Landscape scale risk assessment of cyanobacteria blooms in California lakes

Marcus W. Beck[1], Martha Sutula, Meredith Howard, Eric Stein

[1]Southern California Coastal Water Research Project, Costa Mesa, CA
marcusb@sccwrp.org, Phone: 714-755-3217

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Bioassessment in California

Wadeable streams are covered statewide

- Reference sites [Ode et al., 2016]
- Macroinvertebrate, algal integrity [Mazor et al., 2016], [Theroux et al., in prep]
- Expectations of constraints [Beck et al., in prep]
- Recent proposal of biological standards

California lakes

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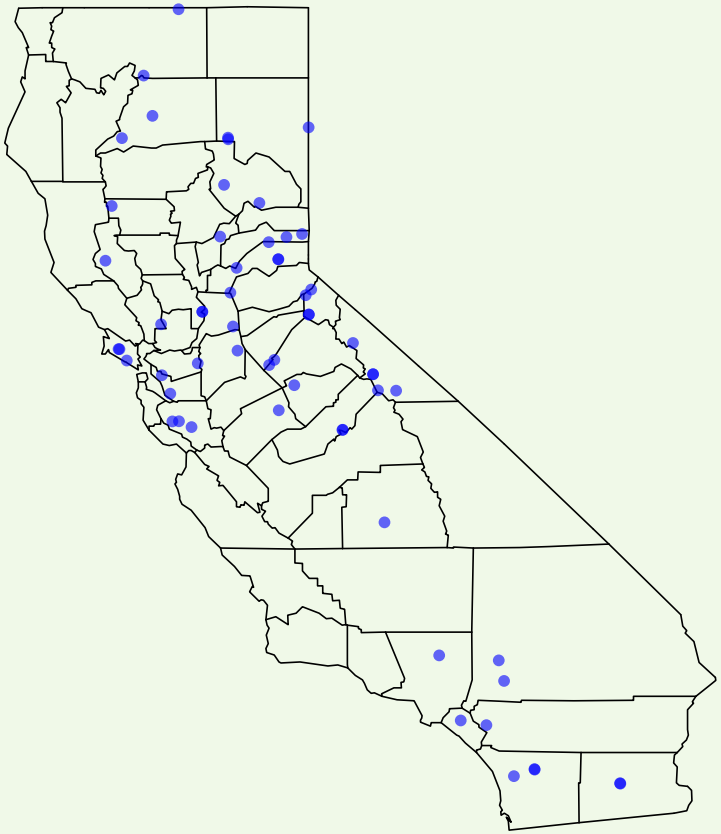
Goal: evaluate the relative risk of lakes in California of exceeding a eutrophication endpoint that is related to bloom occurrence

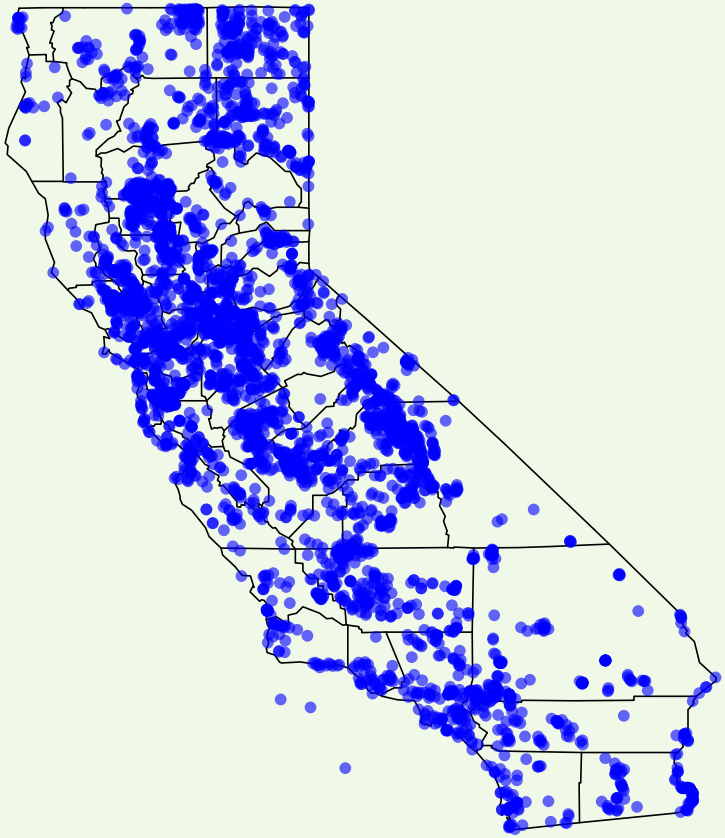
Available data

Limited *in situ* data for California, tons of watershed data

NLA07, NLA12: 59 lakes



LakeCat: 4924 lakes



[USEPA (US Environmental Protection Agency), 2009,

USEPA (US Environmental Protection Agency), 2017, Hill et al., 2018]

Modelling approach

A four-step approach to make statewide inferences from a limited dataset:

1. Develop link between chlorophyll and microcystin

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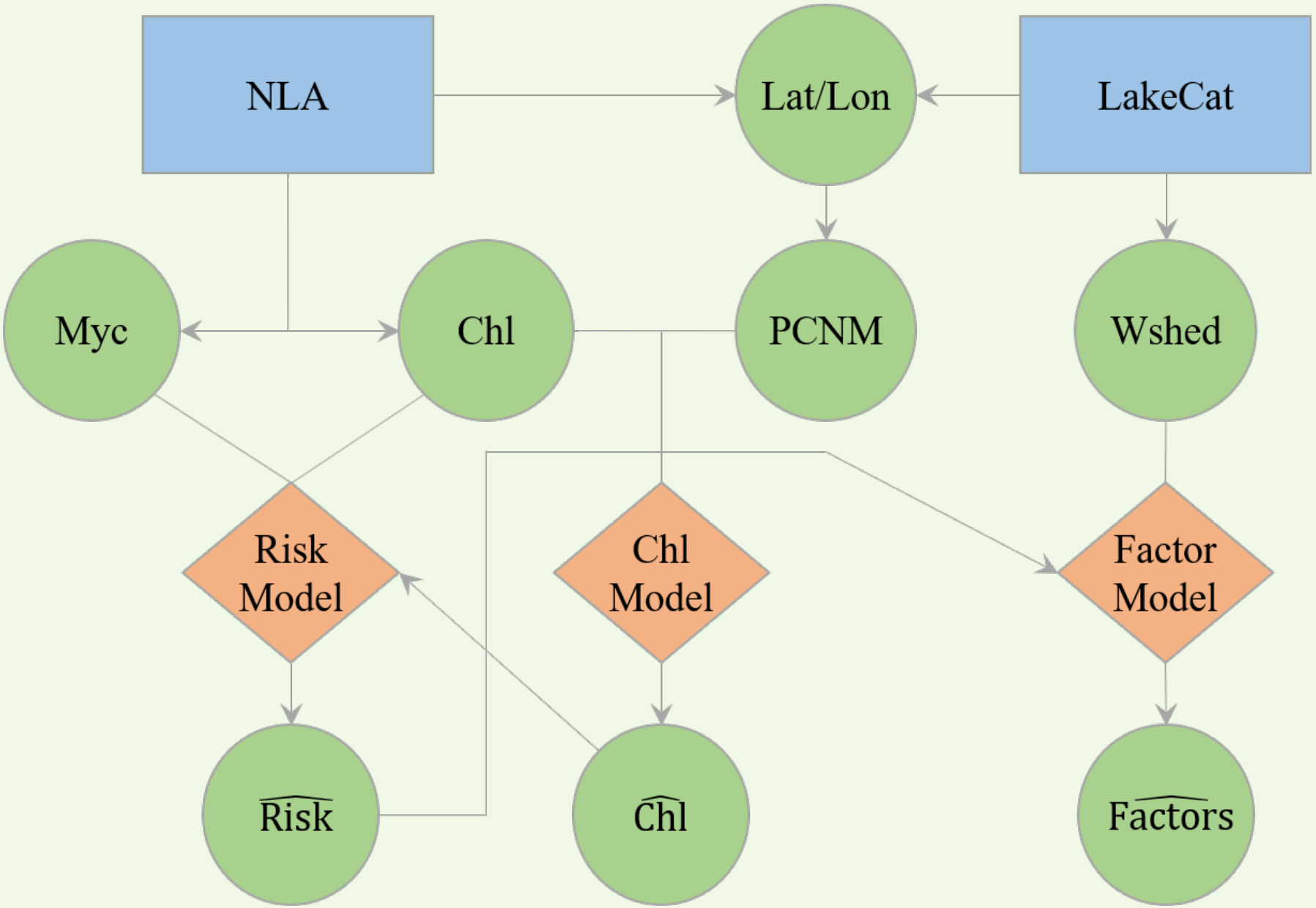
An exercise in diminishing returns...

Modelling approach



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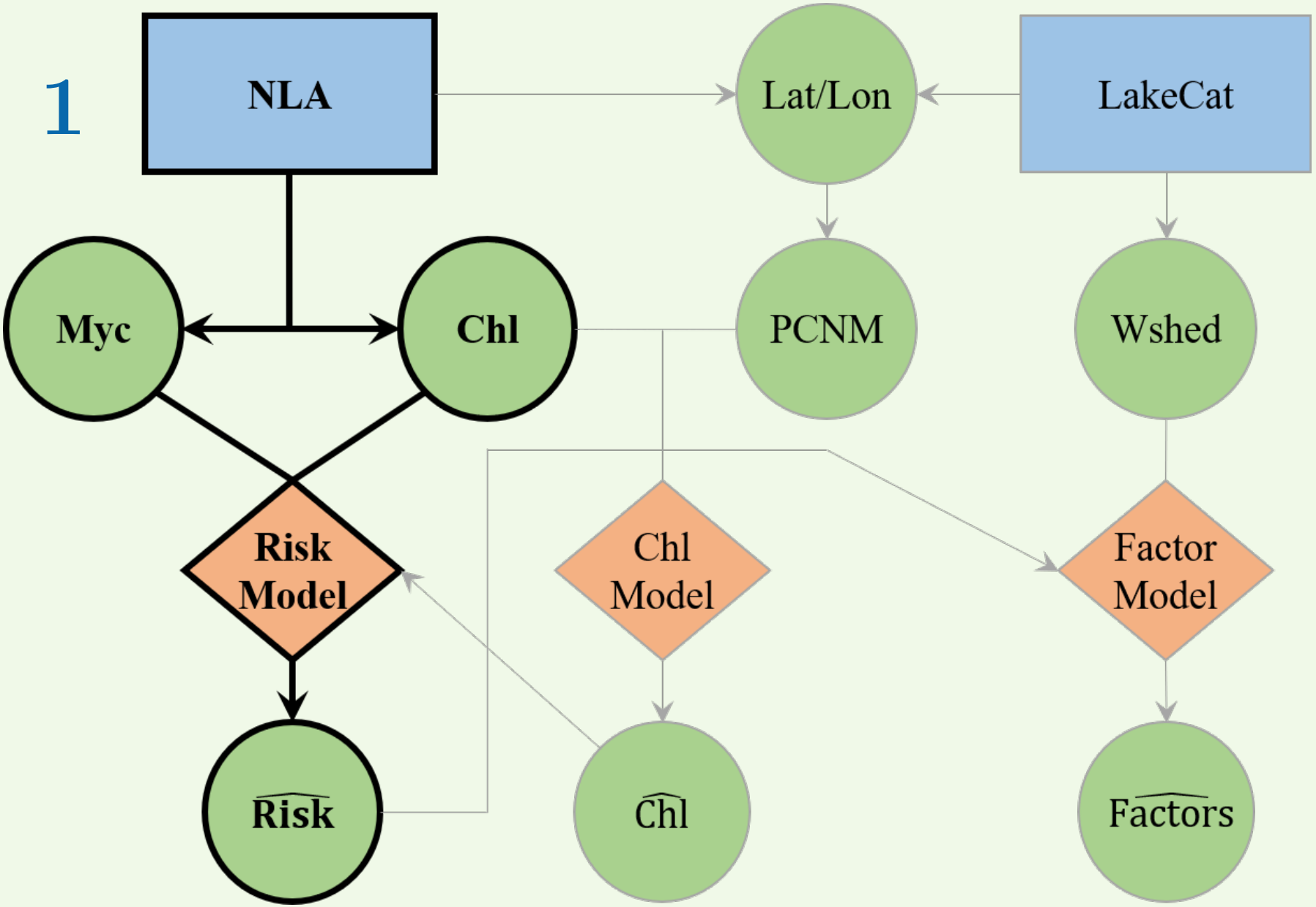

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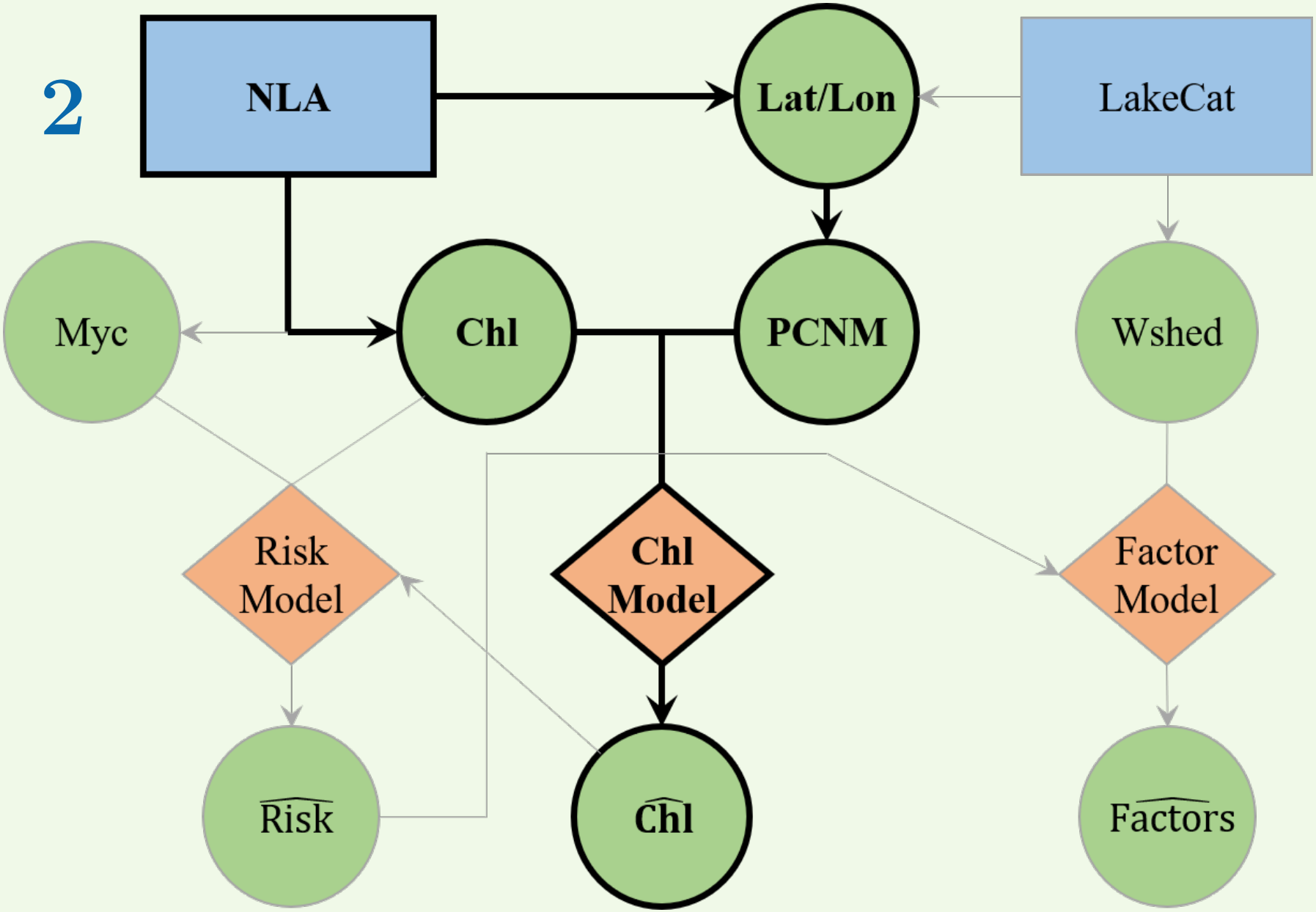

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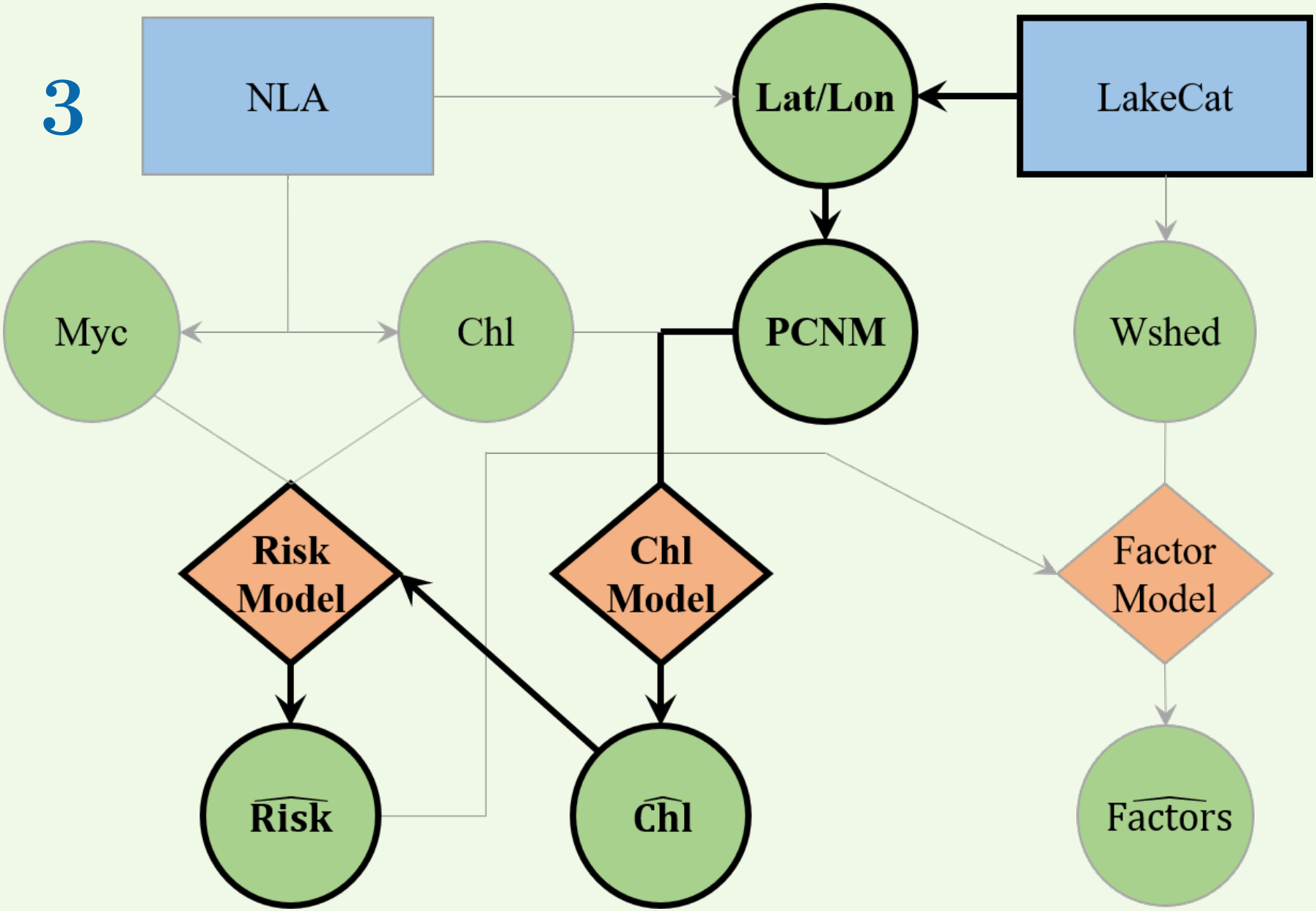

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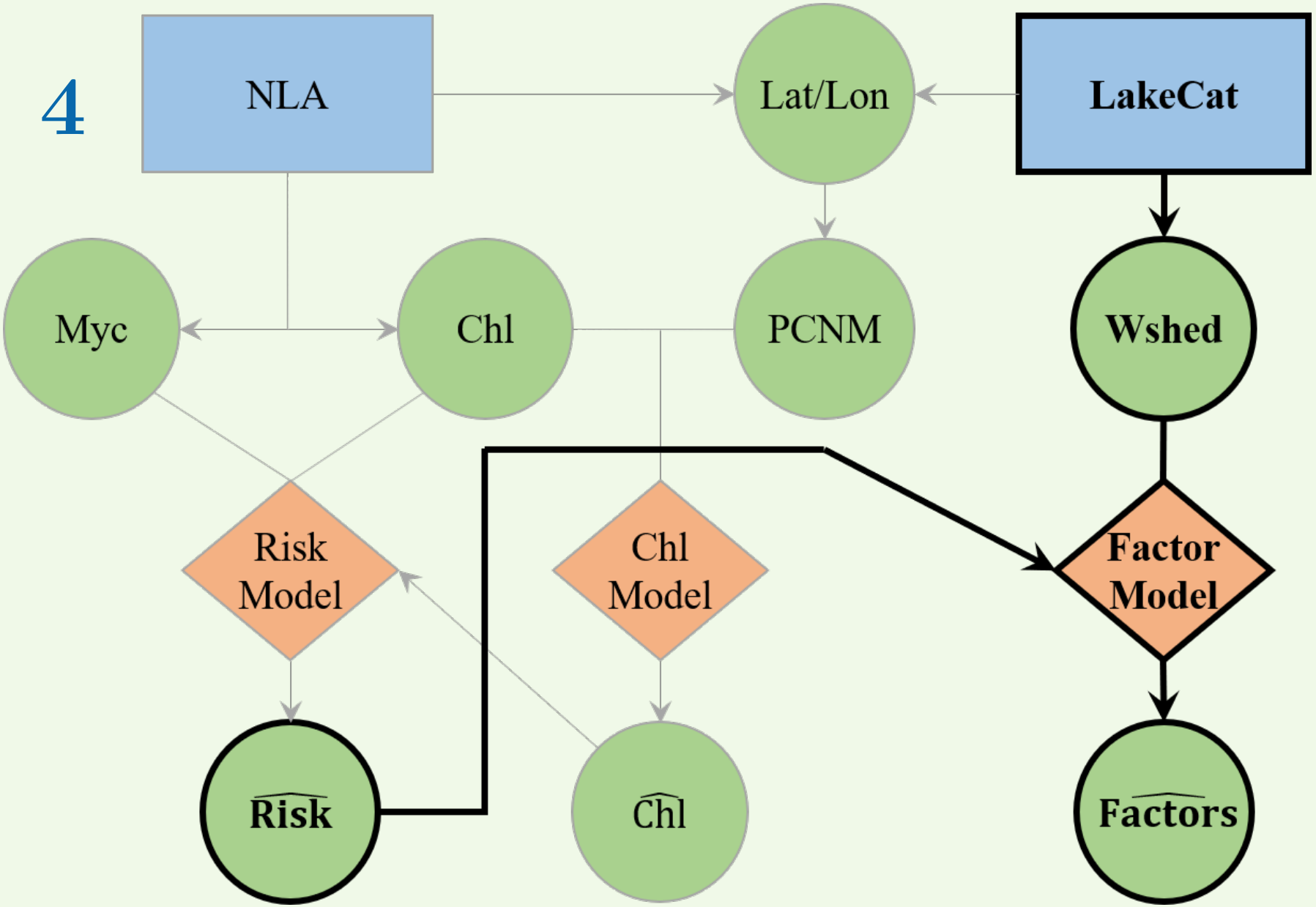

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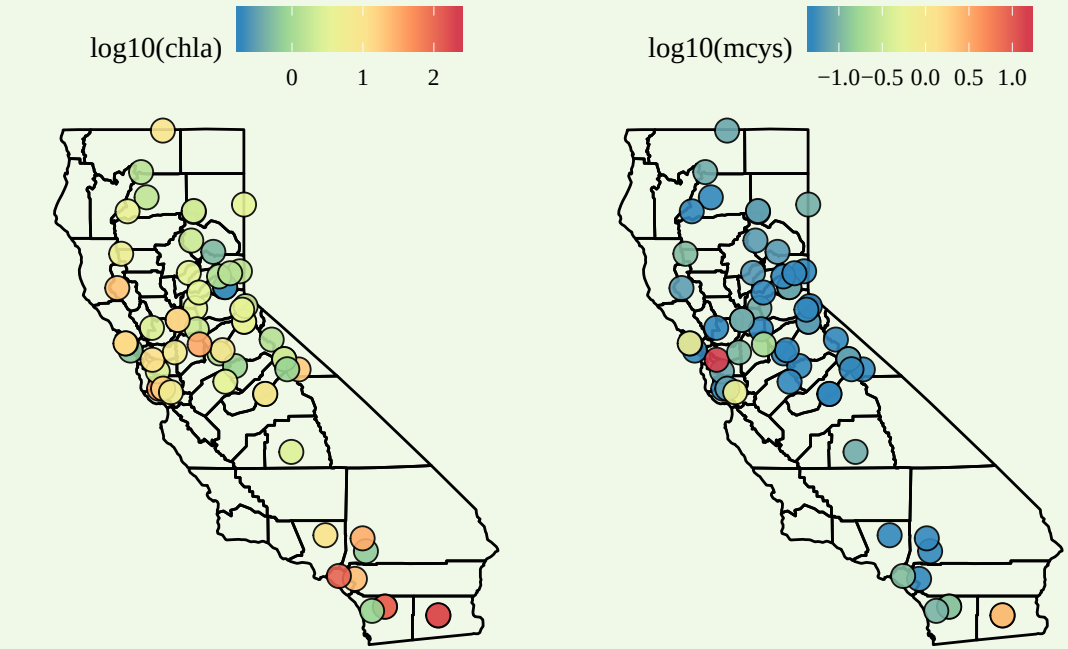
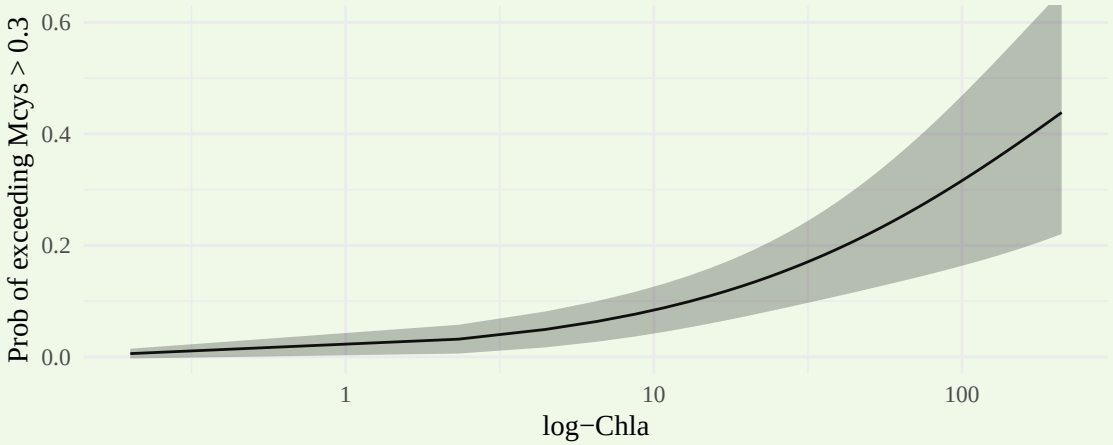
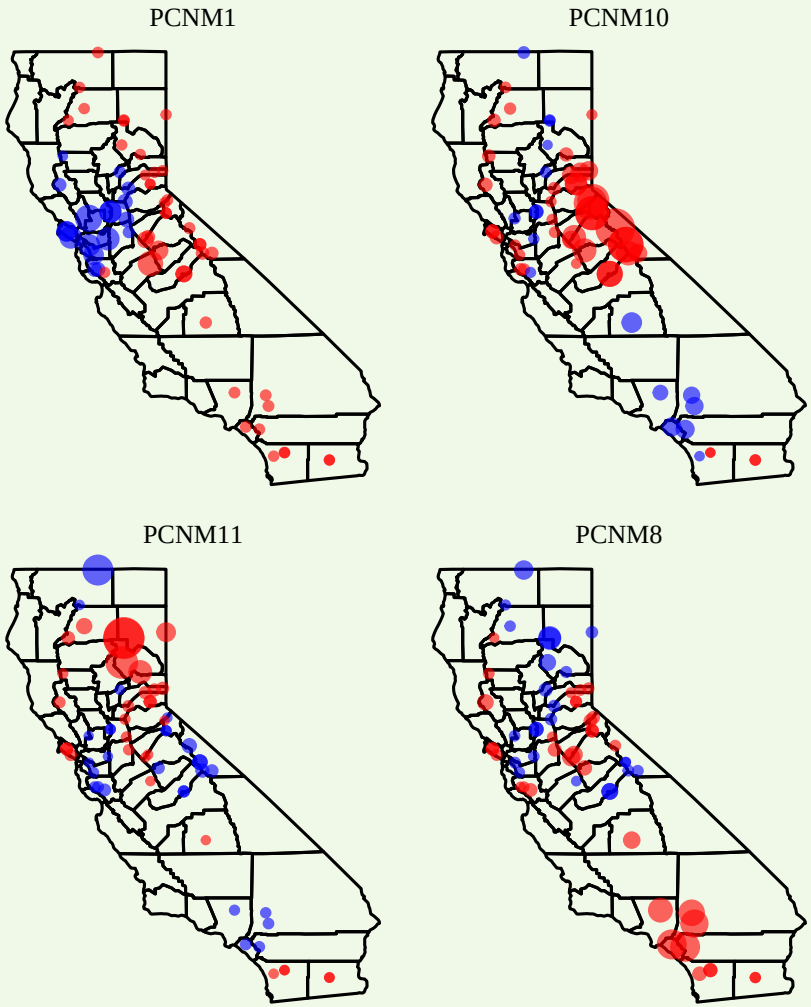


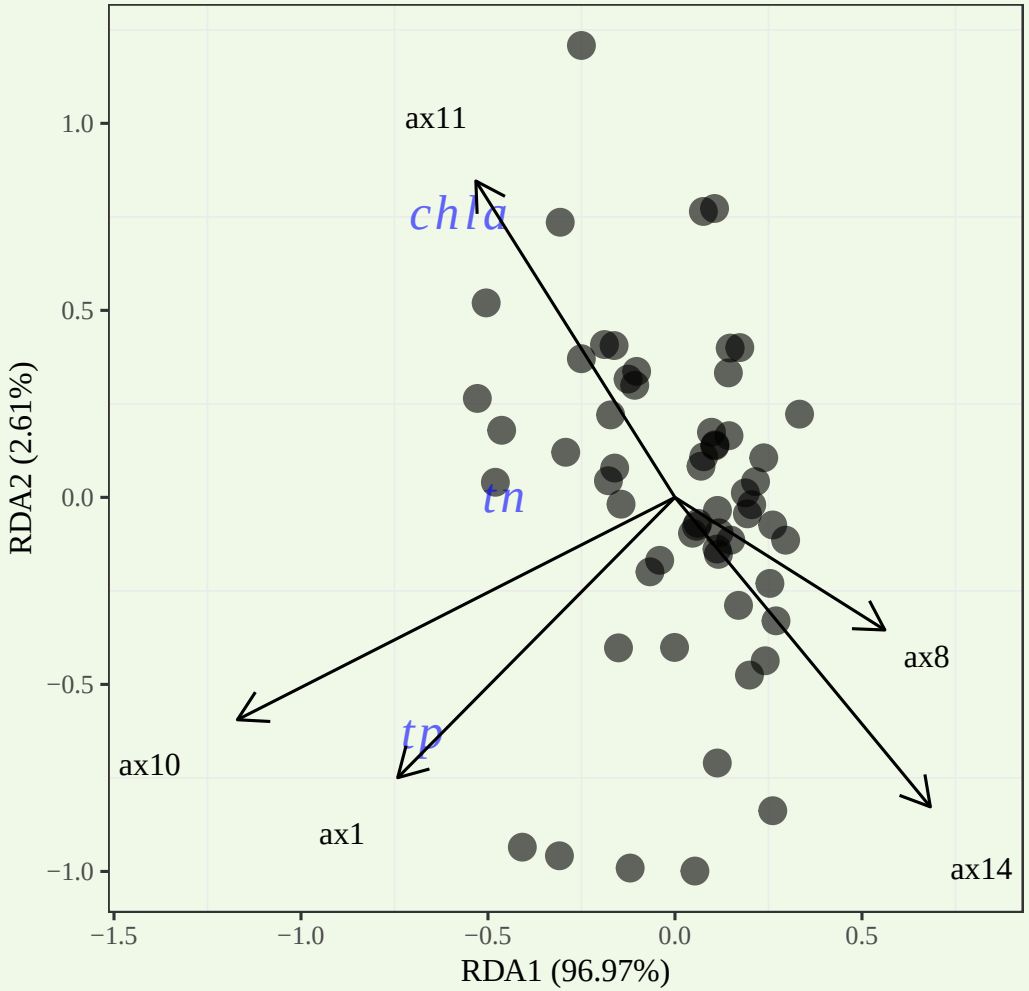


- *In situ* NLA data
- Build a simple model of the likelihood of exceeding some threshold
- WHO criteria for children drinking water

2) Link between chlorophyll and location

Making data using a spatial PCA





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Results

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Issues and future work

Assumptions and limitations

Issues and future work

Alternative data acquisition

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Blake Schaeffer (USEPA, ORD) for CyAN data

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marcusb@sccwrp.org, 7147553217

GitHub (project): https://github.com/fawda123/cali_lake

GitHub (presentation): https://github.com/fawda123/SFS_2018

Twitter: @fawda123

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