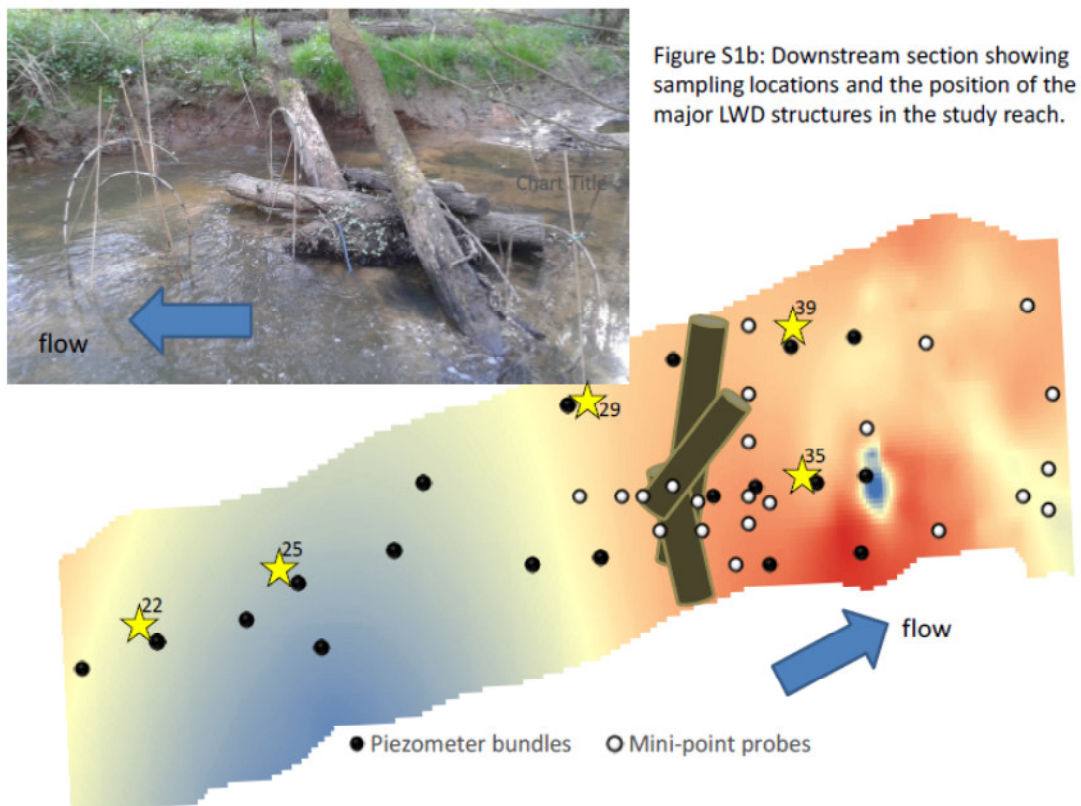
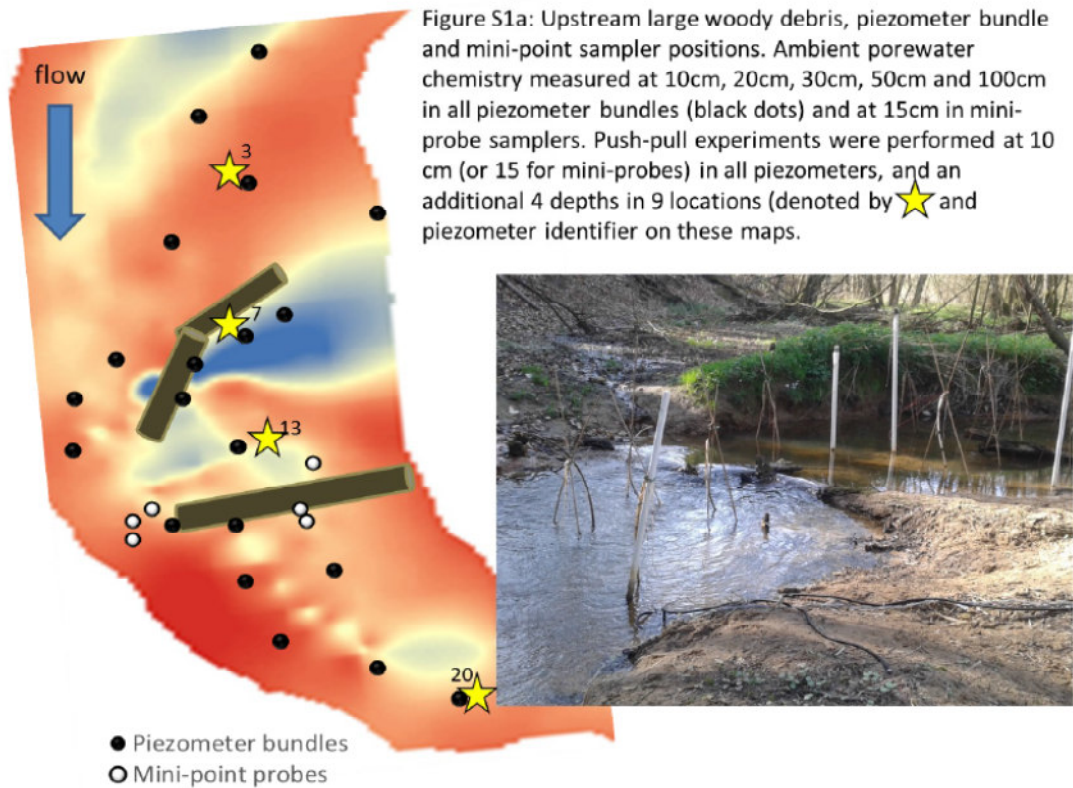


Explanatory Variable	Change with depth?		Interaction with month?	
Dissolved Oxygen	$F_{(1,415)}=6.4$	$p=0.012$	$F_{(3,412)}=39.5$	$p=0.07$
Nitrate	$F_{(1,511)}=29.2$	$p<0.0001$	$F_{(3,508)}=1.2$	$p=0.32$
pH	$F_{(1,511)}=214$	$p<0.0001$	$F_{(3,508)}=39.5$	$p<0.0001$
Temperature	$F_{(1,511)}=20.9$	$p<0.0001$	$F_{(3,508)}=13.4$	$p<0.0001$
Methane	$F_{(1,518)}=8.9$	$p=0.003$	$F_{(3,515)}=2.5$	$p=0.06$
Nitrous Oxide	$F_{(1,518)}=0.9$	$p=0.35$	$F_{(3,515)}=4.6$	$p=0.004$
Phosphate (SRP)	$F_{(1,518)}=0.7$	$p=0.42$	$F_{(3,515)}=3.7$	$p=0.013$
Organic carbon (NPOC)	$F_{(1,407)}=0.3$	$p=0.61$	$F_{(3,404)}=6.6$	$p=0.0002$
Ammonium	$F_{(1,517)}=9.0$	$p=0.003$	$F_{(3,514)}=1.7$	$p=0.17$
Iron (II)	$F_{(1,104)}=1.7$	$p=0.2$	Only 1 month of data	

Supplementary Table 1: Statistical model outputs for pore water chemistry against depth. For all models, month and piezometer were fitted as random effects (intercept only) and F and p values (where <0.05 in bold), along with the number of degrees of freedom are reported here.

Model ID	Depth	Oxygen	Temp	Nitrate	Residence Time	K	Log-Likelihood	AICc	$\Delta AICc$	ω_i
1	X			X	X	9	-411.22	841.1	0.00	0.35
2	X		X	X	X	10	-410.42	841.6	0.55	0.27
3	X	X		X	X	10	-410.55	841.9	0.79	0.24
4	X	X	X	X	X	11	-409.9	842.8	1.70	0.15
Intercept						6	-464.51	941.3	100.2	0.00
Importance	1.00	0.74	0.63	0.60	1.00					

Supplementary Table 2: AIC output comparing the relative strength of the 4 best candidate models (and the intercept-only model) which explain variation in measured nitrate reduction rates. An X indicates which parameters were included in each model and K is the total number of parameters in the models. The best model is shown in bold and was identified by having the lowest small-samples corrected AIC (AICc). The top five models all had a difference between the lowest AICc and their AICc (i.e. $\Delta AICc$) of <2. We used these four models to calculate the relative importance of each parameter, where maximal importance (i.e. appears in all models) is equal to 1.00. The intercept only model (i.e. no effect of explanatory variables) is included for reference.



Supplementary Electronic Figure 2

