

Ecological site R028BY022NV WET MEADOW 14+ P.Z.

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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

The Wet Meadow 14+ P.Z. site occurs on stream terraces. Slope gradients of less than 2 percent are typical. Elevations are 5500 to 8200 feet.

Average annual precipitation is over 14 inches. Mean annual air temperature is 43 to 45 degrees F. The average growing season is 70 to 100 days.

The soils associated with this site are fertile, very deep and have a moderate to high available water capacity. They are poorly to very poorly drained and have a water table at or near the surface early in the spring that usually stabilizes within 20 inches of the surface throughout the growing season. These soils are rarely to occasionally flooded for very brief periods 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 and grass-like plants. The plant community is dominated by tufted hairgrass, bluegrasses, and sedges. Potential vegetative composition is about 80 percent grasses and grass-like plants and 20 percent forbs. Approximate ground cover (basal and crown) is about 60 to 75 percent.

Associated sites

F028BY025NV	Mountain Stream Terrace The Mountain Stream Terrace occurs along mountain stream terraces and flood plains. Soils are very deep, have a mollic epipedon, moderately well drained and formed in alluvium derived from quartzite and glacial outwash. This ecological site experiences occasional brief flooding and endosaturation between 76 to 100cm during the spring time.
R028BY024NV	LOAMY BOTTOM 14+ P.Z. This site occurs on inset fans, flood plains and lake plains. Slopes range from 0 to 8 percent. Slope gradients of 2 to 8 percent are most typical. Elevations are 7000 to 8500 feet. Dominated by basin wildrye.
R028BY029NV	LOAMY 16+ P.Z. This site is found on north-facing, concave mountain sideslopes. Slope gradients of 15 to 30 percent are most typical. Elevations are 8000 to 10,000 feet. The soils associated with this site are deep, well drained and formed in residuum/colluvium from volcanic and mixed parent material. They have a thick mollic epipedon and an argillic horizon within 50cm of the soil surface. The soil moisture regime is xeric and the soil temperature regime is cryic.
R028BY095NV	DRY MEADOW 12-16 P.Z. This site typically occurs on inset fans adjacent to intermittent streams, on the outer margins of perennial stream floodplains, swales and on concave positions of mountain valley fans. Slopes range from 2 to 15 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 6800 to 8500 feet.

Similar sites

R028BY095NV	DRY MEADOW 12-16 P.Z. PONE3-PHAL codominant grasses; less productive site.
R028BY001NV	WET MEADOW 10-14 P.Z. POA dominant grass; lower elevations.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Deschampsia caespitosa</i> (2) <i>Carex</i>

Physiographic features

This site occurs on stream terraces. Slope gradients of less than 2 percent are typical. Elevations are 5500 to 8200 feet.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace
Runoff class	High to very high
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	5,500–8,200 ft
Slope	0–2%
Water table depth	0–72 in
Aspect	Aspect is not a significant factor

Climatic features

The climate is semiarid, characterized by cold, moist winters and warm, dry summers.

Average annual precipitation is about 14 inches. The mean annual air temperature is about 43 to 45 degrees F. The average growing season is 70 to 100 days.

There are no climate stations close to the Wet Meadow 14+ P.Z. ecological site.

Table 3. Representative climatic features

Frost-free period (average)	85 days
Freeze-free period (average)	
Precipitation total (average)	14 in

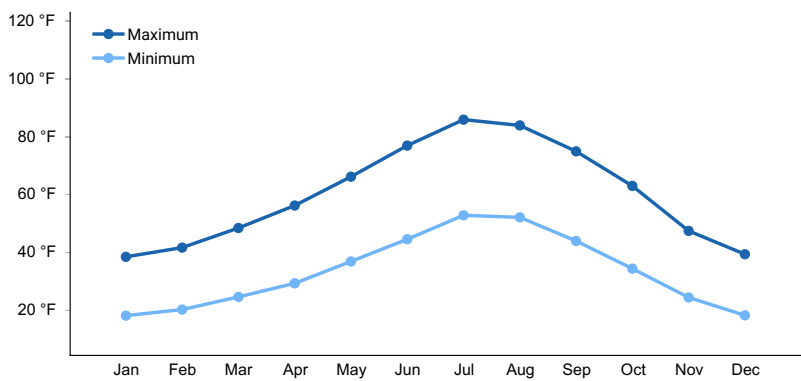


Figure 1. Monthly average minimum and maximum temperature

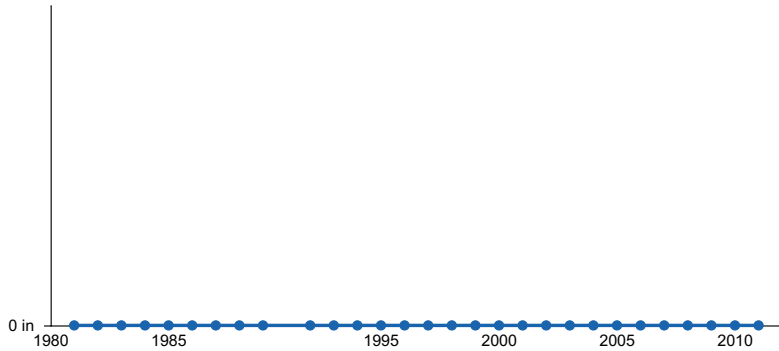


Figure 2. Annual precipitation pattern

Influencing water features

The influencing water features associated with this site are perennial streams, springs, and seeps.

Soil features

The soils are fertile, very deep and have a moderate to high available water capacity. They are poorly to very poorly drained and have a water table at or near the surface early in the spring that usually stabilizes within 20 inches of the surface throughout the growing season. These soils are rarely to occasionally flooded for very brief periods in the spring by stream overflow or unconfined runoff from surrounding areas. Some soils are kept moist through the growing season by seeps or springs. Runoff is high to very high. The soils are susceptible to gully erosion which intercepts normal overflow patterns and results in site degradation. Where stream channels become entrenched, the water table is lowered and a more drought tolerant vegetation succeeds on this site. The soils series associated with this site are Bicondoa, Devilsgait and Lehmandow.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to very 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)	6.8–7.9 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As ecological condition declines, tufted hairgrass and other deep-rooted grasses and grass-like species decrease. Kentucky bluegrass, rushes, and undesirable forbs such as wildiris increase as ecological condition declines. Where site potential is altered due to lowering of the water table as a result of stream channel entrenchment, this site is first replaced by the plant community characterized in the Dry Meadow (R028BY095NV) site description. With continuing site degradation and severe stream channel entrenchment the soil moisture balance of this site is greatly altered resulting in the much more drought tolerant potential plant community characterized in the Loamy Bottom 14+” PZ (R028BY024NV) site description. Thistles and redbud are species likely to invade this site.

Fire Ecology:

Fire in wet meadow communities often only top-kills plants. Prescribed fires are most effective in late summer, early fall, or during dry years when the water is below the soil surface. The sedges have deep buried rhizomes which usually survive all but the most severe fires. Tufted hairgrass generally survives all but the most severe fires. It usually sprouts from the root crown after aerial portions are burned. Tufts formed by the leaves often protect basal buds from fire damage. Tufted hairgrass seeds occur in the seedbank. After fire tufted hairgrass may regenerate from soil-stored seed. 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. Nevada bluegrass is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Moderately severe fires will top-kill timothy, and severe fires may cause damage to or kill the root crown, killing the plant. It reproduces by both seed and shoots from the base. Mat muhly is top killed by fire. Fire does not harm mat muhly to any great extent because the rhizome buds are insulated by the soil. There is a greater than 65 percent chance that at least 50 percent of the plants in a population will survive a fire.

State and transition model

Ecosystem states

1. Reference State

State 1 submodel, plant communities

1.1. Tufted
hairgrass/Sedge

State 1 Reference State

This Reference State has two general community phases.. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Plant community phase changes are primarily driven by fire or grazing and periodic drought.

Community 1.1 Tufted hairgrass/Sedge

The reference plant community is characterized by a dense stand of perennial grasses and grass-like plants. The

plant community is dominated by tufted hairgrass, bluegrasses, and sedges. Potential vegetative composition is about 80 percent grasses and grass-like plants and 20 percent forbs. Approximate ground cover (basal and crown) is about 60 to 75 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1120	1600	2560
Forb	210	300	480
Shrub/Vine	70	100	160
Total	1400	2000	3200

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			1160–2120	
	sedge	CAREX	<i>Carex</i>	400–600	—
	rush	JUNCU	<i>Juncus</i>	40–160	—
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	40–100	—
	alpine timothy	PHAL2	<i>Phleum alpinum</i>	40–100	—
2	Secondary Perennial Grasses			100–300	
	sloughgrass	BECKM	<i>Beckmannia</i>	10–60	—
	spikerush	ELEOC	<i>Eleocharis</i>	10–60	—
	mannagrass	GLYCE	<i>Glyceria</i>	10–60	—
	meadow barley	HOBR2	<i>Hordeum brachyantherum</i>	10–60	—
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	10–60	—
Forb					
3	Perennial			300–500	
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	40–100	—
	yarrow	ACHIL	<i>Achillea</i>	10–60	—
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	10–60	—
	cinquefoil	POTEN	<i>Potentilla</i>	10–60	—
	ragwort	SENEC	<i>Senecio</i>	10–60	—
	blue-eyed grass	SISYR	<i>Sisyrinchium</i>	10–60	—
	clover	TRIFO	<i>Trifolium</i>	10–60	—
Shrub/Vine					
4	Shrubs			40–100	
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	20–60	—
	Woods' rose	ROWO	<i>Rosa woodsii</i>	20–60	—
	willow	SALIX	<i>Salix</i>	20–60	—

Animal community

Livestock Interpretations:

This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production.

Tufted hairgrass provides good to excellent forage for all classes of livestock. It is often an abundant source of forage throughout its growing season. 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. Nevada bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Nevada bluegrass is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial bunchgrasses. Timothy is palatable and nutritious forage for domestic livestock. Timothy maintains itself well with proper management, but it is not resistant to heavy grazing. Young mat muhly is readily eaten by livestock. Plants become less palatable as they mature. Mat muhly plants usually grow in scattered patches, so they are seldom sufficiently abundant to be of major importance to livestock. In the northern part of its range, mat muhly is rated as good to very good forage for cattle and horses and fairly good for domestic sheep.

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:

Tufted hairgrass has a high to moderate resource value for elk and a medium value for mule deer. Use of tufted hairgrass by wildlife species is variable. Tufted hairgrass forage value for wildlife has been rated fair to good. 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. Nevada bluegrass is desirable for pronghorn antelope and mule deer in the spring and preferable in the spring, summer, and fall for elk and desirable as part of their winter range. Timothy provides important cover for a variety of game birds, small mammals, and waterfowl. The palatability of mat muhly for wildlife species has been rated as fair to poor.

Hydrological functions

Runoff is high to very high. Permeability is moderately slow to slow.

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

The stems of rush were historically used by Native Americans as a foundation for coiled basketry.

Other information

Tufted hairgrass has a broad ecological range and is useful for revegetation, particularly on disturbances at high elevation or high latitude. Tufted hairgrass has been successfully established by seeding on alpine disturbances. It is a valuable soil stabilizer, especially in wet, acid locations. 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. Timothy is used for reseeding rangelands where the soil is moist and the growing season long enough for seed production.

Inventory data references

NASIS soil component data.

Type locality

Location 1: White Pine County, NV	
Township/Range/Section	T20 N R55 E S5
Latitude	39° 38' 10"
Longitude	115° 48' 17"
General legal description	SE¼, Robinson Springs area, about 1 mile west of Eldridge Ranch in Newark Valley, east slope Diamond Mountains, White Pine County, Nevada. This site is also located in Elko, Eureka, southern Lander, and eastern Churchill Counties, Nevada.

Other references

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

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://plants.usda.gov/index.html>).

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)	PATTI NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	07/12/2012
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

3. **Number and height of erosional pedestals or terracettes:** None
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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 \pm 5-15%.
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5. **Number of gullies and erosion associated with gullies:** None
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None
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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage of grasses and annual & perennial forbs) only expected to move during periods of flooding by adjacent streams. Persistent litter (large woody material) will remain in place except during large flooding events.
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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 values will range from 4 to 6. (To be field tested.)
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is subangular blocky or fine granular. Soil surface colors are dark grayish brown or dark brown and the soils have thick mollic epipedons. Organic matter can range from 2 to 3 percent for much of the upper 20 inches. (OM values derived from lab characterization data.)
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep-rooted perennial grasses and/or rhizomatous grass-like (i.e. rush) slow runoff and increase 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):** Compacted layers are none. Subangular blocky or massive subsurface layers are not to be interpreted as compaction.
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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: Reference State: Deep-rooted, cool season, perennial grasses and grass-like plants
- Sub-dominant: deep-rooted, cool season, perennial forbs > fibrous, shallow-rooted, cool season, annual and perennial forbs > shallow-rooted, cool season perennial grasses > tall shrub.
- Other: rhizomatous grasses
- Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Little to no decadence present.
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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces ($\pm 10\text{-}15\%$) and litter depth is $> \frac{1}{4}$ inch.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (through June) ± 1700 lbs/ac. Favorable years ± 3200 lbs/ac and unfavorable years ± 1400 lbs/ac.
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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:** Increasers include rubber rabbitbrush. Potential invaders include: thistle, knapweeds, tall whitetop (perennial pepperweed), and salt cedar.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in most years.
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