

Publication

Assessing the decline of brown trout (*Salmo trutta*) in Swiss rivers using a Bayesian probability network**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 3707635**Author(s)** Borsuk, M. E.; Reichert P., Peter; A., Schager; E., Burkhardt-Holm**Author(s) at UniBasel** [Holm, Patricia](#) ;**Year** 2006**Title** Assessing the decline of brown trout (*Salmo trutta*) in Swiss rivers using a Bayesian probability network**Journal** Ecological Modelling**Volume** 192**Number** 1-2**Pages / Article-Number** 224-244**Keywords** integrated modelling; causal assessment; population viability; anthropogenic stressors; ecological risk

A Bayesian probability network has been developed to integrate the various scientific findings of an interdisciplinary research project on brown trout and their habitat in Switzerland. The network is based on a dynamic, age-structured population model, which is extended to include the effect of natural and anthropogenic influence factors. These include gravel bed conditions, water quality, disease rates, water temperature, habitat conditions, stocking practices, angler catch and flood frequency. Effect strength and associated uncertainty are described by conditional probability distributions. These conditional probabilities were developed using experimental and field data, literature reports, and the elicited judgment of involved scientists. The model was applied to brown trout populations at 12 locations in four river basins. Model testing consisted of comparing predictions of juvenile and adult density under current conditions to the results of recent population surveys. The relative importance of the various influence factors was then assessed by comparing various model scenarios, including a hypothetical reference condition. A measure of causal strength was developed based on this comparison, and the major stress factors were analyzed according to this measure for each location. We found that suboptimal habitat conditions are the most important and ubiquitous stress factor and have impacts of sufficient magnitude to explain the reduced fish populations observed in recent years. However, other factors likely contribute to the declines, depending on local conditions. The model developed in this study can be used to provide these site-specific assessments and predict the effect of candidate management measures. (c) 2005 Elsevier B.V. All rights reserved.

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