

Butterflies, Bees, and Weeds: Improving habitat for pollinators through management of Minnesota's tallgrass prairies



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Why do we care about butterflies, bees, and weeds?

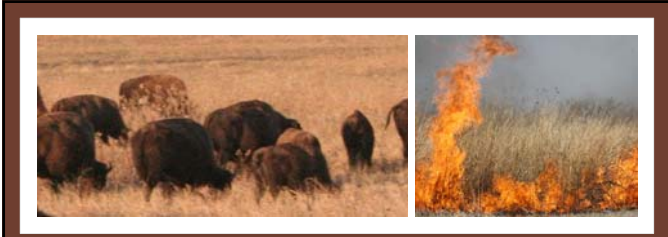


- Pollinators are in decline worldwide
- Minnesota prairies are home to several imperiled bee and butterfly species
- Weeds reduce native prairie plant diversity and make it less fit as habitat for beneficial insects and grassland birds



How are tallgrass prairies managed?

Grazing and Fire



Why manage Minnesota's tallgrass prairie?

The wildfires and wide-ranging herds of bison are no longer present




Why manage Minnesota's tallgrass prairie?


Lacking fire and/or grazing, shrubs and trees would likely invade

Ideal Management Outcome:


Butterflies



Bees



Weeds



Where did we survey?

- 73 vegetation sites
- Including 20 insect sites

Burn vs. Graze Study Sites 2016-2017

2016-2017 Insect and Vegetation Sites

- burn(16)
- graze(16)

2016 Vegetation-only Sites

- burn(17)
- graze(16)

2017 Vegetation only sites

- burn(27)
- graze(26)

— MN County Boundaries

■ Private Parkland Provinces

■ Manganese District

Data from MN DNR, US FWS; Jen Larson, 2016

The Nature Conservancy

Private citizen partners

mi DEPARTMENT OF NATURAL RESOURCES

Butterflies

How do butterflies depend on prairie habitat?

- Nectar for adults
- Larval host plants
- Over-wintering shelters

How did we survey butterflies?

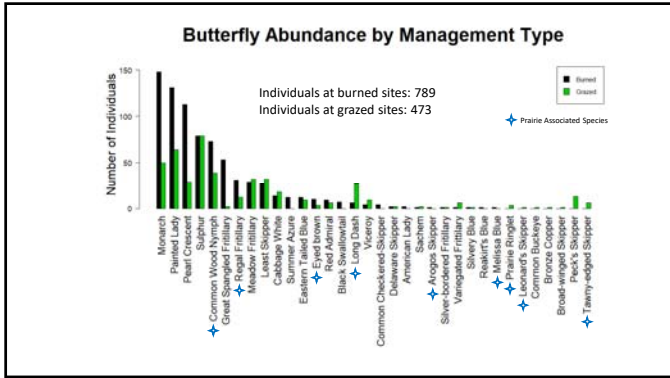
Pollard transect walk:

Observer walk:

30 – 120 min.

What butterflies did we find?

- All 5 families of Minnesota butterflies
- 40 BUTTERFLY SPECIES
- 9 prairie associated species
- 1222 individuals
- 35 species at burned prairies
- 35 species at grazed prairies
- 30 species were the same at burned and grazed prairies




Fire and Grazing management are both important for butterflies

- There are more butterflies at burned sites
- There are more common species at burned sites
- Many rarer species and prairie specialists are found at grazed sites

Some butterflies were only found at grazed sites


Graze-only




Silvery Checkerspot



Broad-winged Skipper



Prairie Ringlet














European Skipper






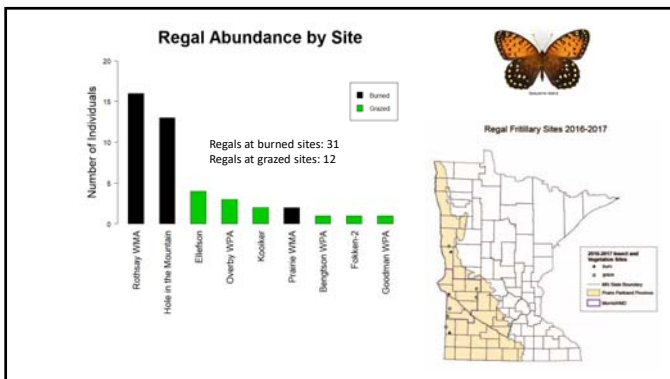
Tawny-edged Skipper

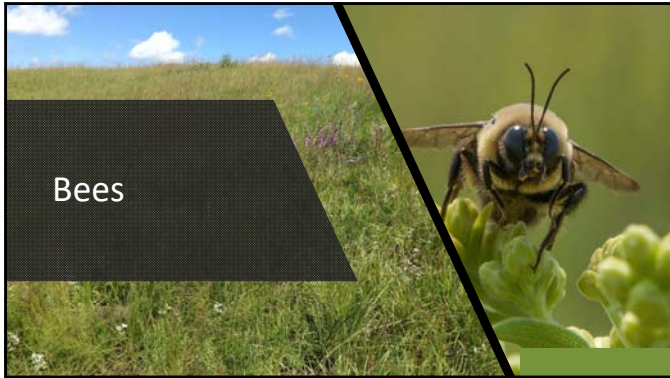
and some butterflies were only found at burned sites

Graze-only				Burn-only	
					
					

 **Regal Fritillary**
(*Speyeria idalia*)

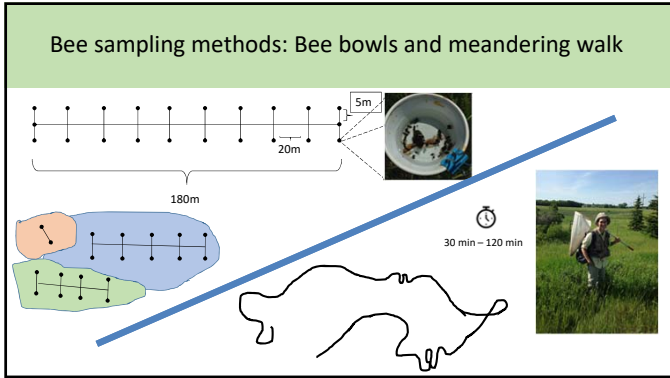














What bees did we find?

- 121 bee species
- 30 bee genera
- 12,540 individuals
- 11 species of bumble bees
- 98 species at burned prairies
- 94 species at grazed prairies
- 71 species were the same at burned and grazed prairies

B. auricomus

B. fervidus

B. bimaculatus

B. griseocollis

B. terricola

B. vagans

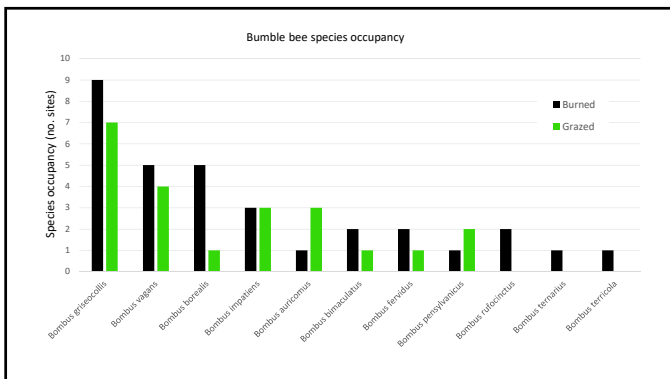
B. pennsylvanicus

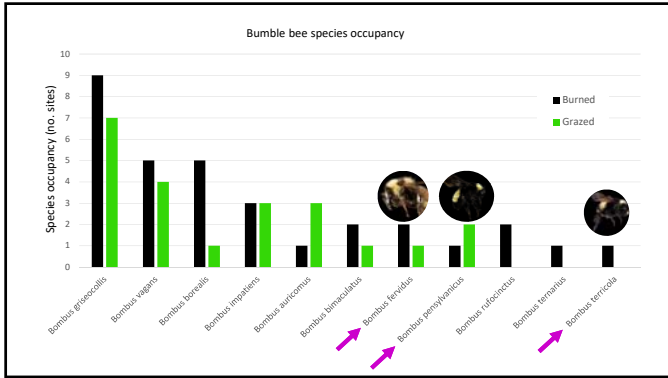
B. ternarius

B. borealis

B. impatiens


B. rufocinctus






Grazing and fire are equivalent for bees

- Slightly more bees were collected at grazed sites than burned sites (6,491 vs. 6,039)
- Very similar numbers of species (94 vs. 98)
- Most species occur in both managements
- No significant difference**, statistically, in abundance or richness between burned and grazed sites











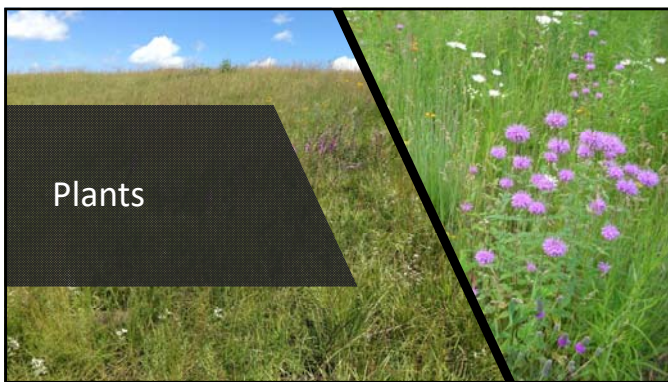
Beyond management: Other signals

- Higher frequencies of flowers in prairies are significantly associated with greater numbers of bee species
- Sandier soils are significantly associated with greater numbers of bees and numbers of bee species



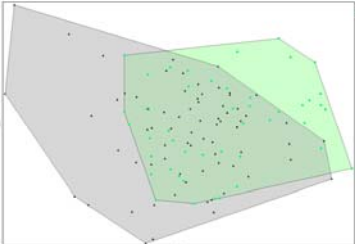
A subset of bees only found with one type or another

Graze-only		Burn-only	
 <i>Nomada articulata</i>	 <i>Perdita perpallida</i>	 <i>Svastra obliqua</i>	 <i>Bombus rufocinctus</i>
 <i>Colletes susannae</i>	 <i>Heriades carinata</i>	 <i>Bombus terricola</i>	 <i>Megachile mendica</i>



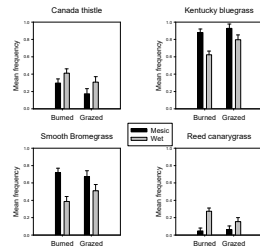
Does management with fire result in a different plant community than management with grazing?

- No!
- Sites closer together on this graph had more similar vegetation



Weeds: Soil moisture is more important than management type

- Canada thistle and Reed canarygrass prefer wet prairie
- Kentucky bluegrass and Smooth bromegrass prefer mesic prairie
- None showed a significant preference for burned or grazed prairies



Does prairie "quality" vary between management types?

- ❖ **Mean species richness** does not vary between management types.
- ❖ **Average richness:**
 - ❖ 24.39 in burned sites
 - ❖ 24.47 in grazed sites
- ❖ **Coefficient of Conservatism** is a measure of how restricted species are to high quality remnant prairie (higher=more restricted)
- ❖ **Average Coefficient of Conservatism**
 - ❖ 4.06 in burned sites
 - ❖ 3.70 in grazed sites



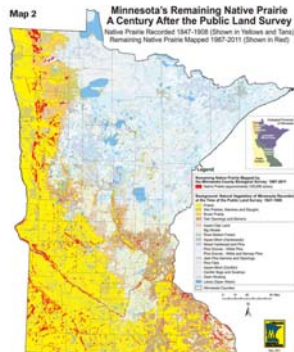
We need both fire and grazing to improve habitat for prairie bees and butterflies

Why do these results matter?



There is very little prairie left in Minnesota

- Once 18 million acres
- < 2% remains
- Heavily fragmented



How are we sharing this information?

- Direct feedback to participating landowners and managers
- Webinars
- Workshop and field day for land managers
- Public website
- Public talks
- Manuscripts in preparation



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Thank you!



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