

Validating alternative methodologies to estimate the hydrological regime of temporary streams when flow data are unavailable

Pilar Llorens (1), Francesc Gallart (1), Jérôme Latron (1), Núria Cid (2), Maria Rieradevall (2), and Narcís Prat (2)
(1) Institute Environmental Assessment and Water Research (IDAEA), CSIC, Barcelona, Spain (pilar.llorens@idaea.csic.es),
(2) FEM, Department of Ecology, University of Barcelona, Barcelona, Spain (nprat@ub.edu)

Aquatic life in temporary streams is strongly conditioned by the temporal variability of the hydrological conditions that control the occurrence and connectivity of diverse mesohabitats. In this context, the software TREHS (Temporary Rivers' Ecological and Hydrological Status) has been developed, in the framework of the LIFE Trivers project, to help managers for adequately implement the Water Framework Directive in this type of water bodies. TREHS, using the methodology described in Gallart et al (2012), defines six temporal 'aquatic states', based on the hydrological conditions representing different mesohabitats, for a given reach at a particular moment. Nevertheless, hydrological data for assessing the regime of temporary streams are often non-existent or scarce. The scarcity of flow data makes frequently impossible the characterization of temporary streams hydrological regimes and, as a consequence, the selection of the correct periods and methods to determine their ecological status. Because of its qualitative nature, the TREHS approach allows the use of alternative methodologies to assess the regime of temporary streams in the lack of observed flow data. However, to adapt the TREHS to this qualitative data both the temporal scheme (from monthly to seasonal) as well as the number of aquatic states (from 6 to 3) have been modified.

Two alternatives complementary methodologies were tested within the TREHS framework to assess the regime of temporary streams: interviews and aerial photographs. All the gauging stations (13) belonging to the Catalan Internal Catchments (NE, Spain) with recurrent zero flows periods were selected to validate both methodologies. On one hand, non-structured interviews were carried out to inhabitants of villages and small towns near the gauging stations. Flow permanence metrics for input into TREHS were drawn from the notes taken during the interviews. On the other hand, the historical series of available aerial photographs (typically 10) were examined. In this case, flow permanence metrics were estimated as the proportion of photographs presenting stream flow.

Results indicate that for streams being more than 25% of the time dry, interviews systematically underestimated flow, but the qualitative information given by inhabitants was of great interest to understand river dynamics. On the other hand, the use of aerial photographs gave a good estimation of flow permanence, but the seasonality was conditioned to the capture date of the aerial photographs. For these reasons, we recommend to use both methodologies together.