USDA Natural Resources
Conservation Service

Ecological site R034AY262WY
Shallow Loamy Foothills and Basins West (SwLy)

Accessed: 05/14/2025

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.

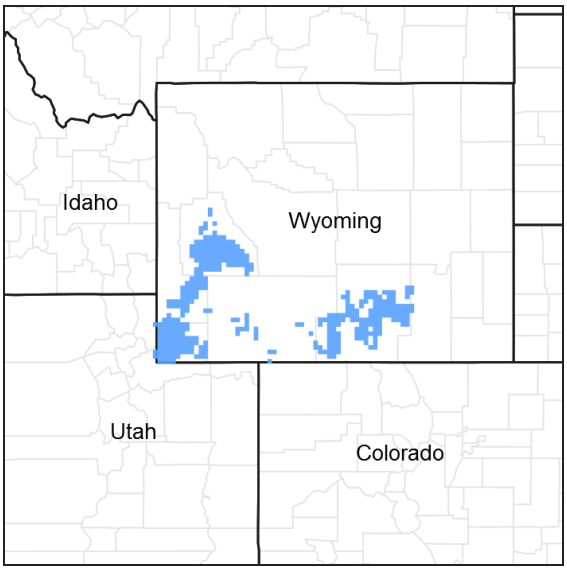

Figure 1. Mapped extent

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
R034AY258WY	**Shallow Clayey Foothills and Basins West (SwCy)** Shallow Clayey

Similar sites

R034AY162WY	**Shallow Loamy Green River and Great Divide Basins (SwLy)** Shallow Loamy 7-9GR has lower production.
R034AY222WY	**Loamy Foothills and Basins West (Ly)** Loamy 10-14W has mostly big sagebrush, not a mix of big and low sagebrush, and sagebrush height and density is greater on the Loamy site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site will usually occur in an upland position on rolling to steep slopes. It is found on all exposures, but is more common on south and west facing slopes. Slopes average 5 to 35% and elevations are mostly above 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	1,981–2,286 m
Slope	5–60%
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.

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

There are no water features associated with this site.

Soil features

These are well drained shallow soils (10 to 20 inches deep) over all kinds of bedrock except igneous or volcanic. Textures range from very fine sandy loams to clay loam. Parent material is residuum, colluvium, and alluvium from sedimentary rock. Surface texture can be loam, clay loam, sandy loam, fine sandy loam, and silty clay loam with surface texture modifiers of gravelly and channery.

Major soil series correlated to this site includes: Anchutz, Blazon, Feltner, Fossilon, Thermopolis, and Worfman.

Other soil series in MLRA 34A correlated to this site include: Highams, Rentsac, Tigon, Ashuelot variant, Roxal, Midfork, Prow, Rencot, Redthayne, and Southace.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Sandy loam
Family particle size	(1) Clayey
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	2.54–6.35 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–8 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)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–20%

Ecological dynamics

As this site deteriorates, species such as rabbitbrush and big sagebrush will increase. Cool season bunchgrasses such as bluebunch wheatgrass, needleandthread, and Indian ricegrass 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 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

Ecosystem states

1. Bluebunch Wheatgrass/Big Sagebrush (HCPC)

2. Big Sagebrush/Rhizomatous Wheatgrass

3. Big Sagebrush/Cheatgrass

State 1 submodel, plant communities

1.1. Bluebunch Wheatgrass/Big Sagebrush (HCPC)

State 2 submodel, plant communities

2.2. Big Sagebrush/Rhizomatous Wheatgrass

State 3 submodel, plant communities

3.3. Big Sagebrush/Cheatgrass

State 1
Bluebunch Wheatgrass/Big Sagebrush (HCPC)

Community 1.1
Bluebunch Wheatgrass/Big Sagebrush (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is about 75% grasses or grass-like plants, 10% forbs, and 15% woody plants. The major grasses include bluebunch wheatgrass, rhizomatous wheatgrass, Indian ricegrass, needleandthread, and bottlebrush squirreltail. Other grasses include Canby, mutton, and Sandberg bluegrass, Letterman needlegrass, needleleaf sedge, plains reedgrass, and prairie junegrass. Big sagebrush is the major woody plant. Other woody plants include green rabbitbrush and winterfat. A typical plant composition for this state consists of bluebunch wheatgrass 10-25%, rhizomatous wheatgrass 10-25%, needleandthread 5-15%, Indian ricegrass 5-15%, bottlebrush squirreltail 5-10%, other grasses and grass-like plants 10-20%, perennial forbs 5-10%, Wyoming big sagebrush 5-10%, and 5-10% other woody species. Ground cover, by ocular estimate, varies greatly depending on the amount of exposed parent

material, and herbage cover ranges from 15-30%. 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 extremely 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: • Wildfire or Severe Ground Disturbance followed by Heavy Continuous Season-long Grazing will convert this plant community to the Big Sagebrush/Cheatgrass State. • Heavy Continuous Season-long Grazing will convert this plant community to the Big Sagebrush/Rhizomatous Wheatgrass State.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	588	757	1009
Shrub/Vine	118	151	202
Forb	78	101	135
Total	**784**	**1009**	**1346**

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 2
Big Sagebrush/Rhizomatous Wheatgrass

Community 2.1
Big Sagebrush/Rhizomatous Wheatgrass

This plant community is the result of frequent and severe grazing. Intermixed Wyoming big and low sagebrush are a significant component of this plant community, often making up 15-40% of the annual production. Thickspike wheatgrass, Letterman needlegrass, and unpalatable annual and perennial forbs dominate the herbaceous understory. Green rabbitbrush and bare ground have increased. Western yarrow and phlox are often significant components of this site. The total annual production (air-dry weight) of this state is about 500 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 800 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: • 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 (Bluebunch Wheatgrass/Big Sagebrush State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges. • Severe Ground Disturbance and/or Heavy Continuous Season-long Grazing will convert this plant community to the Big Sagebrush/Cheatgrass State.

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			

State 3
Big Sagebrush/Cheatgrass

Community 3.1
Big Sagebrush/Cheatgrass

This plant community is the result of severe ground disturbance, including very severe grazing. Dominant species include intermixed Wyoming big and low sagebrush, which often exceeds 20-40% annual production, green rabbitbrush, and rhizomatous wheatgrass. Cheatgrass often invades, on south and west facing slopes in particular. The total annual production (air-dry weight) of this state is about 150 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 700 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 low sagebrush, 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 Historic Climax Plant Community (Bluebunch Wheatgrass/Big Sagebrush 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). 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 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				101–252	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	101–252	–
2				101–252	
	western wheatgrass	PASM	*Pascopyrum smithii*	101–252	–
3				50–151	
	needle and thread	HECO26	*Hesperostipa comata*	50–151	–
4				50–151	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	50–151	–
5				50–101	
	squirreltail	ELEL5	*Elymus elymoides*	50–101	–
6				101–202	
	Grass, perennial	2GP	*Grass, perennial*	0–50	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	0–50	–
	needleleaf sedge	CADU6	*Carex duriuscula*	0–50	–
	plains reedgrass	CAMO	*Calamagrostis montanensis*	0–50	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–50	–
	muttongrass	POFE	*Poa fendleriana*	0–50	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–50	–
Forb					
7				50–101	
	Forb, perennial	2FP	*Forb, perennial*	0–50	–
	common yarrow	ACMI2	*Achillea millefolium*	0–50	–
	rosy pussytoes	ANRO2	*Antennaria rosea*	0–50	–
	milkvetch	ASTRA	*Astragalus*	0–50	–
	Indian paintbrush	CASTI2	*Castilleja*	0–50	–

	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–50	–
	fleabane	ERIGE2	*Erigeron*	0–50	–
	buckwheat	ERIOG	*Eriogonum*	0–50	–
	aster	EUCEP2	*Eucephalus*	0–50	–
	granite prickly phlox	LIPU11	*Linanthus pungens*	0–50	–
	stoneseed	LITHO3	*Lithospermum*	0–50	–
	bluebells	MERTE	*Mertensia*	0–50	–
	nailwort	PARON	*Paronychia*	0–50	–
	beardtongue	PENST	*Penstemon*	0–50	–
	phacelia	PHACE	*Phacelia*	0–50	–
	spiny phlox	PHHO	*Phlox hoodii*	0–50	–
	stemless mock goldenweed	STAC	*Stenotus acaulis*	0–50	–
	clover	TRIFO	*Trifolium*	0–50	–
Shrub/Vine					
8				50–101	
	big sagebrush	ARTR2	*Artemisia tridentata*	50–101	–
9				50–101	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–50	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–50	–

Animal community

Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass/Big Sagebrush 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. 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. When found proximal to taller sagebrush, these sites are suitable locations for sage grouse leks. Other birds that would frequent this plant community include horned larks and golden eagles.

Big Sagebrush/Rhizomatous Wheatgrass Plant Community: This plant community may be beneficial 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.

Big Sagebrush/Cheatgrass Plant Community: This plant community may be beneficial 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.

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/Big Sagebrush (HCPC) 700-1200 lb./ac and .2 AUM/ac

Big Sagebrush/Rhizomatous Wheatgrass 300-800 lb./ac and .15 AUM/ac

Big Sagebrush/Cheatgrass 100-700 lb./ac and .05 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 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. Cryptogrammic 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

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

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be

known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Date	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.

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

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

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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 15-45%.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Rare 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. Large woody debris from sagebrush will show no movement.

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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 3.0 or greater.

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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 1-15 inches (3-38 cm) with OM of .5 to 1.5%.

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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 70-85% grasses, 10% forbs, and 5-20% shrubs.

Evenly distributed plant canopy (30-60%) and litter plus slow to moderate 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.

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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):** None.

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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>>perennial forbs>short, cool season bunchgrasses

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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 25-65% 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.
