraster.geo.uu.nl/

How does HABITAT work?

GIS maps or field observations in raster format are used as input for HABITAT. Input maps are combined with dose-effect relations after which they are sent to the calculation core of HABITAT. This core is based on PCRaster which facilitates a large variety of spatial analyses. The results are given as potential suitability for species (Habitat Suitability Index, HSI) presented on maps and in tables.

Software

HABITAT is freely available if the newly developed knowledge rules are shared with the HABITAT community through a knowledge database. In principle the model is stationary, but dynamics can be added by analyzing different time steps (semi-stationary).

Schematic representation of HABITAT. GIS maps or field observations combined with dose-effect relations are used as input and are sent to the PCRaster calculation core. Results are presented on maps and in tables.

A project is built by scenarios containing models. Each model can contain different input maps with dose-effect relations. There are several types of models which differ in shape, varying from formulas and broken linear functions to tables with classifications. Moreover, it is possible to calculate areas, for example the potential suitable area of a species in a nature reserve. Fast visualization of maps and statistics and the graphically oriented interface make HABITAT easy to use. Users also have the opportunity to share or re-use models with the toolbox option where dose-effect relations can be saved.
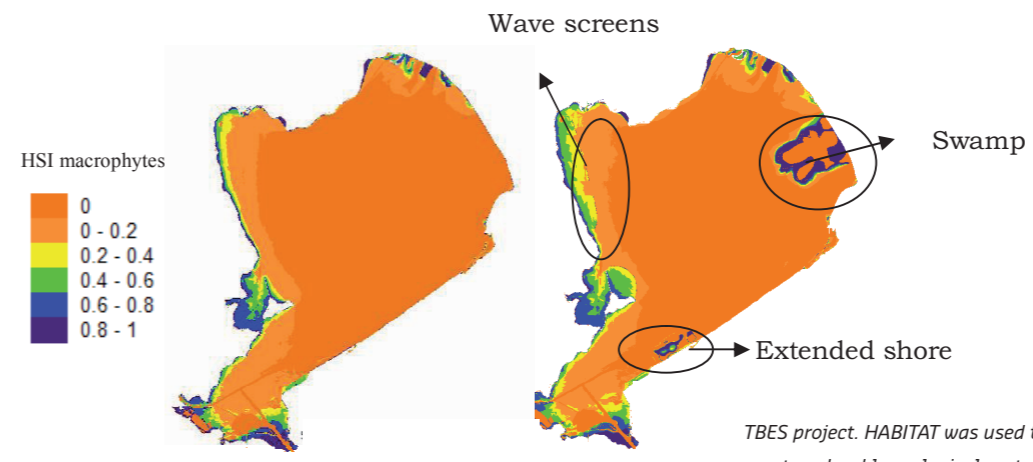
TBES project. HABITAT was used to calculate the effect of measures to create a durable ecological system in the lakes IJssel and Marken in the Netherlands. The Habitat Suitability Index (HGI) of macrophytes is depicted in the reference situation (left) and after taking several measures (right). The area of higher suitability of macrophytes is increased after the measures.

Knowledge database

Besides the HABITAT tool there is an extended knowledge database available containing dose-effect relations for a variety of water plants, fish, macro-invertebrates, birds, mammals and ecotopes. HABITAT can be used in all land- and watertypes if the appropriate dose-effect relations are available. The knowledge database is constructed according to the 'Dare to Share' principle, meaning that everyone has access to the database and is allowed to add data. In this way a platform is created for interactive exchange of knowledge.

The User Interface of HABITAT. In the project explorer the process-effect chain is built. In each scenario different models can be added containing input maps and dose-effect relations. Results can be presented graphically or in tables (statistics). In 'Properties' metadata can be added to maps.

The knowledge database of HABITAT. The 'Dare to Share' principle facilitates active exchange of knowledge.