

Ecological site R011XB013ID Shallow Loamy 8-12 PZ ARAR8/PSSPS

Last updated: 4/06/2020
Accessed: 05/15/2024

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

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

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

Shallow, with >35% coarse fragments (by volume), skeletal
not strongly or violently effervescent in the surface mineral 10"

Surface textures range from sandy loam to loam in 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

Associated sites

R011XA003ID	Shallow Loam 8-12 PZ ARTRT/PSSPS
R011XB003ID	Stony Loam 8-12 PZ ARTRW8/PSSPS
R011XB006ID	Loamy 8-12 PZ ARTRT/LECI4
R011XB009ID	Shallow Stony 8-12 PZ ARTRW8/PSSPS
R011XB016ID	Sand 8-12 PZ ARTRT-PUTR2/HECOC8
R011XY007ID	Gravelly 10-12 PZ
R011XY008ID	South Slope 10-12 PZ
R011XY015ID	Loamy Bottom 8-14 PZ ARTRT/LECI4

Table 1. Dominant plant species

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

Physiographic features

This site occurs on nearly level lava plains to gently sloping and undulating low foothills and basalt uplands. The site is on all aspects with slopes ranging from 1 to 30 percent. Elevations range from 4000 to 5500 feet (1200-1700 meters).

Table 2. Representative physiographic features

Landforms	(1) Lava plain
Elevation	1,219–1,676 m
Slope	1–30%
Water table depth	152 cm

Climatic features

The Upper Snake River Plain, MLRA 11B, is part of the Northwestern Wheat and range Region. It has a mean elevation of 4841 feet above sea level, and varies from 4177 to 4841 feet. In general, it is a geologically young, level to gently sloping lava plateau. In places larger streams have cut deep, steep-walled canyons. The average annual precipitation, based on 10 long term climate stations located throughout the MLRA, is 10.88 inches. The averaged low is 8.74 inches and the maximum average is 12.69. Monthly precipitation usually peaks in May, then drop off rapidly to reach its low in July and August. The climate station at Aberdeen Experiment Station (1000010) has records of zero precipitation in 11 months of the year, and as low as 0.03 inches in December, the lone non-zero month.

Temperatures can be extremely variable across the year. Highs of up to 104° and lows down to -42° Fahrenheit have been recorded. The average annual temperature from ten climate stations is 44.75° F. The frost-free period ranges from 91 to 115 days. The freeze-free period can last from 123 to 146 days.

Both morning and afternoon average relative humidity values reach their low in August, and are far below the national average. Wind speed peaks in the Spring, and is generally somewhat above the national average. 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. The average total snowfall is approximately 29 inches.

Table 3. Representative climatic features

Frost-free period (average)	115 days
Freeze-free period (average)	146 days
Precipitation total (average)	330 mm

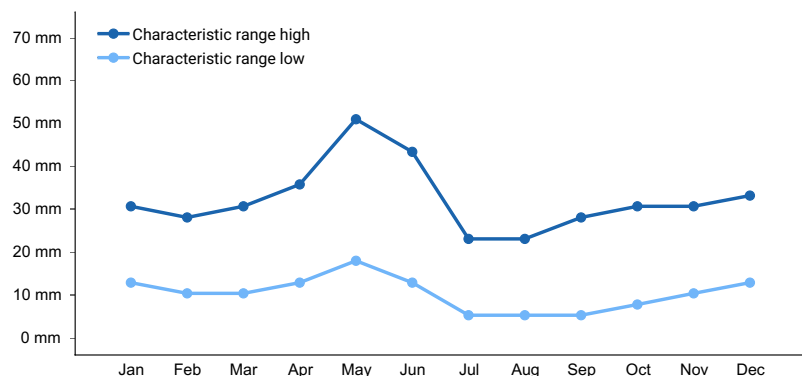


Figure 1. Monthly precipitation range

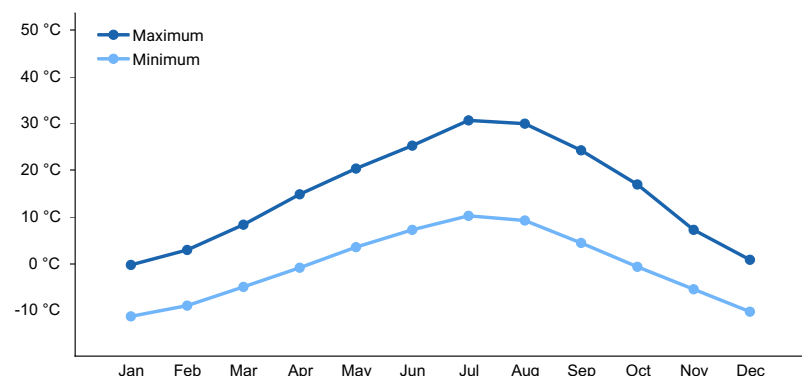


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are light colored, shallow, well drained, with moderate to moderately rapid permeability above the bedrock. Runoff is low to medium. The erosion hazard is slight to high by water and slight to high by wind. The available water holding capacity (AWC) is very low to low. These soils are usually 8 to 20 inches deep to basalt bedrock. The surface texture is generally very stony loam, stony loam or gravelly loam. The subsoil is usually slightly developed with clay ranging from approximately 10 to 18 percent. These soils are characterized by limited AWC, an aridic soil moisture regime and a frigid or mesic soil temperature regime.

Soil Series Correlated to this Ecological Site

Tenno Bondfarm
Trevino
Bondbranch

Table 4. Representative soil features

Surface texture	(1) Very stony sandy loam (2) Gravelly silt loam (3) Extremely stony loam
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	4–27%

Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	4.83–9.4 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–13
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–35%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

The dominant visual aspect is low sagebrush and bluebunch wheatgrass. Composition by weight is approximately 60 to 70 percent grasses, 10 to 20 percent forbs, and 15 to 25 percent shrubs.

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

Fire has historically occurred on this site every 80 to 100 years. Fire occurs only in years with above normal precipitation.

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 bluebunch wheatgrass and low sagebrush. Thurber's needlegrass and Sandberg bluegrass are the subdominant grass species. Other prominent species in the plant community include arrowleaf balsamroot, longleaf phlox, and tapertip hawksbeard. Threetip sagebrush may be a significant part of 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 450 pounds per acre (504 Kg/ha) in a normal year. Production in a favorable year is 625 pounds per acre (700 Kg/ha). Production in an unfavorable year is 275 pounds per acre (308 Kg/ha). 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 grazing by livestock in spring, early summer, and fall. It also provides habitat for mule deer, pronghorn antelope, small game, sage grouse, small birds, and rodents in the spring, summer and fall.

The site provides limited recreational opportunities except early spring flower observation and some hunting.

This site is easily degraded by improper grazing management due gentle topography and low production. Stony surfaces in some areas may limit livestock access. Inherent low production on the site makes it susceptible to accelerated degradation. Infiltration and production can be maintained with a mixed stand of deep-rooted perennial bunchgrasses and shrubs. Runoff potential is medium to rapid and the erosion hazard is slight to moderate.

Impacts on the Plant Community.

Influence of fire:

This site historically had a very low fire frequency, approximately every 80-100 years. Most of the shrubs evolved in the absence of fire, therefore they can be severely damaged or killed when burned. Thurber's needlegrass in the community can be lost with a fire. Rabbitbrush species can increase with fire. Cheatgrass and medusahead can be troublesome invaders on this site after fire, preventing perennial grass and shrub re-establishment and increasing the fire frequency. Sandberg bluegrass is usually maintained in the community.

Threetip sagebrush may be a component of the plant community in some areas. Threetip sagebrush has been found to be a weak sprouter in some locations and a strong sprouter in others. This suggests the species has ecotypic variation from one geographic location to another. Fire in one location may result in killing most of the plants, while in another location, the plant community may become dominated by threetip sagebrush following a fire event. Threetip sagebrush in this site description is considered to be a weak sprouter, but more data is needed.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be detrimental to this site. This type of management leads to reduced vigor of bluebunch wheatgrass and other deep-rooted perennial bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in low sagebrush and invasive plants. Threetip sagebrush may increase if present in the community.

Continued improper grazing management influences fire frequency with an increase in cheatgrass and medusahead. As these fine fuels increase, the fire frequency becomes more frequent.

Proper grazing management that addresses frequency, duration, and intensity of grazing can help maintain the integrity of the plant community.

Weather influence:

Above normal precipitation in April, May, and June can dramatically increase total annual production. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Extended periods of drought significantly impact this site due to the low available water holding capacity (AWC) and shallow soil. Extended drought reduces vigor of the perennial grasses and shrubs. Extreme drought may cause plant mortality.

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. An outbreak of a particular insect is usually influenced by weather but no specific data is available for this site.

Influence of noxious and invasive plants:

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. Cheatgrass and medusahead can be very invasive on this site, especially after fire. Once they become established the fire frequency increases. As a result, the shrub component can be lost.

Influence of wildlife:

Relatively low numbers of wildlife use this site and have little impact on it. Pronghorn antelope is the dominant large herbivore using the site. They use the site yearlong but prefer it in the spring, fall, and early winter. Sage grouse use the site for strutting grounds and they may also use the site during the winter. Winter and spring use by mule deer occasionally occurs.

Watershed:

Decreased infiltration and increased runoff on slopes greater than 10 percent occur when low sagebrush is removed with frequent fires, particularly the year following the fire event. The increased runoff also increases sheet and rill erosion. The long-term effect is a transition to a different state. When hydrologic condition of the vegetative cover is good, natural erosion hazard is slight.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with fire. Fire only occurs in above normal precipitation about every 80-100 years.

Phase A to C. Develops under improper grazing management and no fire.

Phase B to A. Develops under prescribed grazing management program and no fire.

Phase C to A. Develops from prescribed grazing management and no fire.

Phase C to B. Develops with fire.

State 1, Phase B to State 2. Results from continued improper grazing management and/or frequent fire. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

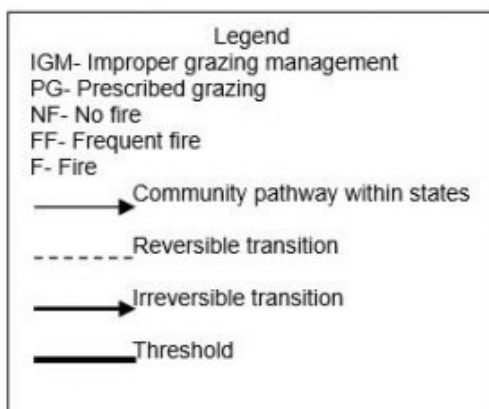
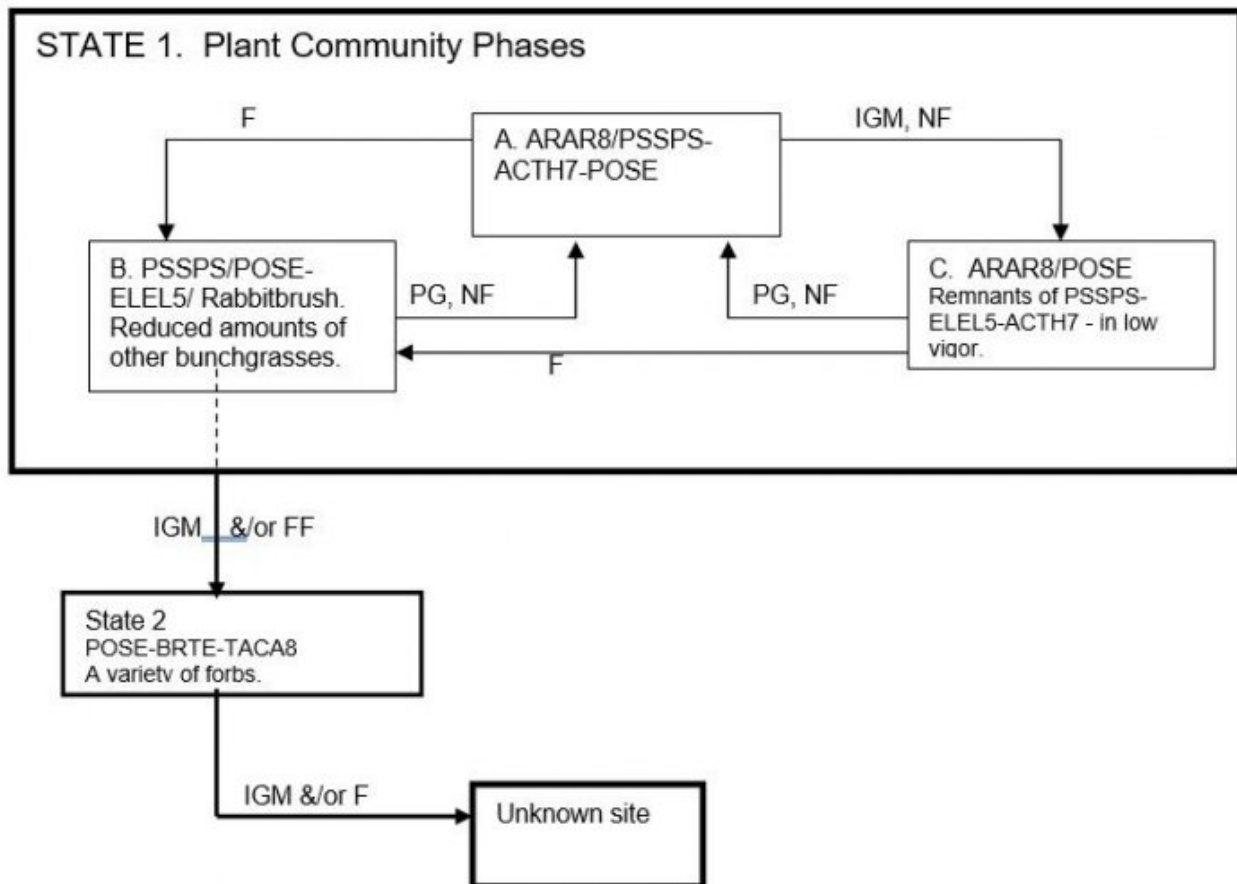
State 2 to Unknown Site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and fire causes this state to cross a threshold and retrogress to a new site with reduced potential. It is not economical to return this site to State 1 with accelerating practices.

Practice Limitations:

Moderate limitations exist for implementing vegetative management practices due to surface stones in some areas. Early spring grazing should be avoided when soils are wet. Moderate limitations exist for implementing facilitating practices on this site due to shallow soils and stones on the surface in some areas. Shallow and stony soils present severe limitations for range seeding activities by ground moving equipment and is generally not economically feasible due to the low production potential.

Cheatgrass and medusahead can invade and increase on the site without careful planning and technically sound implementation procedures.

State and transition model



PLANT LEGEND STATES 1 & 2

ARAR8 - Low Sagebrush
PSSPS - Bluebunch Wheatgrass
ACTH7 - Thurber's Needlegrass
POSE - Sandberg Bluegrass
ELEL5 - Bottlebrush Squirreletail
BRTE - Cheatgrass
TACA8 - Medusahead

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 is dominated by bluebunch wheatgrass and low sagebrush. Thurber's needlegrass and Sandberg bluegrass are the subdominant grass species. Other prominent species in the plant community include arrowleaf balsamroot, longleaf phlox, and tapertip hawksbeard. Threetip sagebrush may be a significant part of the plant community in some areas. There is a large variety of other grasses, forbs, and shrubs that can occur in minor amount. Natural fire frequency is 80-100 years.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	202	325	460
Shrub/Vine	62	101	140
Forb	45	78	101
Total	309	504	701

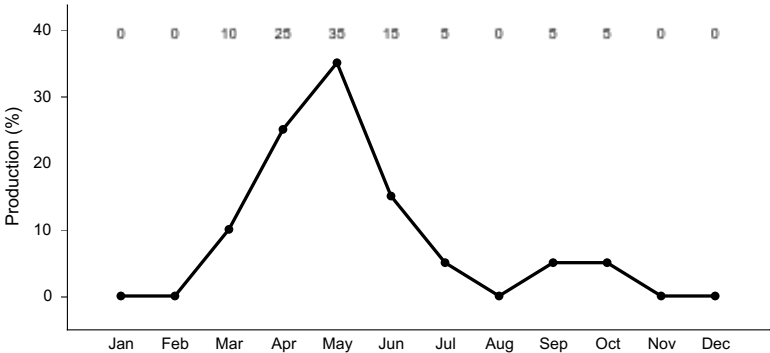


Figure 4. Plant community growth curve (percent production by month). ID0610, ARNO4/ACTH7/PSSPS. State 1.

State 2
 State 1. Plant Community B

Community 2.1
 State 1. Plant Community B

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Several species of rabbitbrush are present. Bottlebrush squirreltail has increased. Some Thurber’s needlegrass and other bunchgrasses may have died due to fire. Most forbs are maintained in the plant community. Some threetip sagebrush may have resprouted if present in the community prior to the fire. This phase has developed due to fire.

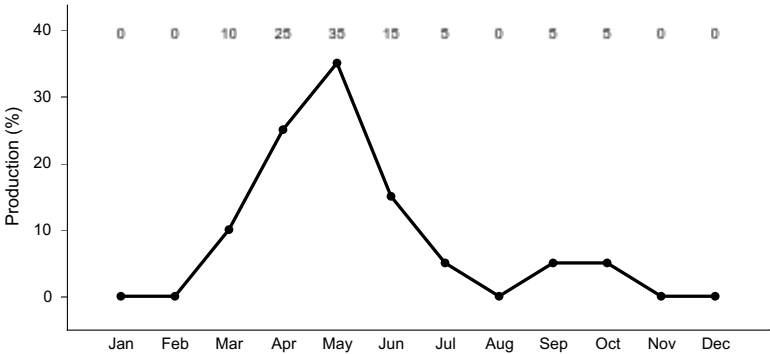


Figure 5. Plant community growth curve (percent production by month). ID0610, ARNO4/ACTH7/PSSPS. State 1.

State 3
 State 1, Plant Community C

Community 3.1
 State 1, Plant Community C

This plant community is dominated by low sagebrush with Sandberg bluegrass in the understory. Bluebunch wheatgrass and other deep-rooted perennial bunchgrasses are present but in reduced amounts and in low vigor. If threetip sagebrush is present, it may have increased in the community. This phase has developed due to improper grazing management and no fire.

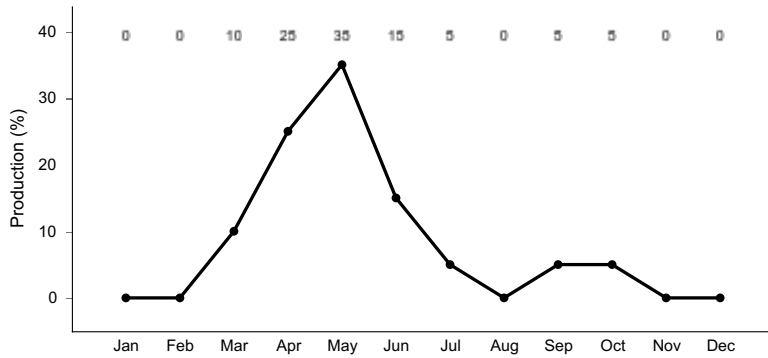


Figure 6. Plant community growth curve (percent production by month).
ID0610, ARNO4/ACTH7/PSSPS. State 1.

State 4

State 2

Community 4.1

State 2

This plant community is dominated by Sandberg bluegrass, cheatgrass, medusahead and a variety of forbs. Some perennial forbs are present. The community has developed due to continued improper grazing management and/or frequent fire. Some soil loss has occurred. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

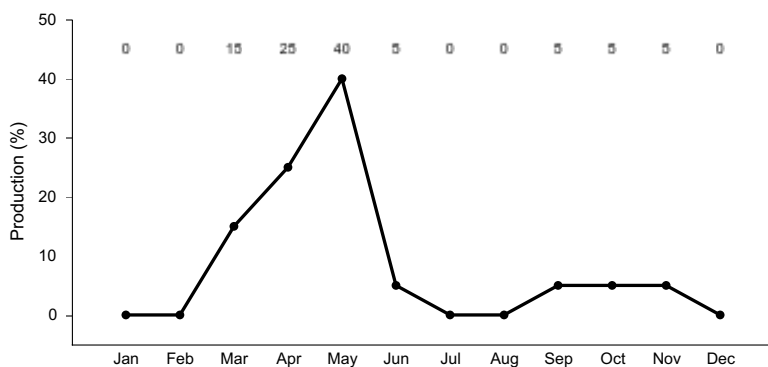


Figure 7. Plant community growth curve (percent production by month).
ID0611, POSE/ BRTE/ ANNUALS . State 2.

State 5

Unknown Site

Community 5.1

Unknown 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 community has developed due to continued improper grazing management and/ or fire. It is not economical to return this site to State 1 with accelerating 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 the reference plant community is dominated by mule deer, pronghorn antelope, and elk. The site provides important seasonal habitat 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. A change in the quality of the reference plant community over time can reduce the number and diversity of wildlife species in the area. Loss of shrubs can cause shrub obligate avian species to become rare including sage-grouse, brewer's sparrow, sage sparrow, and sage thrasher. Encroachment of noxious and invasive plant species (i.e. cheatgrass, tumblemustard, medusahead, and bulbous bluegrass) in isolated areas 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 features are sparse provided by seasonal streams and artificial water catchments. The site is interspersed with pre-historic lava flows which provide unique cave habitats for several sensitive animal species, including the Blind Cave Leiodid Beetle, Cave Obligate Mite, Bats, and the Cave Obligate Harvestman.

State 1 Phase 1.1 – Low Sagebrush/ Bluebunch Wheatgrass/ Thurber's Needlegrass/ Sandberg Bluegrass 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. Native shrub-steppe obligate avian species utilizing the habitat include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (winter cover and winter food) for sage-grouse is provided by this diverse plant community. The plant community provides seasonal forage needs for large mammals (mule deer, antelope, and elk). A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize this plant community.

State 1 Phase 1.2- 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 animals. Insect diversity would be reduced but a diverse native forb plant community would still support select pollinators. Cave dwelling insects and mammals from adjacent habitats would be supported by this plant community. Diversity and populations of reptiles would be limited or excluded due to the loss of shrub cover. The dominance of herbaceous vegetation with little sagebrush canopy cover would prevent 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 nearby. The site does not provide suitable winter cover or food 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 but the site would provide little thermal and young of year cover. Small mammal diversity would be reduced.

State 1 Phase 1.3 – Low Sagebrush/ Sandberg Bluegrass Plant Community:

This plant community is the result of improper grazing management and no fire. An increase in canopy cover of sagebrush comes at the expense of a sparse herbaceous understory. An increase in threetip sagebrush may occur if it is present in the plant community, leading to an increase in sagebrush canopy cover. The reduced herbaceous understory results in lower diversity and populations of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, and western rattlesnake. The reduced diversity and populations of insects will reduce reptile diversity and populations. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (winter cover and winter food) for sage-grouse is available but may be limited if threetip sagebrush becomes dominant in the plant community. The plant community supports limited seasonal forage habitat for large mammals including mule deer, antelope, and elk. A small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize this plant community.

State 2 - Sandberg Bluegrass / Cheatgrass / Medusahead Plant Community:

This plant community is the result of continued improper grazing management and/or frequent fire. The plant community does not support a diverse insect community. The reduced forb and shrub component in the plant community would support a very limited population of pollinators. Most reptilian species are not supported with food,

water, or cover. 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 available 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 reduction of insect population and diversity would reduce suitability of site for bats. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

Grazing Interpretations.

This site is suited for grazing by livestock in spring, early summer, and fall. Early spring grazing should be avoided when soils are wet. Natural water supplies may be limiting or absent.

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

The soils in this site are in hydrologic group D. They have high runoff potential.

Recreational uses

Colorful spring and early summer blooming forbs provide excellent opportunities for photography and nature study. Hunting opportunities for pronghorn antelope and sage grouse exist.

Wood products

None

Other products

None

Other information

Field Offices

Burley, ID
Shoshone
American Falls, ID
Pocatello, ID
Blackfoot, ID
Arco, ID
Rexburg, ID
St. Anthony, ID
Rigby, ID
Fort Hall, ID
Idaho Falls, 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
Joe May, State Rangeland Management Specialist, NRCS, Idaho
Leah Juarros, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Clark County, ID	
General legal description	Near the headquarters area at U.S. Sheep Experiment Station.

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

USDA, Forest Service, Fire Effects Information Database. 2004. www.fs.fed.us/database/feis

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.

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.

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Date	04/23/2009
Approved by	Kendra Moseley
Approval date	

Indicators

1. **Number and extent of rills:** are rare on this site. If rills are present they are likely to occur on slopes greater than 10 percent and immediately following a wildfire or high intensity storm. Rills are most likely to occur on soils with silt loam or clay loam surface texture. Surface stones reduce rill development.

2. **Presence of water flow patterns:** are rare on this site. They are most likely to occur on slopes greater than 10 percent. When they do occur they are short and disrupted by cool season grasses, shrubs, and surface stones. They are not extensive.

3. **Number and height of erosional pedestals or terracettes:** pedestals are common on the site where flow patterns are present and the surface soils have high clay content. Do not mistake frost-heaving for pedestals. Terracettes occur occasionally.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** need data but is expected to range from 25-35 percent.

5. **Number of gullies and erosion associated with gullies:** none.

6. **Extent of wind scoured, blowouts and/or depositional areas:** usually not present in Phase A, State 1.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 2 feet 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 4-6 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure typically includes weak thin and moderately thick platy and weak fine granular. Soil organic matter (SOM) ranges from 0.5 to 3 percent. The surface horizon is typically 1 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 runoff and increase infiltration. Surface stones aid in slowing water movement and increasing infiltration. Shrubs accumulate some 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. Do not mistake an increase in clay content in the subsoil as a compaction layer.
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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: medium shrubs
- Other: perennial forbs
- Additional: shallow rooted bunchgrasses
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** very little mortality or decadence is expected on this site. Mortality of shallow rooted grasses may occur due to extended periods of drought.
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14. **Average percent litter cover (%) and depth (in):** additional data is needed but is expected to be low and at a shallow depth.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 450 pounds per acre in a year with normal precipitation and temperatures. Perennial grasses produce 60-70 percent of the total production, forbs 10-20 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, clasping pepperweed, beggars ticks, tansymustard, Jim Hill tumbled mustard, yellow salsify, burr buttercup, medusahead, Russian thistle, annual kochia, and halogeton.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in favorable years.
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