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Effects of extreme flood events on flora and fauna in Middle Elbe floodplains

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In Central Europe floodplains belong to the most complex ecological systems and have a very high biodiversity. The Elbe flood 2002 and the drought in 2003 are two extreme events, which had huge impacts not only on man, but also on fauna and flora. The project HABEX (Auenhabitate nach Extremhochwasserereignissen am Beispiel der Mittleren Elbe- Floodplain Habitats after Extreme High Water Events by Example of the Middle Elbe), funded by the BfG and the UFZ, aims to investigate the ecological impact of extreme flood events on fauna and flora. The very well established plot-base of the preceding RIVA project (Übertragung und Weiterentwicklung eines Robusten Indikationssystems für ökologische Veränderungen in Auen – Development of a Robust Generally Applicable Indicator System for Ecological Changes in Flood Plain Systems – funded by the German Federal Ministry for Education and Scientific Research 1997 - 2000) enables the repeated survey of the same plots for flora, carabids, and molluscs in the autumn of 2002, early summer and autumn of 2003. The surveyed species and their abundances add to the extensive RIVA-database. First analyses' results show that the effects of the extreme flood varies very much between the different species-groups:

Vegetation: Compared with the results of 1998/99 many species, for example *Arrhenatherum elatius,* have become rarer after the extreme flood event. On the other hand *Alopecurus pratensis* shows a higher occurrence in the same area.

Carabids: In autumn 2002 the results compared with the years of 1998/99 were very different considering the number of specimens (16 %) and species (41 %) as well. The extreme flood affected both dry habitats as well as wetland inhabiting species. In 2003 the number of species recovered, but only up to around 75 %, the number of individuals only up to 25 % of the former results.

Molluscs: The number of species has considerably increased, from fall of 1999 to fall 2002 almost by 30 %, from early summer 1999 to 2003 by 55 %. In contrast to the previous years the aquatic species dominate over the terrestrial molluscs in terms of species numbers. Their numbers increased by 180 to 200 % from autumn of 1999 to 2002 resp. early summer of 1999 to 2003. Also their populations are larger than those of the terrestrial molluscs.

Summing up it is apparent that after the flood conditions were very different from those of 1998/99. These considerable changes are definitely consequences of the extreme flood of August 2002. Similar effects, probably dramatic losses both of species and of individuals within the autumn of 2003 are expected, according to survey, as consequence of the extraordinary long drought of 2003.

The results will be integrated in the BfG model-system INFORM. This system serves as a tool for predicting ecological impacts due to changes in the hydrological system. This decision support tool will be extended to terms of high flood events and support can be given to stakeholders in riverine management.

This report presents preliminary results of the investigation of flora and fauna after the extreme Elbe flood in the year 2002 from selected sites of the floodplain of the Middle Elbe with the use of data for validation of ecological risk-assessment, and risk modeling. For thorough and careful evaluation of the models set up so far it is essential to follow the long-term development of the studied biocoenoses in the field for at least two more years (2004 and 2005) in order to achieve an optimal data-set.