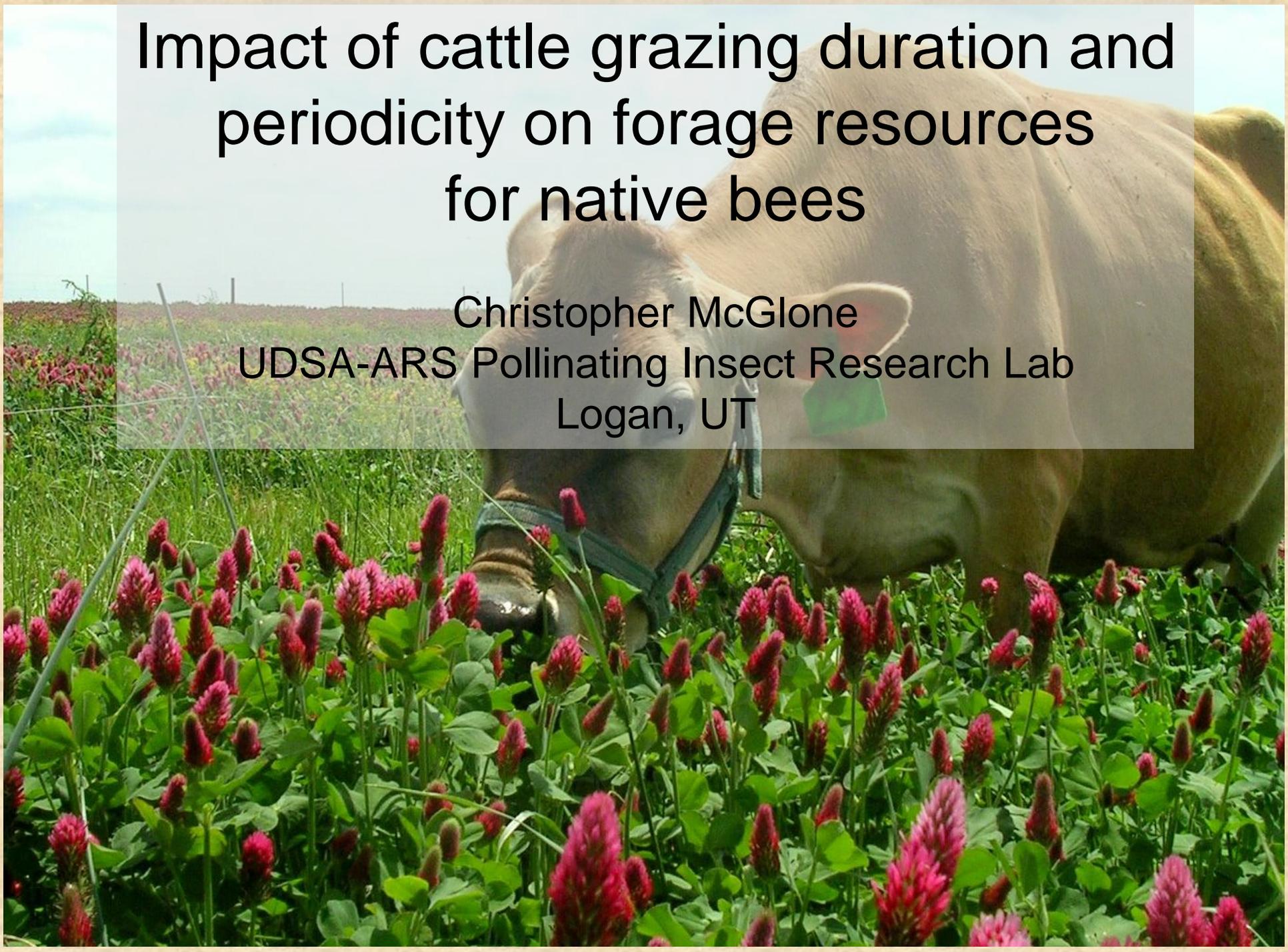


# Impact of cattle grazing duration and periodicity on forage resources for native bees

Christopher McGlone  
UDSA-ARS Pollinating Insect Research Lab  
Logan, UT



# Outline

- Overview of rotational grazing concept
- Introduce grazing/bee forage study
- Pitch for thinking about pollinator resources in restoration



# Rotational vs. continuous, season-long grazing

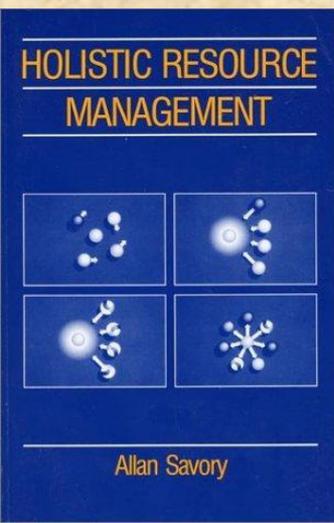
## Rotational grazing

Allan Savory – “Holistic Resource Management” 1988

Proactively move cattle to different pastures throughout the grazing season.

Encourages cattle to graze more areas of pastures instead just “hot spots”

- Near water resources
- Previously grazed patches



# Impacts on local vegetation community

Past studies have focused primarily on perennial grass recovery and overall diversity

How do the different strategies influence forage for wild bees?

Balsamroot (*Balsamorhiza* spp.)

Lupine (*Lupinus* spp.)

Milk vetch (*Astragalus* spp.)

Groundsel (*Senecio* / *Packera* spp.)

Globemallow (*Sphaeralcea* spp.)



# Study locations

Red Canyon Ranch, Fremont Co., WY

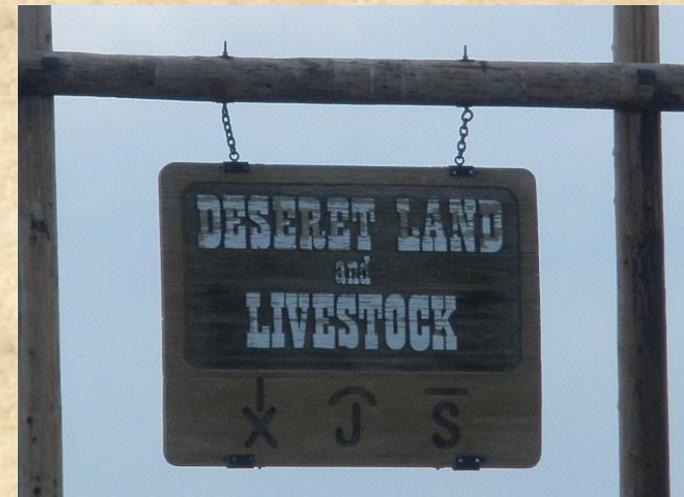
- Near Lander, WY
- East slope of the Wind River Mountains
- Owned and managed by The Nature Conservancy
- 4 pastures
  - Rotational grazing <10 years
  - Rotational grazing >10 years
  - Continuous grazing for many decades



# Study locations Cont.

Deseret Land and Livestock Ranch, Rich Co., UT

- Near UT/WY border
- East slope of Bear River Mountains
- Owned and managed by LDS Corp.
  - Rotational grazing >10 years
- Companion pasture managed by BLM
  - Continuous grazing for many decades



# Sampling Protocols

Photosampling using portable camera stand

Total plant aerial cover/bare ground

Number of target species plants/m<sup>2</sup>

Number of flower stalks/target species plant

Ocular sampling

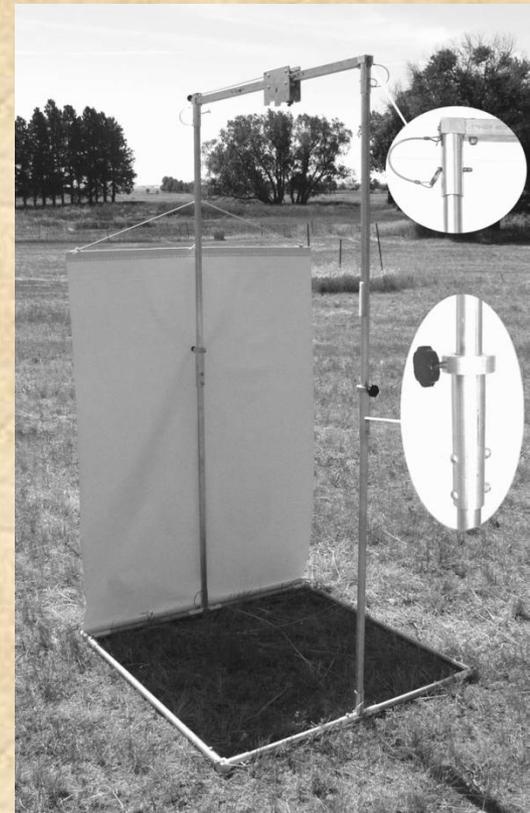
Species presence/absence

Flowers of target species/flower stalk

Multiple 100m transects

Ordered distance plant-centered plots

Based on target species



# Think of the pollinators in seeding treatments

Biodiversity: est. 30,000 species of bees

Many species in decline (CCD, Bumble bees)

Also birds, bats, butterflies, moths, etc.

Pollinators are an important part of the food chain

No pollinators = no seed set

Are forage resources available in treatment area?

If not, how far is it to the nearest pollen source?

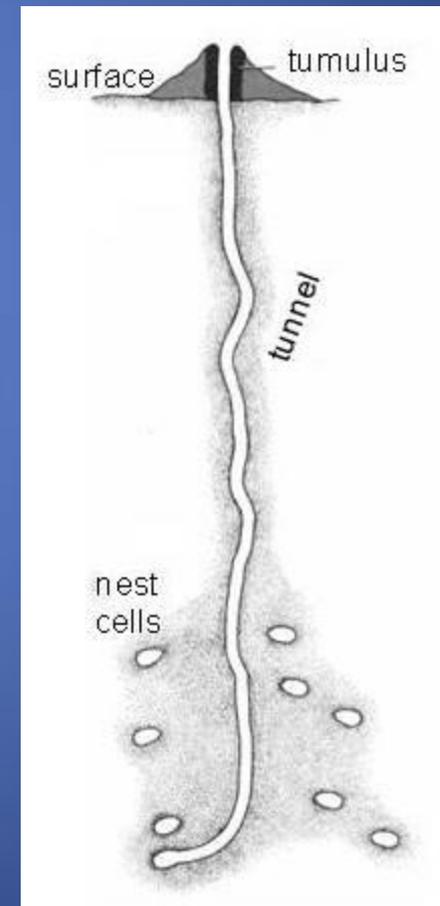
**Long Butte Fire**  
**South of Boise, ID**  
**21 August, 2010**  
**123,881 hectares (478 sq. miles)**



Species	Intact	Burn
<i>Agapostemon (Agapostemon) angelicus/texanus</i>	32	77
<i>Agapostemon (Agapostemon) femoratus</i>	0	1
<i>Agapostemon (Agapostemon) virescens</i>	10	16
<i>Andrena sp.</i>	0	3
<i>Anthophora (Heliophila) flexipes</i>	1	0
<i>Anthophora (Heliophila) petrophila</i>	1	2
<i>Anthophora (Mystacanthophora) urbana</i>	1	3
<i>Bombus (Pyrobombus) huntii</i>	1	0
<i>Bombus (Separatobombus) griseocollis</i>	3	0
<i>Diadasia enavata</i>	12	12
<i>Dianthidium (Dianthidium) curvatum</i>	26	3
<i>Dianthidium (Dianthidium) pudicum</i>	0	1
<i>Dufourea marginata</i>	0	10
<i>Halictus (Halictus) ligatus</i>	1	0
<i>Halictus (Seladonia) tripartitus</i>	9	4
<i>Lasioglossum (Dialictus) incompletum</i>	13	20
<i>Lasioglossum (Dialictus) sp.</i>	62	53
<i>Megachile sp.</i>	1	0
<i>Megachile (Argyropile) parallela</i>	8	1
<i>Megachile (Litomegachile) sp.</i>	2	0
<i>Melissodes sp.</i>	12	8
<i>Melissodes (Callimelissodes) lupina</i>	2	0
<i>Melissodes (Eumelissodes) agilis</i>	13	82
<i>Melissodes (Eumelissodes) bimatrix</i>	0	2
<i>Melissodes (Eumelissodes) grindeliae</i>	4	48
<i>Melissodes (Eumelissodes) microsticta</i>	12	1
<i>Perdita sp.</i>	13	9
<i>Sphcodes sp.</i>	1	0
<i>Svastra (Epimelissodes) obliqua</i>	2	0
<i>Triepeolus sp.</i>	1	10
<i>Xeromelecta (Melectomorpha) californica</i>	0	1

## Long Butte fire bee species list

*Agapostemon* & *Melissodes*  
Deep ground nesters (>>5cm)



Species	Intact	Burn
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*Dianthidium*  
Surface nesters

- *Megachile parallela*  
Shallow ground nester (2cm)



# Impact of wildfire on bee community

Deep ground nesting bees survived

Shallow ground, surface, and twig nesting bees did not

Very limited forage availability after fire  
Annual sunflower along roadside

Little is known about impact of monotypic diet on bee fitness

Little is known about ability of bees to “bank”  
in low-resource years

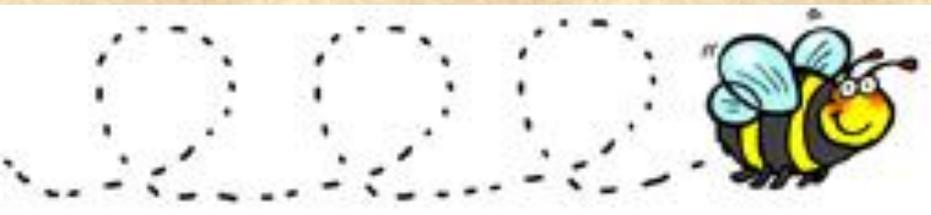
Data from Byron Love, PhD student, USU

# Recommendations for restoration seeding projects

Try to get diverse forbs into the mixture  
Bees, moths, butterflies, birds, etc.

Forbs that flower quickly

Concentrate on areas that are farthest from pollen and nectar sources



# Recommended species for bees

Globemallows (*Sphaeralcea* spp.)

Sunflower tribe (*Heliantheae*)

Sunflowers, Balsamroot, Groundsels

Most legumes (*Fabaceae*)

Milk vetch, Sweet vetch, Clover

Beardtongues (*Penstemon* spp.)

Bisquitroot (*Lomatium* spp.)

Bee plant (*Cleome* spp.)

Questions?

