Managing for Ecosystem Services: Research Base and New Directions for Range Science

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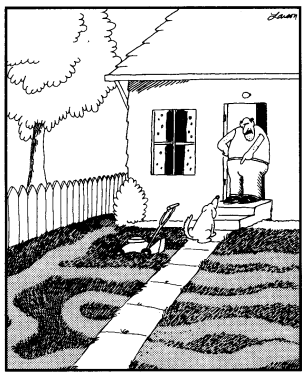


The Far Side®

"You call that mowin' the lawn? … Bad dog! … No biscuit! … Bad dog!"

Parallel to Range Science Research?

Road Map

Research Base
- Production focus
- Literature synthesis

New Directions
- Ecosystem services and tradeoffs
- Ongoing efforts

Research Base

Research Focus: 20th Century

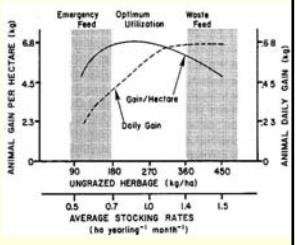
Forage production
- Range improvements
- Brush removal
- Introduced species

Livestock production
- Weight gain
- Genetics

Management Practices: 20th Century

Emphasis on proper stocking rates with associated facilitating practices (fence, water) for forage and livestock production

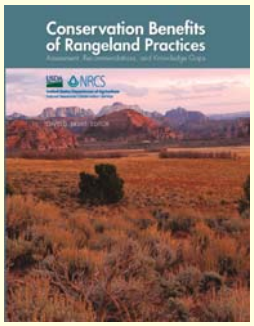
Uniform use of vegetation within and across pastures



Bement 1969

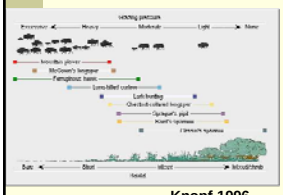
Literature Synthesis

Grazing
Brush Management
Planting
Fire
Riparian Management
Wildlife
Landscape Approach
Social-economics





New Directions for Range Science




Knopf 1996

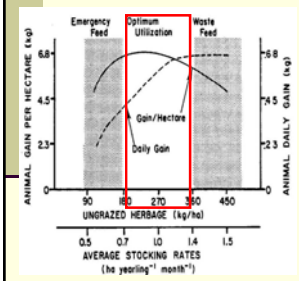
Management Practices: 21st Century
The Production-Conservation Interface

Provision of multiple ecosystem goods and services

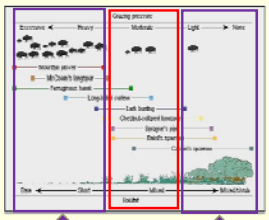
Species of concern and habitat considerations

An Example of New Directions: Research in the Great Plains

Management Paradigm → Conservation Concern



Bement 1969



Underrepresented habitats

Knopf 1996

Grassland Bird Emphasis

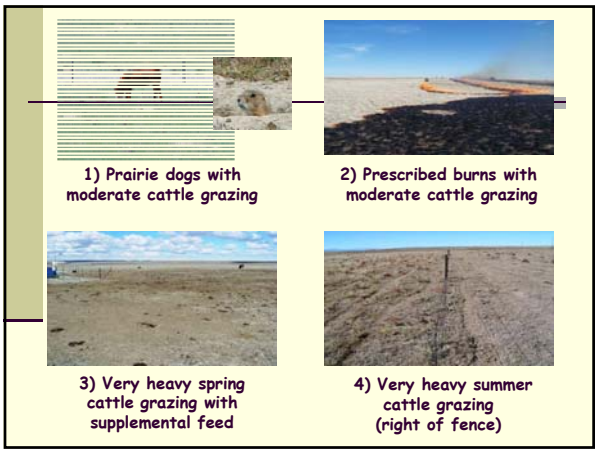
Mountain Plover (*Charadius montanus*)

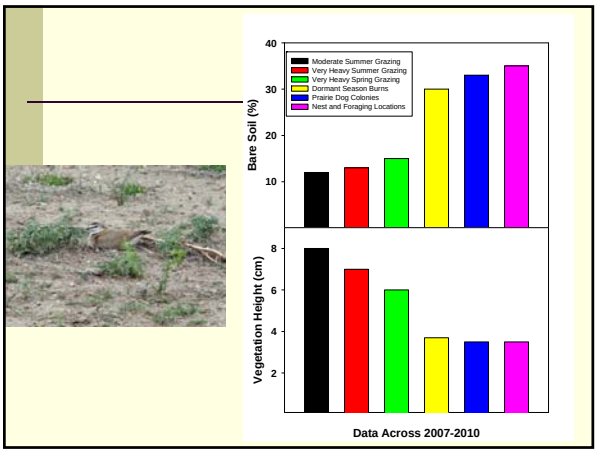
Needs short vegetation structure and substantial amount of bare ground for nesting

Characterizing Nesting/Foraging Habitat Conditions

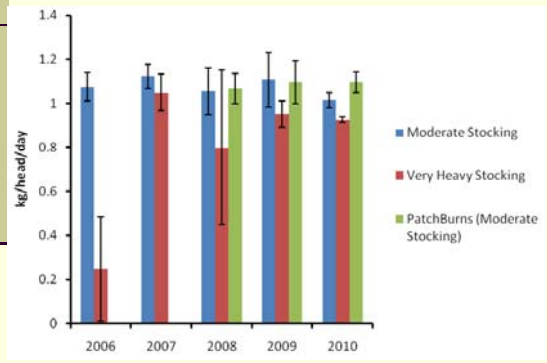
106 Sites (61 nests, 45 foraging locations)

Bare Soil Exposure: Mean + 95% CI = **35 ± 3%**
Vegetation Height: Mean + 95% CI = **3.7 ± 0.2 cm**

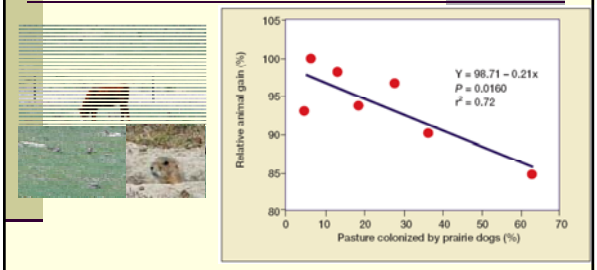





Tradeoffs with Livestock Performance?



Tradeoff in Livestock Performance with Prairie Dogs



Derner, JD, JK Detling and MF Antolin. 2006. Are livestock weight gains affected by black-tailed prairie dogs? *Frontiers in Ecology and the Environment* 4(9): 459-464

Economic Tradeoffs of Livestock Gain

(Relative to moderate stocking rates on a per yearling steer basis)

Prairie dogs[1]				Prescribed burning		Very heavy spring		Very heavy summer	
20% occupation		60% occupation							
ADG	$	ADG	$	ADG	$	ADG	$	ADG	$
-5.5%	-19.69	-14.0%	-50.13	0	0	-92.4%	*	-25.7%	-92.02

ADG: average daily gains (pounds/head/day) of yearling steers
$: dollars of summer (May 10–Oct 1) weight gain, assuming $1/pound selling price

[1]From Derner et al. 2006
* Different season of grazing, also costs of supplemental feed tubs for spring grazing

Summary of Production-Conservation Tradeoffs

Prescribed burns
- Provides suitable habitat conditions
- Implementation costs for burning
- No negative effects on livestock weight gain

Prairie dogs
- Provides suitable habitat conditions
- Loss of forage quantity > increase in forage quality
- Reduced livestock weight gains

Very heavy summer grazing
- Does not provide suitable habitat conditions
- Reduced livestock weight gains
- Long-term vegetation change?

Very heavy spring grazing
- Does not provide suitable habitat conditions
- Substantially reduced livestock weight gains
- High costs of supplemental feed

Adaptive Grazing Management Studies in CA,WY and CO for Multiple Ecosystem Services

Survey Efforts

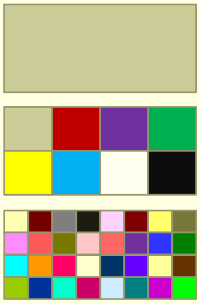
CA survey
- Lubell presentation on key findings

WY survey
- Just sent out

Both will have on-ranch visits

Large-scale Adaptive Grazing Management Experiments in 2013

For both CA and CO experiments, advisory group representing diverse interests determines adaptive nature of grazing practices (in comparison to traditional practices) for provision of multiple ecosystem goods and services



Summary Points

- Strong foundation base of knowledge
- Conservation-Production interface is the reality of 21st century management of rangelands, and this necessitates provision of multiple ecosystem goods and services
- Open frontier of research to address adaptive management for ecosystem goods and services using participatory input

Questions?

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