River restoration in the context of climate and global change

- The aim of the multidisciplinary RECORD Catchment project is to comprehensively investigate what measures are most effective to influence the river corridor. With this information, river restoration and groundwater flow systems can be designed to help mitigate the effects of floods and droughts, in the context of climate and global change. We develop indicators on how the measures will affect different functions of groundwater (water use, sustainable eco- /agricultural systems, flood mitigation) and, more generally, how groundwater flow systems modify the response of catchments to climate change.
- The study is centered on the Thur catchment (NE Switzerland). The study sites include high altitude groundwater flow systems that play an integral role for drinking water supply and groundwater flow systems in alluvial plains.
- We focus on the more natural flood-dependent groundwater recharge in restored river reaches within the Thur catchment in comparison to channelized sections. Special attention will be given to the behavior of the physical and biogeochemical state of the interface between the river bed and the aquifer, as well as on interactions between the soil moisture and groundwater storages. The results of the studies will be generalized by developing a method for assessing the vulnerability of groundwater flow systems to climate change.

A way of dampen dry periods?

The RECORD Catchment project comprises local-scale studies at the current RECORD (RECORD – Restored Corridor Dynamics) field sites Niederneunforn / Altikon and Widen as well as the pre-alpine Rietholzbach catchment. These local-scale sites serve as long-term natural hydrological, atmospheric and ecological observatories to study water fluxes, ecological and biogeochemical interactions within the context of climate change. Furthermore, the RECORD Catchment project investigates the larger scale influence of processes on the local scale and vice versa.

**Widen / Felben-Welhausen**
Discharge Ike Niederneunforn / Altikon
Character Channelized Thur section with pumping station, losing stream
Methods Time series analysis, DTS, Tracer tests, groundwater sampling...

**Niederneunforn / Altikon**
Discharge [m³/s] Qmed ~ 53 Qmin ~3 Qmax ~1100
Character One restored, one channelized Thur section with pumping station, losing stream
Methods Analytical modeling, numerical flow and transport modeling, time series analysis, Distributed Temperature Sensing (DTS), groundwater sampling...

**Rietholzbach area**
Discharge [m³/s] Qmed ~ 6.04 Qmin ~0.6 Qmax ~0.2
Character small pre-alpine creek, gaining stream
Methods Time series analysis, Tracer tests, groundwater sampling, analytical and numerical modeling...

**Urban Hydrogeology: Case study Weinfelden (population ~80,000)**
Questions Input load of urban areas for selected compounds and contaminants? Impact of industrial areas in the Thur catchment?
Methods Groundwater sampling, GIS,...