

# Abundant data from approx. 8.500 drillings und 25.000 groundwater analysis

Work packages and time frame

## 2010 – 2014

### Continuous tasks

- groundwater modeling
- production of maps, visualization
- public relation activities
- project management

## 2010 – 2011

### Characterization of groundwater hydraulics

- data management groundwater levels
- data management hydrochemistry
- update groundwater data base
- conceptual hydraulic groundwater model
- installation of monitoring wells
- groundwater monitoring campaign

## 2011 – 2012

### Contaminant load and transport

- conceptual model for contaminant distribution, degradation and transport paths
- pumping tests and field investigations
- chemical analysis for contaminants, trace substances and isotopes

## 2012 – 2013

### Contaminant degradation and retention

- installation of monitoring wells
- groundwater analysis
- detailed investigation of contaminant degradation

## 2013 – 2014

### Remediation concepts

- additional field tests
- remedial technical and feasibility tests

## 2014

### Guidance and best practice

- guidance on groundwater remediation
- guidance on integral groundwater risk management

**MAGPlan goal: a comprehensive groundwater management plan**

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Picture credits

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Groundwater hydraulics: City of Stuttgart, Department for Environmental Protection

Project area: City of Stuttgart, City Surveying Office

Stuttgart mineral spa: Mineral spa Stuttgart-Bad Cannstatt

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# MAGPlan

Clean groundwater for Stuttgart



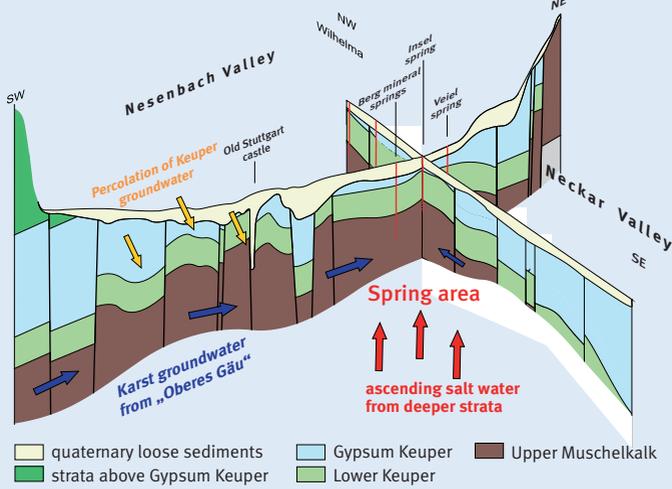
Project information

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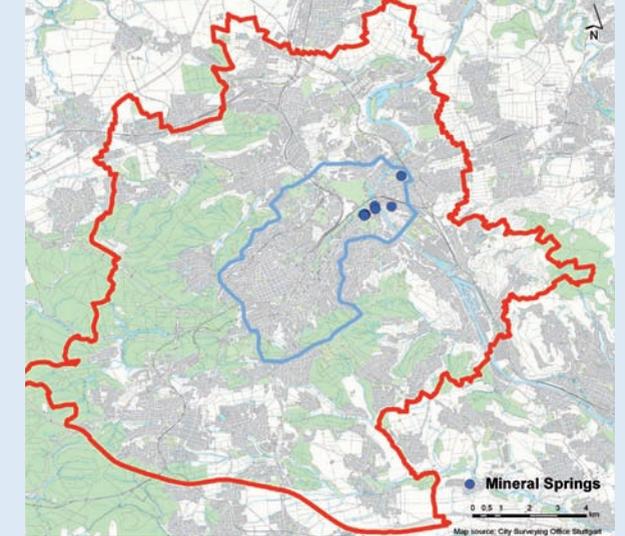




Complex groundwater flow conditions in Stuttgart



Stuttgart mineral spas are recharged by groundwater



Project area MAGPlan (blue line) in Stuttgart city area (red line)

## Why MAGPlan?

MAGPlan (“Management plan to prevent threats from point sources on the good chemical status of groundwater in urban areas”) aims at a sustainable improvement of groundwater quality in Stuttgart’s city area and a permanent protection of Stuttgart’s mineral springs (karst groundwater of Upper Muschelkalk, Middle Triassic).

Experts coordinated by the Department for Environmental Protection of the City of Stuttgart in cooperation with The State Institute for Environment, Measurements and Nature Conservation of Baden-Württemberg apply the comprehensive approach of the integral groundwater investigation. This strategy is based on a detailed groundwater model of the project area providing an understanding for groundwater hydraulics and contaminant transport. It offers the possibility to identify existing contaminant sources and to prepare the clean-up of the relevant hot spots.

## Background

The groundwater in Stuttgart has been impacted by volatile chlorinated hydrocarbons (CHC) for decades. These chemicals were applied as solvent agents mainly in the mechanical engineering and electrical industry as well as by dry cleaners. Although the application stopped, the pollution is still remaining in the groundwater.

Since 1984 in the inner city of Stuttgart about 100 CHC contaminated sources have been investigated and partly remediated so far. There are 700 additional potentially contaminated sites documented. The investigation of each single site would be tremendously demanding, but would not really resolve the predominant question: “How do contaminants reach the mineral springs?” Therefore MAGPlan pursues an alternative, integral investigation concept.

The European Union co-finances this project, running from 2010 to 2014. 50 % of the 3.4 million € total costs are subsidies by the EU program LIFE. The other half is taken over by the City of Stuttgart (1.6 million €) and the Federal State of Baden-Württemberg (100000 €) respectively.

## Project area

The MAGPlan project area (covered by the blue line) comprises the inner city area of Stuttgart, located in the Nesenbach Valley. In this valley a multitude of small and medium industrial and manufacturing companies settled at the beginning of 20th century.

According to current scientific knowledge, the percolation of the contaminants generates the pollution of the mineral springs. This process can be located within an area of 26.6 km<sup>2</sup>, upstream the mineral springs in the Nesenbach Valley.

Recent large scale investigations in larger distance from the catchment area of the mineral springs did not reveal any significant contamination outside the project area. This was proved especially for the “Oberes Gäu”-area in the southwest of Stuttgart, representing a core zone of mineral water recharge. Thus the contaminant sources are assured to be within the Nesenbach Valley.