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The renaturation of the river Ticino: A feasibility study

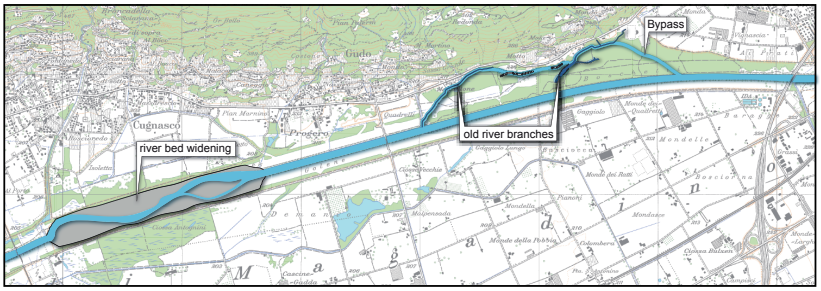

Fig. 1: Renaturation measures at the river reach: a channel widening near Cugnasco and a bypass at the riverside floodplain forest Boschetti.

Introduction

Due to river training, the river Ticino is constricted between embankments and flows very straight through the plain of Magadino. In order to stop river bed degradation and to improve both, ecological diversity and flood protection, the local nature conservation foundation (Fondazione Bolle di Magadino) and the canton Ticino plan a revitalization of the Ticino over a length of 12 km between Sementina and its mouth into the Lago Maggiore.

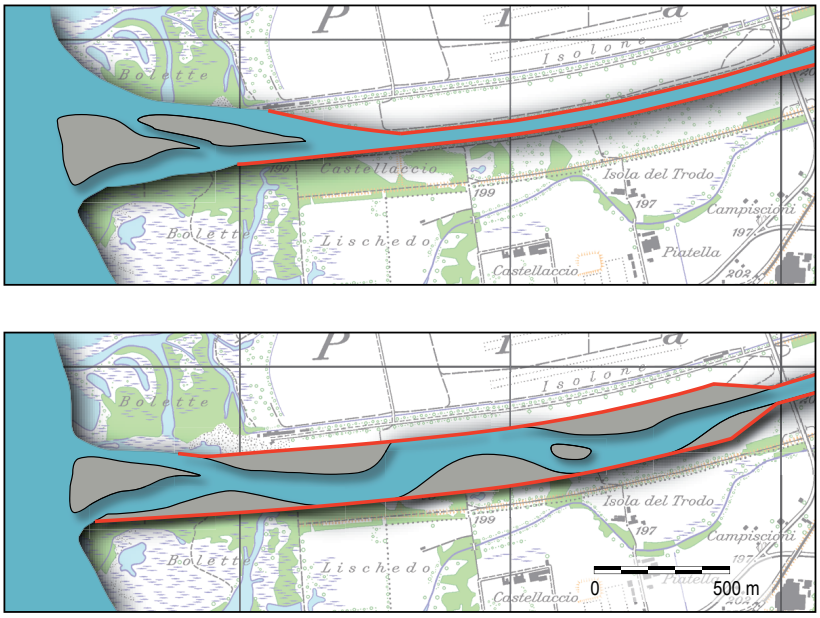

Fig. 2: Different options to develop a more dynamic delta: wedge shaped (top) or double sided (bottom) widening.

Renaturation measures at the river reach

Renaturation measures were studied for the floodplain forest between Sementina and Gudo and for the river channel near Cugnasco by applying the computer program Floris 2000 (simulation program based on stream tube approach with sediment module).

A possibility to improve ecological demands at the riverside forest between Sementina and Gudo is a bypass that reconnects existing old river branches with the actual river channel (Fig.1).
For the river reach near Cugnasco a channel widening was studied. By increasing the width of constricted rivers, the original morphological dynamics may be restored and river ecosystems will be improved. Additionally, widenings normally lead to reduction of the river bed erosion.

Renaturation measures at the river mouth

Since regulation of the river Ticino was terminated in 1924, delta development is more likely to show state of stagnation than sustained growth.
As a result of the canalized lake inflow of river Ticino and a reduced sediment regime, delta growth today is mainly controlled by the influence of lake level fluctuations. Due to high velocities in the channel during flood events, sedimentation close to the river mouth in shallow water zones is only predominant when lake levels are high. At lower lake levels sediments are drifted into deeper parts of the lake.
The primary goal of the project is to initialize a more dynamically delta development by river engineering works. For this reason different options of dam removals and river widening were worked out. Fig. 2 shows two out of five options.

Keywords:	Renaturation, Ticino, River mouth, Numerical modelling
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