

Ecological site R011XY011ID Sand 8-12 PZ ARTRT/ACHY

Last updated: 4/06/2020
Accessed: 04/24/2024

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

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 very deep, with <35% coarse fragments (by volume). Not skeletal
not strongly or violently effervescent in the surface mineral 10"

Textures range from sand to loamy sand in the surface mineral 4"

Stabilized dunes

Slope is <30%

Clay content is =<35% in surface mineral 4"

Site does not have an argillic horizon with >35% clay

Associated sites

R011XY004ID	Shallow Loamy 8-12 PZ
R011XY008ID	South Slope 10-12 PZ
R011XY009ID	Silty 7-10 PZ KRLA2/ACHY
R011XY010ID	Calcareous Loam 7-10 PZ ATCO-PIDE4/ACHY-ACTH7
R011XY014ID	Sandy Loam 8-12 PZ ARTRW8/ACHY-HECOC8
R011XY015ID	Loamy Bottom 8-14 PZ ARTRT/LECI4

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	Not specified
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Physiographic features

This site occurs on nearly level to rolling slopes that range from 0 to 20 percent. The site occurs on all aspects. Elevations range from 2000 to 3500 feet (600-1100 meters). This site is associated with stabilized to mostly stabilized sand dunes that occur in the lower and middle Snake River plains.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Dune
Flooding frequency	None
Elevation	2,000–3,500 ft
Slope	0–10%
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

MLRA 11 is part of Idaho's Snake River Plain. The elevation ranges from 2,077 to 7,549 feet, with a mean of 3,992 feet. Most of the precipitation falls as rain in the fall, winter and spring. Very little precipitation occurs during the summer months. In general this MLRA receives more sun than the U.S. average during the summer, but less than average during the winter.

The average annual precipitation is 10.01 inches (based on 10 long term climate stations located throughout the MLRA), with minimum and maximum values of 8.38 and 11.62 inches, respectively.

The average annual temperature ranges from 38° to 65° Fahrenheit. With a maximum average temperature of 65 degrees F. and a minimum average of 38 degrees F. The frost free interval ranges from 139 to 165 days and the freeze free interval ranges from 168 to 196 days.

Table 3. Representative climatic features

Frost-free period (average)	165 days
Freeze-free period (average)	196 days
Precipitation total (average)	12 in

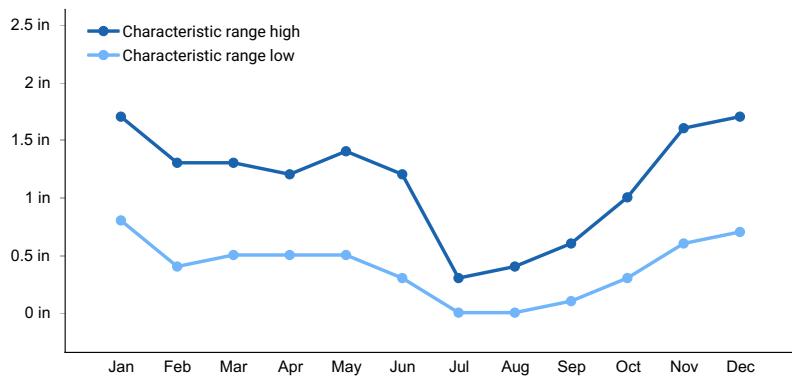


Figure 1. Monthly precipitation range

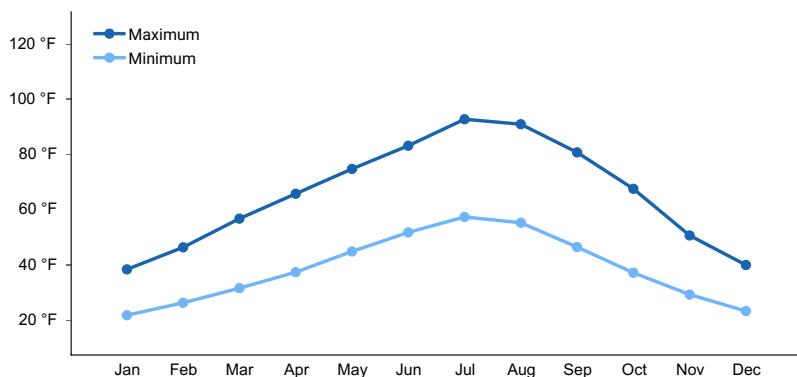


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils on this site are shallow or moderately deep to bedrock or duripan, or very deep and are well to excessively drained. Permeability is moderately rapid or rapid. Development of the soil profile is very weak. Textures are mostly sand or loamy sand throughout. The surface texture is sandy with stones on the surface, except for Quincy. The available water holding capacity (AWC) is very low or low and runoff is negligible or low. The erosion hazard is slight by water, and severe by wind. These areas are stabilized or nearly stabilized dunes. Some small areas near Bruneau Recreation Area have variable salt concentrations. These soils are characterized by an aridic soil moisture regime that borders on xeric. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site

Arrowrock
Davey
Jacquith
Painter
Quincy
Solarview

Table 4. Representative soil features

Surface texture	(1) Fine gravelly loamy sand (2) Loamy fine sand (3) Fine sand
Drainage class	Well drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	10–60 in
Surface fragment cover <=3"	0–35%
Surface fragment cover >3"	0–15%
Available water capacity (0–40in)	0.6–4.7 in
Calcium carbonate equivalent (0–40in)	0–5%
Soil reaction (1:1 water) (0–40in)	6.1–8.4

Subsurface fragment volume <=3" (Depth not specified)	0–35%
Subsurface fragment volume >3" (Depth not specified)	0–45%

Ecological dynamics

The dominant visual aspect of this site is Indian ricegrass in the understory with basin big sagebrush in the overstory. Composition by weight is approximately 50 to 65 percent grasses, 10 to 20 percent forbs, and 25 to 35 percent shrubs.

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

Fire has historically occurred on the site at intervals of 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 Phase is Phase A. This plant community is dominated by Indian ricegrass and basin big sagebrush. The sub-dominant grass is needle and thread. Other species that can be significant in the community include bottlebrush squirreltail, sand dropseed, and penstemon. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 625 pounds per acre (700 kilograms per hectare) in a normal year. Production in a favorable year is 850 pounds per acre (952 kilograms per hectare). Production in an unfavorable year is 375 pounds per acre (420 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

This site is suited for livestock grazing in the spring, fall, and winter. The site can be winter range for big game in the winter. This site has limited value for recreational uses but some hiking and photographic opportunities exist. Off road vehicle use can degrade the site easily.

This site is susceptible to degradation due to the gentle slopes, ease of access, and instability of sandy surface textures. Infiltration is good where the community is in mid to late seral status. The site has slow runoff potential but wind erosion hazard is high. The plant community needs a mix of deep rooted perennial grasses and shrubs to be stable.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, basin big sagebrush can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, basin big sagebrush can displace most of the primary understory species.

When fires become more frequent than historic levels (50-70 years), basin big sagebrush is reduced significantly. Rabbitbrush and horsebrush can increase slightly. Spiny hopsage and fourwing saltbush are significantly reduced. Some fourwing saltbush will sprout after fire since it is a weak sprouter. With continued short fire frequency, basin big sagebrush can be completely eliminated along with many of the desirable understory species such as Indian ricegrass and needle and thread. These species may be replaced by bottlebrush squirreltail along with a variety of

annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site. These fine fuels will increase the fire frequency. After fire, the sandy surface soils are susceptible to severe wind erosion.

Influence of improper grazing management.

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. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in basin big sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels. As cheatgrass increases and becomes co-dominant with 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 basin big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management on this specific site needs to be very carefully evaluated as a reduction in shrubs without a suitable understory of perennial grasses can result in an increase in cheatgrass 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 these spring months can significantly reduce total annual production and be detrimental to viable seed production. Overall plant composition is normally not affected when perennials have good vigor.

Below normal temperatures in the spring can have an adverse impact on total production regardless of the precipitation. An early, hard freeze can occasionally kill some plants.

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

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. Wyoming big sagebrush, if present in the plant community can be affected by the sagebrush defoliator moth (*Aroga websterii*). It can cause mortality in relatively small patches. Antelope bitterbrush if present in the plant community can be affected by the western tent caterpillars (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush.

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:

Big game animals use this site in the spring and fall and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community. High numbers of burrowing rodents can provide bare ground areas that allow invasion of invasive species.

Watershed:

Decreased infiltration and increased runoff occur with an increase in basin big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. 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 in the absence of fire.

Phase A to C. Develops with fire.

Phase B to A. Develops with prescribed grazing and no fire.

Phase C to A. Develops with prescribed grazing and no fire.

State 1 Phase C to State 2. Develops through frequent fire with or without proper grazing management. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

State 2 to State 3. Develops through range seeding.

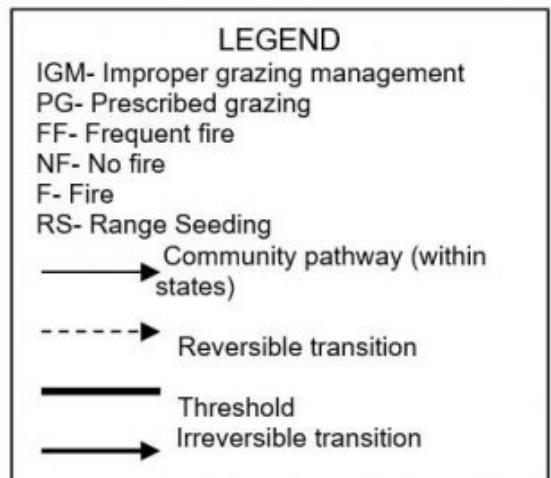
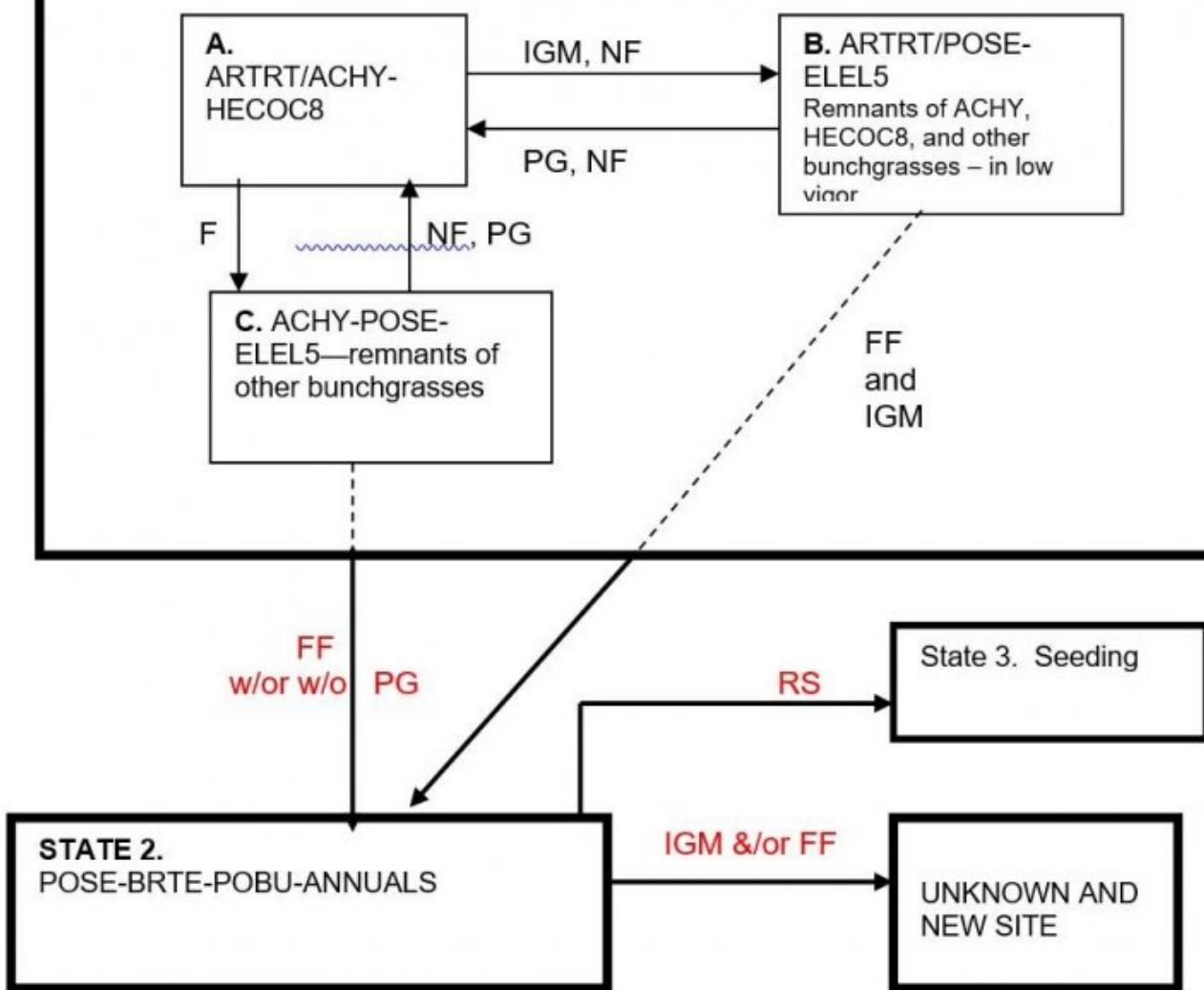
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this state to State 1 with accelerated practices.

Practice Limitations:

No physical limitations exist for seeding on this site. There is a high risk of failure due to the low moisture holding capacity of the soil, low precipitation and wind erosion hazard. There are no physical limitations that exist for brush management on this site. Planning should carefully analyze the stand of perennial grasses and forbs, because removal of basin big sagebrush can result in significant wind erosion.

State and transition model

STATE 1. Plant Community Phases



PLANT LEGEND STATES 1 & 2

ARTRT - Basin Big Sagebrush
ACHY - Indian Ricegrass
HECOC8- Needle and Thread
POSE - Sandberg Bluegrass
ELEL5 - Bottlebrush Squirreltail
BRTE - Cheatgrass
POBU - Bulbous Bluegrass

State 1
State 1 Phase A

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by Indian ricegrass and basin big sagebrush. The subdominant grass is needle and thread. Other species that can be significant in the community include bottlebrush squirreltail, sand dropseed, and penstemon. A variety of other grasses, forbs, and shrubs can occur in the plant community in minor amounts. Natural fire frequency is 50-70 years.

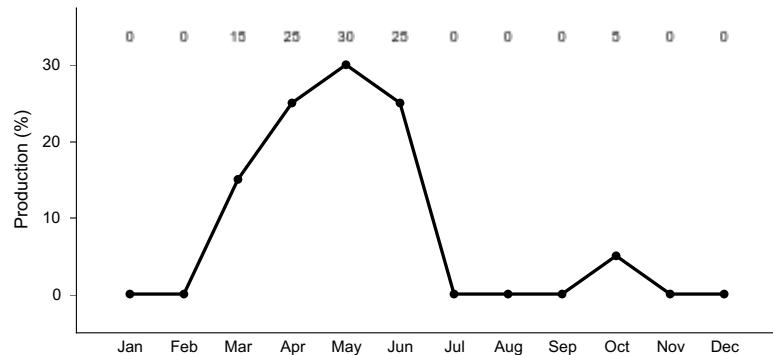


Figure 3. Plant community growth curve (percent production by month).
ID0405, PSSPS bluebunch wheatgrass ARTRT-ACHY . State 1.

State 2 **State 1 Phase B**

Community 2.1 **State 1 Phase B**

This plant community is dominated by basin big sagebrush with bottlebrush squirreltail in the understory. There are reduced amounts of Indian ricegrass and needle and thread. Other bunchgrasses have been significantly reduced. All deep-rooted bunchgrasses are in reduced vigor. Basin big sagebrush has increased. This state has developed due to improper grazing management and lack of fire. Rabbitbrush and horsebrush may have increased.

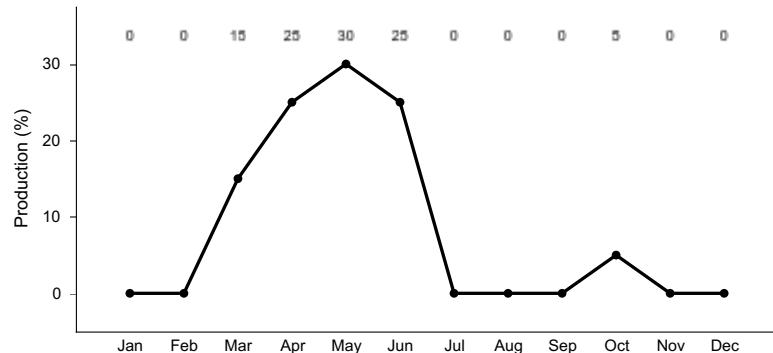


Figure 4. Plant community growth curve (percent production by month).
ID0405, PSSPS bluebunch wheatgrass ARTRT-ACHY . State 1.

State 3 **State 1 Phase C**

Community 3.1 **State 1 Phase C**

This plant community is dominated by Indian ricegrass and needle-and-thread. Bottlebrush squirreltail has increased. Other bunchgrasses have been significantly reduced. Forbs remain about in the same proportion as Phase A. Only small amounts of basin big sagebrush are present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting and may have increased. Fourwing saltbush, if present in the plant community, may have resprouted. This plant community is the result of wildfire.

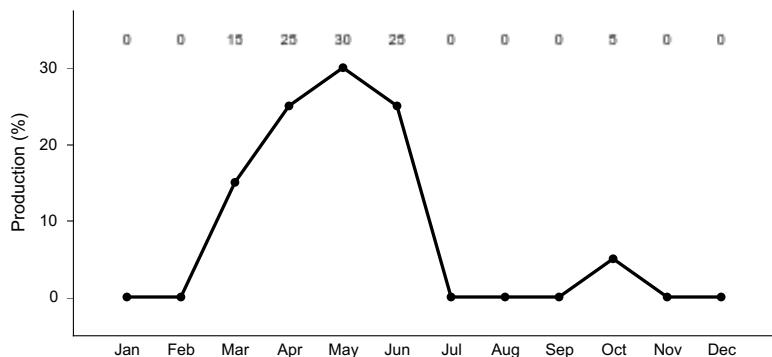


Figure 5. Plant community growth curve (percent production by month).
ID0405, PSSPS bluebunch wheatgrass ARTRT-ACHY . State 1.

State 4

State 2

Community 4.1

State 2

This plant community is dominated by cheatgrass, bulbous bluegrass, invasive plants, and annuals. Root sprouting shrubs such as rabbitbrush and horsebrush can be present, dependent upon, how frequent, fire has occurred. This state has developed due to frequent fires with or without proper grazing management. Some soil loss has occurred. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

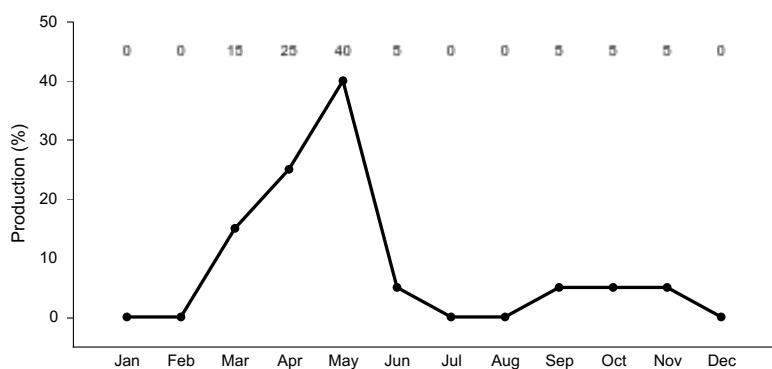


Figure 6. Plant community growth curve (percent production by month).
ID0411, BRTE/ ANNUALS . State 2.

State 5

State 3

Community 5.1

State 3

This plant community is dominated by the seeded species. The seeding can be introduced species or native species that mimic State 1. This community is the result of range seeding.

State 6

State 4

Community 6.1

State 4

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 state has developed due to continued improper grazing management and/or frequent fires. It is economically

impractical to return this state to State 1 with accelerated 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 this ecological site is dominated by mule deer and pronghorn antelope. 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. Area sensitive species include pygmy rabbit, burrowing owl, great basin ground squirrel, and Townsend pocket gopher. With reduced shrub cover, shrub obligate avian and mammal species become rare including sage-grouse, brewer's sparrow, sage thrasher, sage sparrow, and pygmy rabbit. Encroachment of noxious and invasive plant species (cheatgrass) 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 - Basin Big Sagebrush/ Indian Ricegrass/ Needle and Thread Reference Plant Community (RPC): The RPC provides a diversity of grasses, forbs, and shrubs used by native insect communities who assist in the pollination process for the plant community. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, and western toad. 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. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Brood-rearing habitat for the sage grouse may be provided by this plant community. Open areas may be utilized by burrowing owls. Indian ricegrass provides excellent early spring feed for ungulates (mule deer and antelope) and basin big sagebrush is also utilized for browse. In mild winters the site is winter habitat for mule deer and antelope. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize the site. Where big sagebrush canopy cover is high, pygmy rabbits may occur.

State 1 Phase 1.2- Basin Big Sagebrush/ Sandberg Bluegrass/ Bottlebrush Squirretail Plant Community: This phase has developed due to improper grazing management and a lack of fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in lower diversity and numbers of insects. You can expect a decrease in populations and diversity of reptiles due to the reduced diversity and canopy cover of herbaceous vegetation. The 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. Brood-rearing habitat for sage-grouse is limited due to the reduced diversity and canopy cover of herbaceous vegetation. Winter cover is provided for mule deer and antelope. A small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots, and pygmy rabbits would utilize this plant community.

State 1 Phase 1.3 - Indian Ricegrass/ Sandberg Bluegrass/ Bottlebrush Squirretail Plant Community: This plant community is the result of frequent fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure, limiting use by shrub obligate animals. Insect diversity would be reduced but a native forb community similar to State 1 Phase 1.1 would still support select pollinators. 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 with little sagebrush canopy cover would severely reduce or eliminate use of these areas for nesting by Brewer's sparrow, sage sparrow, and sage thrasher. This plant community provides limited brood-rearing habitat for sage-grouse when the site is adjacent to sagebrush cover. The site would not provide winter habitat for sage-grouse. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Indian ricegrass provides excellent spring feed for ungulates (mule deer and antelope) but the lack of sagebrush cover would reduce fall and winter use by mule deer. An increase in antelope use may occur on this site. Small mammal diversity would favor grass seed eating species and the plant community would not provide suitable habitat for pygmy rabbits. Large areas of this plant community have

resulted in fragmentation of the RPC and may significantly impact native animal species dependant on the shrub component as part of their life history.

State 2 - Sandberg Bluegrass/ Cheatgrass/ Bulbous Bluegrass and Annuals Plant Community: This state has developed due to frequent fires with or without proper grazing management. The reduced forb component in the plant community would support a very limited population of pollinators. Most reptilian species would not be supported with food, water, or cover. The plant community would not support sage-grouse, sage thrasher, Brewer's sparrow, or sage sparrow. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Deer and antelope may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) would be more palatable. At other times of the year these mammals would not regularly utilize these areas due to poor food and cover conditions. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, and kangaroo rat would utilize this site for nesting and/or foraging. Large areas of this plant community can result in fragmentation of the RPC and may significantly impact native animal species dependant on the shrub component as part of their life history.

State 3 - Range Seeding Plant Community: The proposed seeding mixture (native or non-native) would determine the animal species that would utilize the area. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 phase 1.3. A diverse seed mixture of grasses, forbs, and shrubs would provide similar habitat conditions as described in State 1 Phase 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, birds, or mammals. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, mule deer, and antelope would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Large areas of this plant community can result in fragmentation of the RPC and may significantly impact native animal species dependant on the shrub component as part of their life history.

Grazing Interpretations.

This site is suitable for grazing in the spring, early summer, fall, and winter. Improper grazing management can result in sand "blowouts".

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 B. When hydrologic conditions of the vegetative cover are good, the natural erosion hazard is slight from water.

Recreational uses

The site has very little recreational value. It has some spring blooming flowers which offers slight aesthetic values. There are some hiking and photographic opportunities on the site. Off road vehicle use can degrade the site easily.

Wood products

None

Other products

None

Other information

Field Offices

Meridian, ID

Caldwell, ID
Mountain Home, ID
Marsing, ID
Payette, ID
Weiser, ID
Emmett, 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
Dan Ogle, Acting State Rangeland Management Specialist, NRCS, Idaho
Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho
Leah Juarros, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Owyhee County, ID	
Township/Range/Section	T8S R6E S28
Location 2: Owyhee County, ID	
Township/Range/Section	T7S R5E S25

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.

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

Indicators

1. **Number and extent of rills:** rills are rare on this site. If rills are present they are likely to occur immediately following wildfire and a high intensity convection storm and on slopes approaching 10 percent. Sandy surface texture will limit rill development.

2. **Presence of water flow patterns:** water-flow patterns are rare on this site. They may occur immediately following a high intensity convention storm and on slopes approaching 10 percent. If they occur, they are short and disrupted by cool season grasses and tall shrubs and are not extensive. Water infiltration is generally rapid for the site.

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):** data is not available for this site. On sites in mid-seral status, bare ground is expected to be about 50-60%. This site is naturally unstable due to sandy surface textures particularly following a wildfire.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** wind-scoured and deposition areas can occur on this site, particularly following a wildfire. Deposition will be noticeable in the crowns of bunchgrasses and at the base of shrubs.

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 or further with wind. 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 average 1-2 but needs to be tested. They should be 4 to 6.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure is single grain or weak thin and medium platy. Soil organic matter (SOM) is 0.5 to 3 percent. The A or A1 horizon is typically 3 to 4 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 shrubs can catch 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):** 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: tall shrubs

Other: perennial forbs

Additional: shallow rooted perennial bunchgrasses

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** basin big sagebrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.

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.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 625 pounds per acre (700 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 50-65 percent of the total production, forbs 10-20 percent, and shrubs 25-35 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, bulbous bluegrass, rush skeletonweed, musk and scotch thistle, diffuse, Russian, and spotted knapweed, Russian thistle, annual kochia, halogeton, whitetop, and mustard.

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