Effects of elevation, land cover, and Irene disturbance on stream insect communities

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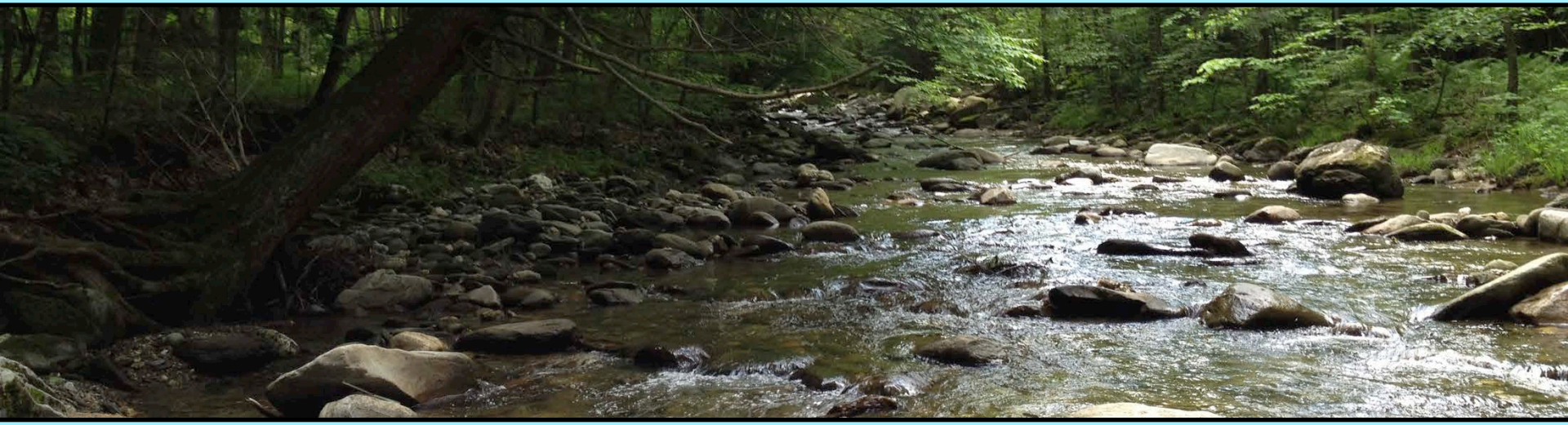
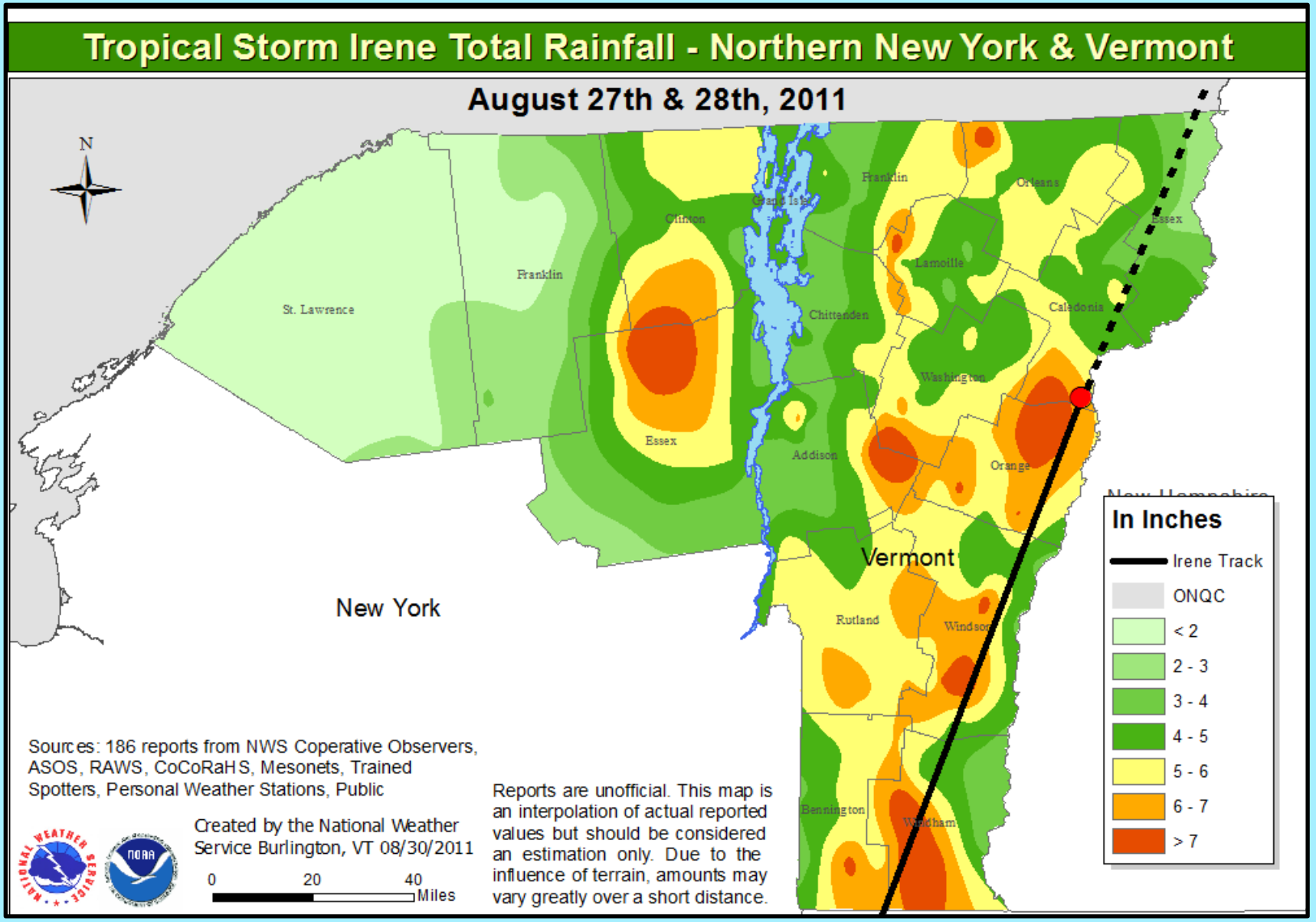
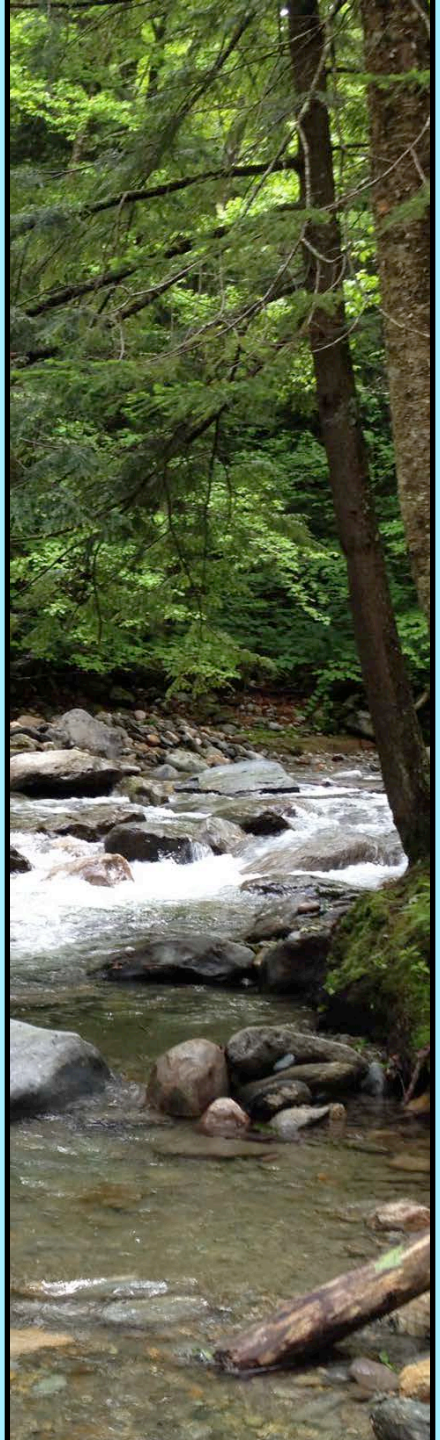


Irene Total Rainfall



Source: NOAA/NWS Burlington



Research Questions

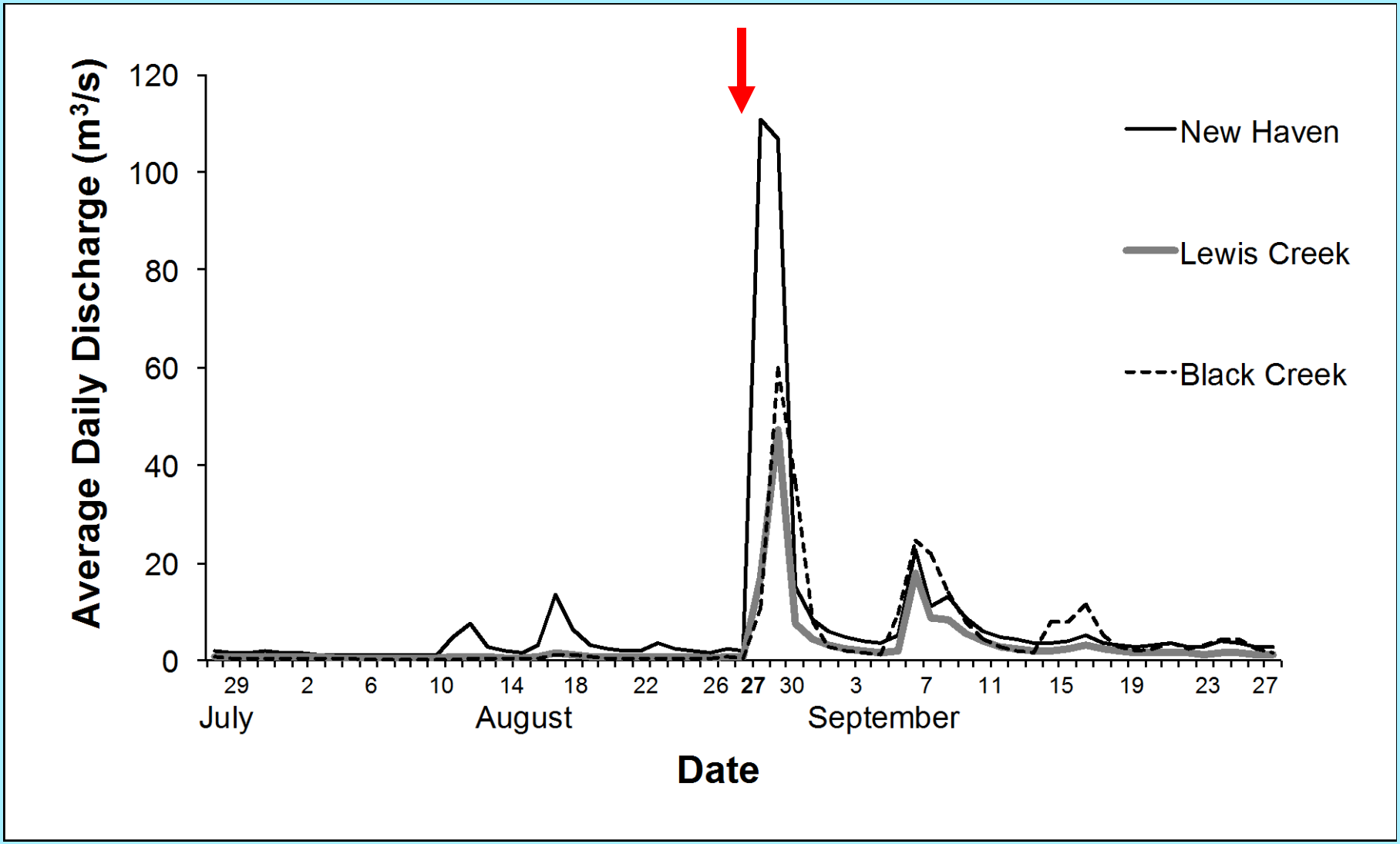
- Physical and biological elevational gradients intact?

- Can we detect disturbance effects 9 months later?

- Disturbance vs. land cover?

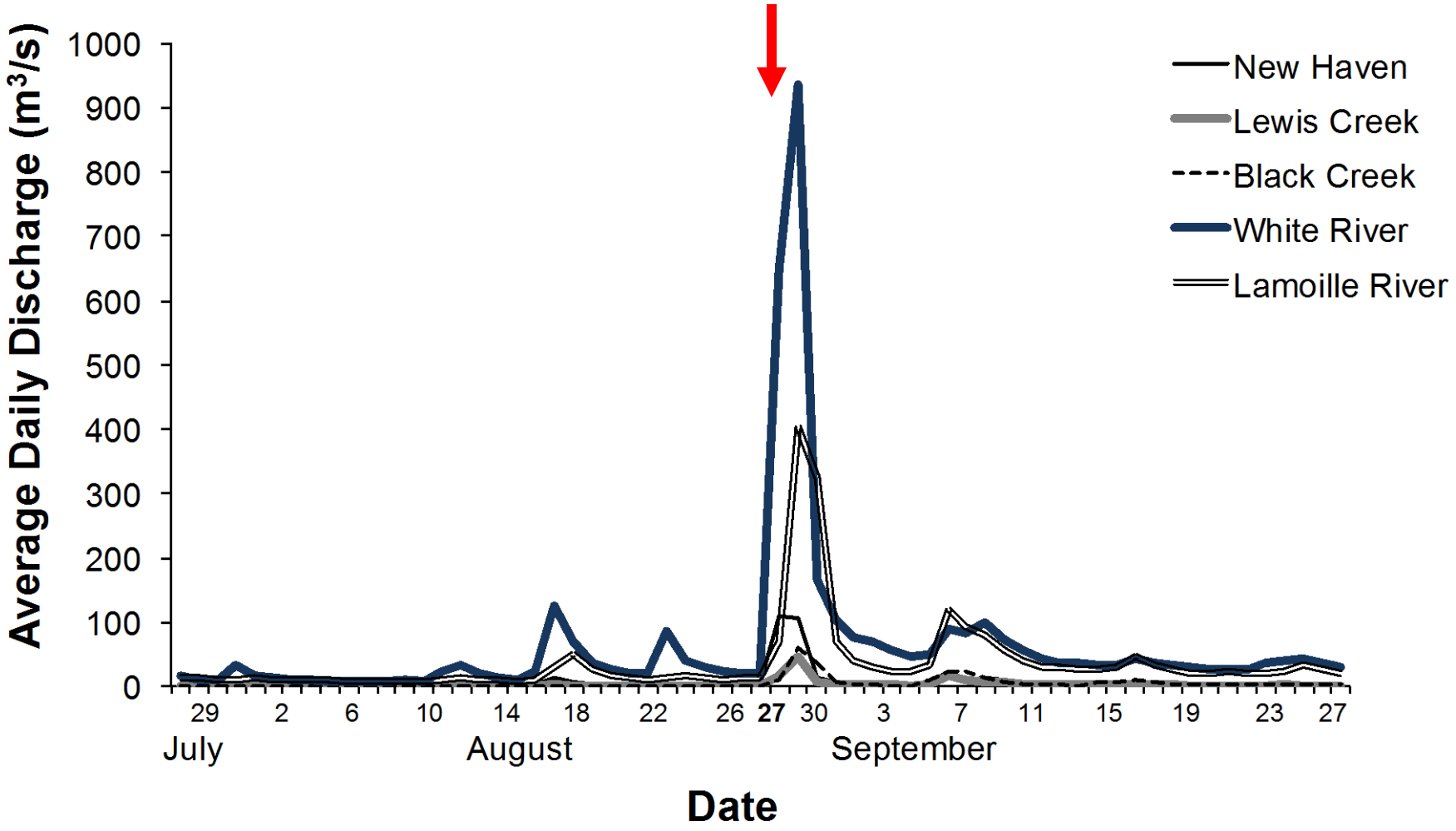
How resilient are Vermont streams to disturbance?

Summer 2011 River Flow

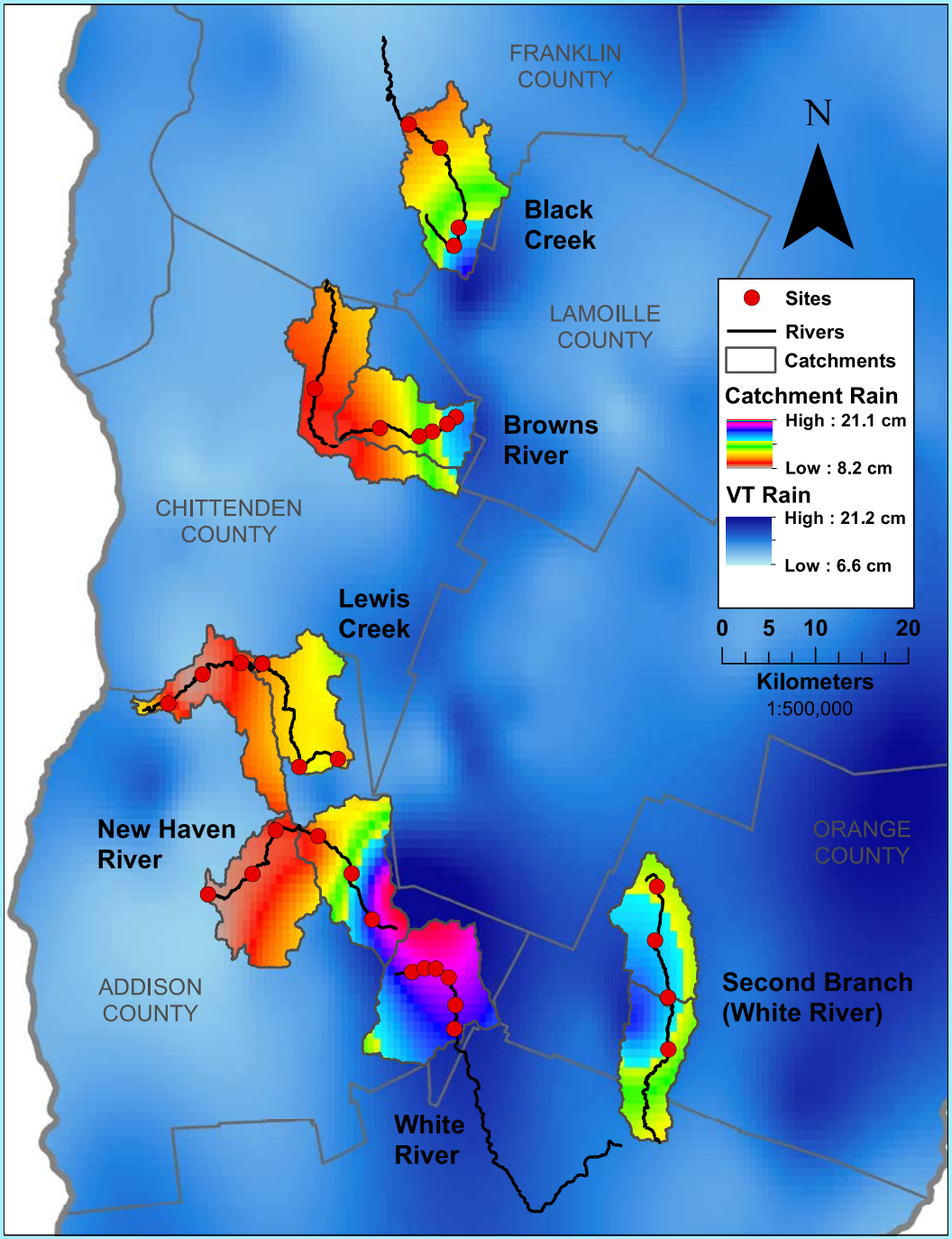


Data: USGS (http://waterdata.usgs.gov/vt/nwis/rt)

Summer 2011 River Flow



Data: USGS (http://waterdata.usgs.gov/vt/nwis/rt)

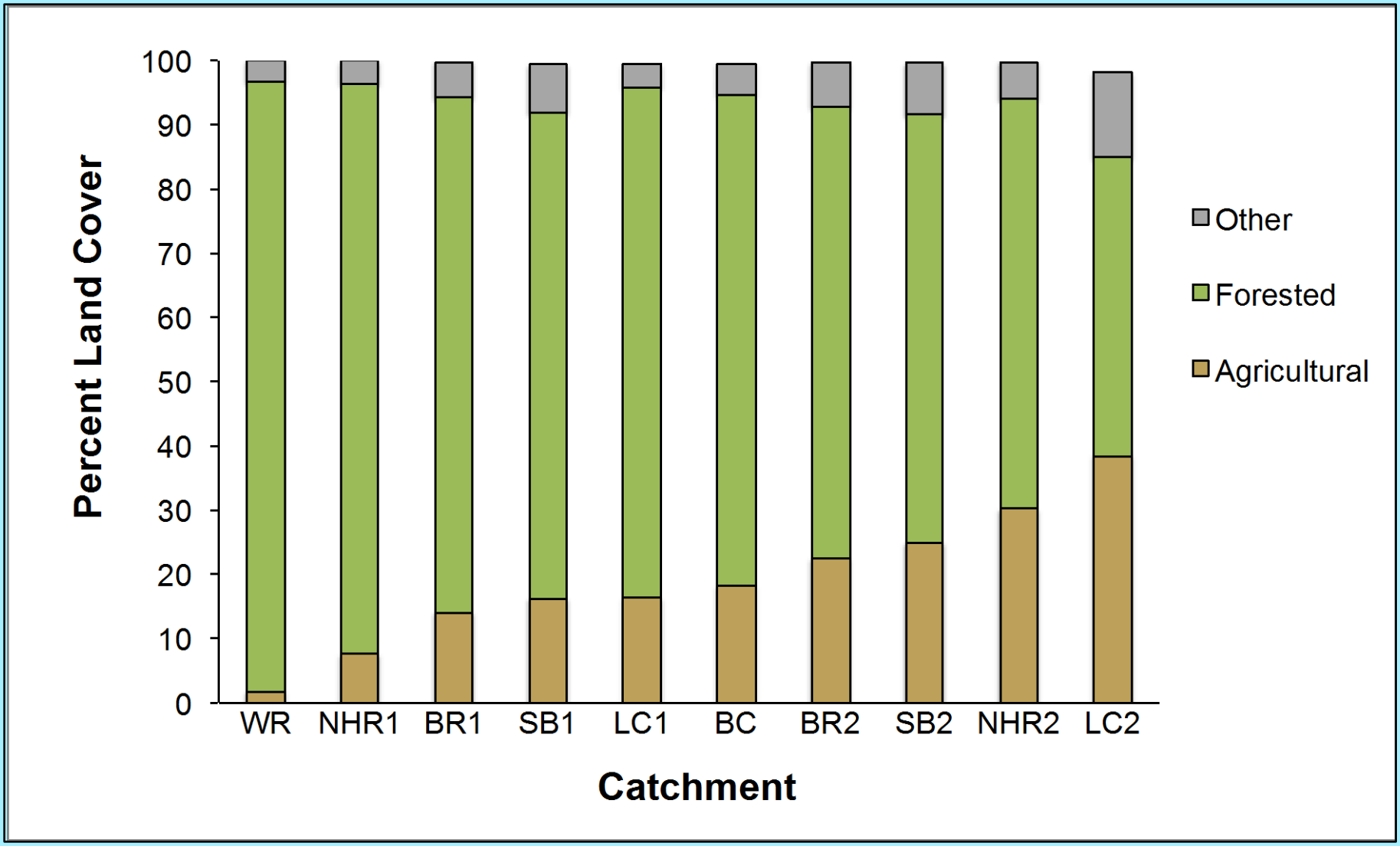


Irene Rainfall by Watershed

Data: VCGI (http://vcgi.vermont.gov/)

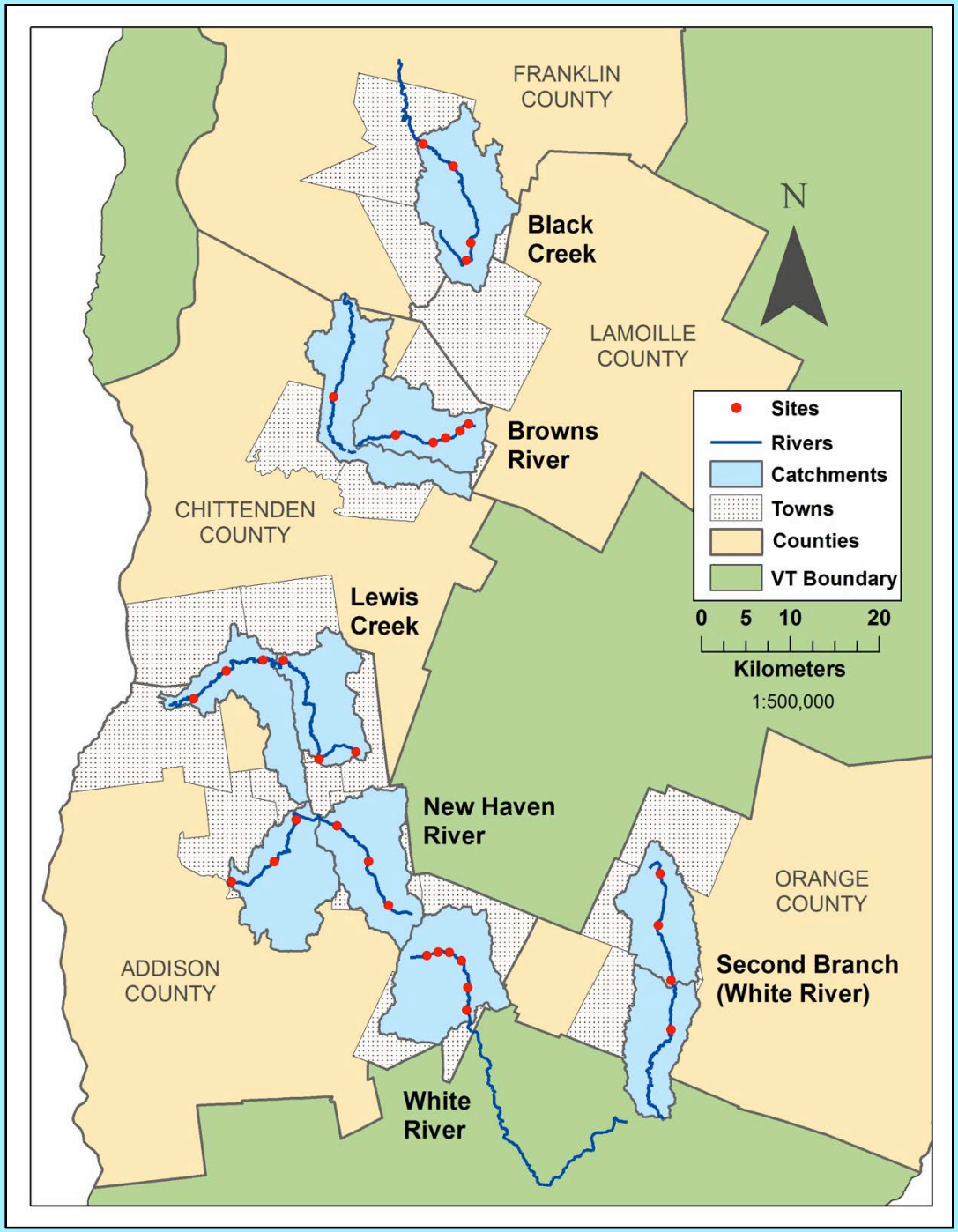
Analysis: ESRI ArcMap 10

Watershed Land Cover



Data: VCGI (http://vcgi.vermont.gov/); Analysis: ESRI ArcMap 10

Elevational Gradient Example



Study Site Distribution

6 rivers
10 watersheds
32 sites
128 samples

Data: VCGI (http://vcgi.vermont.gov/)

Analysis: ESRI ArcMap 10

E

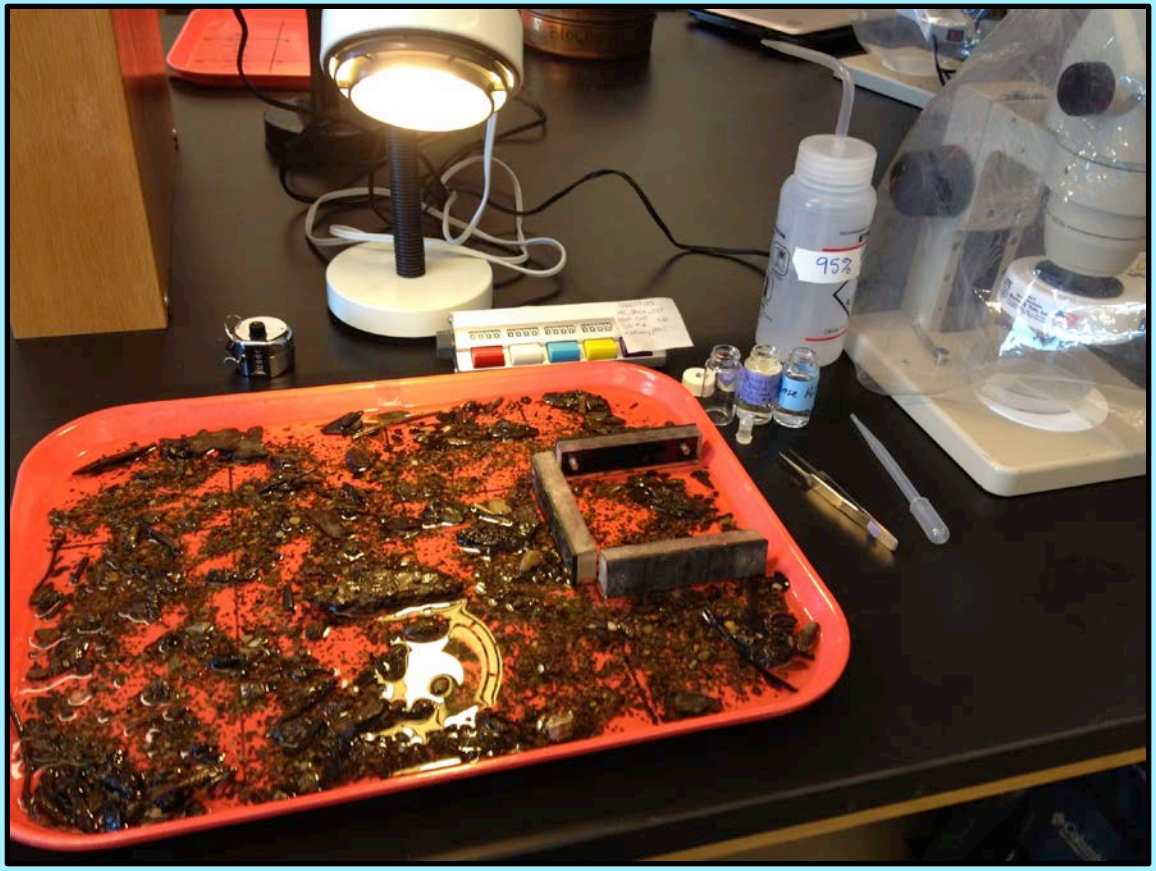
P

T

Diptera

Lab Methods

- Subsampling
- Identification
- Community metrics
- Data Analysis

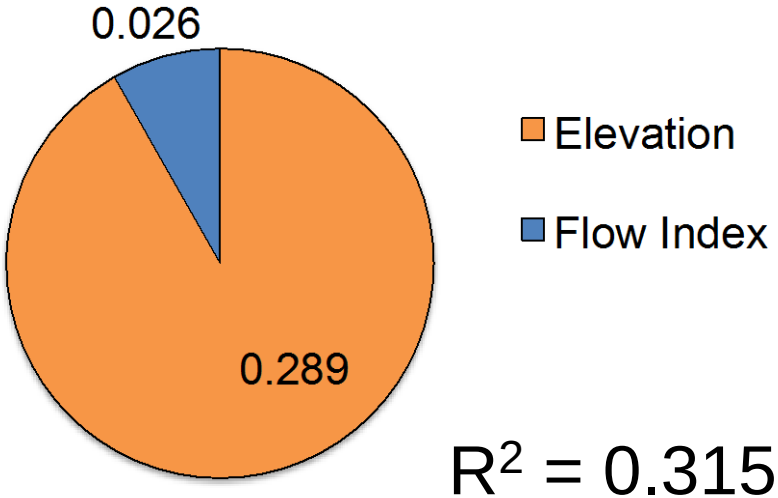


Results – Stepwise multiple regression

- Which independent variables best predict biological community metrics?

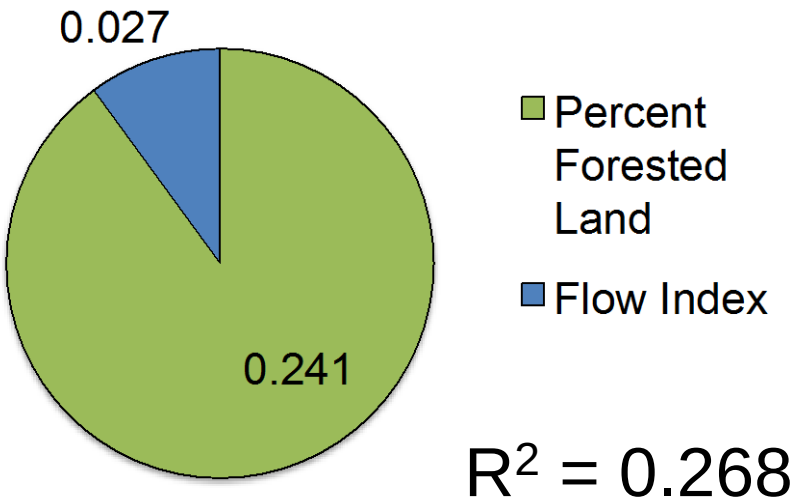
Elevation
Percent Canopy Cover
Post-Irene Flow Index
Site Rainfall
Catchment Rainfall
Percent Forested Land
Percent Agricultural Land

Percent Composition EPT



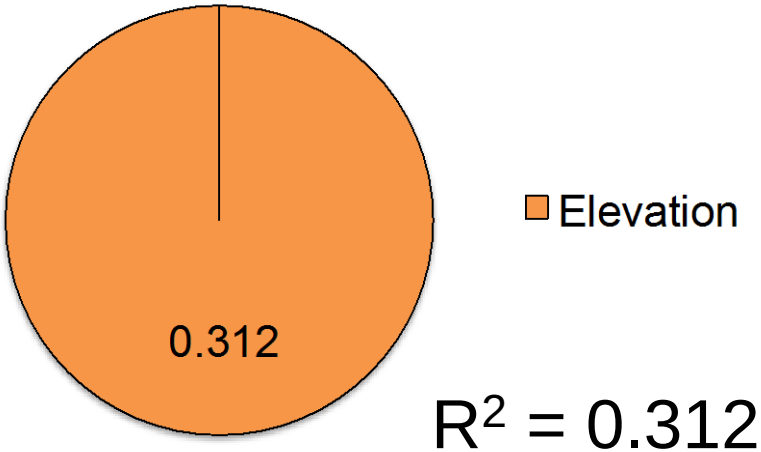
$R^2 = 0.315$

Relative Abundance



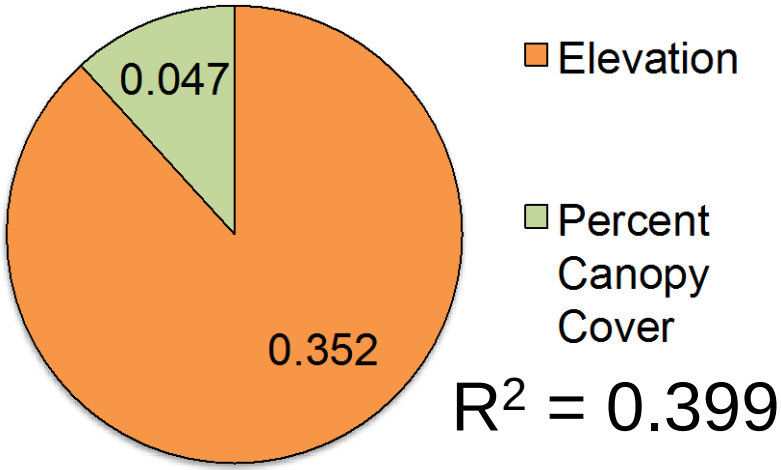
$R^2 = 0.268$

Total Richness



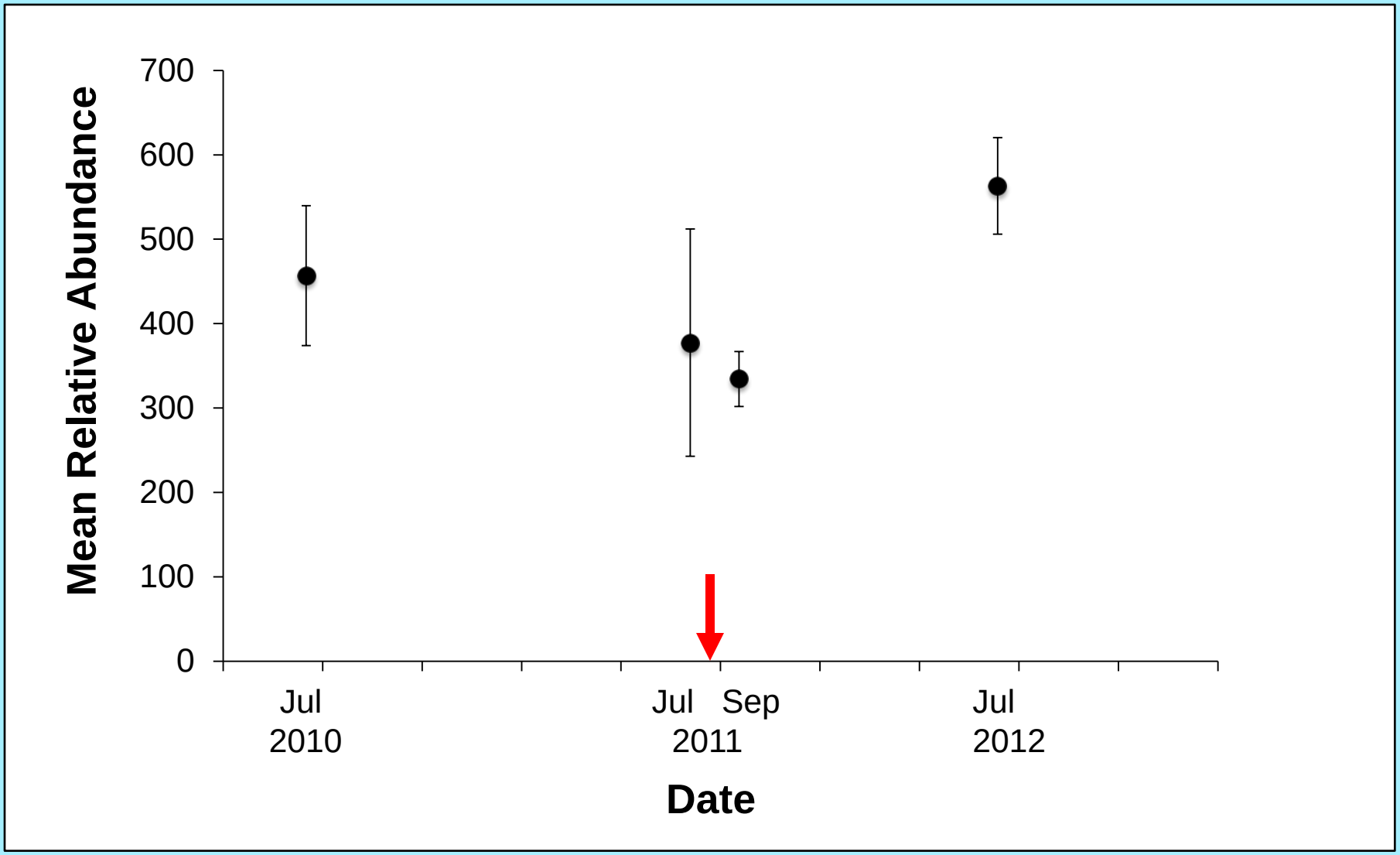
$R^2 = 0.312$

Percent Composition Mayflies



$R^2 = 0.399$

Results – Lewis follow-up site



Conclusions

- Clear physical and biological gradients
- Evidence for biological and physical resilience
- Land cover → more important stressors?


Thank you!

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