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 (mg/L)	0.04	0.02	0.11
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

	sd	cd	bf	ll	sr	la
cd	0.29	NA	NA	NA	NA	NA
bf	-0.53	-0.23	NA	NA	NA	NA
ll	-0.24	-0.05	0.13	NA	NA	NA
sr	-0.26	-0.12	0.17	0.29	NA	NA
la	-0.11	0.00	0.17	-0.02	-0.27	NA
md	-0.05	-0.01	0.24	-0.01	-0.02	0.17

Table 3: Partition cutoff table

Abb	Scale	Metric	Connectivity Type	Split Value	Delta k
cd	nws	Closest lake distance	long	2776.81	0.27
ll	nws	Average Link Length	long	2237.34	0.19
lc	focal	Lake Connection	long	NA	0.17
la	nws	Upstream lake area	lat	153.50	0.16
md	focal	Max Depth	NA	19.81	0.15
ll	iws	Average Link Length	long	2177.08	0.14
sd	nws	Stream density	lat	10.40	0.13
bf	iws	Baseflow	lat	63.76	0.12
sr	iws	Stream order ratio	long	0.67	0.10
cd	iws	Closest lake distance	long	3773.61	0.05
sr	nws	Stream order ratio	long	0.47	0.05
sd	iws	Stream density	lat	4.43	0.03
bf	nws	Baseflow	lat	52.94	0.00

metric	direction	k	connectivity	in_lake_processing	axis	connectivity type
closest lake distance	lower	higher	lower	higher	lake-stream	long
average link length	lower	higher	lower	higher	stream	long
lakeconnection	DR_Stream	higher	lower	higher	lake	long
upstream lake area	lower	higher	lower	higher	lake	lat
stream density	higher	higher	lower	higher	stream	lat

metric	direction	k	connectivity	in_lake_processing	axis	connectivity type
baseflow	higher	higher	lower	higher	stream	lat
stream order ratio	higher	higher	lower	higher	stream	long
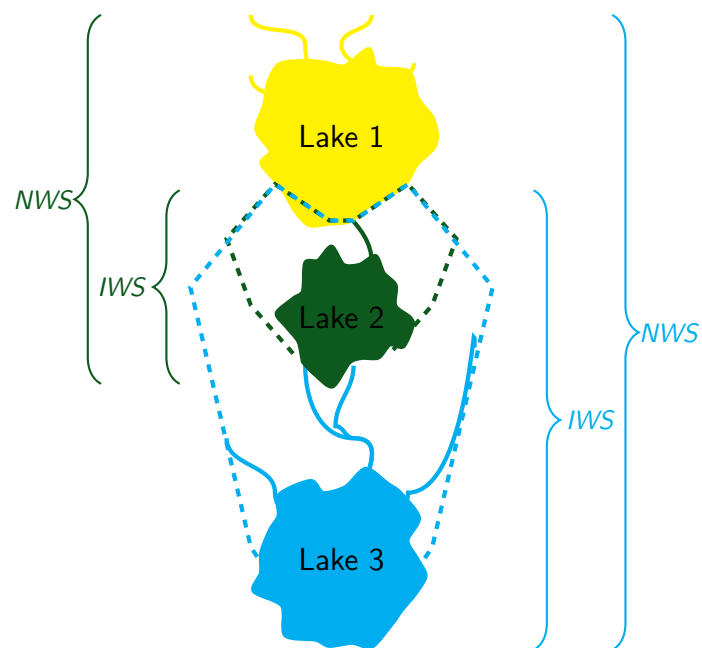
Figure 1: Watershed diagram

Lower Connectivity　　　　Higher Connectivity

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

Average Link Length: Length of stream reaches where each stream reach starts and ends at a junction 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
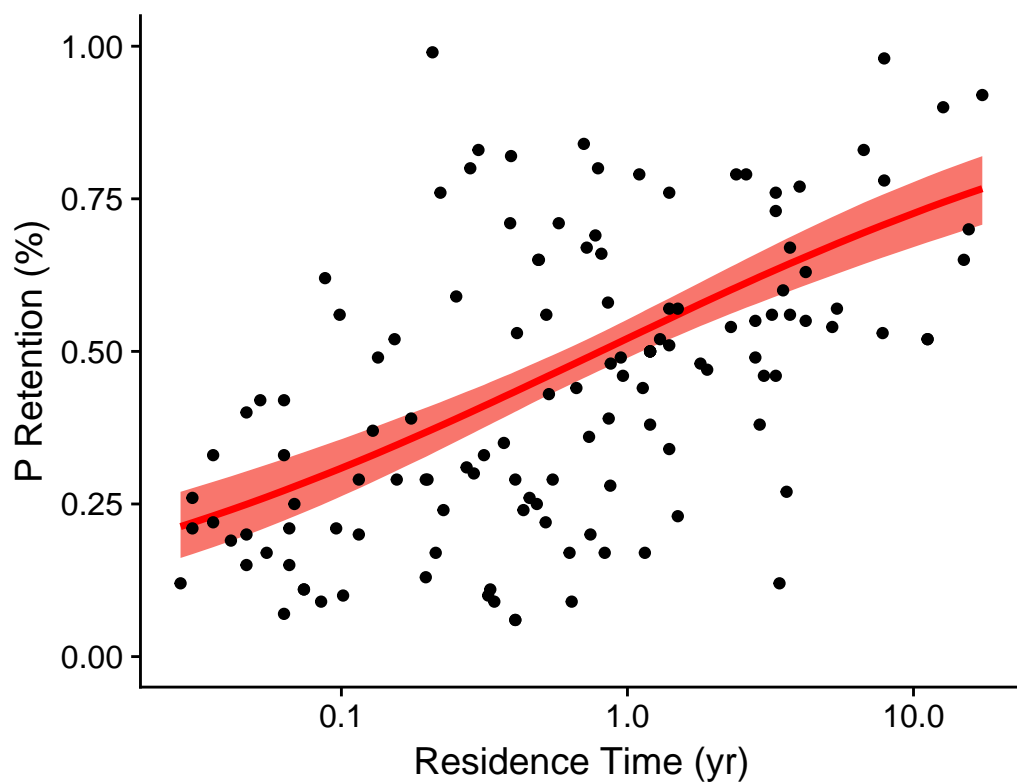
Figure 3: Median and central 95% interval estimates from the non-hierarchical model posterior relative to raw data.
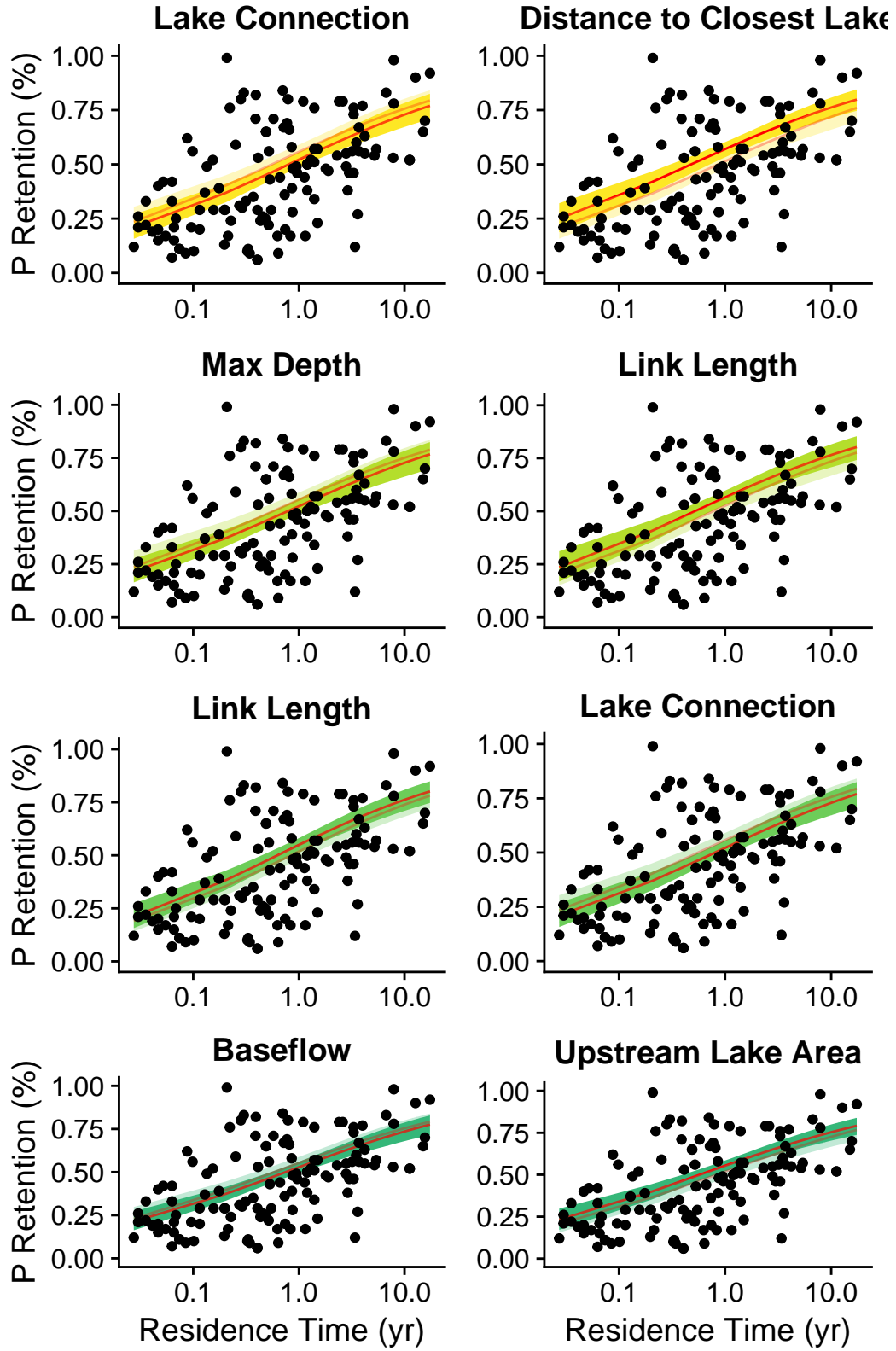
Figure 4: Median and central 95% interval estimates from the hierarchical model posteriors relative to raw data. Dark lines and shaded polygons represent the estimates from the lower of the two partition groups (see Table 1)
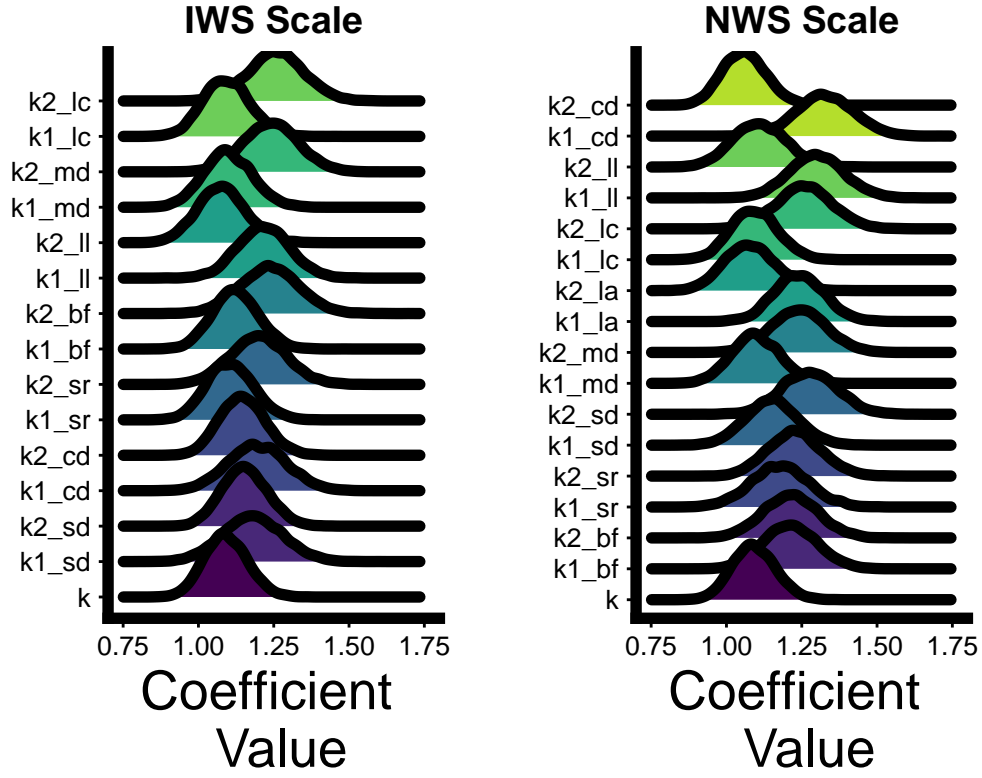
Figure 5: Distribution of Vollenweider's k in low and high connectivity partitions at the IWS and NWS scales.
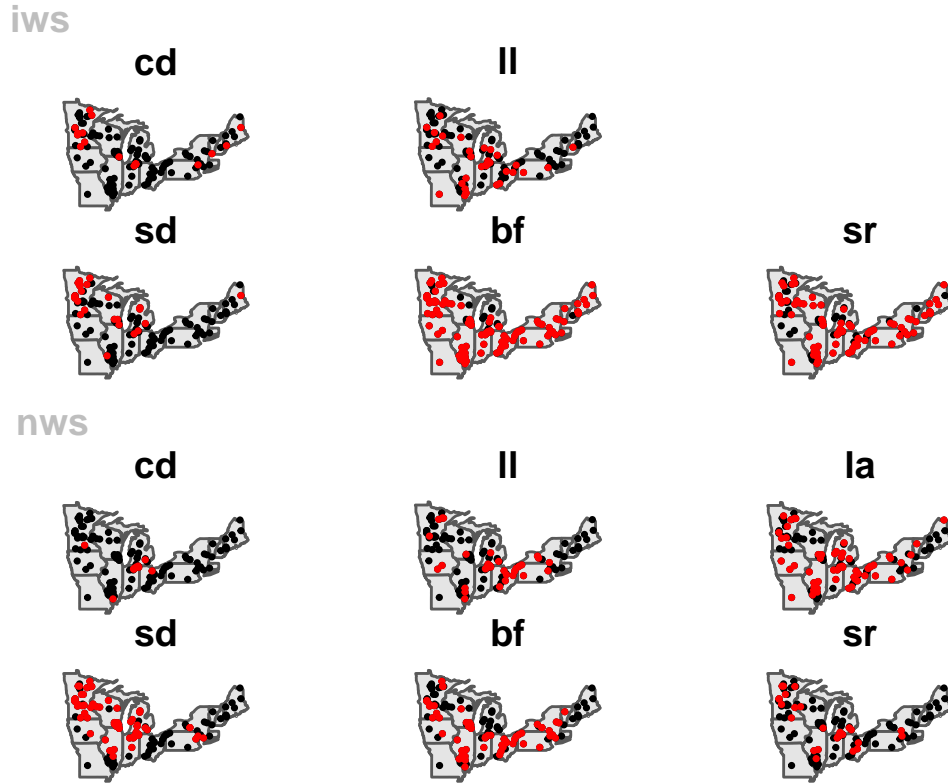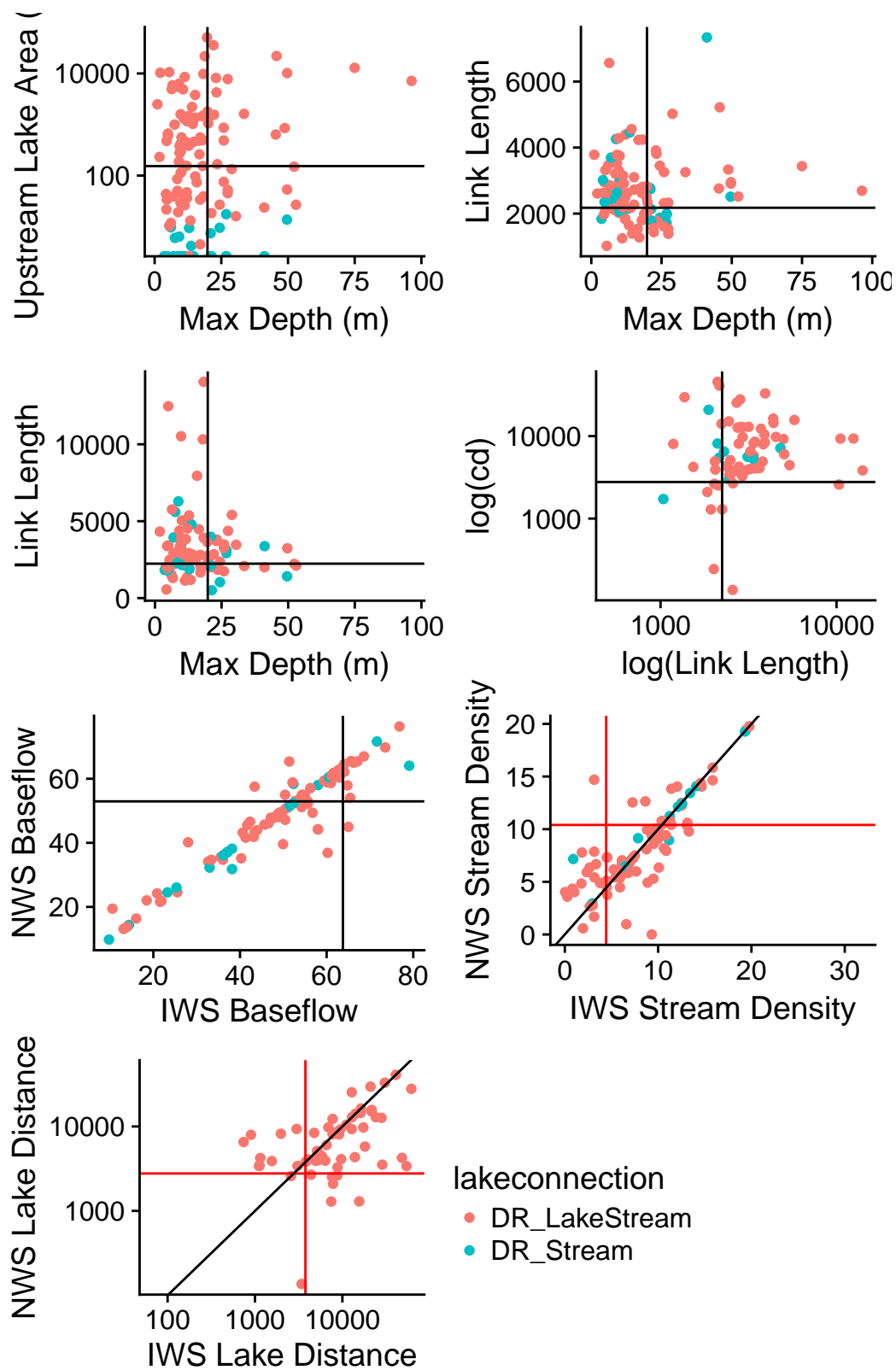

Figure 6: Map of lake connectivity partitions.

Figure 7: Exploratory plots