Ecohydrological approaches to wetland restoration and management

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International Course on Ecohydrological Approaches to Wise Use, Restoration, Management and Conservation of Wetlands

UNESCO's International Hydrological Programme (IHP) developed ecohydrology as a transdisciplinary, scientific approach to achieve water quality improvement, biodiversity enhancement and sustainable development by using the understanding of relationships between hydrological and biological processes at the scale of water catchment basins. The ecohydrological approach is based upon the assumption that sustainable water resources management can be achieved by restoring and maintaining evolutionarily established processes of water and nutrient circulation and energy flows at catchment scale, thus enhancing the carrying capacity of ecosystems to absorb human impacts and using ecosystem properties as water management tools. To develop demonstration projects and to organize training courses and workshops on ecohydrology, the European Regional Centre on Ecohydrology (ERCE) was established in early 2006 as an international institute of the Polish Academy of Sciences at the University of Lodz (cf. www.erce.unesco.lodz.pl).

Ecohydrology, as an applied concept for environmental problem-solving, has its roots in wetland-related research established under the auspices of UNESCO's Man and the Biosphere Programme (MaB), mainly at the institutes of Botany and of Systems Biology and Landscape Ecology of the Czech Academy of Sciences. Here, the untiring Jan Kvet, one of Europe's pioneers in modern wetland ecology, was inspired to team up with Martina Eiseltová (of the Environment and Wetland Training Centre), Jan Pokorný (former Ramsar STRP member), and Libuše Vlasáková (member of Ramsar's Standing Committee), to prepare together an international course on ecohydrological approaches for wetlands wise use. They invited Iwona Wagner of ERCE in Lodz, Willy Ripl of the Technical University in Berlin, and the undersigned from the Ramsar Secretariat, to contribute further to the substantive reflections on integrated wetland ecology, together with other specialists and two dozen course participants from countries in Europe and Asia.

An underlying assumption of the ecohydrological approach is that extensive drainage of cultural landscapes for agricultural purposes has often led to the loss of important hydrological functions of the vegetation, mainly through the reduction of evapotranspiration, i.e. the release of water vapour by plants into the atmosphere. In many areas of former productive landscapes we are victims of soil degradation and desertification, due to the replacement of rich forest and wetland vegetation by intensive cultures on drained fields. Today's focus seems to concentrate on the global carbon cycle only, while the climate influence of the water cycle seems to be neglected. Water vapour is a very significant greenhouse gas. Losing forest and wetland vegetation in the landscape reduces evapotranspiration, water vapour in the atmosphere and precipitation, a spiral leading ultimately to desertification.

The course linked such conceptual approaches with the practical wetland management needs in our real world, e.g. to monitor the ecological status of Europe's waterbodies, as required by the European Union Water Framework Directive, or the advantages of transboundary cooperation for shared wetlands and river basins, as promoted by the Ramsar Convention. This was illustrated with field excursions to Czech Ramsar sites in the nearby cultural landscape of the Trebon fishponds and the Šumava peatlands in the uppermost part of the Vltava river catchmen, close to the German-Austrian border. On the last day, the course participants briefly presented wetland management issues they are dealing with at home. An ideal way to share experience and lessons learnt.

The organizers have to be congratulated for a highly innovative, intense and rewarding course. They promised to follow up on the promising contacts and exchanges thus created.
Hana Cižková, of the Institute of Systems Biology and Landscape Ecology, explains the monitoring of gas exchange (CO2 and water vapour) in the fen landscape near the historic town of Trebon. The field station is part of an integrated project among 61 research centres from 17 European countries to determine the role of the European continent in the global carbon cycle (www.carboeurope.org).
Jan Pokorný of the ENKI environmental consultancy discussing an ecohydrological problem in the wet meadows of Trebon with Iwona Wagner, of ERCE in Lodz.

Jan Kvet (centre, with orange shirt) introducing the course participants to the wetland plant collection in Trebon of the Institute of Botany of the Southern Bohemian University.
The Trebon basin Protected Landscape Area and Biosphere Reserve contains 460 fishponds. The dykes constructed to create the large ponds are often dating back to the 15th and 16th centuries. They are covered by lush, old-growth oak trees. The landscape between the fish ponds is made up of a mosaic of shallow marshes, wet meadows, floodplain forests, peat bogs, cultivated areas and small settlements. The area includes 33 Nature Reserves and Nature
Monuments, and two Ramsar Sites (Trebon Fishponds and Peatlands).

During the extreme summer floods in August 2002, much damage was avoided in the downstream capital Prague thanks to the exceptional retention capacity of the Trebon fishponds. This is illustrated by the high water mark at the Rožmberk pond outlet, corresponding to an eleven-fold retention volume of the normal 6.3 million m³, flooding an area of 2220 ha, instead of the normal 490 ha pond surface.
Course participants from Armenia, Belarus, Bulgaria, Czechia, France, Hungary, Kazakhstan, Kyrgyzstan, Macedonia, Poland, Russia, Serbia, Slovakia and Ukraine during the field trip to the Šumava peatlands Ramsar Site in the well-preserved upper Vltava floodplain (Vlatvsky luh).

Nearby peat bog Soumarsky Mošt eight years after the stop of industrial peat cutting. Where the water table was restored, peat-forming vegetation reappears rapidly.

-- photos provided by Libuše Vlasáková and Tobias Salathé