

Ecological site R034AY176WY **Very Shallow Green River and Great Divide Basins (VS)**

Last updated: 2/26/2025
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

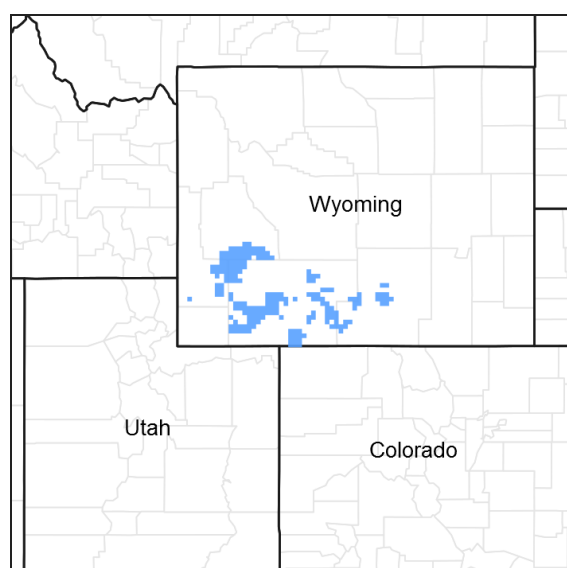


Figure 1. Mapped extent

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

R034AY162WY	Shallow Loamy Green River and Great Divide Basins (SwLy) Shallow Loamy
R034AY158WY	Shallow Clayey Green River and Great Divide Basins (SwCy) Shallow Clayey

Similar sites

R034AY156WY	Shallow Breaks Green River and Great Divide Basins (SwBr) Shallow Breaks (SwB) 7-9GR has higher production and juniper is the dominant woody species.
R034AY276WY	Very Shallow Foothills and Basins West (VS) Very Shallow (VS) 10-14W has higher production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site usually occurs in upland positions with steep slopes. It is prevalent on wind swept ridges with 25 to 50% slopes.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Escarpment (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,829–2,195 m
Slope	1–70%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 7-9 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 July 15. Some green up of cool season plants may occur in September if moisture is available.

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 “Bitter Creek”, “Farson”, “Rock Springs FAA AP”, and “Wamsutter” in Sweetwater County; “Church Buttes Gas PLT”, and Mountain View” in Uinta County; “Fontenelle”, “La Barge”, and “Sage 4 NNW” in Lincoln County; and “Big Piney” in Sublette County.

Table 3. Representative climatic features

Frost-free period (average)	121 days
Freeze-free period (average)	132 days
Precipitation total (average)	229 mm

Influencing water features

There are no water features associated with this site.

Soil features

Soils of this site are generally less than 8 inches deep, but this site will include areas of exposed bedrock and pockets of deep soil. Bedrock may be fractured which allows brush species to grow. Soils are well drained. Roots penetrate the soil material readily above the bedrock and to a very limited extent into rock fractures.

Major Soil Series correlated to this site include: Wint and a few phases of Hatterton and Huguston series.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Fine sandy loam (3) Very fine sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	5–20 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	1.52–4.06 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–10 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

As this site deteriorates, species such as green rabbitbrush will increase. Cool season bunchgrasses such as bluebunch wheatgrass, Indian ricegrass, and needleandthread will decrease in frequency and production. Cheatgrass often invades. This site has relatively low productivity potential, and is not well suited to grazing improvement practices unless treated as part of a larger unit containing more productive areas.

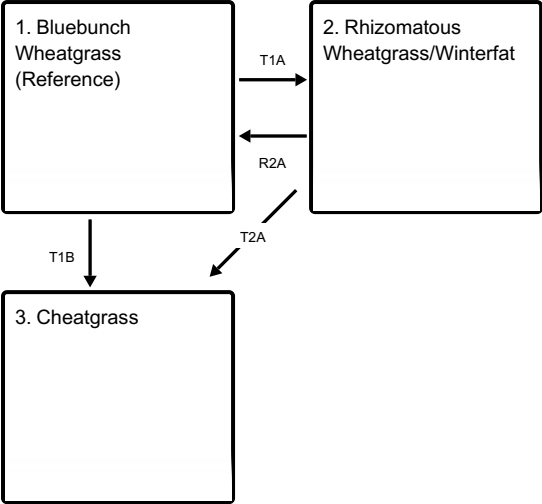
These plant communities narratives may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC’s) will be determined by 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.

The Reference 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.

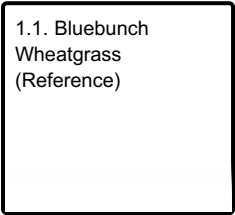
The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model

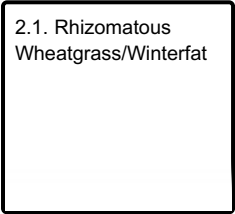
Ecosystem states



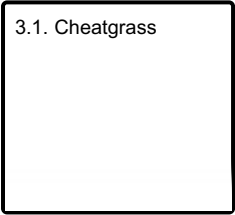
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Bluebunch Wheatgrass (Reference)

Community 1.1
Bluebunch Wheatgrass (Reference)

The interpretive plant community for this site is the Reference Plant Community. Potential vegetation is estimated at 65% grasses or grass-like plants, 10% forbs, and 25% woody plants. The major grasses include bluebunch wheatgrass, thickspike wheatgrass, Indian ricegrass, bottlebrush squirreltail, and needleandthread. Other grasses include Sandberg bluegrass, prairie junegrass, needleleaf sedge, and threeawn. At higher elevations, juniper may occur as the dominant woody plant. Other woody plants may include bud, big, and low sagebrush, green rabbitbrush, winterfat, skunkbush sumac, limber pine, and spiny horsebrush. A typical plant composition for this state consists of bluebunch wheatgrass 20-40%, thickspike wheatgrass 15-30%, needleandthread 10-20%, Indian ricegrass 10-20%, bottlebrush squirreltail 10-20%, other grasses and grass-like plants 10-20%, perennial forbs 5-10%, juniper 1-10%, and 5-15% other woody plants. When this occurs at lower elevations and on windswept ridges, the woody component may lean toward winterfat or be absent. Ground cover, by ocular estimate, varies from 15-20%. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from

about 200 lbs./acre in unfavorable years to about 400 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: • Severe Ground Disturbance will convert this plant community to the Cheatgrass State. • Continuous Season-long Grazing will convert the plant community to the Rhizomatous Wheatgrass/Winterfat State.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	146	219	291
Shrub/Vine	56	84	112
Forb	22	34	45
Total	224	337	448

**Figure 5. Plant community growth curve (percent production by month).
WY0401, 7-9GR, UPLAND SITES. ALL UPLAND SITES.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

State 2 Rhizomatous Wheatgrass/Winterfat

Community 2.1 Rhizomatous Wheatgrass/Winterfat

This plant community is a result of frequent and severe grazing. The stand is composed of almost entirely rhizomatous wheatgrass and winterfat with such forbs as phlox and goldenweed present as well. This state is commonly found on exposed, windswept ridges that are subject to harsh climatic conditions as well as severe winter use due to their exposed nature. The total annual production (air-dry weight) of this state is about 200 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 300 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: • Severe Ground Disturbance will convert this plant community to the Cheatgrass State. • Long-term Prescribed Grazing will return this state to near Reference Plant Community (Bluebunch Wheatgrass State).

**Figure 6. Plant community growth curve (percent production by month).
WY0401, 7-9GR, UPLAND SITES. ALL UPLAND SITES.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

State 3 Cheatgrass

Community 3.1 Cheatgrass

This plant community is a result of severe ground disturbance either with or without improper grazing use. Green rabbitbrush, fringed sagewort, cheatgrass, and annual forbs are significant components of this plant community. The total annual production (air-dry weight) of this state is about 100 pounds per acre, but it can range from about 50 lbs./acre in unfavorable years to about 250 lbs./acre in above average years. The state is unstable and vulnerable to excessive erosion. The biotic integrity of this plant community is at risk depending on how far a shift has occurred in plant composition toward cheatgrass and annual forbs. The watershed is usually at risk or

nonfunctioning due to an increase in bare ground. Transitional pathways leading to other plant communities are as follows: It is not often practicable or economically feasible to convert this plant community at the present time.

**Figure 7. Plant community growth curve (percent production by month).
WY0401, 7-9GR, UPLAND SITES. ALL UPLAND SITES.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

Transition T1A State 1 to 2

Continuous Season-long Grazing will convert the plant community to the Rhizomatous Wheatgrass/Winterfat State.

Transition T1B State 1 to 3

Severe Ground Disturbance will convert this plant community to the Cheatgrass State.

Restoration pathway R2A State 2 to 1

Long-term Prescribed Grazing will return this state to near Reference Plant Community (Bluebunch Wheatgrass State).

Transition T2A State 2 to 3

Severe Ground Disturbance will convert this plant community to the Cheatgrass State.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				67–135	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	67–135	–
2				50–101	
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	50–101	–
3				34–67	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	34–67	–
4				34–67	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	34–67	–
5				34–67	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	34–67	–
6				34–67	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–17	–
	threeawn	ARIST	<i>Aristida</i>	0–17	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–17	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–17	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–17	–

	Sanicula	POLE	Forb	0-17	—
Forb					
7				17–34	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–17	—
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–17	—
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–17	—
	milkvetch	ASTRA	<i>Astragalus</i>	0–17	—
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–17	—
	fleabane	ERIGE2	<i>Erigeron</i>	0–17	—
	buckwheat	ERIOG	<i>Eriogonum</i>	0–17	—
	aster	EUCEP2	<i>Eucephalus</i>	0–17	—
	toadflax	LINAR	<i>Linaria</i>	0–17	—
	granite prickly phlox	LIPU11	<i>Linanthus pungens</i>	0–17	—
	desertparsley	LOMAT	<i>Lomatium</i>	0–17	—
	beardtongue	PENST	<i>Penstemon</i>	0–17	—
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–17	—
	stonecrop	SEDUM	<i>Sedum</i>	0–17	—
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–17	—
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0–17	—
	clover	TRIFO	<i>Trifolium</i>	0–17	—
Tree					
8				3–34	
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	3–34	—
Shrub/Vine					
9				17–50	
	little sagebrush	ARAR8	<i>Artemisia arbuscula</i>	0–17	—
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–17	—
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–17	—
	mountain mahogany	CERCO	<i>Cercocarpus</i>	0–17	—
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–17	—
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–17	—
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	0–17	—
	limber pine	PIFL2	<i>Pinus flexilis</i>	0–17	—
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–17	—
	shortspine horsebrush	TESP2	<i>Tetradymia spinosa</i>	0–17	—

Animal community

Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass Plant Community (HCPC): When blown clear, this plant community provides limited winter forage for large grazers when snow depth prevents foraging on other sites. Otherwise, it is mostly used by wildlife in transit to other habitats. When found proximal to taller sagebrush, these sites can be suitable sage grouse lek locations.

Rhizomatous Wheatgrass/Winterfat Plant Community: This plant community may be useful for the same wildlife that

would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

Cheatgrass Plant Community: This plant community exhibits a low level of plant species diversity. It is not a desirable plant community to select as a wildlife habitat management objective.

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 (lb./ac) and Carrying Capacity* (AUM/ac)

Bluebunch Wheatgrass (HCPC) 200-400 lb./ac and .09 AUM/ac

Rhizomatous Wheatgrass/Winterfat 100-300 lb./ac and .06 AUM/ac

Cheatgrass 50-250 lb./ac and .02 AUM/ac

* - 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 and soil depth are the principal factors limiting forage production on this site. This site is dominated by soils in hydrologic group C and D. Infiltration ranges from very slow to slow. Runoff potential for this site varies from moderate to high depending on soil hydrologic group, depth and fracturing of bedrock, slope, and ground cover (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies may be present, but should be small. Water flow patterns should be barely distinguishable. Pedestals are only slightly present in association with bunchgrasses such as bluebunch wheatgrass. 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. Wildflowers that bloom throughout the growing season have esthetic values that appeal to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

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. 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.

Contributors

Karen Clause

Approval

Kirt Walstad, 2/26/2025

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	03/16/2007
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- Number and extent of rills:** Some rills to be expected on this site. Depending on slope, rills range from .5-2 inches (1-5 cm) wide and are found every 3-6 feet (1-2 m).

- Presence of water flow patterns:** Some observable.

- Number and height of erosional pedestals or terracettes:** Slight pedestalling evident.

- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground can range from 50-75%.

- Number of gullies and erosion associated with gullies:** Active gullies, where present, should be rare.

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Minimal to nonexistent.
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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Stability Index ratings range from 1 (interspaces) to 5 (under plant canopy), but average values should be 2.0 or greater.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Currently no soil series are correlated to this ecological site. Soil Organic Matter of less than .5% is expected.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 65-75% grasses, 10% forbs, and 15-25% shrubs. Minimal plant canopy (10-40%) and litter, steep slopes, plus moderate infiltration rates result in slight to moderate runoff. Basal cover is typically less than 5% and does very little to effect runoff on this site.
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer exists, but shallow depth to and exposed bedrock may be mistaken for a compaction layer.
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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>>cool season rhizomatous grasses>perennial shrubs/trees>short, cool season bunchgrasses=perennial forbs
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub/tree component.
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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 5-15% of total canopy measurement with total litter (including beneath the plant canopy) from 5-30% expected. Herbaceous litter depth is typically very shallow, ranging from 1-5mm. Woody litter can be up to several inches (>8 cm).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 200-400 lb/ac (300 lb/ac average); Metric: 224-448 kg/ha (336 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 85% and the presence of cheatgrass are the most common indicators of a threshold being crossed. Rabbitbrush, Sandberg bluegrass, and phlox are common increasers. Annual weeds such as cheatgrass, halogeton, kochia, 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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