USDA Natural Resources
Conservation Service

Ecological site R028BY044NV
WETLAND

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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.

MLRA notes

Major Land Resource Area (MLRA): 028B–Central Nevada Basin and Range

MLRA 28B occurs entirely in Nevada and comprises about 23,555 square miles (61,035 square kilometers). More than nine-tenths of this MLRA is federally owned. This area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. It is an area of nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by long, gently sloping to strongly sloping alluvial fans. The mountains are uplifted fault blocks with steep sideslopes. Many of the valleys are closed basins containing sinks or playas. Elevation ranges from 4,900 to 6,550 feet (1,495 to 1,995 meters) in the valleys and basins and from 6,550 to 11,900 feet (1,995 to 3,630 meters) in the mountains.
The mountains in the southern half are dominated by andesite and basalt rocks that were formed in the Miocene and Oligocene. Paleozoic and older carbonate rocks are prominent in the mountains to the north. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments are throughout this area. The valleys consist mostly of alluvial fill, but lake deposits are at the lowest elevations in the closed basins. The alluvial valley fill consists of cobbles, gravel, and coarse sand near the mountains in the apex of the alluvial fans. Sands, silts, and clays are on the distal ends of the fans.
The average annual precipitation ranges from 4 to 12 inches (100 to 305 millimeters) in most areas on the valley floors. Average annual precipitation in the mountains ranges from 8 to 36 inches (205 to 915 millimeters) depending on elevation. The driest period is from midsummer to midautumn. The average annual temperature is 34 to 52 degrees F (1 to 11 degrees C). The freeze-free period averages 125 days and ranges from 80 to 170 days, decreasing in length with elevation.
The dominant soil orders in this MLRA are Aridisols, Entisols, and Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an aridic or xeric soil moisture

regime, and mixed or carbonatic mineralogy. They generally are well drained, loamy or loamyskeletal, and shallow to very deep.
Nevada's climate is predominantly arid, with large daily ranges of temperature, infrequent severe storms and heavy snowfall in the higher mountains. Three basic geographical factors largely influence Nevada's climate: continentality, latitude, and elevation. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the West but throughout the state, as a result the lowlands of Nevada are largely desert or steppes.
The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with well-developed seasons and the terrain responds quickly to changes in solar heating. Nevada lies within the midlatitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in weather during the late fall, winter and spring months, when most of the precipitation occurs.
To the south of the mid-latitude westerlies, lies a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with occasional thundershowers. The eastern portion of the state receives noteworthy summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Ecological site concept

This site occurs on lake plains adjacent to springs, seeps, sloughs or ponds. Slope gradients of 0 to 8 percent but slopes of 0 to 2 percent are most typical. Elevations are 5500 to 6200 feet.

Average annual precipitation is 6 to 10 inches. Mean annual air temperature is 45 to 50 degrees F. The average growing season is about 100 to 120 days.

The soils associated with this site are very deep and poorly to somewhat poorly drained. Soils are saturated during most of the year, with the water table above or very near the surface continuously. These soils have poor aeration and are high in organic matter. The soils have an aquic moisture regime that borders on xeric.

The reference plant community is dominated by bulrush and cattail. Baltic rush, sedge and

common reed are other commonly associated species. Potential vegetative composition is about 90 percent grasses and grass-likes, and 10 percent forbs. Approximate ground cover (basal and crown) is 40 to 70 percent.

Associated sites

R028BY012NV	**WET SALINE MEADOW** WET SALINE MEADOW, Dominated by western wheatgrass.
R028BY001NV	**WET MEADOW 10-14 P.Z.** This site occurs on floodplains, stream terraces, and lake plains. Slopes of 0 to 2 percent are typical. Elevations are 5100 to 7500 feet. The soils associated with this site are very deep, poorly drained, and have high available water holding capacity. These soils are characterized by a mollic epipedon and a water table at or near the surface early in the spring that usually stabilizes at 10 to 30 inches during the growing season. This site experiences occasional, brief flooding in the spring by stream overflow or unconfined runoff from surrounding areas. The reference plant community is characterized by a dense stand of perennial grasses, grass-like plants, and perennial forbs; dominated by Nevada bluegrass, alkali bluegrass, sedges, and rushes.
R028BY002NV	**SALINE MEADOW** This site occurs lake terraces. Slopes are less than 2 percent and elevations range from 4400 to 6800 feet. The soils associated with this site are very deep, poorly drained, and strongly salt and sodium affected. Soils are characterized by a ochric epipedon and decreasing salinity with depth. The water table is near the surface for short periods in the early spring, but usually stabilizes at depths below 40 inches during the growing season.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Scirpus* (2) *Typha*

Physiographic features

This site occurs on lake plains on nearly level land adjacent to springs, seeps, sloughs or ponds. Slope gradients of 0 to 8 percent but slopes of 0 to 2 percent are most typical. Elevations are 5500 to 6200 feet.

Table 2. Representative physiographic features

Landforms	(1) Lake plain
Runoff class	High to very high
Flooding duration	Long (7 to 30 days)

Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Frequent
Elevation	5,500–6,200 ft
Slope	0–2%
Water table depth	0–9 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cold, moist winters and warm, dry summers.

Average annual precipitation ranges from 6 to 10 inches. Mean annual air temperature is about 45 to 50 degrees F. The average growing season is about 100 to 120 days.

Table 3. Representative climatic features

Frost-free period (average)	107 days
Freeze-free period (average)	
Precipitation total (average)	8 in

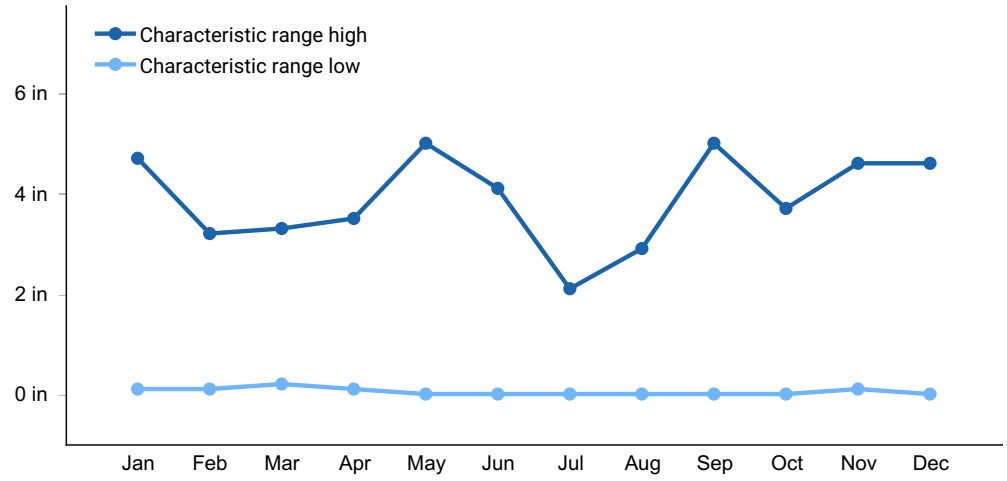

Figure 1. Monthly precipitation range

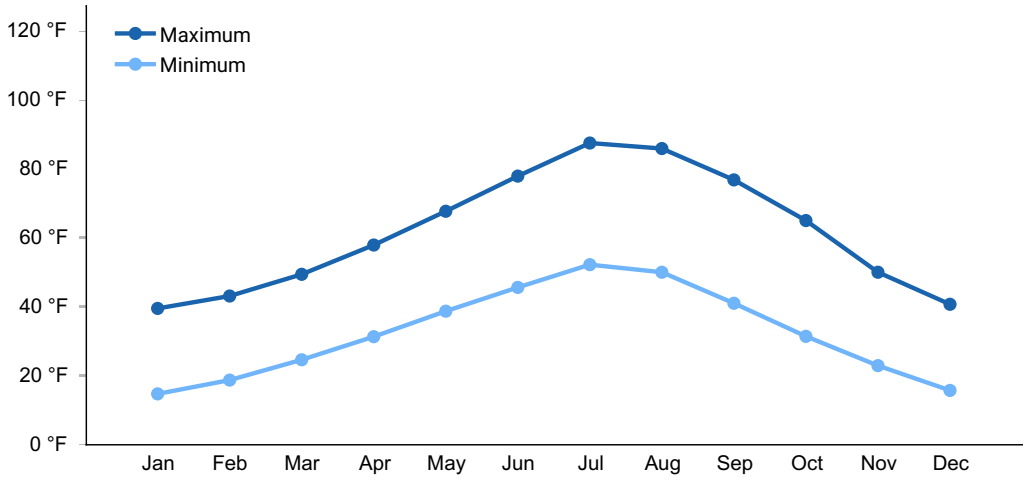

Figure 2. Monthly average minimum and maximum temperature

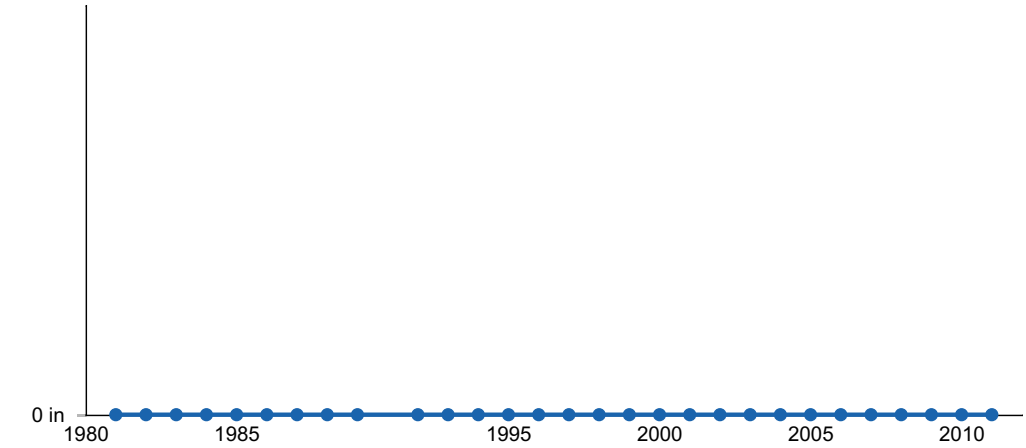

Figure 3. Annual precipitation pattern

Influencing water features

Soils are saturated at or near the surface for at least one month during most years, mainly during the late winter through early summer months.

Soil features

The soils associated with this site are very deep and poorly to somewhat poorly drained. Soils are saturated during most of the year, with the water table above or very near the surface continuously. These soils have poor aeration and are high in organic matter. The soils have an aquic moisture regime that borders on xeric. Soil series associated with this site include: Devilsgait and Kolda.

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Lacustrine deposits

Surface texture	(1) Loam (2) Silt loam (3) Silty clay
Family particle size	(1) Loamy
Drainage class	Very poorly drained to somewhat poorly drained
Permeability class	Slow to moderately slow
Soil depth	72–84 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	7.1–7.9 in
Calcium carbonate equivalent (0-40in)	0–30%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	7.9–9.6
Subsurface fragment volume <=3" (Depth not specified)	3–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As ecological condition declines, this site often becomes drained and the hydrophytic plants give rise to less water-loving species. As more xeric vegetation becomes established on this site, bulrush and cattail are replaced by sedges, Baltic rush, bluegrass, alkali sacaton or alkali cordgrass.

Fire Ecology:
Fire in wetland communities often only top-kills plants. Wetland species have deep buried rhizomes which usually survive all but the most severe fires. Fire return interval is typically less than 35 years. Common cattail rhizomes are buried in the soil and are often under water where they cannot be harmed by the heat of fire. When above ground foliage is consumed by fire, common cattail quickly initiates new top-growth from these surviving underground regenerative organs. Bulrush can survive fire by sprouting from rhizomes. Common cattail rhizomes are buried in the soil and are often under water where they cannot be harmed by the heat of fire. When above ground foliage is consumed by fire, common cattail quickly initiates new top-growth from these surviving underground

regenerative organs. Common reed stands are typically dense and contain much dead material. Standing dead canes and litter often constitute twice as much biomass as living shoots. This abundant dead fuel carries fire well, allowing stands to burn during midsummer when the current year's shoots are green. Common reed's rhizomes are deeply buried in soil and are often under water as well. The heat from most fires does not penetrate deep enough into the soil to injure these regenerative structures. When fire consumes the above ground foliage, new top growth is initiated from the surviving rhizomes. Sedge is top-killed by fire, with rhizomes protected by insulating soil. The rhizomes of sedge species may be killed by high-severity fires that remove most of the soil organic layer. Reestablishment after fire occurs by seed establishment and/or rhizomatous spread. Rush is fire tolerant when dormant and top-killed by fire during the growing season. It establishes after fire through seed and/or lateral spread by rhizomes.

State and transition model

Ecosystem states

1. Reference State

State 1 submodel, plant communities

1.1. Bulrush/Broadleaf cattail

State 1
Reference State

Community 1.1
Bulrush/Broadleaf cattail

The reference plant community is dominated by bulrush and cattail. Baltic rush, sedge and common reed are other commonly associated species. Potential vegetative composition is about 90% grasses and grass-likes, and 10% forbs. Approximate ground cover (basal and crown) is 40 to 70 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1800	2520	3600
Forb	200	280	400
Total	**2000**	**2800**	**4000**

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	**Primary Perennial Grasses/Grasslikes**			1652–3248	
	bulrush	SCIRP	*Scirpus*	840–1400	–
	broadleaf cattail	TYLA	*Typha latifolia*	560–1120	–
	common reed	PHAU7	*Phragmites australis*	140–280	–
	sedge	CAREX	*Carex*	56–224	–
	rush	JUNCU	*Juncus*	56–224	–
2	**Secondary Perennial Grasses**			140–180	
	saltgrass	DISP	*Distichlis spicata*	14–84	–
	bluegrass	POA	*Poa*	14–84	–
	alkali sacaton	SPAI	*Sporobolus airoides*	14–84	–
Forb					
3	**Perennial**			140–420	
	northern water plantain	ALTR7	*Alisma triviale*	14–84	–
	spiny naiad	NAMA	*Najas marina*	14–84	–
	pondweed	POTAM	*Potamogeton*	14–84	–
	arumleaf arrowhead	SACU	*Sagittaria cuneata*	14–84	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production. Bulrush herbage production is high, but forage value is low. It

is seldom grazed by livestock if other forage is available. If upland forage becomes limited and soil conditions dry, livestock may utilize bulrush. Common cattail is generally considered poor livestock forage. These animals rarely graze common cattail unless upland forage becomes scarce. Common reed is moderately tolerant of grazing, but prolonged heavy grazing tends to reduce the extent and size of stands. Sedge provides good to fair forage for domestic grazing. Rush is described as a fair to good forage species for cattle. On average, Rush palatability is considered medium to moderately low. Rush is considered palatable early in the growing season when plants are young and tender, but as stems mature and toughen palatability declines.

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 Considerations:
The hard-coated seeds of bulrushes are one of the most important and most commonly used foods of ducks and of certain marshbirds and shorebirds. The stems and underground parts are eaten by muskrats and geese. Bulrushes also furnish important nesting cover for waterfowl as well as for marsh wrens and blackbirds and give concealing protection to muskrats, otters, raccoons and other animals. Common cattail rootstocks are much more valuable as food for wildlife than are the seeds. Geese and muskrats use the starchy underground stems a great deal. Cattails also provide valuable shelter and nesting cover for several species of songbirds. For ducks, cattails have relatively little value. They furnish cover but they also take the place of more useful plants that would furnish both food and cover. Common reed provides shade, nesting, and cover habitat for mammals, waterfowl, song birds, and fishes. Common reed is not rated as a high-value wildlife food unless plants are young. Sedges have a high to moderate resource value for elk and a medium value for mule deer. Elk consume beaked sedge later in the growing season. Rush provides food for several wildlife species and waterfowl. Rush is an important cover species for a variety of small birds, upland game birds, birds of prey, and waterfowl.

Hydrological functions

Runoff is low to very high. Permeability is slow to moderately slow. There are no rills, waterflow patterns, gullies, erosional pedestals and/or terracettes, on this site. The plant communities on this site are ponded during most of the year.

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 has potential for waterfowl, upland and big game hunting.

Other products

Native Americans used common cattail as food. Rhizomes were dried and ground into flour or eaten as cooked vegetables; young stems were eaten raw or cooked; and immature fruiting spikes were eaten after roasting. The leaves were woven for matting and the "soft down" from ripe fruiting heads was used as padding and in diapers. Common reed was utilized as a food source and as a medicine by Native Americans. Shoots were eaten raw or cooked. Flour was made from dried shoots and rhizomes. Common reed rhizomes provided a year-round food source. Seeds were harvested and ground into a high fiber meal. The plant material was used to construct pipestems, arrows, mats, nets, and prayer sticks. The stems of rush were historically used by Native Americans as a foundation for coiled basketry.

Other information

Bulrush erosion control and short-term and long-term revegetation potential are rated as medium. Bulrush buffers wind and wave action on lakes and ponds, which may enhance the establishment of vegetation along shorelines. Ease of establishment, rapid vegetative spread, and high tolerance of disturbance make common reed an understandable choice for rehabilitation. However, these same traits make common reed a nuisance or weedy species in some areas. In natural or wild areas, the use of native common reed haplotypes may be required or preferred. Rush's production of deep and fibrous roots originating from a mass of coarse and creeping rhizomes makes it a valuable species for stabilizing streambanks and protecting against soil erosion.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Elko County, NV	
Township/Range/Section	T36N R64E S33
Latitude	40° 57′ 35″
Longitude	114° 44′ 39″
General legal description	Big Springs Ranch. Independence Valley area, Elko County, Nevada. In and around open water areas in the Ruby Marsh, Elko and White Pine Counties. This site also occurs in Eureka County, Nevada.

Other references

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

Houghton, J.G., C.M. Sakamoto, and R.O. Gifford. 1975. Nevada's Weather and Climate, Special Publication 2. Nevada Bureau of Mines and Geology, Mackay School of Mines, University of Nevada, Reno, NV.

National Oceanic and Atmospheric Administration. 2004. The North American Monsoon. Reports to the Nation. National Weather Service, Climate Prediction Center. Available online: http://www.weather.gov/

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

Contributors

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Approval

Kendra Moseley, 2/19/2025

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)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

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2. **Presence of water flow patterns:** None

3. **Number and height of erosional pedestals or terracettes:** None

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Water ±50%; bare ground ±5%; foliar cover of perennial herbaceous plants ± 75%; surface rock fragments and woody plants absent.

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter is only expected to move during periods of flooding by adjacent streams.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Surface soil stability values will range from 4 to 6. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Immediate surface soil consists well-decomposed organic soil material with more than 12% OM. Mineral soils have platy or massive surface soil structure with organic carbon ranging from 2.5 to over 5 percent in the upper 10 inches.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** These plant communities are ponded during most, if not all, of the year and there is no runoff.

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

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: Reference State: Grass-like plants >> water-loving, perennial, forbs. (By above ground production)

    Sub-dominant: Water-loving, annual, forbs >> perennial grasses. (By above ground production)

    Other:

    Additional:

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

14. **Average percent litter cover (%) and depth (in):** Litter cover is commonly 100% within plant interspaces and depth of litter is 6-inches to more than 24-inches.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season ± 2800 lbs/ac.

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:** Willow, foxtail barley, thistle, tall whitetop, salt cedar are invaders on this site.

17. **Perennial plant reproductive capability:** All functional groups should reproduce in most years.
