USDA Natural Resources
Conservation Service

Ecological site R030XC012NV
GRAVELLY CALCAREOUS INSET FAN 9-11 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.

Ecological site concept

This site occurs on inset fans of upper piedmont slopes. Slope gradients of 2 to 8 percent are most typical. Elevations are 5300 to 6400 feet. The soils associated with this site are very deep and derived from mixed rock sources.

Please refer to group concept R030XC033NV to view the provisional STM.

Associated sites

R030XC005NV	**PIEDMONT WASH** Adjancent to drainage channel.
R030XC011NV	**GRAVELLY INSET FAN 7-9 P.Z.** Lower elevations.

Similar sites

R030XC013NV	**LOAMY BOTTOM 11-13 P.Z.** More productive site, deep soils.
R030XC011NV	**GRAVELLY INSET FAN 7-9 P.Z.** Lower elevation, blackbrush site.
R030XC005NV	**PIEDMONT WASH** Found near channel, less stable plant community.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. vaseyana*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Achnatherum speciosum*

Physiographic features

This site occurs on inset fans of upper piedmont slopes. Slope gradients of 2 to 8 percent are most typical. Elevations are 5300 to 6400 feet.

Table 2. Representative physiographic features

Landforms	(1) Inset fan

Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare
Elevation	5,300–6,400 ft
Slope	2–8%
Aspect	Aspect is not a significant factor

Climatic features

The primary air masses affecting the Spring Mountains are cold maritime polar air from the Gulf of Alaska and warmer, moist maritime subtropical air from lower latitudes. Occasionally there are invasions of cold continental polar air from northern Canada or the Rocky Mountains. Precipitation in the area results primarily from the passage of cyclones with associated fronts during fall, winter and spring; from closed cyclones in late winter and spring; and from the flow of moist tropical air from the southeast to the southwest quadrant in the summer.

The mean annual precipitation is 9 to 11 inches; mean annual air temperature is 45 to 50 degrees F., and the frost-free season is 90 to 130 days.

Table 3. Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	
Precipitation total (average)	11 in

Influencing water features

This site is subject to flood flows during spring runoff and during summer convective storms.

Soil features

The soils associated with this site are very deep and derived from mixed rock sources. Water intake rates are moderate to rapid, available water capacity is low, runoff is low and soils are well drained. The soils are subject to periodic (often intense) flood flows that occur primarily during summer convection storm activity. The soils are classified as Xeric Haplocambids.

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	72 in
Surface fragment cover <=3"	30–50%
Surface fragment cover >3"	5–10%
Available water capacity (0-40in)	2.4–2.5 in
Calcium carbonate equivalent (0-40in)	15–30%
Electrical conductivity (0-40in)	2–8 mmhos/cm

Sodium adsorption ratio (0-40in)	0–13
Soil reaction (1:1 water) (0-40in)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	24–65%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

Please refer to group concept R030XC033NV to view the provisional STM.

With severe disturbance such as flash flood flows, or wildfire, rubber rabbitbrush will increase. Abusive grazing by feral livestock will cause a decrease in the perennial grasses and an increase in rubber rabbitbrush, blackbrush and sagebrush. Species likely to invade this site are introduced annuals such as red brome and filaree.

Fire effects:
Presettlement fire return intervals in mountain big sagebrush communities varied from 15 to 25 years. Mountain big sagebrush is readily killed by fire and requires at least 15 years to recover after fire. Postfire establishment is from seed. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas. Low culm density in Indian ricegrass reduces charring of crowns below soil, thereby protecting the growing points during a fire.
Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. Fire removes the accumulation; a rapid, cool fire will not burn deep into the root crown. Most perennial grasses have root crowns that can survive wildfire.

State and transition model

Ecosystem states

1. Reference Plant Community

State 1 submodel, plant communities

1.1. Reference Plant Community

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by mountain big sagebrush and Indian ricegrass. Other important species associated with this site are Ephedra species, Stansbury cliffrose and desert needlegrass. Potential vegetative composition is about 20 percent grasses, 5 percent forbs and 75 percent shrubs and trees. Approximate ground cover (basal and crown) is 25 to 40 percent. Total annual air-dry production is 900 pounds in favorable years, 700 pounds in normal year and 500 pounds in unfavorable years.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	375	525	675
Grass/Grasslike	100	140	180
Forb	25	35	45
Total	**500**	**700**	**900**

Table 6. Ground cover

Tree foliar cover	1-5%
Shrub/vine/liana foliar cover	20-40%
Grass/grasslike foliar cover	10-15%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-15%
Surface fragments >0.25" and <=3"	30-50%
Surface fragments >3"	5-10%
Bedrock	0%
Water	0%
Bare ground	15-25%

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			63–175	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	35–105	–
	needle and thread	HECO26	*Hesperostipa comata*	14–35	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	14–35	–
2	**Secondary Perennial Grasses**			1–35	
	blue grama	BOGR2	*Bouteloua gracilis*	4–14	–
	squirreltail	ELEL5	*Elymus elymoides*	4–14	–
	Sandberg bluegrass	POSE	*Poa secunda*	4–14	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	4–14	–
Forb					
3	**Perennial Forbs**			1–35	
	milkvetch	ASTRA	*Astragalus*	4–21	–
	desert larkspur	DEPA	*Delphinium parishii*	4–21	–
	Cooper's rubberweed	HYCO2	*Hymenoxys cooperi*	4–21	–
	lupine	LUPIN	*Lupinus*	4–21	–
4	**Annual Forbs**			1–35	
	cryptantha	CRYPT	*Cryptantha*	4–21	–
	gilia	GILIA	*Gilia*	4–21	–
Shrub/Vine					
5	**Primary Shrubs**			315–630	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	210–385	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	49–105	–
	blackbrush	CORA	*Coleogyne ramosissima*	14–35	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	14–35	–
	mormon tea	EPVI	*Ephedra viridis*	14–35	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	14–35	–
6	**Secondary Shrubs**			35–70	
	fourwing saltbush	ATCA2	*Atriplex canescens*	7–21	–
	Apache plume	FAPA	*Fallugia paradoxa*	7–21	–
	spiny greasebush	GLSPA	*Glossopetalon spinescens var. aridum*	7–21	–
	desert-thorn	LYCIU	*Lycium*	7–21	–
	desert almond	PRFA	*Prunus fasciculata*	7–21	–
	sage	SALVI	*Salvia*	7–21	–
	banana yucca	YUBA	*Yucca baccata*	7–21	–
	Joshua tree	YUBR	*Yucca brevifolia*	7–21	–

Animal community

Livestock Interpretations:
This site is suited to livestock grazing during the summer and fall. Wild horses and burros may use this site year

round if water is avaible. Grazing management should be keyed to needlegrass production. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. 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. Needleandthread provides highly palatable forage, especially in the spring before fruits have developed. Needlegrasses are grazed in the fall only if the fruits are softened by rain. Mountain big sagebrush is eaten by domestic livestock but has long been considered to be of low palatability, and a competitor to more desirable species. Stansbury cliffrose is an important browse species for livestock, especially in the winter. Blackbrush is not preferred as forage by domestic livestock, but does provide some forage during the spring, summer and fall. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Green ephedra is heavily browsed by livestock on winter range but only moderately or lightly browsed during other seasons. In general, livestock forage only lightly on rubber rabbitbrush during the summer, but winter use can be heavy in some locations. Fall use is variable, but flowers are often used by livestock. A few leaves and the more tender stems may also be used.

Stocking rates vary with such factors as kind and class of grazing animal, season of use and fluctuations in climate. Actual use records for individual sites, a determination of the degree to which the sites have been grazed, and an evaluation of trend in site condition offer the most reliable basis for developing initial stocking rates.

Wildlife Interpretations:
Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass. Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat large amounts of shattered Indian ricegrass seed lying on the ground. Needleandthread is moderately important spring forage for mule deer, but use declines considerably as more preferred forages become available. Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer and elk. Stansbury cliffrose is an important browse species for mule deer, pronghorn, game birds, and songbirds. Wild ungulates use it heavily in winter. Blackbrush is a valuable browse species for bighorn sheep. It may also comprise up to 25% of the mule deer winter diet. Blackbrush provides cover for upland game birds, nongame birds and small mammals. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Green ephedra is an important browse species for big game animals. Green ephedra is heavily used by wildlife on winter ranges. Wildlife forage only lightly on rubber rabbitbrush during the summer, but winter use can be heavy in some locations. Fall use is variable, but flowers are often used by wildlife. A few leaves and the more tender stems may also be used. The forage value of rubber rabbitbrush varies greatly among subspecies and ecotypes.
Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Meadows surrounded by sagebrush may be used as feeding and strutting grounds. Sagebrush is a crucial component of their diet year-round, and sage-grouse select sagebrush almost exclusively for cover. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities.

Hydrological functions

Rills – none present.
Water flow Patterns – Short, not connected.
Pedestals and/or Terracettes – Few to none.
Gullies – none.
Low runoff due to plant cover and composition. Plant community composition contributes to infiltration.

Other products

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

Other information

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: Clark County, NV	
Township/Range/Section	T19 S R58 E S30 SE
UTM zone	N
UTM northing	4014140n
UTM easting	0632658e
General legal description	In drainage at turnoff from Kyle Canyon to Harris Springs Canyon, Spring Mountains, Clark County, Nevada.

Other references

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Glenne, G., Johnson, D. 2002. Guide to Species of Concern in the Spring Mountains National Recreation Area, Clark and Nye Counties, Nevada. USFS, Las Vegas, NV.

Nachlinger, J., G. Reese. 1996. Plant Community Classification of the Spring Mountains National Recreation Area, Clark and Nye Counties, Nevada. The Nature Conservancy. Reno, Nevada.

Contributors

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Approval

Sarah Quistberg, 2/25/2025

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)	P NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	06/22/2006
Approved by	Sarah Quistberg
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare. Occurrence is usually limited to areas of 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 ± 15-25%; surface cover of rock fragments variable but often more than 35%.

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5. **Number of gullies and erosion associated with gullies:** Gullies are rare in areas of this site that occur on stable landforms. Where this site occurs on inset fans, gullies and head cuts associated with ephemeral channel entrenchment are rare to common. Gullies and head cuts should be healing or stable.

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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 during intense summer convection storms or rapid snowmelt events. 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 should be 3 to 6 on most soil textures found on this site. (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 thin to thick platy. Soil surface colors are pale browns and typified by an ochric epipedon. Organic matter of the surface 2 to 4 inches is typically less than 1 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., desert needlegrass & Indian ricegrass]) slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

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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 subangular blocky structure surface are not to be interpreted as compacted.

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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: Tall shrubs (big sagebrush & cliffrose)

    Sub-dominant: Deep-rooted, cool season, perennial bunchgrasses (Indian ricegrass & desert needlegrass) > associated shrubs > deep-rooted, cool season, perennial forbs > shallow-rooted, cool season, perennial bunchgrasses = warm season, perennial bunchgrass > fibrous, shallow-rooted, cool season, 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 25% of total woody canopy; some of the mature bunchgrasses (<10%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (±15 - 25%) and litter depth is ±¼ 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 mid-June) ±700 lbs/ac; Favorable year: 900 lbs/ac; Unfavorable year: 500 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 intruders include redbrome, Mediterranean grass, red-stem filaree and annual mustards.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years. Reduced growth and reproduction occur during extreme or extended drought periods.
