



Does Lake and Stream Connectivity Control Phosphorus Retention in Lakes?

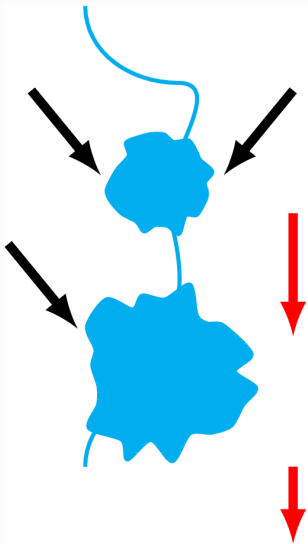
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Michigan State University

Assoc. Limnology and Oceanography, 2018 June

<http://doi.org/ckpf>

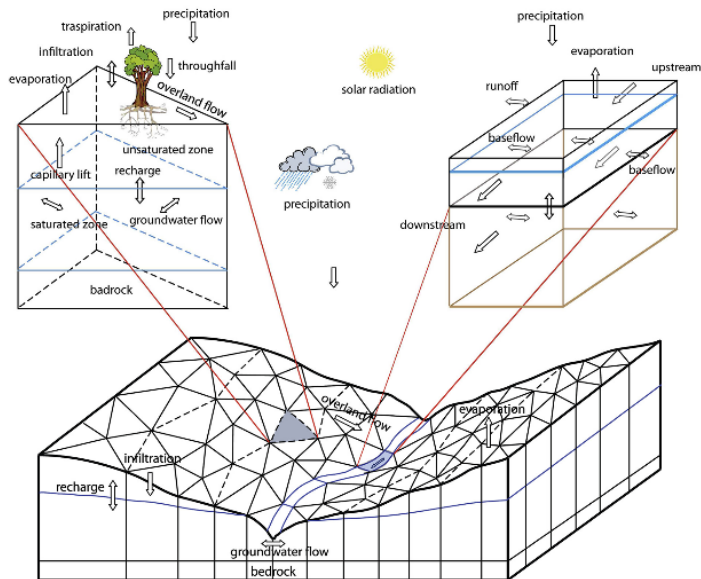
LAKE PHOSPHORUS (P) RETENTION



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

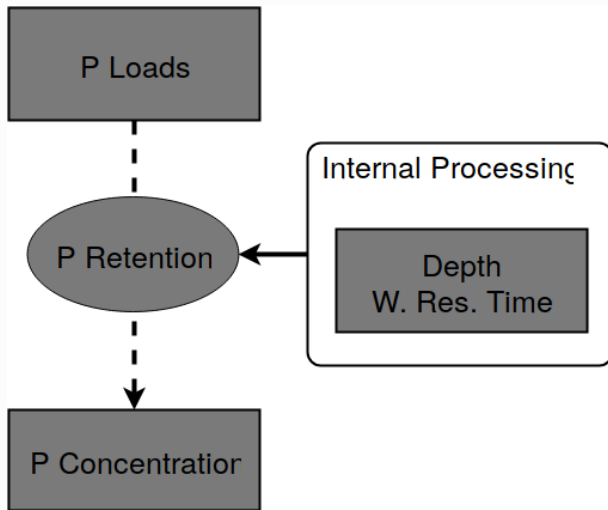
P retention indirectly controls sediment P accumulation [Søndergaard et al., 2013]

PREDICTING P RETENTION IS COMPLEX

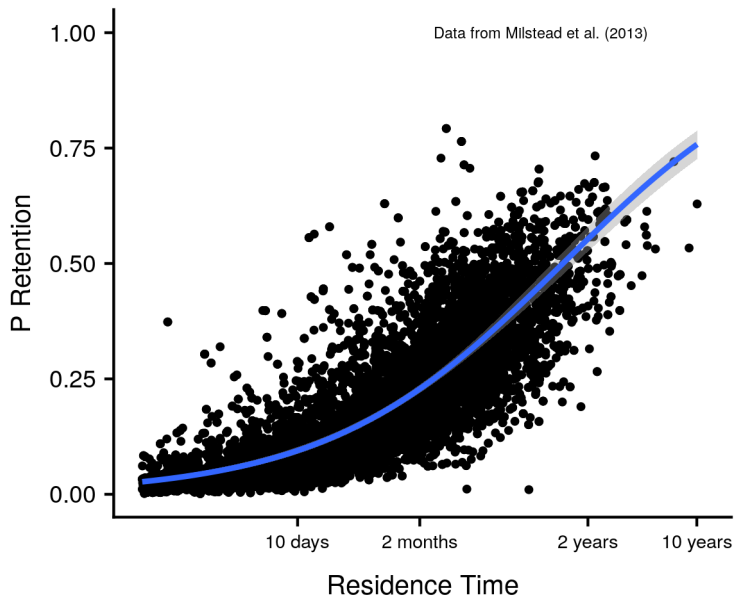


[Bhatt et al., 2014]

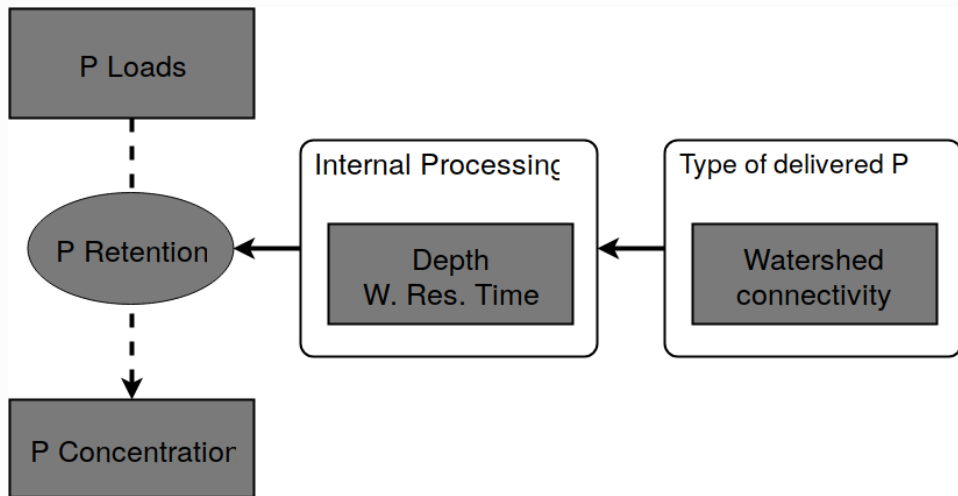
P RETENTION CONCEPTUAL MODEL



P RETENTION VERSUS WATER RESIDENCE TIME



EXTENDING P RETENTION MODELS

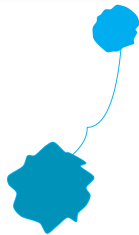


MULTIPLE WAYS TO DEFINE CONNECTIVITY

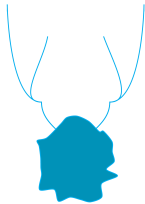
Low Connectivity

High Connectivity

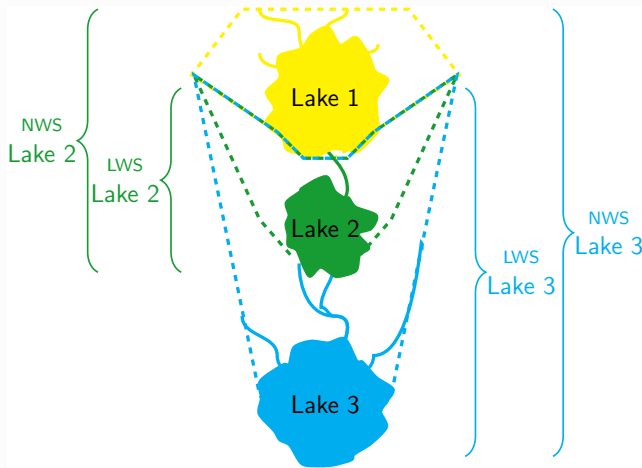
Closest Lake Distance: Network distance to the closest upstream lake.



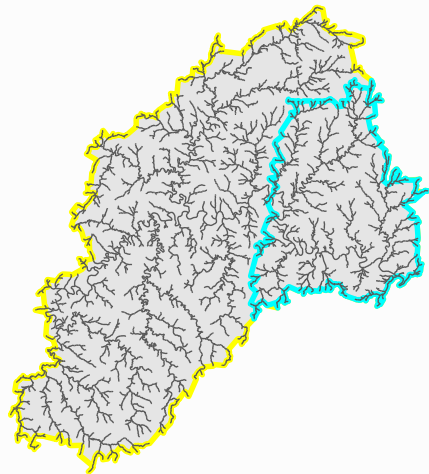
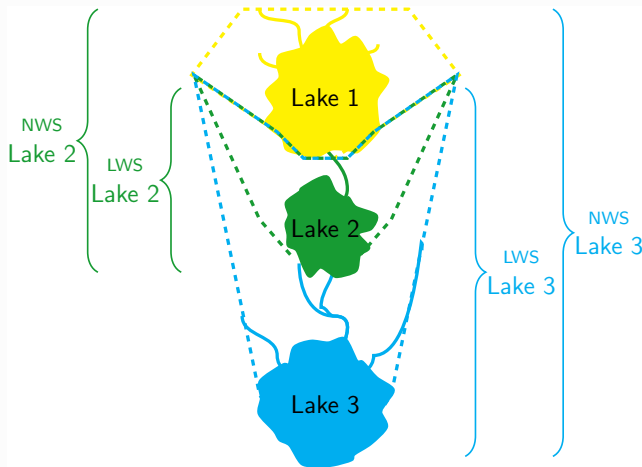
Average Link Length: Sum of the total length of stream reaches between junctions divided by the total number of reaches.

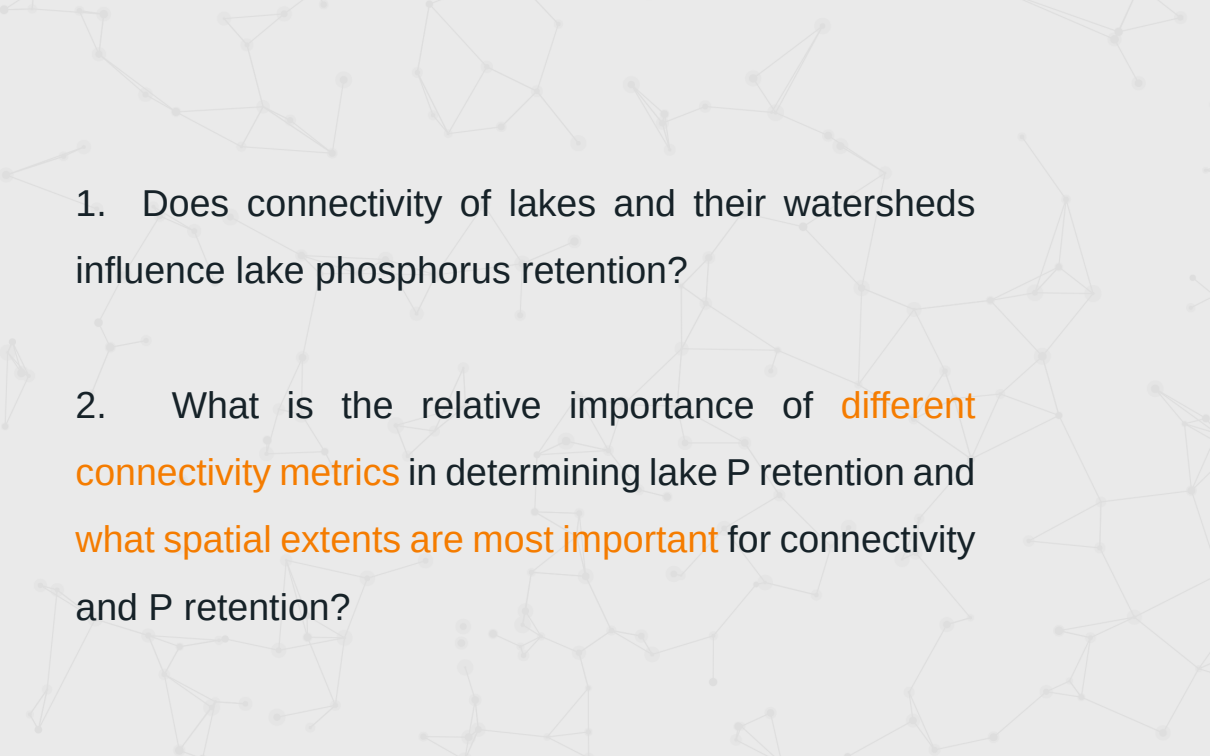


WATERSHED CONNECTIONS



WATERSHED CONNECTIONS

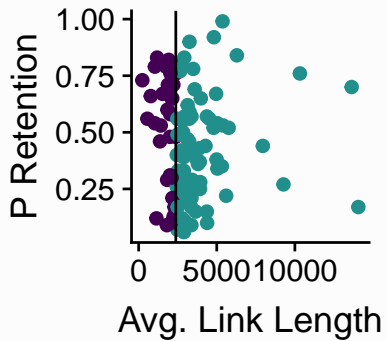
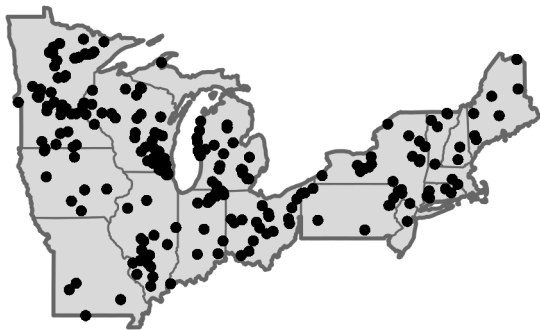


A faint, light gray background pattern consisting of a network of interconnected nodes and lines, resembling a molecular structure or a complex web, covering the entire slide.

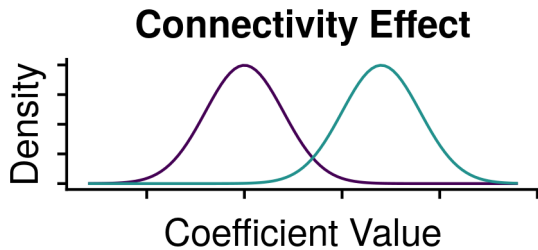
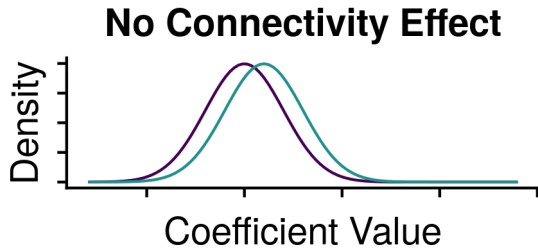
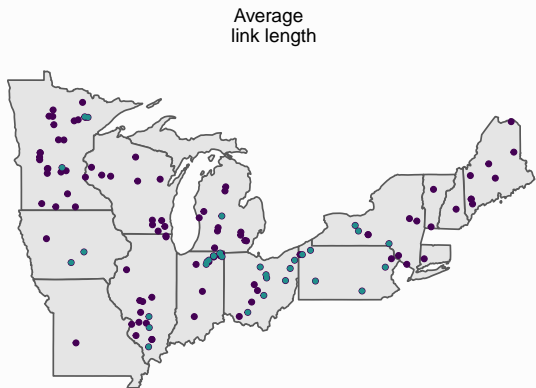
1. Does connectivity of lakes and their watersheds influence lake phosphorus retention?

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

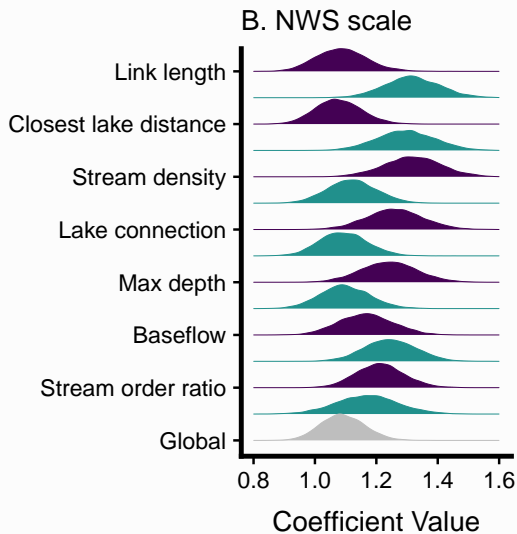
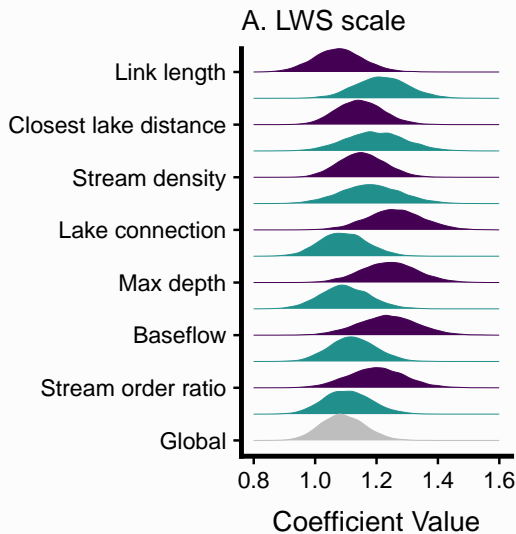


METHODS - P RETENTION MODELLING

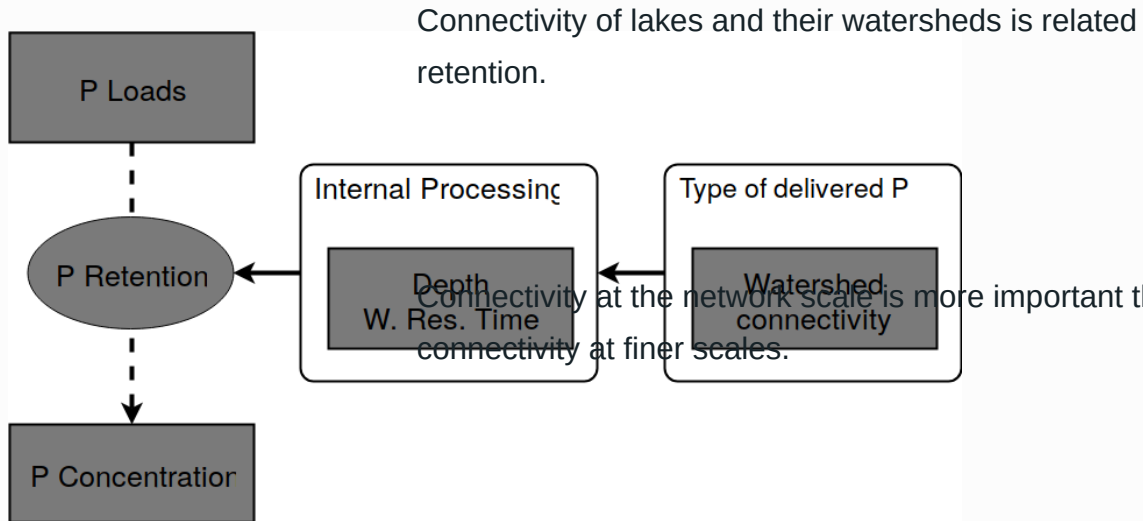




P RETENTION (PROCESSING) COEFFICIENT DISTRIBUTIONS



CONCLUSION



IMPLICATIONS

- WS:LA ratio



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