

The role of environmental refugia in mitigating anthropogenic disturbances on macroinvertebrates in streams

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Human activities are abiotic disturbances of aquatic ecosystems and can be a major factor in structuring stream communities. Scientific observations and researches demonstrate the influences of anthropogenic infrastructure, such as dams, intakes or sediment traps, on aquatic fauna's habitats. The presence and distribution of physical habitats of macroinvertebrates is governed by physical and chemical conditions in the aquatic environment.

According to Sedell et al. (1990), a refugia is defined as "habitats or environmental factors that convey spatial and temporal resistance and/or resilience to biotic communities that have been impacted by biophysical disturbances". The main argument of this project is that refugia are critical components of natural river and stream ecosystems. Therefore, the understanding of their role in maintaining biodiversity may offer alternative insights into the mitigation of human impacts on streams. In fact, the effects of a disturbance generated by changes in water movement may be ameliorated if the biota use refugia (Lake, 2000).

Research on disturbance ecology in streams has concentrated on flow-generated disturbances. In a structurally heterogeneous channel, there may be many types of refugia as obstacles, holes, interstices, or pieces of debris that offer protection from disturbance (Lake, 2000). Accordingly, the environmental impacts and benefits of flows needs to account for the availability of environmental refugia. Therefore, improvement in technologies allows to predict the availability and quality of habitats by combining hydrodynamic models obtained by UAVs with the habitat suitability index. In this project, we will focus on macroinvertebrates, which are the biotic group of concern and the assessment of sediment traps impacts on their habitats.

Key words: *Refugia; sediment traps; macroinvertebrates; habitats; disturbances; photogrammetry; DEM;*

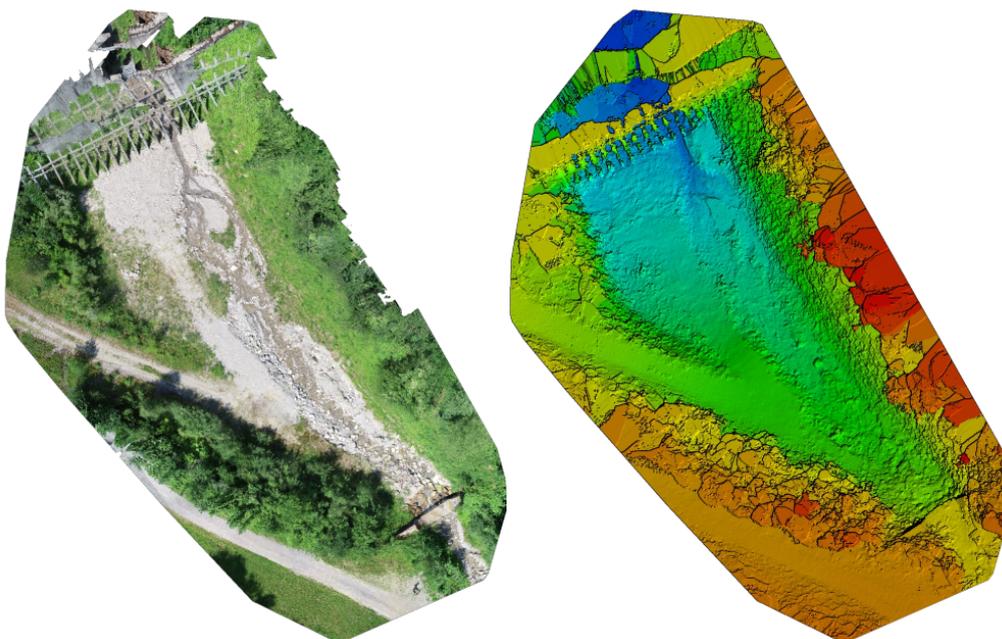


Figure 1: Orthomosaic of the sediment trap and the corresponding sparse Digital Surface Model (DSM) before densification.