

Ecological site R028AY310UT Upland Loam (Bonneville Big Sagebrush) North

Accessed: 05/04/2024

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.

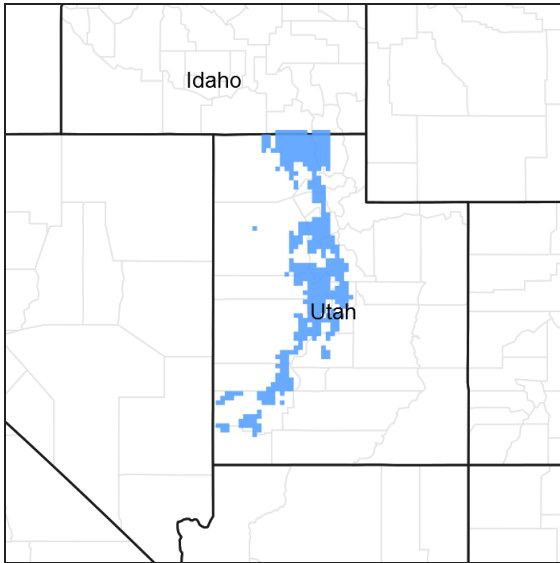


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Ecological site concept

This site occurs on Lake benches and alluvial fans associated with pleistocene lakes. It is a plant community visually dominated by bonneville big sagebrush with snowberry and bluebunch wheatgrass as major players in the community. The site is located just above the Wyoming big sagebrush zone in the areas where it is found.

Associated sites

R028AY306UT	Upland Gravelly Loam (Bonneville Big Sagebrush) The amount of gravel in the soil and the 100 to 300 pounds per acre are notable differences in these two sites. Also the difference in the amount of Antelope bitterbrush makes these two sites different.
R028AY307UT	Upland Gravelly Loam (Wyoming Big Sagebrush) This site is a Wyoming big sagebrush site. It will have fewer kinds and amounts of forbs than the Bonneville big sagebrush sites. Production will 300 to 500 pounds per acre less than the upland loam Bonneville big sagebrush site.
R028AY309UT	Upland Loam (Wyoming Big Sagebrush) This site will normally be located just below the Bonneville big sagebrush site. The notable differences are the sagebrush species, the fewer forb species and the smaller amount of forbs found in the plant community. Also there will be about 300 to 500 pounds less production in the Wyoming community.
R028AY325UT	Upland Shallow Loam (Black Sagebrush) This site is a completely different site Black sagebrush, Shallow soil, much lower production, etc.

Similar sites

R028AY306UT	<p>Upland Gravelly Loam (Bonneville Big Sagebrush)</p> <p>The amount of gravel in the soil and the 100 to 300 pounds per acre are notable differences in these two sites. Also the difference in the amount of Antelope bitterbrush makes these two sites different.</p>
R028AY309UT	<p>Upland Loam (Wyoming Big Sagebrush)</p> <p>This site will normally be located just below the Bonneville big sagebrush site. The notable differences are the sagebrush species, the fewer forb species and the smaller amount of forbs found in the plant community. Also there will be about 300 to 500 pounds less production in the Wyoming community</p>

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>xbonnevillensis</i> (2) <i>Purshia tridentata</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i>

Physiographic features

This site occurs on loamy lake terraces, alluvial fans and fan remnants at elevations of 4,400 to 7,300 feet. It is most commonly found on gentle slopes, but can occupy slopes of up to 30 percent. Runoff is variable depending on slope, basal cover and soil permeability. Much of this site has been developed for dry farming, CRP or residential housing.

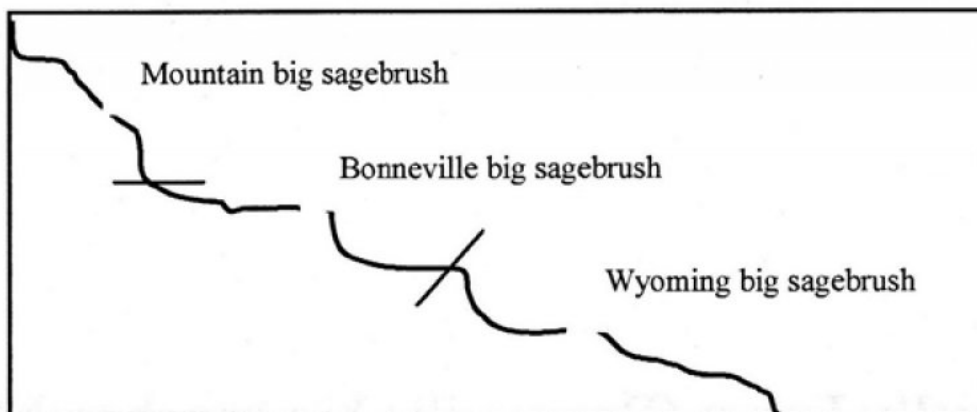


Figure 2. Catena Drawing

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Lake terrace (3) Fan remnant
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	1,676–2,225 m
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is characterized by cold, snowy winters and warm dry summers. The average annual

precipitation is 14 to 16 inches. May is typically the wettest month and July is typically the driest. The most reliable source of moisture for plant growth is the snow that accumulates over the winter. Summer thunderstorms are not a reliable source of moisture during the growing season.

Table 3. Representative climatic features

Frost-free period (average)	121 days
Freeze-free period (average)	154 days
Precipitation total (average)	381 mm

Influencing water features

Due to its landscape position, this site is not typically influenced by streams or wetlands.

Soil features

The soils of this site formed in alluvium derived from various types of parent materials. They are usually deep, though occasionally as shallow as 20 inches to lithic bedrock or duripan. Surface and subsurface textures are loams. Rock fragments usually make up less than 15 percent of the soil volume and may not be present on the soil surface. Permeability is slow to moderate and available water-holding capacity ranges from 3.5 to 7.3 inches of water in the upper 40 inches of soil. The soil moisture regime is xeric and the soil temperature regime is mesic or occasionally frigid.

Soil Survey Area: Soil Components (Map Units in parentheses);

Box Elder County, Eastern Part (UT602); Collinston (CwD, WmE); Dagor (DaB); Eccles (EcA, EcB, EcD); Forsgren (FgB, FgD, FgE); Gemson (GcD, GcE, GEE); Hansel (HaA, HaB, HaD); Kearns (KeB, KeC, KeD, KeE, KgD, PxE); Kidman (KIA, KIB, KmA, KmB, KmD, KmE); Mendon (MhB, MhD); Millville (MIA, MIB, MmB); Parleys (PbA, PdA, PeA, PeB, PeD, PeE, PIA, PmD, PmE, PnD, PyE, SuE); Pomat (PnD, PwD, PwE, PwG2, PxE, PyE); Red Rock (RdA, ReA, ReB); Stingal (KgD, SvB, SvD); Timpanogos (TmA, TmB, TnA, ToB, ToC); Windmill (WnB, WnD, WnE);

Davis-Weber Area (UT607); Ackmen (AbB, AbC, AbD, AbE2); Hillfield (HMG2, HnD2, HnE2, HTF2, HTG2); Kidman (FKG2, KaA, KaB, KaC, KaD, KaE2); Parleys (HTF2, HTG2, PaA, PaB, PaC, PaD, PaE2); Pleasant view (PvB, PvC, PvD, PvE, PvE2, Pwc, PwD); Timpanogos (HTF2, HTG2, TbA, TbB, TbC, TbD2, TbE2); Timpanogos Variant (TcD, TcE, TDD);

Tooele Area (UT611) Doyce (15); Erda (19);

Salt Lake Area (UT612) Bluffdale (BIB, BmB, BmC, BnB); Dry Creek (DPD), DPE, DRD, HDF); Hans (HaB, HaC); Hillfield (HfC, HIA, HIB, HIC, HtF2); Kearns (KaB, KaC); Kidman (KdA, KdB, KdC, KfA, KfB); Parleys (PaA, PeA, PeB); Preston (KsF2, PrD, PrF, PsB); Red Rock (Re); Taylorsville (HtF2, TaA, TaB, TaC, TbB, TcA, TcB, TcC2); Timpanogos (TtA, TtC, TuB); Trenton (Tv); Welby (WmA, WmB);

Utah County (UT621); Dagor (Da, Db); Dry Creek (DCF); Hillfield (HmE, HmF, HNG, HOF, HpF, WhD, WhE); Keigley (KeA, KeB, KgA); Kidman (KmA, KmB, KmC); Parleys (PaB, PaC, PbC, PcB); Pleasant vale (PnA, PoA, PoC, PpB); Taylorsville (MtE2, Taa, TaB, TcA, TcB, TcC2); Timpanogos (TmB, TmC, ToB); Welby (HpF, WbA, WbB, WbC, WeA, Web, WeC, WeD2, WhD, WhE);

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone and sandstone (2) Lacustrine deposits–shale (3) Colluvium–quartzite
Surface texture	(1) Loam (2) Silty clay loam (3) Silt loam

Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–11%
Surface fragment cover >3"	0–2%
Available water capacity (0-101.6cm)	8.89–18.54 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–11%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

As ecological condition deteriorates due to overgrazing, grasses and bitterbrush decrease, while mountain big sagebrush and rubber rabbitbrush increase.

When the potential natural plant community is burned mountain big sagebrush decreases while arrowleaf balsamroot and rabbitbrush increase.

Utah juniper, pinyon pine, cheatgrass and Russian thistle are most likely to invade this site.

State and transition model

Upland Loam (Bonneville big sagebrush) North

See Attached Descriptions	9/15/2014	R028AY310UT
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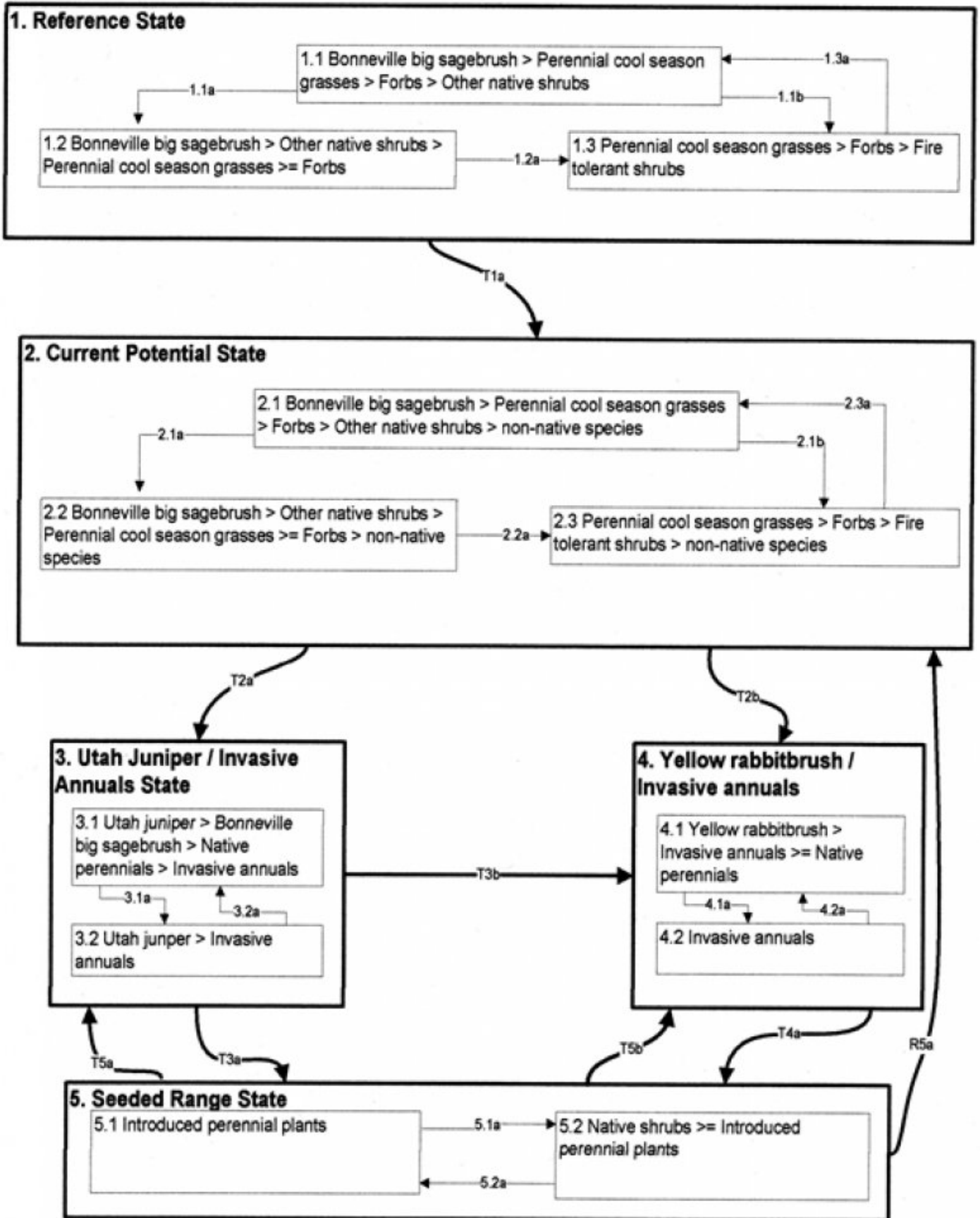


Figure 7. 28A310 State and Transition Model

State 1 Reference State

This state includes the plant communities that were best adapted to the unique combination of factors associated with the ecological site. 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 60 % Grass 25 % forbs and 15 % shrubs on a dry weight base.

Community 1.1 Bonneville big sagebrush > Perennial cool season grasses > Forbs > Other native shrubs

The dominant aspect of this plant community is Bonneville big sagebrush and bluebunch wheatgrass. The composition by air-dry weight is approximately 60 percent perennial grasses, 25 percent forbs, and 15 percent shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	605	1009	1480
Forb	252	420	616
Shrub/Vine	151	252	370
Total	1008	1681	2466

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-15%
Grass/grasslike foliar cover	40-50%
Forb foliar cover	15-25%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	0%	1-2%	3-9%	5-10%
>0.15 <= 0.3	0%	1-2%	12-23%	10-15%
>0.3 <= 0.6	0%	0-1%	35-45%	5-10%
>0.6 <= 1.4	0%	10-20%	1-3%	5-10%
>1.4 <= 4	0%	5-10%	1-3%	0%
>4 <= 12	0%	0%	0%	0%
>12 <= 24	0%	0%	0%	0%
>24 <= 37	0%	0%	0%	0%
>37	0%	0%	0%	0%

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, Utah serviceberry and Antelope bitterbrush increase. This causes the grasses and forbs to be suppressed. The community will be represented by 40 % grasses, 25 % Forbs and 35 % shrubs. This community will have around 10 – 20 % bare ground.

Community 1.3

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, Snowberry and Utah serviceberry to the point where they cannot gain dominance in the community. The plant community is represented with 70 % grasses, 20 % Forbs and 10 % Shrubs. The initial plant list works well in this situation as well. This community will likely have around 15 to 20 % bare ground.

Pathway a

Community 1.1 to 1.2

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

Pathway b

Community 1.1 to 1.3

Fire: Normally mid-summer, insects, prolonged drought and pathogens that kill and/or reduces the dominant shrub overstory. Fire is the most effective of these disturbances.

Pathway a

Community 1.2 to 1.3

Fire: Normally mid-summer. A fire that is hot enough and fast moving enough to kill sagebrush and stimulate the perennial cool season grasses, insects, prolonged drought and pathogens that kill and/or reduces the dominant shrub overstory. Fire is the most effective of these disturbances.

Pathway a

Community 1.3 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 CPS state will include acclimatized, naturalized or invasive nonnative species. There is no known way to effectively or efficiently remove these plants completely from the site once they have become established. The level of occurrence of these plants in the CPS can be controlled with careful management. 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 nonnative species. Additional plant communities with significant portions of invasive annuals may also be possible within this state.

Community 2.1

Bonneville sagebrush > perennial cool season grass > forb > other native shrub > non-native species

Bonneville big sagebrush, Perennial Cool Season Grasses, Forbs other Shrubs and non-native species: This is the Community that is described in the initial Plant List. This community is represented with 60 % Grasses; 25 % Forbs and 15 % Shrubs. The dominant shrub visually and in production is Bonneville big sagebrush. The dominant grass is Bluebunch wheatgrass and the dominant Forb is Arrowleaf balsamroot. This community is strong enough to have around 8 – 12 % bare ground.

Community 2.2

Bonneville sagebrush > other native shrub > perennial cool season grass >= forb > non-native species

Bonneville big sagebrush, other native shrubs, Perennial cool season grasses, Forbs and non-native species. 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, Utah serviceberry and Antelope bitterbrush increase. This causes the grasses and forbs to be suppressed. The community will be represented by 40 % grasses, 25 % Forbs and 35 % shrubs. This community will have around 10 – 20 % bare ground.

Community 2.3

Perennial cool season grass > forbs > fire tolerant shrubs > non-native species

Perennial Cool Season Grasses, Forbs, Fire tolerant Shrubs and non-native species: 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, Snowberry and Utah serviceberry to the point where they cannot gain dominance in the community. The plant community is represented with 70 % grasses, 20 % Forbs and 10 % Shrubs. The initial plant list works well in this situation as well. This community will likely have around 15 to 20 % bare ground.

Pathway a

Community 2.1 to 2.2

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

Pathway b

Community 2.1 to 2.3

Fire: Normally mid-summer, insects, prolonged drought and pathogens that kill and/or reduces the dominant shrub overstory. Fire is the most effective of these disturbances.

Pathway a

Community 2.2 to 2.3

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

perennial cool season grasses, insects, prolonged drought and pathogens that kill and/or reduces the dominant shrub overstory. Fire is the most effective of these disturbances.

Pathway a **Community 2.3 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**

3 - Utah Juniper/Invasion State This State has only two described Plant Communities but many variations of the represented ones are present. This is the State that this plant community will move to when there is a lack of fire (over exuberant fire control) and there is a source of Utah Juniper and/or Pinyon seed. Movement from community faze to community faze can and often is accelerated by overgrazing. The dominant aspect of the plant community is Utah juniper and Sandberg bluegrass if it moves from State (1) but the main grass will be Cheatgrass brome if it moves from state (2). With the coming of Cheatgrass brome this plant will always become the main grass on the site at this point in time. 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 state**

This community has a strong overstory of Utah Juniper and at times Pinyon but can still have an understory similar to community 2.1. This community will often have around 20 to 35 % bare ground. Fire is the surest means to bring this community from this state to the Current Potential State. Chaining can also be used if done properly and with a lot of caution.

Community 3.2 **Utah Juniper > Invasive Annuals State**

This community is present when 99 - 100% of the native plant community has been removed and only the Utah Juniper and/or Pinyon are left with only a sparse understory of invasive annuals are left on the site. This community will have around 35 to 50 % bare ground.

Pathway a **Community 3.1 to 3.2**

Overgrazing with or without drought over a prolonged period of time.

Pathway a **Community 3.2 to 3.1**

Fire, insects, prolonged drought and pathogens that kill and/or reduces the dominant shrub overstory. Fire is the most effective of these disturbances.

State 4 **Yellow rabbitbrush / Invasive Annuals**

This is the State that this Plant Community will move to when it is in an overgrazed and/or drought condition and not rested to allow recovery and/or burned (wild or controlled) without being seeded. The dominant aspect of the plant community is Cheatgrass brome, Yellow rabbitbrush, with a small amount of Bonneville big sagebrush.

Community 4.1 **yellow rabbitbrush > invasive annuals >= native perennials**

Yellow rabbitbrush, Invasive Annuals, native Perennials: This plant community consists of approximately 40 %

Yellow rabbitbrush, 45 % Invasive Annuals and 10 % Native Perennials with 5 % Native Annuals. This community will have around 20 – 35 % bare ground.

Community 4.2

Invasive annuals

Invasive Annuals: This plant community consists of approximately 85 % invasive annuals (mostly Cheatgrass brome and Japanese (Field) brome), and 12 % Native perennials with 3 % Native annuals. The community will have around 20 – 40 % bare ground.

Pathway a

Community 4.1 to 4.2

Increased fire frequency (from 10 to 15 years to 3 to 5 years) and intensity without follow-up management. Overgrazing can move this change along faster. In state (5) the Yellow rabbitbrush/Invasive annuals State in box 5.5 the fire frequency will remain at the 3 to 5 year interval. This condition is somewhat 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 changes to take place.

Pathway a

Community 4.2 to 4.1

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

State 5

Seeded Range State

This State exists when the site is cultivated and/or burned and planted to Introduced perennial plants and/or in some situations a mix of Native grasses and forbs with at times some Introduced plant species.

Community 5.1

Introduced perennial plants

The plant community here consists of Introduced and in some situations Native grasses, Forbs and sometimes native and/or introduced half-shrubs and/or shrubs. This State is often as productive as it is in the Current Potential State.

Community 5.2

Native shrubs >= Introduced perennial plants

This Faze exists when weather conditions and often management create the kind of situation where the right kind of episodic weather situation allows Bonneville big sagebrush and other Native plants to reestablish in the site.

Pathway a

Community 5.1 to 5.2

Time without catastrophic event. This was probably dependent on a specific chain of climatic events. Also heavy prolonged cattle grazing can cause this to happen.

Pathway a

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 20 to 40 years to 60 to 90 years and there is an introduction of Utah Juniper.

Transition T2b
State 2 to 4

Prolonged drought and/or prolonged overgrazing. Most often it is a combination of the two conditions that bring this condition into existence. Continued overgrazing and increase of the fire frequency over a very prolonged period of time i.e. 3 to 5 year fire frequency interval.

Transition T3b
State 3 to 4

- Continued overgrazing and increase of fire frequency over a very prolonged period of time i.e. 3 to 5 year fire frequency interval.

Transition T3a
State 3 to 5

Human caused disturbance i.e. mechanical treatment and seeding; chemical treatment and seeding etc.

Transition T4a
State 4 to 5

Human caused disturbance i.e. mechanical treatment and seeding; chemical treatment and seeding etc.

Restoration pathway R5a
State 5 to 2

Time with proper management that favors the Native Plants as they move back onto the site.

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 understory and the fire frequency is increased from 20 to 40 years to 60 to 90 years and there is an introduction of Utah Juniper.

Transition T5b
State 5 to 4

Continued overgrazing and increase of fire frequency over a very prolonged period of time i.e. 8 to 12 year fire frequency interval.

Additional community tables

Table 8. Community 1.1 plant community composition

				Annual Production	Foliar Cover
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Group	Common Name	Symbol	Scientific Name	(Kg/Hectare)	(%)
Shrub/Vine					
0	Primary Shrubs			504–807	
	Bonneville big sagebrush	ARTRB3	<i>Artemisia tridentata</i> ssp. <i>*bonnevillensis</i>	303–504	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	202–303	–
3	Secondary shrubs			202–605	
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	101–202	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	101–202	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	20–61	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	20–61	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	20–61	–
	granite prickly phlox	LIPU11	<i>Linanthus pungens</i>	20–40	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	20–40	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	20–40	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–20	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–20	–
	Woods' rose	ROWOU	<i>Rosa woodsii</i> var. <i>ultramontana</i>	0–20	–
Grass/Grasslike					
0	Primary Grasses			908–1412	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	303–504	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	202–303	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	202–303	–
1	Secondary Grasses			303–605	
	Grass, perennial	2GP	<i>Grass, perennial</i>	202–303	–
	Grass, annual	2GA	<i>Grass, annual</i>	101–202	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	61–101	–
	thickspike wheatgrass	ELLA3	<i>Elymus lanceolatus</i>	20–101	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	20–101	–
	muttongrass	POFE	<i>Poa fendleriana</i>	61–101	–
	beardless wheatgrass	PSSPI	<i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>	20–61	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	20–61	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	20–61	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	20–61	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	20–61	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	20–61	–
	oniongrass	MEBU	<i>Melica bulbosa</i>	20–61	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0–40	–
Forb					
0	Primary Forb			202–504	
	white sagebrush	ARLUC8	<i>Artemisia ludoviciana</i> ssp. <i>candicans</i>	61–101	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	61–101	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	61–101	–

2	Secondary Forbs			101-303	
	Forb, perennial	2FP	<i>Forb, perennial</i>	202-504	-
	Forb, annual	2FA	<i>Forb, annual</i>	101-202	-
	common yarrow	ACMI2	<i>Achillea millefolium</i>	20-101	-
	nettleleaf giant hyssop	AGUR	<i>Agastache urticifolia</i>	20-61	-
	Indian paintbrush	CASTI2	<i>Castilleja</i>	20-61	-
	purple milkvetch	ASAG2	<i>Astragalus agrestis</i>	20-61	-
	silverleaf milkvetch	ASAR4	<i>Astragalus argophyllus</i>	20-61	-
	Torrey's milkvetch	ASCA9	<i>Astragalus calycosus</i>	20-61	-
	painted milkvetch	ASCE	<i>Astragalus ceramicus</i>	20-61	-
	freckled milkvetch	ASLE8	<i>Astragalus lentiginosus</i>	20-61	-
	woollypod milkvetch	ASPU9	<i>Astragalus purshii</i>	20-61	-
	longstalk springparsley	CYLO	<i>Cymopterus longipes</i>	20-61	-
	Anderson's larkspur	DEAN	<i>Delphinium andersonii</i>	20-61	-
	twolobe larkspur	DENU2	<i>Delphinium nuttallianum</i>	20-61	-
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	20-61	-
	matted buckwheat	ERCA8	<i>Eriogonum caespitosum</i>	20-61	-
	cushion daisy	ERCO3	<i>Erigeron compactus</i>	20-61	-
	cutleaf daisy	ERCO4	<i>Erigeron compositus</i>	20-61	-
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	20-61	-
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	20-61	-
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	20-61	-
	sticky purple geranium	GEVI2	<i>Geranium viscosissimum</i>	20-61	-
	Lewis flax	LILE3	<i>Linum lewisii</i>	20-61	-
	prairie flax	LILEL2	<i>Linum lewisii</i> var. <i>lewisii</i>	20-61	-
	western stoneseed	LIRU4	<i>Lithospermum ruderale</i>	20-61	-
	Macdougal's biscuitroot	LOFOM	<i>Lomatium foeniculaceum</i> ssp. <i>macdougalii</i>	20-61	-
	Gray's biscuitroot	LOGR	<i>Lomatium grayi</i>	20-61	-
	Nevada biscuitroot	LONE	<i>Lomatium nevadense</i>	20-61	-
	Great Basin desertparsley	LOSI3	<i>Lomatium simplex</i> var. <i>simplex</i>	20-61	-
	lobeleaf groundsel	PAMU11	<i>Packera multilobata</i>	20-61	-
	low beardtongue	PEHU	<i>Penstemon humilis</i>	20-61	-
	carpet phlox	PHHOC	<i>Phlox hoodii</i> ssp. <i>canescens</i>	20-40	-
	smoothstem blazingstar	MELA2	<i>Mentzelia laevicaulis</i>	20-40	-
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	20-40	-
	yellow owl's-clover	ORLU2	<i>Orthocarpus luteus</i>	20-40	-
	tailcup lupine	LUCAC3	<i>Lupinus caudatus</i> ssp. <i>caudatus</i>	13-40	-
	stoneseed	LITHO3	<i>Lithospermum</i>	20-40	-
	manyflower stickseed	HAFL2	<i>Hackelia floribunda</i>	20-40	-
	common sunflower	HEAN3	<i>Helianthus annuus</i>	20-40	-
	scarlet gilia	IPAGA3	<i>Ipomopsis aggregata</i> ssp. <i>aggregata</i>	20-40	-
	Utah buttercup	RAJO	<i>Ranunculus jovis</i>	20-40	-

	lambstongue ragwort	SEIN2	<i>Senecio integerrimus</i>	20–40	–
	yellow fritillary	FRPU2	<i>Fritillaria pudica</i>	20–40	–
	yellow avalanche-lily	ERGR9	<i>Erythronium grandiflorum</i>	20–40	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	20–40	–
	white mariposa lily	CAEU	<i>Calochortus eurycarpus</i>	20–40	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	20–40	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	20–40	–
	tall annual willowherb	EPBR3	<i>Epilobium brachycarpum</i>	20–40	–
	Brandegees woollystar	ERBR3	<i>Eriastrum brandegeeeae</i>	20–40	–
	showy milkweed	ASSP	<i>Asclepias speciosa</i>	0–40	–
	wavyleaf thistle	CIUNU	<i>Cirsium undulatum</i> var. <i>undulatum</i>	20–40	–
	yellow spiderflower	CLLUL	<i>Cleome lutea</i> var. <i>lutea</i>	20–40	–
	miner's lettuce	CLPEP	<i>Claytonia perfoliata</i> ssp. <i>perfoliata</i>	20–40	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	20–40	–
	maiden blue eyed Mary	COPA3	<i>Collinsia parviflora</i>	20–40	–
	cushion cryptantha	CRCI2	<i>Cryptantha circumscissa</i>	20–40	–
	roundspike cryptantha	CRHU2	<i>Cryptantha humilis</i>	20–40	–
	tapertip onion	ALAC4	<i>Allium acuminatum</i>	20–40	–
	Nevada onion	ALNE	<i>Allium nevadense</i>	20–40	–
	textile onion	ALTE	<i>Allium textile</i>	20–40	–
	foothill deathcamas	ZIPA2	<i>Zigadenus paniculatus</i>	20–40	–
	flatbud pricklypoppy	ARMUR	<i>Argemone munita</i> ssp. <i>rotundata</i>	0–20	–
	hookedspur violet	VIADA	<i>Viola adunca</i> var. <i>adunca</i>	0–20	–
	upland yellow violet	VIPRL	<i>Viola praemorsa</i> ssp. <i>linguifolia</i>	0–20	–
	goosefoot violet	VIPUV2	<i>Viola purpurea</i> ssp. <i>venosa</i>	0–20	–
	mountain tarweed	MAGL2	<i>Madia glomerata</i>	0–20	–

Animal community

This site is suited for grazing by cattle and sheep during spring, summer, and fall.

Wildlife using this site include rabbit, coyote, sage grouse, pronghorn antelope, mule deer, and elk.

This is a short list of the more common species found. Many other species are present as well and migratory birds are present at times.

Hydrological functions

The soils are in hydrologic group B with runoff curves ranging from 61 to 79 depending on hydrologic condition.

Recreational uses

Resources that have special aesthetic and landscape values are grassland aesthetics. Some recreation uses of this site are camping, hiking and hunting.

Wood products

There will be some opportunity to harvest firewood and fence posts on this site when one needle pinyon and Utah

juniper have invaded the site.

Other information

Threatened and endangered species include plants and animals.

Inventory data references

This site was first written back in 1994. When it was written and revised in 2014 it was done with the 26 ECS-417s and 2 UT-Range-2 completed in the 1900s and 4 UT-Range-2 done from 2009 to 2014 along with personal knowledge collected by Brock Benson Rangeland Management Specialist working in the D28A MLRA for 30 years.

Other references

Type Location: West Hills located West of Tremonton, Utah and the Wasatch Mountains East of Provo, Utah

Contributors

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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	02/09/2010
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** None to few. Any rills present should be short in length (less than 1.5 feet long) and follow the surface micro-features. If rills are present, they should be widely spaced and not connected. Old rills will weather quickly because of loamy surface textures. Frost heaving can accelerate recovery. 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 be meandering and may show minor evidence of erosion. They will be short (1 to 3 feet long) and look stable. As slopes increase water flow patterns will tend to get longer. There can be very slight evidence of deposition.

3. **Number and height of erosional pedestals or terracettes:** Plants should show slight (? – ½ in.) pedestaling. Pedestaling 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 very little to 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):** There will be 8 to 20 % bare ground. This will show as 8 – 14 % bare ground on slopes up to 25 % and 10 – 20 % bare ground on slopes from 25 % up. There should be very few if any spaces greater than one foot square.
-
5. **Number of gullies and erosion associated with gullies:** 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:** Slight wind generated soil movement is normal. Wind caused blowouts are very 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. Very 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 de-compositional and incorporated (Average Soil Stability Class 5). This should be observable in that water flow patterns that 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 10 to 16 inches thick. Color is a grayish brown 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, which will increased the numbers of rills and/or lead to 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.
-
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: Bonneville big sagebrush, Snowberry, Bluebunch wheatgrass, Slender Wheatgrass;

Sub-dominant: Muttongrass, Western wheatgrass, Antelope bitterbrush.

Other: other grasses, other forbs, other shrubs

Additional: Assumed fire cycle of 30-55 years. Perennial bunchgrasses > non-sprouting shrubs > rhizomatous grasses > fire tolerant shrubs » annuals > invaders such as Cheatgrass brome. Plant community will have Sub-dominants: Muttongrass, Western wheatgrass, Antelope bitterbrush. The perennial bunchgrass about 50 to 70 %; forbs about 8 to 25%; non-sprouting shrub 10 to 25 % (composition by biomass) are the functional groups that are expected on this site.

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 percent of decadent and/or dead plants should not exceed 5 %. This may increase during long-term drought periods.
-
14. **Average percent litter cover (%) and depth (in):** 15 to 30 % of the ground surface should have a litter covering that is within 1 inch or less of the soil surface. Excess litter may accumulate in the absence of disturbance. Vegetative production may be reduced if litter cover exceeds 40%.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** On an average production year expect approximately 1400 to 1800 lb./acre on slopes 0 to 20 % and 1100 to 1500 lb./acre on slopes greater 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:** Potential invasive (including noxious) species (native and non-native). List species which characterize degraded states and which, after a threshold is crossed, "can, and often do, continue to increase regardless of the management of the site and may eventually dominate the site": As ecological condition deteriorates due to outside disturbances, perennial bunch grasses decrease while less desirable plants like yellow rabbitbrush, and prickly pear increase along with invasive plants like pinyon pine, Utah juniper and cheatgrass brome. When the historic climax plant community is burned, Bonneville big sagebrush will decrease while perennial grasses, forbs and Low rabbitbrush increase markedly. Broom snakeweed and Antelope bitterbrush increase to a much lesser extent. 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.
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