

Ecological site R034AY144WY Saline Upland Green River and Great Divide Basins (SU)

Last updated: 9/28/2023
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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.

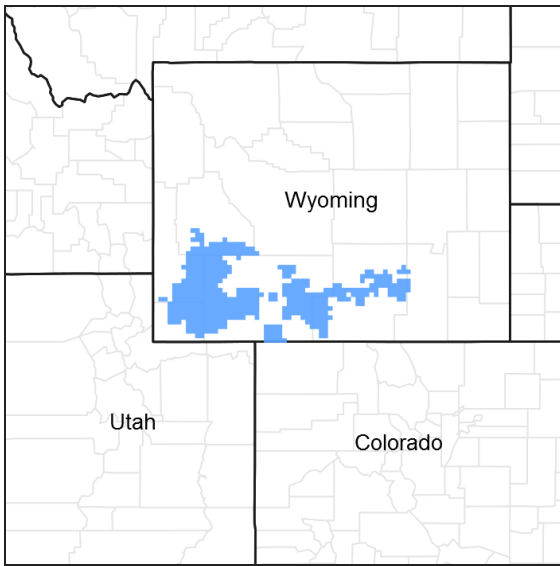


Figure 1. Mapped extent

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

R034AY138WY	Saline Lowland Green River and Great Divide Basins (SL) Saline Lowland
R034AY140WY	Saline Lowland Drained Green River and Great Divide Basins (SLDr) Saline Lowland, drained
R034AY154WY	Shale Green River and Great Divide Basins (Sh) Shale

Similar sites

R034AY138WY	Saline Lowland Green River and Great Divide Basins (SL) Saline Lowland (SL) 7-9GR has higher production with greasewood as a dominant woody species, but with an insignificant amount of Gardner's saltbush.
R034AY140WY	Saline Lowland Drained Green River and Great Divide Basins (SLDr) Saline Lowland (SLdr) 7-9GR has greasewood as a dominant woody species with a significant amount of Gardner's Saltbush.
R034AY244WY	Saline Upland Foothills and Basins West (SU) Saline Upland (SU) 10-14W has higher production.

R034AY154WY	Shale Green River and Great Divide Basins (Sh) Shale (Sh) 7-9GR has lower production and is located in a more upland, sloping position.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site usually occurs in a lowland position, but can occur on all slopes and in all positions. The slopes vary from 1 to 25%, but are mostly 1 to 10%.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace (3) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,829–2,195 m
Slope	0–25%
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

These soils commonly are at least 15" deep to very deep, saline and commonly sodic soils. They are composed of mostly fine alluvium sediment with excess sodium. Surface clays may disperse when wetted and inhibit infiltration. Permeability and available water capacity are also restricted.

Major Soil Series correlated to this site include: Youjay, Debone, Laney, Merna, and Sandbranch.

Other Soil Series correlated in MLRA 34 include: Thayer and Zegro series with some phases of Monte, Shellcreek, Dines, Haternus, and Westvaco series.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	38–152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.81–8.13 cm
Calcium carbonate equivalent (0-101.6cm)	5–15%
Electrical conductivity (0-101.6cm)	8–32 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	13–20
Soil reaction (1:1 water) (0-101.6cm)	8.4–9.6
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As this site deteriorates from improper grazing management, species such as halogeton and annual forbs will invade. Indian ricegrass, bud sagebrush, and Gardner's saltbush will decrease in frequency and production.

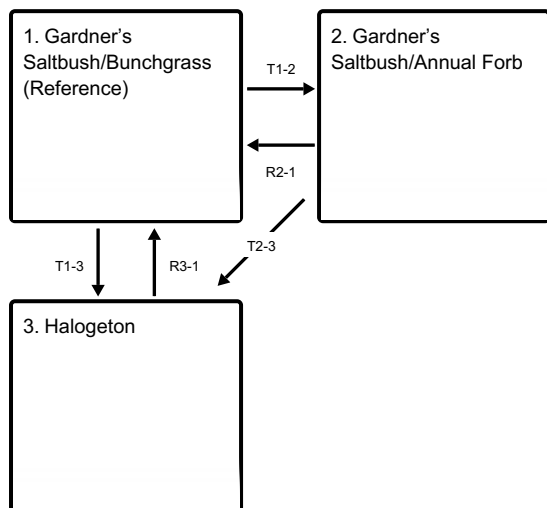
These plant communities narratives may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some 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.

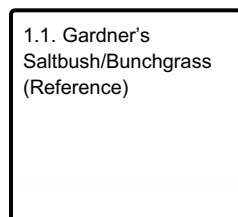
The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model

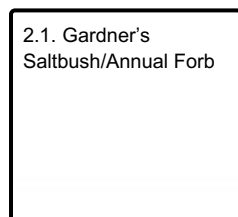
Ecosystem states



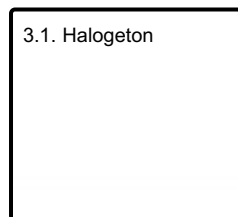
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Gardner's Saltbush/Bunchgrass (Reference)

Community 1.1
Gardner's Saltbush/Bunchgrass (Reference)

The interpretive plant community for this site is the Reference Plant Community. Potential vegetation is about 50% grasses or grass-like plants, 5% forbs, and 45% woody plants. Saline tolerant plants dominate this site. The major grasses include bottlebrush squirreltail and Indian ricegrass. Other grasses may include rhizomatous wheatgrass, needleandthread, Sandberg bluegrass, and Salina wildrye. Gardner's saltbush and bud sagebrush are the dominant woody plants. Other woody plants may include greasewood and winterfat. A typical plant composition for this state consists of bottlebrush squirreltail 15-30%, Indian ricegrass 15-25%, other grasses and grass-like plants 5-20%, perennial forbs 1-5%, Gardner's saltbush 25-45%, bud sagebrush 5-15%, and 5-10% other woody species. This state provides valuable winter grazing for domestic livestock. Ground cover, by ocular estimate, varies from 20-40%. 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 600 lbs./acre in above average years. This state is fragile, but well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows for some drought resistance. This is a sustainable plant community, but is difficult to reestablish when damaged. (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 Halogeton State.
- Continuous Season-long Grazing will convert this plant community to the Gardner's Saltbush/Annual Forb State.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	112	224	336
Shrub/Vine	101	202	303
Forb	11	22	34
Total	224	448	673

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

Gardner's Saltbush/Annual Forb

Community 2.1

Gardner's Saltbush/Annual Forb

This plant community is a result of moderate to heavy continual grazing use. Gardner's saltbush remains the dominant woody plant, however frequency and production is decreased. Grasses are replaced by annual and perennial forbs. The total annual production (air-dry weight) of this state is about 250 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 500 lbs./acre in above average years. The site is at risk and not well protected from excessive erosion. Grazing for wildlife and cattle has been reduced. The biotic integrity of this plant community is not intact. The amount of bare ground puts the watershed at risk for increased runoff. Transitions or pathways leading to other plant communities are as follows:

- Severe Ground Disturbance will convert this plant community to the Halogeton State.
- Prescribed grazing will prevent further deterioration and over the long-term may return this state to near Reference Plant Community (Gardner's Saltbush/Bunchgrass 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

Halogeton

Community 3.1 Halogeton

This plant community is a result of severe ground disturbance. Halogeton, bottlebrush squirreltail, and bare ground are a major part of this state. Sparse saline tolerant grasses can be found in the understory with the balance made up of annual forbs. 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 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 halogeton and annual forbs. The watershed is at risk as bare ground increases. Transitional pathways leading to other plant communities are as follows: • Chemical Seedbed Preparation and Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this plant community to near Reference Plant Community (Gardner's Saltbush/Bunchgrass State) although halogeton will remain a part of the plant community. Additional deferment may be necessary and should be prescribed on an individual site basis.

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 T1-2 State 1 to 2

Continuous Season-long Grazing will convert this plant community to the Gardner's Saltbush/Annual Forb State.

Transition T1-3 State 1 to 3

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

Restoration pathway R2-1 State 2 to 1

Prescribed grazing will prevent further deterioration and over the long-term may return this state to near Reference Plant Community (Gardner's Saltbush/Bunchgrass State).

Transition T2-3 State 2 to 3

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

Restoration pathway R3-1 State 3 to 1

Chemical Seedbed Preparation and Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this plant community to near Reference Plant Community (Gardner's Saltbush/Bunchgrass State) although halogeton will remain a part of the plant community. Additional deferment may be necessary and should be prescribed on an individual site basis.

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	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	67–135	–
2				67–112	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	67–112	–
3				22–90	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–22	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0–22	–
	saline wildrye	LESA4	<i>Leymus salinus</i>	0–22	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–22	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–22	–
Forb					
4				4–22	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–22	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–22	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–22	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–22	–
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	0–22	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–22	–
	phlox	PHLOX	<i>Phlox</i>	0–22	–
	princesplume	STANL	<i>Stanleya</i>	0–22	–
	woodyaster	XYLOR	<i>Xylorhiza</i>	0–22	–
	deathcamas	ZIGAD	<i>Zigadenus</i>	0–22	–
Shrub/Vine					
5				112–202	
	Gardner's saltbush	ATGA	<i>Atriplex gardneri</i>	112–202	–
6				22–67	
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	22–67	–
7				22–45	
	birdfoot sagebrush	ARPE6	<i>Artemisia pedatifida</i>	0–22	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–22	–
	greasewood	SAVE4	<i>Sarcobatus vermiculatus</i>	0–22	–

Animal community

Animal Community – Wildlife Interpretations

Gardner's Saltbush/Bunchgrass Plant Community (HCPC): The predominance of woody plants in this plant community provides winter grazing for mule deer and antelope. Suitable thermal and escape cover may be limited due to the low quantities of tall woody plants. Sagebrush obligate species may frequent the area, but do not prefer this habitat. When found adjacent to sagebrush dominated states, this plant community may provide lek sites for sage grouse. It provides suitable habitat for prairie dog towns, badgers, burrowing owls, and other ground-burrowing animals.

Gardner's Saltbush/Annual Forb 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.

Halogeton 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)

Gardner's Saltbush/Bunchgrass (HCPC) 200-600 lb./ac and .1 AUM/ac

Gardner's Saltbush/Annual Forb 100-500 lb./ac and .09 AUM/ac

Halogeton 50-250 lb./ac and .03 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 salinity/alkalinity are the principal factors limiting forage production on this site. This site is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from slow to moderate. Runoff potential for this site varies from moderate to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (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 may be present. Cryptogammic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides limited hunting opportunities.

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, 9/28/2023

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, B. Brazee, E. Bainter
Contact for lead author	karen.clause@wy.usda.gov or 307-367-2257
Date	03/16/2007
Approved by	Kirt Walstad
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 30-65%.

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:** Minimal to nonexistent.

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move only in small amounts (to leeward side of shrubs) due to wind.
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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 3 (interspaces) to 5 (under plant canopy), but average values should be 4.0 or greater.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Typically an A-horizon of greater than 3 inches (7 cm) with medium platy structure and color hues of 10YR or 5Y, values of 5-7, and chromas of 2-4. Sometimes a shallow E-horizon of 1 inch (3 cm) with weak to medium platy structure that is grayish brown (i.e. 2.5Y 5/2) will replace the A-horizon. Organic matter typically ranges from .5 to 1%.
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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 25-75% grasses, 5% forbs, and 20-70% shrubs. Evenly distributed plant canopy (25-50%) and litter, but slow infiltration rates result in slight to moderate runoff. Basal cover is typically less than 5% for this site 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 some soil crusting in dry conditions is typical.
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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: perennial shrubs>mid-size, cool season bunchgrasses >cool season rhizomatous grasses>>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.
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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 5-20% of total canopy measurement with total litter (including beneath the plant canopy) from 10-30% expected. Herbaceous litter depth is typically very shallow, ranging from 1-5mm. Woody litter can be up to an inch (3 cm).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 200-600 lb/ac (400 lb/ac average); Metric: 224-672 kg/ha (448 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. Sandberg bluegrass and phlox are common increasers. Annual weeds such as 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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