USDA Natural Resources
Conservation Service

Ecological site DX035X03A118
Bottomland

Accessed: 05/04/2024

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.

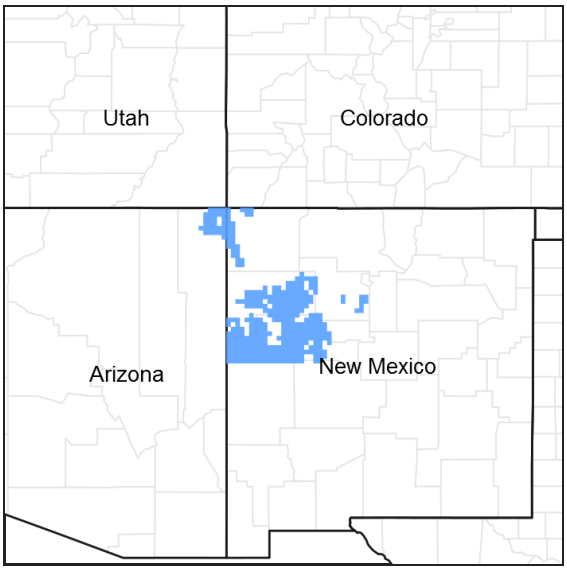


Figure 1. Mapped extent

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.

Table 1. Dominant plant species

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

Legacy ID

R035XA118NM

Physiographic features

This site occurs in valley or flood plain positions, including large swales or draws with substantial drainage areas, which receive periodic inundation from floodwaters. Slopes average less than 3 percent. Elevations range from 6000 to 7300 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Valley floor (3) Draw
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	1,829–2,315 m
Slope	0–4%
Ponding depth	0–3 cm
Water table depth	0–51 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.

Soil features

These soils are deep with moderately fine to moderately coarse-textured surfaces. Permeability is moderate to moderately slow, and the available water capacity is moderately high to high. A thin strata of subsurface materials from gravel to clay is common. Erosion hazard is slight when vegetative cover is at or near its potential.

Table 4. Representative soil features

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

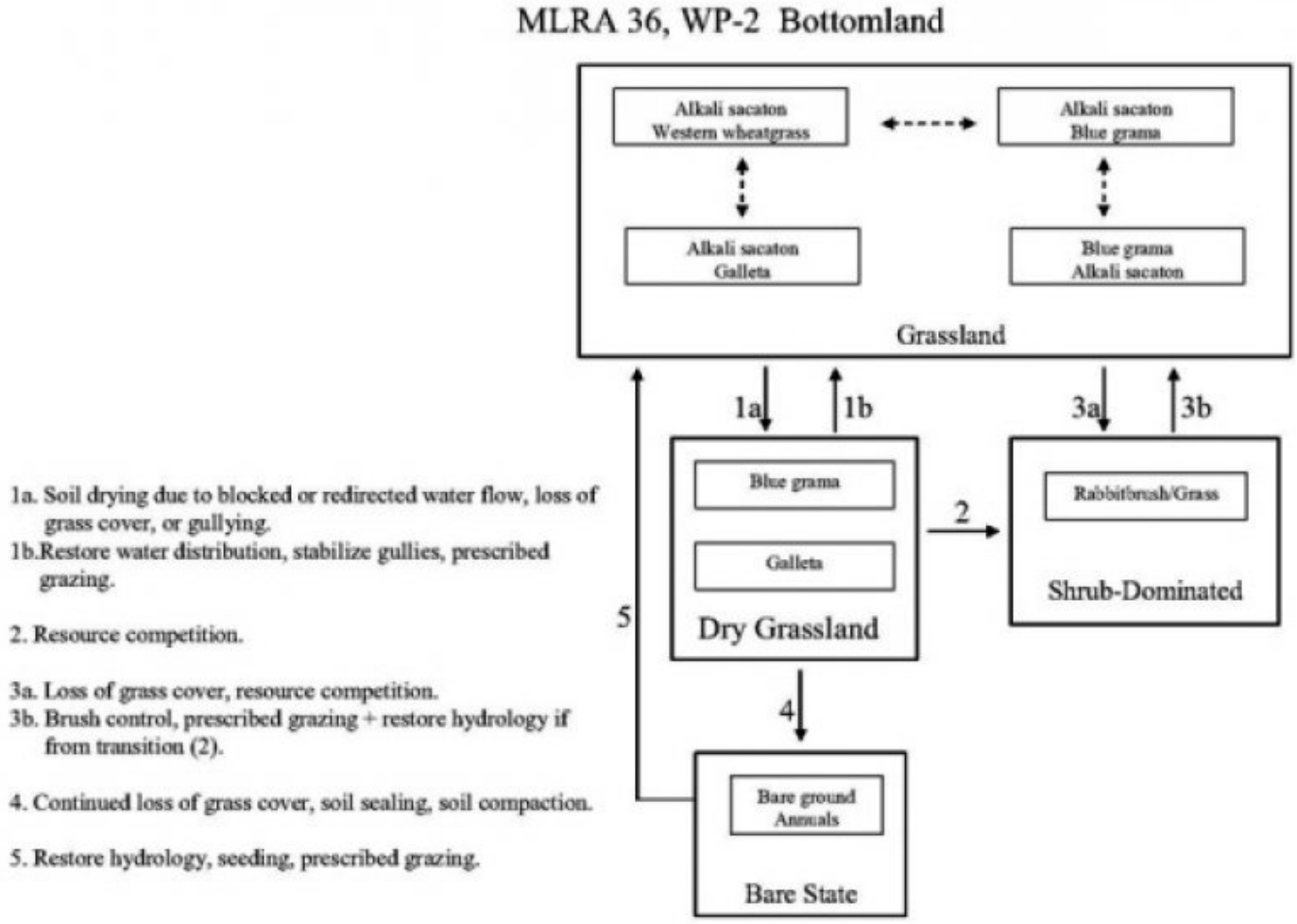
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to somewhat excessively drained
Permeability class	Very slow to moderately rapid
Soil depth	152 cm
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0–3%
Available water capacity (0-101.6cm)	15.24–30.48 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–4
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	7–13%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

Overview
This site occurs on floodplains or stream terraces on valley floors. It occurs as a distinct unit or as part of a mosaic with Clayey Bottomland sites. The historic plant community of the Bottomland site is a highly productive grassland characterized by both warm and cool-season grasses, scattered shrubs, and forbs. Alkali sacaton is the dominant grass species with western wheatgrass occurring as the sub-dominant. Fourwing saltbush and rabbitbrush are common shrubs. Decreased available soil moisture due to changes in hydrology can cause a transition to a less productive Dry Grassland State. Continued loss of grass cover, soil surface sealing, or continuous disturbance may result in a state with extensive areas of bare ground (Bare State). Loss of grass cover and decreased soil moisture can increase competition by shrubs, facilitating shrub encroachment and result in a Shrub-Dominated state.

State and transition model

Plant Communities and Transitional Pathways (diagram)



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

State Containing Historic Climax Plant Grassland State: The historic plant community is dominated by alkali sacaton with western wheatgrass occurring as the sub-dominant. Other important grasses that typically appear on this site include blue grama, galleta, vine mesquite, spike muhly, and bottlebrush squirreltail. Fourwing saltbush is the dominant shrub. Rabbitbrush, broom snakeweed, and spineless horsebrush 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 with blue grama or galleta as the sub-dominant may result. If the site continues to decline, blue grama may eventually dominate. Diagnosis: Grass cover is uniform with few large bare areas present. Shrubs are scattered with canopy cover averaging six percent or less. Evidence of erosion, including 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	1211	2118	3026
Forb	40	71	101
Total	**1251**	**2189**	**3127**

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	12%

Figure 5. Plant community growth curve (percent production by month). NM0309, R035XA118NM-Bottomland-HCPC. WP-2 Bottomland HCPC warm/cool season perennial plant community..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	12	10	15	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 galleta or blue grama is the dominant grass species. Alkali sacaton if present is generally found in clumps or tussocks with interconnected bare areas between plants, or in patches on wetter low spots. Diagnosis: Grass cover is variable ranging from relatively uniform to patchy with large interconnected bare areas present. Blue grama or galleta is 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 flow onto 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 flow rates, and initiate gullying. Key indicators of approach to transition: * Reduction in western wheatgrass and alkali sacaton cover * 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 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
Shrub-Dominated

Community 3.1
Shrub-Dominated

Shrub-Dominated: This state is characterized by the predominance of shrubs, especially rabbitbrush. Spineless horsebrush and broom snakeweed may also increase in representation. Blue grama, galleta, and alkali sacaton are typically the dominant grass species, however, alkali sacaton may be sparse if the transition to this state was from

the Dry Grassland. Diagnosis: Rabbitbrush is found at increased densities relative to the Grassland state. Grass cover is patchy with large bare areas present. Evidence of erosion including pedestalling of plants, elongated water flow patterns, and litter dams is common. Rills or gullies may be present. Transition to Shrub-Dominated (2, 3a) Loss of grass cover and resulting decreased competition by grasses is 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 pressure4 and after 1-3 years following fire5. 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 is necessary to initiate the transition back to the grassland state. Chemical control has been shown to be effective in controlling rabbitbrush. 1, 3 Prescribed grazing will help ensure adequate deferment period following brush control and will assist in the establishment and aintenance 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).

State 4
Bare State

Community 4.1
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 (4) 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.2 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 (5) The hydrology of the site must be restored first (see 1b). Seeding may be necessary to reestablish bottomland grasses. Prescribed grazing will help restore and maintain adequate grass cover, and facilitate recovery of compacted soils. 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.

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				706–942	
	alkali sacaton	SPAI	*Sporobolus airoides*	706–942	–
2				471–706	
	western wheatgrass	PASM	*Pascopyrum smithii*	471–706	–
3				24–118	
	vine mesquite	PAOB	*Panicum obtusum*	24–118	–
4				235–353	
	blue grama	BOGR2	*Bouteloua gracilis*	235–353	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	235–353	–
	James' galleta	PLJA	*Pleuraphis jamesii*	235–353	–
5				24–118	
	squirreltail	ELEL5	*Elymus elymoides*	24–118	–
6				24–118	
	threeawn	ARIST	*Aristida*	24–118	–
	creeping muhly	MURE	*Muhlenbergia repens*	24–118	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	24–118	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	24–118	–
	dropseed	SPORO	*Sporobolus*	24–118	–
7				24–71	
	big sacaton	SPWR2	*Sporobolus wrightii*	24–71	–
Shrub/Vine					
9				71–235	
	fourwing saltbush	ATCA2	*Atriplex canescens*	71–235	–
10				24–118	
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	24–118	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	24–118	–
11				24–71	
	Bigelow sage	ARBI3	*Artemisia bigelovii*	24–71	–
	prairie sagewort	ARFR4	*Artemisia frigida*	24–71	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	24–71	–
Forb					
12				24–118	
	Forb, perennial	2FP	*Forb, perennial*	24–118	–
13				24–71	
	Forb, annual	2FA	*Forb, annual*	24–71	–

Animal community

This range site provides habitats which support a resident animal community that is characterized by pronghorn antelope, coyote, black-tailed jackrabbit, Botta's pocket gopher, sparrow hawk, mourning dove, chipping sparrow,

western spadefoot, leopard lizard, and prairie rattlesnake.

The chestnut-collared larkspur winters on this site, and the common raven and prairie falcon hunt over it.

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
Dondiego----------B
Zepol----------B

Recreational uses

This site offers a limited opportunity for establishing small water area, usually of an 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 floodwaters to channel and thus begin gullying of the site. Permanent sites for picnicking and camping are best located away from this site because of flooding hazard.

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 with out regard to season of year. However, 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 heavy grazing continues and the site then becomes subject to take over 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 management 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 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, Cibola, Catron, Socorro, 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. 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

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

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

5. Wright, H. A. 1972. Shrub response to fire. In: McKell, Cyrus M.; Blaisdell, James P.; Goodin, Joe R., eds. Wildland shrubs--their biology and utilization: Proceedings of a symposium; 1971 July; Logan, UT. Gen. Tech. Rep. INT-1. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station: 204-217.

Contributors

Brenda Simpson
Christine Bishop
David Trujillo
Don Sylvester
John Tunberg

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:**

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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):**

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:**

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17. **Perennial plant reproductive capability:**
