

Ecological site R010XA045ID Cinder South 12-16 PZ PUTR2/HECO26

Last updated: 5/14/2024
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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): 010X–Central Rocky and Blue Mountain Foothills

This MLRA is characterized by gently rolling to steep hills, plateaus, and low mountains at the foothills of the Blue Mountains in Oregon and the Central Rocky Mountains in Idaho. The geology of this area is highly varied and ranges from Holocene volcanics to Cretaceous sedimentary rocks. Mollisols are the dominant soil order and the soil climate is typified by mesic or frigid soil temperature regimes, and xeric or aridic soil moisture regimes. Elevation ranges from 1,300 to 6,600 feet (395 to 2,010 meters), increasing from west to east. The climate is characterized by dry summers and snow dominated winters with precipitation averaging 8 to 16 inches (205 to 405 millimeters) and increasing from west to east. These factors support plant communities with shrub-grass associations with considerable acreage of sagebrush grassland. Big sagebrush, bluebunch wheatgrass, and Idaho fescue are the dominant species. Stiff sagebrush, low sagebrush, and Sandberg bluegrass are often dominant on sites with shallow restrictive layers. Western juniper is one of the few common tree species and since European settlement has greatly expanded its extent in Oregon. Nearly half of the MLRA is federally owned and managed by the Bureau of Land Management. Most of the area is used for livestock grazing with areas accessible by irrigation often used for irrigated agriculture.

For further information, see "Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (U.S. Department of Agriculture Handbook 296, 2006)" available online at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053624

Classification relationships

No data.

Ecological site concept

- Site occurs on uplands
- Slopes greater than 30% on southerly aspects
- Occurs in 12-16 inch PZ
- Soils are volcanic cinders

Associated sites

R010XA044ID	Cinder 12-16 PZ PIFL2/ARTRV Adjacent low slope areas
R010XA046ID	Cinder Garden 12-16 PZ EROVD-LERE7 Adjacent low slope cinder gardens
R010XA020ID	Mixed Shrub 12-16 PZ Adjacent low slope areas with shallow soils

R010XA043ID	Cinder North 12-16 PZ PIFL2/PUTR2 Adjacent north aspects
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Similar sites

R010XA049ID	Gravelly Loam 12-16 PZ ARTRV-PUTR2/PSSPS Slopes generally less than 30%, occurring on all aspects
R010XA046ID	Cinder Garden 12-16 PZ EROVD-LERE7 Slopes generally less than 30%, occurring on all aspects
R010XA048ID	Cindery South 12-16 PZ PUTR2-ARTRV/PSSPS Site supports PUTR2-ARTRV/PSSPS rather than PUTR2/HECO26, no abiotic criteria identified
R010XA044ID	Cinder 12-16 PZ PIFL2/ARTRV All aspects, less than 30% slope

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Purshia tridentata</i>
Herbaceous	(1) <i>Hesperostipa comata</i>

Physiographic features

This site occurs on moderate mountain side slopes on south, southwest, or west aspects. Slopes range from 30 to 60 percent. The elevation ranges from about 5000 to 7000 feet (1500 to 2150 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–7,000 ft
Slope	30–60%
Aspect	W, S, SW

Climatic features

The Big and Little Wood River Foot slopes and Plains, proposed as MLRA 10X, has a mean elevation of 5310 feet above sea level, and varies from 3600 to 9235 feet. In general, average annual precipitation is greatest on the western side, with the southeast area being the driest. The average annual precipitation, based on 7 long term climate stations located throughout the MLRA, is 15.39 inches, with a range of 12.5 to 18 inches. Monthly precipitation is generally greatest at the end of the year, diminishes steadily until a low in July and August, then increases rapidly in the autumn.

Monthly temperatures can vary considerably. Highs of up to 102° and lows down to -52° Fahrenheit have been recorded. The average annual temperature is 42.9°. The frost-free period ranges from 75 to 98 days. The freeze-free period is a bit longer: 106 to 133 days.

Both morning and afternoon average relative humidity values peak in the winter, and reach their low in July and August. The average number of sunny, cloud-free days is above average for the summer months, but below average for the period from November through February.

Table 3. Representative climatic features

Frost-free period (characteristic range)	75-98 days
Freeze-free period (characteristic range)	106-133 days

Precipitation total (characteristic range)	12-16 in
Frost-free period (actual range)	
Freeze-free period (actual range)	
Precipitation total (actual range)	12-18 in
Frost-free period (average)	98 days
Freeze-free period (average)	133 days
Precipitation total (average)	15 in

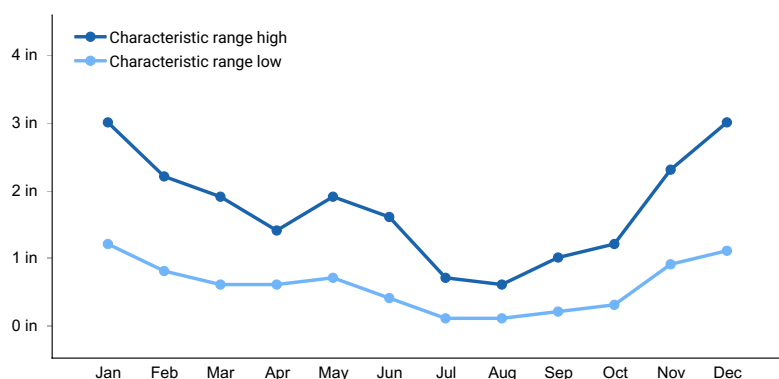


Figure 1. Monthly precipitation range

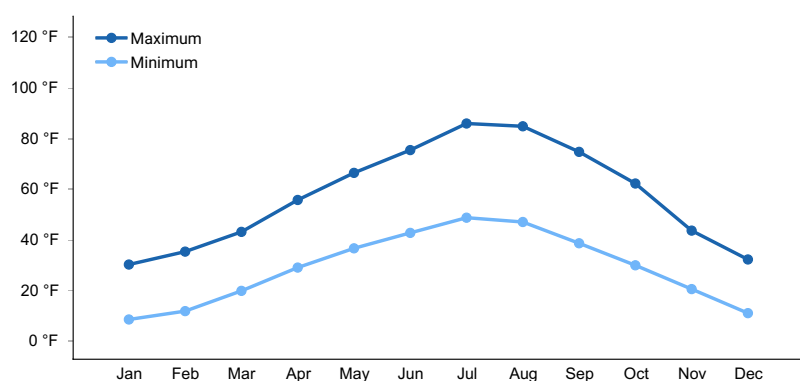


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Wetland description

This site is not influenced by adjacent wetlands.

Soil features

The soils are formed in volcanic cinders. They are gravelly or very gravelly loams and gravelly coarse sandy loams. The soils have over 35 percent coarse fragments throughout the profile. The subsoils are generally very gravelly sandy loams. The gravels throughout the profile are cinders. The water intake is rapid with well to excessive drainage. Available water capacity is low to medium. Erosion hazard is low.

Soil Series Correlated to this Ecological Site.

No data

Table 4. Representative soil features

Parent material	(1) Cinders--volcanic rock
Surface texture	(1) Gravelly loam (2) Very gravelly sandy loam
Drainage class	Well drained to excessively drained
Permeability class	Rapid
Surface fragment cover <=3"	10–35%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	0–4 in
Subsurface fragment volume <=3" (Depth not specified)	35–60%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The dominant visual aspect of this site is an overstory of limber pine and mountain big sagebrush with needle and thread in the understory. Composition by weight is 35 to 45 percent grasses, 20 to 30 percent forbs, 25 to 35 percent shrubs and 5 percent trees.

This site is evolving 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 and lagomorphs.

Ecological sites in this portion of the MLRA occur on geologically very young soils with poorly developed profiles. The plant communities reflect this lack of soil development. Six ecological sites have been identified based on relative soil development and are found in association on the landscape. Age of the soils and the associated sites can be shown in the following diagram:

Non-aspect sites

Volcanic ? Cinder ? Cinder? Cindery
Activity Garden (not described)

Aspect sites

Volcanic ? Cinder ? Cinder? Cindery
Activity Garden North or North or
South South

-----Soil development -----?

Fire has historically occurred on the site at intervals of 50-100 years.

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.

FUNCTION:

This site is suited for big game as late spring, summer and fall range. The site can be winter range for big game in moderate winters. It is not well suited to livestock grazing due to unstable soils that can be severely disturbed and moved down slope from hoof action. It is also suited for wildflower observation in the spring and early summer.

Infiltration is good where the community is in mid to late seral status. Snow accumulates on the site due to high elevation and presence of tall shrubs.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, mountain big sagebrush and antelope bitterbrush can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, mountain big sagebrush and bitterbrush can displace most of the primary understory species. Limber pine also increases slightly.

When fires become more frequent than historic levels (50 to 100 years), mountain big sagebrush and antelope bitterbrush are reduced significantly. Limber pine can survive if the fire intensity is low to moderate but will be killed with intense or crown fires. Rabbitbrushes can increase slightly. With continued short fire frequency, mountain big sagebrush and antelope bitterbrush can be completely eliminated along with many of the desirable understory species such as needle and thread. These species may be replaced by Canby bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site at lower elevations. These fine fuels will increase the fire frequency.

Influence of improper grazing management:

This site is not well suited to livestock grazing due to unstable soils that can be severely disturbed and moved down slope from hoof action. 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, an increase in mountain big sagebrush and noxious and invasive plants will occur.

Continued improper grazing management influences fire frequency by increasing fine fuels. As cheatgrass increases and becomes co-dominant with Canby bluegrass and other annuals, fires become more frequent, particularly at lower elevations.

Proper grazing management that addresses frequency, duration, and intensity of grazing can also keep fine fuels from developing, thereby reducing fire frequency. Grazing can lead to down slope movement of soil. This soil movement can kill some plants through dislodgement or burying.

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:

Outbreaks can affect vegetation health. Bitterbrush can be severely affected by the western tent caterpillar (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. 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. Snow mold can adversely affect the health of mountain big sagebrush. Limber pine can be infected with white pine blister rust (*Cronartium ribicola*). *Ribes* species are obligate alternate hosts. Limber pine is susceptible to numerous other fungal diseases. It can be killed by limber pine dwarf-mistletoe (*Arceuthobium cyunocarpum*) and is susceptible to infestation by mountain pine beetle, cone beetles, coneworms, and budworms.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency. 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, summer, and fall and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community. Herbivory can be detrimental to bitterbrush when livestock grazing and browsing by big game occurs at the same time and season. This will occur when both kinds of animal are using the plant in the late summer or fall. The adverse impact is excessive use of the current year's leader growth. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed. Clark's nutcrackers have co-adapted an important mutualism with limber pine and are the primary harvester and disperser of its seeds.

Watershed:

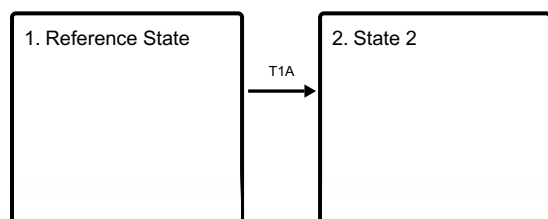
Decreased infiltration and increased runoff occur with an increase in mountain big sagebrush. Desired understory species can be reduced. This affect is reduced with gravelly surface. This composition change can affect nutrient and water cycles. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long-term effect is a transition to a different state.

Practice Limitations:

Mechanical seeding is generally not feasible on this site due to steep slopes and gravelly surface. Mechanical brush control is not feasible on steep slopes. Brush management can occur with aerial chemical application or prescribed burning, but needs to be carefully planned and applied to insure that cheatgrass does not increase.

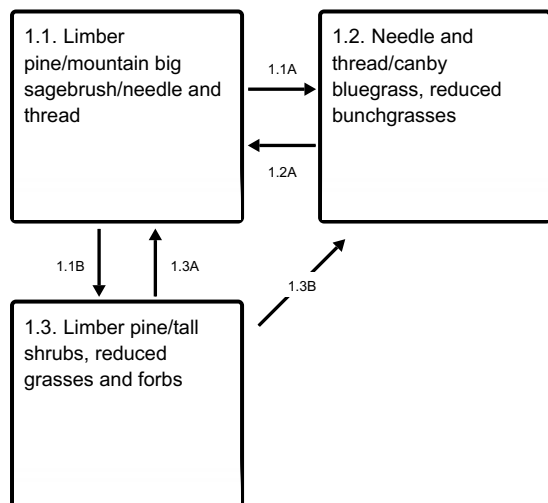
State and transition model

Ecosystem states



T1A - frequent fire, uncontrolled surface-disturbance

State 1 submodel, plant communities



- 1.1A - Fire
- 1.1B - improper grazing management, hoof/foot traffic, surface-disturbance, no fire
- 1.2A - no fire, controlled surface-disturbance
- 1.3A - Controlled surface-disturbance
- 1.3B - Fire

State 2 submodel, plant communities

2.1. Canby bluegrass -
cheatgrass - annuals

State 1
Reference State

Community 1.1
Limber pine/mountain big sagebrush/needle and thread

The Reference Plant Community Phase is Phase 1.1. This plant community is dominated by mountain big sagebrush and needle and thread. Scattered limber pine does occur on the site. Other understory plants include basin wildrye, Canby bluegrass, fineleafed lomatium, tapertip hawksbeard, sulfur buckwheat, rubber rabbitbrush, and antelope bitterbrush. Natural fire frequency is 50 to 100 years.

Resilience management. The plant species composition of Phase 1.1 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 1100 pounds per acre (1232 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 dominant, followed by tall shrubs being about equal to perennial forbs while shallow rooted bunchgrasses and trees are subdominant.

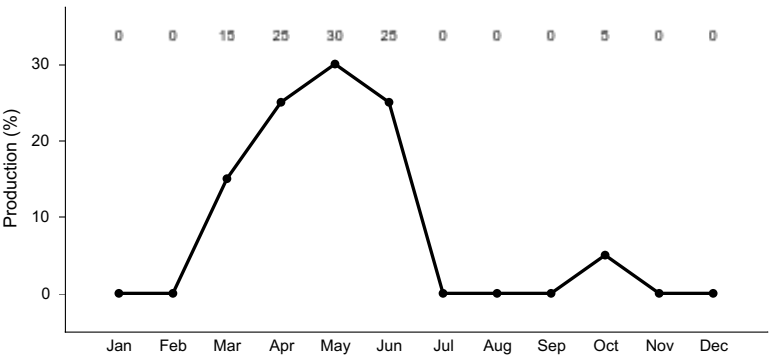


Figure 3. Plant community growth curve (percent production by month). ID0305, ARTRV SOUTH .

Community 1.2
Needle and thread/canby bluegrass, reduced bunchgrasses

This plant community is dominated by needle and thread. Indian ricegrass is about the same as plant community 1.1. Canby bluegrass and bottlebrush squirreltail have increased. Forbs remain about in the same proportion as plant community 1.1. Only small amounts mountain big sagebrush and antelope bitterbrush occur in the plant community due to fire, but some root-sprouting rabbitbrush are present. Limber pine may have survived the fire if the intensity was low or may have died in severe or intense fire. Some cheatgrass may have invaded the site at lower elevations. This plant community is the result of fire (1.1A).

Community 1.3

Limber pine/tall shrubs, reduced grasses and forbs

This plant community is dominated by mountain big sagebrush and scattered limber pine. Grasses and forbs are reduced in the community. All deep-rooted bunchgrasses are typically in low vigor. Tall shrubs have increased. This phase has developed due to improper grazing management, uncontrolled hoof/foot traffic or other soil disturbing activities and no fire (1.1B). If improper grazing management is occurring, most grasses will be in low vigor and bitterbrush will be hedged. If the fire cycle is longer than normal, tall shrubs become decadent. Some cheatgrass may have invaded the site at lower elevations.

Pathway 1.1A

Community 1.1 to 1.2

Plant Community Phase 1.1 to 1.2. Develops with fire.

Pathway 1.1B

Community 1.1 to 1.3

Plant Community Phase 1.1 to 1.3. Develops with improper grazing management, hoof/foot traffic or other surface-disturbing activities and no fire longer than normal fire cycle.

Pathway 1.2A

Community 1.2 to 1.1

Plant Community Phase 1.2 to 1.1. Develops with no fire and control of surface-disturbing activities.

Pathway 1.3A

Community 1.3 to 1.1

Plant Community Phase 1.3 to 1.1. Develops with control of all surface-disturbing activities.

Pathway 1.3B

Community 1.3 to 1.2

Plant Community Phase 1.3 to 1.2. Develops with fire

State 2

State 2

Community 2.1

Canby bluegrass - cheatgrass - annuals

This plant community is dominated by Canby bluegrass, cheatgrass and other annuals. Root sprouting shrubs such as rabbitbrush can be present. Some soil loss or severe movement from hoof/foot traffic has occurred. This state has developed due to frequent fires, improper grazing management, severe hoof/foot traffic or uncontrolled soil surface disturbing activities. It is economically impractical to return this plant community to State 1 with accelerating practices.

Resilience management. State 2 to an unknown new site. Excessive soil loss and changes in the hydrologic cycle caused by frequent fire or continued uncontrolled surface-disturbing activities 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.

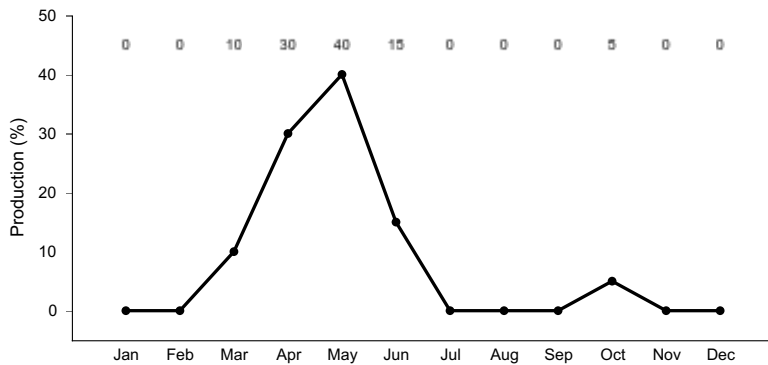


Figure 4. Plant community growth curve (percent production by month).
ID0302, ARTRV Early Serai.

Transition T1A State 1 to 2

State 1, Phase 1.2 and 1.3 to State 2. Develops through frequent fire or continued uncontrolled surface-disturbing activities. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

Compared to other ecological sites within this MLRA, the low level of soil development limits plant diversity and available food and cover for wildlife. The plant community provides a mixture of forbs and shrubs throughout the growing season, offering suitable habitat for native invertebrates. Mule deer and elk are the large herbivores using the site. The site provides seasonal habitat for resident and migratory animals including Clark's nutcracker, chipping sparrow, red squirrel, sagebrush lizard, shrews, bats, 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 medusahead) in isolated areas can replace native plant species which provide feed, brood-rearing and nesting cover for a variety of native wildlife. The loss of herbaceous understory vegetation can have a negative impact on ground nesting birds, while the loss of shrub and tree cover negatively affects both ground and shrub nesting avians. Water features are sparse provided by seasonal streams, artificial water catchments and springs.

State 1 Phase 1.1 – Limber Pine/ Mountain Big Sagebrush/ Needle and Thread Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs and shrubs, used by native insect communities that assist in pollination. An extensive array of forbs and shrubs are in bloom throughout the growing season leading to a diverse native insect community. Many avian and mammal species utilize this habitat based on the availability of invertebrate prey species. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink and western rattlesnake. Clark's nutcracker is beneficial to the site as it is the principal vector for planting limber pine. Native shrub-steppe obligate avian species (Brewer's sparrow, sage sparrow, sage-grouse and sage thrasher) may use the site if limber pine is sparse. As the canopy cover of limber pine increases the use of this phase by shrub-steppe obligate species declines. The plant community provides year round forage and thermal cover for mule deer and elk. Antelope bitterbrush provides preferred winter forage for mule deer and fair forage for elk. The coarse subsoil material would limit burrowing mammals but a small population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots could be expected on the site. Pikas may utilize the site if adjacent to rocky open areas. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.2 – Needle and Thread/ Canby Bluegrass Plant Community Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush or antelope bitterbrush would provide less vertical structure for animals. Insect diversity would be reduced but a diverse native forb plant community would still support select pollinators. An increase in rabbitbrush

would provide late season pollinator habitat. The reptiles, including short horned lizard and sagebrush lizard would be limited or excluded due to the loss of sagebrush. The dominance of herbaceous vegetation with little sagebrush canopy cover would prevent use of these areas as nesting habitat by Brewer's sparrow, sage sparrow and sage thrasher. This plant community provides limited brood-rearing habitat for sage- grouse if adjacent sagebrush cover is provided. The loss of limber pine in this phase eliminates habitat for the Clark's nutcracker. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Mule deer and elk would use site for seasonal (spring and early summer) forage needs but the site would offer little thermal cover and young of year cover. The loss of shrub cover would allow higher predation of small mammals and would favor grass seed eating species.

State 1 Phase 1.3- Limber Pine/ Mountain Big Sagebrush/ Plant Community: This phase has developed due to improper grazing management, uncontrolled hoof/foot traffic or other soil disturbing activities and no fire. An increase in canopy of sagebrush results in a sparse herbaceous understory. Available pollinator habitat is reduced as is the diversity and numbers of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western rattlesnake and western skink. The reduction of grasses and forbs in the plant community would reduce the available prey species and cover for these resident reptile species. Fewer prey species and less understory cover results in limited food, brood-rearing and nesting habitat for bird species. Clark's nutcracker and chipping sparrow would still utilize the site if limber pine is still part of the plant community. Key shrub-steppe obligate bird species include Brewer's sparrow, sage sparrow and sage thrasher that may benefit from the increase in sagebrush. As the canopy cover of limber pine increases the use of this phase by shrub-steppe obligate species declines. Seasonal (spring, summer and fall) forage habitat for mule deer and elk would be reduced due to reduced vigor and amounts of grasses and antelope bitterbrush. Quality of winter habitat for mule deer and elk would be reduced due to poor vigor and amounts of antelope bitterbrush. Small mammal population would be similar to Phase 1.1. Pikas may be present in areas with adjacent open rocky habitat. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 2 –Canby Bluegrass/ Cheatgrass Plant Community:

This state has developed due to frequent fires, improper grazing management, severe hoof/foot traffic or uncontrolled soil surface disturbing activities. Invasive herbaceous plants and patches of root sprouting shrubs like rabbitbrush can be present. With the loss of forbs the plant community does not support a diverse insect community. An increase in rabbitbrush would enhance fall pollinator habitat. Native reptile species identified in Phase 1 are not supported with food, water or cover. This plant community does not support the habitat requirements for sage thrasher, Brewer's sparrow, sage-grouse or sage sparrow. 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. Mule deer and elk 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. Poor cover for small mammals would allow more predation and the plant community would favor seed eating mammal species.

Grazing Interpretations.

This site is not well suited to livestock grazing due to unstable soils that can severely move down slope from hoof action.

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

No data.

Recreational uses

The site has limited opportunities for hunting, hiking, photography, and nature study.

Wood products

The annual production of wood on this site is very low. Harvesting of wood products is limited. Some firewood from downed and dead trees is possible.

Other products

None.

Other information

Field Offices

Mountain Home, ID
Gooding, ID
Fairfield, ID
Shoshone, ID
Rupert, ID
Arco, ID

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. Those involved in developing this site description include:

Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC
Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC
Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho
Jim Cornwell, Range Management Specialist, IASCD
Kristen May, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Butte County, ID	
General legal description	Both of these are within the Craters of the Moon National Monument.
Location 2: Butte County, ID	
General legal description	Both of these are within the Craters of the Moon National Monument.

References

. Fire Effects Information System. <http://www.fs.fed.us/database/feis/>.

Other references

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USDA, NRCS.2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA

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

Approval

Kirt Walstad, 5/14/2024

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	06/22/2009
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** none.

2. **Presence of water flow patterns:** water-flow patterns do not occur on this site.

3. **Number and height of erosional pedestals or terracettes:** pedestals do not occur on this site. Terracettes do not occur in the traditional sense (caused by water movement), but can develop due to dry raveling or foot/h hoof action. They are not extensive.

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 15-30 percent. Most of the area absent of plants or litter is cinders.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** none due to gravelly.

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7. **Amount of litter movement (describe size and distance expected to travel):** fine and coarse litter generally does not move. Gravels on the surface and shrub cover help reduce fine litter movement.
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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 3 to 5 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):** No data.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** infiltration is good regardless of plant cover due to cinder surface. Tall shrubs catch blowing 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):** is 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 bunchgrasses
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** little decadence is expected in shrubs or grasses with normal fire cycle, but decadence can occur in the absence of fire greater than the normal fire frequency. 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 15-20 percent to a depth less than 0.1 inches. Under mature shrubs litter is >0.5 inches deep and is 90-100 percent ground cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 900 pounds per acre (1008 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 35-45 percent of the total production, forbs 20-30 percent, shrubs 25-35 percent and trees 5 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: includes bulbous bluegrass, rush skeletonweed, musk and scotch thistle, and diffuse and spotted knapweed. Cheatgrass can invade the site at the lower elevations.

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