

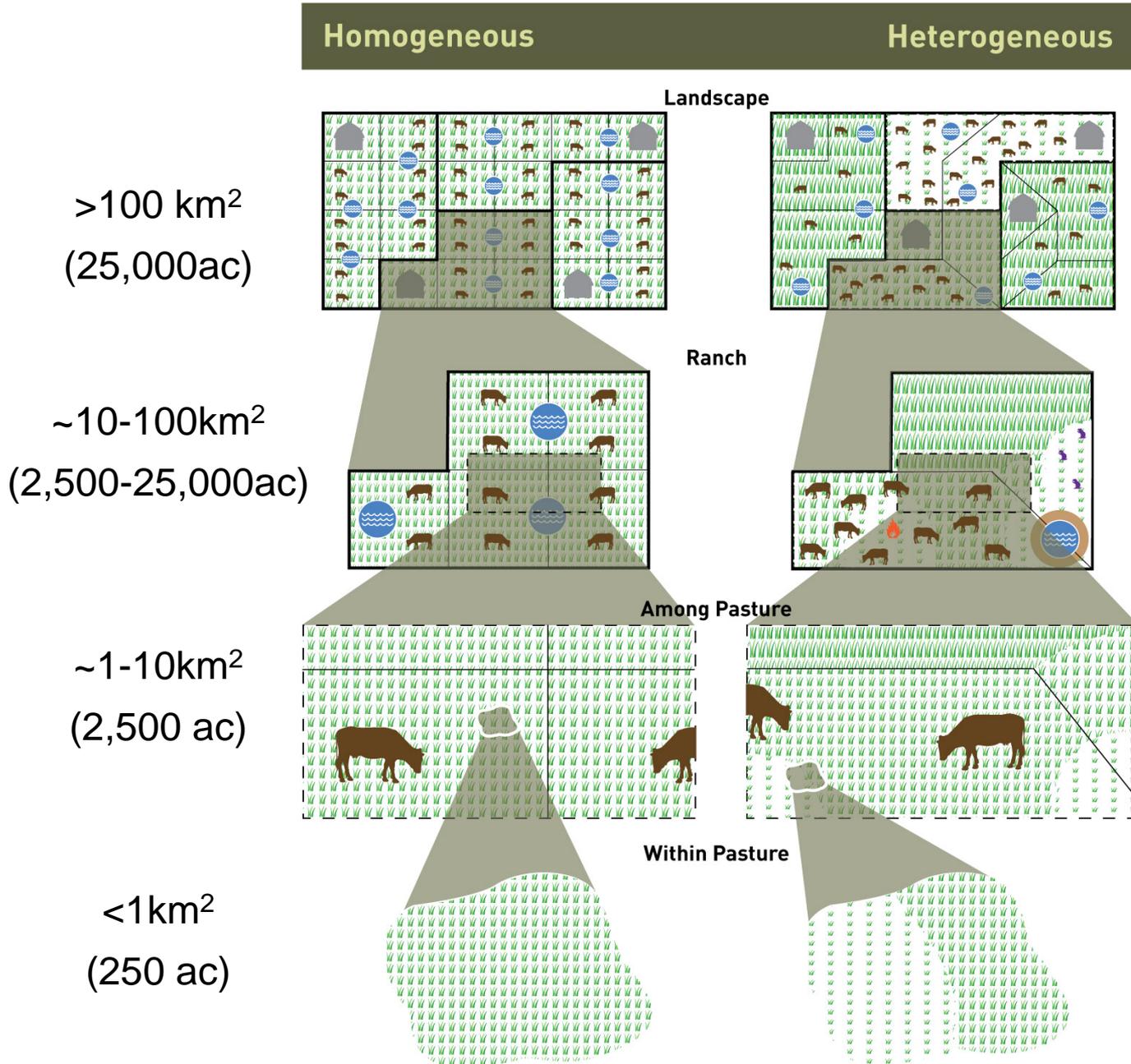
# Heterogeneity Management in Semi-Arid Rangelands

- 8:30-9:00: Overview of potential heterogeneity management practices in the western Great Plains
- 9:00-9:15: Break
- 9:15-10:30: Discussion of ecological, logistical and economic issues
- 10:30-10:45: Break
- 10:45-12:00: Discussion of social and political issues

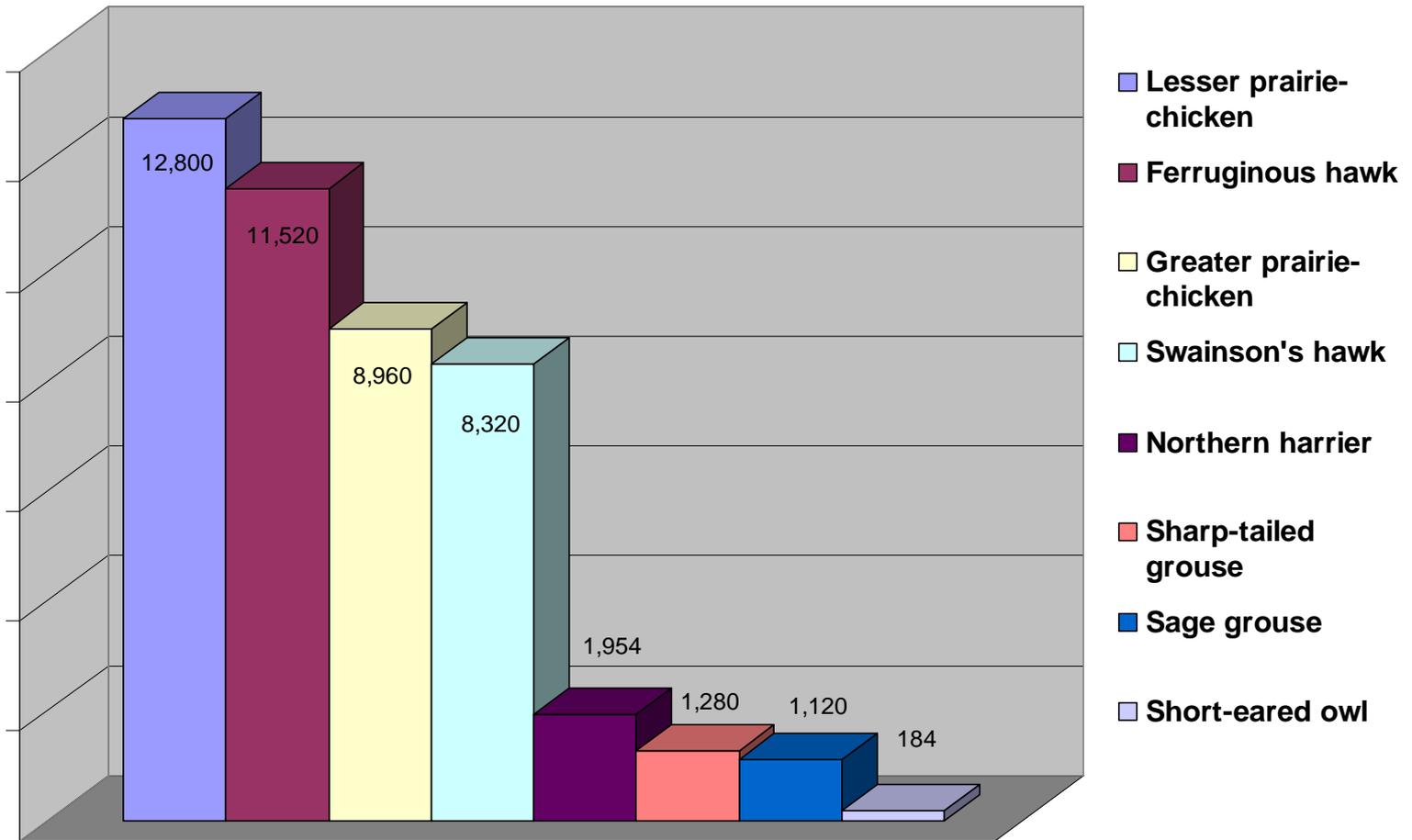
- Considerations at different spatial scales
- Heterogeneity management practices



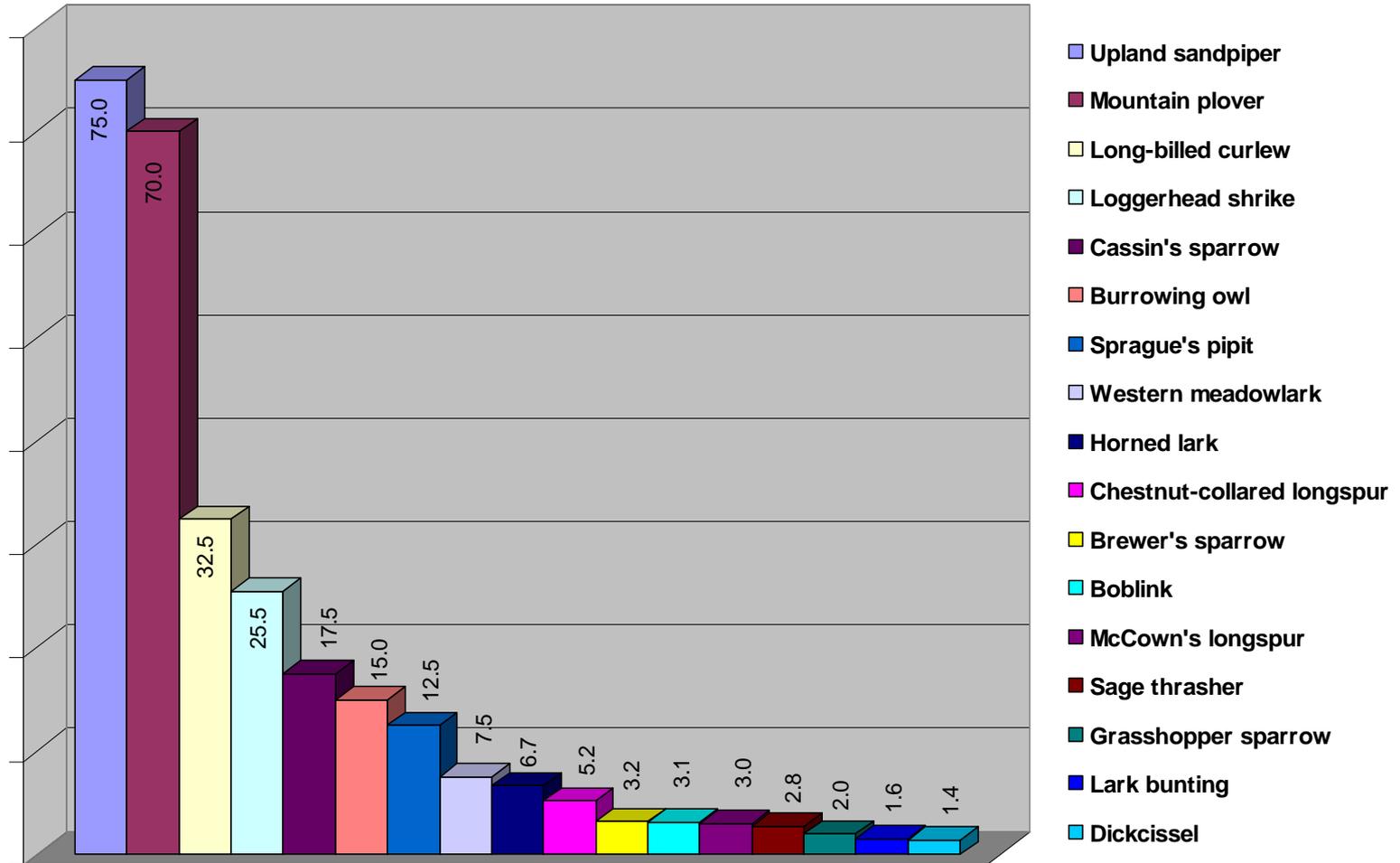
Figure 1. A comparison of vegetation homogeneity and heterogeneity at various scales.



# Species requiring areas larger than 1/4 section for breeding territories



# Species requiring areas less than 1/4 section for breeding territories



**Figure 2.** When developing a plan to promote heterogeneity, first consider management practices at the landscape and ranch scales, then at the among and within pasture scales.

## Landscape & Ranch Scales

Management Factor:		Management Consideration:
A. Landscape Context <ul style="list-style-type: none"> <li>• If similar</li> <li>• If different</li> </ul>	then then	enhance contrast. maintain contrast.
B. Ranch Stocking Rate <ul style="list-style-type: none"> <li>• If high</li> <li>• If low or moderate</li> </ul>	then then	decrease stocking rate before proceeding. proceed to next scale of consideration.
C. Ranch Size <ul style="list-style-type: none"> <li>• If small (&lt; 10 sq. km)</li> <li>• If large</li> </ul>	then then	fewer options at this scale. proceed to next scale of consideration.

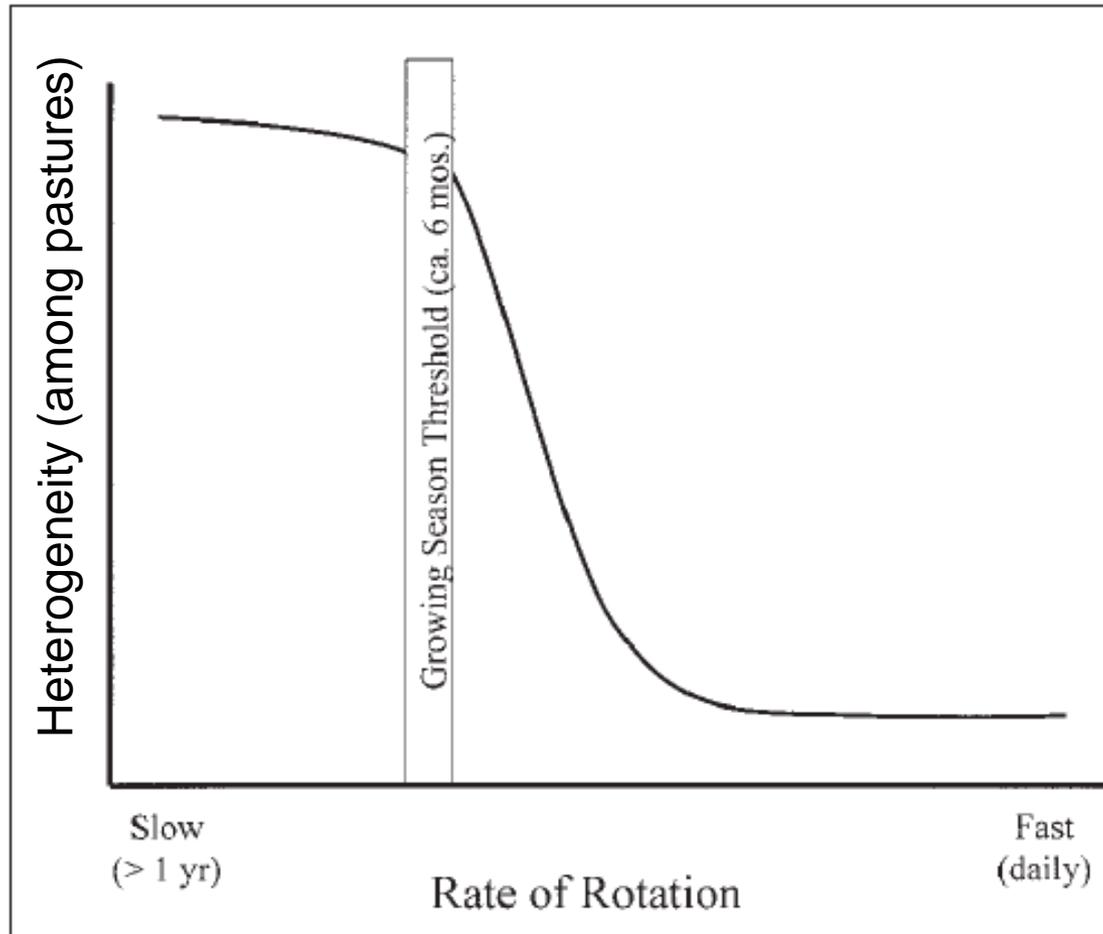


## Among & Within Pasture Scales

Evaluate Existing:	Consider:
Pasture size/fencing configuration	<ul style="list-style-type: none"> <li>• increasing pasture size.</li> <li>• changing pasture configuration.</li> </ul>
Herd rotation schedule	<ul style="list-style-type: none"> <li>• lengthening rotation schedule.</li> </ul>
Water distribution	<ul style="list-style-type: none"> <li>• rotating water locations.</li> </ul>
Stocking rate in each pasture	<ul style="list-style-type: none"> <li>• varying by pasture by year.</li> </ul>
Topographical/edaphic heterogeneity	<ul style="list-style-type: none"> <li>• contribution to overall vegetation heterogeneity.</li> </ul>
Prairie dog colony numbers/distribution	<ul style="list-style-type: none"> <li>• managing numbers/distribution.</li> </ul>
Within pasture vegetation heterogeneity	<ul style="list-style-type: none"> <li>• targeting areas for patch burning/ grazing and placement of livestock attractants.</li> </ul>



# Grazing rotations



**Figure 2.** When developing a plan to promote heterogeneity, first consider management practices at the landscape and ranch scales, then at the among and within pasture scales.

## Landscape & Ranch Scales

Management Factor:		Management Consideration:
A. Landscape Context <ul style="list-style-type: none"> <li>• If similar</li> <li>• If different</li> </ul>	then then	enhance contrast. maintain contrast.
B. Ranch Stocking Rate <ul style="list-style-type: none"> <li>• If high</li> <li>• If low or moderate</li> </ul>	then then	decrease stocking rate before proceeding. proceed to next scale of consideration.
C. Ranch Size <ul style="list-style-type: none"> <li>• If small (&lt; 10 sq. km)</li> <li>• If large</li> </ul>	then then	fewer options at this scale. proceed to next scale of consideration.



## Among & Within Pasture Scales

Evaluate Existing:	Consider:
Pasture size/fencing configuration	<ul style="list-style-type: none"> <li>• increasing pasture size.</li> <li>• changing pasture configuration.</li> </ul>
Herd rotation schedule	<ul style="list-style-type: none"> <li>• lengthening rotation schedule.</li> </ul>
Water distribution	<ul style="list-style-type: none"> <li>• rotating water locations.</li> </ul>
Stocking rate in each pasture	<ul style="list-style-type: none"> <li>• varying by pasture by year.</li> </ul>
Topographical/edaphic heterogeneity	<ul style="list-style-type: none"> <li>• contribution to overall vegetation heterogeneity.</li> </ul>
Prairie dog colony numbers/distribution	<ul style="list-style-type: none"> <li>• managing numbers/distribution.</li> </ul>
Within pasture vegetation heterogeneity	<ul style="list-style-type: none"> <li>• targeting areas for patch burning/ grazing and placement of livestock attractants.</li> </ul>



# Prairie Dog Assisted Living Community



**Figure 2.** When developing a plan to promote heterogeneity, first consider management practices at the landscape and ranch scales, then at the among and within pasture scales.

## Landscape & Ranch Scales

Management Factor:		Management Consideration:
A. Landscape Context <ul style="list-style-type: none"> <li>• If similar</li> <li>• If different</li> </ul>	then then	enhance contrast. maintain contrast.
B. Ranch Stocking Rate <ul style="list-style-type: none"> <li>• If high</li> <li>• If low or moderate</li> </ul>	then then	decrease stocking rate before proceeding. proceed to next scale of consideration.
C. Ranch Size <ul style="list-style-type: none"> <li>• If small (&lt; 10 sq. km)</li> <li>• If large</li> </ul>	then then	fewer options at this scale. proceed to next scale of consideration.



## Among & Within Pasture Scales

Evaluate Existing:	Consider:
Pasture size/fencing configuration	<ul style="list-style-type: none"> <li>• increasing pasture size.</li> <li>• changing pasture configuration.</li> </ul>
Herd rotation schedule	<ul style="list-style-type: none"> <li>• lengthening rotation schedule.</li> </ul>
Water distribution	<ul style="list-style-type: none"> <li>• rotating water locations.</li> </ul>
Stocking rate in each pasture	<ul style="list-style-type: none"> <li>• varying by pasture by year.</li> </ul>
Topographical/edaphic heterogeneity	<ul style="list-style-type: none"> <li>• contribution to overall vegetation heterogeneity.</li> </ul>
Prairie dog colony numbers/distribution	<ul style="list-style-type: none"> <li>• managing numbers/distribution.</li> </ul>
Within pasture vegetation heterogeneity	<ul style="list-style-type: none"> <li>• targeting areas for patch burning/ grazing and placement of livestock attractants.</li> </ul>



**Figure 3.** Examples of strategies to promote vegetation heterogeneity for contrasting existing ranch conditions.

<b>Existing Conditions:</b>	
<b>Ranch A</b>	<b>Ranch B</b>
<ul style="list-style-type: none"> <li>• Large pastures (&gt;2.56 km<sup>2</sup> or 1 mi<sup>2</sup> each)</li> <li>• Season-long grazing</li> <li>• Some areas &gt;1.6 km (1 mi) from water</li> <li>• Prairie dogs present</li> <li>• Moderate within-pasture heterogeneity</li> <li>• Moderate stocking rate</li> </ul>	<ul style="list-style-type: none"> <li>• Small pastures (&lt;2.56 km<sup>2</sup> or 1 mi<sup>2</sup> each)</li> <li>• Intensive rotational grazing system</li> <li>• All areas &lt;1.6 km (1 mi) from water</li> <li>• Low within-pasture heterogeneity</li> <li>• Moderate stocking rate</li> </ul>
<b>Potential practices to increase among and within pasture heterogeneity:</b>	
<b>Ranch A</b>	<b>Ranch B</b>
<ul style="list-style-type: none"> <li>• Rotate use of water sources among years within largest pastures (add water sources if necessary)</li> <li>• In years with appropriate weather/fuel conditions, implement patch burns (≤25% of a pasture per year)</li> <li>• Maintain prairie dog presence</li> <li>• Implement rest-rotation (3 or more pastures) to allow 1 non-use pasture per year</li> </ul>	<ul style="list-style-type: none"> <li>• Implement rest-rotation (3 or more pastures) to allow 1 non-use pasture per year</li> <li>• Increase pasture size with fence removal; rotate use of water sources among years</li> <li>• Increase pasture size and implement patch burns (≤25% of a pasture per year)</li> </ul>

## Questions:

- 1) What other practices/approaches should we consider? What has been the result of your experiences implementing these types of practices?
- 2) What technical/ecological problems or concerns might you have with assisting private landowners to implement heterogeneity management?

## Practices

- Among-pasture
  - Fence/water infrastructure
  - Stocking rate
  - Rotations
- Within-pasture
  - Water
  - Supplemental feed
  - Patch burning
  - Herding
- Prairie dogs