Ecological site DX035X03A120
Swale

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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 occupies depressions, such as swales, which receive significant run-on moisture. Soils are moderately deep to very deep. Textures are variable, but soils are usually fine-loamy or fine family.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Sporobolus airoides* (2) *Pascopyrum smithii*

Legacy ID

R035XA120NM

Physiographic features

The topography of this site is level to moderately sloping and usually occurs in a slightly depressed position, which receives runoff from adjacent sites. Slopes range to 10 percent but average less than 5 percent. Elevations range from about 6,000 to just over 7,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Swale (3) Draw
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	Occasional to frequent
Ponding frequency	None

Elevation	1,830 – 2,130 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Climatic features

Average annual precipitation varies from about 10 inches to just over 16 inches. Fluctuations ranging from about 5 inches to 25 inches are not uncommon. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. As much as half or more of the annual precipitation can be expected to come during the period of July through September. Thus, fall conditions are often more favorable for good growth of cool-season perennial grasses, shrubs, and forbs than are those of spring.

The average frost-free season is about 120 days and extends from approximately mid-May to early or mid-September. Average annual air temperatures are 50 degrees F or lower and summer maximums rarely exceed 100 degrees F. Winter minimums typically approach or go below zero. Monthly mean temperatures exceed 70 degrees F for the period of July and August.

Rainfall patterns generally favor warm-season perennial vegetation, while the temperature regime tends to favor cool-season vegetation. This creates a somewhat complex community of plants on a given range site which is quite susceptible to disturbance and is at or near its productive potential only when both the natural warm- and cool-season dominants are present.

Table 3 Representative climatic features

Frost-free period (average)	170 days
Freeze-free period (average)	250 days
Precipitation total (average)	410 mm

Influencing water features

This site is not influenced by water from a wetland or perennial stream. However, this site does receive run-on moisture from adjacent landforms.

Soil features

Soils are typically moderately fine- to fine- textured on the surface (or very thin surface loams, sandy loams or sandy clay loams, over fine-textured subsoils), moderately deep to deep with moderately fine- to fine-textured subsoils. Permeability is usually slow, and the available water capacity is moderately high to high. Soil cracking following dry periods provides an opportunity for occasional deep wetting when moisture is received, although runoff in the absence of good vegetative cover can be excessive.
Erosion hazard is high.

Table 4. Representative soil features

Surface texture	(1) Clay loam (2) Sandy clay loam (3) Silty clay loam

Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow to moderately slow
Soil depth	150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	12.7 – 20.32 cm
Electrical conductivity (0-101.6cm)	0 – 10 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

Overview

This site occurs as narrow to broad, slightly concave, gently sloping drainageways that often receive additional run-on water from adjacent uplands. Loamy sites are often associated with swale sites. The Swale site stands out in relation to adjacent sites due to extra water received and resulting increased production. This site has the aspect of a mixed-shrub grassland and is characterized by western wheatgrass, alkali sacaton, blue grama, and galleta. Typical shrubs include fourwing saltbush, rabbitbrush, and winterfat. Forbs are naturally variable in kind and amount and make up what is a relatively broad fluctuation in their percentage of the natural plant community. They are evenly distributed, however, and will at times exhibit a significant aspect influence. This site is resistant to state change unless grass cover is reduced to the point that accelerated erosion takes place. A severe loss of grass cover, soil compaction, and gullying may result from continuous heavy grazing and initiate the transition to the Gullied state.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				381-605	
	western wheatgrass	PASM	*Pascopyrum smithii*	382-601	–
2				56-168	
	alkali sacaton	SPAI	*Sporobolus airoides*	55-164	–
3				112-168	
	blue grama	BOGR2	*Bouteloua gracilis*	110-164	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	110-164	–
	James' galleta	PLJA	*Pleuraphis jamesii*	110-164	–
4				34-56	
	squirreltail	ELEL5	*Elymus elymoides*	33-55	–
5				56-112	
	sideoats grama	BOCU	*Bouteloua curtipendula*	55-110	–
6				56-112	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	55-110	–
	common wolfstail	LYPH	*Lycurus phleoides*	55-110	–
	vine mesquite	PAOB	*Panicum obtusum*	55-110	–
	little bluestem	SCSC	*Schizachyrium scoparium*	55-110	–
7				11-56	
	threeawn	ARIST	*Aristida*	11-55	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	11-55	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	11-55	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	11-55	–
Shrub/Vine					
8				56-112	
	fourwing saltbush	ATCA2	*Atriplex canescens*	55-110	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	55-110	–
9				11-56	
	desert-thorn	LYCIU	*Lycium*	11-55	–
10				11-34	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	11-33	–
Forb					
11				11-112	
	Forb, perennial	2FP	*Forb, perennial*	11-110	–
12				11-56	
	Forb, annual	2FA	*Forb, annual*	11-55	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Animal community

This range site provides habitats which support a resident animal community that is characterized by prong horn antelope, kit fox, black-tailed jackrabbit, Botta's pocket gopher, silky pocket mouse, sparrow hawk, mourning dove, chipping sparrow, western spadefoot toad, leopard lizard, and prairie rattlesnake. The black-chinned sparrow nests in this rangesite, the chestnut-collared longspur winters and the common raven and prairie falcon hunt over this site.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups. Hydrologic Interpretations Soil Series----------Hydrologic Group

Recreational uses

This site has potential for hiking, horseback riding, nature observation, photography, picnicking, and camping, although the latter two activities may be limited due to the lack of shade normally found on the site. Occasionally, during the spring and summer when soil moisture conditions are adequate, a colorful array of wild flowers may be seen.

Wood products

This site has little or no significant value for wood products.

Other products

This site is suitable for grazing during all seasons of the year, generally without regard to kind or class of livestock, but is not well suited for continuous year-long grazing if the natural potential vegetation is to be maintained. Under such use, cool-season grasses, such as western wheatgrass and bottlebrush squirreltail, tend to decline or disappear. If use is heavy and prolonged, some of the more palatable warm-season species will also decline. The site, in a typically deteriorated condition, may be characterized by threeawns, ring muhly, and low vigor, sod-like blue grama mixed with heavy stands of rabbitbrush and broom snakeweed. Excessive amounts of bare ground also occur, and the site is highly subject to gullying at this stage. It may also be slow to recover using improved grazing management alone.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month Similarity Index----------Ac/AUM 100 - 76----------2.9-3.8 75 – 51----------3.7-5.0 50 – 26----------4.7-10.0 25 – 0----------10.0+

Other references

1. McDaniel, K. C., L. A. Torell, and J.W. Bain. 1993. Overstory-understory relationships for broom snakeweed-blue grama grasslands. Journal of Range Management. 46: 506-511.

2. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality— [Online]. Available:
http://soils.usda.gov/sqi/soil_quality/land_management/range.html

Data collection for this site was done in conjunction with the progressive soil surveys within the New Mexico and Arizona Plateaus & Mesas Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: McKinley, Catron, Cibola, Socorro and Sandoval.

Contributors

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Approval

Kendra Moseley, 5/29/2025

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	05/11/2026
Approved by	
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):**

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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:**
