

Comparison of WRTDS and GAMs for evaluating long-term trends in chlorophyll

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Today's call

- Motivation for the analysis
- Site selection
- Exploratory evaluation of trends
- Initial applications of WRTDS/GAMS
- Group discussion (and throughout)

Study motivation

- WRTDS and GAMS recently used to evaluate water quality trends in tidal waters
- The relative values of each approach have not been evaluated - empirical description, desired products
- Comparisons could inform use of each model for management/restoration or for describing long-term changes

Goal: Provide a description of the relative abilities of GAMS and WRTDS to describe long-term changes in time series of response endpoints in tidal waters

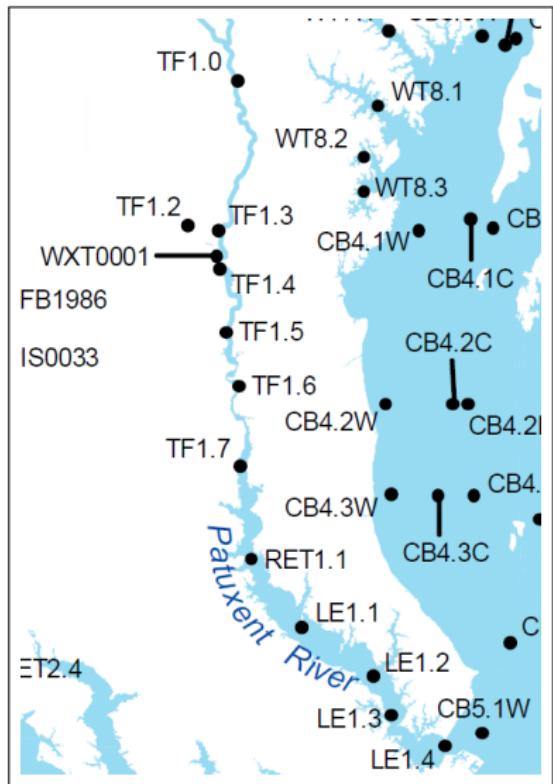
Objectives

- Provide a narrative comparison of the statistical foundation, both as a general description and as a means to evaluate water quality trends
- Use each technique to describe water quality changes in a common dataset with known historical changes in water quality drivers
- Compare each technique's ability to describe changes, as well as the differences in the information provided by each
- Apply to simulated data to evaluate the ability to reproduce flow-normalized trends

Site selection

Monitoring stations in the Patuxent River Estuary...

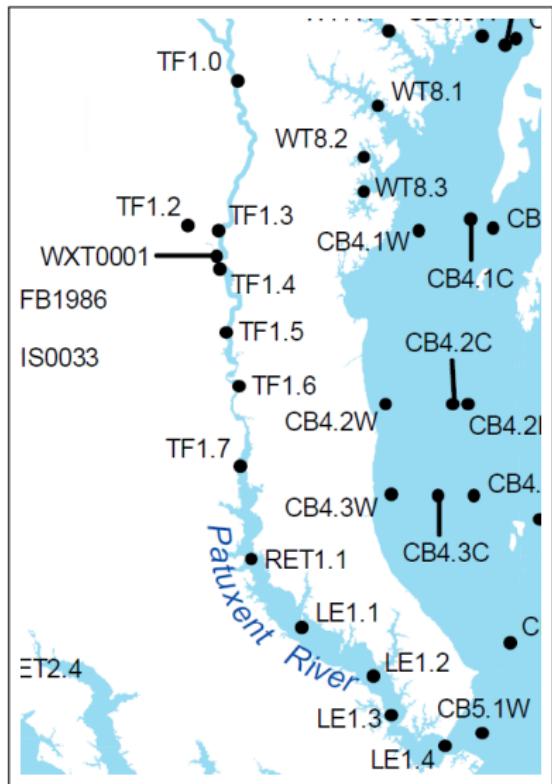
- longitudinal gradient from watershed to mainstem influences
- hurricane impacts
- well-studied (Testa, Kemp, Hagy, etc.)



Site selection

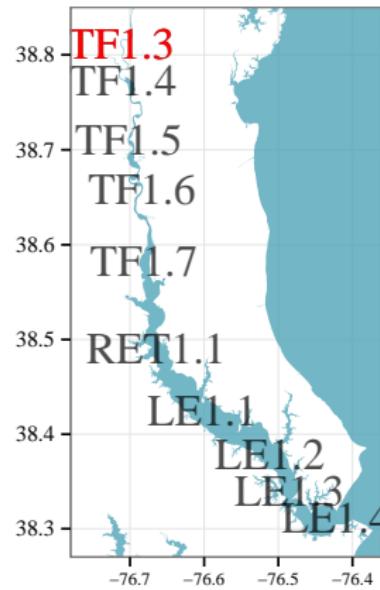
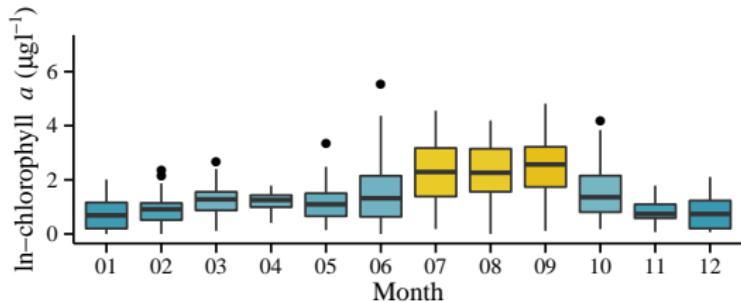
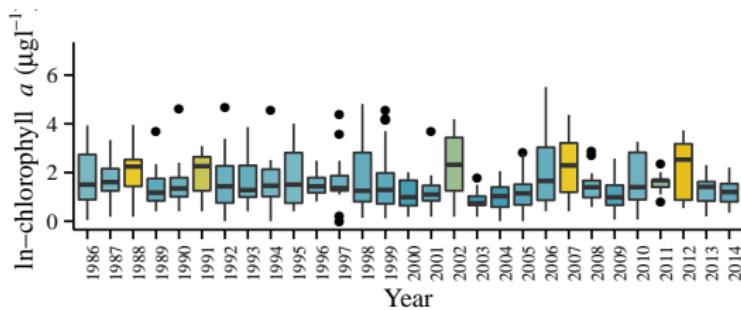
Monitoring stations in the Patuxent River Estuary...

- TF1.7, LE1.1 based on data distribution - monthly from 1986 – 2014
- surface chlorophyll only (okay?)
- vertically integrated salinity
- No detection limit issues



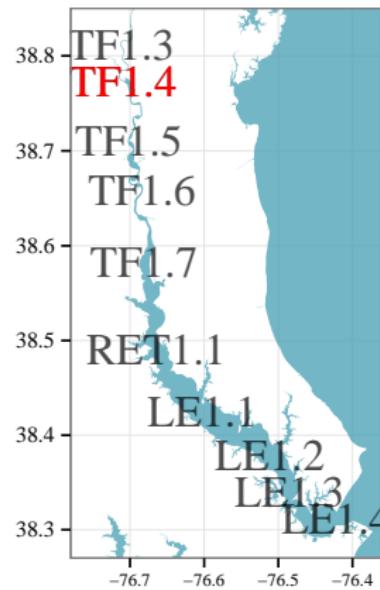
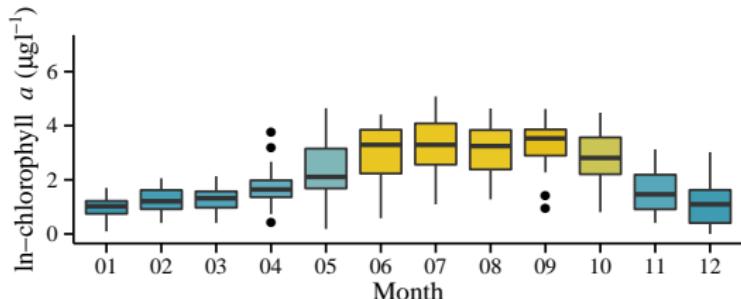
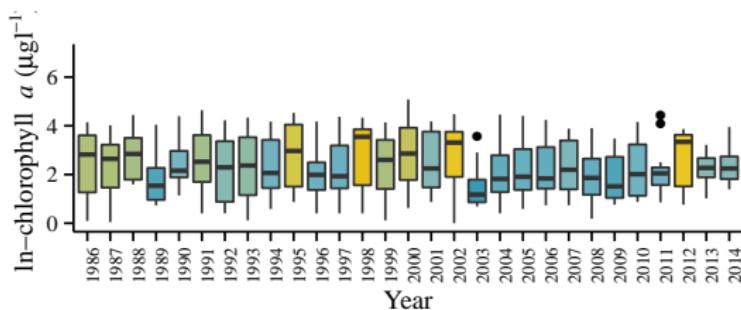
Some exploratory graphs

Summaries of annual and seasonal trends by station



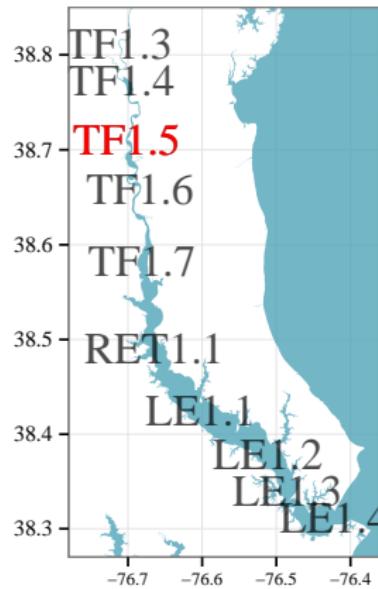
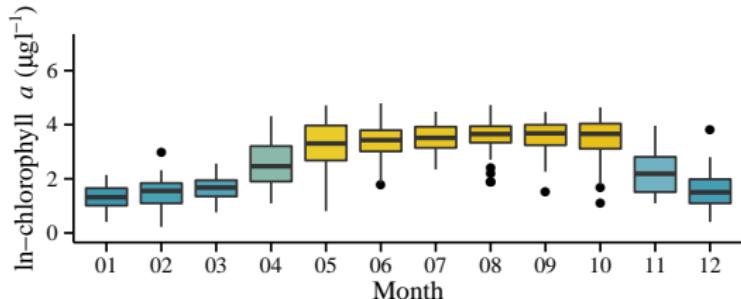
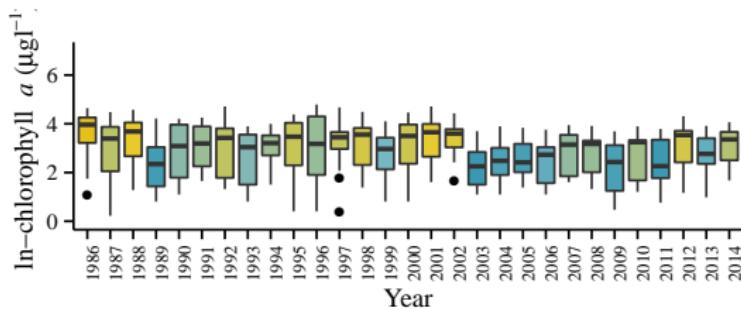
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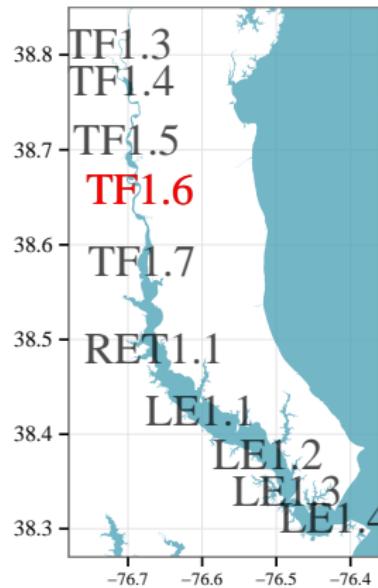
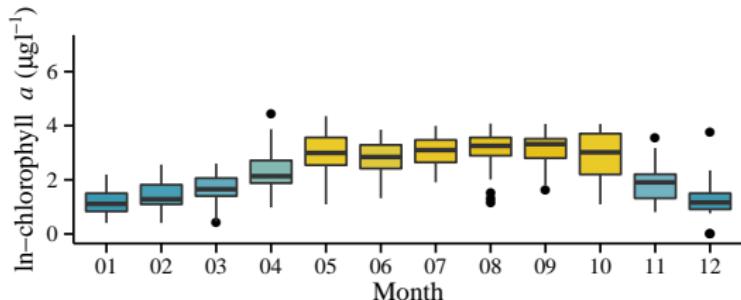
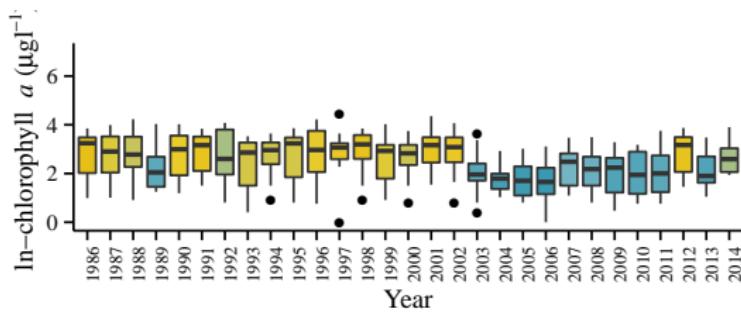
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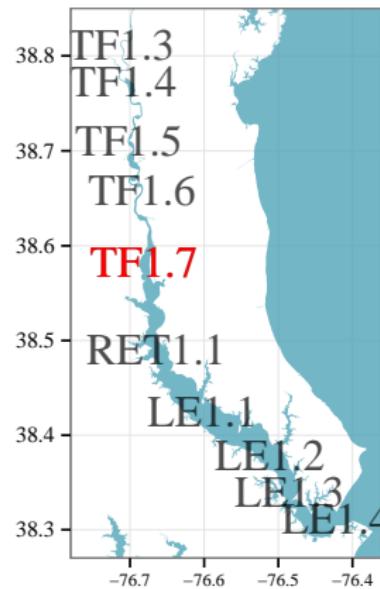
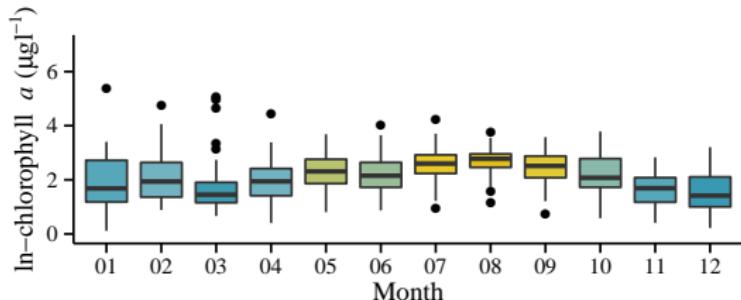
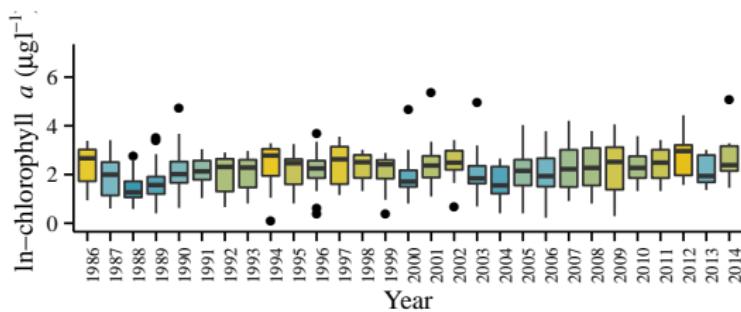
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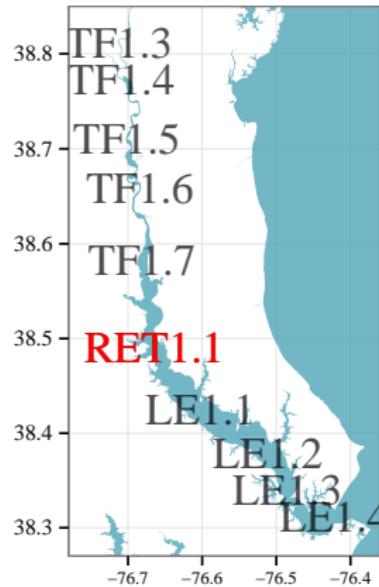
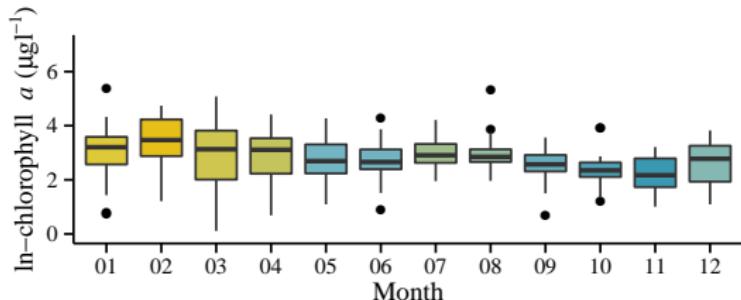
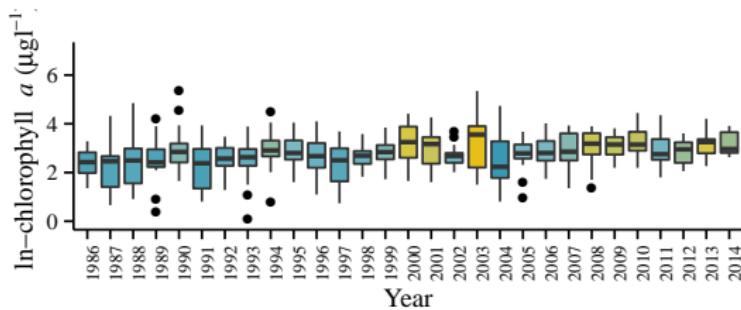
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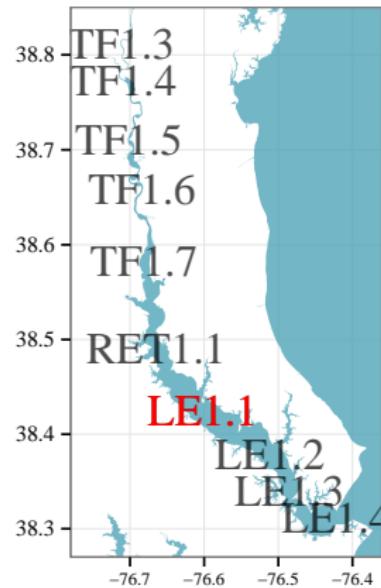
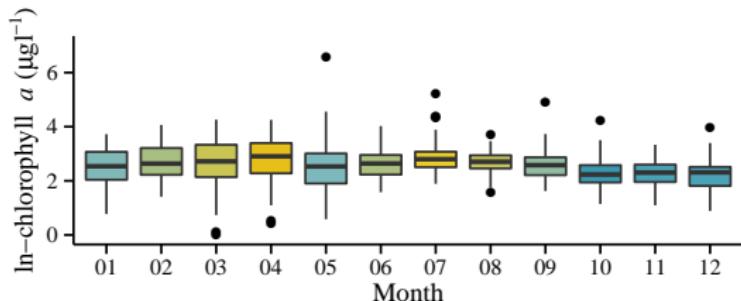
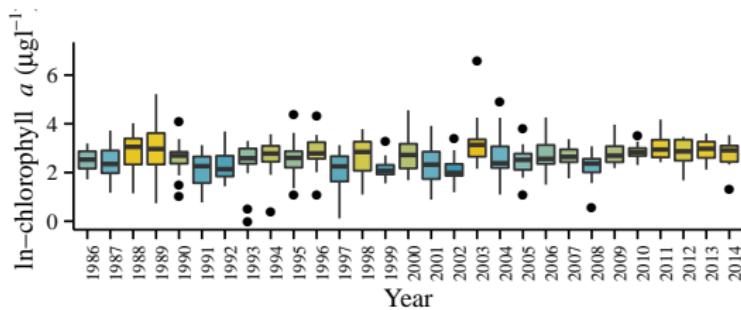
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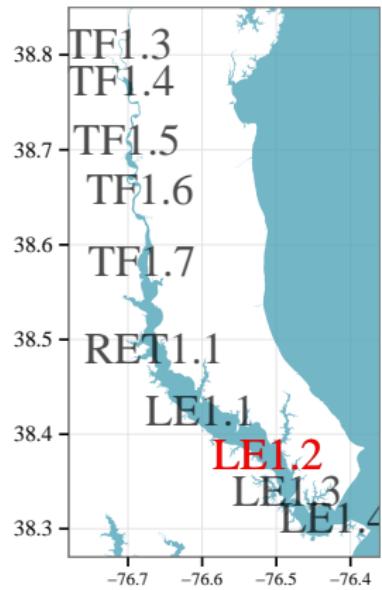
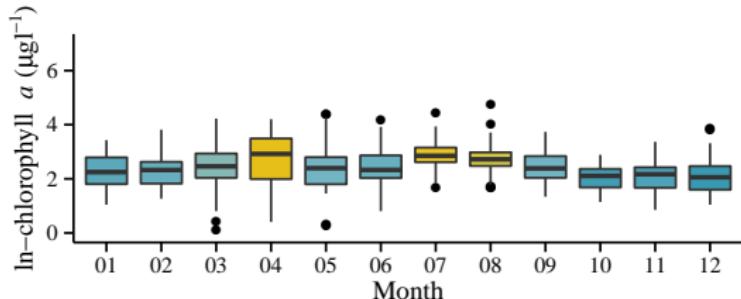
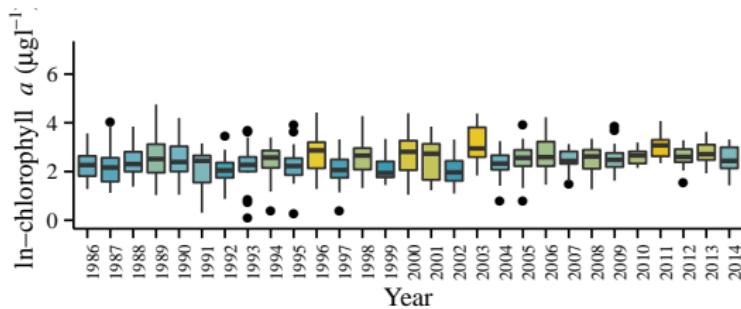
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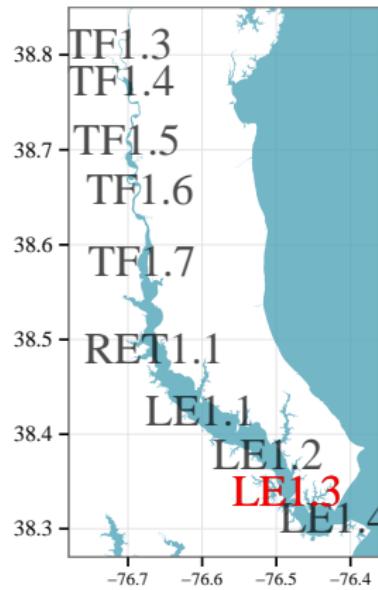
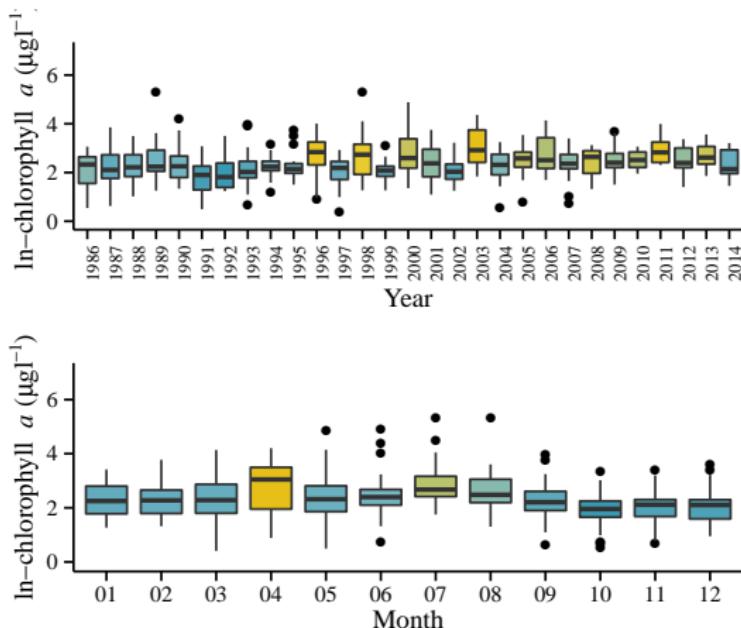
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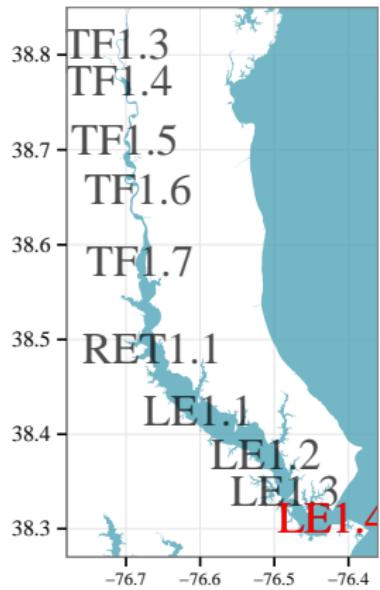
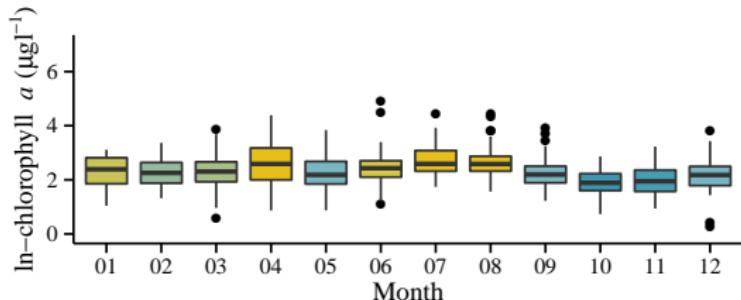
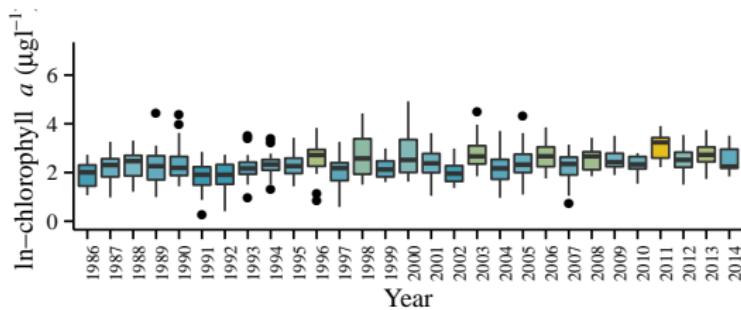
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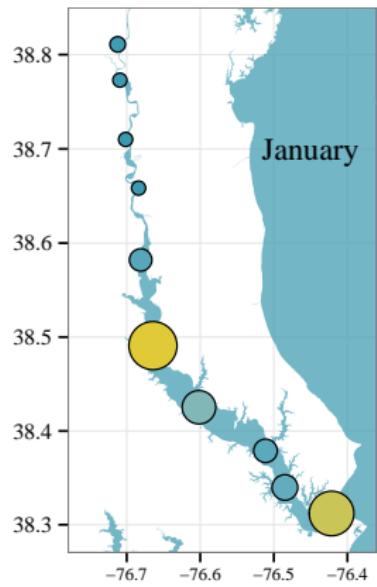
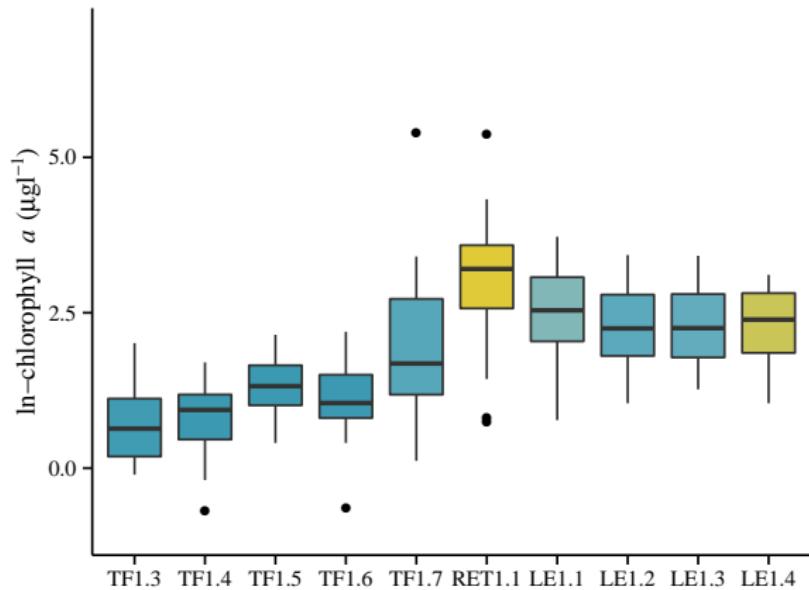
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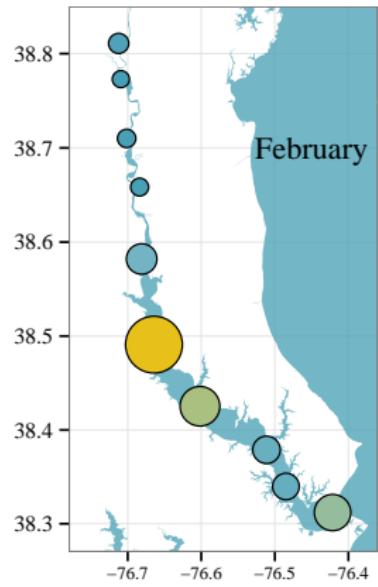
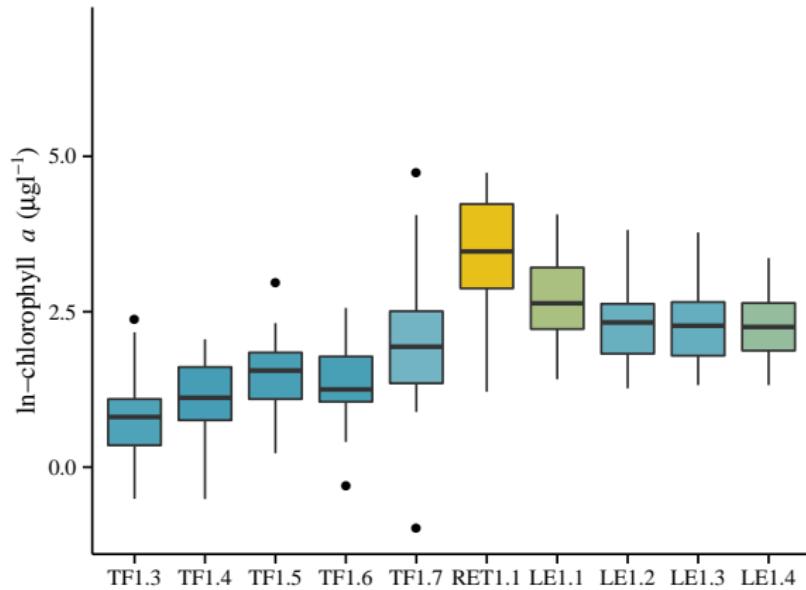
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Chlorophyll changes by month, annual aggregations



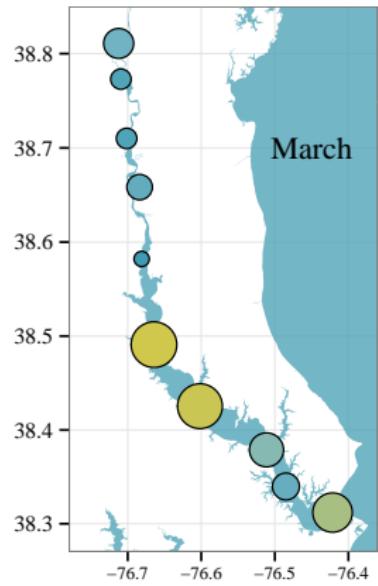
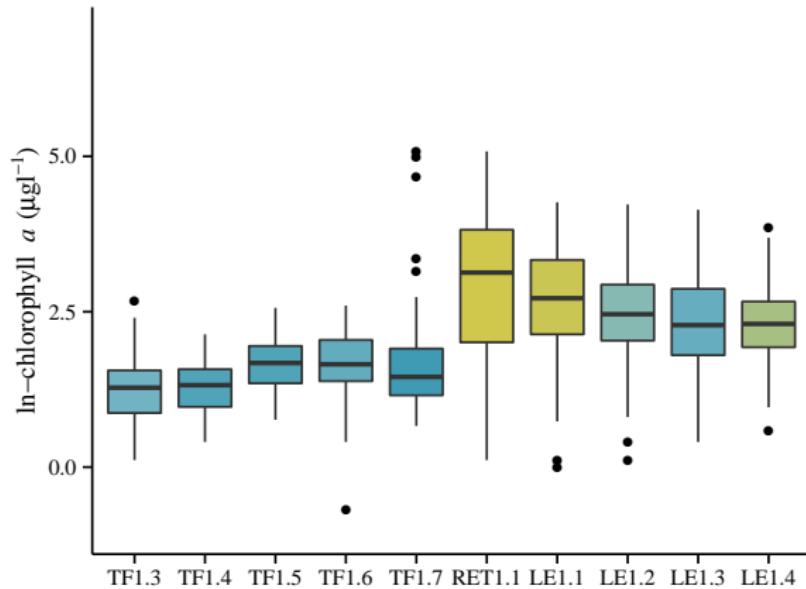
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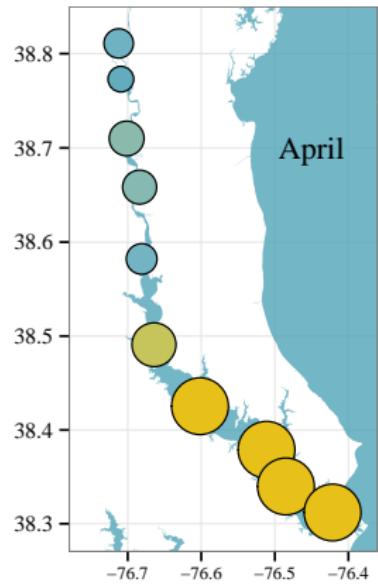
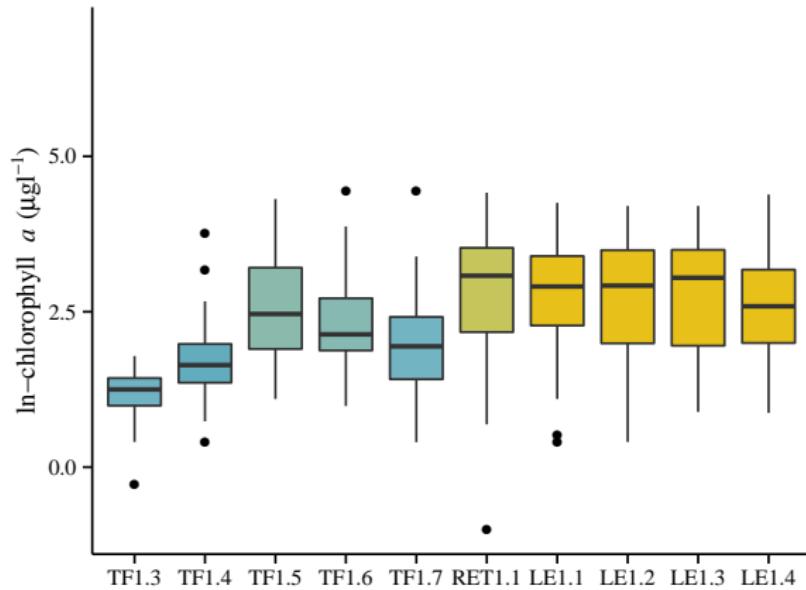
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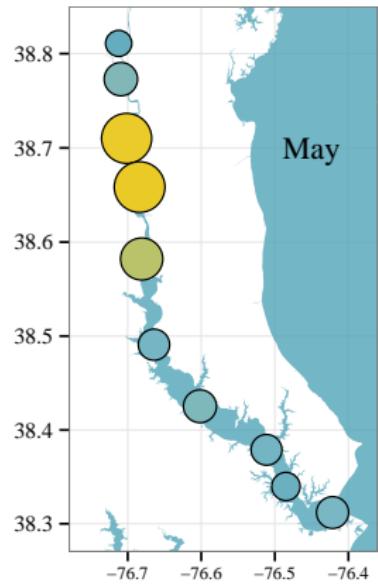
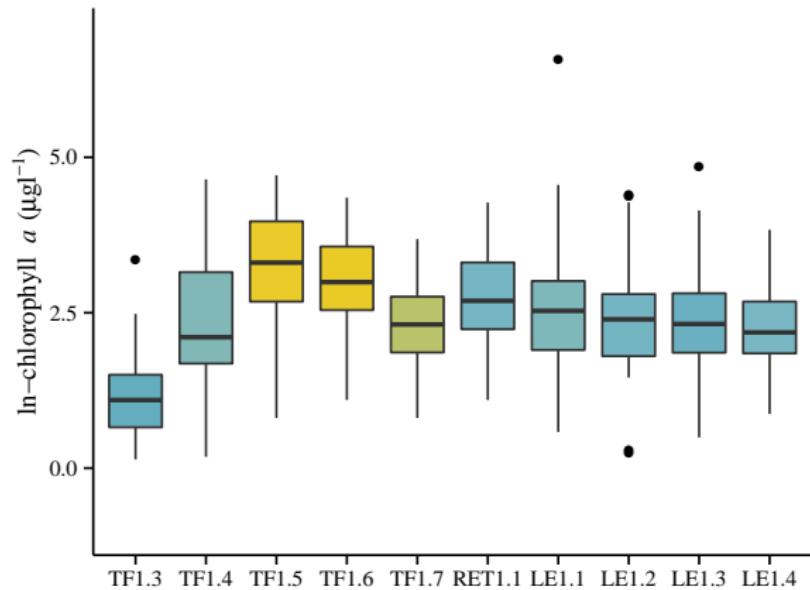
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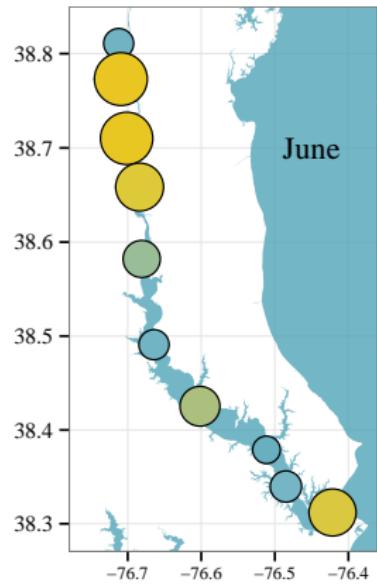
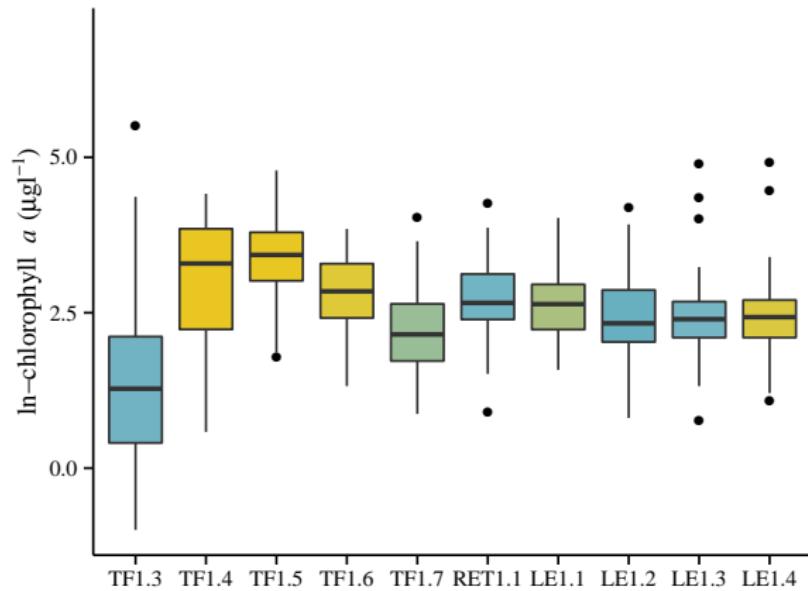
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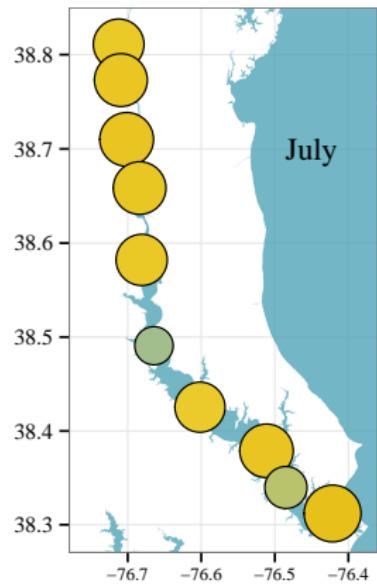
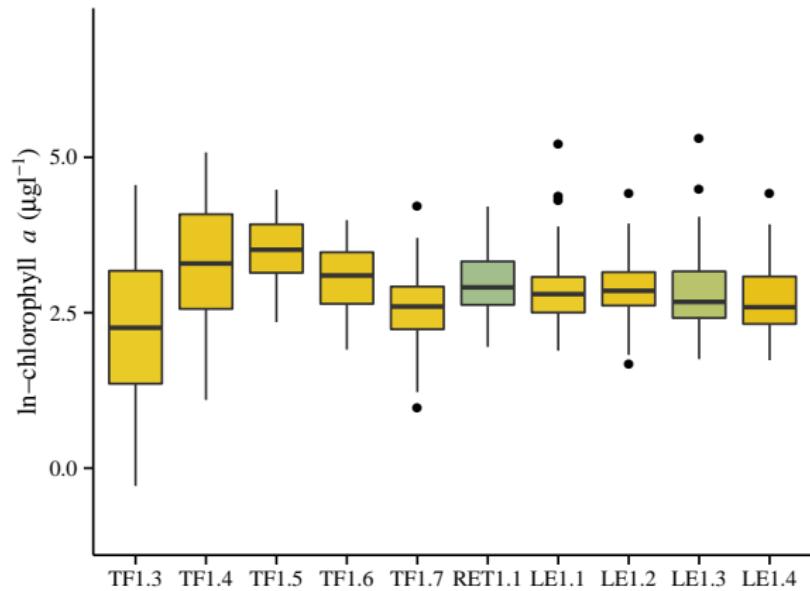
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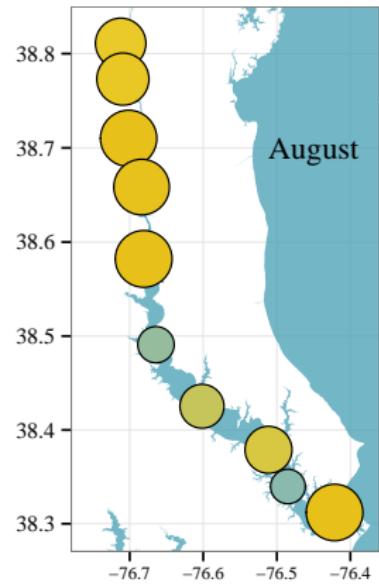
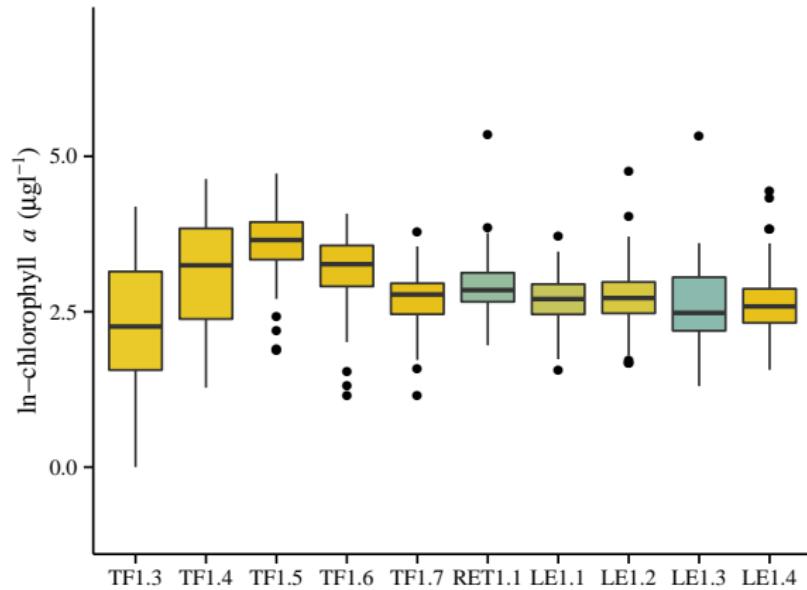
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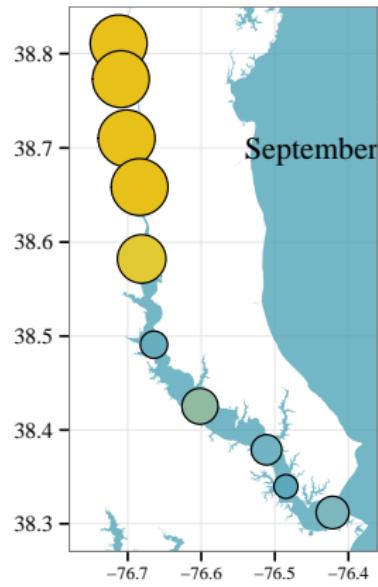
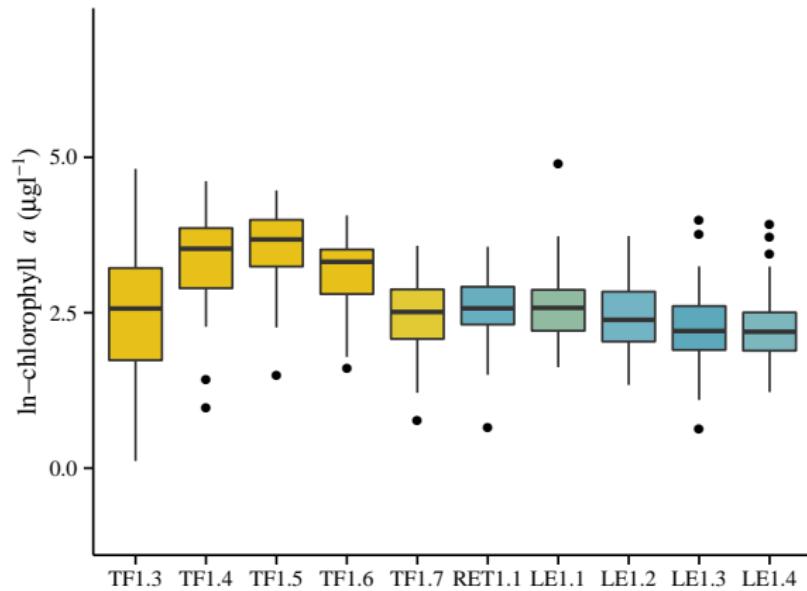
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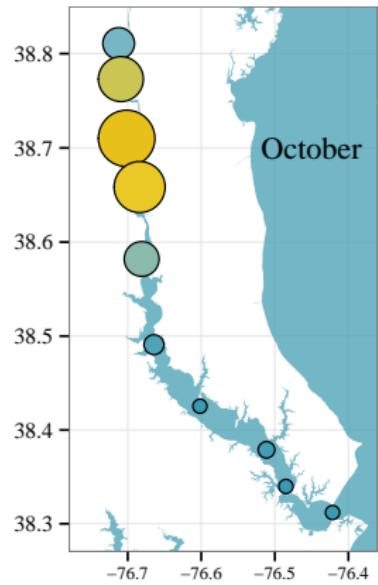
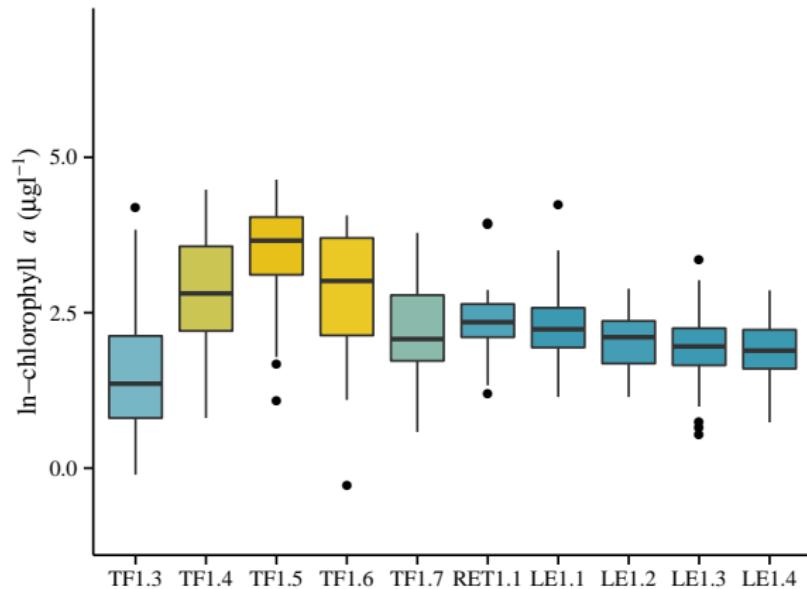
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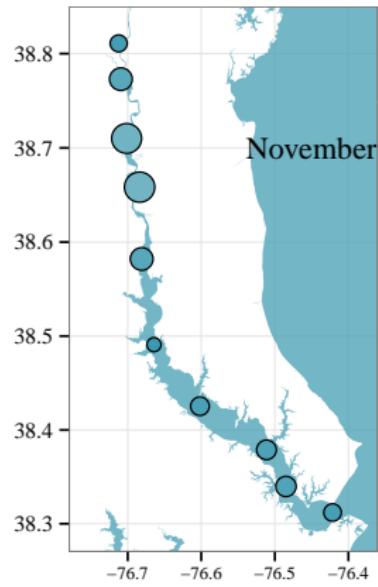
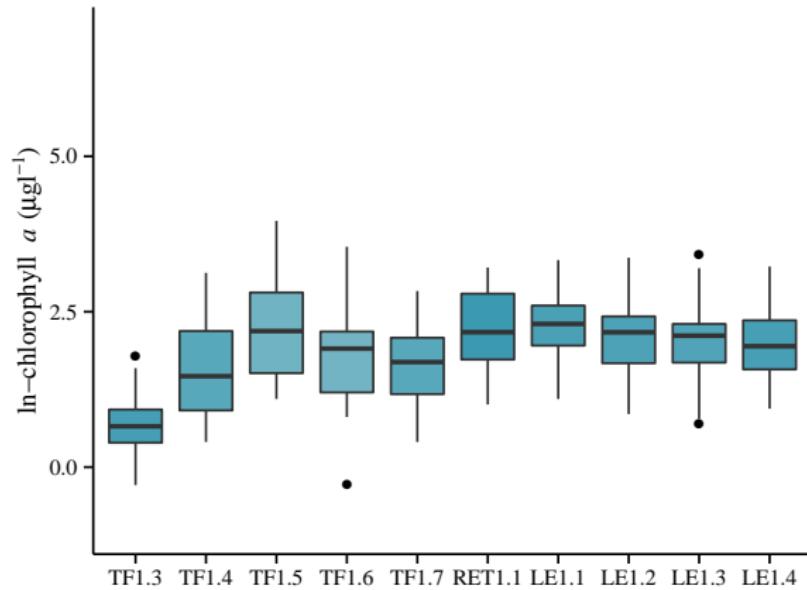
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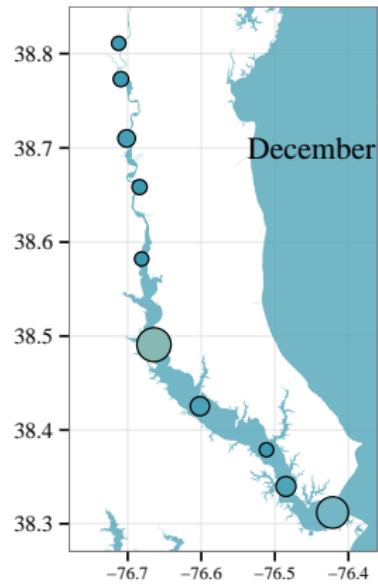
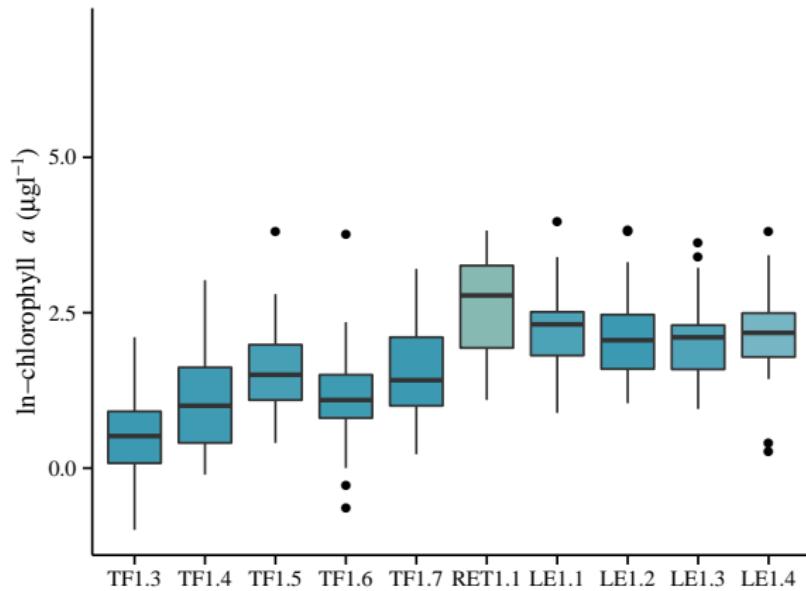
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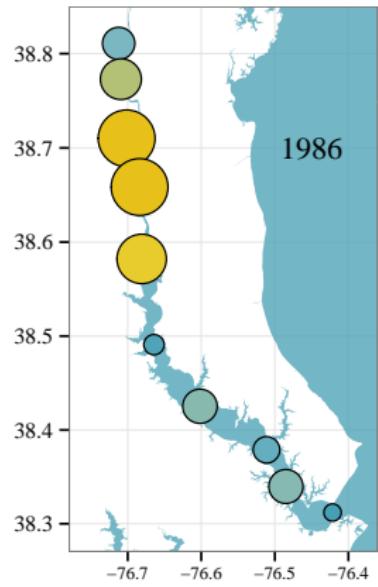
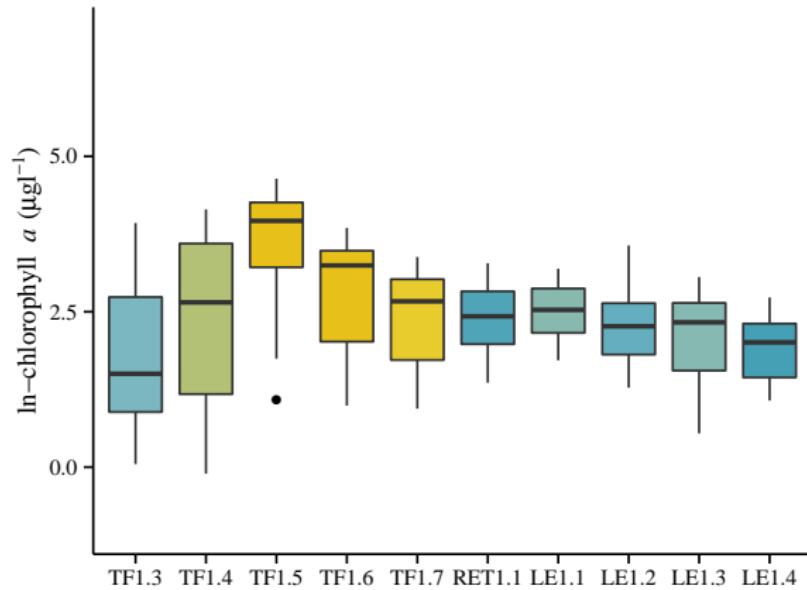
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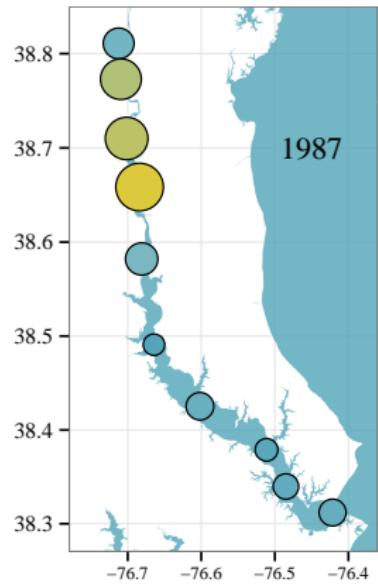
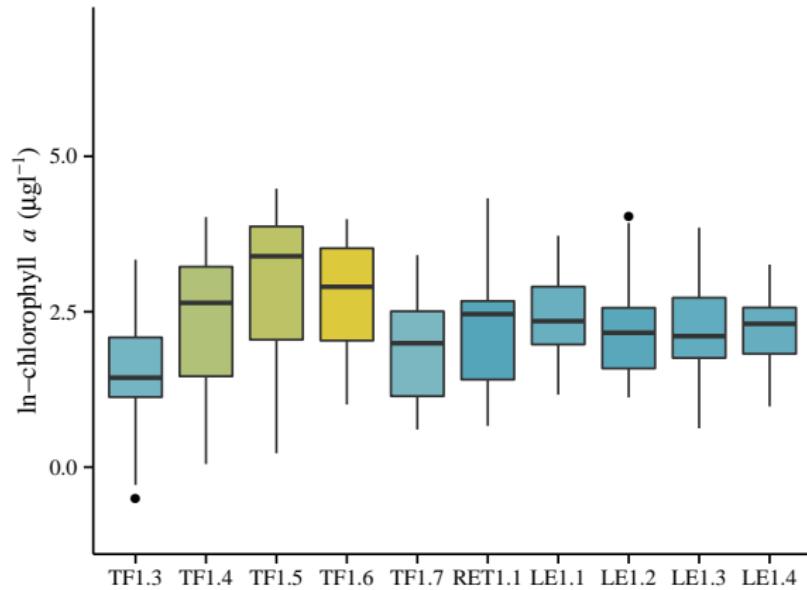
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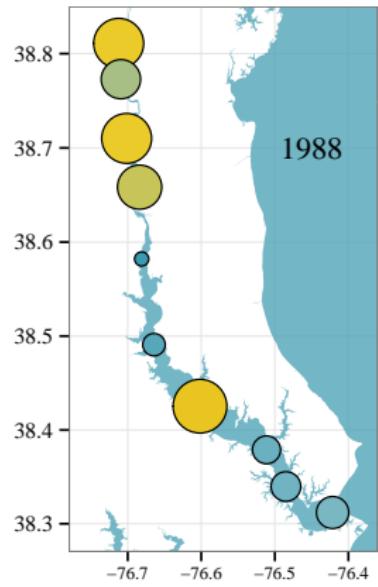
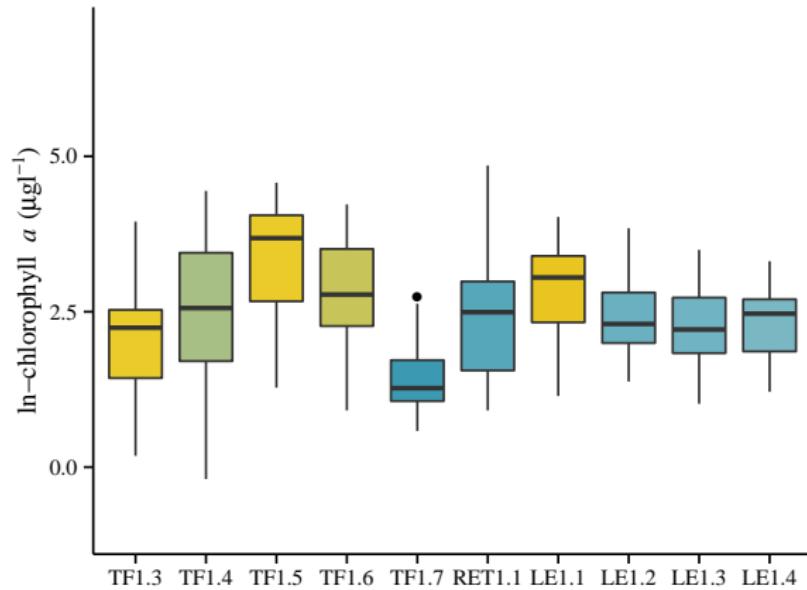
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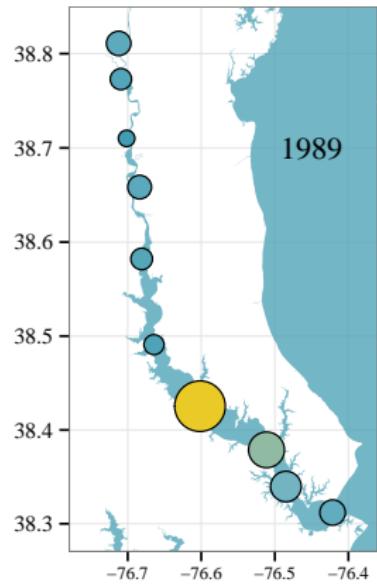
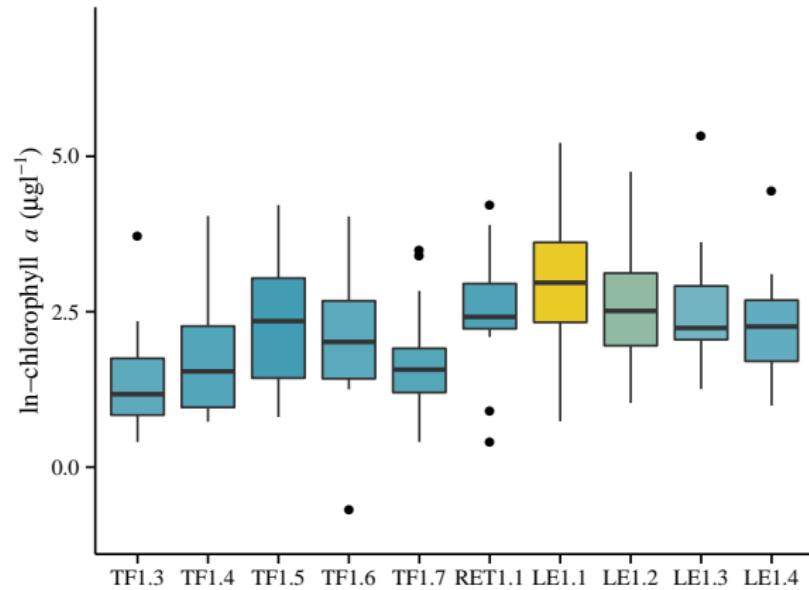
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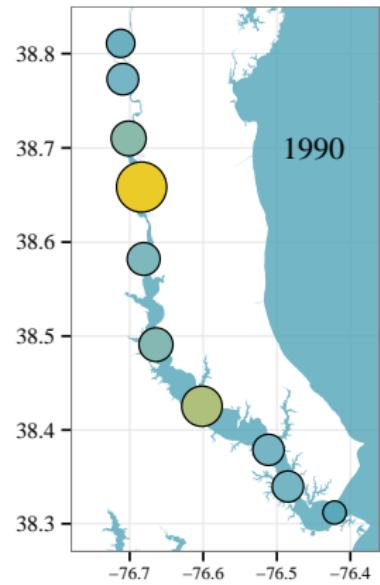
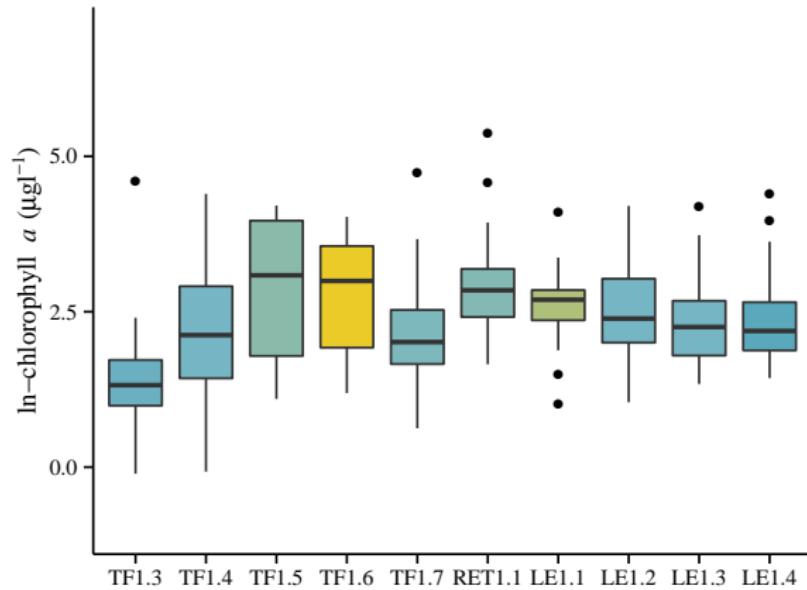
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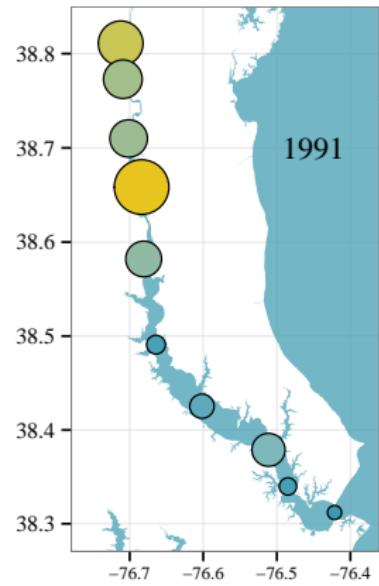
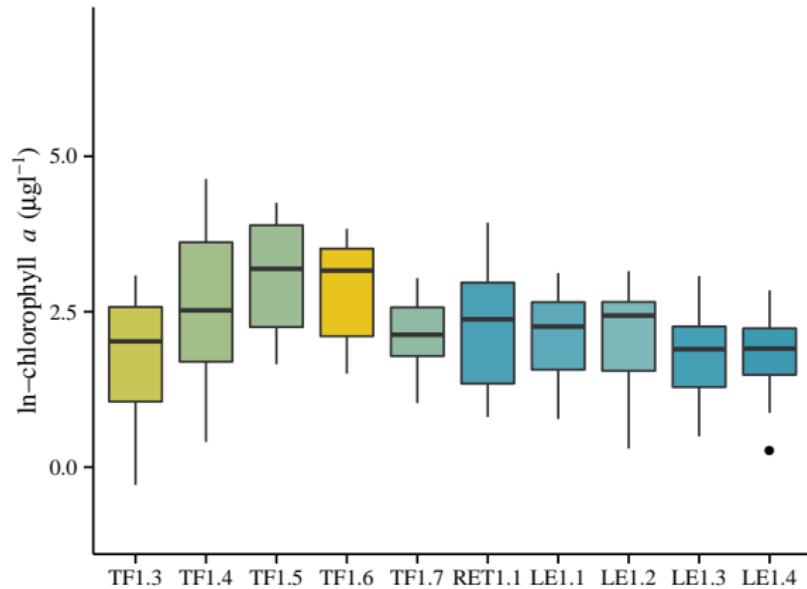
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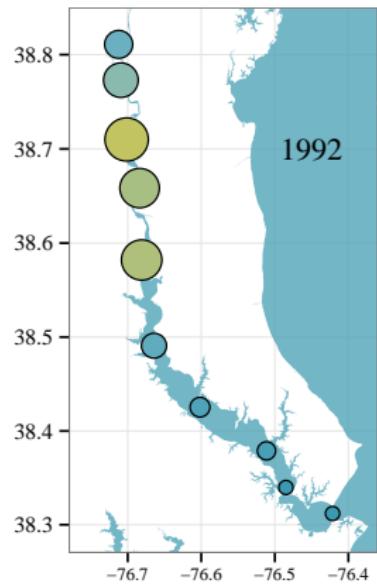
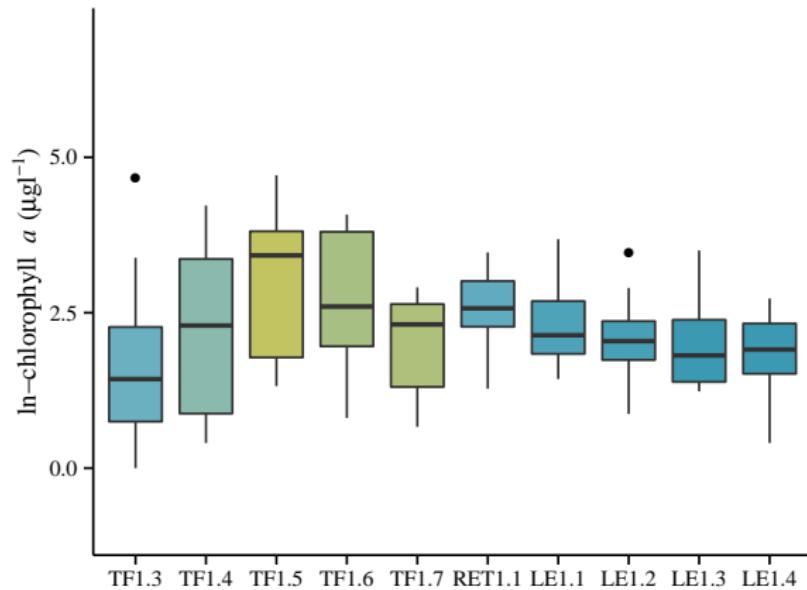
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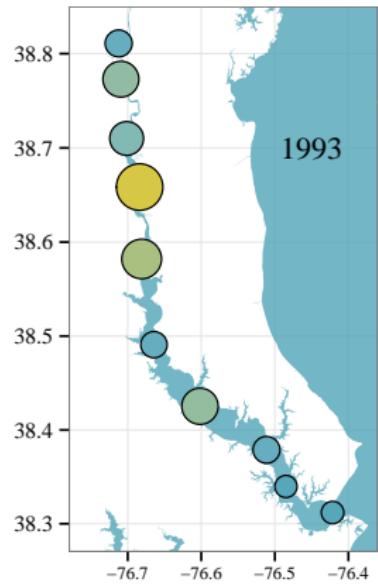
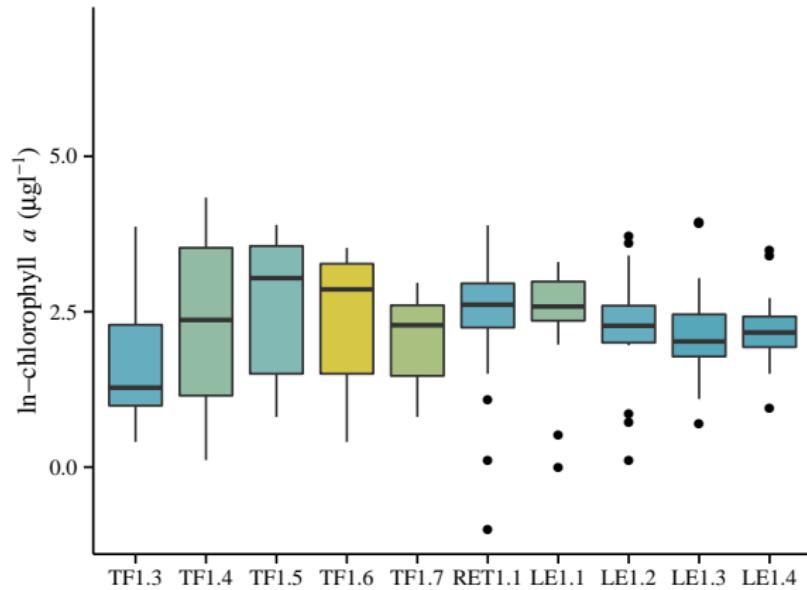
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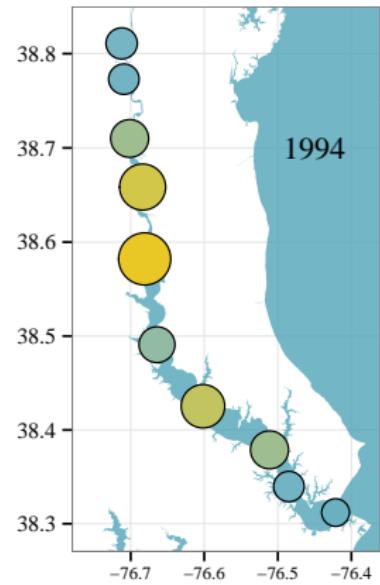
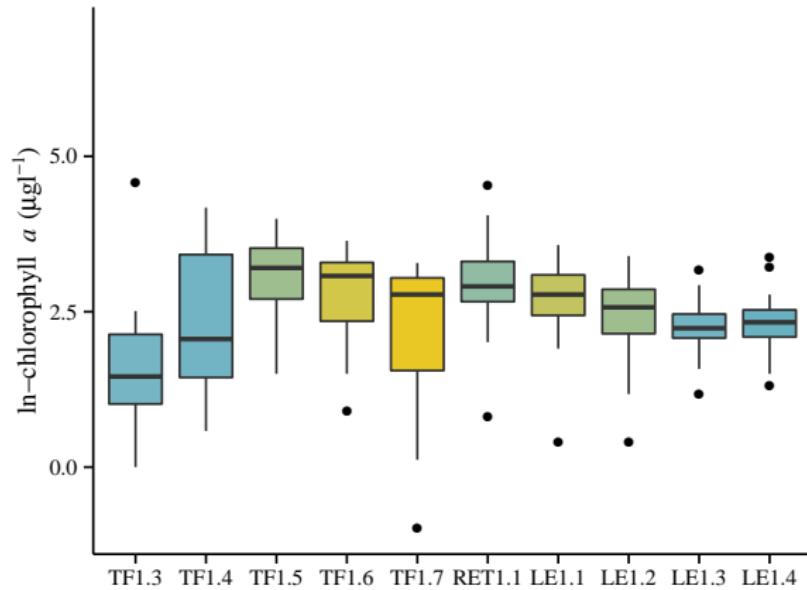
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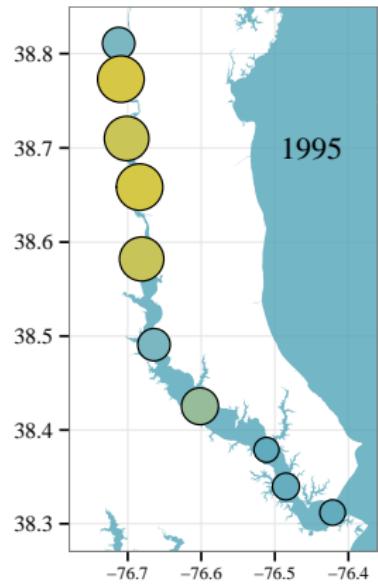
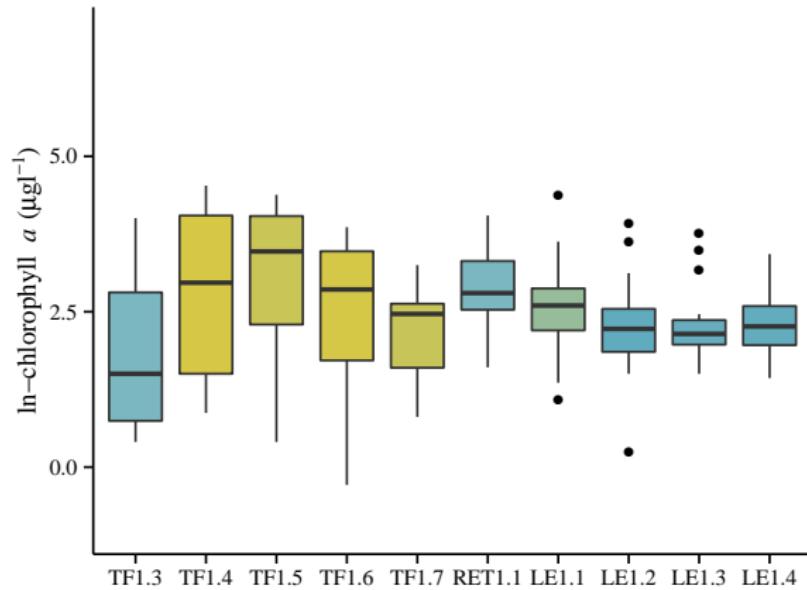
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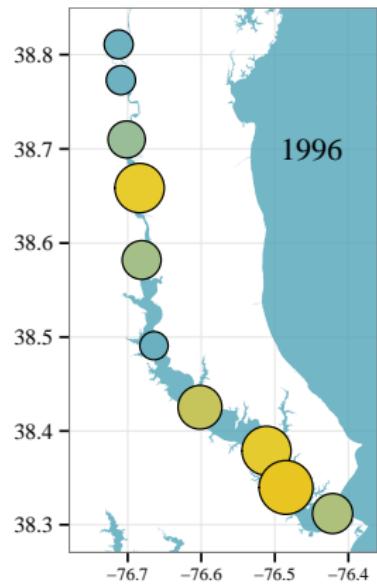
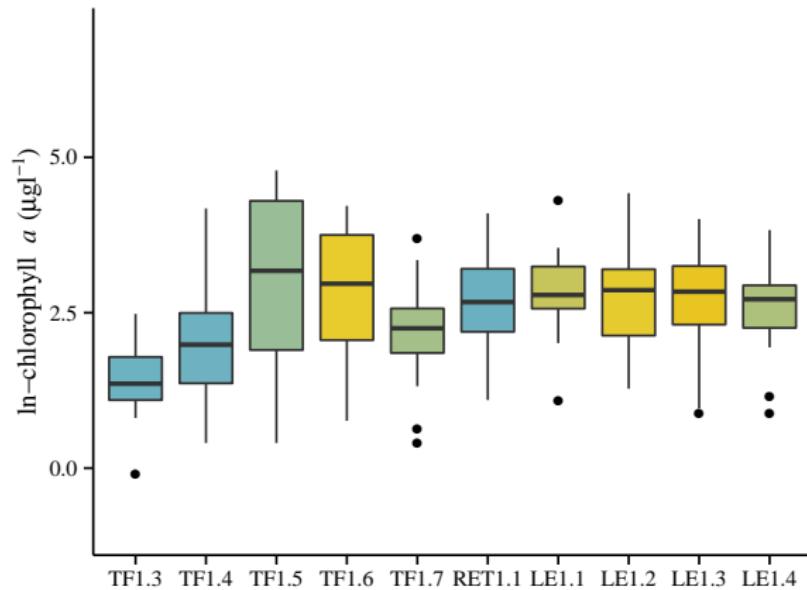
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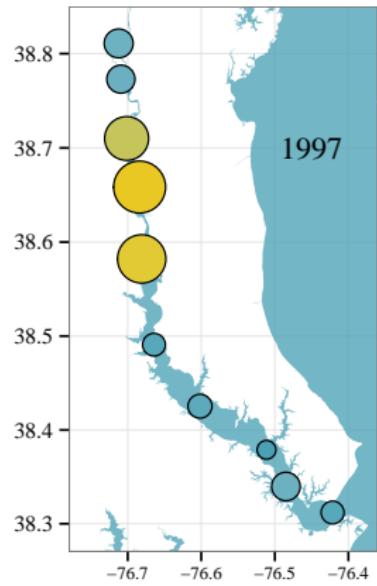
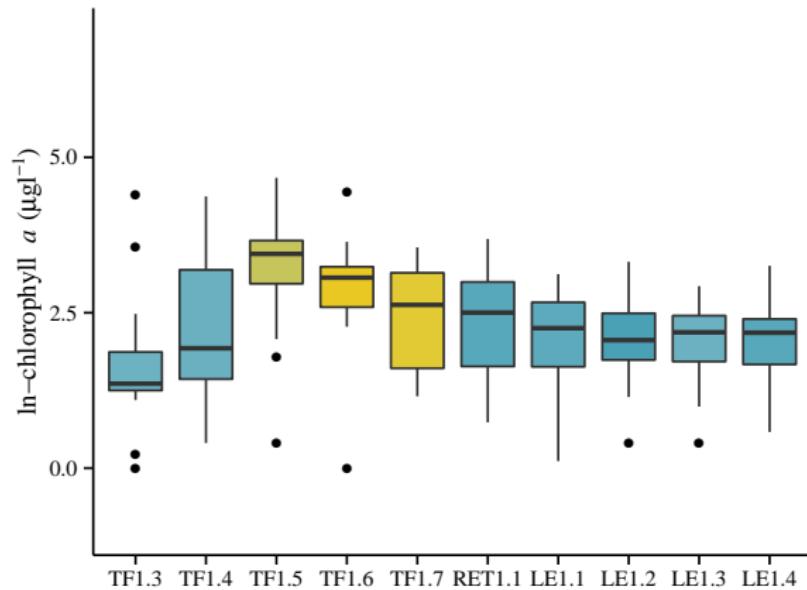
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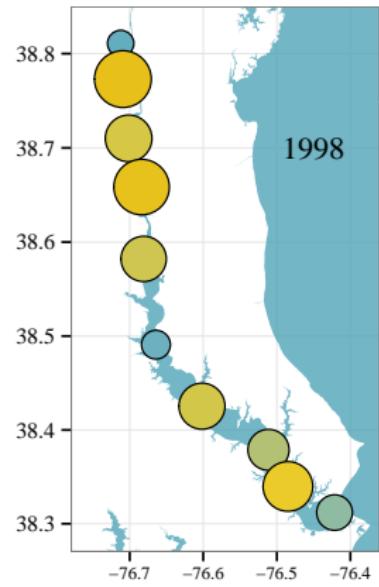
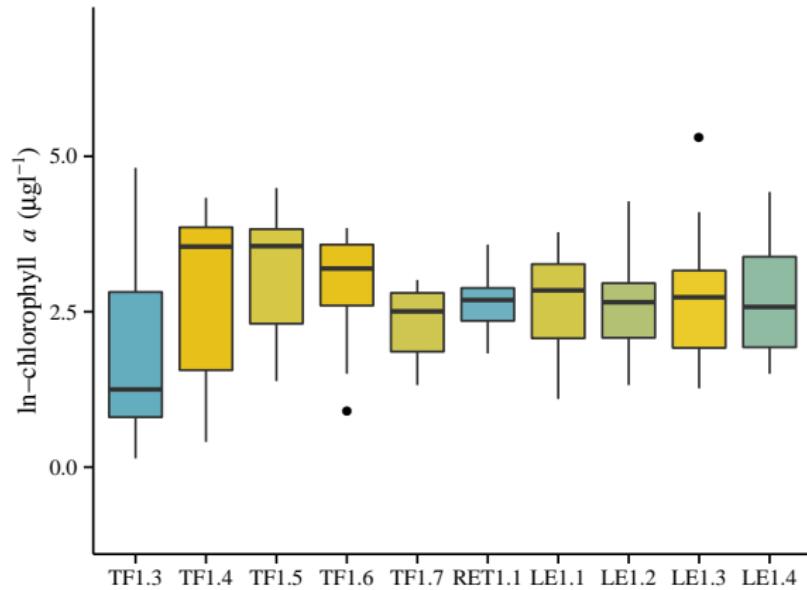
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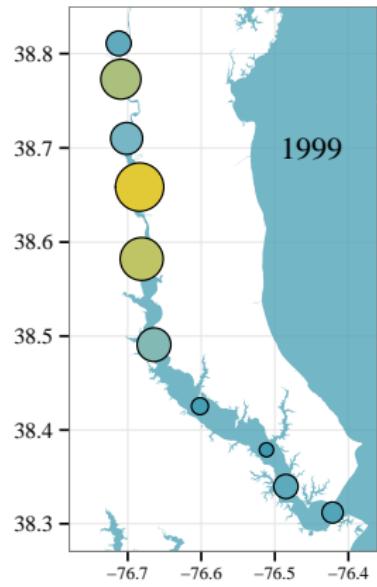
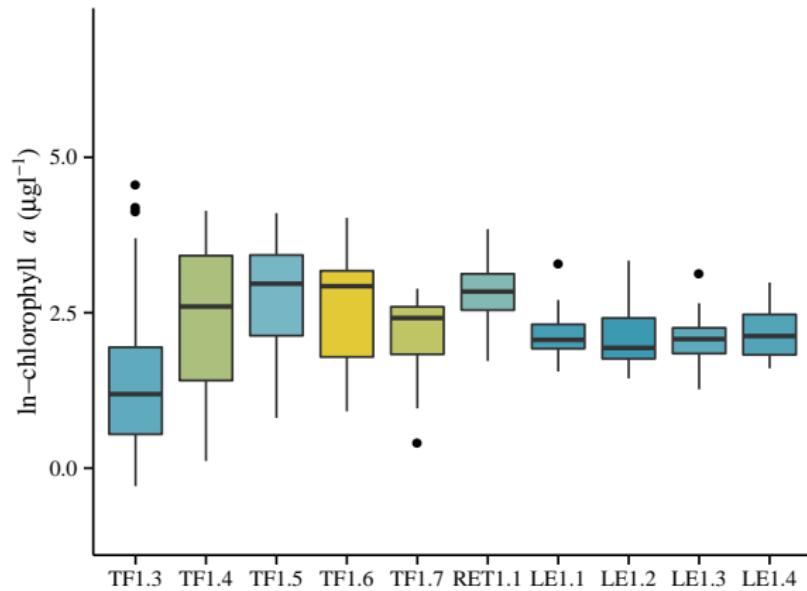
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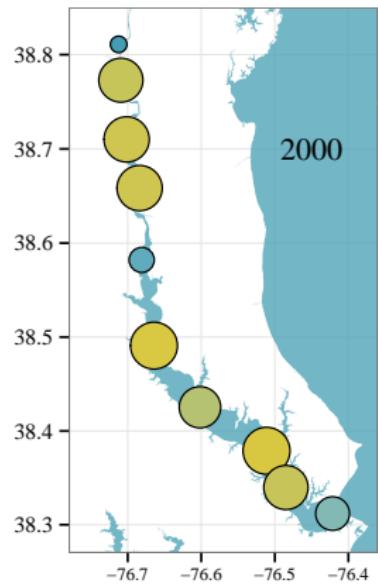
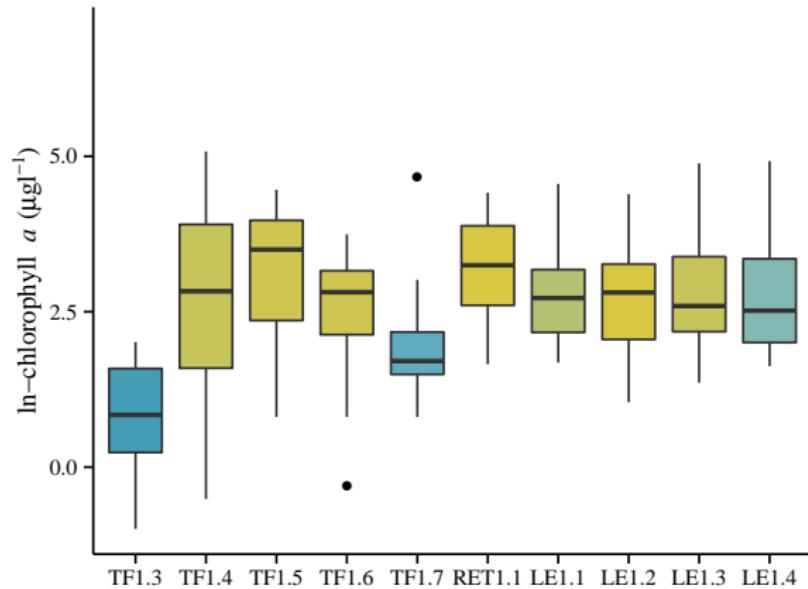
Some exploratory graphs

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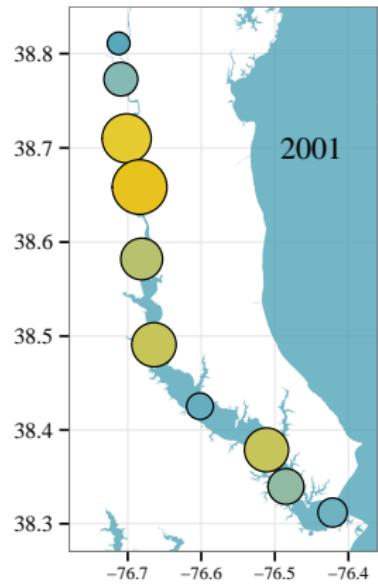
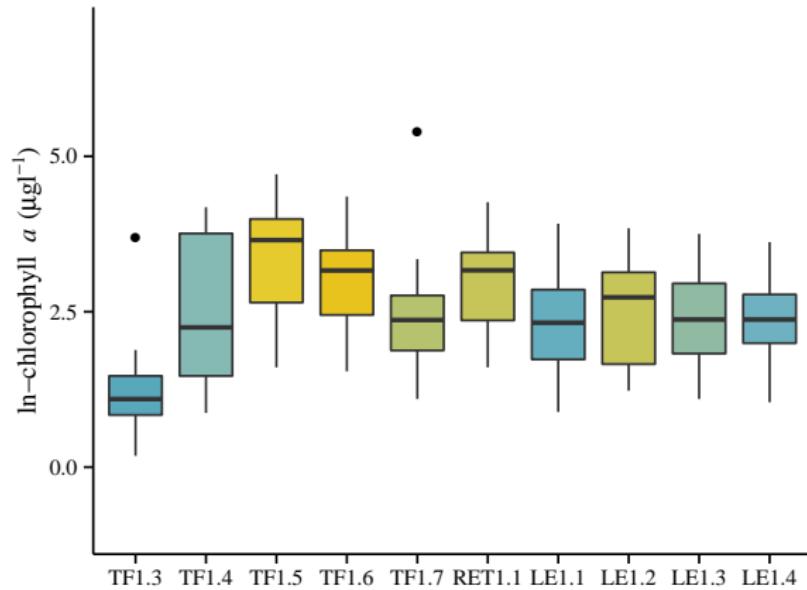
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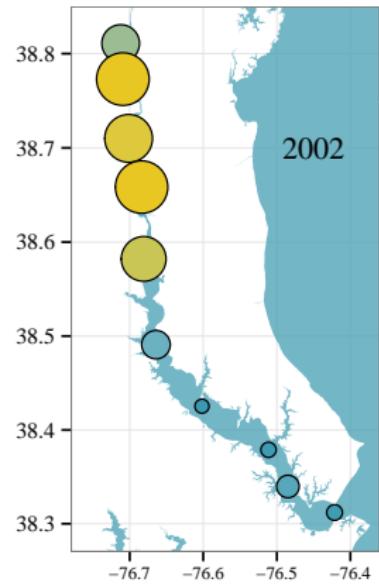
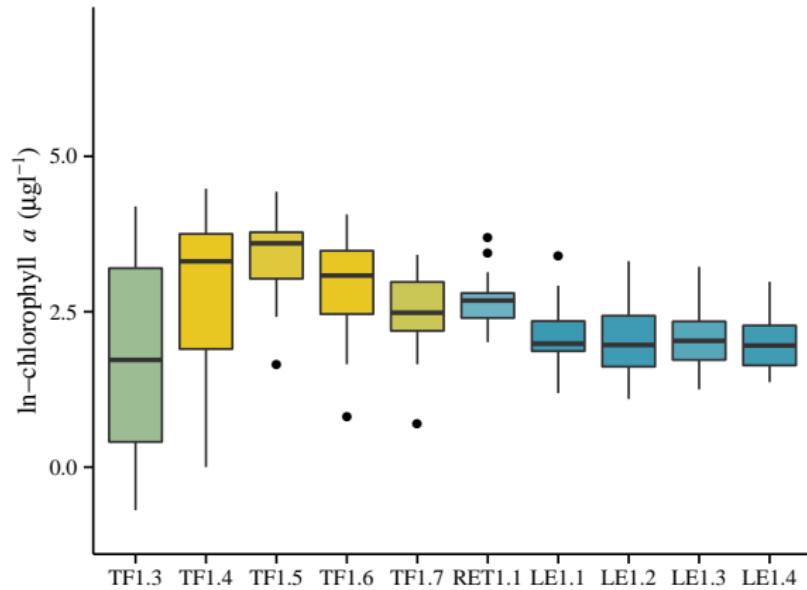
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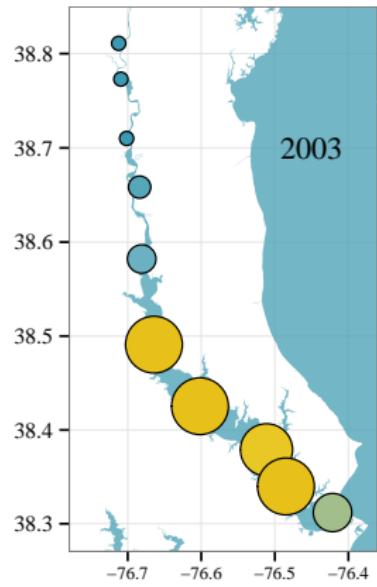
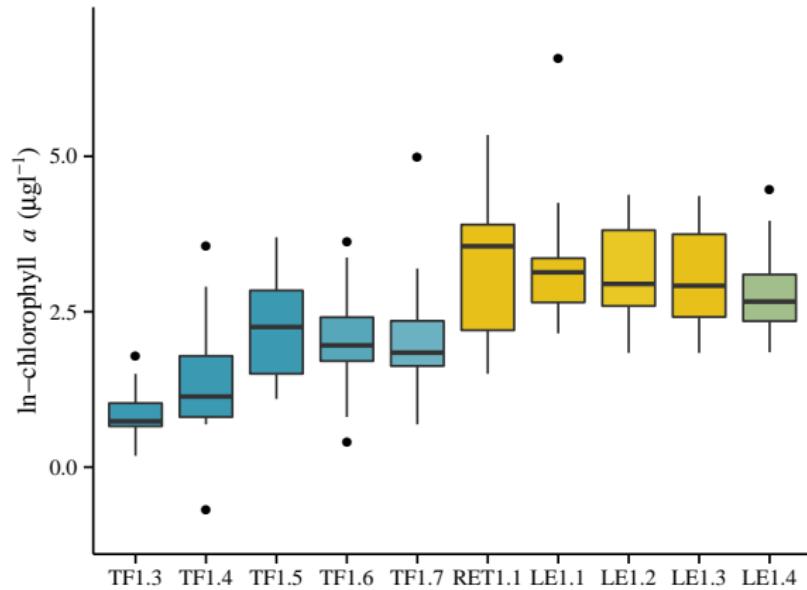
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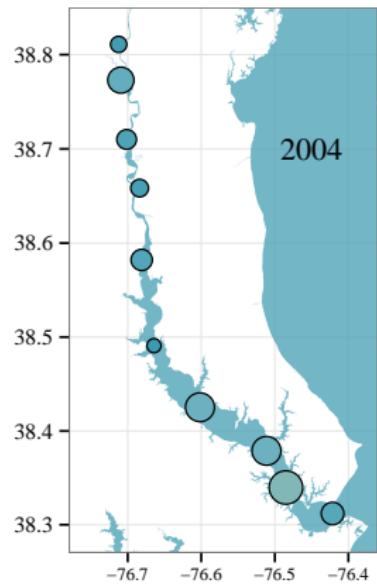
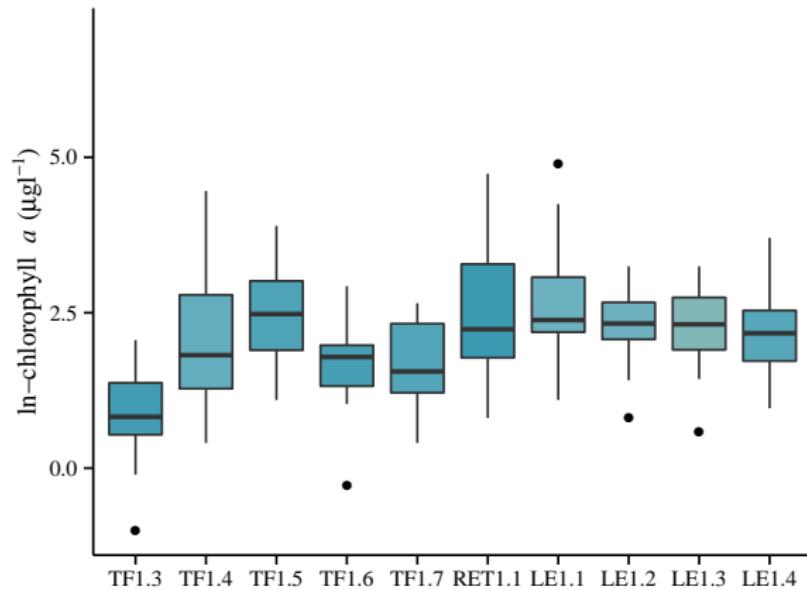
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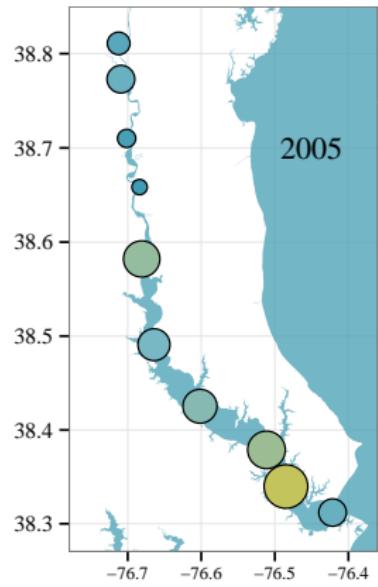
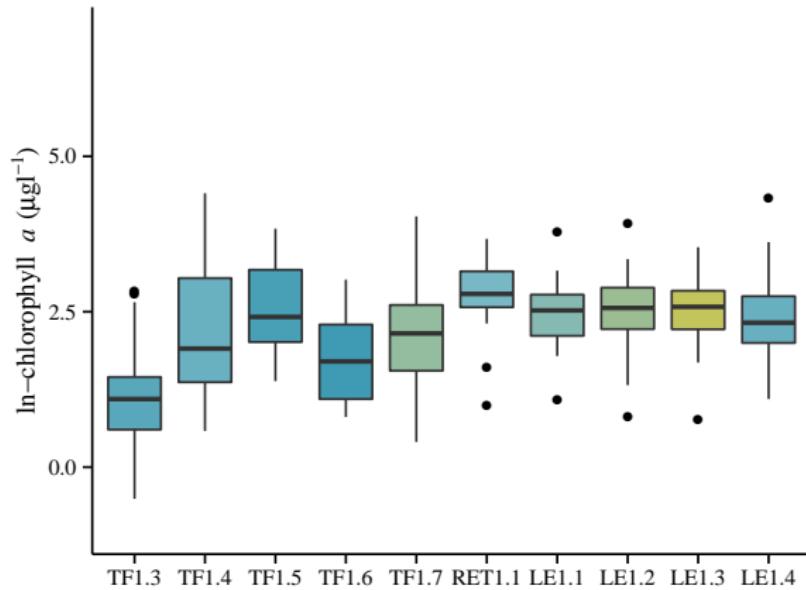
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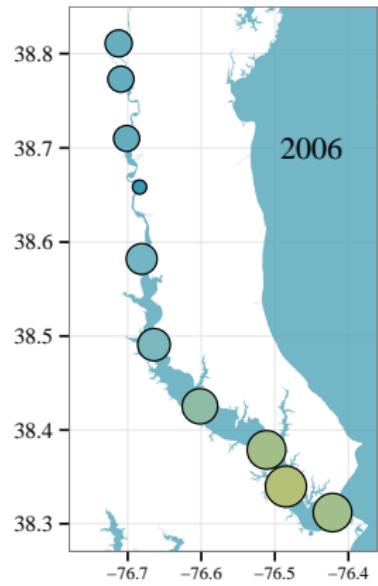
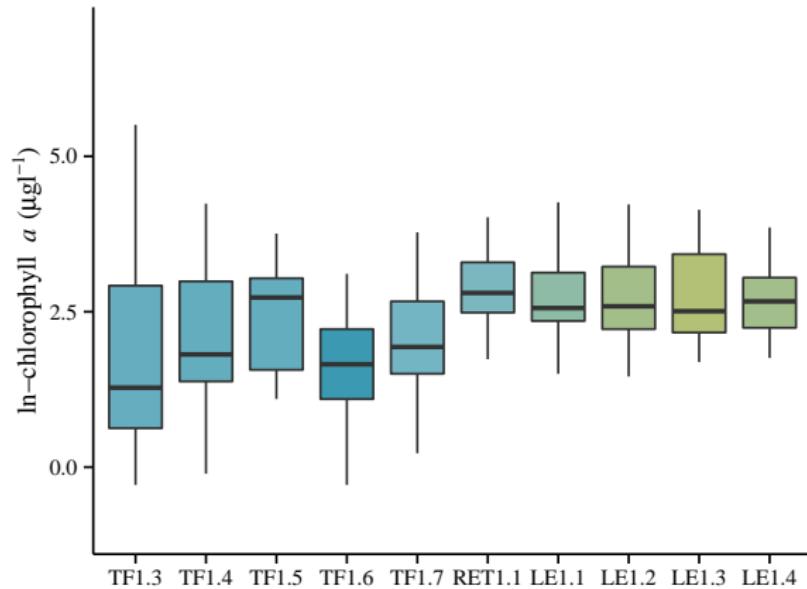
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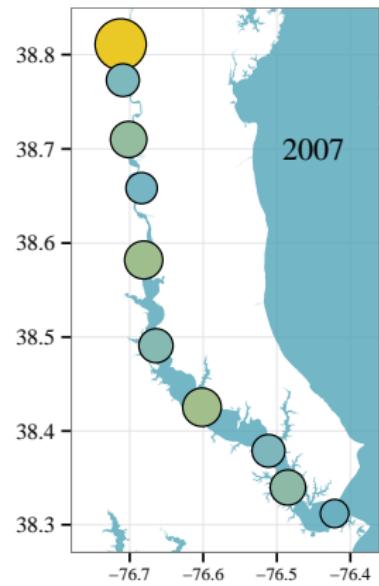
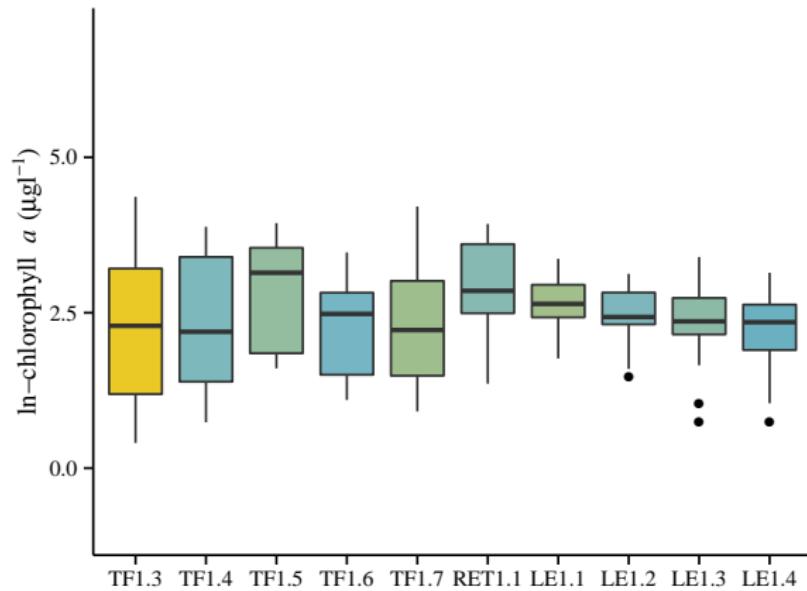
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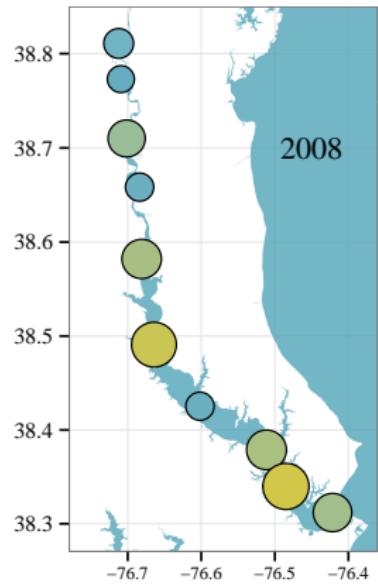
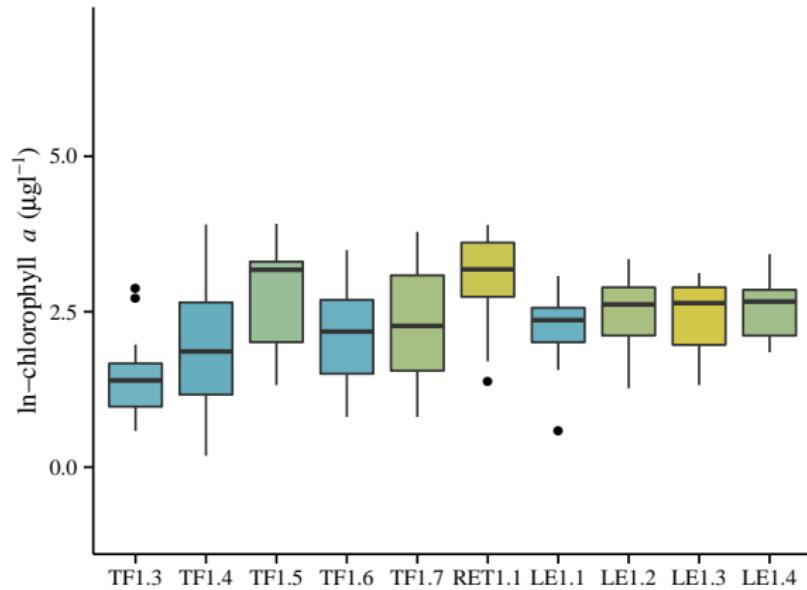
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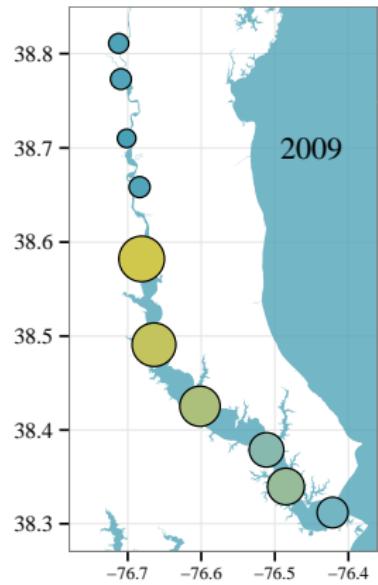
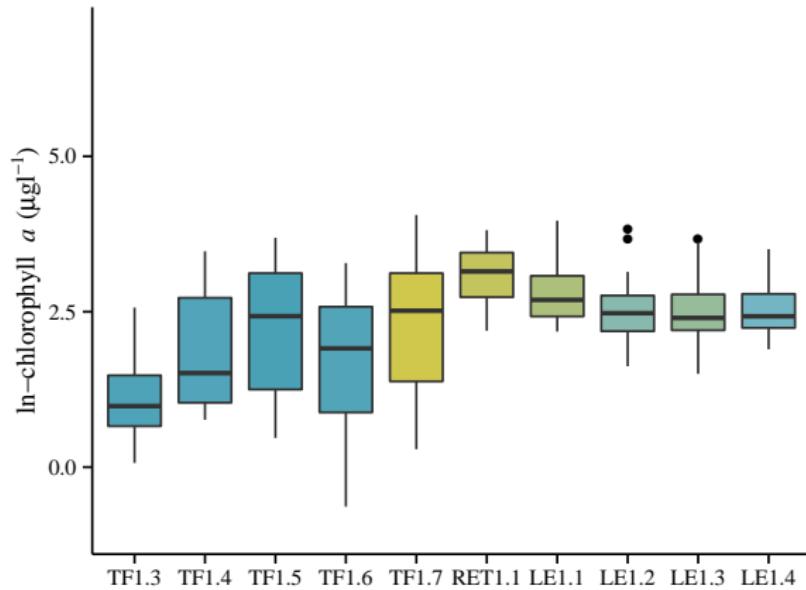
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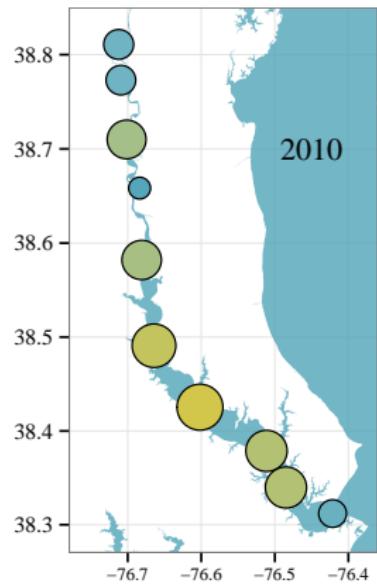
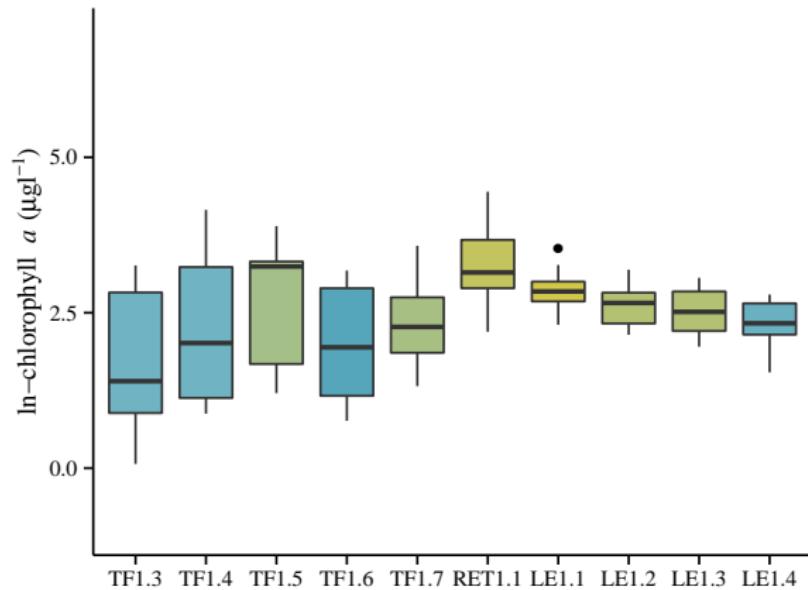
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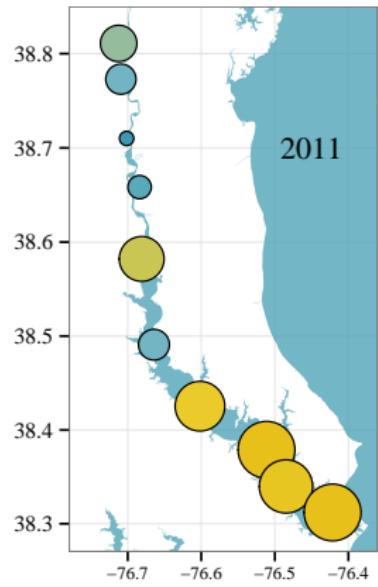
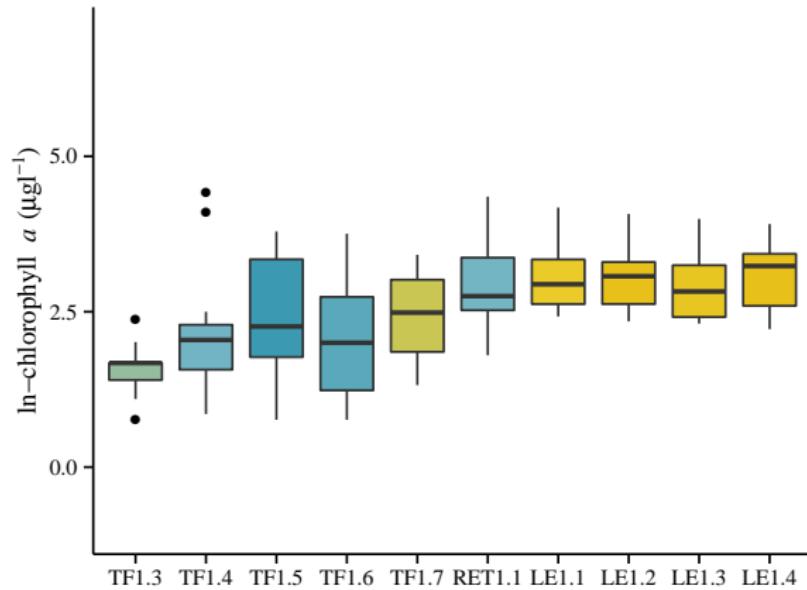
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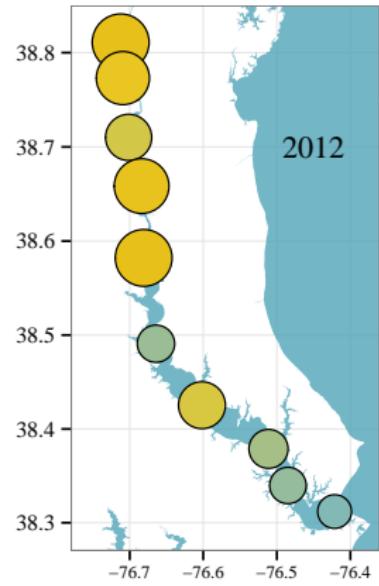
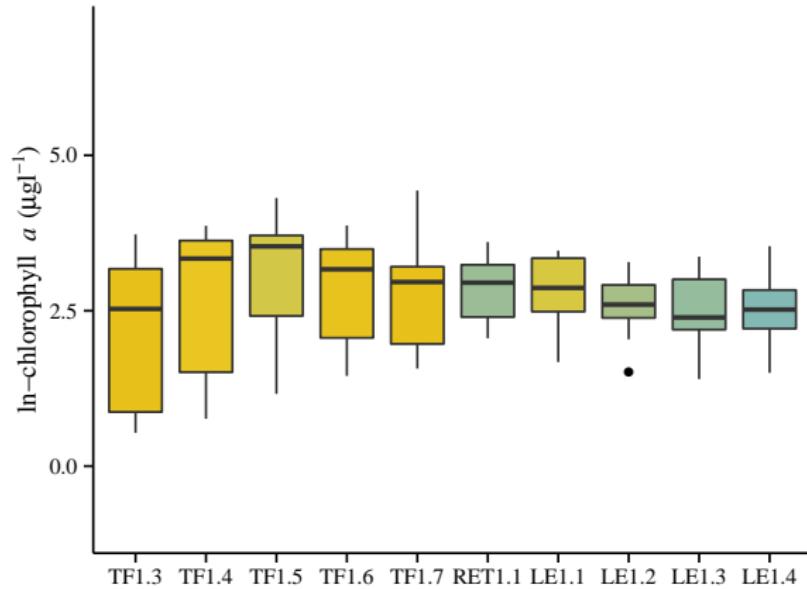
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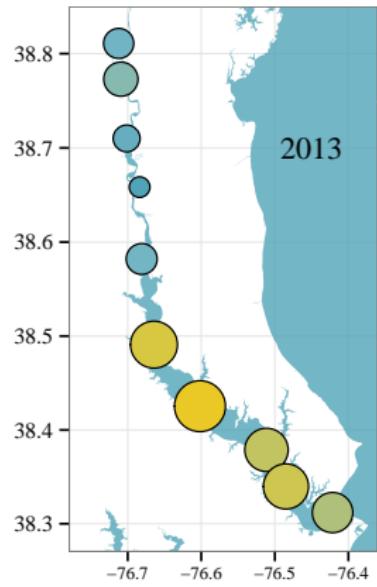
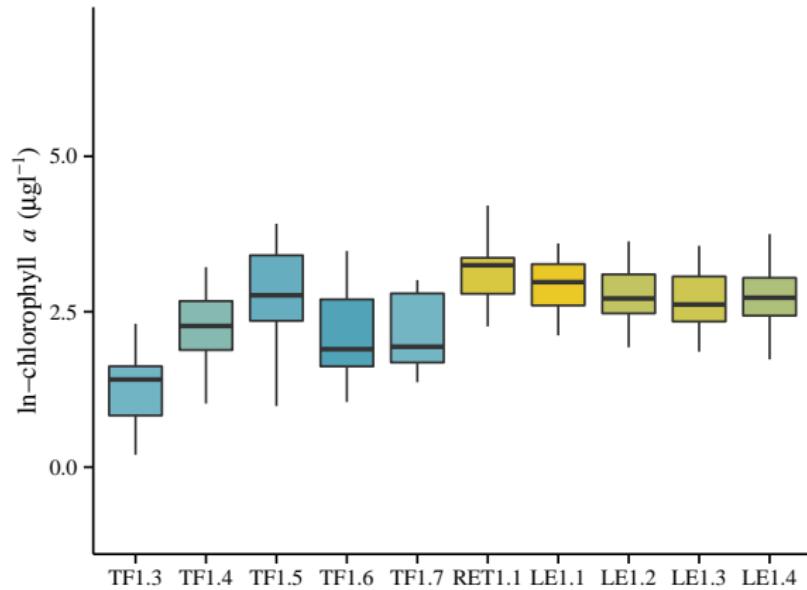
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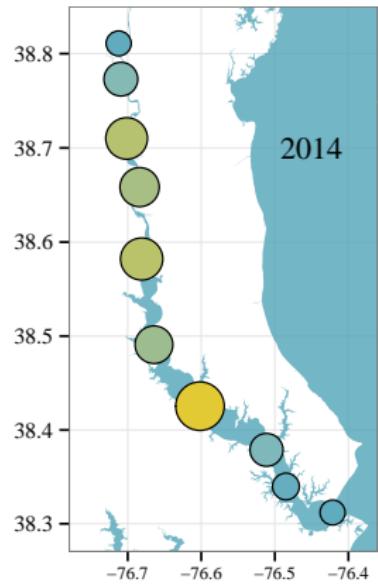
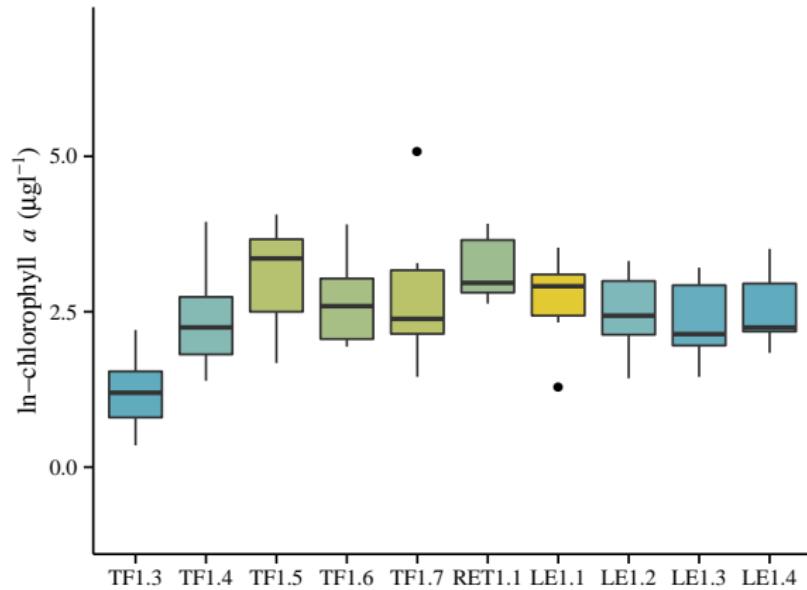
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Initial application of WRTDS/GAMs