Ecological Site Correlation

Sandy. mixed, thermic Entic Haplo xeroll

Sand Hills

Sandy Bottoms

Gravelly Sand Hills

Mixed, thermic Typic Xeropsamment

Sandy-skeletal, mixed, thermic Entic Haplo xeroll

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This area (shown in fig. 43B-1) is in Montana (38 percent), Idaho (32 percent), and Wyoming (30 percent). Also, it is in a small area in Utah (82 square miles, or 213 square kilometers). It makes up about 75,915 square miles (196,715 square kilometers). The towns of Butte, Anaconda, and Deer Lodge, Montana, Ketchum, Idaho, and Jackson and Thermopolis, Wyoming, occur in this MLRA. Interstates 90 and 15 cross this area in Montana. This MLRA is made up of the Rocky Mountains. It has numerous national forests, including the Clearwater, Nez Perce, Bitterroot, Salmon, Challis, Payette, Boise, Targhee, and Sawtooth National Forests in Idaho; the
Ecological sites are correlated across political boundaries such as states or counties. The “modal concepts” for ecological sites are developed within Major Land Resources Areas or Land Resource Units (MLRA’s and/or LRU’s). Thus, soil components that are identical across states lines must have a common ecological site.
Are Land Resource Units (LRU’s) being Used?

Identify LRU attributes – What LRU designation have been made in the MRLA and what are the designations based on? How are they described?

a. precipitation amount (total or effective)
b. precipitation timing
c. soil moisture regimes
d. soil temperature regimes
e. vegetation types, life zones, etc.
What are the processes that dominate the functions within the MLRA/LRU?

i. Hydrology

ii. Erosion

iii. Invasive Species
What are the ecological site concepts for the MLRA/LRU?

a. Physiographic Features
   i. landform
   ii. aspect
   iii. slope

b. Climate
   i. precipitation amount (total)
   ii. precipitation timing and intensity
   iii. Temperature
   iv. Winds
What are the ecological site concepts for the MLRA/LRU?

c. Water Features
   i. riparian
   ii. wetland

d. Soil Characteristics
   i. soil surface texture
   ii. soil depth (to what – bedrock, cementation, clay pan, etc.)
   iii. mineralogy (gypsum, sodium, etc.)
   iv. horizonation (argillic, calcic, etc.)
How does the vegetation relate to the ecological site concepts?

i. Kinds, amounts and proportions

ii. Response to management/disturbance
Which map unit components do not “fit” the modal concepts for the site, LRU or MLRA?

i. Outliers

ii. Odd geomorphology

iii. “Sky islands”
These concepts need to be compared within MLRA’s/LRU’s across political/administrative boundaries before ecological dynamics and state-and-transition models can be discussed.

It is necessary to determine how the site concepts match across political/administrative boundaries before comparing state-and-transition models and community phases.
Ecological site reference state/community phases

Data available to support reference state community phases.

Data available to support ecological dynamics of reference state.

Data available to support dynamics in state-and-transition model.

Exceptions to modal concepts
Feedbacks

Ground fire maintains herbaceous dominance

Minimal bare patch size

Increased organic matter inputs

Increased soil surface stability

Increased annual production

Increased organic matter inputs
State-and-Transition Model

1.0 Reference State

1.1 - Warm season tall and mid grasses
Surface Soil Stability >4.3
Subsurface Soil Stability >2.7
Canopy Gaps <8%
Basal Gaps <15%
Basal Cover >7%
Juniper Foliar Cover <8%

1.2 - Warm season mid and tall grasses and one-seed juniper < 4' tall
Surface Soil Stability 3.4-4.1
Subsurface Soil Stability 1.8-2.1
Canopy Gaps 12-27%
Basal Gaps 15-36%
Basal Cover 7-9%
Juniper Foliar Cover 11-24%

2.0 Juniper State

2.1 - One-seed juniper > 4' tall
Warm season mid grasses
Surface Soil Stability 2.5-2.8
Subsurface Soil Stability 1.5-1.8
Canopy Gaps 7-13%
Basal Gaps 5-10%
Basal Cover 7-9%
Juniper Foliar Cover 18-28%

2.2 - One-seed juniper > 4' tall and warm season mid grasses
Surface Soil Stability 2.4-2.8
Subsurface Soil Stability 1.2-1.8
Canopy Gaps 18-33%
Basal Gaps 29-55%
Basal Cover <4%
Juniper Foliar Cover 16-32%

3.0 Eroded State

3.1 - One-seed juniper active wind and water erosion
Surface Soil Stability <2.1
Subsurface Soil Stability <1.5
Canopy Gaps >29%
Basal Gaps >30%
Basal Cover <4%
Juniper Foliar Cover >29%
Ecological site correlation

All concepts must be agreed on prior to field activities.

Select ecological site from each political/administrative area that show the greatest level of agreement.

Field visits to finalize/confirm ecological site agreement between political/administrative areas and identify needs for further documentation of similarities/differences.
Feedbacks

Decrease in juniper canopy

Increase in herbaceous production

Decrease in bare ground

Increased organic matter inputs

Increased soil surface stability

Increased annual production
LRUs are typically coextensive with State general soil map units, but some general soil map units are subdivided into LRUs because of significant geographic differences in soils, climate, water resources, or land use. LRUs generally are several thousand acres in size. A unit can be one continuous area or several separate areas that are near each other.
Gravelly, shallow carbonatic relict fan
(shallow indurated horizon, fissures permit shrub dominance, water limited for grass)

Limestone parent

Jornada Basin soil-geomorphic system (15 km)

Calcareous loamy piedmont
(transportational surface, low aggregate stability, susceptible to water erosion and grassland loss)

Clayey basin floor
(receives water and sediment, highly resilient grassland)