

Differences in water, soil, and vegetation characteristics in high and low disturbance wetlands

Aliana Britson, Denice Wardrop, Patrick Drohan,
Robert Brooks, and Elizabeth Boyer

SWS Mid-Atlantic Chapter Meeting

April 5th, 2014

Riparian Disturbance Hypothesis

Stressors *alter the hydrologic regime*

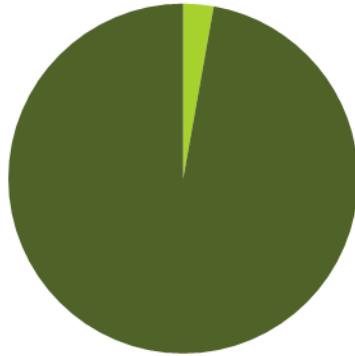
Streams incised, *separating them from floodplains, drying out of riparian vegetation communities - more invasive plants*

Drier and more oxygenated soils and vegetation changes *increase decomposition* causing less soil moisture and organic matter

Changes in microhabitats cause shifts or loss in biodiversity composition and riparian functions

Low Disturbance

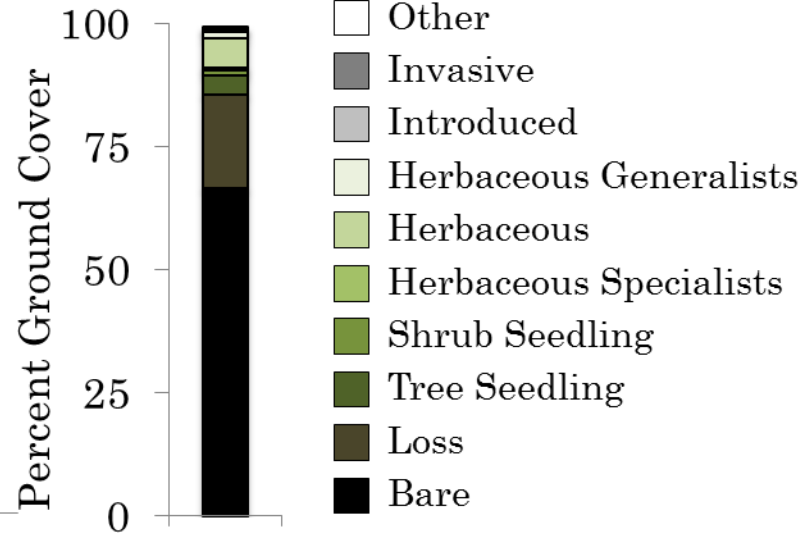
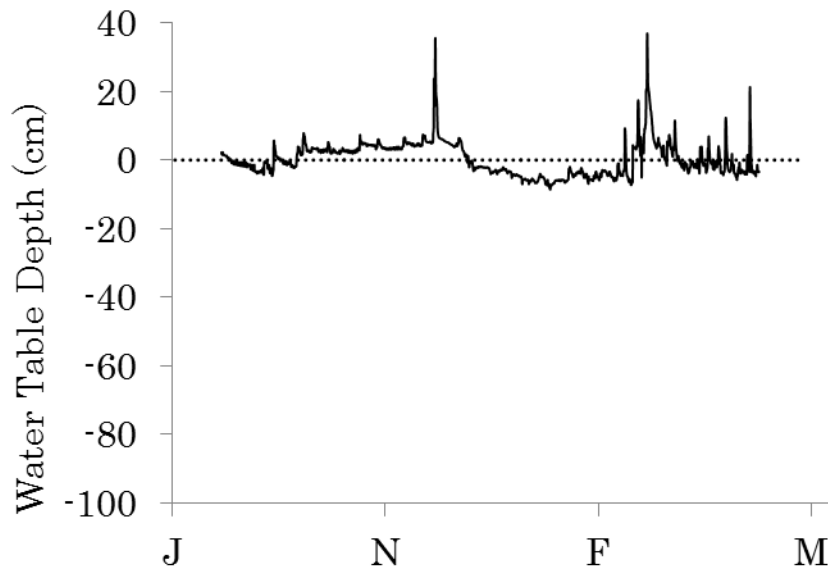
Landscape



Forest
Pasture

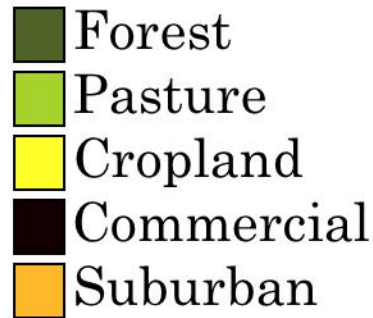
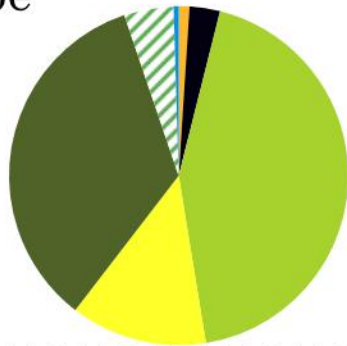


Wetland

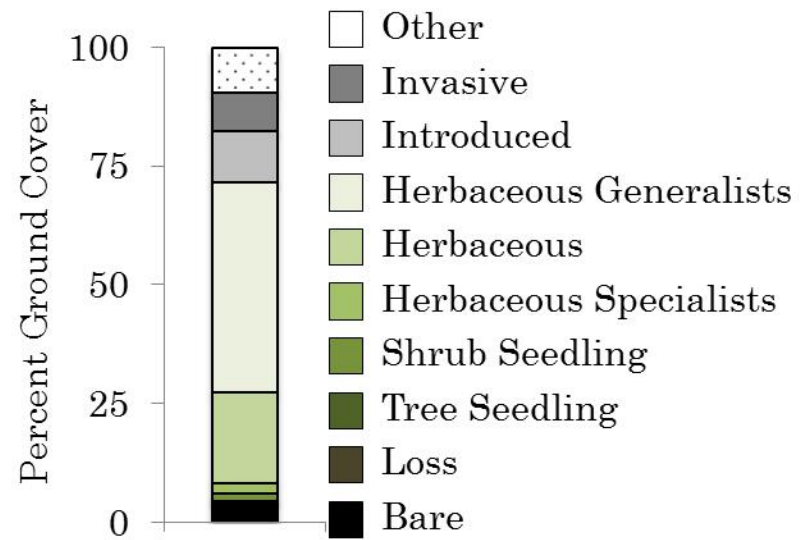
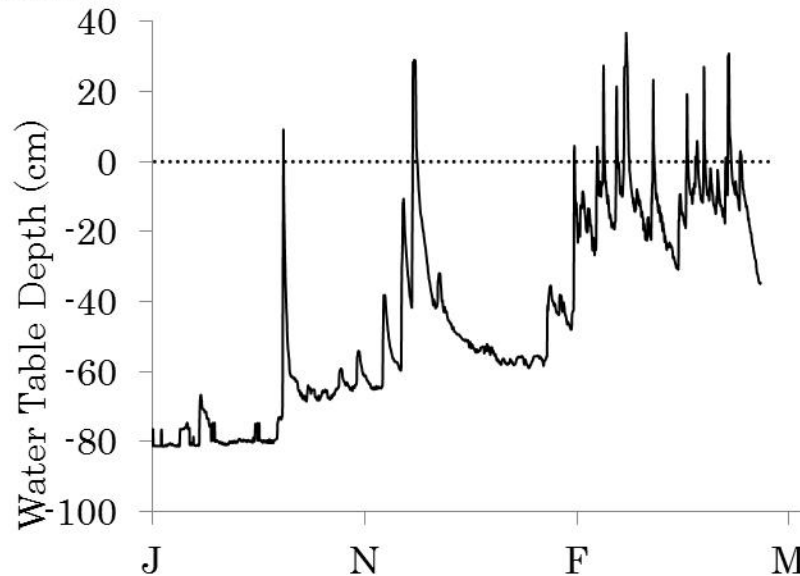


High Disturbance

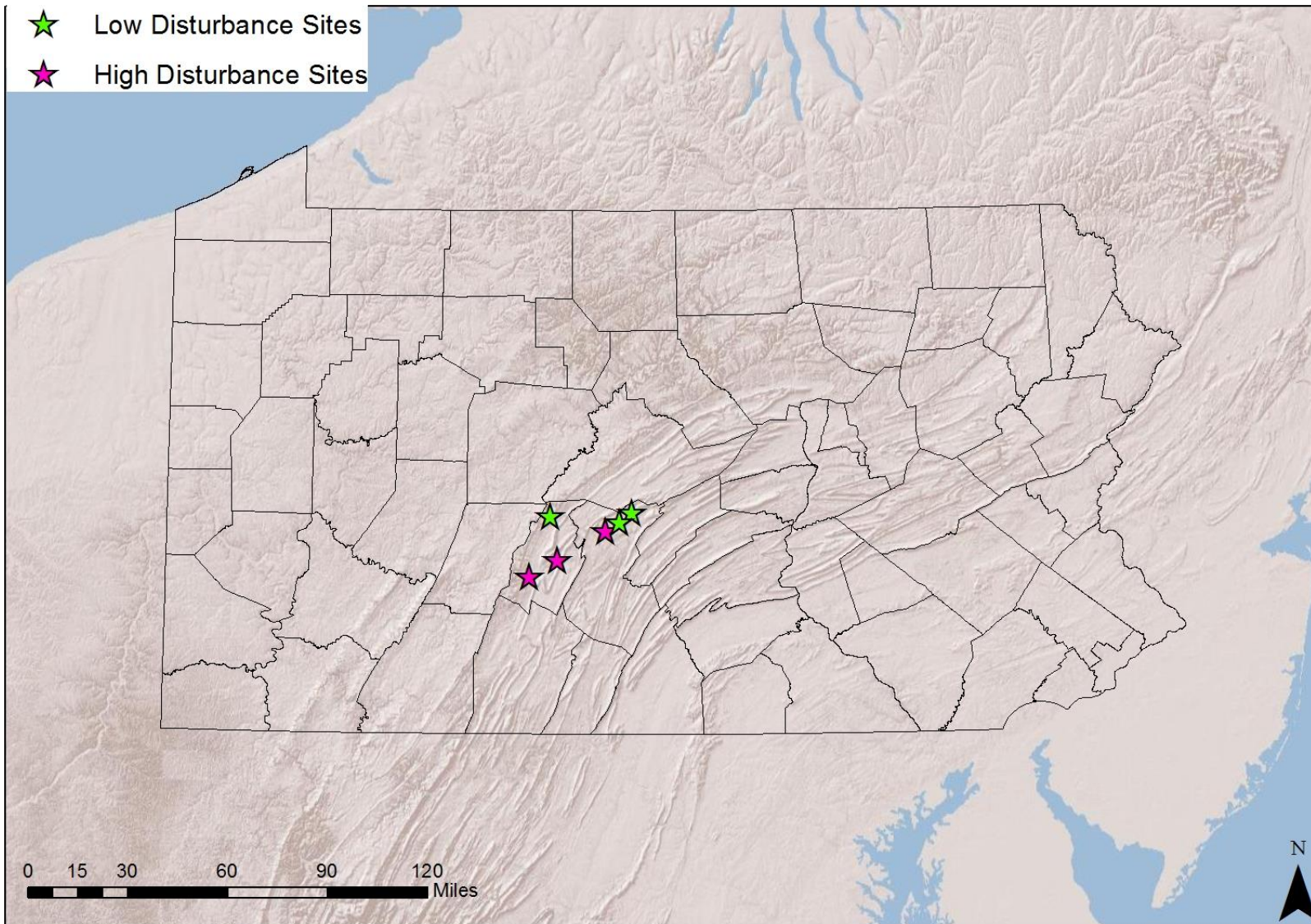
Landscape



Wetland



- **How are high and low disturbance sites different chemically?**
 - Water Quality
 - Litter Quality
 - Soil
- **How do these differences affect N and C cycling?**
 - Denitrification
 - Carbon Storage
 - C Export



Fork



Whipple Dam



Shaver's Creek



Mosquito



Cambaris



Cauldron



Methods



Water

- 20 piezometers per wetland
- Spring and Fall sampling 2011-2012
- pH, temp, nitrate, dissolved organic carbon



Vegetation

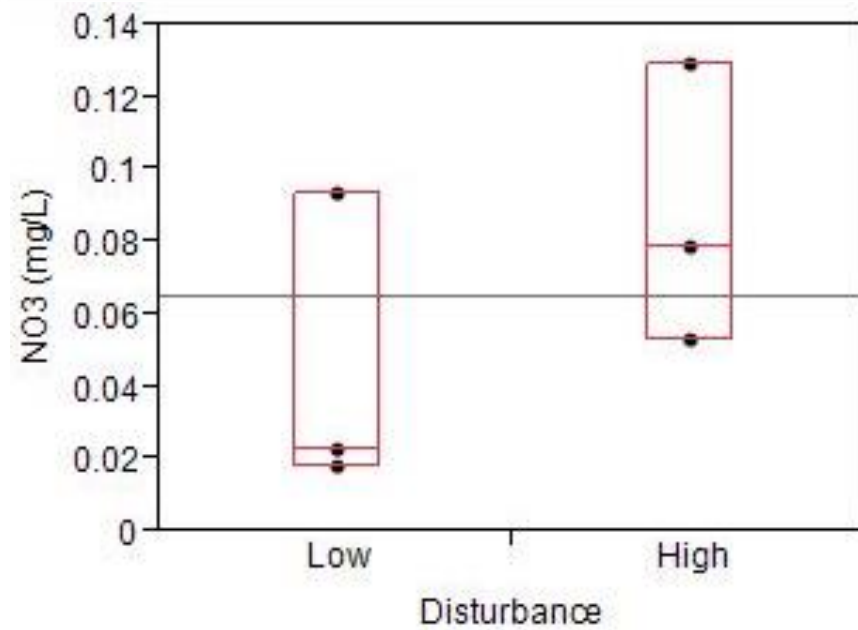
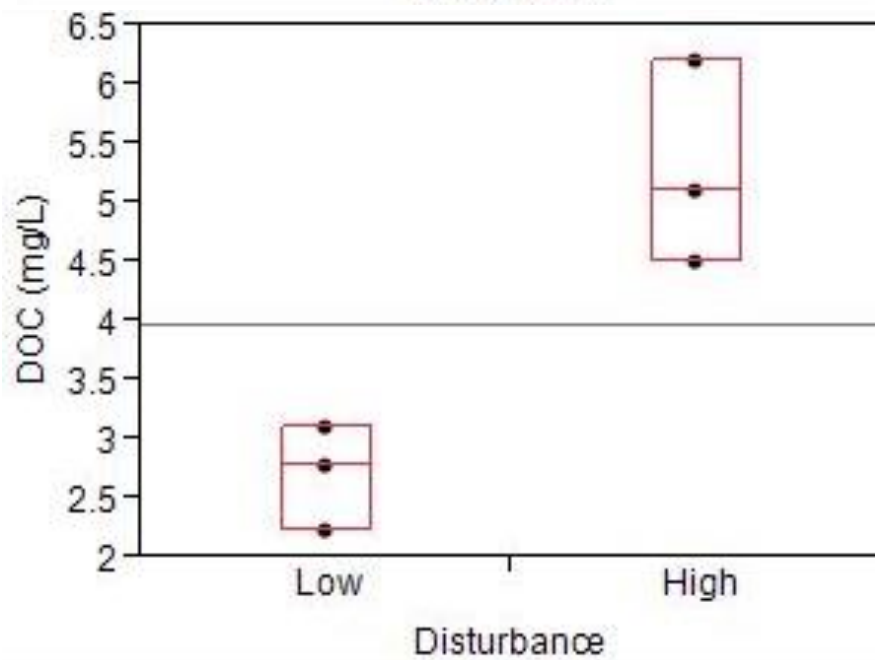
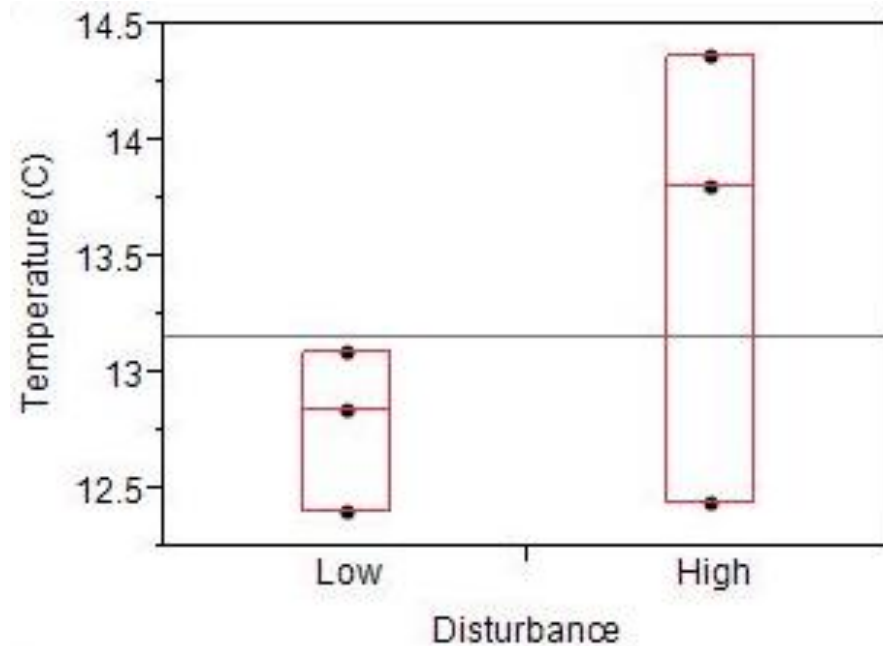
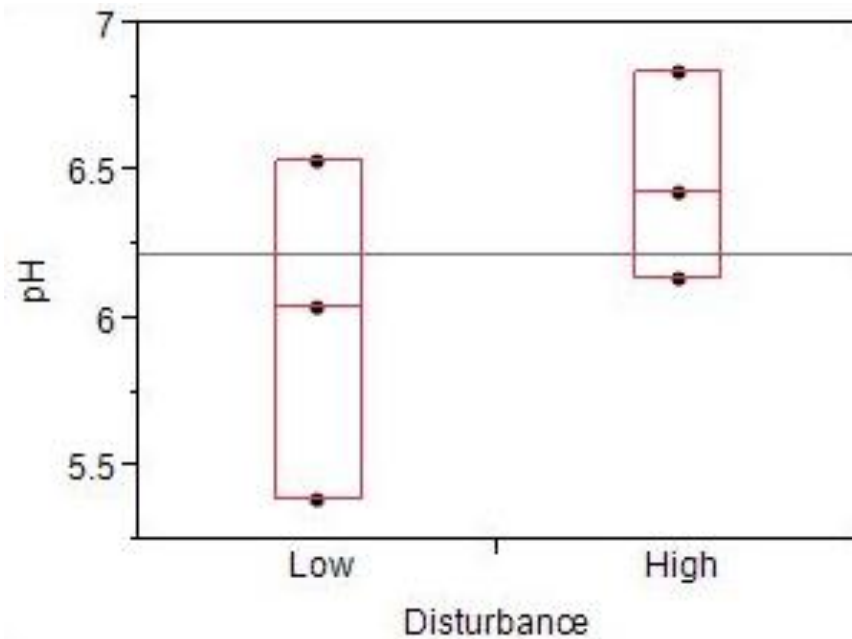
- September 2012
- Four 0.25m² square plots
- All Vegetation
- %C, %N, % cellulose, % lignin



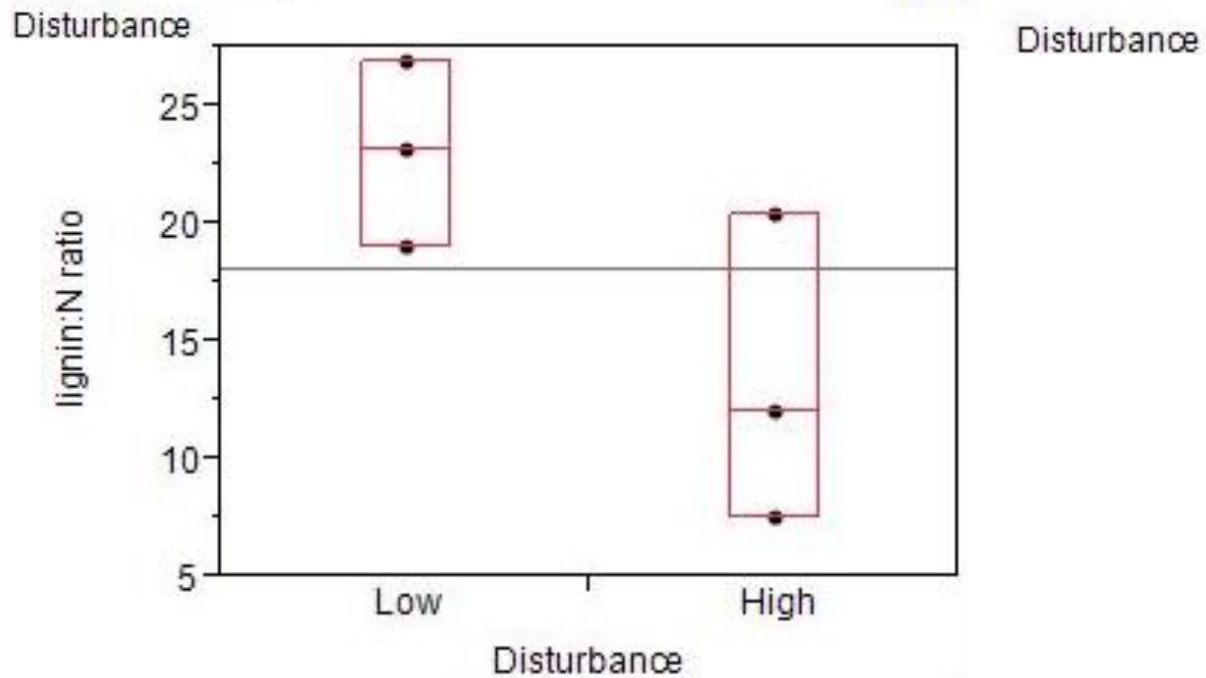
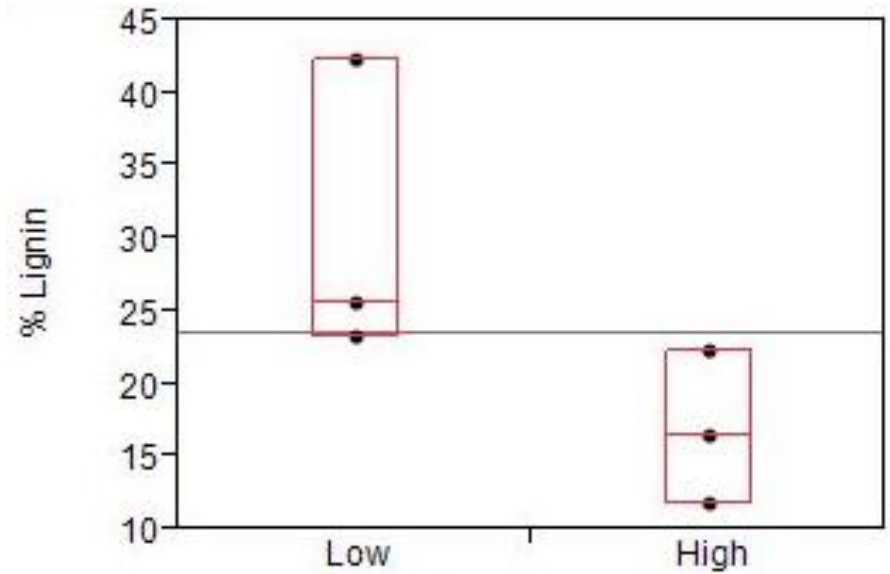
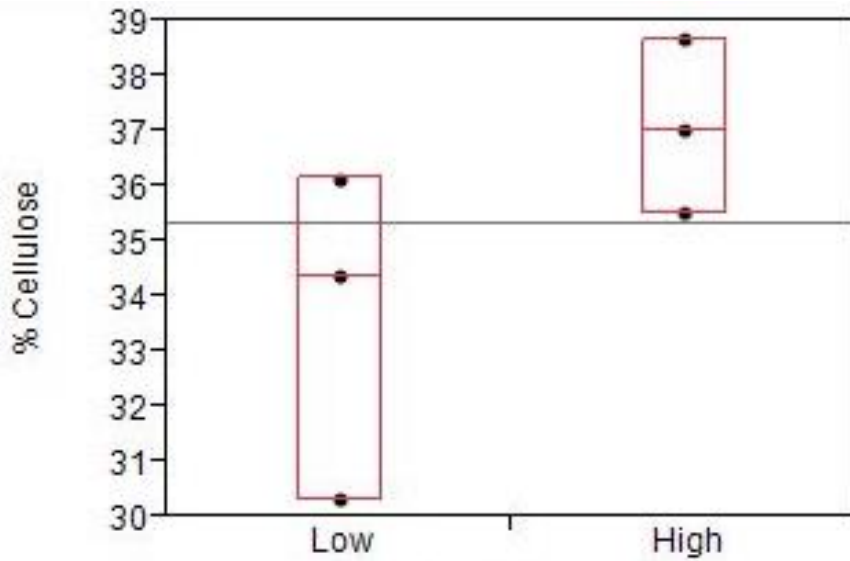
Soil

- 20 cores per site
- Core to 50cm
- Samples from each horizon
- Analyzed for %C and %N

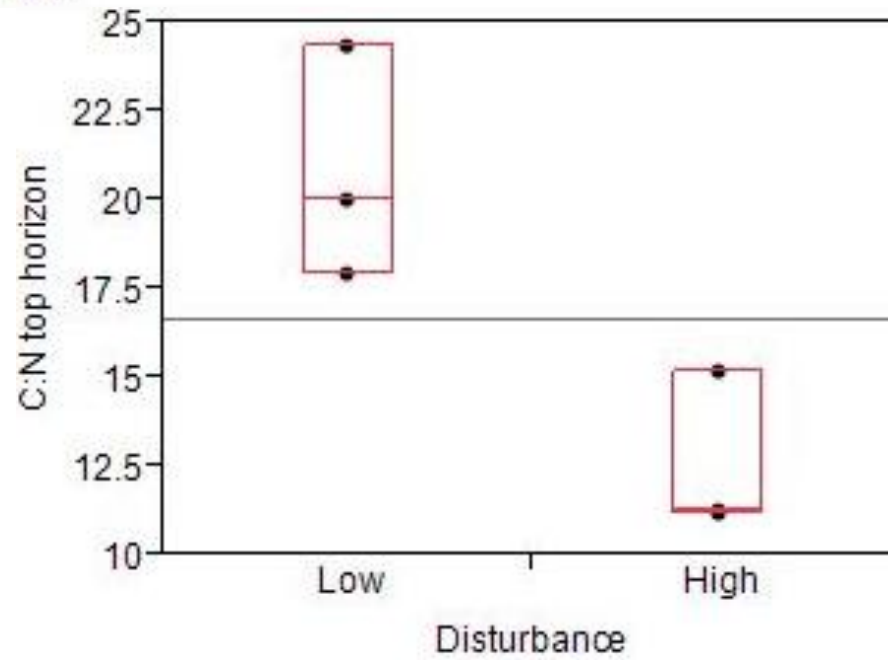
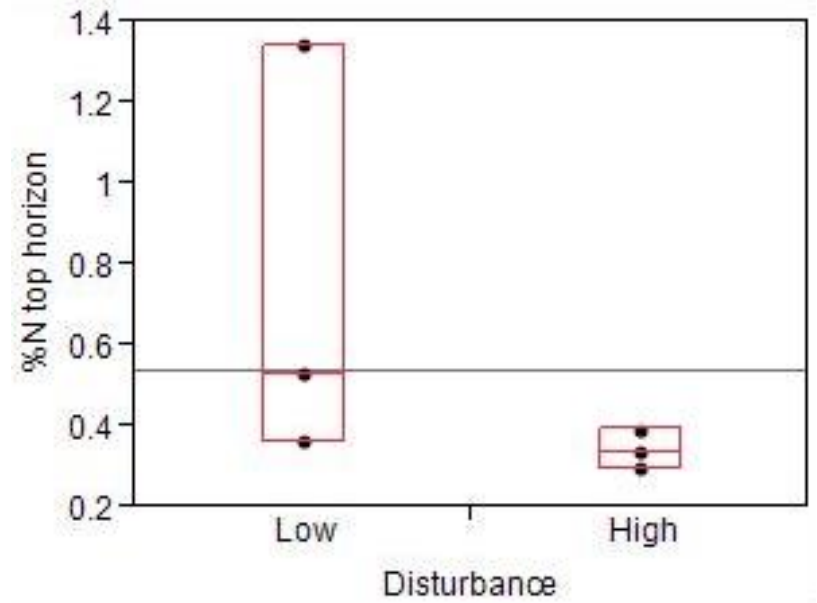
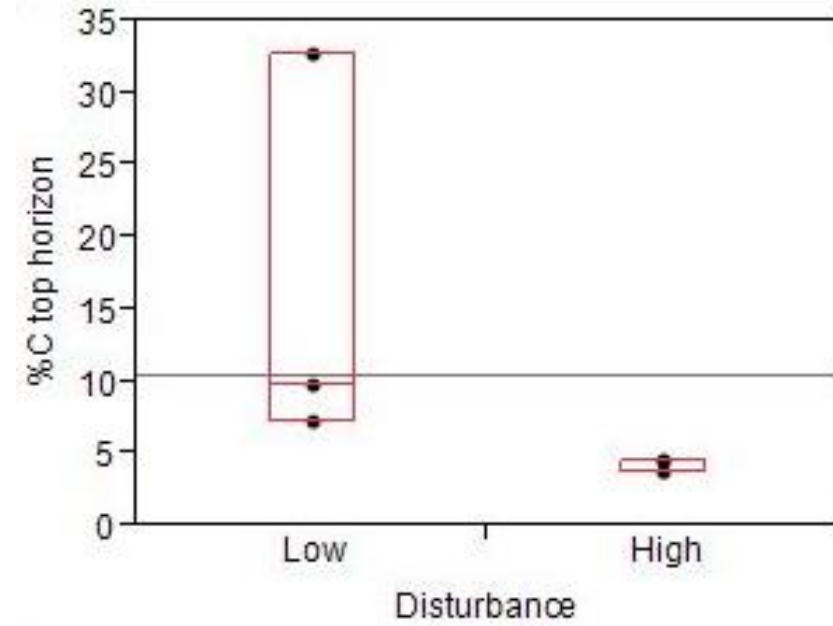
Water






Vegetation



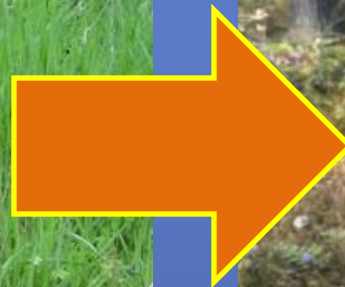
Soil



Conclusions

- See differences in water, vegetation, and soil chemistry between high and low disturbance sites
- Denitrification 
 - Due to increase in temperature, DOC, and nitrate
- C Export 
 - Increase in DOC in high disturbance wetlands
- C Storage 
 - See less C in high disturbance sites
 - Greater decomposability of litter and soil C in high disturbance sites

Plant community is important!!



Acknowledgements

Committee

- Denice Wardrop
- Elizabeth Boyer
- Patrick Drohan
- Chris Duffy

Land Access

- PA DCNR
- State Game Lands
- Larry Suwak
- David Culp
- Penn State Experimental Forest

Riparia Research Group



Lab Help

- Karol Confer
- Mike Brown
- Denyce Maitland
- Lisa Lentz

Funding

- EPA
- NASA Pennsylvania Space Grant Consortium

Field Help

- Kyle Martin
- Marla Korpar
- Danny Molinaro
- Jason Britson
- Kendra Martz
- Melissa Pastore
- Tyler Yost
- Anna Puchkoff