

Ecological site R044AP809MT Upland Sagebrush Shrubland Group

Last updated: 9/07/2023
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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): 044A–Northern Rocky Mountain Valleys

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This MLRA includes the northern portion of the Northern Rocky Mountain Valleys Province of the Rocky Mountain System. The mountain valleys are deeply dissected and are typically bordered by mountains trending north to south. The nearly level broad flood plains are bordered by gently to strongly sloping terraces and alluvial fans. The surrounding mountains and in some areas the valleys experienced glaciation. The average precipitation is 12 to 16 inches generally, though can vary widely. The dominant soil orders are Inceptisols, Mollisols and Andisols. The valleys support coniferous forests, shrublands and grasslands.

Description of MLRAs can be found in: 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

Ecological site concept

- Site does not receive any additional water
- Site not located in a flood plain
- Dominant Cover: Shrubland/Grassland; Small patch shrub and grassland that is a mix of the two main sagebrush types in Montana; Big sagebrush species are the dominant shrub (Wyoming primarily and at higher elevations Mountain big sagebrush subspecies and green rabbitbrush may be present). Fringed sagewort, cactus and broom snakeweed rare.

Mid-statured bunchgrasses dominant plant type. Bluebunch tends to be the most common however Rough fescue or Idaho fescue, needle and thread, Sandberg bluegrass, Thurber's needlegrass, prairie junegrass and green needlegrass are possible as mid-statured bunchgrasses. Minor component of forbs (low pussytoes) growing between shortgrasses. Forbs will rarely exceed 10% composition by weight.

- Soils are
 - o Not saline or saline-sodic
 - o Not limy
 - o Moderately deep, deep, very deep
 - o Not ashy or medial textural family
 - o Typically less than 15% stone and boulder surface area (<15% max)
- Soil surface texture silt loam to silty clay loam in surface mineral 4"
- Parent material is lacustrine deposits and alluvium
- Drainage class is well drained; no flooding frequency
- Site Landform: lake plains, lake terraces, alluvial fans, fan remnants
- Moisture Regime: ustic/xeric
- Temperature Regime: frigid

- Elevation Range: 2000-4700ft
- Slope: 7-15%

Associated sites

R044AP808MT	Upland Grassland Group This associated ecological site resides in areas with deeper soils with less rocks.
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Similar sites

R044AP808MT	Upland Grassland Group This ecological site is similar in that it resides in upland areas, has deep loamy soils, though the amount of rock fragments may be significantly less. Both ecological sites have shrub and perennial grassland species, but this similar ecological site is dominated by grasses while the upland sagebrush ecological site is dominated by sagebrush.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. vaseyana</i> (2) <i>Artemisia tridentata ssp. wyomingensis</i>
Herbaceous	(1) <i>Festuca campestris</i> (2) <i>Festuca idahoensis</i>

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Valley > Lake plain (2) Valley > Lake terrace (3) Valley > Alluvial fan (4) Valley > Fan remnant
Elevation	2,000–4,700 ft
Slope	7–15%
Water table depth	60 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

- Moisture Regime: ustic/xeric
- Temperature Regime: frigid
- Representative Value (RV) of range of Mean Annual Precipitation: 12-16 inches
- Representative Value (RV) of range of Mean Average Annual Temperature: 39-45 degrees
- Representative Value (RV) of range of Frost Free Days: 100-120 days

Table 3. Representative climatic features

Frost-free period (characteristic range)	43-99 days
Freeze-free period (characteristic range)	86-133 days
Precipitation total (characteristic range)	13-24 in
Frost-free period (actual range)	18-114 days
Freeze-free period (actual range)	64-144 days
Precipitation total (actual range)	11-34 in
Frost-free period (average)	73 days

Freeze-free period (average)	113 days
Precipitation total (average)	19 in

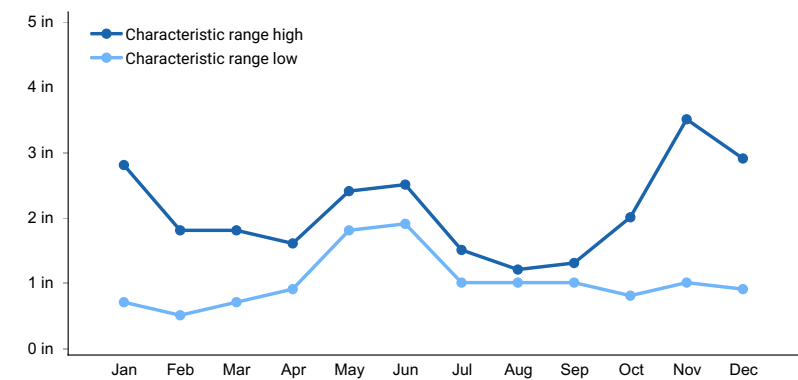


Figure 1. Monthly precipitation range

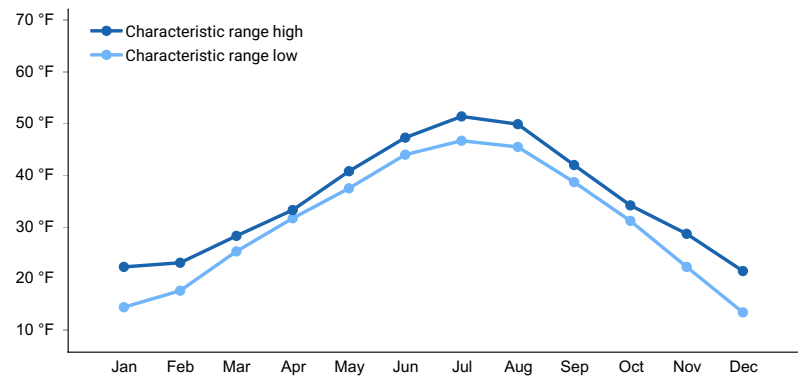


Figure 2. Monthly minimum temperature range

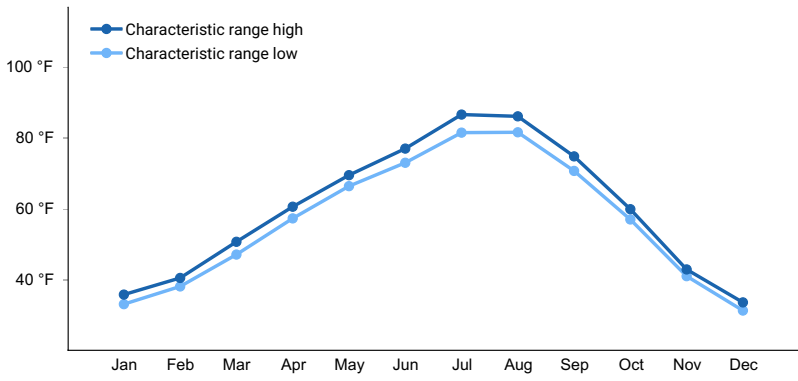


Figure 3. Monthly maximum temperature range

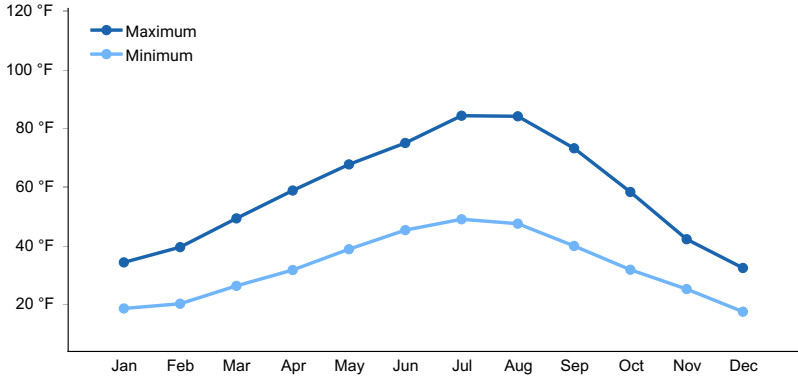


Figure 4. Monthly average minimum and maximum temperature

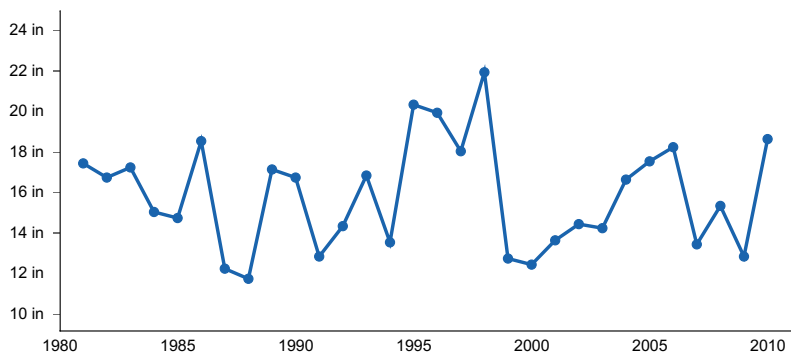


Figure 5. Annual precipitation pattern

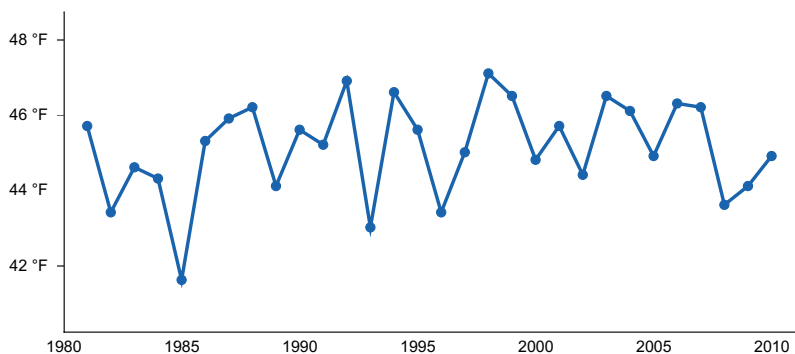


Figure 6. Annual average temperature pattern

Climate stations used

- (1) BONNERS FERRY [USC00101079], Bonners Ferry, ID
- (2) SANDPOINT EXP STN [USC00108137], Sandpoint, ID
- (3) HERON 2 NW [USC00244084], Heron, MT
- (4) TROUT CREEK RS [USC00248380], Trout Creek, MT
- (5) TROY [USC00248390], Troy, MT
- (6) SAINT REGIS 1 NE [USC00247318], Saint Regis, MT
- (7) EUREKA RS [USC00242827], Eureka, MT
- (8) KALISPELL 9 NNE [USC00244560], Kalispell, MT
- (9) POLSON KERR DAM [USC00246640], Polson, MT
- (10) SUPERIOR [USW00024159], Superior, MT
- (11) ALBERTON [USC00240075], Alberton, MT
- (12) MISSOULA INTL AP [USW00024153], Missoula, MT
- (13) STEVENSVILLE [USC00247894], Stevensville, MT
- (14) OVANDO 9 SSE [USC00246304], Helmville, MT
- (15) DEER LODGE 3 W [USC00242275], Deer Lodge, MT
- (16) TRIDENT [USC00248363], Three Forks, MT
- (17) TWIN BRIDGES [USC00248430], Sheridan, MT

Influencing water features

- Site does not receive any additional water
- Site not located in a flood plain
- Dominant Cover: Shrubland

Wetland description

DOES NOT APPLY

Soil features

- o Not saline or saline-sodic
- o Not limy
- o Moderately deep, deep, very deep
- o Not ashy or medial textural family
- o Typically less than 15 percent stone and boulder surface area (less than 15 percent max)
- Soil surface texture silt loam to silty clay loam in surface mineral 4 inches
- Drainage class is well drained; no flooding frequency

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Lacustrine deposits
Surface texture	(1) Silt loam (2) Silty clay loam
Drainage class	Well drained
Soil depth	20–60 in
Surface fragment cover >3"	15%

Ecological dynamics

1.1 Mid-statured bunchgrasses dominant plant type. Bluebunch tends to be the most common however Rough fescue or Idaho fescue, needle and thread, Sandberg bluegrass, Thurber's needlegrass, prairie Junegrass and green needlegrass are possible as mid-statured bunchgrasses. Minor component of forbs (low pussytoes) growing between shortgrasses. Forbs will rarely exceed 10 percent composition by weight. Big sagebrush species dominant shrub (Wyoming and Mountain big sagebrush subspecies and green rabbitbrush may be present). Fringed sagewort, cactus and broom snakeweed rare.

1.1a Plant community experiences long term drought, wildfire (low intensity), untimely grazing event

1.2 Mid-statured bunchgrasses share dominance with short bunchgrasses. Sagebrush increases as well as forbs likely to increase. Limited tree cover may exist where fire has been suppressed for extended periods. Bare ground is expected to increase slightly

1.2a Plant community receives timely moisture and has an opportunity to rest from disturbance

1.3 Areas with a slight increase in limy soils may have bluebunch wheatgrass as the dominant grass and winterfat increasing to co-dominate with big sagebrush

2.1 Shortgrasses take over dominance with Sagebrush and forbs as a subdominant plant groups. Mid-statured bunchgrasses rare. Tree presence likely rare though may include Rocky Mountain Juniper, Douglas Fir, and/or Ponderosa Pine. Cactus presence increases. Shrub canopy increases as larger bunchgrasses are removed.

T1A Catastrophic fire (extremely rare), multiple overgrazing events, long term drought, climate change

R1A Time and timely moisture, proper grazing management, brush management, possibly reseeding

3.1 Site becomes invaded with invasive forbs and grasses. Tree encroachment also occurs particularly where fire has been excluded long-term. Bare ground typically high

T1B Overgrazing, Catastrophic fire, introduction of invasive species

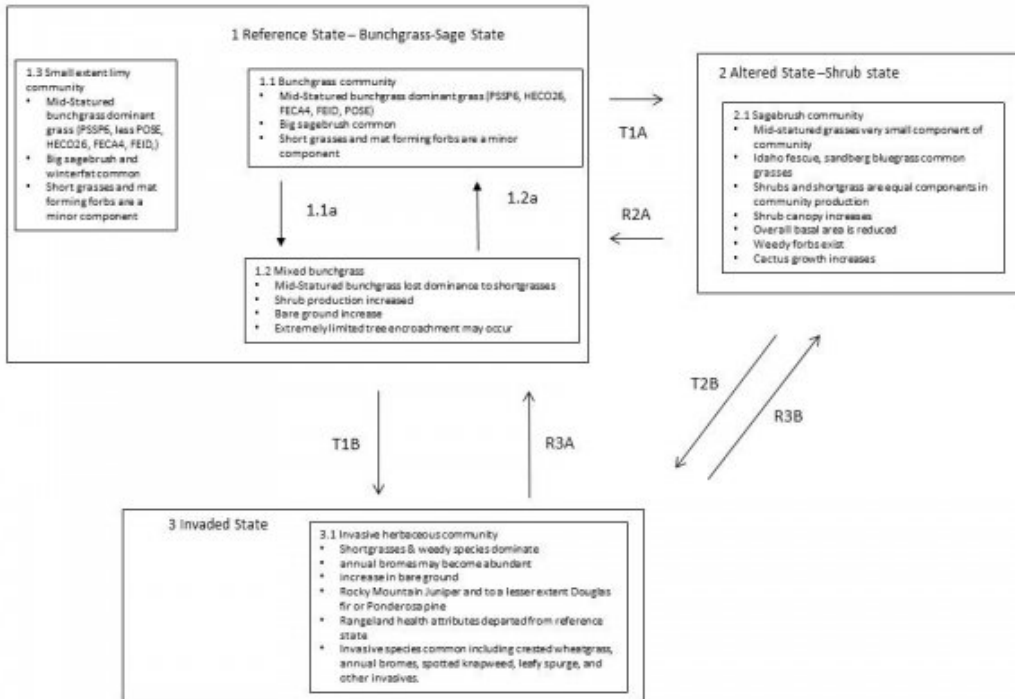
R3A Removal of invasive species (if possible), proper grazing management, time

T2B Overgrazing, Catastrophic fire, introduction of invasive species

R3B Removal of invasive species (if possible), proper grazing management, time

State and transition model

Upland Sagebrush Shrubland R044AP809MT



Legend

Pathways

1.1a Plant community experiences long term drought, wildfire (low intensity), untimely grazing event

1.2a Plant community receives timely moisture and has an opportunity to rest from disturbance

Transitions

T1A Catastrophic fire (extremely rare), multiple overgrazing events, long term drought, climate change

R1A Time and timely moisture, proper grazing management, brush management, possibly reseeding

T1B Overgrazing, Catastrophic fire, introduction of invasive species

R3A Removal of invasive species (if possible), proper grazing management, time

T2B Overgrazing, Catastrophic fire, introduction of invasive species

R3B Removal of invasive species (if possible), proper grazing management, time

Animal community

Species that are commonly found at this site include big game species elk, mule deer, white-tailed deer, pronghorn, bighorn sheep, small mammals such as voles, shrews, mice, and skunk, badger, fox, coyote, wolf and mountain lion. Various birds of prey such as hawks, eagles, falcons and songbirds; and reptiles and amphibians.

The greater sage grouse is not shown to reside, breed or overwinter in Northwestern Montana.

The response to grazing depends on the type of grazer, the amount, the time of season and other factors. In general, shrubs and increaser grass species such as needle and thread will increase with heavy grazing. As well, grazing may impact microphytic crust, if present at the site. Heavy grazing can also lead to an introduction or an increase and potentially a dominance of annual bromes.

Production of Shrub Habitat Types (Muegller, 1980):

Big Sage brush (mountain and Wyoming subspecies)/ bluebunch wheatgrass type has 739 to 864 pounds per acre dry weight(2 sites)

Big Sage brush (mountain and Wyoming subspecies)/ rough fescue type has 1100 to 1600 dry pounds per acre dry weight

Big Sage brush (mountain and Wyoming subspecies)/ Idaho fescue type has 769 to 1443 pounds per acre dry weight

Hydrological functions

Fire suppression would increase shrub cover at this site, potentially disrupting the hydrologic function of this site. If annual bromes dominate this site, then there will be a change in the natural hydrologic function of this site. As well, a transition of the site to annual bromes will change the frequency, severity and effects of fire.

Recreational uses

HIKING, BIKING, PHOTOGRAPHY

Wood products

NONE

Other information

This site is a mix of the two dominant sagebrush steppe vegetation communities in Montana. The Big Sagebrush Steppe community that dominates in central Montana and the Montane Sagebrush Steppe that dominates in southwestern area of Montana. Sagebrush in the mountainous western Montana is in small patches and the vegetation is determined by site characteristics and climate. At higher elevation or in sites that are harsher, mountain sagebrush community of the southwest predominates. This has mountain big sagebrush and rough fescue, Idaho fescue, pinegrass, needlegrass, mountain brome, slender wheatgrass, arrowleaf balsamroot, Indian paintbrush, and cinquefoil species. At lower elevations and drier site conditions, big sagebrush community of central Montana predominates. This has Wyoming big sagebrush, western wheatgrass, Idaho fescue and lesser Indian ricegrass, sandberg bluegrass, blue grama, bluebunch wheatgrass and Hood's phlox and scarlet globemallow. Both of these sagebrush communities have variable shrub cover and higher cover of grasses and forbs. The Big Sagebrush steppe community has shrub cover at 10-25% and dominated by Wyoming big sagebrush. The Montane Big Sagebrush steppe community has shrub cover very wide ranging 10-50%.

Other references

Big Sagebrush Steppe — Inter-Mountain Basins Big Sagebrush Steppe. Montana Field Guide. Montana Natural Heritage Program Retrieved on April 12, 2019, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=5454

Montane Sagebrush Steppe — Inter-Mountain Basins Montane Sagebrush Steppe. Montana Field Guide. Montana Natural Heritage Program Retrieved on April 12, 2019, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=5455

Mueggler, Walter F., and William L. Stewart. "Grassland and shrubland habitat types of western Montana." Grassland and shrubland habitat types of western Montana. INT-66 (1980).

Contributors

Jay Skovlin
Stephanie Shoemaker

Approval

Kirt Walstad, 9/07/2023

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	05/10/2025
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):**

-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
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:**
