Supporting Information

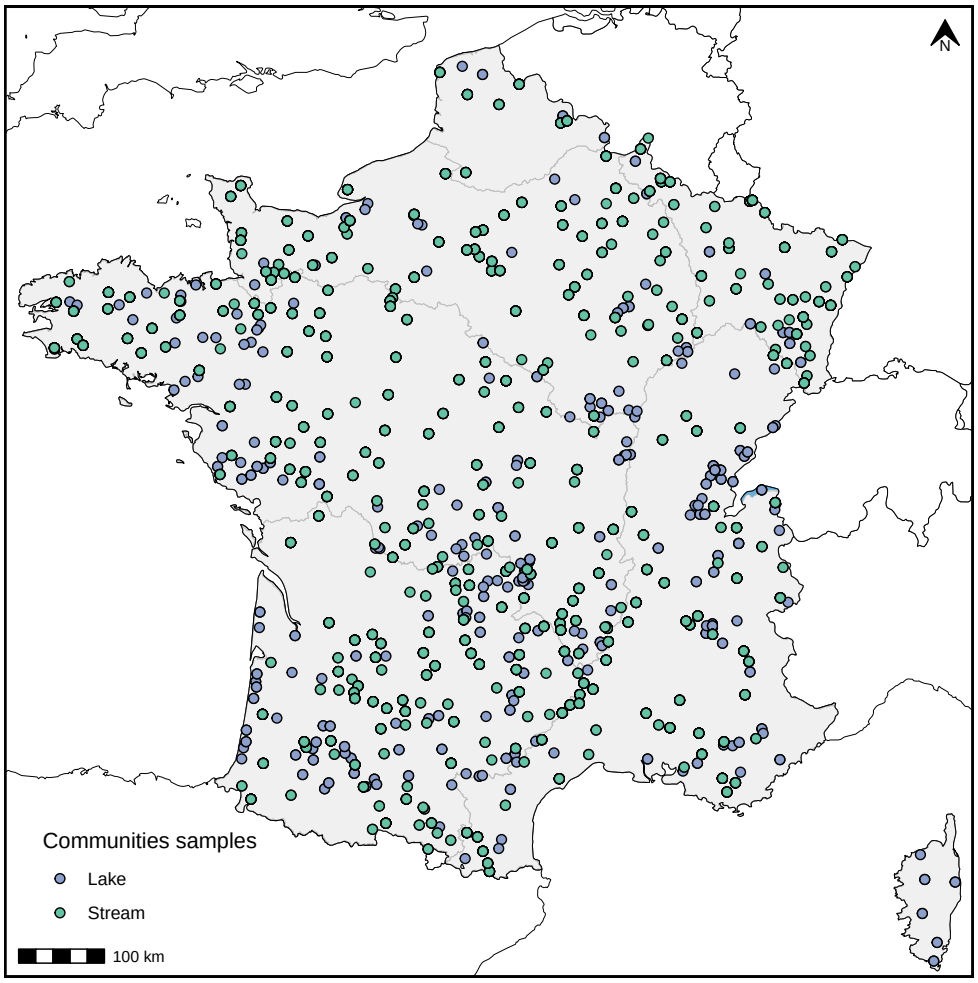

Figure S1: Metropolitan France map showing the geographical distribution of the 629 sites, where taxonomic and environmental data have been collected. Green points represent sampled lakes (n = 256), purple points represent sampled streams (n = 373) and grey borders into France represent the 7 hydrographic basins.

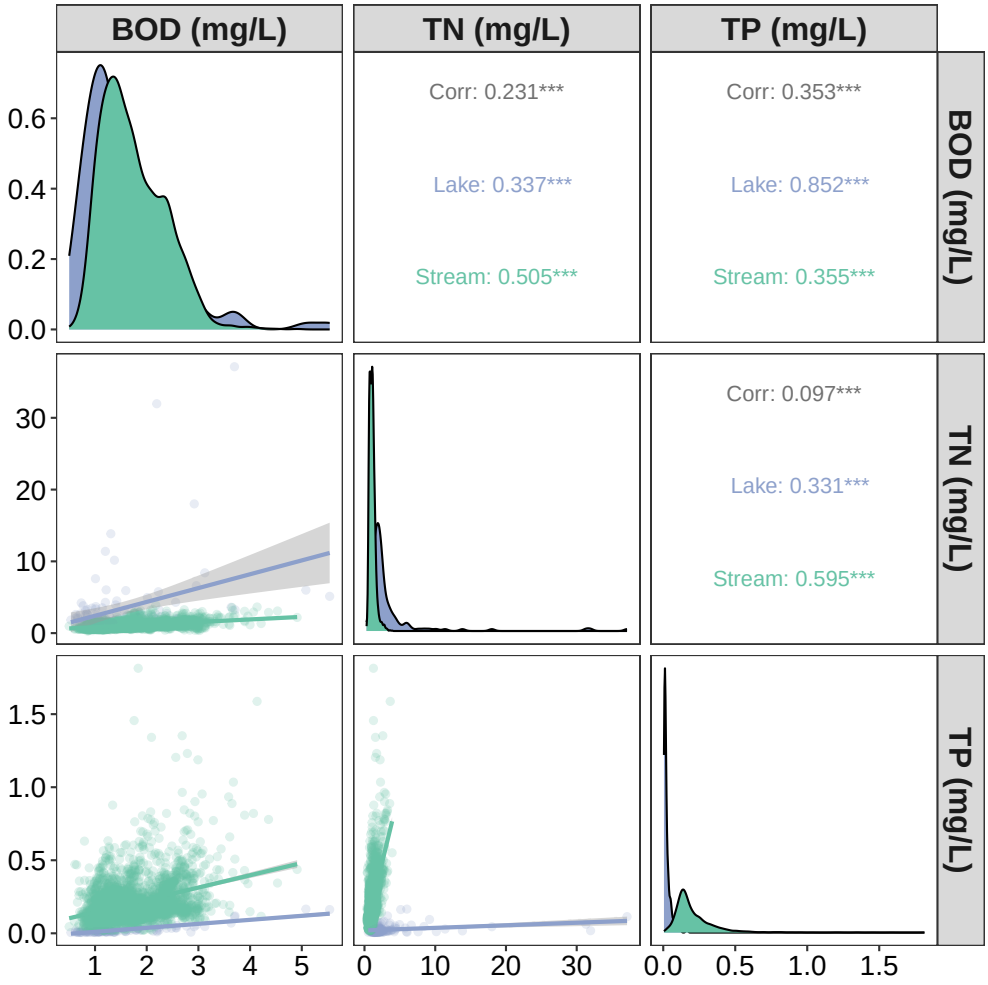

Figure S2: Scatterplot matrix of BOD and nutrients for the sampled lakes (in purple) and streams (in green). Scatterplots of each pair of numeric variable are drawn on the left part of the figure. Pearson correlation is displayed on the right. Variable distribution is available on the diagonal. The variable *TN* refers to total nitrogen and *TP* corresponds to total phosphorus

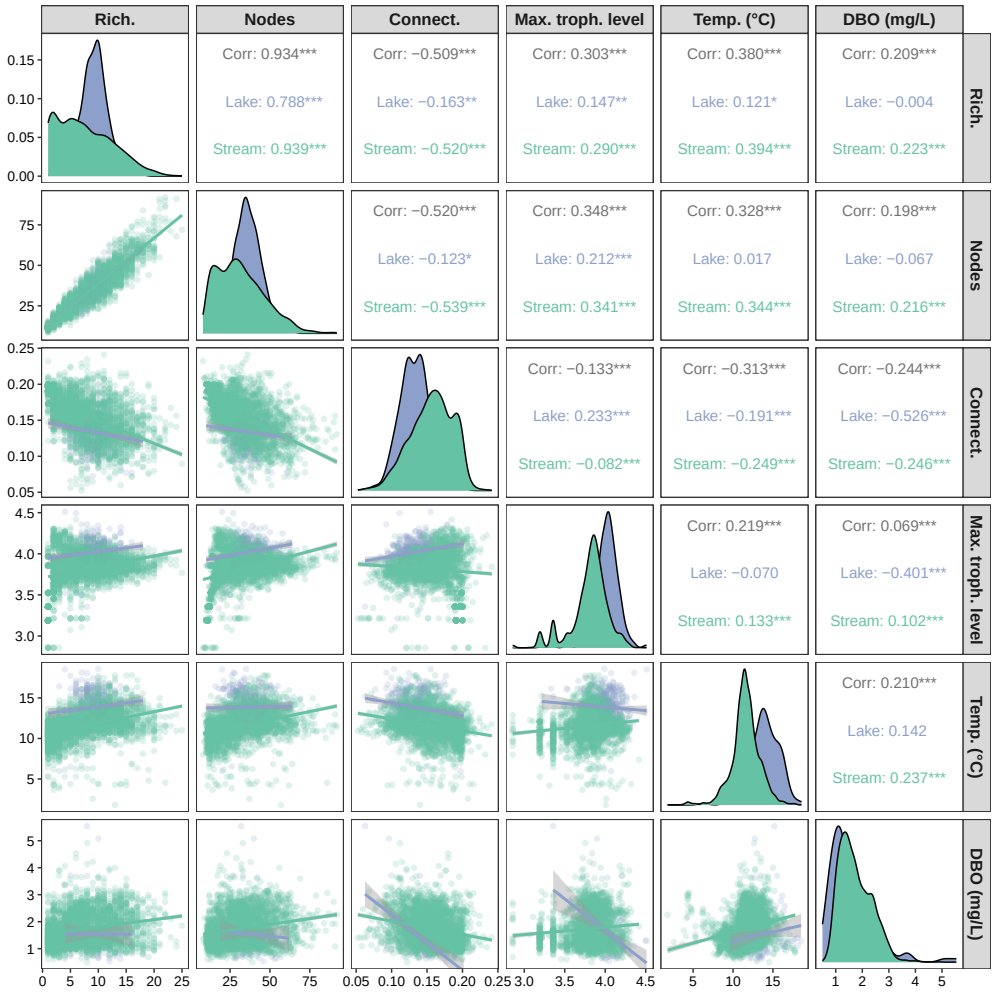

Figure S3: Scatterplot matrix of food-web and environmental properties for the sampled lakes (in purple) and streams (in green). Scatterplots of each pair of numeric variable are drawn on the left part of the figure. Pearson correlation is displayed on the right. Variable distribution is available on the diagonal. The variable *Rich.* refers to the trophic species richness, *Connect.* corresponds to the connectance, *Max. troph. level* corresponds to the maximum trophic level, and *Temp.* refer to the temperature.

Table S1: R2, Variance Inflation Factor (VIF), Standard Error inflation factors for the Structural Equation Model (SEM) explaining dissolved oxygen concentration. VIF values and SE factors are very close to one, indication that the SEM displays low multicollinearity.

Response	R squared	Predictor	VIF	SE factor
Oxygen	0.209	BOD	1.046	1.023
		Temperature	1.046	1.023
BOD	0.196	Nitrogen	1.035	1.017
		Phosphore	1.017	1.008
		Temperature	1.019	1.009

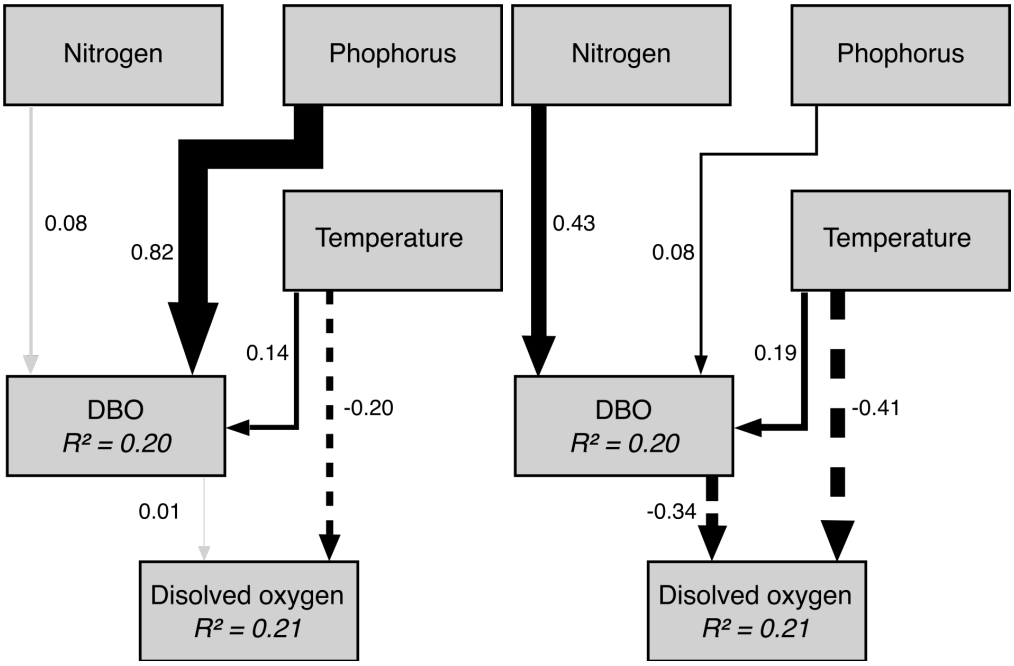

Figure S4: Structural Equation Model linking Nitrogen, Phosphore loads and temperature to BOD, and BOD and temperature to dissolved oxygen concentation in lakes (left panel) and streams (right panel). Negative and positive relationships are respectively displayed with dashed and solid arrows, the width of the arrows being proportional to the values of the standardized coefficients. Gray arrows display non-significant relationships. Standardized coefficients are displayed along the arrows. We observe that enrichement, linked to BOD, is driven by Phosphorus and temparuture in Lake while it is driven by Nitrogen and temperature in streams. Tempeture drives lower dissolved oxygen concentration both in lakes and streams but enrichnment (BOD) drives lower dissolved oxygen concentration only in streams.