USDA Natural Resources
Conservation Service

Ecological site R038XB106NM
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	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs principally on the floodplains of large drainageways and is commonly subject to frequent overflow or flooding (normally more than once in two years). Slopes average less than 3 percent. Elevation range from about 5,000 to 6,500 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Elevation	5,000–6,500 ft
Slope	0–3%

Aspect	Aspect is not a significant factor

Climatic features

Average annual precipitation varies from about 12 inches to just over 16 inches. Substantial fluctuations from year to year are common, ranging from a low of about 6 inches to a high of over 30 inches. Approximately one-half of the annual precipitation comes in the form of rainfall during the months of July, August, and September, although wintertime precipitation in the form of snow, sleet, or rain is sometimes significant. Spring and late fall months are normally dry.

The average frost-free period ranges from about 165 to 190 days and extends from approximately the third or fourth week in April to mid October. Average annual air temperatures are about 56 degrees F. Summer maximums can exceed 100 degrees F and winter minimums on occasion go below zero. Monthly mean temperatures generally exceed 70 degrees F for the period of June through August.

Growing conditions favor warm-season perennial vegetation, although late winter and late summer precipitation is adequate to foster a significant cool-season component in the potential plant community. Occasional wet springs also create good conditions for annual forb production, but frequent winds from the west and southwest are common during this time of year and tend to deplete soil moisture at a critical time for the growth of these plants.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	298 days
Precipitation total (average)	16 in

Influencing water features

This site may be influenced by water from a wetland or stream. This site is influenced by run-on water from surrounding sites.

Soil features

The soils on this site are deep and somewhat well drained to well drained. Surface layers are typically medium to fine textured. Underlying layers may be almost any type of material from coarse to fine textured. Intake rates are moderate to slow and water-holding capacities are moderate to high. The soils are subject to deep gullying; and although naturally subject to frequent overflow, may be found in a drained condition once gullies have formed or certain man-made diversions have been constructed.

Table 4. Representative soil features

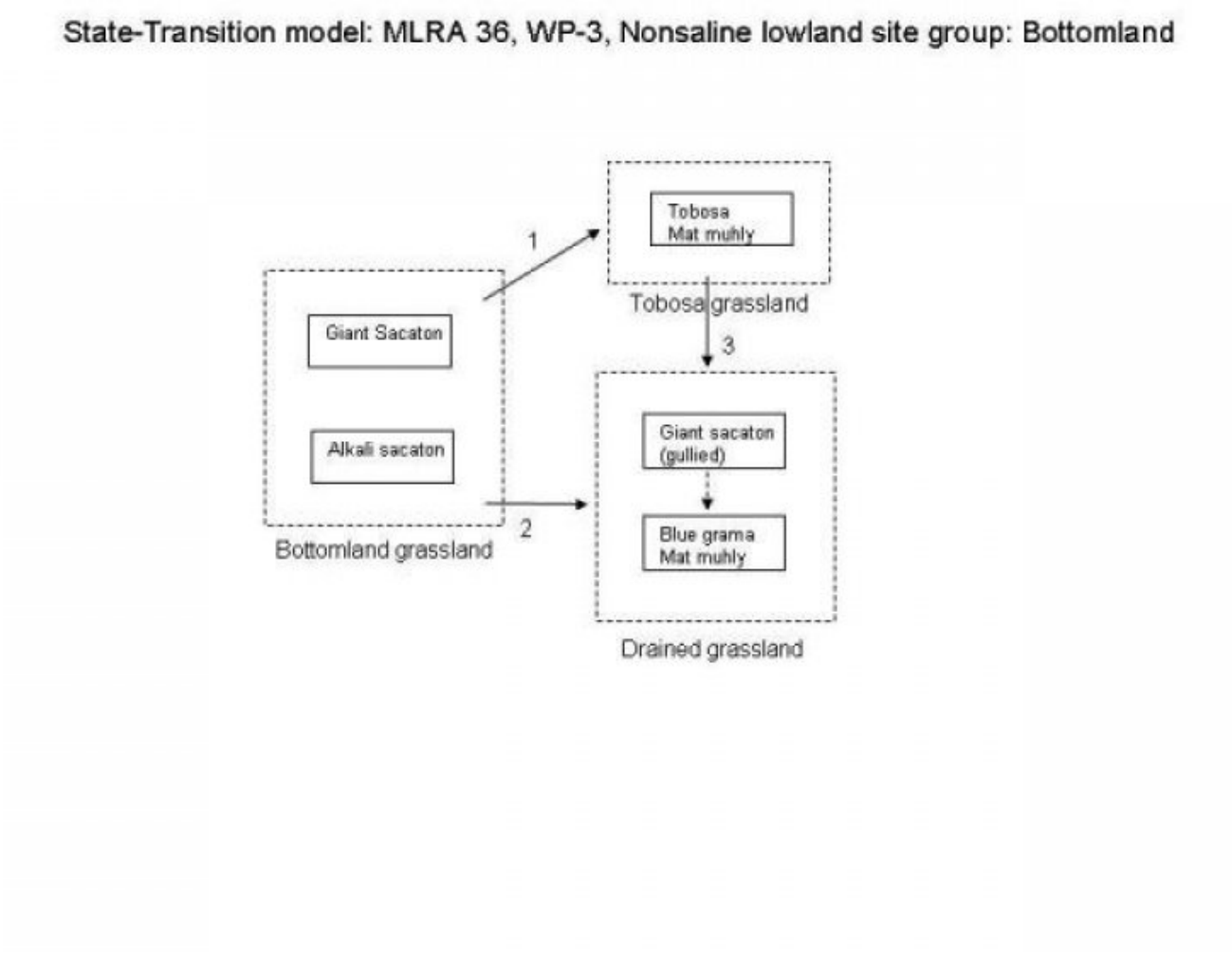
Surface texture	(1) Silty clay (2) Clay loam (3) Loam
Family particle size	(1) Sandy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately rapid
Soil depth	72 in
Available water capacity (0-40in)	4 in
Calcium carbonate equivalent (0-40in)	7%

Electrical conductivity (0-40in)	0–4 mmhos/cm
Soil reaction (1:1 water) (0-40in)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–12%

Ecological dynamics

A decrease in giant sacaton, alkali sacaton, sideoats grama, and cane bluestem and an increase in such plants as tobosa, burrograss, creeping or mat muhly, threeawns, and broom snakeweed characterize site deterioration. Eventually, under prolonged heavy grazing, mesquite may invade. Although site deterioration may be caused by abusive grazing it is more frequently caused on this site by gullying and draining. This condition is, at its extreme, represented by an abundance of bare ground and annuals, coupled with remnant stands of sacaton or tobosa situated so as to receive overflow from side drainages. The site at this stage may not be recoverable using improved grazing management alone.

State and transition model



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

State-transition model: MLRA 36, WP-3: Bottomland DRAFT—12 June 2001 STATUS—First abbreviated draft Overview The historic plant community type (HCPC) of this site is dominated by giant sacaton (*Sporobolus wrightii*) or alkali sacaton (*Sporobolus airoides*). Vine mesquite (*Panicum obtusum*) and sideoats grama (*Bouteloua curtipendula*) may also be common. Reduced plant cover with increased erosion and subsequent channelization causes transitions to two alternate states. In cases where the slope is slight (<1%), small channels tend to form and the subsequent lowered soil moisture average leads to a transition to a tobosa (*Pleuraphis mutica*)-dominated state. In cases where slopes are more steep (>1%) or where soils or increased erosion withi the tonosa-dominated state permit the formation of deeper channels, extensive soil drying can leave a sparse grassland with sacaton individuals concentrated along channel margins. Eventually, these conditions result in the establishment of upland grass species, including blue grama (*Bouteloua gracilis*). No quantitative information exists concerning the causes of transitions among grassland types or to shrublands or annuals. No systematic studies exist regarding the effects of range management on grassland-shrubland/annual community transitions in the lowland ecological site group. Information sources and theoretical background: Communities, states and transitions are derived from the observations of Gene Atkins and Elizabeth ??. Communities are usually defined by the primary and secondary dominant plant species, but sometimes emphasize dominant species of differing life-forms. The channelization hypothesis holds that the loss of herbaceous vegetation cover increases erosion and channelization, and that channelization reduces soil moisture availability to grasses across broad areas. Changes in soil moisture availability, in turn, lead directly to changes in the composition of dominant plants (Gile and Grossman 1997). Catalog of states and community pathways Bottomland grasslands: The historic plant community is dominated by giant sacaton and alkali sacaton either alone or in mixture, and harbors several other grass species including vine mesquite, tobosa (*Pleuraphis mutica*), galleta (*Pleuraphis jamesii*). Western wheatgrass (Elymus smithi) may also occur at high elevations within this subresource area. It is not known what conditions or circumstances lead to the differing abundances of the sacaton species among bottomlands, or if shifts in their relative abundances occur over time. Each of these has relatively high palatability when compared to tobosa and during the growing season. Thus, reduction of populations of bottomland grass species due to overgrazing and erosion is likely in the absence of proper management. The giant sacaton grasslands have been reduced to 5% of their original extent (Cox 1988), thus there is great interest in preserving the remaining stands. Diagnosis: Basal cover of giant sacaton and/or alkali sacaton ranges from x to x. Mean bare patch size does not exceed x cm. Tobosa grassland: This grassland occurs as gullying increases and soil moisture levels decline during flood periods. Channels, however, are small and stable within this state. Tobosa and mat muhly (*Muhlenbergia richardsonis*) dominate overall, but giant sacaton may occur in wetter patches. Diagnosis: Basal cover of giant sacaton and/or alkali sacaton ranges from x to x. Tobosa ranges from x to x. Mean bare patch size ranges from x-x. Small gullies are present and physical soil crusts and shrink-swell cracking is visible in bare patches. Drained grassland: Most of the area in this state may have been reduced to either bare ground or annuals. Patches of sacaton may occur along the margins of deep gullies that characterize this site in its early stages. Over time, upland grasses such as blue grama will increase, and with mat muhly, dominate the site. Over extended periods (e.g. 50-100 years) agradation of soil into channels will lead to a return of flooding cycles, and bottomland grasslands may reestablish. Thus, this site may exhibit a cyclic sequence of states over the long term. Diagnosis: Bare ground or annual cover exceeds x. Giant sacaton and other grasses occur only in isolated patches, sometimes on the fringes of the annual-dominated area, or not at all. Gullies are present, often up to x cm deep. Physical crusting and shrink-swell cracking of the bare soil surface is extensive. Upland grasses may dominate the site. Catalog of transitions GT: Burning, mowing for hay in conjunction with heavy grazing may reduce grass cover, and subsequent gullying and diversion of water may produce changes in the soil moisture regime that facilitates a shift in dominance to tobosa. Key indicators of approach to threshold: Increases in bare ground cover, increases in the size of bare ground patches, decreases in the cover and reproduction of giant and alkali sacaton, appearance of water flow patterns, rills, and debris dams associated with open spaces, reduced frequency and duration of flooding. Reversing practices: Grazing giant sacaton during dry summers or fall may expose crowns to freezing temperatures and cause grass mortality (Cox 1988). Frequent utilization during the spring when grasses are palatable and growing, however, may weaken them. Giant sacaton, for example, is relatively slow to recover from fire, taking from 2-3 years. Thus, the appropriate timing of grazing and fire is critical.?? GD: Causes are similar to GT under conditions of steeper slope or easily erodable soils. TD: If the conditions permitting rapid erosion are sustained and channels deepen, this transition may occur on even shallow slopes. Key indicators of approach to threshold: Increases in bare ground cover, increases in the size of bare ground patches, decreases in the cover of tobosa, deepening of gullies. This site is strongly dominated by giant sacaton. Alkali sacaton, tobosa, vine-mesquite, scattered shrubs such as fourwing saltbush, Apacheplume, and occasionally yucca on the more medium textured soils, also occur. Forbs and shrubs occur as minor components of the plant community when the site is at its potential. *Western wheatgrass may be found at certain higher elevations and in the northern portions of the site’s range of occurrence.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1488	2444	3400
Forb	140	230	320
Total	**1628**	**2674**	**3720**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	4%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	4%

Figure 5. Plant community growth curve (percent production by month). NM0606, R038XB106NM Bottomland HCPC. R038XB106NM Bottomland HCPC Giant sacaton dominated grassland with scattered shrubs and a minor component of forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				1438–1725	
	big sacaton	SPWR2	*Sporobolus wrightii*	1438–1725	–
2				288–431	
	vine mesquite	PAOB	*Panicum obtusum*	288–431	–
	western wheatgrass	PASM	*Pascopyrum smithii*	288–431	–
	alkali sacaton	SPAI	*Sporobolus airoides*	288–431	–
3				144–288	
	James' galleta	PLJA	*Pleuraphis jamesii*	144–288	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	144–288	–
4				29–144	
	threeawn	ARIST	*Aristida*	29–144	–
	creeping muhly	MURE	*Muhlenbergia repens*	29–144	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	29–144	–
	burrograss	SCBR2	*Scleropogon brevifolius*	29–144	–
5				29–144	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	29–144	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	29–144	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	29–144	–
6				0–86	
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–86	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	0–86	–
7				29–86	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	29–86	–
Forb					
8				86–144	
	Forb, annual	2FA	*Forb, annual*	86–144	–
9				29–144	
	Forb, perennial	2FP	*Forb, perennial*	29–144	–
Shrub/Vine					
10				86–230	
	fourwing saltbush	ATCA2	*Atriplex canescens*	86–230	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	86–230	–
	Apache plume	FAPA	*Fallugia paradoxa*	86–230	–
	arrowweed	PLSE	*Pluchea sericea*	86–230	–
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	86–230	–
	yucca	YUCCA	*Yucca*	86–230	–
11				29–86	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	29–86	–

Animal community

This ecological site provides habitat which can support a resident animal community characterized by black-tailed jackrabbit, coyote, pronghorn antelope, meadowlark, mockingbird, Scott's oriole, scaled quail, mourning dove, leopard lizard, Couch's spadefoot toad, and Western diamondback rattlesnake.

Where large soaptree yucca and woody shrubs are present, mockingbird, Scott's oriole, and mourning dove nest.

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
Haverson----------B
Redbank----------B
Ruidoso----------C
San Mateo----------B
Sparank----------D
Stirk Variant----------D

Recreational uses

This site offers limited recreation potential for horseback riding, picnicking, nature observation, photography, and hunting for mourning dove, scaled quail, and pronghorn antelope. When favorable spring moisture conditions occur, some wildflowers may be seen.

Wood products

This site has no significant value for wood products.

Other products

Grazing:
This site is suitable for grazing cattle, sheep, and horses, generally without regard to class of livestock. It is better suited, however, for cows with calves old enough to take a substantial amount of milk during spring and summer when grasses are green.

A decrease in giant sacaton, alkali sacaton, sideoats grama, and cane bluestem and an increase in such plants as tobosa, burrograss, creeping or mat muhly, threeawns, and broom snakeweed characterize site deterioration. Eventually, under prolonged heavy grazing, mesquite may invade. Although site deterioration may be caused by abusive grazing it is more frequently caused on this site by gullying and draining. This condition is, at its extreme, represented by an abundance of bare ground and annuals, coupled with remnant stands of sacaton or tobosa situated so as to receive overflow from side drainages. The site at this stage 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----------1.7 – 2.6
75 – 51----------2.3 – 3.5
50 – 26----------3.3 – 6.5
25 – 0----------6.5+

Type locality

Location 1: Grant County, NM
Location 2: Catron County, NM
Location 3: Hidalgo County, NM
Location 4: Sierra County, NM
Location 5: Socorro County, NM

Other references

Data collection for this site was done in conjunction with the progressive soil surveys within the New Mexico and Arizona Plateaus and Mesas 36 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: Socorro, Sierra, Grant, Catron.

Characteristic Soils Are:
Ruidoso, San Mateo

Other Soils included are:
Glenberg, Haverson, Redbank, Sparank, Stirk, Variant

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:**