

Oklahoma Scenic Rivers Joint Phosphorus Study: Interim Report, 14 April 2015

Principal Investigator:

Ryan S. King

*Professor, Department of Biology, Center for Reservoir and Aquatic Systems Research,
Baylor University, Waco, TX 76798*

www.baylor.edu/aquaticlab

Joint Study Committee Members:

Brian Haggard; Co-Chair (University of Arkansas)

Marty Matlock (University of Arkansas)

Thad Scott (University of Arkansas)

Derek Smithee; Co-Chair (Oklahoma Water Resources Board)

Shellie Chard-McClary (Oklahoma Dept. of Environmental Quality)

Shanon Philips (Oklahoma Conservation Commission)

Study Framework

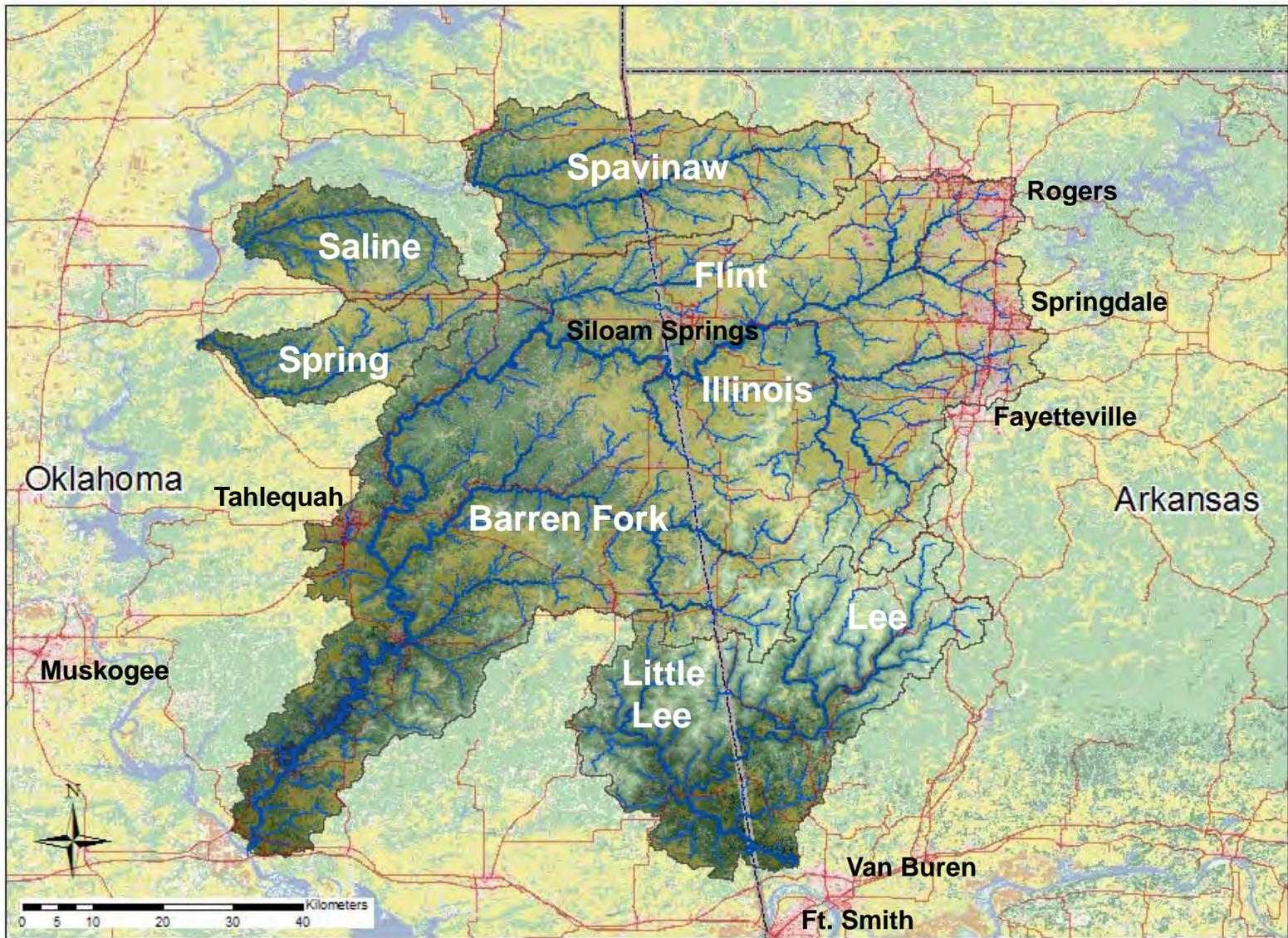
"to determine the total phosphorus threshold response level....at which any statistically significant shift occurs in

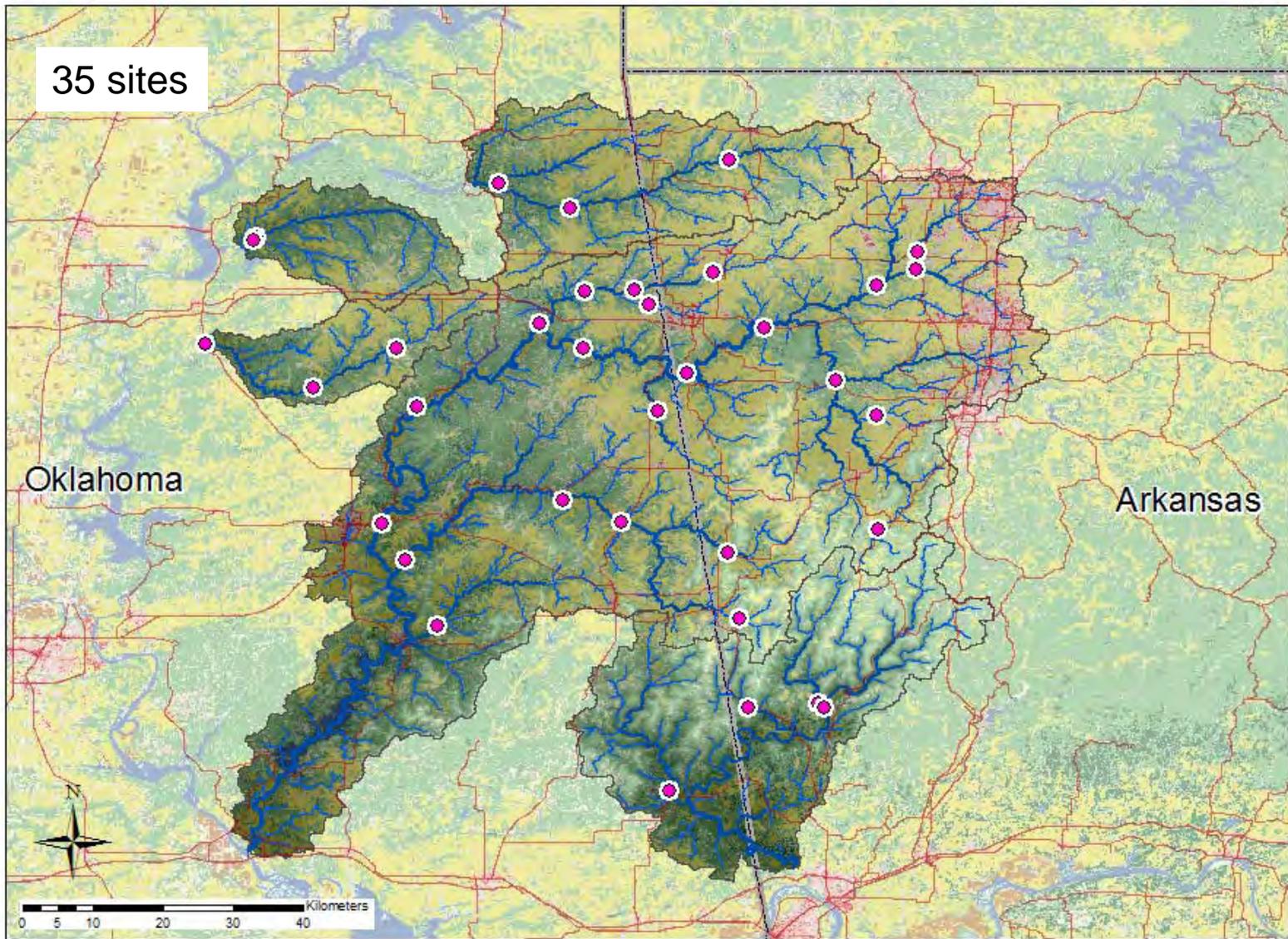
1. algal species composition OR
2. algal biomass production

...resulting in undesirable

1. aesthetic OR
2. water quality

...conditions in the Designated Scenic Rivers."





Sampling Frequency

Sampling scheduled bimonthly. Five events have been completed.
The sixth is currently in progress.

Proposed sampling will result in 12 events in 2 years.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014				Site selection		X		X		X		X
2015		X		In prog.		X		X		X		X
2016		X		X		Final analyses & report writing						

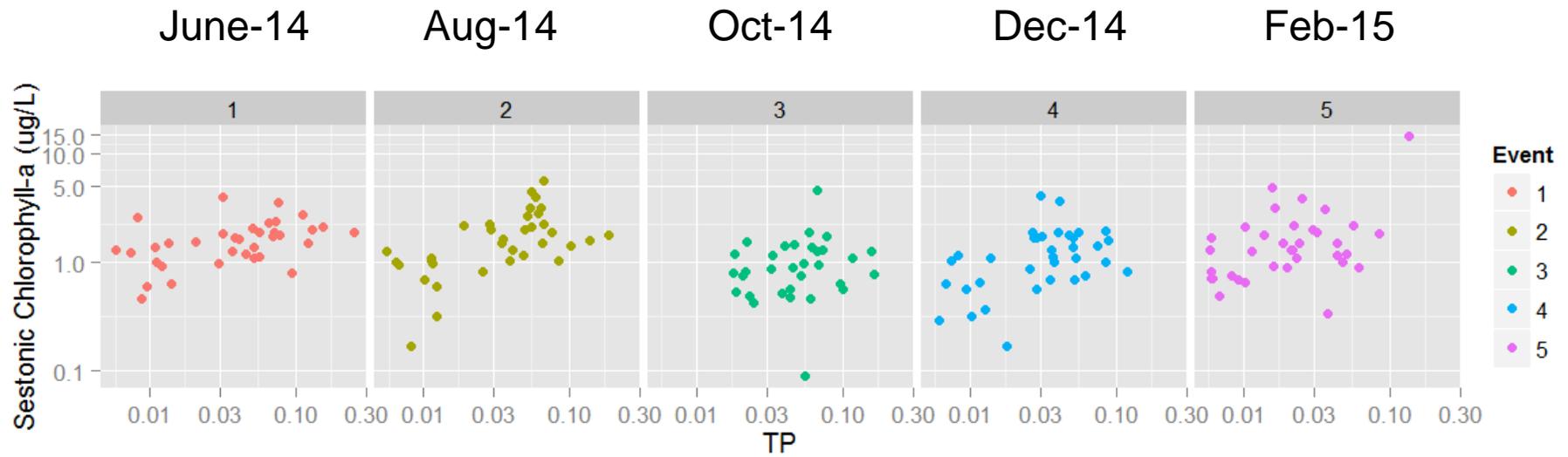
Sample status report

Event	TP	TN, DOC, DNP	Benthic CHLA/ AFDM	Sestonic CHLA/ TSS	Ben- thic CNP	Soft spp.	Dia- tom spp.	Hess	Diel DO
Jun-14	X	X	X	X	X	X	X	X	N/A
Aug-14	X	X	X	X	X	N/A	N/A	X	X
Oct-14	X	X	X	X	X	X	X	X	N/A
Dec-14	X	X	X	X	X	N/A	N/A	X	N/A
Feb-14	X	X	X	X	In prog.	N/A	N/A	In prog.	N/A

Disclaimer

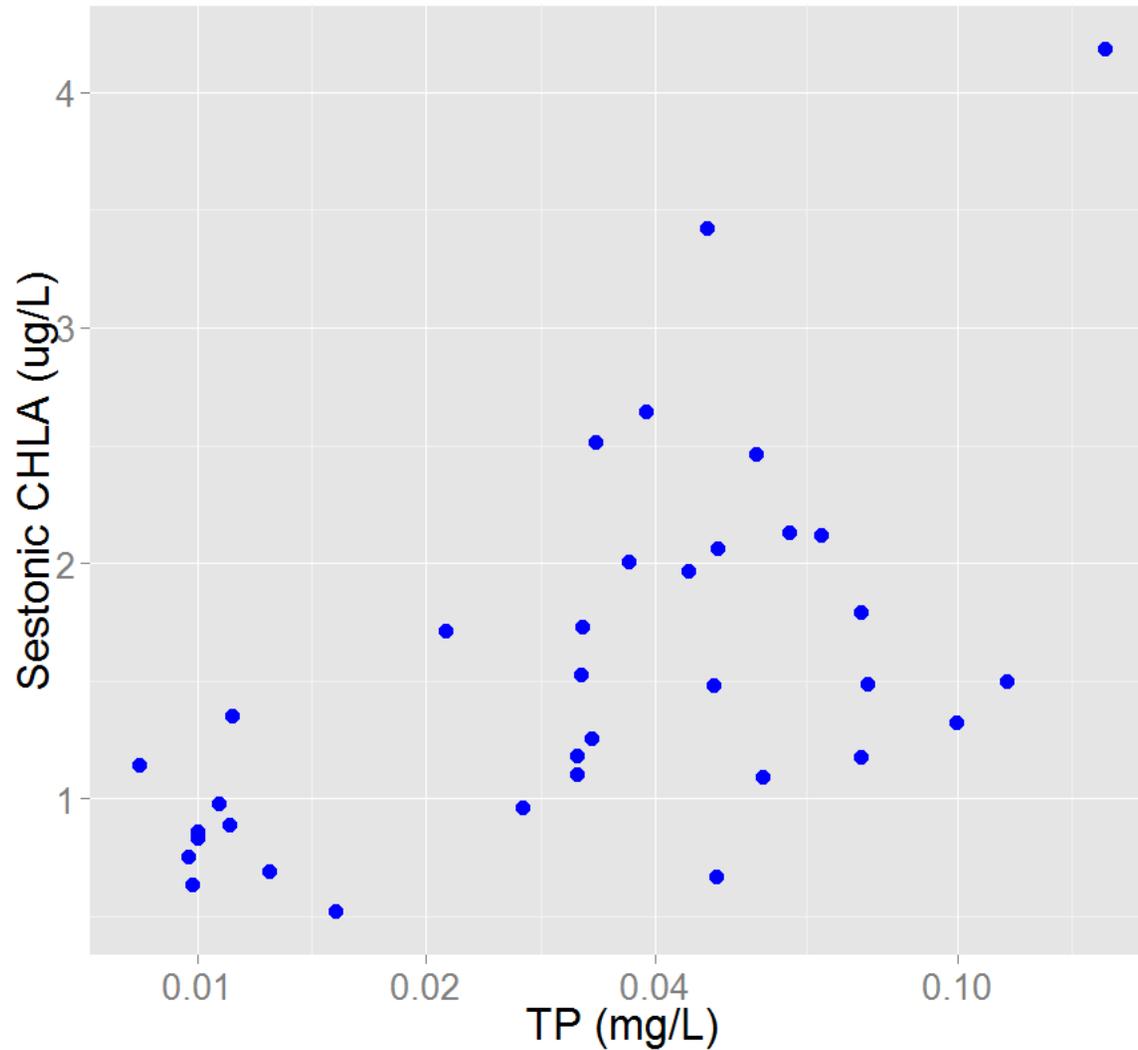
- The following slides are intended only to illustrate PRELIMINARY relationships between total phosphorus (TP) and select biological response variables.
- No statistical analyses have been conducted on these data. It is too early to draw inferences about a threshold level of TP for the Scenic Rivers.
- Please refrain from drawing conclusions from these data. This is a 2-year study for a reason.

Sestonic Chlorophyll-a ($\mu\text{g/L}$) vs. TP (mg/L)



Sestonic Chlorophyll-a ($\mu\text{g/L}$) vs. TP (mg/L)

Average, June 2014 through Feb 2015

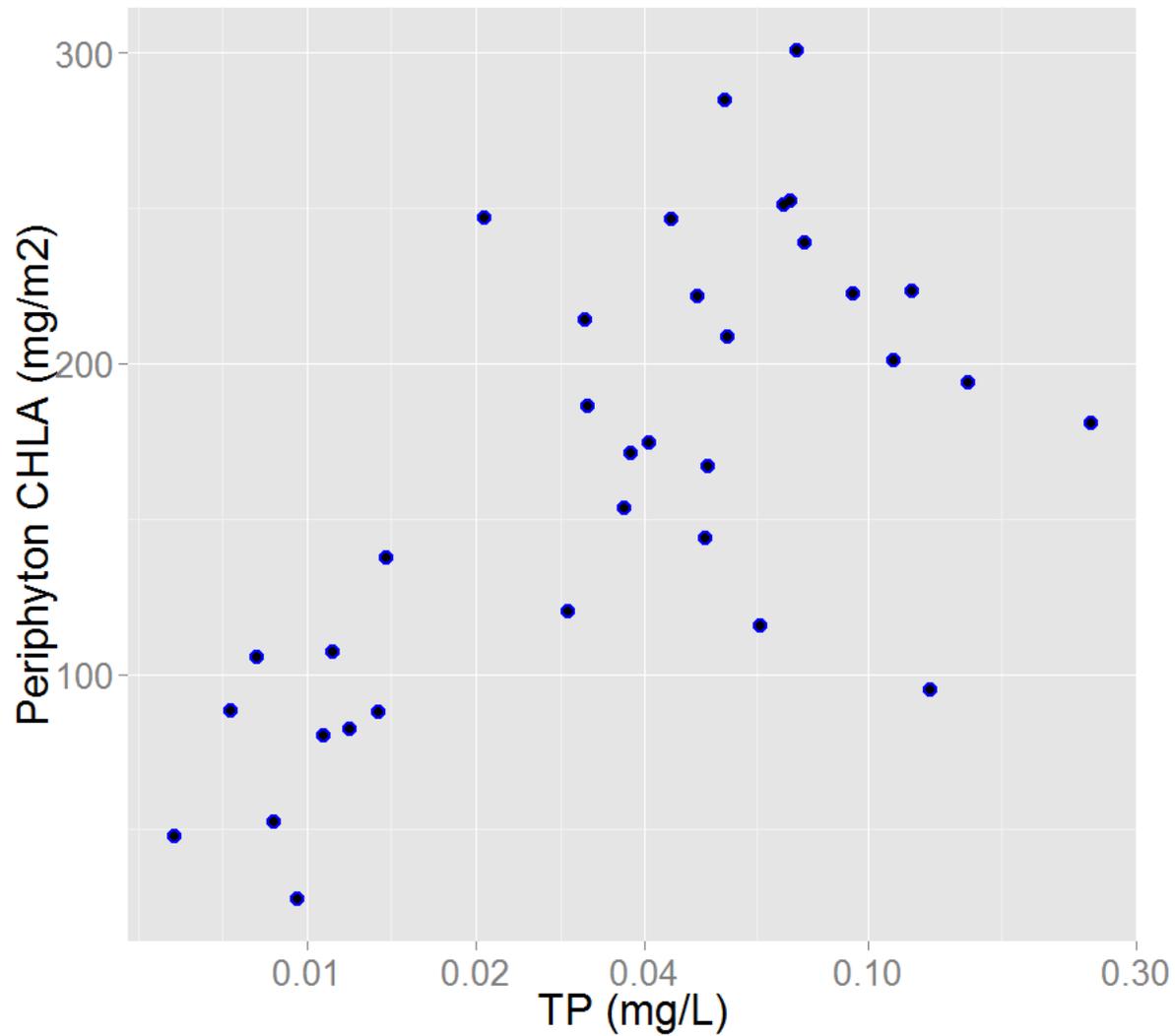


Benthic (Periphyton) Chlorophyll-a



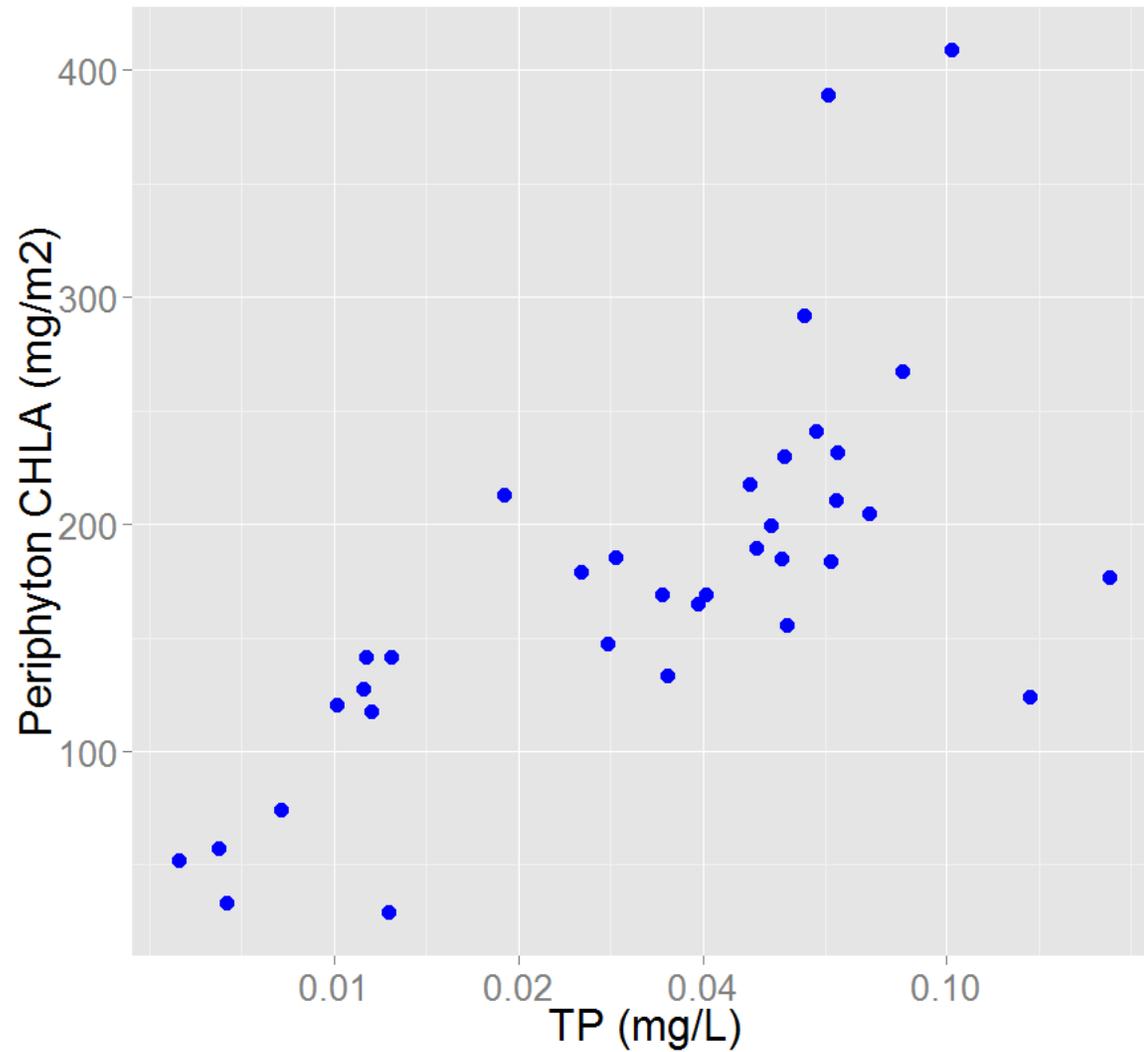
Benthic (Periphyton) Chlorophyll-a (mg/m²) vs TP

June 2014



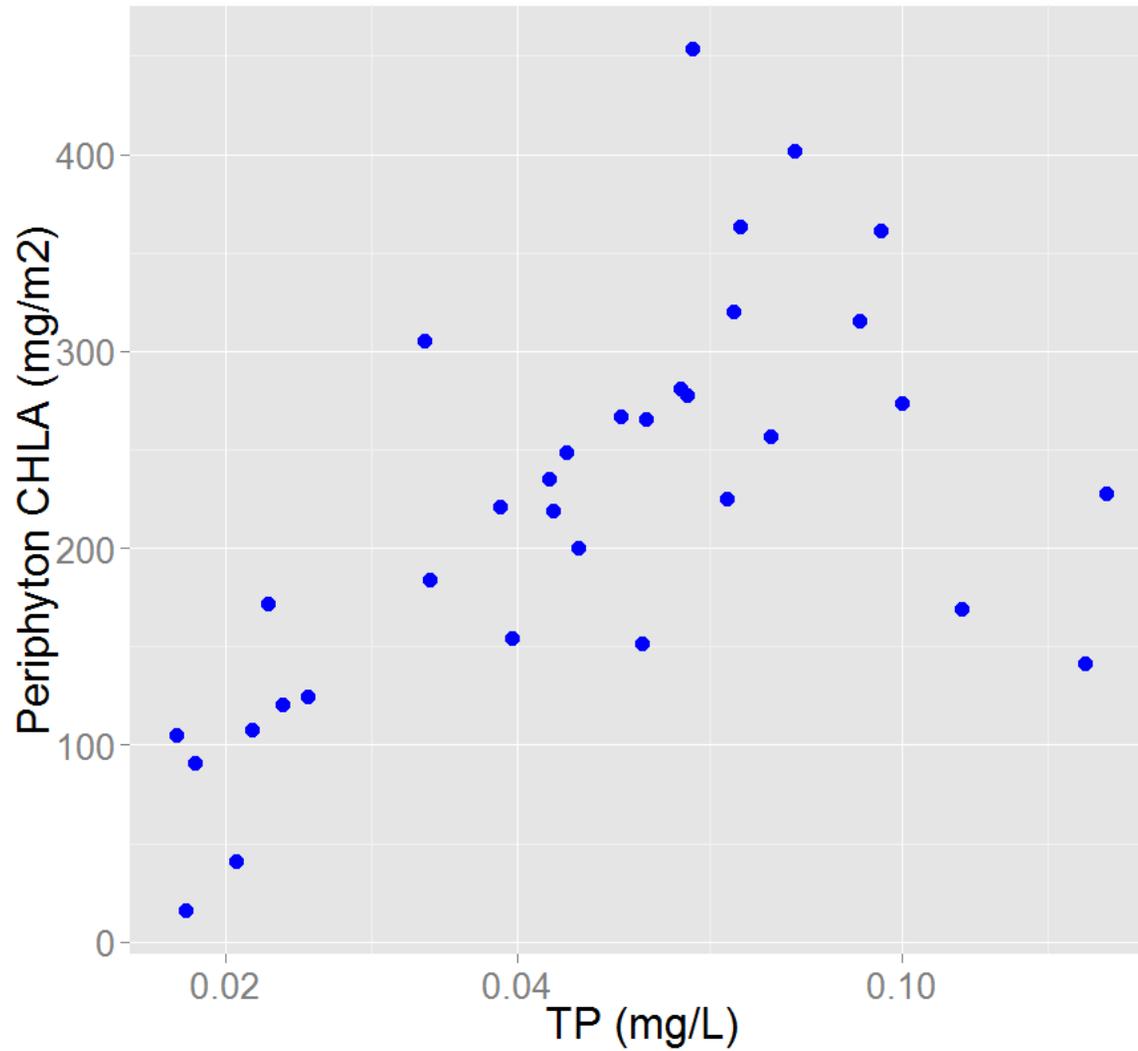
Benthic (Periphyton) Chlorophyll-a (mg/m²) vs TP

August 2014



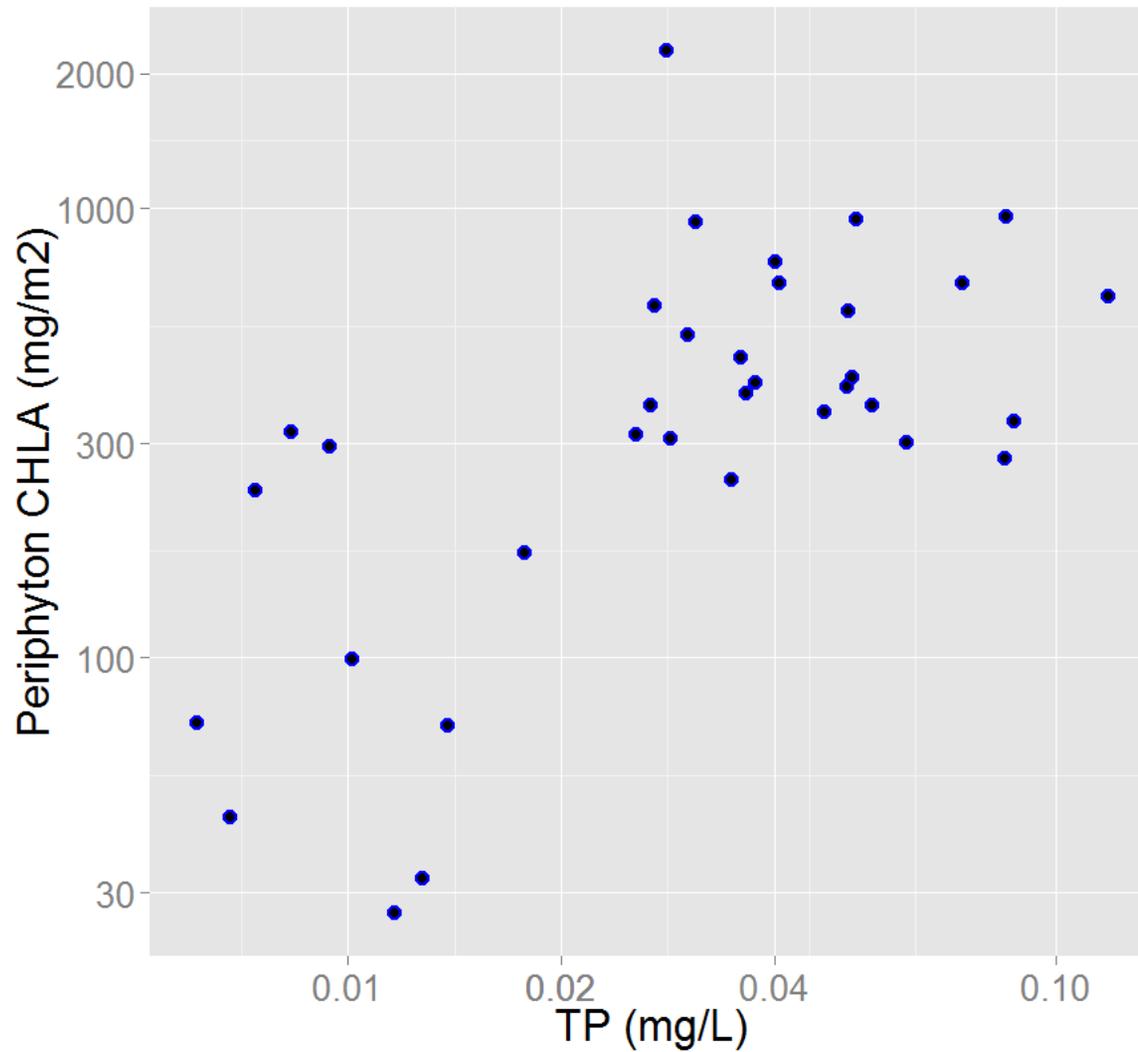
Benthic (Periphyton) Chlorophyll-a (mg/m²) vs TP

October 2014



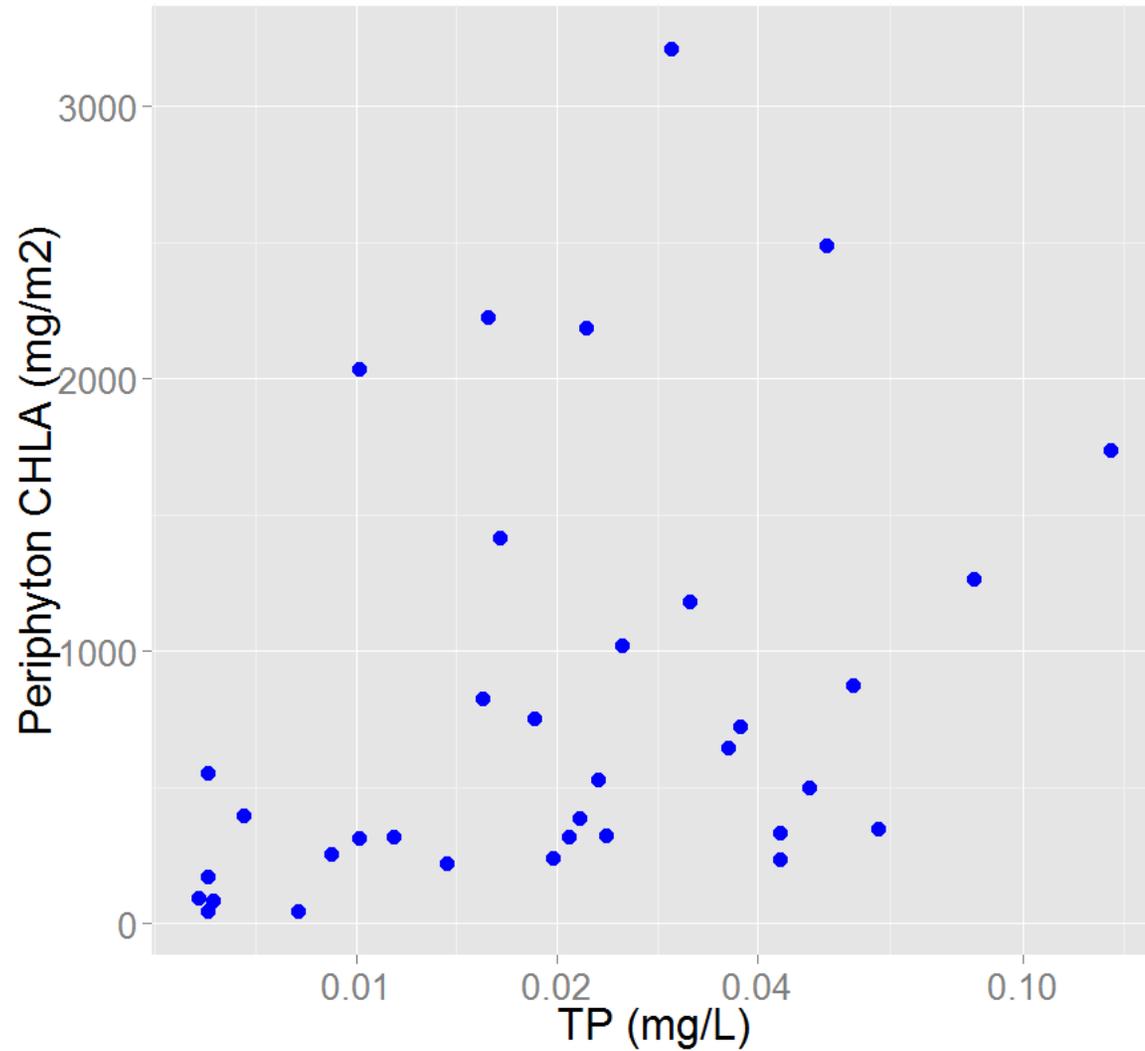
Benthic (Periphyton) Chlorophyll-a (mg/m²) vs TP

December 2014



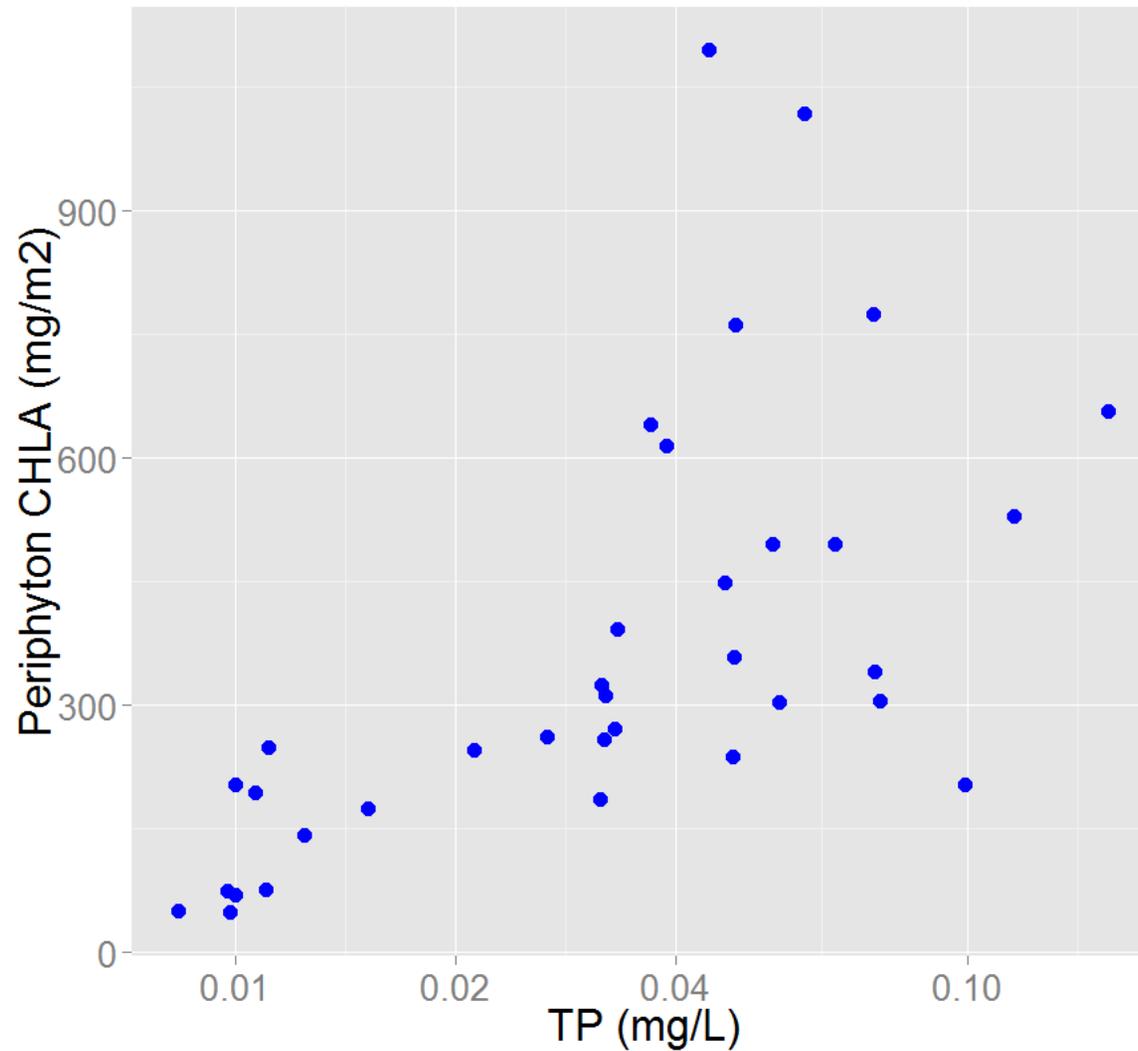
Benthic (Periphyton) Chlorophyll-a (mg/m²) vs TP

February 2015



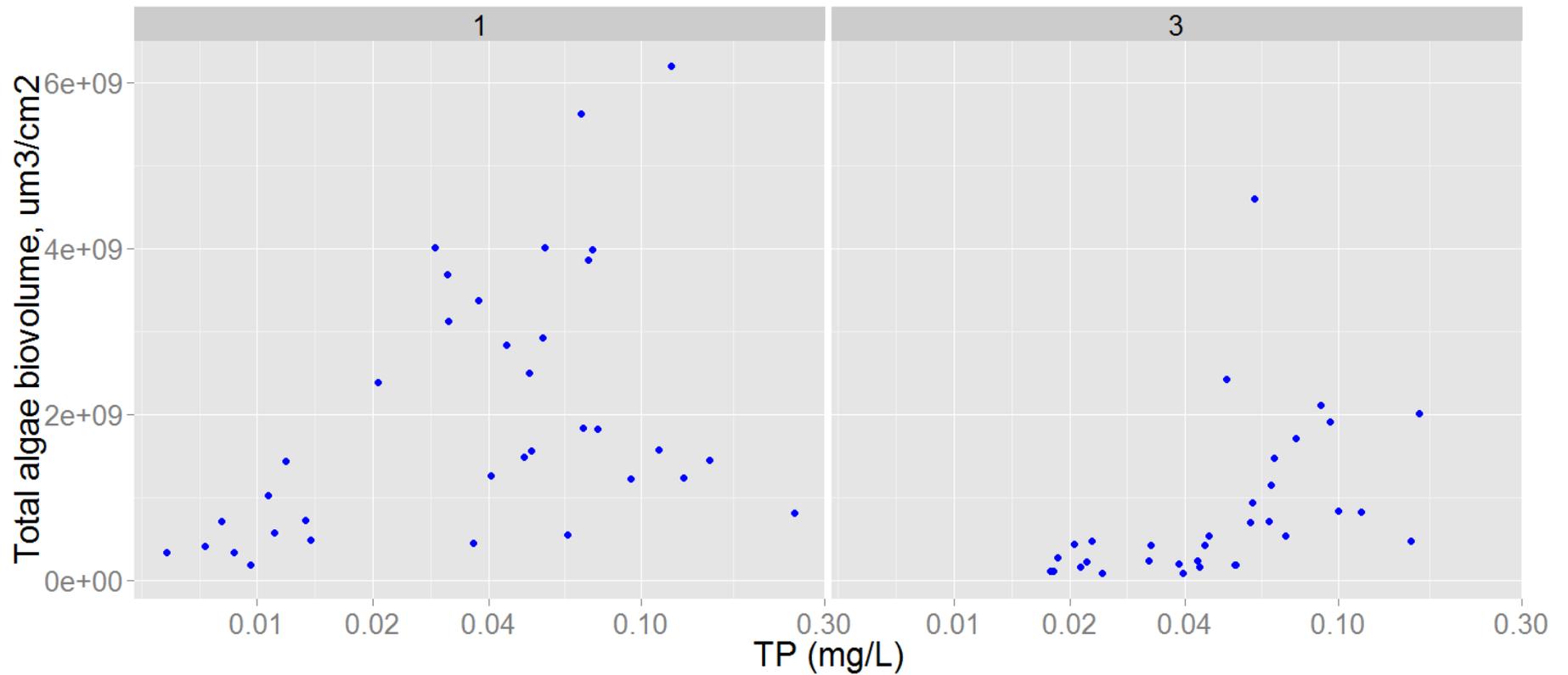
Benthic (Periphyton) Chlorophyll-a (mg/m²) vs TP

Average, June 2014 through Feb 2015

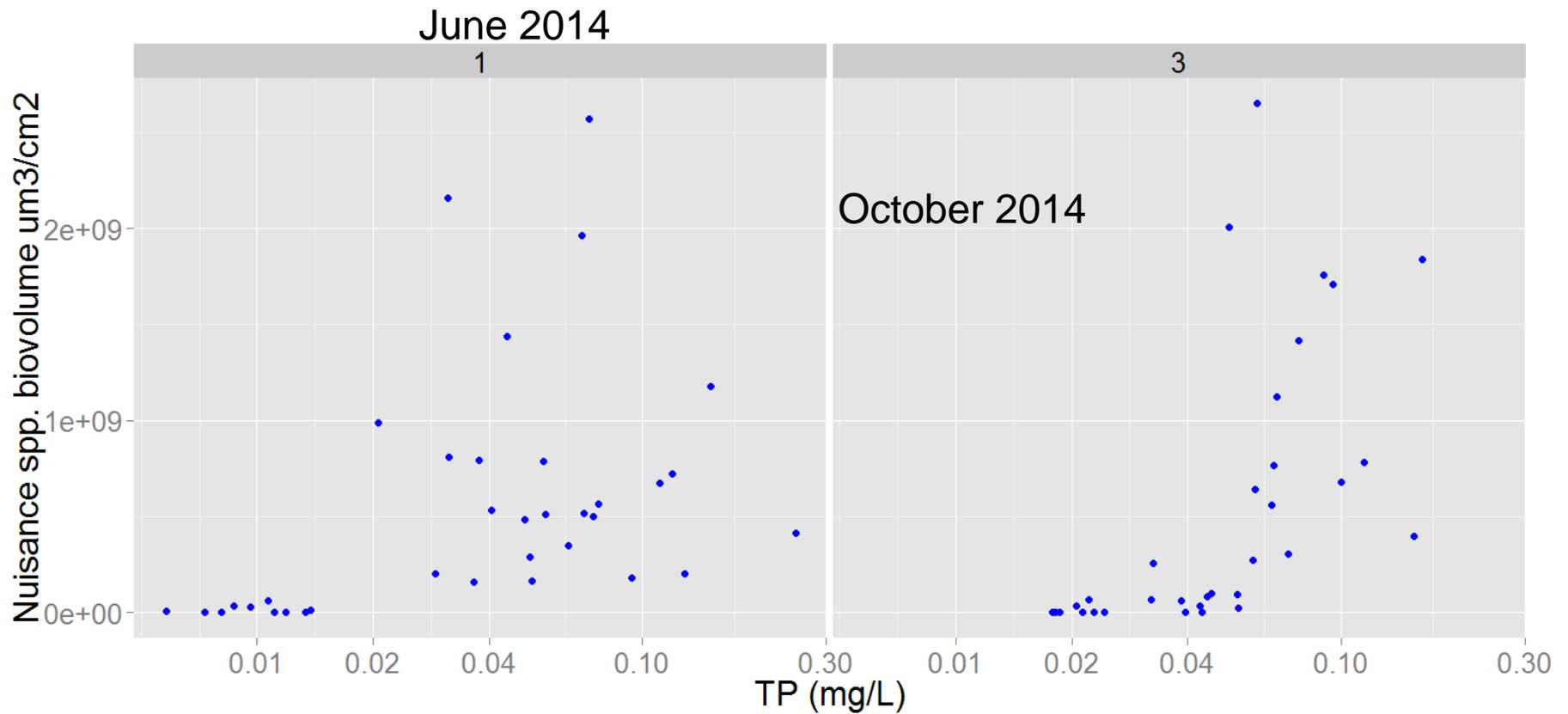


Total algal biovolume ($\mu\text{m}^3/\text{cm}^2$) vs TP

June 2014



Nuisance filamentous green algae Biovolume ($\mu\text{m}^3/\text{cm}^2$) vs TP

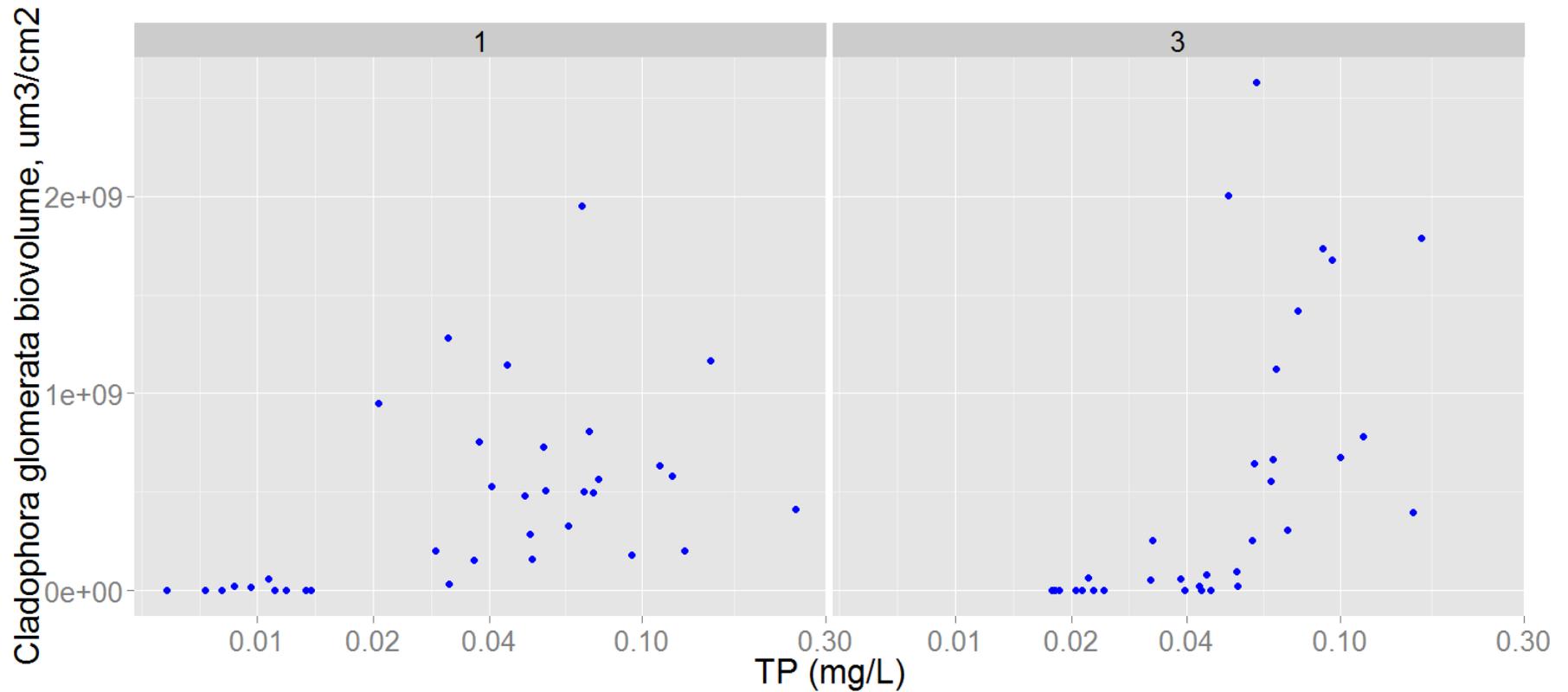


Taxa included: *Cladophora*, *Hydrodictyon*, *Oedogonium*, *Rhizoclonium*



Cladophora glomerata biovolume ($\mu\text{m}^3/\text{cm}^2$) vs TP

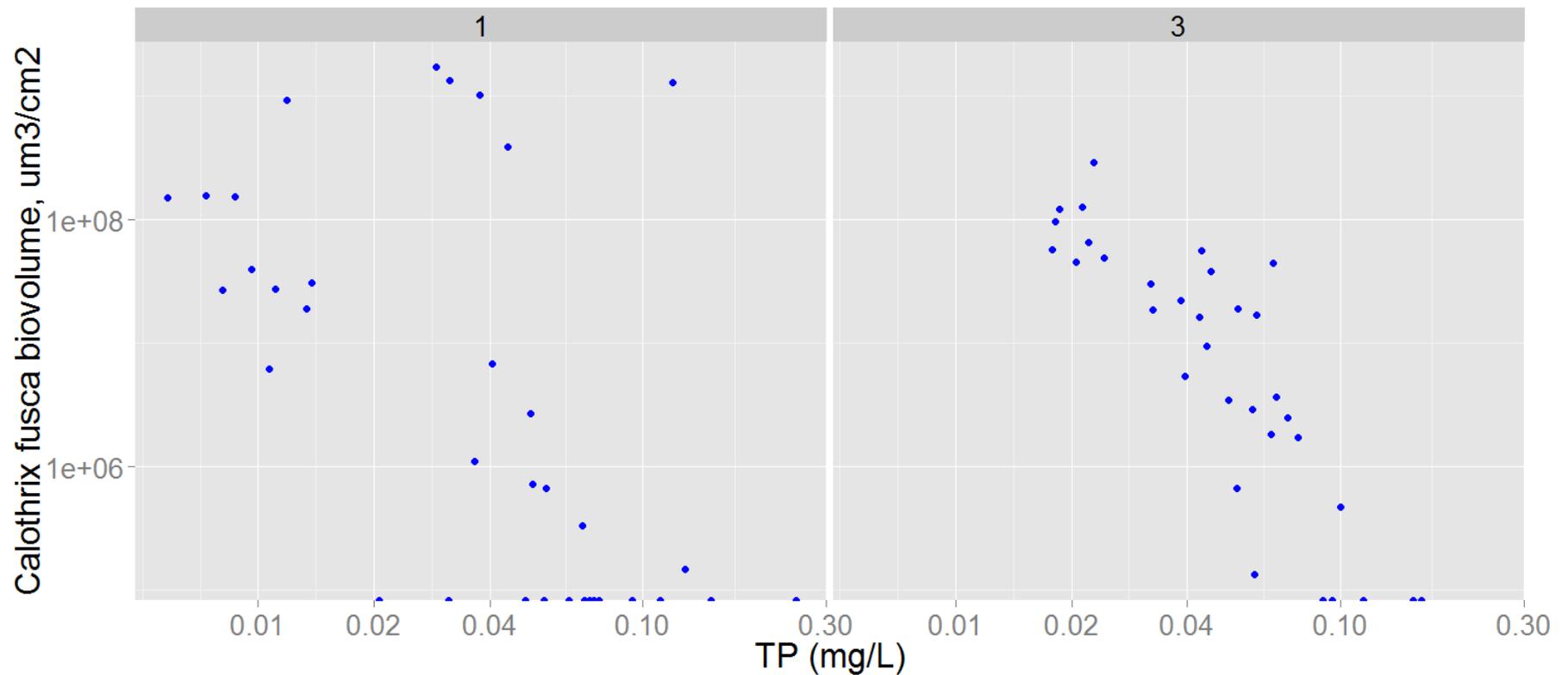
June 2014





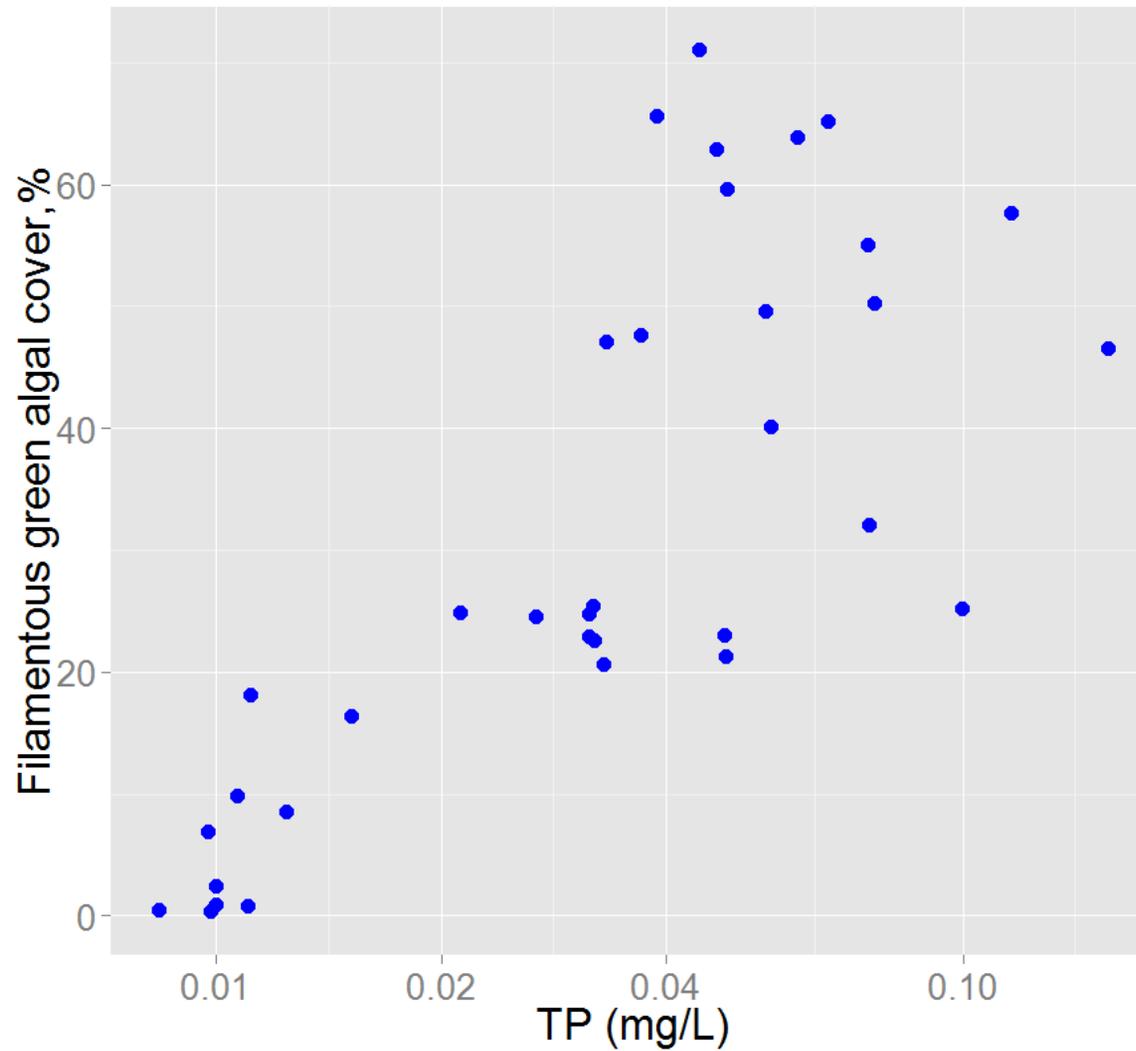
Calothrix fusca biovolume (um³/cm²) vs TP

June 2014



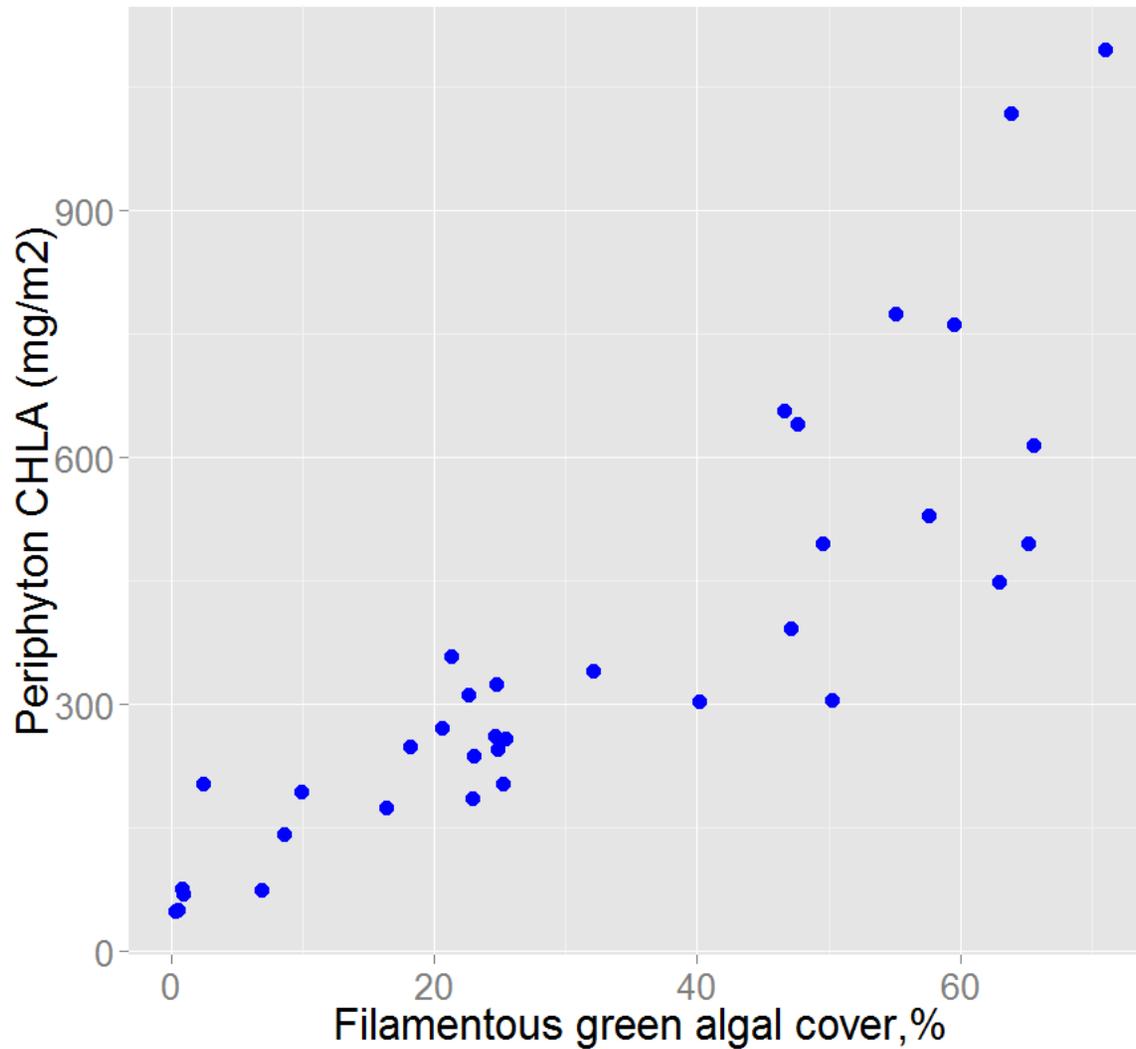
Filamentous green algal cover (%) vs TP

Average, June 2014 through Feb 2015



Periphyton CHLA vs. Filamentous green algal cover (%)

Average, June 2014 through Feb 2015



Lee Creek, Feb 2015









Barren Fork Creek, Welling

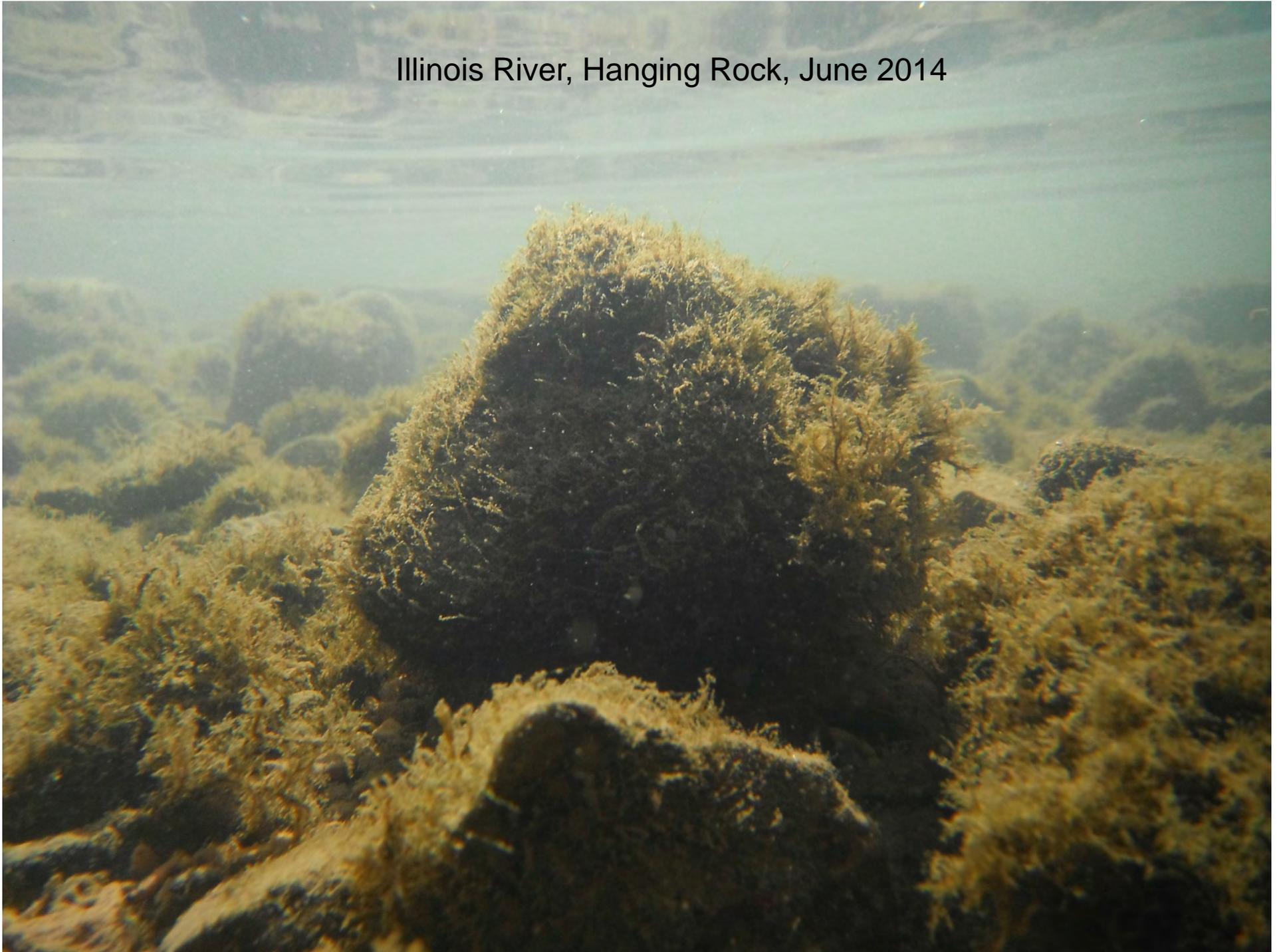








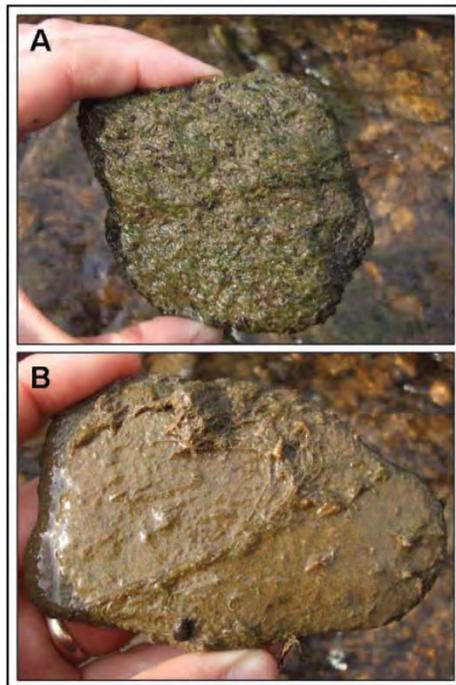
Illinois River, Hanging Rock, June 2014



Grazing minnows increase benthic autotrophy and enhance the response of periphyton elemental composition to experimental phosphorus additions

Jason M. Taylor¹, Jeffrey A. Back², AND Ryan S. King³

Center for Reservoir and Aquatic Systems Research, Department of Biology, Baylor University, Waco, Texas 76798 USA



Campostoma anomalum
Central stoneroller



FIG. 4. *Cladophora glomerata* growth on grazed (A) and ungrazed (B) substrates on day 28 of the experiment.

Illinois River (ILLI-5), Low-water crossing, October 2014



Illinois River (ILLI-5), Low-water crossing, December 2014



Illinois River (ILLI-4) @ AR 59, Feb 2015



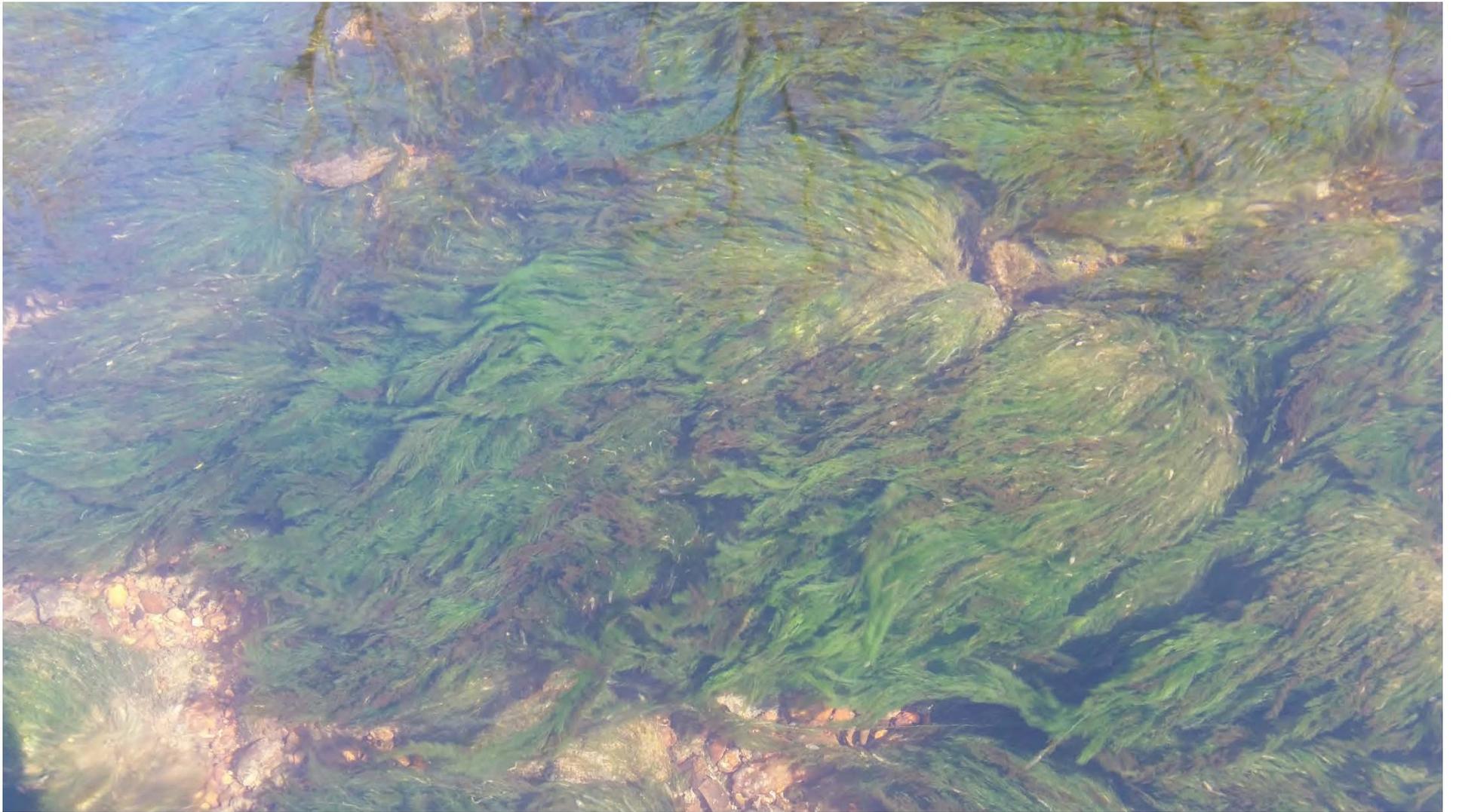


Illinois River (ILLI-8), Tahlequah, Feb 2015



Illinois River (ILLI-3), Chambers Springs Rd, Feb 2015





Acknowledgments

- Baylor SRJS core team:
 - Dr. Jeffrey Back, instrument specialist
 - Katherine Hooker, research technician (BU '14)
 - Morgan Bettcher, research technician (UNC '14)
 - Stephen Elser, research technician (ND '14)
 - Caleb Robbins, Ph.D. student, BU (2012- .)
 - Stephen Cook, Ph.D. student, BU (2013- .)
 - Lauren Housley, M.S. student, BU (2014- .)
- Taxonomists
 - Dr. Stephen Porter (soft algae)
 - Dr. Barbara Winsborough (diatoms)