

Ecological site R010XY025ID

Shallow Stony Loam

12-20 PZ ARTRX/PSSPS

Last updated: 9/23/2020
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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.

Classification relationships

Artemisia vaseyana "xericensis"/ *Agropyron spicatum* HT in "Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush- Grass Habitat Types of Southern Idaho. University of Idaho. Moscow, Idaho. Bulletin Number 35".

Associated sites

R010XY002ID	Very Shallow 12-20 PZ ARRI2/POSE
R010XY007ID	Loamy 12-16 PZ

Similar sites

R010XY009ID	Stony Loam 12-16 PZ ARTRT/PSSPS
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on undulating to steep slopes that range from 4 to 30 percent. Elevation ranges from 2500 to 4500 feet (762-1372m).

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Mountain slope
Elevation	760 – 1,370 m
Slope	0 – 30 %
Water table depth	150 cm

Climatic features

The elevation of MLRA 10 ranges from 1791 feet to 9236 feet, with a mean of 4602 feet. Overall, elevation increases from west to east. However, average annual precipitation decreases from west to east, ranging from 16.59 inches to 22.17 inches, with a mean of 19.56 inches, based on 7 long term climate stations throughout the MLRA. In general, precipitation peaks in December and January, with a steady decline to a low in July and August, then a steep increase during the autumn months. Most of the winter precipitation falls as snow, and maximum annual snowfalls of up to 82 inches have been recorded.

There is considerable variation in temperature throughout the year. Temperatures as low as -52° Fahrenheit and as high as 117° Fahrenheit are on record. Some areas have recorded the occurrence of more than 50 days with temperatures above 90° Fahrenheit. The average maximum annual temperature is 63 degrees F, while the average minimum temperature is 36.2 degrees F. The frost-free period can range from 128 to 152 days, while the freeze-free period can be from 164 to 189 days.

Both the average morning and average afternoon relative humidity values are lowest in July and August, and are below the national average. The number of clear, sunny days peaks during this same period, and is higher than the national average. During the Spring and Summer months high-intensity convective thunderstorms are not unusual.

Table 3 Representative climatic features

Frost-free period (average)	150 days
Freeze-free period (average)	190 days
Precipitation total (average)	560 mm

Influencing water features

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

Soil features

The soils on this site are characterized by shallow depth to bedrock. They are well drained, with moderately slow permeability and very low to low available water capacity. Runoff is medium to very high. The erosion hazard is slight to moderate by water, and slight to severe by wind. The surface texture is generally loamy with surface stones. These soils are characterized by a xeric soil moisture regime. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site

Reywat
Riggins

Table 4. Representative soil features

Surface texture	(1) Extremely stony loam (2) Very stony
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	30 – 50 cm
Surface fragment cover ≤3"	10 – 20 %
Surface fragment cover >3"	30 – 60 %
Available water capacity (0-101.6cm)	2.03 – 6.6 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.1 – 7.8
Subsurface fragment volume ≤3" (Depth not specified)	20 – 50 %
Subsurface fragment volume >3" (Depth not specified)	20 – 50 %

Ecological dynamics

The dominant visual aspect of this site is foothills sagebrush in the overstory with bluebunch wheatgrass in the understory. Composition by weight is approximately 50-70 percent grass, 15-25 percent forbs and 15-25 percent shrubs.

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

Fire has historically occurred on the site at intervals of 20-50 years. The Reference Plant Community Phase of this site is dominated by bluebunch wheatgrass and foothills big sagebrush. Subdominant species include Idaho fescue, prairie junegrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot, tapertip hawksbeard, and antelope bitterbrush. Total annual production is 700 pounds per acre (777 kilograms per hectare) in a normal year. Production in a favorable year is 1000 pounds per acre (1111 kilograms per hectare). Production in an unfavorable year is 400 pounds per acre (444 kilograms per hectare). Structurally, cool season deep-rooted perennial bunchgrasses are very dominant, followed by tall shrubs being co-dominant with perennial forbs while shallow rooted bunchgrasses are subdominant.

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 Representative Plant Community Phase is Phase A. The plant species composition of Phase A is listed later under "Representative Plant Community Phase Plant Species Composition".

This site is best suited for livestock grazing in the spring and early summer. The site provides good habitat for mule deer, sage grouse, a variety of small game and numerous non-game birds and animals.

Due to the stony surface the site is fairly resistant to disturbances that can potentially degrade the site.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, bitterbrush increases to the point of being co-dominant with foothills big sagebrush. Grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (20-50 years), foothills big sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, foothills big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Idaho fescue. These species may be replaced by cheatgrass, Sandberg bluegrass, and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Medusahead will invade on the soils with the heavier textures.

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 and possibly bitterbrush. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to invasion by noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels. If cheatgrass and/or medusahead increase due to improper grazing management and become co-dominant with Sandberg bluegrass and 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 foothills big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation of a prescribed burn. Any brush management should be carefully planned, as a reduction in shrubs can increase cheatgrass or medusahead which will lead 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 the spring months can significantly reduce total annual production and be detrimental to good 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.

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

Influence of Insects and disease:

Insect and disease outbreaks can affect vegetation health. The tent caterpillar (*Malacosoma fragilis*) defoliates bitterbrush. Two consecutive years of defoliation can cause mortality in bitterbrush. 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 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 in the spring, summer and fall and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community. Herbivory can be detrimental to bitterbrush when livestock grazing and browsing by big game occurs at the same time and season. This will occur when both kinds of animal are using the plant in the late summer or fall. The adverse impact is excessive use of the current year's leader growth.

The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

Watershed.

Decreased infiltration and increased runoff occur with an increase in foothill 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.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

- State 1.
- Phase A to B. Develops with improper grazing management and no fire.
- 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. This state has crossed the site threshold. It is not economically feasible to move this state back to State 1.

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 not economically feasible to move this state back to State 1.

Practice Limitations.

Severe limitations exist on this site for seeding and brush management on this site by conventional ground machinery due to shallow soils and excessive stones on or near the soil surface.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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 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. The shallow soils limit animals' ability to dig burrows for nesting and habitation. 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 and sage thrasher. Encroachment of noxious and invasive plant species (cheatgrass, Medusahead) 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. State 1 Phase 1.1 - Foothills Big Sagebrush/ Bluebunch Wheatgrass/ Idaho Fescue 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 rattlesnake, 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 plant community provides habitat for prey species and cover for these resident reptiles and amphibians. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Critical habitat (lek sites, nesting areas, winter cover and food) for sage-grouse is provided by this diverse plant community. The plant community supports the needs of large mammals (mule deer and elk) providing food and cover on a seasonal basis. Antelope bitterbrush and Idaho fescue are preferred browse for mule deer. A diverse small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots would utilize this plant community. The deer mouse is the primary vector for planting bitterbrush seed. State 1 Phase 1.2 – Foothills Big Sagebrush/Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This phase has developed due to improper grazing management and no fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. Grasses, forbs and shrubs, are used by native insects that assist in pollination but the reduced herbaceous understory results in lower diversity and numbers of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink and western rattlesnake. Diversity and populations of the reptile community would decline due to a reduced understory and associated loss of invertebrate habitat. Spring developments that capture all available water would preclude the use of these sites by amphibians. Key shrub-steppe obligate avians include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Critical habitat (lek sites, nesting areas, winter cover and food) for sage grouse is limited due to a less diverse herbaceous plant community. The plant community supports the needs of large mammals (mule deer and elk) providing food and cover on a seasonal basis. Antelope bitterbrush is preferred browse for mule deer but may be in decline. The deer mouse is the primary vector for planting bitterbrush seed. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, deer mouse and yellow-bellied marmots would utilize the habitat. State 1 Phase 1.3 - Bluebunch Wheatgrass/ Sandberg Bluegrass/ bottlebrush Squirreltail Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure for wildlife. Insect diversity would be reduced but a diverse native forb plant community, similar to Phase 1.1, would still support select pollinators. An increase in rabbitbrush would provide fall pollinator habitat. 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 and little or no sagebrush canopy cover would reduce or eliminate use of these areas for nesting by Brewer's sparrow, sage sparrow, sage thrasher, and sage grouse. This plant community provides limited brood-rearing habitat for sage-grouse when sagebrush cover is adjacent to the site. Sage-grouse would not use the area for wintering habitat. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark, savannah sparrow and western meadowlark). Large mammal (mule deer and elk) forage use would be seasonal and the site would offer little thermal cover and young of year cover. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel. State 2 – Sandberg Bluegrass/ Cheatgrass/ Medusahead Plant Community: This plant community is the result of continued improper grazing management or frequent fire. With the loss of the native shrub and herbaceous plant community the site would not support a diverse insect community. The annual forbs component in the plant community would support a very limited population of pollinators although an increase in rabbitbrush would provide fall pollinator habitat. Most native reptilian species are not supported with food, water or cover and would be absent from this site. 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 food and cover conditions. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel. Grazing Interpretations. This site is best suited for spring and summer grazing by livestock. Site deterioration from improper grazing management generally results in an increase in annual grasses, woody forbs, and shrubs. Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings

Hydrological functions

Soils on this site are in hydrologic group D. They have rapid runoff potential under poor vegetative cover.

Recreational uses

This site has fair aesthetic appeal and natural beauty due to some showy spring blooming forbs and antelope bitterbrush. It has poor to fair value for camping and picnicking. Some hunting for upland gamebirds and big game animals does occur on the site.

Wood products

None.

Other products

None.

Other information

Field Offices Weiser, ID Emmett, ID Mountain Home, ID Meridian, ID Cascade, ID

Inventory data references

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

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, 9/23/2020

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Date	04/22/2009
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** can occur on this site. If rills are present they are likely to occur immediately following wildfire and on slopes greater than 15%. Rills are most likely to occur on soils with surface textures of silt loam and clay loam.

- 2. Presence of water flow patterns:** occur on this site. When they occur, they are short and disrupted by cool season grasses, tall shrubs and surface stones. They are not extensive. Gravelly to stony surface texture interrupts flows. Water flow patterns generally occur on slopes greater than 15%.

- 3. Number and height of erosional pedestals or terracettes:** occur on this site but are not extensive. In areas where flow patterns and/or rills are present, a few pedestals may be expected. Terracettes occur on the site uphill from bases of tall shrubs, large bunchgrasses and surface stones. They are not extensive.

- 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 30-50 percent.

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

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

7. Amount of litter movement (describe size and distance expected to travel): fine litter in the interspaces may move up to 3 feet following a significant run-off event. Coarse litter generally does not move. Stones on the surface help reduce fine litter movement.
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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 needs to be tested.
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9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): The A or A1 horizon is typically 3-4 inches thick. Structure ranges from weak very fine to moderate coarse granular. Soil organic matter (SOM) ranges from 1 to 4 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 perennials, slow run-off and increase infiltration. Tall shrubs catch blowing snow in the interspaces.
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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): 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 perennial forbs
- Other:
- Additional:
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13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): foothills big sagebrush and antelope bitterbrush will become decadent in the absence of normal fire frequency 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 5-10 percent to a depth of 0.1 inches. Under mature shrubs 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 700 pounds per acre (777 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 50-70 percent of the total production, forbs 15-25 percent and shrubs 15-25 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, medusahead, bulbous bluegrass, rush skeletonweed, musk and scotch thistle, and diffuse and spotted 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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