

Ecological site R013XY048ID Ceanothus Thicket 10-18 PZ CEVE

Last updated: 9/23/2020
Accessed: 05/12/2025

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): 013X–Eastern Idaho Plateaus

Land Resource Region: B (Northwestern Wheat and Range)
MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

LRU notes

013X-Eastern Idaho Plateaus

Precipitation or Climate Zone: 16-22" P.Z.
<https://soils.usda.gov/survey/geography/mlra/index.html>

Classification relationships

No Data.

Ecological site concept

Site receives additional water. These areas are snow drift areas that retain snow longer into the growing season

Soils are:

not saline or saline-sodic.

Shallow, with >35% gravels (<3") and cobbles (3-10") cover. skeletal within 20" of soil surface, fragment percentage increasing with depth

Not strongly or violently effervescent in surface mineral 10".

textures usually range from sandy loam to silty 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

R013XY005ID	Loamy 16-22 PZ ARTRV/FEID-PSSPS
R013XY014ID	Shallow Stony 12-20 PZ ARAR8/PSSPS
R013XY016ID	Moist Mountain Loam 20+ PZ POTR
R013XY019ID	Stony Loam 16-22 PZ ARTRV/PSSPS
R013XY020ID	Loamy Tall Brush 16-22 PZ ACGL/BRMA4

R013XY022ID	Subalpine Loamy 16-22 PZ ARTRS2/ELTR7-BRMA4
R013XY031ID	Steep Stony North 16-22 PZ ARTRV/FEID

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Ceanothus velutinus</i>
Herbaceous	Not specified

Physiographic features

This site occurs on convex hilltops and shoulder slopes of high elevation basalt plateaus. Slopes generally range from 2 to 35 percent. Elevations range from 5500 to 7500 feet (1650 to 2300 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Lava plain
Elevation	1,676–2,286 m
Slope	2–35%
Aspect	Aspect is not a significant factor

Climatic features

MLRA 13, the Eastern Idaho Plateaus, is part of the Northwestern Wheat and Range Region. Its elevation ranges from 4209 to 9331 feet above sea level, with an average elevation of 5787 feet. The average annual precipitation is 16.41 inches, with a range of 13.56 to 18.75 inches, based on ten long term climate stations located throughout the MLRA. A spike in precipitation amount often occurs in late spring, usually in May.

Temperatures vary widely in the MLRA throughout the year. A maximum temperature of 103° Fahrenheit occurred at the McCammon climate station (# 105716; elevation 4770 feet), while a minimum of -41° was recorded at the Kilgore station (#104908). At all stations temperatures throughout the year are usually below the national average. Kilgore also recorded the greatest annual snowfall amount of 217 inches. The average temperature is 41.4 degrees F. with an average high of 55.3 degrees and an average low of 27.5 degrees.

The frost-free period ranges from 64 to 90 days, while the freeze-free period can be 98 to 123 days.

Table 3. Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	123 days
Precipitation total (average)	483 mm

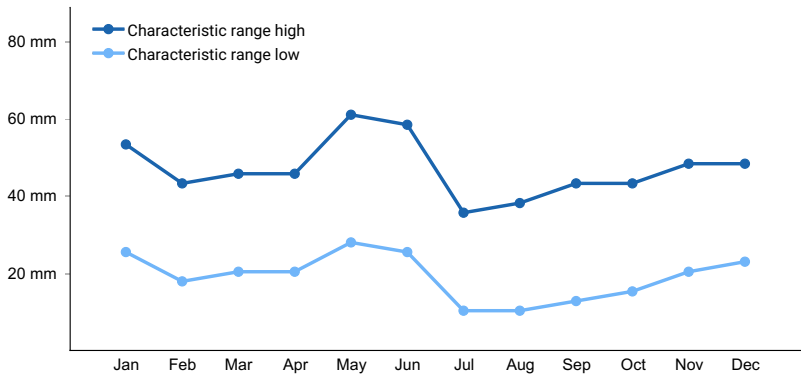


Figure 1. Monthly precipitation range

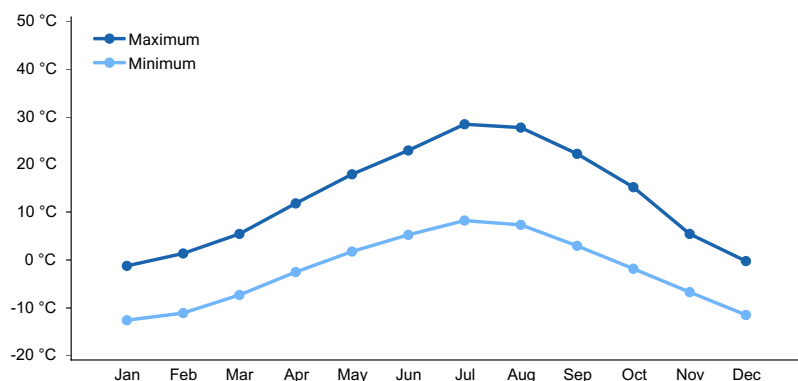


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

These soils are well drained and very deep. They have formed in side slope alluvium and loess. Textures are dominantly gravelly loam and flaggy loam with coarse fragments increasing with depth. The profile is 35 to 90 percent coarse fragments below 20 inches.

Soil Series Correlated to this Ecological Site

None

Table 4. Representative soil features

Surface texture	(1) Gravelly loam
Drainage class	Well drained
Soil depth	152 cm
Surface fragment cover ≤3"	0–35%
Surface fragment cover >3"	0–5%
Subsurface fragment volume ≤3" (Depth not specified)	35–90%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect is snowbrush ceanothus. Composition by weight is approximately 5-10 percent grasses, 5 to 10 forbs, and 80 to 85 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, Rocky Mountain elk, moose, and lagomorphs.

Fire has historically occurred on the site at intervals of 20-40 years. If the fire frequency is relatively long intervals, this site could go to a Douglas fir site.

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 snowbrush ceanothus with minor amounts of grasses and forbs in the understory. Major understory species include mountain brome, slender wheatgrass, Columbia needlegrass, field mint and mountain big sagebrush. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 1500 pounds per acre (1680 kilograms per hectare) in a normal year. Production in a favorable year is 2500 pounds per acre (2800 kilograms per hectare). Production in an unfavorable year is 800 pounds per acre (896 kilograms per hectare). Structurally, tall shrubs are very dominant, followed by cool season deep rooted perennial bunchgrasses being about equal to perennial forbs.

FUNCTION:

This site is well suited for deer, elk, moose, raptors, and other wildlife in summer and early fall. It is used by livestock in the summer but is not well suited to domestic grazing due to low amounts of grass and forbs and low palatable shrubs. The site has high value for hunting, hiking, and horseback riding.

This site due to the relatively high rainfall, elevation, and favorable cool-season growing conditions, it is fairly resistant to disturbances that can potentially degrade it.

Due to the relatively high production and deep soils, infiltration is normally high and runoff moderately low. Runoff, when it does occur is non-erosive except during high intensity convection storms. 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, shrubs, particularly mountain big sagebrush, can gradually increase. Snowbrush ceanothus dies out or becomes decadent. Rocky Mountain juniper or Douglas fir can invade the site if seed sources are in the proximity. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, juniper can displace most of the shrubs and other understory species. See "Influence of juniper invasion" below. Douglas fir can also gradually invade the site. These trees are usually stunted, irregular or poorly shaped.

When fires become more frequent than historic levels (20-40 years), snowbrush ceanothus will maintain itself in the community or increase due to sprouting. Mountain big sagebrush is reduced significantly. With continued short fire frequency, mountain big sagebrush can be completely eliminated along with many of the desirable understory species such as mountain brome. These species will be replaced by Kentucky bluegrass and slender wheatgrass along with a variety of annual and perennial forbs including noxious and invasive plants. Mountain snowberry will increase due to sprouting.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be very detrimental to this site. This type of management leads to reduced vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to Rocky Mountain juniper invasion, an increase in mountain big sagebrush, snowbrush ceanothus, and noxious and invasive plants. Continued improper grazing management influences fire frequency by increasing fine fuels.

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 mountain big sagebrush, snowbrush ceanothus, and/or Rocky Mountain juniper. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. A prescribed burn may maintain a snowbrush ceanothus plant community.

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. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available. 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.

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 summer and fall. Their numbers are seldom high enough to adversely affect the plant community.

Watershed:

Decreased infiltration and increased runoff occur with the invasion of Rocky Mountain juniper. Juniper invasion can be triggered by lack of fire, poor grazing management and prolonged drought. The 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.

Influence of juniper invasion:

The following discussion deals with Rocky Mountain juniper.

In plant communities that are invaded by juniper, the species has a competitive advantage for the following reasons:

- Juniper is very drought tolerant.
- It has the ability to extract soil moisture from a wide range of soil depths.
- Juniper has high evapo-transpiration rates.
- The species intercepts rain and snow before it reaches the soil surface.
- It has the ability to grow as long as there is soil moisture and the temperature is above freezing.
- Juniper has a relatively rapid growth rate and is long-lived. It can readily over-top shade intolerant species which leads to mortality.
- Nutrient cycling is reduced.
- As the canopy closes, juniper gains control of energy capture.

As juniper extracts water, other plants are unable to acquire sufficient water and nutrients to sustain growth and reproduction, thus reducing cover and biomass in the interspaces. After the canopy closes, there is sufficient soil moisture available for shallow-rooted, shade tolerant species to persist directly under the tree.

The following hydrologic impacts occur on sites invaded by juniper:

- Infiltration in the interspaces is reduced.
- Run-off increases resulting in increased sheet and rill erosion with elevated sediment loads.
- Soil temperatures increase in the interspaces which results in accelerated drying of the soil surface.
- Increased bare ground in the interspaces.
- Soil moisture storage is reduced.

As bare ground and interconnectiveness of bare ground increases, flow rates are accelerated (reduction of flow sinuosity) and run-off out of the area increases.

Degradation of these systems can result in the formation of a feedback cycle in which greater juniper cover and density results in greater plant and soil disturbance between the canopies.

In summary, a closed juniper community takes control of the following ecological processes: (1) hydrology, (2) energy capture, and (3) nutrient cycling. The changes are primarily driven by the hydrologic processes. The development of a closed juniper canopy always results in a transition across the threshold to a different state. Generally, when juniper canopy cover nears 20%, the plant community is approaching the threshold.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops in the absence of fire and improper grazing management. There is a Rocky Mountain juniper seed source present in the vicinity near the site.

Phase A to C. Results from a fire or prescribed burning.

Phase A to D. Results from improper grazing management and no fire. There is no Rocky Mountain juniper seed source present in the vicinity.

Phase B to C. Results from a wildfire or brush management.

Phase B to A. Occurs with prescribed grazing and brush management or prescribed burning.

Phase C to A. Results from prescribed grazing and no fire.

Phase D to A. Occurs with prescribed grazing.

Phase D to C. Occurs with fire or prescribed burning and prescribed grazing.

Phase C to D. Occurs with no fire and improper grazing management.

State 1 Phase C or D to State 2. Develops through frequent fire and improper grazing management. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

State 1, Phase B to State 3. Develops with no fire and improper grazing management from a juniper invaded phase of State 1. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

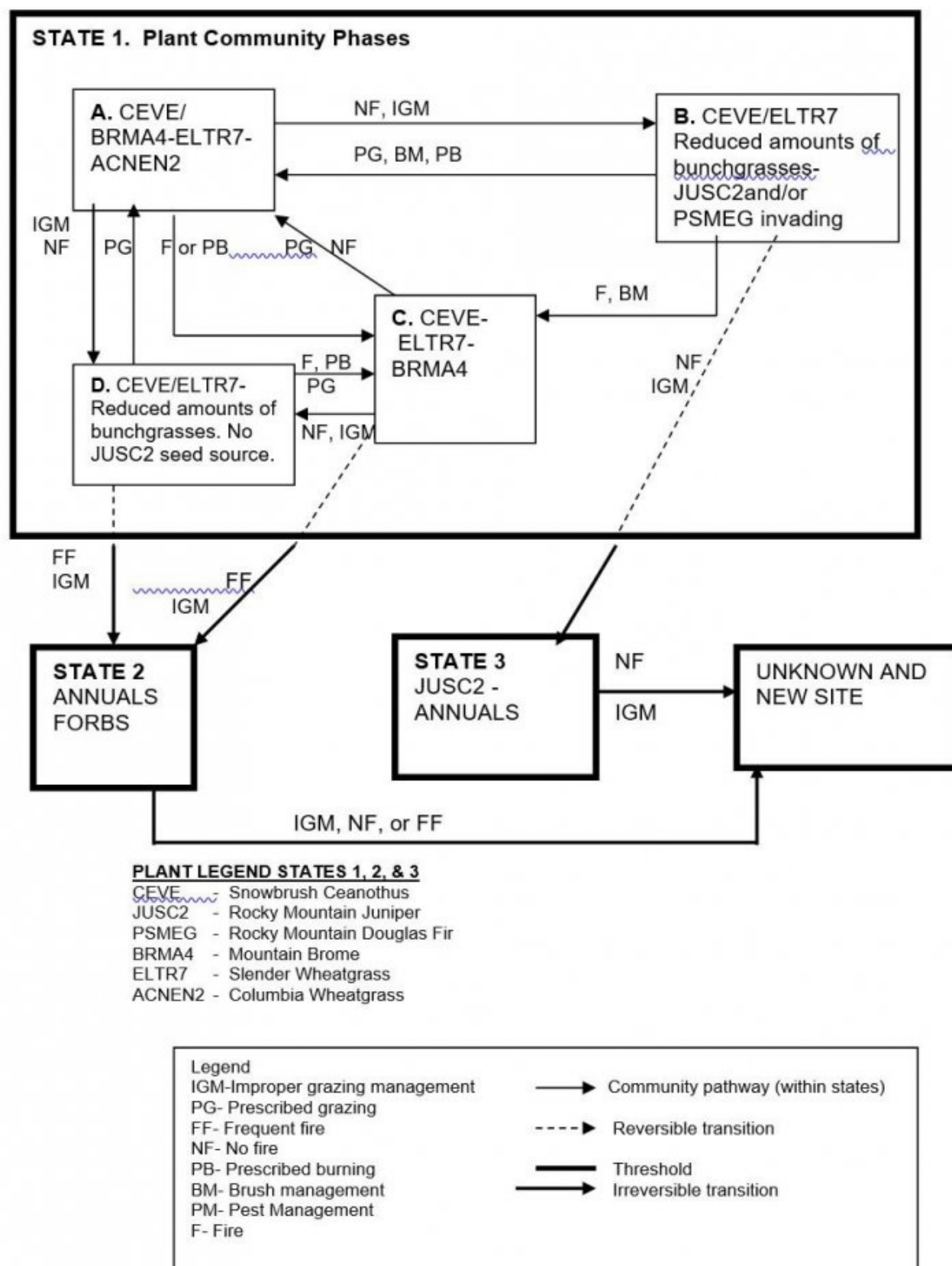
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and no fire or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this state to State 1 with accelerated practices.

State 3 to unknown site. Continued lack of fire or improper grazing management cause this state to cross the threshold and retrogress to a new site with reduced potential due to significant soil loss and changes in hydrology. It is economically impractical to return this state to State 1 with accelerated practices.

Practice Limitations:

This site has limited value for livestock grazing due to low amounts of palatable species. This site is not recommended for rangeland seeding.

State and transition model



State 1

State 1 Phase A

Community 1.1

State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by snowbrush ceanothus with minor

amounts of grasses and forbs in the understory. Major understory species include mountain brome, slender wheatgrass, Columbia needlegrass, field mint, and mountain big sagebrush. Natural fire frequency is 20-40 years.

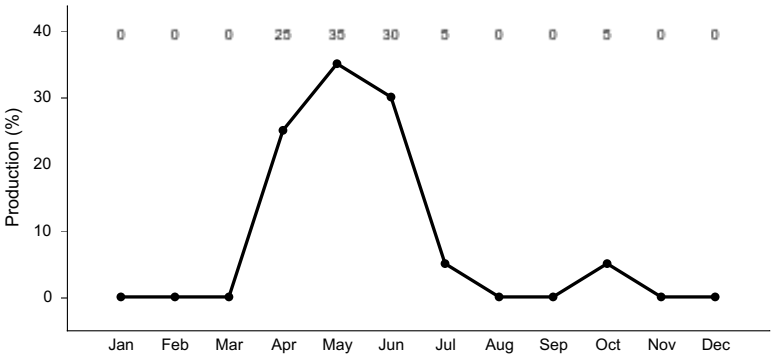


Figure 3. Plant community growth curve (percent production by month). ID0805, B13 ARTRV . State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated in the overstory by snowbrush ceanothus with some Rocky Mountain juniper seedlings and saplings invading. Slender wheatgrass is the dominant understory species with reduced amounts of mountain brome. All perennial grasses are in low vigor. A Rocky Mountain juniper seed source is present in nearby sites. Some Kentucky bluegrass may have invaded the site. Douglas fir can also invade and increase on the site in the absence of normal fire frequency and a seed source nearby. This state has developed due to fire frequency being much longer than normal and improper grazing management.

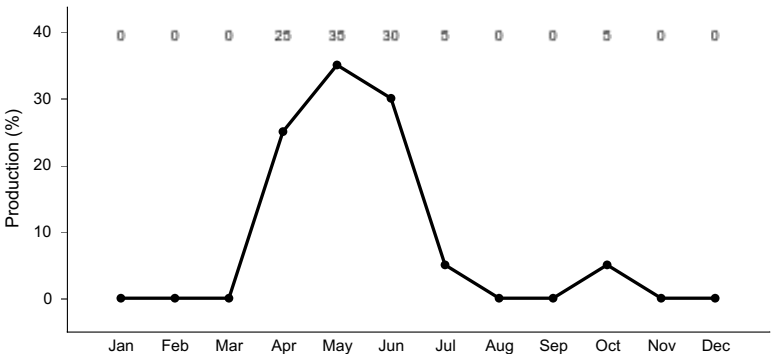


Figure 4. Plant community growth curve (percent production by month). ID0805, B13 ARTRV . State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by snowbrush ceanothus with some slender wheatgrass and mountain brome. Letterman’s and Columbia needlegrasses have decreased and may have died out due to fire. There are a few other shrubs that have resprouted in addition to snowbrush ceanothus. Kentucky bluegrass may have invaded the site. The community is a result of recent wildfire or prescribed burning.

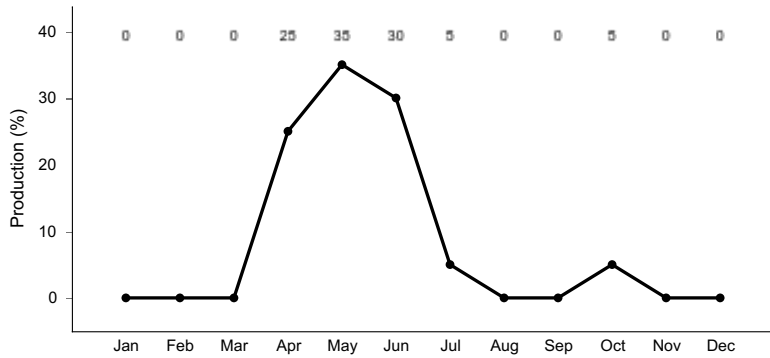


Figure 5. Plant community growth curve (percent production by month).
ID0805, B13 ARTRV . State 1.

State 4 State 1 Phase D

Community 4.1 State 1 Phase D

This plant community is dominated by snowbrush ceanothus in the overstory with significantly reduced amounts of mountain brome and in reduced vigor. Other bunchgrasses have been reduced and are in low vigor. Mountain big sagebrush may have increased. There is no Rocky Mountain juniper seed source in the proximity. Some Kentucky bluegrass may have invaded the site. This plant community has developed due to improper grazing management and no fire.

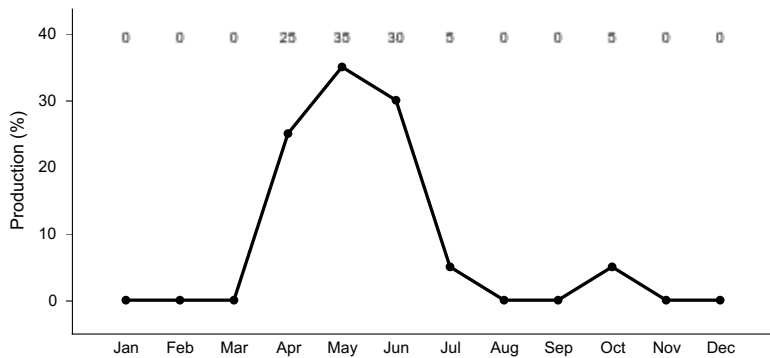


Figure 6. Plant community growth curve (percent production by month).
ID0805, B13 ARTRV . State 1.

State 5 State 2

Community 5.1 State 2

This plant community is dominated by annuals and some perennial forbs. There may be a variety of invasive forbs and some noxious species may have invaded the site. Some soil loss has occurred. The community has developed due to frequent fire and continued improper grazing management. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

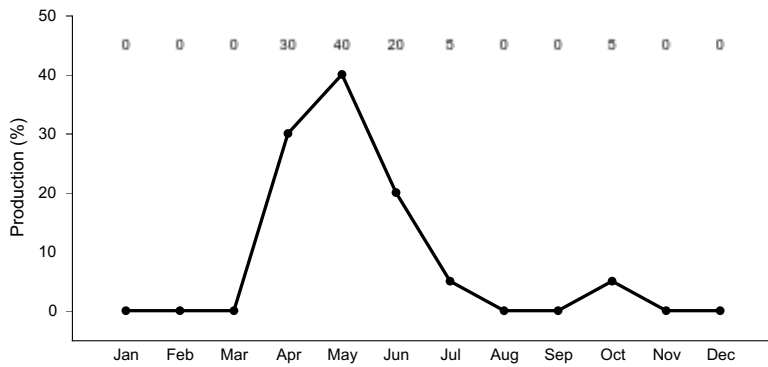


Figure 7. Plant community growth curve (percent production by month).
ID0802, B13 ARTRV Early Seral. State 2.

State 6

State 3

Community 6.1

State 3

This plant community is dominated by Rocky Mountain juniper with annuals in the understory. There is a Rocky Mountain juniper seed source in the proximity. There are few shrubs present due to competition from junipers. Some deep-rooted perennials may be present under the junipers. Generally, when shrub cover is below 12-13%, bare ground is above 27-28%, juniper cover is greater than 20%, and infiltration less than 6 cm/hr the site has crossed the threshold. Some soil loss has occurred. This plant community has developed due to the lack of fire and continued improper grazing management. It is economically impractical to return this community to State 1 with accelerated practices.

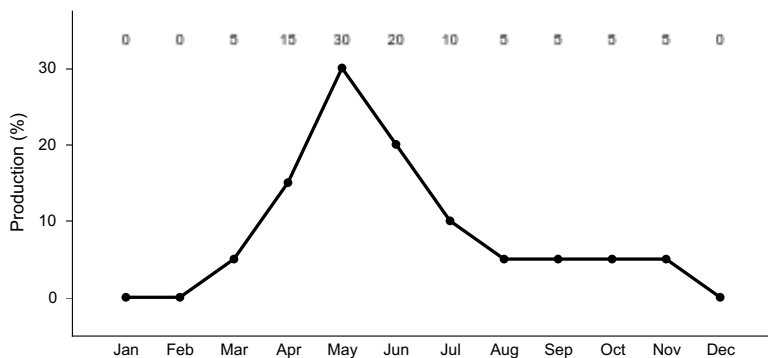


Figure 8. Plant community growth curve (percent production by month).
ID0803, B13 Early Seral, JUOS. State 3.

State 7

State 4

Community 7.1

State 4

Unknown new site. This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and no fire, or frequent fires from State 2 or the continued absence of fire and improper grazing management from the juniper dominated phase of State 3. This site will not return to States 1 or 2 with accelerated practices.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This plant community is dominated by ceanothus offering excellent food and cover habitat for birds and small to large mammals. Mule deer, elk, and moose are the large herbivores using the site. The plant community provides seasonal habitat for resident and migratory animals including western toad, shrews, ground squirrels, mice, coyote, red fox, and badger. Wyoming ground squirrel, Virginia's warbler, Idaho pocket gopher, ring-necked snake, and Merriam's shrew are area sensitive species that maybe associated with this site. Encroachment of noxious and invasive plant species (Kentucky bluegrass and juniper) in isolated areas can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by artificial water catchments and springs.

State 1 Phase 1.1 – Snowbrush Ceanothus/ Mountain Brome/ Slender Wheatgrass/ Columbia Wheatgrass Reference Plant Community (RPC) This plant community is dominated by snowbrush ceanothus offering pollinators early spring flowering habitat. Reptiles may use this plant community for part of their habitat, mostly for escape cover. Amphibians (western toad and northern leopard frog) may be associated with springs and isolated water bodies adjacent to this plant community. Development of spring sites that collect all available water would exclude amphibian use on these sites. The diverse vertical structure offers habitat for many bird species including mountain bluebird, rock wren, grouse, and flycatchers. Birds and small mammals eat ceanothus seed and use the shrub for nesting and escape cover. The plant community provides fair forage for large mammals including mule deer, elk, and moose throughout the year. The site provides thermal and young of year cover for mule deer and elk. A small mammal population including deer mouse, woodrat, golden-mantled ground squirrels, Wyoming ground squirrel, Merriam's shrew, and Idaho pocket gopher may utilize this site and adjacent open areas.

State 1 Phase 1.2 – Snowbrush Ceanothus / Slender Wheatgrass/ Rocky Mountain Juniper Plant Community: This plant community is the result of improper grazing management and no fire. Insect diversity may be lowered due to the reduction of forbs. Reptiles may use this plant community for escape cover. Bird species utilizing the site would be similar to those in State 1 Phase 1.1. As juniper increases, habitat for Brewer's sparrow, sage thrasher, and sage sparrow may increase. Mule deer, elk, and moose would still browse the ceanothus but as juniper encroaches the quality of browse will be lowered. The site would still provide thermal and young of year cover for large mammals. A small mammal population including deer mouse, woodrat, golden-mantled ground squirrels, Wyoming ground squirrel, Merriam's shrew, and Idaho pocket gopher would utilize this community.

State 1 Phase 1.3- Snowbrush Ceanothus / Slender Wheatgrass/ Mountain Brome Plant Community: This phase has developed due to fire. The plant community is similar to State 1 Phase 1.1 and would support a similar invertebrate community. The diverse vertical structure offers habitat for many bird species including mountain bluebird, rock wren, grouse, and flycatchers. The plant community provides fair forage for mule deer, elk, and moose in the spring, summer, and fall. Ceanothus is a fair winter browse for mule deer and elk. The site provides thermal and young of year cover for mule deer and elk. A small mammal population including deer mouse, woodrat, golden-mantled ground squirrels, Wyoming ground squirrel, Merriam's shrew, and Idaho pocket gopher utilize this site and adjacent open areas.

State 1 Phase 1.4 – Snowbrush Ceanothus / Slender Wheatgrass Plant Community: This plant community is the result of improper grazing and no fire. An increase in canopy cover of mountain big sagebrush combined with snowbrush ceanothus 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 one in State 1 Phase 1.1. The reduced diversity of insects and understory cover may reduce quality of food and cover for reptiles. As sagebrush increases, habitat for Brewer's sparrow, sage thrasher, and sage sparrow may increase. The plant community provides fair browse year round for deer, elk, and moose. The site will continue to provide thermal and young of year cover for large mammals. A small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin kangaroo rats may utilize this site and adjacent open areas.

State 2 – Annuals Plant Community: This state has developed due to improper grazing management and frequent fire. The loss of all shrubs and significant reductions of native forbs and grasses will reduce insect diversity on the site. The lack of flowering plants reduces use by pollinators like butterflies and moths. Quality of cover and food habitat for reptiles would decline with the loss of understory vegetation and shrubs. Hunting success by raptors may increase due to the poor cover for prey. 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.

State 3 – Rocky Mountain Juniper/ Annuals Plant Community: This state has developed due to improper grazing management and no fire. The loss of native forbs and understory vegetation will reduce insect diversity on the site. Most reptilian species identified in State 1 Phase 1.1 are not supported with food, water, or cover. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird, and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Hunting success by raptors on the site may decrease due to a heavy overstory of juniper. Hunting success by raptors on adjacent ecological sites may increase due to the availability of perch sites provided by juniper. The plant community supports limited seasonal habitat for mule deer and elk in the spring and fall. The quality of winter habitat for mule deer may increase in value. As juniper encroaches the site will provide additional thermal cover and young of year cover for large mammals.

Grazing Interpretations.

This site has limited value for livestock grazing because of minor amounts of grass production and unpalatability of major shrub components.

Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species composition, similarity index, production, past use history, season of use, and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

The soils in this site are in hydrologic group B. They have moderately high runoff potential.

Recreational uses

This site provides hunting possibilities for mule deer. This site, in association with adjacent sites, creates a pleasing diversity of landscape for scenery and photography.

Wood products

None.

Other products

Field Offices

American Falls

Blackfoot

Burley

Driggs

Idaho Falls

Malad

Pocatello

Rexburg

Soda Springs

St. Anthony

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

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Jim Cornwell, Range Management Specialist, IASCD

Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho
Kristen May, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Clark County, ID	
Township/Range/Section	T13N R33E S11

Other references

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Contributors

DF

Approval

Kendra Moseley, 9/23/2020

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	05/02/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills rarely occur on this site. If rills are present they are most likely to occur on slopes greater than 15 percent and immediately following wildfire. Rills are most likely to occur on soils with surface textures of silt loam.

2. **Presence of water flow patterns:** water flow patterns rarely occur on this site. When they occur they are most likely to occur on slopes greater than 15 percent. When they occur they are short, disrupted by cool season perennial grasses and tall shrubs and are not extensive.

3. **Number and height of erosional pedestals or terracettes:** both are rare on this site. In areas where flow patterns and /or rills are present, a few pedestals may be expected.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data not available. On sites in mid-seral status, bare ground may range from 20-40 percent.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** usually does not occur.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 2 feet following a significant run-off event. Terracettes and bunchgrass can trap fine litter. 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 needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure ranges from _____ to _____. Soil organic matter (SOM) needs to be determined. The A or A1 horizon is typically _____ inches thick. NO DATA

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. Shrubs accumulate snow in the interspaces. .

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

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live**

foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):

Dominant: tall shrubs

Sub-dominant: perennial forbs

Other: grasses

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** snowbrush will become decadent in the absence of fire. Grass and forb mortality will occur as tall shrubs increase immediately following a wildfire.
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14. **Average percent litter cover (%) and depth (in):** annual litter cover in the interspaces will be 20 to 30 percent to a depth of <0.2. Under the mature shrubs litter is greater than 0.5 inches. Fine litter can accumulate on the terracettes.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 1500 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 5-10 percent of the total, forbs 5-10 percent, and shrubs 80-85 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 Kentucky bluegrass, rocky mountain juniper, spotted and diffuse knapweed, leafy spurge, Canada thistle.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years.
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