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Seminar Invitation

Decision Support for Environmental Management – Concepts and Application to Surface Water Restoration

Speaker **Prof. Peter Reichert, Former Head of Department SIAM, EAWAG, Switzerland**

When **October 27, 2022 16.00 to 17.00, CEST**

Where **Eawag Dübendorf, room FC C20 and online via Zoom.**
Please contact seminars@eawag.ch for access details to join online

Abstract Environmental decision support intends to use the best available scientific knowledge to help decision-makers to find management alternatives that result in outcomes that match societal preferences as closely as possible. This requires a careful analysis of (i) how scientific knowledge can be represented and quantified, (ii) how societal preferences can be described and elicited, and (iii) how these concepts can best be used to support communication among authorities, politicians, and the public in environmental management. As societal preferences aggregate diverse and uncertain individual preferences, scientific knowledge is always incomplete, and both have to be quantified by simplified models, the consideration of uncertainty is of high importance in environmental decision support. Decision analysis, in particular multi-attribute value and utility theory, provides a good theoretical basis for such a decision support process. Decision analysis is based on a few "rationality rules" that individuals do not necessarily fulfill for their own decisions. Nevertheless, "rational decision making" is an ideal basis to guide negotiations in societal decision-making processes and to support transparent communication of reasons underlying a decision to the society.

The first part of the presentation will start with a brief review of the principles of decision analysis and its application in a decision support process. Then the focus will be on the consideration of uncertainty in preference description and elicitation. This will be complemented by a discussion of the consideration of uncertainty in model predictions with a particular emphasis on the importance of stochastic models to realistically describe uncertainty in the prediction of the behavior of environmental systems.

In the second part, the implementation of some of the outlined principles in practice will be illustrated by describing the development of surface water assessment procedures in Switzerland. This will be followed by a suggested extension of reach-scale assessment to catchment-scale assessment to support prioritization in river management and, in particular, how these ideas can be used to guide the improvement of the fish migration potential in Swiss rivers.

Finally, I will try to identify areas where further research and application have a particular potential for improvement at the scientific and applied levels.