

Ecological site R011XA009ID Loamy 8-12 PZ ARTRT/PSSPS

Last updated: 4/06/2020
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): 011X–Snake River Plains

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Precipitation or Climate Zone: 8-12" P.Z.

Classification relationships

Land Resource Region: B (Northwest Wheat and Range)
MLRA: 11 (Snake River Plains)
EPA Eco Region: Level III (Snake River Plain)

Ecological site concept

Site does not receive additional moisture

Soils are:

Not saline or saline sodic

Very deep, with <35% coarse fragments (by volume), not skeletal

not strongly or violently effervescent in the surface mineral 10"

Surface textures range from fine sandy loam to silt loam the surface mineral 4"

Slope is <30%

Clay content is =<35% in surface mineral 4"

Site does not have an argillic horizon with >35% clay

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>tridentata</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>

Physiographic features

This site occurs predominantly on slopes of 2 to 25 percent. It occurs on all aspects. Elevation ranges from 3000 to 4800 feet (915-1463 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Flooding frequency	None

Ponding frequency	None
Elevation	914–1,463 m
Slope	2–25%
Aspect	N, S, W

Climatic features

The Central Snake River Plain, MLRA 11A, has a mean elevation of 3929 feet above sea level, and varies from a minimum of 2575 feet to a maximum of 8586 feet. The average annual precipitation is 10.03 inches, with a range of 8.30 to 11.46 inches, based on 10 long term climate stations located throughout the MLRA. In general, annual precipitation is below the national average, especially during the summer months. Temperatures show considerable variation during the year. A maximum temperature of 112° Fahrenheit was recorded at the Hagerman climate station (# 103932; elevation 2880 feet), and a minimum of -38° was recorded at the Richfield station. Richfield has also recorded up to 186 days below freezing during the year.

The frost-free period ranges from 116 to 140 days. The freeze-free period can be as short as 144 days to as long as 169 days. Each period is greatest on the west side of the MLRA. In general, morning and afternoon relative humidity is at or far below the national average, especially during the months of May through September.

Table 3. Representative climatic features

Frost-free period (average)	140 days
Freeze-free period (average)	169 days
Precipitation total (average)	279 mm

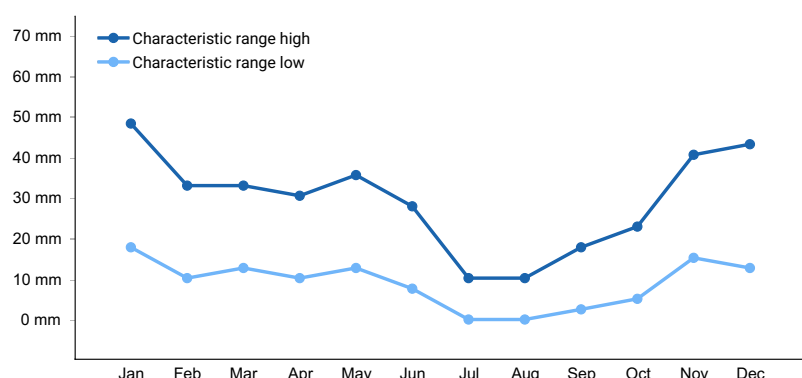


Figure 1. Monthly precipitation range

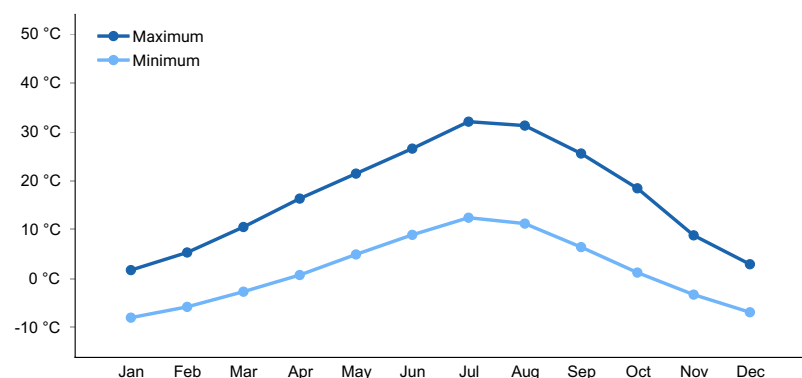


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are moderately deep or deep, well drained, with moderately slow to moderately rapid permeability usually above bedrock or a duripan. Runoff is very low to very high. The erosion hazard is slight to very severe by water, and moderate by wind. Erosion hazard by wind is very severe when plant cover is scarce or lacking. The available water holding capacity (AWC) is very low to moderate. The surface texture is generally loamy with some with surface stones. These soils are characterized by a xeric soil moisture regime or aridic that borders on xeric. Soil temperature regime is mesic or frigid.

Table 4. Representative soil features

Surface texture	(1) Stony fine sandy loam (2) Silt loam (3) Loam
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	0–11%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	5.59–21.08 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–8
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–23%
Subsurface fragment volume >3" (Depth not specified)	0–20%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is basin big sagebrush and bluebunch wheatgrass. Composition by weight is approximately 55 to 65 percent grasses, 10 to 15 percent forbs, and 20 to 30 percent shrubs.

During the last few thousand years, this site has evolved in an arid climate characterized by dry summers and cold, wet winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, lagomorphs, and small rodents. Pronghorn antelope occasionally use the site in the winter.

Fire has historically occurred on the site at intervals of 20-50 years.

The Historic Climax Plant Community (HCPC) moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The HCPC is Phase A. This plant community is dominated by bluebunch wheatgrass in the understory and basin big sagebrush in the overstory. Subdominant species include Indian ricegrass, thickspike wheatgrass, arrowleaf balsamroot and lupine. There is a large variety of other grasses, forbs and shrubs that can occur in minor amounts. The plant species composition of Phase A is listed later under “HCPC Plant Species Composition”.

Total annual production is 750 pounds per acre (840 kilograms per hectare) in a normal year. Production in a favorable year is 1000 pounds per acre (1120 kilograms per hectare). Production in an unfavorable year is 600 pounds per acre (672 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

This site is suited for livestock grazing in the spring, early summer, and fall. The distance to water may be a problem in some areas.

The site provides winter and spring range for mule deer. Pronghorn antelope use the site in the winter. It is also used by small mammals and songbirds. It has some value as brood rearing habitat for sage grouse.

The site has limited value for recreation but does provide some hunting, hiking, and photography opportunities.

Due to gentle slopes and relatively low production, this site can be degraded by improper livestock management. A mixed stand of shrubs and perennial grasses is necessary to reach the potential of the site.

Impacts on the Plant Community

Influence of fire:

In the absence of normal fire frequency, basin big sagebrush can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, basin big sagebrush can displace most of the primary understory species.

When fires become more frequent than historic levels (20-50 years), basin big sagebrush is reduced significantly. Rabbitbrush can increase slightly. With continued short fire frequency, basin big sagebrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Indian ricegrass. These species may be replaced by thickspike wheatgrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site. These fine fuels will increase the fire frequency.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be very detrimental to this site. This type of management leads to reduced vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to increase in basin big sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels. As cheatgrass increases along with other annuals, fires become more frequent.

Proper grazing management that addresses frequency, duration, and intensity of grazing can also keep fine fuels from developing, thereby reducing fire frequency. This can lead to gradual increases in basin big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management should be carefully planned, as a reduction in shrubs without a suitable understory of perennial grasses can increase cheatgrass which leads to more frequent fire intervals.

Weather influences:

Above normal precipitation in March, April and May can dramatically increase total annual production of the plant community. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Likewise, below normal precipitation during these spring months can significantly reduce total annual production and be detrimental to viable seed production. Overall plant composition is normally not affected when

perennials have good vigor.

Below normal temperatures in the spring can have an adverse impact on total production regardless of precipitation. An early, hard freeze can occasionally kill some plants.

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. Prolonged drought can lead to a reduction in fire frequency.

Influence of Insects and disease:

Outbreaks can affect vegetation health. Mormon cricket and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency. Perennial and annual invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife:

Big game animals use this site primarily in the spring and winters. Their numbers are seldom high enough to adversely affect the plant community. Burrowing rodents can impact the community providing microsites for the invasion of noxious and undesirable plants.

Watershed:

Decreased infiltration and increased runoff occur with an increase in basin big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long-term effect is a transition to a different state. See the "Hydrology" section for more detail.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with improper grazing management.

Phase A to C. Develops with fire.

Phase B to A. Develops with prescribed grazing.

Phase C to A. Develops with prescribed grazing and no fire.

State 1 Phase C to State 2. Develops through frequent fire or continued improper grazing management. The site has crossed a threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

State 2 to 3. Develops with range seeding.

State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with

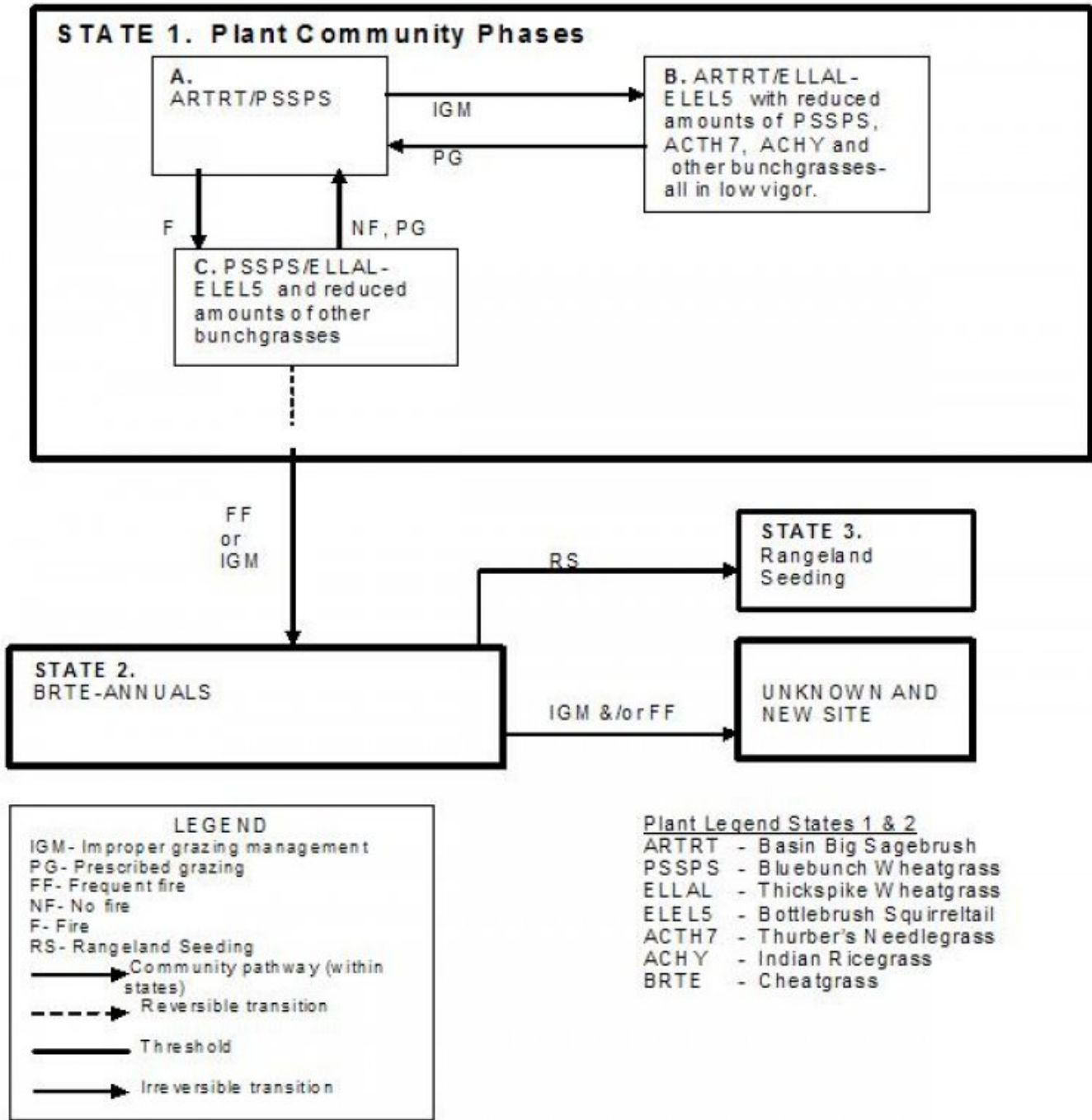
reduced potential. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

Practice Limitations:

Few limitations exist for implementing vegetative management and facilitating practices on this site. Adequate vegetative cover must be maintained to prevent wind erosion. Moderate to severe limitations exist on this site for implementing accelerating practices. Low average annual precipitation and light textured soils make certain precautions necessary in seeding, brush management, prescribed burning, and certain mechanical means of treating the soil.

State and transition model

The Reference State (State 1), the Historic Climax Plant Community (HCPC), moves through many phases depending on the natural and man-made forces that impact the community over time. The Reference Plant Community Phase is Phase A, State 1. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".



State 1
State 1, Plant community A. Historic Climax Plant Community (HCPC)

Community 1.1
State 1, Plant community A. Historic Climax Plant Community (HCPC)

The HCPC has basin big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Subdominant species include Indian ricegrass, thickspike wheatgrass, arrowleaf balsamroot and lupine. There is a large variety of other grasses, forbs, and shrubs that can occur in minor amounts. Natural fire frequency is 20-50

years.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	415	504	673
Shrub/Vine	168	224	280
Forb	90	112	168
Total	673	840	1121

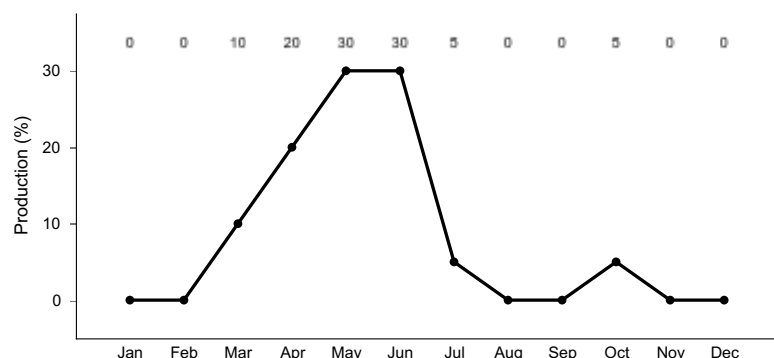


Figure 4. Plant community growth curve (percent production by month). ID0506, ARTRT/PSSPS. State 1.

State 2

State 1, Plant community B

Community 2.1

State 1, Plant community B

This plant community is dominated by basin big sagebrush with reduced amounts of bluebunch wheatgrass. Thickspike wheatgrass and bottlebrush squirreltail have increased in the understory. There is a reduced amount of Thurber's needlegrass, needle and thread grass, Indian ricegrass, and other perennial grasses. All deep-rooted perennial bunchgrasses are typically in low vigor. Basin big sagebrush has increased. This state has developed due to improper grazing management. Some cheatgrass may have invaded the site.

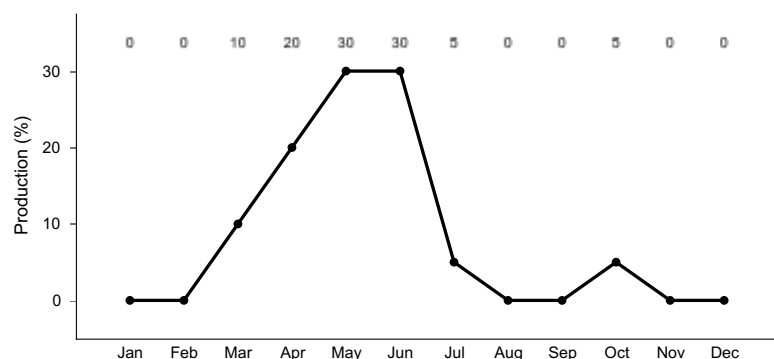


Figure 5. Plant community growth curve (percent production by month). ID0506, ARTRT/PSSPS. State 1.

State 3

State 1, Plant community C

Community 3.1

State 1, Plant community C

This plant community is dominated by bluebunch wheatgrass and thickspike wheatgrass. Some Thurber's

needlegrass grass may be lost due to fire. Some Indian ricegrass may be present. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Plant Community A. Very little basin big sagebrush is present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting. Some cheatgrass has invaded the site. This plant community is the result of wildfire.

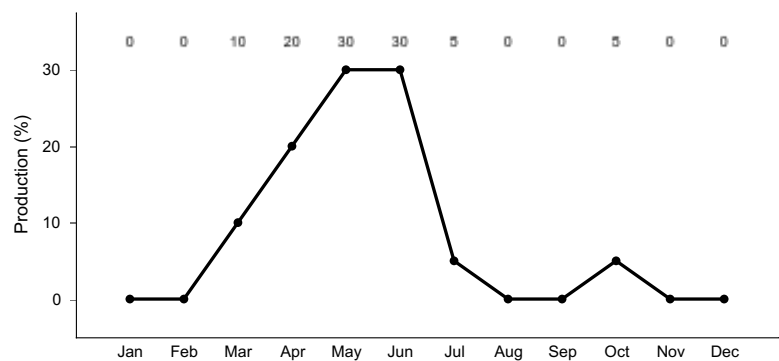


Figure 6. Plant community growth curve (percent production by month). ID0506, ARTRT/PSSPS. State 1.

State 4

State 2

Community 4.1

State 2

This plant community is dominated by cheatgrass and other annuals. Root sprouting shrubs such as rabbitbrush and horsebrush can be present, dependent upon, how frequent, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires or improper grazing management. The site has crossed a threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

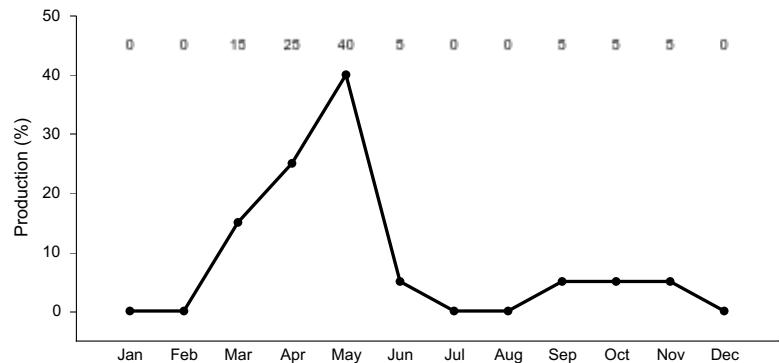


Figure 7. Plant community growth curve (percent production by month). ID0511, BRTE-ANNUALS. State 2.

State 5

State 3. Rangeland seeding

Community 5.1

State 3. Rangeland seeding

This plant community may be introduced species or a mixture of native species that mimic the HCPC.

State 6

Unknown new site

Community 6.1

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. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

Additional community tables

Animal community

Wildlife Interpretations

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. Large herbivore use of this ecological site is dominated by mule deer, pronghorn antelope, and elk. Important seasonal habitat is provided for resident and migratory animals including western toad, sagebrush lizard, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. Changes in the plant community composition can reduce the number and diversity of wildlife species in the area. With reduced shrub cover, shrub obligate avian and mammal species become rare including sage-grouse, sage sparrow, brewer's sparrow, sage thrasher and pygmy rabbit. Area sensitive species include pygmy rabbit, burrowing owl, great basin ground squirrel and Townsend pocket gopher. Encroachment of noxious and invasive plant species (cheatgrass) can replace native plant species which provide critical feed, brood-rearing and nesting cover for a variety of native wildlife. Water features are sparse provided by seasonal streams, artificial water catchments and springs. This rangeland ecological site is commonly associated with pre-historic lava flows which may provide unique cave habitats for several sensitive animal species, including the Blind Cave Leiodid Beetle, Cave Obligate Mite, Bats and Cave Obligate Harvestman.

State 1 Phase 1.1 - Basin Big Sagebrush/ Bluebunch Wheatgrass Reference Plant Community (RPC): The RPC provides a diversity of grasses, forbs and shrubs, used by native insect communities who assist in the pollination process for the plant community. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Brood-rearing habitat for sage grouse may be provided by this plant community. Open areas with deeper soils may support burrowing owls. The plant community provides seasonal (winter and spring) food and cover for mule deer, antelope, and elk. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots and pygmy rabbits would utilize the site.

State 1 Phase 1.2 - Basin Big Sagebrush/ Thickspike Wheatgrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of improper grazing management and a lack of fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in lower diversity and numbers of insects. You can expect a decrease in populations and diversity of reptiles due to the reduced diversity and canopy cover of herbaceous vegetation. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Key shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. The quality of brood-rearing habitat for sage grouse is limited due to the reduced diversity and canopy cover of herbaceous vegetation. The plant community provides a shorter forage season in the spring for mule deer, antelope, and elk. Winter cover is provided for mule deer and antelope. A small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots would utilize this plant community.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Thickspike Wheatgrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of frequent fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure, limiting use by shrub obligate animals. Insect diversity would be reduced but a diverse native forb plant community would still support select pollinators. Reptile use, including short horned lizard, sagebrush lizard and western rattlesnakes, would be limited or excluded due to the absence of sagebrush. The dominance of herbaceous vegetation with little sagebrush canopy cover would severely reduce or eliminate use of these areas for nesting by Brewer's sparrow, sage sparrow and sage thrasher. This plant

community provides brood-rearing habitat for sage-grouse when adjacent to sagebrush cover. The site does not provide suitable winter habitat for sage-grouse. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer, antelope, and elk) forage use would be seasonal (spring and fall) and the site would offer little thermal cover and young of year cover. Small mammal diversity would be reduced and the plant community would not provide suitable habitat for pygmy rabbits.

State 2 - Cheatgrass and Annual Plant Community: This state has developed due to frequent fires and/or improper grazing management. The plant community would not support a diverse insect community. The reduced forb component in the plant community would support a very limited population of pollinators. Most reptilian species would not be supported with food, water or cover. The plant community would not provide suitable habitat for sage-grouse, sage thrasher, Brewer's sparrow or sage sparrow. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse and kangaroo rat would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Large mammals may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) would be more palatable. At other times of the year large mammals would not regularly utilize the site due to its poor food and cover conditions.

State 3 - Range Seeding Plant Community: The proposed seeding mixture (native or non-native) would determine the animal species that would utilize the area. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 phase 1.3. A diverse seed mixture of grasses, forbs and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, avian or mammals. Sagebrush obligate animal species would not be supported with a monoculture of grass species. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat and antelope would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout these areas looking for prey species.

Contributors

DLF

Approval

Kendra Moseley, 4/06/2020

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.

Author(s)/participant(s)	Dave Franzen and Jacy Gibbs.
Contact for lead author	Brendan Brazee, State Range Conservationist USDA-NRCS 9173 W. Barnes Drive, Suite C Boise, ID 83709
Date	03/27/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills: rarely occur on this site. If they do occur they are most likely to be on slopes greater than 15% and immediately following wildfire.

2. **Presence of water flow patterns:** Water-Flow Patterns: rarely occur on this site except on slopes greater than 15%. When they do occur, they are short, disrupted by cool season perennial grasses and tall shrubs and are not extensive.

3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or Terracettes: are rare on this site. In areas of greater than 15% slopes where flow patterns and/or rills are present, a few pedestals and terracettes may be expected.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground: no data on bare ground but is expected to range from 30-40 percent.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind-Scoured, Blowouts, and/or Deposition Areas: are usually not present. The light textured soils can blow following a fire and evidence may be found in mounded soil deposition in the crowns of bunchgrass.

7. **Amount of litter movement (describe size and distance expected to travel):** Litter Movement: fine litter in the interspaces may move up to 2 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):** Soil Surface Resistance to Erosion: 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):** Soil Surface Loss or Degradation: the A or A1 horizon is typically 2 to 9 inches thick. Structure ranges from weak, fine medium or coarse granular to weak, thin, medium or thick platy. Soil organic matter (SOM) ranges from 0.5 to 3 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant Community Composition and Distribution Relative to Infiltration: bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Shrubs accumulate snow in the interspaces. Terracettes provide a favorable micro-site for vegetation establishment, which further increases infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compaction Layer: 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: Functional/Structural Groups: cool season deep-rooted perennial bunchgrasses >>tall shrubs> perennial forbs> shallow rooted grasses.

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant Mortality/Decadence: basin big sagebrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.
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14. **Average percent litter cover (%) and depth (in):** Litter Amount: annual litter cover in the interspaces will be 5-10 percent to a depth of
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production: is 750 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 55-65 percent of the total, forbs 10-15 percent, and shrubs 20-30 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:** Invasive Plants: cheatgrass, rush skeletonweed, scotch thistle, spotted and diffuse knapweed. Russian thistle and kochia can invade at lower elevations.
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17. **Perennial plant reproductive capability:** Reproductive Capability of Perennial Plants: all functional groups have the potential to reproduce in normal years.
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