Targeted Grazing for Fire Mitigation and Vegetation Management

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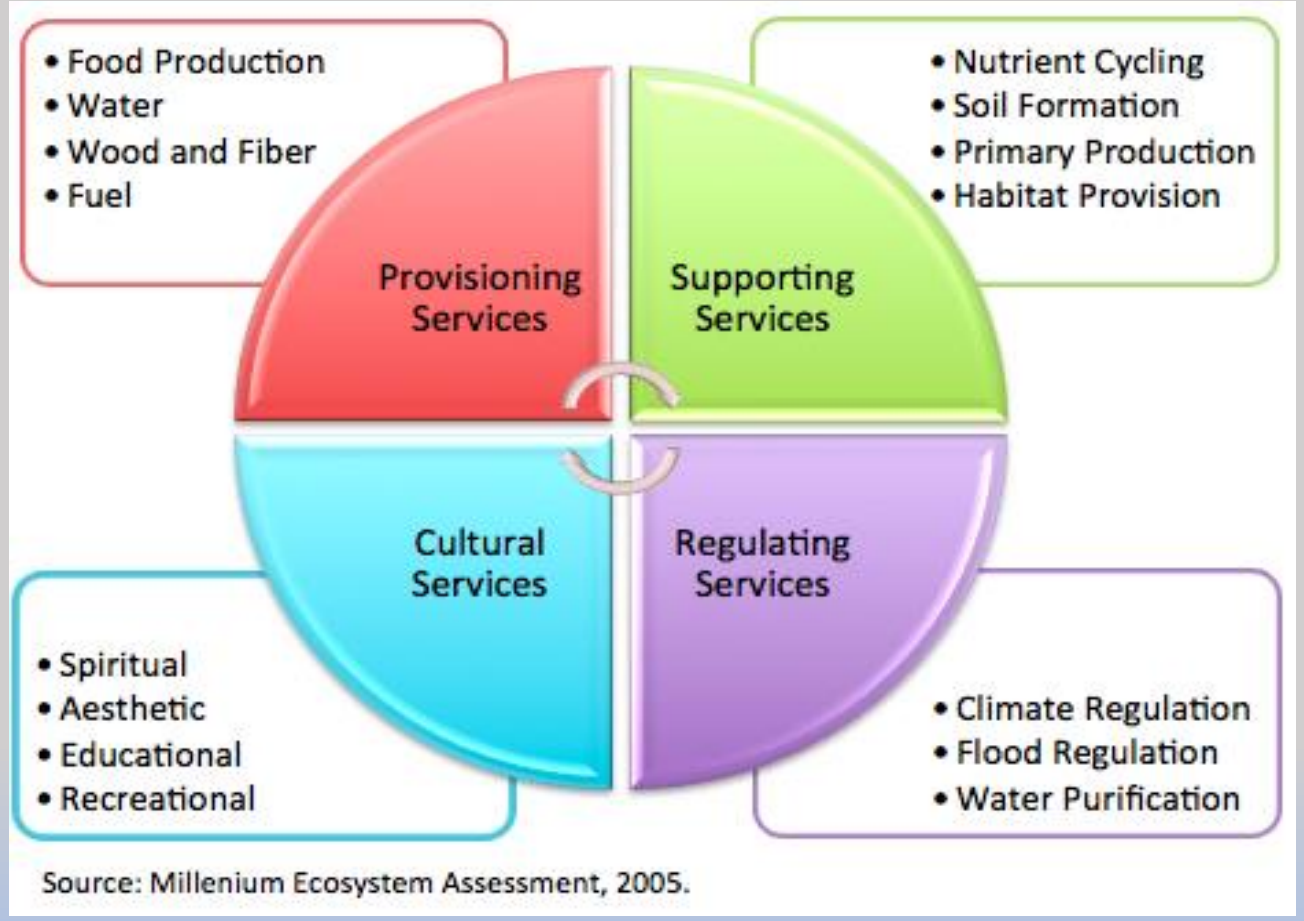
Outline

- Grazing as a tool/definitions
- Goals of grazing
- Principles of grazing management
- Where to apply targeted grazing
- Species selection
- Effects of grazing on fire behavior
- Applying grazing for fire management

Grazing Management

- Control of the amount and timing of livestock grazing to achieve management goals
  - Livestock production
  - Vegetation management
  - Ecosystem services
  - Environmental sustainability



Multiple Goals and Co-benefits of grazing

- Reducing fuel load in wildland
  - Defensible space
  - Remove excess RDM
- Control herbaceous plants in tree crops
- Control invasive weeds on
  - Natural ecosystems
- Improve Biodiversity
- Improve wildlife habitat
  - Mosaic landscapes
- Maintain vernal pool ecosystems
- Improves nutrient cycling

Grazing and plant diversity

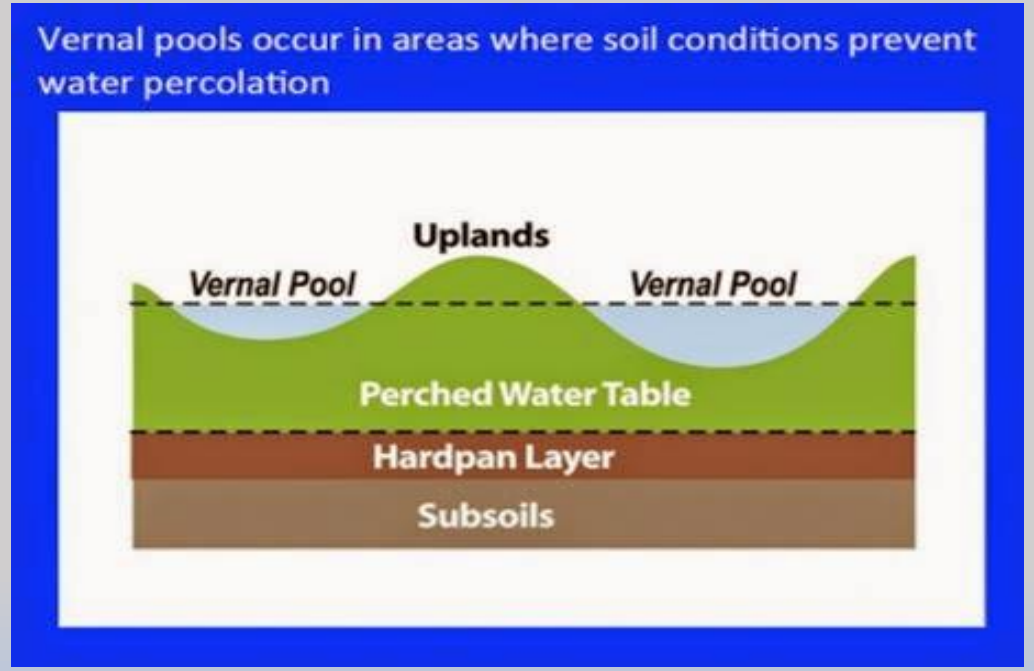
2002

2007

Sheila Barry

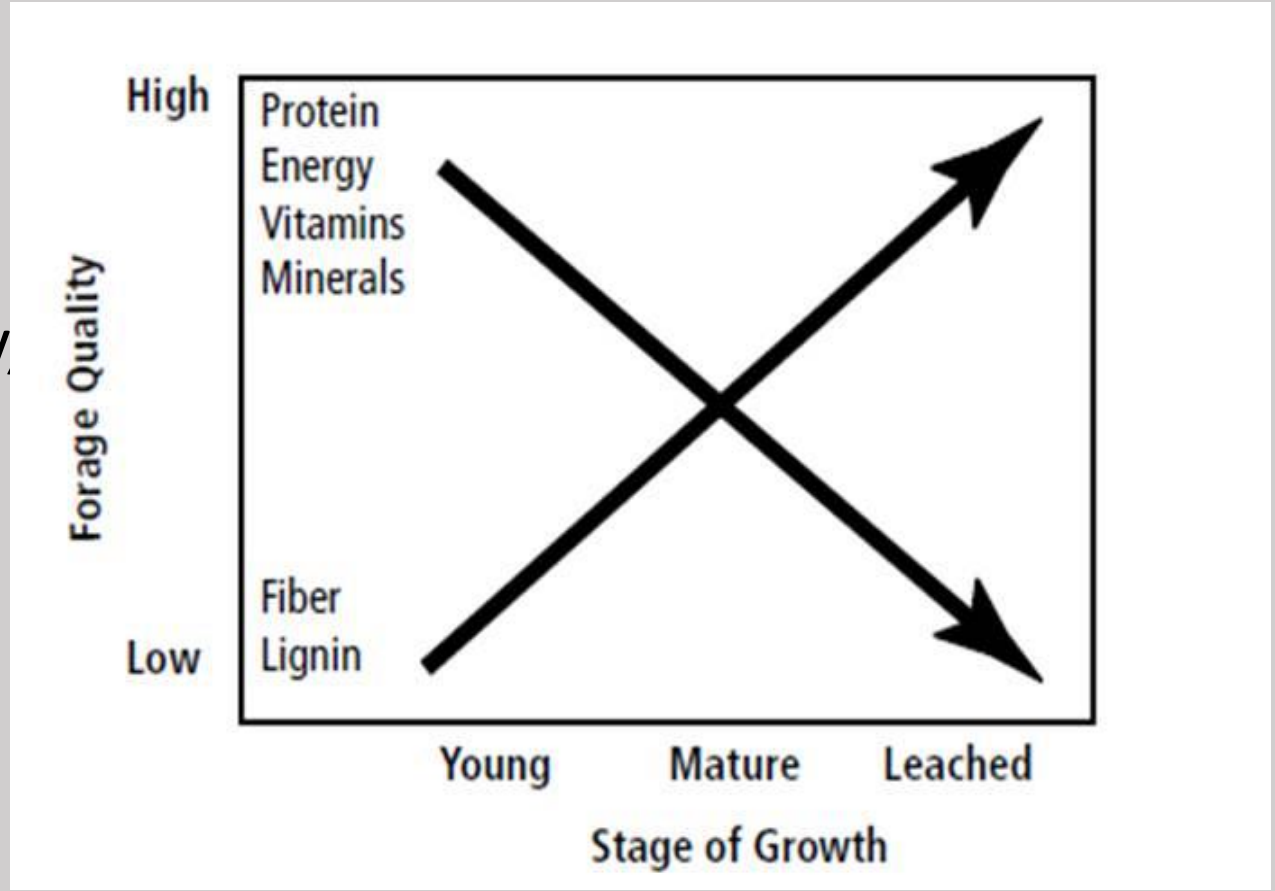
Grazing and vernal pools species

- Promotes species diversity by:
  - Reducing competition from upland species
  - Increase inundation period
  - Hoof prints



Grazing principles

- Animal species
  - Diet, poisonous plants, topography
- Class of animals
- Stocking rate
- Grazing season
  - Plant growth, palatability
- Grazing frequency
  - Length of grazing and rest period
- Grazing height
- Animal distribution
  - Grazing efficiency, multiple uses



Grazing management types

Livestock Production	**Livestock Production**	**Vegetation conditions**
Fur	**Ecosystem health - biodiversity**	**Weed management**
Fuels reduction	**Vegetation condition**	**Fuels management**
	Fuels Management	

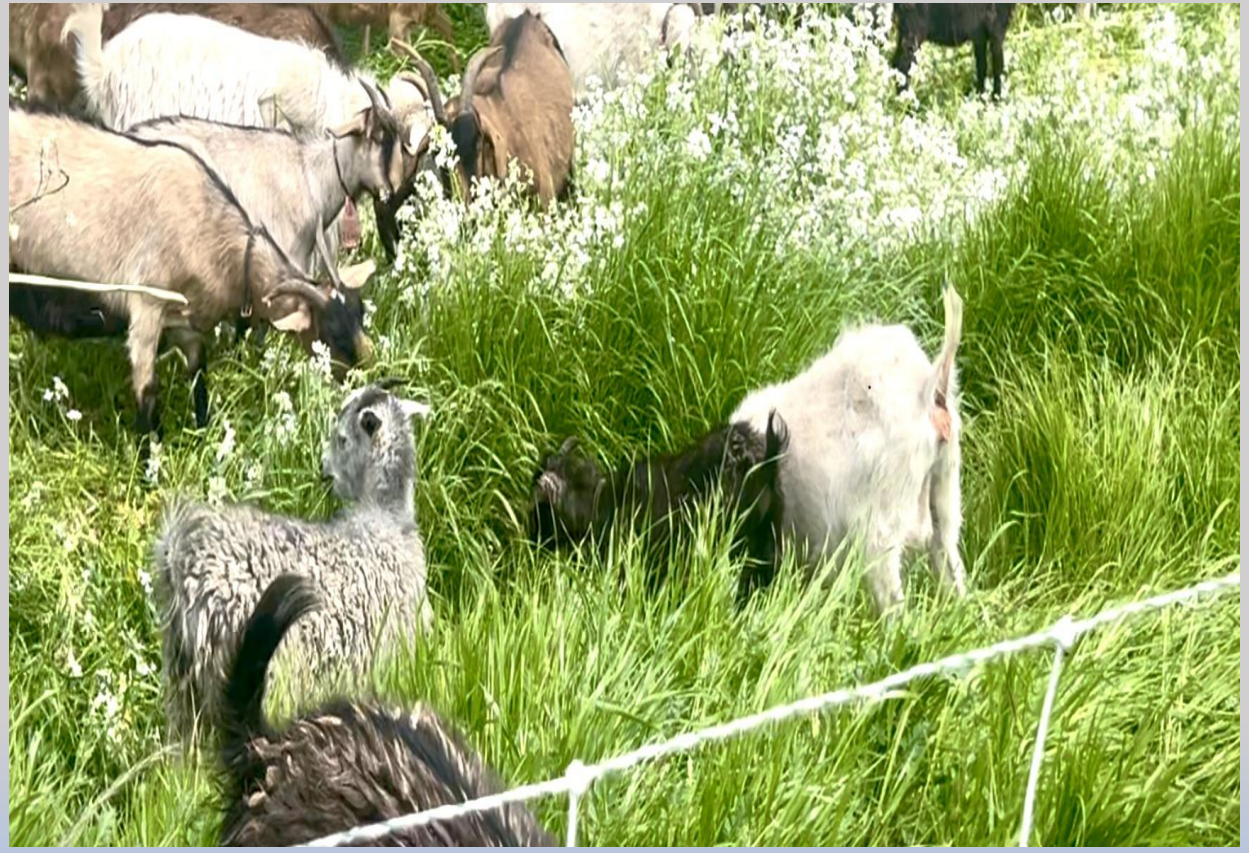
OUTCOMES

Roche and Macon

Targeted grazing

"Applying a specific kind of livestock at a determined season, duration, and intensity, to accomplish defined vegetation or landscape goals."

(Launchbaugh and Walker 2006)



Where to use targeted grazing

- Rangelands
- Forests
- Orchards and vineyards
- Non-agricultural lands/WUI –

(balance environmental, social and economic goals).

  - Around buildings
  - Around neighborhoods
  - Along canals
  - Along power lines
  - Around solar panels

Pros and cons of targeted grazing

PROS

- Cost
- Environmentally-friendly.
- Eliminate risks from other methods: dust, safety, chemicals, fire.
- Socially-acceptable

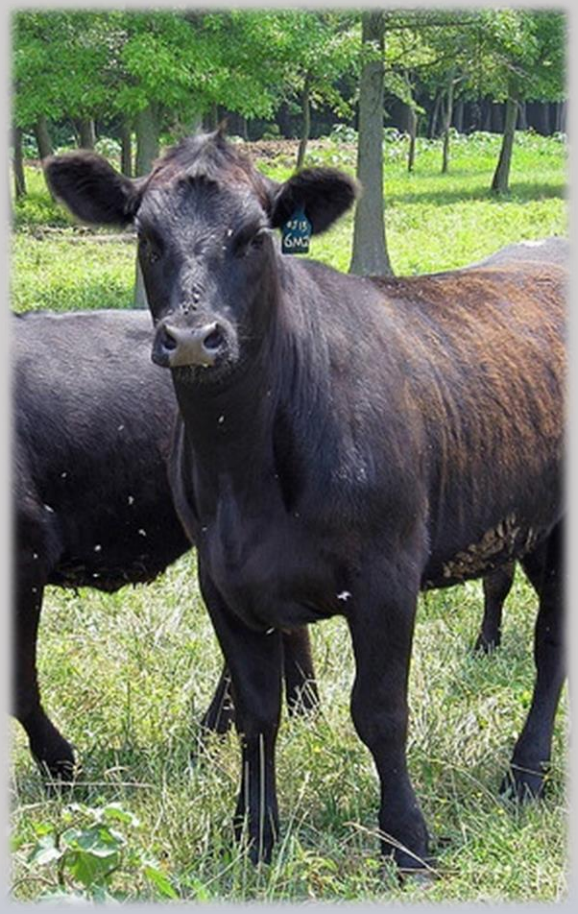
CONS

- Cost of contract grazing
- Lack of grazing animals
- Rules against grazing
- Predator risk
- Animal health risk
- Droppings in urban areas
- Overgrazing

Choosing the right animal for the job

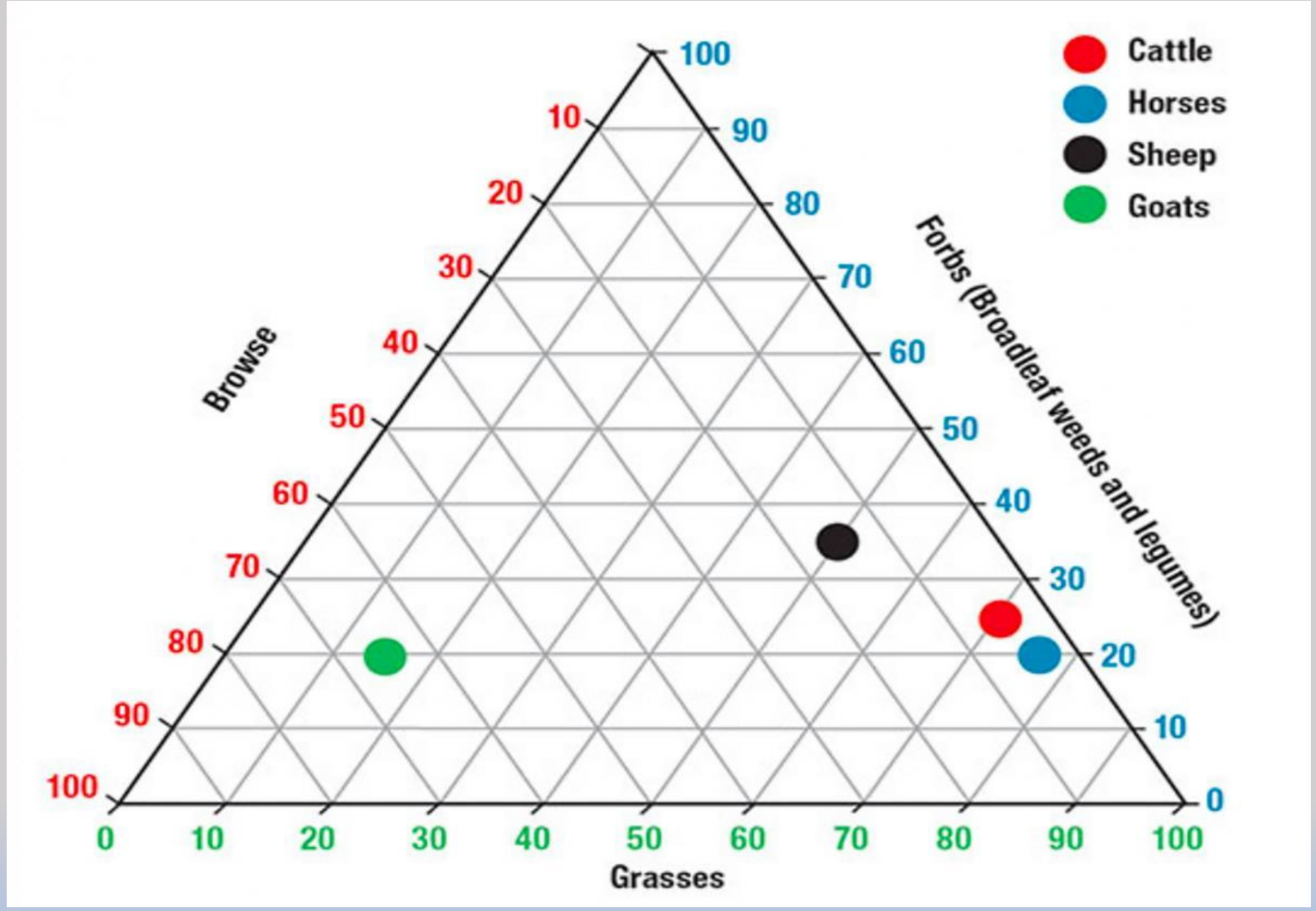
Goats

Sheep



Cattle

Species Selection for targeted grazing



Diet preferences and foraging behavior of livestock

Cattle	Sheep	Goats
• Grass → Forbs → Browse • Primary grazers of grasses and legumes • Tend to graze taller grasses that sheep will refuse • Prefer lower flatter areas • Sensitive to plant toxic compounds and tannins	• Forbs → Grass → Browse • Prefer clovers • Graze close to the ground • Inclined to graze higher and drier areas • Can tolerate salty compounds	• Browse → Forbs → Grass • Opportunistic grazers • Do not like clover but will eat it • Do not like to graze close to the soil surface • Inclined to grazer higher and drier areas • Tolerance for tannins and bitter plant compounds and fewer problems with plant toxicities

Animal of choice: *Cows*

- Most available herbivore
- Not as susceptible to predators as smaller ruminant
- Large ruminant
- Graze more uniformly
- Trample target vegetation

Examples

- Grasses: red brome, medusahead,
- Train cows to eat weeds: knapp weed, sagebrush

Photo: Tim McCabe

Animal of choice: *Cows cont….*

Disadvantages:

- Not adaptable to difficult terrains
- Not great browsers
- Susceptibility to toxins
- Weight loss
- Lowers reproductive rates
- Soil compaction

Ex. grazing and weed control

Medusahead Grass

Taeniatherum caput-medusae

- Winter annual
- Germinates early stays green longer
- Not palatable later
- High silica content
- Monocultures, displacing desirable vegetation
- Loss of diversity
- Fire risk

Animal of choice: *Goats*

- Small ruminants
- Versatile, adaptable
- Access difficult terrains
- Higher tolerance to toxins
- Clearing brush, vines and saplings

Examples

- Poison oak
- Thistles – yellow star, Italian

Animal of choice: *Goats*

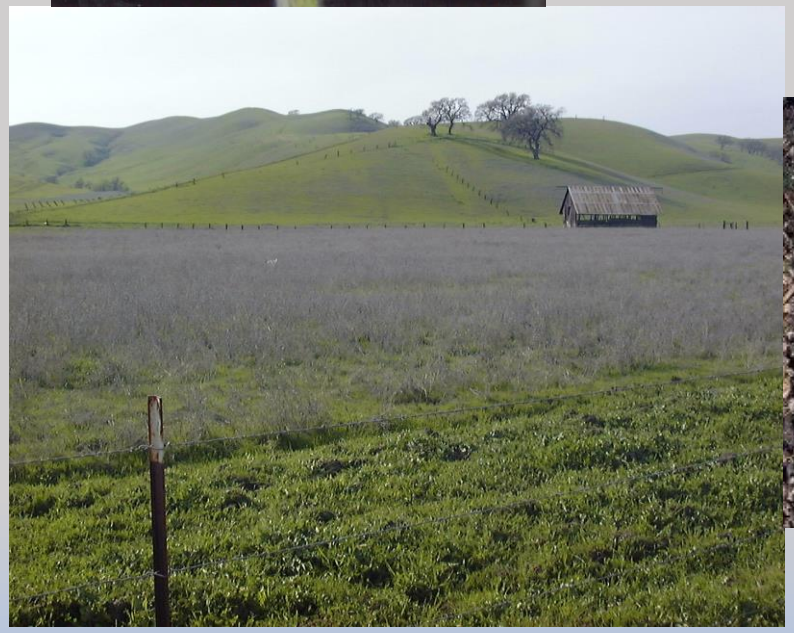
Disadvantages

- Small ruminants
- Predator risk
- Tough on fences
- Not best for grass
- Not good in orchard systems

Ex. Yellow Starthistle

(*Centaurea solstitialis*)

- Most widespread noxious weed in CA
- Reduces biodiversity
- Reduces property values
- Toxic to horses
- Reduces recreation value



Animal of choice: *Sheep*

- Small and versatile
- Great on forbs and grass
- Eat lower than cows

Examples: Targeted grazing on vineyards

- October-April
- July-August

- Organic orchards
- Leafy spurge, knapp weed

Animal of choice: *Sheep*

Disadvantages

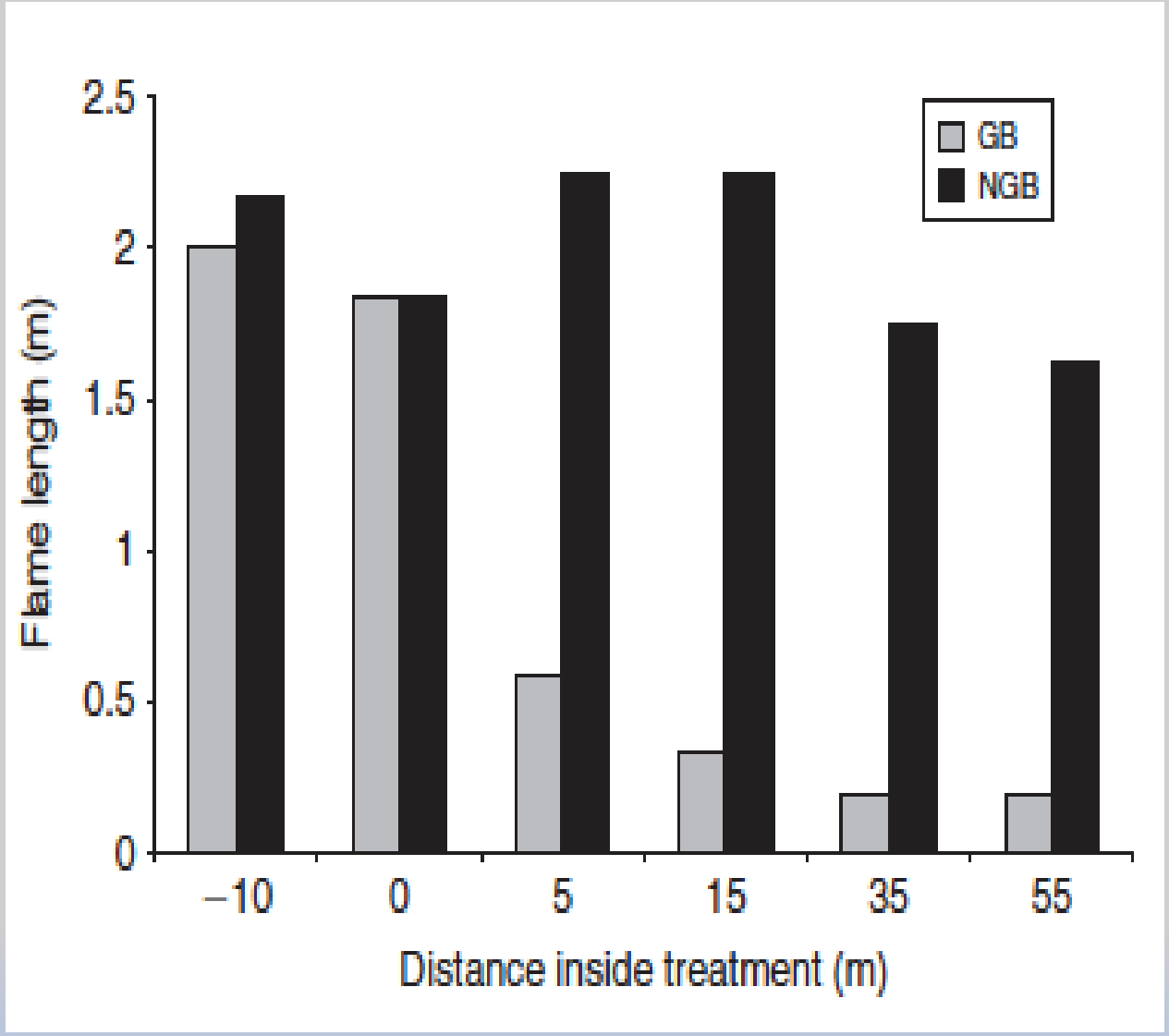
- Small ruminants
- Predator risk
- Fencing
- Not as agile as goats
- Less tolerant to toxins
- Awns get stuck in wool
    - Reduced wool quality

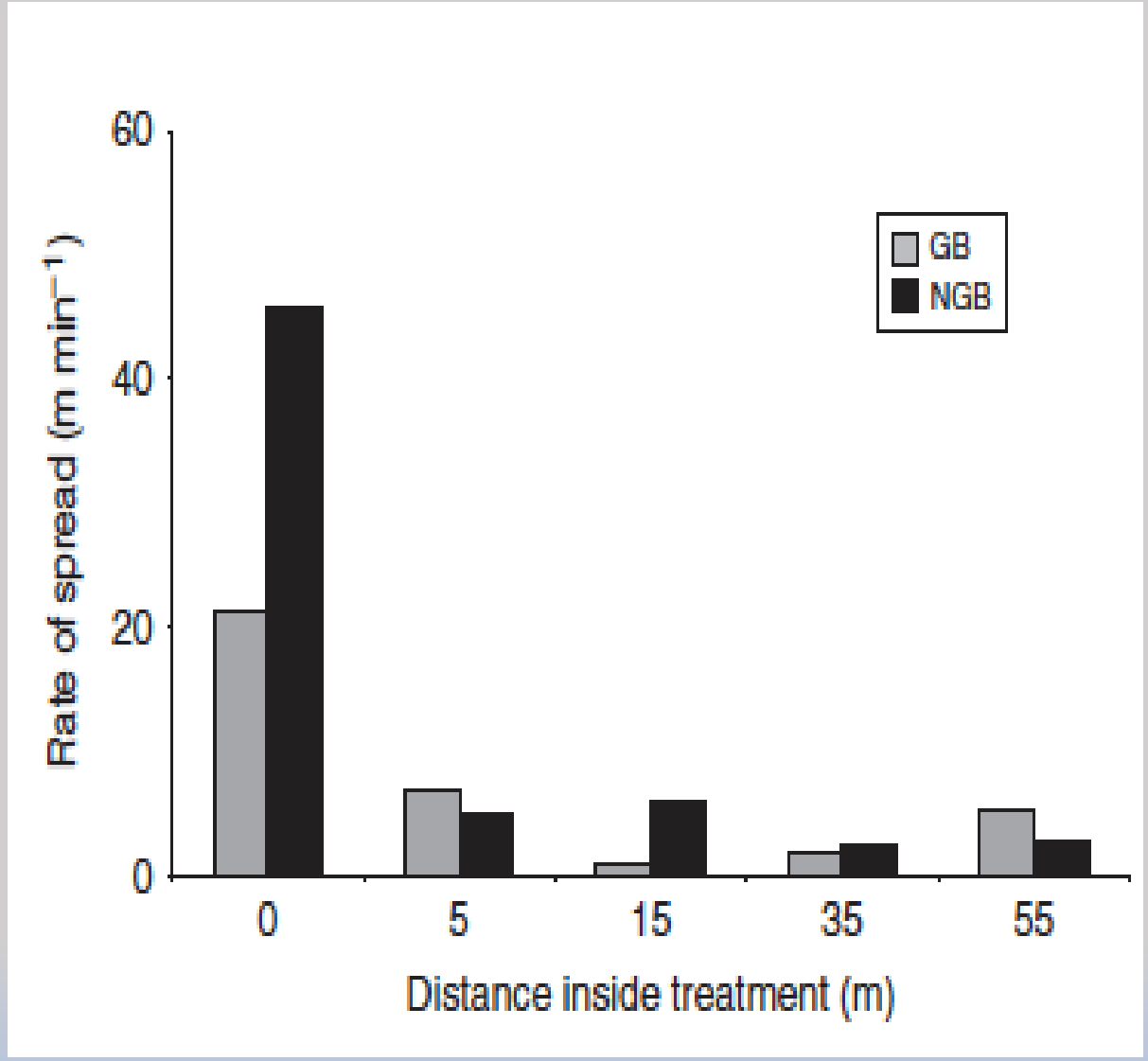
Co-benefits of good grazing management

- Plant diversity
- Maintaining habitat for multiple species
- Fuels reduction
- Nutrient cycling
- Weed management

Effects of grazing on fire behavior (flame length and rate of spread)

Effects of grazing on fire behavior

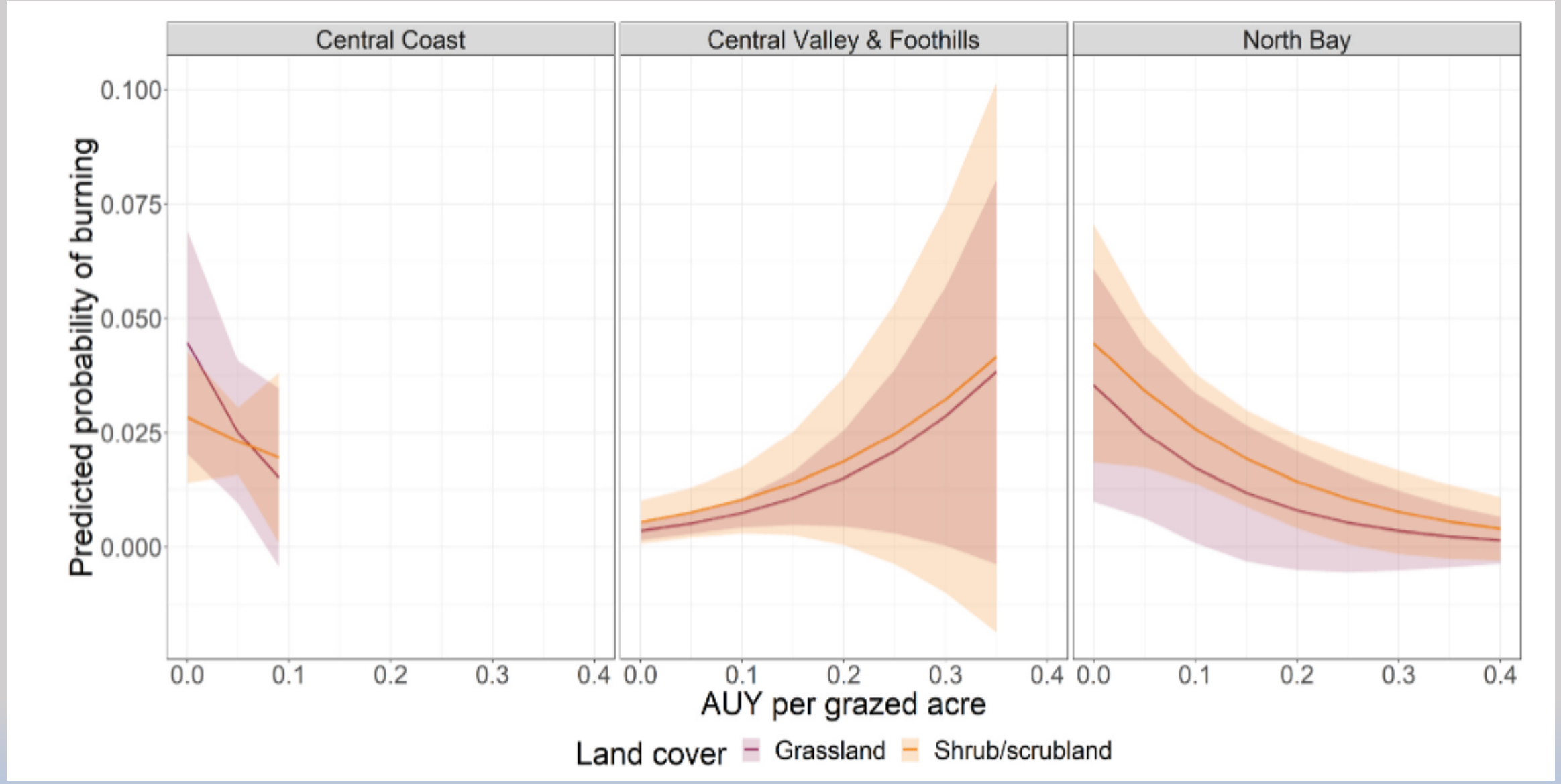




Diamond et al, 2009

Effects of grazing on fire impact

Grazing regimes and regional fire mitigation



Livestock management considerations

Animal unit (AU)

- 1000 lb animal
  - ~2% body weight (range 1-3%)
- ~1 cow or cow and calf (1000lb) = 1 AU
- 6 sheep (150 lb) = 1 AU
- 10 goats (100 lb) = 1 AU

Animal Unit Month (AUM)

- Amount of forage 1 AU will consume in 1 month

- Example:
- 1 AU will eat 20lb of forage per day (2% body weight) → 600lb per month

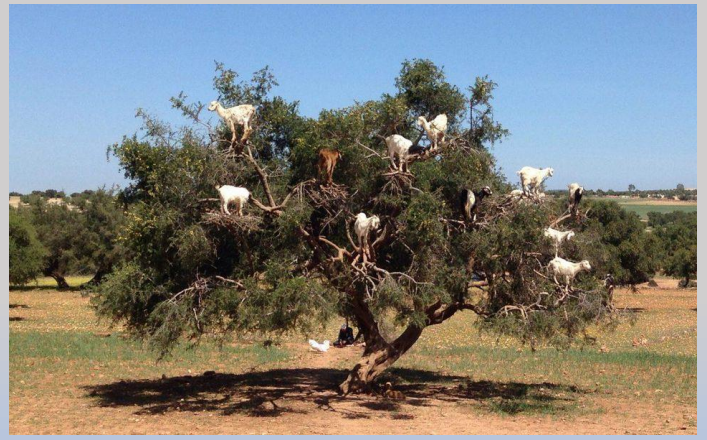
- Eat more when forage if palatable, abundant, nutritious

- Eat less when forage is scarce, unpalatable or less digestible

AU substitution rates

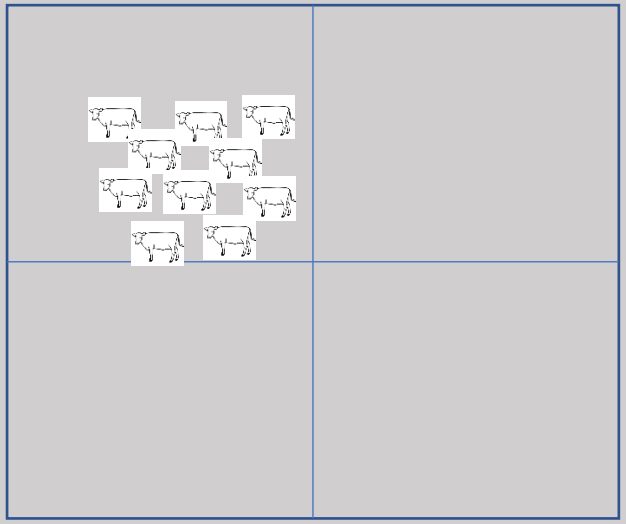
- Important to note that Animal Unit equivalent is not the same as substitution rate

- E.g. 10 goats ≠ 1 cow based on forage intake
- Removing one cow will not provide enough forage for 10 goats
- May be less or more forage depending on:
  - Types of plants
  - Season
  - Topography
  - Other factors

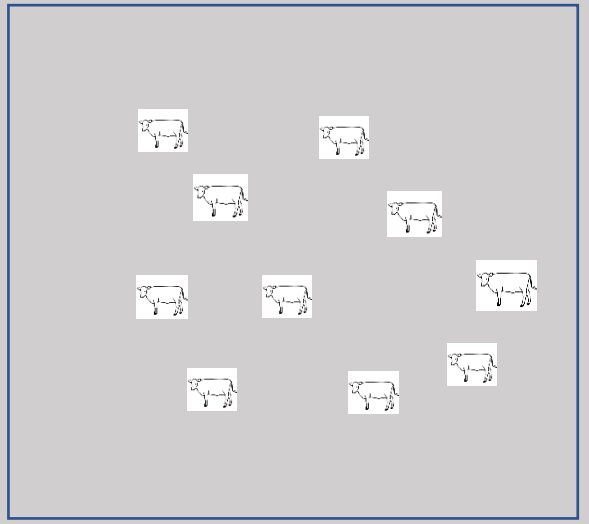


Stocking density

- The number of animal (AU) present per unit area at a given time.
- Example: 1,000 acre ranch with 100 AU



- Stocking rate: 1AU/100 acres
- Stocking density: 1AU/25 acres



Stocking rate: 1AU/100 acres

Stocking density: 1AU/100acres

Contract grazing for fuels and vegetation management

- Demand is currently higher than service providers
- Lack of system to connect supply and demand https://matchgraze.com/
- High cost of contract grazing
  - Fuels reduction vs
  - Orchard systems
- Organized vs individualized efforts
- Single vs multiple year contracts

Application of fire reduction tools considerations

- High home insurance costs
- Regional fuels reduction approach
- Local knowledge and grassroots leadership
- PBA taking an integrated approach (grazing, fire, chemical, mechanical)
- Capacity building
- Policies that supports grazing

Questions?

RESOURCES:

- Targeted Grazing handbook
  http://www.cnr.uidaho.edu/rx-grazing/Handbook.htm
  http://www.sheepusa.org/get_page/pageID/249