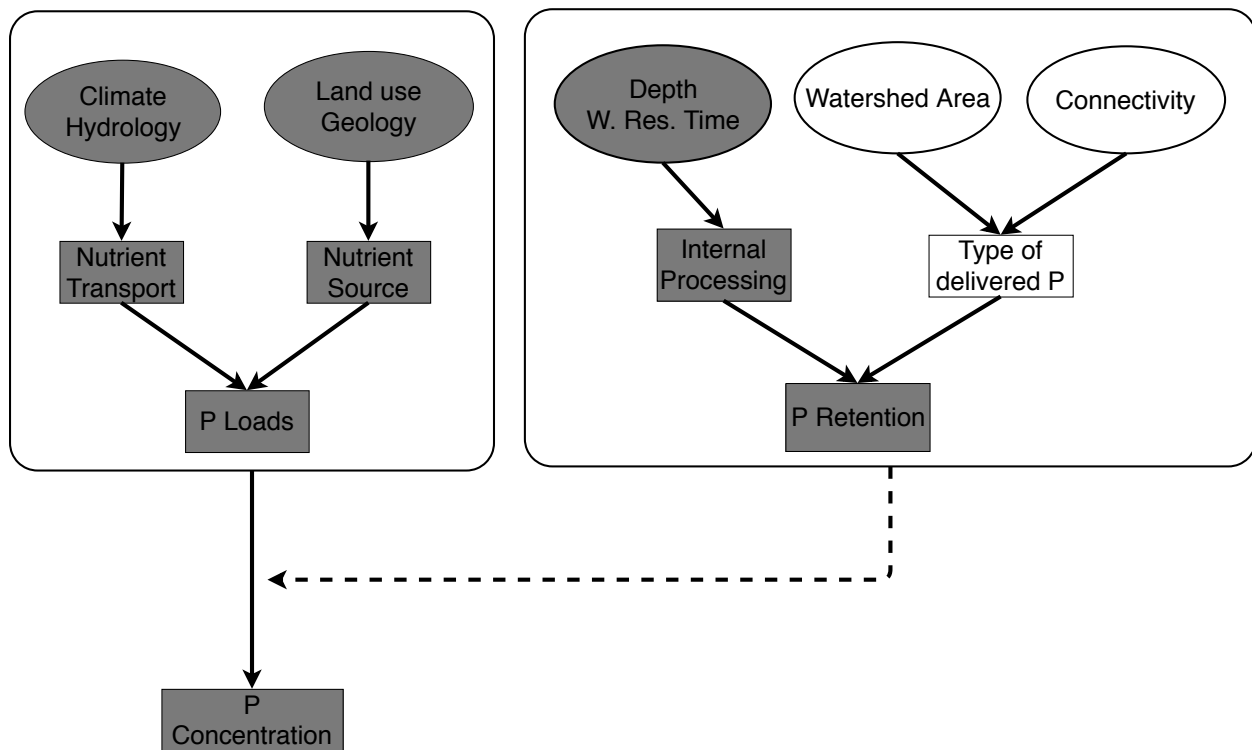# Figures

Figure 1: Major lake and watershed characteristics, factors, and processes affecting lake P retention. Shaded symbols indicate items typically considered in P retention models while open symbols indicate additional items considered in the present study.

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 definitions along with examples of high and low connectivity lakes.
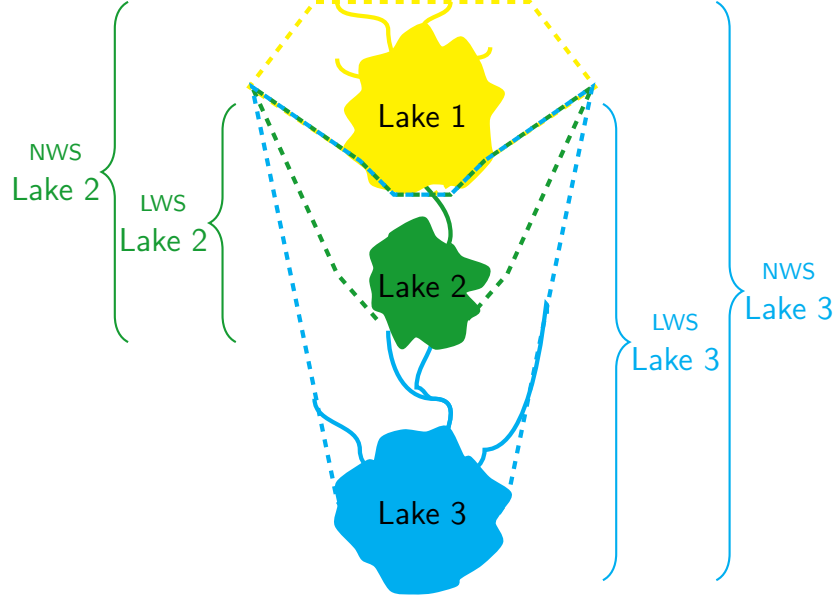
Figure 3: Diagram showing the lake watershed (LWS) and network watershed (NWS) of three lakes. Here the IWS of lake 3 encompasses the LWS of lake 2 because of it is smaller than 10 ha small size but it does not encompass the LWS of lake 1 because it has an area of at least 10 ha. In contrast to the LWS boundaries, the NWS boundaries extend to the headwaters of the lake chain.
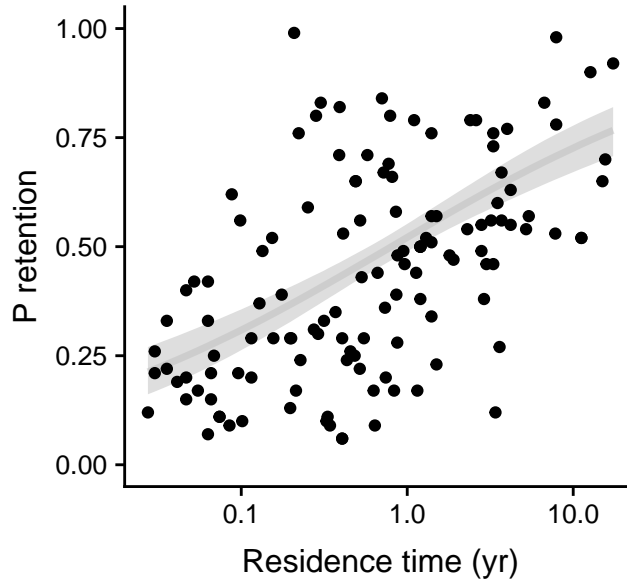

Figure 4: Residence time (yr) versus P retention for the NES dataset and the global model fit to the data where the solid line and shaded interval represents the median and central 95% interval estimates respectively.
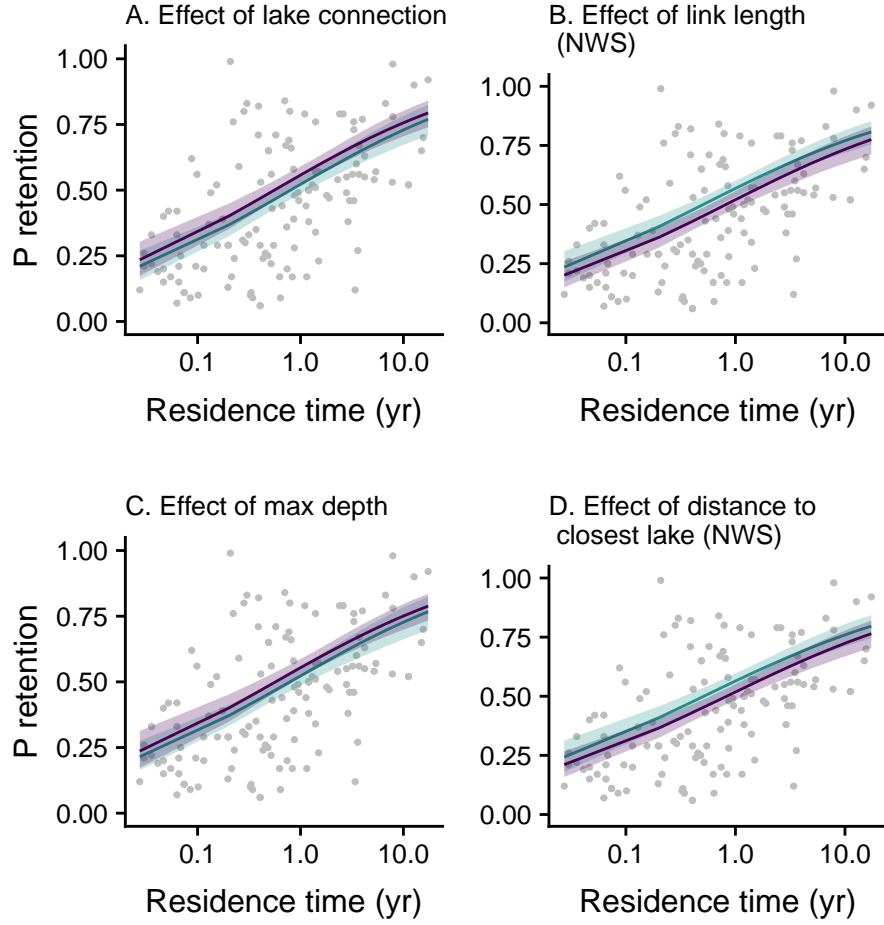
Figure 5: Residence time (yr) versus P retention for the NES dataset and hierarchical model fits to the data where the solid lines and shaded intervals represent the median and central 95% model estimates respectively. The green lines and symbols are the estimates from the lower of the two partition groups while the purple lines are estimates for the upper of the two partition groups (see Table 2).
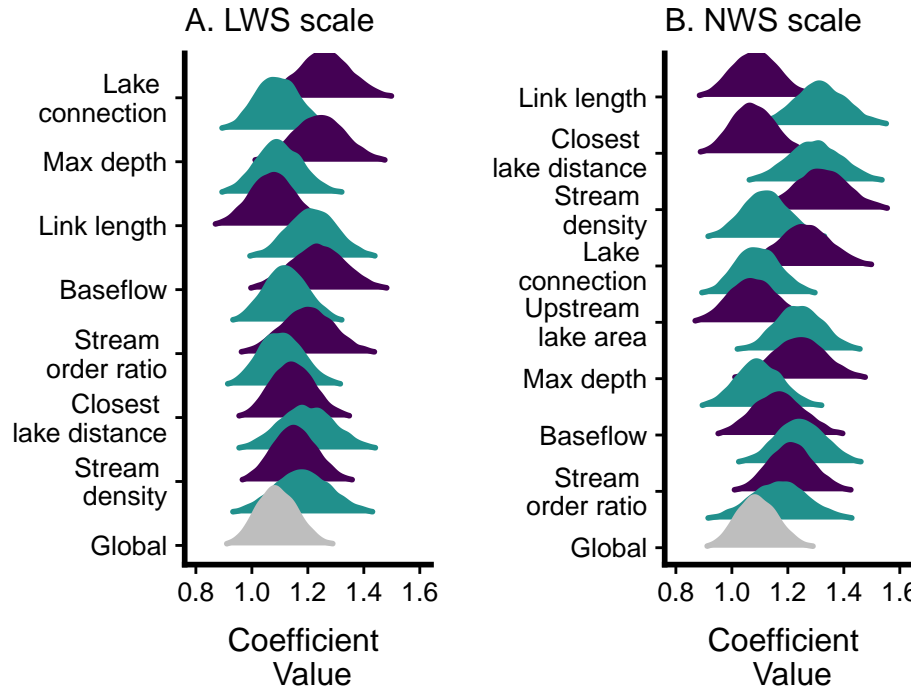
Figure 6: Distribution of the k parameter from the Vollenweider's equation in low and high connectivity partitions at the (A) LWS and (B) NWS scales. Green symbols indicate the lower of the two partition groups while purple symbols represent the higher of the two partition groups (see Table 2).
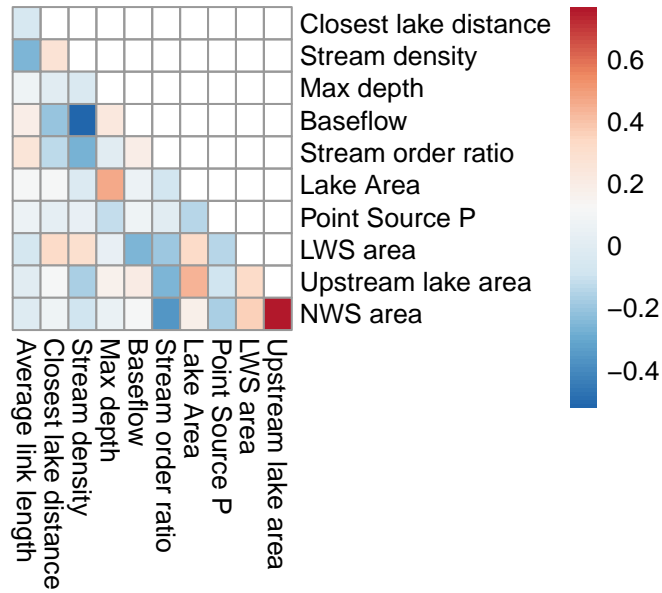

Figure 7: Correlation between connectivity metrics and selected lake characteristics.

A. LWS:

Closest
lake distance

Average
link length

Stream
density

Baseflow

Stream
order ratio

B. NWS:

Closest
lake distance

Average
link length

Upstream
lake area

Stream
density
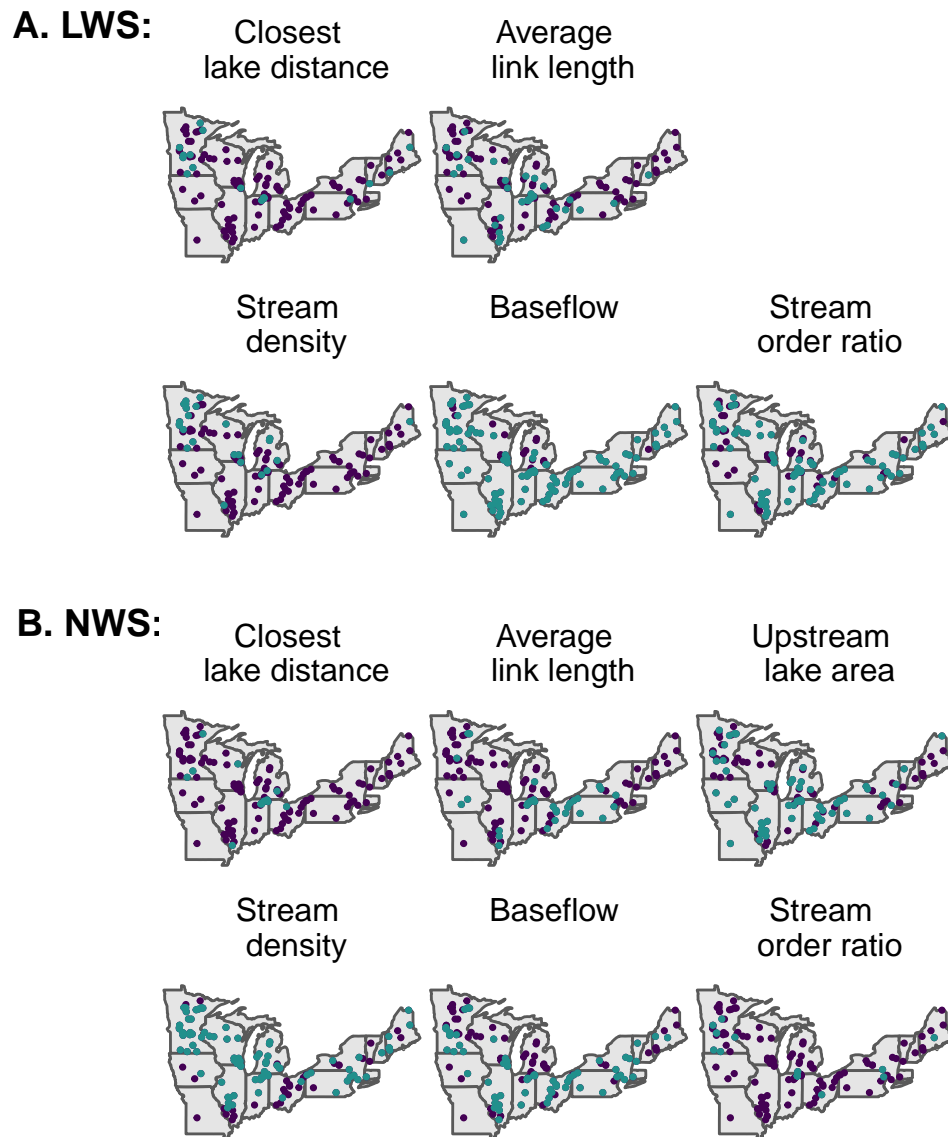
Baseflow

Stream
order ratio

Figure 8: Maps showing the locations of lake connectivity partitions. Green symbols indicate the lower of the two partition groups while purple symbols represent the higher of the two partition groups (see Table 2).