

# Grassland vegetation dynamics

## Part 2: Herbivory

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What are the main disturbances  
in grasslands?

Species shifts tend to be driven more by  
**allogenic** than **autogenic** causes (why?)

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## **Bison as a keystone species in tallgrass prairie**

**Knapp et al., 1999**



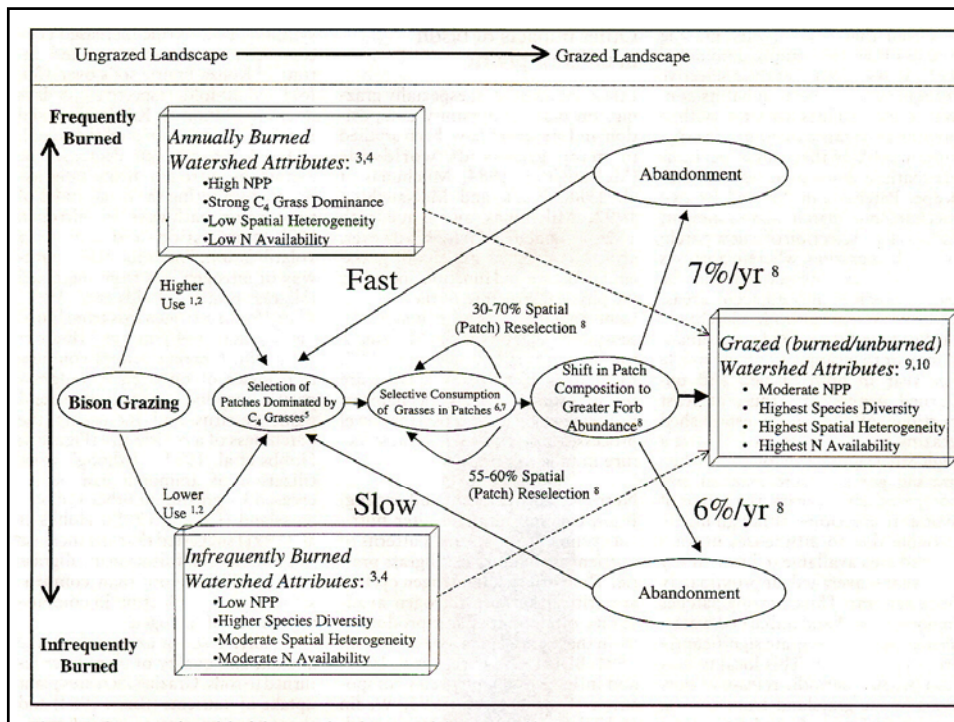
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### **Consider these questions:**

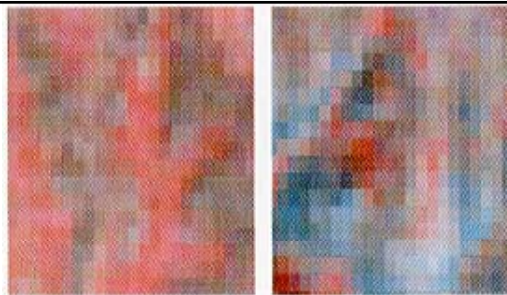
1. What is a keystone species? Do bison qualify?
2. How do bison affect biodiversity? What is the relationship between productivity and diversity with and without bison?
3. How do they affect the N cycle and heterogeneity?
4. How is biomass production affected by 1) fire, 2) bison, 3) fire plus bison?
5. What are some interactive effects of bison grazing and fire on species composition?
6. How does bison grazing compare with cattle grazing on tallgrass prairie?
7. What is overcompensation and what were some explanations for it in the Knapp paper?

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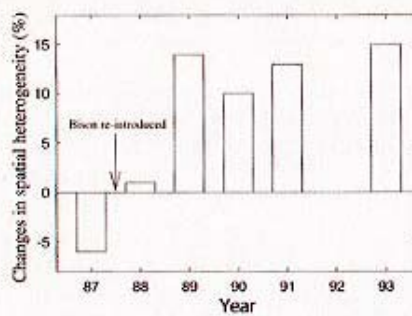


In what ways do bison affect spatial heterogeneity?



Ungrazed

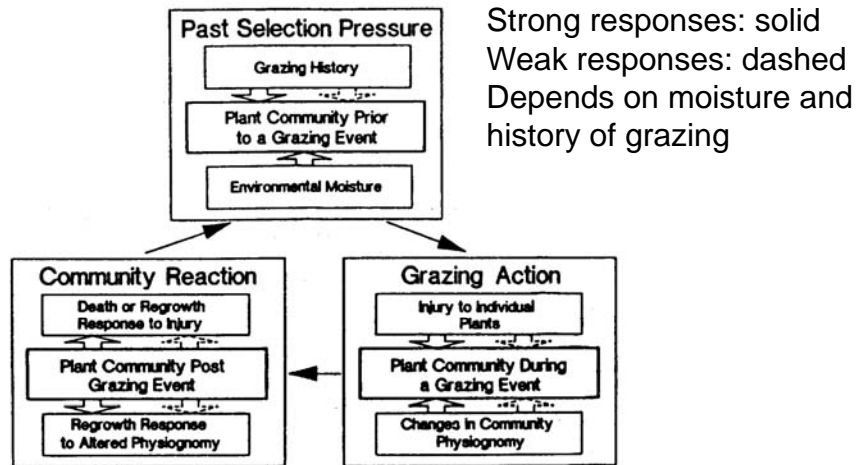
Grazed



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# Effects of grazing in grasslands



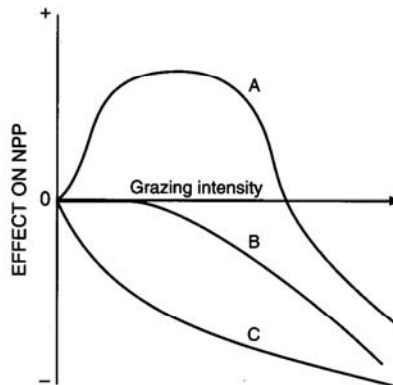
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# Grazing effects on NPP

Compensatory growth hypothesis (Fig. 5.7, Knight)

- A=overcompensation
- B=partial compensation
- C= NPP declines



Why might grazing lead to an increase in NPP?

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## Evolution “in steppe” with hoofed mammals (Mack & Thompson, 1982)

- Resilience depends on whether or not the grasslands evolved with grazing pressure
- Few ungulates in CA & Palouse; why?
- What factors make bunchgrasses less resilient than sod formers east of Rockies?

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## Ultimate nutrient cycling



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