

**TABLE S10.** Estimated parametric coefficients and approximate significance of smooth terms of the fine-scale prevalence community GAMMs. The deviance explained ( $D^2$ ) is given for every model as a measure of the model fit.

	Term	Smooth terms				
		Parametric coefficient		Statistic	p-value	
		Estimate	Standard error			
Evenness ( $D^2 = 69.79\%$ )	Intercept	-0.911	0.478	-1.905 <sup>2</sup>	0.070	NA
	s(Evenness)	NA	NA	1.382 <sup>3</sup>	0.094	0.729
	s(Lake)	NA	NA	3.606 <sup>3</sup>	0.001	7.647
Diversity index ( $D^2 = 79.58\%$ )	Intercept	-0.926	0.611	-1.515 <sup>2</sup>	0.141	NA
	s(Diversity)	NA	NA	26.281 <sup>3</sup>	0.007	1.275
	s(Lake)	NA	NA	6.124 <sup>3</sup>	0.000	8.747
Species richness ( $D^2 = 73.61\%$ )	Intercept	-0.919	0.552	-1.665 <sup>2</sup>	0.107	NA
	s(Lake)	NA	NA	4.999 <sup>3</sup>	0.000	8.361
	s(Species_richness)	NA	NA	6.864 <sup>3</sup>	0.111	0.688
Non-host abundance ( $D^2 = 87.5\%$ )	Intercept	-0.837	0.513	-1.633 <sup>2</sup>	0.114	NA
	s(Lake)	NA	NA	6.933 <sup>3</sup>	0.000	8.789
	s(tot_Cyprinidae)	NA	NA	76.476 <sup>3</sup>	0.000	1.829
Fish abundance ( $D^2 = 80.8\%$ )	Intercept	-0.772	0.549	-1.407 <sup>2</sup>	0.171	NA
	s(Lake)	NA	NA	6.262 <sup>3</sup>	0.000	8.467
	s(tot_fish)	NA	NA	27.030 <sup>3</sup>	0.002	1.483
Elevation ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Elevation)	NA	NA	0.000 <sup>3</sup>	0.396	0.000
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
Drainage area ( $D^2 = 69.73\%$ )	Intercept	-0.970	0.488	-1.987 <sup>2</sup>	0.056	NA
	s(Drainage_area)	NA	NA	0.051 <sup>3</sup>	0.336	0.218
	s(Lake)	NA	NA	4.371 <sup>3</sup>	0.000	7.890
Water residence time ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
	s(WRT)	NA	NA	0.000 <sup>3</sup>	0.828	0.000
Distance to nearest lake ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Connectivity)	NA	NA	0.000 <sup>3</sup>	0.580	0.000
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
Lake maximum depth ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
	s(Max_depth)	NA	NA	0.000 <sup>3</sup>	0.852	0.000
Lake mean depth ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
	s(Mean_depth)	NA	NA	0.000 <sup>3</sup>	0.767	0.000
Perimeter ( $D^2 = 69.90\%$ )	Intercept	-1.078	0.317	-3.403 <sup>2</sup>	0.002	NA
	s(Lake)	NA	NA	0.000 <sup>3</sup>	0.442	0.000
	s(Perimeter)	NA	NA	5.732 <sup>3</sup>	0.000	5.633
Surface area ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake_area)	NA	NA	0.000 <sup>3</sup>	0.422	0.000
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
Area:Perimeter ( $D^2 = 67.77\%$ )	Intercept	-1.101	0.310	-3.554 <sup>2</sup>	0.001	NA
	s(Area_Perimeter)	NA	NA	5.832 <sup>3</sup>	0.000	3.678
	s(Lake)	NA	NA	0.029 <sup>3</sup>	0.153	0.190
Conductivity ( $D^2 = 56.41\%$ )	Intercept	-0.685	0.178	-3.841 <sup>2</sup>	0.001	NA
	s(Conductivity)	NA	NA	4.338 <sup>3</sup>	0.000	2.788
	s(Lake)	NA	NA	0.000 <sup>3</sup>	0.239	0.000
DO ( $D^2 = 75.28\%$ )	Intercept	-0.884	0.499	-1.772 <sup>2</sup>	0.087	NA
	s(DO)	NA	NA	28.741 <sup>3</sup>	0.016	1.250
	s(Lake)	NA	NA	4.477 <sup>3</sup>	0.000	7.743
pH ( $D^2 = 70.52\%$ )	Intercept	-0.735	0.367	-2.005 <sup>2</sup>	0.054	NA
	s(Lake)	NA	NA	1.911 <sup>3</sup>	0.007	6.249
	s(pH)	NA	NA	18.337 <sup>3</sup>	0.012	1.249
Turbidity ( $D^2 = 88.71\%$ )	Intercept	-0.806	0.542	-1.488 <sup>2</sup>	0.149	NA
	s(Lake)	NA	NA	9.251 <sup>3</sup>	0.000	8.822
	s(Turbidity)	NA	NA	87.726 <sup>3</sup>	0.000	3.519
Temperature ( $D^2 = 79.54\%$ )	Intercept	-0.749	0.472	-1.589 <sup>2</sup>	0.123	NA
	s(Lake)	NA	NA	4.073 <sup>3</sup>	0.000	7.746
	s(Temperature)	NA	NA	30.170 <sup>3</sup>	0.001	1.578
Trunk ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
	s(Trunk)	NA	NA	0.000 <sup>3</sup>	0.406	0.000
Transect depth ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
	s(Site_depth)	NA	NA	0.000 <sup>3</sup>	0.740	0.000
Macrophyte cover ( $D^2 = 84.167\%$ )	Intercept	-0.889	0.461	-1.928 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	6.150 <sup>3</sup>	0.000	8.456
	s(Macrophyte)	NA	NA	19.530 <sup>3</sup>	0.000	1.551
Boulder ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Boulder)	NA	NA	0.000 <sup>3</sup>	0.785	0.000
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
Rock ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
	s(Rock)	NA	NA	0.000 <sup>3</sup>	0.838	0.000
Sand ( $D^2 = 74.18\%$ )	Intercept	-1.035	0.498	-2.078 <sup>2</sup>	0.047	NA
	s(Lake)	NA	NA	5.538 <sup>3</sup>	0.000	8.048
	s(Sand)	NA	NA	1.701 <sup>3</sup>	0.055	0.849
Silt ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065
	s(Silt)	NA	NA	0.000 <sup>3</sup>	0.673	0.000
TOC ( $D^2 = 69.63\%$ )	Intercept	-0.941	0.489	-1.922 <sup>2</sup>	0.065	NA
	s(Lake)	NA	NA	4.411 <sup>3</sup>	0.000	8.048
	s(TOC)	NA	NA	0.003 <sup>3</sup>	0.338	0.016
TP ( $D^2 = 73.50\%$ )	Intercept	-0.916	0.496	-1.847 <sup>2</sup>	0.075	NA
	s(Lake)	NA	NA	4.517 <sup>3</sup>	0.000	8.147
	s(TP)	NA	NA	3.858 <sup>3</sup>	0.059	1.000
TN ( $D^2 = 72.62\%$ )	Intercept	-0.975	0.524	-1.862 <sup>2</sup>	0.073	NA
	s(Lake)	NA	NA	5.000 <sup>3</sup>	0.000	8.066
	s(TN)	NA	NA	1.599 <sup>3</sup>	0.216	1.000
TN:TP ( $D^2 = 87.07\%$ )	Intercept	-1.036	0.528	-1.960 <sup>2</sup>	0.062	NA
	s(Lake)	NA	NA	8.055 <sup>3</sup>	0.000	8.769
	s(TN_TP)	NA	NA	5.051 <sup>3</sup>	0.002	4.315
Null ( $D^2 = 69.64\%$ )	Intercept	-0.942	0.490	-1.922 <sup>2</sup>	0.064	NA
	s(Lake)	NA	NA	4.541 <sup>3</sup>	0.000	8.065

<sup>1</sup> Effective degrees of freedom

<sup>2</sup>