USDA Natural Resources
Conservation Service

Ecological site R034AY156WY
Shallow Breaks Green River and Great Divide Basins (SwBr)

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.

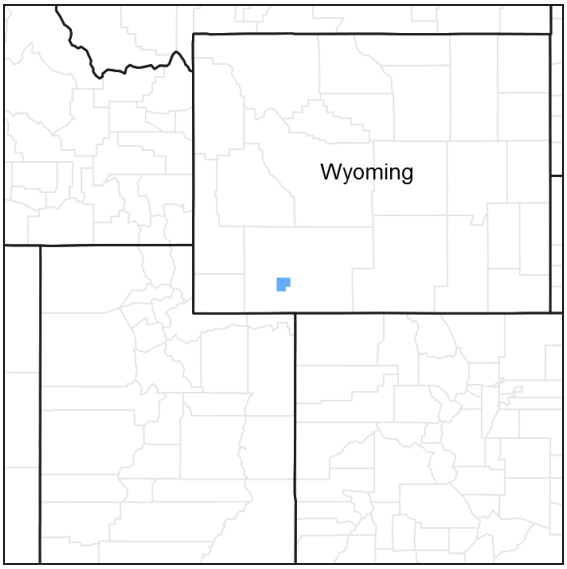


Figure 1. Mapped extent

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

R034AY158WY	**Shallow Clayey Green River and Great Divide Basins (SwCy)** Shallow Clayey
R034AY162WY	**Shallow Loamy Green River and Great Divide Basins (SwLy)** Shallow Loamy
R034AY176WY	**Very Shallow Green River and Great Divide Basins (VS)** Very Shallow

Similar sites

R034AY176WY	**Very Shallow Green River and Great Divide Basins (VS)** Very Shallow (VS) 7-9GR has lower production, and junipers are limited to higher elevations.
R034AY256WY	**Shallow Breaks Foothills and Basins West (SwBr)** Shallow Breaks (SwB) 10-14W has higher production.

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is usually found in an upland position on gently sloping to very steep topography. It may be found on all exposures, but is primarily on south and west facing slopes.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	6,000–7,200 ft
Slope	1–70%
Ponding depth	0 in
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 late 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)	9 in

Influencing water features

There are no water features associated with this site.

Soil features

The soils of this site are generally less than 15 inches deep over sedimentary bedrock. This bedrock usually develops large cracks and crevices where junipers can utilize moisture. Included in this site are small areas of exposed bedrock and very shallow to deep pockets of soil. This site usually occurs on steep slopes, but may be on any slope.

Major Soil Series correlated to this site include: Huguston and Spool.

Other Soil Series in MLRA 34 correlated to this site include: Rentsac and Blackhall.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	8–15 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0.7–2.2 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As this site deteriorates, species such as juniper and big sagebrush increase. Cheatgrass and annual forbs often invade. Cool season bunchgrasses such as bluebunch wheatgrass, Indian ricegrass, and needleandthread will decrease in frequency and production.

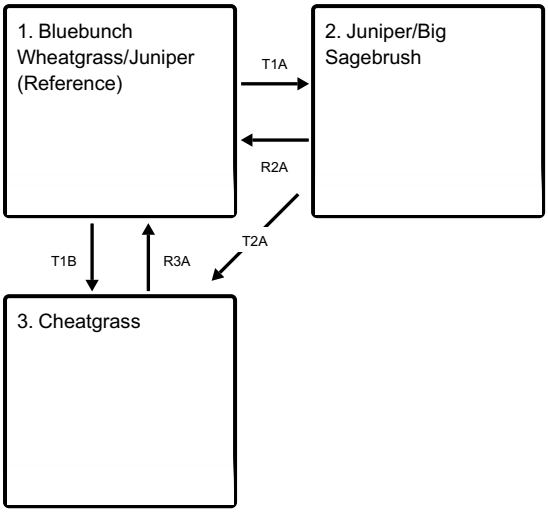
These plant communities narratives may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some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

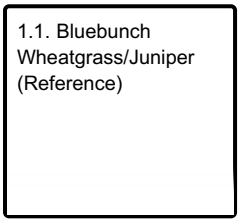
The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model

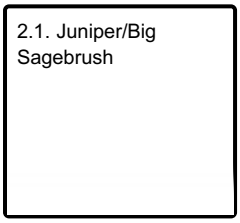
Ecosystem states



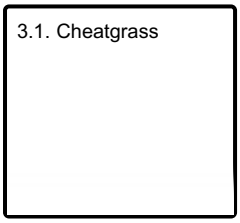
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Bluebunch Wheatgrass/Juniper (Reference)

Community 1.1
Bluebunch Wheatgrass/Juniper (Reference)

The interpretive plant community for this site is the Reference Plant Community. This state evolved with grazing by large herbivores and is suited for grazing by domestic livestock. Potential vegetation is about 40% grasses or grass-like plants, 10% forbs, and 50% woody plants. The major grasses include bluebunch wheatgrass, rhizomatous wheatgrass, Indian ricegrass, and needleandthread. Other grasses include Sandberg bluegrass, prairie junegrass, Letterman needlegrass, bottlebrush squirreltail, and needleleaf sedge. Juniper is the dominant woody plant. Other

woody plants include low and Wyoming big sagebrush, limber pine, and green rabbitbrush. A typical plant composition for this state consists of bluebunch wheatgrass 15-35%, rhizomatous wheatgrass 10-20%, Indian ricegrass 5-15%, needleandthread 5-15%, other grasses and grass-like plants 5-15%, perennial forbs 5-10%, juniper 25-45%, and 5-10% other woody species. Ground cover, by ocular estimate, varies from 10-20%. 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 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: • Heavy Continuous Season-Long Grazing will convert this plant community to the Juniper/Big Sagebrush State. • Wildfire or Prescribed Fire will convert this plant community to the Cheatgrass State.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Tree	270	360	495
Grass/Grasslike	240	320	440
Forb	60	80	110
Shrub/Vine	30	40	55
Total	**600**	**800**	**1100**

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
Juniper/Big Sagebrush

Community 2.1
Juniper/Big Sagebrush

This plant community is a result of frequent and severe grazing in the absence of fire or brush management. Juniper, Wyoming big sagebrush, and other woody species dominate this community, often exceeding 80% of the annual production. Rhizomatous wheatgrass and annual forbs make up the majority of the understory. The total annual production (air-dry weight) of this state is about 400 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 700 lbs./acre in above average years. Soil erosion is accelerated because of increased bare ground. The biotic community has been compromised, but is relatively stable. The watershed is functioning, but is at risk of further degradation. Water flow patterns and pedestals are obvious. Infiltration is reduced and runoff is increased. Transitional pathways leading to other plant communities are as follows: • Mechanical Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Reference Plant Community (Bluebunch Wheatgrass/Juniper State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges. • Wildfire or Prescribed Fire will convert this plant community to the Cheatgrass 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 the result of wildfire or a hot prescribed fire. Dominant species include green rabbitbrush and rhizomatous wheatgrass. Cheatgrass often invades, on south and west facing slopes in particular, effectively increasing the fire frequency and preventing the re-establishment of non-sprouting woody species. 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 350 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 green rabbitbrush, cheatgrass, 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 (Bluebunch Wheatgrass/Juniper State) although cheatgrass 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 T1A
State 1 to 2

Heavy Continuous Season-Long Grazing will convert this plant community to the Juniper/Big Sagebrush State.

Transition T1B
State 1 to 3

Wildfire or Prescribed Fire will convert this plant community to the Cheatgrass State.

Restoration pathway R2A
State 2 to 1

Mechanical Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Referemce Plant Community (Bluebunch Wheatgrass/Juniper State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

Transition T2A
State 2 to 3

Wildfire or Prescribed Fire will convert this plant community to the Cheatgrass State.

Restoration pathway R3A
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 (Bluebunch Wheatgrass/Juniper State) although cheatgrass 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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					

1				120–280	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	120–280	–
2				80–160	
	western wheatgrass	PASM	*Pascopyrum smithii*	80–160	–
3				40–120	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	40–120	–
4				40–120	
	needle and thread	HECO26	*Hesperostipa comata*	40–120	–
5				40–120	
	Grass, perennial	2GP	*Grass, perennial*	0–40	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	0–40	–
	needleleaf sedge	CADU6	*Carex duriuscula*	0–40	–
	squirreltail	ELEL5	*Elymus elymoides*	0–40	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–40	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–40	–
Forb					
6				40–80	
	Forb, perennial	2FP	*Forb, perennial*	0–40	–
	common yarrow	ACMI2	*Achillea millefolium*	0–40	–
	textile onion	ALTE	*Allium textile*	0–40	–
	rosy pussytoes	ANRO2	*Antennaria rosea*	0–40	–
	milkvetch	ASTRA	*Astragalus*	0–40	–
	Indian paintbrush	CASTI2	*Castilleja*	0–40	–
	fleabane	ERIGE2	*Erigeron*	0–40	–
	buckwheat	ERIOG	*Eriogonum*	0–40	–
	aster	EUCEP2	*Eucephalus*	0–40	–
	beardtongue	PENST	*Penstemon*	0–40	–
	phacelia	PHACE	*Phacelia*	0–40	–
	spiny phlox	PHHO	*Phlox hoodii*	0–40	–
	stonecrop	SEDUM	*Sedum*	0–40	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–40	–
	stemless mock goldenweed	STAC	*Stenotus acaulis*	0–40	–
	clover	TRIFO	*Trifolium*	0–40	–
Tree					
7				200–360	
	Rocky Mountain juniper	JUSC2	*Juniperus scopulorum*	200–360	–
Shrub/Vine					
8				40–80	
	little sagebrush	ARAR8	*Artemisia arbuscula*	0–40	–
	big sagebrush	ARTR2	*Artemisia tridentata*	0–40	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–40	–
	limber pine	PIFL2	*Pinus flexilis*	0–40	–

Animal community

Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass/Juniper Plant Community (HCPC): This plant community provides excellent thermal and escape cover for wintering mule deer and elk. Year-round habitat is provided for mule deer, bobcat, cottontail rabbits, jackrabbits, sage grouse and many other birds such as the black-throated sparrow, lark sparrow, green-tailed towhee, and neotropical migrants. Juniper provides good thermal cover and nesting habitat for many bird species.

Juniper/Big Sagebrush 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/Juniper (HCPC) 600-1100 lb./ac and .1 AUM/ac

Juniper/Big Sagebrush 300-700 lb./ac and .08 AUM/ac

Cheatgrass 50-350 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 is the principal factor limiting forage production on this site. This site is highly variable and is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from slow to very rapid. Runoff potential for this site varies from moderate to high depending on soil hydrologic group, depth to and permeability 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. Cryptogrammic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species. Variable topography, rock outcrop, and juniper trees appeal to hikers.

Wood products

Limber pine and juniper may be used for firewood and very limited use for fence posts.

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

1. **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).

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

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

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 30-60%.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move in slight to moderate amounts. Large woody debris will show only slight movement down slope.

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 2 (interspaces) to 6 (under plant canopy), but average values should be 3.0 or greater.

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 1% is expected.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 35-80% grasses, 10% forbs, and 10-55% shrubs/trees. Moderate plant canopy (40-60%) 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.

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.

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: trees>mid-size, cool season bunchgrasses>>cool season rhizomatous grasses>perennial shrubs>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.

14. **Average percent litter cover (%) and depth (in):** Litter ranges from 5-30% of total canopy measurement with total litter (including beneath the plant canopy) from 15-45% expected. Herbaceous litter depth is typically very shallow, ranging from 1-5mm. Woody litter can be up to several inches (>8 cm).

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 600-1100 lb/ac (800 lb/ac average); Metric: 672-1232 kg/ha (896 kg/ha average).

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% and the presence of cheatgrass are the most common indicators of a threshold being crossed. Junipers, big sagebrush, 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.

17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.