

# Figures

Table 1: Summary of study lake characteristics

Characteristic	Mean	LQ	UQ
Max Depth (m)	12.95	9.20	21.34
Ag Landuse (%)	53.27	17.68	74.05
TP (ug/L)	40.00	20.00	110.00
P Retention (%)	0.46	0.24	0.59
Secchi (m)	1.50	0.90	2.40
Chl (ug/L)	11.85	6.05	21.30
Residence Time (yr)	0.63	0.20	1.80

Table 2: Results table

Metric	Scale	Connectivity Type	Split Value	Delta k
Average Link Length	nws	Lateral	2380.09	0.23
Closest lake distance	nws	Longitudinal	3273.65	0.22
Stream density	nws	Lateral	13.84	0.20
Lake Connection	focal	Longitudinal		0.17
Upstream lake area	nws	Longitudinal	153.50	0.16
Max Depth	focal		19.81	0.15
Average Link Length	iws	Lateral	2177.08	0.14
Baseflow	iws	Lateral	63.76	0.12
Stream order ratio	iws	Longitudinal	0.67	0.10
Baseflow	nws	Lateral	53.43	0.08
Closest lake distance	iws	Longitudinal	3773.61	0.05
Stream order ratio	nws	Longitudinal	0.40	0.04
Stream density	iws	Lateral	4.43	0.03

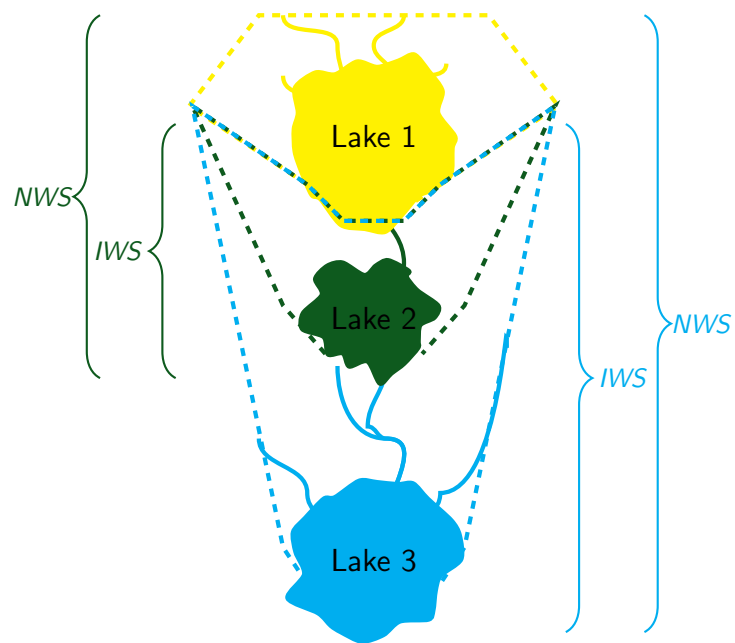


Figure 1: Watershed diagram



Figure 2: Connectivity metric box

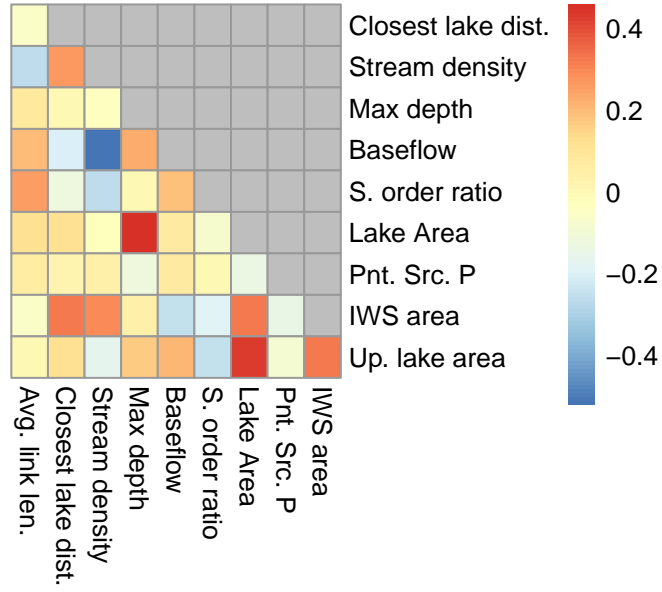


Figure 3: Connectivity metric correlation heatmap.

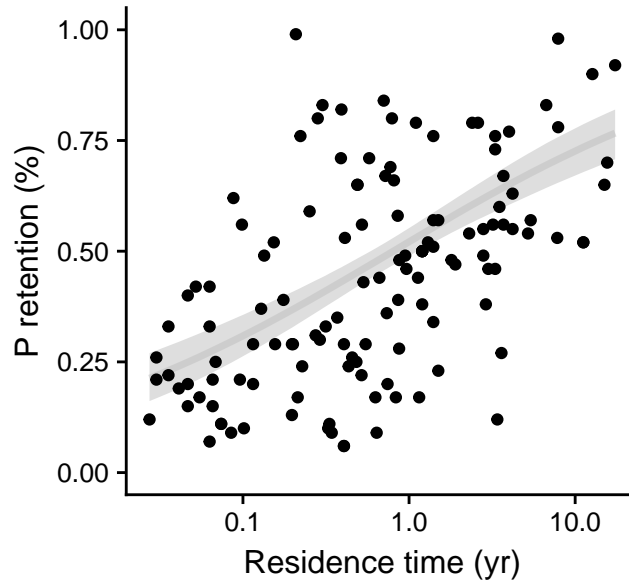


Figure 4: Median and central 95% interval estimates from the non-hierarchical model posterior relative to raw data.

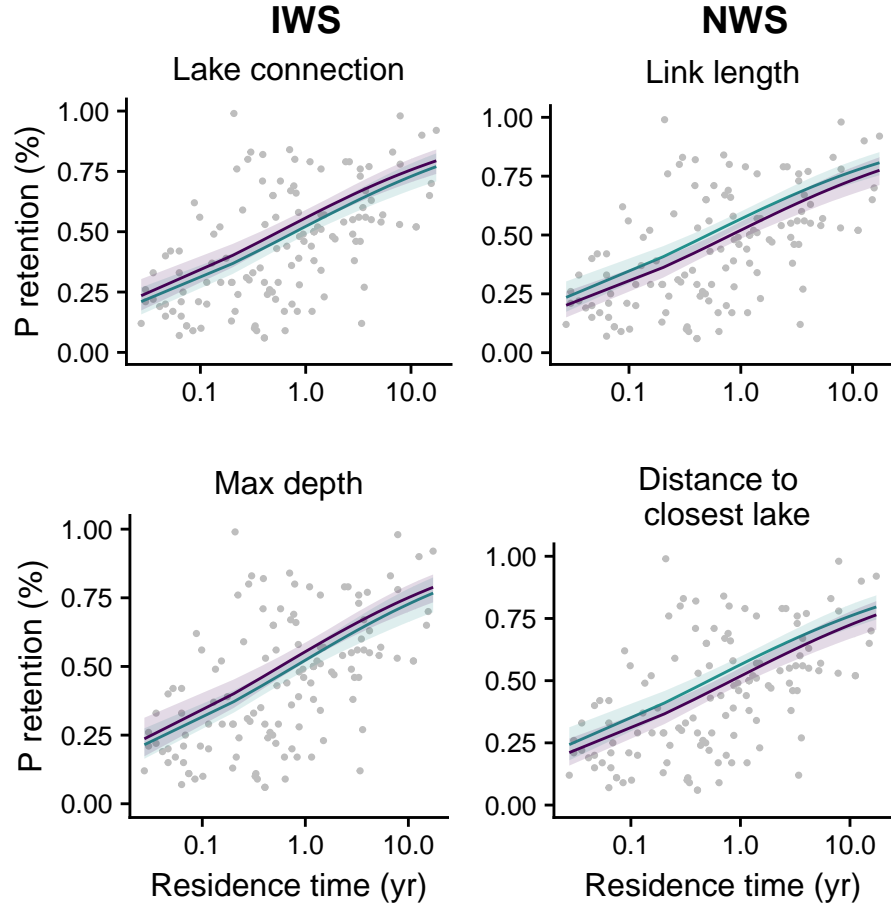


Figure 5: Median and central 95% interval estimates from the hierarchical model posteriors relative to raw data. Lighter colored lines and shaded polygons represent the estimates from the lower of the two partition groups (see Table 3)

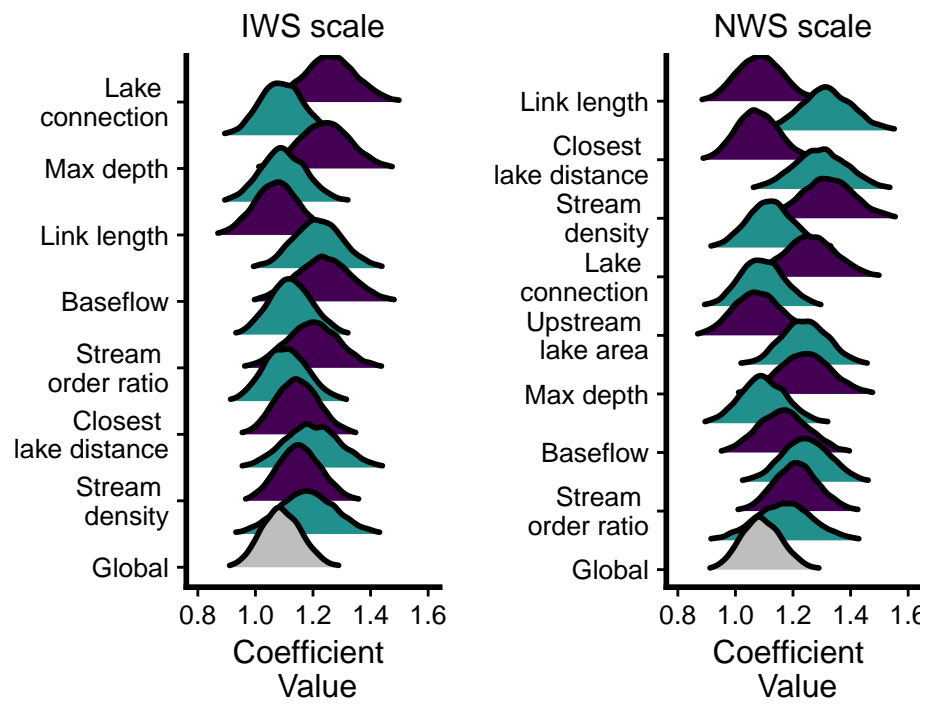
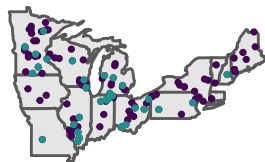
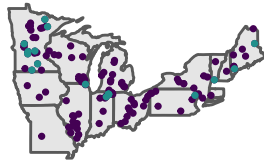


Figure 6: Distribution of Vollenweider's  $k$  in low and high connectivity partitions at the IWS and NWS scales.

IWS:

Closest lake dist.

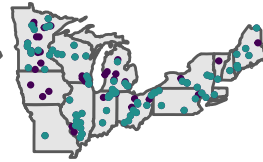
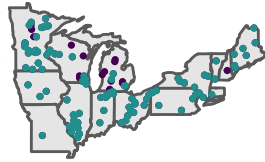
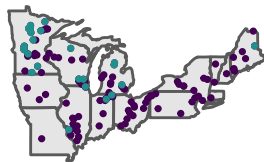
Avg. link len.



Stream density

Baseflow

S. order ratio

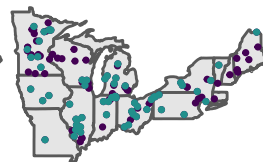
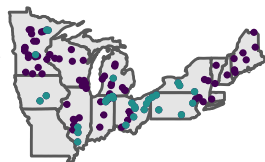
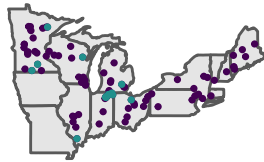


NWS:

Closest lake dist.

Avg. link len.

Up. lake area



Stream density

Baseflow

S. order ratio

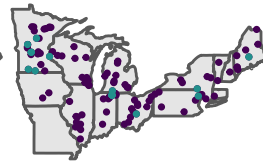
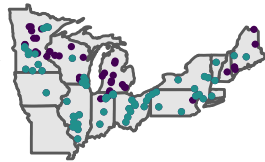
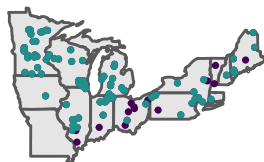


Figure 7: Map of lake connectivity partitions where lighter colored lakes have metric values on the lower side of the respective partition in Table 3.

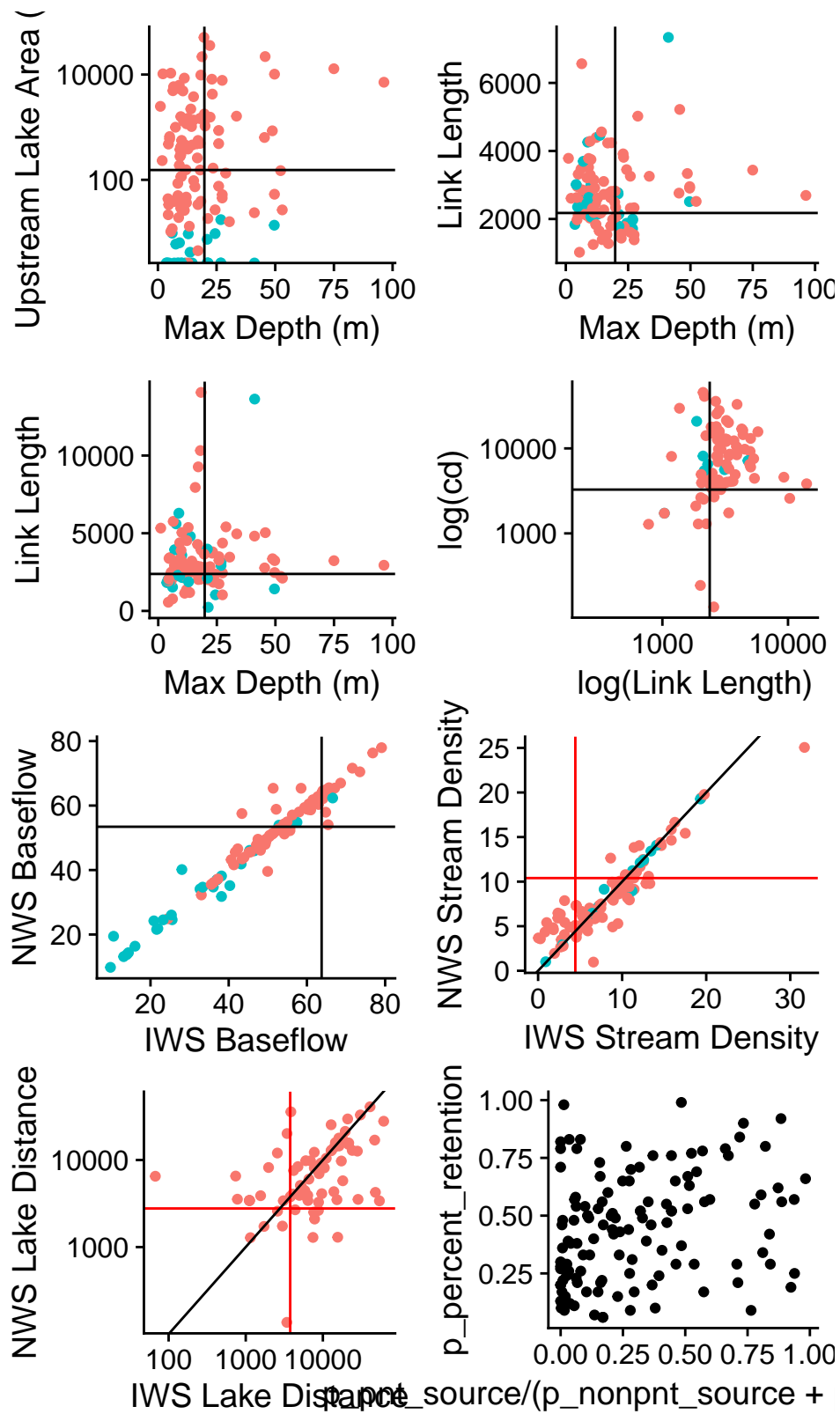


Figure 8: Exploratory plots



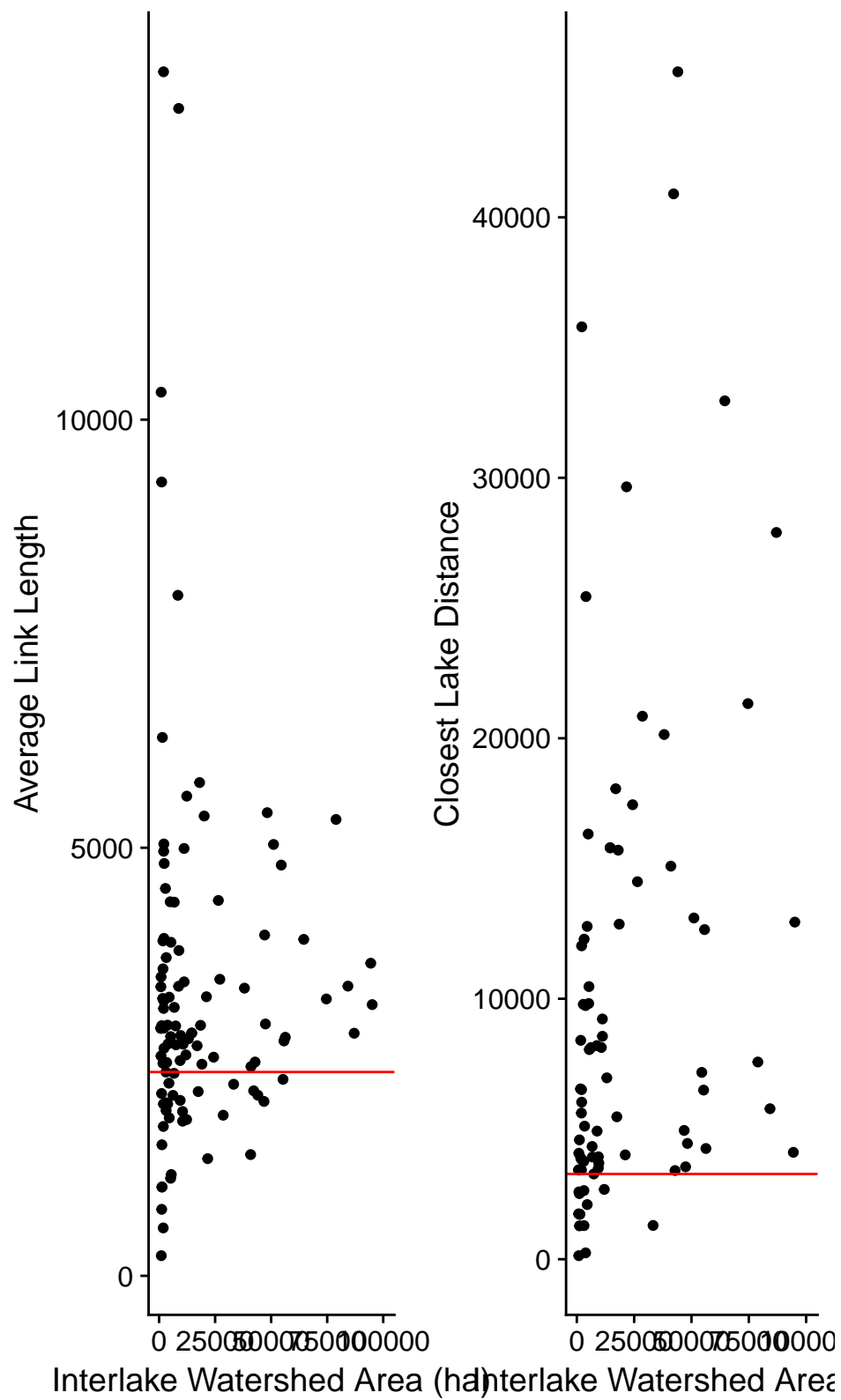


Figure 9: Exploratory plots cont