

## **ABSTRACT**

This diploma thesis provides a complex evaluation of the hydrogeological situation in the Pňovice water supply area. The water supply area is partly located in a riparian forest. It is essential for riparian forests that the groundwater table is located near the ground surface. The goal of this work was to determine whether the depression cone in the groundwater table caused by water abstractions can range to a distance of several hundred meters, where the especially protected parts of the riparian forest are located. Furthermore, the goal was to clarify the relationship between the groundwater and surface streams in the area and to determine the source of groundwater in the abstraction wells. Drilling documentation in the Pňovice water supply area and its surroundings was created, archival and newly collected water chemistry samples were processed, and most significantly, measurements from piezometers and from the database of the ČHMÚ were analysed. Geological cross-sections documented that the water in the abstraction wells originates from the upper Quaternary aquifer. The analysis of chemistry and stable isotopes of hydrogen and oxygen in water molecules revealed that the groundwater originates mainly from water infiltrated in mountainous areas outside the Upper Morava Valley. The dynamic groundwater resources (base flow) including the influx from streams was compared with groundwater abstraction in the quaternary catchment of Pňovice water supply area. It was found that the dynamic groundwater resources are much larger than present groundwater abstraction. On the contrary, it was found that evapotranspiration in the riparian forest during summer periods exceeds the dynamic groundwater resources. The drop in the groundwater level from May to September in the riparian forest is caused by evapotranspiration. Monitoring has shown that the water table is strongly controlled by local streams. The water from streams is usually infiltrating into the Quaternary sediments and contributes to the groundwater. The effect of groundwater abstraction on water table in a distance of several hundred meters from the abstraction wells under present extraction rate is highly improbable. The water table in the riparian forest is strongly controlled by stream condition (flowing streams/dry streambed). When Benkovský stream and Nový Kobylník streams dry out, the water table drops by approximately 1 m to lower level. Influx from streams and their existence is therefore vital for the existence of higher level of water table in the riparian forest.

**Keywords:** interaction of surface water and groundwater, groundwater abstraction, infiltration background, Pňovice, riparian forests