Ecological site R011XB032ID
Gravelly Loam 7-10 PZ ARNO4/ACHY-HECOC8

Last updated: 4/06/2020
Accessed: 04/25/2024

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: 7-10” P.Z.

Classification relationships

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

Ecological site concept

Site does not receive additional moisture
Soils are:
Not saline or saline sodic
Moderately deep to deep, 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 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

R011XB001ID	**Loamy 8-12 PZ**
R011XB003ID	**Stony Loam 8-12 PZ ARTRW8/PSSPS**
R011XB006ID	**Loamy 8-12 PZ ARTRT/LECI4**
R011XB009ID	**Shallow Stony 8-12 PZ ARTRW8/PSSPS**
R011XB013ID	**Shallow Loamy 8-12 PZ ARAR8/PSSPS**
R011XB016ID	**Sand 8-12 PZ ARTRT-PUTR2/HECOC8**
R011XB018ID	**Shallow Sandy 8-12 PZ ARNO4/ACHY-HECOC8**
R011XB032ID	**Gravelly Loam 7-10 PZ ARNO4/ACHY-HECOC8**

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on alluvial fans and out washed plains. Slopes are 3 to 10 percent. Elevations range from 5100 to 5500 feet (1550-1675 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	5,100–5,500 ft
Slope	3–10%
Aspect	Aspect is not a significant factor

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)	13 in

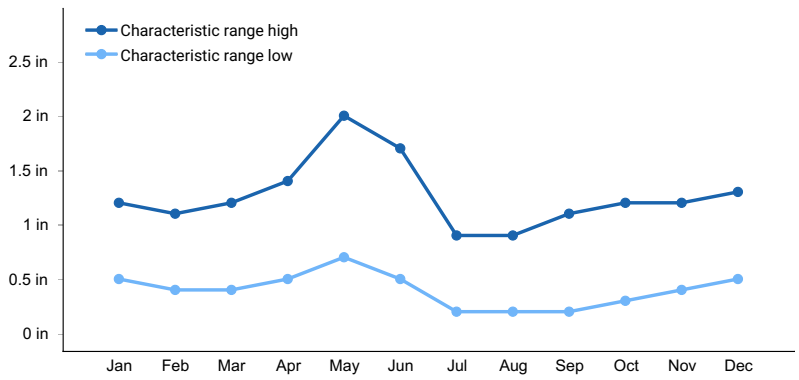


Figure 1. Monthly precipitation range

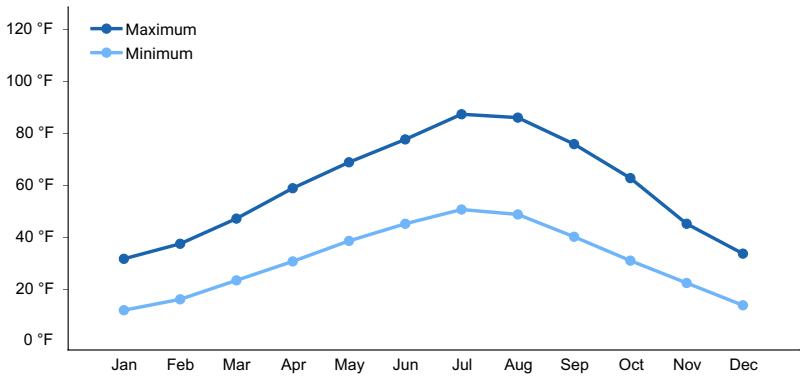


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

Soils that characterize this site are medium textured, gravelly, rapidly permeable, moderately deep to a concentrated lime zone and well-drained. They are coarse textured and gravelly below about 22 inches. Water intake rate is moderate. The water supplying capacity is 3 to 5 inches. Soil does not restrict root depths. Erosion is moderate where adequate plant cover is not present. Low precipitation is the limiting factor to herbage yield rather than soil characteristics.

Soil Series Correlated to this Ecological Site

None

Ecological dynamics

The dominant visual aspect of this site is black sagebrush with Indian ricegrass and needle and thread. Composition by weight is approximately 60 to 80 percent grass, 1 to 10 percent forbs, and 20 to 30 percent shrubs.

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

Fire has historically occurred on this site every 50 to 70 years.

The Historic Climax Plant Community (HCPC), the Reference State (State 1), moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The Reference Plant Community is Phase A. This site is dominated by Indian ricegrass, needle and thread, and black sagebrush. Subdominant species include western wheatgrass, bottlebrush squirreltail, scarlet globemallow, and bud sage. There are a variety of other grasses, forbs, and shrubs that occur in the plant community in minor amounts. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 600 pounds per acre (672 Kg/ha) in a normal year. Production in a favorable year is 800 pounds per acre (896 Kg/ha). Production in an unfavorable year is 400 pounds per acre (448 Kg/ha).

Structurally, cool season deep rooted perennial bunchgrasses are dominant, followed by shrubs that are more dominant than perennial forbs followed by shallow rooted bunchgrasses.

FUNCTION:

This site provides yearlong range for pronghorn antelope. Mule deer make slight use in mild winters and moderate to heavy use in severe winters.

It is best suited for livestock use in the winter. There are limited recreational opportunities.

This site is easily degraded by improper grazing management due to ease of access and low production potential.

Impacts on the Plant Community.

Influence of fire:

This site historically had a low fire frequency, approximately every 50-70 years. Most of the shrubs, including black and bud sagebrush, can be severely damaged or killed when burned. Indian ricegrass is usually maintained in the community. Western wheatgrass, bottlebrush squirreltail, Sandberg bluegrass, and low green rabbitbrush can increase in the community with fire. Winterfat can be killed with severe, high intensity fires but can sprout with low intensity fires. Forbs are usually maintained in the plant community. When fires become more frequent than the historic levels (50-70 years), perennial grasses and most shrubs are killed and replaced with annuals, invasive and noxious perennials. Rabbitbrush and fourwing saltbrush will normally re-sprout and increase slightly. Cheatgrass can be a troublesome invader on this site, preventing perennial grass and shrub re-establishment and increasing the fire frequency.

Influence of improper grazing management:

Black sagebrush and winterfat can be impacted by improper grazing management. Relatively low levels of utilization by cattle and sheep are needed to maintain the shrub component. Indian ricegrass and needle and thread will be reduced in the community with improper grazing management. As these species are reduced in the plant community, western wheatgrass, bottlebrush squirreltail and Sandberg bluegrass will increase. Low green rabbitbrush can increase significantly. Bud sage usually in maintained in the community, but can be reduced with heavy sheep grazing. Forbs and invasive annuals can increase. Cheatgrass will invade the site.

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

Weather influences:

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 water holding capacity and shallow soil. Extended drought reduces vigor of the perennial grasses and palatable shrubs. Extreme drought may cause plant mortality. An early, hard frost can occasionally kill some plants.

Influence of Insects and disease:

Outbreaks can affect vegetation health. An outbreak of a particular insect is usually influenced by weather but no specific data is available for this site. 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. Shadscale saltbush can be heavily impacted by the scale insect, Orthezia annae. It is also called “mealy bug”. This insect is moved by ants from one plant to another and feeds on the roots of shadscale saltbush. It can cause stand mortality, especially following a series of drought years.

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 can be very invasive on this site. Once it becomes 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 that uses the site. They use the site yearlong but prefer it in the spring, fall, and early winter. Winter and spring use by mule deer occasionally occurs.

Watershed:

Decreased infiltration and increased runoff occur when black sagebrush and bud sage are removed with frequent fires, particularly the year of 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 is slight.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.
Phase A to B. Develops with fire (approximately every 50-70 years).
Phase A to C. Develops under improper grazing management and no fire.
Phase C to A. Develops under prescribed grazing management program and no fire.
Phase B to A. Develops from prescribed grazing and no fire.

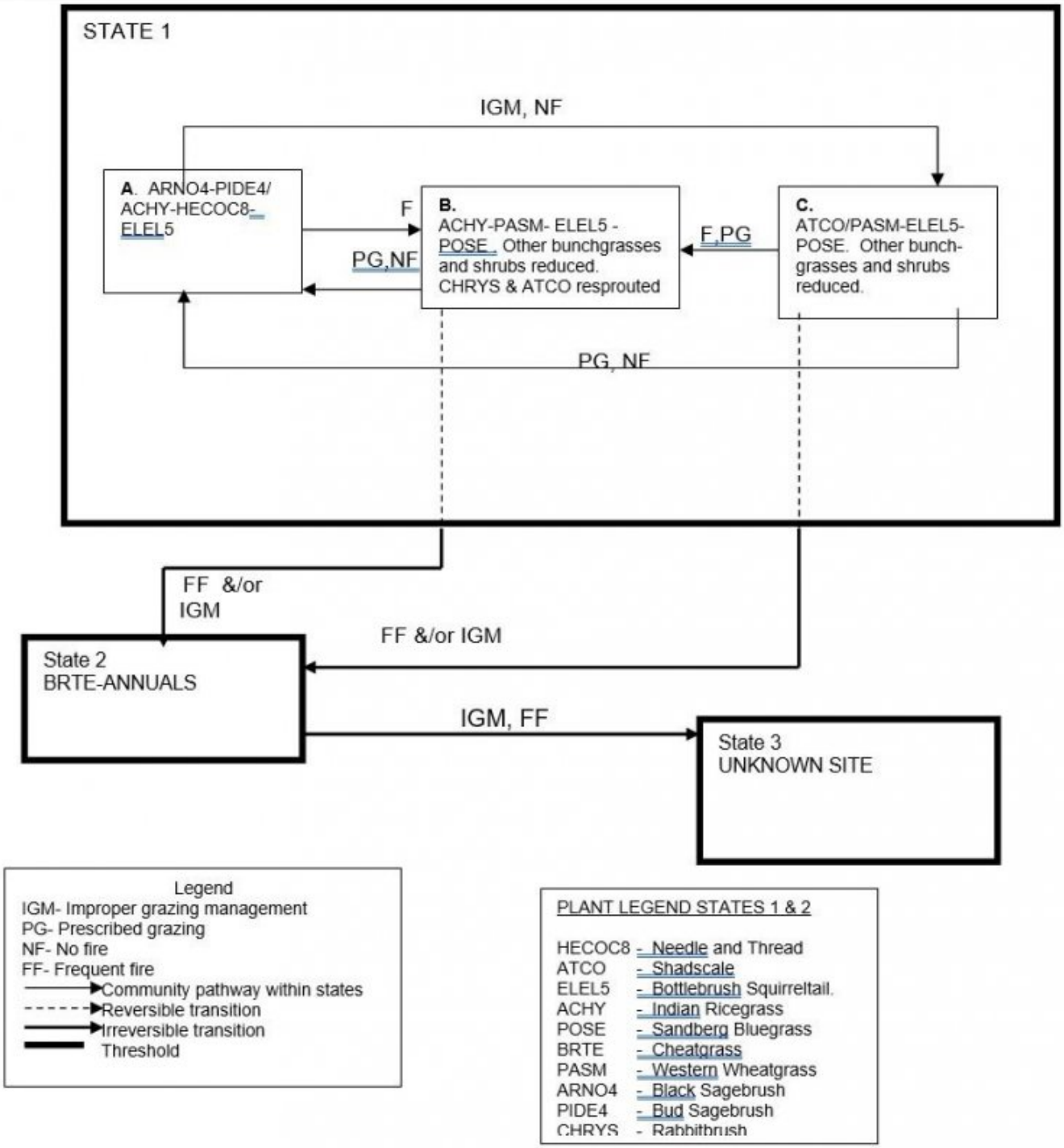
State 1, Phase B or C to State 2. Develops with frequent fire and/or improper grazing management. The site has crossed the threshold. It is not economical to return this plant community to State 1 with accelerating practices.

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

Practice Limitations:

There are slight limitations on this site for implementing vegetative management and facilitating practices. There are moderate to severe limitations for accelerating practices due to low annual precipitation.

State and transition model



State 1
State 1 Phase A

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by black sagebrush, bud sage, Indian ricegrass, needle and thread and. Subdominant species include bottlebrush squirreltail, western wheatgrass, and scarlet globemallow. There are a variety of other grasses, forbs, and shrubs that occur in the plant community in minor amounts. Natural fire frequency is approximately 50 to 70 years.

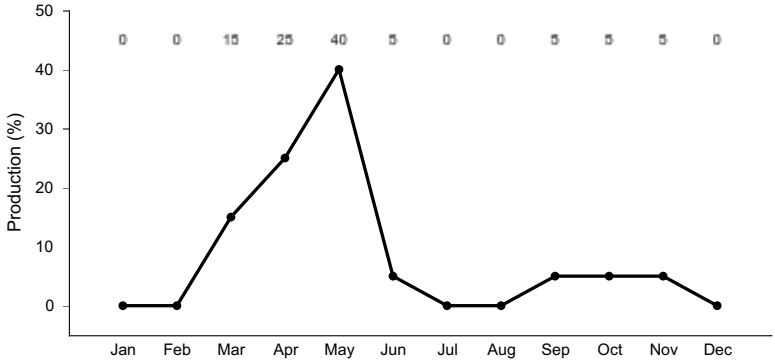


Figure 3. Plant community growth curve (percent production by month). ID0611, POSE/ BRTE/ ANNUALS . State 2.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community has developed after a fairly recent fire. Fire intolerant shrubs such as black sagebrush, bud sagebrush, shadscale, and winterfat have been significantly reduced or eliminated. Rabbitbrush and fourwing saltbrush have re-sprouted. A low intensity fire will not kill all of the winterfat. Indian ricegrass is maintained in the stand. Needle and thread has been reduced and some may have been killed by the fire. Bottlebrush squirreltail, western wheatgrass, and Sandberg bluegrass have increased. Some cheatgrass may have invaded.

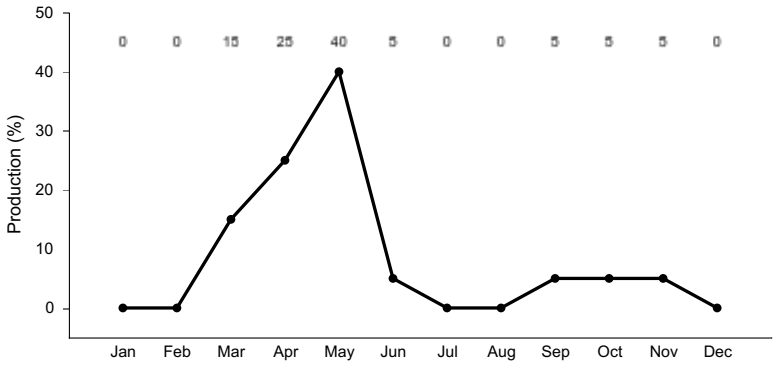


Figure 4. Plant community growth curve (percent production by month). ID0611, POSE/ BRTE/ ANNUALS . State 2.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

Due to improper grazing management, Indian ricegrass and needle and thread have been significantly reduced in amounts and are in low vigor. Western wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail have increased. Winterfat, black sagebrush, and bud sagebrush have been reduced in the stand. Dwarf green rabbitbrush, shadscale, and fourwing saltbrush have increased. Many forbs have increased as well. Some annual forbs and cheatgrass may have invaded the site.

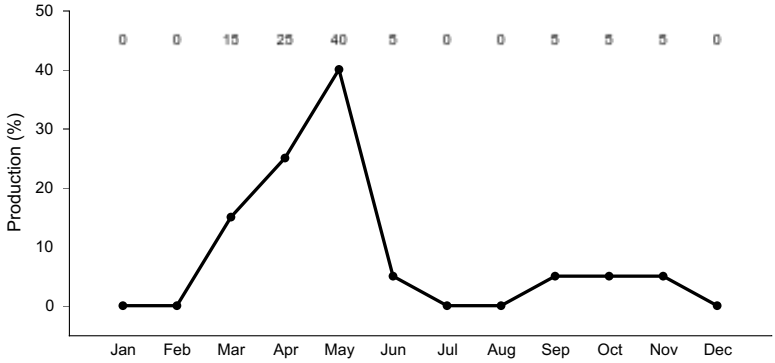


Figure 5. Plant community growth curve (percent production by month). ID0611, POSE/ BRTE/ ANNUALS . State 2.

State 4
State 2

Community 4.1
State 2

The site has degraded into a plant community dominated by annual grasses and forbs. Fine fuels are adequate to carry a fire in favorable years. Frequent fires and/or improper grazing management have caused the degradation from either Phase B or C, from State 1. Excessive soil loss has not occurred at this point but the site has crossed the threshold. It is not economical to return this plant community to State 1 with accelerating practices.

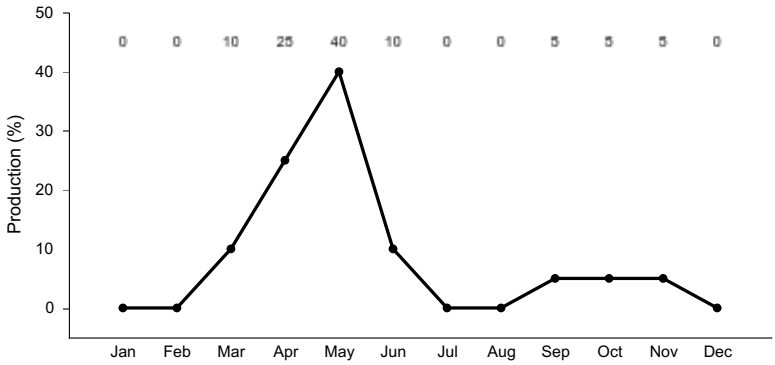


Figure 6. Plant community growth curve (percent production by month). ID0612, ANNUALS/FORBS.

State 5
Unknown New Site

Community 5.1
Unknown New Site

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This community has developed due to continued improper grazing management and/or frequent fire. It is not economical to return this plant community to State 1 with accelerating practices.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides habitat for select native wildlife species. Mule deer and antelope are the large herbivores using the site. The site provides seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, shrews, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Sage-grouse, an area sensitive species, may utilize the plant community for nesting, winter cover, and winter food. Encroachment of noxious and invasive plant species (cheatgrass) in isolated areas can replace native plant species. Water features are sparse provided by seasonal streams, artificial water catchments, and springs.

State 1 Phase1.1 –Black Sagebrush/ Bud Sagebrush/ Indian Ricegrass/ Needle and Thread/ Bottlebrush Squirreltail Reference Plant Community (RPC) This plant community provides a diversity of grasses, forbs and shrubs, used throughout the growing season 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, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Development of spring sites that collect all available water would exclude amphibian use on these sites. Sage-grouse may utilize this plant community for nesting and winter habitat. The plant community provides forage for large mammals including mule deer and antelope. Black sagebrush provides excellent winter, fall, and early spring forage for antelope and mule deer. Bud sagebrush provides early spring forage for antelope and mule deer. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize this community.

State 1 Phase 1.2 –Indian Ricegrass/ Western Wheatgrass/ Bottlebrush Squirreltail / Sandberg Bluegrass Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation would provide less vertical structure for animals. Patches of root sprouting shrubs (rabbitbrushes and fourwing saltbush) may begin to provide limited vertical structure for wildlife. Insect diversity would be reduced but native forbs are still present and support select pollinators while rabbitbrushes provide some fall pollinator habitat. The reptiles including short horned lizard and sagebrush lizard would be limited or excluded due to the loss of sagebrush. Amphibian habitat would be tied to permanent spring sites in the area. Sage-grouse use for winter cover and winter food is eliminated. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer and antelope) use for forage would be limited to herbaceous vegetation in the spring and fall. Quality winter habitat for large mammals would be eliminated. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

State 1 Phase 1.3- Shadscale/ Western Wheatgrass/ Bottlebrush Squirreltail/ Sandberg Bluegrass Plant Community: This plant community is the result of improper grazing management and/or no fire. An increase in canopy cover of brush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in reduced diversity of insects. Forb diversity may be similar to Phase 1.1 plant community. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, and western toad. With proper grazing management prey species and cover for these resident reptiles would be similar to Phase 1.1. Structural habitat for birds would be similar to Phase 1.1. Winter cover and food for sage-grouse is limited with the reduction of sagebrush in the plant community and dominance of shadscale and rabbitbrush. Reduced understory vegetation and a decrease in sagebrush density reduce forage value for mule deer and antelope. A small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize these areas.

State 2 - Cheatgrass / Annuals Plant Community:
Frequent fires and/or improper grazing management have caused the degradation from either Phase 1.2 or 1.3, from State 1. Invasive herbaceous plants and patches of root sprouting shrubs like rabbitbrushes can be present. 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 provide the habitat requirements needed for sage-grouse. 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 populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

Grazing Interpretations.

It is best suited for livestock use in the winter. Natural water supplies can be short or absent, and livestock water may have to be piped, hauled, or otherwise made available.
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 on this site are in hydrologic group B. They have moderately low runoff potential.

Recreational uses

This site has very little recreation value. This site has fair aesthetic appeal and natural beauty. It is poor for camping, picnicking, and hiking. It is also poor for hunting.

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

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”.

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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.

Forty Years of Change in a Shadscale Stand in Idaho. L.A. Sharp, K. Sanders and N. Rimbey. 1990. Rangelands 12(6): 313-328.

Approval

Kendra Moseley, 4/06/2020

Rangeland health reference sheet

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

Author(s)/participant(s)	Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	06/17/2009
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills are rare.

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2. **Presence of water flow patterns:** water-flow patterns are rare.

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3. **Number and height of erosional pedestals or terracettes:** both are rare.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** may range from 10 to 20 percent but data needs to be collected.

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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:** usually not present, but some soil movement may occur immediately following a wildfire.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces typically moves 1 to 2 feet. 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 3 to 5 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** No data.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** bunchgrasses, especially deep-rooted perennial species, slow runoff and increase infiltration.

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.

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

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.

14. **Average percent litter cover (%) and depth (in):** additional data is needed but is expected to be low and at a shallow depth.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 600 pounds per acre (672 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 60 to 80 percent of the total production, forbs 1-10 percent and shrubs 20-30 percent.

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, beggar ticks, tansymustard, Jim Hill tumblemustard, yellow salsify, and halogeton.

17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in normal and favorable years.