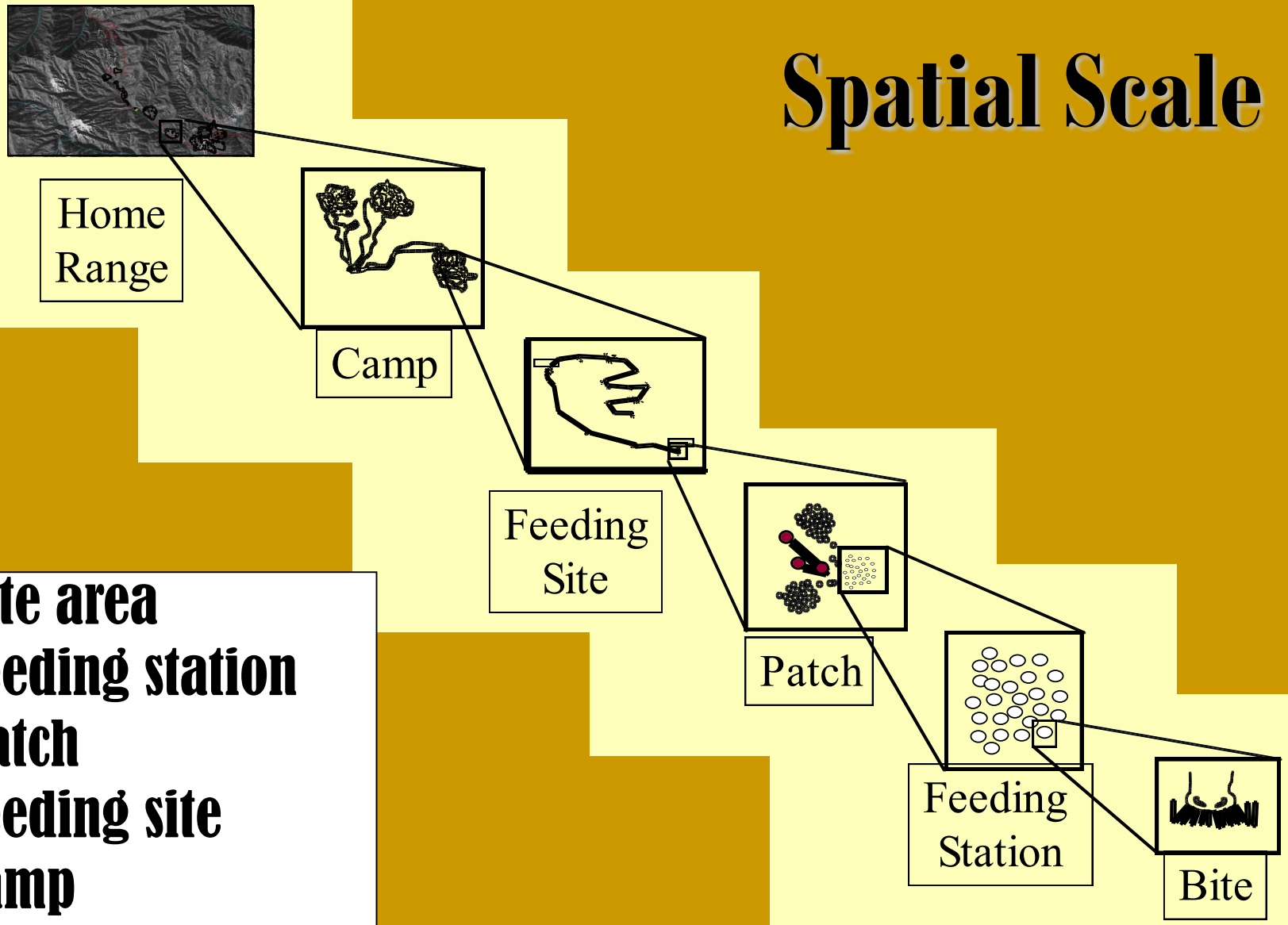
Determining Patch Priority for Weed Management on Rangelands

Stephanie Larson, Ph.D.
Livestock and Natural Resource Advisors
University of California Cooperative Extension

University of California
Agriculture and Natural Resources
Making a Difference for California

Rangelands on a Spatial and Temporal Scale

Spatial Scale



Bite area
Feeding station
Patch
Feeding site
Camp
Home Range

Senft et al. (1985)

Bailey et al. (2001)

Patch Distribution
Spatial & Temporal Scale

Bite area ~ 1-2 seconds

Feeding station ~ 5 – 100 seconds

Patch ~ 1-30 minutes

Feeding site ~ 1-4 hours

Camp ~ 1-4 weeks

Home Range ~ 1 Mo to 2 Yrs.

Patch Identification & Prioritization

Patch

Small scale; 0-40 m

Large scale: 40-300, >

Turning Frequency

Frequency of Selection

Plant Community and Patch Attributes

Attribute	Function
Moisture holding capacity of soil	**Forage supply and stability of supply**
Species composition	**Affects suitability/stability of the site for general dietary and nutritional needs**
Plant frequency	**Affects the probability of encounter of plant species by animal and number of dietary decisions**
Abundance	**Affects supply of nutrients**
Structure	**Affects accessibility and harvest ability of plant species and nature of thermal niches provided**
Continuity	**Affects movement velocity**
Size	**Affects amount of search area available**
Aspect	Affects the thermal characteristics of the site
Orientation in landscape	Position relative to needs foci affects frequency of exposure to grazing

Plant Community and Patch Attributes

Attribute	Function
Moisture holding capacity of soil	Forage supply and stability of supply
Species composition	Affects suitability/stability of the site for nutritional needs
Plant frequency	Affects the probability of encounter during a number of dietary decisions
Abundance	**Affects supply of nutrients**
Structure	Affects accessibility and harvest ability of plants; provides varied nature of thermal niches provided
Continuity	Affects movement velocity
Size	Affects amount of search area available
Aspect	Affects the thermal characteristics of the
Orientation in landscape	Position relative to needs foci affects the grazing

Diagram A

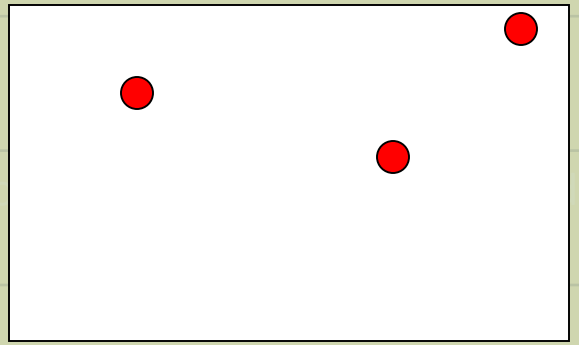
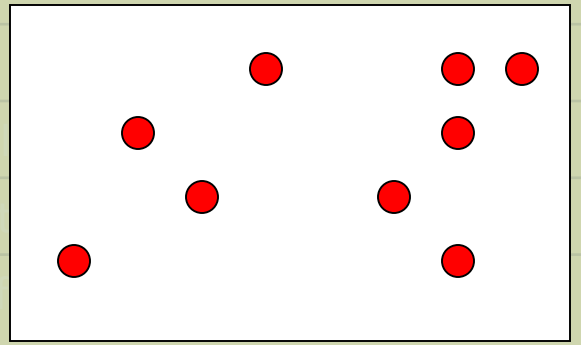


Diagram B



Plant Community and Patch Attributes

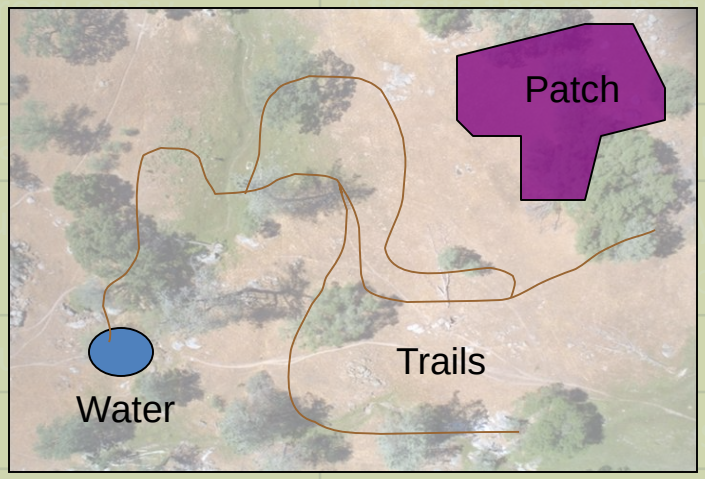
Attribute	Function
Patch A 30 m 40 m  Area 30 x 40 = 120 m^2	Patch B  20 m 30 m Area 30 x 20 = 60 m^2
Size	**Affects amount of search area available**
Aspect	Affects the thermal characteristics of the site
Orientation in landscape	Position relative to needs foci affects frequency of exposure to grazing

Plant Community and Patch Attributes

Attribute	Function
Orientation in landscape	**Position relative to needs foci affects frequency of exposure to grazing**

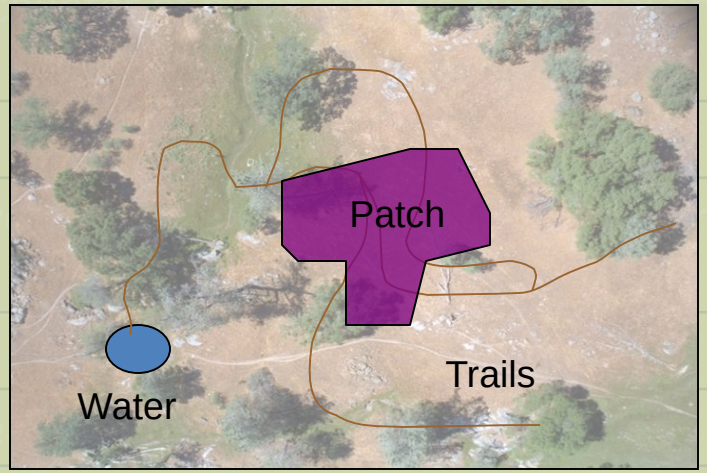
Pasture A

Patch is Far from Water/Trails

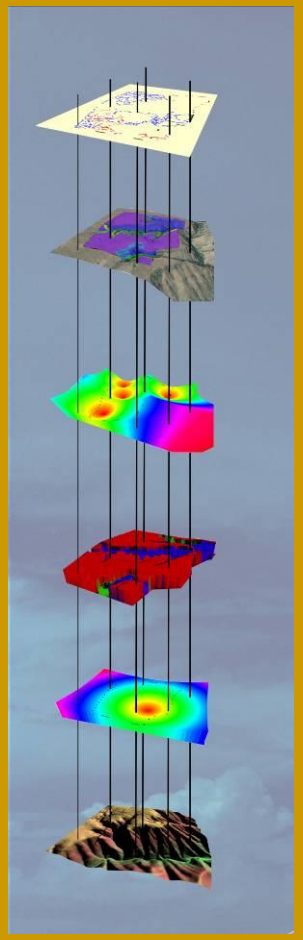


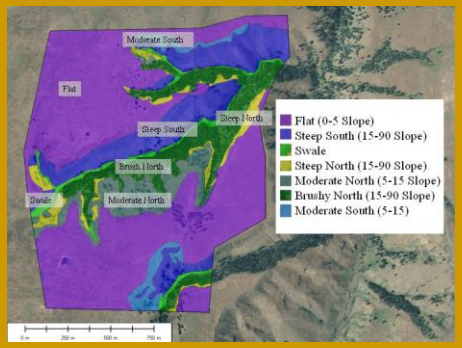
Pasture B

Patch is Close to Water/Trails



Scientific Analysis of Patches



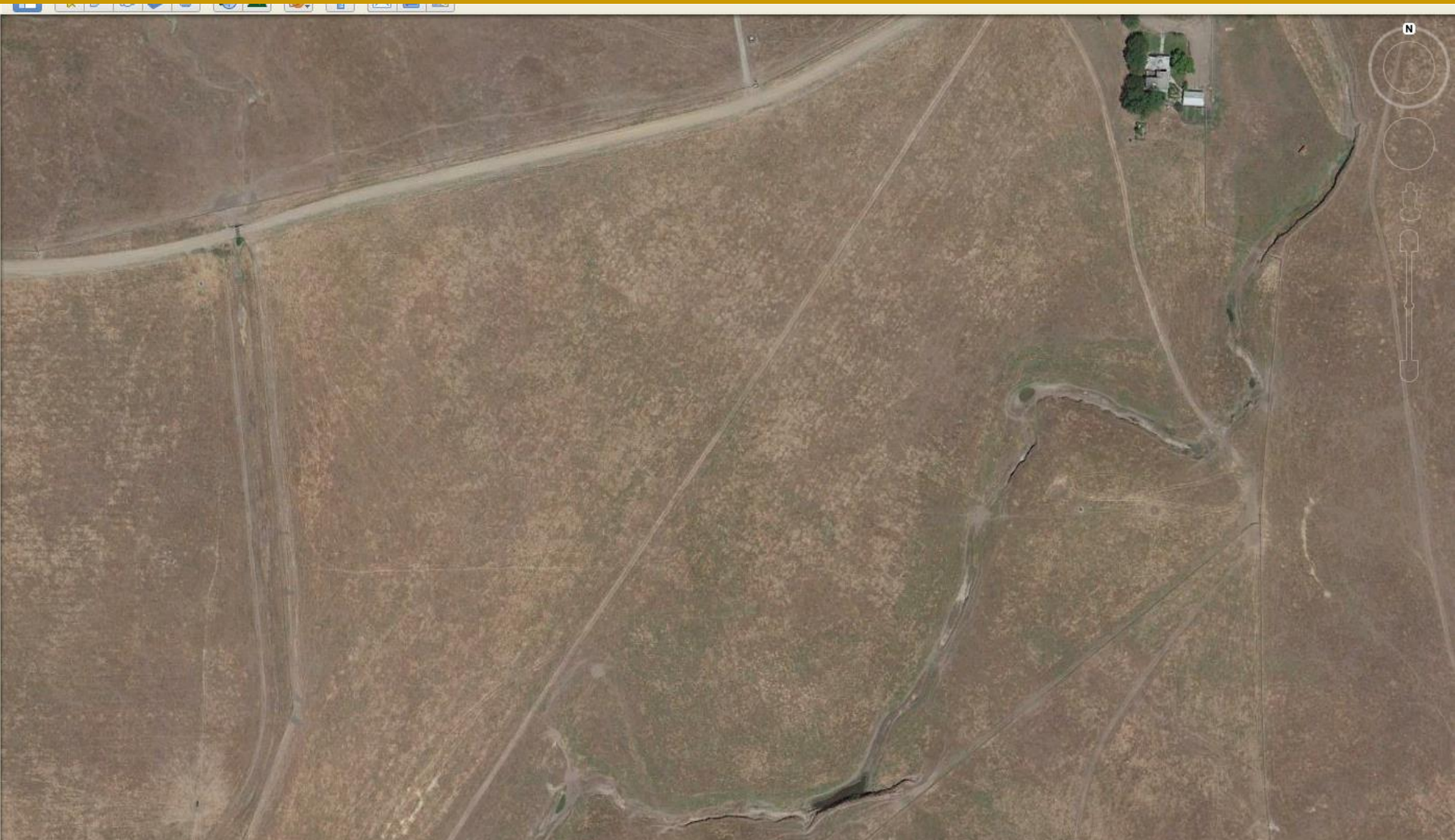


- Geographical Information Systems (GIS)
- Develop layers of information

  -- Canopy Cover
  - Soil type
  - Aspect of the landscape
  - Slope of the landscape
  - Aerial photography
  - Vegetation

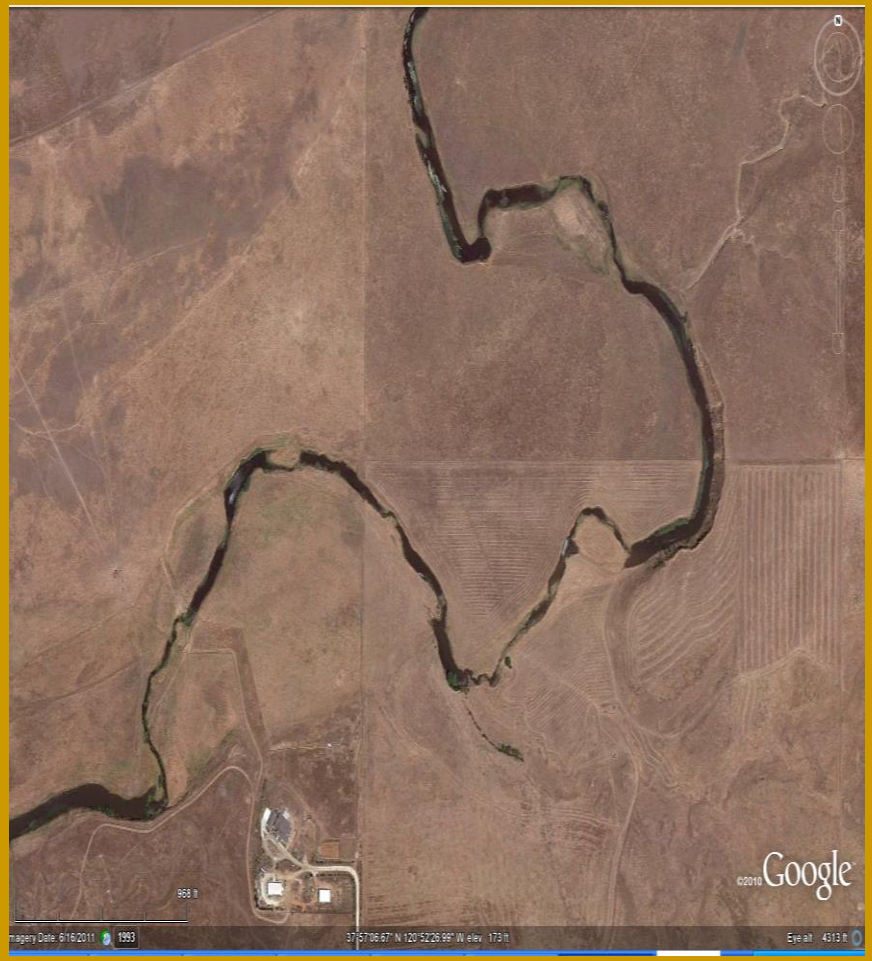
Web based decision making tool ~ Can determine the boundaries of patches

Google Maps



Patch ~ Google Map

Patch Prioritization



Determining Patch Priority

Determine statewide priority for weed patches

Determine landscape scale priorities

Determine ranch scale priorities

Determine where to spend limited money for best results