USDA Natural Resources
Conservation Service

Ecological site R029XY014NV
SHALLOW CALCAREOUS SLOPE 8-12 P.Z.

Accessed: 05/11/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

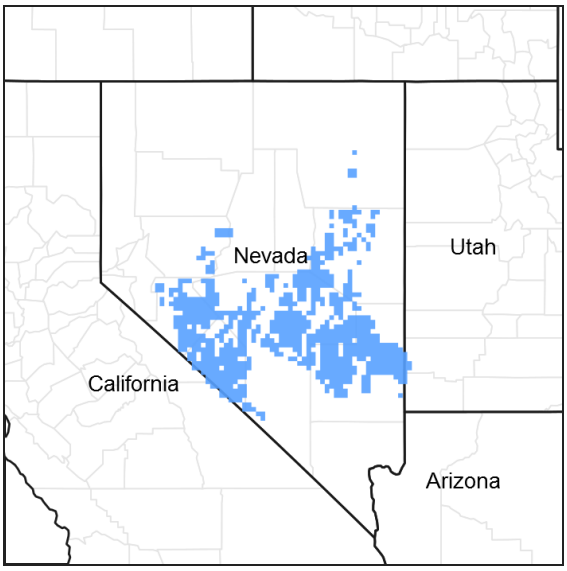

Figure 1. Mapped extent

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

F029XY069NV	**PIMO-JUOS WSG 0R0504 12 to 16**
R029XY008NV	**SHALLOW CALCAREOUS LOAM 8-12 P.Z.**
R029XY010NV	**LOAMY SLOPE 8-10 P.Z.**

Similar sites

R029XY015NV	**SHALLOW CALCAREOUS HILL 8-10 P.Z.** PUST and JUOS major species
R029XY008NV	**SHALLOW CALCAREOUS LOAM 8-12 P.Z.** More productive site
R029XY045NV	**STONY CALCAREOUS SLOPE 8-12 P.Z.** ACSP12 dominant grass
R029XY028NV	**SHALLOW CALCAREOUS SLOPE 12-14 P.Z.** PSSPI dominant grass

Table 1. Dominant plant species

Tree	Not specified

Shrub	(1) *Artemisia nova*
Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

This site occurs on summits and backslopes of hills and mountains, fan remnants, and rock pediments. Slopes range from 2 to over 75 percent, but slope gradients of 15 to 50 percent are typical. Elevations are 4300 to about 8800 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Fan remnant (3) Hill
Flooding frequency	None
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	Rare
Elevation	4,300–8,800 ft
Slope	2–75%
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cold, moist winters and warm, somewhat dry summers. Average annual precipitation is 8 to 12 inches. Mean annual air temperature is 43 to 57 degrees F. The average growing season is about 90 to 150 days.

Table 3. Representative climatic features

Frost-free period (average)	150 days
Freeze-free period (average)	0 days
Precipitation total (average)	12 in

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils on this site are calcareous or carbonatic and have a shallow effective rooting zone with depth to a hardpan or bedrock ranging from 5 to 20 inches. The soils have high amounts of gravels throughout the soil profile and are well drained to moderately well drained. The soil surface typically has a cover of 75 percent or more rock fragments. The available water capacity is very low to low. Runoff is low to very high. Rock fragments on the soil surface have a stabilizing effect on surface erosion conditions. Soil series associated with this site are: Argalt, Armespan, Armoine, Blackcan, Haarvar, Kyler, Littleailie, Lomoine, Nevoyer, Old Camp, Penelas, Stewval, Ursine, Vinini, Weepah, and Zoate.

Table 4. Representative soil features

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

Drainage class	Well drained to moderately well drained
Permeability class	Very slow to moderately rapid
Soil depth	4–40 in
Surface fragment cover <=3"	5–68%
Surface fragment cover >3"	1–30%
Available water capacity (0-40in)	0.2–1.9 in
Calcium carbonate equivalent (0-40in)	1–35%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	6.6–9.6
Subsurface fragment volume <=3" (Depth not specified)	5–73%
Subsurface fragment volume >3" (Depth not specified)	0–33%

Ecological dynamics

Black sagebrush and rabbitbrush increase while Indian ricegrass decreases with excessive use by cattle or horses. Galleta will initially increase but with continued abusive use, it will also decrease. With excessive use by sheep, black sagebrush and forbs decrease as winterfat and rabbitbrush increase. Rodent activity is typically evident by small patches dominated by spiny hopsage. Shadscale is recognized as a seral community dominant occurring following wildfire or other major disturbance to the black sagebrush community (particularly at the lower elevations of this site's occurrence). Cheatgrass and annual mustards are the species most likely to invade this site. Utah juniper increases on this site where it occurs adjacent to juniper woodland areas.

Fire Ecology:
Black sagebrush communities generally lack enough fine fuels to carry a fire. In addition to low fine fuel loading, wide shrub spacing makes fire infrequent or difficult to prescribe in black sagebrush types. Black sagebrush is highly susceptible to fire-caused mortality; plants are readily killed by all fire intensities. Following burning, reestablishment occurs through off-site sources. 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.
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. Needleandthread grass is top-killed by fire. It may be killed if the aboveground stems are completely consumed. Needleandthread grass is classified as slightly to severely damaged by fire. Needleandthread grass sprouts from the caudex following fire, if heat has not been sufficient to kill underground parts. Recovery usually takes 2 to 10 years. Galleta is a rhizomatous perennial which can resprout after top-kill by fire.

State and transition model

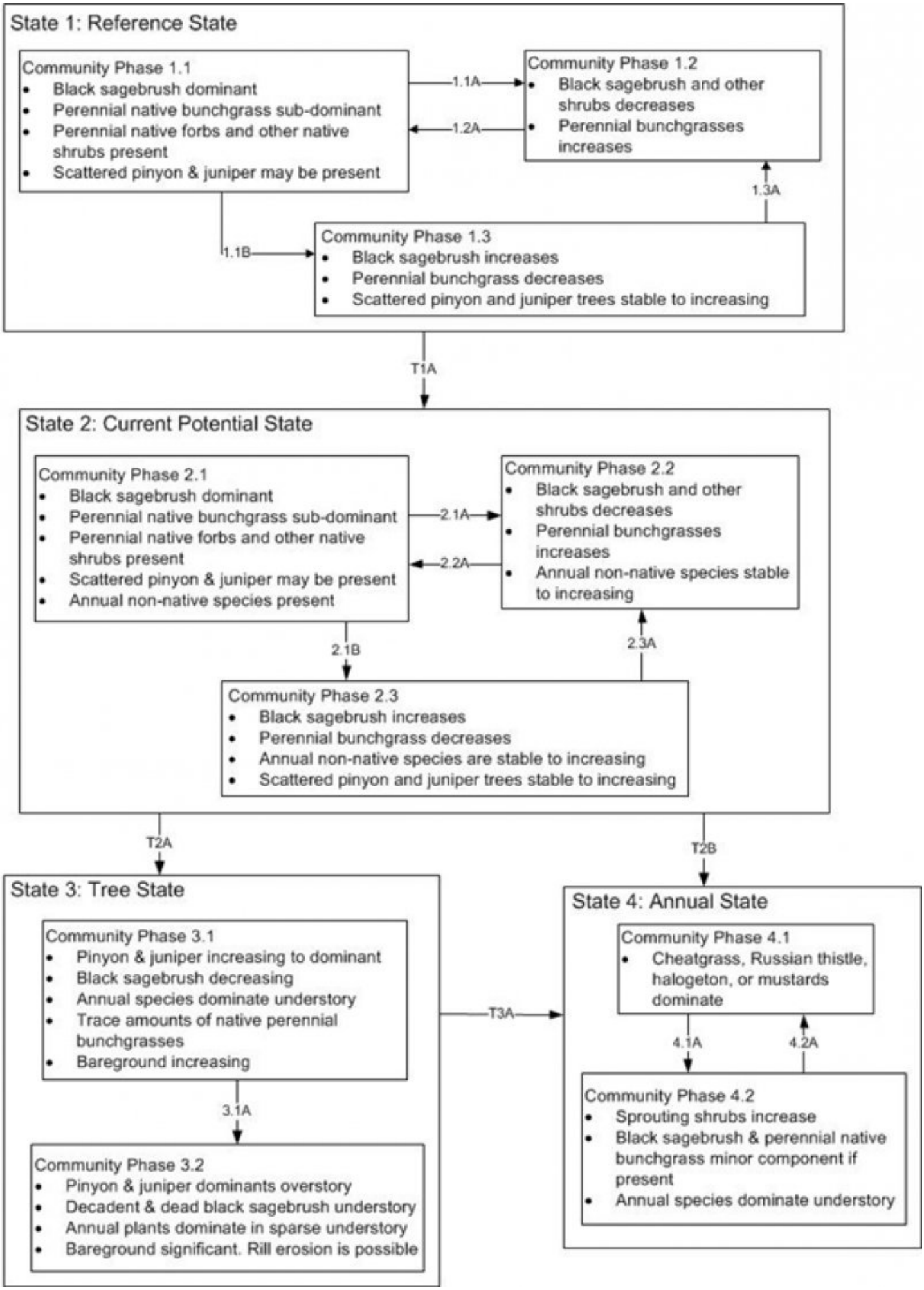

Figure 3. DRAFT STM

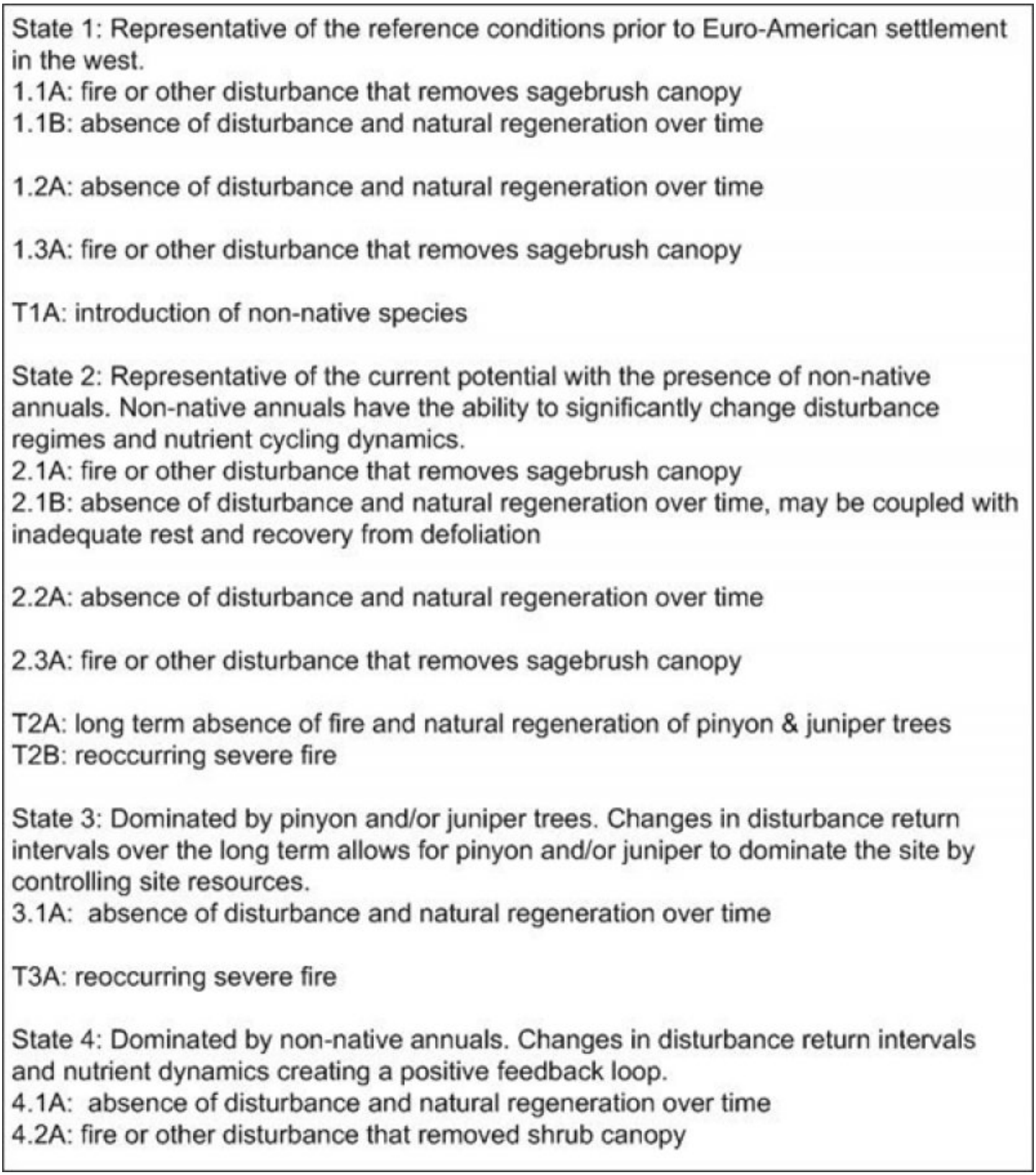

Figure 4. DRAFT STM LEGEND

State 1
Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by black sagebrush, Indian ricegrass and needle-and-thread grass. Nevada ephedra and galleta are other important species. Potential vegetative composition is about 35% grasses, 5% forbs and 60% shrubs and trees. Approximate ground cover (basal and crown) is 15 to 25 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	45	120	210
Grass/Grasslike	26	70	123
Forb	4	10	17
Total	**75**	**200**	**350**

State 2
Current Potential State

State 3
Tree State

State 4
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**			34–86	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	20–40	–
	needle and thread	HECO26	*Hesperostipa comata*	10–30	–
	James' galleta	PLJA	*Pleuraphis jamesii*	4–16	–
2	**Secondary Perennial Grasses**			4–16	
	threeawn	ARIST	*Aristida*	1–6	–
	slimstalk spiderling	BOGR	*Boerhavia gracillima*	1–6	–
	squirreltail	ELEL5	*Elymus elymoides*	1–6	–
	western wheatgrass	PASM	*Pascopyrum smithii*	1–6	–
	Sandberg bluegrass	POSE	*Poa secunda*	1–6	–
Forb					
3	**Perennial**			4–16	
	blue grama	BOGR2	*Bouteloua gracilis*	1–6	–
	globemallow	SPHAE	*Sphaeralcea*	1–4	–
4	**Annual**			0–16	
	western wheatgrass	PASM	*Pascopyrum smithii*	1–6	–
Shrub/Vine					
5	**Primary Shrubs**			85–165	
	black sagebrush	ARNO4	*Artemisia nova*	60–90	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	25–75	–
	James' galleta	PLJA	*Pleuraphis jamesii*	4–16	–
6	**Secondary Shrubs**			10–40	
	Forb, perennial	2FP	*Forb, perennial*	3–12	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	1–10	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	1–10	–
	spiny hopsage	GRSP	*Grayia spinosa*	1–10	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	1–10	–
	spiny menodora	MESP2	*Menodora spinescens*	1–10	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	1–10	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	1–10	–
	globemallow	SPHAE	*Sphaeralcea*	1–4	–
Tree					
7	**Evergreen**			2–20	
	Utah juniper	JUOS	*Juniperus osteosperma*	1–10	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	1–10	–

Animal community

Livestock Interpretations:
This site has marginal potential for livestock grazing due to the low forage production and steep slopes. Grazing management should be keyed to Indian ricegrass, needleandthread, and galleta grass production. Indian ricegrass has good forage value for domestic sheep, cattle and horses. Indian ricegrass is often used most heavily in the late winter, when succulent and nutritious new green leaves are produced. 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. 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. In winter, at lower elevations, black sagebrush is heavily utilized by domestic sheep. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats.

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:
Black sagebrush is a significant browse species within the Intermountain region. It is especially important on low elevation winter ranges in the southern Great Basin, where extended snow free periods allow animal's access to plants throughout most of the winter. In these areas it is heavily utilized by pronghorn and mule deer. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. 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. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Indian ricegrass is eaten by pronghorn in "moderate" amounts whenever available. In Nevada it is consumed by desert bighorns. 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. In Nevada, Indian ricegrass may even dominate jackrabbit diets during the spring through early summer months. 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. Desert bighorn sheep of the Mojave Desert utilize galleta as forage. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species.

Hydrological functions

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

Recreational uses

This site offers opportunities for photography and nature study. This site has potential for off-road vehicle use and hiking.

Other products

Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used seed as a reserve food source.

Other information

Black sagebrush is an excellent species to establish on sites where management objectives include restoration or improvement of domestic sheep, pronghorn, or mule deer winter range. 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. Needleandthread grass is useful for stabilizing eroded or degraded sites.

Type locality

Location 1: Esmeralda County, NV

Township/Range/Section	T2S R43E S14
General legal description	About 7 miles northeast of Goldfield, Esmeralda County, Nevada
Location 2: Lincoln County, NV	
Township/Range/Section	T4S R66E S35
General legal description	Meadow Valley Wash area, Lincoln County, Nevada. This site also occurs in Mineral and Nye Counties, 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

HA/GC/VWM

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	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare. Rock fragments armor the soil surface.

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2. **Presence of water flow patterns:** Waterflow patterns are none to rare (short and stable).

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of waterflow 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 ± 10-25% depending on amount of surface rock fragments.

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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 (foliage from grasses and annual & perennial forbs) expected to move distance of slope (<5 m) length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

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.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is thick or thin platy. Soil surface colors are light browns or grays and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is typically <1 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

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) slow runoff and increase infiltration. Shrubs break raindrop impact and provide opportunity for snow catch and accumulation on site.

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. Massive sub-surface horizons or subsoil argillic horizons should not to be interpreted as compacted layers.

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: Low shrubs (black sagebrush) >deep-rooted, cool season, perennial bunchgrasses

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

    Other: shallow-rooted cool season perennial bunchgrasses and warm season perennial bunchgrasses, evergreen trees

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within shrubs are common and standing dead shrub canopy material may be as much as 25% of total shrub canopy; mature bunchgrasses (<25%) may have dead centers.

14. **Average percent litter cover (%) and depth (in):** Under canopy and within interspaces (20-30%) and litter depth is < ¼ inch.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (through May) ± 200 lbs/ac. Favorable years ±350 lbs/ac and unfavorable years ±75 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:** Potential invaders include Russian thistle, annual mustards, and cheatgrass. Singleleaf pinyon and Utah juniper may increase on this site.

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 drought years.