Researchers work on model to help restoration managers with decision-making

October 27 2015

It sounds rather simple: In order to restore the original high level of biodiversity in our rivers, they should be returned to their original state. Yet, researchers from the University of Montana and the Helmholtz Center for Environmental Research (UFZ) determined it really is not that easy, as efforts often are limited by historical, cultural or economic factors.

Because it is profoundly difficult for on-site researchers to examine the wide array of ecological factors that may take priority from an ecological perspective, the research team set out to develop a system to help land managers identify restoration project priorities.

UM and UFZ researchers developed an ecological simplification concept and tested it in two river landscapes that differ in length of human influence: the Missouri River, located in Montana, and the Elbe River, located in Saxony-Anhalt, Germany. Their findings recently were published in the journal *BioScience*, which can be found online at http://bioscience.oxfordjournals.org/content/early/2015/09/03/biosci.biv120.

In the case study, the team of researchers carefully and systematically examined the Missouri and Elbe rivers and observed components of complexity. A section of the Missouri River in eastern Montana with comparatively low human influence was compared to a section of the Elbe River that flows through populated areas of northeastern Germany, where it has been influenced by intensive agricultural activity, shaped as

an important shipping lane and isolated from its flood plains over most of its length.

"When selecting efficient management measures, it makes a big difference how the ecological problems were derived from past transformations," said UM systems ecology Professor Maury Valett. "Challenge can arise from development of human infrastructure, from a history of pollution caused by chemicals and/or from invasion by alien species."

The authors' concept recognizes that man-made bank structures such as the groyne fields of the River Elbe can be optimised for biodiversity. If they have the "right" shape, they can create ecological niches and increase the variety of species living there.

A comparison of both rivers showed that although the original niche diversity of a natural location cannot be fully restored, certain parameters - such food variety for wildlife - are converging back to their natural state through the influence of man-made structures. At the same time, the researchers also noted that artificially increasing the complexity of the Elbe River created new problems, such as invasive species taking hold, making it more difficult for native species to repopulate in the long term.

The research team now will underpin the theoretical concept with specific case studies and corresponding recommendations for action.

Provided by University of Montana