

Characterization of a Disturbed Prairie Plant Community in North Dakota

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Introduction

- North American Prairies - Why are they important?
- Point-Intercept Method
- Characterization
- Discussion



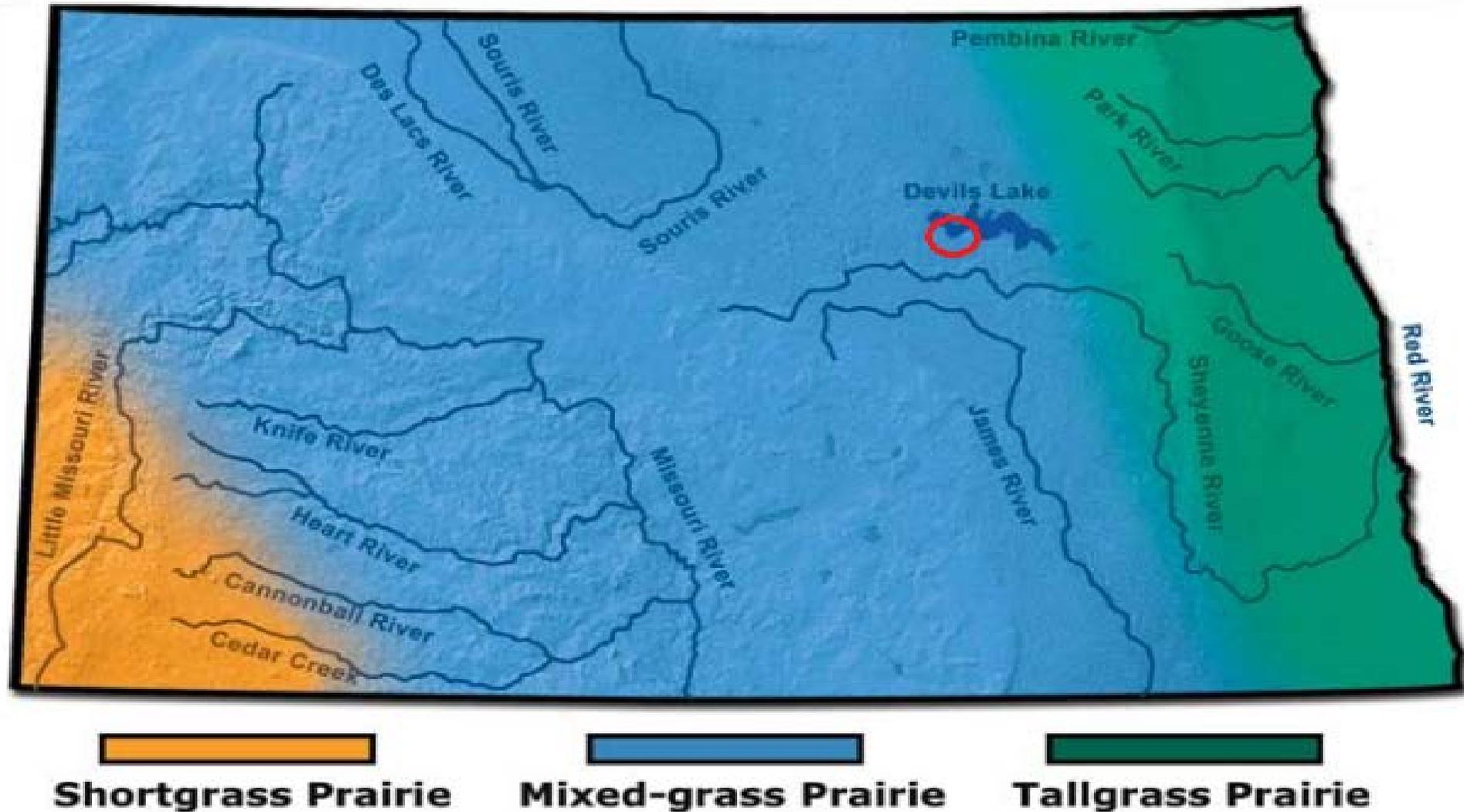


Figure 1: Designates where our study was conducted as well as an approximate gradient between the 3 variants of prairie in North Dakota

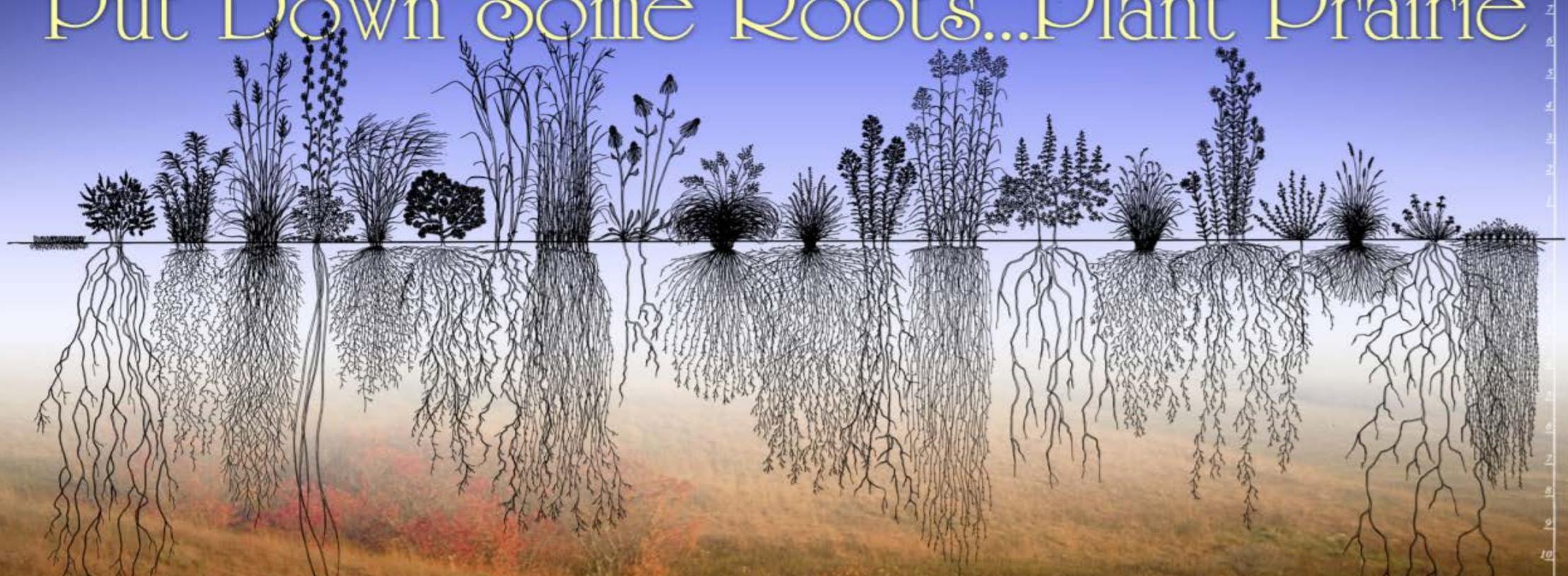
Prairies in decline

- Approximately 162 million Hectares of prairie existed before European settlement in the Midwest (Sampson, 1994)
- Native Tallgrass prairie is the most endangered ecosystem nationally with it having a 99.9% decline in Eastern North Dakota (Minnesota DNR, 2008)
 - Sod-forming grass
- Mixed-grass prairies in North Dakota have gone through a declination of ~55% (85%-30%) (Herman, Johnson 2008)
 - Contains a mixture of sod-forming and bunch grasses



Figure 2: Stem of Prairie Cord grass

Put Down Some Roots...Plant Prairie



Improve water quality • Anchor soil • Provide wildlife habitat • Sequester carbon
 Native tallgrass prairie is the most endangered ecosystem in North America

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|---|---|--|--|---|---|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|
| Kentucky Blue Grass
<i>Poa pratensis</i>
(Nonnative) | Lead Plant
<i>Amarpha canescens</i> | Missouri Goldenrod
<i>Solidago missouriensis</i> | Indian Grass
<i>Sorghastrum nutans</i> | Compass Plant
<i>Siphium laciniatum</i> | Porcupine Grass
<i>Sipa spartea</i> | Heath Aster
<i>Aster ericoides</i> | Prairie Cord Grass
<i>Sporobolus pacificus</i> | Big Blue Stem
<i>Andropogon gerardi</i> | Pale Purple Coneflower
<i>Echinacea purpurea</i> | Prairie Dropseed
<i>Sporobolus heterolepis</i> | Side Oats Gramma
<i>Bouteloua curtipendula</i> | False Bonaset
<i>Kuhnia angustifolia</i> | Switch Grass
<i>Panicum virgatum</i> | White Wild Indigo
<i>Baptisia leucocarpa</i> | Little Blue Stem
<i>Andropogon scoparius</i> | Rosin Weed
<i>Silphium integrifolium</i> | Purple Prairie
<i>Petalostemum purpureum</i> | June Grass
<i>Koeleria cristata</i> | Cylindric Blazing Star
<i>Cylindropuntia</i> | Buffalo Grass
<i>Buchloe dactyloides</i> |
|---|---|--|--|---|---|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|

Artwork by Conservation Research Institute, Heidi Natura

Prairies & their benefits

- Different plants in the prairie can help with air quality control as they can absorb different chemicals from the air (Herman & Johnson, 2008)
- Prairie wetlands are important sites for carbon sequestration as they may be able to offset the annual fossil CO₂ emissions by 2.4% (Euliss Jr. et al. 2006)
- They are one of our most diverse ecosystems in the nation as there have been recorded as many as 300 species on a single remnant prairie (Minnesota DNR, 2008)
- Grasses found in prairies tend to have deep root systems, this allows for the soil to become tightly packed together to prevent against erosion. (Herman & Johnson, 2008)

Point Intercept Method

- This method is considered to be one of the most objective methods to measure cover.
 - It involves creating a transect (line) between two points and marking point along said transect at pre-determined intervals
 - This also allows for minimal bias as the sampler only needs to evaluate what plants are touching the point.
 - Sampling pole and pole diameter influence the accuracy of the results as well as how much the measuring tool is level.
 - The data from transects in a plot was combined to characterize relative species abundance and percent native vs non-native.
 - (Caratti, no date)





Figure 3: Sampling plot map



Figure 4: Stake flags, open-reel measuring tape, & orange stakes

Method and Materials

- Marked our plots using a random number generator
- Went out to field and identified plants within each of our plots
- Used orange stakes to mark boundaries of said plots
- Put flags at 5 meter intervals for a 45 meter transect measured with an open reel measuring tape
- Recorded into categories of Canopy, Sub-Canopy, and Soil surface
- Utilized Microsoft Excel to compile results into pie charts for cover estimates



Figure 1: First plot characterized (Plot 3)



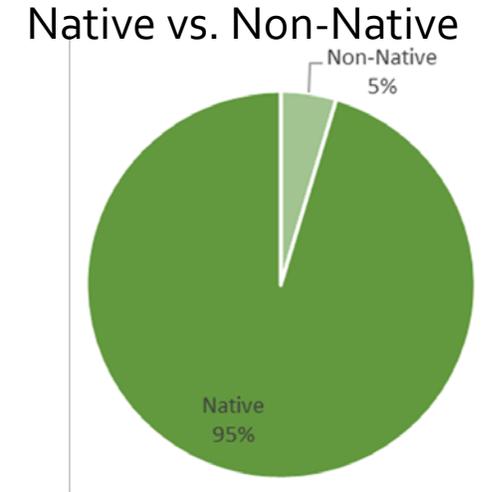
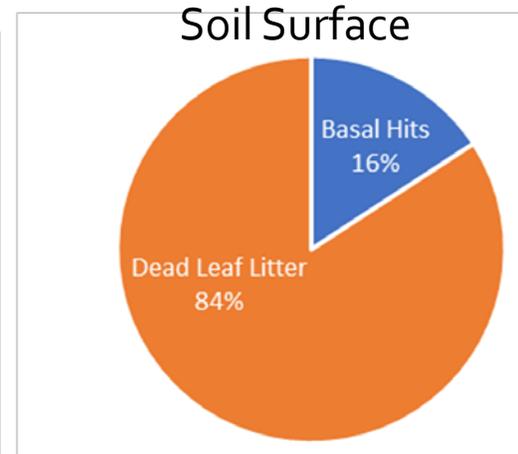
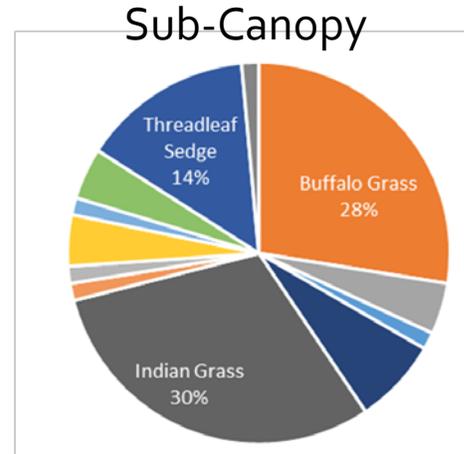
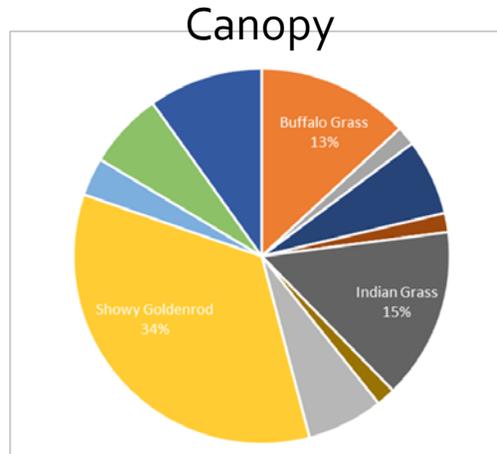
Figure 2: Second plot characterized (Plot 21)



Figure 3: Third plot characterized (plot 23)

Characterization results

Plot 3



- Big Bluestem Grass ■ Buffalo Grass ■ Canada Thistle ■ Cattail ■ Common Dandelion ■ Coneflower ■ Cord Grass ■ Heath Aster ■ Indian Grass ■ Needle Grass ■ Poison Ivy
- Prairie Parsnip ■ Prairie Sage ■ Red Clover ■ Rough Cocklebur ■ Showy Goldenrod ■ Smooth Aster ■ Snowberry ■ Threadleaf Sedge ■ White Sweet Clover ■ Wild Prairie Rose

Figure 5: Showy goldenrod more prevalent in plot with Buffalo grass and Indian grass with similar estimations of cover.

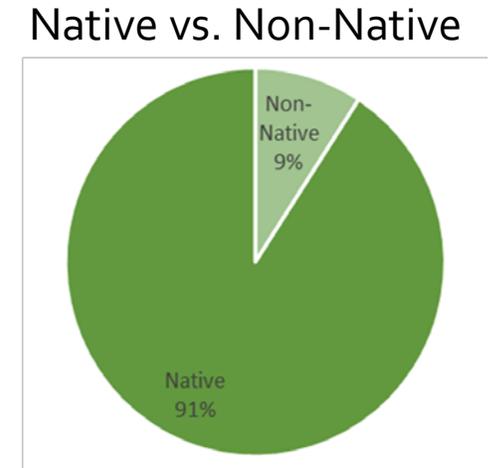
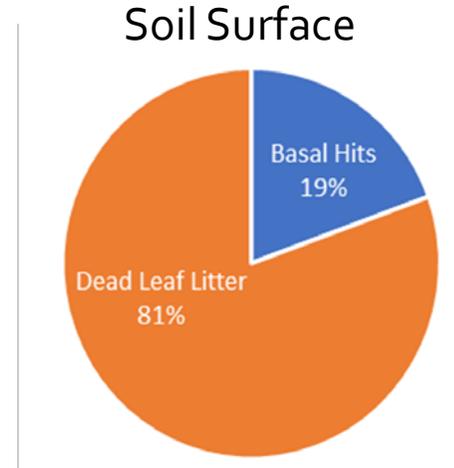
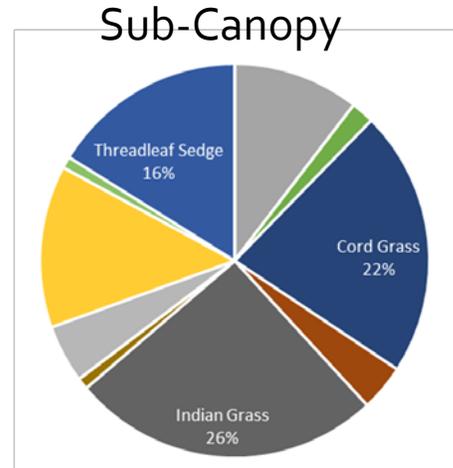
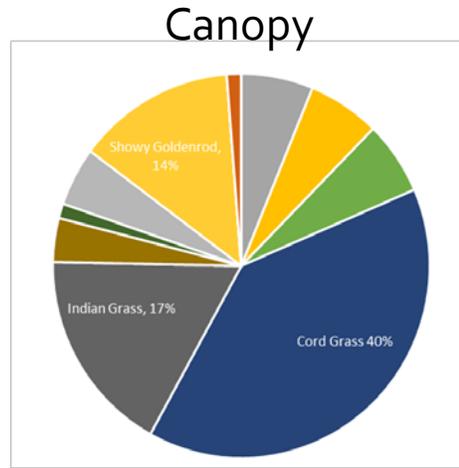
Figure 6: Indian grass and Buffalo grass both cover more than half of the plot with Threadleaf sedge being third abundant.

Figure 7: Leaf litter abundant with there being a low amount of basal hits. Plants had more spacing on ground.

Figure 8: Native species are still highly abundant in this plot with only about 5% being Non-native.

Characterization Results

Plot 21



- Big Bluestem Grass ■ Buffalo Grass ■ Canada Thistle ■ Cattail ■ Common Dandelion ■ Coneflower
- Prairie Parsnip ■ Prairie Sage ■ Red Clover ■ Rough Cocklebur ■ Showy Goldenrod ■ Smooth Aster
- Cord Grass ■ Heath Aster ■ Indian Grass ■ Needle Grass ■ Poison Ivy
- Snowberry ■ Threadleaf Sedge ■ White Sweet Clover ■ Wild Prairie Rose

Figure 9: Cord grass covered two-fifths of the plot with Indian grass and Showy Goldenrod covering approximately a quarter of the prairie.

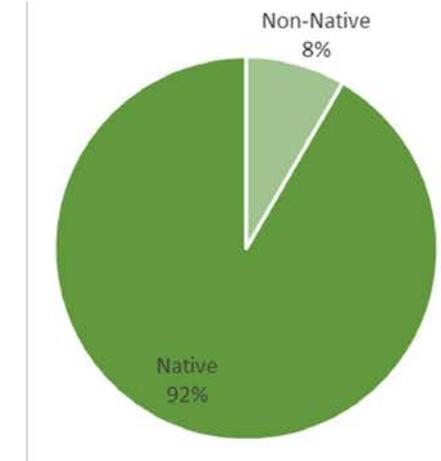
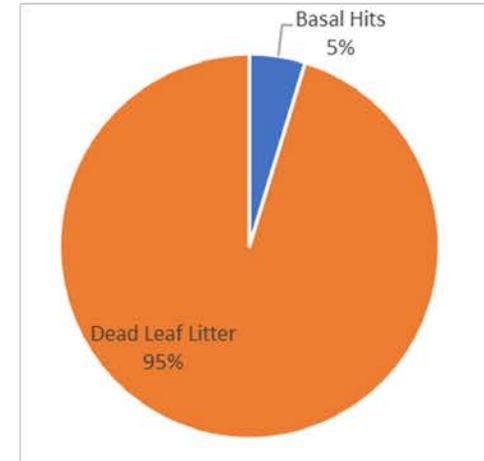
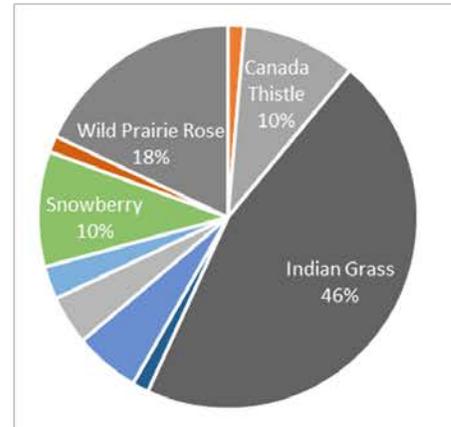
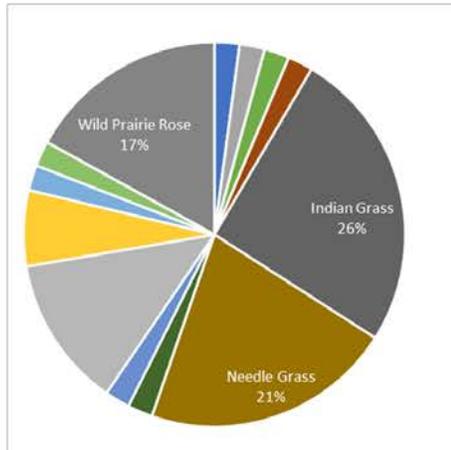
Figure 10: Indian grass and Cord grass approximate for about half of the Sub-Canopy cover with Threadleaf Sedge showing up as well.

Figure 11: Leaf litter highly abundant due to sampling in fall. Basal hits indicate spacing between vegetation.

Figure 12: Native species are highly prevalent compared to the 9% of Non-native species.

Characterization Results

Plot 23



- Big Bluestem Grass ■ Buffalo Grass ■ Canada Thistle ■ Cattail ■ Common Dandelion ■ Coneflower
- Prairie Parsnip ■ Prairie Sage ■ Red Clover ■ Rough Cocklebur ■ Showy Goldenrod ■ Smooth Aster

- Cord Grass ■ Heath Aster ■ Indian Grass ■ Needle Grass ■ Poison Ivy
- Snowberry ■ Threadleaf Sedge ■ White Sweet Clover ■ Wild Prairie Rose

Figure 13: Needle grass, Indian Grass, and Wild Prairie Rose were the 3 most prevalent plants for the Canopy.

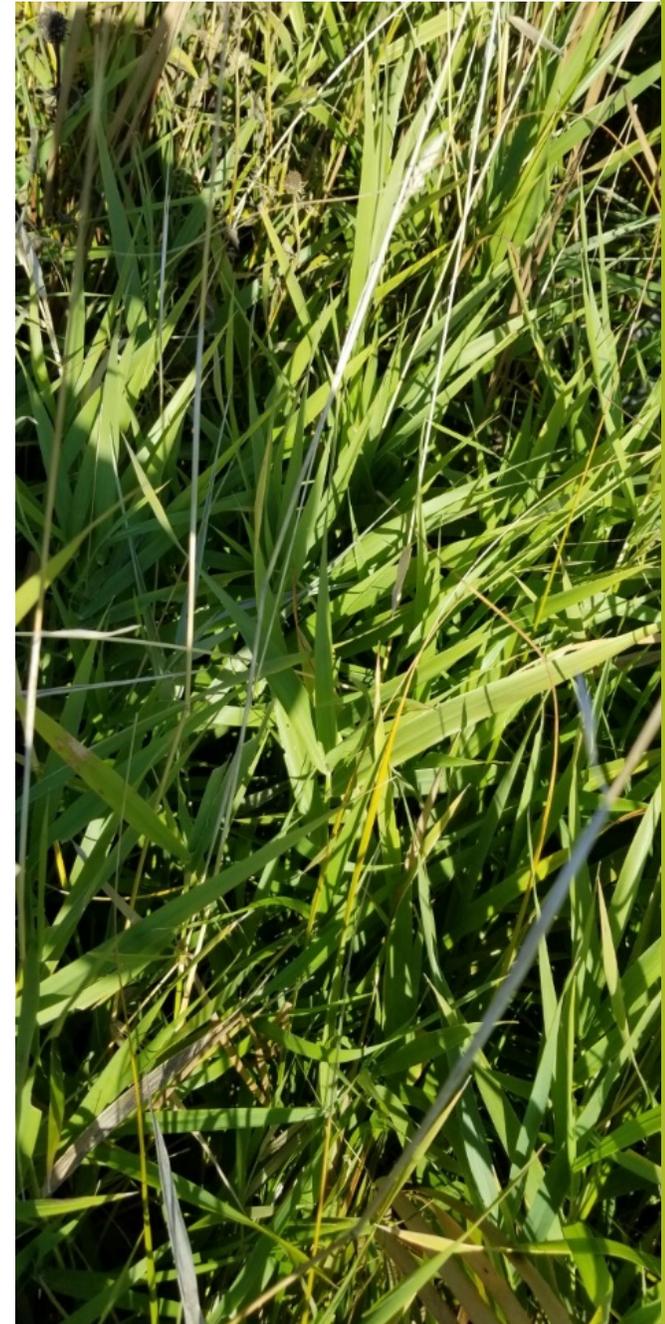
Figure 14: Indian Grass covered nearly half of the sub-canopy. Wild prairie rose was second followed by Canada thistle and Snowberry, each covering a tenth of the plot

Figure 15: Dead Leaf litter highly abundant due to sampling in the fall.

Figure 16: Native species are highly abundant with about 8% of the coverage coming from non-native species.

Discussion

- Majority of the species were native.
- A portion of the disturbed prairie might be from a prairie remnant
- The presence of the water made a difference in plant community in each plot
 - In plot 3, Buffalo grass and Showy Goldenrod were more abundant as they tend to gravitate towards drier soil.
 - Plot 21 had most of its Canopy covered with Cord Grass reaching approximate heights of 5+ ft. Cord grass prefers moist areas over those dry.
- Dead leaf litter was highly abundant due to sampling in the fall.
- This area needs to be protected and monitored for future studies



Caveats

- Students might have misidentified due to first experience with plant identification.
- More sampling plots should be characterized in future.
- Multiple seasons should be characterized as different plants are more apparent at different times.
- Due to limits of the sampling method, species present in minor amounts were not represented at all.

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Questions????????????????????????????????



Concerns or comments?