

Introduction

Near-natural inland waters, littoral zones and floodplains are among the most valuable, but also most endangered ecosystems in Europe. They are hotspots of biodiversity and central elements of an ecological network. Therefore, more than 50 % of the area of rivers and active floodplains belong to the Natura 2000 network of protected sites (Brunotte et al. 2009). There is almost no other ecosystem type that offers such a remarkable variety of goods and services to humans like rivers, their floodplains, aquifers and wetlands.

Methods of assessing floodplains

The Federal Agency for Nature Conservation (BfN) funded several research projects, which compiled an inventory of the former floodplain area for the larger rivers in Germany, the remaining active floodplains and their status (Brunotte et al. 2009). The survey of the floodplain area was conducted for sections of the rivers with a catchment area of at least 1,000 km². Tidal waters were excluded. Remaining active and former floodplains were assessed. Together they form the geomorphologic floodplain which is defined in this case as the area which could be inundated, if there were no man-made dikes.

For each 1-km section of the rivers, separately for the left and the right side, the active and former floodplain areas were assessed and land use, nature conservation value, and protection status were documented. The data base of the floodplain assessment consists of several digitally available georeferenced data (GIS) provided by German administrations. This way, for 10,000 km of river course of 79 German rivers a consistent data base about the floodplains exists (Fig. 1).

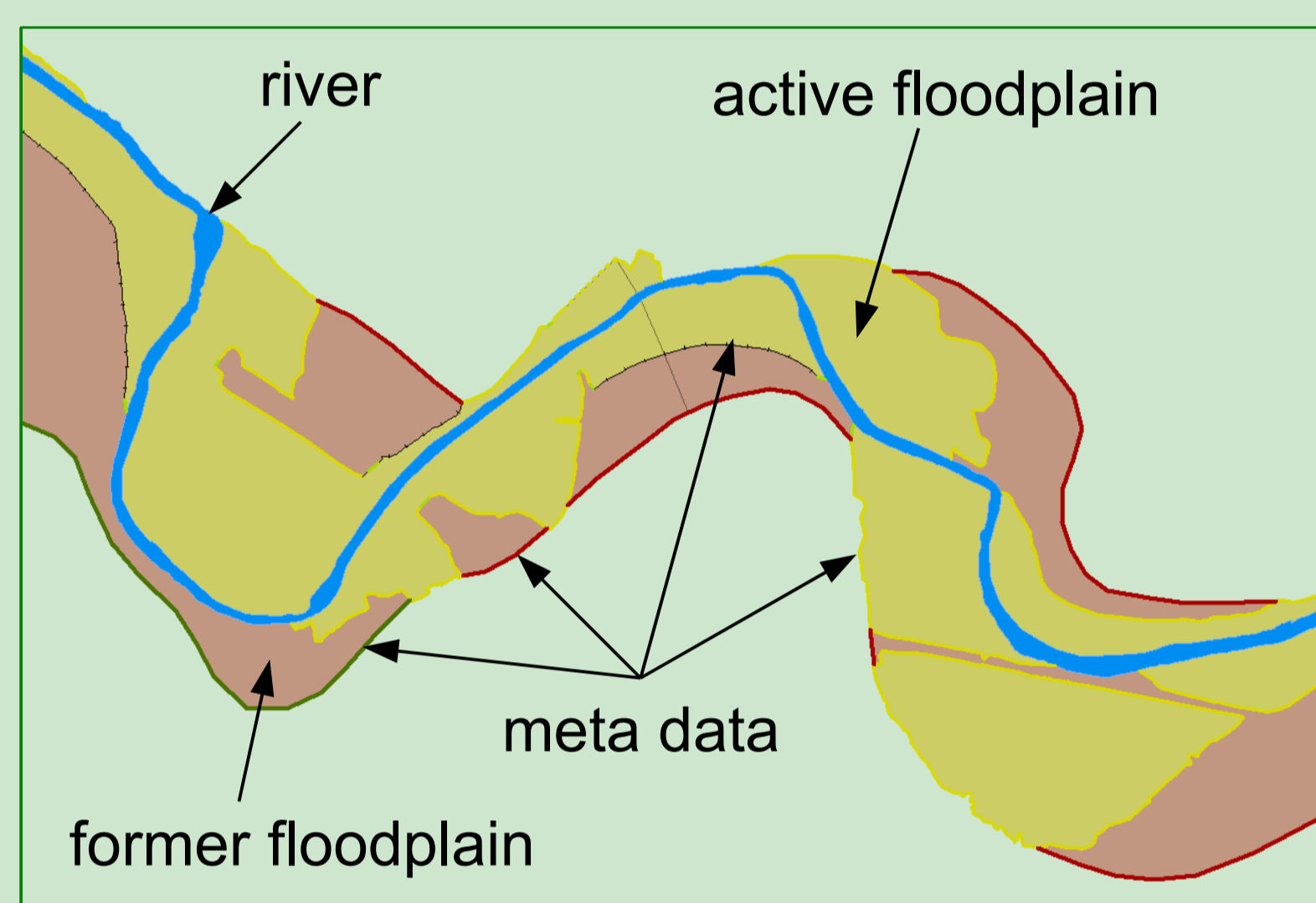


Fig. 1: Exemplary detail of the basic GIS-map of floodplain delineation

The status report on German floodplains

Floodplains of larger rivers in the past covered about 15,000 km², which corresponds to 4.4% of the German territory, of which two-thirds were lost by embanking. Less than 10% of the active floodplains fully provide their ecological functions (Fig. 2). The remaining near-natural hardwood forests cover only about 1% of the active floodplain area. This situation resulted from the intense agricultural use and from the former importance of rivers as routes for transport and trade as well as the arising settlements and infrastructure.

In the former floodplain areas, a small percentage (4%) of "slightly modified" floodplain sections have left, which apparently still maintained "floodplain-like" without being inundated. Hence, active floodplains as well as former floodplains should be targeted for conservation and restoration measures.

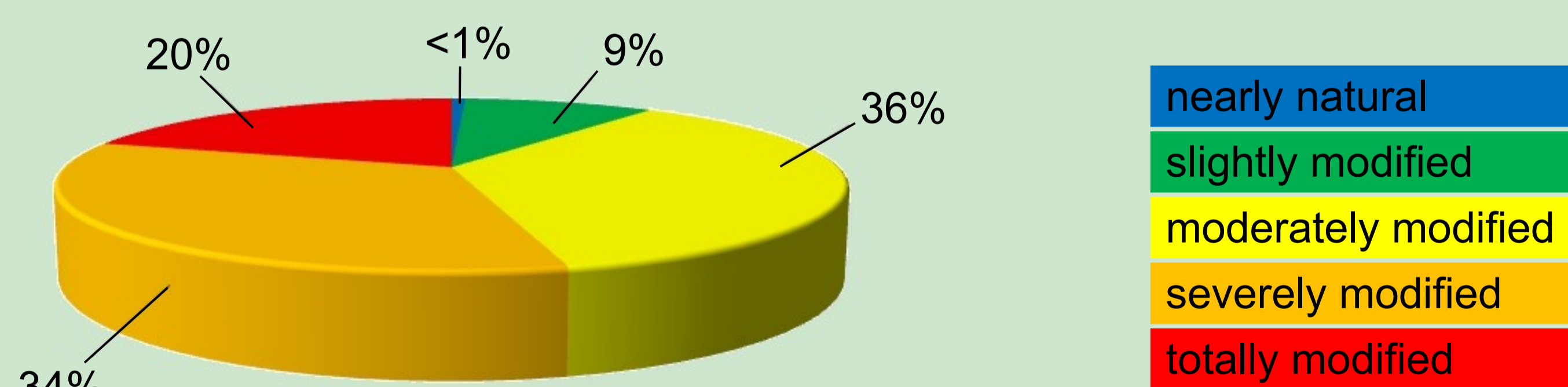


Fig. 2: Distribution of the floodplain status classes for all assessed sections of active floodplains in Germany

Discussion

The available inventory and assessment of floodplains (BMU & BfN 2009) can serve as a useful tool to identify nationally important floodplain areas and potential areas for restoration of floodplains as well as flood protection areas. This way the status report on German floodplains can contribute to the implementation of synergies between nature conservation and flood protection measures.

Acknowledgements

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http://www.bfn.de/0324_auenzustandsbericht.html

Maps and Legends

The results of the status report on German floodplains have been condensed to three maps: loss of active floodplain area, percentage area of arable land and general status. Fig. 3, Fig. 4 and Tab. 1 show the legends of the adjacent maps.

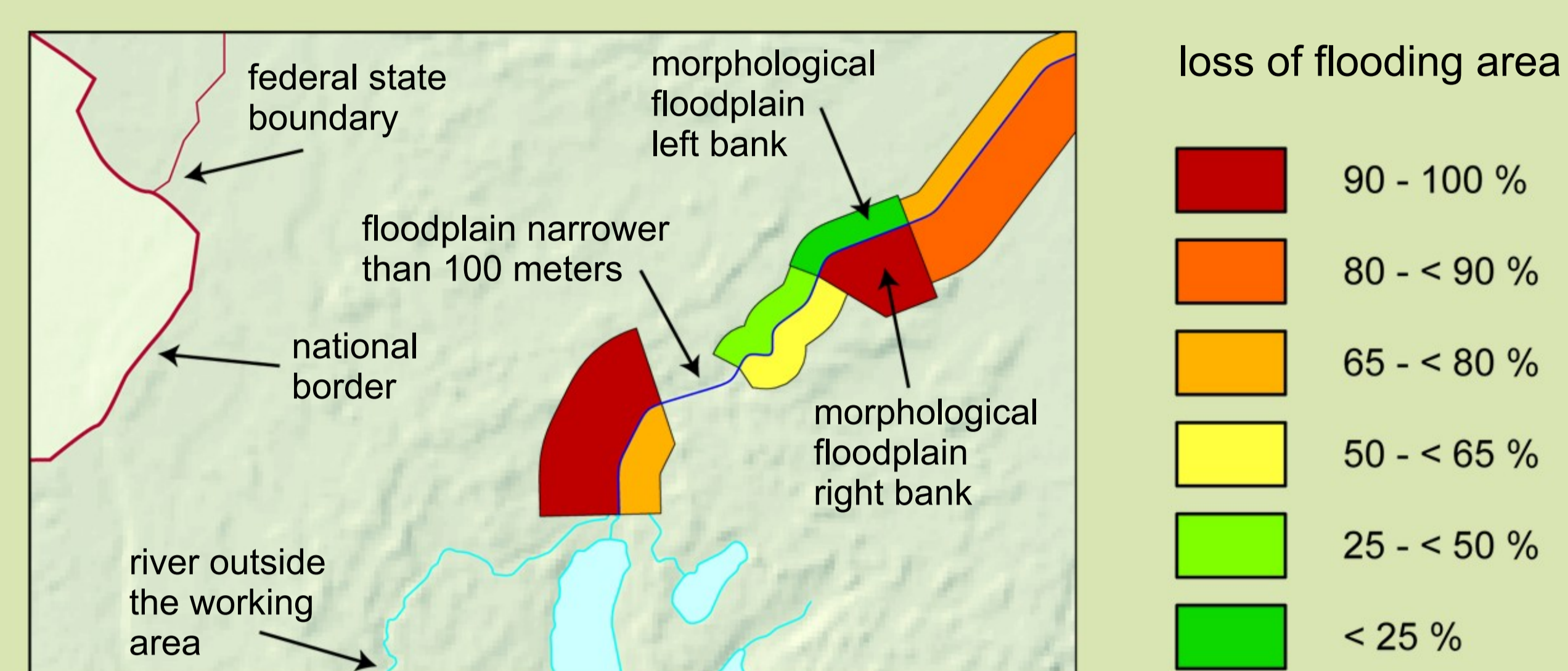


Fig. 3: Percentage loss of active floodplain area

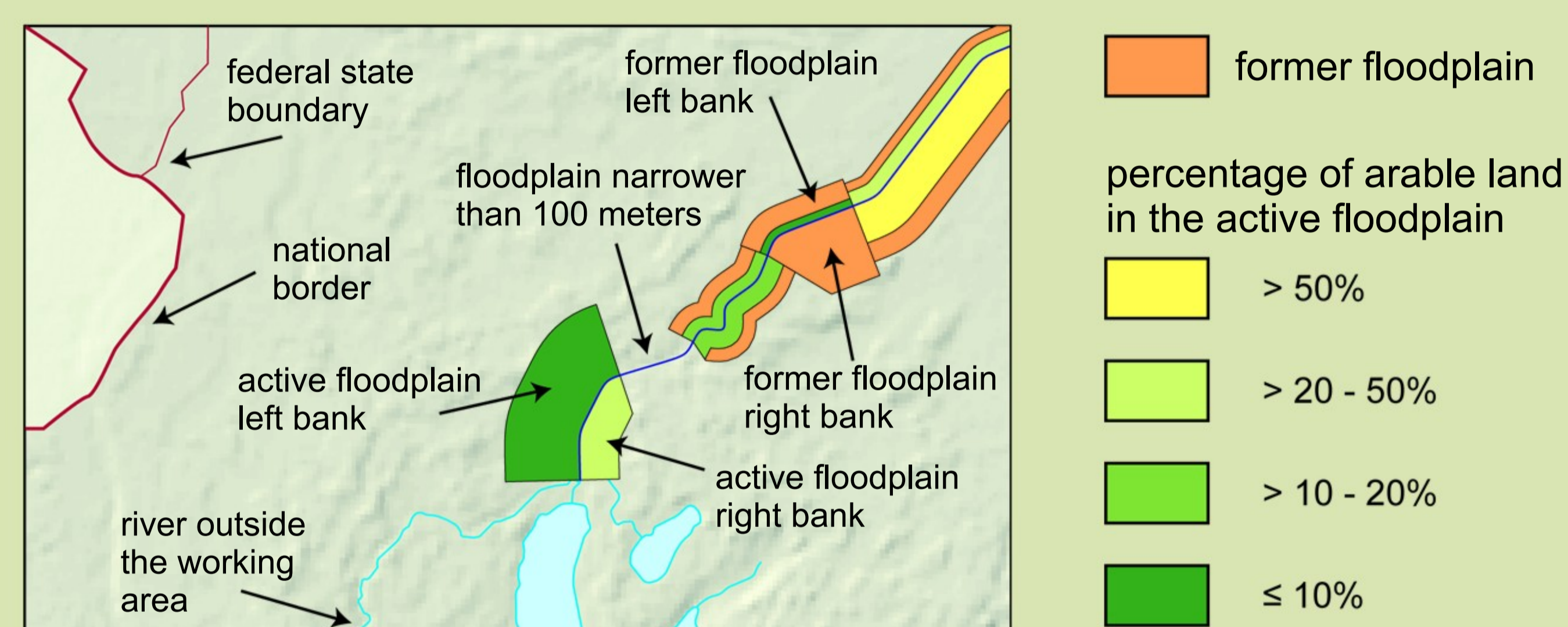


Fig. 4: Percentage area of arable land in the active floodplain

Assessment of the status

Koenzen (2005) developed an approach to define reference conditions for riverine landscapes (potentially natural status) which were further used to assess the status of active as well as former floodplains based on the floodplain data suggested above (Brunotte et al. 2009). Main input data for the status assessment of floodplains comprises the main factors of habitat quality for all species, including the geomorphologic and hydrologic habitat conditions, vegetation and land use. The assessment is presented in five classes of the degree of modification compared to the potentially natural status (Tab. 1).

The classification of each floodplain section is based on a number of clearly defined factors and is, hence, completely transparent. The assessment of floodplain status was validated with additional locally available information at 21 selected sections of different floodplain types and degrees of river modification.

Tab. 1: The five classes of floodplain status with a condensed specification

class	specification
1 nearly natural	Floodplains not or to a very small degree disconnected from floods by river regulation and/or flood protection measures Rivers only slightly regulated, with high flooding possibility Mainly no or very low intensity land use, mostly forest, wetlands, and rarely grassland
2 slightly modified	Floodplains to a small degree disconnected from floods by river development and/or flood protection measures Rivers variably regulated, but usually with high flooding possibility Mainly low intensity land use, mostly forest, wetlands and grassland
3 moderately modified	Floodplains partly disconnected from floods by river development and/or flood protection measures Rivers generally regulated, but usually with flooding possibility Variable intensity of land use
4 severely modified	Floodplains widely disconnected from floods by river development and/or flood protection measures Rivers generally regulated, partly dammed High intensity land use, mainly intensive agriculture and urban areas
5 totally modified	Floodplains completely disconnected from floods by river development and/or flood protection measures Rivers generally regulated heavily, frequently dammed High intensity land use, mostly with high percentage of urban areas
not assessed	

References

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit & Bundesamt für Naturschutz (Hrsg.) (2009): Auenzustandsbericht. Flussauen in Deutschland. Berlin, 35 p. Brunotte, E., E. Dister, D. Günther-Diringer, U. Koenzen & D. Mehl (2009): Flussauen in Deutschland - Erfassung und Bewertung des Auenzustandes. - Naturschutz und Biologische Vielfalt 87: 141 S. + Anhang und Kartenband, Bonn - Bad Godesberg.
Koenzen, U. (2005): Fluss- und Stromauen in Deutschland - Typologie und Leitbilder. Angewandte Landschaftsökologie 65: 1-327.