Rangeland management for multiple ecosystem services

California Climate & Agriculture Summit
Carbon & Cattle: Climate Benefits of Rangeland Conservation

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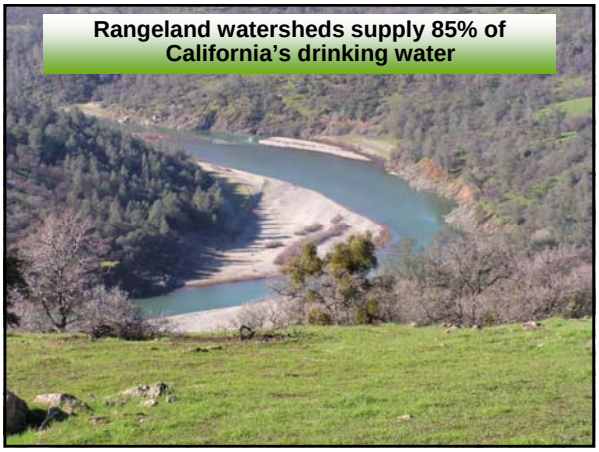
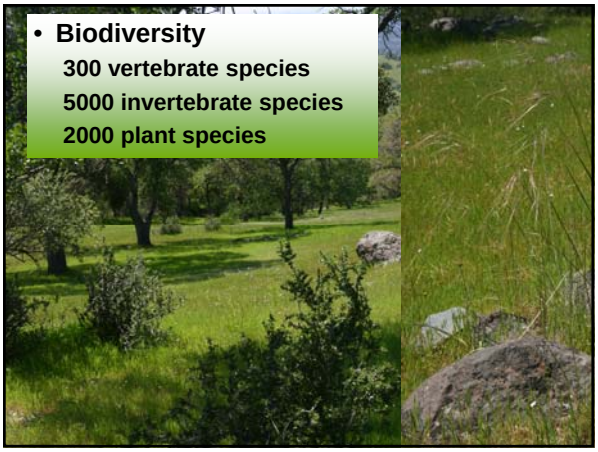
California Oak Woodland

- 70% state's annual forage base
- $3 B annual beef cattle industry

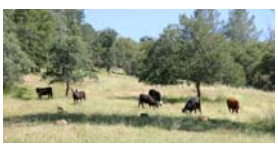
Rangeland watersheds supply 85% of California's drinking water



- Biodiversity
  - 300 vertebrate species
  - 5000 invertebrate species
  - 2000 plant species



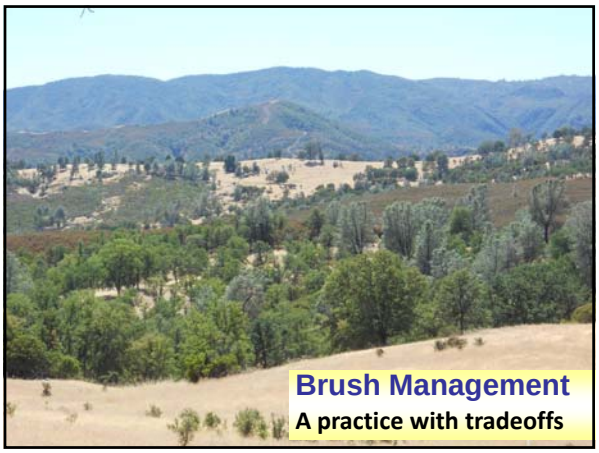
Threats to rangelands



Management Models and Past Policy

Historic clearing in mid 1950s and 1960s

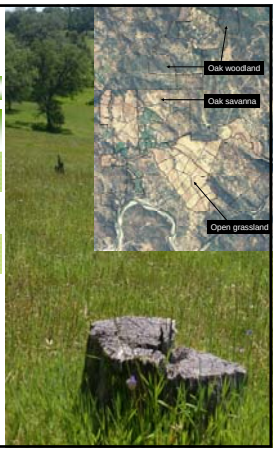
Goal: Forage production



Agricultural Benefits

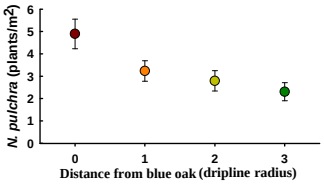
Production data: UC SFREC 1998-2008

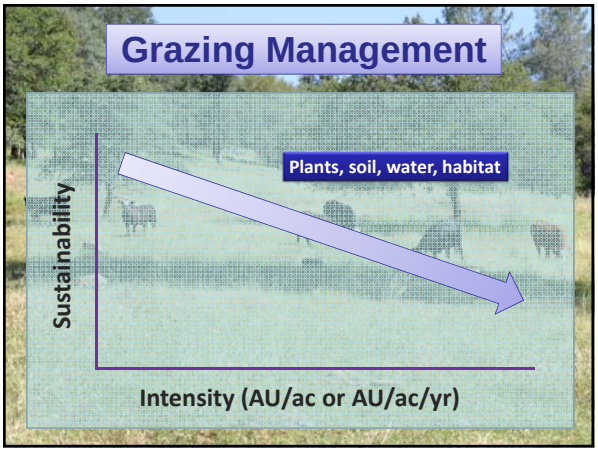
Stocking Rate acre/AUY	Oak thin/conversion
26	None – Oak woodland
13	Thin to 30% oak cover – Oak savanna
7	Thin to 10% oak cover
6	Clear to 0% oak cover – Open grassland



Oaks, shrubs important to maintaining ecosystem services – balance forage increase w/ conservation

Metric	Oak Woodland	Grassland
Total N	3.6 g/kg	2.5 g/kg
Total C	52 g/kg	30 g/kg
Infiltration	218 cm/hr	20 cm/hr
Diversity	2.05	1.64



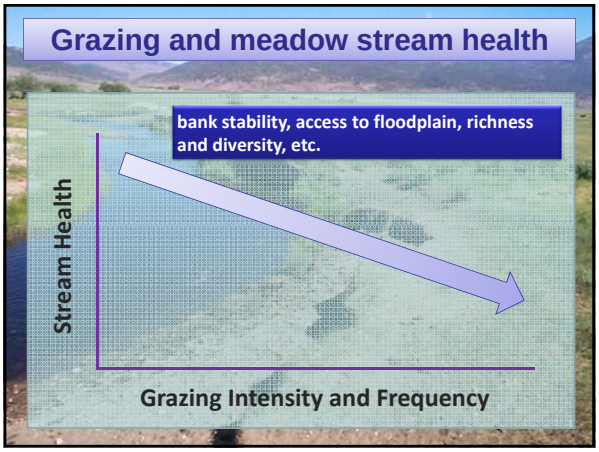


Practices

- **Prescribed Grazing:** intensity, season, frequency of grazing
- **Grazing Facilities:** water, fencing
- **Rest from Grazing:** frequency, season, duration
- **Target or Precision Grazing:** precise implementation of the herbivore

Restoration and grazing management on mountain meadows and streams

Grazing and meadow stream health



Grazing and meadow stream health

Grazing Management Activity	Correlation to Health Score
Time maintaining off-stream attractants (days/yr)	Positive
Herding to reduce time near stream (days/yr)	Positive
Livestock density (AU/ac)	Negative
Frequency of grazing (times/yr)	Negative

Managing for multiple outcomes and win-win solutions

- Forage and Livestock Production
- Weed Control – Diversity
- Wildlife and their Habitat
- Productive and Healthy Soils
- Water Quantity and Quality

Managing for multiple outcomes and win-win solutions

- Interest in science-based support for conservation effectiveness
- Interdisciplinary research
- Incorporation of manager knowledge

Prescribed Grazing to Restore Rangeland Soil Quality, Plant Diversity, Water Quality, and Agricultural Productivity

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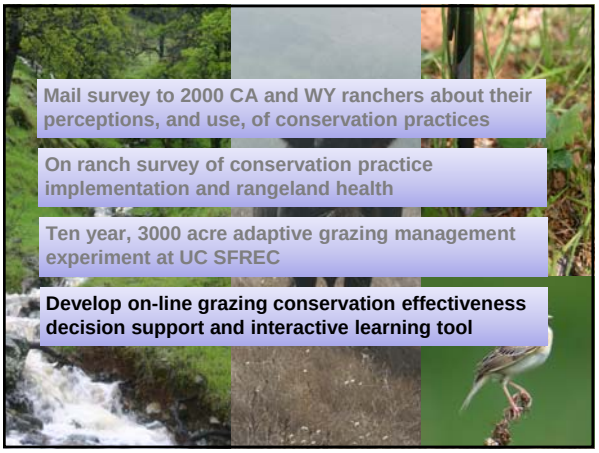


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