USDA Natural Resources
Conservation Service

Ecological site R030XC020NV
SHALLOW SANDSTONE HILL 11-13 P.Z.

Last updated: 2/25/2025
Accessed: 05/12/2025

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.

Ecological site concept

This site occurs on convex to straight mountain summits and sideslopes and cliffs. Slopes typically range from 15 to about 75 percent. Elevations are 3700 to about 7020 feet. The soils associated with this site are shallow to very shallow to sandstone bedrock. The soils have formed in residuum from sandstone parent material.

Associated sites

R030XC007NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.**
R030XC022NV	**BOULDERY SANDSTONE SLOPE 11-13 P.Z.**

Similar sites

R030XC022NV	**BOULDERY SANDSTONE SLOPE 11-13 P.Z.** ARTRW important shrub

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Quercus turbinella* (2) *Arctostaphylos pungens*
Herbaceous	(1) *Achnatherum parishii var. depauperatum*

Physiographic features

This site occurs on convex to straight mountain summits and sideslopes and cliffs. Slopes typically range from 15 to about 75 percent. Elevations are 3700 to about 7020 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Cliff
Elevation	1,128–2,140 m
Slope	15–75%
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. Average annual precipitation is (11)12 to about 14 inches. Mean annual air temperature is 48 to 54 degrees F. The average growing season is about 140 to 180 days.

Table 3. Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	
Precipitation total (average)	356 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are shallow to very shallow to sandstone bedock. The soils have formed in residuum from sandstone parent material. Available water capacity is very low. Infiltration is rapid and permeability is moderately rapid. The surface has very high amounts of gravels and cobbles. These soils are dry most of the year but are moist for short periods during the winter and early spring months and occasionally for short intermittent periods following summer convection storms. The soil series associated with this site is Nupper.

Table 4. Representative soil features

Surface texture	(1) Extremely flaggy loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	15–36 cm
Surface fragment cover <=3"	5–10%
Surface fragment cover >3"	60–70%
Available water capacity (0-101.6cm)	1.52–1.78 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	10–51%
Subsurface fragment volume >3" (Depth not specified)	20–70%

Ecological dynamics

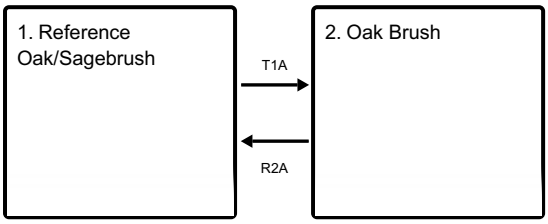
As ecological condition declines, cool-season perennial grasses decrease as woody plants becomes more dominant. Following wildfire, turbinella oak and manzanita greatly increase.

Fire Effects:

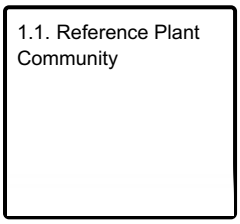
Turbinella oak is well adapted to survive fire and typically resprouts vigorously from the root crown and rhizomes in response to fire or other disturbance.Fire effects to pointleaf manzanita vary with season, severity, and intensity and range from partial consumption to complete consumption of the aboveground plant. Pointleaf manzanita is dependent on fire for germination of its dormant, banked seed. 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. Fires top-kill mountain snowberry. Although plant survival may be variable, mountain snowberry root crowns usually survive even severe fires. Mountain snowberry sprouts from basal buds at the root crown following fire. Needlegrasses are damaged by burning due to the dense plant material that can burn slowly and long, charring to the growing points. Late summer and early fall fires are the least harmful. 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 and surviving tufts will resprout. Muttongrass is unharmed to slightly harmed by light-severity fall fire. Muttongrass appears to be harmed by and slow to recover from severe fire.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference Oak/Sagebrush

This state is dominated by turbinella oak, Pointleaf manzanita, and Black sagebrush.

Community 1.1
Reference Plant Community

The reference plant community is dominated by turbinella oak, manzanita, and black sagebrush. Singleleaf pinyon and Utah juniper are important tree species associated with this community, however, these trees collectively comprise less than 10 percent canopy cover. Potential vegetative composition is about 20% grasses, 5% perennial and annual forbs and 70% shrubs and about 5% trees. Approximate ground cover (basal and crown) is 20 to 25 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	314	471	628
Grass/Grasslike	90	135	179
Forb	22	34	45
Tree	22	34	45
Total	**448**	**674**	**897**

State 2

Oak Brush

This state is dominated by basal sprouting turbinella oak

Transition T1A
State 1 to 2

Intense wildfire taking out black sagebrush and creating high density, low stature, basal sprouting stands of oak.

Restoration pathway R2A
State 2 to 1

A disturbance to set the oak back and management to improve herbaceous species along with colonization of sagebrush.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			61–135	
	little Parish's needlegrass	ACPAD	*Achnatherum parishii var. depauperatum*	34–67	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	13–34	–
	muttongrass	POFE	*Poa fendleriana*	13–34	–
2	**Secondary Perennial Grasses**			1–34	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	3–13	–
	threeawn	ARIST	*Aristida*	3–13	–
	blue grama	BOGR2	*Bouteloua gracilis*	3–13	–
	Sandberg bluegrass	POSE	*Poa secunda*	3–13	–
Forb					
3	**Perennial Forbs**			13–54	
4	**Annual Forbs**			1–34	
Shrub/Vine					
5	**Primary Shrubs**			316–538	
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	135–235	–
	pointleaf manzanita	ARPU5	*Arctostaphylos pungens*	101–135	–
	black sagebrush	ARNO4	*Artemisia nova*	67–101	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	13–67	–
	Forb, annual	2FA	*Forb, annual*	0–34	–
6	**Secondary Shrubs**			34–67	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	7–20	–
	blackbrush	CORA	*Coleogyne ramosissima*	7–20	–
	Heermann's buckwheat	ERHE	*Eriogonum heermannii*	7–20	–
	currant	RIBES	*Ribes*	7–20	–
	sage	SALVI	*Salvia*	7–20	–
Tree					
7	**Trees**			13–54	
	Utah juniper	JUOS	*Juniperus osteosperma*	7–27	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	7–27	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to steep slopes. Grazing management should be keyed to perennial grasses or palatable shrubs production. Shrub oak generally provides relatively little browse for most species of livestock. In many areas it is used heavily only when other more palatable species are unavailable; however, shrub oak is sometimes an important food source for livestock. Pointleaf manzanita provides food and cover for livestock. Domestic goats prefer pointleaf manzanita browse. In winter, at lower elevations, black sagebrush is heavily utilized by domestic sheep. Snowberry is readily eaten by all classes of livestock, particularly domestic sheep. Little Parish's needlegrass provides a palatable, nutritious feed during the spring and early summer for livestock. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. Muttongrass is excellent forage for domestic livestock especially in the early spring. Muttongrass begins growth in late winter and early spring, which makes it available before many other forage plants.

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:
Shrub oak generally provides relatively little browse for most species of wildlife. In many areas it is used heavily only when other more palatable species are lacking; however, shrub live oak is sometimes an important food source for deer. Pointleaf manzanita provides food and cover for wildlife. Many frugivorous animals eat the berries, including blue grouse, Gambel's quail, mule deer, American black bears, coyotes and skunks. Palatability of pointleaf manzanita is considered "low" for deer species. Pointleaf Manzanita stands are considered excellent cover for deer and desert bighorn sheep. 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. Snowberry is an important forage species for deer and elk on high elevation summer ranges. Snowberry is frequently one of the first species to leaf out, making it a highly sought after food in the early spring. Little Parish's needlegrass provides a palatable, nutritious feed during the spring and early summer for wildlife. 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. Deer and elk make heavy use of muttongrass, especially in early spring when other green forage is scarce. Depending upon availability of other nutritious forage, deer may use muttongrass in all seasons. Muttongrass cures well and is an important fall and winter deer food in some areas.
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.

Hydrological functions

Runoff is very high. Permeability is moderately rapid.

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 hiking and has potential for upland and big game hunting.

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.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T22S R58E S4
General legal description	About 3½ miles northeast of Mountain Springs Summit off NvHwy 160, Spring Mountains, Clark 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

TJ WOLFE

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)	
Contact for lead author	
Date	05/12/2025
Approved by	Sarah Quistberg
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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:

    Sub-dominant:

    Other:

    Additional:

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

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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:**

17. **Perennial plant reproductive capability:**