Ecological site R025XY045ID
DOUGLAS FIR SNOWBERRY 22+

Last updated: 4/25/2024
Accessed: 05/11/2025

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.

MLRA notes

Major Land Resource Area (MLRA): 025X–Owyhee High Plateau

MLRA Notes 25—Owyhee High Plateau
This area is in Nevada (56 percent), Idaho (30 percent), Oregon (12 percent), and Utah (2 percent). It makes up about 27,443 square miles. MLRA 25 is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. The western boundary is marked by a gradual transition to the lower and warmer basins of MLRA 24. The boundary to the south-southeast, with MLRA 28B, is marked by gradual changes in geology marked by an increased dominance of singleleaf pinyon and Utah juniper and a reduced presence of Idaho fescue. The boundary to the north, with MLRA 11, is a rapid transition from the lava plateau topography to the lower elevation Snake River Plain.
Physiography:
All of this area lies within the Intermontane Plateaus. The southern half is in the Great Basin section of the Basin and Range province. This part of the MLRA is characterized by isolated, uplifted fault-block mountain ranges separated by narrow, aggraded desert plains. This geologically older terrain has been dissected by numerous streams draining to the Humboldt River.
The northern half of the area lies within the Columbia Plateaus province. This part of the MLRA forms the southern boundary of the extensive Columbia Plateau basalt flows. Most of the northern half is in the Payette section, but the northeast corner is in the Snake River Plain section. Deep, narrow canyons draining into the Snake River have been incised into this broad basalt plain. Elevation ranges from 3,000 to 7,550 feet on rolling plateaus and in gently sloping basins. It is more than 9,840 feet on some steep mountains. The Humboldt River crosses the southern half of this area
Geology:
The dominant rock types in this MLRA are volcanic. They include andesite, basalt, tuff, and rhyolite. In the north and west parts of the area, Cretaceous granitic rocks are exposed among Miocene volcanic rocks in mountains. A Mesozoic igneous and metamorphic rock complex dominates the south and east parts of the area. Upper and Lower Paleozoic calcareous sediments, including oceanic deposits, are exposed with limited extent in the mountains. Alluvial fan and basin fill sediments occur in the valleys.
Climate:
The average annual precipitation in most of this area is typically 11 to 22 inches. It increases to as much as 49 inches at the higher elevations. Rainfall occurs in spring and sporadically in summer. Precipitation occurs mainly as snow in winter. The precipitation is distributed fairly evenly throughout fall, winter, and spring. The amount of precipitation is lowest from midsummer to early autumn. The average annual temperature is 33 to 51 degrees F. The freeze-free period averages 130 days and ranges from 65 to 190 days, decreasing in length with elevation. It is typically less than 70 days in the mountains.
Water:
The supply of water from precipitation and streamflow is small and unreliable, except along the Owyhee, Bruneau, and Humboldt Rivers. Streamflow depends largely on accumulated snow in the mountains. Surface water from mountain runoff is generally of excellent quality and suitable for all uses. The basin fill sediments in the narrow alluvial valleys between the mountain ranges provide some ground water for irrigation. The alluvial deposits along the large streams have the most ground water. Based on measurements of water quality in similar deposits in

adjacent areas, the basin fill deposits probably contain moderately hard water. The water is suitable for almost all uses. The carbonate rocks in this area are considered aquifers, but they are little used. Springs are common along the edges of the limestone outcrops.
Soils:
The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic or frigid temperature regime and an aridic, aridic bordering on xeric, or xeric moisture regime. Soils with aquic moisture regimes are limited to drainage or spring areas, where moisture originates or runs on and through. These soils are of a very limited extent throughout the MLRA. They generally are well drained, clayey or loamy, and shallow or moderately deep. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam with ashy texture modifiers in some areas. Argillic horizons occur on the more stable landforms. They are exposed nearer the soil surface on convex landforms, where ash and loess deposits are more likely to erode. Soils that formed in carbonatic parent material in areas that receive less than 12 inches of precipitation are characterized by calcic horizons throughout the profile, while soils in areas that receive more than 12 inches of precipitation do not have calcic horizons in the upper part of the profile. Soils that formed on stable landforms at the lower elevations are dominated by ochric horizons. Soils that formed at the middle and upper elevations are characterized by mollic epipedons. Soils in drainage areas at all elevations that receive moisture running on or through them are characterized by thicker mollic epipedons.
Biological Resources:
This MLRA supports shrub-grass vegetation. Lower elevations are characterized by Wyoming big sagebrush associated with bluebunch wheatgrass, western wheatgrass, and Thurber’s needlegrass. Other important plants include bluegrass, squirreltail, penstemon, phlox, milkvetch, lupine, Indian paintbrush, aster, and rabbitbrush. Black sagebrush occurs but is less extensive. Singleleaf pinyon and Utah juniper occur in limited areas. With increasing elevation and precipitation, vast areas characterized by mountain big sagebrush or low sagebrush/early sagebrush in association with Idaho fescue, bluebunch wheatgrass, needlegrasses, and bluegrass become common. Snowberry, curl-leaf mountain mahogany, ceanothus, and juniper also occur. Mountains at the highest elevations support whitebark pine, Douglas-fir, limber pine, Engelmann spruce, subalpine fir, aspen, and curl-leaf mountain mahogany.
Major wildlife species include mule deer, bighorn sheep, pronghorn, mountain lion, coyote, bobcat, badger, river otter, mink, weasel, golden eagle, red-tailed hawk, ferruginous hawk, Swainson’s hawk, northern harrier, prairie falcon, kestrel, great horned owl, short-eared owl, long-eared owl, burrowing owl, pheasant, sage grouse, chukar, gray partridge, and California quail. Reptiles and amphibians include western racer, gopher snake, western rattlesnake, side-blotched lizard, western toad, and spotted frog. Fish species include bull, red band, and rainbow trout.

Ecological site concept

This forestland site occurs on all aspects of mountain sideslopes. Slopes range from 8 to 75 percent. Elevations are 5200 to 11,600 feet. Average annual precipitation is 12 to 20 inches. Mean annual air temperature is 40 to 43 degrees F. The average growing season is 70 to 90 days.
The soils associated with this site are deep to very deep and well to somewhat excessively drained. The soils are formed in colluvium derived from limestone and shale or quartzite. These soils have large volumes of rock fragments.

Douglas Fir is the dominant overstory species. Creeping barberry and mountain snowberry are the principal understory shrubs.

Associated sites

R025XY018ID	**MAHOGANY SAVANNA 16-22**
R025XY011ID	**LOAMY 13-16**

Similar sites

R025XY011ID	**LOAMY 13-16**

Table 1. Dominant plant species

Tree	(1) *Pseudotsuga*
Shrub	(1) *Symphoricarpos albus var. albus*
Herbaceous	Not specified

Physiographic features

This site occurs on mountain slopes. Elevation ranges a broad spectrum from 5200 to 11600 feet. Most commonly however elevations occurs between 5200 and 8200 feet. Slopes range from 15 percent to 60 percent most commonly. This site has been found on slopes as high as 85 percent.
Runoff is medium to very high dependent upon slope gradients.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	5,200–8,200 ft
Slope	15–60%
Water table depth	80 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	5,200–11,600 ft
Slope	Not specified
Water table depth	Not specified

Climatic features

Mean annual precipitation averages 11 inches. Frost free days are estimated to be 101 days with 138 freeze free days estimated.

Estimates are made from the below climate station. The climate station sits ~1000 ft. lower than the lowest elevation where the site occurs. More climate data is needed to determine more accurately the climate features for this site.

Table 4. Representative climatic features

Frost-free period (characteristic range)	101 days
Freeze-free period (characteristic range)	138 days
Precipitation total (characteristic range)	11 in
Frost-free period (actual range)	101 days
Freeze-free period (actual range)	138 days
Precipitation total (actual range)	11 in
Frost-free period (average)	101 days

Freeze-free period (average)	138 days
Precipitation total (average)	11 in

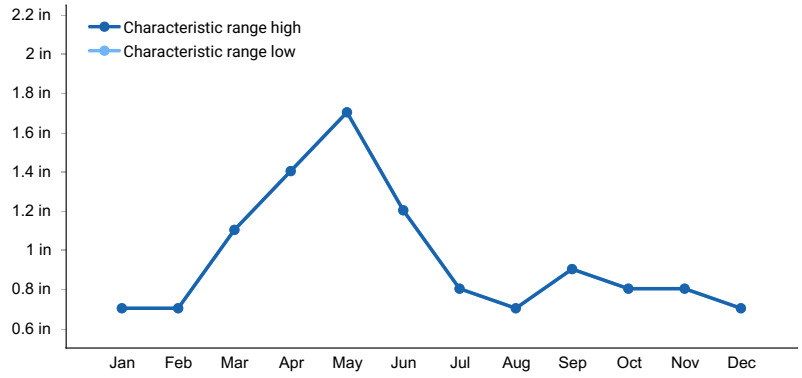


Figure 1. Monthly precipitation range

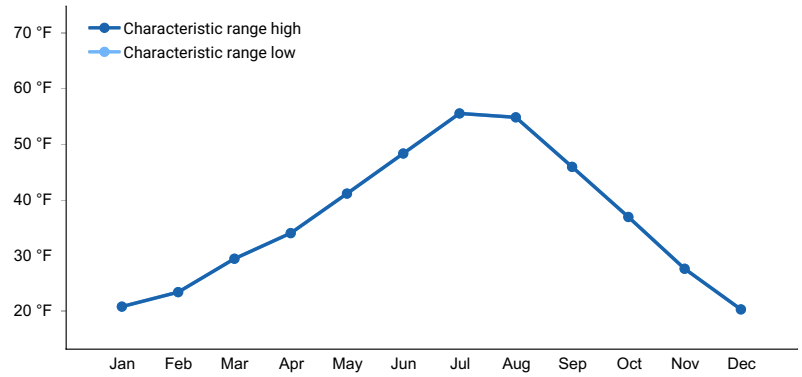


Figure 2. Monthly minimum temperature range

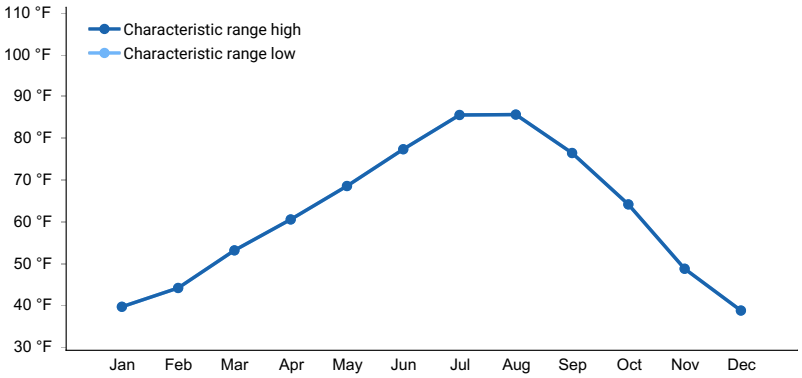


Figure 3. Monthly maximum temperature range

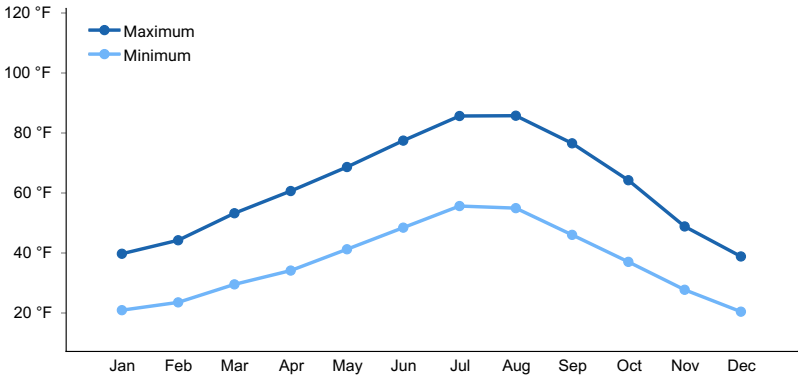


Figure 4. Monthly average minimum and maximum temperature

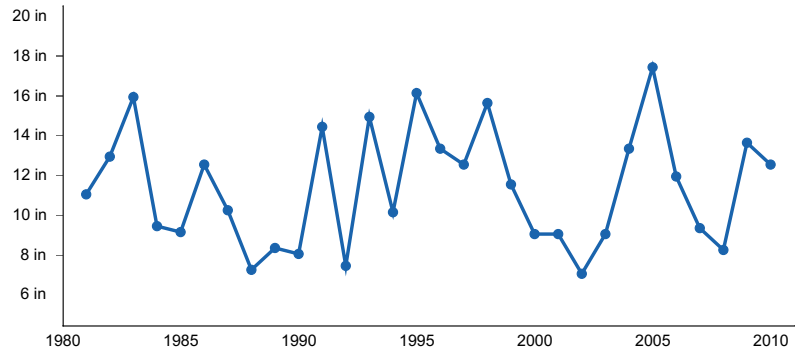


Figure 5. Annual precipitation pattern

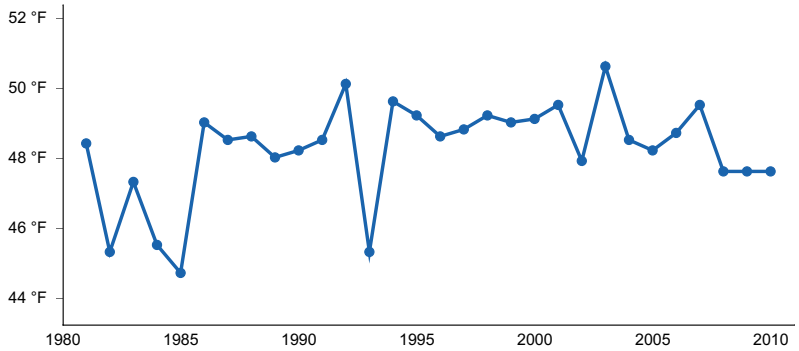


Figure 6. Annual average temperature pattern

Climate stations used

- (1) OAKLEY [USC00106542], Oakley, ID

Influencing water features

There are no influencing water features for this site.

Soil features

Soils are derived from colluvium and residuum. Soils are deep to very deep. Rock fragments on the surface range from 5 to 45 percent. Subsurface fragments range from 5 to 50 percent.

Soil series correlated to this site are: Booneville, Dinnen familly, Graylock, Leadville family, Lockman, Naz, Nazation, Sambrito family, Southmount, Ula and Wareagle.

Table 5. Representative soil features

Parent material	(1) Colluvium (2) Residuum
Surface texture	(1) Loam (2) Sandy loam (3) Very stony loam (4) Very stony sandy loam
Family particle size	(1) Fine-loamy (2) Coarse-loamy (3) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Depth to restrictive layer	40–72 in

Soil depth	40–72 in
Surface fragment cover <=3"	0–35%
Surface fragment cover >3"	0–45%
Available water capacity (0-40in)	3–6.2 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–50%
Subsurface fragment volume >3" (Depth not specified)	5–45%

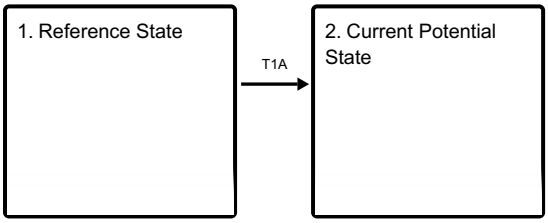
Ecological dynamics

An ecological site is the product of all the environmental factors responsible for its development and it has a set of key characteristics that influence a site's resilience to disturbance and resistance to invasives. Biotic factors that influence resilience include site productivity, species composition and structure, and population regulation and regeneration.

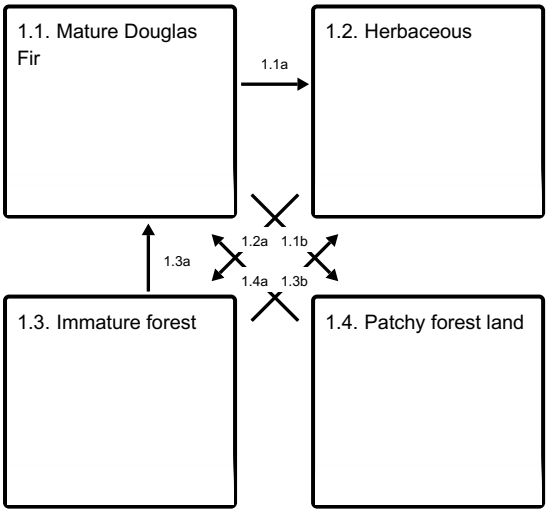
This is a very stable site. Fire is the main disturbance but will be rare and low severity due to low fuel loads. Common dandelion is the most common species to invade these sites. This site has two stable states; the Reference State and Current Potential.

State and transition model

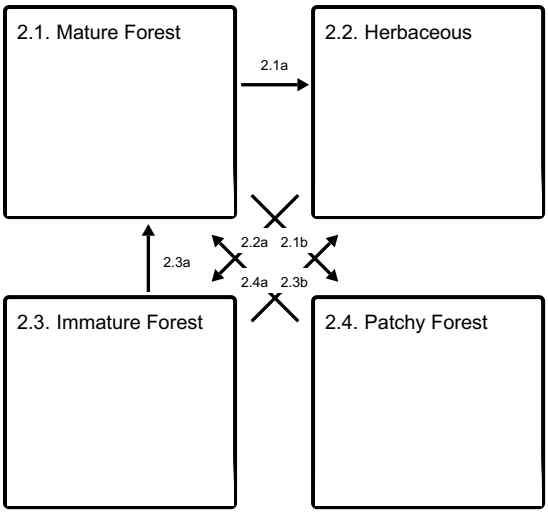
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference State

The Reference State is representative of the natural range of variability under pristine conditions. This reference state has four general community phases.. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Plant community phase changes are primarily driven by fire, periodic drought and/or insect or disease attack.

Community 1.1
Mature Douglas Fir

The plant community is dominated by Douglas fir. Quaking aspen (*Populus tremuloides*) is recognized as an important seral species in the development of this woodland site. Creeping barberry and mountain snowberry are the principal understory shrubs. Sedges, along with mountain brome, are the most prevalent understory grasses. Geranium, yarrow and arnica are common understory forbs.

Forest overstory. MATURE FORESTLAND: The visual aspect and vegetal structure are dominated by Douglas-fir that have reached or are near maximal heights for the site. Dominant trees average ten inches or greater in diameter at breast height. Tree canopy cover is about 50 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few seedlings and/or saplings of Douglas fir or quaking aspen occur in the understory.

Forest understory. Understory vegetative composition is about 15 percent grasses, 15 percent forbs and 70 percent shrubs and young trees when the average overstory canopy is medium (40 to 50 percent). Average understory production ranges from 50 to 350 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4½ feet of the ground surface.

Dominant plant species

- Douglas-fir (*Pseudotsuga menziesii*), tree
- mountain snowberry (*Symphoricarpos oreophilus*), shrub
- mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), shrub
- Geyer's sedge (*Carex geyeri*), grass
- mountain brome (*Bromus marginatus*), grass
- sticky purple geranium (*Geranium viscosissimum*), other herbaceous
- common yarrow (*Achillea millefolium*), other herbaceous
- heartleaf arnica (*Arnica cordifolia*), other herbaceous

Community 1.2
Herbaceous

The herbaceous understory increases. Sprouting shrubs such as serviceberry and creeping barberry may increase. Perennial grasses in the understory may increase due to reduced competition from the overstory and increased sunlight. Conifers may be present in patches and fire safe zones.

Community 1.3
Immature forest

The herbaceous understory decreases due to competition from maturing conifer seedlings and saplings. Mountain big sagebrush increases. Douglas fir seedlings and saplings increase in size and density.

Community 1.4
Patchy forest land

Mature trees minimally reduced. Sprouting shrubs such as creeping barberry and Utah serviceberry may be sprouting or increasing in the understory. Perennial bunchgrasses such as bluebunch wheatgrass may be reduced the first season after fire but will likely increase in cover and density due to the reduced competition from shrubs and trees.

Pathway 1.1a
Community 1.1 to 1.2

High severity, stand replacing fire would reduce tree cover and allow for the herbaceous understory to increase.

Pathway 1.1b
Community 1.1 to 1.4

A lightning strike, low severity fire and/or disease and insects would reduce the tree cover and shrubs in the understory and allow the perennial bunchgrasses to increase.

Pathway 1.2a
Community 1.2 to 1.3

Time without disturbance such as fire, drought or disease will allow for the trees and shrubs to increase in height and density.

Pathway 1.3a
Community 1.3 to 1.1

Time without disturbance such as fire, drought or disease will allow for the trees and shrubs to increase in height and density.

Pathway 1.3b
Community 1.3 to 1.2

Fire would reduce the maturing trees and shrubs and allow for the herbaceous understory to increase.

Pathway 1.4a
Community 1.4 to 1.1

Time without disturbance would allow for the conifers to increase.

State 2
Current Potential State

This state is similar to the Reference State and has four similar community phases. Ecological function has not changed in this state, but the resiliency of the state has been reduced by the presence of invasive weeds. These

non-native species can be highly flammable, and promote fire where historically fire had been infrequent. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads and retention of organic matter and nutrients. Positive feedbacks decrease ecosystem resilience and stability of the state. These include the non-natives high seed output, persistent seed bank, rapid growth rate, ability to cross pollinate and adaptations for seed dispersal.

Community 2.1
Mature Forest

This community phase is characterized by mature Douglas Fir. Mountain big sagebrush is the dominant shrub in the understory. Sedges and perennial bunchgrasses common in the understory. Utah serviceberry is a common understory shrubs. Non-native species such as common dandelion are present.

Community 2.2
Herbaceous

The herbaceous understory increases. Sprouting shrubs such as serviceberry and creeping barberry may increase. Perennial grasses in the understory may increase due to reduced competition from the overstory and increased sunlight. Conifers may be present in patches and fire safe zones. Non-native species present.

Community 2.3
Immature Forest

The herbaceous understory decreases due to competition from maturing conifer seedlings and saplings. Mountain big sagebrush increases. Douglad fir seedlings and saplings increase in size and density. Non-native species present.

Community 2.4
Patchy Forest

Mature trees minimally reduced. Mountain big sagebrush is killed by fire and may take many years to reestablish. Sprouting shrubs such as creeping barberry and serviceberry may be sprouting or increasing in the understory. Perennial bunchgrasses may be reduced the first season after fire but will likely increase in cover and density due to the reduced competition from shrubs and trees. Non-native species such as common dandelion may be present.

Pathway 2.1a
Community 2.1 to 2.2

High severity, stand replacing fire would reduce tree cover and allow for the herbaceous understory to increase.

Pathway 2.1b
Community 2.1 to 2.4

A lightning strike, low severity fire and/or disease and insects would reduce the trees in the overstory and shrubs in the understory allowing the perennial bunchgrasses to increase.

Pathway 2.2a
Community 2.2 to 2.3

Time without disturbance such as fire, drought or disease will allow for the trees and shrubs to increase in height and density.

Pathway 2.3a
Community 2.3 to 2.1

Time without disturbance such as fire, drought or disease will allow for the trees and shrubs to increase in height and density.

Pathway 2.3b
Community 2.3 to 2.2

Fire would reduce the maturing trees and shrubs and allow for the herbaceous understory to increase.

Pathway 2.4a
Community 2.4 to 2.1

Time without disturbance such as fire, drought or disease will allow for the trees and shrubs to increase in height and density.

Transition T1A
State 1 to 2

Trigger: This transition is caused by the introduction of non-native plants. Slow variables: Over time the annual non-native species will increase within the community. Threshold: Any amount of introduced non-native species causes an immediate decrease in the resilience of the site. Annual non-native species cannot be easily removed from the system and have the potential to significantly alter disturbance regimes from their historic range of variation.

Additional community tables

Inventory data references

Soils and Physiographic features are gathered from NASIS.

Type locality

Location 1: Boise County, ID	
Latitude	43° 41′ 24″
Longitude	116° 2′ 47″

Contributors

S Quistberg

Approval

Kendra Moseley, 4/25/2024

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)	
Contact for lead author	
Date	05/11/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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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:

    Sub-dominant:

    Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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:**

17. **Perennial plant reproductive capability:**