Tallgrass prairie dynamics are moderated by prescribed burn: Case study at Concordia's Long Lake Field Station

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Introduction

Fire is an essential part of the health of an ecosystem, affecting specifically the biodiversity of the ecosystem. More competitive, dominant plants are usually not favorites among herbivores and contribute a large amount of biomass to an ecosystem. Additionally, these species tend to use a large amount of resources and incringe on resource accessibility of other species. Recently, the push for fire suppression has lead to implications such as the decrease in diversity and the accumulation of biomass or biofuel that eventually leads to more intense wildfires. Management methods must be altered to avoid extreme fires and loss of biodiversity. Though almost all ecosystems require regular, consistent burns, this project specifically studies a Minnesota prairie ecosystem. The objective of this project is to determine the effect of the spring burn on understory biomass and diversity at the Concordia research station at Long Lake.

Hypotheses:

- The spring burn will decrease understory biomass due to the combustion of pre-burn understory material.
- The spring burn will decrease the ratio of litter to total understory biomass due to the release of resources for new growth.
- The spring burn will increase understory species diversity since, the stimulation of understory growth will allow for more understory species.

Methods

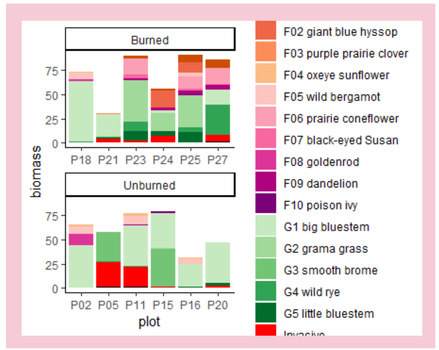
This project is a part of the broader project, a carbon census of Long Lake. The carbon census of Long Lake is based on a model that uses data from understory growth, tree growth, carbon efflux, and the types of tree and understory species. In this project on the effect of the spring burn on diversity of prairies in the Long Lake area, we used the data collected for the carbon census project.

We collected three biomass samples from the subplots of 12 prairie plots. The biomass samples included all of the understory biomass within a 30cm by 30cm quadrat. We then sorted the biomass by specific species, placed them in bags or envelopes, dried them in a dryer for 48 hours at 60°C, and weighed each bag and envelope. The dryer was used to ensure that we only weighed biomass of plant material and did not include moisture in our analysis. After all weights were recorded on paper and typed up on Excel, and then the data was transferred into R Studio for further analysis.

Spring burn decreased total biomass

Spring burn decreased the ratio of litter to total biomass

Results of Hypothesis 3



Conclusion

References

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