Restoring small streams: Effects on habitat complexity

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Background

- 23 restored reaches in small Swiss streams were sampled using a standardised procedure (Fig. 1).
- Field surveys addressed habitat diversity, temperature, invertebrates, fish, aquatic and terrestrial plants.
- The results from the restored reaches were then compared with those from channelised control reaches.

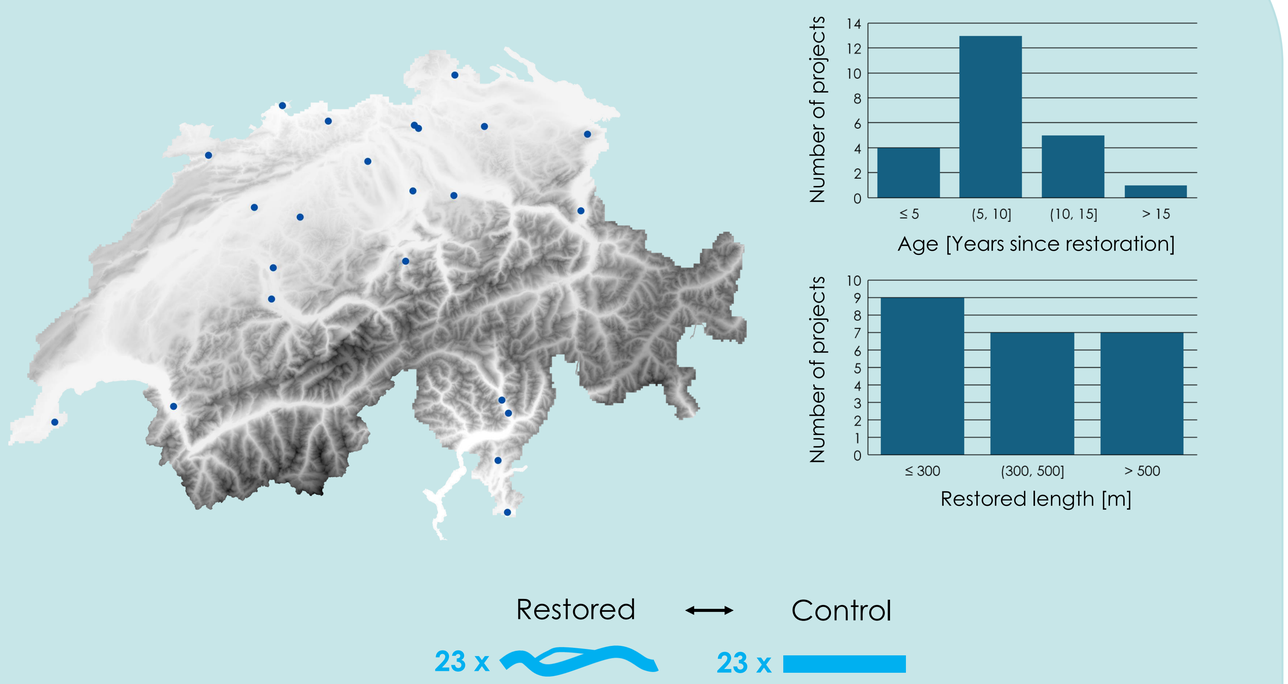

Figure 1: The 23 river restoration projects studied and some of their key characteristics. Channelised control reaches were situated close by.

Landscape metric [unit]	Quantification method *Ecological relevance (examples)*
Median Patch Size [m^2]	Median size of a patch *-> Habitat size*
Edge Density [m / ha]	Sum of the total edge length divided by the total area *-> Connectivity, patchiness*
Mean Euclidean Nearest-Neighbour [m]	Distance from a patch to the nearest patch of the same type *-> Proximity/ isolation, dispersal*
Patch Evenness [-]	Degree of even distribution of patches per habitat type *-> Spatial distribution*

Table 1: Selected landscape metrics used to quantify habitat diversity and patchiness.

Approaches used

- Our interest: Quantifying whether habitat diversity and patchiness are generally higher in restored reaches.
- To accomplish this we employed landscape metrics such as edge density or nearest neighbour (Tab. 1).
- Landscape metrics originate from terrestrial ecology and serve as proxies for ecological processes.

Key findings

- Several landscape metrics indicate positive effects of restoration (Fig. 3).
- The habitats in the restored reaches are significantly more diverse and patchier than those in the channelised control reaches.
- Landscape metrics are useful for monitoring river restoration projects, even in small streams.

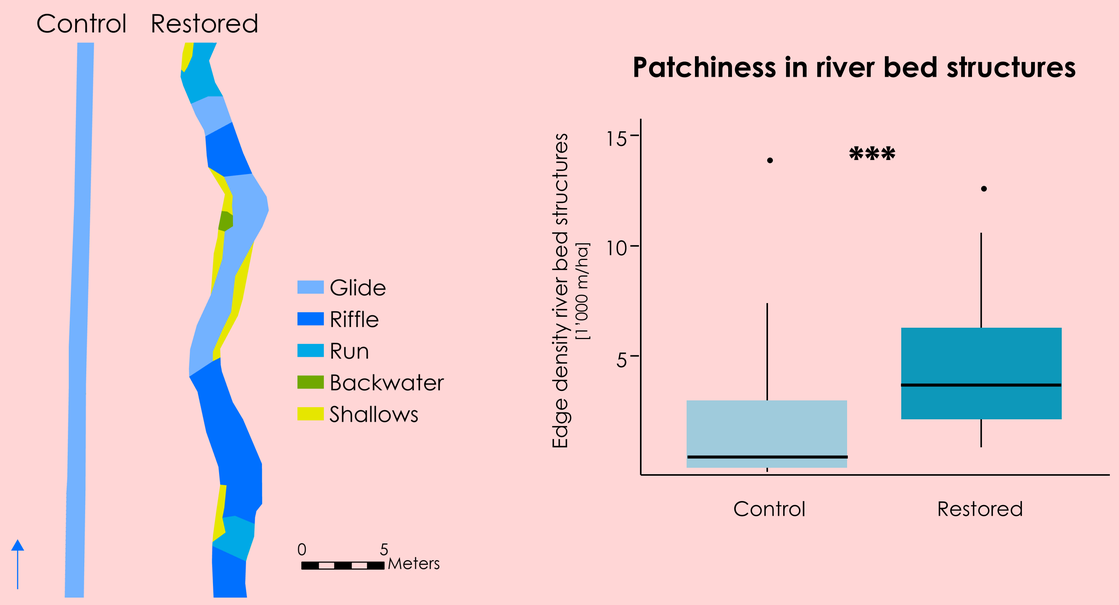

Figure 3: *Left*: River bed structures in a channelised control reach and a restored reach. *Right*: Performance of the landscape metrics "edge density" for river bed structures across 23 control and restored reaches.