

Ecological site R010XA042ID Loamy Bottom 12-16 PZ LECI4

Last updated: 12/13/2023
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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): 010X–Central Rocky and Blue Mountain Foothills

This MLRA is characterized by gently rolling to steep hills, plateaus, and low mountains at the foothills of the Blue Mountains in Oregon and the Central Rocky Mountains in Idaho. The geology of this area is highly varied and ranges from Holocene volcanics to Cretaceous sedimentary rocks. Mollisols are the dominant soil order and the soil climate is typified by mesic or frigid soil temperature regimes, and xeric or aridic soil moisture regimes. Elevation ranges from 1,300 to 6,600 feet (395 to 2,010 meters), increasing from west to east. The climate is characterized by dry summers and snow dominated winters with precipitation averaging 8 to 16 inches (205 to 405 millimeters) and increasing from west to east. These factors support plant communities with shrub-grass associations with considerable acreage of sagebrush grassland. Big sagebrush, bluebunch wheatgrass, and Idaho fescue are the dominant species. Stiff sagebrush, low sagebrush, and Sandberg bluegrass are often dominant on sites with shallow restrictive layers. Western juniper is one of the few common tree species and since European settlement has greatly expanded its extent in Oregon. Nearly half of the MLRA is federally owned and managed by the Bureau of Land Management. Most of the area is used for livestock grazing with areas accessible by irrigation often used for irrigated agriculture.

For further information, see "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, 2006)" available online at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053624

Classification relationships

None.

Ecological site concept

- Site occurs on bottomlands
- Slopes less than 8%
- Water table usually not present

Associated sites

R010XA004ID	Loamy 12-16 PZ ARTRV/FEID-PSSPS Adjacent meadows at higher landscape positions relative to water sources
R010XA027ID	Meadow DECA18-CANE2 Adjacent meadows at lower landscape positions relative to water sources
R010XA028ID	Dry Meadow 8-15 PZ PONE3-PHAL2 Adjacent meadows at lower landscape positions relative to water sources

Similar sites

R010XA028ID	Dry Meadow 8-15 PZ PONE3-PHAL2 Water at or near the surface at beginning of the growing season and greater than 40 inches at the end of the growing season
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Table 1. Dominant plant species

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

Physiographic features

This site occurs on nearly level to moderately sloping land as alluvial outwash, floodplains and valleys. Slopes generally range from 1 to 8 percent. Elevation ranges from 5000 to 7000 feet (1500 to 2150 meters).

Table 2. Representative physiographic features

Landforms	(1) Valley > Flood plain (2) Valley > Valley floor
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	None to rare
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	5,000–7,000 ft
Slope	1–8%
Ponding depth	0–2 in
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

The Big and Little Wood River Foot slopes and Plains, proposed as MLRA 10X, has a mean elevation of 5310 feet above sea level, and varies from 3600 to 9235 feet. In general, average annual precipitation is greatest on the western side, with the southeast area being the driest. The average annual precipitation, based on 7 long term climate stations located throughout the MLRA, is 15.39 inches, with a range of 12.5 to 18 inches. Monthly precipitation is generally greatest at the end of the year, diminishes steadily until a low in July and August, then increases rapidly in the autumn.

Monthly temperatures can vary considerably. Highs of up to 102° and lows down to -52° Fahrenheit have been recorded. The average annual temperature is 42.9°. The frost-free period ranges from 75 to 98 days. The freeze-free period is a bit longer: 106 to 133 days.

Both morning and afternoon average relative humidity values peak in the winter, and reach their low in July and August. The average number of sunny, cloud-free days is above average for the summer months, but below average for the period from November through February.

Table 3. Representative climatic features

Frost-free period (characteristic range)	75-98 days
Freeze-free period (characteristic range)	106-133 days
Precipitation total (characteristic range)	12-16 in
Frost-free period (actual range)	

Freeze-free period (actual range)	
Precipitation total (actual range)	12-18 in
Frost-free period (average)	86 days
Freeze-free period (average)	120 days
Precipitation total (average)	15 in

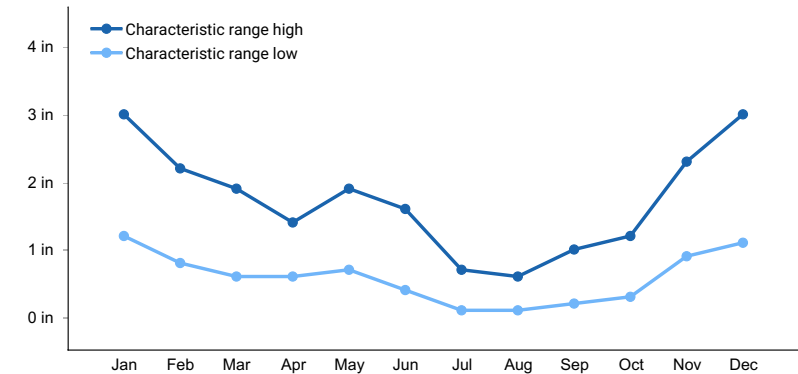


Figure 1. Monthly precipitation range

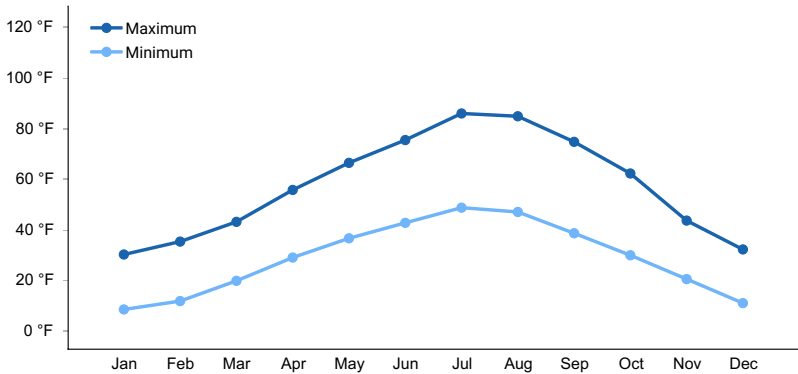


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Some run-on water from adjacent sites can occur on this site, especially in years with above normal snow depths or unusually heavy precipitation periods. Some overland flow can also occur during high runoff periods.

Soil features

The soils on this site are well drained and deep to very deep. They occur on terraces and valley bottoms. They are formed in alluvium from volcanic cinders, sandstone, limestone, and quartzite. Textures are dominantly loam, fine sandy loam, silt loam, and very gravelly fine sandy loam.

Soil Series Correlated to this Ecological Site

Goodalf

Table 4. Representative soil features

Parent material	(1) Alluvium–volcanic and sedimentary rock
Surface texture	(1) Gravelly loam (2) Very gravelly fine sandy loam (3) Silt loam

Family particle size	(1) Fine-loamy (2) Loamy-skeletal
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	40–60 in
Surface fragment cover <=3"	0–45%
Surface fragment cover >3"	0–10%
Available water capacity (0–40in)	1–6 in
Soil reaction (1:1 water) (0–40in)	6–7.5
Subsurface fragment volume <=3" (4–60in)	15–60%
Subsurface fragment volume >3" (4–60in)	0–10%

Ecological dynamics

The dominant visual aspect of this site is large bunchgrass and tall shrubs with an understory of sod-grasses. Composition by weight is approximately 80 to 90 percent grasses, 5 to 10 percent forbs, and 5 to 10 percent shrubs. Major species are basin wildrye and mountain big sagebrush.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by warm summers and cold winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, Rocky Mountain elk, moose, and lagomorphs.

Fire has historically occurred on the site at intervals of 20 to 40 years.

The Reference State (State 1), previously referred to as 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.

FUNCTION:

This site is suitable for livestock grazing in the late spring, summer, and fall grazing at lower elevations. Water is often limited in the summer and fall unless it is adjacent to an intermittent or perennial stream. This site provides good cover for most wildlife species in all seasons.

Opportunities for hunting and hiking occur on this site.

The site has moderately low runoff potential. Snow accumulates on the site due to the presence of tall shrubs.

Due to the deep soils and inherent productivity of the grass component and relatively flat slopes the site is fairly resistant to disturbances that can potentially degrade it. Site degradation is usually the result of downstream changes of grade and/or loss of the understory component which leads to the development of gullies. Once gullies begin to develop, erosion is accelerated by the concentrated water flows within the gully itself.

Impacts on the Plant Community.

Influence of fire:

This site has a normal fire frequency of 20 to 40 years. Immediately after a fire, basin wildrye is stimulated. Gray and green rabbitbrush typically re-sprout and mountain big sagebrush is killed. In the absence of normal fire frequency, bitterbrush and mountain big sagebrush may increase. Grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (20 to 40 years), mountain big sagebrush is reduced significantly. With continued short fire frequency, big sagebrush can be completely eliminated along with many of the desirable understory species such as Columbia needlegrass and oniongrass. The rabbitbrush can become the dominant overstory species. The understory species may be replaced by cheatgrass at lower elevations. Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive species generally increase.

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 basin wild rye. 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, mountain big sagebrush will increase. Surface erosion increases and may lead to the development of rills and 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 needs to be carefully planned. A decrease in brush species can lead to an increase in cheatgrass if a suitable understory of perennial grasses is not present.

Weather influences:

Because of the deep soils and influence of run-on, the production of this site changes little during dry years. 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.

Insects and disease outbreaks.

Periodic disease and insect outbreaks can affect vegetation health. Outbreaks of Black grass bugs occur commonly on basin wildrye and the wheatgrasses. They seldom kill the plants but do reduce vigor and affect the palatability for grazing animals. 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 the spring, summer, and fall. 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 stream channel 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 water table is below the root zone of the perennial grasses. These grasses are ultimately replaced by shrubs,

annual grasses and forbs. Extreme gully development can move the site across the threshold to a new, less productive site.

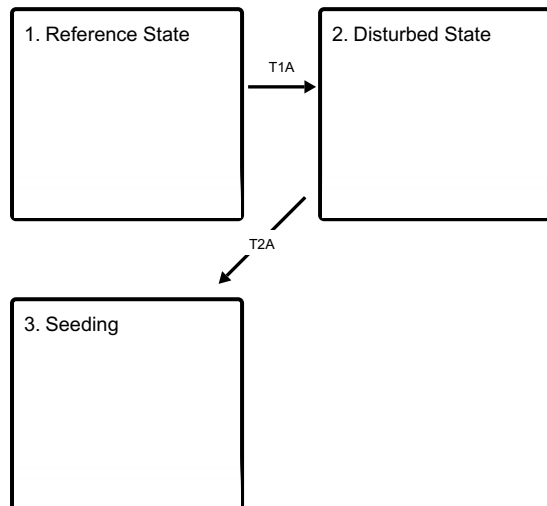
Practice Limitations.

There are few restrictions to seeding on this site. Spring wetness may prevent early planting.

Brush management is feasible. However, the wildlife impacts should be carefully evaluated.

State and transition model

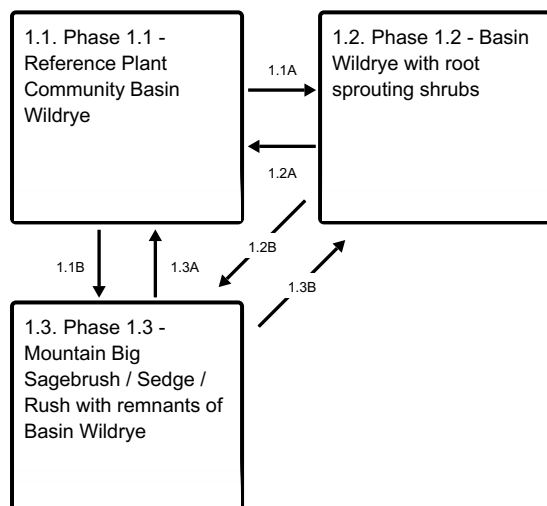
Ecosystem states



T1A - improper grazing management, fire

T2A - Pest management, brush management, range seeding

State 1 submodel, plant communities



1.1A - Fire

1.1B - Improper grazing management, no fire

1.2A - No fire

1.2B - Improper grazing management, no fire

1.3A - Prescribed grazing

1.3B - Prescribed grazing, fire

State 2 submodel, plant communities

2.1. State 2 -
Rabbitbrush, Annuals,
and Forbs

State 3 submodel, plant communities

3.1. Phase 3.1

State 1
Reference State

Dominant plant species

- basin wildrye (*Leymus cinereus*), grass

Community 1.1
Phase 1.1 - Reference Plant Community Basin Wildrye

The Reference Plant Community Phase is Phase 1.1. This plant community is dominated by basin wildrye with an overstory of basin big sagebrush. Mountain big sagebrush is present. Understory species include Columbia needlegrass, threadleaf sedge, rushes, western wheatgrass, and oniongrass. Natural fire frequency is 20 to 40 years.

Resilience management. The plant species composition of Phase 1.1 is listed later under “Reference Plant Community Phase Plant Species Composition”. Total annual production is 4000 pounds per acre (4444 kilograms per hectare) in a normal year. Production in an unfavorable year is 3000 pounds per acre. Production in a favorable year is 5000 pounds per acre. 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.

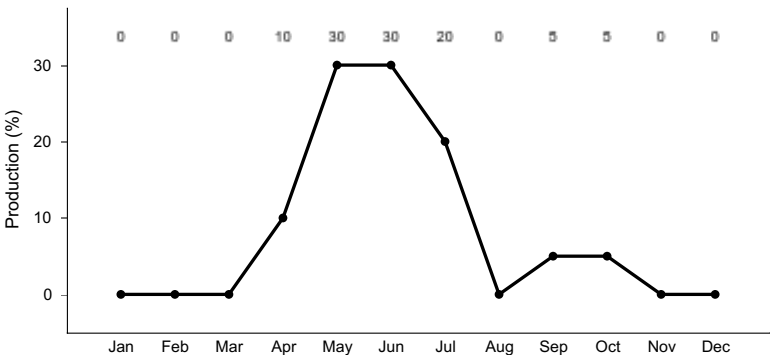


Figure 3. Plant community growth curve (percent production by month). ID0213, POPR/ARLU. STATE2.

Community 1.2
Phase 1.2 - Basin Wildrye with root sprouting shrubs

This plant community is dominated by basin wildrye. Few shrubs are present, since fire has removed them. However root sprouting shrubs such as gray and green rabbitbrush re-establish rapidly and usually increase. Understory species include, dryland sedge, western wheatgrass, and a variety of forbs. This phase has developed due to fire (1.1A).

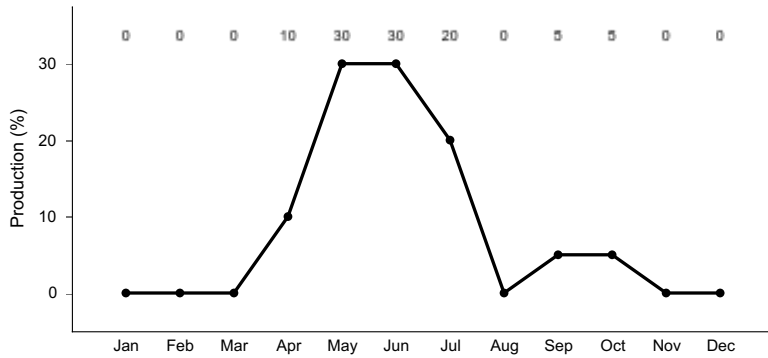


Figure 4. Plant community growth curve (percent production by month).
ID0213, POPR/ARLU. STATE2.

Community 1.3

Phase 1.3 - Mountain Big Sagebrush / Sedge / Rush with remnants of Basin Wildrye

This plant community is dominated by mountain big sagebrush. Dryland sedge and remnants of basin wildrye, rushes, and western wheatgrass are present but in extremely low vigor. Kentucky bluegrass may have invaded the site. The perennial grasses that remain are typically protected in and around the sagebrush plants. This phase has developed due to improper grazing management and lack of fire (1.1B).

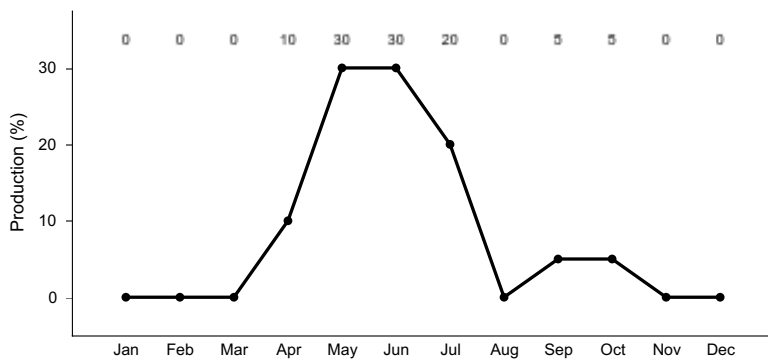


Figure 5. Plant community growth curve (percent production by month).
ID0213, POPR/ARLU. STATE2.

Pathway 1.1A

Community 1.1 to 1.2

Plant Community Phase 1.1 to 1.2 (1.1A). Develops with either prescribed or wild fire.

Pathway 1.1B

Community 1.1 to 1.3

Plant Community Phase 1.1 to 1.3 (1.1B). Usually results from improper grazing management and no fire.

Pathway 1.2A

Community 1.2 to 1.1

Plant Community Phase 1.2 to 1.1 (1.2A). Develops in the absence of fire.

Pathway 1.2B

Community 1.2 to 1.3

Plant Community Phase 1.2 to 1.3 (1.2B). Usually results from improper grazing management and no fire.

Pathway 1.3A

Community 1.3 to 1.1

Plant Community Phase 1.3 to 1.1 (1.3A). Develops from prescribed grazing.

Pathway 1.3B

Community 1.3 to 1.2

Plant Community Phase 1.3 to 1.2 (1.3B). Develops from prescribed grazing and fire.

State 2

Disturbed State

Dominant plant species

- yellow rabbitbrush (*Chrysothamnus viscidiflorus*), shrub

Community 2.1

State 2 - Rabbitbrush, Annuals, and Forbs

This plant community is dominated by root-sprouting shrubs (rabbitbrush), annual grasses, and forbs. This plant community has developed due to improper grazing management and fire (T1A). The plant community has crossed the threshold. It is generally not economically feasible to move this community back towards the State 1.

Resilience management. State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by channel downcutting, improper grazing management, and/or fire (T2B) cause this state to cross the threshold and retrogress and to a new site with reduced potential. It is generally not economically feasible to move this state back towards the State 1.

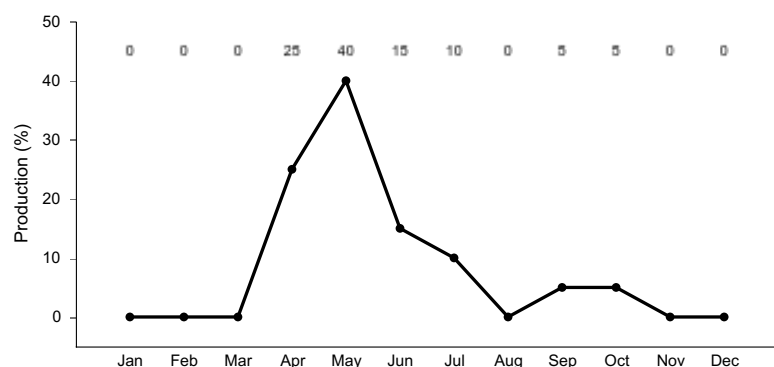


Figure 6. Plant community growth curve (percent production by month). ID0209, ARTRV/POSE/ANNUALS. State 2.

State 3

Seeding

Dominant plant species

- crested wheatgrass (*Agropyron cristatum*), grass

Community 3.1

Phase 3.1

This plant community is made up of either introduced or native species that attempt to mimic the Reference Plant Community (1.1).

Transition T1A

State 1 to 2

State 1, Phase 1.3 to State 2 (T1A). Develops through improper grazing management and fire. This site has

crossed the threshold. It is generally not economically feasible to move this state back towards the State 1.

Transition T2A

State 2 to 3

State 2 to State 3. Pest management, brush management, and range seeding are used to change this plant community (T2A).

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 includes mule deer and elk. Important seasonal habitat is provided for resident and migratory animals including western toad, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, horned lark and western meadowlark. Changes in the plant community composition can reduce the number and diversity of wildlife species in the area. The plant community is not preferred nesting habitat for shrub obligate avian and mammal species including sage-grouse, brewer's sparrow, sage thrasher and pygmy rabbits. Encroachment of invasive plant species (cheatgrass and bulbous bluegrass) can replace native plant species which provide critical feed, brood-rearing and nesting cover for a variety of native wildlife. The loss of herbaceous understory vegetation can have a negative impact on ground nesting birds, while the loss of shrub cover negatively affects both ground and shrub nesting avians. Water is limited, being provided only by seasonal runoff, artificial water catchments and spring sites.

State 1 Phase 1.1 – Basin Wildrye/ Mountain Big Sagebrush Reference 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 leopard lizard, short horned lizard, sagebrush lizard, western skink, western toad, boreal chorus frog and northern leopard frog. 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. The dense and tall herbaceous vegetation limits use of the site by sage-grouse, brewer's sparrow and sage thrasher. The plant community provides excellent seasonal needs of large mammals (mule deer and elk) providing forage and cover. The site is excellent fawning habitat for deer and elk. Antelope avoid the site due to the tall and dense herbaceous vegetation. A diverse small mammal population includes montane mole, western harvest mouse and deer mouse. The dense and tall herbaceous vegetation is not preferred habitat for pygmy rabbits.

State 1 Phase 1.2 – Basin Wildrye/ Rabbitbrush/ Plant Community: This plant community is the result of fire. A diverse insect population is present throughout the growing season to assist in pollination and provide a prey base to avians, reptiles and amphibians. The reptile and amphibian community is represented by leopard lizard, desert horned lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad, boreal chorus frog, and northern leopard frog. Spring developments that capture all available water would preclude the use of these sites by amphibians. The loss of big sagebrush limits the use by shrub-steppe obligate avian species including Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. The reduced vigor of the understory and loss of big sagebrush reduces the quality of forage and cover mule deer and elk. The dominant shrub (rabbitbrush) is not preferred forage for large mammals. A diverse small mammal population would be similar to Phase 1.1 although favoring species that prefer a dense shrub component.

State 1 Phase 1.3 – Mountain Big Sagebrush/ Basin Wildrye/ Dryland Sedges/ Western Wheatgrass Plant Community: This phase has developed due to improper grazing management and lack of fire. The plant community, dominated by mountain big sagebrush with sparse understory vegetation in low vigor would have reduced insect diversity and populations. Reptile and amphibian community would be similar to Phase 1.1. Diversity of prey (insects) for reptiles would be reduced. Mountain sagebrush would provide nesting and brood-rearing habitat for Brewer's sparrow, sage sparrow, sage thrasher, and sage- grouse. The plant community provides suitable winter habitat for sage-grouse. Large mammal (mule deer, antelope, and elk) use would be seasonal offering thermal or young of year cover. Small mammal diversity would be similar to Phase 1.2. The site would provide suitable habitat

for pygmy rabbits.

State 2 - Rabbitbrush/ Cheatgrass and Forb Plant Community: This plant community is the result of continued improper grazing management and/or frequent fire. The forb and rabbitbrush plant community would support a population of pollinators throughout the growing season. Reptilian species present would be similar to Phase 1.2. This plant community does not support the habitat requirements for sage-grouse, sage thrasher, Brewer's sparrow or sage sparrow. Diversity of grassland 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 forage and cover habitat. The diversity of mammal species would be similar Phase 1.2.

State 3 - Range Seeding Plant Community: The seeding mixture (native or non-native) determines the animal species that would utilize this site. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in 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. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, avians, mammals or sagebrush obligate species. Grassland animal species including western meadowlark, horned lark, savannah sparrow and elk would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout this community looking for prey species.

Grazing Interpretations.

This site is best adapted for livestock grazing in the summer and fall grazing season.

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 B. They have moderately low runoff potential.

Recreational uses

This site provides open space in the valley bottoms with tall shrubs and grass understory. Intermittent or perennial streams are often associated or may traverse the site. Hiking and hunting are a popular use of this site.

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
Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho
Jim Cornwell, Range Management Specialist, IASCD
Kristen May, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Butte County, ID

References

. Fire Effects Information System. <http://www.fs.fed.us/database/feis/>.

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".

USDA Forest Service, Rocky Mountain Research Station. 2004. Restoring Western Ranges and Wildlands. General Technical Report RMRS-GTR-136-vols. 1-3.

USDA, NRCS.2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDI Bureau of Land Management, US Geological Service; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Contributors

Dave Franzen and Jacy Gibbs

Approval

Kirt Walstad, 12/13/2023

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.

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Date	06/18/2009
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills do not occur on this site.

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

3. **Number and height of erosional pedestals or terracettes:** both 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):** ranges from 20-30 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:** blowouts and depositional areas are usually not present. Immediately following wildfire some soil movement may occur on lighter textured soils.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move 6 feet or more 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):** Soil structure is typically weak fine granular. Soil organic matter needs to be determined. Soil surface color ranges from dark grayish brown to black. The A or A1 horizon is generally 3 to 6 inches thick.

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. Tall grasses and shrubs accumulate snow in the interspaces.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** 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: cool season deep rooted perennial bunchgrasses

Sub-dominant: tall 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):** basin wildrye and mountain 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):** 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):** is 6000 pounds per acre (6667 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 60-70 percent of the total production, forbs 5-15 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:** includes cheatgrass, Kentucky bluegrass, bulbous bluegrass, leafy spurge, whitetop, annual kochia, annual mustards, Russian thistle, rush skeletonweed, Canada, musk and scotch thistle, and diffuse and spotted knapweed.
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17. **Perennial plant reproductive capability:** perennial plants in all functional groups have the potential to reproduce in most years.
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