USDA Natural Resources
Conservation Service

Ecological site R070BY058NM
Saline

Last updated: 9/12/2023
Accessed: 05/19/2024

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 positions around playa bottoms which are sub-irrigated by do not pond. Soils exhibit significant accumulations of salts, and typically have moderate to high salinity.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex canescens* (2) *Gutierrezia sarothrae*
Herbaceous	(1) *Sporobolus airoides* (2) *Pleuraphis jamesii*

Physiographic features

This site is on level, low benches surrounding large enclosed basins or playas. Slopes are typically less than 1 percent, but may range to 3 percent. The regolith consists of fine textured, calcareous, moderately alkaline, water-deposited sediments. The average annual precipitation is 16 inches. The average air temperature is 54 degrees F. Elevations range from 3,800 to 6,100 feet.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Flood plain (3) Playa
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	Rare to occasional
Elevation	1,158–1,859 m
Slope	0–5%
Ponding depth	3–13 cm
Water table depth	25–76 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this area can be classified as “semi-arid continental”.

Annual average precipitation ranges from 11 to 16 inches. Roughly 78 percent of the moisture falls during the 6-month period of May through October. Most of this summer precipitation falls in the form of brief and heavy afternoon and evening thunderstorms. Hail may accompany the more severe summer storms. In the winter, there is normally only one day a month when as much as one-tenth inch of moisture falls, usually in the form of snow. Snow seldom lies on the ground for more than a few days.

Temperatures are characterized by a distinct seasonal change and large annual and diurnal temperature ranges. Summers are moderately warm. Maximum temperature average above 90 degrees F from July to August, and an average summer includes about 80 days with high readings exceeding 90 degrees F and 10 days with readings above 100 degrees F. Temperatures usually fall rapidly after sundown and lows average 60 degrees F on most summer nights. Winters are mild, sunny, and dry. Daytime shade temperatures in midwinter usually rise to the 50’s. However, freezing temperatures normally occur at night from mid-November to mid-March.

The freeze-free season ranges from 196 to 218 days. Dates of the last freeze range from April 11th to April 17th and the first freeze ranges from October 20th to October 25th.

Both temperature and rainfall distribution favor warm-season, perennial plant communities in the area. However, sufficient late winter and early spring moisture allows cool-season species to occupy a minor component within the plant community.

Climate data was obtained from http://www.wrcc.dri.edu/summary/climsmnm.html web site. Data were interpreted utilizing NM Climate Summarizer spreadsheet.

Table 3. Representative climatic features

Frost-free period (average)	192 days
Freeze-free period (average)	218 days
Precipitation total (average)	406 mm

Influencing water features

This site is not influenced by water from a stream, but sites located within or directly adjacent to playa bottoms may have hydric soils and be included within the wetland acreage. The Church soil series may have ponding adjacent to playas and may contain high water tables. Redox concentrations of segregated iron are few from 10 to 24 inches

and few to common below 24 inches in the C horizons during some years.

Soil features

Soils are deep and range from well drained to somewhat poorly drained. Surface textures are clay loam or silty clay loam. Subsoil textures are silty clay loam, clay loam, or clay, and are moderately alkaline and moderately to strongly saline. Substratum textures are are silty clay loam, clay loam, or clay, and are moderately alkaline and moderately to strongly saline. Permeability is very slow. The available water-holding capacity is high. Effective rooting depth is 60 inches or more. Ther air-water relationship is favorable for plant growth during favorable years.
Note that these soils are salty due to evaporative discharge of moisture derived from shallow water tables. The water table is likely to be saline and is the source of the salts precipitating at the soil surface through capillary action.

In the Church soil, concentrations of segregated iron are few from 10 to 24 inches and few to common below 24 inches. This is an indication of a relatively high water table.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic Soils:
Church
Grier
Kinkead
Montoya

Table 4. Representative soil features

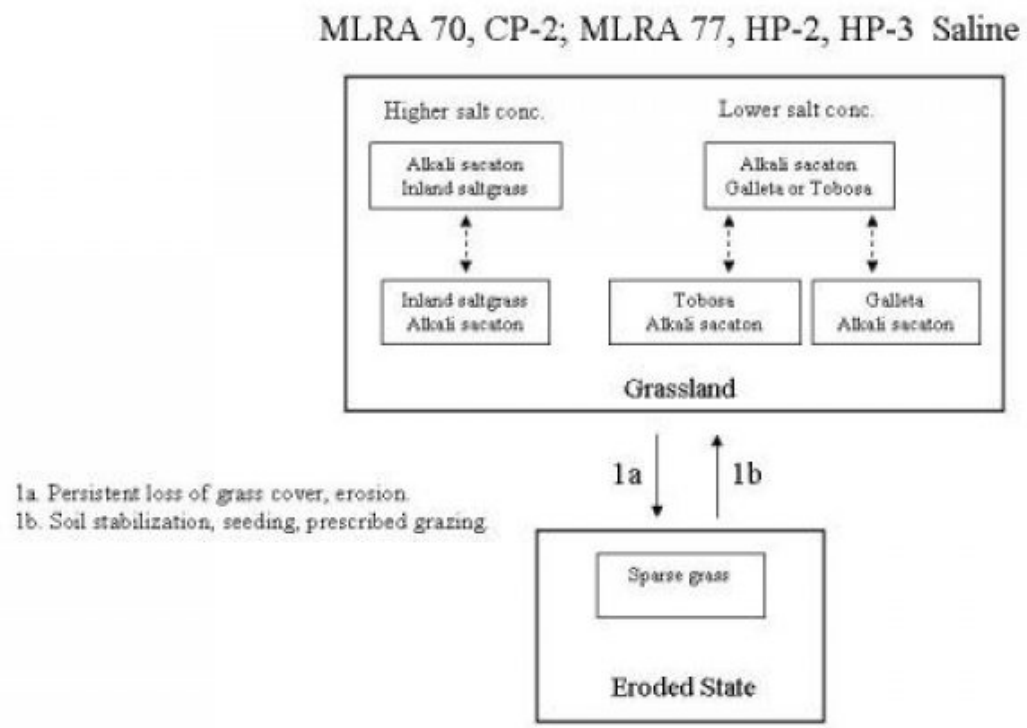
Surface texture	(1) Clay loam (2) Clay (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Well drained to somewhat poorly drained
Permeability class	Slow to very slow
Soil depth	152–203 cm
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	22.86–30.48 cm
Calcium carbonate equivalent (0-101.6cm)	1–7%
Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–30
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The reference plant community of the Saline ecological site is a grassland with scattered shrubs and a minor component of forbs. Alkali sacaton dominates this site. Other species that can occur in significant amounts include

inland saltgrass, galleta or tobosa, blue grama, and vine mesquite. Persistent loss of grass cover and attendant sealing of soil surfaces lead to increases in sheet flow and may eventually result in an Eroded state.

State and transition model



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

Alkali sacaton is the dominant grass. On areas with higher salt concentrations, inland saltgrass may be sub-dominant and increase with heavy grazing pressure. On areas with lower salt concentrations, tobosa or galleta may be sub-dominant to alkali sacaton, and species such as blue grama and vine mesquite can occur in significant amounts. Under heavy grazing pressure species such as vine mesquite, western wheatgrass, alkali sacaton and blue grama decrease. This can result in communities dominated by galleta or tobosa, with alkali sacaton becoming sub-dominant. Burrograss also typically increases under these circumstances. In the HP-2 resource area, western wheatgrass may occur with greater frequency on areas with both high and low salt concentrations. Diagnosis: Depending on salt concentration and response to grazing pressure, alkali sacaton, inland saltgrass, tobosa, or galleta may dominate. Grass cover is variable ranging from fairly uniform to patchy. Cover is more uniform on less salt-affected areas. On areas with higher salt concentrations, large bare areas may be common with salt accumulation forming crusts on the soil surface.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	572	1239	1905
Forb	67	146	224
Shrub/Vine	34	67	112
Total	**673**	**1452**	**2241**

Figure 5. Plant community growth curve (percent production by month). NM4058, R070BY058NM Saline HCPC. R070BY058NM Saline HCPC.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	6	12	15	20	30	7	5	0	0

State 2
Eroded State

This state shows evidence of significant erosion such as truncated topsoil and/or a pedestalled surface.

Community 2.1
Eroded

Grasses typically consist of scattered tussocks of alkali sacaton, tobosa, or galleta. Patches of inland saltgrass may occupy depressions or the wetter areas across the site. On a portion of the site, the surface layer of the bare interspaces is eroded down to the exposed clay subsoil, causing the surface to have rough, uneven microrelief. A thin crust of white salt is common on the surface. Diagnosis: Grass and litter cover is sparse. Erosion is evident by pedestalling of plants, rills, and loss of A horizon. Salt crusts and soil sealing are common. Transition Eroded State (1a) Persistent loss of grass cover due to drought, heavy grazing pressure, or other repetitive disturbance may initiate this transition. Soils on this phase tend to seal by means of physical or chemical crusts following loss of organic matter. This reduces infiltration, inhibits seedling establishment, and increases runoff. Transitions to this phase are thought to occur over long time periods, as erosion rates are relatively slow due to average slopes of less than three percent and favorable surface soil textures. Key indicators of approach to transition: Decreased grass and litter cover Increase in bare ground Transition back to Grassland (1b) Erosion control structures or pitting may help to slow runoff and reduce erosion. Seeding is necessary to reestablish grass cover and stabilize the soils. Seeding may be more successful on less salt-affected areas. Prescribed grazing will help to ensure adequate rest until grasses are established. Proper grazing use is necessary following establishment. Excess salts, soil sealing, and loss of organic matter and nutrients may limit seeding success

Figure 6. Plant community growth curve (percent production by month). NM4058, R070BY058NM Saline HCPC. R070BY058NM Saline HCPC.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	6	12	15	20	30	7	5	0	0

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				437–504	
	alkali sacaton	SPAI	*Sporobolus airoides*	437–510	–
2				146–191	
	James' galleta	PLJA	*Pleuraphis jamesii*	0–189	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	146–189	–

3				112–146	
	blue grama	BOGR2	*Bouteloua gracilis*	117–146	–
4				112–146	
	saltgrass	DISP	*Distichlis spicata*	117–146	–
5				112–146	
	vine mesquite	PAOB	*Panicum obtusum*	117–146	–
6				45–78	
	switchgrass	PAVI2	*Panicum virgatum*	44–73	–
7				45–78	
	western wheatgrass	PASM	*Pascopyrum smithii*	44–73	–
8				45–78	
	silver bluestem	BOSA	*Bothriochloa saccharoides*	44–73	–
9				0–45	
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–44	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–44	–
10				0–34	
	squirreltail	ELEL5	*Elymus elymoides*	0–29	–
11				0–34	
	windmill grass	CHLOR	*Chloris*	0–29	–
12				0–34	
	threeawn	ARIST	*Aristida*	0–29	–
	burrograss	SCBR2	*Scleropogon brevifolius*	0–29	–
Forb					
13				0–34	
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–29	–
14				0–34	
	dotted blazing star	LIPU	*Liatris punctata*	0–29	–
15				0–34	
	buckwheat	ERIOG	*Eriogonum*	0–29	–
	locoweed	OXYTR	*Oxytropis*	0–29	–
16				34–56	
	Forb, perennial	2FP	*Forb, perennial*	29–58	–
17				34–56	
	Forb, annual	2FA	*Forb, annual*	29–58	–
Shrub/Vine					
18				45–78	
	fourwing saltbush	ATCA2	*Atriplex canescens*	44–73	–
19				0–45	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–44	–

Animal community

Habitat for Wildlife: This site provides habitats which support a resident animal community that is characterized by desert cottontail, marsh hawk, roadrunner, scaled quail, ornate box turtle, and Great Plains skunk. There is seasonal use by pronghorn antelope.

Hydrological functions

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

Hydrologic Interpretations

Soil Series Hydrologic Group
Church---------- D
Grier---------- D
Kinkead---------- C
Montoya---------- D

Recreational uses

This site has limited recreation potential due to the dense plant growth and the lack of shade during the summer. Camping, hiking, and picnicking are poor. Hunting for upland game birds and rabbits is fair. Hunting for antelope is poor to fair. The “wide open spaces” of the area enhance aesthetic appeal.

Wood products

This site produces no wood products.

Other products

Grazing: This site can be grazed during any season of the year, but it is better utilized in spring and early winter before alkali sacaton matures. The site is best suited to grazing by cattle and horses due to the coarseness of the forage produced by alkali sacaton. Maximum production on this site can be achieved by mowing and using as hay or concentrating cattle on the site before alkali sacaton matures, along with resting in alternate years. Approximately 90 percent of the total annual yield is from species that furnish forage for livestock. Continuous yearlong grazing or grazing from the period of April through September will result in a plant community dominated by galleta or tobosa. Under continued overgrazing, burrograss will dominate. Under these conditions, plant cover and forage production is greatly reduced, and large bare areas are common. A system of deferred grazing, which varies the seasons of grazing and rest during successive years, is needed to maintain or to improve the plant community. Winter rest will benefit fourwing saltbush. Spring rest will benefit western wheatgrass and bottlebrush squirreltail, and allow alkali sacaton sufficient time to “green up”. Summer rest (July-September) will benefit warm-season plants such as alkali sacaton, vine mesquite and switchgrass.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM
100 - 76 2.3 – 5.5
75 – 51 3.2 – 7.0
50 – 26 5.4 – 16.0
25 – 0 16.0+

Other references

Data collection for this site was performed in conjunction with the progressive soil surveys within the Pecos-Canadian Plains and Valleys, Major Land Resource Area 70 of New Mexico. This site has been mapped and correlated to soils in the following counties: San Miguel, Quay, Guadalupe, De Baca, and Chaves.

Contributors

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Approval

Kendra Moseley, 9/12/2023

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	05/19/2024
Approved by	Kendra Moseley
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:**
