USDA Natural Resources
Conservation Service

Ecological site DX035X03A119
Clayey Bottomland

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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.

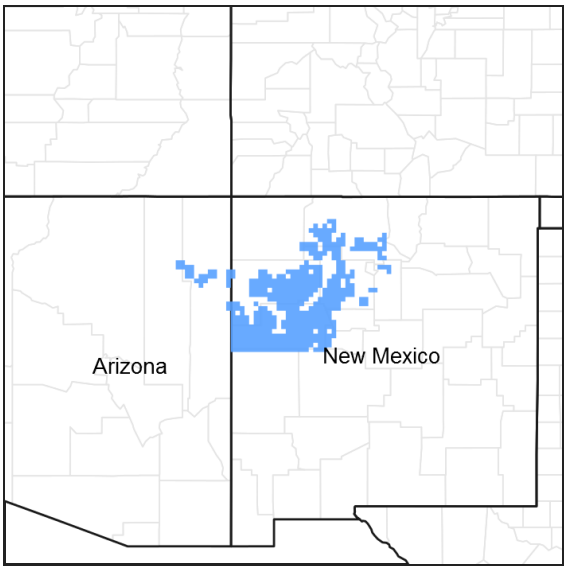


Figure 1. Mapped extent

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex canescens* (2) *Krascheninnikovia lanata*
Herbaceous	(1) *Pascopyrum smithii* (2) *Panicum obtusum*

Legacy ID

R035XA119NM

Physiographic features

This site occurs in valley or floodplain positions, including swales or draws with substantial drainage areas. This site can receive periodic inundation from flood waters.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Valley floor (3) Draw
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	1,829–2,225 m
Slope	0–4%
Water table depth	137–183 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 5 to 25 inches are not uncommon. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. Half or more of the annual precipitation can be expected to come during the period of July through September. Fall conditions are often more favorable for growth of cool season perennial grasses, shrubs, and forbs than those of spring.

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.

Soil features

These soils are moderately deep to deep with fine or very fine textured surfaces. Permeability is moderately slow to slow. Available water capacity is moderate to high. A thin strata of subsurface materials from gravel to clay is common. Erosion hazard is mainly in the form of gullying, piping and draining of the site when vegetation has deteriorated from its natural potential.

Table 4. Representative soil features

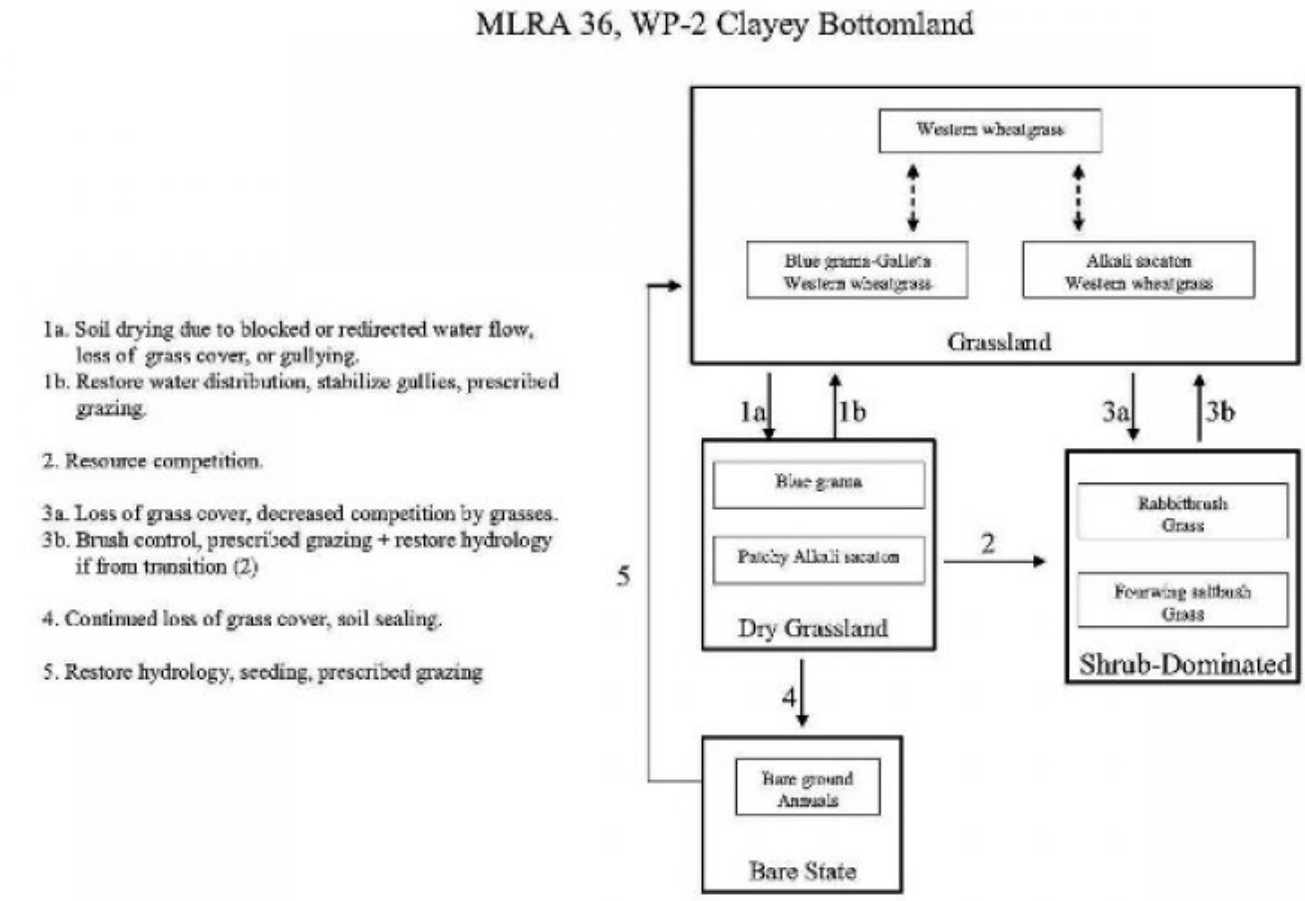
Surface texture	(1) Clay loam (2) Silty clay loam (3) Sandy clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow to slow
Soil depth	183 cm
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0–3%
Available water capacity (0-101.6cm)	12.7–17.78 cm

Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–12
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

Overview
This site occurs on swales, depressions, and flood plains on valley floors. It occurs as a distinct unit or as part of a mosaic with Bottomland sites. The historic plant community of the Clayey Bottomland site is a productive grassland characterized by both warm and cool-season grasses, scattered shrubs, and forbs. Western wheatgrass is the dominant grass species. Fourwing saltbush and rabbitbrush are the more common shrubs. Decreased available soil moisture due to blocked or redirected flow of run-on water, loss of grass cover, or gullying can cause a transition to a less productive Dry Grassland State. Continued loss of grass cover and soil surface sealing may result in a state with extensive areas of bare ground. Alternatively, loss of grass cover and soil drying can decrease competition by grasses, facilitating shrub encroachment and result in a Shrub-Dominated state.

State and transition model



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

State Containing the Historic Climax Plant Community Grassland State: The historic plant community is dominated by western wheatgrass. Other important grasses that typically appear on this site include, alkali sacaton, blue grama, galleta, vine mesquite and spike muhly. Fourwing saltbush is the dominant shrub. Rabbitbrush, broom snakeweed, and winterfat may also be sparsely scattered across the site. Continuous heavy grazing will cause a decrease in western wheatgrass and vine mesquite. A community dominated by alkali sacaton or blue grama and galleta with western wheatgrass as the subdominant may result. In other instances, especially on the heavier textured clay soils, a sparse, less productive, near monotypic stand of western wheatgrass may persist. Diagnosis: Grass cover is uniform with few large bare areas present. Shrubs are scattered with canopy cover averaging five percent. Evidence of erosion such as pedestalling of grasses, rills and gullies is infrequent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1191	2120	3049
Forb	84	150	215
Total	**1275**	**2270**	**3264**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	18%

Figure 5. Plant community growth curve (percent production by month). NM0310, R035XA119NM-Clayey Bottomland-HCPC. WP-2 Clayey Bottomland HCPC warm/cool.

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

State 2
Dry Grassland

Community 2.1
Dry Grassland

Additional States: Dry Grassland: This site is characterized by decreased available soil moisture. Typically alkali sacaton or blue grama is the dominant grass species. Alkali sacaton is generally found in clumps or tussocks with

interconnected bare areas between plants. Blue grama occurs as low vigor sod like patches with frequent large bare areas present. Diagnosis: Grass cover is patchy with large interconnected bare areas present. Alkali sacaton or blue grama are the dominant grass species. Rills, gullies, or obstructions to overland flow are present. Transition to Dry Grassland (1a): Soil drying due to blocked or redirected flow of run-on water, loss of grass cover, or gullying are thought to initiate this transition. Water retention or diversion structures, sediment deposition, or roads may block or divert water that would naturally run-on to the site. Roads or trails may concentrate water during high flow periods and facilitate gully formation. Loss of adequate grass cover due to overgrazing can decrease infiltration, increase runoff rates, and initiate gullying. Key indicators of approach to transition: *Reduction in western wheatgrass cover and increase in size and frequency of bare patches. *Increase in cover of blue grama, galleta, ring muhly and mat muhly. *The formation of trails, gullies, barriers or other features that disrupts natural overland flow Transition back to Grassland (1b) The natural hydrology of the site must be restored. Erosion control structures, shaping or filling gullies, culverts, turnouts, or moving or re-routing obstructions may be necessary to restore natural run-on flow patterns. Prescribed grazing will help restore and maintain adequate grass cover.

State 3
Bare State

Community 3.1
Bare State

Bare State: Extensive areas of bare ground characterize this site. Surface soils in most bare areas are sealed over with physical crusts. Herbaceous cover consists mainly of annuals. If perennial grasses are present they occur only in isolated patches. Diagnosis: Annuals are the dominant herbaceous vegetation. Extensive interconnected bare areas are common with scattered or no grass plants. Evidence of erosion such as rills and gullies are present. Transition to Bare State (4a) The continued loss of remaining grass cover due to overgrazing or soil drying may cause this transition. The subsequent sealing of the soil surface by physical crusts can inhibit grass reestablishment.4 Additionally, heavy use by livestock during periods when the soils are saturated can cause trampling damage and soil compaction. Soil compaction decreases infiltration limiting grass reestablishment. Transition back to Grassland (4b) The hydrology of the site must be restored first (see 1b). Seeding is necessary to reestablish Bottomland grasses. Prescribed grazing will help ensure adequate rest and proper forage utilization following grass establishment. The degree to which this site is capable of recovery depends on the restoration of hydrology, the extent of degradation to soil resources, and adequate rainfall necessary to establish grasses.

State 4
Shrub-Dominated

Community 4.1
Shrub-Dominated

Shrub-Dominated: This state is characterized by the predominance of shrubs, especially rabbitbrush, and in some instances fourwing saltbush. Blue grama, galleta, or sparse western wheatgrass are typically the dominant grass species. Diagnosis: Rabbitbrush or fourwing saltbush is found at increased densities relative to the Grassland state. Grass cover is patchy with large bare areas present. Evidence of erosion such as pedestalling of plants, elongated water flow patterns, litter dams, and rills or gullies is common. Transition to Shrub-Dominated (2, 3a) Loss of grass cover and resulting decreased competition by grasses are believed to initiate this transition. The loss of grass cover may be due to a change in hydrology, overgrazing, or other disturbance such as fire. Rabbitbrush is believed to increase under heavy grazing pressure6, and after 1-3 years following fire7. Fourwing saltbush is a highly palatable shrub and typically decreases in response to heavy browsing.2 Resource competition by grasses is reported to negatively affect the establishment of fourwing saltbush.3 It may be possible that fourwing saltbush increases in response to a loss of grass cover and reduced competition, due to causes other than heavy grazing. Key indicators of approach to transition: * Change in composition or distribution of grass cover. * Increase in size and frequency of bare patches. * Increase in amount of shrub seedlings. Transition back to Grassland (3b) Brush control may be necessary to initiate the transition back to the grassland state. Chemical control has been shown to be effective in controlling 12 rabbitbrush.1, 5 Root plowing and other mechanical methods that sever the plant below the root crown may reduce rabbitbrush densities, however follow up treatment may be necessary. Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover. In addition the natural hydrology of the site must be restored if the transition pathway was from Dry

Grassland to Shrub-Dominated (2). See Transition Back to Grassland (1b).

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				873–1122	
	western wheatgrass	PASM	*Pascopyrum smithii*	873–1122	–
2				250–374	
	vine mesquite	PAOB	*Panicum obtusum*	250–374	–
3				124–250	
	blue grama	BOGR2	*Bouteloua gracilis*	124–250	–
4				250–374	
	spike muhly	MUWR	*Muhlenbergia wrightii*	250–374	–
	James' galleta	PLJA	*Pleuraphis jamesii*	250–374	–
5				124–250	
	alkali sacaton	SPAI	*Sporobolus airoides*	124–250	–
6				25–75	
	squirreltail	ELEL5	*Elymus elymoides*	25–75	–
7				25–124	
	threeawn	ARIST	*Aristida*	25–124	–
	creeping muhly	MURE	*Muhlenbergia repens*	25–124	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	25–124	–
Shrub/Vine					
8				75–250	
	fourwing saltbush	ATCA2	*Atriplex canescens*	75–250	–
9				25–75	
	winterfat	KRLA2	*Krascheninnikovia lanata*	25–75	–
10				25–124	
	Bigelow sage	ARBI3	*Artemisia bigelovii*	25–124	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	252–124	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	25–124	–
Forb					
11				25–124	
	Forb, perennial	2FP	*Forb, perennial*	25–124	–
12				25–75	
	Forb, annual	2FA	*Forb, annual*	25–75	–

Animal community

This range site prvides habitats that support a resident animal community that is characterized by pronghorn antelope, coyote, black-tailed jackrabbit, Betta's pocket gopher, sparrow hawk, mourning dove, chipping sparrow, Western spadefoot toad, leopard lizard, and prairie rattlesnake. The chestnut-collared longspur winters on this site

and the common raven and prairie falcon hunt over it.

Hydrological functions

This site is in hydrologic group D. Runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series----------Hydrologic Group
Camelrock----------D

Recreational uses

This site offers limited opportunity for establishing small water areas, usually of intermittent nature, in the form of ponds or tanks. It also has potential for hiking, horseback riding, nature observation, photography, picnicking, and camping. The establishment of trails for hiking or horseback riding should be done with care, however, since frequently used trails can furnish places for natural flood waters to channel and thus begin gullying of the site. Pernament sites for picnicking and camping are best located away from this site because of flooding hazards.

Lush vegetative growth resulting from summer flooding can cause this site to contrast sharply with those surrounding it, and natural beauty is thus enhanced.

Wood products

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

Other products

This site is suitable for grazing by most kinds and classes of livestock without regard to season of the year. It is best suited, however, to mother cows with calves old enough to take a substantial amount of milk during spring and summer months when grasses are most productive following flooding. Excessive grazing use over a prolonged period will result in a decrease in western wheatgrass, vine-mesquite, and alkali sacaton. Blue grama may increase initially but will eventually decrease if the heavy grazing continues, and the site then becomes subject to a takeover by rabbitbrush and other invading woody plants such as sagebrush or greasewood. The site is subject to gullying or draining when the natural potential vegetation is so disturbed and may not be recoverable using improved grazing alone.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index----------Ac/AUM
100 - 76----------2.0 - 2.9
75 – 51----------2.7 - 4.3
50 – 26----------4.0 - 7.5
25 – 0----------7.5+

Other references

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.

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.

2. Pieper, R. D. and G. B. Donart. 1978. Response of fourwing saltbush to periods of protection. Journal of Range Management. 31: 314-315

3. Ueckert, D. N, and J. L. Pertersen. 1991. Selecting Atriplex canescens for greater tolerance to Competition. Journal of Range Management. 41: 220-222

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

5. Whisenant, S.G. 1988. Control of threadleaf rubber rabbitbrush with herbicides. Journal of Range Management. 41: 470-472

6. Whitson, T.D. (ed.). 1999. Weeds of the West. The Western Society of Weed Science, Wyoming. pp 103

7. Wright, H. A. 1972. Shrub response to fire. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/[2004].

Characteristic Soils Are:
Moriarty silty clay

Other Soils included are:
Navajo clay----------Manzano clay loam

Contributors

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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	
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):**

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:**