USDA Natural Resources
Conservation Service

Ecological site R047XA306UT
Upland Gravelly Loam (Bonneville big sagebrush)

Last updated: 2/05/2025
Accessed: 02/26/2025

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): 047X–Wasatch and Uinta Mountains

MLRA 47 occurs in Utah (86 percent), Wyoming (8 percent), Colorado (4 percent), and Idaho (2 percent). It encompasses approximately 23,825 square miles (61,740 square kilometers). The northern half of this area is in the Middle Rocky Mountains Province of the Rocky Mountain System. The southern half is in the High Plateaus of the Utah Section of the Colorado Plateaus Province of the Intermontane Plateaus. Parts of the western edge of this MLRA are in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The MLRA includes the Wasatch Mountains, which trend north and south, and the Uinta Mountains, which trend east and west. The steeply sloping, precipitous Wasatch Mountains have narrow crests and deep valleys. Active faulting and erosion are a dominant force in controlling the geomorphology of the area. he Uinta Mountains have a broad, gently arching, elongated shape. Structurally, they consist of a broadly folded anticline that has an erosion-resistant quartzite core. The Wasatch and Uinta Mountains have an elevation of 4,900 to about 13,500 feet (1,495 to 4,115 meters).
The mountains in this area are primarily fault blocks that have been tilted up. Alluvial fans at the base of the mountains are recharge zones for the basin fill aquifers. An ancient shoreline of historic Bonneville Lake is evident on the footslopes along the western edge of the area. Rocks exposed in the mountains are mostly Mesozoic and Paleozoic sediments, but Precambrian rocks are exposed in the Uinta Mountains. The Uinta Mountains are one of the few ranges in the United States that are oriented west to east. The southern Wasatch Mountains consist of Tertiary volcanic rocks occurring as extrusive lava and intrusive crystalline rocks.
The average precipitation is from 8 to 16 inches (203 to 406 mm) in the valleys and can range up to 73 inches (1854 mm) in the mountains. In the northern and western portions of the MLRA, peak precipitation occurs in the winter months. The southern and eastern portions have a greater incidence of high-intensity summer thunderstorms; hence, a significant amount of precipitation occurs during the summer months. The average annual temperature is 30 to 50 degrees Fahrenheit (-1 to 15 C). The freeze-free period averages 140 days and ranges from 60 to 220 days, generally decreasing in length with elevation.The dominant soil orders in this MLRA are Aridisols, Entisols, Inceptisols, and Mollisols. The lower elevations are dominated by a frigid temperature regime, while the higher elevations experience cryic temperature regimes. Mesic temperature regimes come in on the lower elevations and south facing slopes in the southern portion of this MLRA. The soil moisture regime is typically xeric in the northern part of the MLRA, but grades to ustic in the extreme eastern and southern parts. The minerology is generally mixed and the soils are very shallow to very deep, generally well drained, and loamy or loamy-skeletal.

LRU notes

Major Land Resource Unit 47A is located in the northern half of the Middle Rocky Mountains Province of the Rocky Mountain System. This MLRA includes the Wasatch Mountains which tend to run north and south. These steeply sloping, precipitous mountains have narrow crests and deep valleys. They are primarily fault blocks that have been tilted up. The alluvial fans located at the base of these mountains are important recharge zones for valley aquifers.

Ecological site concept

Dominant vegetative aspect is Bonneville big sagebrush and Bluebunch wheatgrass with other grasses and forbs in the interspaces. This site is usually associated with Pleistocene Lake formation terraces. The air-dry composition weight is 55 percent perennial grasses, 25 percent forbs and 20 percent shrubs. Plants begin growth around May 1 and end growth around September 15.

The soils of this site formed mostly in alluvium derived from rhyolite and quartzite. Surface soils are gravelly sandy loam in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up less than 35 percent of the soil volume. These soils are deep to very deep, well-drained, and have moderately slow permeability. pH is slightly to slightly alkaline.. Available water-holding capacity ranges from 3.9 to 5.7 inches of water in the upper 60 inches of soil. The soil moisture regime is mostly aridic ustic and the soil temperature regime is frigid. Precipitation ranges from 12 to 16 inches annually.

Associated sites

R047XA305UT	**Upland Stony Loam (Utah juniper)** Sites often occur adjacent to each other.

Similar sites

R047XA320UT	**Upland Shallow Loam (Wyoming big sagebrush)** Similar floral characteristics, however this site is shallower.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. ×bonnevillensis* (2) *Purshia tridentata*
Herbaceous	(1) *Pseudoroegneria spicata*

Physiographic features

This site occurs primarily on fan remnants along the foothills of the mountains. Slopes are moderately low to steep.. Runoff is low to medium. Flooding and ponding do not occur on this site.

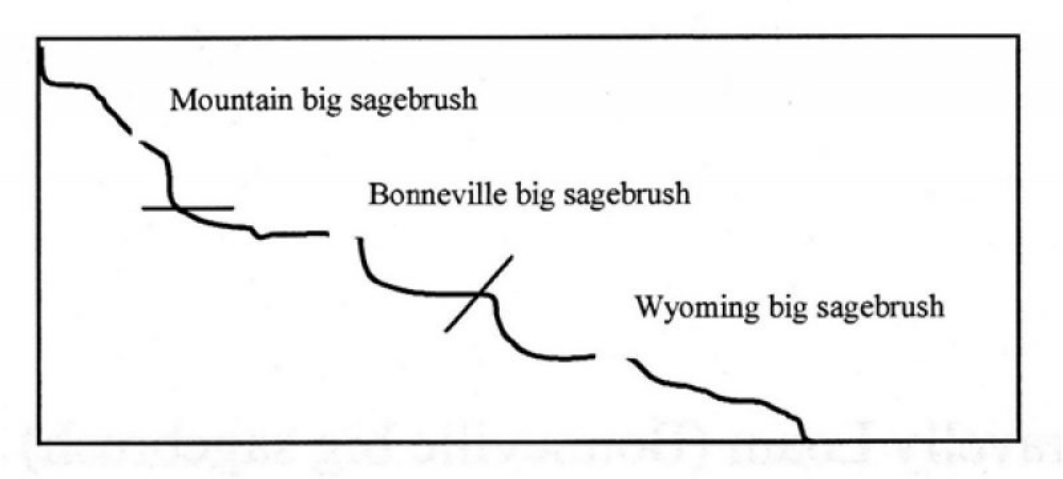

Figure 1. Catena

Table 2. Representative physiographic features

Landforms	(1) Fan remnant
Runoff class	Low to medium
Flooding frequency	None

Ponding frequency	None
Elevation	6,300–7,200 ft
Slope	4–35%
Aspect	Aspect is not a significant factor

Climatic features

The climate is characterized by warm, dry summers, cold, moist winters and fairly moist springs. This climate is modified by local topographic conditions. The mountains appreciably modify both the precipitation and temperature patterns. October to May is the wettest part of the year with July to September being the driest.

Table 3. Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	12-16 in
Frost-free period (average)	188 days
Freeze-free period (average)	219 days
Precipitation total (average)	

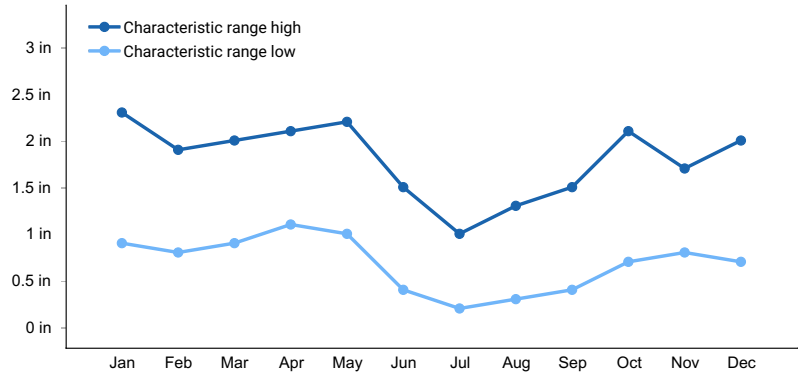

Figure 2. Monthly precipitation range

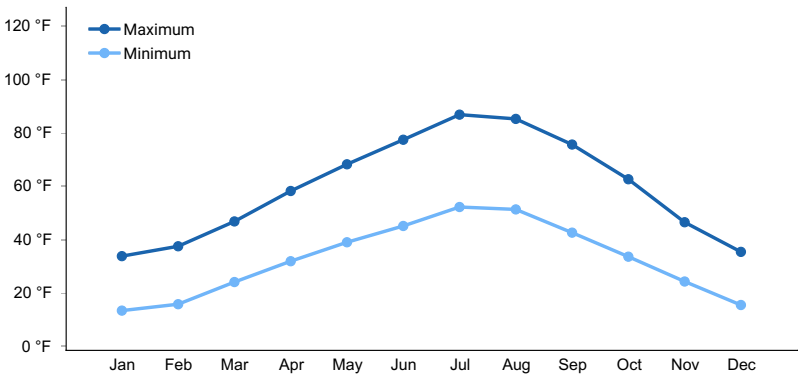

Figure 3. Monthly average minimum and maximum temperature

Influencing water features

Due to its landscape position, this site is not typically influenced by streams or wetlands. It can sometimes be influenced by overland flow during heavy thunderstorms and during wetter Spring runoff periods.

Wetland description

N/A

Soil features

The soils of this site formed mostly in alluvium derived from rhyolite and quartzite. Surface soils are gravelly sandy loam in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up less than 35 percent of the soil volume. These soils are deep to very deep, well-drained, and have moderately slow permeability. pH is slightly to slightly alkaline. Available water-holding capacity ranges from 3.9 to 5.7 inches of water in the upper 60 inches of soil. The soil moisture regime is mostly aridic ustic and the soil temperature regime is frigid. Precipitation ranges from 12 to 16 inches annually.

Table 4. Representative soil features

Parent material	(1) Alluvium–rhyolite (2) Alluvium–quartzite
Surface texture	(1) Gravelly sandy loam
Drainage class	Well drained
Permeability class	Moderately slow
Depth to restrictive layer	60 in
Soil depth	60 in
Surface fragment cover <=3"	15%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3.9–5.7 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	7.4–7.8
Subsurface fragment volume <=3" (Depth not specified)	35%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. As more data is collected, some of these plant communities way be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as the “desired plant community”. According to the USDA NRCS National Range and Pasture Handbook, the desired plant community will be determined be the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

All of these scenarios are very interrelated and dependent on weather patterns and events as well as fire frequency and intensity. The fire frequency should be around 30 to 55 years. Any set of events that are strong enough to force the plant community out of this pattern can push it over a threshold and into another state.

State and transition model

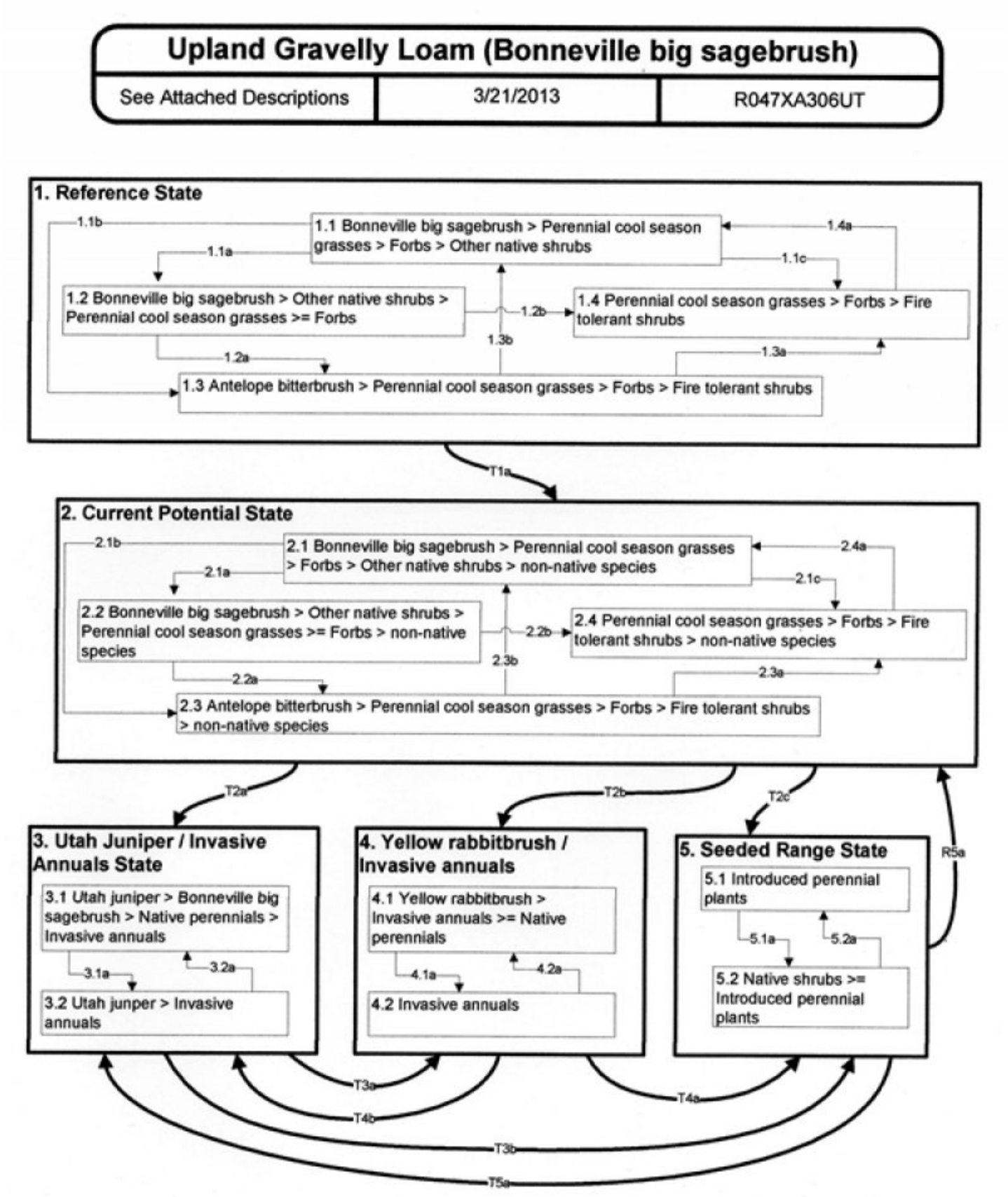

Figure 4. 47A306 State and Transsition Model

State 1
Reference State

This state includes the plant communities that were best adapted to the unique combination of factors associated with this ecological site prior to European settlement. It was in a natural dynamic equilibrium with the historic biotic,

abiotic, climatic factors on its ecological site in North America at the time of European immigration and settlement. This dominant aspect of the plant community is Bonneville big sagebrush and bluebunch wheatgrass. The community is made up of 55 percent grasses, 25 percent forbs, and 20 percent shrubs on a dry weight base. All of these scenarios are very interrelated and dependent on weather patterns and events as well as fire frequency and intensity. The fire frequency should be around 30 to 55 years. Any set of events that are strong enough to force the plant community out of this pattern can push it over a threshold and into another state.

Community 1.1
Bonneville big sagebrush . Perennial Cool-season Grasses Forbs Other Native Shrubs

Bonneville big sagebrush, perennial cool-season grasses, forbs and other shrubs: This is the community that is described in the initial plant list. This community is represented with 55 percent grasses, 25 percent forbs, and 20 percent shrubs. The dominant shrub visually and in production is Bonneville big sagebrush. The dominant grass is bluebunch wheatgrass and the dominant forb, visually, is arrowleaf balsamroot. This community is strong and maintains 10 to 15 percent bare ground and surface rock fragments.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	500	1000	1485
Forb	225	450	675
Shrub/Vine	180	500	550
Total	**905**	**1950**	**2710**

Table 6. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	0%	5-10%	10-15%
>0.5 <= 1	–	3-5%	10-15%	10-20%
>1 <= 2	–	10-35%	10-15%	5-15%
>2 <= 4.5	–	5-10%	5-10%	5-15%
>4.5 <= 13	–	–	0-5%	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Community 1.2
Bonneville big sagebrush Other Native Shrubs Perennial Cool-season Grasses = Forbs

Bonneville big sagebrush, other native shrubs, perennial cool-season grasses, and forbs: This community shows up when there is a period of time when the Bonneville big sagebrush increases to where it is suppressing the understory and other shrubs, (notably mountain snowberry, antelope bitterbrush and Utah serviceberry) increase which also helps to suppress the herbaceous understory. This community is strong enough to maintain 10 to 20 percent bare ground and surface rock fragments.

Community 1.3
Antelope bitterbrush Perennial Cool-season Grasses Forbs Fire Tolerant Shrubs

Antelope bitterbrush, perennial cool-season grasses, forbs, and fire tolerant shrubs: With this community the initial plant list fits except that due to fire (usually mid-temperature fast moving fire, associated with summer convection thunderstorms) removes the Bonneville big sagebrush and is replaced with antelope bitterbrush. It takes about five

to ten years and a proper episodic weather event year to get the sagebrush to move back into the site. This community maintains 10 to 15 percent bare ground and surface rock fragments.

Community 1.4
Perennial Cool-season Grasses Forbs Fire Tolerant Shrubs

Perennial cool-season grasses, forbs and fire tolerant shrubs: This community usually occurs when there is a hot erratically moving fire that heats the ground to the point where it damages the antelope bitterbrush so that it cannot take the dominant community position. The plant community is represented with 65 percent grasses, 25 percent forbs, and 10 percent shrubs. The initial plant list of grasses and forbs will be quite accurate in this community. This community will likely have around 15 to 20 percent bare ground and surface rock fragments.

Pathway 1.1a
Community 1.1 to 1.2

Time without catastrophic event. This was probably dependent on a specific chain of climatic events.

Pathway 1.1b
Community 1.1 to 1.3

Fire: Normally mid-Summer. A fire that is hot enough and fast enough moving to kill the sagebrush and stimulate the antelope bitterbrush.

Pathway 1.1c
Community 1.1 to 1.4

Fire; insects; prolonged drought; pathogens that kills or reduces the dominant shrub overstory. Fire is the most effective of these disturbances

Pathway 1.2a
Community 1.2 to 1.3

Fire: Normally mid-summer. A fire that is hot enough and fast enough moving to kill the sagebrush and stimulate the antelope bitterbrush.

Pathway 1.2b
Community 1.2 to 1.4

Fire; insects; prolonged drought; pathogens that kills or reduces the dominant shrub overstory. Fire is the most effective of these disturbances

Pathway 1.3b
Community 1.3 to 1.1

Time without catastrophic event. This was probably dependent on a specific chain of climatic events.

Pathway 1.3a
Community 1.3 to 1.4

Fire; insects; prolonged drought; pathogens that kills or reduces the dominant shrub overstory. Fire is the most effective of these disturbances

Pathway 1.4a
Community 1.4 to 1.1

Time without catastrophic event. This was probably dependent on a specific chain of climatic events.

State 2
Current Potential State

This state includes the biotic communities that would become established on the ecological site if all successional sequences were completed without interferences by man under the present environmental conditions. Natural disturbances are inherent in its development. The Current Potential State (CPS) will include acclimatized, naturalized or invasive nonnative species. There is no known way to effectively remove these plants from the site once they have become established. The level of occurrence of these plants in the CPS is such that careful management can prevent their domination of the site. This site is irreversibly changed. Plant communities within the CPS state may be managed and used for various purposes by man without significant alteration in plant community composition or production. It includes all of the plant communities that exist in the RPC state with the inclusion of species that are non-native to this ESD. These non-native plants are not to be considered when considering plants for the rangeland health site evaluation. The initial Plant List of Grasses and Forbs will be quite accurate in this community also. This community will likely have around 15 to 20 percent bare ground and surface rock fragments. All of these scenarios are very interrelated and dependent on weather patterns and events as well as fire frequency and intensity. The fire frequency should be around 30 to 55 years. Any set of events that are strong enough to force the plant community out of this pattern can push it over a threshold and push it into another state.

Community 2.1
Bonneville big sage > Perennial Cool Season Grass > Forbs > Other Native Shrubs > Non-Native Species

Bonneville big sagebrush, Perennial cool season grasses, Forbs and other shrubs: This is the Community that is described in the initial Plant List. This community is represented with 55% grasses, 25% Forbs and 20% Shrubs. The dominant shrub visually and in production is Bonneville big sagebrush. The dominant grass is Bluebunch wheatgrass and the dominant Forb visually is Arrowleaf balsamroot. This community is strong enough to only have around 10 – 15% bare ground and surface rock fragments. This community will have notable amounts of non-native species shown above as well as others not mentioned.

Community 2.2
Bonneville big sage > Other Native Shrubs > Perennial Cool Season grass >= Forb > Non-Native Species

Bonneville big sagebrush, other native shrubs, Perennial cool season grasses, and Forbs: This Community is shows up when there is a period of time when the Bonneville big sagebrush increases to where it is suppressing the understory and other shrubs (notably) Mountain snowberry, Antelope bitterbrush and Utah serviceberry increase which also helps to suppress the herbaceous understory. This community is strong enough to only have around 10 – 20% bare ground and surface rock fragments. This community will have notable amounts of non-native species shown above as well as others not mentioned.

Community 2.3
Antelope bitterbrush > Perennial Cool Season Grass > Forb > Fire Tolerant Shrub > N0n-Native Species

Antelope bitterbrush, Perennial cool season grasses, Forbs and Fire tolerant shrubs: With this community the initial plant list fits except that due to fire (usually mid temperature fast moving fire, of the kind that would be associated with Summer convection thunder storms) the Bonneville big sagebrush has been removed and replaced with Antelope bitterbrush. It takes about five to ten years and a proper episodic weather event year to get the sagebrush to move back into the site. This community will have notable amounts of non-native species shown above as well as others not mentioned.

Community 2.4
Perennial Cool Season Grass > Forbs > Fire Tolerant Shrubs > Non-Native Species

Perennial cool season grasses, Forbs and Fire tolerant shrubs: This community usually occurs when there is a hot erratically moving fire that heats the ground to the point where it damages the antelope bitterbrush so that it cannot take the dominant community position. The plant community is represented with 65% grasses, 25% forbs and 10%

shrubs. This community will have notable amounts of non-native species shown above as well as others not mentioned.

Pathway 2.1a
Community 2.1 to 2.2

Time without catastrophic event. This was probably dependent on a specific chain of climatic events

Pathway 2.1b
Community 2.1 to 2.3

Fire: Normally mid-Summer. A fire that is hot enough and fast enough moving to kill the sagebrush and stimulate the antelope bitterbrush.

Pathway 2.1c
Community 2.1 to 2.4

Fire; insects; prolonged drought; pathogens that kills and/or reduces the dominant shrub overstory. Also overgrazing with or without drought over a prolonged period of time Fire and/or overgrazing are the most common of these disturbances

Pathway 2.2a
Community 2.2 to 2.3

Fire: Normally mid-Summer. A fire that is hot enough and fast enough moving to kill the sagebrush and stimulate the antelope bitterbrush.

Pathway 2.2b
Community 2.2 to 2.4

Fire; insects; prolonged drought; pathogens that kills and/or reduces the dominant shrub overstory. Also overgrazing with or without drought over a prolonged period of time Fire and/or overgrazing are the most common of these disturbances

Pathway 2.3b
Community 2.3 to 2.1

Time without catastrophic event. This was probably dependent on a specific chain of climatic events

Pathway 2.3a
Community 2.3 to 2.4

Fire; insects; prolonged drought; pathogens that kills and/or reduces the dominant shrub overstory. Also overgrazing with or without drought over a prolonged period of time Fire and/or overgrazing are the most common of these disturbances

Pathway 2.4a
Community 2.4 to 2.1

Time without catastrophic event. This was probably dependent on a specific chain of climatic events

State 3
Utah Juniper / Invasive Annuals State

This state has only two described plant communities but many variations of the represented ones are present. The lack of fire with a source of Utah Juniper and maybe a source of pinyon seed insight the move to this state. Movement from community phase to community phase can and often is accelerated by overgrazing. The dominant

drivers of the plant community is Utah Juniper and cheatgrass. This state can persist for a long time until extreme conditions needed for a wildfire occur or some other management treatment is implemented.

Community 3.1
Utah Juniper Bonneville big sagebrush Native Perennials Invasive Annuals

This community has a strong overstory of Utah Juniper and Singleleaf pinyon but still has an understory similar to Community 2.1. This community will have around 20 to 35 percent bare ground and surface rock fragments. Fire is the surest means to bring this community back toward the Current Potential State.

Community 3.2
Utah Juniper Invasive Annuals

This community is present when 99 to 100 percent of the native plants have been removed from the plant community and only pinyon pine and Utah juniper with a sparse understory of invasive annuals are left on the site. This community will have around 35 to 85 percent bare ground and surface rock fragments.

Pathway 3.1a
Community 3.1 to 3.2

Overgrazing with or without drought over a prolonged period of time

Pathway 3.2a
Community 3.2 to 3.1

Fire; insects; prolonged drought; pathogens that kills or reduces the dominant shrub overstory. Fire is the most effective of these disturbances

State 4
Yellow rabbitbrush / Invasive Annuals State

This is the state that this plant community will move to when it is in an over-grazed or drought condition and then burned (wild or controlled) and not seeded. The dominant aspect of the plant community is cheatgrass, yellow rabbitbrush with a very small amount of Bonneville big sagebrush. The community will usually be made up of 70 percent cheatgrass, 10 percent forbs, and 20 percent yellow rabbitbrush with minor components of other shrubs.

Community 4.1
Yellow rabbitbrush Invasive Annuals Native Perennials

Figure 6. R047XA306 State 4 phase 4.1

Yellow rabbitbrush, invasive annuals, native perennials: This plant community consists of approximately 40 percent yellow rabbitbrush, 45 percent invasive annuals, and 10 percent native perennials with a small component of other species. This community will have around 20 to 35 percent bare ground and surface rock fragments.

Community 4.2
Invasive Annuals

Invasive annuals: This plant community consists of approximately 85 percent invasive annuals (mostly cheatgrass and Japanese brome (field brome)), and 10 percent native perennials with a small component of other species. This community will have around 20 to 40 percent bare ground and surface rock fragments.

Pathway 4.1a
Community 4.1 to 4.2

Increased fire frequency (from a 10 to 15 year interval to a 3 to 5 year fire return interval) and intensity without follow-up management. Overgrazing can move this change along faster. The Yellow rabbitbrush / Invasive annuals Community (5.1), the fire frequency will remain at a 3 to 5 year interval. This condition is self-sustaining and the site will keep deteriorating until the site potential is lost. This will continue unless a large amount of energy is injected into the system to cause a change to take place.

Pathway 4.2a
Community 4.2 to 4.1

Time and management of grazing alone or along with other disturbances where human or naturalized introduction of native and introduced perennial plant species takes place.

State 5
Seeded Range State

This state exists when the site is cultivated or burned, and planted to introduced and, in some situations, native grasses and forbs.

Community 5.1
Introduced Perennial Plants

The plant community here consists of introduced or native grasses and forbs. It is normally as productive as the site is in the Current Potential State.

Community 5.2
Native Shrubs = Introduced Perennial Plants

Figure 7. R047XA306 State 5 Phase 5.2

Figure 8. R047XA306 State 5 Phase 5.2

This site comes into existence when weather conditions create the kind of episodic situation that allows Bonneville big sagebrush to move back into the site.

Pathway 5.1a
Community 5.1 to 5.2

Time without catastrophic event. This was probably dependent on a specific chain of climatic events

Pathway 5.2a
Community 5.2 to 5.1

Time and management of grazing alone or along with other disturbances where human intervention takes place to move the community back.

Transition T1a
State 1 to 2

Introduction of non-native species into the ecosystem.

Transition T2a
State 2 to 3

Prolonged Drought, Overgrazing, Extreme lengthening of the fire interval frequency. This takes place when the sagebrush canopy gets so heavy that it destroys the perennial grass and forb understory and the fire frequency is increased from a 20 to 40 year interval to a 60 to 90 year fire return interval, and the introduction of Utah juniper.

Transition T2b
State 2 to 4

Continued overgrazing and increase of fire frequency over a prolonged period of time. (8 to 12 year fire frequency interval)

Transition T2c
State 2 to 5

Human caused disturbance (mechanical treatment and seeding; chemical treatment and seeding. etc.)

Transition T3a
State 3 to 4

Continued overgrazing and increase of fire frequency over a prolonged period of time. (8 to 12 year fire frequency interval)

Transition T3b
State 3 to 5

Human caused disturbance (mechanical treatment and seeding; chemical treatment and seeding. etc.)

Transition T4b
State 4 to 3

Prolonged Drought, Overgrazing, Extreme lengthening of the fire interval frequency. This takes place when the understory gets so depleted and the perennial grass and forb understory have been destroyed. At this time the fire frequency will increase from a 20 to 40 year interval to a 60 to 90 year fire return interval, because of the amount of bare ground and the introduction of Utah juniper.

Transition T4a
State 4 to 5

Human caused disturbance (mechanical treatment and seeding; chemical treatment and seeding. etc.)

Restoration pathway R5a
State 5 to 2

Time with proper management that favors the re-establishment of native plants in the site.

Conservation practices

Prescribed Grazing
Grazing Management Plan - Applied

Transition T5a
State 5 to 3

Prolonged Drought, Overgrazing, Extreme lengthening of the fire interval frequency. This takes place when the sagebrush canopy gets so heavy that it destroys the perennial grass and forb under story and the fire frequency is increased from a 20 to 40 year interval to 60 to 90 year fire return interval, and the introduction of Utah juniper.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
0	**Primary Grasses**			700–1100	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	500–600	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	100–300	–
	western wheatgrass	PASM	*Pascopyrum smithii*	100–200	–
	Sandberg bluegrass	POSE	*Poa secunda*	100–200	–
Grass/Grasslike					
0	**Primary Forbs**			95–400	
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	60–100	–
	white sagebrush	ARLUC8	*Artemisia ludoviciana ssp. candicans*	60–100	–
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	60–100	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	60–100	–
Forb					
0	**Primary Shrubs**			400–900	
	Bonneville big sagebrush	ARTRB3	*Artemisia tridentata ssp. ×bonnevillensis*	300–600	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	200–520	–
	Utah snowberry	SYORU	*Symphoricarpos oreophilus var. utahensis*	200–520	–

Animal community

This site is a part of the sagebrush steppe supporting populations of Greater Sage-grouse (Centrocercus urophasianus), Columbian Sharp-tailed Grouse (Tympanuchus phasianellus columbianus), other at-risk neotropical migratory bird species, Utah prairie-dog (Cynomys parvidens). Other wildlife using this site include Black-tail Jackrabbit; Coyote; Gold Eagle; Ravens and Mule Deer. This is a short list of the more common species found. Many other species are present as well and migratory birds are present at certain times of the year.

Hydrological functions

The Hydrologic group is B

Recreational uses

Recreation activities include aesthetic value; and fair opportunities for hiking and hunting.

Wood products

There are no wood products from this site unless there is Utah Juniper invasion onto the site. With this event you will be able to harvest Cedar posts and firewood.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used.

In the previously written ESD there was reference made to having 1 NRCS-ECS-417 in a similarity index of 26 - 50% and 6 Utah-Range-2s of which 2 were in a similarity index of 51 - 75%; 3 in 26 - 50% and 1 in 0 - 25%.

Other references

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Contributors

GBB

Approval

Kendra Moseley, 2/05/2025

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	12/15/2011
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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Old rills will weather quickly because of loamy surface textures. A slight increase in rill formation may be caused by major disturbance events such as severe thunderstorms.

2. **Presence of water flow patterns:** Flow patterns around perennial plants bases will show minor evidence of erosion. They will be short (1 to 3 feet long) and look stable. There is slight evidence of deposition.

3. **Number and height of erosional pedestals or terracettes:** Plants should show slight (1/8 – ½ in.) pedestialing. Pedestialing on the down slope side of plants may appear to be greater than this and will be more visible as slopes increase. Terracettes should be absent until slopes are greater than 20 %. At this point the terracettes should look stable and have no evidence of soil being re-deposited.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10 to 30 % (10 – 15 % on slopes up to 25 % and 15 – 30 % on slopes from 25 % up)

5. **Number of gullies and erosion associated with gullies:** None to very few. Any gullies present should show little sign of active erosion and should appear stable having perennial plants growing in the bottom and on the sides.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Very slight wind generated soil movement is normal. Wind caused blowouts are extremely rare and are mostly stable and have healed over or started to do so. Increased wind generated soil movement can occur after severe wind events but will not be visually apparent.

7. **Amount of litter movement (describe size and distance expected to travel):** Little redistribution can be caused by both wind and water. Very fine to fine litter movement may occur in water flow patterns with deposition occurring at points of obstruction. Fine litter may be removed from the site by wind action.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** 80 to 90% of this site should have soil surfaces that are stabilized by organic matter both decompositional and incorporated (Stability Class 4). This should be observable in that water flow patterns are not scoured to where the surface is visibly smoother than soil surfaces in non flow pattern areas.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The A horizon is varies from 5 to 18 inches thick. Color is a grayish brown gravelly loam (typical mollic colors). Structure should be granular.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** When perennial plant community is intact it will maintain the organic granular structure, soil porosity, and sinuous water flow paths that allows water to infiltrate at a rate that will not lend to water leaving the site. If the plant community has been degraded then the site will show longer and/or smoother than expected water flow patterns, with increased numbers of and/or longer rills, and a more platy structure.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** There should be no compaction layer. The amount of gravel can make it hard to use a probe to determine this.

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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: Perennial bunchgrasses (bluebunch wheatgrass, slender wheargrass, nevada bluegrass), Perennial rhizomatous grass (western wheatgrass) > Non-sprouting shrubs (bonneville big sagebrush, utah snowberry) > Sprouting shrubs (antelope bitterbrush).

    Sub-dominant: Bunchgrasses > Perennial forbs > Rhizomatous grasses > Annual forbs.

    Other: A wide variety of other perennial grasses, both perennial and annual forbs and shrubs can be expected to occur in this plant community.

    Additional: Invaders such as cheatgrass brome and japanese brome are examples.Dominants: Bonneville big sagebrush Bluebunch wheatgrass; Sub-dominants: Slender Wheatgrass, Western wheatgrass, Antelope bitterbrush. The perennial bunchgrass about 30 to 60 %; non-sprouting shrub 10 to 20 % (composition by biomass) functional groups are expected on this site.

    Assumed fire cycle of 20-40 years.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All age classes (seedling, immature, mature, and decadent) of perennial bunchgrasses and non-sprouting shrubs should be present. The % of decadent and/or dead plants should not exceed 5 %.

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14. **Average percent litter cover (%) and depth (in):** Litter cover will be heavier under plants. Most litter will be herbaceous and shown amounts and depths would be considered normal. Perennial vegitation should be well distributed on the site.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 950 – 1100 lb./acre on slopes 20 to 30 % and 1000 to 1300 lb./acre on slopes less than 20 % under normal growing conditions.

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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:** As ecological condition deteriorates due to outside disturbances, perennial bunch grasses decrease while less desirable plants like Low rabbitbrush, and Pricklypear increase along with invasive plants like Cheatgrass brome and Utah juniper. When the Reference plant community is burned, Bonneville big sagebrush will decrease while Antelope bitterbrush, perennial grasses, forbs and Low rabbitbrush increase markedly with fast summer fires. Broom snakeweed and Antelope bitterbrush increase to a much lesser extent with cooler or erratic hot fires. If the site is burned too frequently Cheatgrass brome, Halogeton, Broom snakeweed and Russian thistle are most likely to

invade this site and eventually dominate it.

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17. **Perennial plant reproductive capability:** All plants should have the ability to reproduce either by seed and/or vegetative tillers in all years, except after prolonged extreme drought years.
