Alternative methods to understand the water regime of the temporary rivers

September 21 2016

Temporary rivers are watercourses with a varying water regime –from abundant flows in spring to seasons of droughts- which makes the diagnoses difficult with common methodologies. Credit: Núria Cid, UB-FEM

When there are no data due to a lack of hydrometric station, interviews to neighbours and air photographs of water environment are the effective methods to collect information on the water regime of temporary rivers.

This is one of the main conclusions of a study published in the journal *Science of The Total Environment* and signed by the researchers Narcís Prat, Maria Rieradevall and Núria Cid, from the Research Group Freshwater Ecology and Management (FEM) of the University of Barcelona (UB), and Francesc Gallart, Pilar Llorens and Jérôme Latron, from the Institute of Environmental Assessment and Water Research (IDAEA-CSIC).

Temporary rivers: from abundant flow to droughts

Temporary rivers are watercourses with a varying water regime –from abundant flows in spring to seasons of droughts- which makes the diagnoses difficult to see their ecological status with common methodologies, which are aimed for permanent rivers. Also, the ponds that remain are worth preserving biodiversity reservoirs.

Designing new tools to diagnose the hydrological and ecological status of temporary rivers and improving their management in accordance with the Water Framework Directive of the European Union is the main aim of LIFE Trivers, a project financially supported by the European Union and led by Professor Narcís Prat, from the Department of Evolutionary Biology, Ecology and Environmental Sciences at the University of Barcelona.

Improving the management of short-lived rivers in the Mediterranean

"LIFE Trivers aims to fill a space that Mediterranean basin agents find: the lack of tools that allow taking right decisions when deciding, first, whether it is a temporary river, secondly, if its temporality is due to natural or human factors, and thirdly, how to make a right ecology quality diagnose" says Narcís Prat, coordinator of the European Project

LIFE Trivers and head of the Research Group Fem-UB. The project also counts with the participation of the Institute of Environmental Assessment and Water (IDAEA-CSIC), the Catalan Water Agency (ACA) and the Jucar Hydrographical Confederation (CHJ).

According to the scientific article, mixing interviews to neighbours and series of high-resolution air photographs is an alternative that allows substituting or complementing the registers and assessing the water regime of temporary rivers. In this research, experts used the TREHS system (Temporary Rivers Ecological and Hydrological Status), a new tool developed in the LIFE Trivers framework to characterize the ecological status of temporary rivers. To verify the new methodology, the experts included data from three hydrometric stations- facilities with technological devices to obtain hydrological data- which are now in interior basins in Catalonia, with recurring dry periods. It will be necessary to update these data through professional and expert observation.

TREHS adds historical available data on the flow of each river, as well as data for simulations from water torrent models. In addition, it allows obtaining or completing this information with the interviews done to neighbours and analysis of air photographs.

"These statistics will enable us defining the hydrological status of the river, knowing whether it is temporary due to natural or human reasons, and helping when selecting the sample calendar of reference biological communities in the temporary regime", says Francesc Gallart, researcher of IDAEA-CSIC and first author of the scientific article published in the journal *Science of The Total Environment.*

In this project, there is also the collaboration of the experts Núria Bonada, from the Research Group FEM-UB and the Biodiversity Research Institute (UB-IRBio), Pablo Rodríguez-Lozano (FEM-UB),

and Dolors Vinyoles and Jaume Cambra, from the Department of Evolutionary Biology, Ecology and Environmental Sciences at the University of Barcelona.

First meeting with COST SMIRES work groups

Trivers is also one of the members of the action COST SMIRES (Science and Management of Intermittent Rivers and Ephemeral Streams), financially supported by the European Union to widen and unify the knowledge of temporary rivers and supporting their recognition within the water ecosystem management. On September 12 and 13, the city of Lyon (France) held the first meeting of COST SMIRES work groups, with the participation of the experts Francesc Gallart (IDAEA-CSIC), Núria Cid (FEM-UB) and Antoni Munné (ACA).

The COST SMIRES initial meeting, led by Thibault Datry from the National Research Institute of Science and Technology for Environment and Agriculture, gathered around one hundred experts from around the world. According to Francesc Gallart, who develops the hydrological part of LIFE Trivers, "the main problem in the study and management of temporary rivers is the lack of information, worsened by the fact that when we have hydrometric stations, they don't add information on the presence or lack of water basins when there is no flow".

According to Núria Cid, member of the Research Group FEM-UB and head of projects in LIFE Trivers, "SMIRES project will contribute greatly to obtain data from biological communities from different areas in Europe with diverse climate characteristics with the presence of temporary rivers, and deepen the study of this ecosystem at a greater scale". The head of the Department of Control and Quality of Waters of ACA, Antoni Munné, highlighted that temporary and intermittent rivers have been given little attention and there is little knowledge in order to

allow an accurate management.

According to Munné, who is also member of the management committee in TRIVERS as state representative, COST SMIRES has to allow debating and advancing in effective forms to apply the existing knowledge in management and preservation of these water ecosystems, which are also the available resource for other activities that need to be juggled.

More information: F. Gallart et al. Validating alternative methodologies to estimate the regime of temporary rivers when flow data are unavailable, *Science of The Total Environment* (2016). DOI: 10.1016/j.scitotenv.2016.05.116

Provided by University of Barcelona