DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

River reaches upstream from dam reservoirs will be treated in this project as field laboratories of the short- and long-term impact of the base-level rise on the gravel-bed river hydrodynamics and its vegetation pattern adjustments. Dam reservoirs were built in the last century in the Polish Carpathians, similarly as in other mountains all over the world. In the geomorphological literature, significant morphological and sedimentological changes of gravel-bed rivers caused by forced bedload and suspended sediment deposition in the river sections with raised base level have been highlighted so far. However, **the changes of the river hydrodynamics and the vegetation pattern in the river channel and floodplain, as well as a vegetation-hydrodynamic feedback occurring in the river sections have not been explored.** The results of this project will allow to: **(1)** determine the changes of hydrodynamic conditions in the river channel and on the floodplain of gravel-bed rivers caused by short- and long-lasting impact of base-level rise, **(2)** determine changes in the spatial distribution of thickness of fine sediments and in the types and pattern of vegetation cover changes on channel bars and floodplain in the river section with raised base level, **(3)** analyze the mutual hydrodynamic-vegetation interaction and its effects, **(4)** determine differences and similarities in the changes of hydrodynamics and vegetation patterns between rivers that differ in size and the magnitude of base-level rise, and **(5)** drain catchments of different physiographical setting, and **(6)** determine the impact of floods on the hydrodynamic conditions and the course of vegetation pattern adjustments in the river sections with base-level rise.

In the reach of the Dunajec River upstream from the Czorsztyn Reservoir functioning since 1997 (the study reach representing morphological, sedimentological and vegetation pattern changes resulting from short-lasting impact of base-level rise), and in the channel of the Smolnik Stream upstream from the Rożnowski Reservoir functioning since 1941 (the reach representing changes resulting from long-lasting impact of base-level rise), we will performed three-dimensional modelling of the river and floodplain hydrodynamics. This will allow us to compare changes of the river hydrodynamics resulting from short- and long-lasting impact of base-level rise and to determine the role of floods in the course of these adjustments **(objectives 1 and 6)**.

For the same rivers reaches, we will perform an analysis of archival aerial photos, orthophotos and digital land cover models (1950-2013). This will allow the reconstruction of vegetation pattern changes (mean age, percentage of the canopy cover, type, shape and size of vegetation patches) in the channel and on the floodplain resulting from the impact of base-level rise of different duration **(objective 2)**. The observations from these reaches will be also used to evaluate potential interactions between hydrodynamics and vegetation **(objective 3)**, and to determine differences in the vegetation pattern adjustments between rivers with different magnitude of base-level rise **(objective 4)**, as well as the role of floods in the course of vegetation pattern adjustments **(objective 6)**.

The reconstruction of the adjustments of vegetation pattern resulting from long-lasting impact of base-level rise performed for the Smolnik Stream draining the Beskid Wyspowy (catchment representing mountains of intermediate height, with a large proportion of arable lands and relatively low forest cover) will be compared with a similar reconstruction performed for the Wisłoka River upstream from a small Krempna Reservoir constructed in 1971 in the Beskid Niski (catchment representing low mountains, not cultivated and with relatively high forest cover). This comparison will allow us to distinguish potential differences in the course of vegetation pattern adjustments resulting from the base-level rise in the catchments differing in the physiographical setting **(objective 5)**.

The obtained results will allow us to create a model of the interaction between vegetation and hydrodynamics in the section of a gravel-bed river with raised base level upstream from a dam reservoir, which is currently lacking in gemorphological literature. The results of the project may be used for predicting the biogemorphological evolution of gravel-bed rivers upstream from dam reservoirs which will be built in the future, and may facilitate the evaluation of flood risks in these areas and help in management of the river valley sections in the zones of base-level rise.