

## Supplementary materials

**Table S1**

Mean and maximum (in parentheses) values of water depth and flow velocity in the channel zone of the control and backwater reaches of the Smolnik Stream, during small ( $1.8 \text{ m}^3 \text{ s}^{-1}$ ), medium ( $24.5 \text{ m}^3 \text{ s}^{-1}$ ) and large floods ( $89.5 \text{ m}^3 \text{ s}^{-1}$ ). For the backwater reach, the values for scenarios with and without backwater inundation by reservoir water are presented. Mann–Whitney test was used to evaluate difference of depth and flow velocity parameters between control and backwater reaches. Statistically significant differences are indicated (\* -  $p$  value  $<0.01$ , \*\* -  $p$  value  $<0.001$ , \*\*\* -  $p$  value  $<0.0001$ , n.s. - not statistically significant).

Parameter	Flood magnitude	River channel			Relative change (%) of mean in comparison to control reach and statistical significance of the difference	
		Control reach	Backwater reach		Backwater reach	
			without backwater inundation	with backwater inundation	without backwater inundation	with backwater inundation
Water depth (m)	Small	0.63 (1.74)	1.62 (2.42)	2.07 (3.28)	+157,14 ***	+228,57 ***
	Medium	1.25 (3.35)	2.71 (4.30)	3.70 (5.53)	+116,80 ***	+196,00 ***
	Large	1.92 (4.08)	3.46 (4.98)	5.50 (7.38)	+80,21 ***	+186,46 ***
Flow velocity ( $\text{m s}^{-1}$ )	Small	0.86 (1.90)	0.52 (1.31)	0.47 (1.32)	-39,53 ***	-45,35 ***
	Medium	0.96 (2.22)	0.37 (1.05)	0.18 (0.99)	-61,46 ***	-81,25 ***
	Large	1.41 (4.04)	0.49 (1.55)	0.11 (0.95)	-65,25 ***	-92,20 ***

**Figure S1.** Maximum and minimum monthly water levels at the Rożnów Reservoir (1997-2019)

