Does Lake and Stream Connectivity Control Phosphorus Retention in Lakes?

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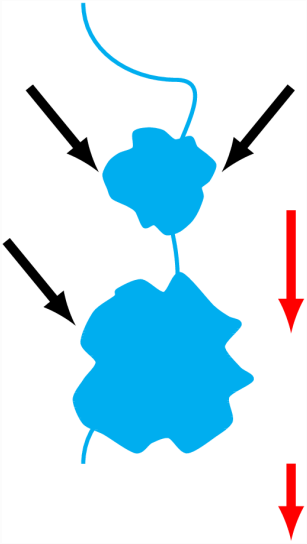
LAKE PHOSPHORUS (P) RETENTION



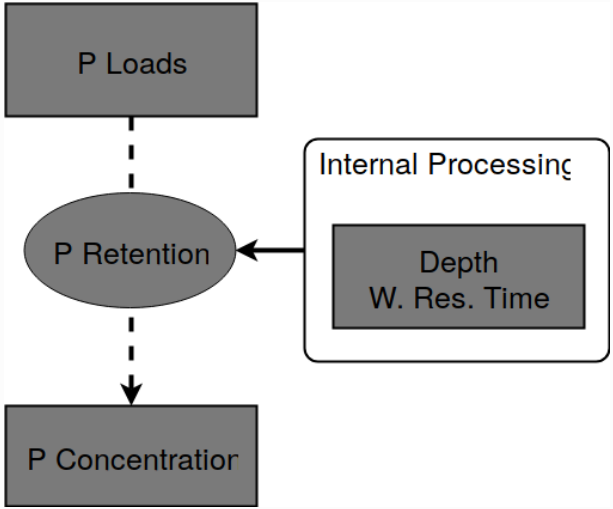
P retention directly controls downstream transport [Alexander et al., 2002]

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

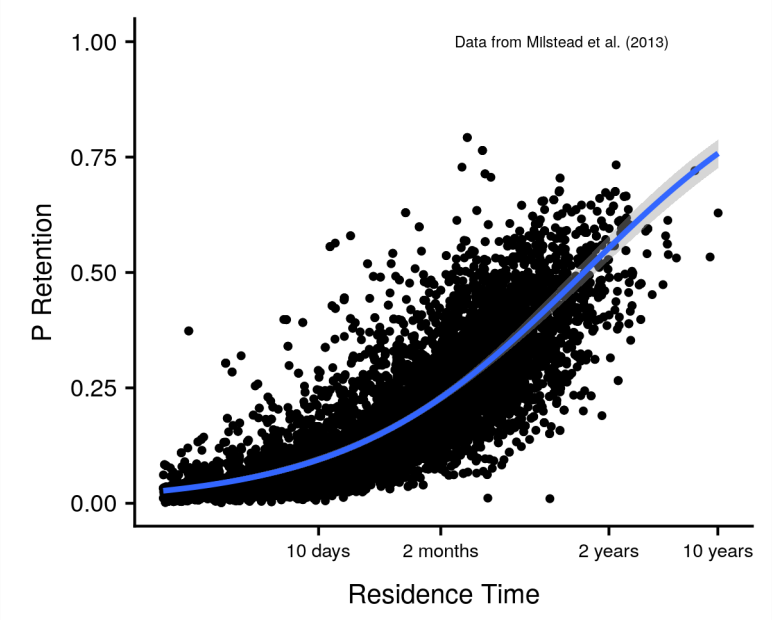
ESTIMATING P RETENTION FOR A SINGLE LAKE

- Field work material
- Sediment traps
- Benthic coring

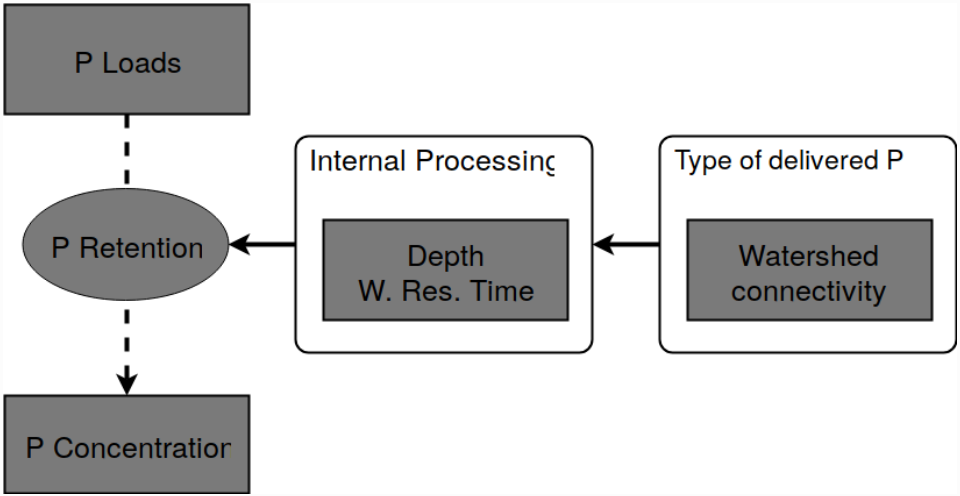
P RETENTION CONCEPTUAL MODEL



P RETENTION VERSUS WATER RESIDENCE TIME



EXTENDING P RETENTION MODELS



MULTIPLE WAYS TO DEFINE CONNECTIVITY

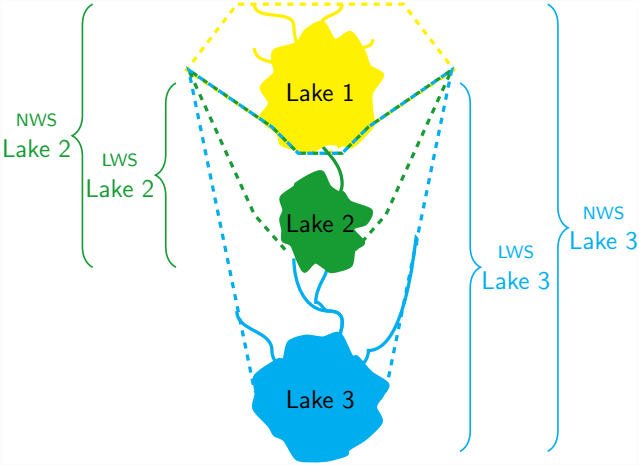
Low Connectivity

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.

WATERSHED EXTENTS

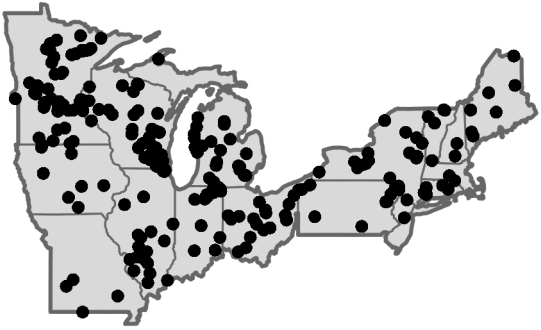


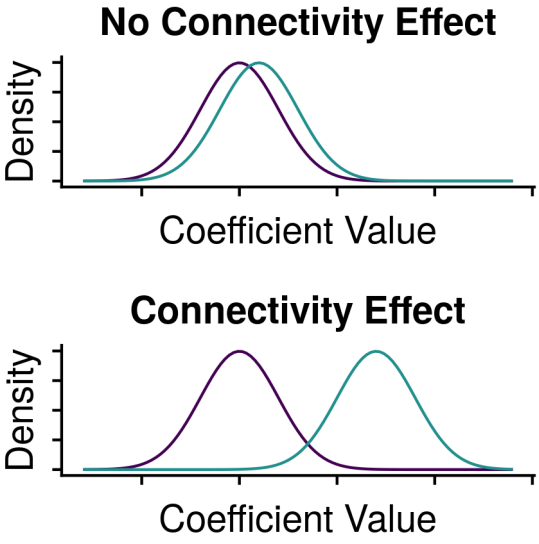
1. Does connectivity of lakes and their watersheds influence lake phosphorus retention?

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

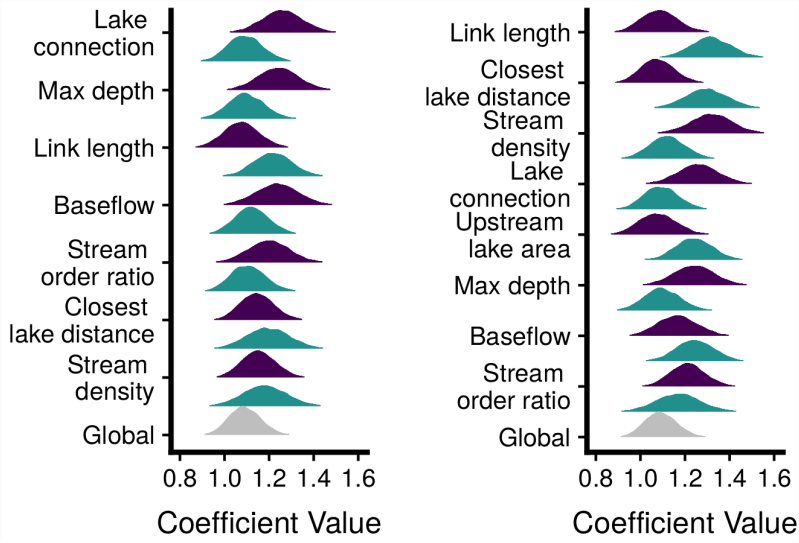
METHODS - CONNECTIVITY PARTITIONS

METHODS - P RETENTION MODELLING

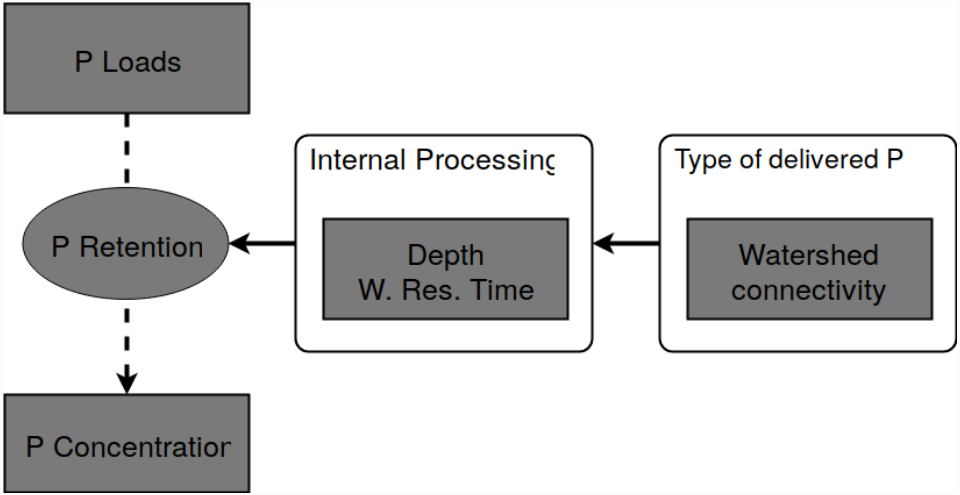




P RETENTION (PROCESSING) COEFFICIENT DISTRIBUTIONS



CONCLUSION



Connectivity of lakes and their

SPECULATION SLIDE

- WS:LA ratio

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.

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Hydrobiologia, 710(1):95–107.

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