USDA Natural Resources
Conservation Service

Ecological site R011XY002ID
Saline Bottom 8-12 PZ

Last updated: 4/06/2020
Accessed: 05/13/2025

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:
saline or saline sodic
Deep to very deep, with <35% coarse fragments (by volume), not skeletal
May be strongly or violently effervescent in the surface mineral 10”
Textures range from fine sandy loam to clay 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

R011XY004ID	**Shallow Loamy 8-12 PZ**
R011XY005ID	**Stony 10-12 PZ**
R011XY007ID	**Gravelly 10-12 PZ**
R011XY008ID	**South Slope 10-12 PZ**
R011XY009ID	**Silty 7-10 PZ KRLA2/ACHY**
R011XY010ID	**Calcareous Loam 7-10 PZ ATCO-PIDE4/ACHY-ACTH7**
R011XY011ID	**Sand 8-12 PZ ARTRT/ACHY**
R011XY012ID	**Shallow Stony 8-10 PZ ARAR8/ACTH7-SPCR**
R011XY013ID	**Saline Silty 7-10 PZ ATNU2/ACHY**
R011XY014ID	**Sandy Loam 8-12 PZ ARTRW8/ACHY-HECOC8**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus*
Herbaceous	(1) *Leymus cinereus*

Physiographic features

This site occurs on nearly level to undulating slopes of 0 to 3 percent on all aspects. Elevations range from 2300 to 3500 feet (700-1100 meters). This site is associated with the Snake River lacustrine deposits and occurs along drainage ways and low lying bottoms where salts accumulate.

Table 2. Representative physiographic features

Landforms	(1) Lakebed (2) Terrace
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Elevation	701–1,067 m
Slope	0–30%
Water table depth	46–152 cm
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)	182 days
Freeze-free period (average)	152 days
Precipitation total (average)	254 mm

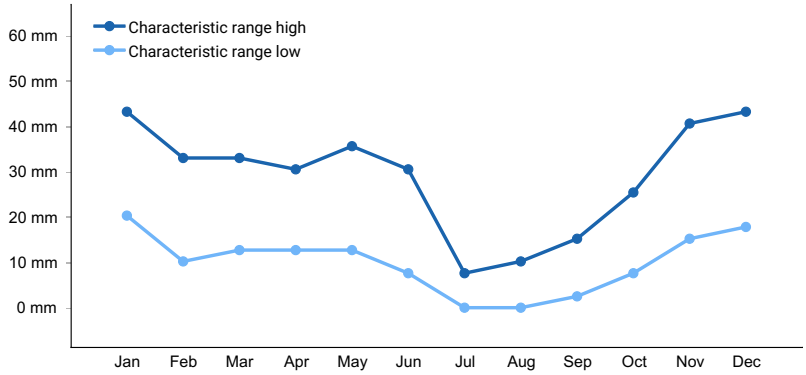

Figure 1. Monthly precipitation range

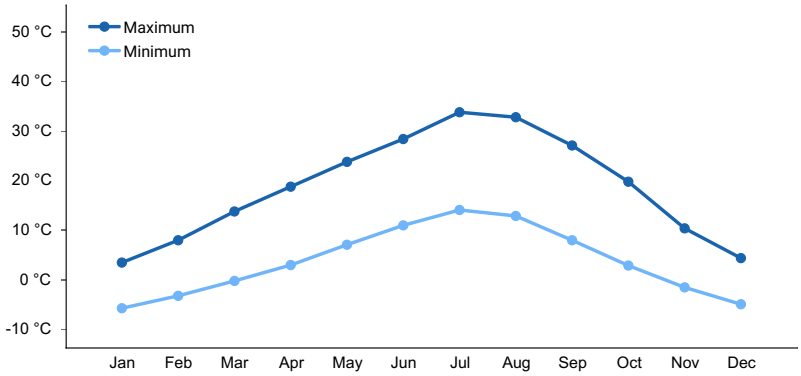

Figure 2. Monthly average minimum and maximum temperature

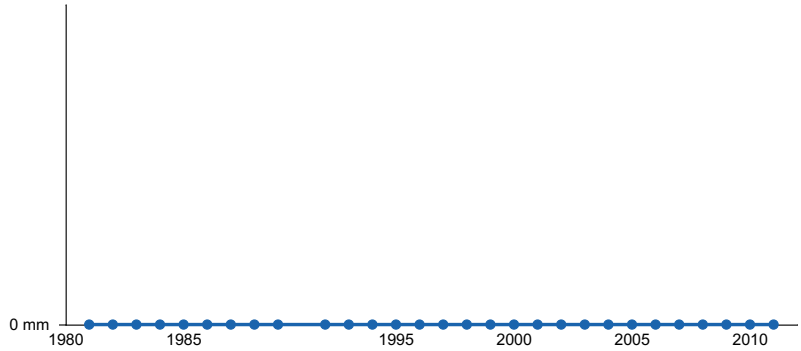

Figure 3. Annual precipitation pattern

Influencing water features

This site is influenced by run-on from adjacent uplands and from a deep water table.

Soil features

The soils supporting this site are deep or very deep, well to excessively drained, with slow to very rapid permeability. Runoff is negligible to high. The erosion hazard is slight to moderate by water, and moderate to severe by wind. Erosion hazard by wind is very severe when plant cover is scarce or lacking. The available water holding capacity (AWC) is very low to moderate. The surface texture is variable with some surface stones. These soils are characterized by an aridic moisture regime that borders on xeric. Levelton has an aquic moisture regime. Soil temperature regime is mesic or frigid for Levelton.

Soil Series Correlated to this Ecological Site

Granview
Hawsley
Levelton
Mazuma

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Clay loam (3) Loamy sand
Drainage class	Well drained to excessively drained
Permeability class	Slow to very rapid
Soil depth	152 cm
Surface fragment cover <=3"	0–9%

Surface fragment cover >3"	0–9%
Available water capacity (0-101.6cm)	5.08–20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0–40%
Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–13
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–11%
Subsurface fragment volume >3" (Depth not specified)	0–9%

Ecological dynamics

The dominant visual aspect of this site is black greasewood and basin wildrye. Composition by weight is approximately 45 to 60 percent grass, 4 to 6 percent forbs, and 35 to 50 percent shrubs.

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

Fire has historically occurred on the site at intervals of 50-70 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 black greasewood and basin wildrye. Inland saltgrass and bottlebrush squirreltail are also significant in 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 900 pounds per acre (1008 kilograms per hectare) in a normal year. Production in a favorable year is 1200 pounds per acre (1344 kilograms per hectare). Production in an unfavorable year is 600 pounds per acre (672 kilograms per hectare). 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 suitable for livestock grazing in the late spring and fall. Water is often limited in the summer and fall. This site provides good cover for most wildlife species in all seasons.
This site has limited opportunities for recreation. This site can be degraded by the formation of gullies that lower the permanent water table. This site has moderately low runoff potential.

Impacts on the Plant Community.

Influence of fire.

This site has a normal fire frequency of 50-70 years. The site is quite resistant to degradation from fire. Immediately after a fire, basin wildrye and inland saltgrass are stimulated. Black greasewood sprouts from the root crown and

lateral roots. Inland saltgrass sprouts from rhizomes. Horsebrush may also sprout after a fire. Wyoming big sagebrush will be significantly reduced if present in the plant community. In the absence of normal fire frequency, black greasewood may increase. Other grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (50-70 years), black greasewood and inland saltgrass can remain in the plant community, unless fire frequency becomes very short due to flashy understory fuels such as cheatgrass that may have invaded the site. With this short fire frequency, black greasewood may be significantly reduced. The understory species may be replaced by cheatgrass. In addition to invasion by cheatgrass, annuals such as Russian thistle and annual kochia can also encroach.

Influence of improper grazing management.

Season-long grazing and/or excessive utilization can be very detrimental to this site. The vigor of the perennial grasses can be reduced significantly by heavy early season grazing, especially with basin wild rye. This type of management leads to reduced vigor of the other bunchgrasses also. With reduced vigor, recruitment of these species declines. Continued improper grazing management influences fire frequency by increasing fine fuels. Once the understory is depleted of deep-rooted perennial grasses, surface erosion increases and may lead to the development of rills and gullies.

Proper grazing management that addresses frequency, duration, and intensity of grazing can also keep fine fuels from developing, thereby reducing fire frequency. Proper grazing management can help maintain the integrity of the plant community.

Weather influences:

Above normal precipitation in March, April, and May can dramatically increase total annual production of the herbaceous layer of the plant community. Because of the deep soils and a deep water table the production of black greasewood changes little during dry years. 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.

Influence of Insects and disease:

Periodic disease and insect outbreaks can affect vegetation health. Outbreaks of Black grass bugs commonly occur on basin wildrye. It seldom kills the plants but does reduce vigor and affects the palatability for grazing animals. 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 for this site is available.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency.
Many of the annual and perennial invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife.

Wildlife species use this site in all seasons. Their numbers are seldom high enough to adversely affect the plant community.

Watershed.

The largest threat to degradation of this site is that of rill and gully development. Soils are usually very deep and have few coarse fragments in the profile to prevent erosion. If the perennial grass cover is depleted, rill and gully

development can occur rapidly. High run-off events from the adjacent uplands can severely damage or change the normal runoff patterns on the site. Once gully development begins, the water table is lowered and run-on water no longer flows across the site. As the available soil moisture is lowered, productive potential is lost. Eventually the water table is below the root zone of the perennial grasses. These grasses are ultimately replaced by black greasewood and other shrubs, annual grasses, and forbs. Extreme gully development can move the site across the threshold to a new, less productive site.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.
Phase A to B. Develops with wild fire.
Phase A to C. Results from improper grazing management and no fire.
Phase B to A. Develops in the absence of fire.
Phase C to A. Develops from prescribed grazing.

State 1 Phase C to State 2. Develops through improper grazing management and very frequent fire. The site has crossed the threshold. It is generally not economically feasible to move this state back towards State 1 with accelerated practices.

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

State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle has been caused by gully development, adjacent channel downcutting (which has lowered the water table), and improper grazing management. Frequent fire can help accelerate degradation. The results cause this state to retrogress to a new site with reduced potential. The site has crossed the threshold. It is generally not economically feasible to move this state back towards State 1 with accelerated practices.

Practice Limitations:

The site is adapted to reseeding to selected species. Species that are selected need to have high saline tolerance. There is a moderate to high chance of failure in unfavorable moisture years and high salinity or alkalinity. There are generally no limitations to brush management, but black greasewood sprouts from the root crowns and lateral roots, limiting mechanical methods. Generally, only remove the brush to prepare a seedbed for reseeding to desirable species. However, the wildlife impacts should be carefully evaluated. Natural water supplies may be limited for livestock grazing particularly in the summer.

State and transition model

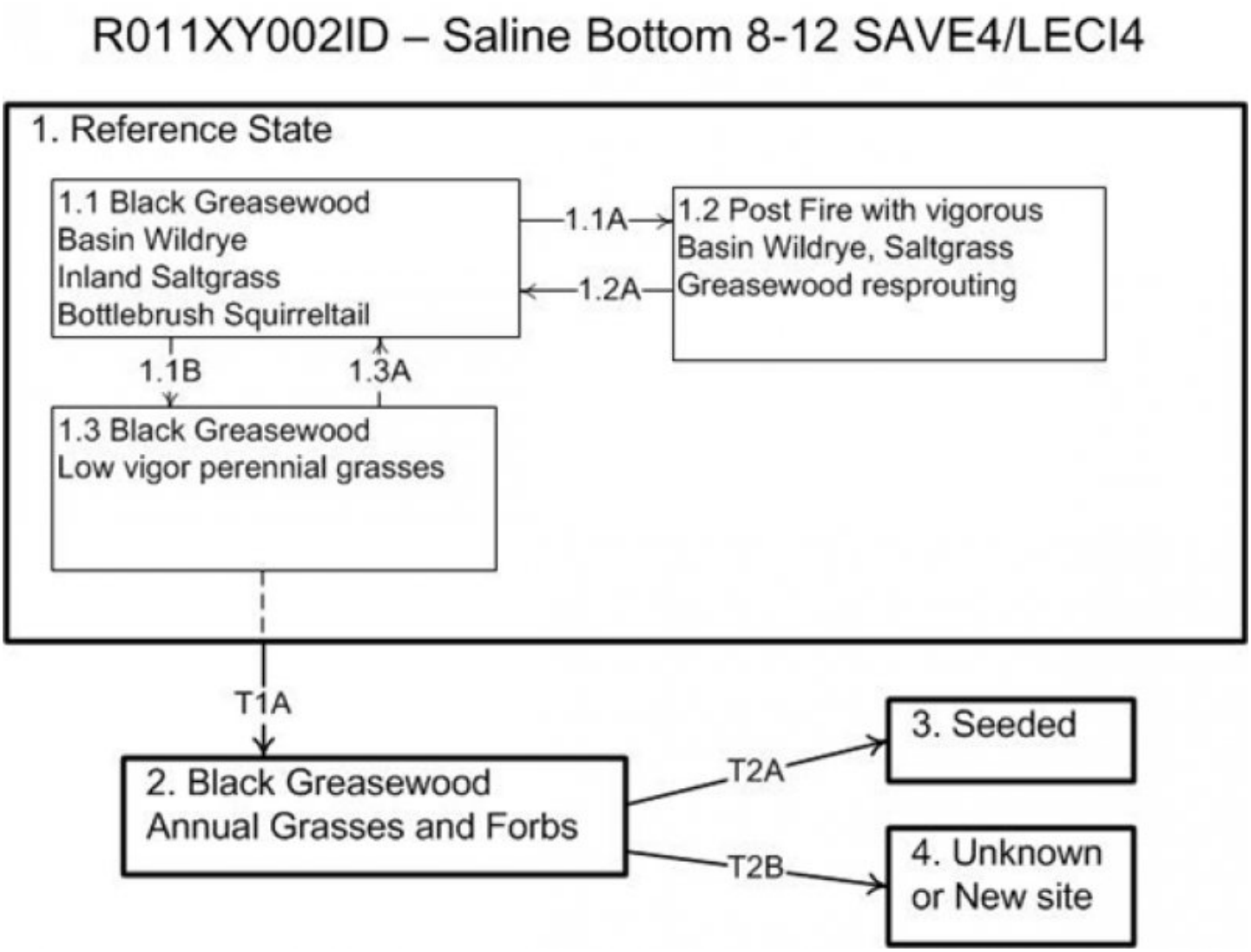

Figure 5. 11x-02

State 1
State 1 Phase A

Community 1.1
State 1 Phase A

This plant community is dominated by black greasewood and basin wildrye. Inland saltgrass and bottlebrush squirreltail are also significant in the plant community. There are a few other grasses, forbs, and shrubs that occur in small amounts. Natural fire frequency is 15 to 25 years.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	353	532	706
Shrub/Vine	286	426	572
Forb	34	50	67
Total	**673**	**1008**	**1345**

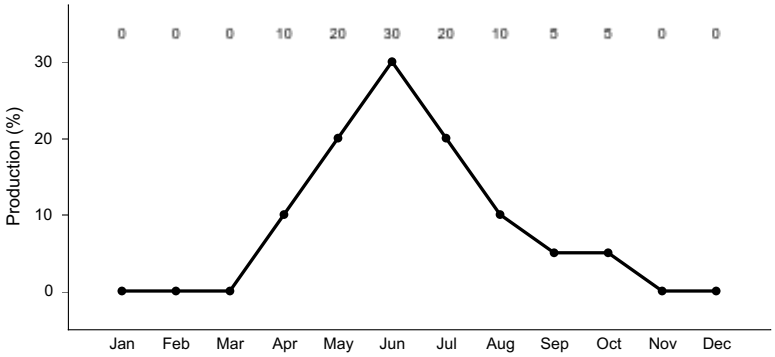

Figure 7. Plant community growth curve (percent production by month). ID0413, ARTRT/LECI4. State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is similar to phase A. The dominant species have not changed, but basin wildrye and inland saltgrass have been stimulated to grow more lush vegetation. The black greasewood has sprouted from root crowns and lateral roots. The appearance is that of a young plant with lush growth. Overall production of the herbaceous layer has increased. Some plants may have been lost to fire such as Wyoming big sagebrush, shadscale, and fourwing saltbrush (some fourwing may also sprout). This state has developed due to fire.

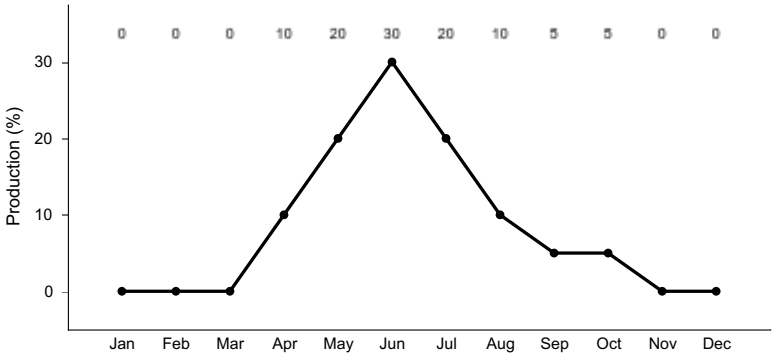

Figure 8. Plant community growth curve (percent production by month). ID0413, ARTRT/LECI4. State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by black greasewood. There are reduced amounts of basin wildrye and inland saltgrass. Grasses are typically in low vigor. The perennial grasses that remain are typically protected in and around the shrubs. Some cheatgrass and un- desirable species have invaded the site. This state has developed due to long period of improper grazing management and lack of fire.

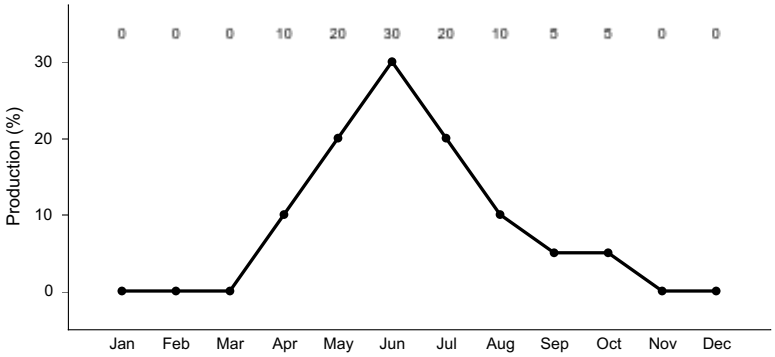

Figure 9. Plant community growth curve (percent production by month). ID0413, ARTRT/LECI4. State 1.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by widely spaced black greasewood. The understory is annual grasses and forbs. Shadscale and fourwing saltbush have been killed out. Bare ground has significantly increased. Some soil loss has occurred. This state has developed due to continued improper grazing management and very frequent fire. The site has crossed the threshold. It is generally not economically feasible to move this state back towards State 1 with accelerated practices.

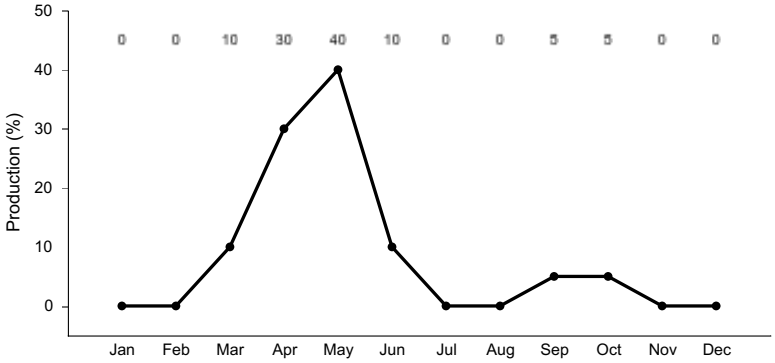

Figure 10. Plant community growth curve (percent production by month). ID0409, ARTRT-ARTRW8POSE-ANNUALS. State 2.

State 5
State 3

Community 5.1
State 3

Rangeland seeding. This plant community is dominated by introduced species or native species planted to mimic the Reference State.

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. Gully development has lowered the watertable so that it is below the rooting depth of the perennial grasses and forbs.

This state has developed due to continued improper grazing management and/or frequent fires. Off-site hydrologic conditions may also contribute to increased run-on to accelerate gully development. It is generally not economically feasible to move this state back towards State 1 with accelerated practices.

Additional community tables

Animal community

Wildlife Interpretations:
Animal Community – Wildlife Interpretations

This ecological site lies adjacent to the Snake River providing habitat for wetland and upland wildlife species. The variety of plant species, structural diversity, and proximity to water provides cover to a variety of wildlife. Area sensitive species that may utilize the site include Woodhouse's toad, Great Basin collared lizard, long-nosed snake, groundsnake, and Great Basin ground squirrel.

State 1 Phase 1.1 – Black Greasewood/ Basin Wildrye/ Inland Saltgrass/ Bottlebrush Squirretail 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. This community provides habitat for a wide array of small mammals such as jackrabbits, cottontail rabbits, mice, and voles. The diverse prey species support a variety of predators including badgers, fox, coyotes, and raptors such as red-tail and Swainson's hawks. Birds such as horned larks and western meadowlarks utilize this community for nesting and foraging. This site is typically adjacent to seasonal and permanent wetlands and streams and can provide important nesting cover for a variety of waterfowl and shorebirds. Greasewood provides suitable thermal, escape, and young of year cover for mule deer and antelope.

State 1 Phase 1.2 – Black Greasewood/ Basin Wildrye/ Inland Saltgrass/ Plant Community: This phase has developed due to fire. Under proper management the plant community can support a similar insect community as represented in Phase 1.1. Birds of prey (northern harrier and Cooper's hawk) may range throughout these areas looking for prey species. Small mammals utilizing this site would be similar to Phase 1.1 mammals listed above. This plant community provides seasonal forage needs for browsers like mule deer and antelope. The site provides thermal cover and young of year cover for mule deer and antelope. Area sensitive species including Woodhouse's toad, Great Basin collared lizard, long-nosed snake, groundsnake, and Great Basin ground squirrel would be supported with this plant community.

State 1 Phase 1.3 –Black Greasewood Plant Community: This plant community is the result of improper grazing and lack of fire. An increase in canopy cover of black greasewood contributes to a sparse herbaceous understory. This plant community provides minimal pollinator habitat. Little or no native perennial forbs exist and pollinators need to rely on annual forbs which are typically invasive or noxious weeds. Thermal, escape, and young of year cover is provided for deer and antelope. Bird diversity and populations would be reduced due to the reduction of herbaceous vegetation. Small mammal diversity would be similar to Phase 1.1 and 1.2 but would be at low population levels due to a poor understory vegetation. Predators would include fox, coyote, badgers, and raptors who may have a higher hunting success rate due to poor understory vegetation.

State 2 – Black Greasewood/ Cheatgrass Plant Community: This state has developed due to frequent fires and improper grazing management. The reduced forb and shrub components in the plant community would support a very limited population of pollinators. Most reptilian species are not supported with food, water, or cover. 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:
This site is suitable for livestock grazing in the late spring and fall. Natural water supplies are usually available only

in the spring.
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 C. They have moderately high runoff potential.

Recreational uses

This site offers minimal value for recreation or aesthetics.

Wood products

None

Other products

None

Other information

Field Offices

Mountain Home, ID
Meridian, ID
Caldwell, ID
Marsing, ID
Weiser, ID
Payette, 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
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Type locality

Location 1: Owyhee County, ID	
Township/Range/Section	T5S R1E S36
Location 2: Owyhee County, ID	
Township/Range/Section	T7S R5E S5

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, 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

Dave Franzen And Jacy Gibbs

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	04/03/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills are not common on this site.

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

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

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data is not available. On sites in mid-seral status bare ground may range from 40-60 percent.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** usually not present. Immediately following wildfire some soil movement may occur on lighter textured soils.

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7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move 6 feet or more following a significant run-off event. Coarse litter generally does not move.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 4 to 6 but needs to be tested.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** depth of the A or A1 horizon is 4 to 7 inches thick. Soil organic matter (SOM) ranges from 0 to 2 percent. Soil structure ranges from single grain to weak very fine subangular blocky.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Tall shrubs accumulate snow in the interspaces.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** not present.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: cool season deep rooted perennial bunchgrasses

    Sub-dominant: tall shrubs

    Other: perennial forbs

    Additional: shallow rooted perennial bunchgrasses

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

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14. **Average percent litter cover (%) and depth (in):** additional litter cover data is needed but is expected to be 20-25 percent to a depth of 0.2 inches. Under mature shrubs and basin wildrye litter is >0.5 inches deep and is 90-100 percent ground cover.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 900 pounds per acre (1008 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 45-60 percent of the total production, forbs 2-5 percent, and shrubs 35-50 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, whitetop, annual kochia, annual mustards, Russian thistle, and Russian knapweed.

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