

Ecological site R029XY031NV **SHALLOW DROUGHTY LOAM 5-8 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.

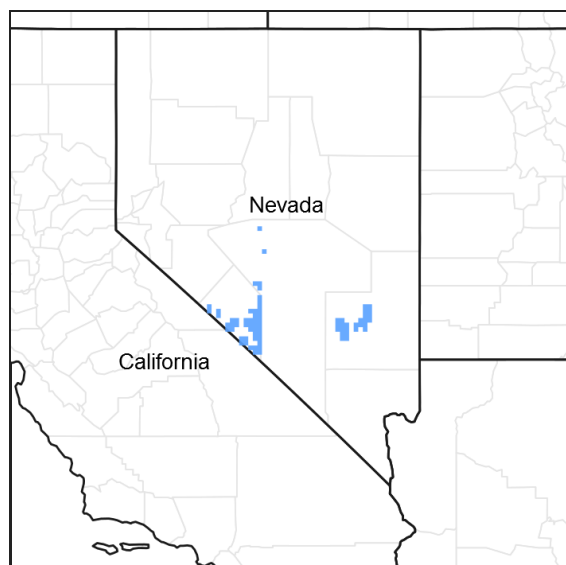


Figure 1. Mapped extent

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

R029XY013NV	SHALLOW GRAVELLY LOAM 5-8 P.Z.
R029XY046NV	SANDY LOAM 5-8 P.Z.
R029XY074NV	SHALLOW LOAM 5-8 P.Z.
R029XY079NV	DROUGHTY LOAM 5-8 P.Z.

Similar sites

R029XY074NV	SHALLOW LOAM 5-8 P.Z. MESP2-ATCO codominant shrubs
R029XY079NV	DROUGHTY LOAM 5-8 P.Z. MESP2 rare to absent
R030XB036NV	DROUGHTY LOAM 5-7 P.Z. PLRI3 dominant grass
R030XB041NV	SHALLOW DROUGHTY LOAM 5-7 P.Z. PLRI3 dominant grass
R029XY016NV	LOAMY UPLAND 5-8 P.Z. More productive site; MESP2 minor shrub

R029XY021NV	LOAMY HILL 5-8 P.Z. Less productive site; GRSP-LYAN codominant shrubs
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Grayia spinosa</i> (2) <i>Menodora spinescens</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i>

Physiographic features

This site occurs on hills, mesas, and fan remnants on all exposures. Slopes range from 2 to over 30 percent, but slope gradients of 2 to 15 percent are typical. Elevations are 4200 to about 7200 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Hill (3) Mesa
Elevation	4,200–7,200 ft
Slope	2–30%
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 5 to 8 inches. Mean annual air temperature is 52 to 58 degrees F. The average growing season is about 140 to 200 days.

Table 3. Representative climatic features

Frost-free period (average)	200 days
Freeze-free period (average)	0 days
Precipitation total (average)	8 in

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are shallow to moderately deep and are well drained. These soils have formed in mixed alluvium from volcanic rocks with minor amounts of limestone. Some soils may have a restrictive layer below the main plant rooting depth. Runoff is low to very high and permeability is slow to moderately rapid. Available water capacity is very low to low. Soil series associated with this site are Delamar, Pumel, Tokoper, Tybo, and Tognoni.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very cobbly fine sandy loam (3) Gravelly fine sandy loam
Family particle size	(1) Loamy

Drainage class	Well drained
Permeability class	Slow to moderately rapid
Soil depth	8–40 in
Surface fragment cover <=3"	26–42%
Surface fragment cover >3"	23–30%
Available water capacity (0–40in)	0.4–4.1 in
Calcium carbonate equivalent (0–40in)	0–25%
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)	4–36%
Subsurface fragment volume >3" (Depth not specified)	2–35%

Ecological dynamics

Where management results in abusive livestock use, snakeweed, Douglas rabbitbrush, white burrobrush and Anderson wolfberry increase while Indian ricegrass and other desirable forage species decline. Species most likely to invade this site are cheatgrass and annual mustards. This site, when in deteriorated condition, subjected to wildfire, may become a nearly solid stand of horsebrush, snakeweed, and rabbitbrush with introduced annual grasses or galleta occurring in the shrub interspaces.

Fire Ecology:

The mean fire return interval for desert shrub communities ranges from 35 to 100 years. Increased presence of non-native annual grasses, such as cheatgrass, can alter fire regimes by increasing fire frequency under wet to near-normal summer moisture conditions. When fire does occur, the effect on the ecosystem may be extreme. Spiny hopsage is considered to be somewhat fire tolerant and often survives fires that kill sagebrush. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy. Spiny menodora often survives fire because its foliage does not readily burn. Nevada ephedra generally sprouts after fire damages aboveground vegetation. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. However, severe fires may kill shallowly buried regenerative structures. Fire typically destroys aboveground parts of wolfberry, but the degree of damage to the plant depends on fire severity. Fire typically destroys aboveground parts of Anderson wolfberry, but the degree of damage to the plant depends on fire severity. Budsage is killed by fire. Budsage communities rarely burn due to insufficient fire loads. Winterfat is either killed or top-killed by fire, depending on fire severity. Severe fire can kill the perennating buds located several inches above the ground surface and thus kills the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the aboveground portions of winterfat and thus does not cause high mortality. Fires may be frequent in some Joshua tree woodlands. Joshua tree exhibits numerous specialized adaptations to fire. Fire may be extremely important in both producing and maintaining large pure stands. Plants are generally not killed by fire even when aboveground vegetation is consumed or badly damaged. 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. Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. Fire removes the accumulation and a rapid, cool fire will not burn deep into the root crown. Galleta is a rhizomatous perennial which can resprout after top-kill by fire. Fire top-kills bush muhly. A nonrhizomatous species, bush muhly regenerates following fire from soil-stored seed. Burning causes at least short-term decline of bush muhly. Recovery time is thought to vary considerably and is probably dependent on postfire weather and competition. When ungrazed, bush muhly's dense growth may contribute to fire spread. It may be most susceptible to fire damage when growing beneath shrubs

because of increased fuels and higher temperatures as shrubs burn.

State and transition model

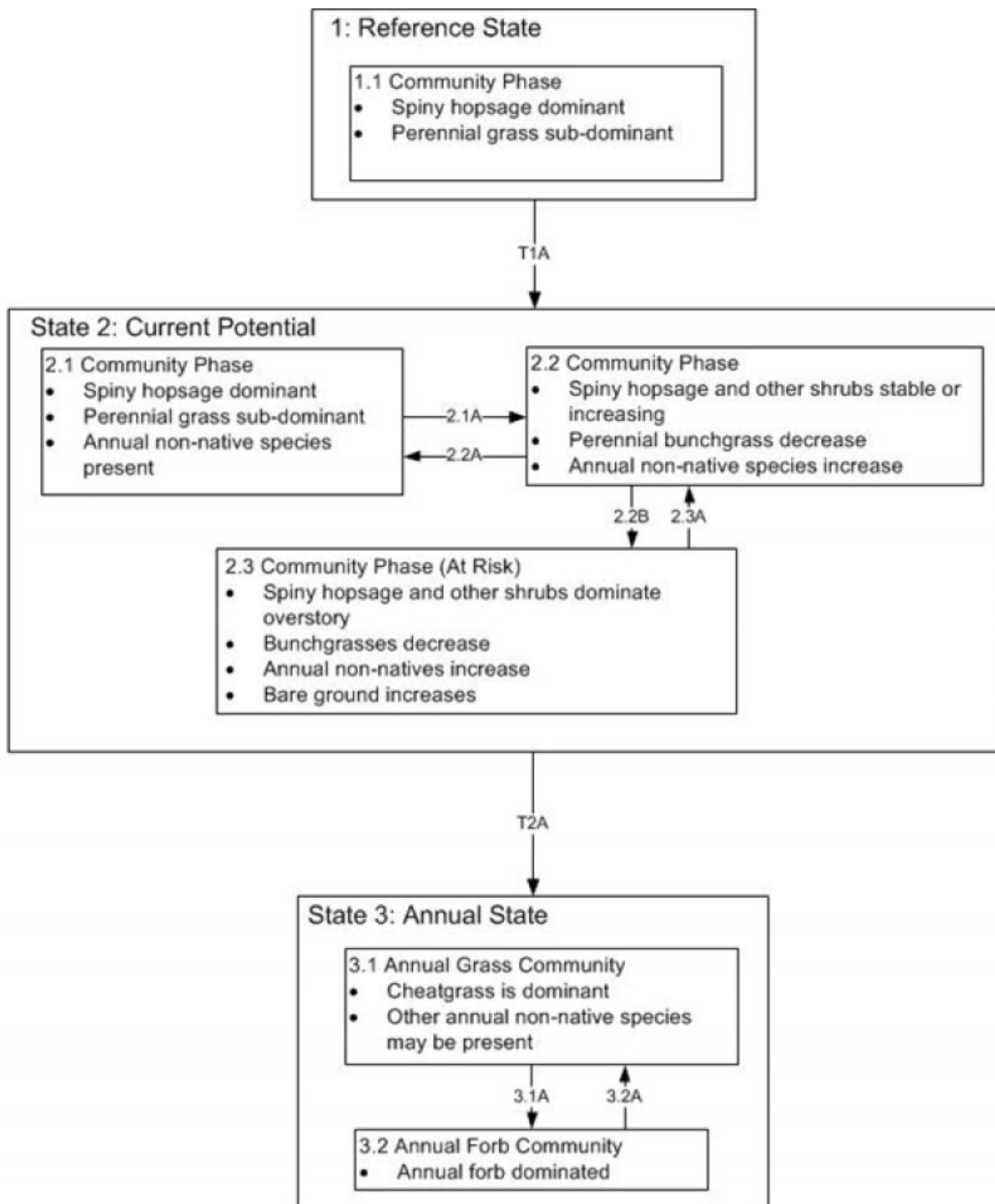


Figure 4. DRAFT STM

T1A: introduction of non-native species

2.1A: prolonged drought/ inadequate rest and recovery from defoliation

2.2A: rest and recovery

2.2B: prolonged drought/ inadequate rest and recovery from defoliation

2.3A: recovery or changes in management

T2A: Inadequate rest and recovery from defoliation and/or prolonged drought/Catastrophic wildfire.

3.1A: fire or cheatgrass die off

3.2A: time

Figure 5. DRAFT STM LEGEND

State 1

Reference State

Community 1.1

Reference Plant Community

The reference plant community is dominated by spiny hopsage, spiny menodora and Indian ricegrass. Other important species are galleta and Nevada ephedra. Potential vegetative composition is about 35% grasses, 5% forbs and 60% shrubs. Approximate ground cover (basal and crown) is 20 to 30 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	180	300	420
Grass/Grasslike	105	175	245
Forb	15	25	35
Total	300	500	700

State 2

Current Potental State

State 3

Annual State

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			70–200	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	50–100	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	10–50	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0–25	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	10–25	–
2	Secondary Perennial Grasses			9–45	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	3–15	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	3–15	–
Forb					
3	Perennial			10–40	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	10–25	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	5–10	–
	princesplume	STANL	<i>Stanleya</i>	5–10	–
4	Annual			0–15	
Shrub/Vine					
5	Primary Shrubs			160–355	
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	75–125	–
	spiny menodora	MESP2	<i>Menodora spinescens</i>	50–100	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	10–40	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	5–25	–
	water jacket	LYAN	<i>Lycium andersonii</i>	10–25	–
	banana yucca	YUBA	<i>Yucca baccata</i>	5–15	–
6	Secondary Shrubs			18–90	
	Shockley's goldenhead	ACSH	<i>Acamptopappus shockleyi</i>	3–15	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	3–15	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	3–15	–
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	3–15	–
	burrobrush	HYSA	<i>Hymenoclea salsola</i>	3–15	–
	horsebrush	TETRA3	<i>Tetradymia</i>	3–15	–

Animal community

Livestock Interpretations:

This site is suited for livestock grazing. Grazing management should be keyed to perennial grass production. 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. Desert needlegrass produces considerable basal foliage and is good forage while young. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle but rarely grazed by sheep. When actively growing, galleta provides good to excellent forage for cattle and horses and fair forage for domestic sheep. Although not preferred, all classes of livestock may use galleta when it is dry. Domestic sheep show greater use in winter than summer months and typically feed upon central portions of galleta tufts, leaving coarser growth around the edges. Galleta may prove somewhat coarse to domestic sheep. Spiny hopsage provides a palatable and nutritious food source for livestock, particularly during late winter through spring. Domestic sheep browse the succulent new growth of spiny hopsage in late winter and early spring. Cattle will graze spiny menodora in the spring. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Anderson wolfberry

is sometimes used as forage by livestock. Palatability of Anderson wolfberry browse is presumably fair to low. This species is used as forage only when more desirable species are unavailable. The fruit, however, appears to be moderately palatable. Budsage is palatable and nutritious forage for domestic sheep in the winter and spring although it is known to cause mouth sores in lambs. Budsage can be poisonous or fatal to calves when eaten in quantity. Budsage, while desired by cattle in spring, is poisonous to cattle when consumed alone. Winterfat is an important forage plant for livestock, especially during winter when forage is scarce. Abusive grazing practices have reduced or eliminated winterfat on some areas even though it is fairly resistant to browsing. Effects depend on severity and season of grazing. Use by livestock, however, is limited to the consumption of accessible blossoms and fruits and utilization of shade.

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:

Spiny hopsage provides a palatable and nutritious food source for big game animals. Spiny hopsage is used as forage to at least some extent by domestic goats, deer, pronghorn, and rabbits. Spiny menodora is not a desirable plant species for wildlife. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Palatability of Anderson wolfberry browse is presumably fair to low. This species is used as forage only when more desirable species are unavailable. The fruit, however, appears to be moderately palatable. Anderson wolfberry is sometimes used as forage by feral burros. The red berries are eaten by some birds and mammals. Berries of this plant constituted 2 percent of the diet of chukar partridges. In some areas of southern Nevada, the fleshy leaves and juicy berries provide part of the succulence permitting Gambel quail to occupy desert areas devoid of drinking water. In desert washes Anderson wolfberry grows in dense thorny thickets which provide good cover for quail and other small wildlife. Budsage is palatable, nutritious forage for upland game birds, small game and big game in winter. Budsage is rated as "regularly, frequently, or moderately taken" by mule deer in Nevada in winter and is utilized by bighorn sheep in summer, but the importance of budsage in the diet of bighorns is not known. Bud sage comprises 18 – 35% of a pronghorn's diet during the spring where it is available. Chukar will utilize the leaves and seeds of bud sage. Budsage is highly susceptible to effects of browsing. It decreases under browsing due to year-long palatability of its buds and is particularly susceptible to browsing in the spring when it is physiologically most active. Winterfat is an important forage plant for wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents and are a staple food for black-tailed jackrabbits. Mule deer and pronghorn antelope browse winterfat. Winterfat is used for cover by rodents. It is potential nesting cover for upland game birds, especially when grasses grow up through its crown. Bananna yucca is an undesirable plant species for wildlife.

Hydrological functions

Runoff is low to very high. Permeability is low to moderately rapid.

Recreational uses

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.

Other products

Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour. Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Native Americans used the fleshy berries of Anderson wolfberry either fresh or boiled and then dried them for later use. This shrub is also used as an ornamental valued chiefly for its showy red berries. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source.

Other information

Spiny hopsage has moderate potential for erosion control and low to high potential for long-term re-vegetation projects. It can improve forage, control wind erosion, and increase soil stability on gentle to moderate slopes. Spiny

hopsage is suitable for highway plantings on dry sites in Nevada. Nevada ephedra is useful for erosion control, and seedlings have been successfully planted onto reclaimed strip mines, with survival ranging from 12 to 94%. Atrazine may be effective in controlling Nevada ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine. Winterfat adapts well to most site conditions, and its extensive root system stabilizes soil. However, winterfat is intolerant of flooding, excess water, and acidic soils. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Desert needlegrass seeds are easily germinated and have potential for commercial use. Desert needlegrass may be used for groundcover in areas of light disturbance, but it is susceptible to excessive trampling.

Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T5S R61E S2
General legal description	Approximately 6 miles east of Hiko Junction and south of US Hwy 93, Six Mile Flat area, Lincoln County, Nevada.

Other references

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

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

Contributors

RRK/GKB

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)	P NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	05/15/2013
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

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2. **Presence of water flow patterns:** Water flow patterns are often numerous in areas subjected to summer convection storms. Flow patterns short (<3 m) and stable.
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3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare with occurrence typically limited to areas within water flow patterns.
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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 25 to 70% depending on amount of surface rock fragments (variable 15 to over 40%)
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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 from grasses and annual & perennial forbs) expected to move distance of slope length (< 5 m) during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall 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 should be 2 to 4 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. (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):** Surface structure is typically platy. Soil surface colors are light brown or gray and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse shrub canopy and associated litter break provide some protection from raindrop impact.
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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. Platy or massive sub-surface horizons or duripans are not to be interpreted as compacted layers.
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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: deciduous shrubs (spiny hopsage, spiny menodora)

Sub-dominant: deep-rooted, cool season, bunchgrasses > associated shrubs > warm season grasses > deep-rooted, perennial forbs = fibrous, shallow-rooted, perennial forbs = annual forbs

Other: succulents

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 35% of total woody canopy; mature bunchgrasses commonly ($\pm 25\%$) have dead centers.
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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (20-30%) and depth ($< \frac{1}{4}$ -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 (thru May) ± 500 lbs/ac; Favorable years ± 700 lbs/ac and unfavorable years ± 300 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:** Potential invaders include halogeton; Russian thistle, red brome, red stem filaree, annual mustards, and cheatgrass.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Little growth or reproduction occurs during extended or severe drought periods.
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