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

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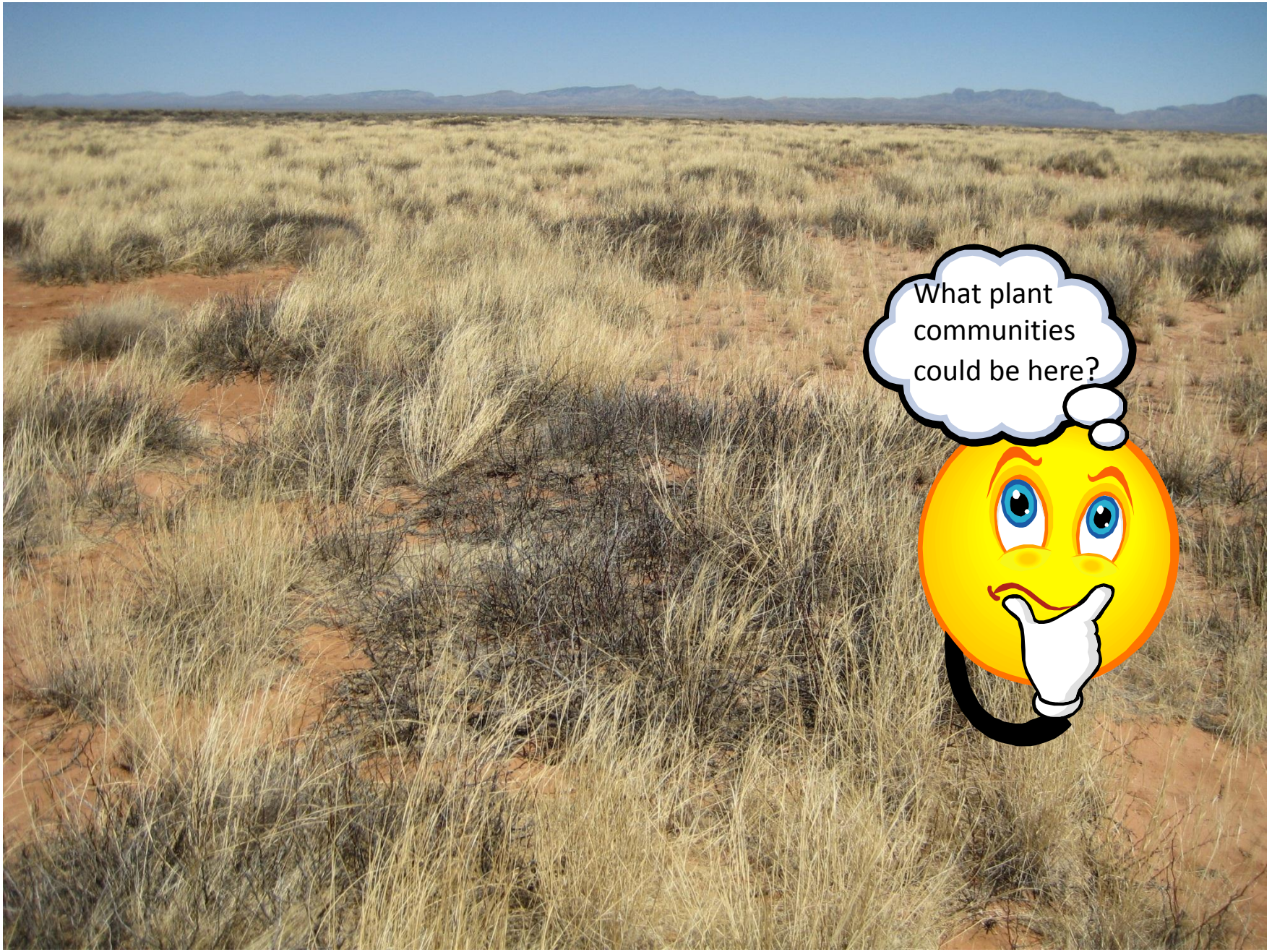
What services are provided by this site?


What plant communities used to be here?


What plant communities could be here?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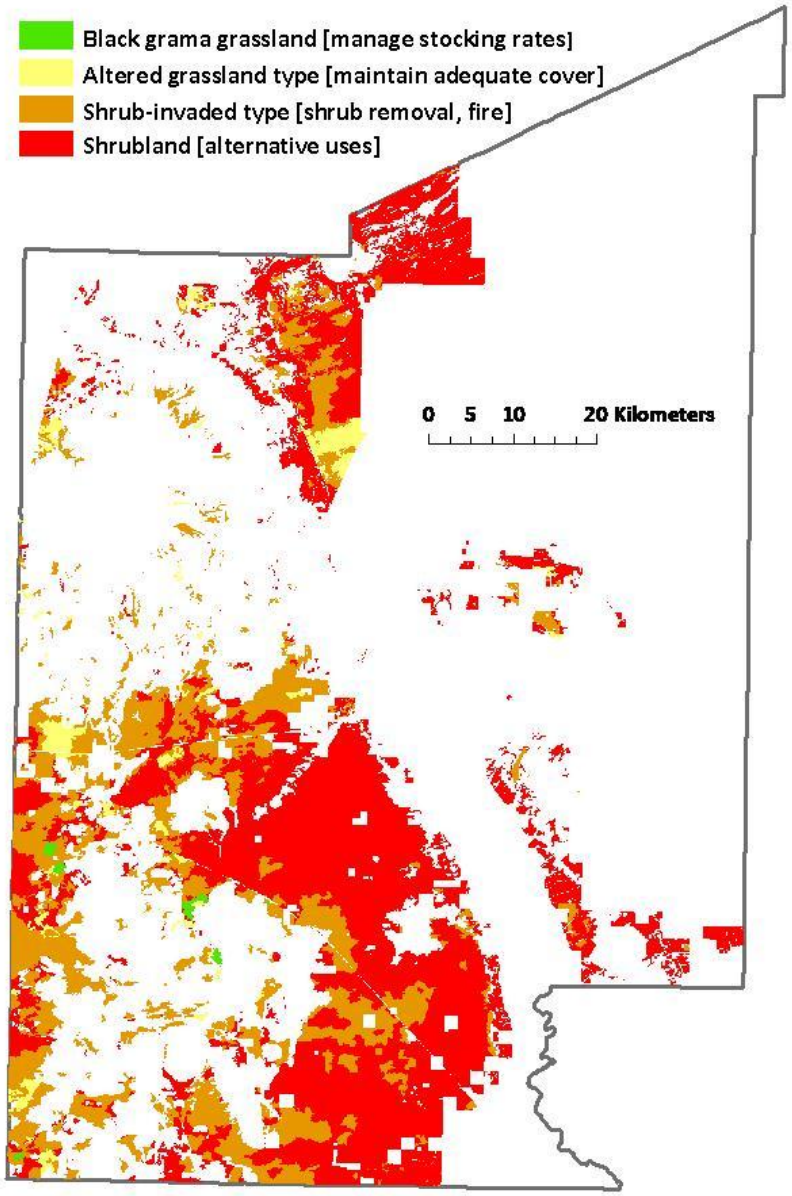
How should
I get (or keep)
what I want?



(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

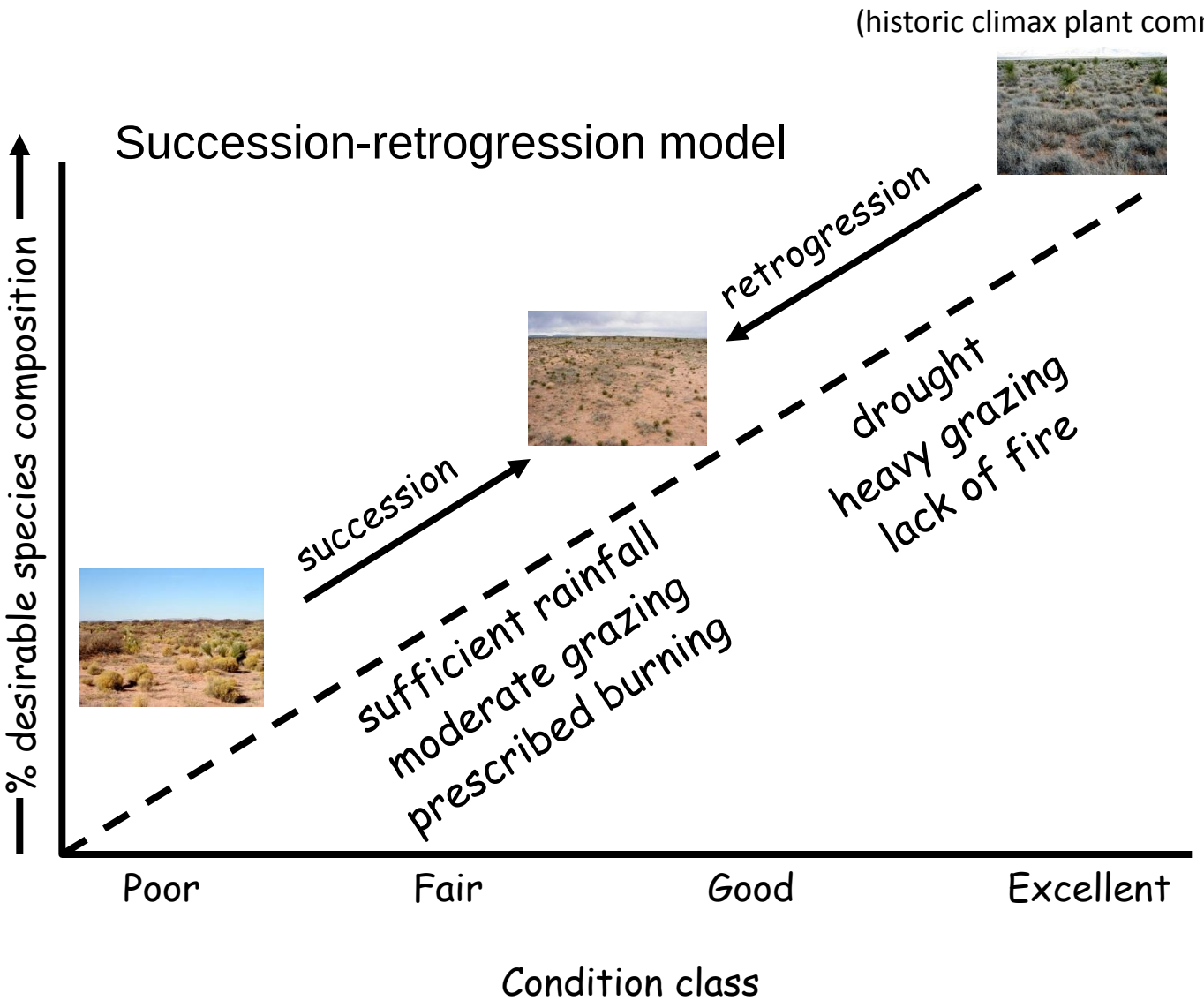
1. A short history
2. Parts of an ecological site description
3. How ecological sites are developed and linkage to soil mapping
4. State-and-transition models and their development
5. Tools to access ecological site descriptions
6. A brief example of use of ecological site information

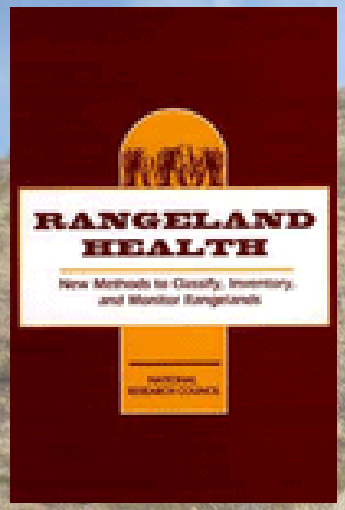
History of ecological sites

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)

Range Manage
t 271-282 May 1995

NEW CONCEPTS FOR ASSESSMENT OF RANGELAND CONDITION

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Abstract

Range condition score or classification does not tell us, in a literal sense, much of what managers and the public want to now about rangelands. Range condition is not a reliable ndicator, across all rangelands, of biodiversity, erosion otential, nutrient cycling, value for wildlife species, or productivity. Succession, the basis for the current concept of nge condition is not an adequate yardstick for evaluation of ngelands. The Society for Range Management (SRM) stablished the Task Group on Unity in Concepts and erminology 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 lost from an ecological site, the potential of the site is changed. The Task Group made three recommendations, which were adopted by the SRM: 1) evaluations of rangelands 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

Visual examples of some of these concepts will appear in an article to be published in *Rangelands* Vol. 17(3):83–92, June 1995.

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SRM Unity in Concepts and Terminology (1995)

- 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

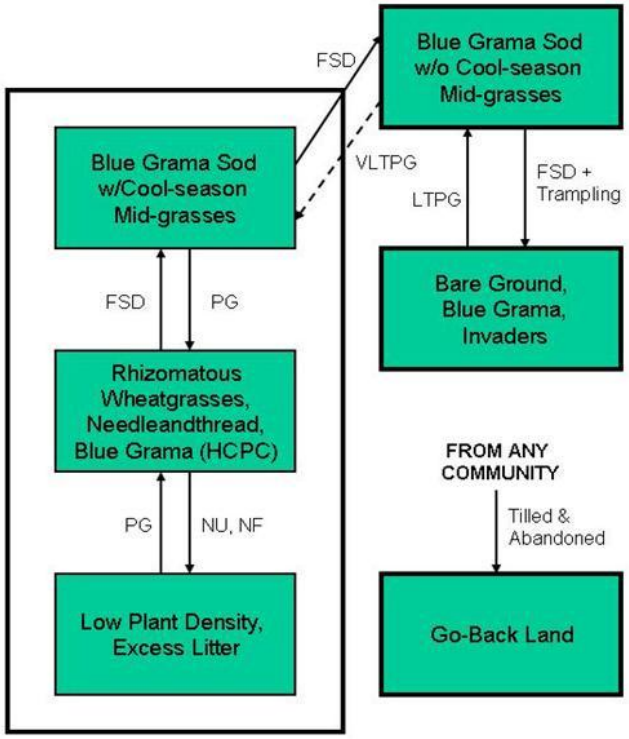
Permeability Class: Moderately slow To Moderate

	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 CaCl2):		
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.

Characteristics of states

Reference to minor variations

Reference to indicators

Causes of transitions to other states

and

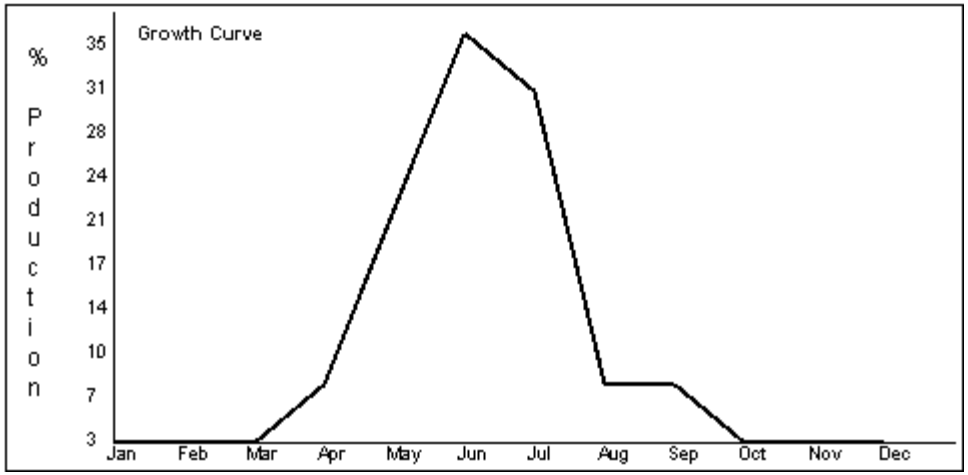
Reference to conservation practices

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

Rhizomatous Wheatgrasses, Needleandthread, Blue Grama Plant Community Plant Species Composition:

Grass/Grasslike

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

Site Name	Site ID	Site Narrative
Shallow Loamy (SwLy) 12-17” Precipitation Zone	R067AY162WY	Shallow Loamy 12-17 ” P.Z.

Similar Sites:

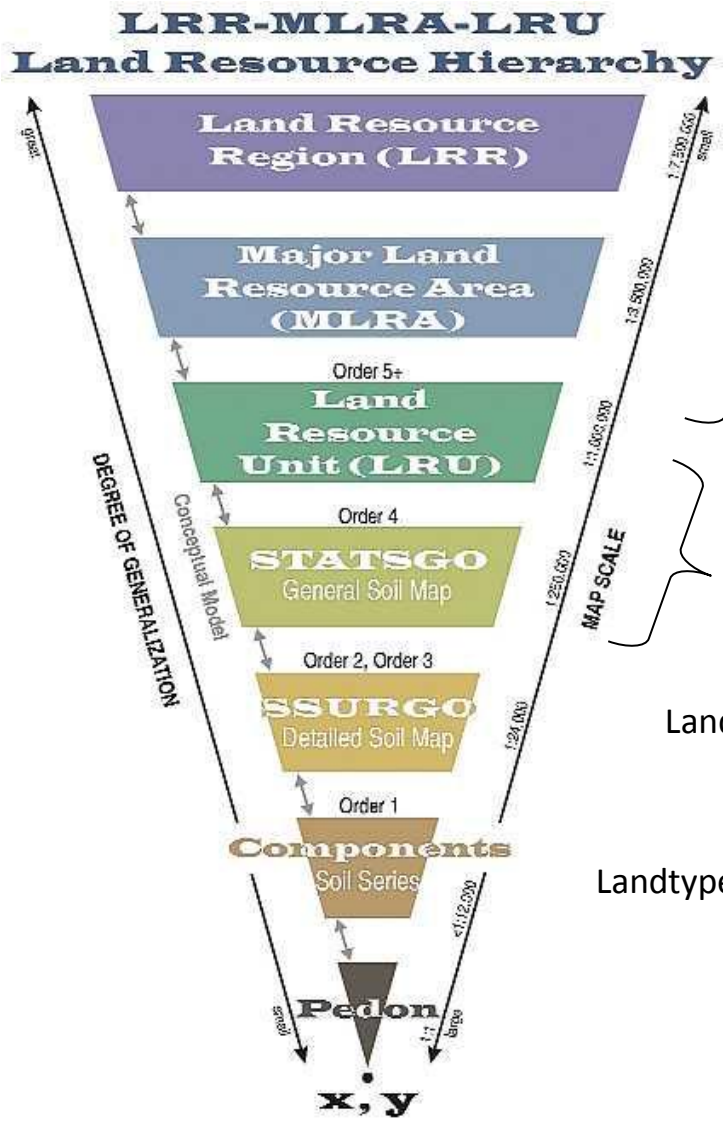
Site Name	Site ID	Site Narrative
Clayey (Cy) 12-17” Precipitation Zone	R067AY104WY	Clayey 12-17” P.Z. has more western wheatgrass
Loamy Overflow (LyO) 12-17” Precipitation Zone	R067AY126WY	Loamy Overflow 12-17” P.Z. is more productive
Sandy (Sy) 12-17” Precipitation Zone	R067AY150WY	Sandy 12-17” P.Z.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

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



National Hierarchical Framework of Ecological Units

Domain, division, province

Section

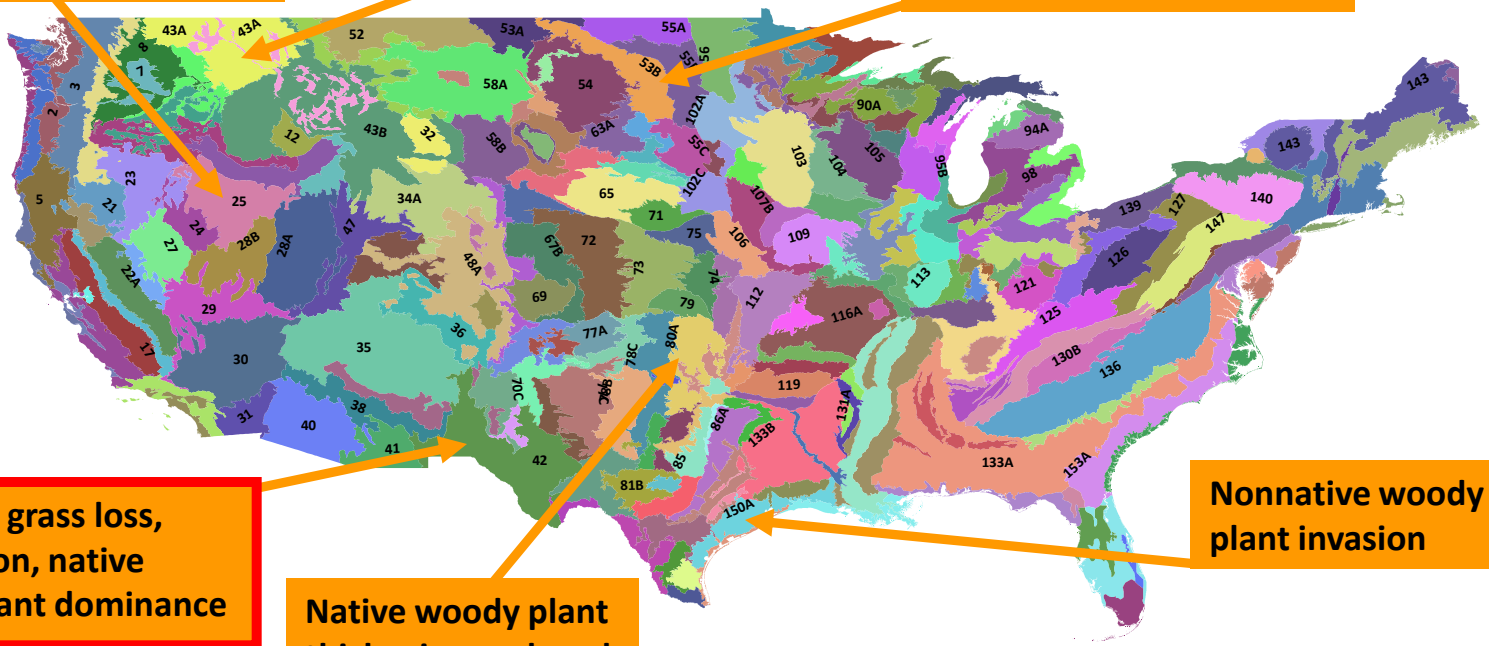
Subsection

Landtype

Landtype phase

MLRAs contain a set of related ecological sites

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

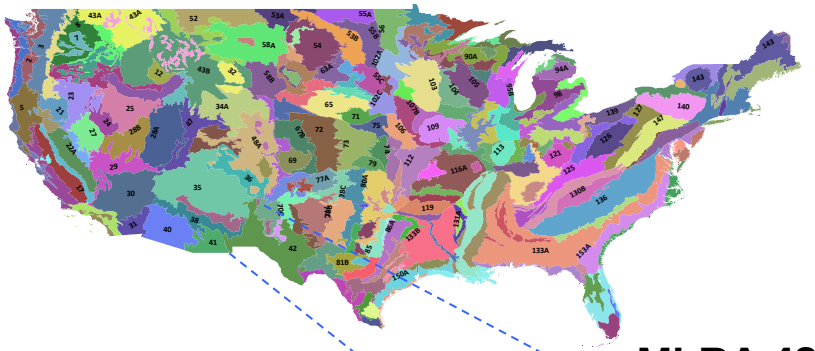


Major Land Resource Areas of the continental USA

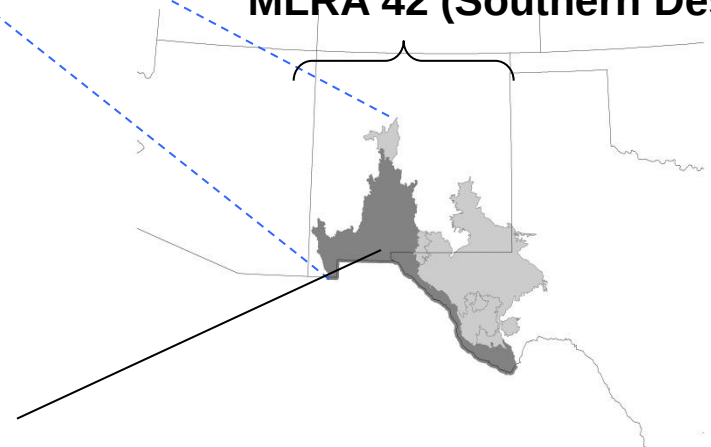
Sometimes LRUs are recognized that subdivide an MLRA based on local climate

-LRUs then contain a set of associated ecological sites

-in some MLRAs, LRUs are not mapped (due to elevation/aspect variations)

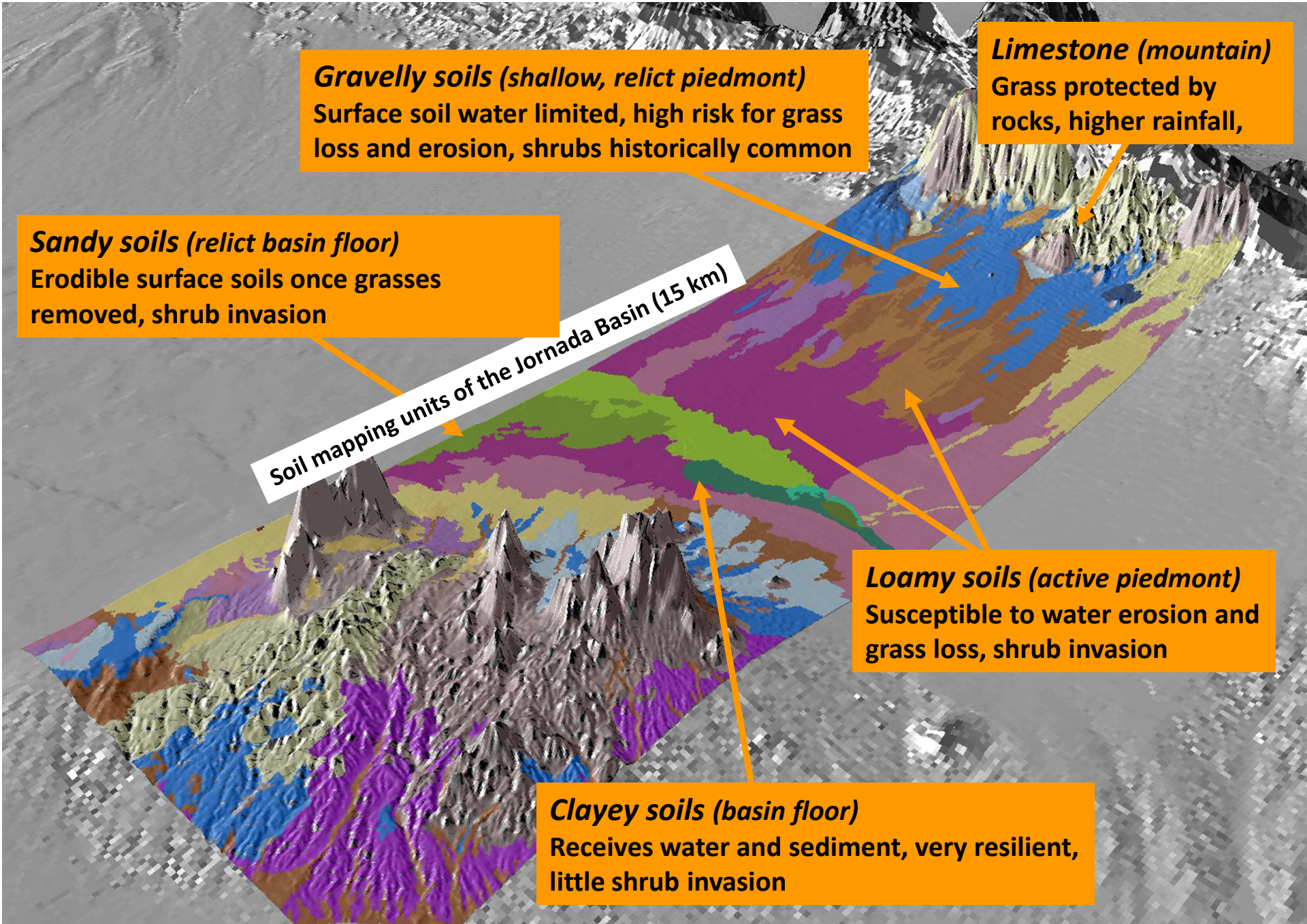


MLRA 42 (Southern Desertic Basins, Plains, and Mountains)



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

Develop concepts for how to subdivide the landscape



Soil-landscape properties used to classify ecological sites

Slope and aspect

Landscape position
(run-in vs. run off)

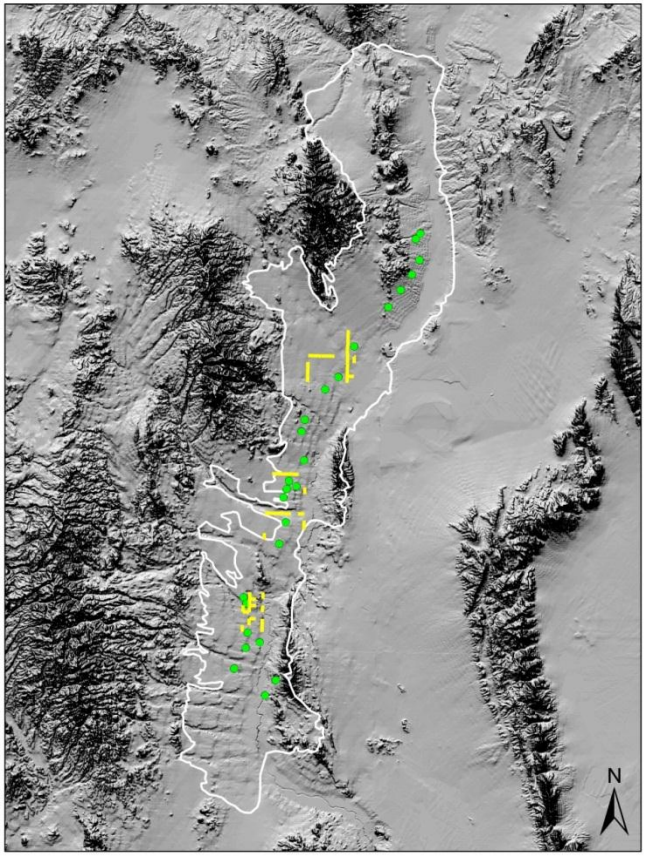
Soil texture
(by depth)

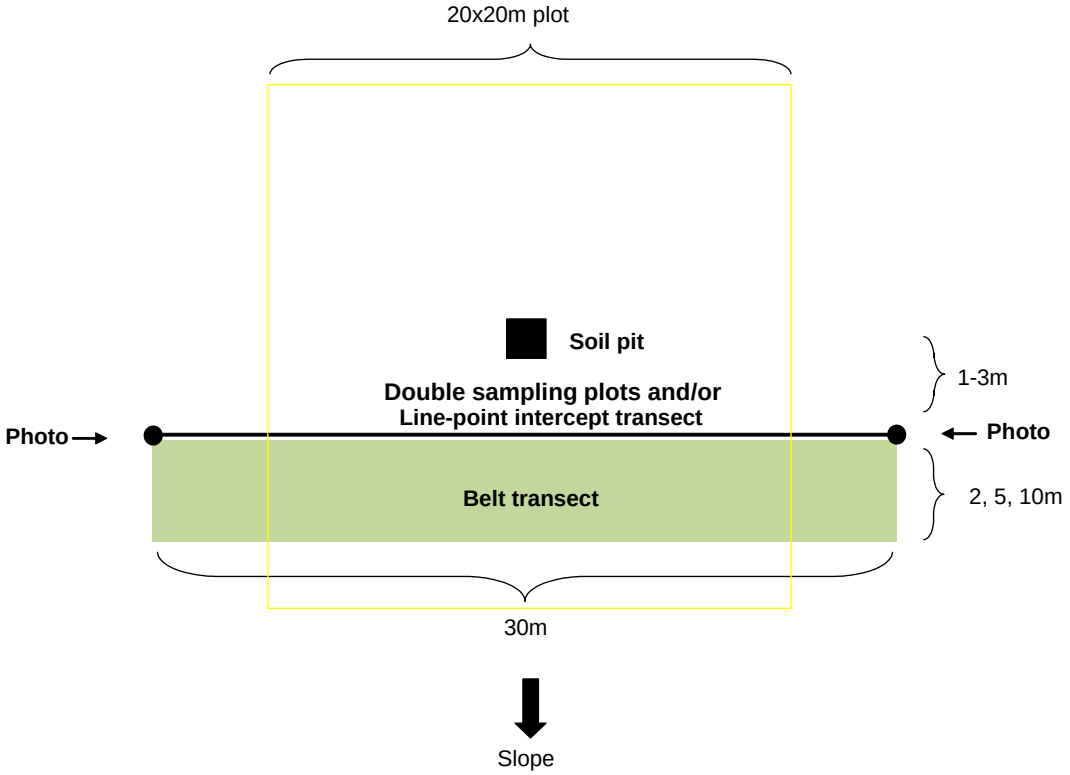
Soil chemistry
(gypsum, sodium)

Soil depth
(kind of restrictive horizon)

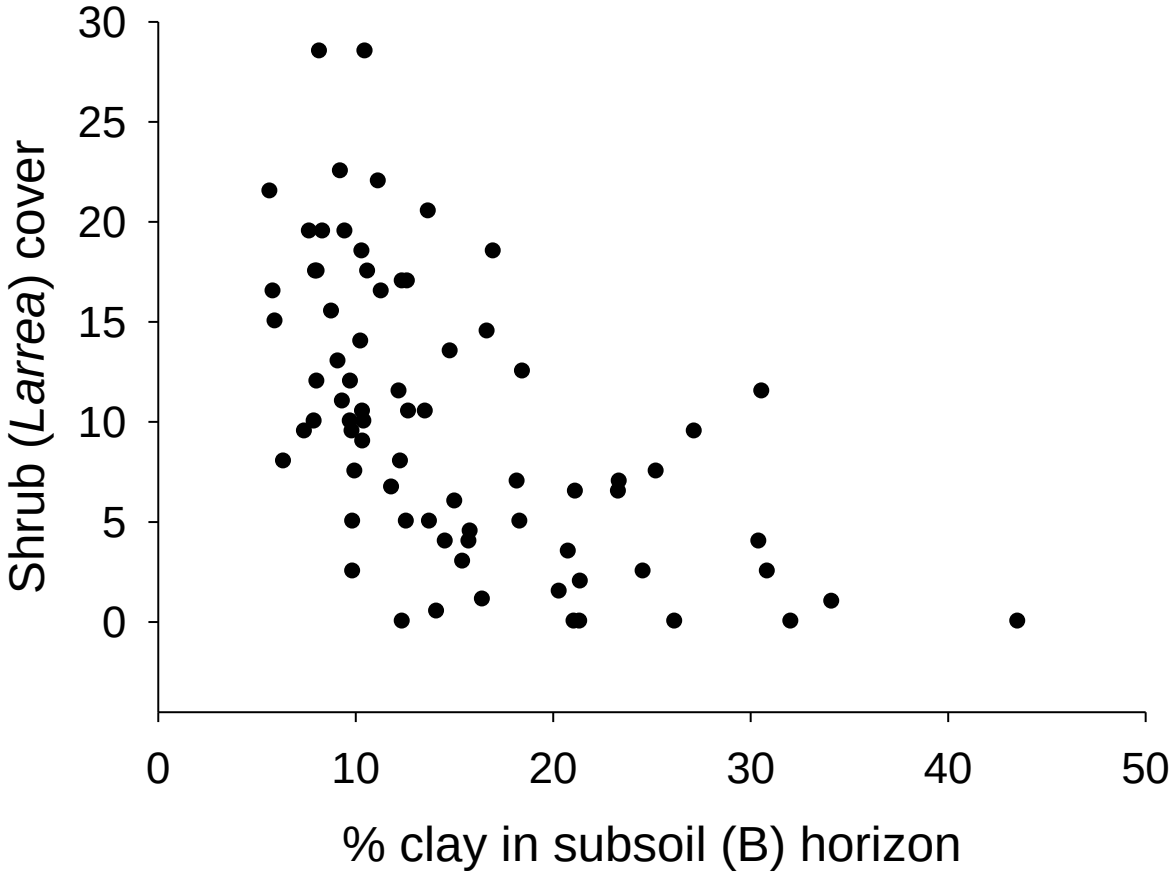
Use inventory to gather data and test ecological site concepts

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

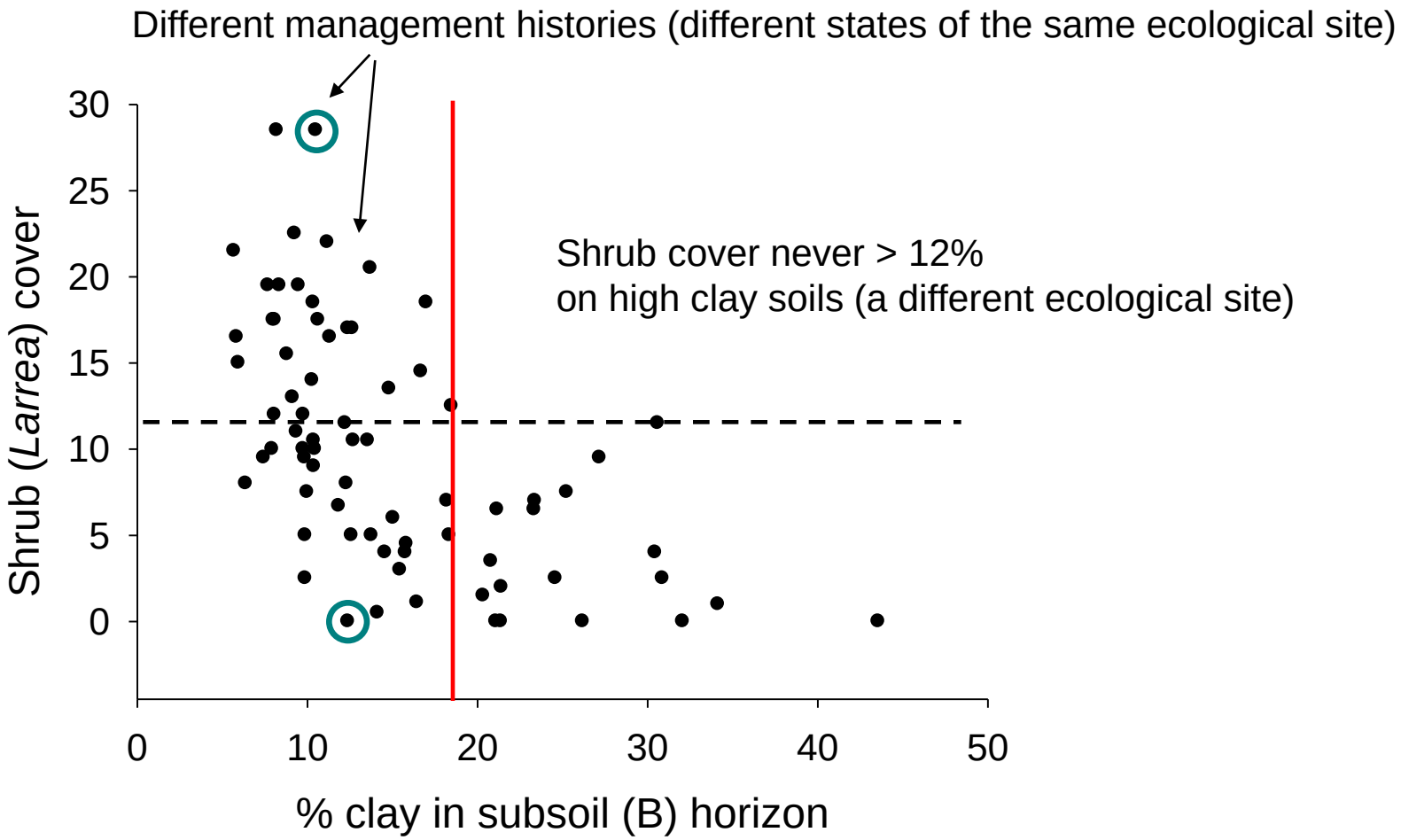




Use inventory to gather data and test ecological site concepts

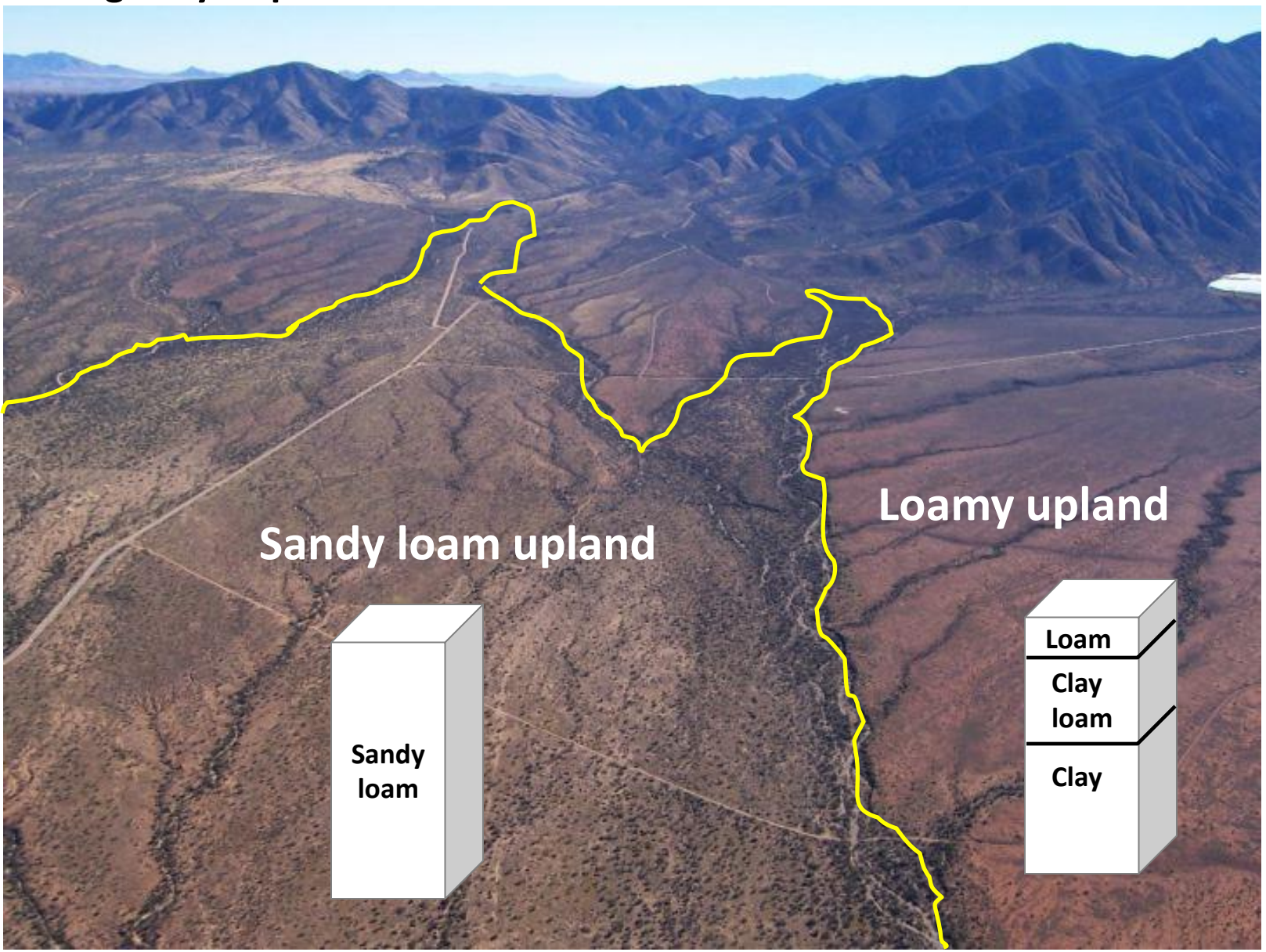


Inventory as a learning process



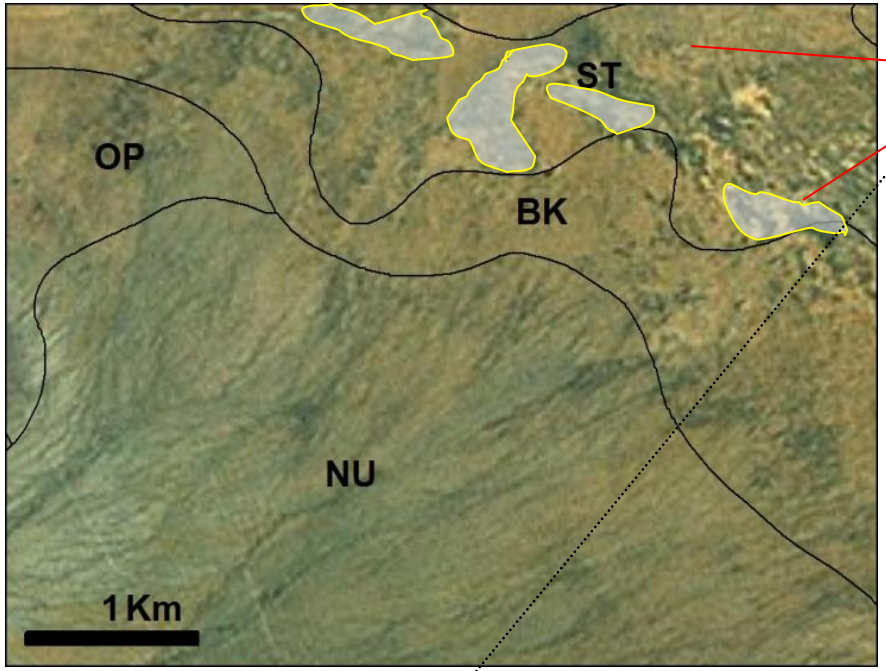
Data support recognition of two "gravelly" ecological sites

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*

ST: Stellar association
40% Stellar clay loam, 0-3% slopes = *Clayey*
40% Stellar clay loam, 0-3% slopes, flooded = *Bottomland*
20% other inclusions

BK: Berino-Dona Ana association
50% Berino fine sandy loam, 1-5 % slopes = *Sandy*
30% Dona Ana fine sandy loam, 1-5% slopes = *Sandy*
20% other inclusions

OP: Onite-Pajarito association
40% Onite loamy sand, 1-4% slopes = *Sandy*
30% Pajarito fine sandy loam, 0-5% slopes = *Sandy*
15% Pintura fine sand, 0-5% slopes = *Deep sandy*
15% other inclusions

A soil map unit can contain more than one ecological site

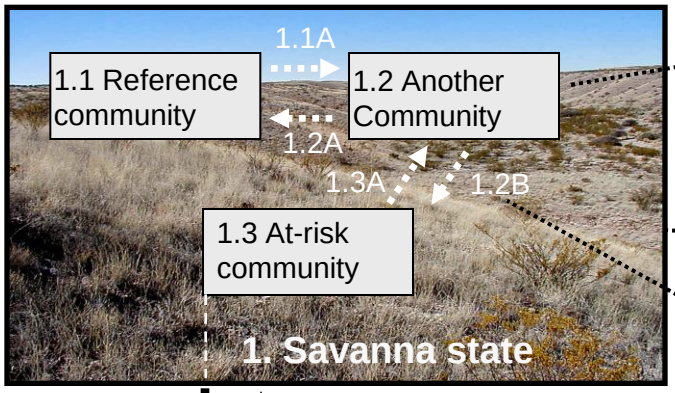
An ecological site groups several similar soil map unit components

State-and-transition models

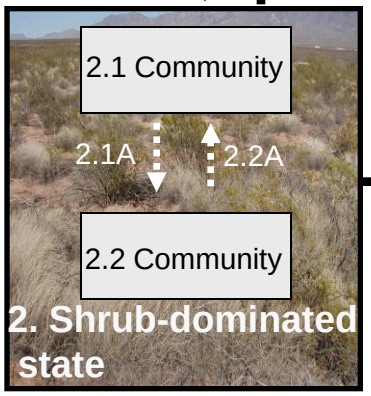
Data-supported descriptions of the multiple conditions or states of an ecosystem and the processes causing transitions among states

- *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*

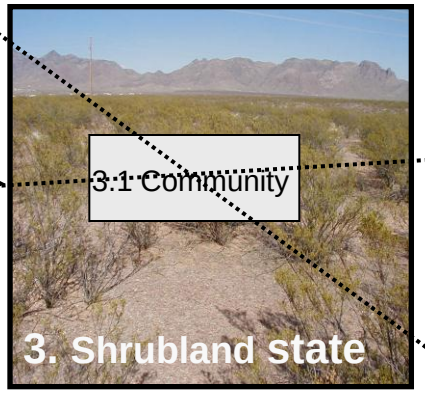
State-and-transition models now feature standardized approaches for the production of narratives (not yet fully adopted)



T1A R1A



T2A



Community phase
Bush muhly-creosotebush community

State
Savanna state

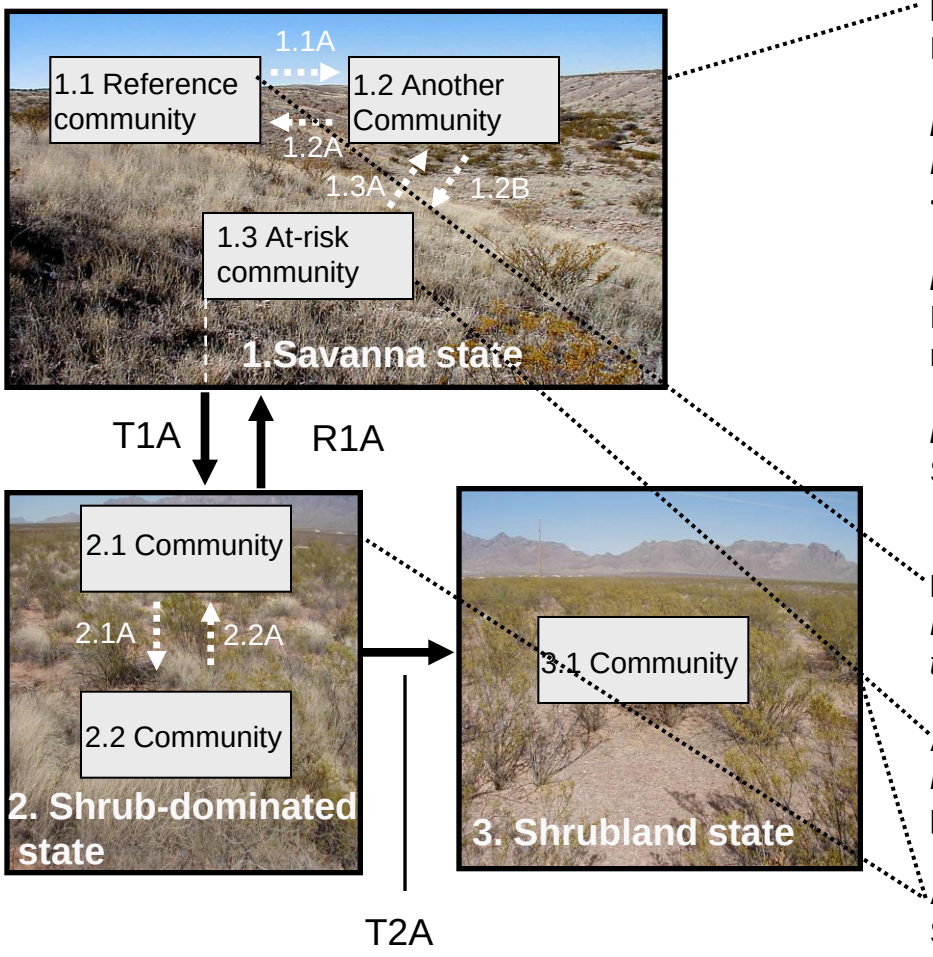
Community pathway
Winter-spring rainfall exceeds 100 mm

Transition
Loss of perennial grasses and soil erosion that favors woody plant dominance and alters productivity

Restoration pathway
Control of woody plants with clopyralid + triclopyr mixture followed by two growing season rest results in increased grass establishment

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

Specific components of state descriptions



Reference state
Black grama-creosotebush savanna (historical + extant)

Indicators/Diagnosis
Bouteloua eriopoda >15% foliar cover, *Larrea tridentata* <12% foliar cover, little erosion

Ecological Feedbacks
Perennial grass continuity promotes soil and water retention and fire

Management
Summer grazing rest in drought, fire every 20 years

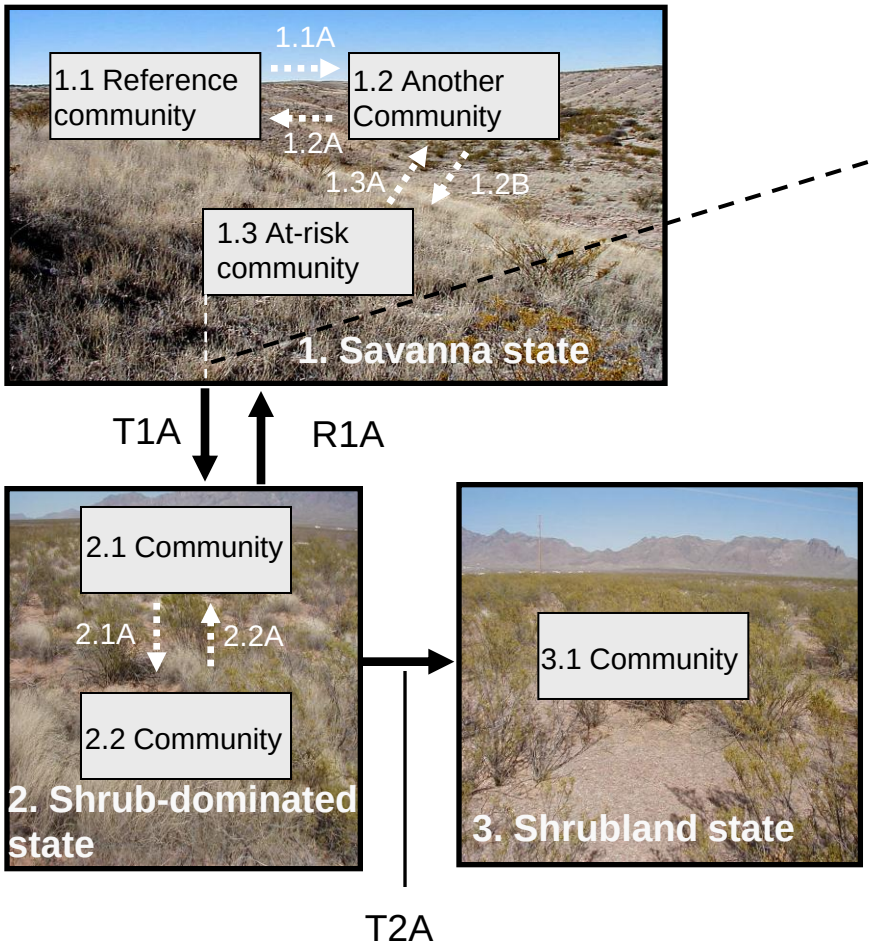
Reference community phase
Bouteloua eriopoda (15-60% foliar cover), *Larrea tridentata* (1-5% foliar cover)

At-risk community phase
Bouteloua eriopoda (3-5% foliar cover), large bare patches

Alternative states
Shrub-dominated, shrubland states

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

Specific components of transition descriptions



Transition (T)

Slow variables and triggers
Chronic heavy defoliation coupled to multi-year drought events

Threshold
Black grama grass cover loss to < 3% and inability to recover continuity via vegetative growth

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)**

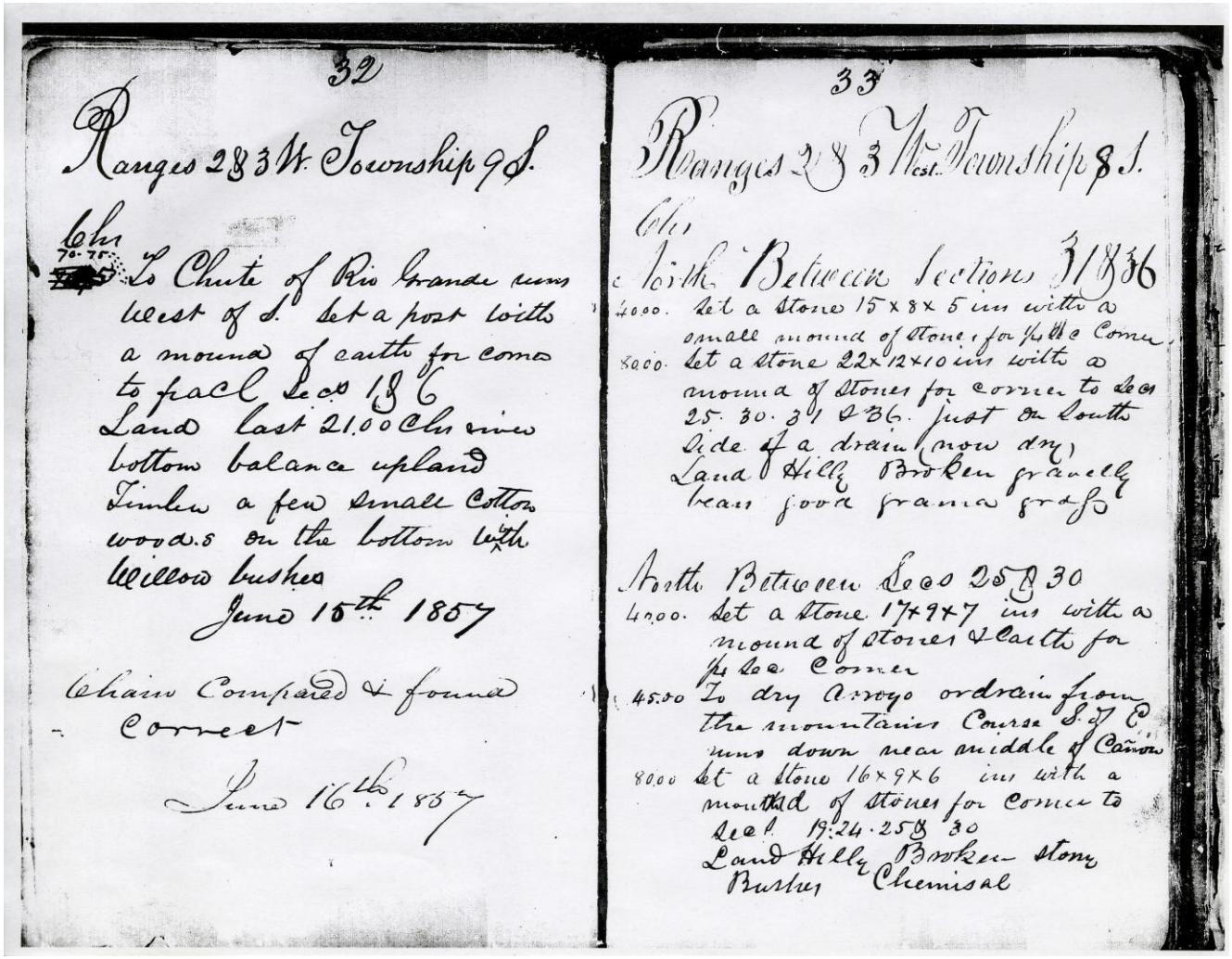
often requires soil sampling to associate data to an ecological site

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



32

Ranges 2 & 3 W. Township 9 S.

6 chs 70-75 To Chute of Rio Grande runs West of S. Set a post with a mound of earth for corner to sec 18 & 6 Land last 21.00 Chs river bottom balance upland Timber a few small cotton woods on the bottom with Willow bushes

June 15th 1857

Chains Compared & found Correct

June 16th 1857

33

Ranges 2 & 3 West Township 8 S.

6 chs

North Between Sections 31 & 36

40.00. Set a Stone 15 x 8 x 5 ins with a small mound of stones for ¼ Sec Corner

80.00. Set a Stone 22 x 12 x 10 ins with a mound of Stones for corner to Secs 25. 30. 31 & 36. just on South Side of a drain (now dry) Land Hilly Broken gravelly bear good grama grass

North Between Secs 25 & 30

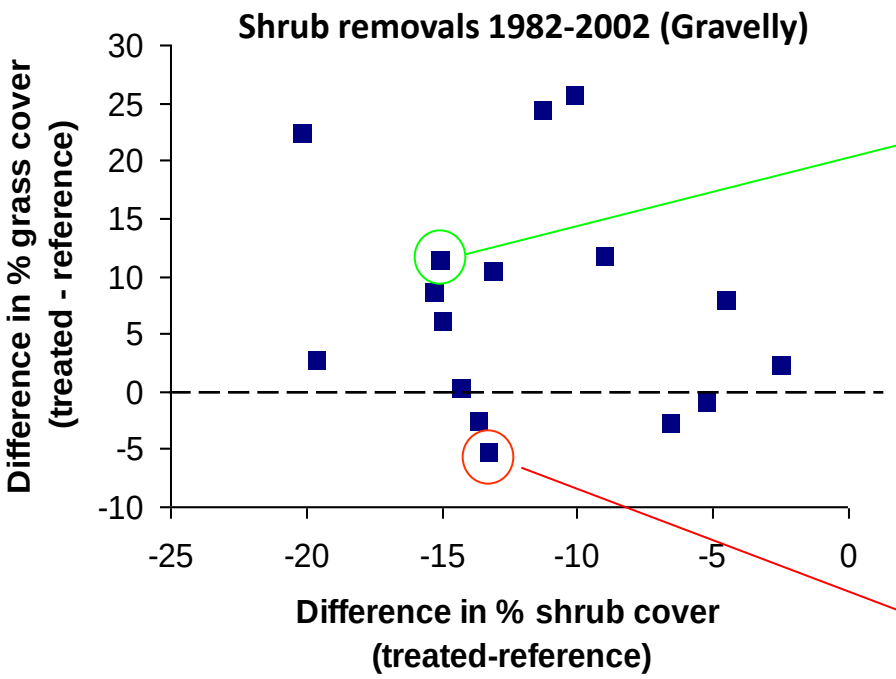
40.00. Set a Stone 17 x 9 x 7 ins with a mound of Stones & Earth for ¼ Sec Corner

45.00 To dry Arroyo or drain from the mountains Course S. & E. runs down near middle of Cañon

80.00 Set a Stone 16 x 9 x 6 ins with a mound of Stones for Corner to Secs 19. 24. 25 & 30 Land Hilly Broken stony Bushy Chemisal

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

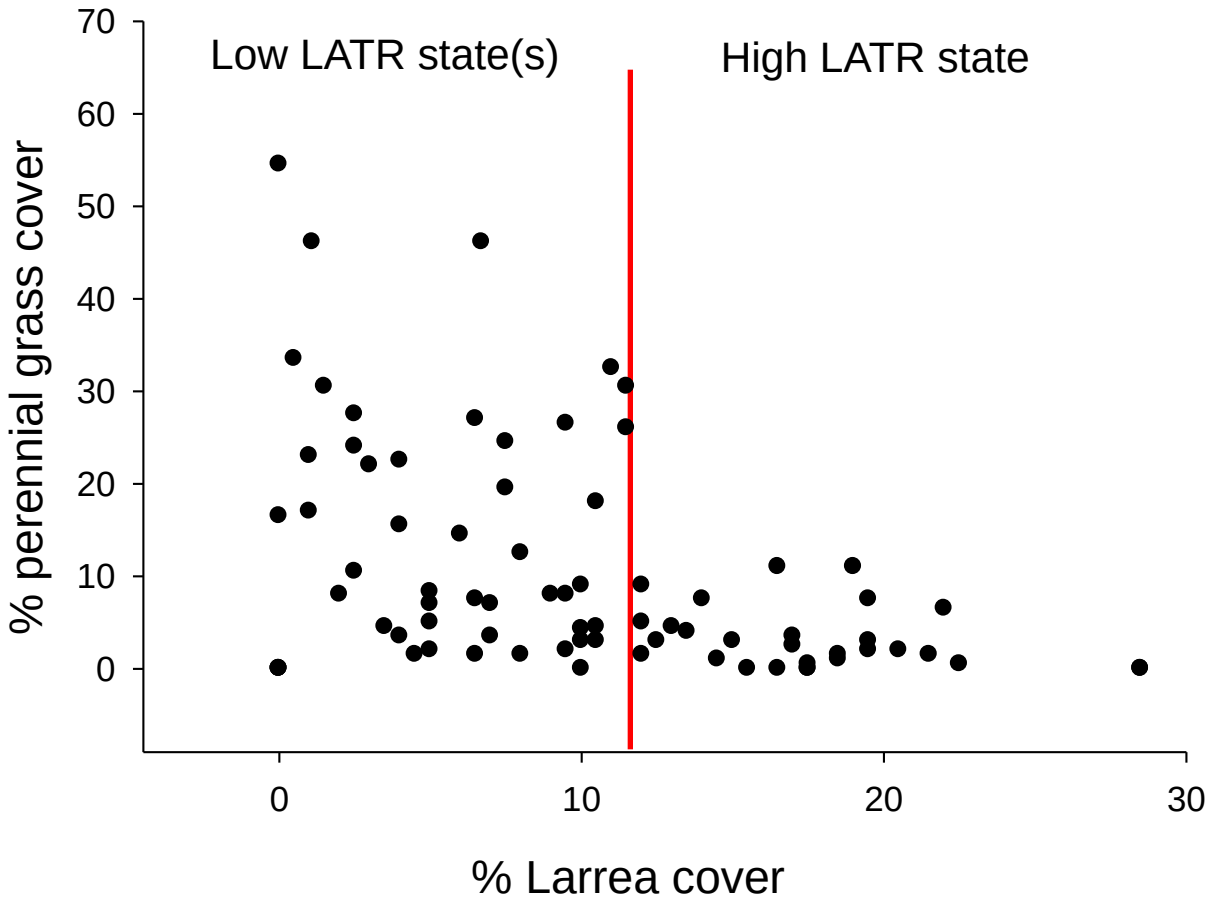
Historical reconstructions to describe restoration outcomes



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*
 **Shrub savanna state**	Grass cover is > 15% only small bare patches	Keep on doing what you're doing, maybe prescribed fire
 **Shrub-dominated state**	Shrub cover >12%, few grass patches, interconnected bare areas	Summer grazing rest, shrub control to increase grasses
 **Shrubland state**	Shrub cover >12%, absence of perennial grasses, eroded soil	Long-term rest to take, advantage of very rainy years, shrub control avoided

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 Soil Survey People Projects Software Site Map

Index Page

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

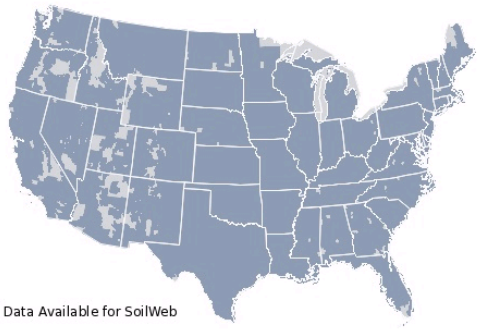
SoilWeb: An Online Soil Survey Browser

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.

SSURGO Map Units

STATSGO Map Units



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.

http://casoilresource.lawr.ucdavis.edu/drupal/

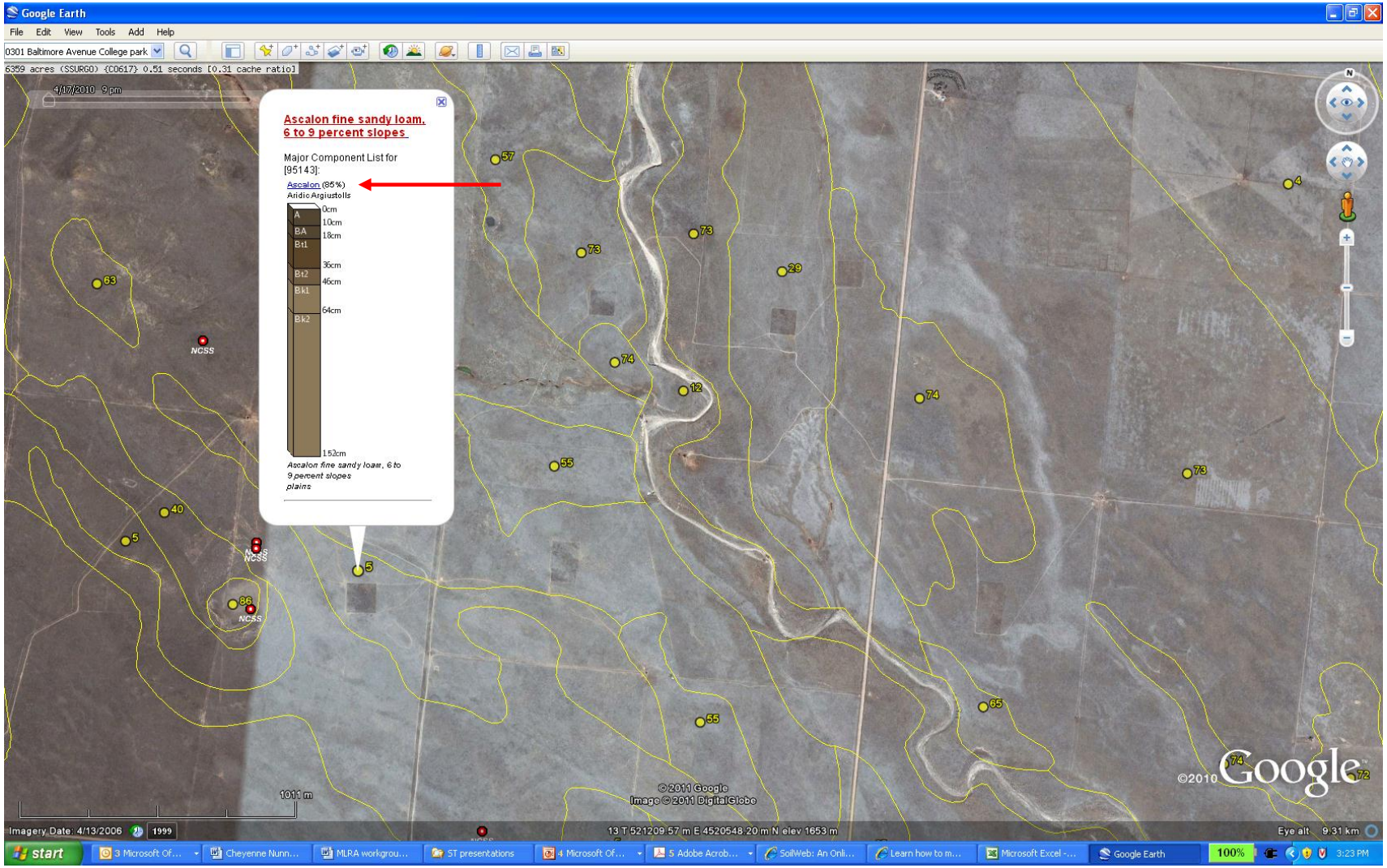
Internet 100%

http://casoilresource.lawr.ucdavis.edu/drupal/node/902

Accessing ecological site descriptions

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

Accessing ecological site descriptions



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

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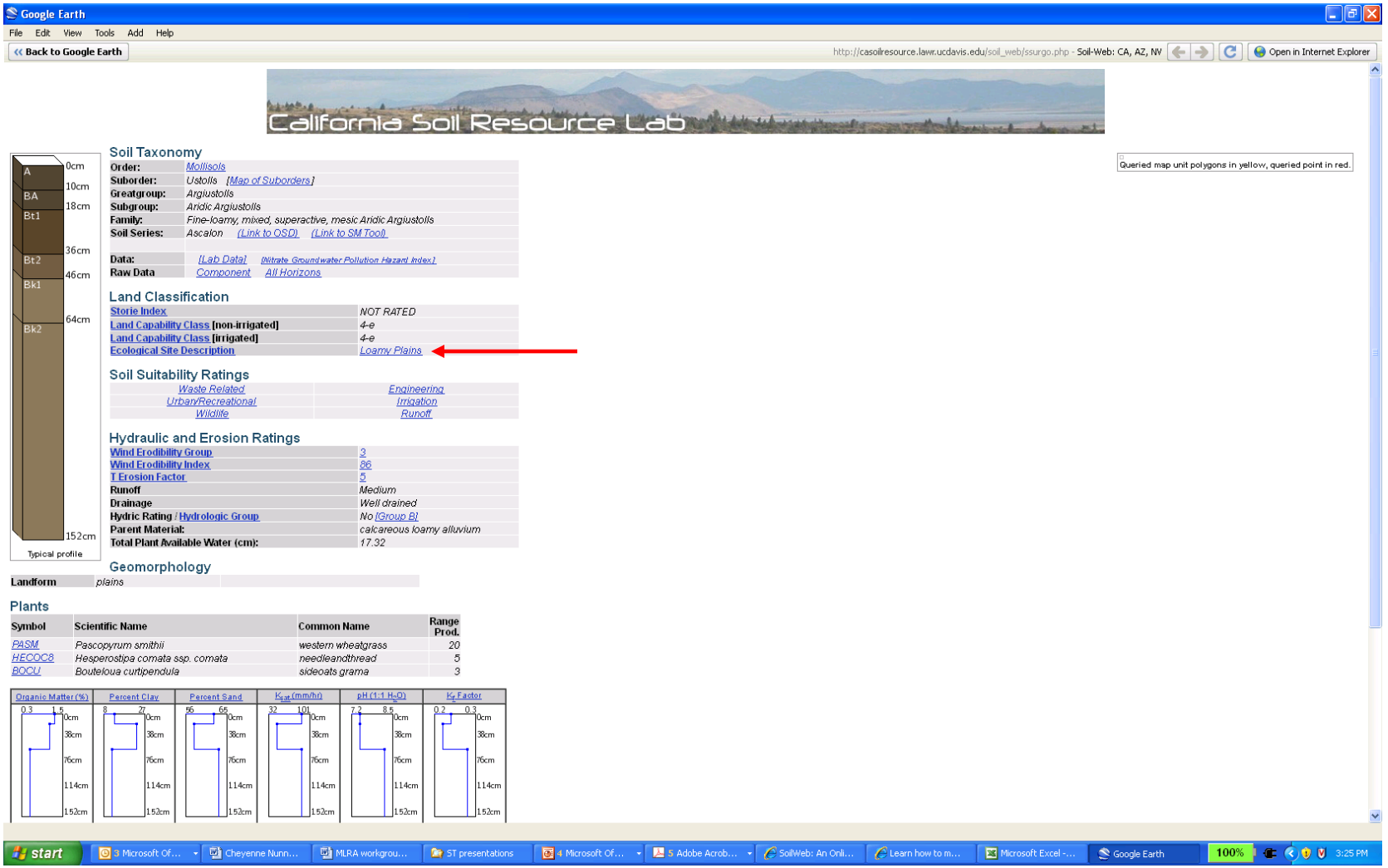

Click on ecological site name

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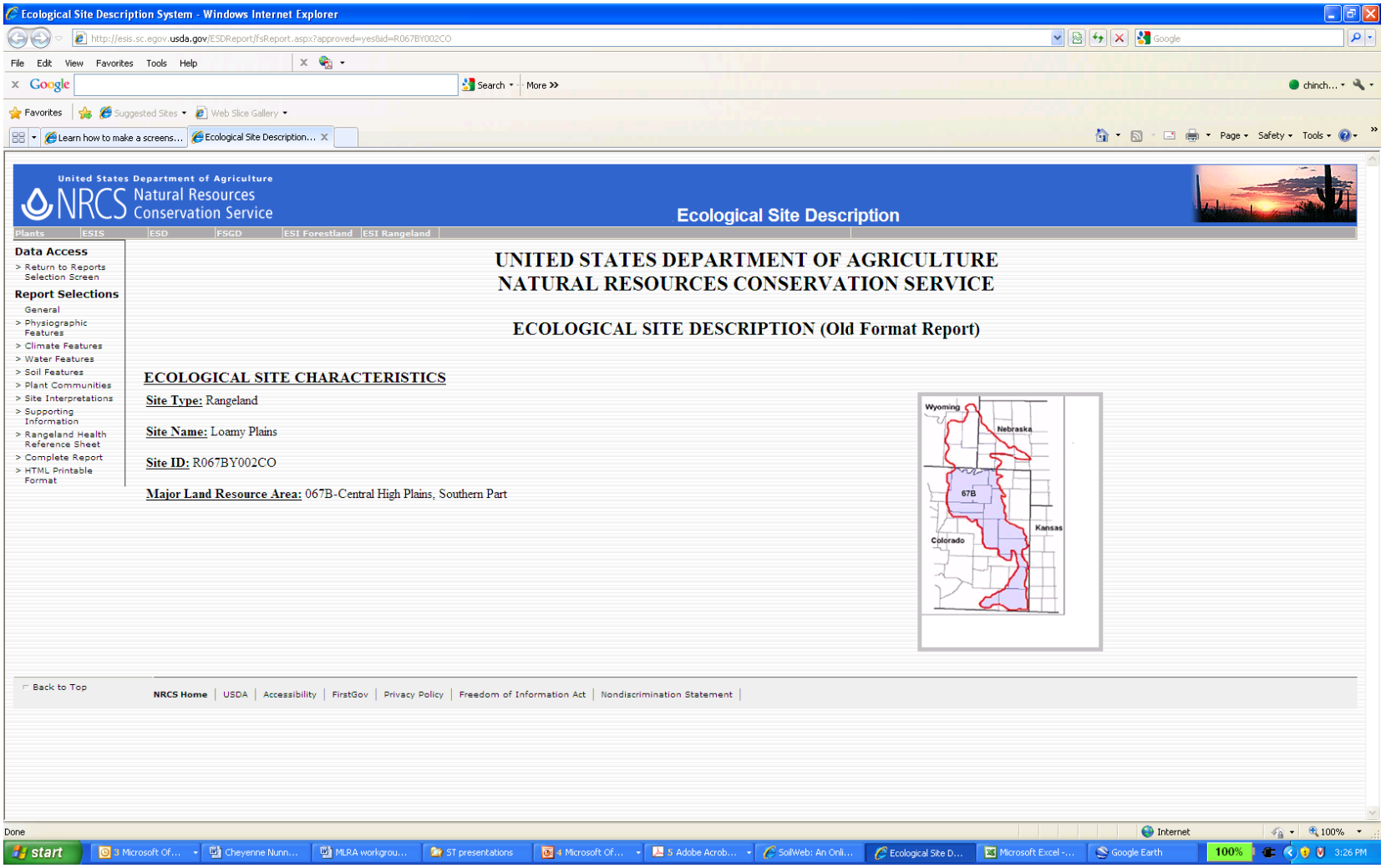
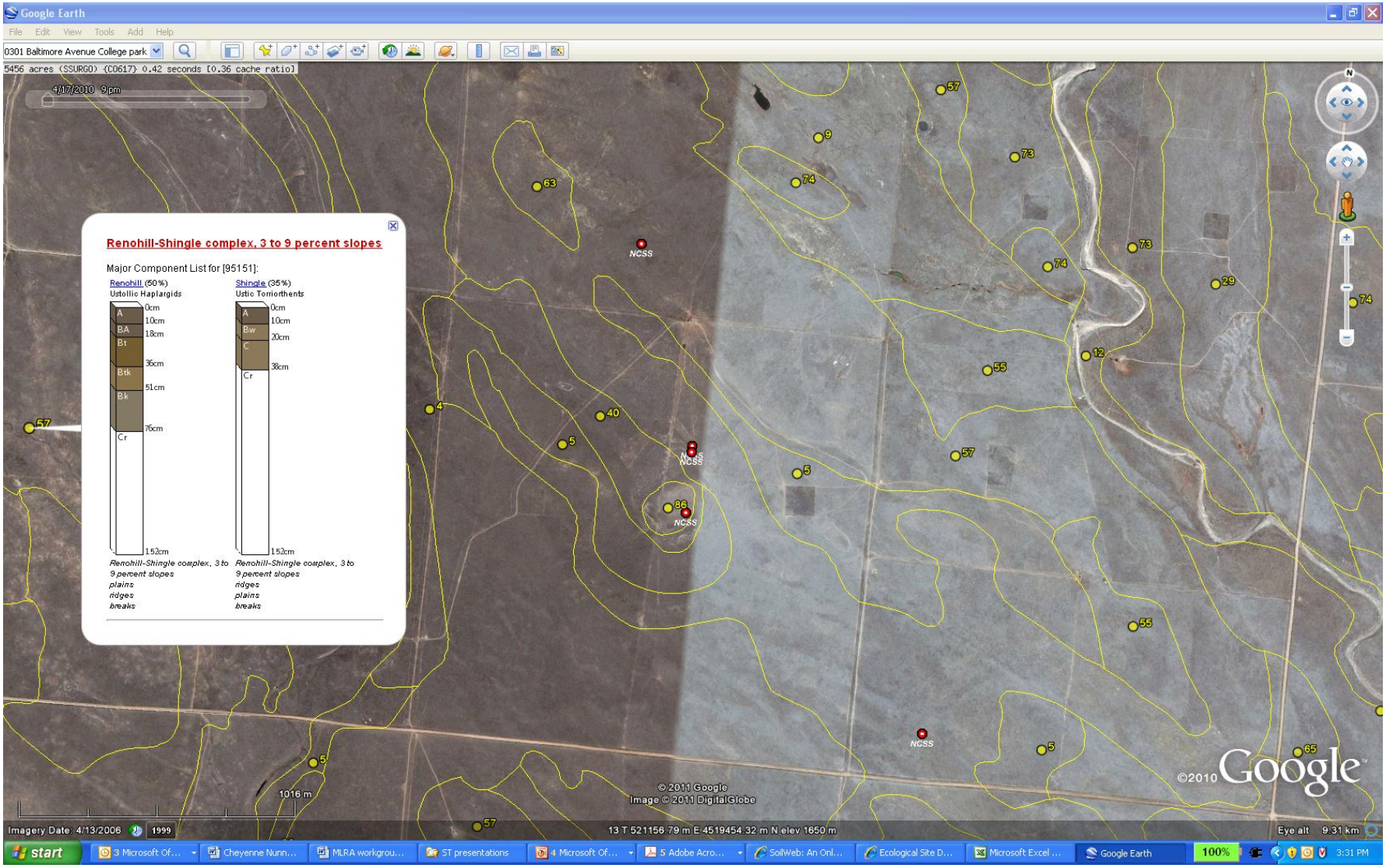


Enjoy

Accessing ecological site descriptions

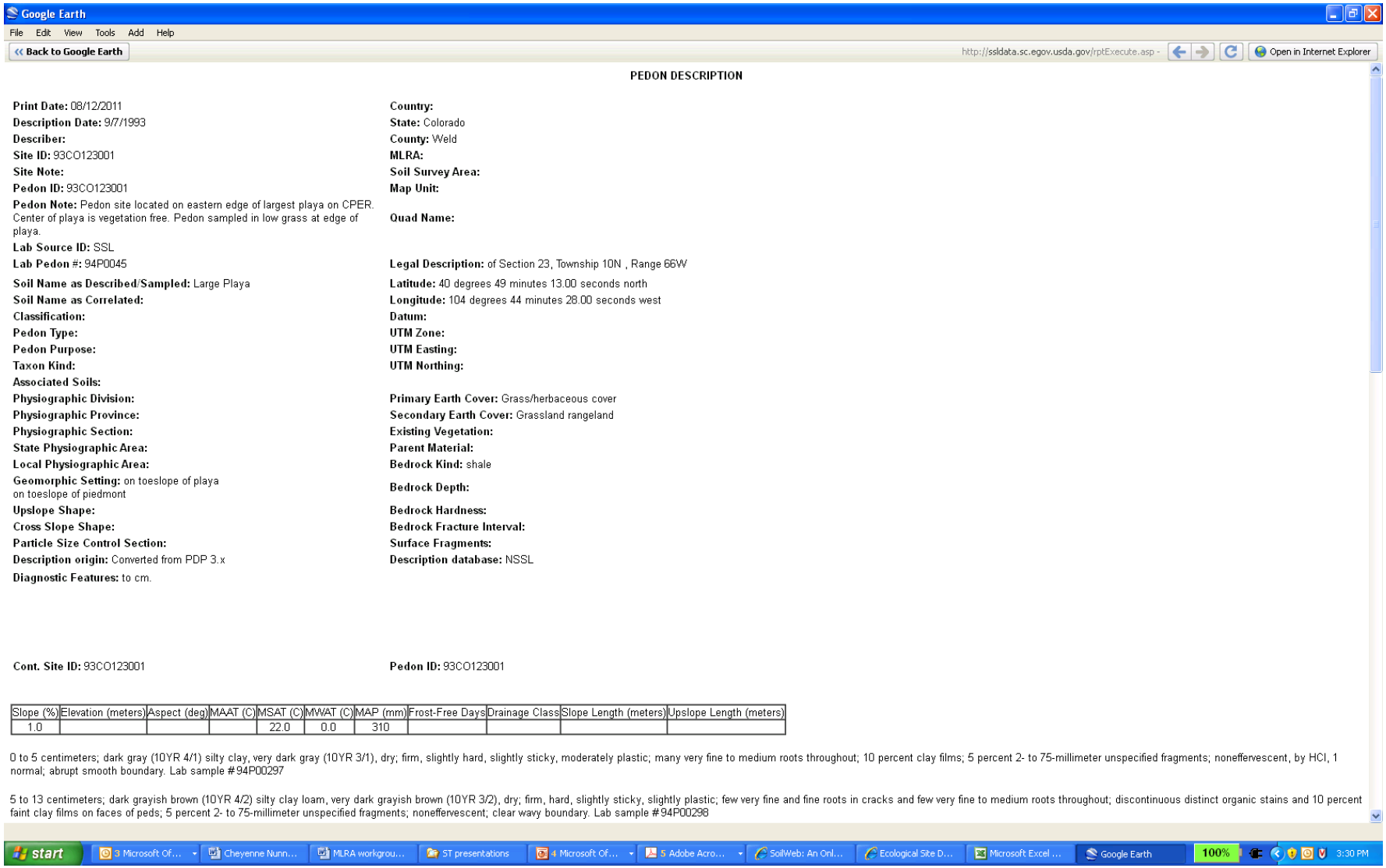


When confronted with two soil components, dig a hole

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

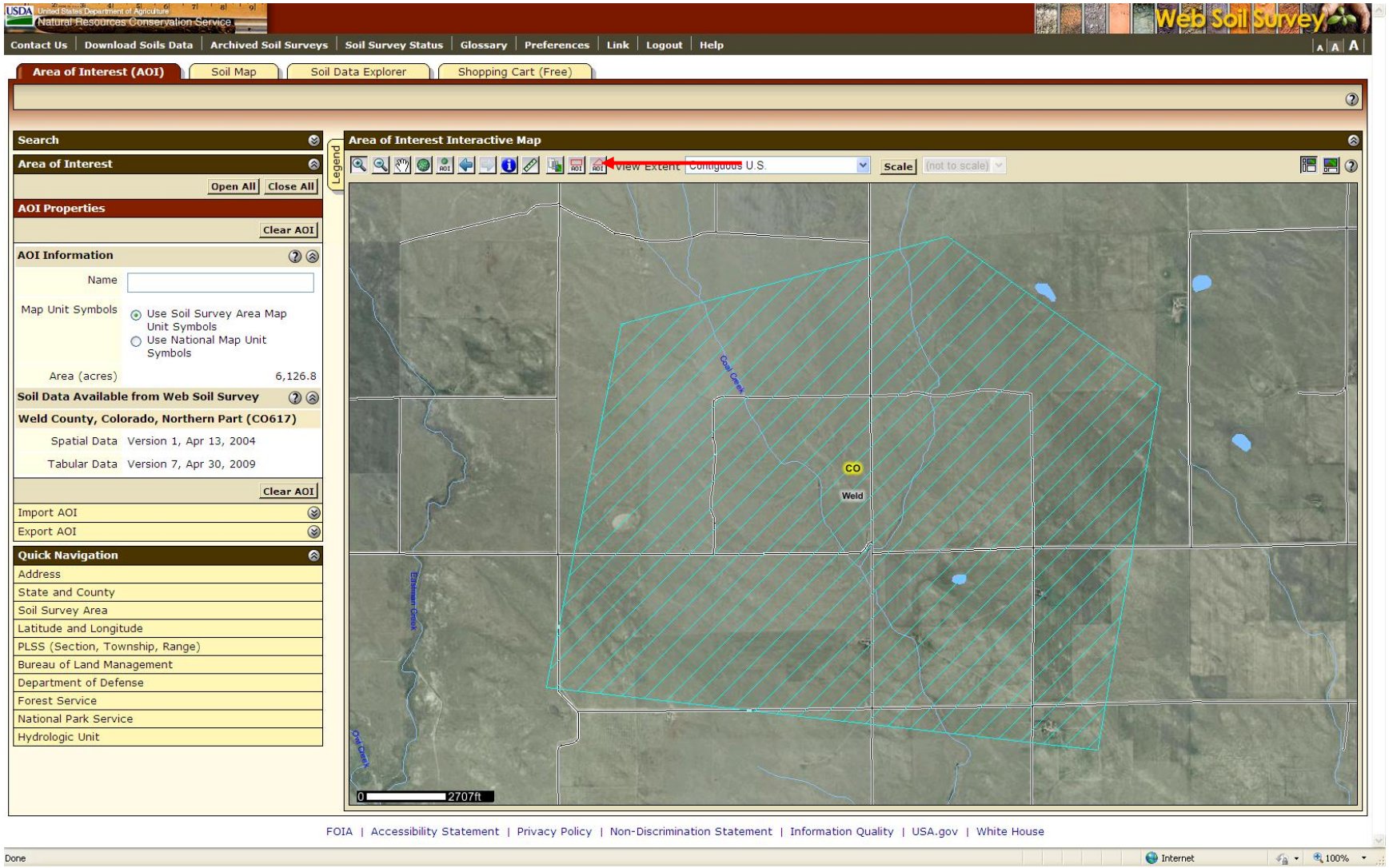
5 to 13 centimeters; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2), dry; firm, hard, slightly sticky, slightly plastic; few very fine and fine roots in cracks and few very fine to medium roots throughout; discontinuous distinct organic stains and 10 percent faint clay films on faces of peds; 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

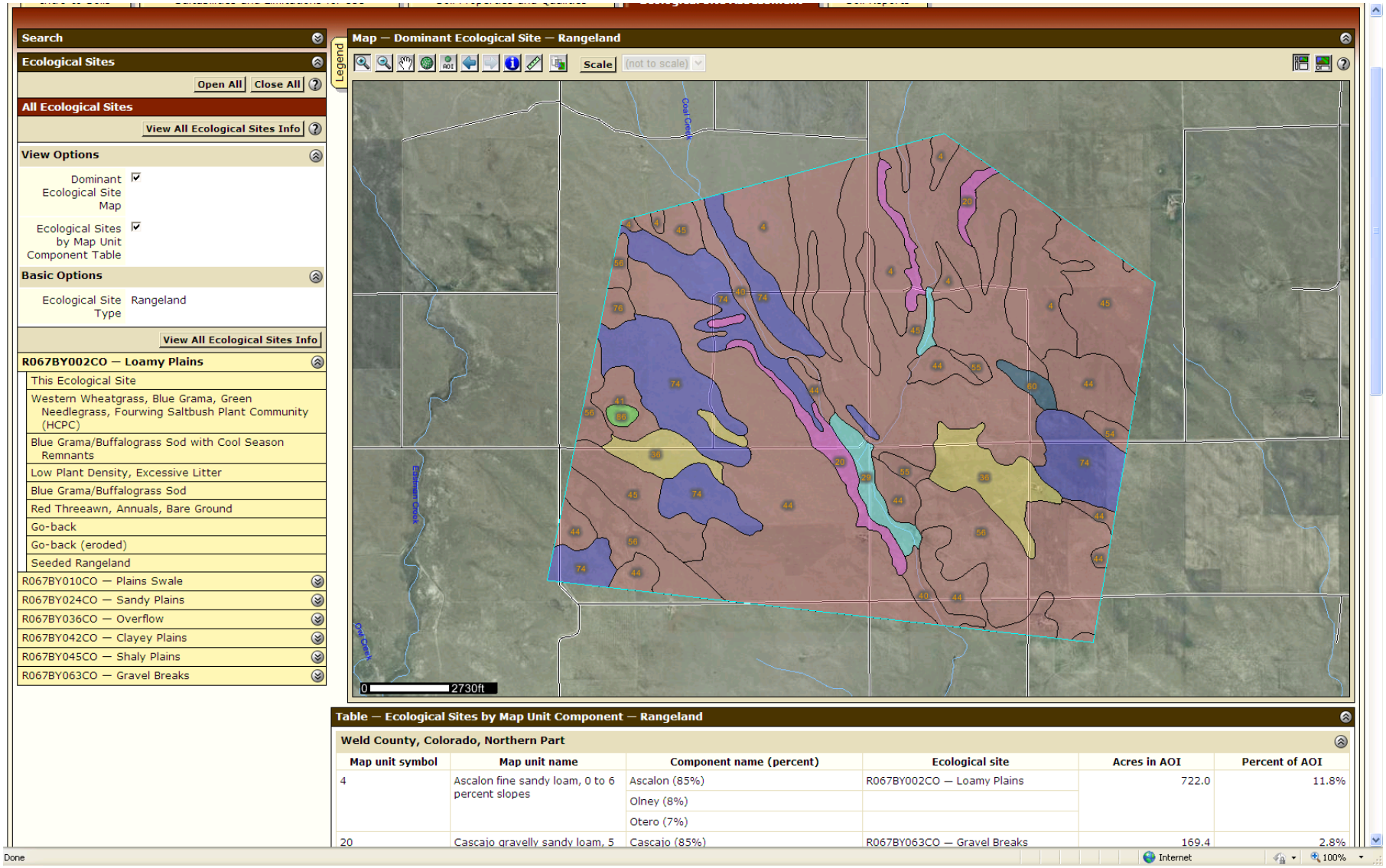
http://websoilsurvey.nrcs.usda.gov/

Accessing ecological site descriptions



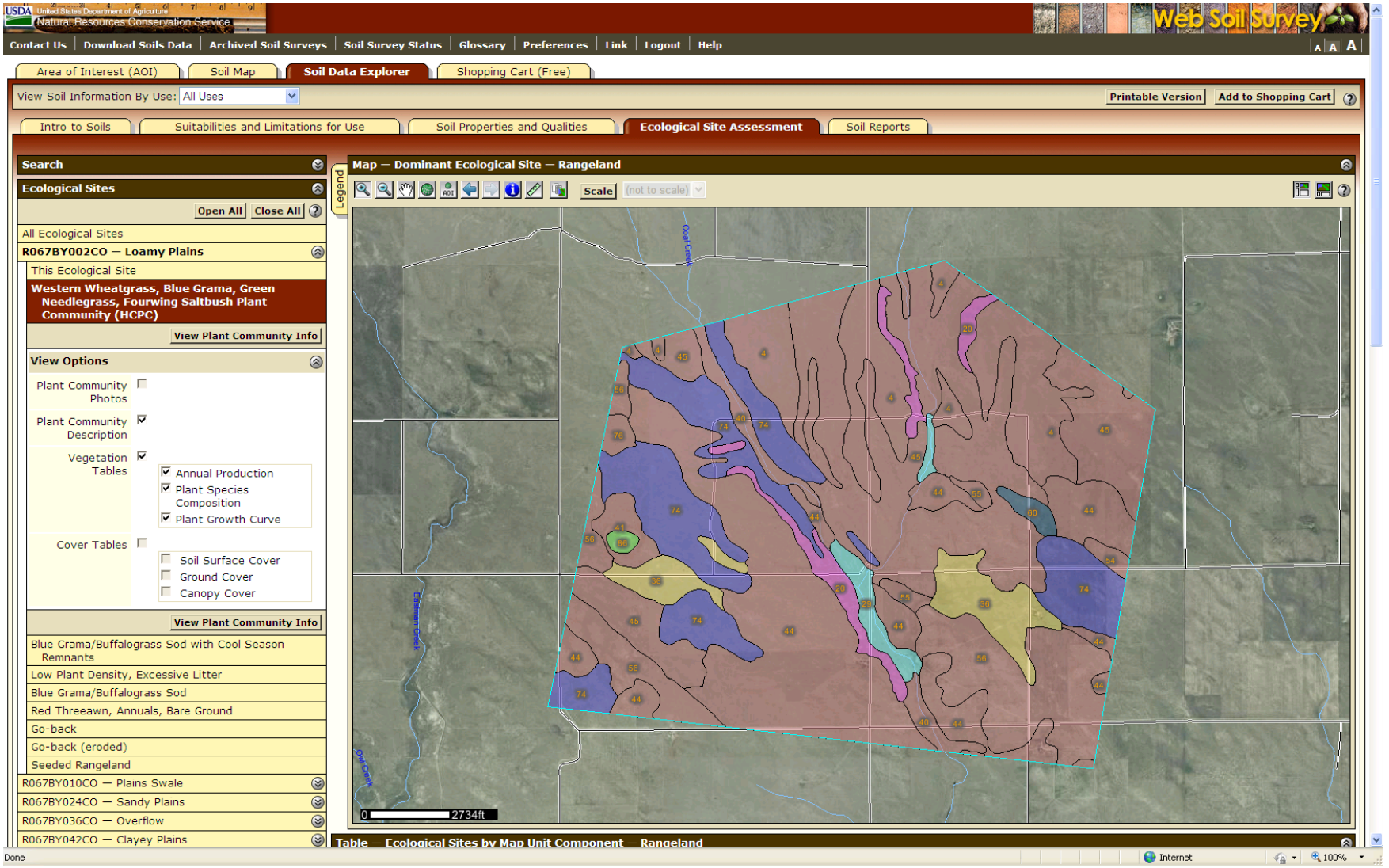
Define area of interest (must be < 10,000 acres)

Accessing ecological site descriptions



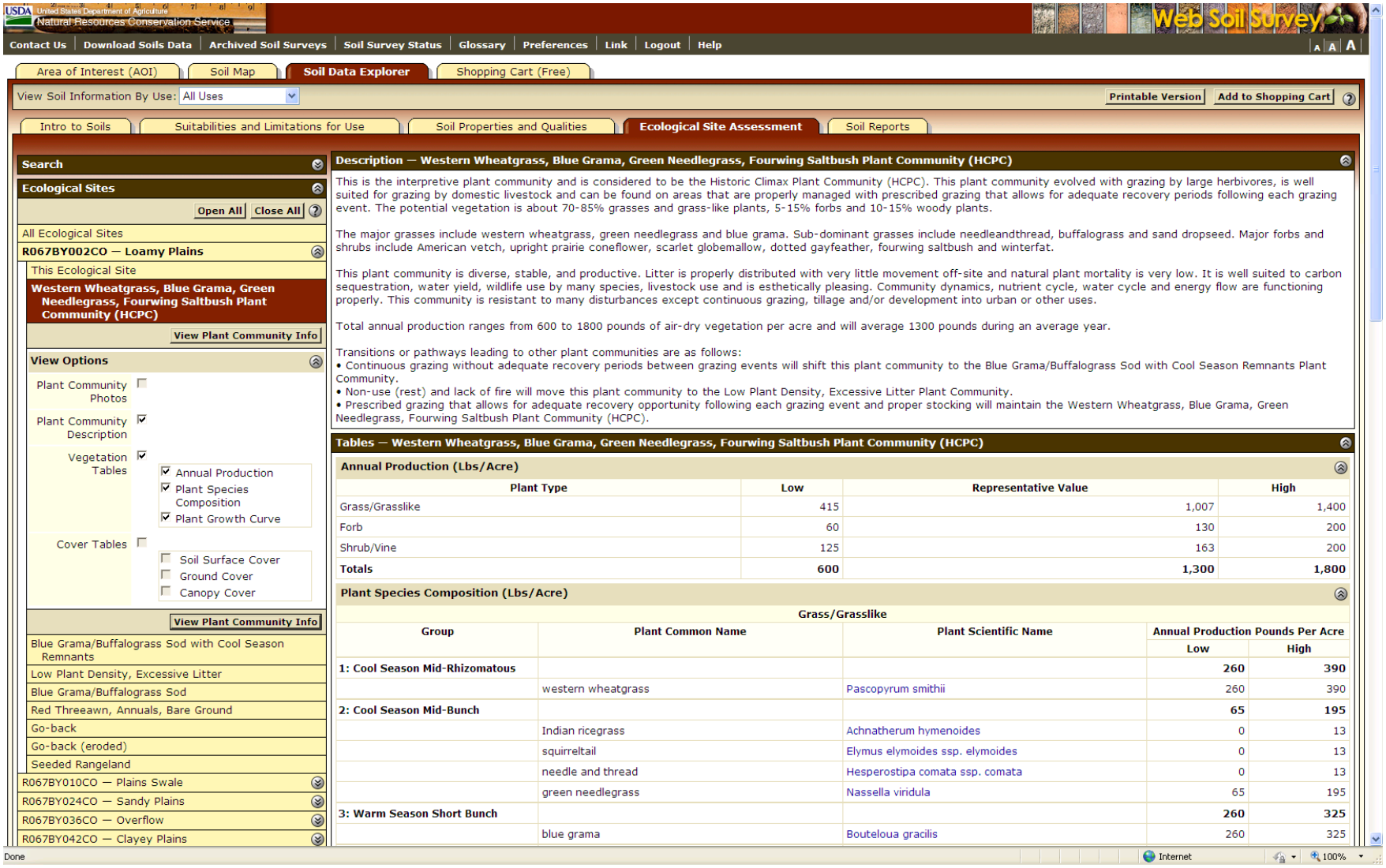
Click on Soil Data Explorer, then Ecological Site Assessment

Accessing ecological site descriptions



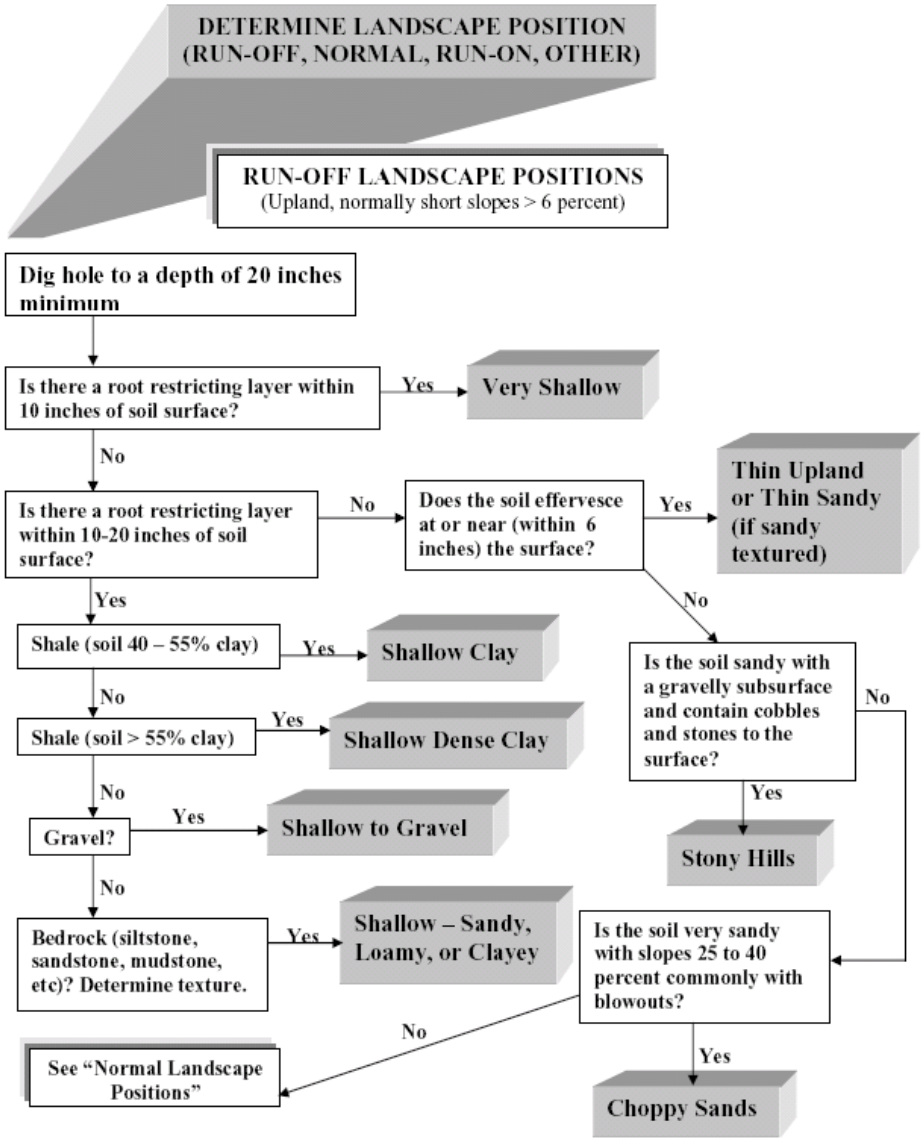
Click on an ecological site and a state from STM

Accessing ecological site descriptions

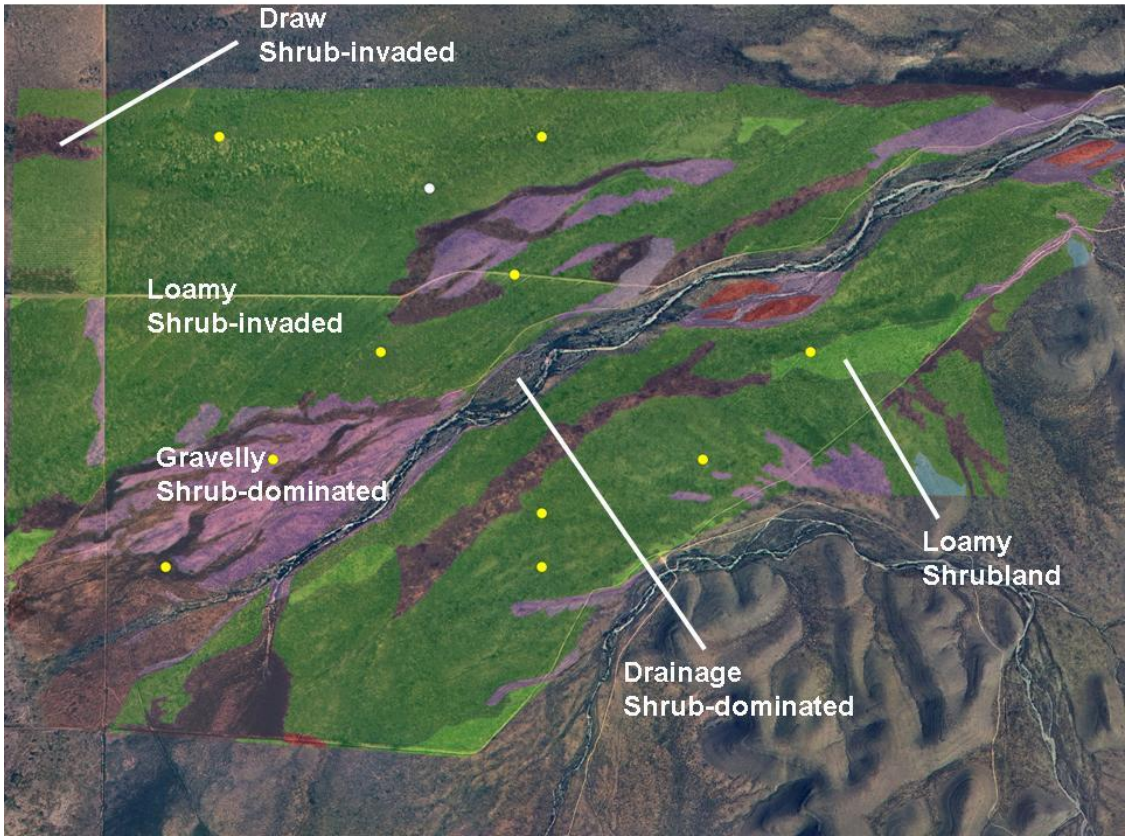


Databased components of the STM

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