

Abstract

„Fluss- und Stromauen in Deutschland - Typologie und Leitbilder“

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Flood plains – the parts of valley floors and lowlands that are affected by flooding – are of exceptional importance for the environment and its ecosystem. Not only in Germany but all over Europe they are counted among the most endangered of our natural habitats.

The submitted work deals with the typological classifications of flood plains in Germany and their appearance in a potentially natural state. It is based on results of the research and development project “Typology and development of type specific reference conditions for flood plains in the Federal Republic of Germany” (FKZ: 803 82 100 of the UFOPLAN 2003). A project produced between 2003 and 2005, initiated and supervised by the German Federal Agency for Nature Conservation.

The main objectives of the project are as follows:

- To create a nationwide valid typological approach and to characterise the flood plains in Germany particularly with regard to their hydrodynamics and morphodynamics as well as their flora.
- To develop approaches and references which are characteristic for an area of unspoiled natural habitat on a typological basis mentioned above, and to further delineate them so that they will become part of the standards for assessment and planning practises
- To present approaches to an assessment method for flood plains based on type specific reference conditions

The main area of the work lies in the formulation of the habitat situation of flood plains in a potential natural state as well as a description of the corresponding flora.

Additionally the fauna of flood plains is taken into consideration with regard to its capacity to act as an indicator for the above mentioned assessment method.

After an introduction to the subject matter, chapter 1 will provide both a definition of the aims and an overview of the current state of research. Chapter 2 provides a description of the applied morphological and hydrological as well as botanical methods.

The results, the typological classification and spatial location of the types of flood plains in Germany as well as a description of the type specific reference conditions, are elaborated in chapter 3. The types of flood plains are defined, described and visualised in detail with the aid of illustrations.

Chapter 4 shows the basic principles for an assessment method supported by type specific reference conditions that allows the description and evaluation of the state of the hydro-morphological conditions and the flood plain flora.

An analysis of the aspects not yet contained within the current research and an insight into possible applications as well as the need for further research and development is provided in chapter 5.

The project uses up stream typological methods in order to maintain a recognizable link to existing stream typologies.

The classification of flood plains will be derived in an iterative process, grounded in the GIS-based analysis of nationwide data. A specially developed parameter system will make the description of the different types of flood plains possible.

Special importance is therefore allocated to the morphodynamic and hydrodynamic parameters because they determine considerably the habitat related factors of flood plains.

The parameter system for the definition of flood plain types consists of; large scale river landscapes and regions, flow regime and valley slope.

For a more detailed classification into areas of flood plain types the parameters describe cover substrates und basic substrates, channel pattern, sinuosity of the stream, flow dynamics and runoff as well as the ground water level and amplitude of the typological effects.

The description of the hydro-morphodynamics acts as a subsuming parameter which integrates the resulting morphological situation as well as the hydrological and hydraulic conditions through lateral migration of the streams.

The comparison and analysis of data and ultimately, the explanation of similarities and distinguishing features, will result in seven types of flood plains of mid sized to large rivers (1.000 – 30.000 km² catchment area) and four types of floodplains of very large rivers (> 30.000 km² catchment area) which will be illustrated on a nationwide map (see appendix).

For the various types of flood plains, type specific reference conditions will be discussed according to comprehensive analyses in selected flood plain sections. This will illustrate the potential natural state of the flood plains based on digital terrain models.

Further, the flooding conditions will be discussed with regard to their seasonal distribution, the flow characteristics and water level fluctuations. Based on this discussion of local conditions, descriptions of the flora according to type specific reference conditions will follow.

Besides these results another advanced perception concerning the differentiation of rivers and flood plains emerges on the basis of the results of morphological situations and the possibility of flooding. Against a background of observed flooding periods of more than a hundred days per year, the strict lateral differentiation between the linear stream water bodies, as it has been assumed for most of the research conducted by the Water Framework Directive (WFD), has to be questioned critically, because corresponding hydro-morphological conditions occur along with the reference conditions in terms of the WFD.

Of future interest is the parameter system developed for the typological classification that will become the basis of a prototype supported evaluation method.

Finally the possibilities for the application of the model developed here are presented and unresolved questions and fields for further investigation are pointed out. The different types of flood plains and type specific reference conditions, as defined in this context, form the basis for a uniform nationwide applicable assessment and planning method for flood plains. These results can be used in the planning operations of nature conservation and sustainable water resource management.