Erős, Tibor, Judit Petrovszki, Attila Mórocz (2023): Planning for sustainability: Historical data and remote sensing-based analyses aid landscape design in one of the largest remnant European floodplains. Landscape and Urban Planning 238

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Abstract

Large floodplain rivers are among the most threatened ecosystems on Earth and their utilization is expected to
grow. Here, we integrated historical data and remote sensing-based landscape analyses and applied stakeholder
evaluation of present-day utilization of different river–floodplain habitat types to understand the process of
landscape development and provide a basis for sustainable landscape design in one of the largest remnant
floodplains of the Danube River, Hungary. Temporal trajectories indicated drastic transformation of the landscape
over almost four centuries as a result of river regulation works. Of these, the most substantial were the
canalization of the main channel of the Danube into its largest side arm and cutting of large meandering segments, which resulted in the conversion of wetlands to other land uses, particularly agricultural land. The total
area of aquatic habitats decreased by more than five-fold, and substantial changes occurred in the extent and
composition of river–floodplain habitat types. Evaluation of present-day land use indicated that protected areas
are under less human influence and have higher potential for the maintenance of

aquatic biodiversity than
unprotected ones. Although the protected area network still includes representatives of all floodplain habitat
types, past changes and present-day utilization of the landscape limit conservation and restoration possibilities.
We provide implications for management and conclude that the joint analyses of historical landscape conditions
and present-day evaluation of human utilization can be fruitful to aid the sustainability design and management
of river–floodplain ecosystems.

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