Habitat-types in a large potamal river: the Elbe

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1 Introduction

Habitats were characterised by a temporal dimension, defined as habitat durational stability (Southwood 1977) or as stability of disturbance (Hildrew & Townsend (1987)). A spatial dimension is determined by heterogeneity in physico-chemical parameters at the same time. To understand temporal heterogeneity as a magnitude of the environmental variables away from long term averages it is necessary to characterise factors describing spatial heterogeneity simultaneously. Based on this information it will be possible to assess factors varying over a long time period influencing habitat durational stability.

The aims of our study were:

- to evaluate the suitability of measuring method of environmental parameters
- to detect environmental factors describing habitat types at different scales of space.

2 Study area

The middle part of the Elbe river characterised as potamal ranges over 400 stream kilometers from Dresden to Geesthacht. In the area of Sachsen-Anhalt and Brandenburg the river is characterised by a transversal system of backwaters and main channel of large extension.

3 Method

In August 1997 over 300 measurements of 10 environmental parameters were made during electrofishing by PAS in the in main channel, backwaters and aquatic floodplain. We used PCA to find out decisive factors dividing habitat types at different scales. The choice of parameters using for PCA based on anti-image matrices and the "Kaiser-Meyer-Olkin-criteria" (Backhaus et al. 1996). Factors were filtered by Eigenvalues larger than one. The statistics were made by SPSS for windows 7.5 on IBM compatible-PC. In case of more then two factors two-dimensional graphics were made demonstrating the distribution.

4 Results / Discussion

The habitat structure of the floodplain demonstrates a wider range of environmental conditions. Contrary to that the main stream habitats were characterised by more similar environmental conditions Focusing on the differentiation of backwater the influence of

morphological factors increases. Connected and disconnected backwaters are more distinguished by physico- (conductivity) chemical (turbidity) factors.

Dike fields occur in the whole potamal Elbe river for 150 years. During the time of the GDR, the single groynes getting increasingly destroyed. This resulted in a more natural development of the shoreline. The destroyed dike fields especially the backwaters inside them became characterised by special physicochemical parameters.

These measurements were performed close to the shoreline complementing the investigation on 0+fish communities by point abundance sampling (PAS). Therefore the role of current as seperating factor of habitats was not adequate considered. Howerver the number of measurements satisfied the results and allowed the characterisation of habitat types on different scales in space.

A further application of this method for smaller spatial scales (microhabitat) and for different temporal scales (season) shall provide more information with regard to the difference between factors describing the space and temporal dimensions.