The aim of the project is to evaluate the impact of various environmental factors on the development of valuable aquatic plants – Water Crowfoots (*Ranunclulus* sect. *Batrachium*) in watercourses in Poland. Among the considered habitat elements physical morphological factors and chemical water quality parameters were included. This scale of comprehensive analysis of the relationship between Water Crowfoots and their habitat will be completed for the first time in Poland and in the world.

Water Crowfoots are aquatic plants, which are strongly morphologically and ecologically diversified. Taxonomic difficulties come from the small number of characteristic features and often extreme variation of morphological forms.

Water Crowfoots vegetation and their habitats are protected by the European Community under the Habitat Directive, because these aquatic plants are valuable elements of river communities and play an important function in the river fluvial system. Due to the difficulties in Water Crowfoots identification, their ecological requirements have not yet been properly defined and protection of this group of plants cannot be properly conducted. Furthermore, due to the extensive utilization of crowfoot species in various bioindicative monitoring systems throughout Europe accurate estimation of crowfoot requirements to nutrients is challenges.

The problem of poor recognition of environmental requirements of crowfoot species is a global problem and there is an urgent need to take such studies in this group of plants that supports the valuable aquatic ecosystems protection and improves the efficiency of conservation measures of protected vegetation. The results of the project can be implemented in many other European countries, because the variation occurring in Polish rivers (plant communities, geographical conditions and the level of degradation)is representative of a large part of the regions of Europe.

The project involves field survey, laboratory work and data analysis. 100 river sites will be selected from among approx. 150 visited sites, located in various rivers throughout the country and representing different river types and different levels of degradation. It is planned to select a approx. 12-13 sites for each of the eight studied crowfoots species. Hydromorphological, hydrochemical and botanical survey will be carried out at every river site. The botanical survey will be conducted according to the Polish macrophyte method utilised in the national river monitoring. The physical habitat of the rivers will be estimated using the British method River Habitat Survey (RHS). Additionally, 30 river sites will be involved into yearly hydrochemical monitoring. Moreover, the so-called underflow of water in the hyporheic zone will be estimated on the 30 monitoring sites, i.e. the flow of water alongside the riverbed where mixing of groundwater and surface water and furthermore, after establishing the river flow velocity the share of groundwater inflow in the total flow rate will be evaluated. The looseness of riverbed sediments caused by the underflow in the hyporheic zone will be also estimated.

Water Crowfoot species identification will be based on molecular markers. Such approach significantly improves the precision of taxa determination and the interpretation subjectivity of extremely variable morphological features can be reduced.