

# Part I. Ecological Sites and Soil Survey

# Part II. A Framework for Soil and Vegetation Dynamics

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# What makes a site a site?

Climate

Physiographic  
features,  
hydrology



Soil

Soil forming factors: climate,  
parent, material, biotic  
factors, and topography,  
acting over time

Soil surveys and ecological sites are developed concurrently through a systematic process.

# Systematic inventory process to develop ecological sites

1. Broad soil-climate relationships are developed.
2. Soil-landscape relationships are developed and soils are mapped.
3. Range specialist describes and compares plant communities on the different soils being mapped.
4. Soil map units components are grouped together based on their ability to produce a plant community and their similarity in ecological processes.
5. Ecological site concepts are developed.  
Steps 1-5 are iterative!
6. Ecological site descriptions written and soil-site correlation is formalized.
7. Ecological site maps can be produced using soil boundary lines.
8. Site descriptions are updated as new information is gained.

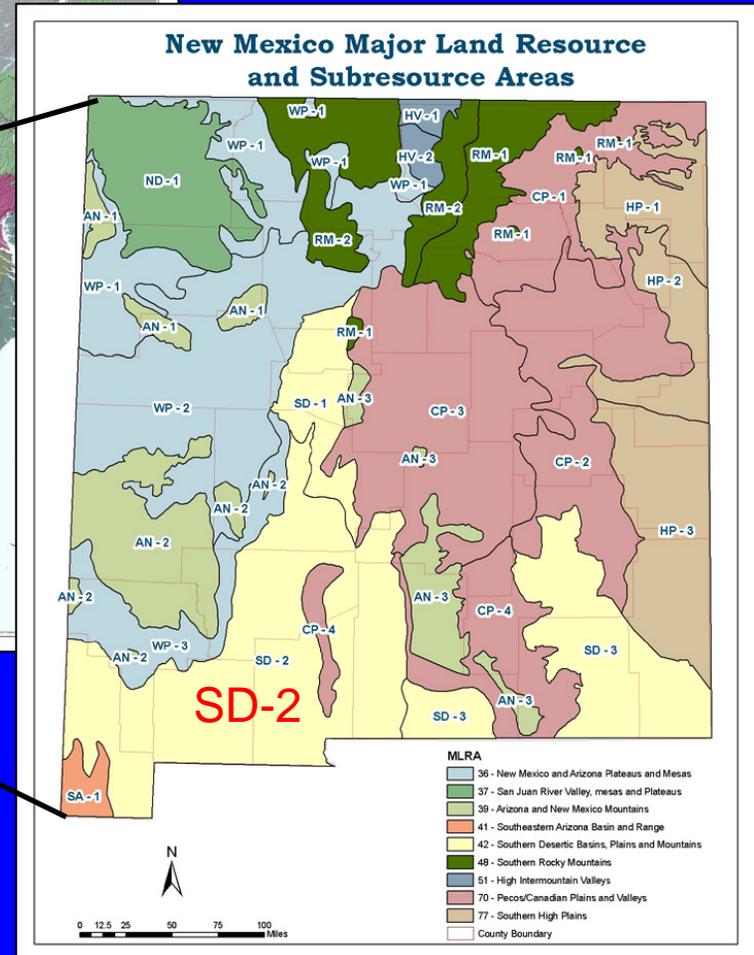
# Systematic inventory process to develop ecological sites

1. Broad soil-climate relationships are developed.

# Climate: Use climatically similar regions (MLRA's, LRU.s and CRA's) and soil moisture, temperature regimes



Land resource regions



Climatically-similar subregions (MLRA's and their subdivisions)

# MLRA 42, Southern Desertic Basins, Plains, Mountains

## LRU: SD-2

### Climate

8-10" ppt  
mostly summer ppt  
60° F; 5 below zero to 110  
200-215 FFD

### Elevation and topography

3,800- 5200 feet  
“gently sloping plains broken  
by mountains”

### Soils

Thermic  
Ustic Aridic  
Argids, Calcids, Cambids, Torrismammets

### Potential natural vegetation

Grassland, mixed grassland-shrub.  
Black grama, bush muhly, giant  
dropseed, tobosa, soaptree yucca,  
creosote, tarbush

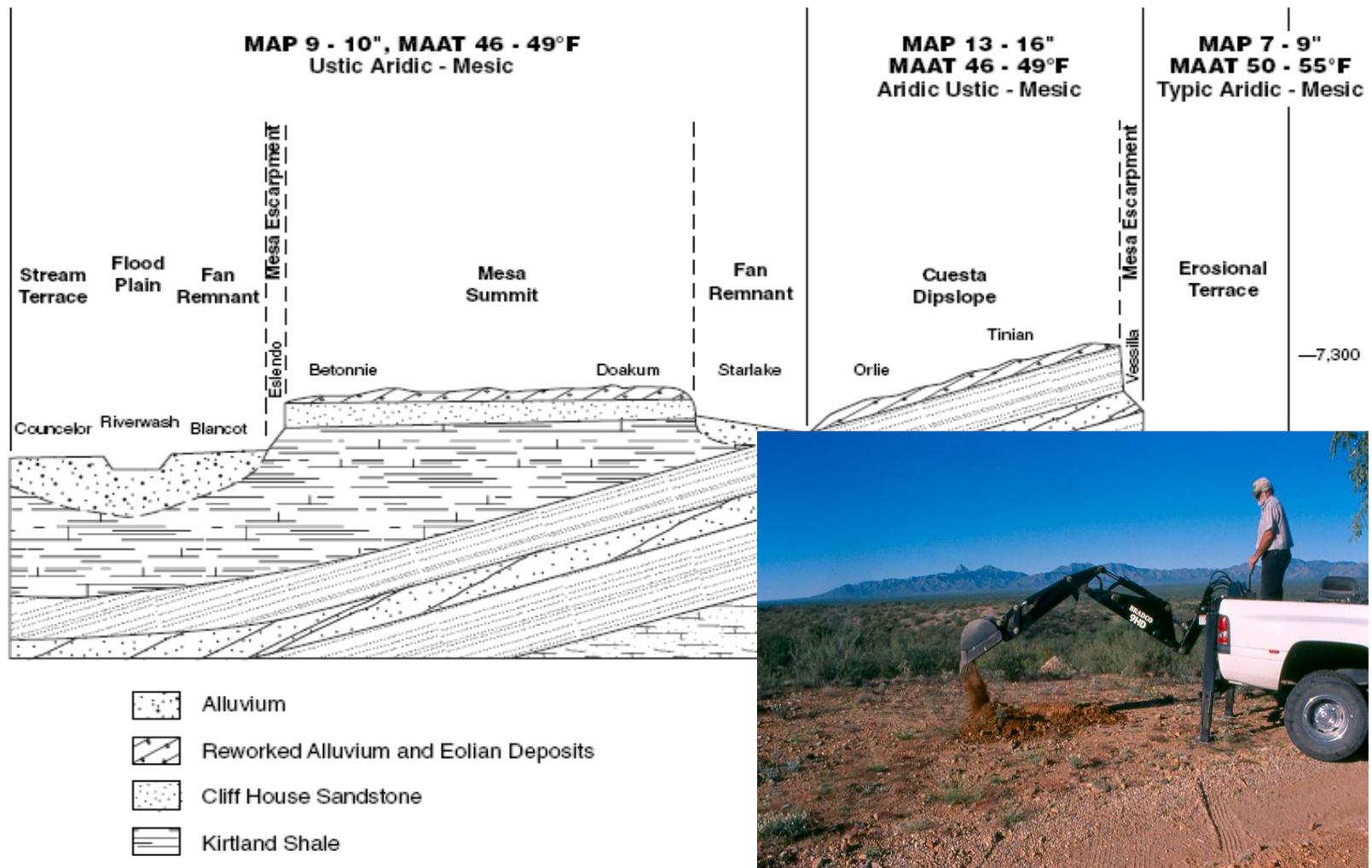


*Black grama-Tobosa  
grassland*



*Tobosa-Burrograss  
grassland*

## 2. Soil-landscape relationships are developed and soils are mapped.



3. Range Specialists describe and compare the plant communities on the different soils being mapped.

4. Soil map units components are grouped together based on their ability to produce a plant community and their similarity in ecological processes.

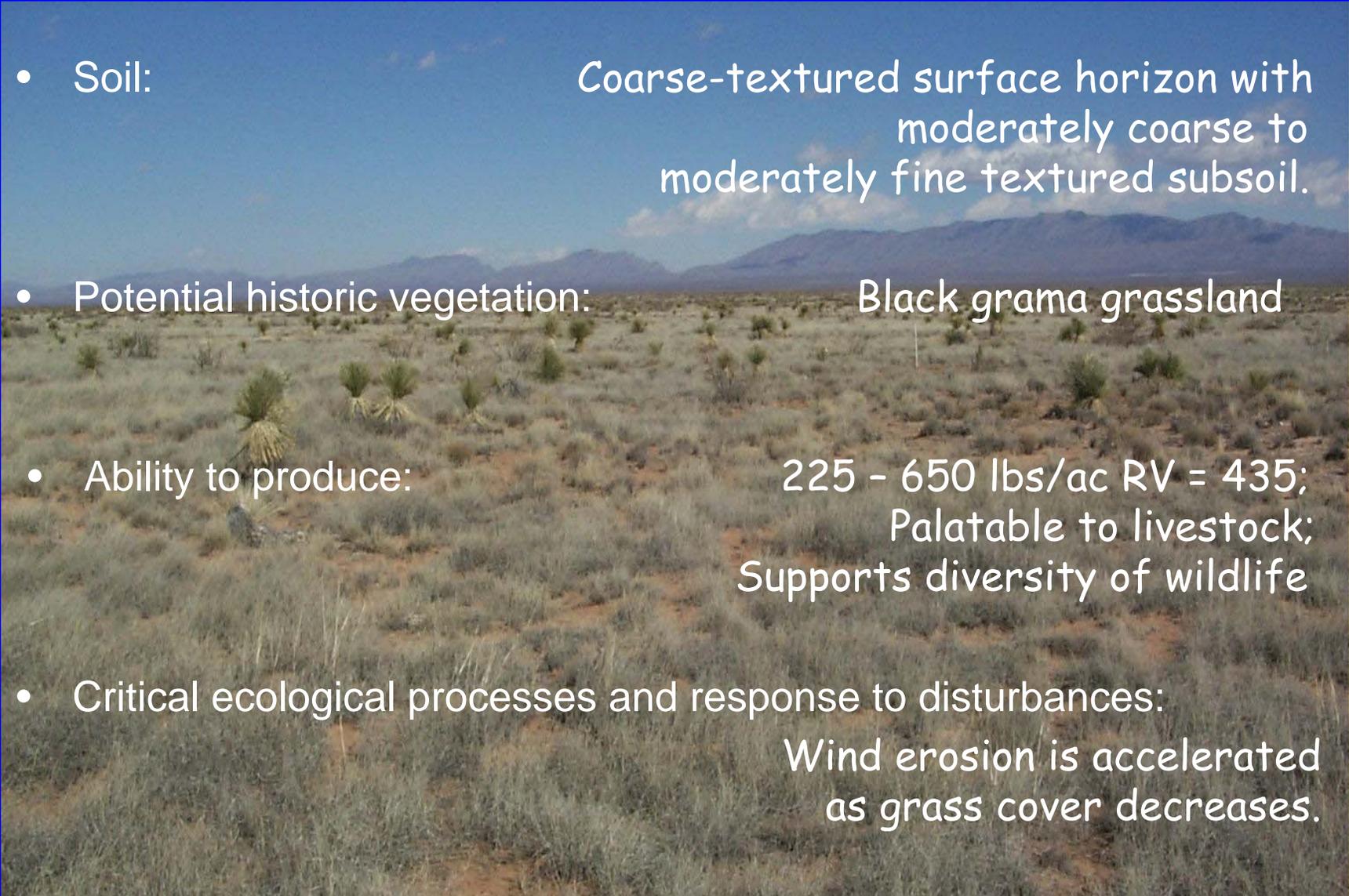


Soil is verified by soil scientist.



# 5. Ecological site concepts are developed.

## Sandy, SD-2, MLRA 42

- 
- Soil: Coarse-textured surface horizon with moderately coarse to moderately fine textured subsoil.
  - Potential historic vegetation: Black grama grassland
  - Ability to produce: 225 - 650 lbs/ac RV = 435;  
Palatable to livestock;  
Supports diversity of wildlife
  - Critical ecological processes and response to disturbances: Wind erosion is accelerated as grass cover decreases.

# Ecological processes

- Hydrology (infiltration/runoff, water table)
- Energy flow (warm vs. cool season)
- Nutrient flow (grassland, shrub-land)
- Soil erosion (natural rates and movement by wind and water)
- Soil deposition (frequency, amounts)
- Plant succession
- Grazing (native grazers, browsers)

## 6. Ecological site descriptions written and soil-site correlation is formalized.

“Soil-Site correlation establishes the relationship between soil components and ecological sites ...[and] normally takes place in conjunction with progressive soil surveys.”  
(NRPH, 2003)

- There is a many to one relationship: many similar soil components can be grouped into one ecological site.
- A single specific soil component (phase of a series) of a named series cannot be included in more than one ecological site.
- Broadly mapped soil components, e.g., higher taxonomic units, may include more than one ecological site.

# Common features for ecological site distinctions within an LRU or CRA

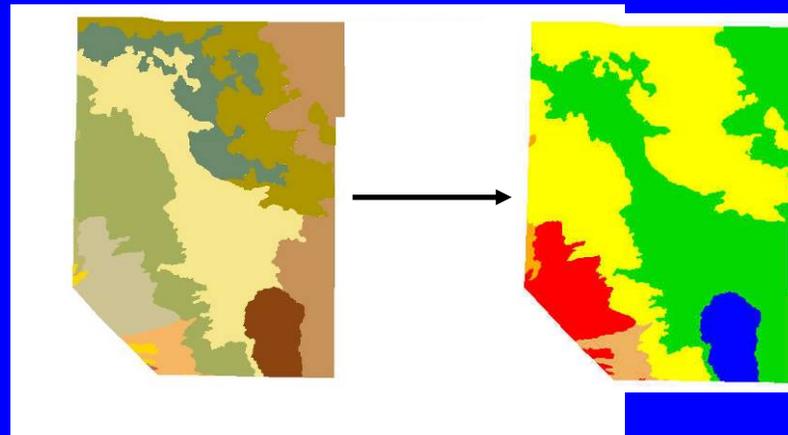
<i>Type</i>	<i>Variable</i>	<i>Example contrast</i>
<i>Hydrology</i>		
	Water table depth (ft.)	Salt meadow vs Salt flats
	Flooding duration (days)	Bottomland vs. Draw
<i>Soil physical properties</i>		
	Soil texture of surface (class)	Clay loam vs. Clayey upland
	Fragment content (%)	Gravelly loam vs. Loamy
	Argillic horizon development (class)	Loamy sand vs. Sandy loam
	Soil depth to restrictive layer (in.)	Sandy vs. Shallow sandy
<i>Lithology/geology</i>		
Hills	Bedrock type (class)	Limestone Hills vs. Igneous
	Slope (%)	Limy upland vs. Limy slopes
<i>Chemistry</i>		
	Soil salinity/sodicity (mmhos)	Salt flats vs. Loamy
	Soil gypsum content/distribution in profile (%/in.)	Gyp Upland vs. Loamy
	Soil carbonate content/distribution in profile (%/in.)	Limy vs. Loamy
Bestelmeyer, per comm.		

## Site names are descriptive, **but not definitive.**

- For example: Clayey in one MLRA may not include the same kinds of soils and landforms as Clayey in another MLRA.
- Names usually contain soil texture, chemistry, parent material and position.
  - “Textures” may include, sandy, sandy loam, loamy, clayey, etc.
  - Chemistry may include adjectives like limy, gypsic and saline
  - Parent material may be granitic, igneous, limestone, sandstone, etc.
  - Position may include upland, slopes, hills, bottoms, swales.

7. Ecological site maps can be produced using soil boundary lines.

8. Site descriptions are updated as new information is gained.



Order 2 or 3  
soil map

Ecological site map

# Summary

1. Developing ecological sites is a systematic inventory process.
2. The process involves the evaluation of relationships among climate, physiographic features, hydrology, soil, and plant communities.
3. A site description describes these relationships.
4. The soil survey is the foundation of this inventory process.
5. Classifying the relationships is only marginally systematic.