

Relationship between prairie fire and insect communities at
Flat Iron Lake for the years 2013—2016
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Fire is a natural regulator of community structure of plants and animals in savannas and prairies. In savannas fires bum off fine fuels and suppress small woody plants while leaving behind large standing trees. This stimulates new prairie natives to grow and controls the amount of new trees or shrubs in the area. In prairies the intensity and frequency of fire suppresses nearly all woody plant growth so large trees are generally absent. Historically Michigan prairie fires occurred from anywhere between annually to every five years, originating from lightning strikes (O'Connor, 2009).

In this project I hope to find out if using fire as a regulator in prairies will have an effect on the community of insects and other arthropods that live at the ground surface. This is an important question to ask because the diversity of arthropods have a direct effect on the condition of the environment. Prairie needs scavengers to process dead materials and enrich the soil again. Also predator arthropods play an important role in pest control (Cantoria, 2013). According to Longcore (2003) the best indicator of ecological restoration success is the diversity and richness of the ground-level arthropods. Therefore it is important to find out what these prairie fires are doing to the arthropod communities in the prairie.

Since 2013 Calvin College has been conducting annual summer research on the effect of prairie bums on the ground-level-arthropod community in the constructed prairie at Flat Iron Lake (Kent Co. MI. The prairie is divided into two parts with each part burned every other year. Four study sites were chosen, two sites per prairie part, for collection and six pitfall traps were placed within each site. In 2016 insects were collected from July 5th to July 18th. The-insects were identified according to order and family to analyze the diversity and richness of ground-level insects in each part of the prairie. Then they will be compared to see if there are any significant differences between the burned and unburned prairies.

In a similar study in 2014 Cassidy Richard discovered that the burned site had twice as many beetle families as the unburned prairie. In 2015 study Jacob Swineford found that the burned site had five times more beetle families than the unburned site. I predict that my 2016 study data, which is still being collected, will show a higher numbers of springtails and sowbugs in the unburned prairies compared to the burned prairies. Also there will be higher diversity in the unburned prairie.

After I finish identifying all my specimens data, I intend to conduct a diversity analysis using Simpson's and Shannon indices. I will also use Chi-square analyses to compare the richness between the two prairies. Finally bar graphs will be made to use for comparison with past years.

This research experience has given me the opportunity to explore arthropod community and appreciate how everything is fearfully and wonderfully made. I was scared of bugs at first but as I spend many hours looking at bugs under the microscope, I came to realize that their scary looking eyes, mouth parts and legs were all remarkable. They were little creatures that each had unique specializations that played their roles in God's creation. My perception of the bug world has forever changed.

Cantoria, C. S. (2013, January 24). The Ecological Importance of Arthropods - Know the Economic Benefits of Diversity. Retrieved July 29, 2016, from <http://www.brighthub.com/environment/science-environmental/articles/85197.aspx>

Longcore, T. (2003). Terrestrial arthropods as indicators of ecological restoration success in coastal sage scrub (California, U.S.A.). *Restoration Ecology* 11(4): 397-409.

O'Connor, R. P., Kost, M. A., & Cohen, I. G. (2009). *Prairies and savannas in Michigan: rediscovering our natural heritage* (pp. 12-16). East Lansing, MI: Michigan State University Press.