USDA Natural Resources
Conservation Service

Ecological site R030XB090NV
GRAVELLY FAN 7-9 P.Z.

Last updated: 3/10/2025
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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 and fan remnants. Slope gradients of 2 to 8 percent are most typical. Elevations are 3600 to 5500 feet. The soils asociated with this site are very deep and derived from alluvium from volcanic rock.

Please refer to group concept R030XC238CA to view the provisional STM.

Associated sites

R030XB014NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.**
R030XB015NV	**SHALLOW GRAVELLY SLOPE 7-9 P.Z.**
R030XB033NV	**SANDY PLAIN 7-9 P.Z.**

Similar sites

R030XB015NV	**SHALLOW GRAVELLY SLOPE 7-9 P.Z.** Less productive site
R030XB014NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.** Less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima*
Herbaceous	(1) *Bouteloua eriopoda* (2) *Achnatherum speciosum*

Physiographic features

This site occurs on inset fans and fan remnants. Slope gradients of 2 to 8 percent are most typical. Elevations are 3600 to 5500 feet.

Table 2. Representative physiographic features

Landforms	(1) Inset fan (2) Fan remnant
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	Very rare to rare
Ponding frequency	None

Elevation	1,097–1,676 m
Slope	2–8%
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid with hot, dry summers and warm, moist winters. Average annual precipitation is 7 to 9(10) inches. Mean annual air temperature is 54 to 65 degrees F. The average growing season is about 140 to 210 days. There is no climate station associated with this site,

Table 3. Representative climatic features

Frost-free period (average)	210 days
Freeze-free period (average)	
Precipitation total (average)	229 mm

Influencing water features

This site is subject to flash flooding primarily during summer convection storms.

Soil features

The soils asociated with this site are very deep and derived from alluvium from volcanic rock. Water intake rates are moderately rapid, available water capacity is very low, runoff is very low to 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 series associated with this site include Lanfair.

Table 4. Representative soil features

Surface texture	(1) Extremely gravelly sandy loam (2) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	183–213 cm
Surface fragment cover <=3"	69–70%
Surface fragment cover >3"	9–10%
Available water capacity (0-101.6cm)	5.08–7.11 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–12
Soil reaction (1:1 water) (0-101.6cm)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	22–65%
Subsurface fragment volume >3" (Depth not specified)	8–10%

Ecological dynamics

Please refer to group concept R030XC238CA to view the provisional STM.

With severe disturbance such as wildfire, snakeweed, Mojave buckwheat, threeawn and burrobrush significantly increase. Species likely to invade this site are introduced annuals such as red brome. Blackbrush often occurs as nearly monospecific stands and is thought to be climax vegetation, occurring in late seral stages. Blackbrush is a long-lived, dominant on older, undisturbed geologic sites. Succession occurs at a very slow rate. Increasing in cover and density, this shrub becomes more dominant over time.

Fire Ecology:
Historic fire return intervals for blackbrush communities appear to have been on the order of centuries, allowing late seral blackbrush stands to establish. Low amounts of fine fuels in interspaces probably limited fire spread to only extreme fire conditions, during which high winds, low relative humidity, and low fuel moisture led to high intensity stand-replacing crown fires. Blackbrush stands are subject to fire, and fire will start and spread easily due to the dense, close spacing nature and resinous foliage of blackbrush. Blackbrush is slow to reestablish. It is generally removed from the site for 60+ years. Black grama is reported to be fire sensitive. Black grama is generally top-killed by fire. It usually recovers from fire slowly, through vegetative spread. However, black grama grows quickly in response to summer moisture, and its postfire recovery can be good if the stand was healthy before fire and there is adequate precipitation in the first two growing seasons after 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.

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 blackbrush, desert needlegrass, black grama, and big galleta. Potential vegetative composition is about 40% grasses, 5% annual and perennial forbs and 55% shrubs and trees. Approximate ground cover (basal and crown) is 20 to 30 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	90	179	269
Shrub/Vine	123	243	249
Forb	11	22	34
Tree	–	3	9
Total	**224**	**447**	**561**

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**			99–224	
	black grama	BOER4	*Bouteloua eriopoda*	45–90	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	22–67	–
	big galleta	PLRI3	*Pleuraphis rigida*	22–45	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	9–22	–
2	**Secondary Perennial Grasses**			9–45	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–13	–
	threeawn	ARIST	*Aristida*	2–13	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–13	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–13	–
3	**Annual Grasses**			1–13	
	sixweeks grama	BOBA2	*Bouteloua barbata*	2–13	–
Forb					
4	**Perennial**			9–36	
5	**Annual**			1–36	
	sixweeks grama	BOBA2	*Bouteloua barbata*	2–13	–
Shrub/Vine					
6	**Primary shrubs**			147–262	
	blackbrush	CORA	*Coleogyne ramosissima*	127–168	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	9–22	–
	burrobrush	HYSA	*Hymenoclea salsola*	1–22	–
	banana yucca	YUBA	*Yucca baccata*	3–12	–
	Joshua tree	YUBR	*Yucca brevifolia*	3–12	–
	Mojave yucca	YUSC2	*Yucca schidigera*	3–12	–
7	**Secondary shrubs**			22–90	
	fourwing saltbush	ATCA2	*Atriplex canescens*	4–13	–
	Virgin River brittlebush	ENVI	*Encelia virginensis*	4–13	–
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	4–13	–
	creosote bush	LATR2	*Larrea tridentata*	4–13	–
	water jacket	LYAN	*Lycium andersonii*	4–13	–
	desert almond	PRFA	*Prunus fasciculata*	4–13	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	4–13	–
	Parish's goldeneye	VIPA14	*Viguiera parishii*	4–13	–

Animal community

Livestock Interpretations:
This site is suited to livestock grazing. Grazing management should be keyed to black grama and desert needlegrass production. Overall, black grama is one of the most nutritious desert winter grasses for livestock. The protein content of perennial grasses is generally high when individuals are developmentally young, and declines rapidly with maturity. Black grama is considered excellent forage for all livestock classes. Black grama provides highly palatable, yearlong forage for domestic cattle.

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.
Blackbrush is not preferred as forage by domestic livestock, but does provide some forage during the spring, summer and fall.

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 grama and desert needlegrass are considered excellent forage for many wildlife species.
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.

Hydrological functions

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

Other information

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.
Blackbrush contributes to desert fertility by 1) protecting the soil against wind erosion through retarding the movement of soil and increasing the accumulation of fine soil particles around its base; 2) protecting understory vegetation from the effects of high temperatures, thereby helping to retain surface nitrogen and adding organic matter to the soil; and 3) serving as a nitrogen reservoir through the storage of nitrogen in roots, leaves, and stems.

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

BLS/GKB

Approval

Kendra Moseley, 3/10/2025

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	05/14/2025
Approved by	Sarah Quistberg
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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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):**

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

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

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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):**

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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:

    Sub-dominant:

Other:

Additional:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
