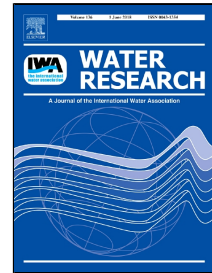


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Integrating river hydromorphology and water quality into ecological status modelling by artificial neural networks

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1 **Integrating river hydromorphology and water quality into ecological status modelling**
2 **by artificial neural networks**

3

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12

13 **Abstract**

14 The aim of the study was to develop predictive models of the ecological status of rivers
15 by using artificial neural networks. The relationships between five macrophyte indices and the
16 combined impact of water pollution as well as hydromorphological degradation were
17 examined. The dataset consisted of hydromorphologically modified rivers representing a wide
18 water quality gradient. Three ecological status indices, namely the Macrophyte Index for
19 Rivers (MIR), the Macrophyte Biological Index for Rivers (IBMR) and the River Macrophyte
20 Nutrient Index (RMNI), were tested. Moreover two diversity indices, species richness (N) and
21 the Simpson index (D) were tested. Physico-chemical parameters reflecting both water quality
22 and hydromorphological status were utilized as explanatory variables for the artificial neural
23 networks. The best modelling quality in terms of high values of coefficients of determination
24 and low values of the normalised root mean square error was obtained for the RMNI and the
25 MIR networks. The networks constructed for IBMR, species richness and the Simpson index

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