

Transformation of the Vltava Historical Riverine Landscape within the Modern Times

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Abstract:

The Vltava River and its surroundings had many different faces and functions in the past centuries. The Vltava is the longest river running through the heart of Bohemia, probably the most famous and popular river in the Czech Republic, one of the national symbols, important trade and transport route in the past, river with beautiful landscape favourite by poets, travellers, and tourists, place where the biggest dam reservoir system in the Czech Republic was built, popular recreational area in the present and many more. Therefore, many different documents are dealing with the Vltava River and its riverine landscape.

The main objective of the project supported by the Ministry of Culture of the Czech Republic is to create comprehensive information system about the Vltava River aggregating and incorporating various historical and modern documents and data. This system will allow maintaining and documenting a wealth of information about the history of the Vltava River, including immovable and movable cultural heritage using new technologies. The project is focused on the upper three quarters of the Vltava River from its springs to confluence with the Berounka River close to Prague in the period from mid 18th century up to the present day. Riverine landscape along the Vltava underwent an intensive transformation in many aspects. Firstly, the cultural landscape with mostly minor settlement combined with appreciated but even feared wild natural narrow valleys has changed intensively along with a construction of the dam cascade especially in the middle part of the river in the second half of the 20th century. Small but widespread settlements, transport function of the river and wild nature were replaced by dams producing electric energy and retaining extensive water reservoirs providing water supply and protection from frequent inundations and last but not least being very popular for recreation. Unfortunately, many houses, water mills, chapels, churches, picturesque natural places, etc. have been flooded. The former face of the Vltava riverine landscape is preserved only in various archival documents and their online presentation is the main project goal.

There are large volumes of miscellaneous historical and modern data sources dealing with the Vltava river which are being used in the project. Extensive research of various public and institutional archives is currently still being carried out. Some resources such as old photographs and postcards are found also in private collections. First of all, there are various works from old cadastral maps, old river maps with cross sections, longitudinal profiles of the river, old site plans and interesting building plans, State Derived Map and aerial photographs from 1950s, site and constructional plans of dams to the up to date cadastral map, orthophotos and DTM. The Imperial Imprints of the Stable Cadastre (scale 1 : 2 880) from the years 1826–1843 rank among the most valuable and very useful. Due to their geometric precision and visual attractiveness, these maps are suitable for vectorization, and form an excellent base layer for the web mapping application and 3D visualization. Another very important map is the State Derived Map (scale 1 : 5 000; its first issue) from the early 1950s containing planimetry as well as altimetry. It shows situation of area just before the dam reservoirs cascade construction was started hence it allows reconstruction of former Vltava valley. Maps and plans are complemented by old photographs, postcards, iconography and also text sources.

All data sources described above have to be carefully processed before their incorporation into the information system and subsequent 2D- or 3D- applications could be designed. Speaking in particular about maps and plans, they have to be digitised, georeferenced and selected map content is vectorised. The majority of data sources are obtained in the analogue paper form, thereby a high resolution scanning has to be done to acquire digital copies of requested maps and plans. Then the scanned data is georeferenced employing suitable global or local transformations depending on the type of map. Carefully selected map content is vectorised and the database of significant features (buildings or objects of cultural, social, production and water management importance) with important attributes is being filled up. Every feature has its location, at least approximately if precise position is unknown. Also the old photographs and postcards are geolocated to be incorporated into the information system.

2D web mapping application (Figure 1) has been created based on processed data and it is being updated. It presents and compares various layers (georeferenced maps and plans, vectorised data model, objects of interest, etc.). The application

allows overlaying of various raster and vector layers from different times using the swipe tool. Objects of interest and photographs are represented by points, where each point leads to a popup with more information.

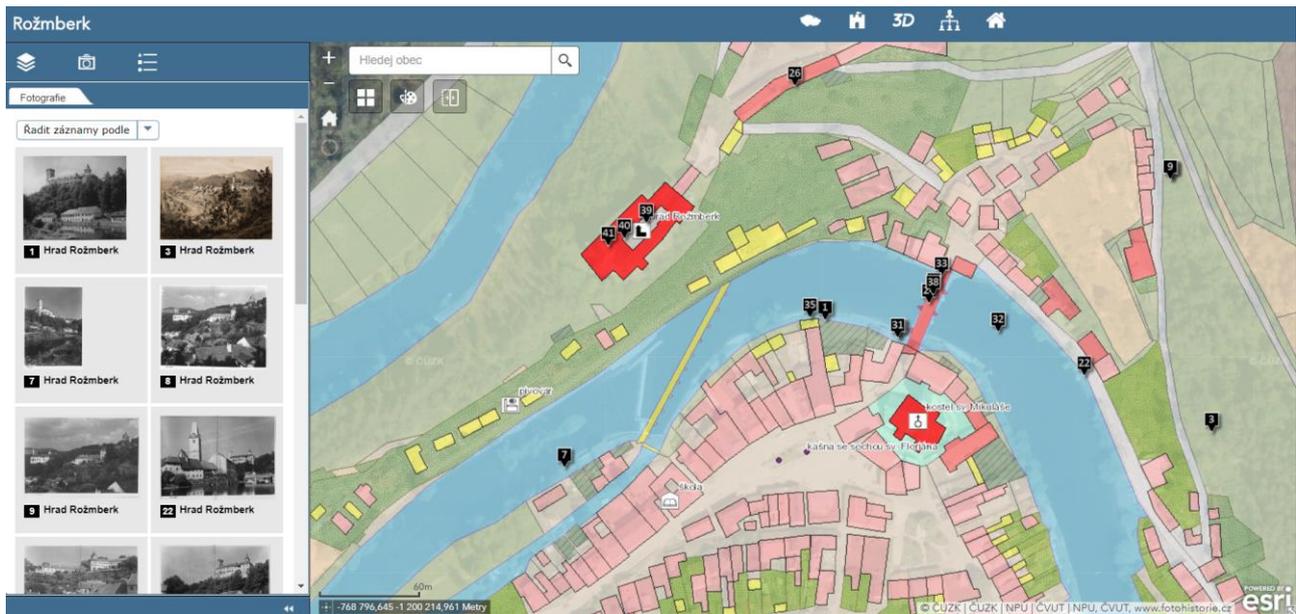


Figure 1. Web mapping application combining various thematic layers

Online 3D visualisation is effective and popular way of geographical data presentation thus besides the 2D also 3D application may bring a new perspective to former Vltava landscape. The Vltava River valley, often narrow and deep, is perfect for the 3D presentation, especially if it is completed by other objects or phenomena (e.g. extinct settlements, important buildings, historical or potential floods). Precise 3D modelling of important structures in CAD software is a common but time-consuming process. Therefore, it is not possible to model the whole extinct settlements in 3D and thus procedural modelling is applied instead. It allows to visualise a simplified reconstructive model of flooded villages in the entire area of interest even in various periods of time.

The mission of the project is, in particular, to document information on the changes of the Vltava riverine landscape within the last three centuries in the context of various events, as well as to make it subsequently available to the general public. Thus, it might act as a transfer of historical science into education through modern cartographic methods. The project itself is actually in its first phase and the activities proceed continuously.

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