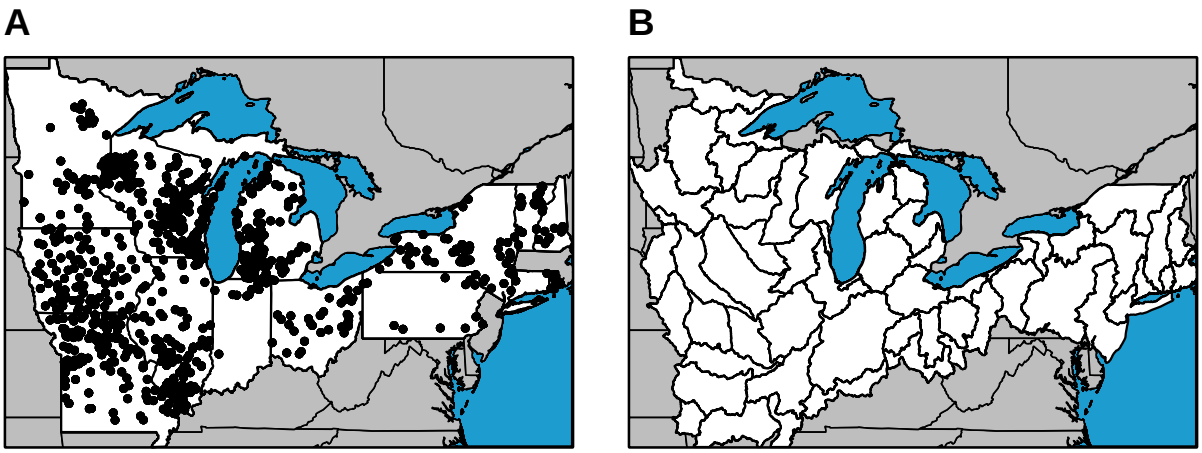

Figure 1: A) Map of lake locations and B) hydrologic (HUC) regions.

Table 1: Medians followed by first and third quantiles of predictor variables for 928 lakes.

Variable	Median	Q25	Q75
Max depth (m)	9	6	14
Watershed-lake ratio	15	6	34
Precipitation (mm/yr)	910	830	1000
Baseflow	49	33	62
Fertilizer N (kg/ha)	55	32	91
Fertilizer P (kg/ha)	10	6	16
Manure N (kg/ha)	27	17	45
Manure P (kg/ha)	7	5	12
N deposition (kg/ha)	6	5	7
Wetland potential (percent)	15	5	26
Soil organic carbon (g C/m2)	4000	2900	5300
Buffer Ag (percent)	25	11	48
Buffer Natural (percent)	41	23	59
Ag (percent)	42	25	63
Forest (percent)	25	12	46
Pasture (percent)	14	7	24
Corn (percent)	7	2	17
Soybeans (percent)	4	1	14
Wetlands (percent)	3	1	8
Clay (percent)	10	5	17

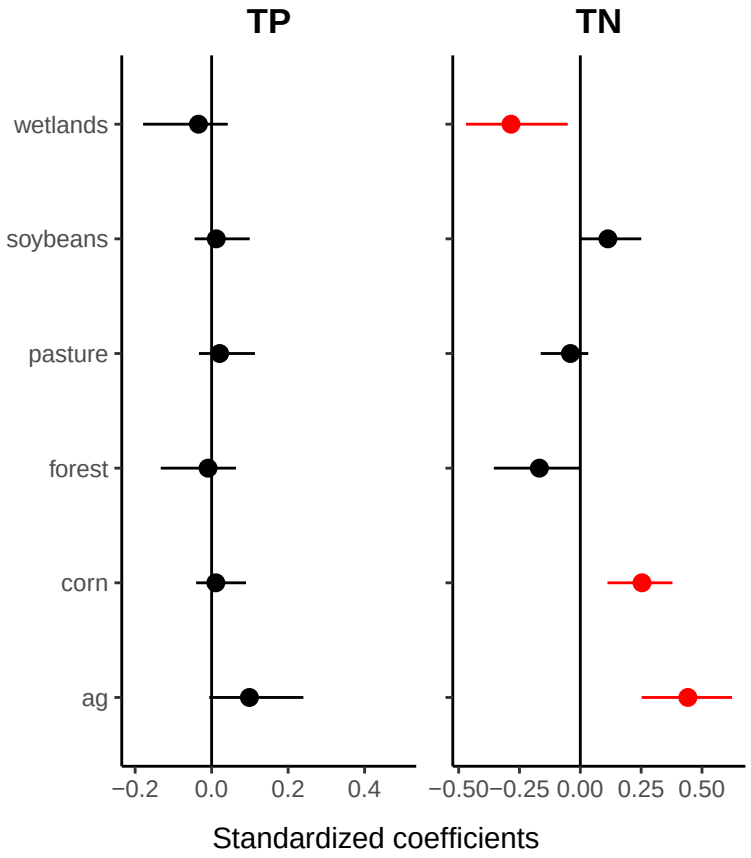

Figure 2: Population level effect of watershed land-use cover on lake TP and TN from six candidate models. Values shown are posterior medians (filled circles) and 95% credible intervals (solid lines). Also shown is a comparison to a zero effect (solid vertical line). Values that do not overlap zero are shaded in red. Coefficient estimates are reported relative to standardized predictor variables centered at zero with unit variance.

Table 2: Diagnostics for each model listed by regionally varying coefficient. Table is sorted by decreasing R2 and expected log predictive density.

response	term	R^2	LOO-ELPD
tp	ag	0.63	0.00
tp	wetlands	0.63	-0.41
tp	corn	0.63	-0.59
tp	pasture	0.63	-0.75
tp	forest	0.63	-0.76
tp	soybeans	0.63	-1.43
tn	ag	0.58	0.00
tn	corn	0.58	-2.58
tn	wetlands	0.54	-16.41
tn	soybeans	0.53	-20.88
tn	pasture	0.53	-21.01
tn	forest	0.53	-22.37

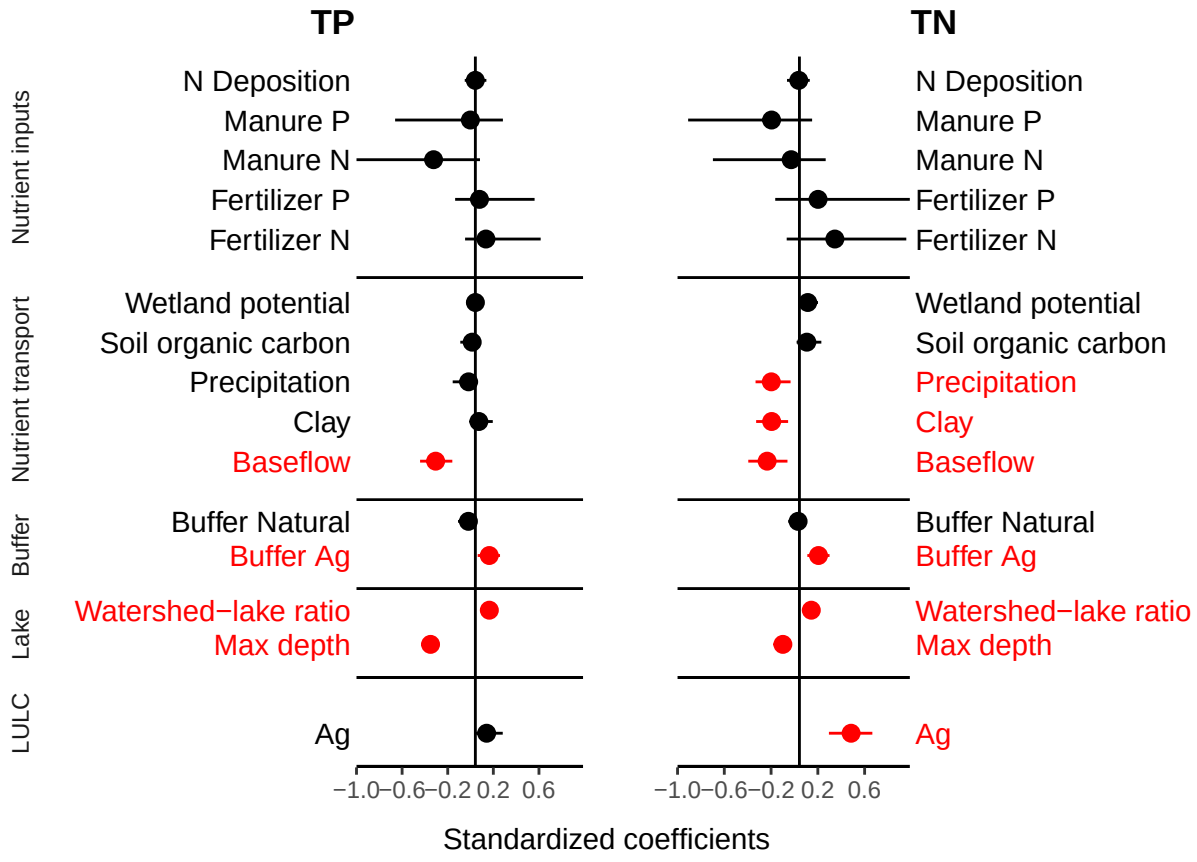

Figure 3: Global (fixed effect) coefficient values and credible intervals for best-fit lake TP and TN models. Values shown are posterior medians (filled circles) and 95% credible intervals (solid lines). Also shown is a comparison to a zero effect (solid vertical line). Values that do not overlap zero are shaded in red. Horizontal bars separate coefficients in distinct predictor categories. Coefficient estimates are reported relative to standardized predictor variables centered at zero with unit variance and correspond with β from Equation 1.

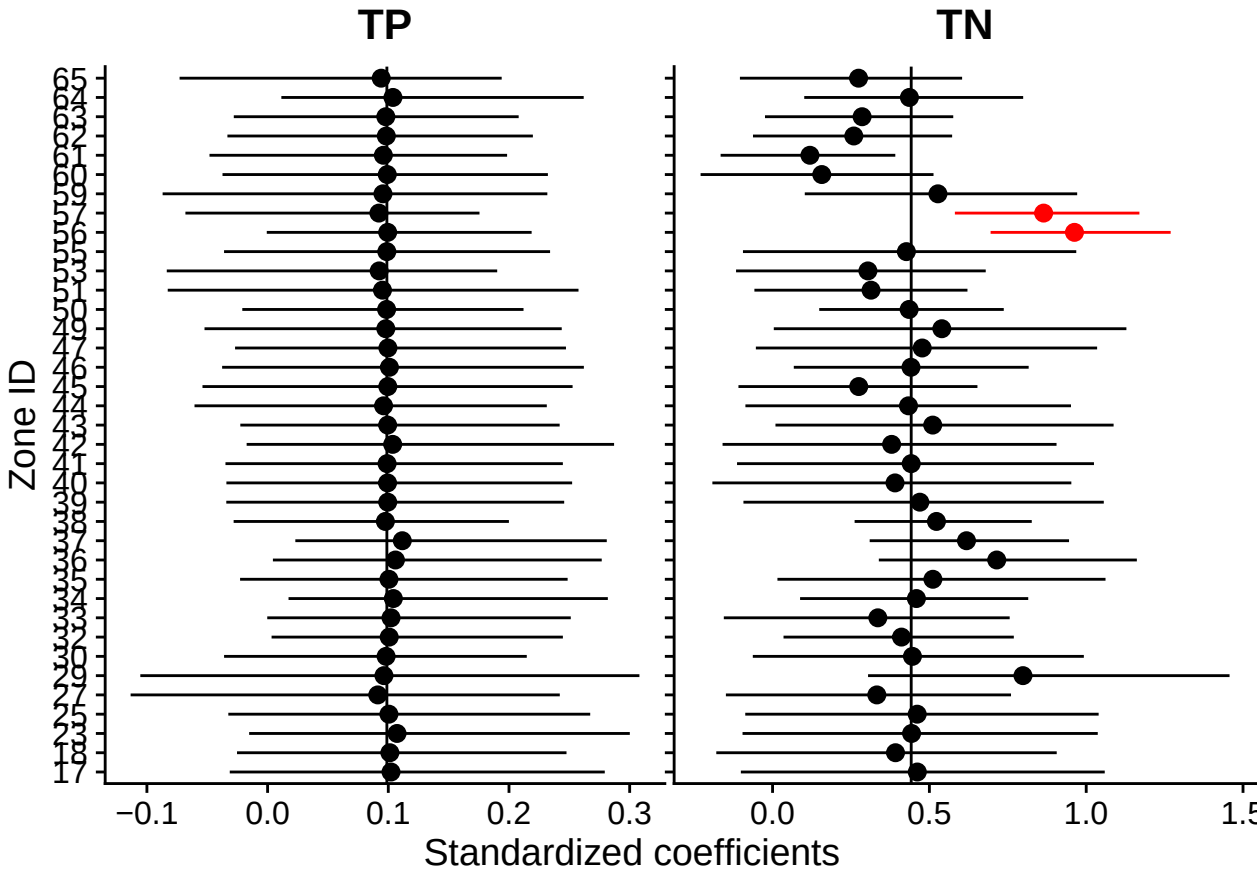

Figure 4: Regionally varying effect of watershed land-use cover for best-fit lake TP and TN models. Values shown are posterior medians (filled circles) and 95% credible intervals (solid lines). Also shown is a comparison to a zero effect (solid vertical line. Values that do not overlap the population level effect are shaded in red. Coefficient estimates correspond with γ from Equation 1.

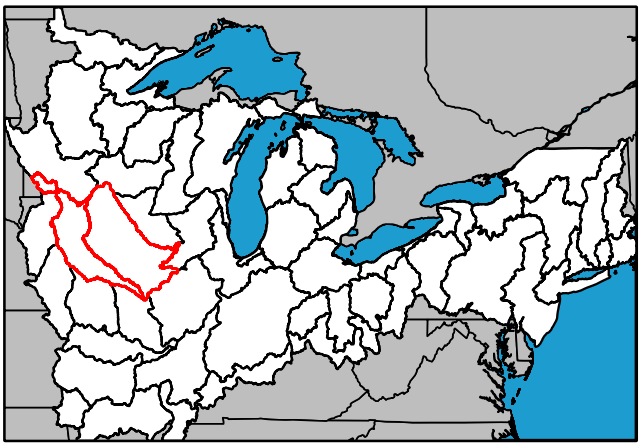

Figure 5: Location of hydrologic regions sensitive to watershed land-use cover corresponding to highlighted credible intervals in Figure 4.

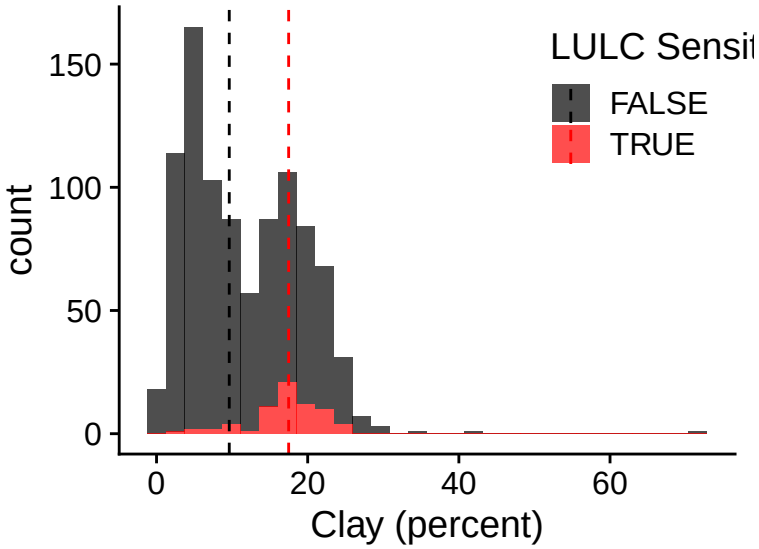

Figure 6: Histograms showing the distribution of soil clay content for regions sensitive to watershed land-use (see highlighted credible intervals in Figure 4) relative to all other regions. Medians for each group are shown as vertical dashed lines.