



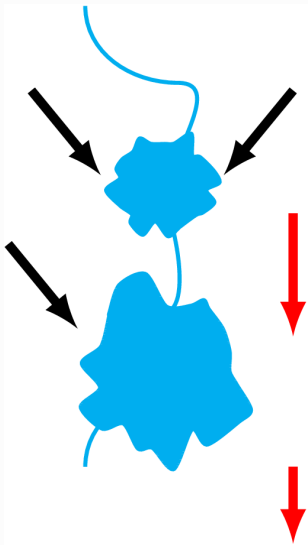
Does Lake and Stream Connectivity Control Phosphorus Retention in Lakes?

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P RETENTION IS IMPORTANT AND WELL-STUDIED

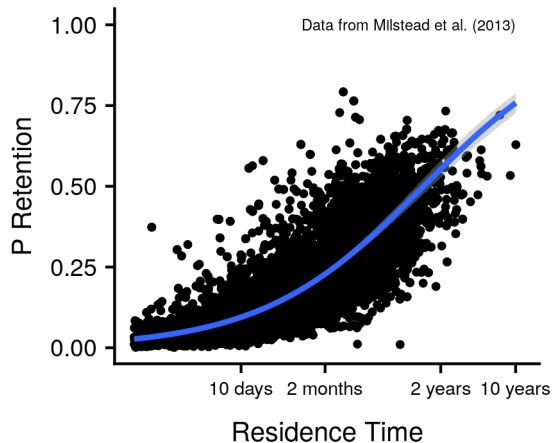
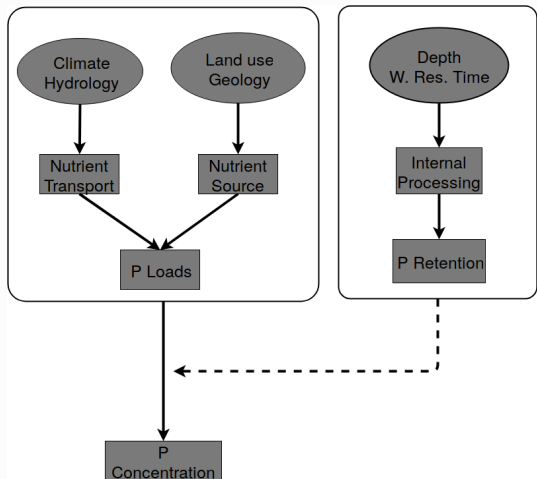


P retention directly controls downstream transport [Alexander et al., 2002]

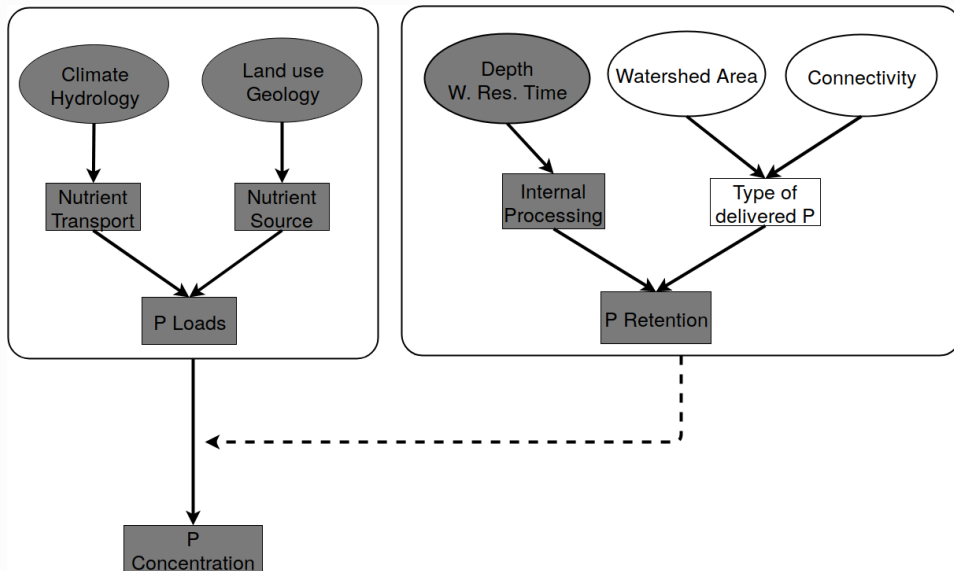
P retention indirectly controls sediment P accumulation [Søndergaard et al., 2013]

P RETENTION IS CONTROLLED BY WATER RESIDENCE TIME

 [Vollenweider, 1975]



WHAT ARE SOME OTHER POTENTIAL CONTROLS ON P RETENTION?



MULTIPLE WAYS TO DEFINE CONNECTIVITY

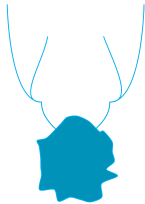
Low Connectivity

High Connectivity

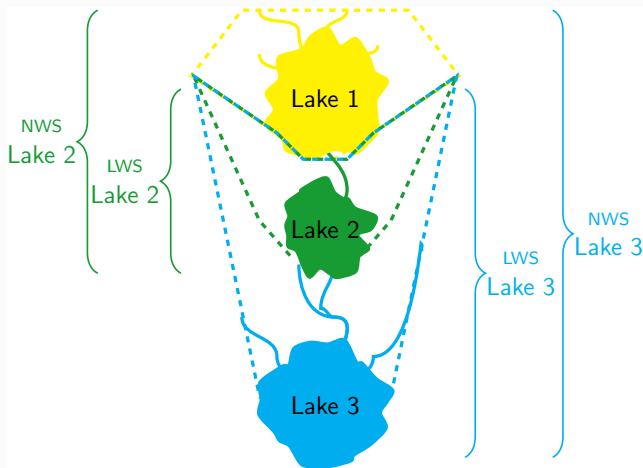
Closest Lake Distance: Network distance to the closest upstream lake.

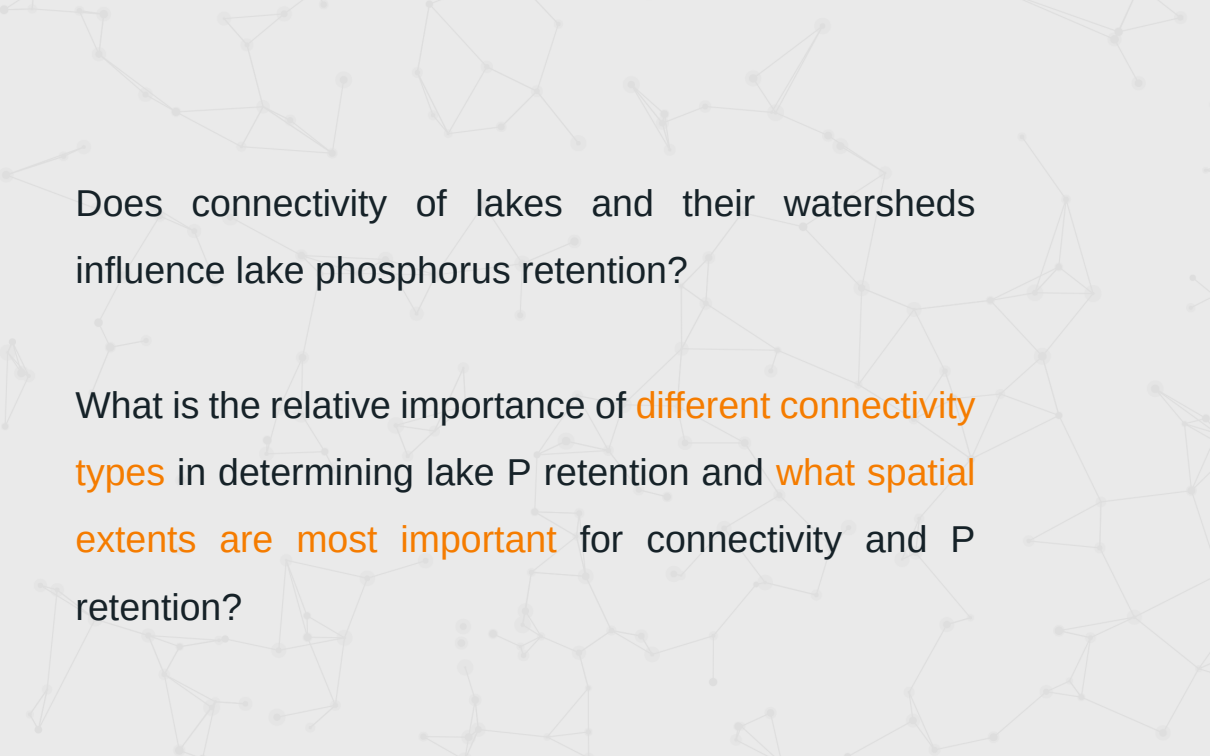


Average Link Length: Sum of the total length of stream reaches between junctions divided by the total number of reaches.



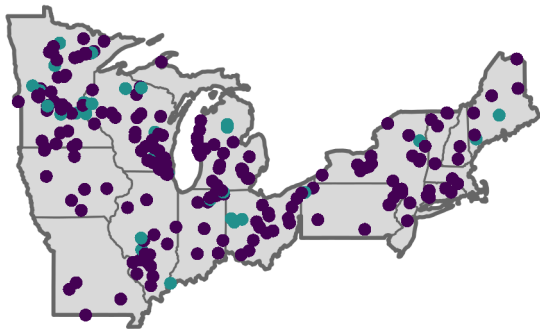
WHAT IS AN APPROPRIATE SCALE FOR MEASURING CONNECTIVITY?



A faint, light gray background pattern consisting of a network of interconnected nodes and lines, resembling a molecular structure or a complex web, covering the entire slide.

Does connectivity of lakes and their watersheds influence lake phosphorus retention?

What is the relative importance of **different connectivity types** in determining lake P retention and **what spatial extents are most important** for connectivity and P retention?

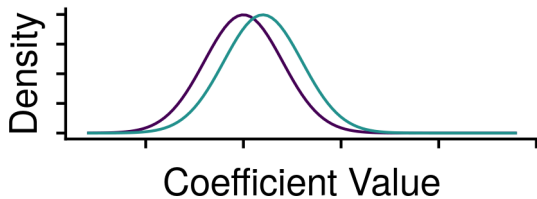


connectivity

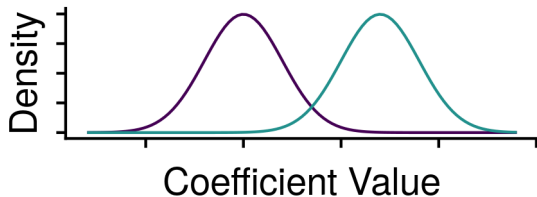
● High

● Low

No Connectivity Effect

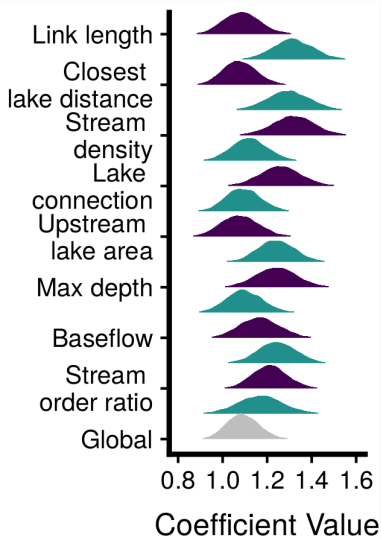
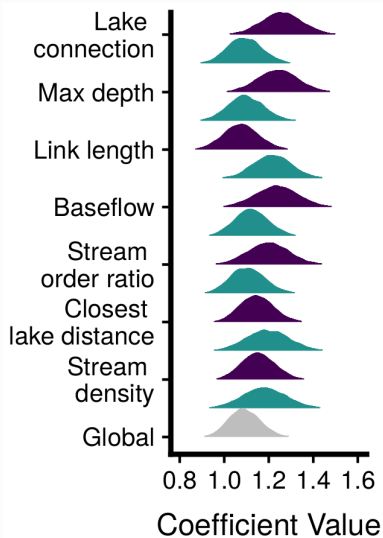


Connectivity Effect





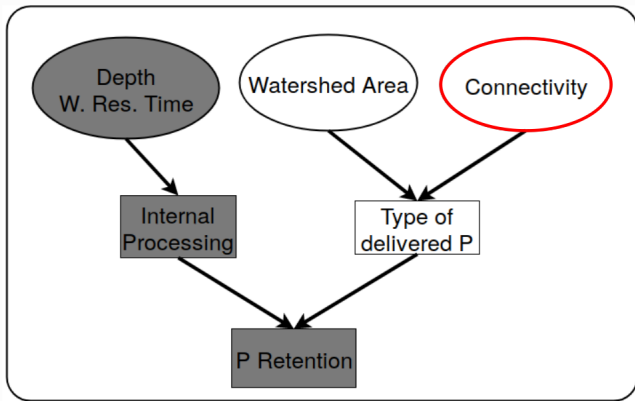
DISTRIBUTIONS OF P LOADING MODEL PROCESSING COEFFICIENTS



RESULTS TABLE OF DELTA K'S




○ P RETENTION.

CONNECTIVITY OF LAKES AND THEIR WATERSHEDS IS RELATED TO



Connectivity of lakes and their watersheds is related to P retention.

Connectivity at the network (broader) scale is more important than connectivity at finer scales.

-  Alexander, R. B., Elliott, A. H., Shankar, U., and McBride, G. B. (2002).
Estimating the sources and transport of nutrients in the Waikato River
Basin, New Zealand: Sources and transport of nutrients.
Water Resources Research, 38(12):4–1–4–23.
-  Søndergaard, M., Bjerring, R., and Jeppesen, E. (2013).
Persistent internal phosphorus loading during summer in shallow
eutrophic lakes.
Hydrobiologia, 710(1):95–107.
-  Vollenweider, R. A. (1975).
Input-output models.
Aquatic Sciences-Research across boundaries, 37(1):53–84.