

Ecological site R012XY019ID

Fragile Lands

<8 PZ ATCO/LESAS2

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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: 8" P.Z. <https://soils.usda.gov/survey/geography/mlra/index.html>

Ecological site concept

Site does not receive additional water. Soils are: Slightly saline or saline-sodic. Shallow to paralithic bedrock, with >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 clay 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

R012XY004ID	Gravelly Loam 8-12 PZ ARTRW8/PSSPS
R012XY009ID	Saline Gravelly 7-9 PZ ATCO/ACHY-HECOC8
R012XY017ID	Shallow Fractured South 8-12 PZ ARTRW8/PSSPS-LESAS2
R012XY026ID	Dry Loamy 7-10 PZ ATCO-ARFR4/PSSPS
R012XY030ID	Loamy 7-10 PZ ARTRW8/POSE

Table 1. Dominant plant species

Tree	Not specified
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Shrub	(1) <i>Atriplex confertifolia</i>
Herbaceous	(1) <i>Leymus salinus</i> ssp. <i>salmonis</i>

Physiographic features

This site occurs on gently sloping rolling hills to 30 percent slopes and south slopes to 70 percent. Slopes range from 10-75 percent. Elevation ranges from 5000 to 7000 feet (1500-2200 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	1,520 – 2,130 m
Slope	10 – 80 %

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 on this site have gravelly sandy loam and clay, very gravelly loam and clay loam and channery fine sandy loam. The site is old exposed deposits of volcanic tuff that have been covered by sedimentary material. Geologic uplift exposed these deposits as they are now. The soils are shallow to a paralithic bedrock. The exception is Millhi which is very deep, but has a natric horizon, high in salts, starting within 6 inches of the surface. The soils are well to moderately well drain with no to moderately rapid permeability. Organic matter content is low. The available water-holding capacity is very low to moderate. The natural productivity potential of these soils is very low. The soils have an aridic soil moisture regime. The soil temperature regime is frigid.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly loam (3) Channery clay loam
Drainage class	Well drained to moderately well drained
Permeability class	Moderately rapid
Soil depth	30 – 150 cm
Surface fragment cover $\leq 3"$	20 – 50 %
Surface fragment cover $> 3"$	0 – 20 %
Available water capacity (0-101.6cm)	1.52 – 19.81 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 10
Subsurface fragment volume $\leq 3"$ (Depth not specified)	10 – 60 %
Subsurface fragment volume $> 3"$ (Depth not specified)	0 – 10 %

Ecological dynamics

The dominant visual aspect of the site is barren ground with very sparse vegetative cover. The site has shadscale saltbush in the overstory with Salmon wildrye and Indian ricegrass in the understory. The composition by weight is 40-60 percent grasses, 10-20 percent forbs and 30-40 percent 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 mule deer, bighorn sheep, lagomorphs and small rodents. Fire has historically occurred on the site at intervals of 80-100 or more 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 Salmon wildrye and Indian ricegrass in the understory and shadscale saltbush in the overstory. Subdominant species include bottlebrush squirreltail, Sandberg bluegrass, Indian ricegrass, bluebunch wheatgrass, Hoods phlox, bud sagebrush and Wyoming big sagebrush. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 200 pounds per acre (222 kilograms per hectare) in a normal year. Production in a favorable year is 350 pounds per acre (388 kilograms per hectare). Production in an unfavorable year is 75 pounds per acre (83 kilograms per hectare). Structurally, cool season perennial bunchgrasses are dominant, followed by medium shrubs being more dominant than perennial forbs.

FUNCTION:

This site is not well suited for livestock grazing due to the low productivity and fragile soils. This is a very dry site and supports a very small compliment of wildlife. Mule deer spend considerable time on this site on sunny winter days as the slopes are usually free of snow.

This site has a very high natural erosion rate. Due to the steep slopes and fragile soils it can be easily degraded by improper grazing management. This site is naturally relatively barren and arid looking. It is unappealing aesthetically to most viewers and gives one an impression of "badlands".

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, shadscale saltbush can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, these shrubs can displace many of the primary understory species.

When fires become more frequent than historic levels (80-100 years), shadscale saltbush, bud sagebrush and Wyoming big sagebrush are reduced significantly. Green rabbitbrush will generally re-sprout after fire. With continued short fire frequency, these shrubs can be completely eliminated along with many of the desirable understory species such as Salmon wildrye, bluebunch wheatgrass and Indian ricegrass. Sandberg bluegrass will increase 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.

Influence of improper grazing management:

Season-long grazing and/or excessive grazing can be very detrimental to this site. This type of management leads to reduced vigor of the bunchgrasses and palatable shrubs. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in prickly pear, Wyoming big sagebrush, green rabbitbrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels. As cheatgrass increases and becomes co-dominant with Sandberg bluegrass and 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 prickly pear, Wyoming big sagebrush and green rabbitbrush. A planned grazing system can be developed to maintain the integrity of the plant community on this site.

Weather influences:

Above normal precipitation in April, May and June 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:

Mormon crickets 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:
Many of these species add to the fine-fuel component and lead to increased fire frequency. Perennial and annual 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 all seasons. Their numbers are seldom high enough to adversely affect the plant community.

Watershed:
Decreased infiltration and increased runoff occur with an increase in prickly pear, Wyoming big sagebrush and green rabbitbrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. 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 or improper grazing management. This site has crossed the threshold. It is not economically practical 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 not economically practical to return this plant community to State 1 with accelerating practices.

Practice Limitations.
Slight to moderate limitations exist on this site for implementing vegetative management and facilitating practices. Severe limitations exist for implementing accelerating practices due to low annual precipitation and low site potential due to soils.

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 (%)
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Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 5.1 plant community composition

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

Wildlife Interpretations Animal Community – Wildlife Interpretations This rangeland ecological site provides limited wildlife habitat 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 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 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 artificial water catchments and springs. State 1 Phase 1.1 – Shadscale Saltbush/ Salmon Wildrye/ Indian Ricegrass 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 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 antelope. Bud sagebrush provides good spring forage and shadscale saltbush provides good spring and winter forage. Bud sagebrush and shadscale are utilized extensively by rodents, rabbits, birds, and pronghorn. Small mammal populations include deer mice, jackrabbits, and Great Basin kangaroo rats and provide an excellent prey base for raptors. State 1 Phase 1.2 – Shadscale Saltbush/ Sandberg Bluegrass Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy cover of brush contributes to a sparse herbaceous understory. A reduced herbaceous understory results in lower diversity and numbers of insects. The reptile community will be similar to the State 1 Phase 1.1 community represented by leopard lizard, short horned lizard, and sagebrush lizard. The reduced diversity of insects and understory cover may reduce the quality of food and cover for reptile populations. The site may provide sage-grouse brood-rearing habitat when adjacent to sagebrush cover. The plant community supports limited seasonal habitat for mule deer and pronghorn. A small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots may utilize this site. State 1 Phase 1.3- Sandberg Bluegrass/ Bottlebrush Squirreltail 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 (green rabbitbrush) may begin to provide limited vertical structure for wildlife over time. Insect diversity would be reduced with the reduction of shadscale 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 due to the loss of cover. The herbaceous vegetation improves habitat for grassland bird species (horned lark and western meadowlark). The loss of shadscale and bud sagebrush would prevent use of the site for winter feed by 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 - Sandberg Bluegrass/ Cheatgrass / Annual Plant Community: This state has developed due to frequent fires 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 provided 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 not well suited for livestock grazing due to the low productivity and fragile soils. 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

Soils on this site are in hydrologic group (NO DATA). This site has a very high natural erosion rate.

Recreational uses

This site is naturally relatively barren and arid looking. It is unappealing aesthetically to most viewers and gives one an impression of "badlands". There are limited opportunities for recreation on this site.

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 Kirsten May, Resource Soil Scientist, NRCS, Idaho

Other references

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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, 9/22/2020

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)	
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Date	01/18/2008
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills can occur on this site. They are most likely to occur after a hard rain for several continuous days, rain on frozen ground and immediately following wildfire.

2. **Presence of water flow patterns:** Water flow patterns can occur on this site except following a hard rain over several continuous days or after a rain on frozen ground event. When they occur, they are short, disrupted by cool season perennial grasses, medium shrubs, surface gravel and are not extensive.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare on this site. Do not misinterpret frost heaving for pedestals. Terracettes are rare.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground data not available. On sites in mid-seral status, bare ground may range from 70-80 percent. ****ADDITIONAL DATA IS NEEDED.****

5. **Number of gullies and erosion associated with gullies:** Data not available. On sites in mid-seral status, bare ground may range from 70-80 percent. ****ADDITIONAL DATA IS NEEDED.****

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind scoured, blowouts and/or depositional areas usually do not occur. Some wind erosion may occur immediately following a wildfire on soils that have fine textured surface soils.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move less than 2 feet following a significant run-off event. Coarse litter generally does not move.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values should range from 4 to 6 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 very fine and fine granular to weak very fine and fine subangular blocky. The A or A1 horizon is typically 1 to 5 inches thick. Soil organic matter (SOM) ranges from 0 to 2 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. Shrubs accumulate snow in the interspaces. Terracettes, when present, provide a favorable micro-site for vegetation establishment which further increases 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 perennial bunchgrasses >>

Sub-dominant: medium shrubs> perennial forbs

Other:

Additional:

13. **Amount of plant mortality and decadence** (include which functional groups are expected to show mortality or decadence):
Very little plant decadence is expected on this site. Some mortality will occur after extended periods of drought.
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14. **Average percent litter cover (%) and depth (in):** Annual litter cover in the interspaces will be 3-10 percent to a depth of <0.1 inches. Under the mature shrubs, litter is greater than 0.5 inches.
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15. **Expected annual annual-production** (this is TOTAL above-ground annual-production, not just forage annual-production):
Annual production is 200 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 40-60 percent of the total, forbs 10-20 percent and shrubs 30-40 percent.
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16. **Potential invasive (including noxious) species (native and non-native).** List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: Invasive species include cheatgrass, halogeton, tansy mustard, rush skeletonweed, scotch thistle, spotted and diffuse knapweed.
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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in normal and favorable years.
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