

Ecological site R034AY266WY **Shallow Sandy Foothills and Basins West (SwSy)**

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.



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.

Associated sites

R034AY222WY	Loamy Foothills and Basins West (Ly) Loamy
R034AY250WY	Sandy Foothills and Basins West (Sy) Sandy

Similar sites

R034AY262WY	Shallow Loamy Foothills and Basins West (SwLy) Shallow Loamy (SwLy) 10-14 West has finer soil texture and more diverse plant species.
R034AY166WY	Shallow Sandy Green River and Great Divide Basins (SwSy) Shallow Sandy (SwSy) 7-9GR has lower production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site usually occurs in an upland position on south and west facing slopes, but may be found on all slopes and positions. Elevations are mostly above 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	1,981–2,286 m
Slope	0–45%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 10-14 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about August 15. Some green up of cool season plants usually occurs in September depending upon fall moisture occurrences.

The following information is from the “Pinedale” climate station:

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days): 18 67 July 5 – August 15

Freeze-free period (days): 53 97 June 15 – August 24

Annual Precipitation (inches): <7.18 >13.94 (2 years in 10)

Average annual precipitation: 11.29 inches

Average annual air temperature: 35.9 F (20.4 F Avg. Min. to 51.4 F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=wy> website. Other climate stations representative of this precipitation zone include “Border 3 N” and Kemmerer Wtr Trtmt” in Lincoln County; “Evanston 1 E” in Uinta County; and “Merna” in Sublette County.

Table 3. Representative climatic features

Frost-free period (average)	67 days
Freeze-free period (average)	97 days
Precipitation total (average)	356 mm

Influencing water features

Soil features

The soils of this site are shallow (10 to 20 inches to hard or soft bedrock, or less commonly, sandy-skeletal material), well-drained soils formed in residuum or eolian deposits. These soils have moderate to rapid permeability and may occur on all slopes.

Major Soil Series correlated to this site include: Abarca, Blackhall, Byrnie, and Tigon series.

Other Soil Series in MLRA 34A correlated to this site include: Cheadle, Blackhall, Quealy, Rentsac, Crestman, and Onason series.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	3.3–6.35 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

As this site deteriorates from improper grazing management, species such as fringed sagewort, Sandberg bluegrass, needleleaf sedge, and unpalatable forbs will increase. Bunchgrasses such as bluebunch wheatgrass, needleandthread, and Indian ricegrass will decrease in frequency and production.

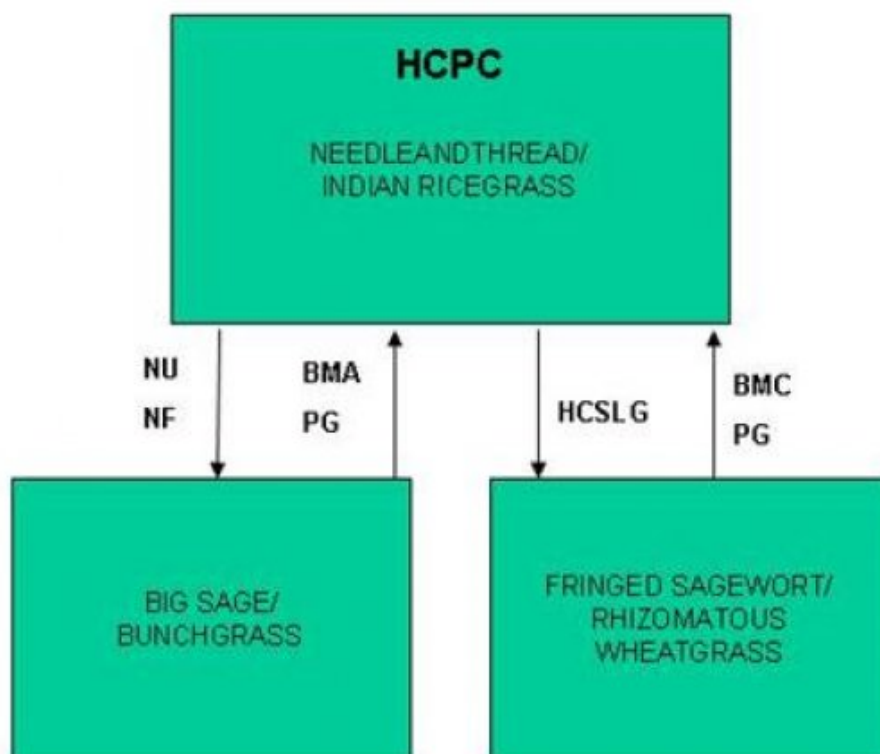
The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model

Site Type: Rangeland
MLRA: 34A-Cool Central Desertic Basins and Plateaus

Shallow Sandy (SwSy) 10-14W
R034AY266WY



BMA – Brush Management (all methods)
BMC – Brush Management (chemical)
BMF – Brush Management (fire)
BMM – Brush Management (mechanical)
CSP – Chemical Seedbed Preparation
CSLG – Continuous Season-long Grazing
DR – Drainage
CSG – Continuous Spring Grazing
HB – Heavy Browse
HCSLG – Heavy Continuous Season-long Grazing
HI – Heavy Inundation
LPG – Long-term Prescribed Grazing
MT – Mechanical Treatment (chiseling, ripping, pitting)

NF – No Fire
NS – Natural Succession
NWC – Noxious Weed Control
NWI – Noxious Weed Invasion
NU – Nonuse
P&C – Plow & Crop (including hay)
PG – Prescribed Grazing
RPT – Re-plant Trees
RS – Re-seed
SGD – Severe Ground Disturbance
SHC – Severe Hoof Compaction
WD – Wildlife Damage (Beaver)
WF – Wildfire

State 1
Needleandthread/Indian Ricegrass Plant Community (HCPC)

Community 1.1
Needleandthread/Indian Ricegrass Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is about 70% grasses or grass-like plants, 15% forbs, and 15% woody plants. The major grasses include needleandthread, Indian ricegrass, thickspike wheatgrass, and bluebunch wheatgrass. Other grasses include Letterman needlegrass, Sandberg, Canby, and mutton bluegrass, prairie junegrass, bottlebrush squirreltail, plains reedgrass, and needleleaf sedge. Wyoming big sagebrush, green rabbitbrush, and winterfat are the major woody plants. A typical plant composition for this state consists of needleandthread 10-20%, Indian ricegrass 5-20%, thickspike wheatgrass 5-15%, bluebunch wheatgrass 5-15%, other grasses and grass-like plants 10-20%, perennial forbs 5-15%, Wyoming big sagebrush 1-10%, up to 5% green rabbitbrush, and up to 5% winterfat. Ground cover, by ocular estimate, varies from 15-25%. The total annual production (air-dry weight) of this state is about 900 pounds per acre, but it can range from about 700 lbs./acre in unfavorable years to about 1200 lbs./acre in above average years. The state is stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Nonuse and No Fire will convert this plant community to the Big Sage/Bunchgrass State. • Heavy Continuous Season-long Grazing will convert this plant community to the Fringed Sagewort/Rhizomatous Wheatgrass State.

Figure 4. Plant community growth curve (percent production by month).
WY0301, 34AC, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	40	50			5			

State 2
Big Sage/Bunchgrass Plant Community

Community 2.1
Big Sage/Bunchgrass Plant Community

This plant community is the result of nonuse and lack of fire. The understory of grass includes Indian ricegrass, needleandthread, and rhizomatous wheatgrass. Wyoming big sagebrush is dominant, often exceeding 20% of the annual production. Green rabbitbrush will also increase, lowering herbaceous production. The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 600 lbs./acre in unfavorable years to about 1100 lbs./acre in above average years. The state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact, however forage value will decrease and wildlife values will shift toward different species. The watershed is functioning. Transitional pathways leading to other plant communities are as follows: • Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Historic Climax Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

Figure 5. Plant community growth curve (percent production by month).
WY0301, 34AC, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	40	50			5			

State 3
Fringed Sagewort/Rhizomatous Wheatgrass Plant Community

Community 3.1

Fringed Sagewort/Rhizomatous Wheatgrass Plant Community

This plant community is the result of frequent and severe grazing. With sagebrush removed, it is dominated by fringed sagewort. Thickspike wheatgrass, Letterman needlegrass, needleleaf sedge, and unpalatable annual and perennial forbs dominate the herbaceous understory. There is a substantial amount of bare ground. The total annual production (air-dry weight) of this state is about 400 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 700 lbs./acre in above average years. The soil is not protected and erosion will increase if management is not changed. The biotic integrity may be reduced due to low vegetative production and blowing sand. The watershed is functioning at risk. Transitional pathways leading to other plant communities are as follows: • Chemical Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Historic Climax Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

Figure 6. Plant community growth curve (percent production by month).
WY0301, 34AC, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	40	50			5			

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				101–202	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	101–202	–
2				50–202	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	50–202	–
3				50–151	
	Montana wheatgrass	ELAL7	<i>Elymus albicans</i>	50–151	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	50–151	–
4				50–151	
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	50–151	–
5				101–202	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–50	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0–50	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–50	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–50	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–50	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–50	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–50	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–50	–
Forb					
6				50–151	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–50	–
	yarrow	ACHIL	<i>Achillea</i>	0–50	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–50	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–50	–

	milkvetch	ASTRA	<i>Astragalus</i>	0–50	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–50	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0–50	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–50	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–50	–
	aster	EUCEP2	<i>Eucephalus</i>	0–50	–
	granite prickly phlox	LIPU11	<i>Linanthus pungens</i>	0–50	–
	nailwort	PARON	<i>Paronychia</i>	0–50	–
	beardtongue	PENST	<i>Penstemon</i>	0–50	–
	phacelia	PHACE	<i>Phacelia</i>	0–50	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–50	–
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0–50	–
	clover	TRIFO	<i>Trifolium</i>	0–50	–
	violet	VIOLA	<i>Viola</i>	0–50	–
Shrub/Vine					
7				50–101	
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	50–101	–
8				50–101	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–50	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–50	–

Animal community

Animal Community – Wildlife Interpretations

Needleandthread/Indian Ricegrass Plant Community (HCPC): Suitable thermal and escape cover for most wildlife is limited due to the low height and density of woody plants. However, sagebrush, which can approach 15% protein and 40-60% digestibility, provides important winter forage for mule deer and antelope. Open and bare ridges are suitable locations for sage grouse leks. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles.

Big Sage/Bunchgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community.

Fringed Sagewort/Rhizomatous Wheatgrass Plant Community: These communities provide limited forage for antelope and mule deer due to low production. Generally, these are not target plant communities for wildlife habitat management.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity.

Plant Community Production Carrying Capacity*

(lb./ac) (AUM/ac)

Needleandthread/Indian Ricegrass (HCPC) 700-1200 .2

Big Sage/Bunchgrass 600-1100 .17

Fringed Sagewort/Rhizomatous Wheatgrass 200-700 .1

* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration is low when soils are wet due to shallow depth to bedrock and/or impervious subsurface layer. Runoff potential for this site varies from high to moderate depending on soil depth, bedrock type (impervious vs. permeable) and ground cover (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogammic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Inventory Data References (narrative)

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: Bill Christensen, Range Management Specialist, NRCS; Karen Clause, Range Management Specialist, NRCS; and Everet Bainter, Range Management Specialist, NRCS. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References

Data Source Number of Records Sample Period State County

SCS-RANGE-417 15 1966-1988 WY Sublette & others

Contributors

K. Clause

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem

condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	K. Clause, E. Bainter
Contact for lead author	karen.clause@wy.usda.gov or 307-367-2257
Date	03/16/2007
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rare to nonexistent. Where present, short and widely spaced.

2. **Presence of water flow patterns:** Barely observable.

3. **Number and height of erosional pedestals or terracettes:** Rare to nonexistent.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground can range from 25-55%.

5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Rare to nonexistent.

7. **Amount of litter movement (describe size and distance expected to travel):** Rare to nonexistent.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Stability Index ratings range from 1 (interspaces) to 6 (under plant canopy), but average values should be 2.7 or greater.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil data is limited for this site. Described A-horizons vary from 1-10 inches (3-25 cm) with OM of .5 to 1.5%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 65-80% grasses, 15% forbs, and 5-20% shrubs.

Evenly distributed plant canopy (30-60%) and litter plus slow to moderately rapid infiltration rates result in minimal runoff. Basal cover is typically less than 5% for this site and does very little to effect runoff on this site. Surface rock fragments of 10-20% provide stability to the site, but reduce infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. A coarse, dry subsurface will often refuse a probe, causing misidentification of a compaction layer. Most soil profiles must be described by hand dug holes.
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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:

Sub-dominant:

Other:

Additional: Mid-size, cool season bunchgrasses>> perennial shrubs>cool season rhizomatous grasses=perennial forbs>short, cool season bunchgrasses

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub component.
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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 10-25% of total canopy measurement with total litter (including beneath the plant canopy) from 20-50% expected. Herbaceous litter depth typically ranges from 3-10mm. Woody litter can be up to a couple inches (4-6 cm).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 700-1200 lb/ac (900 lb/ac average); Metric 784-1344 kg/ha (1008 kg/ha average).
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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:** Bare ground greater than 75% is the most common indicator of a threshold being crossed. Rabbitbrush, granite prickly phlox, Sandberg bluegrass, buckwheat, and phlox are common increasers. Annual weeds such as kochia, mustards, lambsquarter, and Russian thistle are common invasive species in disturbed sites.
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17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.
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