USDA Natural Resources
Conservation Service

# Ecological site R025XY312UT
# Upland Loam (Browse)

Accessed: 05/13/2025

## General information

**Provisional**. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

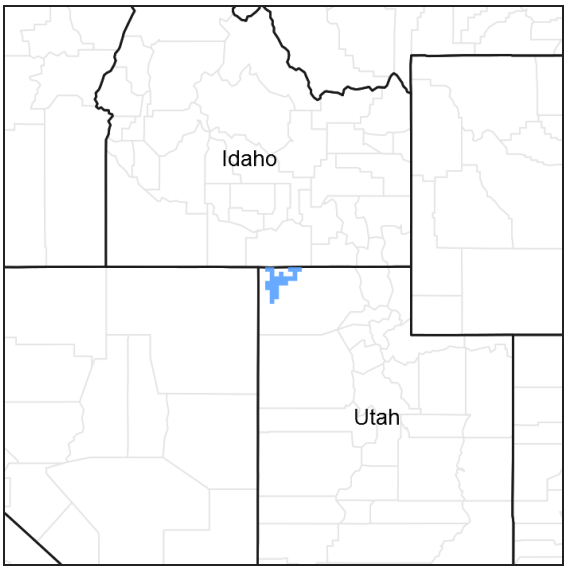


**Figure 1. Mapped extent**

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

## Associated sites

| | |
|---|---|
| R025XY320UT | **Upland Stony Clay (Low Sagebrush)** |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Purshia tridentata* |
| Herbaceous | Not specified |

## Physiographic features

This site can be found on draingeways on fan remnants, hillslopes, valley sides, and hills between slopes of 3 to 15% with slopes occasionally up to 30%. It can occur at elevations between 6,200 to 6,800 feet. Flooding and ponding do not occur on this site.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Drainageway<br>(2) Fan remnant<br>(3) Hill |

| | |
|---|---|
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 1,890–2,073 m |
| Slope | 3–15% |

## Climatic features

The climate is cold and snowy in the winter and warm and dry in the summer. Approximately 60 percent of the precipitation comes as snow from October through March. On the average, July and August are the driest months and December and January are the wettest months. In average years, shrubs begin growth around April 1 and end growth around September 30.

Mean Annual Air Temperature: 43-45
Mean Annual Soil Temperature: 45-47

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 0 days |
| Freeze-free period (average) | 80 days |
| Precipitation total (average) | 406 mm |

## Influencing water features

## Soil features

The soils on this site were formed in colluvium and alluvium derived from quartzite and mica schist. The soil is well drained with moderately rapid permeability in the upper 10 inches of soil. The soil is deep with bedrock greater than 20 inches beneath the soil surface. The soil texture at the surface is loamy. Surface and subsurface rock fragments between 2 mm and 3 inches are 3% and 24 to 27% by cover and volume, respectively. Surface and subsurface rocks over 3 inches in diameter are 0% and 6 to 8% by cover and volume, respectively. Available water capacity is 5.5 in the upper 40 inches of soil. The soil pH is between 6.6 and 7.8. The soil temperature regime is frigid.

Soils associated with this site:
Box Elder Co UT601: Bullump (12, 13, 32, 62, 69)

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Loam |
| Drainage class | Well drained |
| Permeability class | Moderately rapid |
| Soil depth | 102–152 cm |
| Surface fragment cover <=3" | 3% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 13.97 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0% |
| Electrical conductivity (0-101.6cm) | 0 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0 |

| | |
|---|---|
| Soil reaction (1:1 water) (0-101.6cm) | 6.6–7.8 |
| Subsurface fragment volume <=3" (Depth not specified) | 24–27% |
| Subsurface fragment volume >3" (Depth not specified) | 6–8% |

## Ecological dynamics

As ecological conditions deteriorates due to grazing pressure Idaho fescue, bluebunch wheatgrass, and bitterbrush decreases while big sagebrush, rabbitbrush, and Sandberg bluegrass increase. When the potential natural community is burned, big sagebrush, and bitterbrush decrease while bluebunch wheatgrass and rabbitbrush increase.

## State and transition model

**Ecosystem states**

1. Reference State

**State 1 submodel, plant communities**

1.1. Reference State

## State 1
## Reference State

## Community 1.1
## Reference State

The general view of this site is bitterbrush and grass. The composition by air-dry weight is approximately 45 percent perennial grasses, 10 percent forbs, and 45 percent shrubs.

**Table 5. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Grass/Grasslike | 404 | 605 | 757 |
| Shrub/Vine | 404 | 605 | 757 |
| Forb | 90 | 135 | 168 |
| **Total** | **898** | **1345** | **1682** |

**Table 6. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 20-35% |
| Grass/grasslike foliar cover | 10-25% |

| | |
|---|---|
| Forb foliar cover | 5-10% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 0% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 0% |

**Table 7. Canopy structure (% cover)**

| Height Above Ground (M) | Tree | Shrub/Vine | Grass/ Grasslike | Forb |
|---|---|---|---|---|
| <0.15 | – | – | – | – |
| >0.15 <= 0.3 | – | – | – | 5-15% |
| >0.3 <= 0.6 | – | – | 20-30% | – |
| >0.6 <= 1.4 | – | – | – | – |
| >1.4 <= 4 | – | 30-40% | – | – |
| >4 <= 12 | – | – | – | – |
| >12 <= 24 | – | – | – | – |
| >24 <= 37 | – | – | – | – |
| >37 | – | – | – | – |

**Figure 4. Plant community growth curve (percent production by month). UT3121, PNC. Excellent Condition.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 5 | 15 | 40 | 20 | 10 | 5 | 5 | 0 | 0 | 0 |

## Additional community tables

**Table 8. Community 1.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Shrub/Vine** | | | | | |
| 0 | **Primary Shrubs** | | | 491–631 | |
| | antelope bitterbrush | PUTR2 | *Purshia tridentata* | 420–491 | – |
| | mountain big sagebrush | ARTRV | *Artemisia tridentata ssp. vaseyana* | 71–140 | – |
| 3 | **Secondary Shrubs** | | | 43–71 | |
| | Saskatoon serviceberry | AMAL2 | *Amelanchier alnifolia* | 15–43 | – |
| | yellow rabbitbrush | CHVI8 | *Chrysothamnus viscidiflorus* | 15–43 | – |
| | rubber rabbitbrush | ERNA10 | *Ericameria nauseosa* | 15–43 | – |
| | wax currant | RICE | *Ribes cereum* | 15–43 | – |
| | whitestem gooseberry | RIIN2 | *Ribes inerme* | 15–43 | – |
| | mountain snowberry | SYOR2 | *Symphoricarpos oreophilus* | 15–43 | – |
| **Grass/Grasslike** | | | | | |
| 0 | **Primary Grasses** | | | 420–560 | |
| | Idaho fescue | FEID | *Festuca idahoensis* | 211–280 | – |
| | bluebunch wheatgrass | PSSP6 | *Pseudoroegneria spicata* | 211–280 | – |
| 1 | **Secondary Grasses** | | | 140–211 | |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 43–71 | – |
| | Letterman's needlegrass | ACLE9 | *Achnatherum lettermanii* | 43–71 | – |
| | Columbia needlegrass | ACNE9 | *Achnatherum nelsonii* | 43–71 | – |
| | Thurber's needlegrass | ACTH7 | *Achnatherum thurberianum* | 43–71 | – |
| | California brome | BRCA5 | *Bromus carinatus* | 43–71 | – |
| | Geyer's sedge | CAGE2 | *Carex geyeri* | 43–71 | – |
| | squirreltail | ELEL5 | *Elymus elymoides* | 43–71 | – |
| | slender wheatgrass | ELTR7 | *Elymus trachycaulus* | 43–71 | – |
| | basin wildrye | LECI4 | *Leymus cinereus* | 43–71 | – |
| | oniongrass | MEBU | *Melica bulbosa* | 43–71 | – |
| | western wheatgrass | PASM | *Pascopyrum smithii* | 43–71 | – |
| | Sandberg bluegrass | POSE | *Poa secunda* | 43–71 | – |
| **Forb** | | | | | |
| 2 | **Forbs** | | | 140–211 | |
| | nettleleaf giant hyssop | AGUR | *Agastache urticifolia* | 43–71 | – |
| | arrowleaf balsamroot | BASA3 | *Balsamorhiza sagittata* | 43–71 | – |
| | tapertip hawksbeard | CRAC2 | *Crepis acuminata* | 43–71 | – |
| | cushion buckwheat | EROV | *Eriogonum ovalifolium* | 43–71 | – |
| | sticky purple geranium | GEVI2 | *Geranium viscosissimum* | 43–71 | – |
| | western stoneseed | LIRU4 | *Lithospermum ruderale* | 43–71 | – |
| | tailcup lupine | LUCAC3 | *Lupinus caudatus ssp. caudatus* | 43–71 | – |
| | longleaf phlox | PHLO2 | *Phlox longifolia* | 43–71 | – |

## Animal community

This site provides proper grazing for cattle and sheep during spring, summer, and fall.

Wildlife using this site include blacktail jackrabbit, coyote, sage grouse, mule deer, and elk.

## Hydrological functions

The soil is in hydrologic group B. The runoff curve numbers are 61 to 79 depending on the condition of the watershed.

## Recreational uses

Recreation values are hiking and hunting.

## Wood products

None

## Other information

Threatened and endangered species include plants and animals.

## Type locality

| Location 1: Box Elder County, UT | |
|---|---|
| Township/Range/Section | T12N R17W S4 |
| General legal description | NE 1/4 SECTION 4 T 12 N R 17 W BOXELDER COUNTY UTAH |

## Contributors

GBB

## Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

| | |
|---|---|
| Author(s)/participant(s) | Shane A. Green (NRCS), Brock Benson (NRCS), Robert D. Stager (BLM), Mike Gates (BLM), Tyler Staggs (BLM), Alan Bass (BLM). Revised to include updated terminology and concepts by V. Keith Wadman (NRCS Retired). |
| Contact for lead author | shane.green@ut.usda.gov |
| Date | 12/15/2011 |
| Approved by | Shane A. Green |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** None to very few rills present. Some very minor rill development may occur on steeper

slopes or on areas located below exposed bedrock or other water shedding areas where increased runoff may occur. Where rills are present, they should be fairly short (3-6 Feet), <1 inch deep and somewhat widely spaced (4-8 feet). Minor rill development may be observed following major thunderstorm or spring runoff events but should heal during the next growing season.

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2. **Presence of water flow patterns:** Some very minor evidence of water flow patterns may be found around perennial plant bases. They show little evidence of current erosion. They are expected to be short (3-6 feet), stable, sinuous and not connected. There may be very minor evidence of deposition. Evidence of water flow may increase somewhat with slope.

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3. **Number and height of erosional pedestals or terracettes:** Perennial vegetation shows little evidence of erosional pedestalling (1 to 2% of individual plants). Plant roots are covered and litter remains in place around plant crowns. Terracettes should be absent or, if present, stable. A slight increase in both pedestal and terracette development may occur with increasing slope.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-20% bare ground. Bare ground spaces should not be greater than 1 foot in diameter.

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5. **Number of gullies and erosion associated with gullies:** No gullies present on site. A very few gullies may be present in landscape settings where they transport runoff from areas of greater water flow such as exposed bedrock. These gullies will be limited to slopes exceeding 20% and adjacent to sites where this runoff accumulation occurs. Any gullies present should show little sign of accelerated erosion and should be stabilized with perennial vegetation.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None. No evidence of wind generated soil movement is present. Wind caused blowouts and deposition are not present.

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7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water movement. Minor litter removal may occur in flow channels with deposition occurring within 1 to 2 feet at points of obstruction. The majority of litter accumulates at the base of plants. Some grass leaves and small twigs (grass stems) may accumulate in soil depressions adjacent to plants. Woody stems are not likely to move. However, some litter movement is expected (up tp 6 feet) with increases in slopes >15% and/or increased runoff resulting from heavy thunderstorms.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** This site should have a soil stability rating of 5 or 6 under the plant canopies, and a rating of 4 to 5 in the interspaces. The average rating should be a 5. Soil surface textures are loams and gravelly loams.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** (Bullump) Soil surface 0-3 inches. Texture is a gravelly loam; color is very dark grsyish brown (10YR3/2); and structure is weak, fine, subangular blocky. Mollic epipedon ranges to 39 inches. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial vegetation produces sufficient cover and spatial arrangement to intercept most raindrops and reduce raindrop splash erosion. Litter on soil surface also protects soil from splash erosion and encourages a higher rate of infiltration. Plant spatial distribution should slow runoff, allowing additional time for infiltration. Bare spaces are expected to be small and irregular in shape and are usually not connected. Vegetative structure is usually adequate to capture snow and ensure that snowmelt occurs in a controlled manner, allowing maximum time for infiltration, and reducing runoff and erosion in all but the most extreme storm events. When perennial grasses and shrubs decrease due to natural events including drought, insect damage, etc., which reduce ground cover and increase bare ground, runoff is expected to increase and associated infiltration be reduced.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Some soils have an argillic horizon that could be mistaken for a compaction pan.

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Perennial bunchgrasses (bluebunch wheatgrass, Idaho fescue) = > Non-sprouting shrubs (mountain big sagebrush, bitterbrush)

    Sub-dominant: Rhizomatous grasses (slender & western wheatgrass) > Sprouting shrubs (green rabbitbrush, mountain snowberry) > Perennial forbs (arrowleaf balsamroot)

    Other: A wide variety of other perennial grasses and both perennial and annual forbs can be expected to occur in the plant community.

    Additional: Natural disturbance regimes include fire, drought, and insects. Assumed fire cycle of 30 to 40+ years. Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state (e.g. Crested wheatgrass, Smooth brome, intermediate wheatgrass, Siberian Wheatgrass etc.)
    Following a disturbance such as fire, drought, rodents or insects that remove woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community for a period of time. If a disturbance has not occurred for an extended period of time, woody species may continue to increase. These conditions would reflect a functional community phase within the reference state.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All age classes of perennial grasses should be present under average to above average growing conditions with age class expression likely subdued during periods of extended drought. Slight decadence in the principle shrubs could occur near the end of the fire cycle or during periods of extended drought, or insect infestations. In general, a mix of age classes should be expected with some dead and decadent plants present.

14. **Average percent litter cover (%) and depth ( in):** Litter cover will be heavier under plants. Most litter will be herbaceous and depths of 1/2 to 1 inch would be considered normal. Perennial vegetation should be well distributed on the site.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production in air-dry herbage should be approximately 1150 - 1250 #/acre on an average year but could range from 800 to 1500 #/acre during periods of extended drought or above average precipitation.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Utah juniper, cheatgrass, Russian thistle, and invasive, non-native annual forbs.

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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in all years, except in extreme drought years. Green rabbitbrush sprouts vigorously following fire. There are no restrictions on either seed or vegetative reproduction. Some seedling recruitment of major species is present during average above average growing years.

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