USDA Natural Resources Conservation Service

Ecological site R220XY444AK
Maritime Scrub Gravelly Steep Drainageways

Last updated: 3/10/2025
Accessed: 05/11/2025

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): 220X–Alexander Archipelago-Gulf of Alaska Coast

The Alexander Archipelago-Gulf of Alaska Coast area consists of a narrow arc of islands and lower elevation coastal mountains in the Southern Alaska Region. This area spans from the Alexander Archipelago in southeastern Alaska, north and west along the coast of the Gulf of Alaska and Prince William Sound, and further west to the southern tip of the Kenai Peninsula and the northeastern islands of the Kodiak Archipelago. The area makes up about 27,435 square miles (USDA 2006). The terrain primarily consists of low to moderate relief mountains that are deeply incised. Throughout the area glaciers, rivers, and streams have cut deep, narrow to broad valleys. The broader valleys have nearly level to strongly sloping flood plains and stream terraces. Alluvial and colluvial fans and short footslopes are common in the valleys along the base of the mountains. Rocky headlands, sea cliffs, estuaries, and beaches are common along the coast.

This area includes the Municipality of Juneau, Alaska's capital, and a number of smaller coastal towns and villages. Federally administered lands within this MLRA include Admiralty Island National Monument and part of Misty Fjords National Monument, Tongass National Forest, Chugach National Forest, and Glacier Bay, Wrangell-St. Elias, and Kenai Fjords National Parks and Preserves. The southern terminus of the Trans-Alaska Pipeline is in Valdez. During the late Pleistocene epoch, the entire area was covered with glacial ice. The numerous fjords of the Alexander Archipelago and Prince William Sound were formed chiefly as a result of glacial scouring and deepening of preglacial river valleys. Most glacial deposits have been eroded away or buried by mountain colluvium and alluvium, which cover about 90 percent of the present landscape. The remaining glacial and glaciofluvial deposits are generally restricted to coastal areas. During the Holocene epoch, volcanic activity within and adjacent to this area deposited a layer of volcanic ash of varying thickness on much of the landscape in the southeastern and northwestern parts of the area. Paleozoic, Mesozoic, and Lower Tertiary stratified sedimentary rocks and Cretaceous and Tertiary intrusive rocks underlie much of the area and are exposed on steep mountain slopes and ridges (USDA 2006).

The dominant soil orders in this MLRA are Spodosols, Histosols, and Entisols. Soils in the area typically have a cryic soil temperature regime, an udic moisture regime, and have mixed minerology. Spodosols are common on mountains and hills having been formed in gravelly or cobbly colluvium, glacial till, and varying amounts of silty volcanic ash. These Spodosols commonly range from shallow to deep, are well to somewhat poorly drained, and typically classify as Humicryods or Haplocryods. Histosols that are poorly to very poorly drained occur on footslopes, discharge slopes, and valley floors. These wet histosols commonly classify as Cryosaprists, Cryohemists, and Cryofibrists. Histosols that are well drained occur on steep mountainsides. These dry Histosols commonly classify as Cryofolists. Entisols are common on flood plains, stream terraces, and outwash plains having been formed in silty, sandy, and gravelly to cobbly alluvium. These Entisols are generally deep, range from well to somewhat poorly drained, and commonly classify as Cryaquents and Cryofluvents. Miscellaneous (non-soil) areas make up about 23 percent of the MLRA. The most common miscellaneous areas are avalanche chutes, rock outcrop, rubble land, beaches, river wash, and water.

This area represents the northern extent of the Pacific temperature rainforest and is characterized by productive

stands of conifers. Western hemlock and Sitka spruce are the dominant trees on mountains and hills at the lower elevations. Due to warmer temperatures, western red cedar and Alaska cedar are more prevalent in the southern part of the area. Black cottonwood and mixed forest types occur on flood plains. Areas of peat and other sites that are too wet for forest growth support sedge-grass meadows and low scrub. The transition to subalpine and alpine communities typically occurs at elevations between 1500 to 3000 feet (Boggs et al. 2010, Carstensen 2007, Martin et al. 1995), which characterize the vegetation of the Southern Alaska Coastal Mountains area.

For many decades, logging, commercial fishing, and mining have been the primary industrial land uses throughout much of the area. In recent years, changes in public interests, land use policies, and timber economics have contributed to a significant decline in the timber industry. Commercial fishing continues to be an important industry and most communities support a fleet of boats and fishing related facilities. A number of mines operate in the area and others have been prospected and proposed. Tourism and wildland recreation are becoming increasingly important. Subsistence hunting, fishing, and gathering provide food and a variety of other resources to local residents and remain the principal economy for residents of remote villages.

Ecological site concept

This site occurs along drainageways on mountains and hills with moderate to steep slope gradients. The accumulation of meltwater and precipitation on this site results in continuous lateral flow of water via small stream channels and a water table within 30 inches of the soil surface. Soil textures are fine sandy loams to loamy sands, often stratified with lenses of gravel and coarser textures in deeper soil horizons. These soils are somewhat poorly to moderately well drained.
This site supports an open tall shrub reference plant community dominated by Sitka alder and Sitka willow. Other plant communities have yet to be observed on this site.

Associated sites

F220XY430AK	**Maritime Forest Sandy Plain Alluvial Fan** This site is associated with site F220XY430AK, both which occur on very deep, sandy-skeletal alluvial deposits. Site R220XY444AK occurs on somewhat poorly- drained, steep drainageways while site F220XY430AK occurs on well-drained alluvial fans.
F220XY432AK	**Maritime Forest Gravelly Plain** This site may intersect site F220XY432AK on sandy-skeletal outwash plains. Where these sites occur in close proximity, site F220XY432AK is the more well-drained site, with site R220XY444AK occurring in the drainageways.
W1220X433	**Maritime Forest Loamy Slopes** This site is associated with site F220XY433AK on steep mountain slopes in colluvial deposits. Where these sites are associated, site F220XY433AK occurs in the upland position with site R220XY444AK occurring in drainages.
F220XY441AK	**Maritime Forest Gravelly Slopes** This site is associated with ecological site F220XY441AK on steep mountain slopes. Site F220XY441AK is well-drained and occurs outside of the drainages that are characteristic of site R220XY444AK.

Similar sites

R220XY426AK	**Maritime Shrub Low Flood Plain** R220XY426AK is associated with larger streams and larger floodplains, resulting in more a complex plant community that varies with increased distance from and elevation above the stream channel.
R220XY425AK	**Maritime Shrub Drainageway** R220XY425 occurs on relatively flat alluvium and outwash with more frequent flooding and poor soil drainage.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Alnus viridis ssp. sinuata* (2) *Salix sitchensis*

Herbaceous	Not specified

Physiographic features

This site occurs along drainageways on mountains and hills with moderate to steep slopes (greater than 15 percent). These slope gradients result in rare to no flooding or ponding . The water table typically occurs within 24 - 28 inches of the soil surface. This site occurs on all aspects, and at elevations from 0 – 1,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Drainageway (2) Hills > Drainageway
Runoff class	Medium
Flooding frequency	None
Ponding frequency	None
Elevation	0–1,000 ft
Slope	15–50%
Water table depth	24–28 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Medium
Flooding frequency	None to rare
Ponding frequency	None
Elevation	0–1,000 ft
Slope	8–50%
Water table depth	0–60 in

Climatic features

Cloudy skies, moderate temperatures, and abundant rainfall characterize the temperate maritime climate of this site. Frequent winter storms may consist of snow or heavy rainfall. Moderate to strong winds from the south and southeast are common before and during storms throughout the year. Annual precipitation ranges from 44-94 inches, and annual snowfall ranges from 30-70 inches along the coast and up to 200 inches at higher elevations (USDA 2006). The average annual temperature at lower elevations ranges from about 38-43 degrees F (3-6 degrees C). The frost-free period ranges from about 90-140 days, and the freeze-free period ranges from about 125-180 days.

Table 4. Representative climatic features

Frost-free period (characteristic range)	95-142 days
Freeze-free period (characteristic range)	147-183 days
Precipitation total (characteristic range)	55-145 in
Frost-free period (actual range)	84-170 days
Freeze-free period (actual range)	119-218 days
Precipitation total (actual range)	35-172 in
Frost-free period (average)	120 days
Freeze-free period (average)	168 days
Precipitation total (average)	97 in

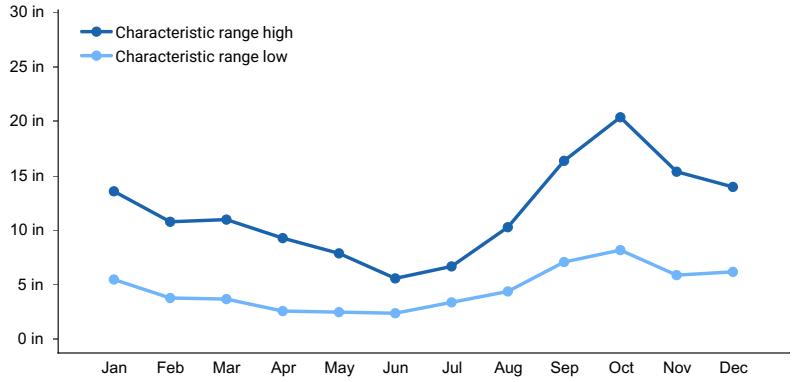

Figure 1. Monthly precipitation range

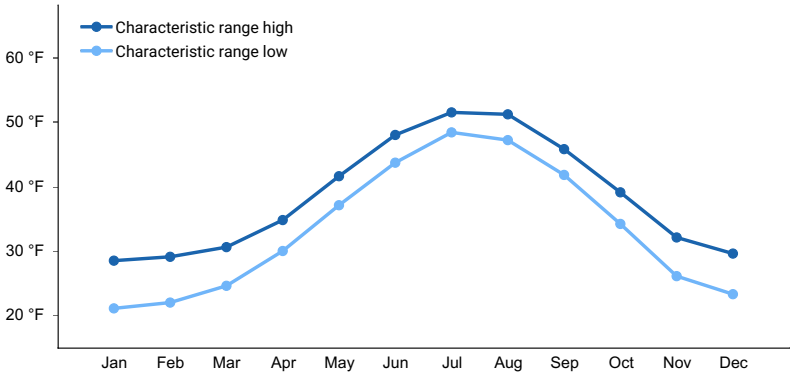

Figure 2. Monthly minimum temperature range

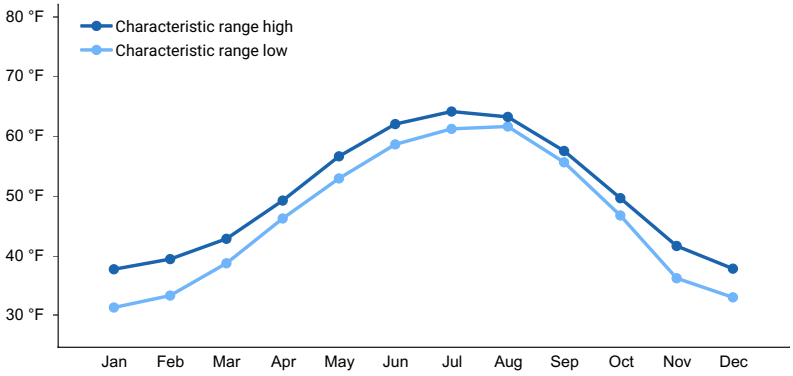

Figure 3. Monthly maximum temperature range

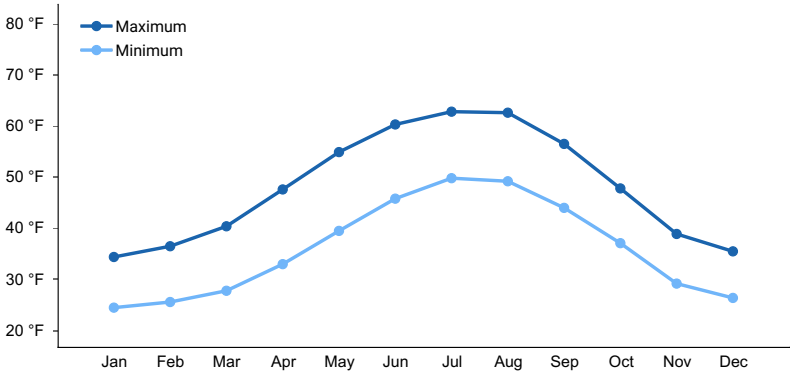

Figure 4. Monthly average minimum and maximum temperature

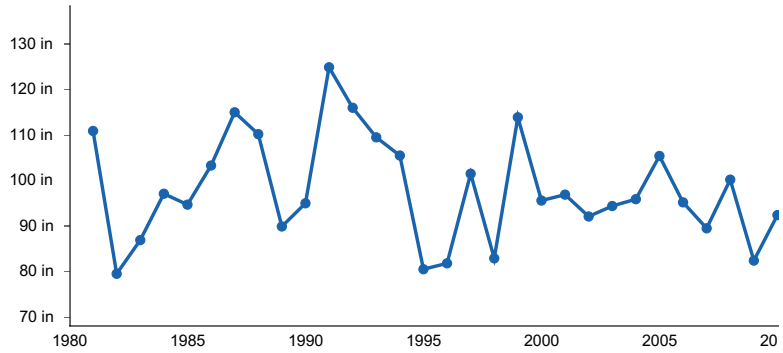

Figure 5. Annual precipitation pattern

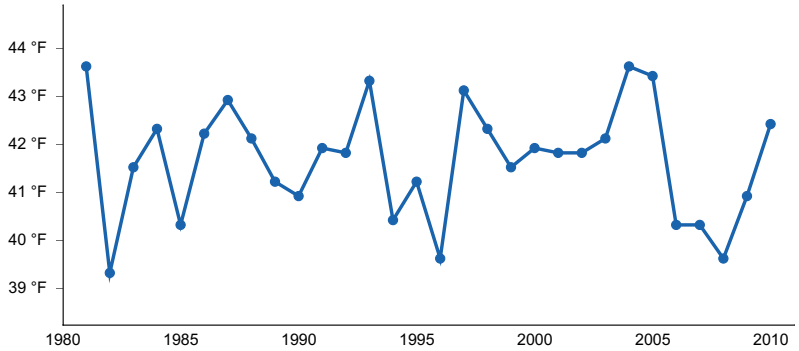

Figure 6. Annual average temperature pattern

Climate stations used

- (1) GUSTAVUS [USW00025322], Gustavus, AK
- (2) GLACIER BAY [USC00503294], Gustavus, AK
- (3) YAKUTAT STATE AP [USW00025339], Yakutat, AK
- (4) SKAGWAY AP [USW00025335], Skagway, AK
- (5) HAINES AP [USW00025323], Haines, AK
- (6) SELDOVIA AP [USW00025516], Homer, AK
- (7) MAIN BAY [USC00505604], Valdez, AK
- (8) CORDOVA M K SMITH AP [USW00026410], Cordova, AK
- (9) SITKA AIRPORT [USW00025333], Sitka, AK
- (10) JUNEAU INTL AP [USW00025309], Juneau, AK
- (11) ANNETTE ISLAND AP [USW00025308], Metlakatla, AK
- (12) PETERSBURG 1 [USW00025329], Petersburg, AK
- (13) KETCHIKAN INTL AP [USW00025325], Ketchikan, AK
- (14) PELICAN [USC00507141], Hoonah, AK

Influencing water features

The concave slope shape associated with mountain drainageways accumulates and facilitates movement of water downslope. Meltwater and precipitation events result in continuous sub-surface, lateral flow of ground water through drainageways during the growing season (May-September). Subsequently, this site has a high water table between 24-28 inches below the soil surface.

Soil features

The soils of this site formed in deep alluvial or colluvium deposits associated with small drainageways. Soil textures range from fine sands to loamy very fine sands, often with lenses of rock and coarser textures in deeper soil horizons. Drainage class ranges from somewhat poorly- to moderately well-drained. This site has an udic soil moisture regime.

Figure 7. Typical soil profile for Kadachan soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska (AK692): Kadachan.

Table 5. Representative soil features

Parent material	(1) Alluvium (2) Colluvium
Surface texture	(1) Fine sand (2) Gravelly loamy very fine sand
Family particle size	(1) Sandy-skeletal
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Rapid to very rapid
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0.2–8 in
Calcium carbonate equivalent (0-40in)	0%
Clay content (0-20in)	2–3%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–7.3
Subsurface fragment volume <=3" (0-60in)	0–3%
Subsurface fragment volume >3" (0-60in)	0–80%

Table 6. Representative soil features (actual values)

Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Rapid to very rapid
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%

Available water capacity (0-40in)	0.2–8 in
Calcium carbonate equivalent (0-40in)	0%
Clay content (0-20in)	2–3%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–7.3
Subsurface fragment volume <=3" (0-60in)	0–3%
Subsurface fragment volume >3" (0-60in)	0–80%

Ecological dynamics

This site is associated with drainageways on hills and mountains along the Gulf of Alaska. Until about 10,000 years ago, this area had many continental-scale ice sheets that advanced and retreated many times over millennia (Chapin 1994). The final advance of these glaciers occurred during the Little Ice Age, which peaked about 1750 AD. Since then, many glaciers have thinned and retreated inland, while numerous tidewater glaciers still exist in the area (Lawson 2015). The 250-year glacial retreat is attributed to less regional snowfall in the mountains, rising winter temperatures, and decreased cloud cover and lower precipitation during the growing season in summer (Hall et al. 2003).

The concave slope shape associated with mountain drainageways accumulates and facilitates movement of water downslope. Meltwater and precipitation events result in continuous sub-surface, lateral flow of ground water through drainageways during the growing season (May-September). The reference plant community phase is persistent and maintained under these hydrologic conditions.

This site supports a reference state composed of one community, characterized as an open tall scrub community dominated by Sitka alder (*Alnus viridis* ssp. sinuata) and Sitka willow (*Salix sitchensis*).

Browsing by moose on willow species was observed on this ecological site, but it does not appear to affect the ecological processes enough to alter the communities described.

State and transition model

R220XY444AK – Maritime Shrub Drainageway Steep

1. Reference State

Phase 1.1 - Sitka alder – Sitka willow

Alaska vegetation classification: Open tall scrub

State 1
Reference State

The reference state is represented by a single open tall scrub community.

Resilience management. This state has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

Dominant plant species

- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Sitka willow (*Salix sitchensis*), shrub

Community 1.1
Sitka alder - willow

Figure 8. Typical plant community associated with community 1.1.

The reference community phase is characterized as open tall scrub, primarily composed of Sitka alder and Sitka willow (Viereck et al. 1992). The strata that characterize this community phase are tall shrubs (greater than 10 feet) and medium shrubs (3 to 10 feet), and medium forbs (4 inches to 2 feet). The ground cover is dominantly herbaceous debris, rock fragments, and moss. Common moss species include Rhizomnium moss and Schreber's big red stem moss.

Resilience management. This community has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

Dominant plant species

- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- stink currant (*Ribes bracteosum*), shrub
- feltleaf willow (*Salix alaxensis*), shrub
- devilsclub (*Oplopanax horridus*), shrub
- red huckleberry (*Vaccinium parvifolium*), shrub
- rhizomnium moss (*Rhizomnium glabrescens*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- violet (*Viola*), other herbaceous
- largeleaf avens (*Geum macrophyllum*), other herbaceous

Table 7. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	0%
Forb basal cover	0%
Non-vascular plants	0-15%
Biological crusts	0%
Litter	35-50%
Surface fragments >0.25" and <=3"	0-3%
Surface fragments >3"	0-60%
Bedrock	0%
Water	0-10%
Bare ground	0-10%

Additional community tables

Table 8. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
balsam poplar	POBA2	*Populus balsamifera*	Native	–	0–10	–	–

Table 9. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Inventory data references

NASIS ID Plant community
13TD06202 Community 1.1

Other references

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Contributors

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Approval

Marji Patz, 3/10/2025

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	05/11/2025
Approved by	Marji Patz
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):**

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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:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
