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Nitrogen, phosphorus, and harmful algal blooms

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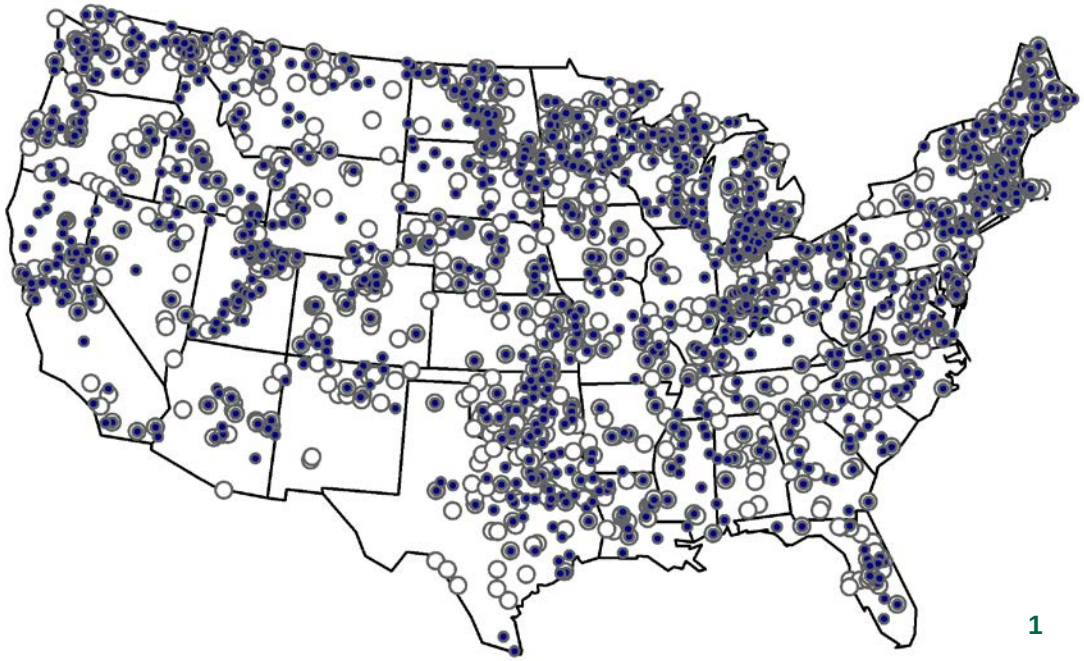
National Lakes Assessment

- Continental-scale spatial coverage of samples
- Uniform sampling protocols applied to all lakes
- 2 cycles of samples completed (2007 and 2012)



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EPA statistical analysis

- Estimate relationships between nutrient concentrations and cyanobacteria biovolume, and nutrient concentrations and microcystin.

- Preliminary results suggest TN and TP are strong predictors of cyanobacteria biovolume and microcystin.

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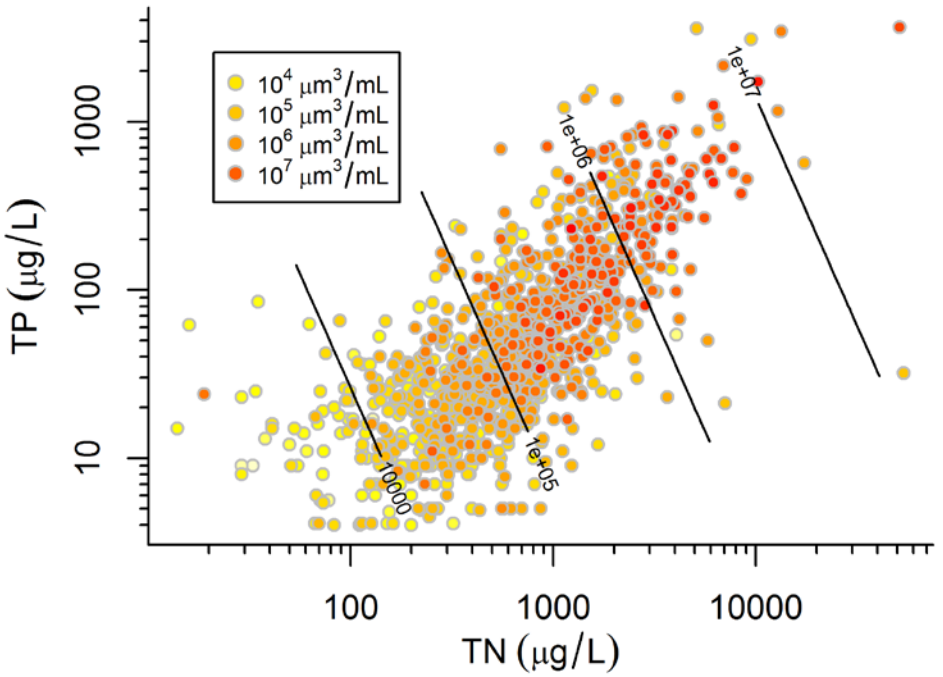
Relationship between cyanobacteria biovolume, TN, and TP

- Strong relationship between cyano biovolume, TN, and TP
- TN and TP account for 77% of the variability in cyano biovolume
- TN accounts for more variability than TP.



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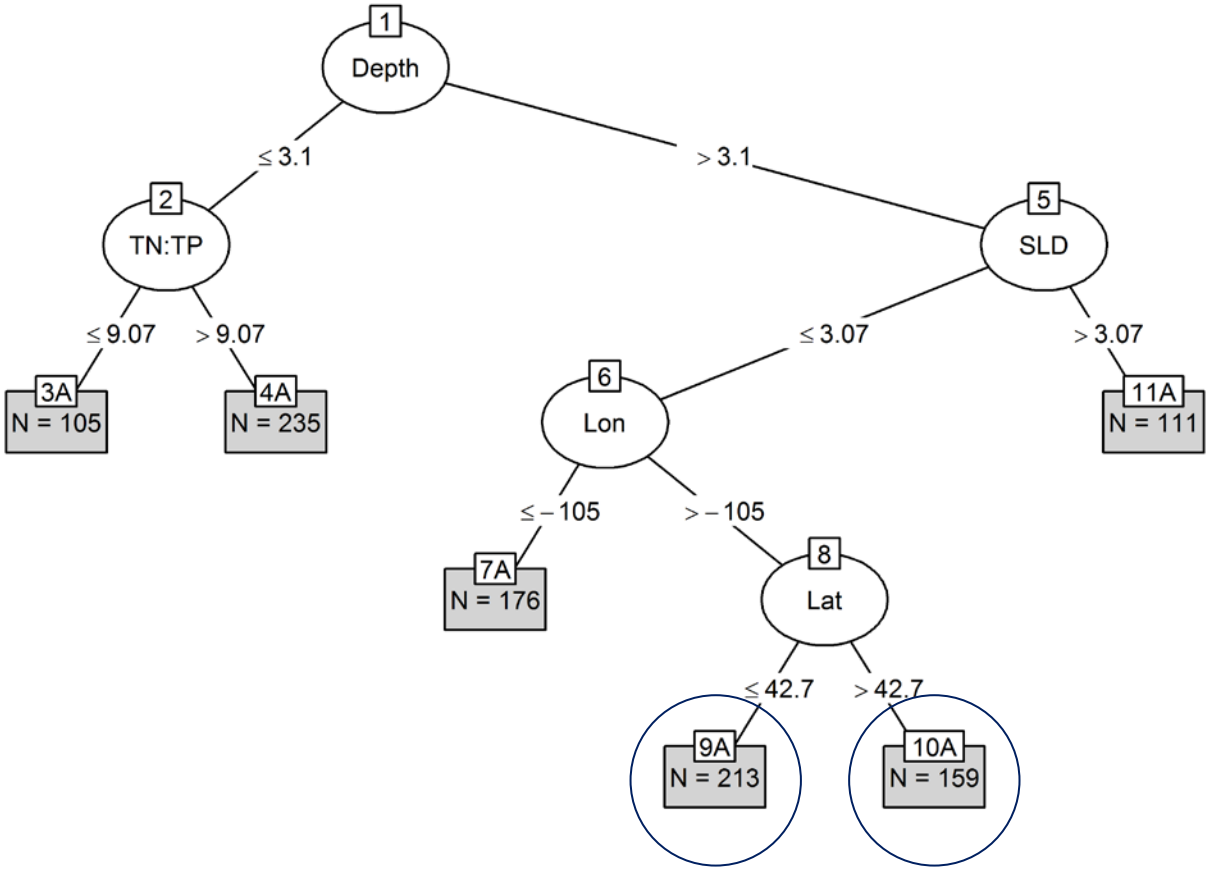
Do relationships change for different types of lakes? A preliminary classification scheme



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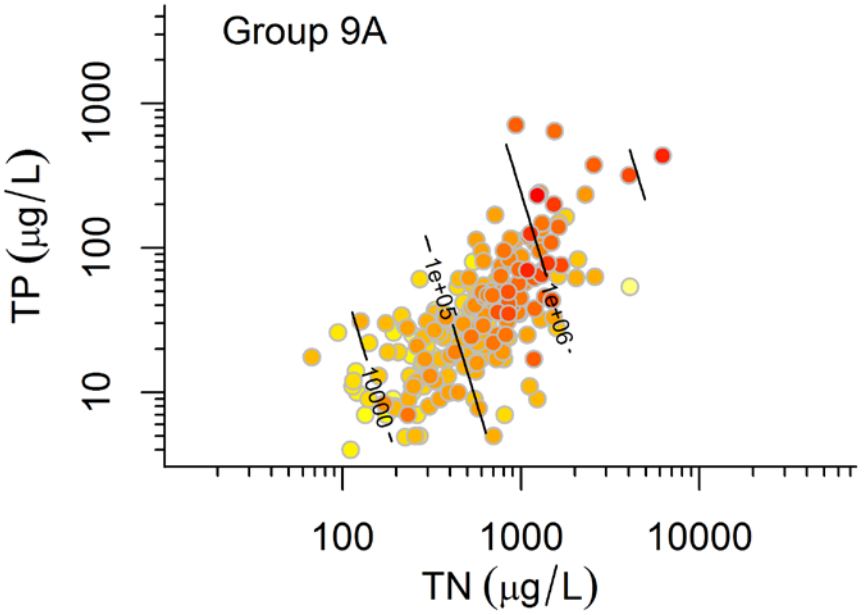
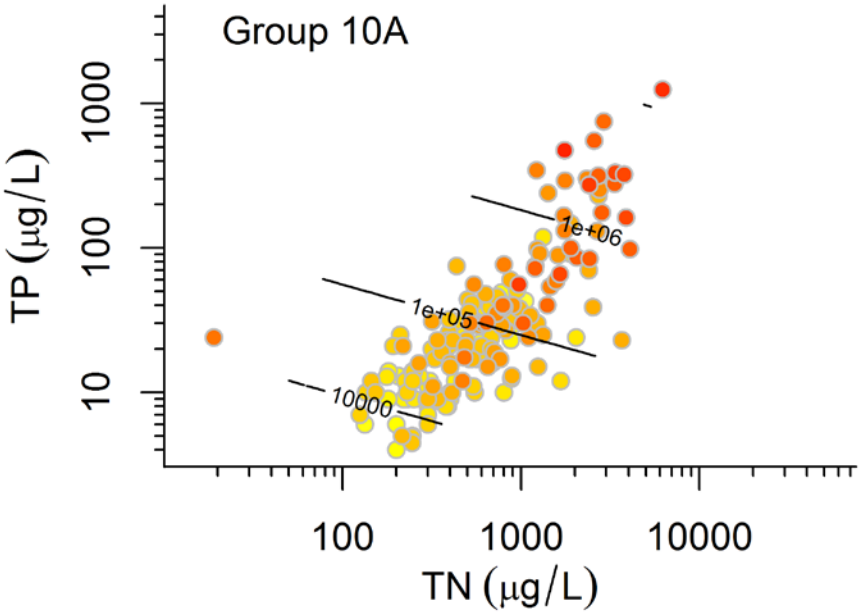
Examples of relationships within different lake-groups





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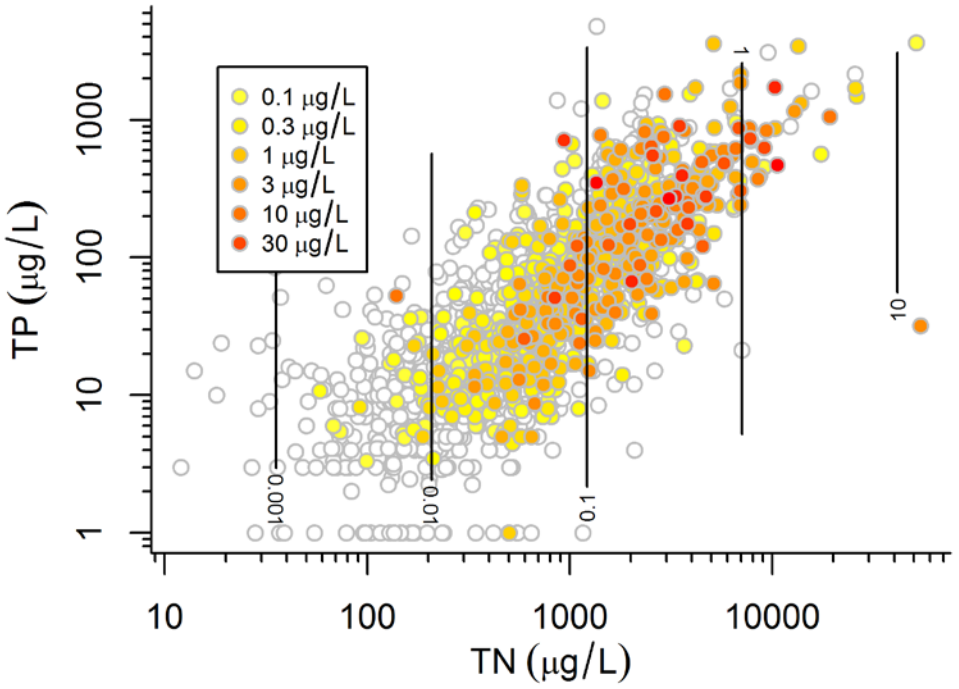
Relationship between microcystin, TN, and TP

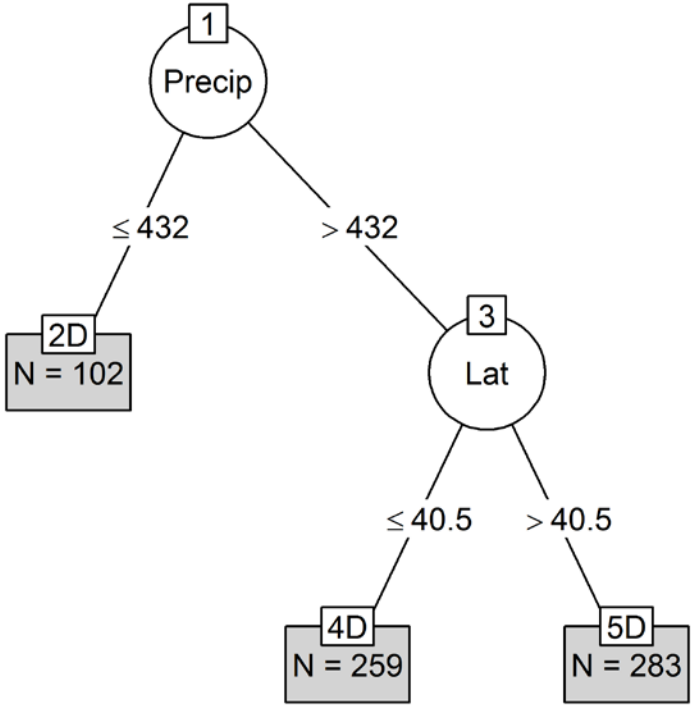
- Strong relationship with TN at national scale



Open circles indicate MC non-detects.

Preliminary classification scheme

- Smaller number of classes because of smaller dataset.
  - Precipitation and latitude define classes.



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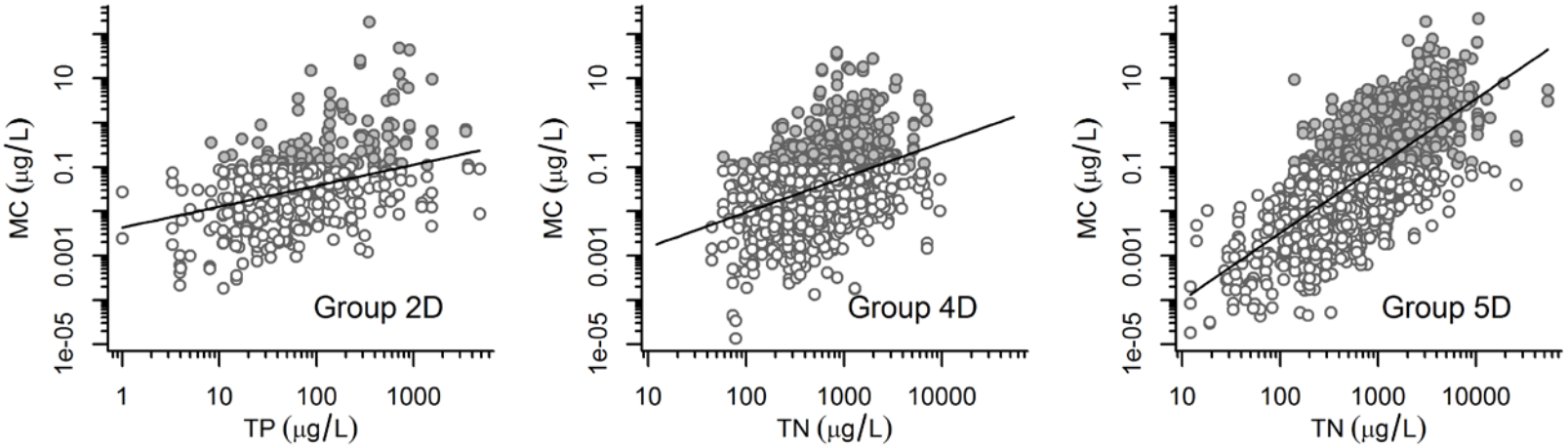
Relationships within lake groups



Filled circles: observed MC concentration
Open circles: Non-detects for MC

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Management of nutrients may be site-specific

- High loading rates of inorganic N loading may indicate the need for N control.
  - If excess N is readily available, even N-fixing cyanobacteria will preferentially use environmental N.

- High N-fixation rates (or low external N-loading) may indicate that P control will also reduce N concentrations.

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Questions?

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