



First results about the impacts of human structures on hydromorphology, chemistry and macroinvertebrate assemblages in River Tresa (North-western Italy)

Angela Boggero, Marzia Ciampittiello, Irene Guarneri, Claudia Dresti, and Helmi Saidi
C.N.R.-Institute for Ecosystem Study (ISE), Largo Tonolli 50/52, 28922 Verbania Pallanza, Italy

Human pressures are known to alter the hydrological, hydro-chemical and ecological characteristics of water-courses. In this context River Tresa, outlet of Lake Lugano and hydrological connection with Lake Maggiore, was studied for one year. The river is about 13 km long and for most of its course constitutes the boundary between Italy and Switzerland. Hydromorphology was studied through the application along the entire river course of the CARAVAGGIO (Core Assessment of River hAbitat VALue and hydromorpholoGical cOndition) survey method and three different indexes were used: HQA (Habitat Quality Assessment), HMS (Habitat Modification Score) and LRD (Lentic/Lotic River Descriptor).

Four different sampling points along its channel and one sampling depth at its mouth were considered to verify the influence of the presence of human structures (mainly a dam and a weir) on the hydromorphology, chemistry and benthic invertebrates fauna composition and density.

Chemical analyses, performed through the analysis of the main anions and cations, nutrients, pH and alkalinity, did not show significant changes among stations. As regard macroinvertebrates, Oligochaetes and Dipterans prevail with high density in the first two stations below the weir and above the dam (> 30000 ind m² and > 200000 ind m²), which cause interruptions of the river continuity with lowered flow and improved particles and organic matter sedimentation. Below the dam, density and biodiversity (Shannon Index) decrease showing values of less than 20000 ind m² and around 1.5, respectively, in both sampling seasons, and the functional organisation of the community show loss of filter feeders and herbivores.

Biological data were also analysed using STAR_ICMi Index (6 different metrics related with tolerance, abundance/habitat and richness/diversity) for the ecological quality evaluation of each site. Results show a moderate quality with the exception of the below dam station that is in scarce conditions.

In conclusion, River Tresa shows mean values of LRD of -19, of HMS equal to 39, and of HQA to 34, with a mean site EQR of 0,57, index of a generally moderate hydro-morphological conditions. Combined results regarding chemistry and macroinvertebrates, as well, classify the river in moderate conditions. This situation negatively affects the environmental quality of L. Maggiore being River Tresa the second most important tributary of the lake.