




# **Ecological Site Descriptions: An overview of basic concepts, background and applications**

**Brandon Bestelmeyer**

**Jornada Experimental Range**

**Las Cruces, NM, USA**

**[bbestelm@nmsu.edu](mailto:bbestelm@nmsu.edu)**



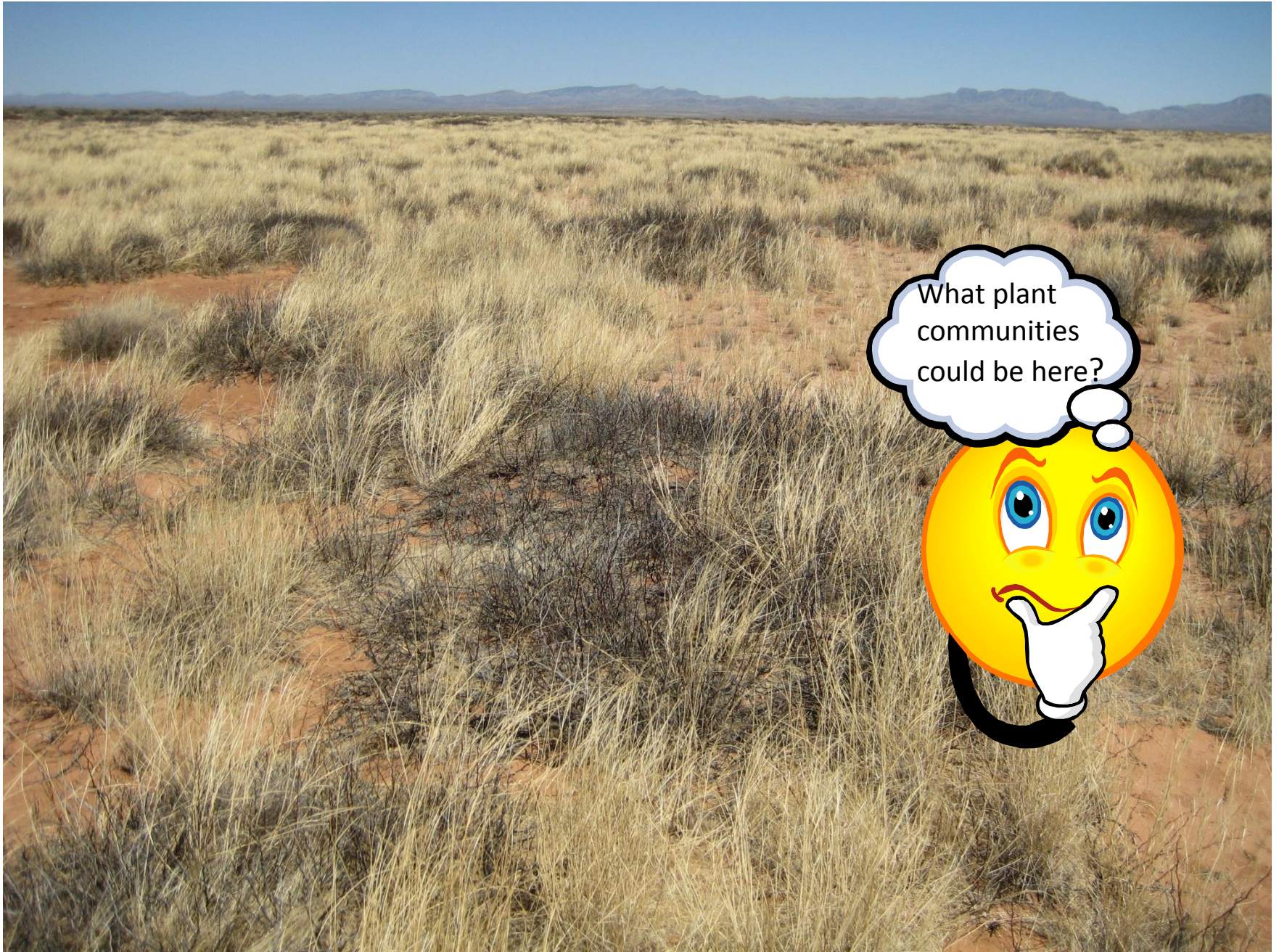
What services  
are provided  
by this site?



What plant communities used to be here?

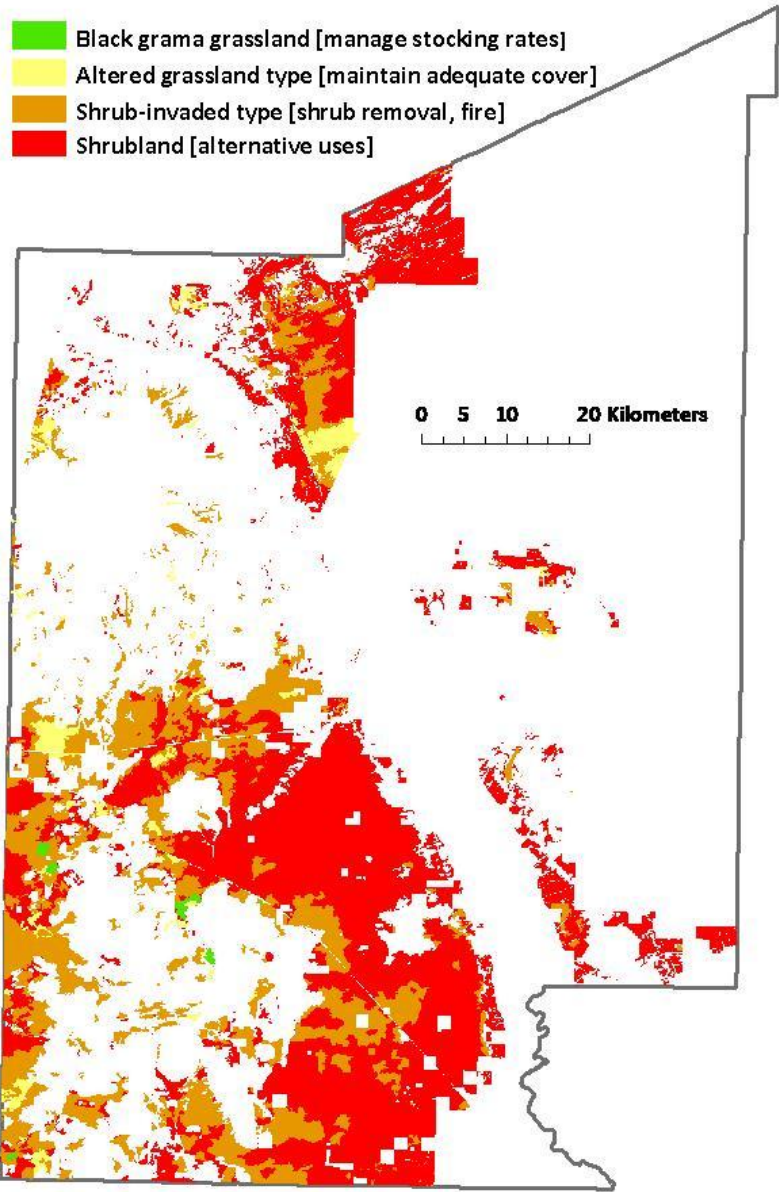


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What plant communities could be here?





(BLM resource conservationist)


## **Ecological Site:**

**“a distinctive kind of land based on recurring soil, landform, geological, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its responses to management actions and natural disturbances”.**

**Divide landscapes into basic units for study, evaluation, and management**

## **Ecological Site Description:**

**Reports with associated data that document the characteristics of an ecological site (including its climate, soils, and state-and-transition model) and the interpretation of its properties related to use and management.**



# Outline

- 1. A short history**
- 2. Parts of an ecological site description**
- 3. How ecological sites are developed and linkage to soil mapping**
- 4. State-and-transition models and their development**
- 5. Tools to access ecological site descriptions**
- 6. A brief example of use of ecological site information**



## History of ecological sites

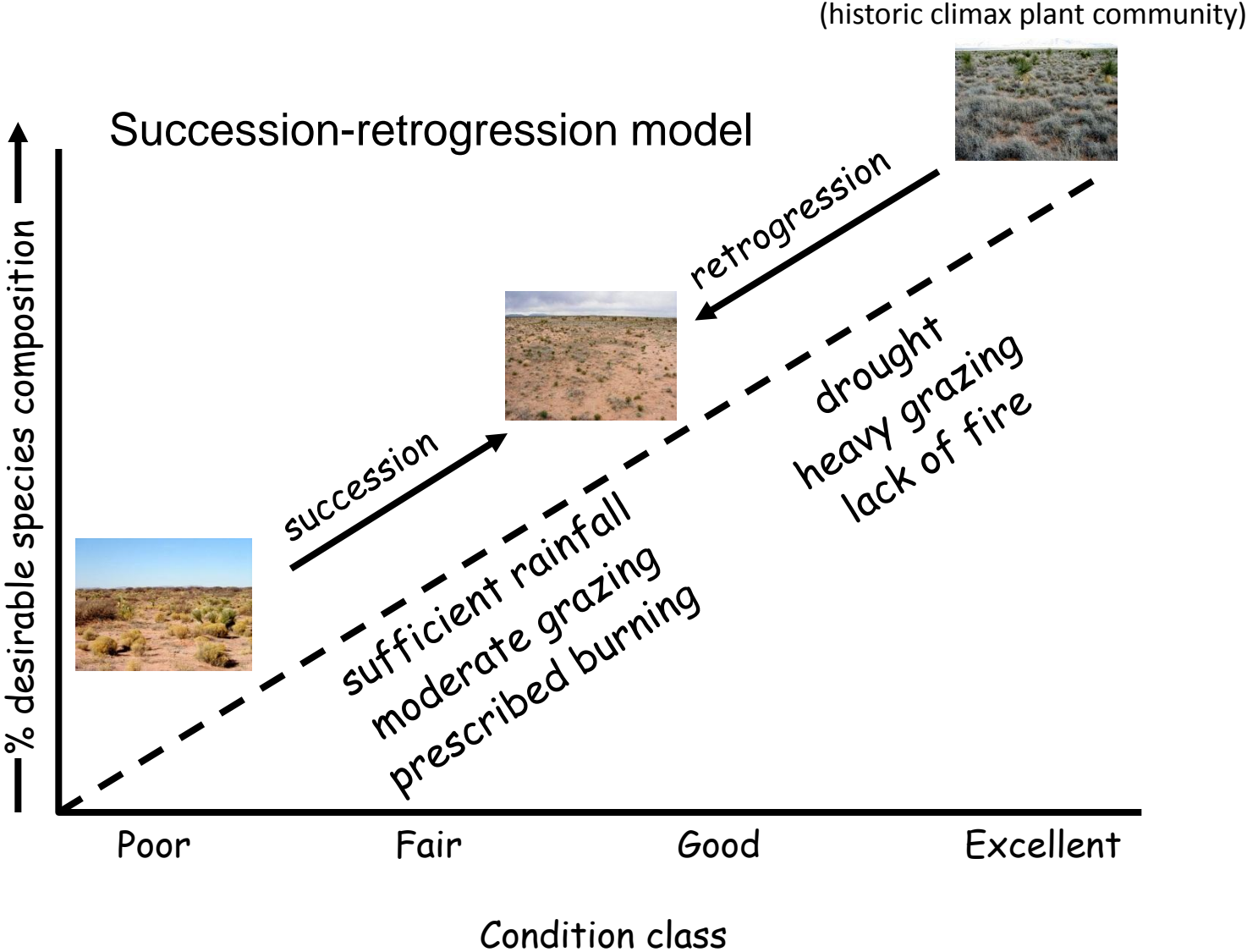
*Forest site*: “an area considered as to its physical factors with reference to forest producing power, or the combined effect of the climatic and edaphic conditions of the forest habitat” (Korstian 1919)



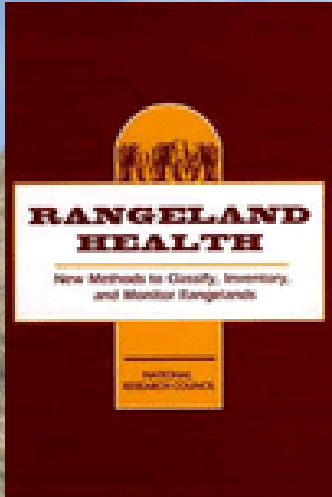
*Range site*: “Different kinds of rangeland are referred to as range sites...Site is not to be confused with type, because many types of vegetation may successfully occupy the same range site in response to different grazing treatments. Current range condition can be measured only in relation to some known potential condition and the only certain indicator of potential is the site”. (Dyksterhuis 1953)



# History of ecological sites



# National Research Council (1994)



# SRM Unity in Concepts and Terminology (1995)

## NEW CONCEPTS FOR ASSESSMENT OF RANGELAND CONDITION

### TASK GROUP ON UNITY IN CONCEPTS AND TERMINOLOGY

#### COMMITTEE MEMBERS

E. Lane Smith University of Arizona Tucson, Arizona 1991-94	Philip Sims USDA-ARS Wendland, Oklahoma 1991-94	Dave Franzen U.S. Fish and Wildlife Service Lakeview, Oregon 1991-94
Chairman 1991-92 Barbara S. Cantano South Dakota State Univ. Brookings, South Dakota 1991-94	Ray Smith Bureau of Indian Affairs Harrison, Virginia 1991-94	Miki Soehren U.S. Fish and Wildlife Service Fort Collins, Colorado 1991-94
Chairman 1992-94 George Wolfe University of Arizona Tucson, Arizona 1991-94	Lyn Valiada U.S. Forest Service Portland, Oregon 1991-94	John Willoughby Bureau of Land Management Sacramento, California 1991-94
First Section Texas A&M University College Station, Texas 1991-94	Mike Tomson U.S. Forest Service Lakeview, Colorado 1991-94	Ned Hatch Bureau of Land Management Lakeview, Colorado 1991-94
Dick Loper Columbia Laramie, Wyoming 1991-94	David Bassett Soil Conservation Service Casper, Wyoming 1991-94	Tom Gerwin National Park Service San Francisco, California 1991-94
Dick Wheeler Rancher Petaluma, California 1991-94	Arnold Mendelsohn Soil Conservation Service Lincoln, Nebraska 1991-94	Jennifer Wiley National Park Service Boulder City, Nevada 1991-94
Dennis Child USDA-ARS Washington, D.C. 1991-94	Scott Wallace Soil Conservation Service Washington, D.C. 1991-94	

#### Abstract

Range condition score or classification does not tell us, in a general sense, much about managers and the public's view of how about rangelands. Range condition is not a reliable indicator, across all rangelands, of biologically-driven or socially-driven systems, their health or quality of system health. Succession, the basis for the current concept of range condition is not an adequate yardstick for evaluation of rangelands. The Society for Range Management (SRM) established the Task Group on Unity in Concepts and Terminology which has developed new concepts for evaluation of the status of rangelands. These concepts are based on the premise that the most important and basic physical resource on each ecological site is the soil. If sufficient soil is left from an ecological site, the potential of the site is checked. The Task Group made three recommendations, which were adopted by the SRM. 1) evaluation of range health should be made from the basis of the same land unit classification, ecological site. 2) plant communities likely to occur on a site should be evaluated for protection of that site against accelerated erosion (Site Conservation Rating, [SCR]) and 3) selection of a Desired Plant Community (DPC) for an ecological site should be made considering both SCR and management objectives for that site.

Key Words: Range Condition, Desired Plant Community, Site Conservation Threshold, Sustainability, Ecological Site, Soil Erosion

- Multiple plant communities can occupy a site
- Plant communities offer a variety of services
- They may differ in their ability to protect a site from accelerated erosion
- 'Threshold' of rangeland health, at risk conditions, and early warning indicators, and multiple ecosystem states as primary management principles

## **Current ecological site descriptions reports have four parts**

*Physical Characteristics* -- Distinguishing physiographic, climate, soil, and hydrological features of the ecological site class, including variability within the class

*Vegetation Dynamics* – State-and-transition model narratives and data

*Interpretations* – Ecosystem services provided by the site and its states, currently focused on grazing uses and sometimes wildlife, but could be expanded

*Supporting Data* – Provides information on sources of information and data utilized in developing the site description

# Example components: Loamy 12-17" (MLRA 67A-Central High Plains, Northern Part)

## *Representative Soil Features*

The soils of this site are very deep to moderately deep (greater than 20" to bedrock), well drained and moderately permeable. Layers of the soil most influential to the plant community varies from 3-10 inches. These layers consist of the A horizon with very fine sandy loam, loam or silt loam texture and may also include the upper few inches of the B horizon with clay loam texture.

Surface Texture: (1) Sandy loam (2) Very fine sandy loam

Subsurface Texture Group: Loamy

	Minimum	Maximum
Surface Fragments <=3" (% Cover):	0	0
Surface Fragments > 3" (% Cover):	0	10
Subsurface Fragments <=3" (% Volume):	0	15
Subsurface Fragments > 3" (% Volume):	0	10

Drainage Class: Moderately well drained To Well drained

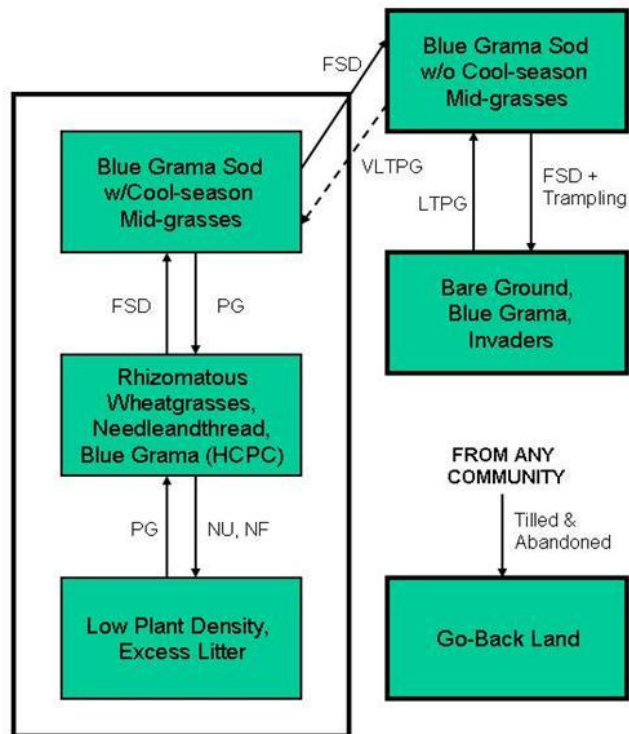
Permeability Class: Moderately slow To Moderate

	Minimum	Maximum
Depth (inches):	20	60
Electrical Conductivity (mmhos/cm):	0	4
Sodium Absorption Ratio:	0	5
Calcium Carbonate Equivalent (percent):	0	10
Soil Reaction (1:1 Water):	6.6	8.4
Soil Reaction (0.01M CaCl <sub>2</sub> ):		
Available Water Capacity (inches):	3.0	6.3

# Example components: Loamy 12-17" (MLRA 67A-Central High Plains, Northern Part)

Site Type: Rangeland  
MLRA: 67 – North Central High Plains

Loamy 12-17" P.Z.  
R067AY122WY



- FSD** - Frequent and Severe Defoliation of the Cool-season Mid-grasses.
- HCPC** - Historic Climax Plant Community
- LTPG** - Long-term Prescribed Grazing.
- NU, NF** - No Use, No Fire.
- PG** - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season).
- VLTPG** - Very Long-term Prescribed Grazing (could take generations)

# Example components: Loamy 12-17" (MLRA 67A-Central High Plains, Northern Part)

## Rhizomatous Wheatgrasses, Needleandthread, Blue Grama Plant Community - Community Phase 1.1

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock and can be found on areas that are grazed and where the grazed plants receive adequate periods of rest during the growing season in order to recover. Historically, fires likely occurred infrequently. The potential vegetation is about 75-90% grasses, 5-15% forbs, and 5-10% woody plants. This community is dominated by cool season mid-grasses. The major grasses include rhizomatous wheatgrasses (predominantly western with some thickspike), needleandthread, and blue grama. Other grasses include green needlegrass, little bluestem, prairie junegrass, and Sandberg bluegrass. Note, green needlegrass is found in greater abundance in the 15-17" precipitation zone and on finer textured soils. A variety of forbs and half-shrubs also occur, as shown in the preceding table. Shrubs are not abundant. Plant diversity is high.

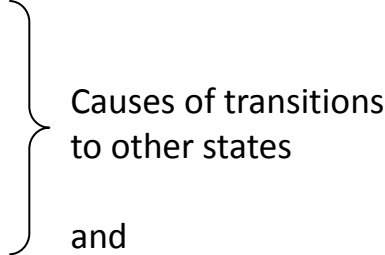
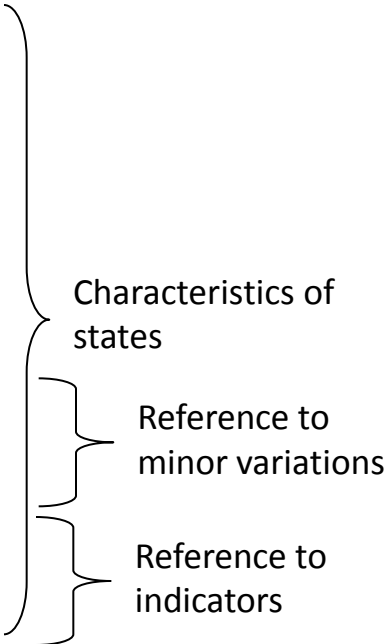
In the 12 to 14 inch precipitation zone, the total annual production (air-dry weight) is about 1300 pounds per acre during an average year, but it can range from about 750 pounds per acre in unfavorable years to about 1750 pounds per acre in above average years.

In the 15 to 17 inch precipitation zone, the total annual production (air-dry weight) is about 1500 pounds per acre during an average year, but it can range from about 1000 pounds per acre in unfavorable years to about 2000 pounds per acre in above average years.

This plant community is stable and well adapted to the Northern Great Plains climatic conditions. Litter is properly distributed with very little movement off-site and natural plant mortality is very low. The diversity in plant species allows for high dry tolerance. This is a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

Transitions or pathways leading to other plant communities are as follows:

- Frequent and severe defoliation, during the growing season of the cool-season mid-grasses, will move this plant community initially towards the Blue Grama Sod w/ Cool-season Mid-grasses Plant Community. Over a period of years, plant species less tolerant to frequent and severe defoliation will begin to decrease, and those more tolerant will begin to increase.
- No use and no fire will move this plant community towards the Low Plant Density, Excess Litter Plant Community. Initially, excess litter begins to build-up. Eventually native plant density begins to decrease and weeds and introduced species may begin to invade.



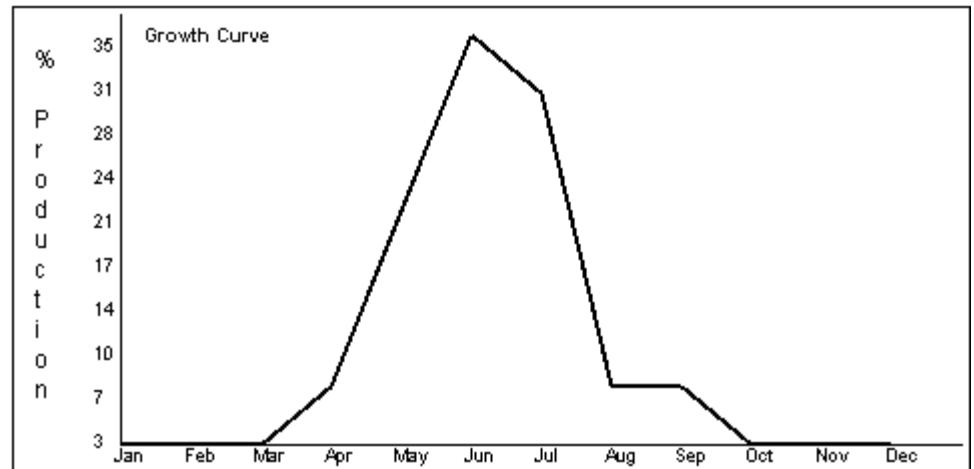
Reference to conservation practices

# Example components: Loamy 12-17" (MLRA 67A-Central High Plains, Northern Part)

## Rhizomatous Wheatgrasses, Needleandthread, Blue Grama Plant Community Plant

### Species Composition:

Grass/Grasslike				Annual Production in Pounds Per Acre		Foliar Cover Percent		
Group	Group Name	Common Name	Symbol	Scientific Name	Low	High	Low	High
1	-12"-14"				390	520		
		needle and thread, needleandthread	HECO26	<a href="#">Hesperostipa comata</a>	325	390		
		green needlegrass	NAVI4	<a href="#">Nassella viridula</a>	65	130		
2	-12"-14"				260	325		
		streambank wheatgrass	ELLA3	<a href="#">Elymus lanceolatus</a>	0	130		
		western wheatgrass	PASM	<a href="#">Pascopyrum smithii</a>	260	325		
3	-12"-14"				130	195		
		blue grama	BOGR2	<a href="#">Bouteloua gracilis</a>	130	195		
4	-12"-14"				65	130		
		little bluestem	SCSC	<a href="#">Schizachyrium scoparium</a>	65	130		





# Example components: Loamy 12-17" (MLRA 67A-Central High Plains, Northern Part)

## Animal Community – Wildlife Interpretations

### Rhizomatous Wheatgrasses, Needleandthread, Blue Grama Community (HCPC)

The predominance of grasses plus high forb diversity in this community favors large grazers such as pronghorn and elk. Suitable thermal and escape cover for mule deer is limited due to low shrub cover. White-tailed and black-tailed jackrabbit, badger, and coyote commonly use this community. This community also provides habitat for a wide array of smaller mammals, so diverse prey populations are available for raptors such as ferruginous and Swainson's hawks. Birds such as western kingbird, western meadowlark, lark bunting, and grasshopper sparrow will utilize this community for nesting and foraging. This community is especially favorable for ground-nesting birds because of the abundant residual vegetation available in the spring for nesting, escape and thermal cover.

### Bare Ground, Blue Grama, Invaders Community

Sparse vegetation and greater amounts of bare ground provide suitable habitat for prairie dogs, horned larks and McCown's longspurs. However, a lack of complex vegetation structure and residual cover makes this community poor habitat in general for most ground-nesting birds and big game species. Burrowing owl may occur here if the community is occupied by prairie dogs. Pronghorn may find limited forage in this community.

## Example components: Loamy 12-17" (MLRA 67A-Central High Plains, Northern Part)

### Plant Community Production Carrying

#### 12-14" Precipitation Capacity (lbs./acre) (AUM/acre)

Rhizomatous Wheatgrasses, Needleandthread, Blue Grama (HCPC) 1300 0.40

Blue Grama Sod w/Cool-season Mid-grasses 900 0.33

Blue Grama Sod w/o Cool-season Mid-grasses 500 0.20

Bare Ground, Blue Grama, Invaders 500 0.10

Low Plant Density, Excess Litter 1200 0.33

Go-back Land (highly variable) 500 0.20

#### 15-17" Precipitation Capacity (lbs./acre) (AUM/acre)

Rhizomatous Wheatgrasses, Needleandthread, Blue Grama (HCPC) 1500 0.50

Blue Grama Sod w/Cool-season Mid-grasses 1100 0.40

Blue Grama Sod w/o Cool-season Mid-grasses 700 0.20

Bare Ground, Blue Grama, Invaders 700 0.10

Low Plant Density, Excess Litter 1400 0.40

Go-back Land (highly variable) 700 0.20

# Example components: Loamy 12-17" (MLRA 67A-Central High Plains, Northern Part)

## Supporting Information

### - Associated Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
<u>Shallow Loamy (SwLy) 12-17" Precipitation Zone</u>	<u>R067AY162WY</u>	<u>Shallow Loamy 12-17 " P.Z.</u>

### - Similar Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
<u>Clayey (Cy) 12-17" Precipitation Zone</u>	<u>R067AY104WY</u>	<u>Clayey 12-17" P.Z. has more western wheatgrass</u>
<u>Loamy Overflow (LyO) 12-17" Precipitation Zone</u>	<u>R067AY126WY</u>	<u>Loamy Overflow 12-17" P.Z. is more productive</u>
<u>Sandy (Sy) 12-17" Precipitation Zone</u>	<u>R067AY150WY</u>	<u>Sandy 12-17" P.Z. has more needleandthread</u>

### - State Correlation:

This site has been correlated with the following states:  
CO NE WY

### Inventory Data References:

Inventory Data References (narrative)

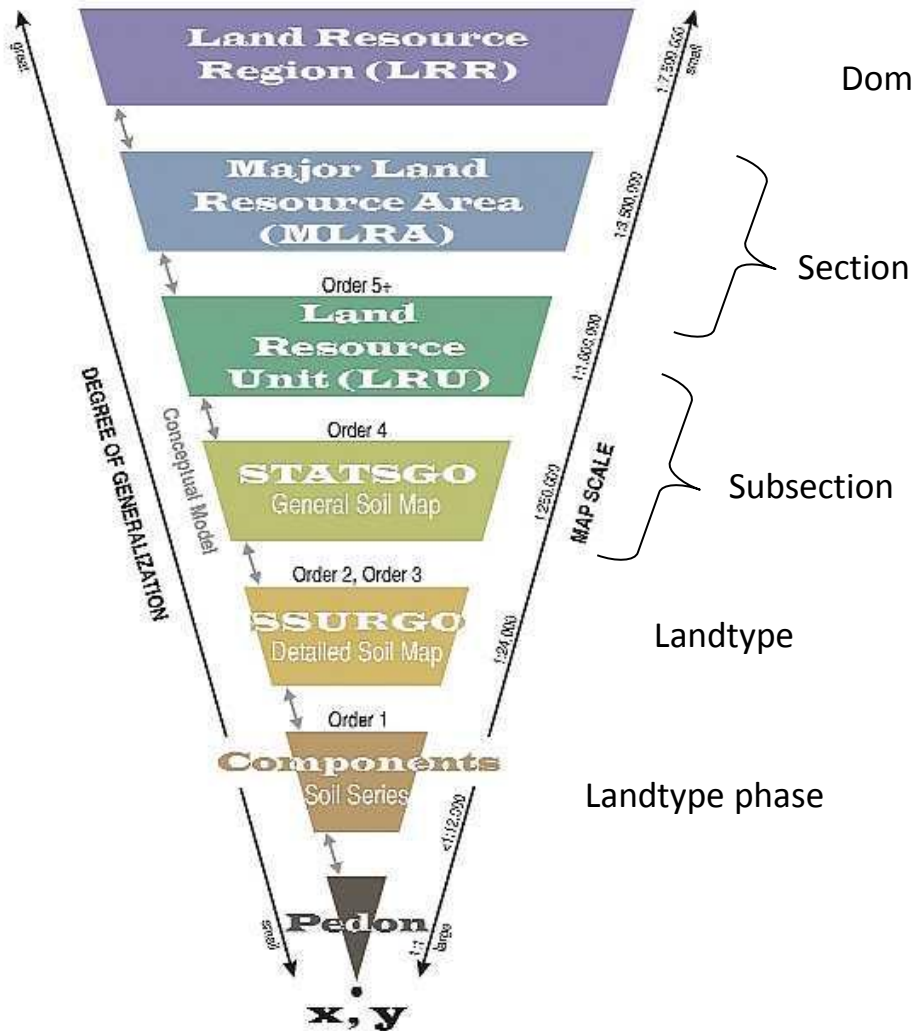
Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used.

Inventory Data References

Data Source Number of Records Sample Period State County  
SCS-RANGE-417 110 1963 -1987 WY Platte & others

# Basics of ecological site development: spatial hierarchy

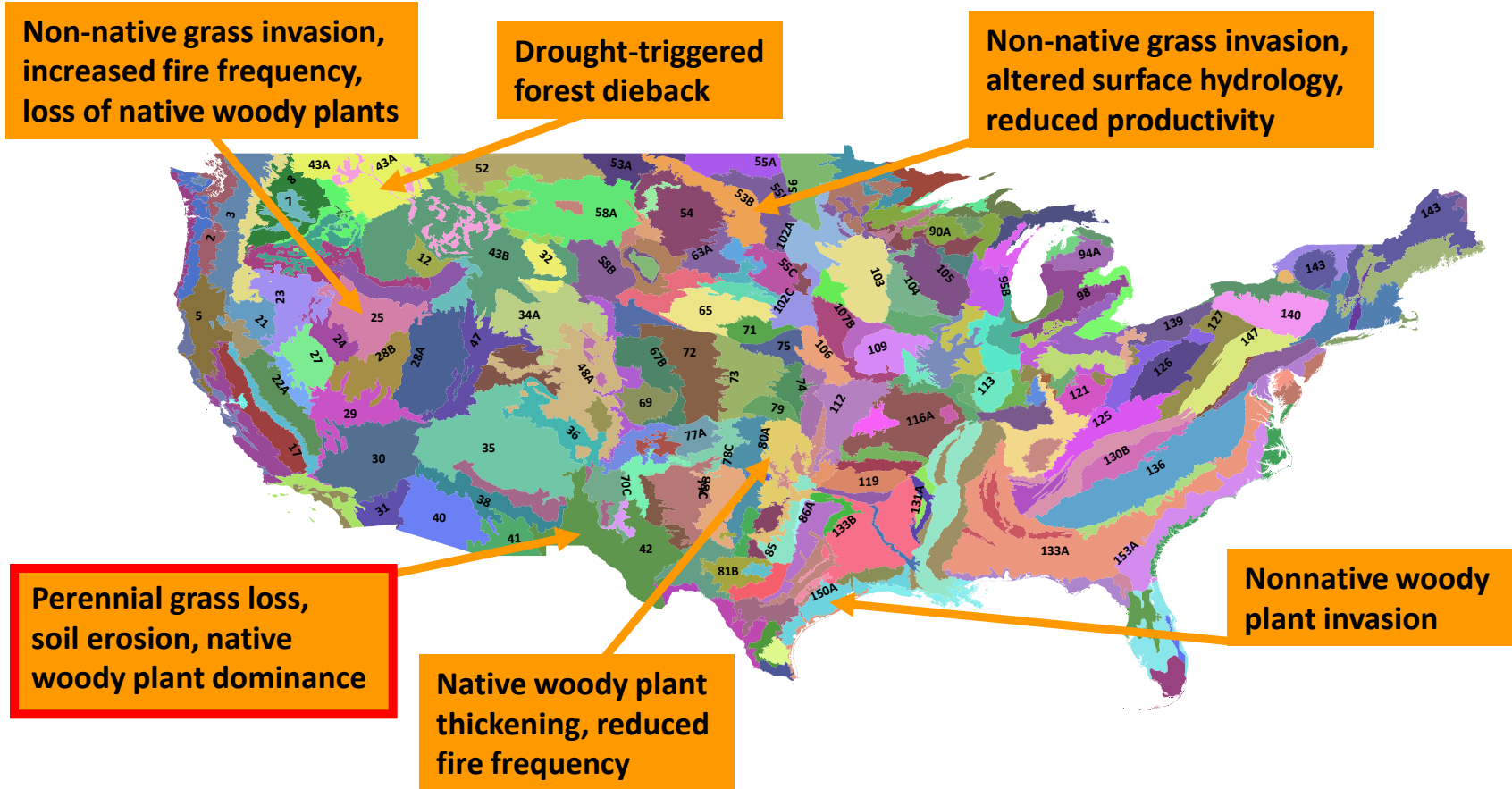
## LRR-MLRA-LRU Land Resource Hierarchy



## National Hierarchical Framework of Ecological Units

# MLRAs contain a set of related ecological sites

*-similar regional climate, suites of soils, and natural resource issues*

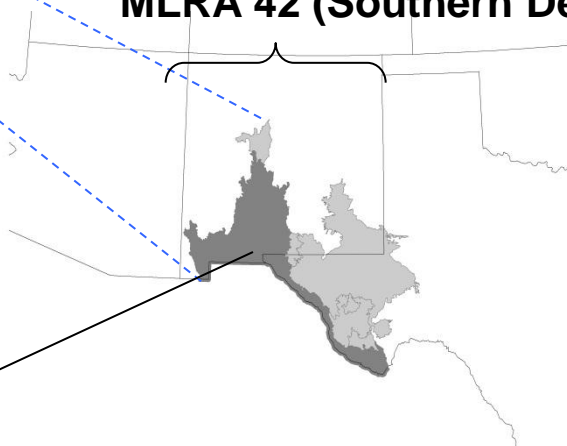


Major Land Resource Areas of the continental USA

Sometimes LRUs are recognized that subdivide an MLRA based on local climate  
*-LRUs then contain a set of associated ecological sites*  
*-in some MLRAs, LRUs are not mapped (due to elevation/aspect variations)*

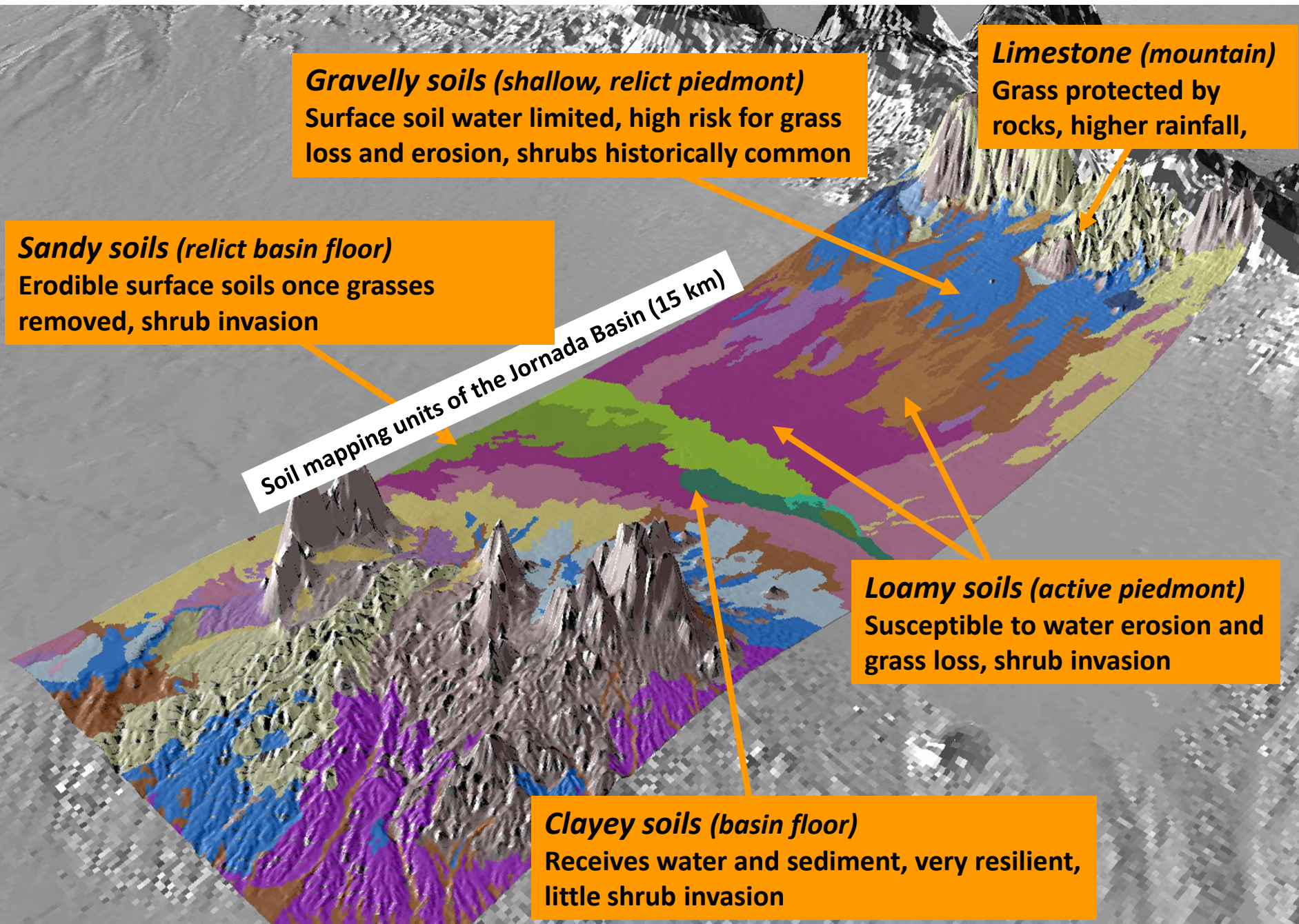


**MLRA 42 (Southern Desertic Basins, Plains, and Mountains)**



**MLRA 42.2 (Chihuahuan Desert Shrubs): 8-10" (typic aridic thermic)**

# Develop concepts for how to subdivide the landscape



**Gravelly soils (shallow, relict piedmont)**  
Surface soil water limited, high risk for grass loss and erosion, shrubs historically common

**Limestone (mountain)**  
Grass protected by rocks, higher rainfall,

**Sandy soils (relict basin floor)**  
Erodible surface soils once grasses removed, shrub invasion

Soil mapping units of the Jornada Basin (15 km)

**Loamy soils (active piedmont)**  
Susceptible to water erosion and grass loss, shrub invasion

**Clayey soils (basin floor)**  
Receives water and sediment, very resilient, little shrub invasion

# Soil-landscape properties used to classify ecological sites



Slope and aspect



Landscape position  
(run-in vs. run off)



Soil texture  
(by depth)



Soil chemistry  
(gypsum, sodium)

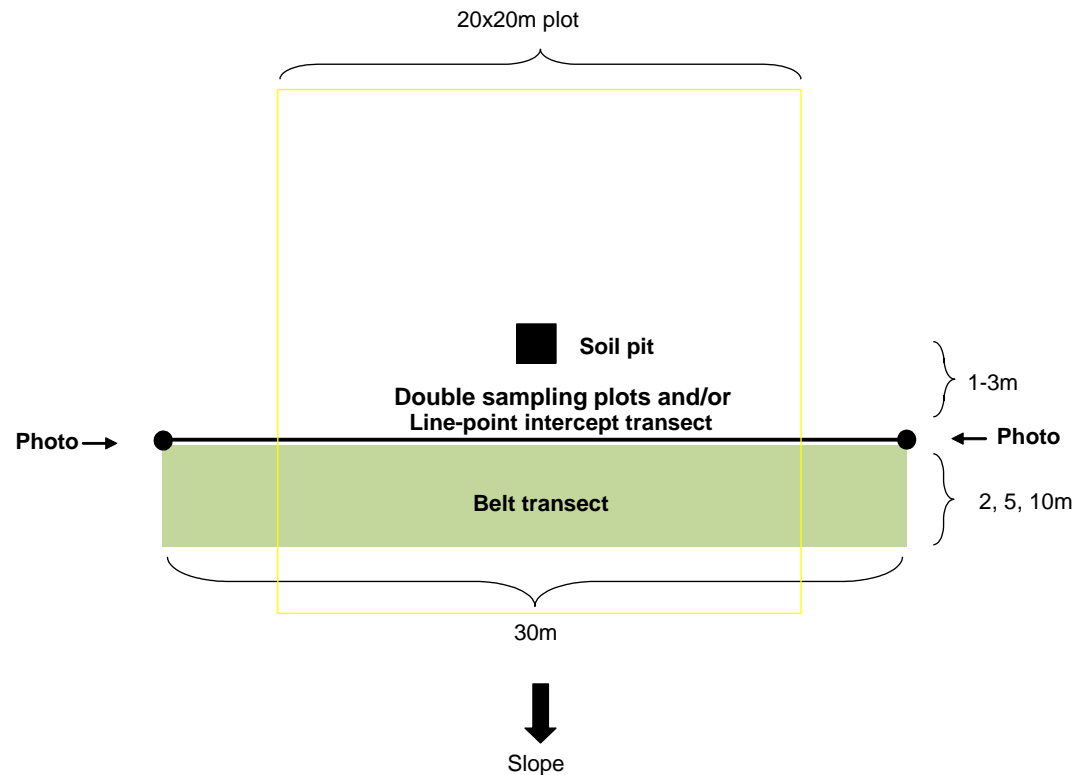
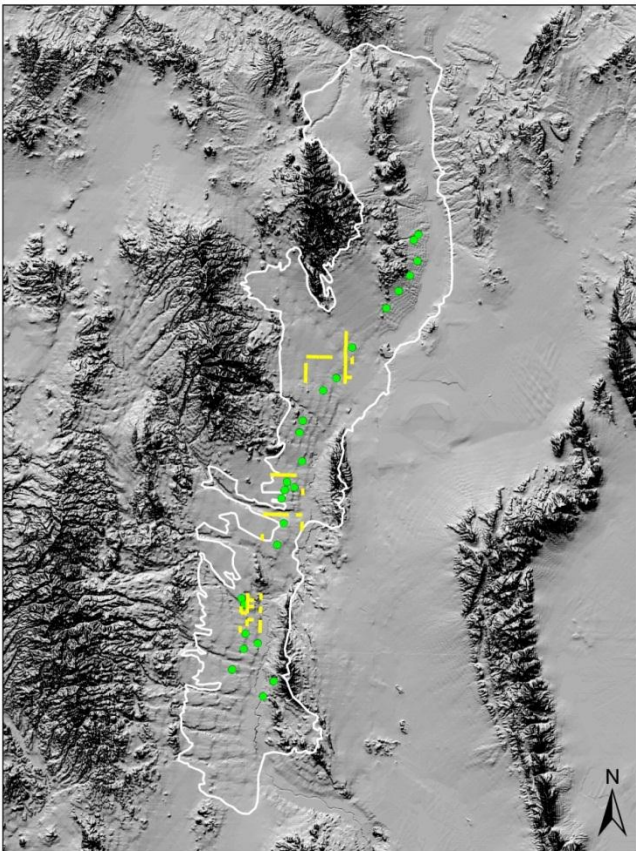


Soil depth  
(kind of restrictive horizon)



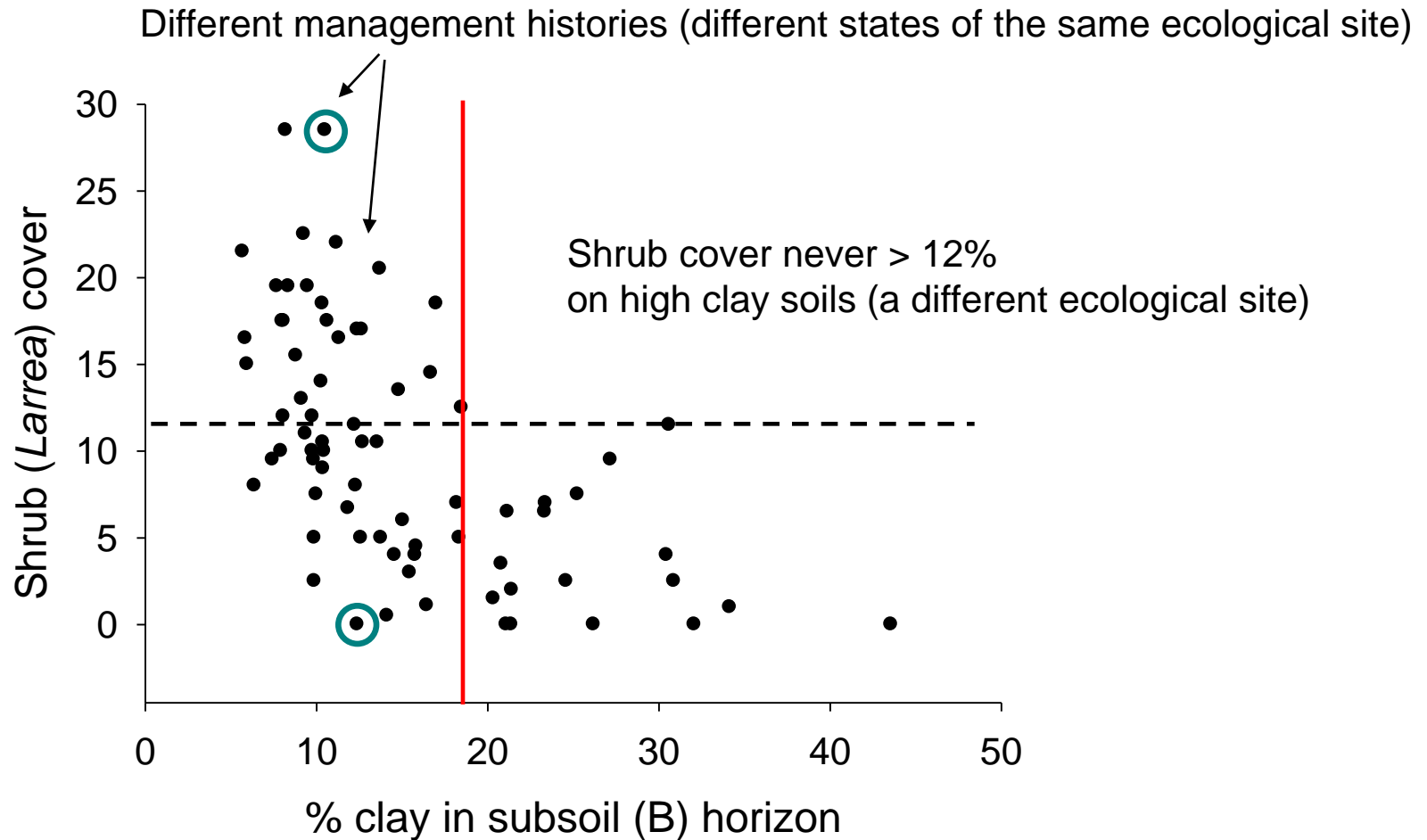
# Use inventory to gather data and test ecological site concepts

- “Gravelly soils” had a lot of variation in shrub dominance
- Due to management or soil profile properties?
- Coupled vegetation and soil sampling within gravelly soils
- Gather historical data where available (General Land Office survey data to 1878)



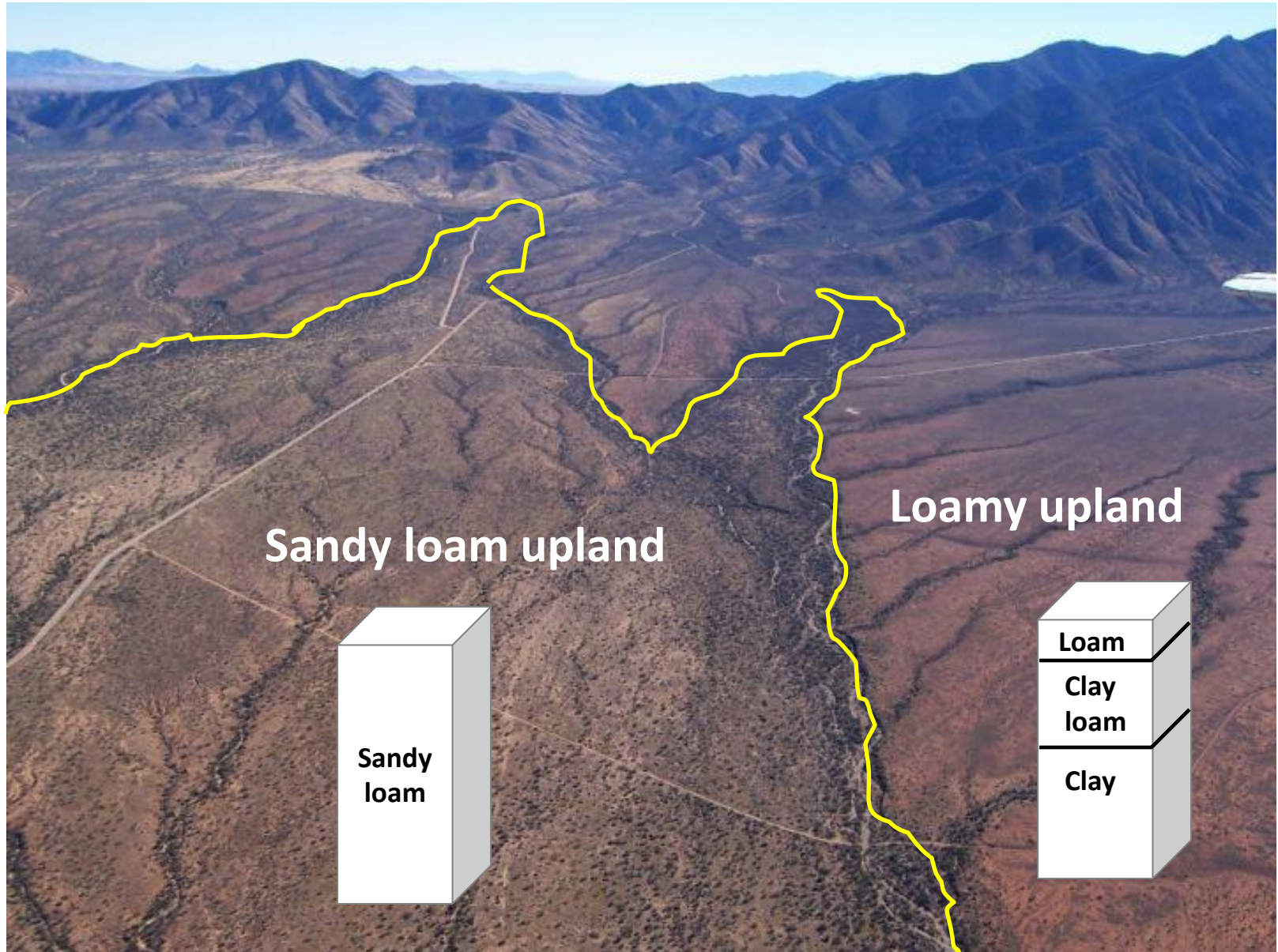


# Inventory as a learning process



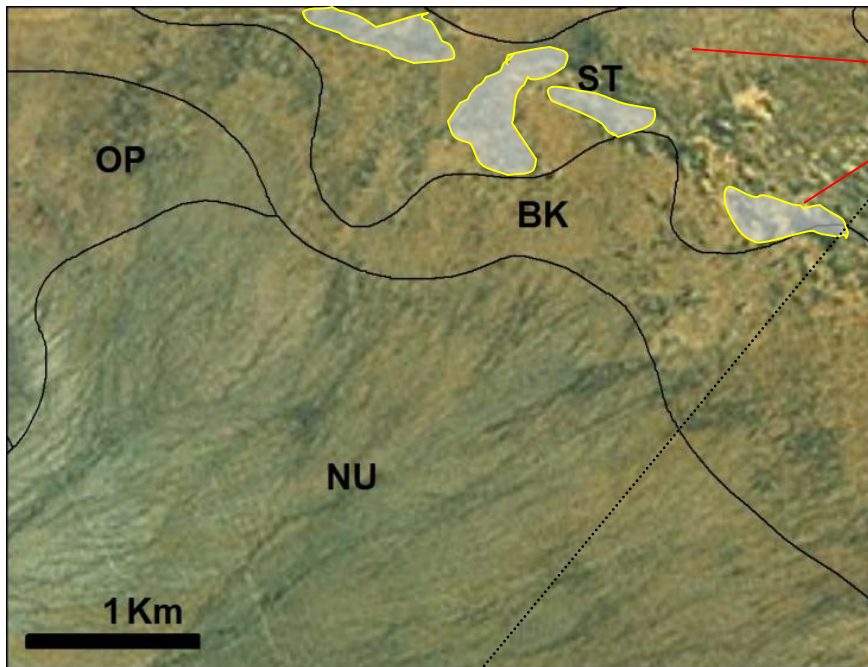
*Data support recognition of two “gravelly” ecological sites*

# Inventory can help soil scientists design map units that capture ecologically-important distinctions



# In other cases, soil mapping does not have a 1:1 relationship with ecological sites

## *Soil-site correlation rules*



Map unit/components	Ecological site
<b>ST: Stellar association</b>	
40% Stellar clay loam, 0-3% slopes	= <i>Clayey</i>
40% Stellar clay loam, 0-3% slopes, flooded	= <i>Bottomland</i>
20% other inclusions	
<b>BK: Berino-Dona Ana association</b>	
50% Berino fine sandy loam, 1-5 % slopes	= <i>Sandy</i>
30% Dona Ana fine sandy loam, 1-5% slopes	= <i>Sandy</i>
20% other inclusions	
<b>OP: Onite-Pajarito association</b>	
40% Onite loamy sand, 1-4% slopes	= <i>Sandy</i>
30% Pajarito fine sandy loam, 0-5% slopes	= <i>Sandy</i>
15% Pintura fine sand, 0-5% slopes	= <i>Deep sandy</i>
15% other inclusions	

*A soil map unit can contain more than one ecological site*

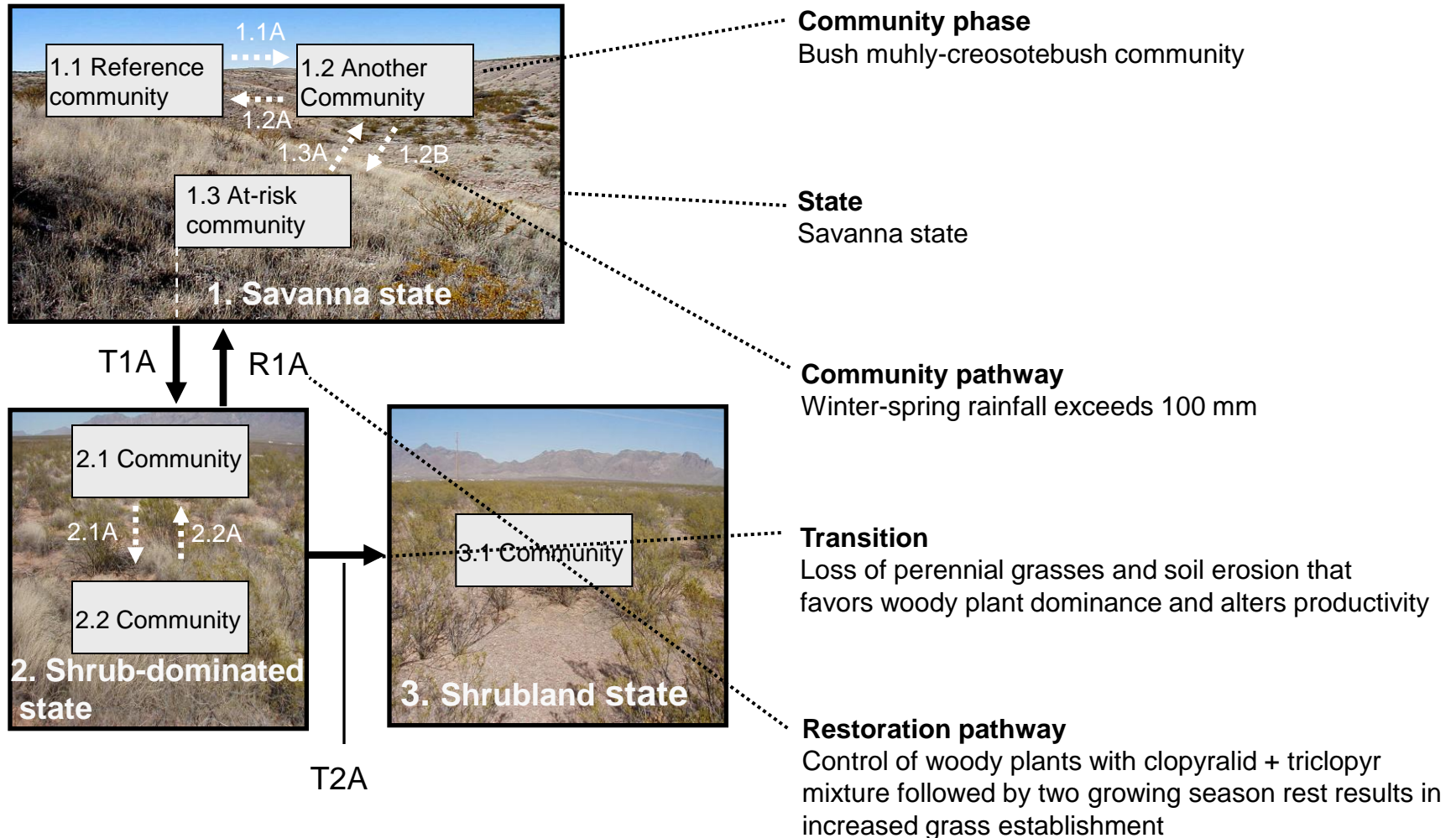
*An ecological site groups several similar soil map unit components*

# State-and-transition models

Data-supported descriptions of the multiple conditions or states of an ecosystem and the processes causing transitions among states

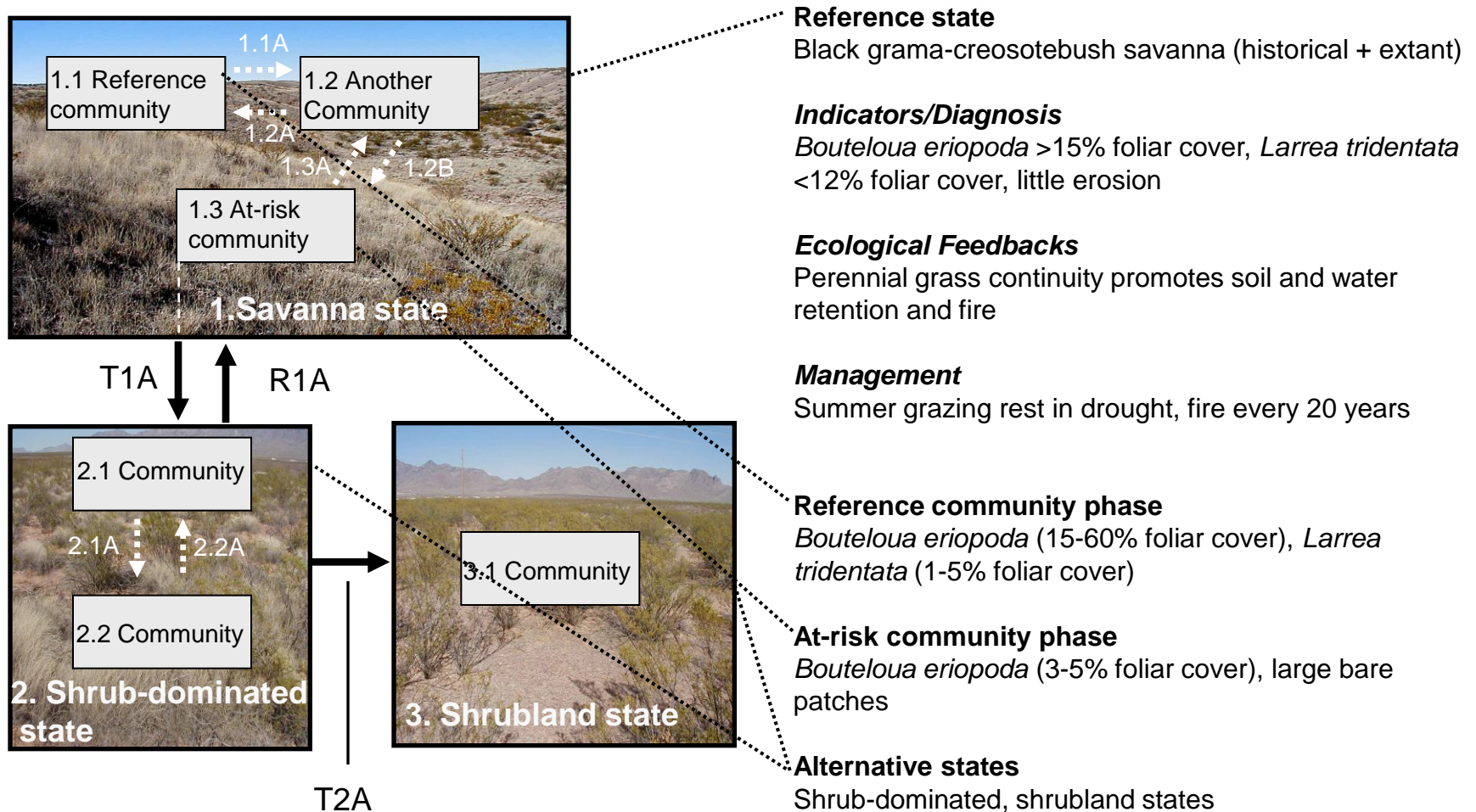
- *Can include synthetic analysis, quantitative values, and protocols for management or restoration practices*
- *Repositories of synthesized science information and local knowledge*
- *Focus on ecological processes underpinning responses to management and natural drivers*

# State-and-transition models now feature standardized approaches for the production of narratives (not yet fully adopted)



# Narratives for states and communities contain indicator values and management strategies to promote resilience

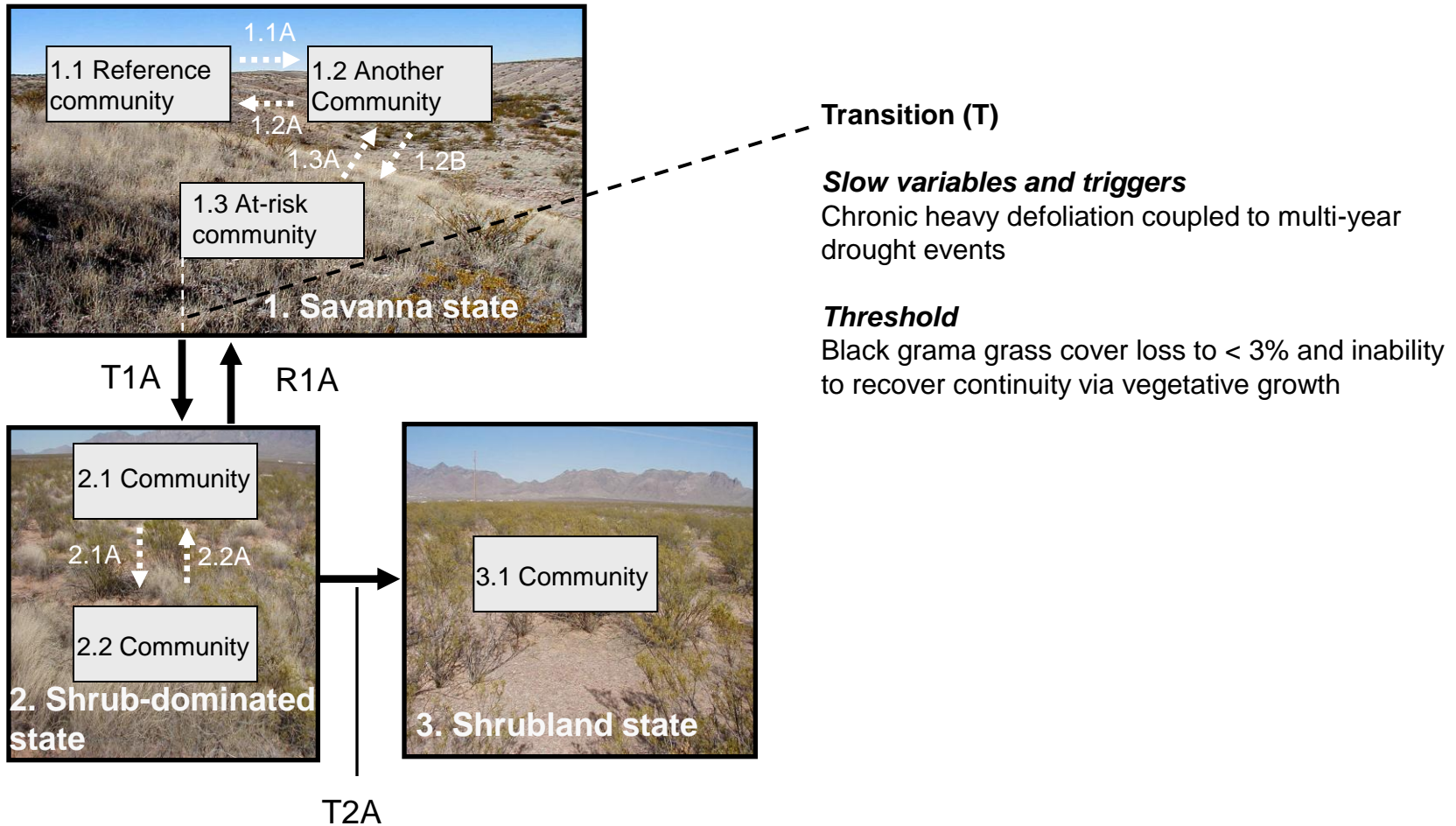
## Specific components of state descriptions





# Narratives for transitions highlight the sequences of management conditions and events that lead to ecological thresholds

## Specific components of transition descriptions



# Information sources used to develop STM narratives

1. Medium-intensity inventory (what are variations observed on the same soils)

2. Reconstructions of historical vegetation changes

- interviews, experiences of locals
- ground photography
- aerial photography
- monitoring data (BLM trend plots)

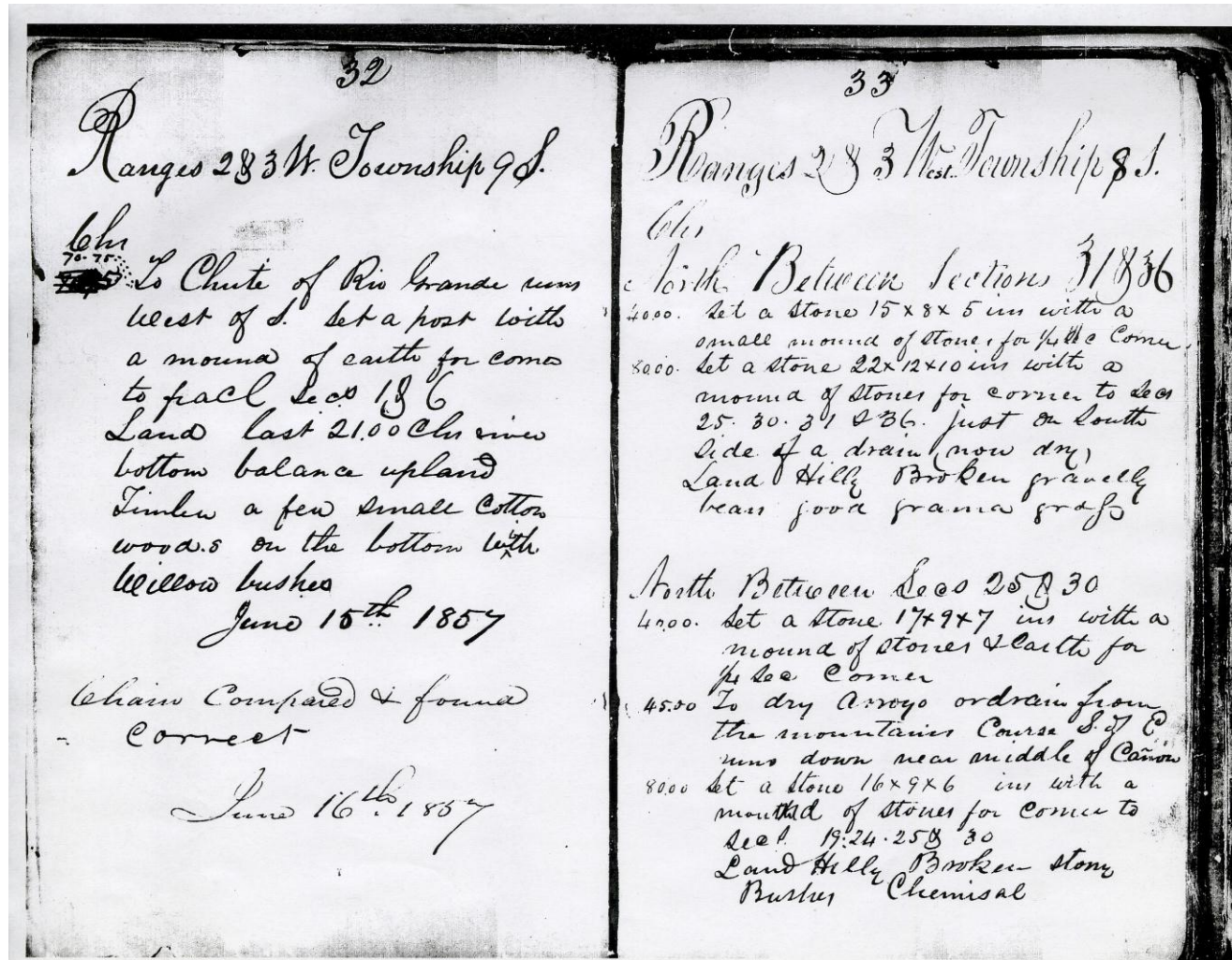
*often requires soil sampling to associate data to an ecological site*

3. Experimental manipulations

- LTER sites, might be generalized to multiple ecological sites
- especially for describing ecological mechanisms

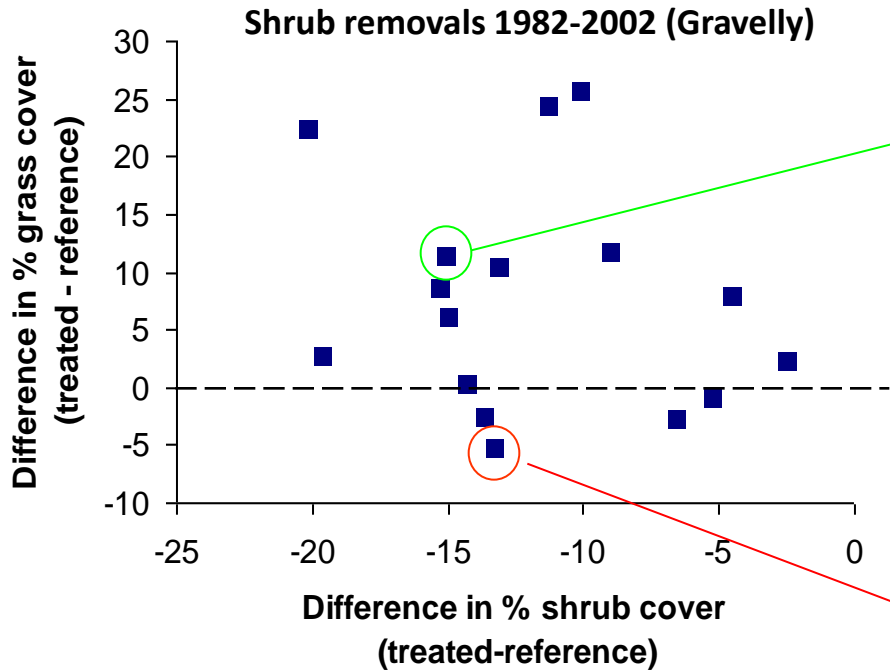
4. High intensity inventory (what are ecosystem services provided by states?)

## Historical reconstructions to describe reference conditions



Historical evidence tied to inventory: in the 1850s, evidence of grass-dominated and *Larrea*-dominated patches on gravelly soils

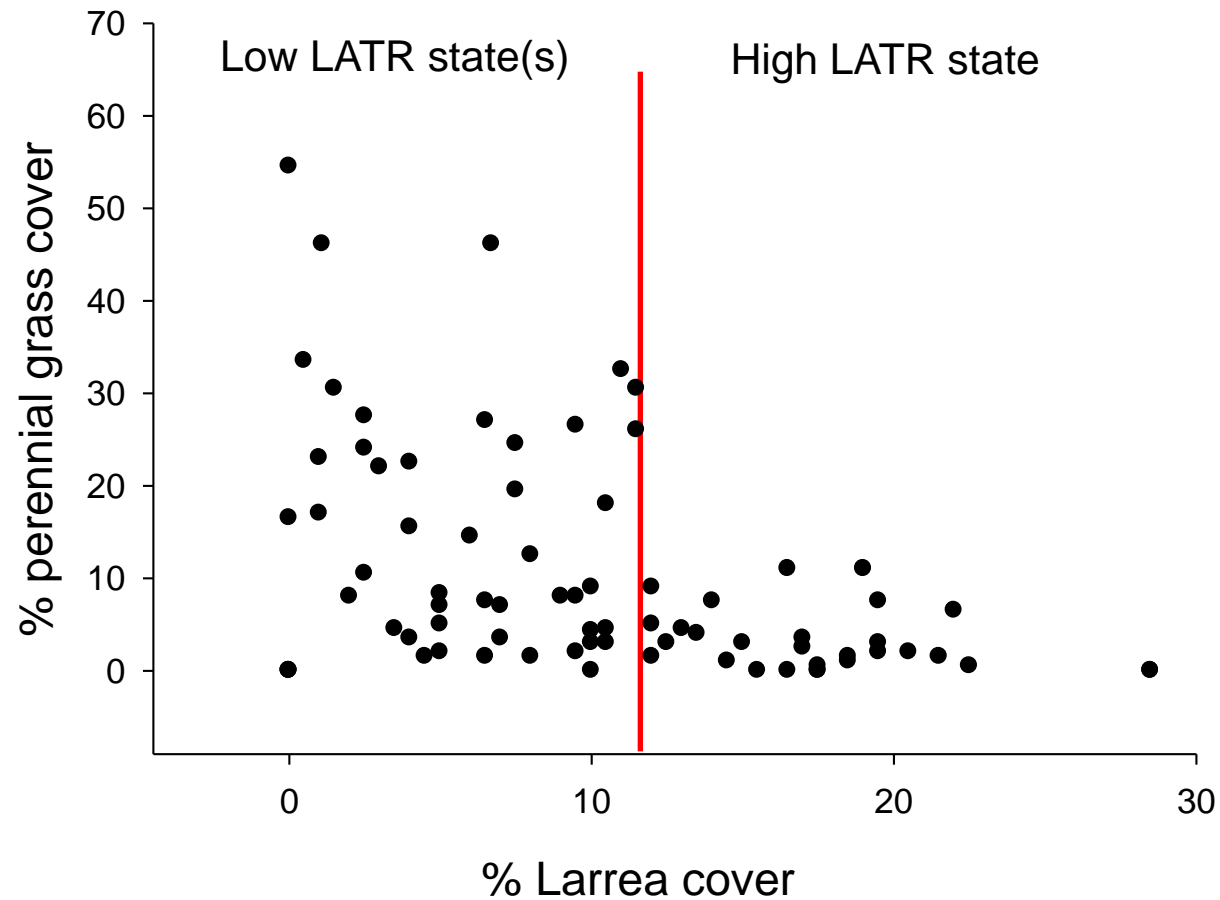
# Historical reconstructions to describe restoration outcomes



**What were the circumstances of failures?**

- initial state?**
- subtle soil variations?**
- post-treatment management?**

# Inventory data to provide quantitative support for state distinctions

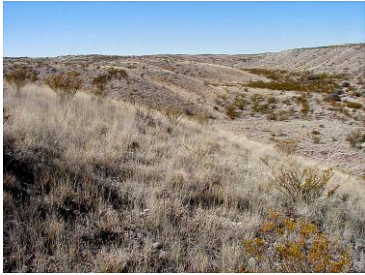


Inventory data support existence of alternative states (12% creosotebush canopy cover is a good break)

# State-and-transition models can be used to create management hypotheses

## *Indicators*

## *Specific management protocols*



Grass cover is > 15%  
only small bare patches

Keep on doing what you're doing,  
maybe prescribed fire

**Shrub savanna state**



Shrub cover >12%,  
few grass patches,  
interconnected bare areas

Summer grazing rest,  
shrub control to increase grasses

**Shrub-dominated state**



Shrub cover >12%,  
absence of perennial  
grasses, eroded soil

Long-term rest to take,  
advantage of very rainy years,  
shrub control avoided

**Shrubland state**

# High intensity inventory and interpretations

*Select representatives of each state*

- Production, cover, height by species
- Dynamic soil properties (bulk density, soil organic matter content)
- Monitoring, preferably through a dry-wet or fire succession cycle

*Use inventory and existing data/literature to define*

- Production ranges/growth curves
- Wildlife habitat (by state or community)
- Hydrologic functions
- Recreation

*Future options (carbon sequestration, dust control, more detail on wildlife habitat)*

# The present reality

- Inventory data are scarce, often represent only a few locations
- Soil and vegetation data come from different locations/spatial scales
- Data gathering and analytical procedures vary
- Information sources and data/metadata are not available
- Adequate information available only for most extensive ecological sites
- Logic used to develop state-and-transition models is not consistent



# Accessing ecological site descriptions



California Soil Resource Lab

Home Links [Online Survey](#) [People](#) [Projects](#) [Software](#) [Site Map](#)

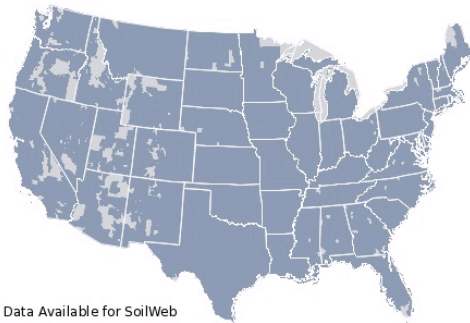
## SoilWeb: An Online Soil Survey Browser

- Accessing Soil Survey Data via Web-Services
- Dynamic Export of Soil Survey Data to KML through Soil-Web
- Initial SoilWeb Concept on Paper
- Major updates to CA, AZ, NV online soil survey system
- Migrating to Ka-Map! Online Soil Survey for AZ, CA and NV
- Planned Improvements in SoilWeb
- Saving Chunks of SSURGO Data in SoilWeb for Google Earth
- Soil Properties Visualized on a 1km Grid
- SoilWeb for the iPhone
- Streaming Soil Survey Data in Google Earth (updates)
- Three New Soils-Related KMZ Demos
- Updated SoilWeb for the iPhone + Alpha Android Version
- Updated SoilWeb Usage Statistics
- Updates to SoilWeb

## SoilWeb: An Online Soil Survey Browser

Submitted by dylan on Fri, 2010-02-26 16:13.

Our online soil survey can be used to access NRCS-NCSS 1:24,000 scale detailed soil survey data (SSURGO) in many parts of the lower 48 states. Where this data is not yet available, 1:250,000 scale generalized soils data (STATSGO) can be accessed instead (AZ, CA, NV only). An interactive map interface allows for panning and zooming, with highways, streets, and aerial photos to assist navigation (Figure 1). Soil polygons become visible near a scale of 1:30,000. Alternatively, a GPS point, CA Zip code, or a street address can be used to zoom in on a specific location. General usage notes and information on how our online soil survey work can be found [here](#). Statistics on who is using our online soil survey can be found [here](#). Technical details on SoilWeb can be found in this [publication](#). Please note that we are currently transitioning to a new server, and planning to have our local copy of the SSURGO, STATSGO, and OSD databases updated in the coming months.



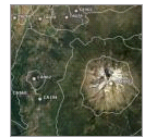
### Select an Interface to SoilWeb

- An [iPhone App](#) for real-time, location-based soil queries! [[details](#)] [[SSSA News Brief](#)] [[ANR News Article](#)] [[UCD Aggie Article](#)]
- Similar App for [AndroidOS](#) smartphones
- [Google Maps interface](#)
- [Google Earth Interface](#) ←
- A [Text-only](#) interface to SSURGO
- [Original Interface](#)
- [Pinnacles National Monument Application](#)

Our online soil survey, *Soil-Web*, will be used as the foundation for a new educational website on the soils of [Pinnacles National Monument, CA](#). Details on this project can be [found on this page](#).



SSURGO Map Units



STATSGO Map Units

# Accessing ecological site descriptions



Locate area of interest, try about 15 km eye altitude to see map

# Accessing ecological site descriptions

The screenshot shows the Google Earth interface with a map of a field. A popup window is open over a point labeled '5'. The popup contains the following text:

**Ascalon fine sandy loam, 6 to 9 percent slopes.**

Major Component List for [95143]:

- Ascalon (85%)
- Andic Argiustolls

A	0cm
BA	10cm
B11	18cm
	30cm
B12	46cm
Bk1	64cm
Bk2	
	152cm

Ascalon fine sandy loam, 6 to 9 percent slopes plains

The map shows a field with yellow contour lines and several numbered points (5, 40, 55, 63, 65, 73, 74, 78). A red arrow points from the popup title to the 'Ascalon (85%)' component name. The bottom of the screen shows the Windows taskbar with various open applications and the system clock at 3:23 PM.

Click on a map unit icon and then map unit component name

# Accessing ecological site descriptions

California Soil Resource Lab

Soil Taxonomy

Order: [Mollisols](#)  
 Suborder: [Ustolls](#) [[Map of Suborders](#)]  
 Greatgroup: [Argiustolls](#)  
 Subgroup: [Andic Argiustolls](#)  
 Family: [Fine-loamy, mixed, superactive, mesic Andic Argiustolls](#)  
 Soil Series: [Ascalon](#) [[Link to OSD](#)] [[Link to SM Tool](#)]

Data: [[Lab Data](#)] [[Nitrate Groundwater Pollution Hazard Index](#)]  
 Raw Data: [[Component](#)] [[All Horizons](#)]

Land Classification

Soil Index	NOT RATED
Land Capability Class [non-irrigated]	4-e
Land Capability Class [irrigated]	4-e
Ecological Site Description	<a href="#">Loamy Plains</a>

Soil Suitability Ratings

<a href="#">Waste Related</a>	<a href="#">Engineering</a>
<a href="#">Urban/Recreational</a>	<a href="#">Irrigation</a>
<a href="#">Wildlife</a>	<a href="#">Runoff</a>

Hydraulic and Erosion Ratings

Wind Erodibility Group	3
Wind Erodibility Index	26
T Erosion Factor	5
Runoff	Medium
Drainage	Well drained
Hydric Rating / <a href="#">Hydrologic Group</a>	No <a href="#">Group B</a>
Parent Material:	calc-areous loamy alluvium
Total Plant Available Water (cm):	17.32

Geomorphology

Landform: [plains](#)

Plants

Symbol	Scientific Name	Common Name	Range Prod.
<a href="#">PASM</a>	<i>Pascopyrum smithii</i>	western wheatgrass	20
<a href="#">HECOCB</a>	<i>Hesperostipa comata</i> ssp. <i>comata</i>	needleandthread	5
<a href="#">BOCU</a>	<i>Bouteloua curtipendula</i>	sideoats grama	3

Organic Matter (%) | Percent Clay | Percent Sand |  $K_{sat}$  (mm/h) | pH (1:1 H<sub>2</sub>O) |  $K_r$  Factor

Depth (cm)	Organic Matter (%)	Percent Clay	Percent Sand	$K_{sat}$ (mm/h)	pH (1:1 H <sub>2</sub> O)	$K_r$ Factor
0cm	0.3	9	96	32	7.2	0.2
3cm	1.5	27	66	101	8.5	0.3
38cm						
76cm						
114cm						
152cm						

Click on ecological site name

# Accessing ecological site descriptions

United States Department of Agriculture  
Natural Resources Conservation Service

## Ecological Site Description

Plants | **ESIS** | ESD | FSGD | EST Forestland | EST Rangeland

### UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

#### ECOLOGICAL SITE DESCRIPTION (Old Format Report)

#### ECOLOGICAL SITE CHARACTERISTICS

**Site Type:** Rangeland

**Site Name:** Loamy Plains

**Site ID:** R067BY002CO

**Major Land Resource Area:** 067B-Central High Plains, Southern Part

Wyoming | Nebraska | Colorado | Kansas

67B

Back to Top | [NRCS Home](#) | [USDA](#) | [Accessibility](#) | [FirstGov](#) | [Privacy Policy](#) | [Freedom of Information Act](#) | [Nondiscrimination Statement](#)

Enjoy

# Accessing ecological site descriptions

The screenshot shows a Google Earth interface with a topographic map of an ecological site. The map features yellow contour lines and several numbered points (e.g., 4, 5, 6, 9, 12, 29, 40, 55, 57, 63, 65, 73, 74, 86) marked with yellow dots. A window titled "Renohill-Shingle complex, 3 to 9 percent slopes" is open, displaying soil profile data for two components: Renohill (60%) and Shingle (35%).

**Major Component List for [95151]:**

Renohill (60%) Ustollic Haplargids		Shingle (35%) Ustic Torriorthents	
A	0cm	A	0cm
BA	10cm	Bw	10cm
Bt	18cm	C	20cm
Btk	30cm	Cr	38cm
Bk	51cm		
Cr	76cm		
	152cm		152cm

*Renohill-Shingle complex, 3 to 9 percent slopes*  
plains  
ridges  
breaks

*Renohill-Shingle complex, 3 to 9 percent slopes*  
ridges  
plains  
breaks

Imagery Date: 4/13/2006 1999  
© 2011 Google  
Image © 2011 DigitalGlobe  
13 T 521156.79 m E 4519454.32 m N elev 1650 m  
Eye alt 9.31 km

When confronted with two soil components, dig a hole

# Accessing ecological site descriptions



To get actual data gathered at a point, click on NCSS soil location

# Accessing ecological site descriptions

**PEDON DESCRIPTION**

**Print Date:** 08/12/2011  
**Description Date:** 9/7/1993  
**Describer:**  
**Site ID:** 93CO123001  
**Site Note:**  
**Pedon ID:** 93CO123001  
**Pedon Note:** Pedon site located on eastern edge of largest playa on CPER. Center of playa is vegetation free. Pedon sampled in low grass at edge of playa.  
**Lab Source ID:** SSL  
**Lab Pedon #:** 94P0045  
**Soil Name as Described/Sampled:** Large Playa  
**Soil Name as Correlated:**  
**Classification:**  
**Pedon Type:**  
**Pedon Purpose:**  
**Taxon Kind:**  
**Associated Soils:**  
**Physiographic Division:**  
**Physiographic Province:**  
**Physiographic Section:**  
**State Physiographic Area:**  
**Local Physiographic Area:**  
**Geomorphic Setting:** on toeslope of playa on toeslope of piedmont  
**Upslope Shape:**  
**Cross Slope Shape:**  
**Particle Size Control Section:**  
**Description origin:** Converted from PDP 3. x  
**Diagnostic Features:** to cm.

**Country:**  
**State:** Colorado  
**County:** Weld  
**MLRA:**  
**Soil Survey Area:**  
**Map Unit:**  
**Quad Name:**  
**Legal Description:** of Section 23, Township 10N , Range 66W  
**Latitude:** 40 degrees 49 minutes 13.00 seconds north  
**Longitude:** 104 degrees 44 minutes 28.00 seconds west  
**Datum:**  
**UTM Zone:**  
**UTM Easting:**  
**UTM Northing:**  
**Primary Earth Cover:** Grass/herbaceous cover  
**Secondary Earth Cover:** Grassland rangeland  
**Existing Vegetation:**  
**Parent Material:**  
**Bedrock Kind:** shale  
**Bedrock Depth:**  
**Bedrock Hardness:**  
**Bedrock Fracture Interval:**  
**Surface Fragments:**  
**Description database:** NSSL

**Cont. Site ID:** 93CO123001      **Pedon ID:** 93CO123001

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
1.0				22.0	0.0	310				

0 to 5 centimeters; dark gray (10YR 4/1) silty clay, very dark gray (10YR 3/1), dry; firm, slightly hard, slightly sticky, moderately plastic; many very fine to medium roots throughout; 10 percent clay films; 5 percent 2- to 75-millimeter unspecified fragments; noneffervescent, by HCl, 1 normal; abrupt smooth boundary. Lab sample #94P00297

5 to 13 centimeters; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2), dry; firm, hard, slightly sticky, slightly plastic; few very fine and fine roots in cracks and few very fine to medium roots throughout; discontinuous distinct organic stains and 10 percent faint clay films on faces of pedis; 5 percent 2- to 75-millimeter unspecified fragments; noneffervescent; clear wavy boundary. Lab sample #94P00298

Can use to help identify ecological site



# Accessing ecological site descriptions

The screenshot shows the Web Soil Survey website (http://websoilsurvey.nrcs.usda.gov/) in a Windows Internet Explorer browser. The page features a header with the USDA logo and the text "United States Department of Agriculture Natural Resources Conservation Service". The main content area includes a search bar, a "START WSS" button, and a "Welcome to Web Soil Survey (WSS)" section. The "Welcome" section describes the WSS as a powerful way to access and use soil data, operated by the USDA Natural Resources Conservation Service (NRCS). It mentions that the site provides access to the largest natural resource information system in the world, with soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

The "Four Basic Steps" section is visible, starting with "1 Define..." and "2 View...". The "Define..." step includes a sub-section "Area of Interest (AOI)" with the instruction "Use the Area of Interest tab to define your area of interest." and a screenshot of the AOI interface. The "View..." step includes a sub-section "Soil Map" with the instruction "Click the Soil Map tab to view or print a soil map, and detailed descriptions of the soils in your Area of Interest." and a screenshot of the soil map interface.

On the left side, there is a "Browse by Subject" menu with the following items:

- Soils Home
- National Cooperative Soil Survey (NCSS)
- Archived Soil Surveys
- Status Maps
- Official Soil Series Descriptions (OSD)
- Soil Series Extent Mapping Tool
- Soil Data Mart
- Geospatial Data Gateway
- eFOTG
- National Soil Characterization Data
- Soil Geochemistry Spatial Database
- Soil Quality
- Soil Geography
- Geospatial One Stop

On the right side, there are two sections: "I Want To..." and "I Want Help With...".

**I Want To...**

- Start Web Soil Survey (WSS)
- Know the requirements for running Web Soil Survey — will Web Soil Survey work in my web browser?
- Know the Web Soil Survey hours of operation
- Find what areas of the U.S. have soil data

**Announcements/Events**

- Web Soil Survey 2.3 has been released! View description of new features.
- Web Soil Survey Release History

**I Want Help With...**

- How to use Web Soil Survey
- How to use Web Soil Survey Online Help
- Known Problems and Workarounds
- Frequently Asked Questions
- Citing Web Soil Survey as a source of soils data

The browser's taskbar at the bottom shows several open applications, including "Inbox - Micro...", "RE: RJ11044 ...", "Outlook Send...", "Cheyenne Nu...", "MLRA work...", "ECOLOGICAL...", "NRC52011", "Microsoft ...", "Microsoft Exc...", "Web Soil Surv...", and "Web Soil Surv...". The system tray shows the time as 4:15 PM and the battery level at 100%.

<http://websoilsurvey.nrcs.usda.gov/>

# Accessing ecological site descriptions

The screenshot displays the USDA Web Soil Survey interface. At the top, the navigation bar includes links for 'Contact Us', 'Download Soils Data', 'Archived Soil Surveys', 'Soil Survey Status', 'Glossary', 'Preferences', 'Link', 'Logout', and 'Help'. Below this, a secondary navigation bar features 'Area of Interest (AOI)', 'Soil Map', 'Soil Data Explorer', and 'Shopping Cart (Free)'. The main content area is titled 'Area of Interest Interactive Map' and includes a search bar, a legend, and a map of Weld County, Colorado. A large, irregularly shaped area is highlighted with a cyan hatched pattern, representing the defined Area of Interest. A red arrow points to the 'View Extent' button in the map's toolbar. The left sidebar contains several panels: 'Search', 'Area of Interest' (with 'Open All' and 'Close All' buttons), 'AOI Properties' (with a 'Clear AOI' button), 'AOI Information' (with a 'Name' field and 'Map Unit Symbols' options), 'Soil Data Available from Web Soil Survey' (showing 'Weld County, Colorado, Northern Part (CO617)' with 'Spatial Data Version 1, Apr 13, 2004' and 'Tabular Data Version 7, Apr 30, 2009'), and 'Quick Navigation' (with a list of agencies including 'Bureau of Land Management', 'Department of Defense', 'Forest Service', 'National Park Service', and 'Hydrologic Unit'). The bottom of the page features a footer with links for 'FOIA', 'Accessibility Statement', 'Privacy Policy', 'Non-Discrimination Statement', 'Information Quality', 'USA.gov', and 'White House'. The browser's status bar at the very bottom shows 'Done' and 'Internet'.

Define area of interest (must be < 10,000 acres)

# Accessing ecological site descriptions

**Map — Dominant Ecological Site — Rangeland**

Scale (not to scale)

**Legend**

**Search**

**Ecological Sites**

Open All Close All

**All Ecological Sites**

View All Ecological Sites Info

**View Options**

Dominant Ecological Site Map

Ecological Sites by Map Unit Component Table

**Basic Options**

Ecological Site Rangeland Type

View All Ecological Sites Info

**R067BY002CO — Loamy Plains**

This Ecological Site

Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)

Blue Grama/Buffalograss Sod with Cool Season Remnants

Low Plant Density, Excessive Litter

Blue Grama/Buffalograss Sod

Red Threeawn, Annuals, Bare Ground

Go-back

Go-back (eroded)

Seeded Rangeland

R067BY010CO — Plains Swale

R067BY024CO — Sandy Plains

R067BY036CO — Overflow

R067BY042CO — Clayey Plains

R067BY045CO — Shaly Plains

R067BY063CO — Gravel Breaks

**Table — Ecological Sites by Map Unit Component — Rangeland**

Weld County, Colorado, Northern Part

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
4	Ascalon fine sandy loam, 0 to 6 percent slopes	Ascalon (85%)	R067BY002CO — Loamy Plains	722.0	11.8%
		Olney (8%)			
		Otero (7%)			
20	Cascajo gravelly sandy loam, 5	Cascajo (85%)	R067BY063CO — Gravel Breaks	169.4	2.8%

0 2730ft

Done

Internet 100%

Click on Soil Data Explorer, then Ecological Site Assessment

# Accessing ecological site descriptions

USDA United States Department of Agriculture  
Natural Resources Conservation Service

Web Soil Survey

Contact Us | Download Soils Data | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Link | Logout | Help

Area of Interest (AOI) | Soil Map | **Soil Data Explorer** | Shopping Cart (Free)

View Soil Information By Use: All Uses Printable Version Add to Shopping Cart

Intro to Soils | Suitabilities and Limitations for Use | Soil Properties and Qualities | **Ecological Site Assessment** | Soil Reports

**Search**

**Ecological Sites** Open All Close All

All Ecological Sites

**R067BY002CO — Loamy Plains**

This Ecological Site

**Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)**

[View Plant Community Info](#)

**View Options**

Plant Community  Photos

Plant Community  Description

Vegetation  Tables

- Annual Production
- Plant Species Composition
- Plant Growth Curve

Cover Tables

- Soil Surface Cover
- Ground Cover
- Canopy Cover

[View Plant Community Info](#)

Blue Grama/Buffalograss Sod with Cool Season Remnants

Low Plant Density, Excessive Litter

Blue Grama/Buffalograss Sod

Red Threawn, Annuals, Bare Ground

Go-back

Go-back (eroded)

Seeded Rangeland

R067BY010CO — Plains Swale

R067BY024CO — Sandy Plains

R067BY036CO — Overflow

R067BY042CO — Clayey Plains

**Map — Dominant Ecological Site — Rangeland**

Scale (not to scale)

0 2734ft

**Table — Ecological Sites by Map Unit Component — Rangeland**

Done Internet 100%

Click on an ecological site and a state from STM

# Accessing ecological site descriptions

The screenshot displays the USDA Natural Resources Conservation Service Web Soil Survey interface. The main content area is titled "Ecological Site Assessment" and provides detailed information for the "Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)".

**Description — Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)**

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores, is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for adequate recovery periods following each grazing event. The potential vegetation is about 70-85% grasses and grass-like plants, 5-15% forbs and 10-15% woody plants.

The major grasses include western wheatgrass, green needlegrass and blue grama. Sub-dominant grasses include needleandthread, buffalograss and sand dropseed. Major forbs and shrubs include American vetch, upright prairie coneflower, scarlet globemallow, dotted gayfeather, fourwing saltbush and winterfat.

This plant community is diverse, stable, and productive. Litter is properly distributed with very little movement off-site and natural plant mortality is very low. It is well suited to carbon sequestration, water yield, wildlife use by many species, livestock use and is esthetically pleasing. Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. This community is resistant to many disturbances except continuous grazing, tillage and/or development into urban or other uses.

Total annual production ranges from 600 to 1800 pounds of air-dry vegetation per acre and will average 1300 pounds during an average year.

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery periods between grazing events will shift this plant community to the Blue Grama/Buffalograss Sod with Cool Season Remnants Plant Community.
- Non-use (rest) and lack of fire will move this plant community to the Low Plant Density, Excessive Litter Plant Community.
- Prescribed grazing that allows for adequate recovery opportunity following each grazing event and proper stocking will maintain the Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC).

**Tables — Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)**

**Annual Production (Lbs/Acre)**

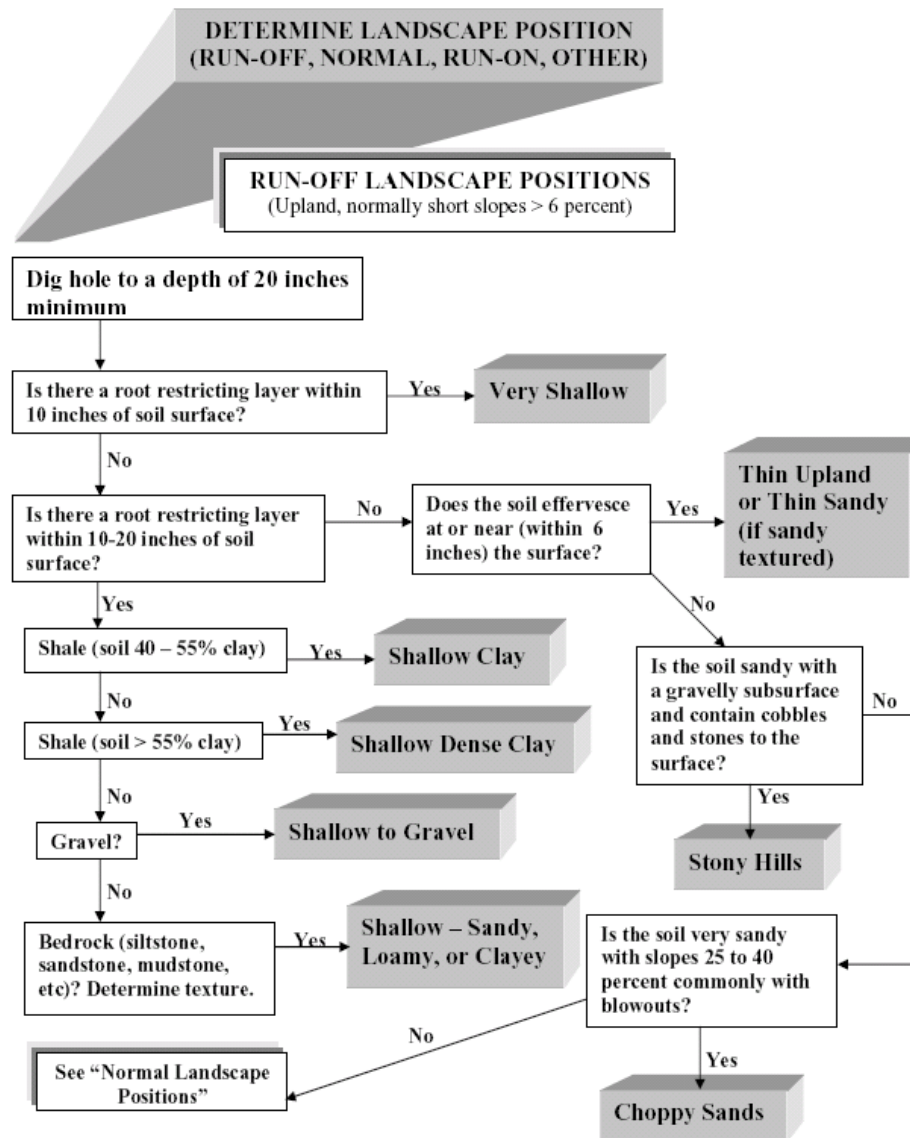
Plant Type	Low	Representative Value	High
Grass/Grasslike	415	1,007	1,400
Forb	60	130	200
Shrub/Vine	125	163	200
<b>Totals</b>	<b>600</b>	<b>1,300</b>	<b>1,800</b>

**Plant Species Composition (Lbs/Acre)**

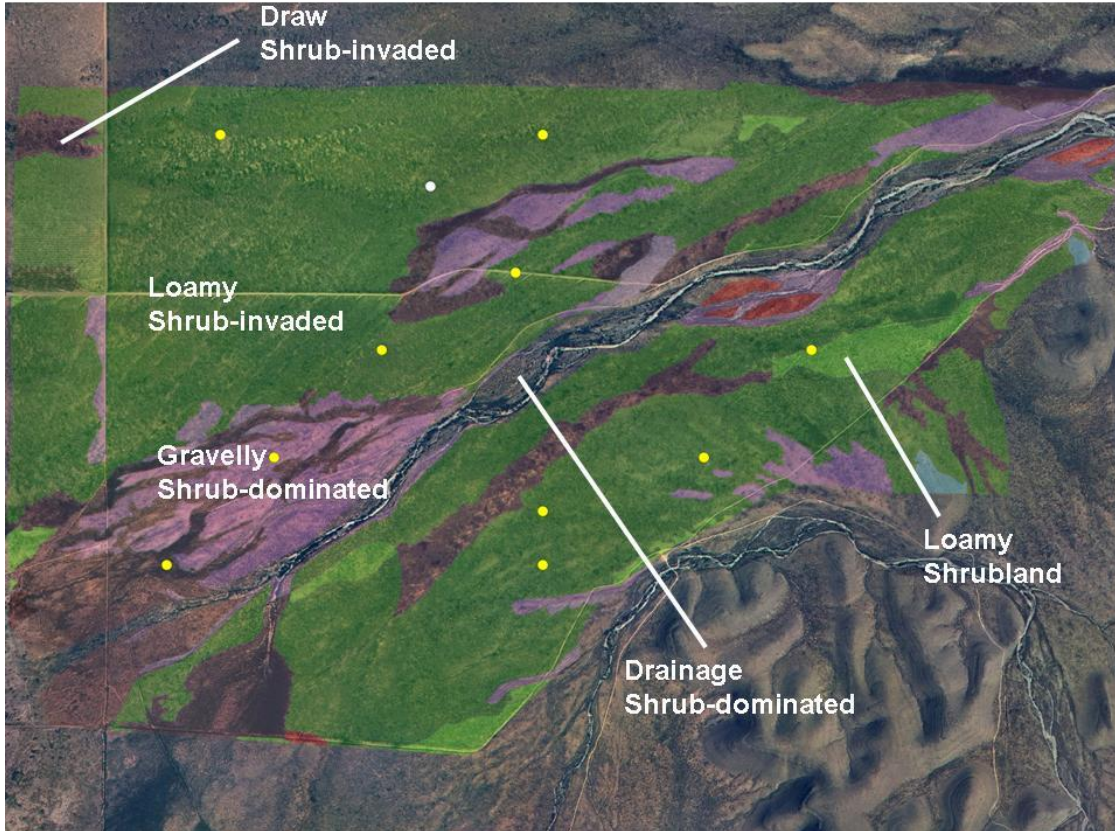
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
<b>1: Cool Season Mid-Rhizomatous</b>	western wheatgrass	<a href="#">Pascopyrum smithii</a>	260	390
	<b>2: Cool Season Mid-Bunch</b>			
	Indian ricegrass	<a href="#">Achnatherum hymenoides</a>	0	13
	squirreltail	<a href="#">Elymus elymoides ssp. elymoides</a>	0	13
<b>3: Warm Season Short Bunch</b>	needle and thread	<a href="#">Hesperostipa comata ssp. comata</a>	0	13
	green needlegrass	<a href="#">Nassella viridula</a>	65	195
	blue grama	<a href="#">Bouteloua gracilis</a>	260	325

Databased components of the STM

# Ecological site keys allow for field identification



# Applications



**Assistance in planning for conservation practices**

**Stratification and estimates for forage, carbon, or habitat inventory**

**Stratification for monitoring**

**Landscape –level planning**

**An ecological site/state map used for brush control planning and monitoring**