USDA Natural Resources
Conservation Service

Ecological site R013XY044ID
Gravelly North 12-16 PZ ARARL/PSSPS

Last updated: 9/23/2020
Accessed: 05/10/2025

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): 013X–Eastern Idaho Plateaus

Land Resource Region: B (Northwestern Wheat and Range)
MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

LRU notes

013X-Eastern Idaho Plateaus

Precipitation or Climate Zone: 12-16” P.Z.
https://soils.usda.gov/survey/geography/mlra/index.html

Classification relationships

No data.

Ecological site concept

Site does not receive any additional water.
Soils are:
not saline or saline-sodic.
Shallow to moderately deep, with >35% gravels (<10”) and cobbles (10-25”) cover. skeletal within 20” of soil surface, fragment percentage increasing with depth
strongly or violently effervescent in surface mineral 10”.
textures usually range from loam to silty loam in surface mineral 4”.
Slope is > 30%.
Clay content is = <35% in surface mineral 4”.
Site does not have an argillic horizon with > 35% clay.

Associated sites

R013XY011ID	**Windswept Ridge 12-20 PZ ARNO4/PSSPS**
R013XY042ID	**Loamy 12-16 PZ ARARL/PSSPS**

Table 1. Dominant plant species

Tree	Not specified

Shrub	(1) *Artemisia arbuscula ssp. longiloba*
Herbaceous	(1) *Pseudoroegneria spicata*

Physiographic features

This site occurs on steeply sloping upper mountainsides, backslopes, and convex shoulders generally on east and north aspects. Slopes generally range from 30-45 percent. Elevations range from 6200-6700 feet (1850-2050 meters).

This site occurs on steeply sloping upper mountainsides, ridges and hillslopes on east and north aspects. Slopes generally range from 30 to 60 percent. Elevations range from 6200-6800 feet (1850 to 2080 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountains > Hill
Flooding frequency	None
Elevation	6,200–6,800 ft
Slope	30–60%
Water table depth	10–40 in
Aspect	N, E

Climatic features

MLRA 13, the Eastern Idaho Plateaus, is part of the Northwestern Wheat and Range Region. Its elevation ranges from 4209 to 9331 feet above sea level, with an average elevation of 5787 feet. The average annual precipitation is 16.41 inches, with a range of 13.56 to 18.75 inches, based on ten long term climate stations located throughout the MLRA. A spike in precipitation amount often occurs in late spring, usually in May.
Temperatures vary widely in the MLRA throughout the year. A maximum temperature of 103° Fahrenheit occurred at the McCammon climate station (# 105716; elevation 4770 feet), while a minimum of -41° was recorded at the Kilgore station (#104908). At all stations temperatures throughout the year are usually below the national average. Kilgore also recorded the greatest annual snowfall amount of 217 inches. The average temperature is 41.4 degrees F. with an average high of 55.3 degrees and an average low of 27.5 degrees.
The frost-free period ranges from 64 to 90 days, while the freeze-free period can be 98 to 123 days.

Table 3. Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	123 days
Precipitation total (average)	19 in

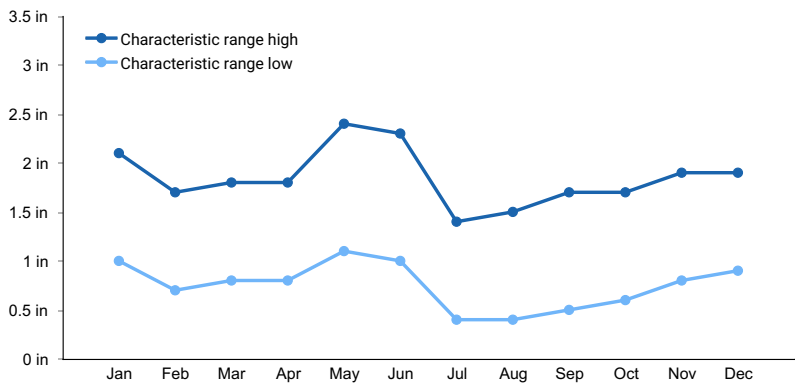


Figure 1. Monthly precipitation range

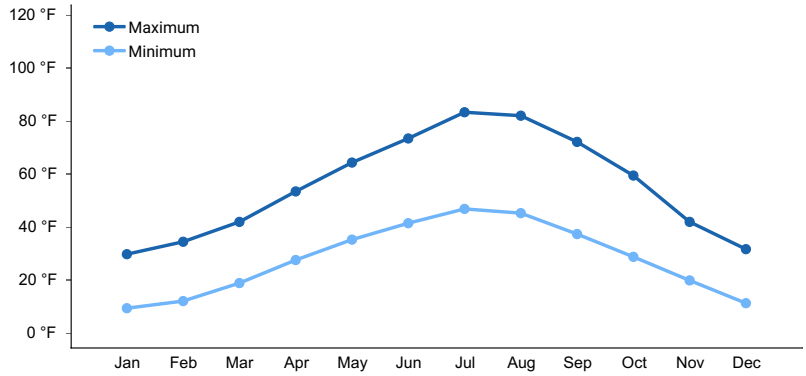


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is not influenced by adjacent wetlands, streams, or run on.

Soil features

The soils on this site are well drained and have a permeability rating of moderate. These shallow to moderately deep soils are formed from residuum and alluvium from limestone and sandstone. Textures are dominantly gravelly loam, gravelly silty clay loam, very gravelly loam, and very gravelly silt loam. Reactions range from moderately alkaline to strongly alkaline. The available water holding capacity (AWC) ranges from very low to low, while runoff is high. These soils are characterized by a xeric soil moisture regime and a frigid soil temperature regime.

Soil Series Correlated to this Ecological Site

Lonjon
Mumford

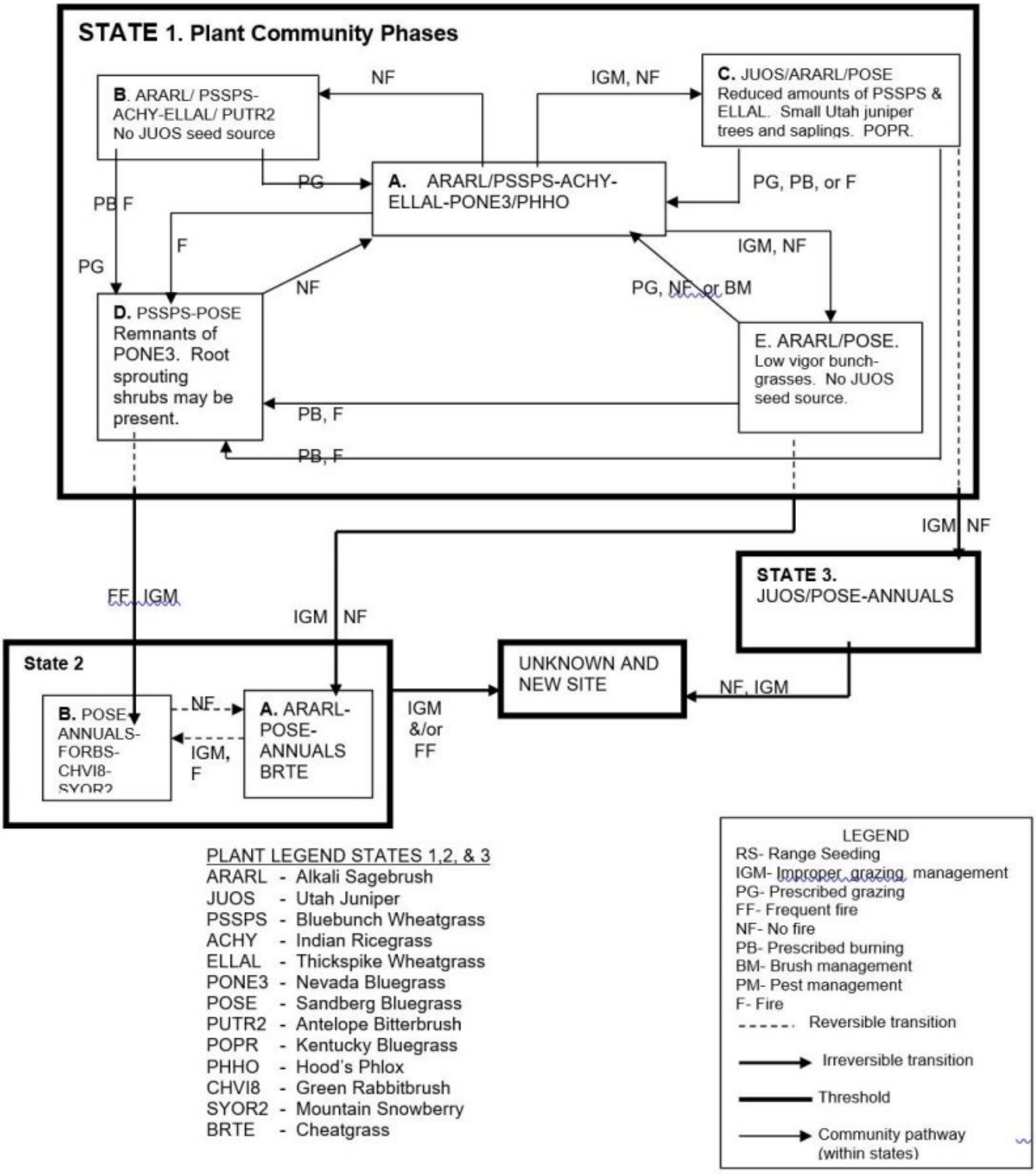
Table 4. Representative soil features

Surface texture	(1) Very gravelly silt loam (2) Gravelly loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	10–40 in
Surface fragment cover <=3"	15–35%
Surface fragment cover >3"	0–5%
Available water capacity (0-40in)	1.1–3.4 in
Calcium carbonate equivalent (0-40in)	5–40%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	35–50%

Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

State and transition model



State 1
State 1 Phase A

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by alkali sagebrush and bluebunch wheatgrass. Subdominant species include Indian ricegrass, Nevada bluegrass, thickspike wheatgrass, Hood's phlox, and biscuitroot. Natural fire frequency is 25-40 years.

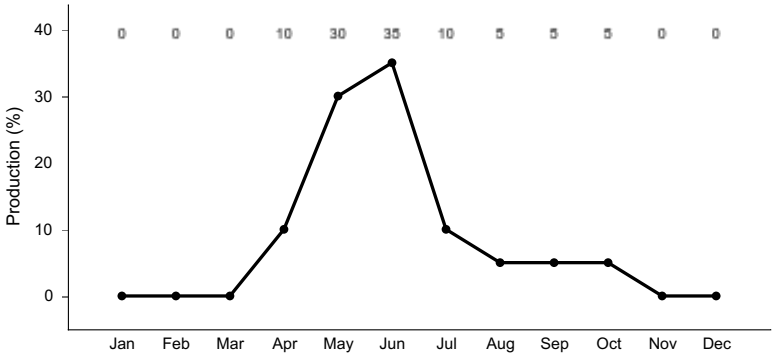


Figure 3. Plant community growth curve (percent production by month). ID0812, ARARL/PSSPS.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated in the overstory by alkali sagebrush. Bluebunch wheatgrass is the dominant species in the understory. Other perennial grasses and forbs include Indian ricegrass, thickspike wheatgrass, Nevada bluegrass, Sandberg bluegrass, Hood's phlox, and biscuitroot. No Utah juniper seed source is present. Antelope bitterbrush is increasing. This state has developed due to fire frequency being much longer than normal.

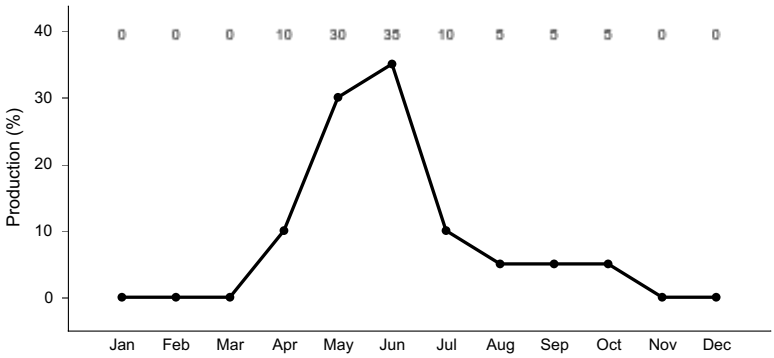


Figure 4. Plant community growth curve (percent production by month). ID0812, ARARL/PSSPS.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by in the overstory with small Utah juniper trees or saplings. Alkali sagebrush and Sandberg bluegrass are the dominant species in the understory. Bluebunch wheatgrass and thickspike wheatgrass are present but in reduced amounts and typically in low vigor. Antelope bitterbrush, when present, is decadent and hedged. Kentucky bluegrass has invaded the site. This state has developed due to improper grazing management and lack of fire. A Utah juniper seed source is in the proximity.

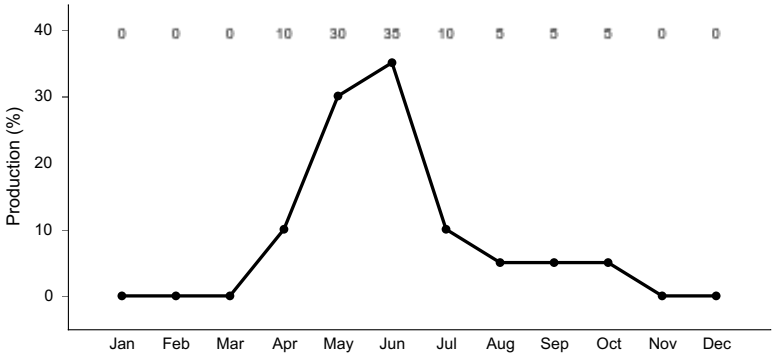


Figure 5. Plant community growth curve (percent production by month). ID0812, ARARL/PSSPS.

State 4
State 1 Phase D

Community 4.1
State 1 Phase D

This plant community is dominated by bluebunch wheatgrass. Sandberg bluegrass and other perennial grasses and forbs are subdominant. Remnants of Nevada bluegrass and other fine-leaved grasses may be present. Root-sprouting shrubs such as rabbitbrush and snowberry may be present, dependent upon, how frequent, fire has occurred. This plant community is a result of one or more fires.

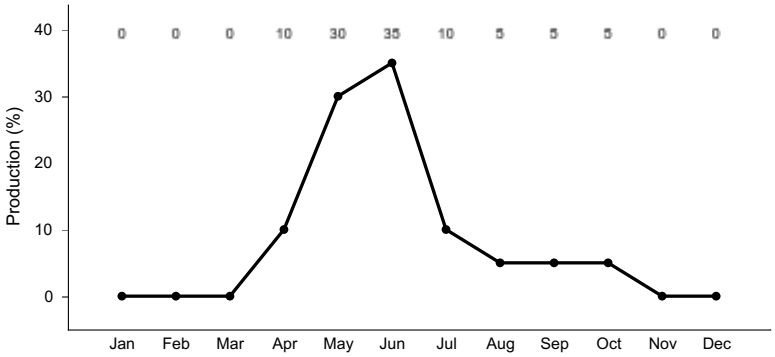


Figure 6. Plant community growth curve (percent production by month). ID0812, ARARL/PSSPS.

State 5
State 1 Phase E

Community 5.1
State 1 Phase E

This plant community is dominated by alkali sagebrush in the overstory. Sandberg bluegrass is the dominant grass in the understory. Bluebunch wheatgrass, thickspike wheatgrass, and Nevada bluegrass are present but in reduced amounts and typically in low vigor. Antelope bitterbrush, when present, is hedged. This state has developed due to improper grazing management and a lack of fire. No Utah juniper seed source is in the proximity.

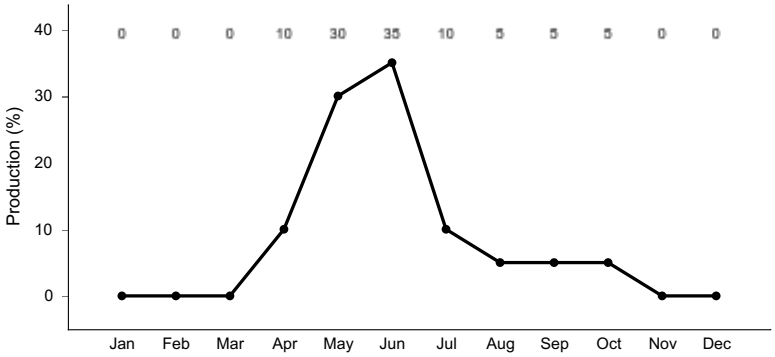


Figure 7. Plant community growth curve (percent production by month). ID0812, ARARL/PSSPS.

State 6
State 2 Phase A

Community 6.1
State 2 Phase A

This plant community is dominated by alkali sagebrush with Sandberg bluegrass and annuals in the interspaces. Cheatgrass has invaded the plant community. This state has developed due to improper grazing management and the absence of fire from phase E, State 1 or with no fire from phase B State 2. This site has crossed the threshold. It is usually uneconomical to return this community to State1 through accelerated practices.

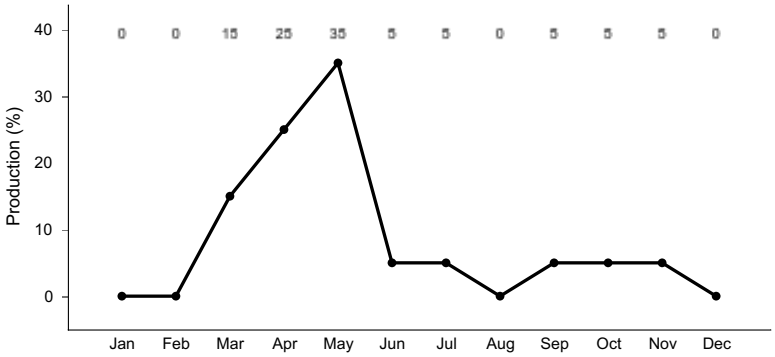


Figure 8. Plant community growth curve (percent production by month). ID0811, POSE-BRTE/ANNUALS.

State 7
State 2 Phase B

Community 7.1
State 2 Phase B

This plant community is dominated by Sandberg bluegrass and other annuals and forbs. Root sprouting shrubs such as rabbitbrush and snowberry are present. This state has developed due to frequent fires and improper grazing management from phase D, State 1 or with improper grazing management and fire from phase A, State 2. Soil loss has occurred. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

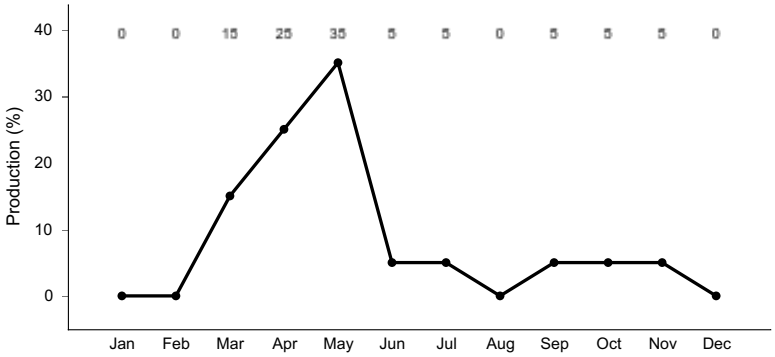


Figure 9. Plant community growth curve (percent production by month). ID0811, POSE-BRTE/ANNUALS.

State 8
State 3

Community 8.1
State 3

This plant community is dominated by Utah juniper. Remnants of bluebunch wheatgrass, thickspike wheatgrass, and Nevada bluegrass can be found in the understory, often under trees. Shallow-rooted grasses, such as Sandberg bluegrass and other annuals can be found in the interspaces. Few shrubs are present. Soil loss has occurred. This state has developed with improper grazing management and in the absence of fire. When shrub cover is below 10-15%, bare ground is above 25-30%, and Utah juniper cover is greater than 20%, the site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

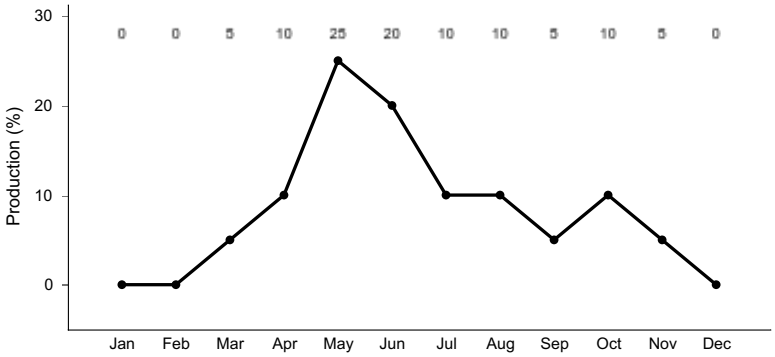


Figure 10. Plant community growth curve (percent production by month). ID0816, Juniper. State 3.

State 9
State 4

Community 9.1
State 4

Unknown new site. This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and/or frequent fires from State 2 or the continued absence of fire and improper grazing management from the Juniper dominated plant community of State 3. This site will not return to State 1 or 2 because of significant soil loss.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides habitat for a variety of native wildlife species. Large herbivore use of the reference plant community is dominated by mule deer and pronghorn antelope. The rangeland provides important seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Sage-grouse and Idaho pocket gopher are area sensitive species that may be present on this site. In isolated areas encroachment of noxious and invasive plant species (cheatgrass, Russian thistle) can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water is limited, being provided only by seasonal runoff, artificial water catchments, and spring sites.

State 1 Phase 1.1 – Alkali Sagebrush/ Bluebunch Wheatgrass/ Indian Ricegrass/ Nevada Bluegrass/ Thickspike Wheatgrass/ Hood's Phlox Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs used by native insect communities that assist in pollination. The reptile and amphibian community is represented by sagebrush lizard, western rattlesnake, northern leopard frog, and western toad. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Spring developments that capture all available water would preclude the use of these sites by amphibians. Resident or migratory birds using the site include mountain bluebird, lazuli bunting, vesper sparrow, grasshopper sparrow, and lesser goldfinch. Brood-rearing habitat, nesting cover, winter cover, and winter food for sage grouse are provided by this plant community. The plant community provides spring, summer, and fall forage habitat for mule deer and pronghorn. Mule deer and pronghorn have a preference for alkali sagebrush. A diverse small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, marmots, and chipmunks.

State 1 Phase 1.2- Alkali Sagebrush/ Bluebunch Wheatgrass/ Indian Ricegrass/ Thickspike Wheatgrass/ Antelope Bitterbrush Plant Community: This phase has developed due to fire return intervals being much longer than normal. An increase in canopy cover of sagebrush and antelope bitterbrush contributes to a decline in the herbaceous understory. Invertebrates' diversity and populations would be similar to those in State 1 Phase 1.1. The reptile community will be similar to the State 1 Phase 1.1 community represented by sagebrush lizard and western rattlesnake. Sagebrush will provide brood-rearing habitat, winter cover, and winter food for sage-grouse. Quality of nesting habitat for sage-grouse may decline with the reduction of herbaceous understory. The plant community provides seasonal (spring summer and fall) forage habitat for mule deer and pronghorn. Antelope bitterbrush is a preferred browse for mule deer and pronghorn. A diverse small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, marmots, and chipmunks.

State 1 Phase 1.3 – Utah Juniper/ Alkali Sagebrush/ Sandberg Bluegrass Plant Community: This phase has developed due to improper grazing management and a lack of fire. An increase in canopy cover of juniper contributes to a sparse herbaceous understory. A reduced herbaceous understory results in a lower diversity of insects. The reptile community will be similar to the State 1 Phase 1.1 community, represented by common sagebrush lizard and western rattlesnake. The reduced diversity of insects and understory cover may reduce the quality of food and cover for reptiles. As juniper increases, habitat cover for Brewer's sparrow, sage thrasher, and sage sparrow may increase. Remaining alkali sagebrush provides brood-rearing habitat for sage-grouse but as juniper encroaches, the quality of this habitat is severely reduced or eliminated. The plant community supports limited seasonal (spring, fall, and winter) habitat for mule deer and pronghorn. As juniper encroaches the site will provide additional thermal and young of year cover for large mammals. Juniper will increase winter habitat value for mule deer. A small mammal population including golden-mantled ground squirrels, chipmunks, deer mice, and yellow-bellied marmots may utilize this site.

State 1 Phase 1.4 - Bluebunch Wheatgrass/ Sandberg Bluegrass Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure for animals. Insect diversity would be reduced with the loss of sagebrush but a native forb plant community similar to that in State 1 Phase 1.1 would still support select pollinators. Encroachment of rabbitbrush would add fall pollinator habitat in the future. Until rabbitbrush is established, diversity and populations of native reptiles would be limited or excluded. The dominance of herbaceous vegetation with no sagebrush canopy cover would eliminate use of this area for winter cover and winter food for sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse when site is adjacent to sagebrush cover. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark, western meadowlark, vesper sparrow, and grasshopper sparrow). Spring and fall forage for mule deer and pronghorn would be provided by this plant

community. Small mammal diversity and populations would be reduced due to a loss of cover and an increase in the success of hunting by predators.

State 1 Phase 1.5 - Alkali Sagebrush/ Sandberg Bluegrass Plant Community: This phase has developed due to improper grazing management and a lack of fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. A reduced herbaceous understory results in lower diversity of insects. The reptile community will be similar to the State 1 Phase 1.2 community represented by sagebrush lizard and western rattlesnake. The reduced diversity of insects and understory cover may reduce the quality of food and cover for reptile populations. As sagebrush increases, habitat for Brewer's sparrow and sage thrasher may increase. Quality of brood-rearing habitat and nesting cover for sage-grouse would decline with the loss native forbs and deep-rooted perennial bunchgrasses. Winter cover and winter food for sage-grouse would still be provided. Spring and fall forage for mule deer and pronghorn would be provided by this plant community although the quality of forage would decline with the reduction of perennial deep rooted grasses. The small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

State 2 Phase 2.1 - Alkali Sagebrush/ Sandberg Bluegrass/ Annuals/ Cheatgrass Plant Community: This phase has developed due to improper grazing management and a lack of fire. An increase in canopy cover of sagebrush and invasive plants contributes to a sparse native herbaceous understory. A reduced herbaceous understory results in lower diversity of insects. The reptile community will be similar to that in State 1 Phase 1.5 but the quality of habitat has been severely reduced due to poor understory vegetation. As sagebrush increases, habitat for Brewer's sparrow and sage thrasher may increase. Quality of brood-rearing habitat for sage-grouse would decline with the loss forbs and deep-rooted perennial bunchgrasses. Winter cover and winter food for sage-grouse would still be provided. Quality of forage habitat for mule deer and pronghorn in the spring and fall is reduced. The small mammal population would include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

State 2 Phase 2.2 - Sandberg Bluegrass/ Annuals/ Forbs/ Green Rabbitbrush/ Mountain Snowberry Plant Community: This plant community is the result of continued improper grazing management and fire. Pollinator habitat may be similar to that in State 1 Phase 1.2. Reptile species would be similar to those in State 2 Phase 1.1 with vertical structure provided by rabbitbrush and snowberry. This plant community does not support the habitat requirements for sage-grouse. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Mule deer and pronghorn may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) are more palatable. Mountain snowberry is desirable browse the entire year for mule deer and pronghorn. Small mammal populations and diversity would be similar to those in State 1 Phase 1.2.

State 3 – Utah Juniper/ Sandberg Bluegrass/ Annuals: This state has developed due to improper grazing management and no fire. The loss of native forbs and understory vegetation will reduce insect diversity on the site. The lack of flowering plants reduces the quality of pollinator habitat for butterflies and moths. The quality of habitat for reptiles is severely reduced resulting in a less diverse population. This plant community does not support the habitat requirements for sage-grouse. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird, and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Hunting success by raptors may decrease due to a heavy overstory of juniper. The plant community provides limited seasonal habitat for mule deer in the spring and fall. Winter habitat for mule deer may increase in value as juniper becomes established. As juniper encroaches, the site will provide additional thermal and young of year cover for large mammals.

Grazing Interpretations.

This site is suited for grazing by domestic livestock in the summer and fall. Natural water supply is short or absent, however water may be available on adjacent sites.
Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use, and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

Soils on this site are in hydrologic group D. The site has high run-off potential.

Due to the relatively steep slopes and gravelly surface soils, this site is not easily degraded by improper grazing management.

Recreational uses

This site provides open space on steep mountain side slopes with a varied floristic component.

Wood products

None.

Other products

None.

Other information

Field Offices

American Falls, ID
Blackfoot, ID
Burley, ID
Driggs, ID
Fort Hall, ID
Idaho Falls, ID
Malad, ID
Pocatello, ID
Rexburg, ID
Soda Springs, ID
St. Anthony, ID

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. Those involved in developing this site description include:
Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC
Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC
Jim Cornwell, Range Management Specialist, IASCD
Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho
Kristen May, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Bear Lake County, ID	
Township/Range/Section	T16S R45E S6

Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number “35”.
Petersen, S.L., 2004. A Landscape-Scale Assessment of Plant Communities, Hydrologic Processes, and State-and-Transition Theory in a Western Juniper Dominated Ecosystem. PhD Dissertation. Oregon State University, Corvallis, Oregon.
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USDA, NRCS.2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov.). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
USDA, Forest Service, Fire Effects Information Database. 2004. www.fs.fed.us/database.
USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Approval

Kendra Moseley, 9/23/2020

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.

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Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	05/01/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rarely occur on this site. They are most likely to occur immediately following a wildfire. Gravels on the surface reduce erosion.

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2. **Presence of water flow patterns:** are rare on this site. When they do occur, they are short, disrupted by cool season perennial grasses, medium shrubs and gravels and are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** both are rare on this site.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** ranges from 30-40 percent.

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5. **Number of gullies and erosion associated with gullies:** does not occur on this site.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** are usually not present.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 2-3 feet or further following a significant run-off event. Coarse litter generally does not move.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 4 to 6 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** the A or A1 horizon is typically 3 to 10 inches thick. Structure ranges from weak fine granular to moderate medium platy to moderate fine and medium subangular blocky. The surface color in typically brown. Soil organic matter (SOM) ranges from 1 to 3 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** not present.

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: cool season perennial bunchgrasses

    Sub-dominant: medium shrubs

    Other: perennial forbs

    Additional: shallow rooted bunchgrasses

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** very little decadence is expected to occur on this site.

14. **Average percent litter cover (%) and depth (in):** annual litter cover in the interspaces will be 5-10 percent to a depth of <0.1ft. Under the mature shrubs litter is greater than 0.5 inches.

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

production): is 1100 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 45-55 percent of the total, forbs 10-20 percent, and shrubs 30-40 percent.

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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:** includes cheatgrass, annual kochia, annual mustards, Russian thistle, Kentucky bluegrass, leafy spurge, and halogeton.

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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in normal years.
