

Severin Hohensinner & Andreas Hahmann, 2015:  
Historische Wasserbauten an der Wiener Donau und ihren Zubringern  
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## Abstract

The first stage of the database of historical hydraulic measures at the Viennese Danube and its tributaries stems from the research project "Environmental History of the Viennese Danube 1500-1890" (ENVIEDAN, FWF No. P22265-G18) and was partially extended in the follow-up project "Vienna's Urban Waterscape 1683-1918" (URBWATER, FWF No. P25796-G18). It includes information about 1,900 hydraulic structures beginning in the 12th century that were identified based on historical, written and cartographic sources, historical literature, recent studies and archaeological finds. The river engineering measures were localized and stored in a database using ESRI ArcGIS 10. For each hydraulic measure, year of origin, construction type, purpose, life span and additional information were documented.

From the 15th until the 17th century, most regulation works were carried out directly in the former city, at the bifurcation of the Wiener Arm (today's Donaukanal) near Nussdorf and further upstream. As a result of several serious floods in the 18th century, the river engineering measures expanded further downstream. In the 19th century, finally, the construction activity encompassed the entire river landscape.

The analysis of the gathered data clearly shows that the Viennese population was forced to respond to climatic and, thus, hydrological and river morphological changes. The effects of the so-called "Grindelwald fluctuation", an extreme phase of the "Little Ice Age" around 1560/70 are as visible as those of the extreme flood phase in the late 18th century. So, between 1750 and 1780, the volume of new hydraulic constructions (bank protections, dikes, etc.) increased from 10 km to 40 km per decade. After the disastrous ice jam flood in 1830, regulation works once more rose significantly: within ten years, 90 km of hydraulic structures were built and areal measures (mainly terrestrialization facilities and channel dredgings) reached an extent of approximately 100 hectares. This volume was exceeded once again with the implementation of the Danube regulation program 1870-1875.

Over the centuries, the functional life, the period during which a hydraulic structure could fulfill its function without major maintenance, changed considerably. Until the 17th century, they functioned only about three years due to the widely used short-lived wood constructions. With the increased use of stone in the 18th century, their functional life increased to an average of approximately 10 years and in the 19th century to 23 years. In the course of the Viennese Danube regulation program from 1870 onwards, it rose significantly to around 70 years. The large volume

and the solid design of the constructions were made possible by the use of fossil fuels and the advent of the steam navigation.

To prepare the river landscape for the uses and protection of the Viennese population, gigantic financial resources were needed. Between 1530 and 1700, when today's Donaukanal was created, annual costs fluctuated between 17,000 and 60,000 days of unqualified labor-equivalents (actually only about one third was spent for manpower; the major part was for materials, transportation and administration/planning). From 1700 to the flood disaster in 1830, the costs were already significantly higher and made up 83,000-190,000 working days per year. After 1830 until 1910 it jumped to 780,000-1,300,000 days unqualified labor-equivalents.