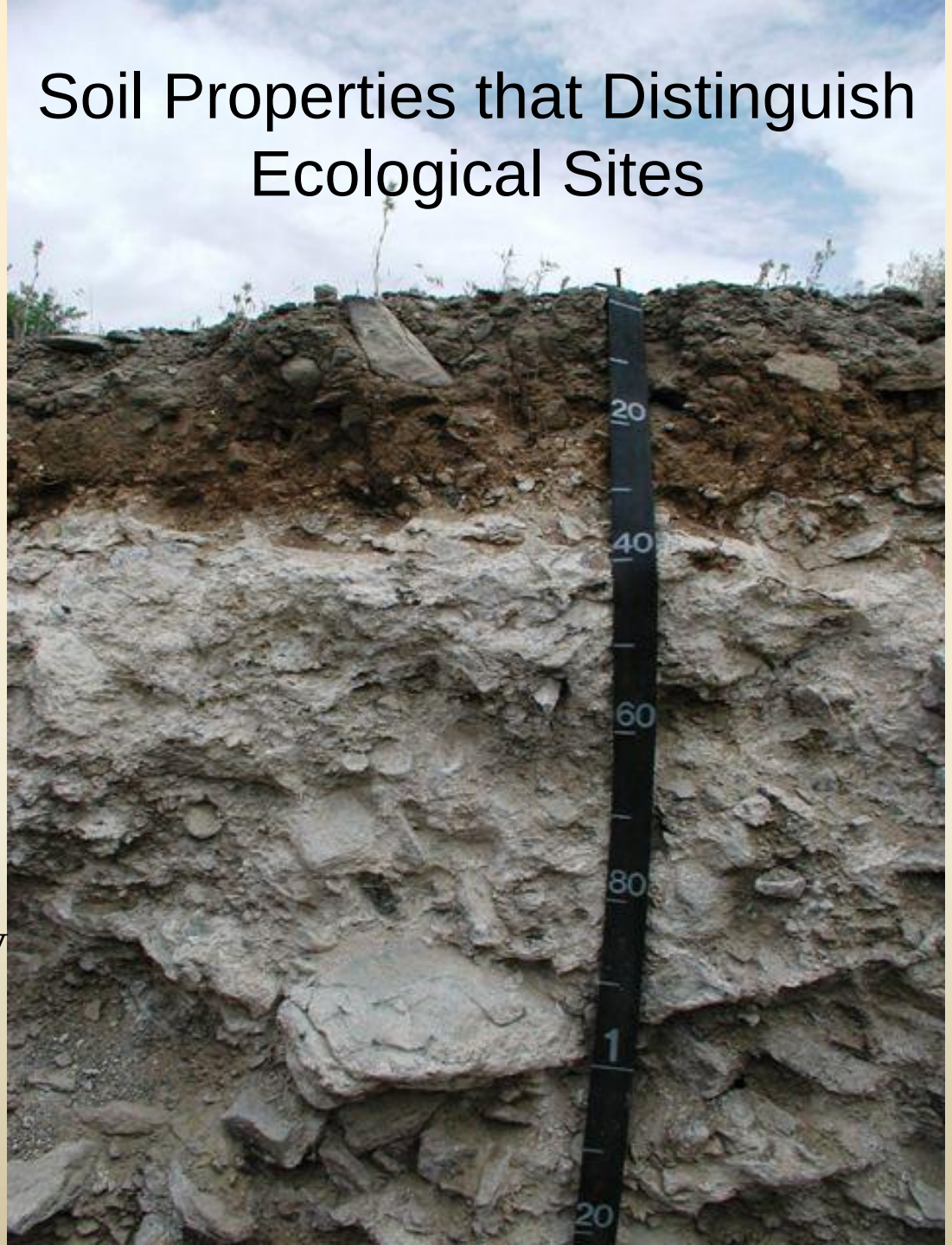
Soil Properties that Distinguish Ecological Sites

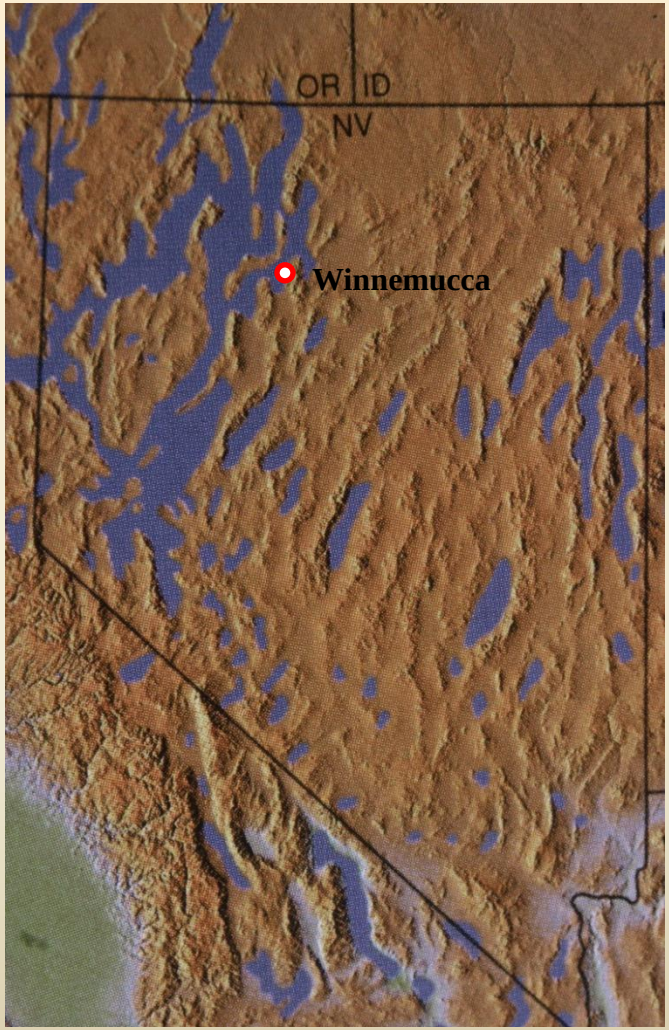


ESD Workshop
Winnemucca, NV
6/5-7/12

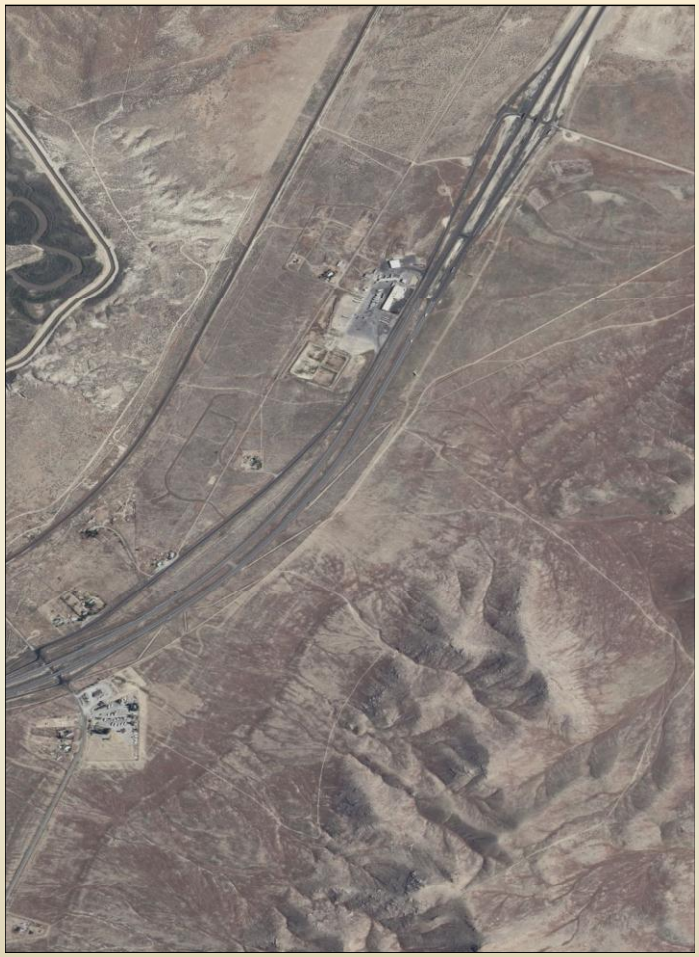
MLRA 24

- 12,680 sq miles
- 94% in Nevada and 6% in Oregon
- Great Basin Section of the Basin and Range Province
- Elevation ranges from 3950 to 5900 feet. A few mountain peaks
- are as high as 8850 feet.
- MAP: 6 to 12 inches. Up to 40 inches in some mountain ranges
- 69 Ecological Sites

Pluvial Lakes



- Valleys in the western part MLRA 24 were inundated by Ancient Lake Lahontan.
- This lake left its mark with lacustrine landforms and associated soils.
- The last high lake stand occurred about 13,000 years ago at an elevation of about 4,370 feet.



Evidence of the last high water stand along I-80 near Mill City, south of Winnemucca

- As Lake Lahontan retreated, dissolved salts accumulated on what is now the basin floor.
- Soils are typically moderately fine to fine textured and saline-sodic affected.
- These soils often pond water following precipitation events.

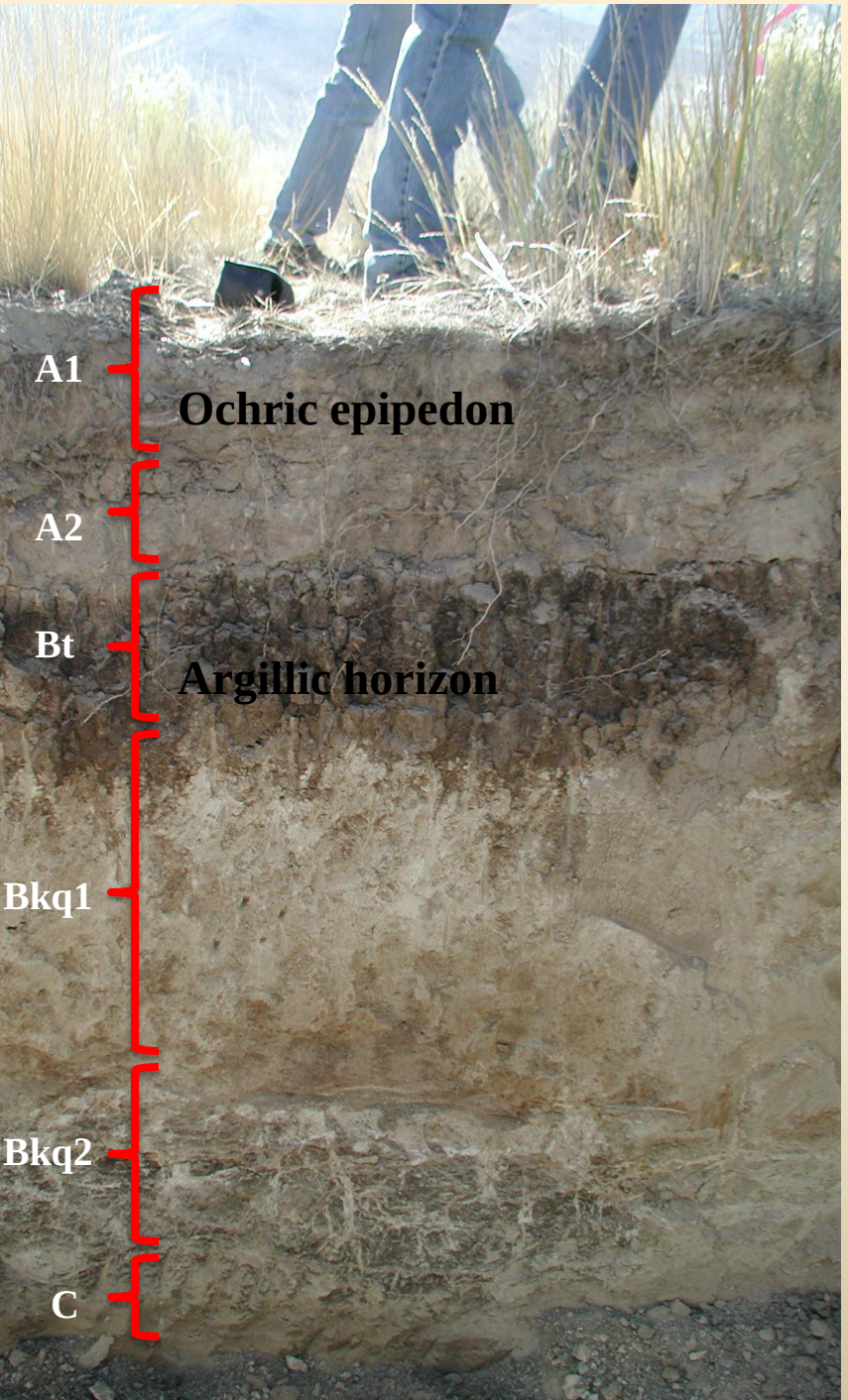
- 40 mile long dune field and sand sheets occur north of Winnemucca. This sand is derived from the basin floor of Ancient Lake Lahontan .
- Where vegetation exists the dunes have stabilized.
- Soil: Xeric Torripsamments.
- Site: Sandy 8-10”PZ

Soil Survey

Soil property data are collected, tested, and correlated as part of soil survey operations.

- **Order 3 soil survey---** Associations
  - 2 - 3 major soil components per map unit
  - Up to 15% minor components
  - Less detail
  - Majority of soil surveys completed in Nevada are at the Order 3 level of intensity

- **Order 2 soil survey---** Consociations
  - 1 major soil component per map unit
  - Usually makes up 100 percent of map unit.
  - Greater detail
  - Appropriate in areas of agricultural production



Soil Properties

Soil properties are measured or inferred from direct observations in the field or laboratory. (NSSH)

- Texture
- Rock fragments
- Available water capacity (AWC)
- pH(soil reaction)
- Calcium carbonate equivalent ($CaCO_3$)
- Restrictions (hardpans, bedrock)
- Organic matter percent
- Electrical conductivity (EC)
- Sodium adsorption ratio (SAR)
- Diagnostic horizons (epipedons)

Landform

Landform is an important part of understanding the formative history of the soil. Position on the landform influences vegetation.(NSSH)

Landform: Fan Remnants

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Vegetation: Black sagebrush, Indian ricegrass

Soil properties significant to the landform and site:

Parent material-limestone alluvium
>35 percent rock fragments throughout
>40% Calcium carbonate equivalent throughout
Effervesence is strong or violent
< 20 inches to restrictive layer-duripan

Epipedon

•The upper part of a soil profile is assigned an "**epipedon"**, which are defined and quantified in the *Keys to Soil Taxonomy*.

• Characteristics of the epipedon can be correlated with ecological sites.

•Two most common in this area:

Mollic Epipeon

Dark colors

Typically has >1.5 % organic matter and occurs in areas that receive >10 inches of precipitation.

Ochric Epipedon

Light colors

Typically has <1.5% organic matter and occurs in areas that receive <10 inches of precipitation

Soil Properties that Distinguish Ecological Sites

Sodic Flat 6-8

Loamy 5-8

Loamy 8-10

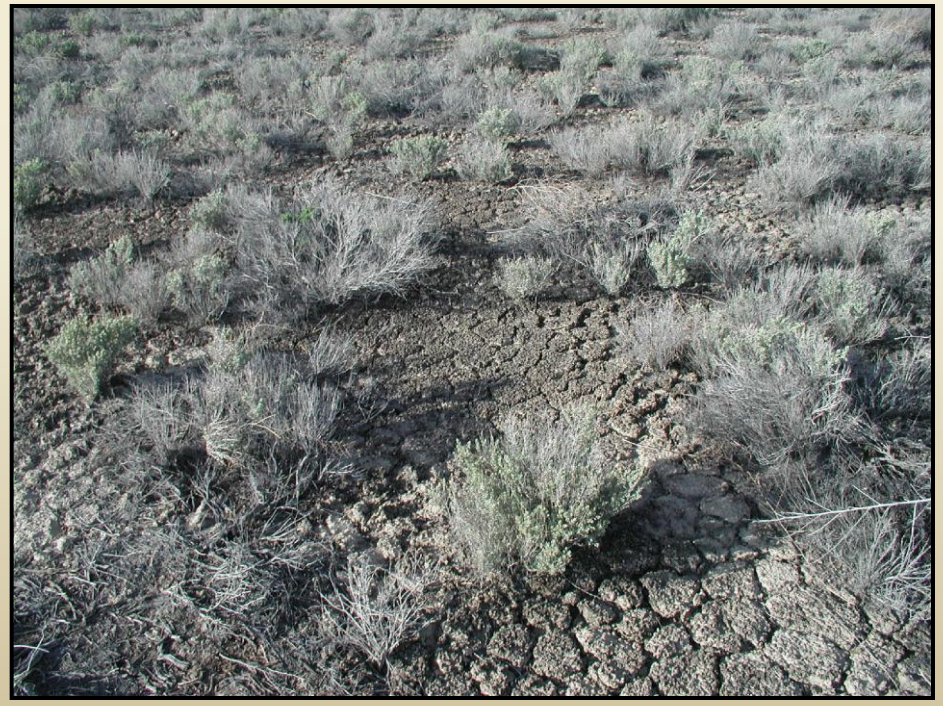
Shallow Calcareous Loam 8-10

Claypan 12-16

Loamy slope 12-16

Map unit 321 and 322

(Humboldt West SSA)



Sodic Flat 6-8” PZ

- **Vegetation**: Black greasewood

- **Landform**: Lake plain
- **Epipedon:** Ochric, <0.5% OM
- **Moisture regime**: Aridic
- **MAP**: <8 inches
- **EC:** >16 mmhos/cm
- **(SAR):** >90 decreasing with depth.
- **Soil reaction**: very strongly alkaline throughout
- Surface texture and physical crust limit water intake.
- Soils are moderately fine to fine textured throughout.
- **Classification:** Typic Torriorthents

Loamy 5-8” PZ

- **Vegetation**: shadscale, bud sagebrush, Indian ricegrass, bottlebrush squirreltail

- **Landform**: fan remnant
- **Epipedon:** Ochric, <1% OM
- **Moisture regime**: aridic
- **MAP**: <8 inches
- **Soil reaction**: slightly alkaline to strongly alkaline increasing with depth.
- **Rock fragments**: typically >35% throughout.

Classification: Durinodic Natrargids

Loamy 8-10” PZ

- **Vegetation**: Wyoming big sagebrush, Thurber ‘s needlegrass, bluebunch wheatgrass

- **Landform**: fan remnant
- **Epipedon:** Ochric, 1-1.5% OM
- **Moisture regime**: aridic bordering xeric
- **MAP**: 8-10 inches
- **CaCO3 equivalent:** Typically <25%
- **Soil reaction**: neutral to slightly alkaline increasing with depth.
- **Surface soil**: textures are loamy.
- Subsoil textures, depth to restrictions and rock fragments are variable.
- **Classification:** Xeric Haplocalcids

Shallow Calcareous Loam 8-10” PZ

- **Vegetation**: black sagebrush, Indian ricegrass, needleandthread

- **Landform**: hill
- **Epipedon**: Ochric, 1-1.5% OM
- **Moisture regime**: aridic bordering xeric
- **MAP**: 8-10 inches
- **CaCO3 equivalent:** >40 percent.
- **Effervesence:** strong or violent
- **Depth:** <20 inches to restrictive layer(typically hardpan or bedrock).
- **Rock fragments**: >35% throughout
- **Classification:**

  Lithic Xeric Haplocalcids

Claypan
12-16” PZ

- **Vegetation**: low sagebrush, Thurber’s needlegrass, bluebunch wheatgrass, Idaho fescue

- **Landform**: mountain slope-convex
- **Epipedon**: Mollic (7 to 14 inches thick), 1.5-3% OM
- **Moisture regime**: aridic bordering xeric
- **MAP**: 12-16 inches
- **Texture**: fine textured argillic horizon with a abrupt upper textural boundary (claypan) or shallow to bedrock.
- **Soil reaction**: slightly acid through slightly alkaline throughout. **No** carbonates in soil profile.
- **Rock fragments**: variable throughout.
- **Classification:**

Aridic Lithic Argixerolls

Loamy Slope
12-16” PZ

- **Vegetation**: mountain big sagebrush, serviceberry, snowberry, Thurber’s needlegrass, bluebunch wheatgrass, Idaho fescue.

- **Landform**: mountain slope-concave
- **Epipedon**: Mollic (14-20 inches thick), 2-3% OM
- **Moisture regime**: xeric
- **MAP**: 12-16 inches
- **Soil reaction**: slightly acid through slightly alkaline decreasing with depth.
- **Surface soil textures:** Typically loamy.
- **Subsoil textures:** range from loamy to clayey.
- **Rock fragments:** may be >35 percent.
- **Classification:** Typic Argixerolls

Soil Phases

Map Unit	-321- Humboldt silty clay loam	-322- Humboldt silty clay loam
Phase	None	Strongly saline
Seasonal Saturation (15 inches below soil surface)	December - July	December - June
Surface Horizon Organic Matter	4 %	2 %
$CaCO_3$ Equivalent (upper 40 inches)	≤ 3 %	≤ 6 %
Salinity/ Sodicity (upper 30 inches)	Slightly sodic	Moderately sodic
Ecological Site	**25XY001NV Moist Floodplain**	**24XY007NV Saline Bottom**

Questions