European River Restoration Conference
Featuring the IRF Riverprize

Celebrating Successes and Addressing Challenges
5th edition | 11-13 September 2013 | Vienna

SESSION 07
RIVER RESTORATION TECHNIQUES

THE POTENTIAL OF RIPARIAN VEGETATION FOR RIVER RESTORATION DEMONSTRATED AT THE TWO LOWLAND RIVERS LAFNITZ AND PINKA

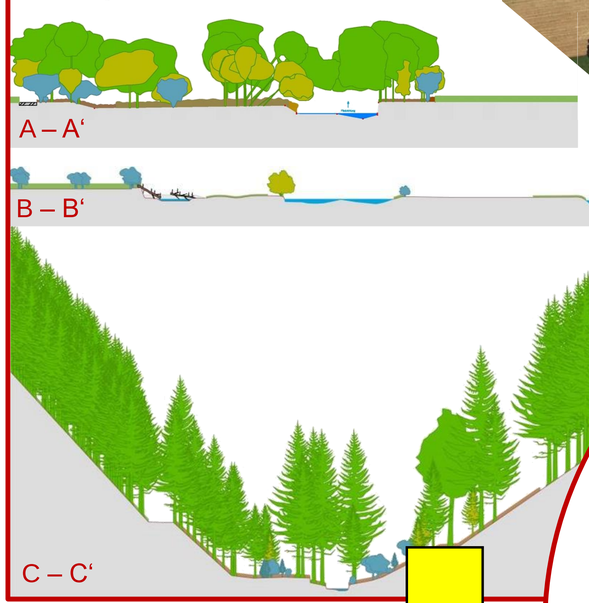
Gerda Holzapfel (University of Natural Resources and Life Sciences, Vienna – Institute of Soil Bioengineering and Landscape Construction, Austria, gerda.holzapfel@boku.ac.at), Hans Peter Rauch (University of Natural Resources and Life Sciences, Vienna – Institute of Soil Bioengineering and Landscape Construction, Austria)

This paper presents research activities of two projects dealing with global warming impacts on European freshwater ecosystems (BIO_CLIC and LOWFLOW+). The projects BIO_CLIC aims to identify and understand the potential of riparian vegetation to mitigate climate change effects on water temperature and following the impacts on benthic invertebrate and fish communities to support river managers in sustainable river restoration towards climate change adaptation, ecological services and socio-economic consequences. The project LOWFLOW+ will provide low water management strategies for future climate scenarios. The study sites of both projects are located at the two rivers Lafnitz and Pinka in the "Hungarian Plains" ecoregion in Austria (Fig. 1) as this region will be most likely subject to highest future temperature increase in Austria (2-2,5°C until 2040). The illustration below outlines the methods concerning river morphology and particularly the vegetation.

Fig. 1: The study site - river Lafnitz and Pinka in the south-east of Austria.

Vegetation

Vegetation buffers of 50 m along the rivers Lafnitz and Pinka are measured. Height, density and distribution of vegetation is determined in consistent areas. Typical sections for an area are surveyed in detail.

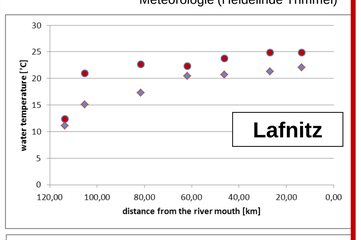


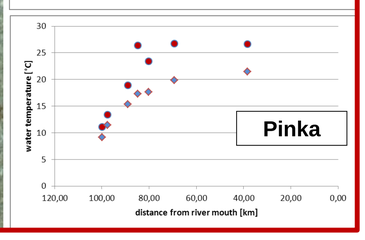
Solar Radiation & Water Temperature

Hemispherical Photographs
Output: GSF – Global Site Factor subjected to vegetation density.

Water Temperature
Min. and max. water temperature (8 July 2012).

Figures generated by working group Meteorologie (Heidelinde Trimmel)





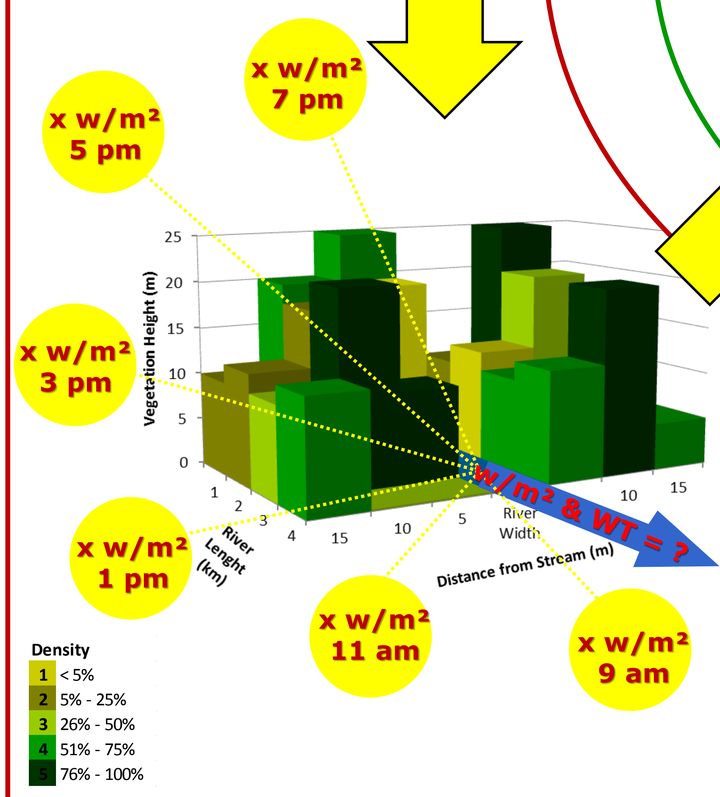
Riparian vegetation design

WT = ?

No vegetation
Isolated vegetation
Patches of vegetation
Small linear vegetation buffer
Closed, dense vegetation

CALIBRATION

Riparian Vegetation Management



Water Energy Balance & Water Temperature Model

Heat Source
A model developed by the Oregon Department of Environmental Quality

Input
- Vegetation (height, width, density)
- River Morphology
- River bed geometry
- Flow velocity
- Tributaries and discharges

Output
- Global Site Factor at water surface
- Water Temperature

Calibration by
- Water temperature and radiation data

River Morphology

The projects BIO_CLIC and LOWFLOW+ are funded by the Austrian Climate and Energy Fonds in the framework of the Austrian Climate Research Programm (ACRP).