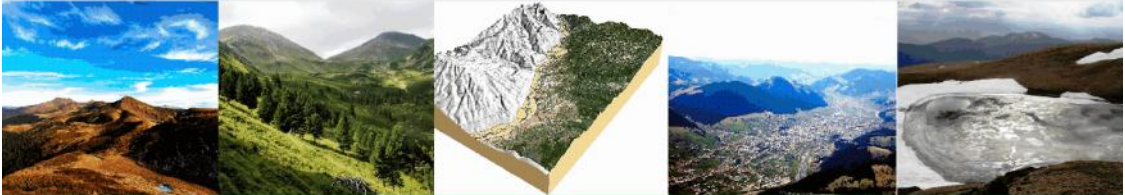




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Hydromorphological quality as a key element of the ecological status of Polish Carpathian rivers

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After a few decades of efforts to detect, quantify and counteract the effects of water pollution on river biota, recent years have brought an increasing understanding of significance of hydromorphological quality of rivers for their ecological status, and research on Polish Carpathian rivers has contributed to the progress in this field. Our team developed a method of hydromorphological assessment of rivers, which is based on the European Standard EN-14614 and compromises between the needs for practical application and the environmental significance of results. Application of the method in rivers with varied channel pattern confirmed its usefulness and showed a significant impact of channelization and channel incision on the hydromorphological quality of Carpathian rivers. Both disturbances simplified flow pattern and homogenised physical habitat conditions in rivers, and the changes are now clearly reflected in the reduced abundance and diversity of fish fauna as well as the reduced taxonomic diversity of benthic invertebrate communities. Significant relationships between these biotic characteristics of Polish Carpathian rivers, and the variation of physical habitat conditions and hydromorphological quality of the rivers indicate that recovery of the degraded communities will require restoration measures increasing morphological complexity of the watercourses. Environmental changes that took place in Carpathian catchments during the twentieth century have changed water and sediment fluxes in the rivers and thus invalidate the historical state of the watercourses as reference for their restoration. Therefore, reference conditions should be defined as those which exist or would exist under present environmental conditions in the catchment but with the lacking human influence on the channel, riparian zone and floodplain of the river which is to be restored. An erodible corridor seems to be a restoration measure enabling the most effective adjustment of a degraded river to its contemporary regime as well as re-establishment of geomorphic dynamic equilibrium conditions and improvement of hydromorphological conditions for river biota.