

Figure SI 1 Comparison of computed and observed water surface elevations for flow of $0.19 \text{ m}^3/\text{s}$. Differences between observed and computed water surface elevations are shown as green triangles while beaver dam locations are illustrated with black stars on x axes.

Figure SI 2 Ranges of temperature for each geomorphic unit in the beaver dam complex: pools (blue), backwaters (red), and marginal areas (green) are compared to the average temperature (black dashed) for each unit (A-C). The temperature in the riffle above and below the pond as well as their difference, where small warming could be observed, are shown in D. The number of sensors within each unit (n) is shown.

Figure SI 3 Thermal stratification in the backwater of old channel.

Figure SI 4 Temperature ranges for main flow of beaver pond and areas above and below. The main flow in the pond and above the pond exhibit very similar temperature regimes. Ranges below the pond are comparable, but show a limited warming influence.

Figure SI 5 2D model results showing computed water depth (A) and depth averaged velocity (B).

Figure SI 6 2D simulation results were dependent on numerical parameters. Change in wetted surface area (as a water level from an arbitrary datum) is shown as a function of eddy viscosity and Manning's n input parameters.

Figure SI 7 2D simulation results were dependent on numerical parameters. Change in computed water surface elevation and difference between computed and observed water surface elevation is shown as a function of eddy viscosity and Manning's n input parameters.