USDA Natural Resources
Conservation Service

Ecological site R035XA126NM
Salt Flats

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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.

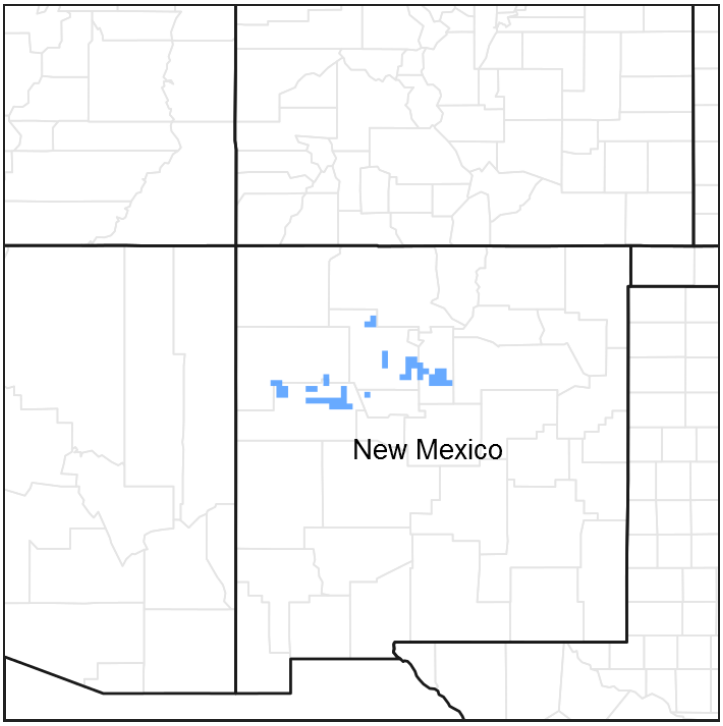

Figure 1. Mapped extent

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.

Ecological site concept

This site occurs on floodplains and basin floors. Slopes are generally less than 3 percent, but range as high as 8 percent.
The soils of this site are typically deep, silty clay loams to clay loams and clays, and are affected by both high pH and total soluble salts. Surface crusting and sealing is common.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex canescens*
Herbaceous	(1) *Sporobolus airoides* (2) *Bouteloua gracilis*

Physiographic features

This site occurs on level to gentle slopes which average 3 percent or less and rarely exceed 8 percent. Exposures are variable although usually not significant, and what is normally a uniform slope may be broken intermittently throughout the site by natural playas, potholes, or arroyos. Elevations range from about 6000 to 7500 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Basin floor
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	Occasional to frequent
Elevation	1,768–2,286 m
Slope	0–8%
Ponding depth	0–5 cm
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 natural warm- and cool- season dominants are present.

Table 3. Representative climatic features

Frost-free period (average)	171 days
Freeze-free period (average)	252 days
Precipitation total (average)	406 mm

Influencing water features

"This site is not influenced by water from wetlands or streams."*

*The legacy statement above could use some clarification. Since this site occurs on floodplains, and also occurs in proximity to playas, it is clear that it is sub-irrigated at least some of the time. Floodplains would, naturally, flood periodically.

Soil features

The soils of this site are typically deep, silty clay loams to clay loams and clays, and are affected by both high pH and total soluble salts. Surface crusting and sealing is common. Permeability is moderately slow to very slow, and ponding is not uncommon following summer rainstorms. Total available water capacity is high, however the availability to plants is often low. Characteristic soils are Ustollic Camborthids-sodic (as mapped in Catron County)

Table 4. Representative soil features

Surface texture	(1) Clay loam (2) Clay (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained to well drained
Permeability class	Very slow to moderately slow
Soil depth	0–152 cm
Surface fragment cover <=3"	2–5%
Surface fragment cover >3"	0–3%

Available water capacity (0-101.6cm)	5.08–7.62 cm
Electrical conductivity (0-101.6cm)	4–16 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	5–8%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

Overview
This site occurs on broad alluvial flats. The soils are deep and well drained. They are salt-affected, often with visible salt accumulations on the soil surface. Permeability is slow and soils are susceptible to erosion and gullying. The reference state is a disclimax maintained by recurring fire. The reference community is a grassland with scattered shrubs and a minor component of forbs. Alkali sacaton dominates this site. Loss of grass cover due to overgrazing, drought, or other disturbance; soil sealing; and increased competition by shrubs may cause the transition to the Shrub-dominated State. The continued loss of grass cover in conjunction with soil sealing, increased overland flow, and resulting erosion may initiate the transition to the Gullied State.

Reference State: The reference plant community is dominated by alkali sacaton. Other important grasses that appear on this site include western wheatgrass, blue grama, vine mesquite, galleta, inland saltgrass, and spike muhly. Shrubs characteristic of this site include fourwing saltbush, shadscale, and greasewood. Continuous heavy grazing typically causes a decrease in western wheatgrass, vine mesquite, and spike muhly. On areas less affected by salt, blue grama and galleta codominate and alkali sacaton is subdominant. On areas with greater salt concentrations, a sparser, less vigorous community dominated by alkali sacaton with subdominant inland saltgrass may result.

Diagnosis: Grass and litter cover is uniform with few large bare areas present. Shrubs are scattered with canopy cover averaging 6%. Evidence of erosion such as pedestalling of grasses, rills, and gullies is infrequent.

Shrub-dominated State: This state is characterized by the predominance of shrubs, including fourwing saltbush, shadscale, and greasewood. Rabbitbrush and broom snakeweed may also increase in representation. Alkali sacaton and inland saltgrass are typically the dominant grasses. Fourwing saltbush or shadscale typically dominate with a patchy understory of alkali sacaton and inland saltgrass with lesser amounts of blue grama, galleta, threeawns, and mat muhly. Greasewood may dominate on soils with high salt concentrations or where livestock exhibit a preference for fourwing saltbush and

shadscale. Greasewood can dominate in nearly pure stands with a sparse understory of inland saltgrass on soils with high salt concentrations. Areas with lower salt concentrations may have less greasewood and have a greater variety of subordinate shrubs and understory grasses.

Diagnosis: Shrubs are dominant. Grass cover is patchy to sparse with frequent large bare areas present. Soil crusting and sealing is prevalent. Evidence of erosion such as pedestalling of plants, elongated water flow patterns, litter dams, and rills or small gullies is common.

Transition to Shrub-dominated State (T1A) Loss of grass cover due to overgrazing and drought in conjunction with increased competition for resources by shrubs is believed to initiate this transition. In addition, soil sealing by means of chemical and physical crusts decrease infiltration and inhibit grass establishment.

Key indicators of approach to transition:
--Loss of western wheatgrass and vine mesquite
--The formation of widely spaced rings or tussocks of alkali sacaton
--Increase in size and frequency of bare patches and surface crusting
--Increase in amount of shrub seedlings

Restoration Pathway to Reference State (R2A) Brush control is necessary to reduce the competitive influence of shrubs and reestablish grass dominance. Greasewood is difficult to control. It is resistant to fire (3) and can resprout following mechanical and chemical treatment (1,2). Seeding may be necessary on those sites where desired grass species are absent or limited. The use of livestock or mechanical means to break up physical crusts and improve infiltration may enhance seeding success. Prescribed grazing will help ensure adequate rest after seeding and proper forage utilization following grass establishment.

Gullied State: Accelerated erosion and gully formation characterize this state. Shrubs, including fourwing saltbush, shadscale, or greasewood are the dominant vegetation. Grass cover is sparse occurring as small patches or widely spaced individual plants occupying shrub interspaces and consists predominantly of inland saltgrass or alkali sacaton, blue grama, galleta, and threeawns.

Diagnosis: Gullying is extensive and may become deep enough to restrict livestock movement. Grass cover is sparse, and litter is confined to shrub bases or other obstructions to overland flow. Soil sealing is widespread and occupies most shrub interspaces.

Transition to Gullied State (T2A). The continued loss of grass cover in conjunction with soil sealing, increased overland flow, and resulting erosion can cause the transition to the Gullied State. The continued loss of grass cover may be due to extended drought, overgrazing, or the competitive influence of shrubs for available soil moisture. The loss of

organic matter and high salt content may increase soil susceptibility to crust formation especially on finer textured soils (4). Decreased infiltration and increased flow rates due to grass cover loss and soil crusting facilitates erosion and gully formation.

Key indicators of approach to transition:
--Decrease in amount of grass cover
--Increase in size and frequency of bare patches and surface crusting
--Increase in amount of rills and presence of small gullies

Restoration Pathway to Reference State (R3A). Erosion control such as shaping and filling gullies, or grade stabilization structures will be necessary to restore hydrology. Brush control will be needed to reduce the competitive influence of shrubs and restore grasses. Seeding may be required to reestablish grass dominance. Prescribed grazing will help ensure adequate rest following seeding, and proper forage utilization once the grasses become established. The multiple practices required to drive the transition back to the Reference State are costly and chances for successful grass establishment are dependent on the degree of soil degradation and adequate precipitation following seeding.

References

1. Cluff, G.J., B.A. Roundy, R.A. Evans and J.A. Young. 1983. Herbicidal control of greasewood (*Sarcobatus vermiculatus*) and salt rabbitbrush (Chrysothamnus nauseosus ssp. consimilis). Weed Science. 31:275-279.

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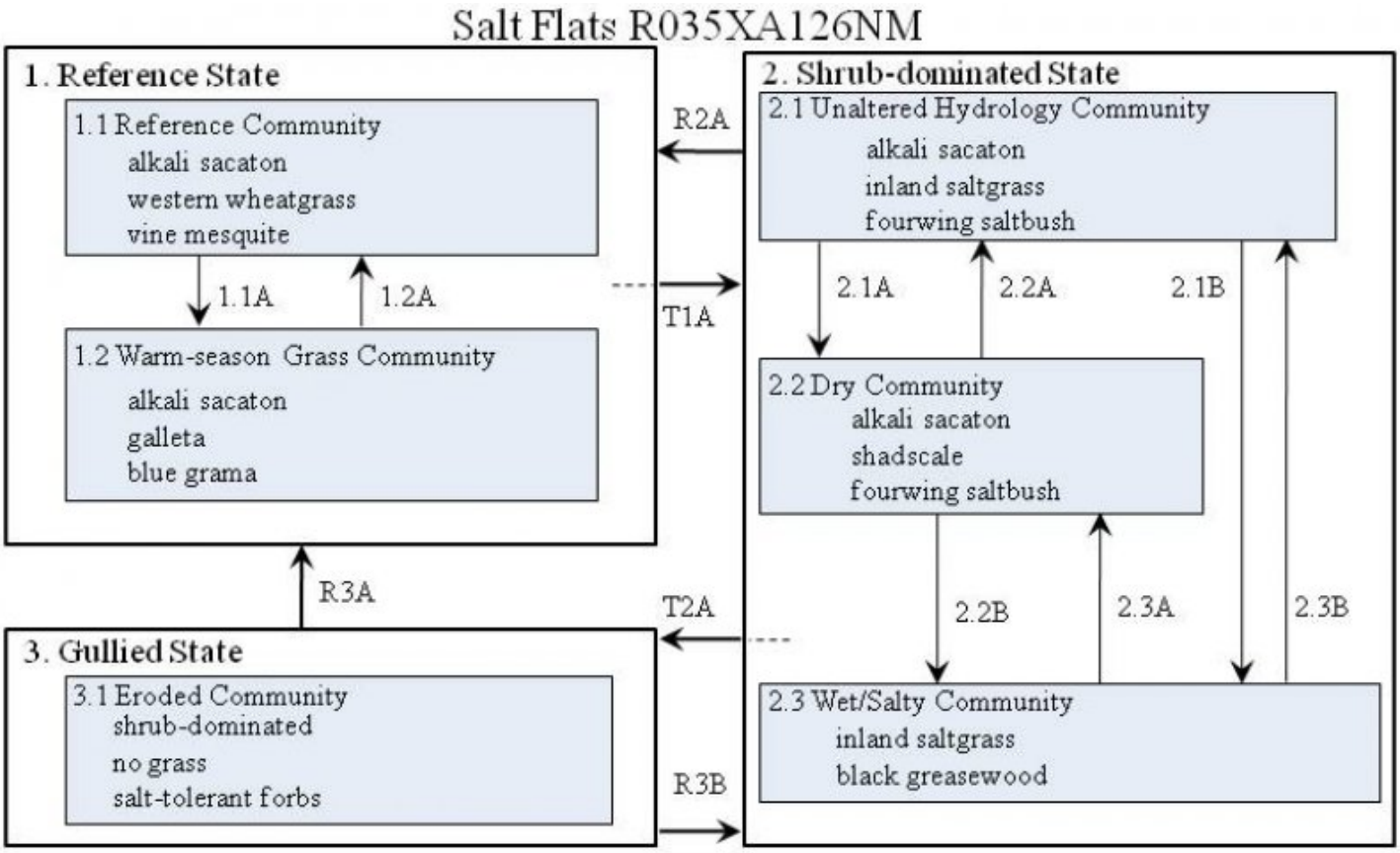
4. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet. Rangeland Soil Quality—Physical and Biological Soil Crusts. Rangeland Sheet 7 [Online]. Available: http://www.statlab.iastate.edu/survey/SQI/range.html.

State and transition model



1.1A. Dry winter/spring with normal monsoon; repeated yearlong overgrazing.
1.2A. Cool-season grazing rest.
2.1A. and 2.1B. Increased surface salts from increased off-site water delivery.
2.2A. Alter delivery of upland-site water to normalize on-site hydrology and salts.
2.2B. Increased surface salts from increased off-site water delivery.
2.3A and 2.3B. Alter delivery of upland-site water to normalize on-site hydrology and salts.
T1A. Repeated yearlong overgrazing; drought.
T2A. Increased surface salts from increased off-site water delivery; downcutting.
R2A. Prescribed fire, prescribed grazing; brush control.
R3A. Headcut repair; prescribed fire/brush control; grass seeding; rest from grazing.
R3B. Headcut repair; grass seeding; rest from grazing.

State 1
Reference State

This state represents the most ecologically stable conditions in terms of resistance to erosion. Moreover, this state has the highest potential for productivity and plant diversity.

Community 1.1
Reference Plant Community

This phase is dominated by western wheatgrass, alkali sacaton, and vine mesquite.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	527	975	1435
Shrub/Vine	90	168	247
Forb	22	34	45
Total	**639**	**1177**	**1727**

Table 6. Ground cover

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

Figure 5. Plant community growth curve (percent production by month). NM0372, R035XA126NM-Salt Flats-HCPC. WP-2 Salt Flats HCPC warm/cool season perennial plant communtiy.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	8	15	10	9	20	25	8	5	0	0

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				516–628	
	alkali sacaton	SPAI	*Sporobolus airoides*	517–632	–
2				168–224	

	blue grama	BOGR2	*Bouteloua gracilis*	173–230	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	173–230	–
	vine mesquite	PAOB	*Panicum obtusum*	173–230	–
	James' galleta	PLJA	*Pleuraphis jamesii*	173–230	–
3				56–112	
	western wheatgrass	PASM	*Pascopyrum smithii*	57–115	–
4				56–112	
	saltgrass	DISP	*Distichlis spicata*	57–115	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	56–115	–
5				11–56	
	threeawn	ARIST	*Aristida*	11–57	–
Shrub/Vine					
6				56–168	
	fourwing saltbush	ATCA2	*Atriplex canescens*	57–173	–
7				11–112	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	11–115	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	11–115	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	11–115	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	11–115	–
Forb					
8				22–34	
	Forb, perennial	2FP	*Forb, perennial*	21–36	–
9				6–22	
	Forb, annual	2FA	*Forb, annual*	7–21	–

Animal community

This range site provides habitats which support a resident animal community that is characterized by pronghorn antelope, coyote, black-tailed jackrabbit, spotted ground squirrel, banner-tailed kangaroo rat, Botta's pocket gopher, silky pocket mouse, sparrow

hawk, meadowlark, western spadefoot toad, leopard lizard, short-horned lizard, and prairie rattlesnake. The common raven hunts over the site, and chestnut- collared longspur winters on it. Where playas and potholes are present, killdeer nests, mourning dove waters, and desert shrimp and tiger salamander are occasionally present.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups.

Recreational uses

Recreation potential on this site is limited by highly saline or alkaline soils and the site's general lack of natural beauty. Activities include horseback riding, hunting for pronghorn antelope, hiking, nature observation, photography, picnicking, and camping.

Wood products

This site has no significant value for wood production.

Other products

At its potential, this is a very productive range site suitable for grazing by most kinds and classes of livestock. It is frequently more productive than surrounding sites and can best be managed when fenced separately and grazed intensively for short periods of time, three to four months or less, then deferred or rested in different seasons from year to year.

Site deterioration due to inadequately managed grazing usually results in a decline in alkali sacaton, western wheatgrass, vine- esquite, and blue grama. Woody species increase under this circumstance and may dominate the site eventually if the condition is not reversed. Production favorable to grazing by livestock is then reduced substantially.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index----------Ac/AUM
100 - 76----------2.5 - 3.5
75 – 51----------3.2 - 4.8
50 – 26----------4.6 - 9.5
25 – 0----------9.5 +

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Approval

Kendra Moseley, 5/20/2025

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	05/21/2025
Approved by	Kendra Moseley
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):**

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):**

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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:**
