



# Hydrology and land use control DOM and nutrient patterns in stream

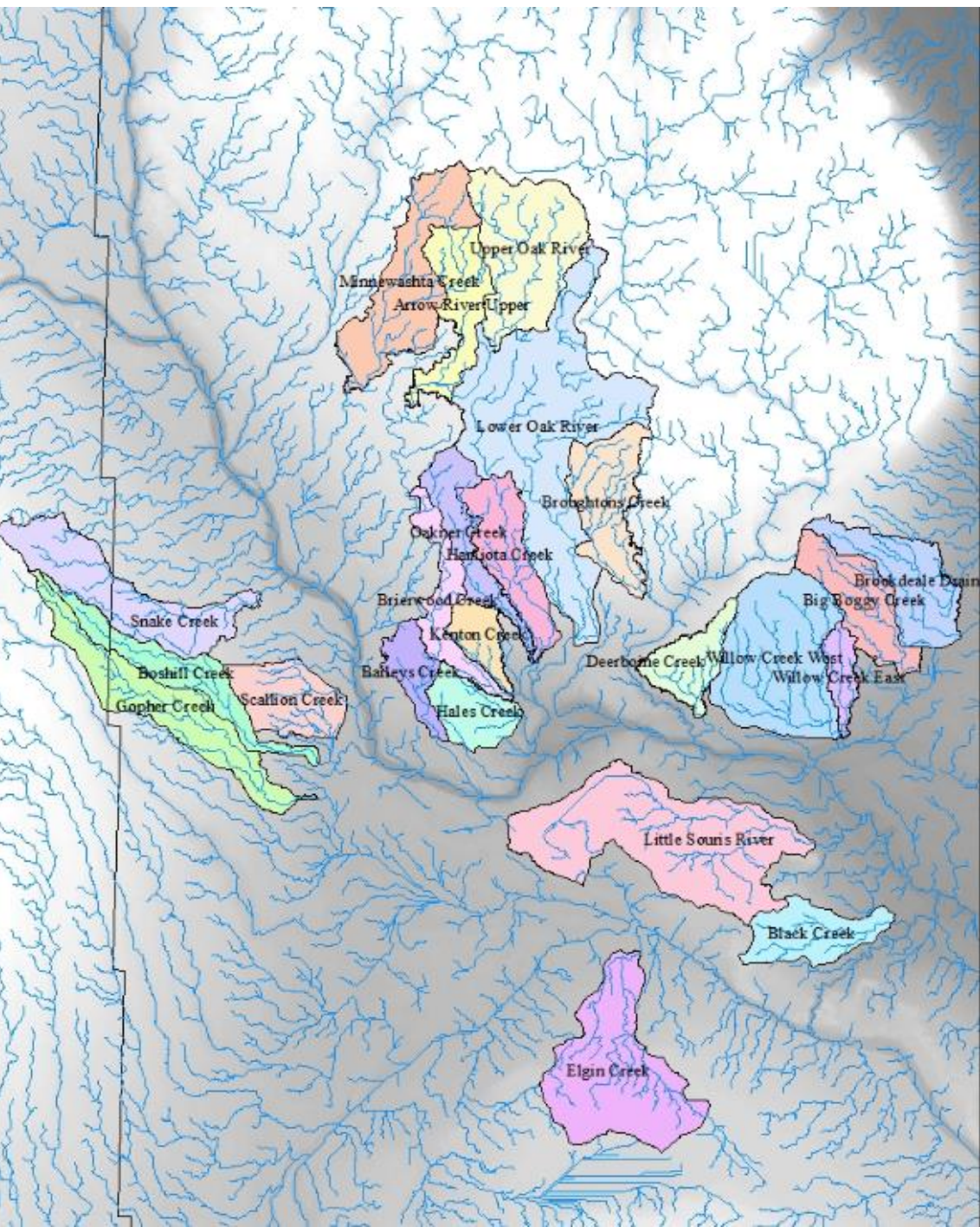
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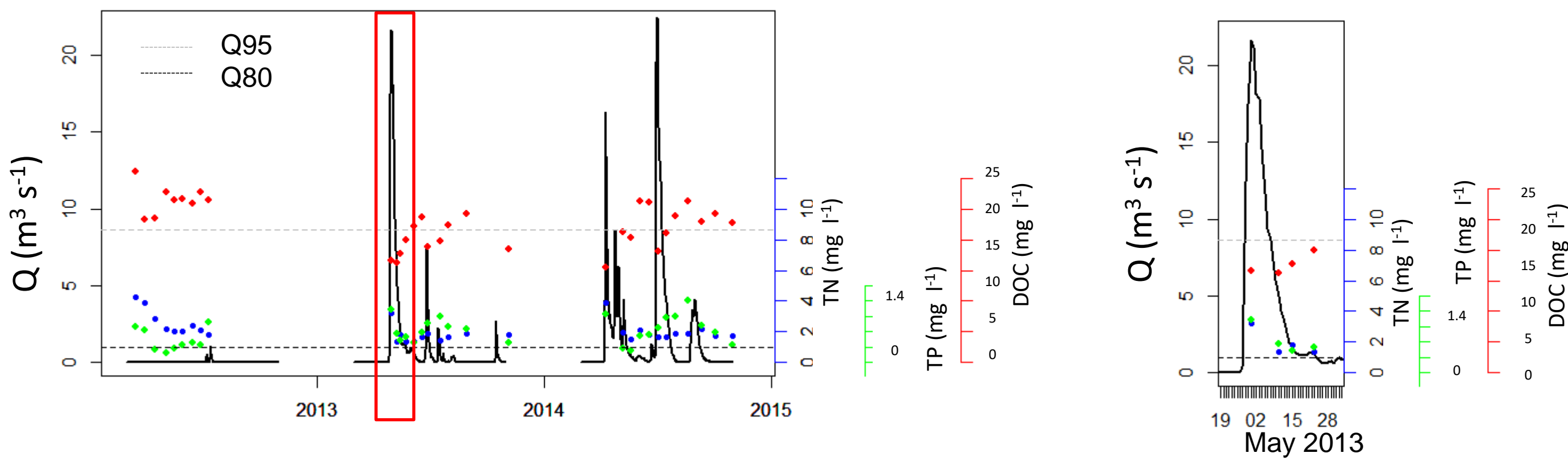
## INTRODUCTION

Streams and rivers play a major role in carbon cycling at the reach to global scale, controlling the input, transport and transformation of both terrigenous and autochthonous organic matter, and nutrients along the river continuum, regulating the stream nutrient and organic matter budget. In the light of ongoing climatic and anthropogenic induced changes, affecting stream hydrology as well as land use patterns, it is crucial to understand the effects of extreme hydrological events on nutrient and dissolved organic matter (DOM) dynamics within ecosystems.

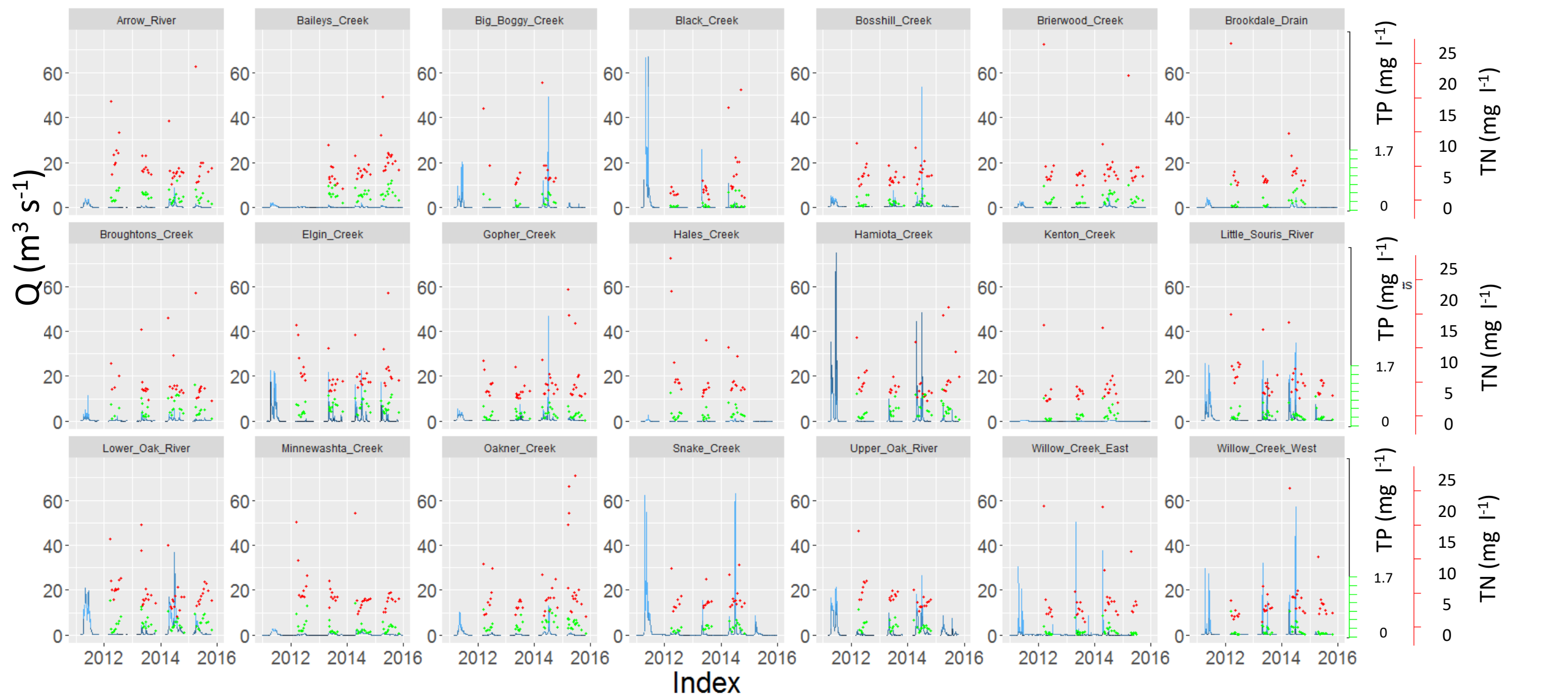
## SITES



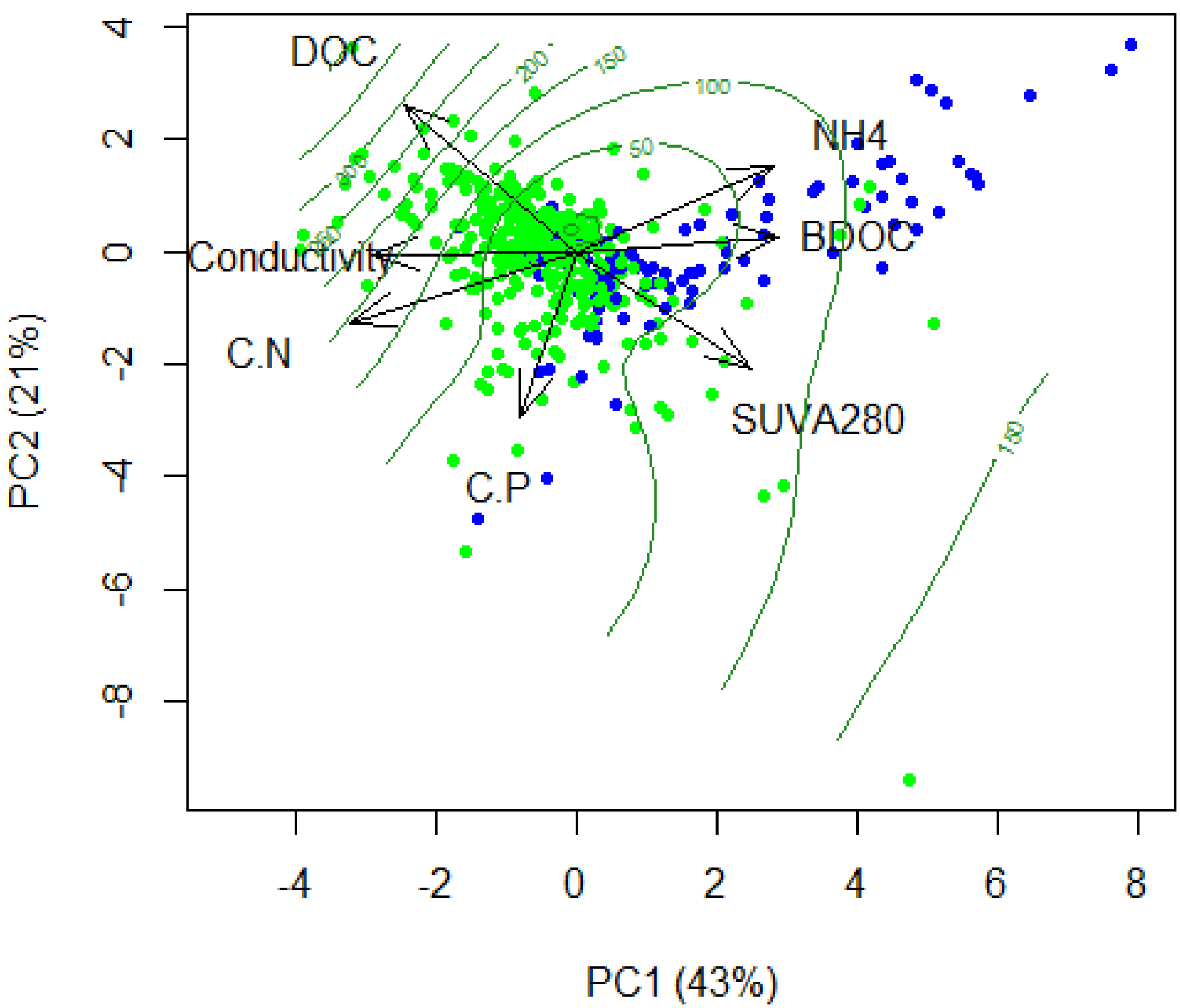
- Event based sampling of
- Dissolved organic carbon (DOC) concentration
  - Total phosphorus (TP) & nitrogen (TN) concentrations
  - Hydrological & climate parameters
  - range of 21 cropland dominated catchments (49 – 83%) with differing land uses in Manitoba over 4 years



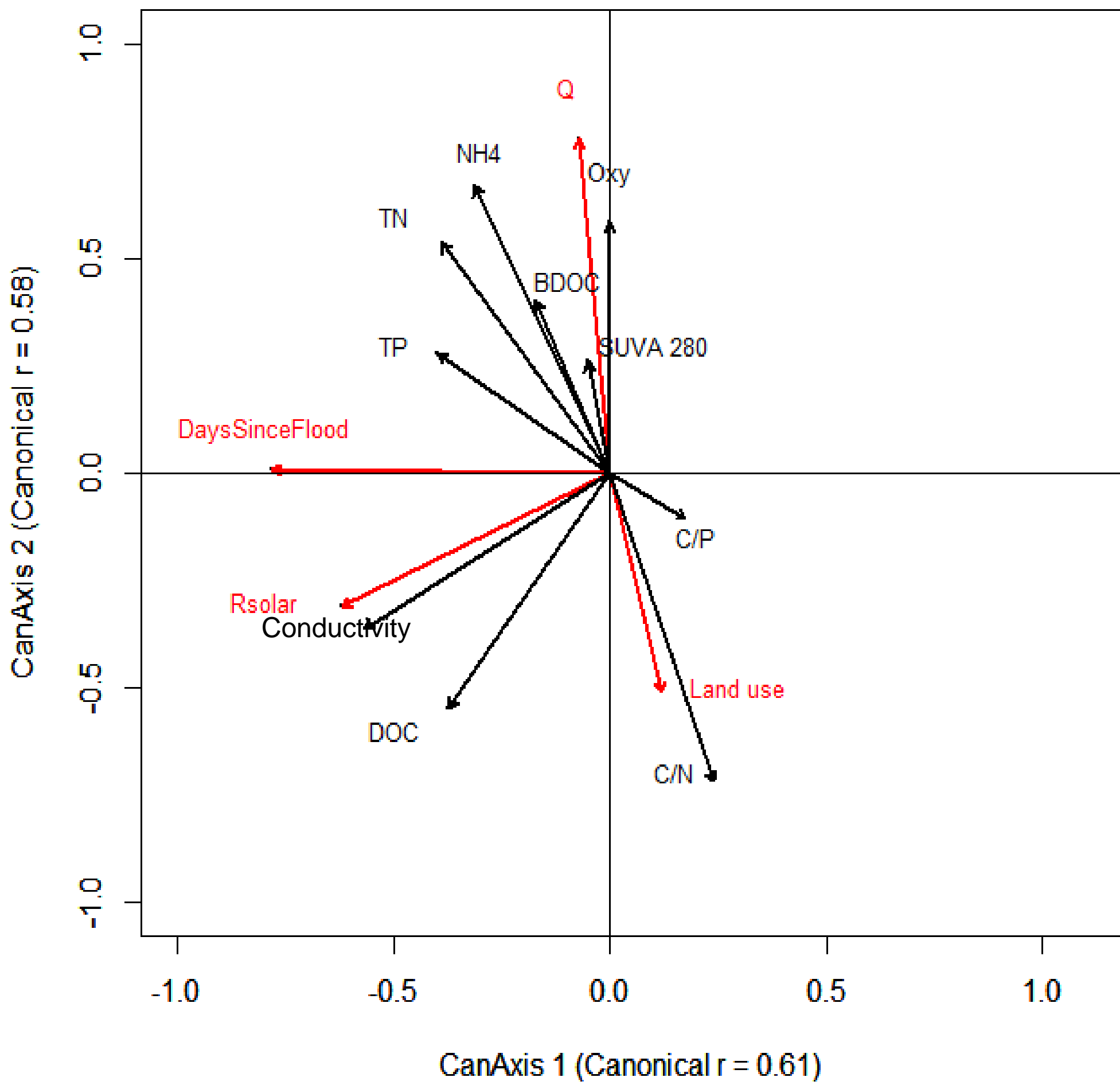
## Discharge, TN & TP per site



## EVENT AND LAND USE DRIVEN PATTERNS

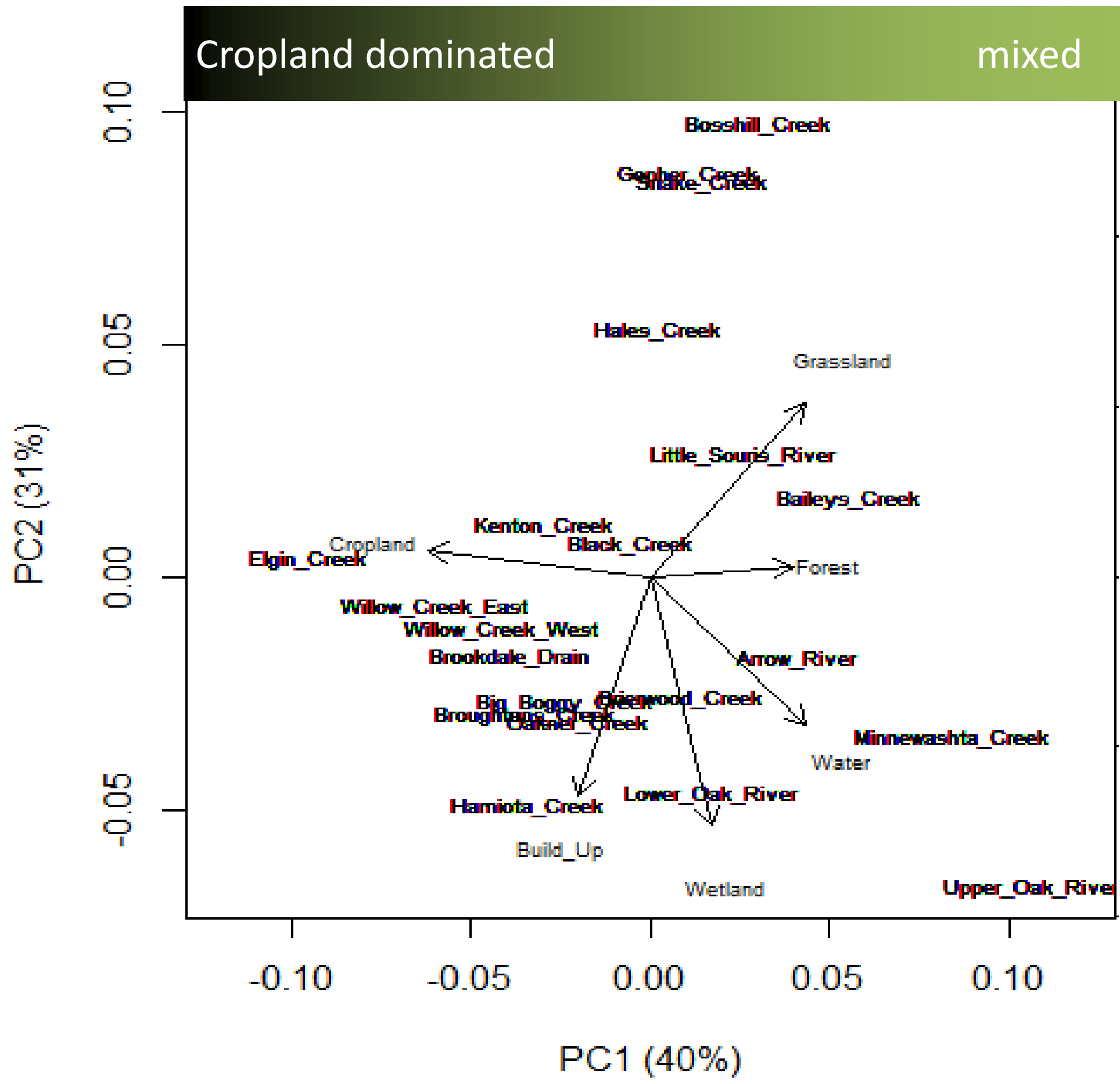


## Canonical correlation analysis...



**Snowmelt** (blue symbols) increases TN concretions, SUVA<sub>280</sub> and the bioavailable fraction of DOC (BDOC), while DOC & conductivity increase as Q returns to baseflow (contours: DaysSinceFlood, Q80)

## Land use gradient



...identifies discharge (Q), the time period since the last high flow (DaysSinceFlood), solar radiation (Rsolar), Land use (PC1 scores derived from Land use PCA) as the main drivers of nutrient (N and P), oxygen and dissolved organic matter properties and its bioavailability across catchments

## CONCLUSIONS

Preliminary results suggest the flow regime controls stream DOM, nitrogen and phosphorus dynamics, modulated by seasonal processes and land use properties. We used DOM, an important intermediary in carbon cycling, as a tracer of solute source, allowing us to link the terrestrial catchment inputs to the stream during flooding events.

Our study highlights the relevance of the flow regime and land use patterns on the dynamics and composition of DOM and nutrients in streams.



**ACKNOWLEDGEMENTS**  
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**REFERENCES**  
 Raymond, PA, Saiers, J.E. *Biogeochemistry* 100,197–209 (2010)  
 Wilson, HF and Xenopoulos MA *Nature Geoscience* 2, 37 - 41 (2009)  
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 Singh, S, et al., *Biogeochemistry* 118:321–337 (2014)

