USDA Natural Resources Conservation Service

# Ecological site R029XY055NV
# CLAYPAN 12-16 P.Z.

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Accessed: 05/13/2025

## 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.

## MLRA notes

Major Land Resource Area (MLRA): 029X–Southern Nevada Basin and Range

The Southern Nevada Basin and Range MLRA (29) represents the transition from the Mojave Desert to the Great Basin. It is cooler and wetter than the Mojave. It is warmer and typically receives more summer precipitation than the Great Basin. This area is in Nevada (73 percent), California (25 percent), and Utah (2 percent). It makes up about 26,295 square miles (68,140 square kilometers). Numerous national forests occur in the area, including the San Bernardino, Angeles, Sequoia, Inyo, Humboldt-Toiyabe, and Dixie National Forests. Portions of Death Valley National Monument, the Nuclear Regulatory Commission's Nevada Test Site, the Hawthorne Ammunition Depot, and the Nellis Air Force Range in Nevada and the China Lake Naval Weapons Center in California also are in this MLRA. The northeast part of the Paiute Indian Reservation and the southern third of the Walker River Indian Reservation are in the part of this MLRA in Nevada, and the Lone Pine, Fort Independence, and Big Pine Indian Reservations are in the part in California.
Physiography:
The entire area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The area of broad, nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by sloping fans and pluvial lake terraces. The mountains are uplifted fault blocks with steep side slopes and not well dissected due to limited annual precipitation. Most of the valleys in this MLRA are closed basins or bolsons containing sinks or playa lakes.
Geology:
The mountains are dominated by Pliocene and Miocene andesite and basalt rocks, Paleozoic and Precambrian carbonate rocks prominent in some areas. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments (Pliocene and Miocene) are in the western and eastern thirds of this MLRA. The valleys consist mostly of alluvial fill and playa deposits at the lowest elevations in the closed basins.
Climate:
The average annual precipitation is 3 to 12 inches (75 to 305 millimeters) in most of this area. It may be as high as 29 inches (735 millimeters), on the higher mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Summers are dry, but sporadic storms are common in July and August.
Water Resources:
Water resources are scarce. Ground water and surface water sources are limited. Streams are small and intermittent. Quality of surface water in naturally degraded as streams cross area of valley fill effected by dissolved salts. Irrigation water may raise the levels of dissolved salts and suspended sediments causing contamination.
Soils:
Dominant soil orders include Entisols and Aridisols.

## Ecological site concept

The Claypan 12-16 P.Z. site is on summits and sideslopes of lower mountains, on all aspects. Slope gradients of 8 to 50 percent are typical. Elevations are 6,100 to about 8,200 feet. The soils are shallow and well drained. Depth to an argillic horizon ranges from 3 to 11 inches. The fine textured subsoil swells on wetting and shrinks and cracks upon drying.

## Associated sites

| | |
|---|---|
| R029XY030NV | **LOAMY 12-14 P.Z.**<br>This site is on fan remnants. Slopes range from 4 to 30 percent. Elevations are 6,800 to about 7,300 feet. The soils formed in alluvium from a variety of parent materials. These soils are deep and have slow permeability, low available water capacity and are well drained. The soil surfaces are usually gravelly and the soil profile may be gravelly throughout. |
| R029XY057NV | **LOAMY ASH INFLUENCED SLOPE 12-14 P.Z.**<br>This site is on summits and sideslopes of hills. Slopes range from 8 to 50 percent. Elevations are 5,000 to about 8,000 feet. The soils formed in residuum or colluvium from volcanic rocks with a component of volcanic ash. These soils are typically shallow to bedrock and the underlying parent material is usually highly fractured. |
| R029XY075NV | **LOAMY SLOPE 10-12 P.Z.**<br>This site is on summits and sideslopes of hills and mountains on all exposures. Slopes range from 2 to over 50 percent, but slope gradients of 30 to 50 percent are typical. Elevations are 4,100 to about 6,300 feet. The soils are shallow over bedrock. These soils have formed in residuum and colluvium from volcanic rocks on steep mountain or hill slopes. |

## Similar sites

| | |
|---|---|
| R029XY052NV | **CLAYPAN 16+ P.Z.**<br>ACLE9 dominant grass. |
| R029XY053NV | **MOUNTAIN RIDGE 16+ P.Z.**<br>Less productive site. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Artemisia arbuscula* |
| Herbaceous | (1) *Achnatherum thurberianum*<br>(2) *Poa fendleriana* |

## Physiographic features

The Claypan 12-16 P.Z. site is on summits and sideslopes of lower mountains, on all aspects. Slope gradients of 8 to 50 percent are typical. Elevations are 6,100 to about 8,200 feet.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Mountain |
| Runoff class | Very high |
| Elevation | 1,859–2,499 m |
| Slope | 5–50% |
| Water table depth | 183 cm |
| Aspect | Aspect is not a significant factor |

## Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 12 to about 16 inches. Mean annual air temperature is 43 to 45 degrees F. The average growing season is about 70 to 100 days. No climate stations are available.

## Influencing water features

There are no associated influencing water features.

## Soil features

The soils are shallow and well drained. Depth to an argillic horizon ranges from 3 to 11 inches. The fine textured subsoil swells on wetting and shrinks and cracks upon drying. These subsoils interfere with deep root development, but some roots, mainly of shrubs and forbs, penetrate the subsoil along vertical cleavage planes. These soils are poorly aerated during the early spring due to a perched water table. Available water capacity is very low. The soils normally have a high percentage of gravels, cobbles, rocks, or stones on the surface. Infiltration of water is restricted once these soils are wetted. A mollic epipedon occurs from 0 to 11 inches. Soils are moist in winter and spring and dry in summer and fall, except for 10 to 20 days between July and October due to convection storms. The soil moisture regime is aridic bordering on xeric and the soil temperature regime is mesic. Soil series include: Schoolmarm.

**Table 3. Representative soil features**

| | |
|---|---|
| Parent material | (1) Colluvium–welded tuff<br>(2) Residuum–welded tuff |
| Surface texture | (1) Very cobbly, ashy sandy loam |
| Family particle size | (1) Clayey |
| Drainage class | Well drained |
| Permeability class | Moderate |
| Soil depth | 25–51 cm |
| Surface fragment cover <=3" | 20–30% |
| Surface fragment cover >3" | 5–20% |
| Available water capacity (0-101.6cm) | 4.32–4.57 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0% |
| Electrical conductivity (0-101.6cm) | 0 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0 |
| Soil reaction (1:1 water) (0-101.6cm) | 6.6–7.3 |
| Subsurface fragment volume <=3" (Depth not specified) | 20–28% |
| Subsurface fragment volume >3" (Depth not specified) | 5–16% |

## Ecological dynamics

Where management results in abusive grazing use by livestock or feral horses, Thurber's needlegrass and other palatable grasses and forbs decrease while low sagebrush, rabbitbrush, and Sandberg's bluegrass increase. Species likely to invade this site are annuals.

Fire Ecology:
Prior to 1897, mean fire return intervals for low sagebrush communities have been estimated to be from 35 to over 100 years. Fire most often occurs during wet years with high forage production. Low sagebrush is very susceptible to fire damage. Low sagebrush is usually killed by fire and does not re-sprout. The recovery in burned areas is usually via small, light, wind-dispersed seed for all low sagebrush subspecies. Partially injured low sagebrush may re-grow from living branches, but sprouting does not occur. Thurber’s needlegrass is classified as moderately resistant, but depending on season of burn, phenology, and fire severity, this perennial bunchgrass is moderately to

severely damaged by fire. Burning has been found to decrease the vegetation and reproductive vigor. Early season burning is more damaging to this needlegrass than late season burning. Muttongrass is unharmed to slightly harmed by light-severity fall fire. Muttongrass appears to be harmed by and slow to recover from severe fire. Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas. Needle and thread is top-killed by fire. It may be killed if the aboveground stems are completely consumed. Needle and thread is classified as slightly to severely damaged by fire. Needle and thread sprouts from the caudex following fire, if heat has not been sufficient to kill underground parts. Recovery usually takes 2 to 10 years.

The reference plant community is dominated by low sagebrush, Thurber's needlegrass, and muttongrass. Potential vegetative composition is about 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Approximate ground cover (basal and crown) is 15 to 25 percent.

## State and transition model

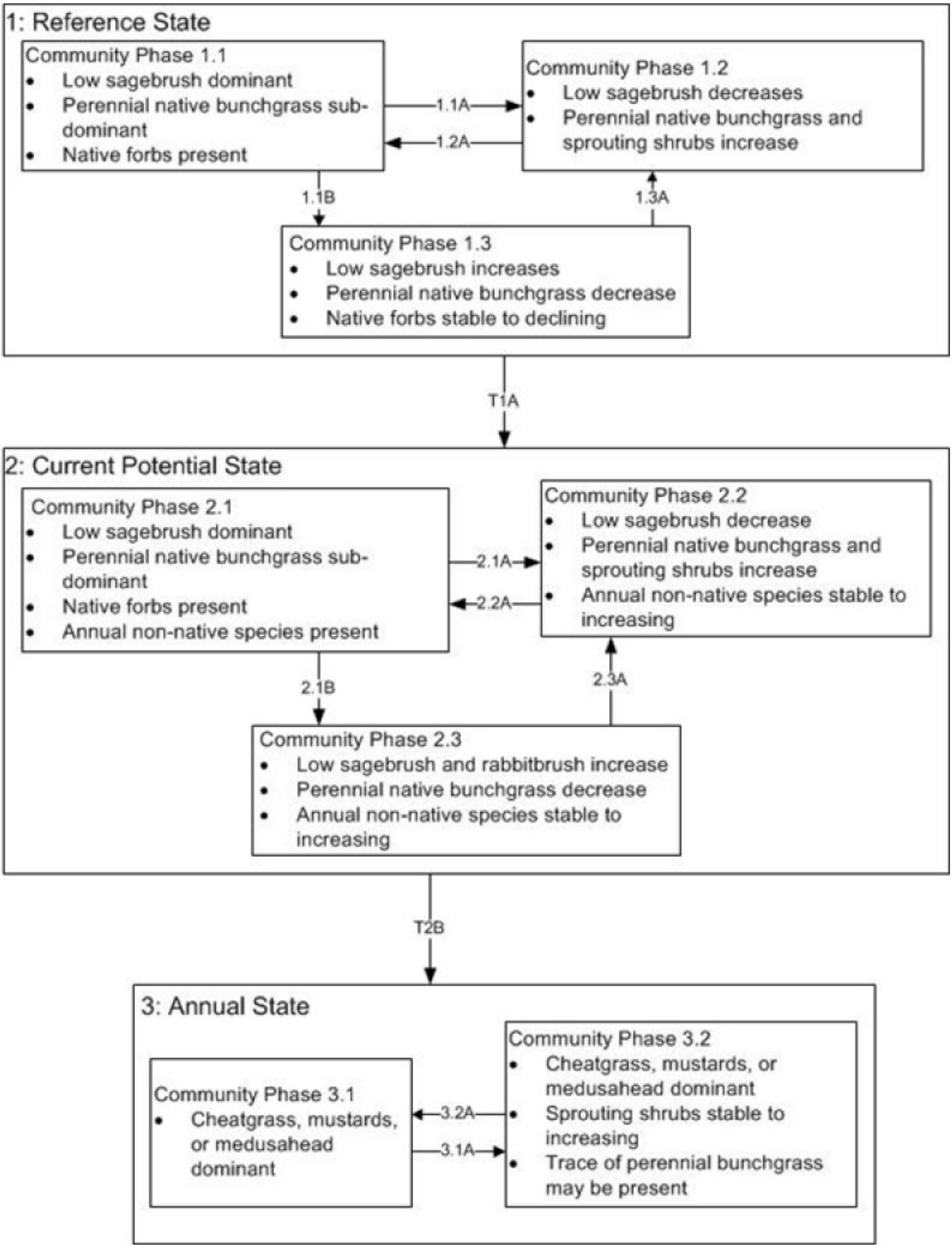


**Figure 1. DRAFT STM**

State 1: Representative of the reference conditions prior to Euro-American settlement in the west.
1.1A: fire or other disturbance that removes sagebrush canopy
1.1B: absence of disturbance and natural regeneration over time. may be coupled with drought

1.2A: absence of disturbance and natural regeneration over time

1.3A: fire or other disturbance that removes sagebrush canopy

T1A: introduction of non-native species

State 2: Representative of the current potential with the presence of non-native annuals. Non-native annuals have the ability to significantly change disturbance regimes and nutrient cycling dynamics.
2.1A: fire or other disturbance that removes sagebrush canopy
2.1B: absence of disturbance and natural regeneration over time, may be coupled with drought and inadequate rest and recovery from defoliation

2.2A: absence of disturbance and natural regeneration over time

2.3A: fire or other disturbance that removes sagebrush canopy
T3A: reoccurring severe fire

State 3: Dominated by non-native annuals. Changes in disturbance return interval and nutrient cycling dynamics create a positive feedback loop preventing recovery of long-lived native perennials .
3.1A: absence of disturbance and natural regeneration over time
3.2A: fire or other disturbance that removes shrub canopy

**Figure 2. DRAFT STM LEGEND**

## Animal community

Livestock Interpretations:
This site is suited for livestock grazing. Grazing management should be keyed to perennial grass production. Thurber's needlegrass species begin growth early in the year and remain green throughout a relatively long growing season. This pattern of development enables animals to use Thurber's needlegrass when many other grasses are unavailable. Cattle prefer Thurber's needlegrass in early spring before fruits have developed as it becomes less palatable when mature. Thurber's needlegrasses are grazed in the fall only if the fruits are softened by rain. Muttongrass is excellent forage for domestic livestock especially in the early spring. Muttongrass begins growth in late winter and early spring, which makes it available before many other forage plants. Indian ricegrass is highly palatable to all classes of livestock in both green and cured condition. It supplies a source of green feed before most other native grasses have produced much new growth. Needle and thread provides highly palatable forage, especially in the spring before fruits have developed. Needlegrasses are grazed in the fall only if the fruits are softened by rain. Domestic sheep and to a much lesser degree cattle consume low sagebrush, particularly during

the spring, fall and winter.

Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year.

Wildlife Interpretations:
Low sagebrush is considered a valuable browse plant during the spring, fall and winter months. In some areas it is of little value in winter due to heavy snow. Mule deer utilize and sometimes prefer low sagebrush, particularly in winter and early spring. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Meadows surrounded by sagebrush may be used as feeding and strutting grounds. Sagebrush is a crucial component of their diet year-round, and sage-grouse select sagebrush almost exclusively for cover. Leks are often located on low sagebrush sites, grassy openings, dry meadows, ridgetops, and disturbed sites. Thurber needlegrass is valuable forage for wildlife. Deer and elk make heavy use of muttongrass, especially in early spring when other green forage is scarce. Depending upon availability of other nutritious forage, deer may use muttongrass in all seasons. Muttongrass cures well and is an important fall and winter deer food in some areas. Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat large amounts of shattered Indian ricegrass seed lying on the ground. Needle and thread is moderately important spring forage for mule deer, but use declines considerably as more preferred forages become available.

## Hydrological functions

Runoff is medium to very high. Permeability is moderate.

## Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site is used for camping and hiking and has potential for upland and big game hunting.

## Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.

## Other information

Low sagebrush can be successfully transplanted or seeded in restoration. Needle and thread is useful for stabilizing eroded or degraded sites.

## Inventory data references

NASIS data used for abiotic narratives and tables.

## Type locality

| |
|---|
| Location 1: Nye County, NV |

## Other references

Fire Effects Information System (Online; http://www.fs.fed.us/database/feis/plants/).

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of

Agriculture, Agriculture Handbook 296.

USDA-NRCS Plants Database (Online; http://www.plants.usda.gov

## Contributors

H. Arnold

## Approval

Kendra Moseley, 2/20/2025

## 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.

| | |
|---|---|
| Author(s)/participant(s) | |
| Contact for lead author | |
| Date | 05/13/2025 |
| Approved by | Kendra Moseley |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:**

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

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

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

5. **Number of gullies and erosion associated with gullies:**

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

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth ( in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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:**

17. **Perennial plant reproductive capability:**