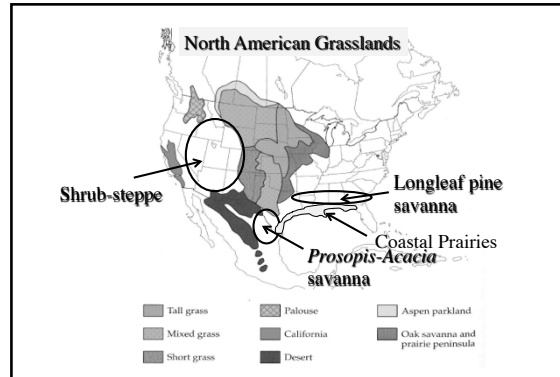


## Grasses, Shrubs & Fire

RNR 355 - INTRO TO WILDLAND FIRE

Steve Archer  
School of Natural Resources and the Environment

22 October 2012



## NRCS Prescribed Burning Practice Standard

### Purposes:

- Control undesirable vegetation
- Prepare sites for planting/seeding
- Control plant diseases
- Reduce wildfire hazards
- Improve wildlife habitat
- Improve plant production and quality
- Remove slash and debris
- Enhance seed production
- Facilitate distribution of livestock & wildlife
- Restore/maintain ecological sites



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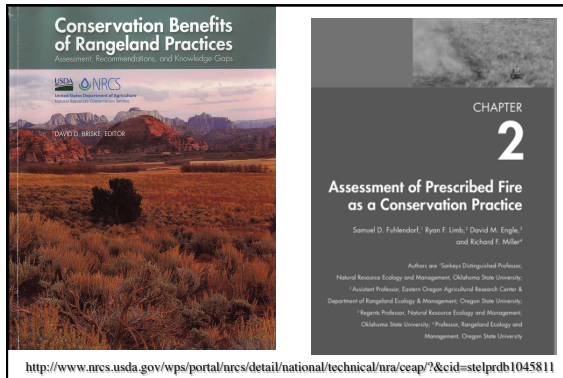
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### NRCS Prescribed Burning Practice Standard

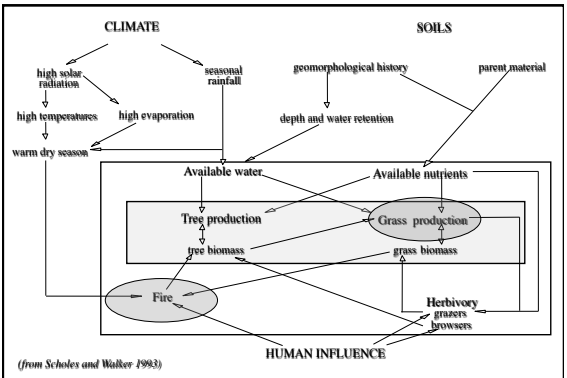
**Purposes:**

- Control undesirable vegetation
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<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/?&cid=stelprdb1045811>

**See Table 7 (p. 94) for evaluation**




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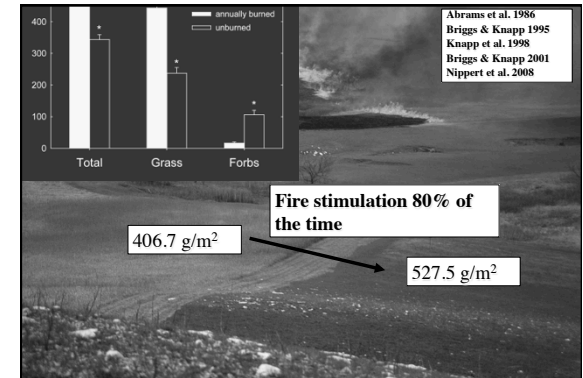


**Dead Plant Material (Litter) affects**  
(Knapp & Seastedt 1986)

- Microclimate
  - ✓ PAR
  - ✓ leaf temp – convective cooling
  - ✓ soil temp
  - ✓ ET
  - ✓ PPT interception
- Phenology
- Species composition
- Productivity
- Nutrient cycling (plant chemistry, microbial activity)

**Fire and grazing key to removing detritus**

**Implications for exclosure studies?**




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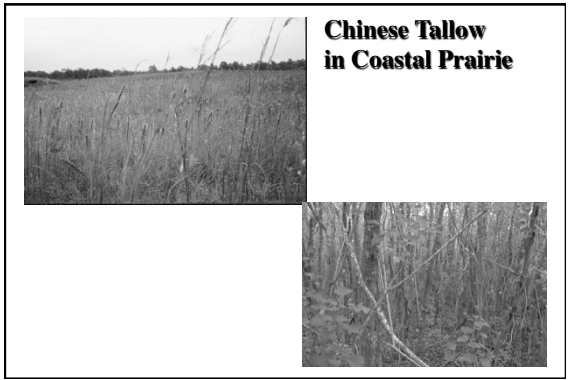
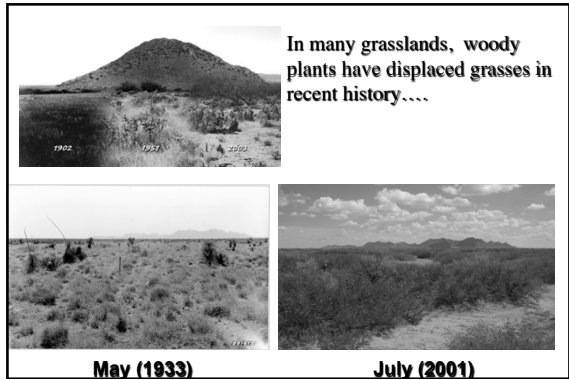
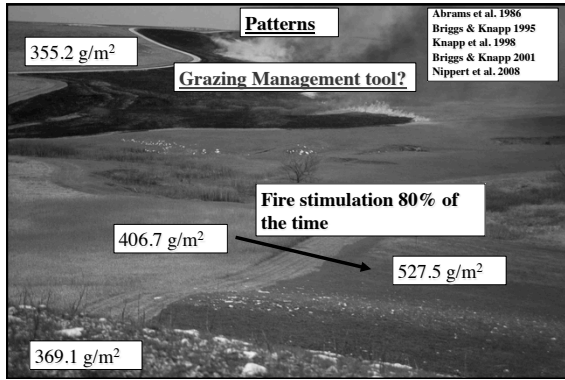
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### Juniper in Sagebrush-steppe



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### Eastern Red Cedar in Tall Grass Prairie



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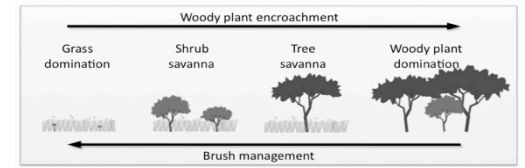
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#### Traditional Considerations

- Livestock production
  - health
  - handling
  - forage production
- Hydrology
  - Stream flow
  - groundwater recharge
- Wildlife
  - game management

#### Emerging Considerations

- Primary production
- Land surface-atmosphere interactions
- Carbon sequestration
- Trace gas fluxes
- Biological diversity
- Non-methane hydrocarbon emissions



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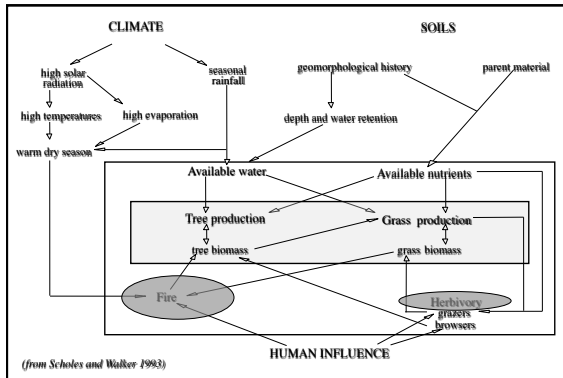
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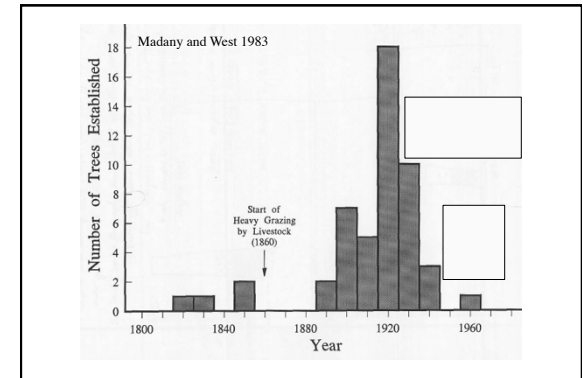
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Proximate Cause of Vegetation Change? (from Madany and West 1983)	
<b>Grazed Plateau</b>	
<b>Vegetation</b>	Dense pine, oak, juniper stands
<b>Historical Observations</b>	Major shift in vegetation around turn of century
<b>Grazing History</b>	Heavily grazed by cattle, sheep since 1860
<b>Fire History</b>	Pre-1860's: 4 to 7 y interval Post-1860's: No fires

From Madany & West (1983) Ecology 64:661-667




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## Proximate Cause of Vegetation Change?

(from Madany and West 1983)

	<u>Protected Mesa Tops</u>
Vegetation	Pine savanna
Historical Observations	Vegetation similar to pre-settlement times
Grazing History	Protected by steep cliffs; No livestock grazing
Fire History	56 to 79 y fire interval

From Madany & West (1983) Ecology 64:661-667

## Protected Mesa Tops vs. Grazed Plateau

- Similar climate
- Similar soils
- Similar atmospheric CO<sub>2</sub> and N-deposition

Differ mainly with respect to grazing & fire history; *but* high fire frequency not necessarily required to maintain savanna




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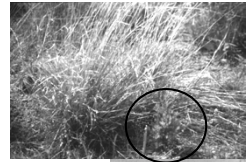
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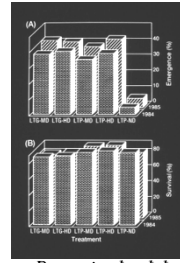
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How Do Woody Plants Gain a Foothold?

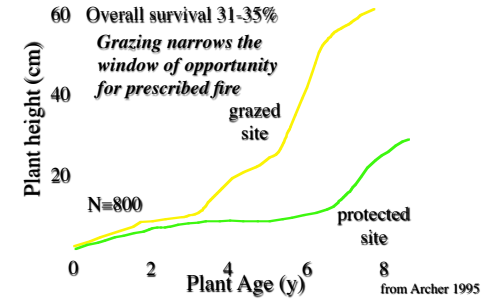


How Do Woody Plants Gain a Foothold?



*Prosopis glandulosa* (honey mesquite)

**Prosopis Growth**




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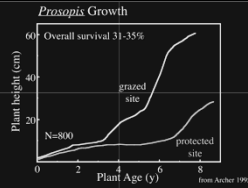
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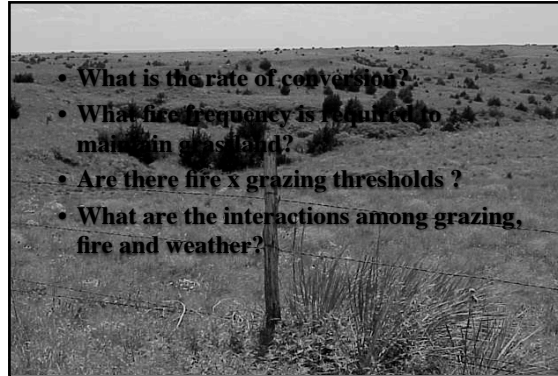


## Grazing Management & Shrub Encroachment

- Brush happens
- Grass composition/production may be of little consequence to woody plant establishment



- May affect rate of stand development
- Important primarily as it affects fire regime
- Fire may suppress but not kill plants
- No silver bullets, only integrated management



- What is the rate of conversion?
- What fire frequency is required to maintain grassland?
- Are there fire x grazing thresholds?
- What are the interactions among grazing, fire and weather?

ModelMaker ....  
Model Maker  
[www.cherwell.com/](http://www.cherwell.com/)

ModelMaker - [File] [Edit] [View] [Component] [Model] [Window] [Help]

www.hps-inc.com

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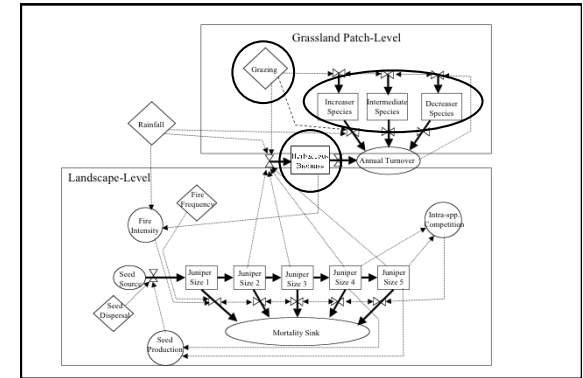
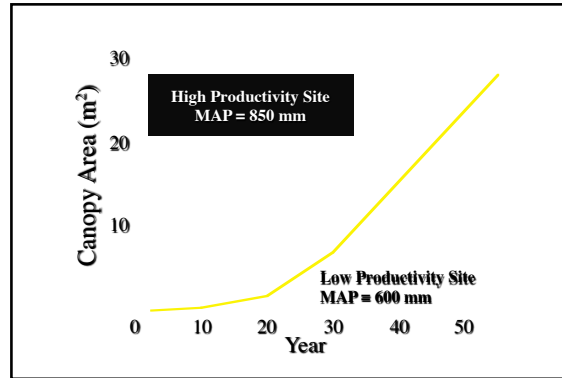
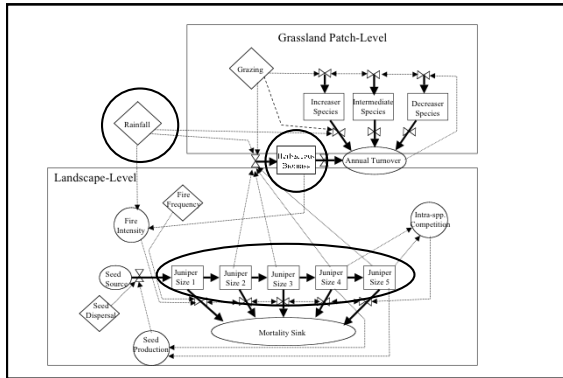
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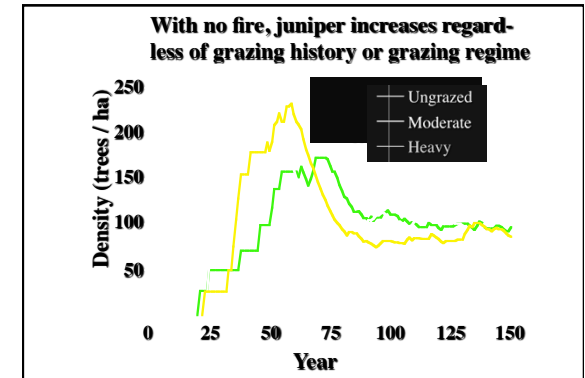
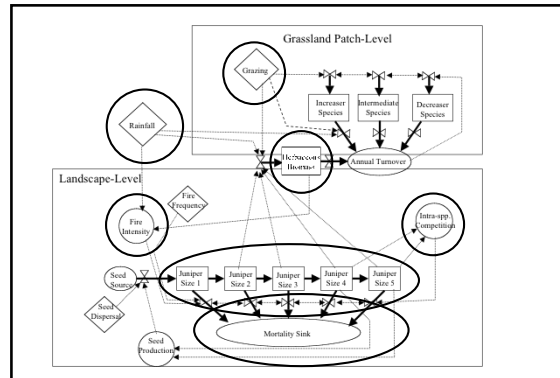
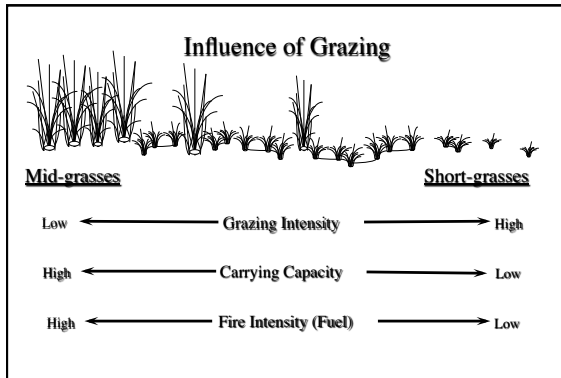
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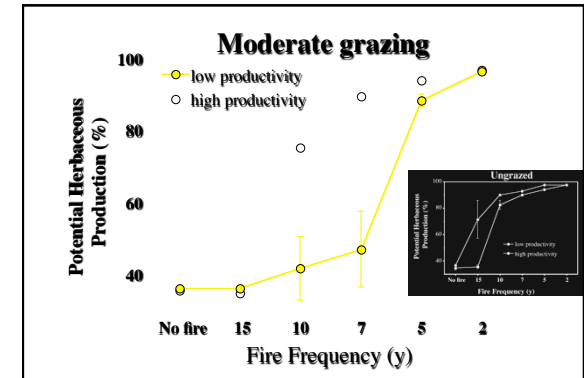
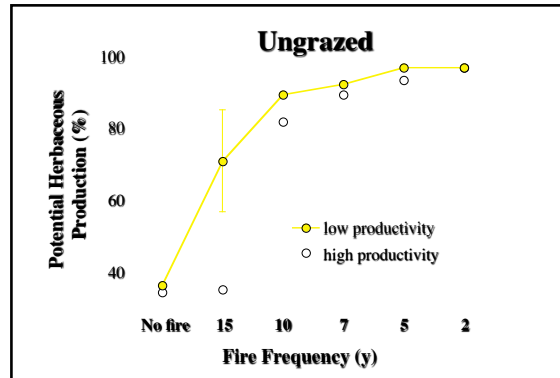
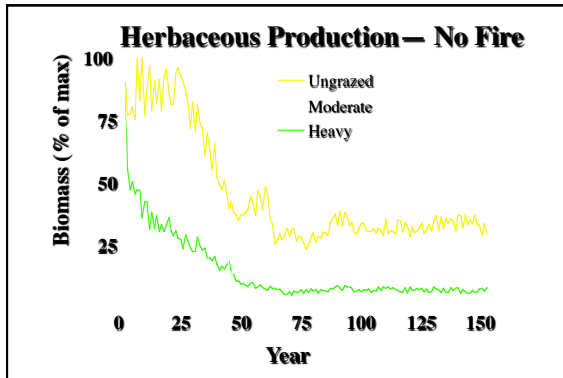
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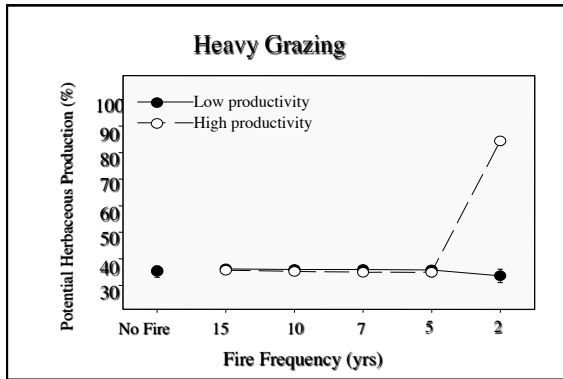
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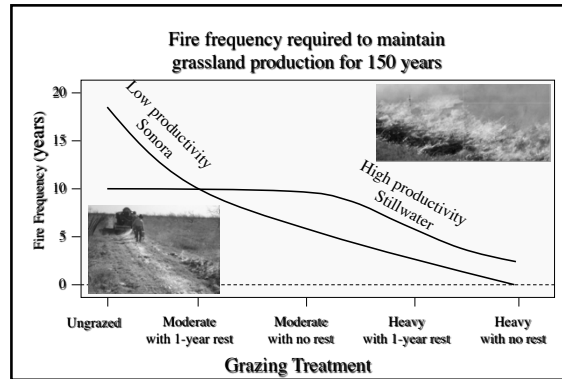
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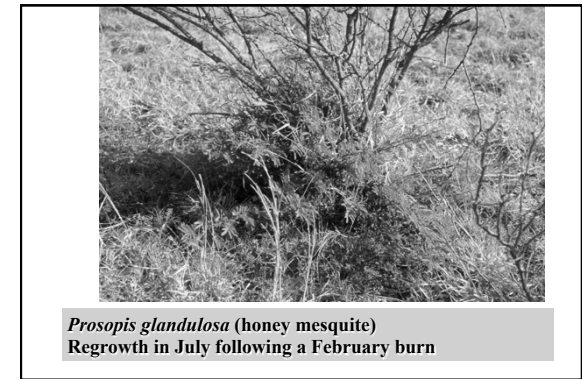
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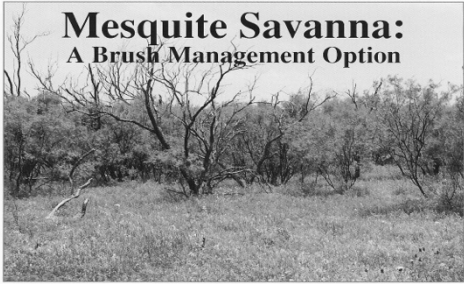
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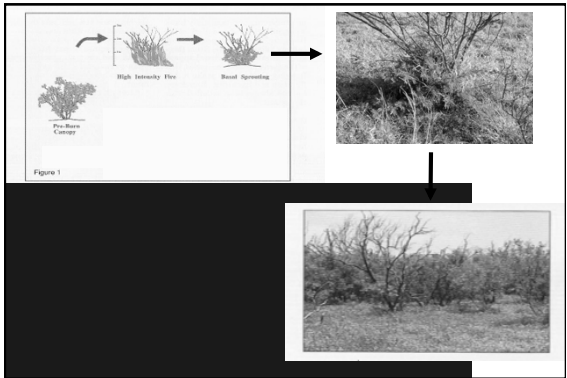
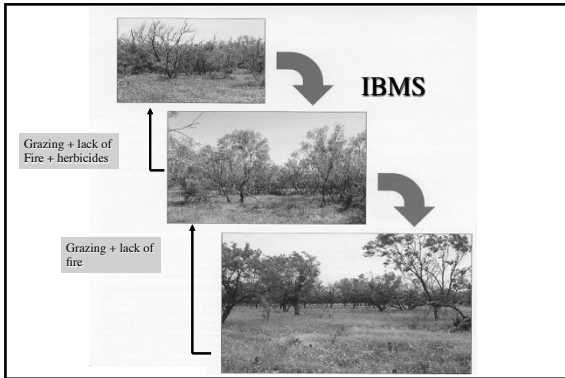
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### Mesquite Savanna: A Brush Management Option



Mesquite (*Prosopis*) thicket in what was once a mesquite savanna. Cause for change? Brush Management!




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