

How Many Words is a Picture Worth?

Using Very Large Scale Aerial Imagery for
Monitoring and Assessing Rangelands

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Outline

- Why monitor?
- Economics of monitoring
- Big-world picture
- Local picture
- Research picture
- Practical application picture

Rangeland Monitoring Picture

- Land health benefits
- Impact of management decisions
- Drought management strategies
- Economic benefits



Economics Picture: Water Infiltration


- Poor condition rangeland
 - $\frac{1}{2}$ inch per hour
- Excellent condition rangeland:
 - 2 inches per hour



OR



Economics Picture: Lost revenue

- Loss of 1 inch of soil water =
65 pounds of forage per acre!!! 
- Poor condition rangeland = 1½ inches lost soil moisture or...
- 97.5 lbs of forage /acre
- 97.5 lbs/acre = nearly 4 more days of grazing per acre!
- If you assume gains of 2.5 lbs per head per day = 9.75 lbs/acre extra beef

Economics Picture: What Could You Be Earning?

- If it rains 2 inches per hour on poor condition rangeland...



- You're missing out on an extra...



\$9.26 per acre!!!

Big World Picture

- Animals
- Land
- Platforms



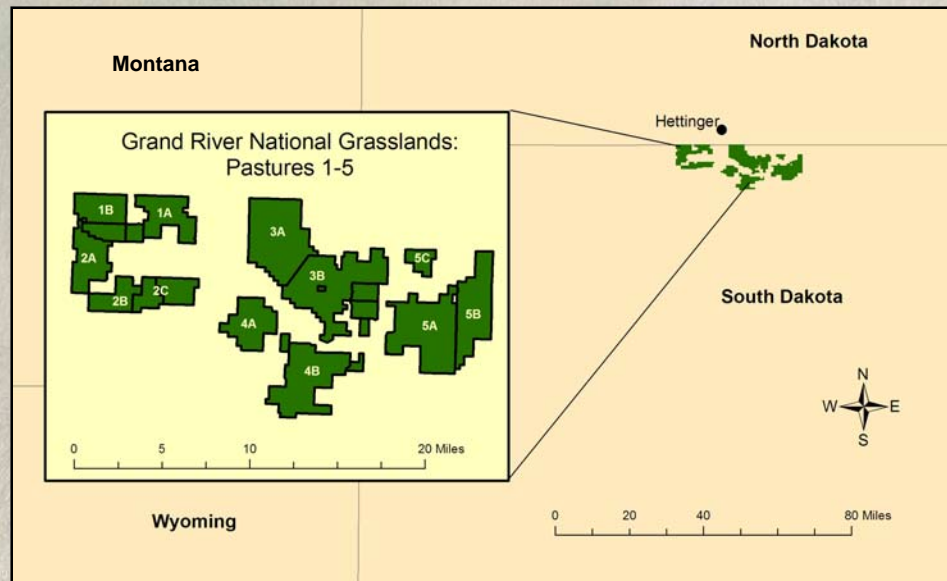
Local Picture

- Grand River monitoring
- Ground methods
- COST!



Research Picture

- Study area is Grand River National Grasslands
- Pastures are native mixed grass prairie, with patches of crested wheatgrass



Methods & Materials - Ground

- Macroplots were approximately 5 ac laid out in the shape of a cross on the cardinal directions (each transect was 450 feet long)
- A ten-pin frame was used estimate basal cover



Methods & Materials - Aerial

- Aircraft is a Moyes-Bailey Dragonfly
 - 115 hp turbocharged Rotax 4-stroke
- Flies at:
 - 300 ft above ground
 - 38-75 mph



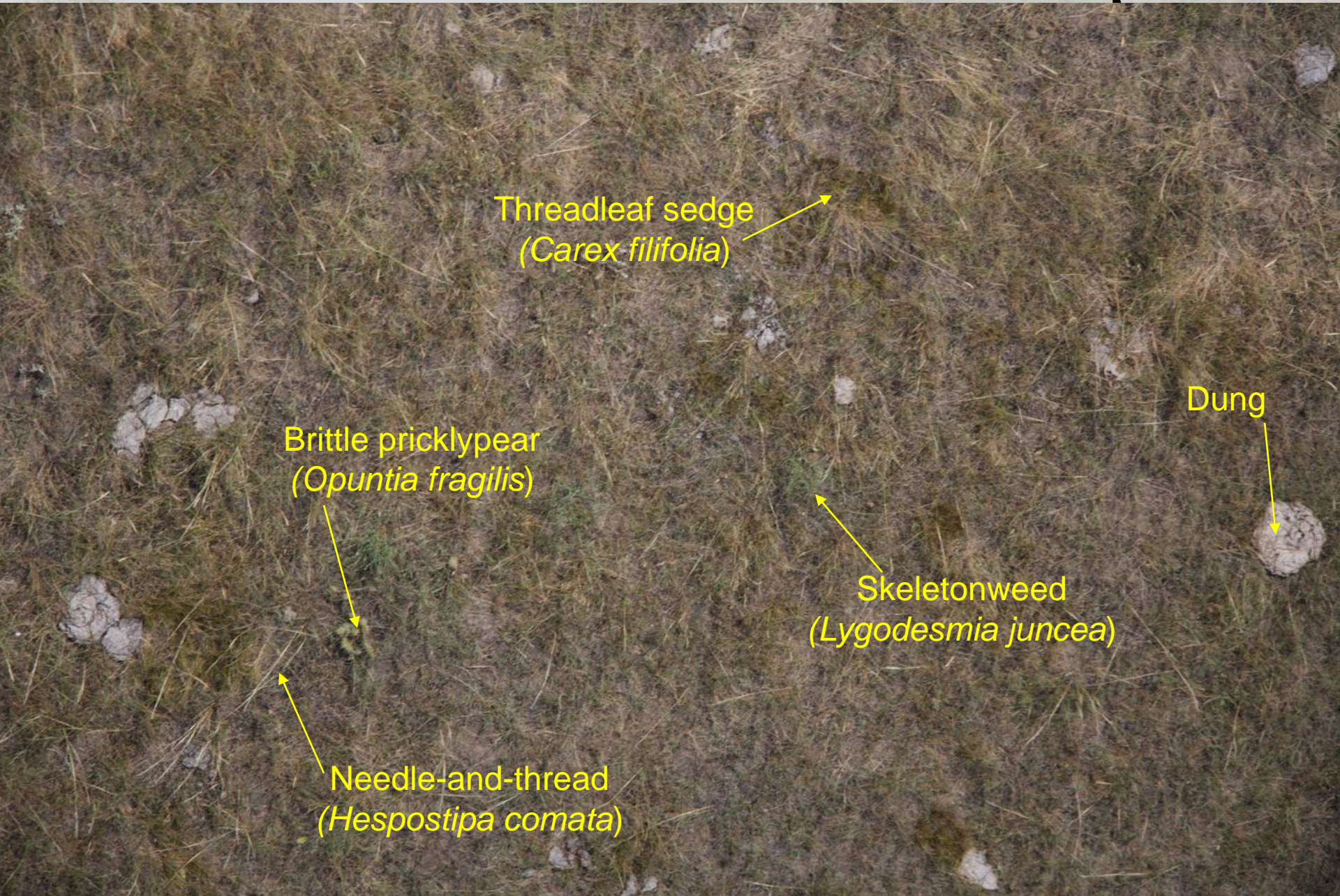
| Camera | Resolution | Photo length | Photo width | GSD |
|-----------|------------|--------------|-------------|---------|
| 1Ds | 11.1 MP | 108 ft | 72 ft | 8.8 mm |
| 1DsMarkII | 16.7 MP | 12 ft | 9 ft | 0.86 mm |

Methods & Materials - Aerial

- Stratified plot location by ecological site
- Matched photos to ground macroplots
- Analyzed photos using Samplepoint



16.7 MP Aerial Photo Example



Threadleaf sedge
(*Carex filifolia*)

Brittle pricklypear
(*Opuntia fragilis*)

Dung

Skeletonweed
(*Lygodesmia juncea*)

Needle-and-thread
(*Hespostipa comata*)

Results

| Variable | r |
|--------------------|----------|
| Bare ground | 0.5 |
| Litter | 0.3 |
| Crested wheatgrass | 0.8 |
| Western wheatgrass | 0.2 |
| Forbs | 0.3 |

0.1 – 0.3 = small; 0.3 – 0.5 = medium; 0.5 – 1.0 = large

Conclusions

- Did it work? (How many words was it worth?)
- Improvements
- Alternatives



Practical Application Picture

- Great, how does this apply to me?
- Skills, skills, skills
- Producer-friendly monitoring?



Recap

- Why monitor?
- Economics of monitoring
- Big world picture
- Local picture
- Research picture
- Practical producer picture
- And always remember...



Big Brother is watching...

Thank You!

Whoo hoo!
The End!



Questions?

