

Ecological site R012XY009ID

Saline Gravelly

7-9 PZ ATCO/ACHY-HECOC8

Last updated: 9/21/2020

Accessed: 09/01/2026

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): 012X—Lost River Valleys and Mountains

Land Resource Region: B (Northwestern Wheat and Range) MLRA: 12 (Lost River Valleys and Mountains) EPA EcoRegion: Level III (Middle Rockies)

LRU notes

012X—Lost River Valleys and Mountains Precipitation or Climate Zone: 7-9" P.Z. <https://soils.usda.gov/survey/geography/mlra/index.html>

Ecological site concept

Site does not receive additional water. Soils are: Saline or saline-sodic. Deep to very deep. >35% (by volume) coarse fragments, skeletal within 20" of soil surface. Not strongly or violently effervescent in the to 20" of the soil profile. textures usually range from sandy loam to silt loam in 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

R012XY003ID	Saline Flat <8 PZ ATGA/ACHY
R012XY011ID	Alluvial Bottom 8-13 PZ ARTRT/ELLAL-LECI4
R012XY018ID	Saline Loamy 8-11 PZ SAVE4/LECI4
R012XY019ID	Fragile Lands <8 PZ ATCO/LESAS2

Similar sites

R012XY006ID	Windswept 8-16 PZ ARFR4/POSE
-------------	------------------------------

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex confertifolia</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i> (2) <i>Hesperostipa comata</i> ssp. <i>comata</i>

Physiographic features

This site occurs on alluvial fans, mountain footslopes and rolling hills. Elevation ranges from 4800 to 7000 feet (1400 to 2200 meters). It occurs on all aspects, however, it is more common on southwest and southeast facing alluvial fans. Slopes range from 0-30%.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Hill
Elevation	1,460 – 2,130 m
Slope	0 – 30 %

Climatic features

MLRA 12 is dominated by dramatic changes in elevation which, in turn, influence local weather patterns. The intermontane valleys have elevations as low as 3800 feet, while the adjacent mountains may reach more than 12,600 feet. The average annual precipitation for the entire MLRA, based on 10 long term climate stations located throughout the MLRA, is approximately 9.38 inches. However, the dry valleys may have averages as low as 6 inches, while the upper peaks may have averages that exceed 46 inches per year.

Temperatures vary considerably over the year. The average annual temperature is 42.25 degrees F. The average low is 27.4 degrees while the average high temperature is 57 degrees.

In the summer the sun shines 78% of the time, but drops to 40% in the winter. The prevailing wind is location-dependent, and generally flows parallel to the orientation of the dominant valleys. In the summer localized afternoon upslope winds and evening downslope winds are common. The average windspeed is greatest in the spring and early summer.

The frost free period ranges from 102 to 107 days while the freeze free period ranges from 134 to 139 days across the MLRA.

Table 3 Representative climatic features

Frost-free period (average)	110 days
Freeze-free period (average)	140 days
Precipitation total (average)	280 mm

Influencing water features

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

Soil features

The soils of this site are predominately gravelly and very gravelly loams, with some gravelly sandy loams and stony silt loams. Gravel exceeds 30 percent by volume in the B horizon. These soils are very deep with the exception of Sactus and Mitring which are shallower to bedrock. The soils are well to somewhat excessively drained and have a moderately slow to rapid permeability. Available water capacity is very low to low. Water erosion can be high when the plant cover is reduced and slope increases. These soils are characterized by an aridic soil moisture regime or an aridic bordering on xeric. The soil temperature regime is frigid.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly silt loam (3) Stony sandy loam
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to rapid
Soil depth	20 – 150 cm
Surface fragment cover <=3"	0 – 50 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-101.6cm)	1.78 – 11.94 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 40 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 10
Subsurface fragment volume <=3" (Depth not specified)	30 – 70 %

Subsurface fragment volume >3" (Depth not specified)	0 – 20 %
---	----------

Ecological dynamics

The dominant visual aspect of this site is low growing vegetation dominated by shadscale saltbush, needle and thread and Indian ricegrass. Composition by weight is approximately 45-55% grass, 1-5% forbs and 40-50% shrubs.

During the last few thousand years, this site has evolved in an arid climate characterized by dry summers and cold winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include pronghorn antelope, mule deer and lagomorphs. Fire has historically occurred on the site at intervals of 80-100 years. Fire only occurs in favorable 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, needle and thread and shadscale saltbush. Bud sagebrush, winterfat, fringed sagewort and Gardner saltbush are often present in the community in smaller amounts. Other significant species in the plant community are bottlebrush squirreltail, Sandberg bluegrass, buckwheat and Hoods phlox. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 350 pounds per acre (392 Kg/ha) in a normal year. Production in a favorable year is 600 pounds per acre (673 Kg/ha). Production in an unfavorable year is 200 pounds per acre (224 Kg/ha). Structurally, cool season grasses are dominant followed by medium height shrubs being more dominant than perennial forbs while shallow rooted bunchgrasses are subdominant.

FUNCTION

This site is best adapted for livestock grazing in the spring, fall and early winter. Natural water supplies are short or absent and livestock water may have to be piped, hauled or otherwise made available.

This site provides important winter habitat for pronghorn antelope and mule deer. It also occurs along major migration routes and fawning areas. The site is important to small mammals and raptors.

Antelope hunting is the major recreational use of this site with sage grouse hunting and sight-seeing being significant but of lesser importance. The site is mostly open space with smooth terrain, varied slopes and low growing vegetation providing unobstructed views of adjacent mountains.

Impacts on the Plant Community

Influence of fire

This site historically had a very low fire frequency, approximately every 80-100 years. Most of the shrubs, especially shadscale saltbush and bud sagebrush, evolved in the absence of fire; therefore, they can be severely damaged or killed when burned at a high intensity. Winterfat will re-sprout after a low intensity fire. Cheatgrass can be a troublesome invader at lower elevations on this site after fire, preventing perennial grass and shrub re-establishment and increasing the fire frequency.

Influence of improper grazing management

Indian ricegrass, needle and thread, bud sagebrush, shadscale saltbush and winterfat can all be impacted by improper grazing management. Relatively low levels of utilization by cattle and sheep are needed to maintain the shrub component. Proper grazing management is critical on this site to maintain the integrity of the plant community.

Weather influences

Extended periods of drought reduces the vigor of the perennial grasses and palatable shrubs. Extreme drought may cause plant mortality.

Influence of insects and disease

Mormon crickets and grasshopper outbreaks occur occasionally. Since defoliation usually occurs only once during the growing season, little mortality occurs. Shadscale saltbush can be heavily impacted by the scale insect, *Orthezia annae*, 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 invasive on this site especially after fire. Once it becomes established the fire frequency increases. As a result, the shrub component can be lost or severely reduced.

Influence of wildlife

Relatively low numbers of wildlife use this site and impact it little. Pronghorn antelope is the dominant large herbivore using the site. They use the site yearlong but prefer it in the spring, fall and early winter. Winter and spring use by mule deer occasionally occurs.

Watershed

Decreased infiltration and increased runoff occurs when shadscale saltbush, bud sagebrush and winterfat is removed with frequent fires, particularly the year following the fire event. The increased runoff also increases sheet and rill erosion. The long-term effect is a transition to a different state.

Plant Community and Sequence

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with improper grazing management and no fire.

Phase A to C. Develops with fire.

Phase B to A. Develops with prescribed grazing 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 and/or continued improper grazing management. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

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

Practice Limitations

This site is not well suited to seeding due to the low precipitation and salts in the soil profile. Brush management is normally not needed or appropriate on this site due to the high forage value and diversity they provide for wildlife and domestic livestock.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 9. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Animal community

Wildlife Interpretations Animal Community – Wildlife Interpretations This rangeland ecological site provides a diverse plant community for select native wildlife species. Mule deer and pronghorn antelope are the large herbivores using the site. The site provides seasonal habitat for resident and migratory animals including sagebrush lizard, shrews, ground squirrels, mice, coyote, red fox, badger, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Encroachment of noxious and invasive plant species (cheatgrass, kochia and Russian thistle) in isolated areas can replace native plant species which provide feed, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by seasonal runoff, artificial water catchments, and springs. State 1 Phase 1.1 – Shadscale Saltbush/ Indian Ricegrass/ Needle and Thread/ Bottlebrush Squirreltail Reference Plant Community (RPC) This plant community provides a diversity of grasses and forbs used throughout the growing season by native insect communities that

assist in pollination. The reptile community is represented by sagebrush lizard, leopard lizard, and short horned lizard. The plant community provides forage throughout the year for mule deer and pronghorn. Bud sagebrush provides good spring forage, and shadscale saltbush provides good spring and winter forage for deer and pronghorn. Bud sagebrush and shadscale are utilized extensively by rodents, rabbits, birds, and pronghorn. Small mammal populations including deer mice, jackrabbits, and Great Basin kangaroo rats can be high and provide an excellent prey base for raptors. State 1 Phase 1.2 – Bottlebrush Squirreltail/ Shadscale Saltbush Plant Community: This state has developed due to improper grazing management and lack of fire. The plant community, dominated by herbaceous vegetation would provide less vertical structure for animals. Patches of shadscale and root sprouting shrubs (Gardner saltbush) may provide limited vertical structure for wildlife over time. Insect diversity would be reduced with the reduction of shadscale, winterfat, and bud sagebrush. Native forbs are still present and support select pollinators. Reptiles including short horned lizard and sagebrush lizard would be limited or excluded on sites with low brush cover. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). The reduced amounts of shadscale, winterfat, and bud sagebrush would reduce the quality of spring and winter forage for mule deer and pronghorn. The populations of small mammals would be dominated by open grassland species. Predator (coyote, fox, and raptors) hunting success may increase due to the reduction of cover for small mammals. State 1 Phase 1.3- Indian Ricegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation would provide little vertical structure for animals. Patches of root sprouting shrubs (Gardner saltbush) may begin to provide limited vertical structure for wildlife over time. Insect diversity would be reduced with the reduction of shadscale, winterfat, and bud sagebrush. Native forbs are still present and would support select pollinators. Reptiles including short horned lizard and sagebrush lizard would be limited or excluded on sites with low brush cover. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). The loss of shadscale, bud sagebrush, and winterfat would prevent the use of the site for winter habitat for mule deer and pronghorn. The populations of small mammals would be dominated by open grassland species. Hunting success by predators may increase due to the reduction of cover for small mammals. State 2 - Cheatgrass / Annual Plant Community: This state has developed due to frequent fires and/or continued 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. Predator hunting success may increase due to poor cover for small mammals and grassland bird 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. Grazing Interpretations This site is best adapted for livestock grazing in the spring, fall and early winter. Natural water supplies are 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.

Recreational uses

Antelope hunting is the major recreational use of this site with sage grouse hunting and sight-seeing being significant but of lesser importance. The site is mostly open space with smooth terrain, varied slopes and low growing vegetation providing unobstructed views of adjacent mountains.

Wood products

None.

Other products

None.

Inventory data references

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

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.

USDI Bureau of Land Management, U.S. Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Approval

Kendra Moseley, 9/21/2020

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)	
Contact for lead author	USDA/Natural Resources Conservation Service Brendan Brazee, State Range Conservationist 9173 W. Barnes Drive, Suite C Boise, ID 83709 (208) 378-5722
Date	02/04/2008
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills rarely occur on this site. They are most likely to occur immediately following a wildfire. Gravels on the surface reduce erosion.

2. **Presence of water flow patterns:** Water-flow patterns are rare on this site. When they do occur, they are short, disrupted by cool season perennial grasses, tall shrubs and gravels and are not extensive.

3. Number and height of erosional pedestals or terracettes: Pedestals and terracettes 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): Bare ground ranges from 40-50 percent.

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: Blowouts and depositional areas are not present.

7. Amount of litter movement (describe size and distance expected to travel): Fine litter in the interspaces may move up to 3-5 feet or further following a significant run-off event. Coarse litter generally does not move.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Values should range from 3 to 5 but need to be tested.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Structure ranges from weak or moderate fine granular to weak or moderate very thin, thin, medium, thick platy to weak fine subangular blocky. The A or A1 horizon is typically 2 to 9 inches thick. Soil organic matter (SOM) ranges from 0 to 3 percent.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Bunchgrasses, especially deep-rooted, slow run-off 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): Compaction layer 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> perennial forbs> shallow rooted grasses

Other:

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
Very little decadence is expected to occur on this site. Mortality can occur following a mealy bug infestation and/or extended drought.
-
14. Average percent litter cover (%) and depth (in): Annual litter cover in the interspaces will be 5-10 percent to a depth of <0.1 Under the mature shrubs, litter is greater than 0.5 inches. Fine litter can accumulate on the terracettes.
-
15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
Annual production is 350 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 45-55 percent of the total, forbs 1-5 percent and shrubs 40-50 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: Invasive species include cheatgrass, annual kochia, annual mustards, Russian thistle and halogeton.
-
17. Perennial plant reproductive capability: All functional groups have the potential to reproduce in favorable years.
-