



Preliminary Investigation of Edge Effects on Prairie Plant Species

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Overview

- Introduction:



Liztsigner Road Ecology Center
Prairies

- Research



Method



Results

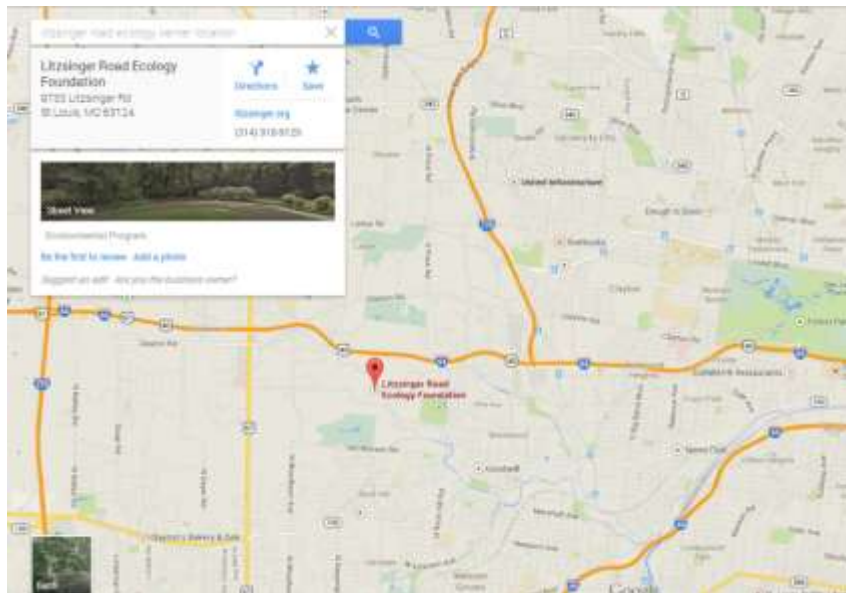


Conclusion/Discussion

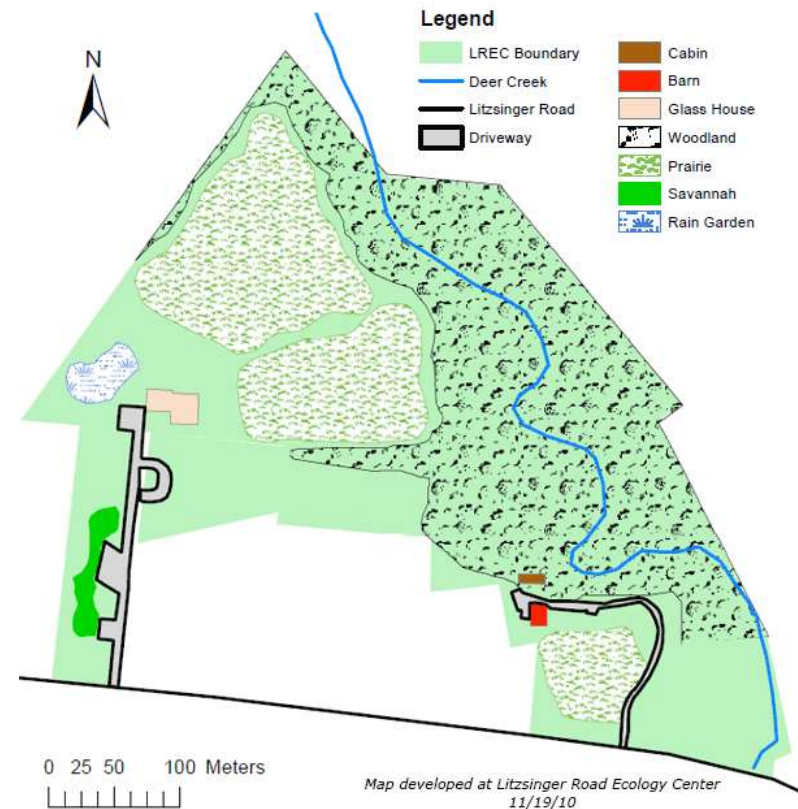


Litzsinger Road Ecology Center (LREC)

Location



Geography

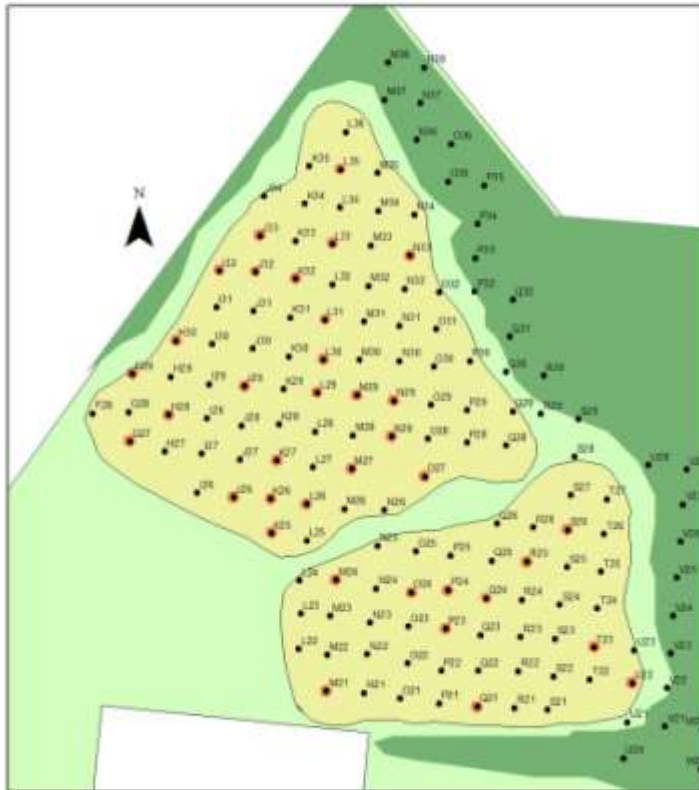


Introduction



LREC Prairie

LREC Monitoring Points
● = Points Used in This Study



- North Prairie is about 5 acres
- South Prairie is about 3.5 acres
- Restored wet-mesic tallgrass prairie since 1989



What is Edge Effect?

When the ecosystem or environment changes there is a creation of two different zones. This stress line or ecotone is determined by physical factors formed by differences in water, temperature, and light (Clements 1907).



Observations

Motivation: LREC staff have observed more woody plants and invasive species along prairie edges than in central portions of the prairies. They have also observed microclimatic differences, for example, snow melting more slowly on the north side of a tree line. These observations created the desire to quantitatively explore the effects of the edge on the species within the prairie.

Hypothesis: That proximity to woodlands and other edges would effect microclimates and species diversity.



The tree line between the North Prairie (left) and South Prairie (right) slows snowmelt along the edge of the North Prairie. Photo by Danelle Haake



The Research

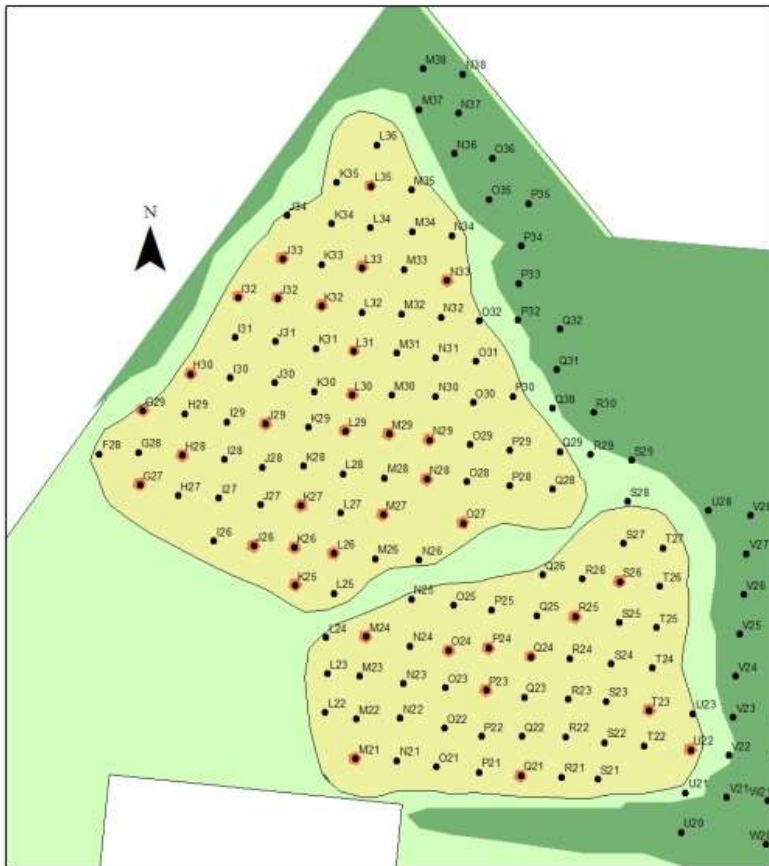


- Temperature
- Species Diversity
- Distance



Methods

LREC Monitoring Points
● = Points Used in This Study



- There are 121 permanent 0.5 m x 0.5 m plots in the LREC North Prairie and South Prairie. Measurements in each plot include (1) distance from the plot to the nearest edge and (2) number of plant species found within the plot.
- All plant species within each plot were identified and assigned a number based on percentage of coverage.



An example of prairie plot monitoring, pictured Danelle Haake.



Methods

- Eighteen plots were randomly selected and temperature was captured by Thermocron® iButtons® every 20 minutes. Two iButtons were placed at each plot at 10 cm (ground-level) and at 70 cm. As the iButtons are not waterproof, a mounting device was crafted by cutting Gatorade bottles in half.
- After three weeks, the ground-level iButtons were removed and placed at 70 cm at 18 additional randomly selected plots for the next two weeks.



Technology and Test Used

- Thermocron® iButtons
- Thermodata Viewer
- Excel
- SPSS

Tests Used:

- Correlation test
- ANOVA test
- Regression test

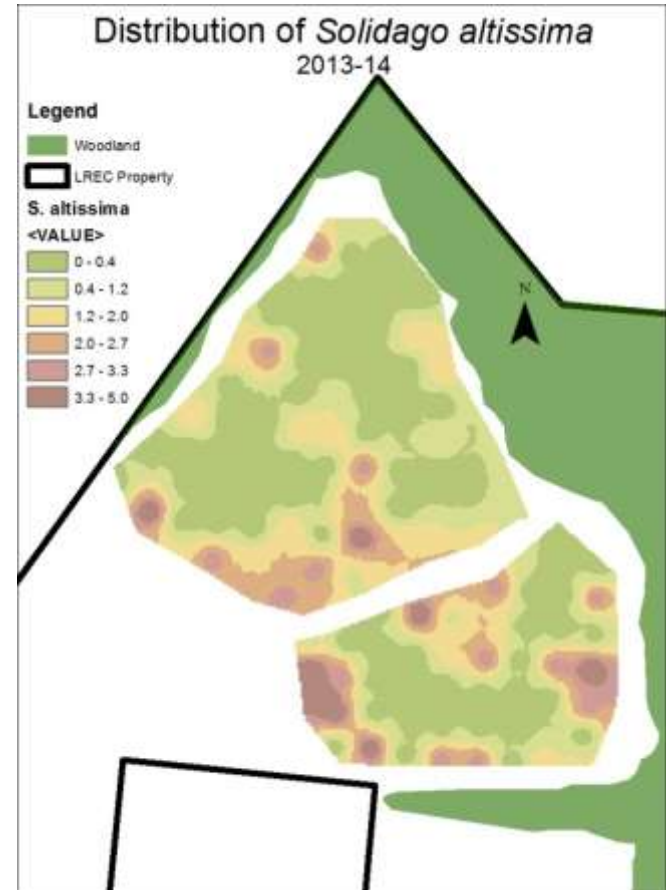
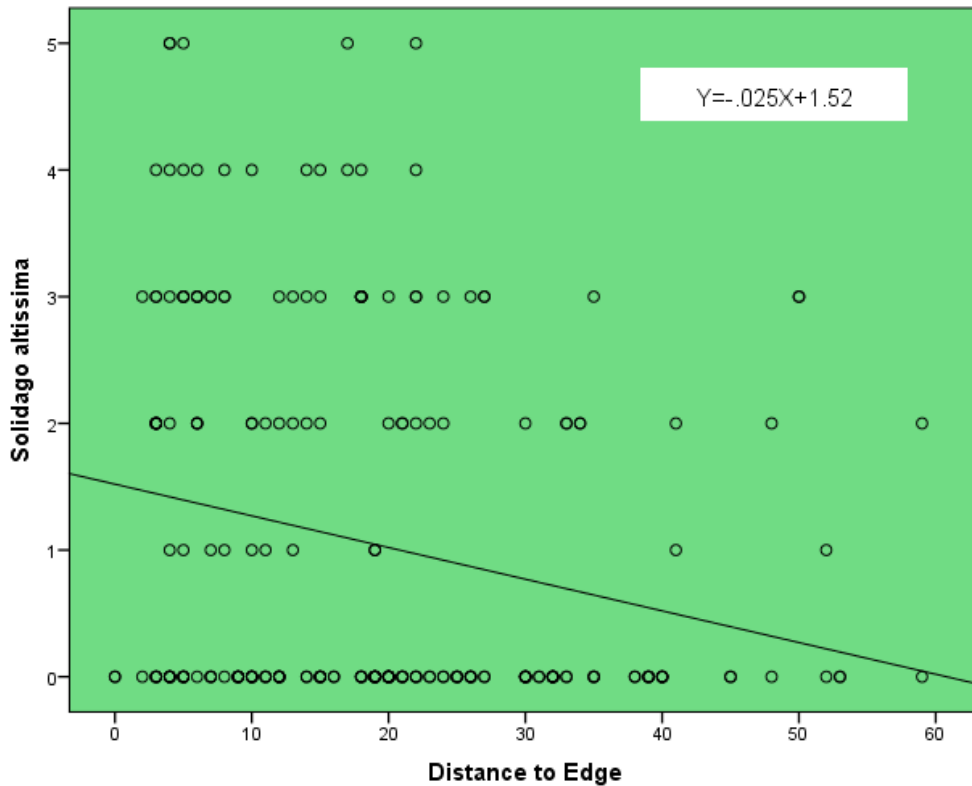


Decrease from Edge

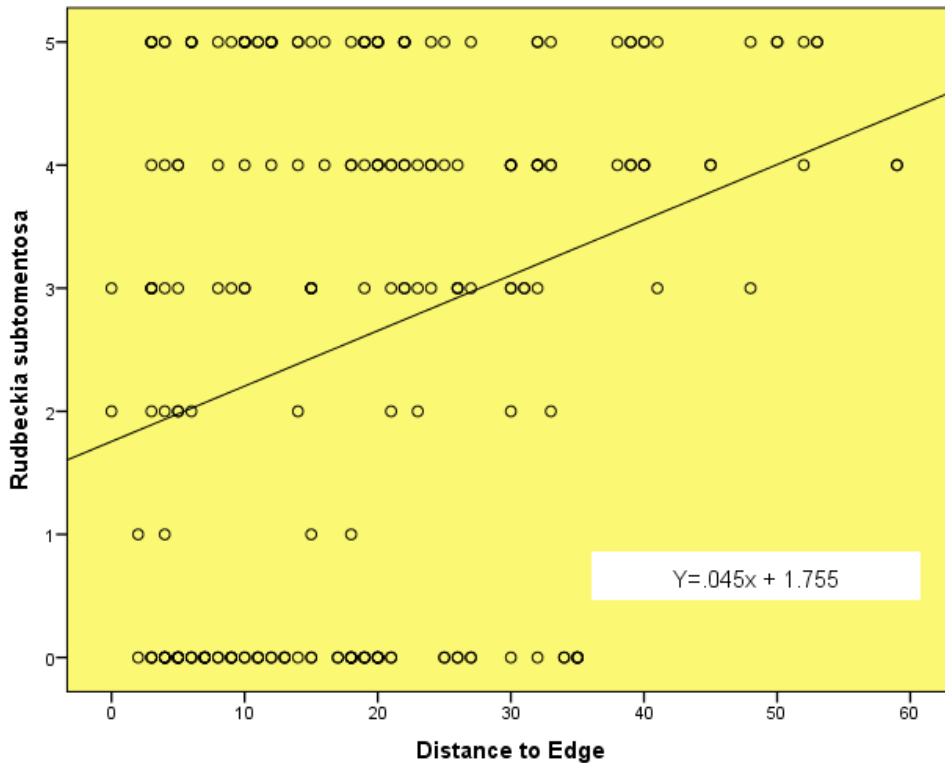
- Plant species that decrease in numbers the farther in the prairie
 - *Solidago alissima*
 - *Vebersina alternifolia*
 - *Erigeron annuus*
 - *Chasmanthium latifolium*
 - *Monarda fistulosa*
 - *Oxalis stricta*
 - *Pilea pumila*
 - *Carex grisea*



Solidago altissima



Increase from Edge

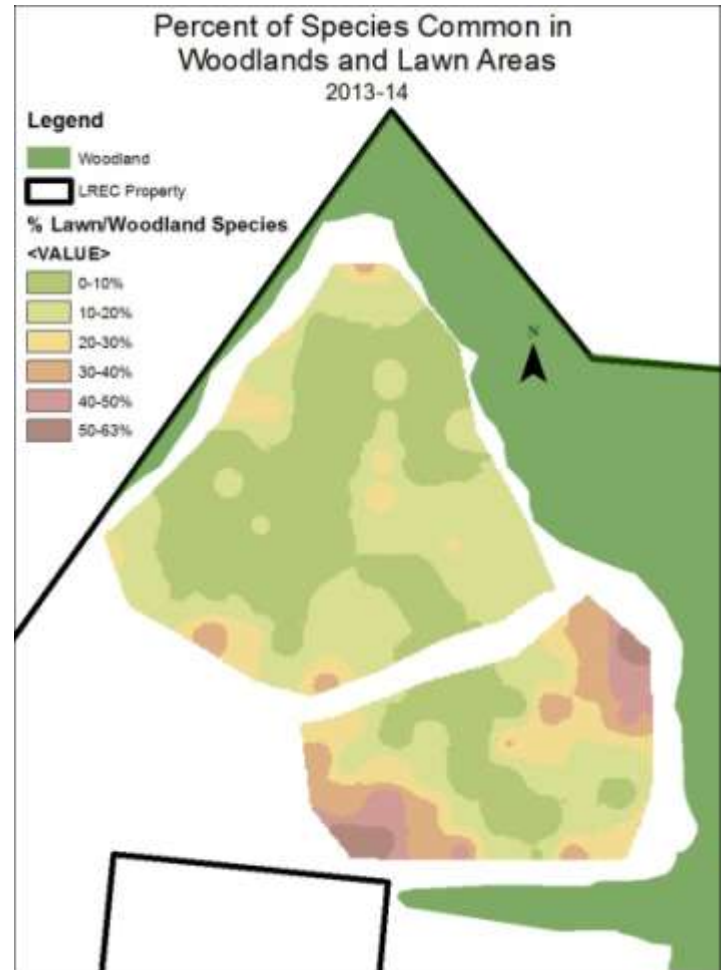


- Plant species that increase in number the farther in the prairie
 - *Cyperus esculentus*
 - *Carex vulpinoidea*
 - *Apios americana*
 - *Polygonum punctatum*
 - *Rudbeckia subtomentosa*
 - *Carex tribuloides*



Groupings

- Certain groups decrease in number the farther in the prairie
 - Number of native asters
 - Number of Woodland Species
 - Number of Lawn Species



Results



Discussion

- Different species thrive in different microclimates
- Seed dispersal can effect the movement of certain plant species



Next Time....

Some things to consider for future studies:

- ✓ Redesigning the equipment to ensure temperature reading is more accurate
- ✓ Allowing time for vegetation to grow after installing equipment

More questions:

- ✓ How does the type seed dispersal effect location of plant species?
- ✓ What effect do pollinator have in aiding plants to produce seeds in proximity to edge?
- ✓ How big does a prairie have to be before the edge effects disappear?



Thank You!

- Litzsigner Road Ecology Center:
Mentor Danelle Haake
- Missouri Botanical Garden/NSF Advisor:
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- Harris-Stowe State University:
Dr. Ann Podleski

