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: Pearson correlation matrix among connectivity metrics.

	Stream density	Avg. link len.	S. order ratio	Closest lake dist.	Baseflow	Up. lake area
Avg. link len.	-0.26					
S. order ratio	-0.26	0.26				
Closest lake dist.	0.27	-0.05	-0.12			
Baseflow	-0.52	0.20	0.19	-0.20		
Up. lake area	-0.16	0.01	-0.25	0.12	0.21	
Max depth	-0.04	0.08	0.01	0.00	0.23	0.17

Table 3: Results table

Metric	Scale	Connectivity Type	Split Value	Delta k
Average Link Length	nws	Longitudinal	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	Lateral	153.50	0.16
Max Depth	focal		19.81	0.15
Average Link Length	iws	Longitudinal	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
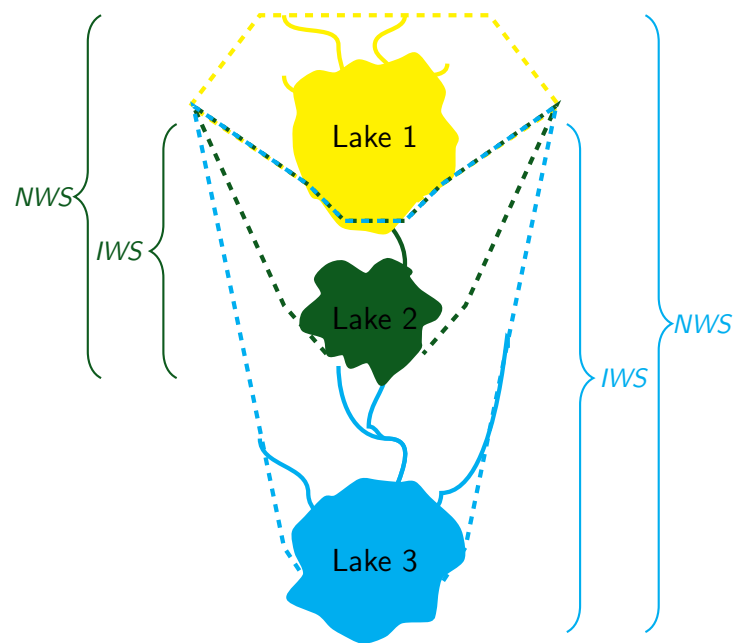
Figure 1: Watershed diagram

Lower Connectivity   Higher Connectivity

Closest Lake Distance: Network distance
to the closest upstream lake.

Average Link Length: Sum of the total
length of stream reaches between junctions
divided by the total number of reaches.

Upstream Lake Area: Total area of
upstream lakes limited to lakes that are
greater than or equal to 4ha.

Stream Density: the length of all streams
(minus artificial lines through lakes) divided
by the area of watershed.

Stream Order Ratio: The total number of
first order stream reaches divided by the total
number of higher order stream reaches. In
this example the lower connectivity lake has a
stream order ratio of 3 whereas the higher
connectivity lake has a stream order ratio of 2.

Figure 2: Connectivity metric box
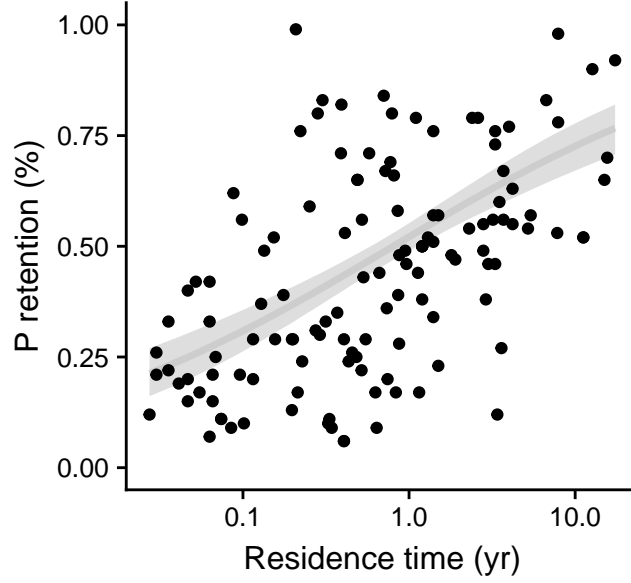
Figure 3: Median and central 95% interval estimates from the non-hierarchical model posterior relative to raw data.
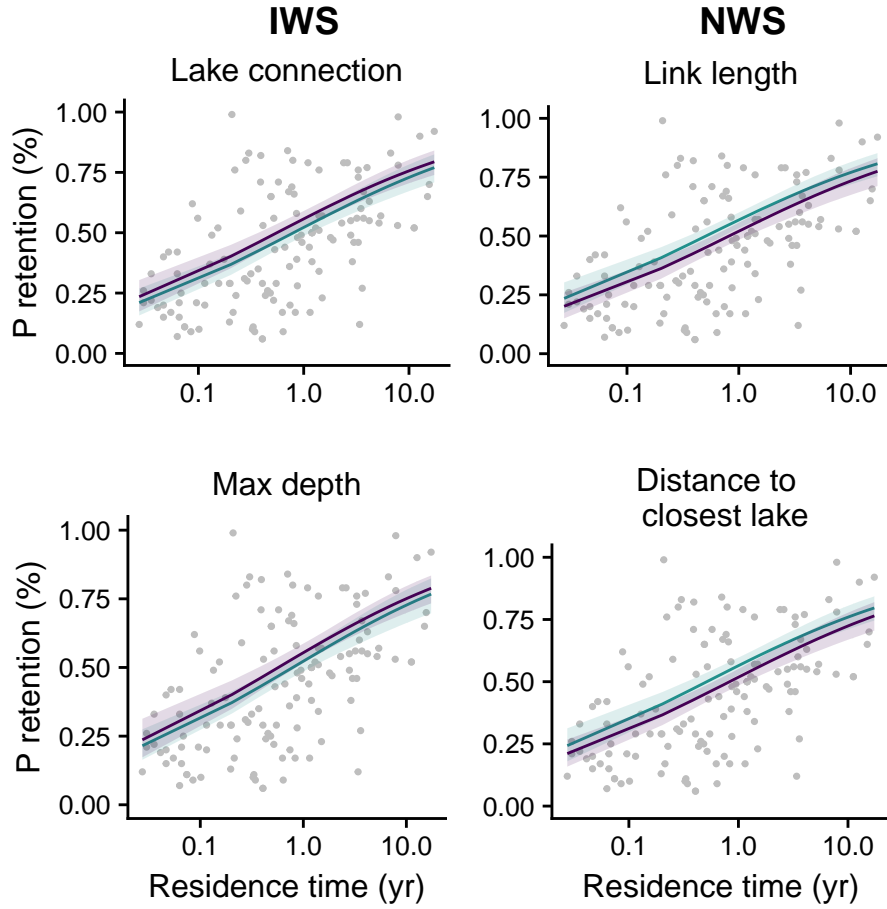
Figure 4: Median and central 95% interval estimates from the hierarchical model posteriors relative to raw data. Lighter colored lines and shaded polygons represent the estimates from the lower of the two partition groups (see Table 3)
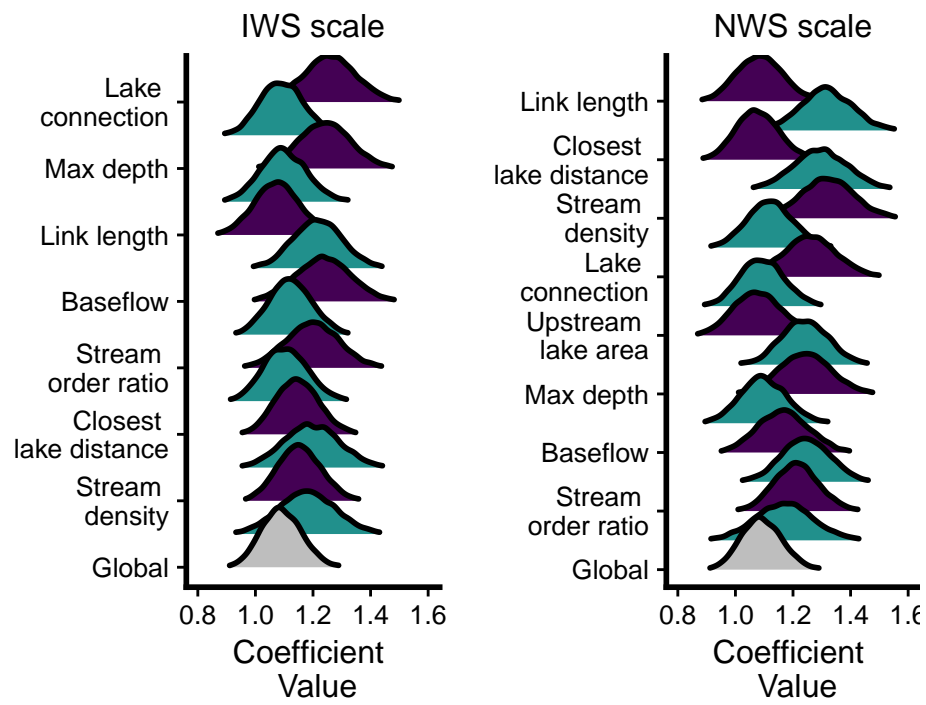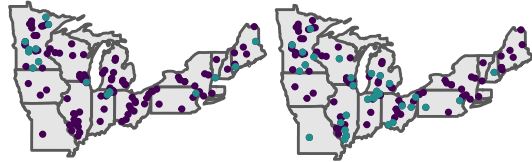
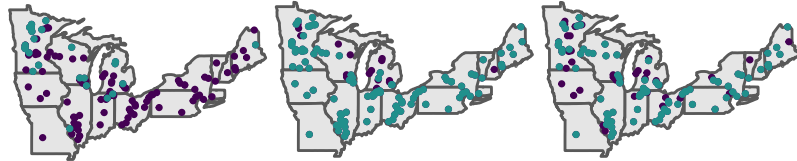Figure 5: Distribution of Vollenweider's k in low and high connectivity partitions at the IWS and NWS scales.

IWS:

Closest lake dist. Avg. link len.
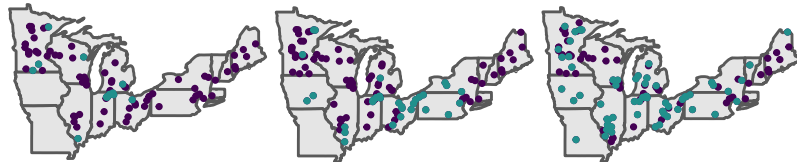
Stream density   Baseflow   S. order ratio

NWS:

Closest lake dist. Avg. link len.   Up. lake area

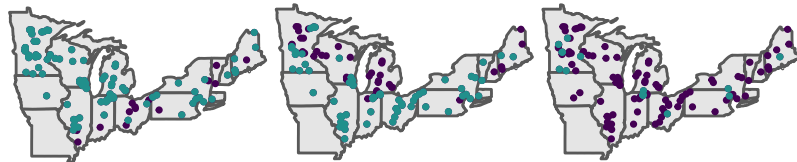Stream density   Baseflow   S. order ratio

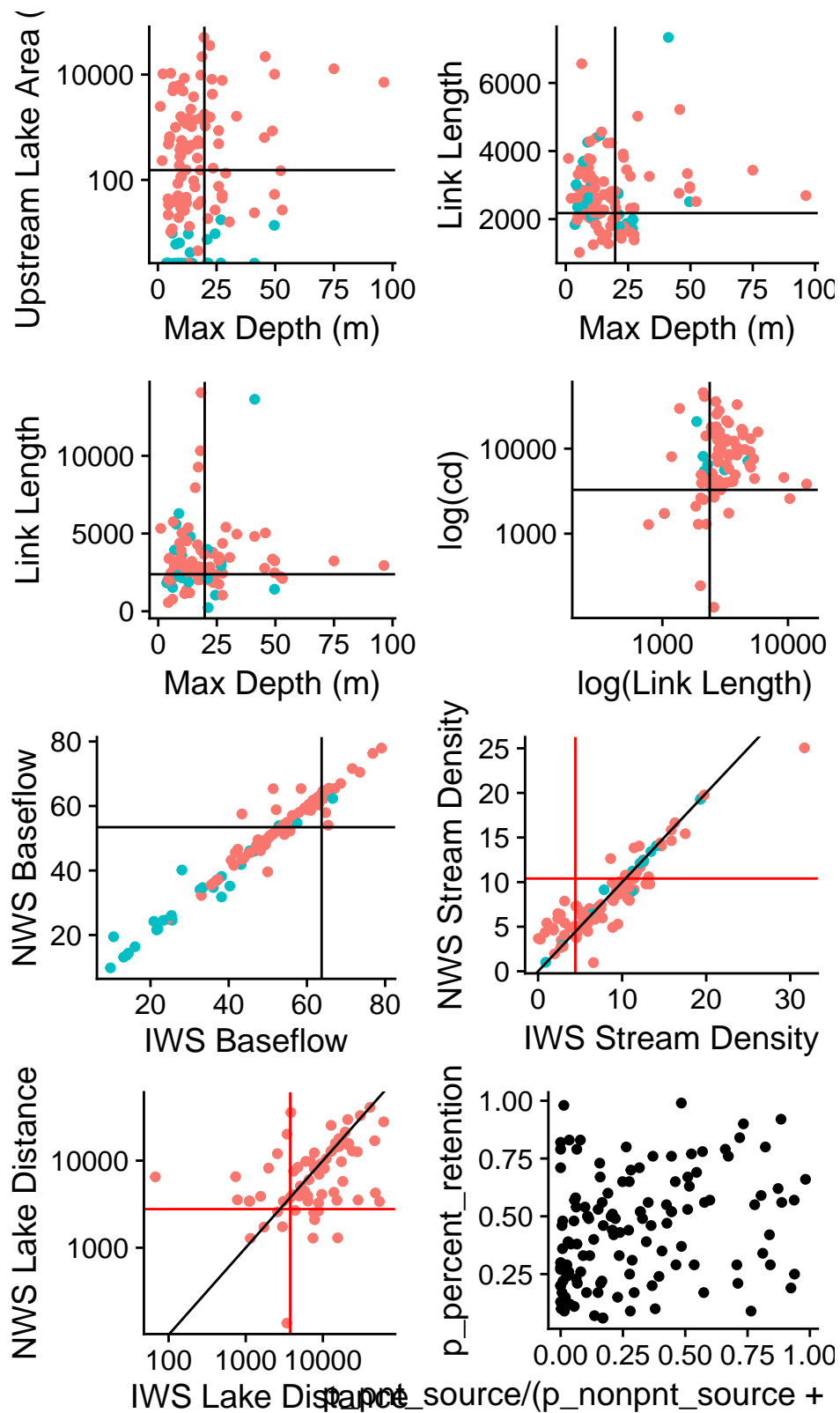Figure 6: Map of lake connectivity partitions where lighter colored lakes have matric values on the lower side of the respective partition in Table 3.

Figure 7: Exploratory plots