



Groundwater dependent terrestrial ecosystems in hemi-boreal climate: two pilot studies

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Groundwater dependent terrestrial ecosystems are wetlands that exist due to continuous supply of groundwater in sufficient quantity and quality. According to the European Union's (EU) Water Framework Directive 2000/60/EC, the member states have an obligation to ensure good status of groundwater bodies and connected groundwater dependent terrestrial ecosystems (GDTEs). Yet, in many EU countries, the authorities are struggling to implement cost-effective measures for identification, assessment and monitoring of GDTEs.

We are undertaking a multidisciplinary investigation of two pilot sites: Matsi spring mires in Estonia and Kazuleja subglacial paleo-valley with tufa (freshwater lime) deposits in Latvia. Both sites are characteristic with calcareous springs discharging in terrain depressions. Both sites are rich in spring-specific species, including numerous specialists of petrifying springs and rare, threatened bryophytes and vascular plants. The research objective is to explore the extent of groundwater dependence in these sites and to identify the most suitable indicators of groundwater discharge and ecosystem quality in terms of GDTE approach. The broader aim of the research is to assist development of national methodologies for GDTE identification, assessment and monitoring. Simple, cost effective measures in detecting the status of GDTE need to be identified as a result of this research.

The planned investigation includes vegetation sampling and mapping, multiple groundwater head logging, direct determination of differences in hydraulic heads, detailed water quality monitoring, stable isotope analysis in water and plants, aerial thermal imaging for groundwater seepage detection, stream gauging and hydrogeological modelling. The field observation programme is focused on water availability and quality in relation with ecosystem quality. Simple and easily measurable indicators that can be used in other similar GDTE sites need to be suggested as a result of this study.

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