

Ecological site R012XY018ID Saline Loamy 8-11 PZ SAVE4/LECI4

Last updated: 9/22/2020
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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): 012X–Lost River Valleys and Mountains

Land Resource Region: B (Northwestern Wheat and Range)
MLRA: 12 (Lost River Valleys and Mountains)

EPA EcoRegion: Level III (Middle Rockies)

LRU notes

012X-Lost River Valleys and Mountains

Precipitation or Climate Zone: 8-11" P.Z.
<https://soils.usda.gov/survey/geography/mlra/index.html>

Ecological site concept

Site does not receive additional water.

Soils are:

Saline or saline-sodic.

Shallow to very deep, with >35% (by volume) coarse fragments, skeletal within 20" of soil surface.

Strongly or violently effervescent in the to 20" of the soil profile.

textures usually range from loam to silty clay 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

R012XY003ID	Saline Flat <8 PZ ATGA/ACHY
R012XY023ID	Dry Meadow PONE3-PHAL2
R012XY046ID	Wet Meadow Carex-Juncus

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Sarcobatus vermiculatus</i>
Herbaceous	(1) <i>Leymus cinereus</i>

Physiographic features

This site occurs on alluvial fans and bottoms, usually with less than 10% slopes. It occurs on all aspects and the elevation ranges from 5000 to 6500 feet (1500-2000 meters).

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan
Elevation	1,524–1,981 m
Slope	0–10%

Climatic features

MLRA 12 is dominated by dramatic changes in elevation which, in turn, influence local weather patterns. The intermontane valleys have elevations as low as 3800 feet, while the adjacent mountains may reach more than 12,600 feet. The average annual precipitation for the entire MLRA, based on 10 long term climate stations located throughout the MLRA, is approximately 9.38 inches. However, the dry valleys may have averages as low as 6 inches, while the upper peaks may have averages that exceed 46 inches per year.

Temperatures vary considerably over the year. The average annual temperature is 42.25 degrees F. The average low is 27.4 degrees while the average high temperature is 57 degrees.

In the summer the sun shines 78% of the time, but drops to 40% in the winter. The prevailing wind is location-dependent, and generally flows parallel to the orientation of the dominant valleys. In the summer localized afternoon upslope winds and evening downslope winds are common. The average windspeed is greatest in the spring and early summer.

The frost free period ranges from 102 to 107 days while the freeze free period ranges from 134 to 139 days across the MLRA.

Table 3. Representative climatic features

Frost-free period (average)	107 days
Freeze-free period (average)	139 days
Precipitation total (average)	279 mm

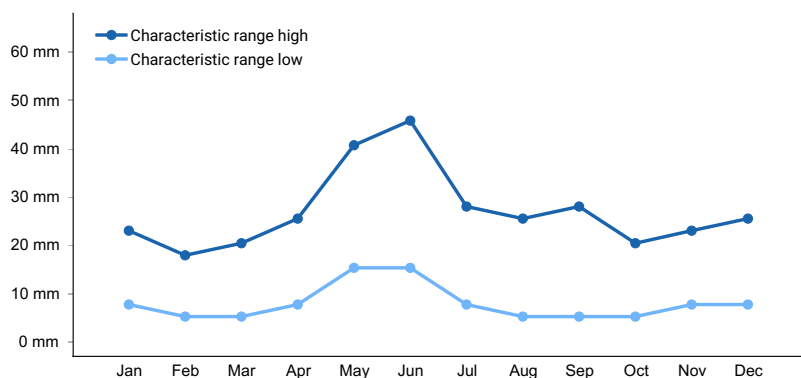


Figure 1. Monthly precipitation range

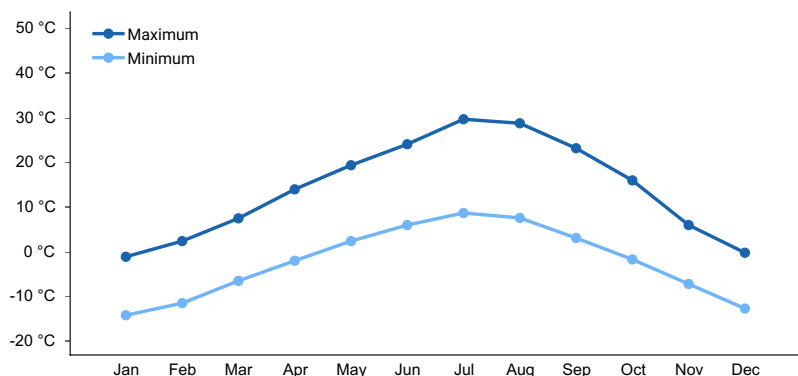


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is influenced by adjacent streams or run on.

Soil features

The soils on this site are silty clay loams to gravelly and very gravelly silt loams and loams. They are very deep and somewhat poorly to well drain. Dickeypeak has sodium salts prevalent throughout the soil profile, along with a higher clay content. Permeability is moderate to moderately rapid for this site. The available water capacity is very low to moderate. The soils have an aridic soil moisture regime, or aridic bordering on xeric. The soil temperature regime is frigid.

Table 4. Representative soil features

Surface texture	(1) Gravelly silty clay loam (2) Very gravelly silt loam (3) Loam
Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	152 cm
Surface fragment cover <=3"	5–40%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	3.81–18.54 cm
Calcium carbonate equivalent (0-101.6cm)	5–40%
Electrical conductivity (0-101.6cm)	8–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	5–25
Soil reaction (1:1 water) (0-101.6cm)	7.9–9.6
Subsurface fragment volume <=3" (Depth not specified)	10–55%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

The dominant visual aspect of this site is black greasewood and basin wildrye. Composition by weight is approximately 40-50 percent grass, 1-5 percent forbs and 50-60 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 and lagomorphs. Fire has historically occurred on the site at intervals of 50-70 years.

The Historic Climax Plant Community (HCPC), the Reference State (State 1), 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 Reference Plant Community Phase is Phase A. This plant community is dominated by black greasewood and basin wildrye. Bottlebrush squirreltail is also significant in the plant community. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 700 pounds per acre (785 kilograms per hectare) in a normal year. Production in a favorable year is 1200 pounds per acre (1344 kilograms per hectare). Production in an unfavorable year is 400 pounds per acre (449 kilograms per hectare). Structurally, tall shrubs are dominant followed by cool season deep rooted perennial bunchgrasses, while perennial forbs and shallow rooted perennial bunchgrasses are about equal.

FUNCTION

This site is suitable for livestock grazing in the late spring, summer, fall and winter. Water is often limited in the summer and fall. This site provides good cover for most wildlife species in all seasons. It is sometimes used by mule deer as winter range.

This site has limited opportunities for recreation. This site can be degraded by the formation of gullies that permanently lower the water table. This site has moderately low runoff potential.

Impacts on the Plant Community

Influence of fire

This site has a normal fire frequency of 50-70 years. The site is quite resistant to degradation from fire. Immediately after a fire, basin wildrye is stimulated. Black greasewood sprouts from the root crown and lateral roots. Basin big sagebrush will be significantly reduced if present in the community. In the absence of normal fire frequency, black greasewood may increase. Other grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (50-70 years), black greasewood and basin wildrye can remain in the plant community, unless fire frequency becomes very short due to flashy understory fuels such as cheatgrass that has invaded the site. With a short fire frequency, black greasewood may be significantly reduced. The understory species may be replaced by cheatgrass. In addition to invasion by cheatgrass, annual invasive species such as Russian thistle and annual kochia can also encroach.

Influence of improper grazing management

Season-long grazing and/or excessive utilization can be very detrimental to this site. The vigor of the perennial grasses can be reduced significantly by heavy early season grazing, especially on basin wildrye. This type of management leads to reduced vigor of the other bunchgrasses also. With reduced vigor, recruitment of these species declines.

Continued improper grazing management influences fire frequency by increasing fine fuels. Once the understory is depleted of deep-rooted perennial grasses, surface erosion increases and may lead to the development gullies.

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

Weather influences

Above normal precipitation in April, May and June can dramatically increase total annual production of the herbaceous layer of the plant community. Because of the deep soils and a deep water table the production of black greasewood changes little during dry years. 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 the precipitation. An early, hard freeze can occasionally kill some plants.

Influence of insects and disease

Periodic disease and insect outbreaks can affect vegetation health. Outbreaks of Black grass bugs commonly occur on basin wildrye. It seldom kills the plants but do reduce vigor and affect the palatability for grazing animals. 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. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available.

Influence of noxious and invasive plants

Many of these species add to the fine-fuel component and lead to increased fire frequency. Many of the annual and perennial 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

Wildlife uses this site in all seasons. Their numbers are seldom high enough to adversely affect the plant community.

Watershed

The largest threat to degradation of this site is that of rill and gully development. Soils are usually very deep and have few coarse fragments in the profile to prevent erosion. If the perennial grass cover is depleted, rill and gully development can occur rapidly. High run-off events from the adjacent uplands can severely damage or change the normal runoff patterns on the site. Once gully development begins, the water table is lowered and run-on water no longer flows across the site. As the available soil moisture is lowered, productive potential is lost. Eventually the watertable is below the root zone of the perennial grasses. These grasses are ultimately replaced by black greasewood and other shrubs, annual grasses, and forbs. Extreme gully development can move the site across the threshold to a new, less productive site.

Plant Community and Sequence

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with wildfire.

Phase A to C. Results from improper grazing management and no fire.

Phase B to A. Develops in the absence of fire.

Phase C to A. Develops from prescribed grazing.

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

State 2 to State 3. Pest management, brush management and range seeding are used to change this plant community. The site has crossed the threshold. It is generally not economically feasible to move this state back towards the HCPC with accelerated practices.

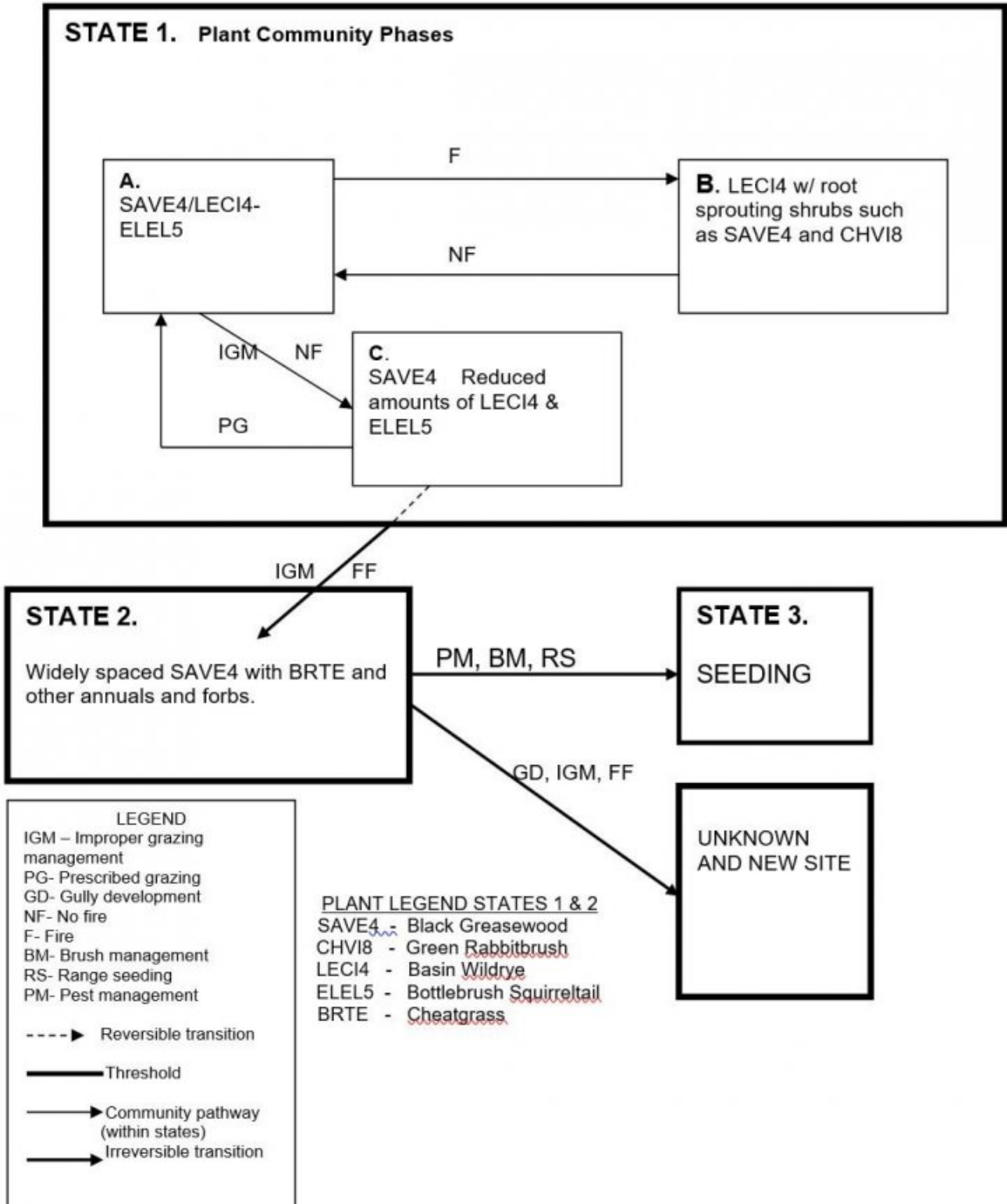
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by gully development and adjacent channel downcutting, lowering of the water table and improper grazing management, cause this state to cross the threshold and retrogress to a new site with reduced potential. Frequent fire can help accelerate the degradation. It is generally not economically feasible to move this state back towards the HCPC with accelerated practices.

Practice Limitations

The site is adapted to reseeding to selected species. The species selected need to have high saline tolerance.

There is a moderate to high chance of failure in unfavorable moisture years and due to the high salinity or alkalinity. There are generally no limitations to brush management, but black greasewood sprouts from the root crowns and lateral roots thus limiting mechanical methods. Generally, only remove brush to prepare a seedbed for reseeding to desirable species. The wildlife impacts, however, should be carefully evaluated. Natural drinking water sources and supplies for livestock may be limited particularly in the summer and fall.

State and transition model



State 1
State 1, Phase A, Reference Plant Community Phase

Community 1.1

State 1, Phase A, Reference Plant Community Phase

This plant community is dominated by black greasewood and basin wildrye. Bottlebrush squirreltail is also significant in the plant community. There are a few other grasses, forbs and shrubs that occur in small amounts. Natural fire frequency is 50-70 years.

State 2

State 1, Phase B

Community 2.1

State 1, Phase B

This plant community is similar to phase A. The dominant species have not changed, but basin wildrye has been stimulated and grows more lush vegetation. The black greasewood and green rabbitbrush have sprouted from root crowns. The appearance is that of a young plant with lush growth. Overall production of the herbaceous layer has increased. Some plants may have been lost to fire such as basin big sagebrush and spiny hopsage. This state has developed due to fire.

State 3

State 1, Phase C

Community 3.1

State 1, Phase C

This plant community is dominated by black greasewood. There are reduced amounts of basin wildrye and bottlebrush squirreltail. Grasses are typically in low vigor. The perennial grasses that remain are typically protected in and around the shrubs. Some cheatgrass and invasive species have invaded the site. This state has developed due to long period of improper grazing management and lack of fire.

State 4

State 2

Community 4.1

State 2

This plant community is dominated by widely spaced black greasewood. The understory is annual grasses and forbs. Bare ground has significantly increased. Some soil loss has occurred. This state has developed due to continued improper grazing management and very frequent fire. The site has crossed the threshold. It is generally not economically feasible to move this state back towards the reference state with accelerated practices.

State 5

State 3. Rangeland seeding

Community 5.1

State 3. Rangeland seeding

This plant community is dominated by introduced species or native species planted to mimic the reference state.

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. Gully development has lowered the watertable so that it is below the root zone of the perennial grasses and forbs. This state has developed due to continued improper grazing management and/or frequent fires. Off-site hydrologic conditions may also contribute to increased run-on to accelerate gully development. It is generally not economically feasible to move this state back towards the HCPC with accelerated practices.

Additional community tables

Animal community

Wildlife Interpretations

Animal Community – Wildlife Interpretations

This ecological site provides habitat for upland wildlife species. The moderate production of plants and high degree of structural diversity provides a large variety of habitat cover. Area sensitive species that may utilize the area include Great Basin ground squirrel and Idaho ground squirrel.

State 1 Phase 1.1 – Black Greasewood/ Basin Wildrye/ Bottlebrush Squirreltail 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, and western toad. The canopy cover of greasewood, basin wildrye, and sagebrush provides suitable thermal and escape cover for mule deer and pronghorn antelope. This plant community may provide brood rearing/foraging areas for sage grouse. This community provides habitat for a wide array of small mammals such as jackrabbits, cottontail rabbits, mice, and voles providing food for badgers, fox, coyotes, and raptors such as red-tailed and Swainson's hawks. Birds such as horned lark and western meadowlark will utilize this community for nesting and foraging.

State 1 Phase 1.2 – Basin Wildrye/ Black Greasewood/ Green Rabbitbrush Plant Community: This phase has developed due to fire. The diversity of the invertebrate community will be similar to Phase 1.1. Vertical structure would be reduced with the reduction or loss of shrub cover. This would reduce habitat quality for birds represented in Phase A. Small mammals including deer mice and northern grasshopper mice may occur here. Birds of prey (red-tailed and Cooper's hawk) may range throughout these areas looking for prey species. When the site is found adjacent to sagebrush, this plant community may provide brood rearing/foraging areas for sage grouse. This plant community would be useful to large grazers like deer and pronghorn for thermal and escape cover.

State 1 Phase 1.3 – Black Greasewood/ Basin Wildrye/ Bottlebrush Squirreltail Plant Community: This phase has developed due to a long period of improper grazing management and lack of fire. This plant community exhibits a moderate level of plant species diversity. Invertebrate populations would be similar to Phase 1.1 and 1.2 communities. Birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles, as well as upland game birds. Small mammals including the deer mouse and northern grasshopper mouse may utilize the site. They would provide a prey base for fox, coyote, badgers, and raptors. Deer and pronghorn would utilize the site on a limited seasonal basis in the spring for forage. The site would provide thermal cover and escape cover for deer and pronghorn.

State 2 – Cheatgrass/ Annuals Plant Community: This state has developed due to frequent fires and improper grazing management. The loss of the native shrub and herbaceous 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 native reptilian species are not supported with food, water, or cover. This plant community does not support the habitat requirements for sage-grouse. Diversity of avian species is reduced due to poor cover and food. 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) are more palatable. At other times of the year large mammals would not regularly utilize these areas due to poor food and cover conditions. The populations of small mammals would be dominated by open grassland species. Large areas of this plant community can fragment the RPC and may significantly impact native animal species dependant on the shrub component as part of their life history.

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 1.2. A diverse seed mixture of grasses, forbs, and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.3. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, birds, or mammals. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, mule deer, and antelope would utilize this site for nesting and/or seasonal foraging. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Large areas of State 3 with no brush cover would fragment the historic plant community and would reduce the quality of habitat for shrub-steppe obligate animal species.

Grazing Interpretations

This site is suitable for livestock grazing in the late spring, summer, fall and winter. Water is often limited in the summer and fall.

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 UNKNOWN. This site can be degraded by the formation of gullies that permanently lower the water table. This site has moderately low runoff potential

Recreational uses

This site has limited opportunities for recreation.

Wood products

None.

Other products

None.

Other information

None.

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

Lee Brooks, Range Management Specialist, IASCD

Kristen May, Resource Soil Scientist, NRCS, Idaho

Other references

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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, 9/22/2020

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)	
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Date	02/04/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** Rills are not common on this site.

- 2. Presence of water flow patterns:** Water-flow patterns can occur on this site from run-on from adjacent sites. When they occur, they are long, often running the length of the site and disrupted by cool season grasses and tall shrubs.

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

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Data is not available. On sites in mid-seral status, bare ground may range from 40-60 percent.

5. **Number of gullies and erosion associated with gullies:** Gullies do not occur on this site.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Blowouts and depositional areas are usually not present. Immediately following wildfire, some soil movement may occur on lighter textured soils.
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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move 2 feet or more following a significant run-off event. Coarse litter generally does not move.
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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):** Values should range from 4 to 6 but need to be tested.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Structure ranges from weak thin, medium and thick platy to moderate thin, medium and thick platy. The A or A1 horizon is typically 2 to 10 inches thick. Soil organic matter (SOM) ranges from 1 to 2 percent.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses, especially deep-rooted, slow run-off and increase infiltration.
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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):** Compaction layer is not present.
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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: Tall shrubs>>
- Sub-dominant: Cool-season, deep rooted perennial bunchgrasses>perennial forbs=shallow rooted bunchgrasses
- Other:
- Additional:
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Basin wildrye and black greasewood 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):** Additional litter cover data is needed but is expected to be 20-25 percent to a depth of 0.2 inches. Under mature shrubs and basin wildrye, litter is >0.5 inches deep and is 90-100 percent ground cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production is 700 pounds per acre (785 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 40-50 percent of the total production, forbs 1-5 percent and shrubs 50-60 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 species include cheatgrass, whitetop, annual kochia, annual mustards, Russian thistle, halogeton and Russian knapweed.
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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in most years.
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