

Supplementary material

Table S1. Summary of the principal components analysis (PCA) for the water chemistry variables, with loadings of the original variables on the PCA axis 1 and 2. Based on this analysis, water color was selected to represent PC 1 and total phosphorus to represent PC 2.

Environmental variable	PCA 1	PCA 2
pH	0.883	0.162
Alkalinity	0.876	0.357
Conductivity	0.681	0.641
Total nitrogen	–0.493	0.806
Total phosphorus	–0.368	0.818
Water color	–0.814	0.239

Table S2. Means and coefficients of variation of environmental variables by geographic region (bioregion and drainage systems, DS1 to DS7).

Variables	Bioregion		DS1		DS2		DS3		DS4		DS5		DS6		DS7	
	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV
Local																
Canopy cover (%)	42.4	53.6	40.8	57.8	22.8	74.1	34.3	54.8	51.2	33.6	47.3	45.9	61.4	34.6	39.8	49.4
Macrophyte cover (%)	33.5	80.9	54.2	55.5	37.6	84.5	30.0	86.0	19.2	98.0	39.0	57.1	21.7	103.1	32.3	69.6
Total phosphorus ($\mu\text{g l}^{-1}$)	26.4	137.3	14.3	50.2	32.9	155.9	9.0	137.1	25.4	70.3	15.2	61.5	65.1	96.8	23.2	58.2
Water color (mg Pt l ⁻¹)	148.0	73.4	57.6	54.6	72.3	58.6	88.0	70.6	287	30.9	163.3	14.3	254	47.8	116.0	56.9
Landscape																
Lakes (%)	2.7	123.4	0.8	109.7	1.7	170.5	5.2	82.8	2.0	124.4	3.0	80.3	0.4	184.5	5.5	65.0
Catchment area (km ²)	23.6	112.4	14.7	99.3	35.5	92.9	17.2	85.4	23.1	114.6	13.0	74.6	16.8	68.5	43.8	94.6
Anthropogenic (%)	2.2	169.4	0.1	277.8	0.4	279.5	1.4	129.6	1.3	180.1	0.3	309.2	3.9	131.9	8.2	43.0
Forest (%)	51.8	29.7	66.6	20.9	48.6	21.2	49.2	29.9	34.9	25.2	47.1	22.1	47.3	20.1	68.6	8.1
Regional																
Elevation range (m)	95.7	75.3	162.0	65.0	137.4	50.4	117.2	52.6	40.5	84.0	48.9	41.5	48.5	45.8	112.6	23.8
Precipitation (mm)	260.4	6.2	263	2.1	245.0	2.3	249.5	1.6	251.5	5.0	286.1	3.0	261.2	6.9	267.4	3.2
Air temperature (°C)	12.4	8.8	10.8	2.8	11.5	2.2	11.7	1.0	12.9	1.1	12.8	1.2	13.6	1.0	13.8	1.1

Table S3. Significant environmental variables related to the PCNM vectors at the bioregion extent. Forward regression based on permutation procedure (Blanchet et al. 2008) was used to select the environmental variables related to each spatial filter. Adj-R² = adjusted coefficient of determination. For the spatial patterns of each PCNM variable, see Fig. 4.

Spatial vectors	Environmental variables	Adj-R ²	F	p
PCNM 2	Water color	0.35	93.11	0.001
	% lakes	0.08	24.13	0.001
	Elevation range	0.07	23.84	0.001
PCNM 3	% forest	0.11	21.91	0.001
	Catchment area	0.06	12.74	0.001
	% lakes	0.04	9.05	0.005
PCNM 4	% lakes	0.20	42.94	0.001
	% forest	0.13	33.32	0.001
	Elevation range	0.02	6.29	0.016