USDA Natural Resources Conservation Service

Ecological site F043BP704WY
Shallow Warm Woodland Group

Last updated: 3/05/2025
Accessed: 05/12/2025

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): 043B–Central Rocky Mountains

043B – Central Rocky Mountains – This MLRA is extensive including Montana, Idaho, Wyoming and a small portion in Utah.

This MLRA consists of the major chains of Mountain Ranges with the corresponding valleys. Cartographic standards limited the ability to capture the foothills as a separate MLRA, so revisions of the MLRA boundaries in 2006 led to the inclusion of the foothills
with the mountains for much of Wyoming.

Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

LRU notes

LRU P: PES (Provisional Ecological Site or Group - PEG) A PROVISIONAL ECOLOGICAL SITE is a conceptual grouping of soil map unit components within a Major Land Resource Area
(MLRA) based on the similarities in response to management. Although there may be wide variability in the productivity of the soils grouped into a Provisional Site, the soil vegetation
interactions as expressed in the State and Transition Model are similar and the management actions required to achieve objectives, whether maintaining the existing ecological state or managing for an alternative state, are similar. Provisional Sites are
likely to be refined into more precise concept during the process of meeting the APPROVED ECOLOGICAL SITE DESCRIPTION criteria.

This PROVISIONAL ECOLOGICAL SITE has been developed to meet the standards established in the National Ecological Site Handbook. The information associated with this ecological site does not meet the Approved Ecological Site Description Standard, but it has been through a Quality Control and Quality Assurance processes to assure consistency and completeness. Further investigations, reviews and correlations are necessary before it becomes an Approved Ecological Site Description.

Classification relationships

Other Classifications:
PIFL2/LEKI2 habitat type (Steele Et.Al. 1983)
PIFL2/CELE habitat type (Steele Et.Al. 1983)
PIFL2/FEID habitat type (Steele Et.Al.1983)

PIFL2/JUCOD habitat type (Steele Et.Al. 1983)

Ecological site concept

• Site does not receive any additional water
• Soils are
o Generally not saline or saline-sodic
o Shallow
o Typically less than 5% stone and boulder on surface (<15%)
o Soil surface texture ranges from sandy loam to clay loam in surface mineral 4”

Associated sites

F043BP711WY	**Upland Warm Woodland Group** Upland Warm Woodland can be found in slightly concave or deeper soils below or around the Shallow Warm Woodlands.
F043BP708WY	**Upland Aspen Woodland Group** Upland Aspen Woodland can be intermixed with the Shallow Warm Woodland, especially in snow melt pockets or seeps occurring near or below rock outcrops, with the Shallow Warm Woodlands occurring on the upper edges or sides associated with the rock outcrops.

Similar sites

R034AY276WY	**Very Shallow Foothills and Basins West (VS)** Very Shallow 10-14
R032XY362WY	**Shallow Loamy (SwLy) 10-14" East Precipitation Zone** Shallow Loamy 10-14
R032XY376WY	**Very Shallow (VS) 10-14" East Precipitation Zone** Very Shallow 10-14
R032XY366WY	**Shallow Sandy (SwSy) 10-14" East Precipitation Zone** Shallow Sandy 10-14
R032XY358WY	**Shallow Clayey (SwCy) 10-14" East Precipitation Zone** Shallow Clayey 10-14
R034AY258WY	**Shallow Clayey Foothills and Basins West (SwCy)** Shallow Clayey 10-14
R034AY260WY	**Shallow Igneous Foothills and Basins West (Swlg)** Shallow Igneous 10-14
R034AY262WY	**Shallow Loamy Foothills and Basins West (SwLy)** Shallow Loamy 10-14
R034AY266WY	**Shallow Sandy Foothills and Basins West (SwSy)** Shallow Sandy 10-14
F043BP702WY	**Shallow Cool Woodland Group** Shallow Cool Woodlands have the same general site concept, except occurs on higher elevations or Eastern aspect slopes across the Mountains. The cooler temperature affects both the tree species as well as the under story species.

Table 1. Dominant plant species

Tree	(1) *Pinus flexilis* (2) *Pseudotsuga menziesii*
Shrub	(1) *Ribes* (2) *Rhus*
Herbaceous	(1) *Pseudoroegneria spicata* (2) *Festuca idahoensis*

Physiographic features

This site occurs on most slopes and along ridge tops. Rock outcrops are common in association with this ecological site.

Table 2. Representative physiographic features

Geomorphic position, mountains	(1) Mountainbase (2) Lower third of mountainflank
Landforms	(1) Mountains > Mountain slope (2) Mountains > Moraine (3) Foothills > Escarpment
Runoff class	Low to very high
Elevation	5,800–9,200 ft
Slope	15–80%
Aspect	W, SE, S, SW

Climatic features

Annual precipitation ranges from 15-24 inches per year. June is generally the wettest month. July, August, and September are somewhat less with daily amounts rarely exceeding one inch. Wide fluctuations may occur in yearly precipitation and result in more dry
years than those with more than normal precipitation.

Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures.

Snowfall is quite heavy in the area. Annual snowfall averages about 150 inches. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. Prevailing winds are from the southwest, because of the varied
topography, the wind will vary considerably for different parts of the area. The wind is usually much lighter at the lower elevations and in the valleys as compared with the higher terrain. Occasional storms, however, can bring brief periods of high winds with gusts
exceeding 50 mph. Growth of native cool season plants begins about May 15 and continues to about September 15.

The following information is from the “Afton”, "Dubois", “Bedford 3 SE", "Moran 5WNW", and "Burgess Junction" climate stations, at the lower end of this precipitation zone. Climate Data is limited and is being extrapolated from the nearest stations.

Table 3. Representative climatic features

Frost-free period (characteristic range)	13-27 days
Freeze-free period (characteristic range)	56-69 days
Precipitation total (characteristic range)	17-22 in
Frost-free period (actual range)	9-41 days
Freeze-free period (actual range)	49-81 days
Precipitation total (actual range)	12-24 in
Frost-free period (average)	22 days
Freeze-free period (average)	63 days
Precipitation total (average)	19 in

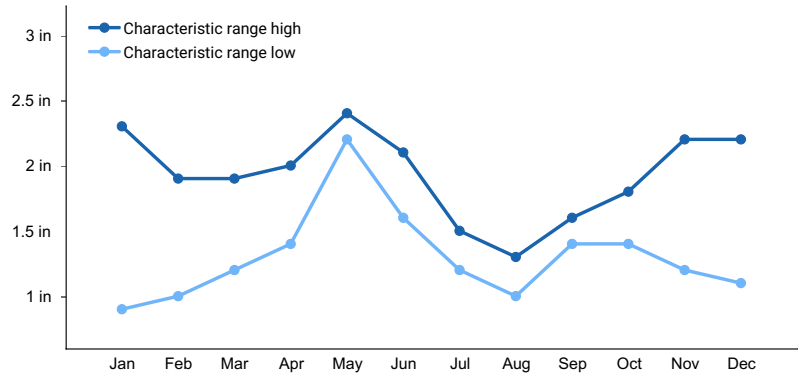


Figure 1. Monthly precipitation range

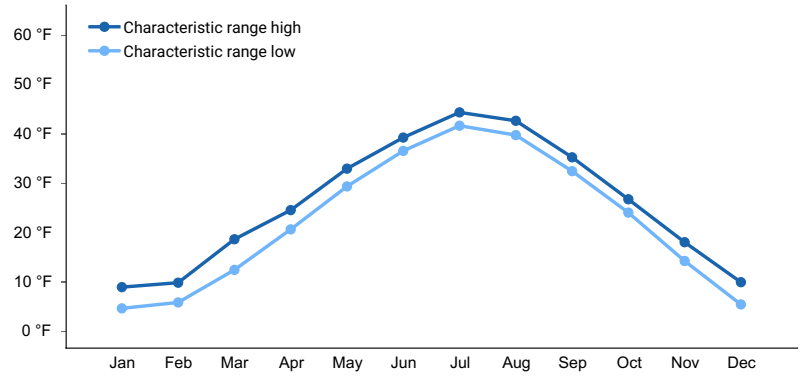


Figure 2. Monthly minimum temperature range

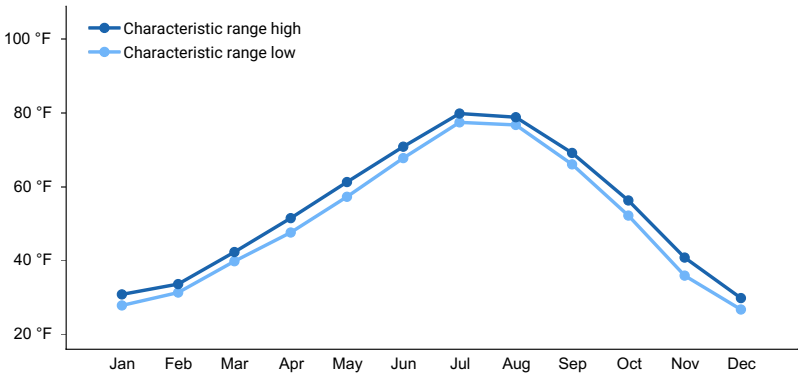


Figure 3. Monthly maximum temperature range

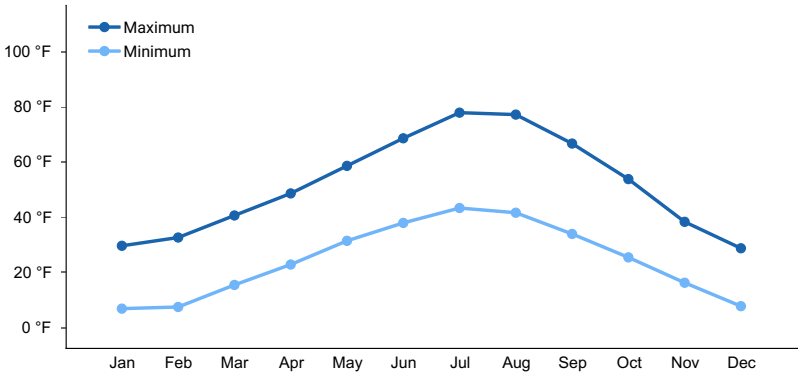


Figure 4. Monthly average minimum and maximum temperature

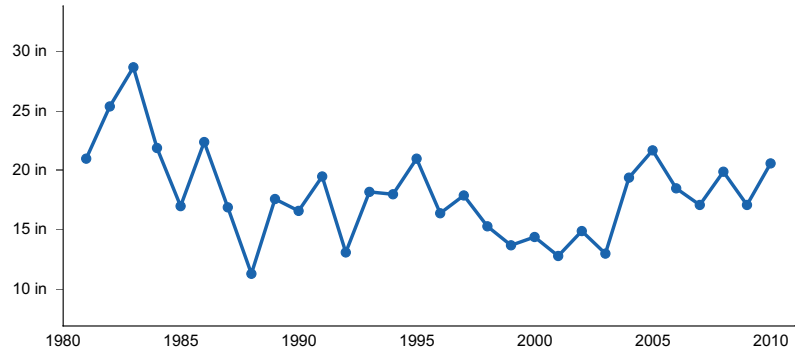


Figure 5. Annual precipitation pattern

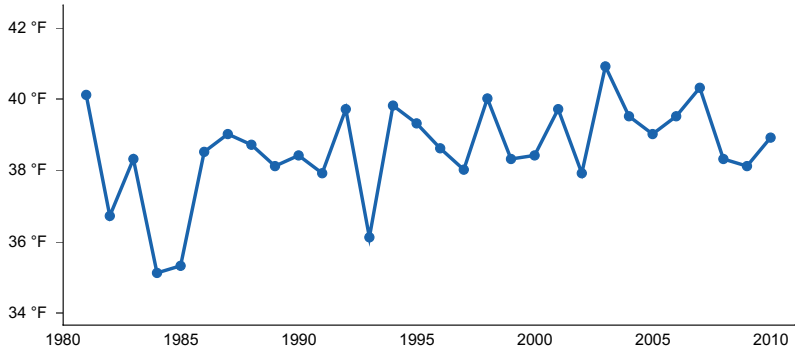


Figure 6. Annual average temperature pattern

Climate stations used

- (1) DUBOIS [USC00482715], Dubois, WY
- (2) AFTON [USC00480027], Afton, WY
- (3) BEDFORD 3 SE [USC00480603], Bedford, WY
- (4) MORAN 5WNW [USC00486440], Moose, WY
- (5) BURGESS JUNCTION [USC00481220], Dayton, WY

Influencing water features

This site is not associated with any type of surface water feature. Snow drift impact is moderate.

Soil features

The soils associated with this site were derived from calcareous sandstone, limestone, quartzite-sandstone mixes, or granitics. These soils are generally less than 20” in depth and virtually impermeable to plant roots. Pockets of deep soil may occur in this site and are moderately acidic. The bedrock will include igneous, metamorphic and sedimentary material. The soil characteristic having the most influence on the plant community is the shallow depth and slope. Soil temperature regime is found on frigid and the lower extent of cryic; while, soil moisture regime is aridic ustic to typic ustic.

Figure 7. Hand excavated pit on the Shallow Warm Woodland ecological site.

Table 4. Representative soil features

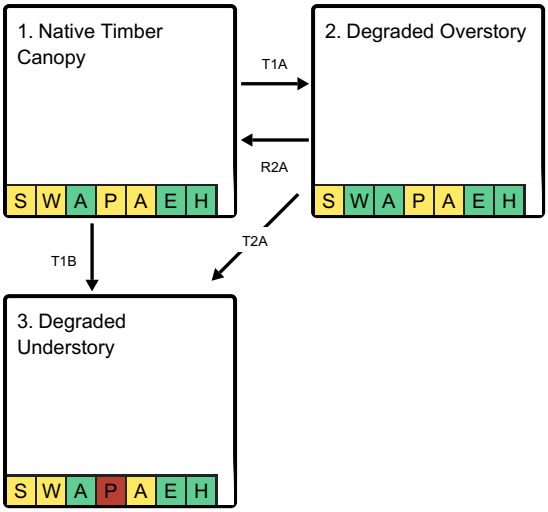
Parent material	(1) Colluvium–limestone and dolomite (2) Residuum–granite and gneiss (3) Slope alluvium–sedimentary rock (4) Quartzite (5) Volcanic and metamorphic rock
Surface texture	(1) Stony, bouldery sandy loam (2) Clay loam (3) Loam (4) Silty clay loam
Drainage class	Well drained
Permeability class	Slow to rapid
Depth to restrictive layer	10–20 in
Soil depth	10–20 in
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	5–15%
Calcium carbonate equivalent (0-5in)	Not specified
Electrical conductivity (0-2in)	Not specified
Soil reaction (1:1 water) (5.4-7in)	Not specified
Subsurface fragment volume <=3" (0-20in)	Not specified
Subsurface fragment volume >3" (0-15in)	Not specified

Ecological dynamics

The lower mountain slopes and foothills provide a warmer band of forested pockets that are dominated by limber pine, rocky mountain juniper, and some cover of Douglas-fir. Although these communities can have dense over story cover, the herbaceous under story is more common. Variability across the broad extent of this ecological grouping is great within species diversity and timber and forage production.

State and transition model

Ecosystem states



T1A - Fire, disease or insect damage, or other canopy disturbances remove the over story, exposing the herbaceous under story.

T1B - Soil disturbance or impacts to the under story cover leave this site vulnerable to invasive species.

R2A - Recovery time, weed and erosion control, as well as assurance that the necessary nursery stock is present are the key factors to restoring this site.

T2A - Significant canopy and soil disturbance with seed sources present lead to the degradation of the under story.

State 1 submodel, plant communities

1.1. Limber pine/Bunchgrasses/Douglas-fir

State 2 submodel, plant communities

2.1. Native Bunchgrasses/Rocky Mountain juniper/Douglas-fir

State 3 submodel, plant communities

3.1. Limber pine/Invasives

State 1
Native Timber Canopy

The Reference State for the Shallow Warm Woodland has a Limber pine overstory with native bunchgrasses and shrubs in present in the under story.

Characteristics and indicators. This limber pine dominated site is commonly accompanied by rocky mountain juniper and a low occurrence of Douglas-fir. The under story is comprised of bluebunch wheatgrass, Idaho fescue, threadleaf and needleleaf sedge as well as sandberg bluegrass. Common shrubs are currant, skunkbush, mahogany, and creeping juniper. Arrowleaf Balsamroot, Indian paintbrush, phlox, and cactus are common on this

site as well.

Resilience management. The fire frequency on this state is low, however, it does play a role in maintaining limber pine as the dominant over story and controlling the density of rocky mountain juniper on this site.

Dominant plant species

- limber pine (*Pinus flexilis*), tree
- Rocky Mountain juniper (*Juniperus scopulorum*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- currant (*Ribes*), shrub
- mountain mahogany (*Cercocarpus*), shrub
- sumac (*Rhus*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass
- Idaho fescue (*Festuca idahoensis*), grass
- threadleaf sedge (*Carex filifolia*), grass
- arrowleaf balsamroot (*Balsamorhiza sagittata*), other herbaceous
- Indian paintbrush (*Castilleja*), other herbaceous
- phlox (*Phlox*), other herbaceous

Dominant resource concerns

- Sheet and rill erosion
- Classic gully erosion
- Aggregate instability
- Plant structure and composition
- Terrestrial habitat for wildlife and invertebrates
- Inadequate livestock water quantity, quality, and distribution

Community 1.1
Limber pine/Bunchgrasses/Douglas-fir

Figure 8. Image of a PIFL2 dominated community, current canopy impacted by insects, in process of transitioning to the 2.1 community.

The Reference Community (1.1) is a limber pine community with a bluebunch wheatgrass and Idaho fescue under story. Low composition of Rocky mountain juniper and Douglas-fir are also found in this community. Shrubs, including currant, sumac (skunkbush), and mountain mahogany, are common. Arrowleaf baslamroot, a variety of paintbrush species, as well as phlox are found in the under story.

Resilience management. This site is resilient, and fire plays a role in the health and management of the timber. However, with increased fire frequency or intensity, this site can be pushed out of balance. The risk of juniper encroachment and cheatgrass are significant factors to the stability of this site.

Dominant plant species

- limber pine (*Pinus flexilis*), tree

- Douglas-fir (*Pseudotsuga menziesii*), tree
- Rocky Mountain juniper (*Juniperus scopulorum*), tree
- currant (*Ribes*), shrub
- sumac (*Rhus*), shrub
- mountain mahogany (*Cercocarpus*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass
- Idaho fescue (*Festuca idahoensis*), grass
- spike fescue (*Leucopoa kingii*), grass
- arrowleaf balsamroot (*Balsamorhiza sagittata*), other herbaceous
- Indian paintbrush (*Castilleja*), other herbaceous
- phlox (*Phlox*), other herbaceous

State 2
Degraded Overstory

The loss of woody canopy cover due to fire or disease characterizes the transition from the reference state to State 2 - Degraded Overstory.

Characteristics and indicators. Native grasses and grass-likes are dominant on this site. The woody canopy is reduced to cover of less than 15%, and may represent only one or two species. Following disease or other impacts to limber pine, juniper may be come dominant on the site. Bluebunch wheatgrass, Idaho fescue, threadleaf sedge, and sandberg bluegrass are the major grass/grass-like species with arrowleaf balsamroot, indian paintbrush, phlox and cactus.

Resilience management. The herbaceous cover is resistant to change and resilient. Fire is a risk and also a factor to control juniper encroachment.

Dominant plant species

- Rocky Mountain juniper (*Juniperus scopulorum*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- currant (*Ribes*), shrub
- common snowberry (*Symphoricarpos albus*), shrub
- mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass
- Idaho fescue (*Festuca idahoensis*), grass
- sedge (*Carex*), grass
- arrowleaf balsamroot (*Balsamorhiza sagittata*), other herbaceous
- Indian paintbrush (*Castilleja*), other herbaceous
- phlox (*Phlox*), other herbaceous

Dominant resource concerns

- Sheet and rill erosion
- Plant productivity and health
- Plant structure and composition
- Terrestrial habitat for wildlife and invertebrates

Community 2.1
Native Bunchgrasses/Rocky Mountain juniper/Douglas-fir

Figure 9. Remnants of woody cover evident, but the bunchgrasses and shrubs are dominant in this community.

As the limber pine canopy is reduced by insect, disease, decadence or fire, the under story transitions to a more bunchgrass dominated community with remnants of woody vegetation. As this community progresses, Rocky mountain juniper can become dominant.

Resilience management. Fire management, to allow limber pine to recover, as well as management of junipers is needed to allow this site to maintain or to recover to the Reference state.

Dominant plant species

- Rocky Mountain juniper (*Juniperus scopulorum*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- common snowberry (*Symphoricarpos albus*), shrub
- currant (*Ribes*), shrub
- mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass
- Idaho fescue (*Festuca idahoensis*), grass
- sedge (*Carex*), grass
- arrowleaf balsamroot (*Balsamorhiza sagittata*), other herbaceous
- Indian paintbrush (*Castilleja*), other herbaceous
- phlox (*Phlox*), other herbaceous

State 3
Degraded Understory

The Degraded Understory State is a result of the loss of the native bunchgrasses and the establishment of invasive and aggressive species.

Characteristics and indicators. As bluebunch wheatgrass and Idaho fescue are removed from the community, sandberg bluegrass, prairie junegrass, and threadleaf sedge maintain a footprint. With drought, soil disturbance or in the removal of further understory, invasive species such as cheatgrass can take a hold in the community.

Resilience management. Once invasive species have established, the community is at risk of further degradation, and management at the current community is difficult due to the increased risk of fire and loss of site stability. Loss of the limber pine community or the general increase of Rocky mountain juniper further increases the limitations of this community.

Dominant plant species

- limber pine (*Pinus flexilis*), tree
- Rocky Mountain juniper (*Juniperus scopulorum*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- currant (*Ribes*), shrub
- sumac (*Rhus*), shrub

- mountain mahogany (*Cercocarpus*), shrub
- Sandberg bluegrass (*Poa secunda*), grass
- prairie Junegrass (*Koeleria macrantha*), grass
- cheatgrass (*Bromus tectorum*), grass
- arrowleaf balsamroot (*Balsamorhiza sagittata*), other herbaceous
- phlox (*Phlox*), other herbaceous
- plains pricklypear (*Opuntia polyacantha*), other herbaceous

Dominant resource concerns

- Sheet and rill erosion
- Aggregate instability
- Plant productivity and health
- Plant structure and composition
- Wildfire hazard from biomass accumulation
- Terrestrial habitat for wildlife and invertebrates
- Feed and forage imbalance
- Inadequate livestock shelter

Community 3.1
Limber pine/Invasives

Figure 10. The overall lack of under story, with the major species persisting being cheatgrass puts this community at risk.

The limber pine, Rocky mountain juniper, and Douglas-fir over story remains in varying composition, while the under story degrades with increased disturbance, drought, or possibly fire. As the under story degrades, invaders increase in the community. Cheatgrass is the main threat in this system. Rocky mountain juniper can also be an invader in this system.

Resilience management. The increased threat of fire with a cheatgrass under story or increased juniper puts this community and state at risk. However, the community is relatively resilient to change and is difficult to improve due to the aggressive behavior of both cheatgrass and junipers.

Dominant plant species

- Rocky Mountain juniper (*Juniperus scopulorum*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- currant (*Ribes*), shrub
- sumac (*Rhus*), shrub
- mountain mahogany (*Cercocarpus*), shrub
- Sandberg bluegrass (*Poa secunda*), grass
- threadleaf sedge (*Carex filifolia*), grass
- cheatgrass (*Bromus tectorum*), grass
- phlox (*Phlox*), other herbaceous
- plains pricklypear (*Opuntia polyacantha*), other herbaceous

- arrowleaf balsamroot (*Balsamorhiza sagittata*), other herbaceous

Transition T1A
State 1 to 2

The impacts of wildfire or controlled burns, insect impacts or disease, can weaken and remove the timber cover leaving a herbaceous dominated community.

Constraints to recovery. The shallow soils, change in hydrologic factors with the loss of canopy cover and instability in the soils with loss of cover are constraints to the recover of this site. The viability of limber pine to rejuvenate on the site is also a constraint to recovery. The type and severity of disturbance influences the ability for the timber to re-establish.

Context dependence. This transition could be viewed as a transition between community phases rather than states. However, due to the time of recovery and the tenancy to transition to a less desirable community, this transition is being expressed as states.

Transition T1B
State 1 to 3

Low intensity fire, or soil and canopy disturbances that impacts the under story, open the community to threat of invasion by invasive species. When seed sources are present or are introduced by wind, wildlife, livestock or recreation, this site is easily transitioned to a degraded under story community.

Constraints to recovery. The inability to control invasive species, especially with an existing canopy of woody species, and the ability to encourage native species is difficult with slopes limits the ability of this site to recover.

Restoration pathway R2A
State 2 to 1

Recovery time of a disturbed site is key to allowing the re-establishment of the key species on this site. Integrated management to reduce threats of invasive or undesirable species and promoting propagation of the desired species may be needed depending on the extent of the disturbance. This restoration is part of a natural process in the recovery on a site post fire. However, with the risk of invasive species and the potential for increased fire frequency, fuel load reductions, patch burns or other management techniques may be needed to prevent this site from transitioning to a degraded under story.

Context dependence. The condition of the stand before disturbance, the species of concern in the area pre-disturbance and the impacts following disturbance are factors affecting the ability to recover. Seeding and plantings, erosion control may be necessary to stabilize the site to aid in the restoration process.

Conservation practices

Critical Area Planting
Mulching
Integrated Pest Management (IPM)
Upland Wildlife Habitat Management
Forest Stand Improvement
Forest stand improvement for habitat and soil quality
Forest stand improvement pre-treating vegetation and fuels
Forest Stand Improvement, Prescribed burning
Forest Stand Improvement for Soil Quality
Forest stand improvement pre-treating vegetation and fuels preceding a prescribed fire

Transition T2A
State 2 to 3

Fire or other canopy and soil disturbance opens this site to the threat of invasive species, primarily cheatgrass. In communities that have lost significant limber pine cover, and those that have severe juniper encroachment, are at risk of weed invasion following burns due to the intensity of fire and the lack of cover to maintain the site.

Constraints to recovery. The difficulty to eradicate or manage invasive species, especially on steeper slopes, limits the ability for this site to recover. Lack of soil depth, and slope again, are constraints on this site.

Additional community tables

Animal community

This site and plant community complex has minimal livestock grazing capacity in the old stand forests. In new growth or following logging or fire, this site may offer some livestock forage. This site is common habitat for elk, mule deer, bear, wolf, mountain lion, and a variety of other wildlife.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is highly variable and is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from slow to very rapid. Runoff potential for this site varies from moderate to high depending on soil hydrologic group, depth and degree of bedrock fracturing, slope, and ground cover (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information.)

Rills and gullies may be present, but should be small. Water flow patterns should be barely distinguishable. Pedestals are only slightly present in association with bunchgrasses such as bluebunch wheatgrass. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts
are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for large ungulates and fur bearing species. Limited for upland game bird species. Hiking is limited by density of tree stands and slope of site.

Wood products

Timber harvest for lumber and firewood, as well as post and pole cuttings are common on this forest type. Christmas tree harvest occurs on lower extents of this forest type.

Other products

Berry harvest from under story species as well as medicinal plants can be found within this ecological site. Fungi (mushroom) harvest can also occur in specific locations.

Inventory data references

Information presented here has been derived from NRCS data and
other inventory data. Field observations from range trained personnel were also used.
Those involved in developing this site include: Bill Christensen, Range Management Specialist, NRCS; Karen Clause, Range Management Specialist, NRCS; and Everet Bainter, Range Management Specialist, NRCS. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Other references

Steele, Robert; Cooper, Stephen V.; Ondov, David M.; Roberts, David W.; Pfister, Robert D. 1983. Forest Habitat Types of Eastern Idaho-Western Wyoming. General Technical Report INT-144. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 122 p.

Contributors

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Approval

Kirt Walstad, 3/05/2025

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	04/29/2024
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**