PN23300304: Development of an Intelligent System for Monitoring hydrological connectivity in the modified river ecosystems of the Danube Delta

**Phase 3/2024**: The problem that this phase of the project addressed was the realization of a complex study on the actual hydrological, morphological, biological and sedimentological dynamics in the areas of the rectified meanders on the Sulina Canal through the interpretation of morphological, hydrological, sedimentological, biological data and ecological acquired in two measurement campaigns realized in the previous phase of the project, in different hydrological conditions, of high and low waters, in May and October 2023. A detailed analysis of the spatial variability of the investigated parameters in the aquatic environment allowed the establishment of the boundary conditions of hydrological connectivity in the studied area. Areas with hydrological connectivity problems were identified, and the effects that its degradation and interruption can have on biodiversity using interdisciplinary research on the current state of aquatic environments affected by anthropogenic interventions. These results will represent the basis for the creation of the Monitoring System, the data transfer, storage and processing software application.

**Phase 4/2024**: This phase of the project focused on carrying out complex investigations on the Sfântu Gheorghe branch and on its rectified meanders (geological, topographical, geophysical, hydrological, sedimentological, biological and ecological measurements) in two periods with different hydrological conditions, in May and September 2024. The purpose of the measurements was to establish the consequences of human activities on water quality and Danube sediments and to analyze the hydrological connectivity. Transversal profiles and data acquisition stations located upstream of the bifurcation with the main distributary, downstream of the bifurcation on the artificial channel and on the former meanders, on the lateral channels connecting to the lakes and on the lakes were made. The water and sediment flows were determined by direct measurements in several relevant sections of the rectified meanders, on the connection channels with the lakes in the deltaic space and on the lakes that have a direct connection to the branch. The water and sediment samples (from the river bed and in suspension) were analyzed in the laboratory from an eco-biological point of view. The quality of water, sediments and the degree of pollution was determined by analyzes of nutrients, chlorophyll, phosphates, silicates, nitrates, nitrites, ammonium and the concentration of heavy metals. All these measurements and analyzes will contribute to the assessment of the hydrological connectivity of the rectified meanders on the Sfântu Gheorghe branch.