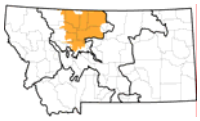
UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION



ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site Name: Clayey 10-14 inch p.z. (precipitation zone)

Site ID: R052XN162MT

Major Land Resource Areas: 52XN -- Glaciated Plains, Northern

Physiographic Features: This site usually consists of deep soils on flood plains and fans, and moderately deep soils on uplands. Slopes vary from 1- 15%, but are usually less than 8%. Elevations generally range from 2,000 to 3,500 feet.

Land Form: (1) flood plain
(2) alluvial fan
(3) terrace

	Minimum	Maximum
Elevation (feet):	1875	4000
Slope (percent):	1	15

Water Table Depth (inches): Greater than 72 inches

Flooding:

Frequency: None
Duration: Non-applicable

Ponding:

Depth (inches): NA
Frequency: None
Duration: Non-applicable

Runoff Class: Medium

Aspect: Occurs on all aspects, soils and vegetation often affected by aspect

Climatic Features

A semi-arid, temperate climate characterizes the Glaciated Plains. The predominance of cool season species has evolved to take advantage of the precipitation regime that peaks in late spring-early summer (June). Seventy-five percent of the annual precipitation usually falls as steady, soaking, frontal system rains. Summer rains usually come with thunderstorms. Precipitation is the most important factor influencing production (Heitschmidt et al 2005). Severe drought occurs on average in two out of every ten years (Cooper, et al., 2001).

	Minimum	Maximum
Frost-free period (days):	85	123
32 F, 90% Probability = Minimum		
50% Probability = Maximum		
Freeze-free period (days):	116	142
28 F, 90% Probability = Minimum		
50% Probability = Maximum		

Mean annual precipitation (inches): 10 to 14

Climate Stations:
(1) #241088 - Bredette
(2) #241692 - Chester
(3) #243558 - Glasgow Airport
(4) #243996 - Havre
(5) #245572 - Medicine Lake
(6) #247500 - Shelby

Influencing Water Features

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

Representative Soil Features

These soils formed in place in glacial till underlain by shale. Some of the soils formed in material derived from shale or in alluvium derived from glacial till or shale. The alluvium was deposited in the valleys on some of the bordering uplands, low terraces, fans and flood plains. The light brownish gray clay surface layer of these soils is usually less than 5 inches in depth. The clay soils are more than 20 inches deep. Soils are well drained. Permeability is very slow. Soil ph varies from 6.6-8.4. This site is characterized by the following soil components: Abor, Lohler, Marias, Bacovey, and Marvan.

Predominant Parent Materials:
Kind: alluvium, till, residuum
Origin: water laid, glacial, weathered from shale
Surface Texture: (1) clay loam
(2) silty clay loam
(3) silty clay
Surface Texture Modifier: (1) None

Subsurface Texture Group: Clayey
Surface Fragments < = 3" (% cover): 0
Surface Fragments >3" (% cover): 0
Subsurface Fragments < = 3" (% Volume): 0 – 11
Subsurface Fragments > 3" (% Volume): 0 – 2

Drainage Class: moderately well to well drained
Permeability Class: very slow

	Minimum	Maximum
Depth (inches):	> 20	> 72
Electrical Conductivity (mmhos/cm):	0	2
Sodium Adsorption Ratio:	0	2
Calcium Carbonate Equivalent (percent):		
Soil Reaction (1:1 Water):	6.1	8.4
Soil Reaction (0.1M CaC12):		
Available Water Capacity (inches):	4	6

Plant Communities

Ecological Dynamics of the Site

This ecological site developed under Northern Great Plains climatic conditions, geological parent materials, fire, biotic factors, and under the natural influence of herbivory. Research consistently shows that precipitation is the principle factor altering productivity on ecological sites in the Northern Great Plains (Heitschmidt et al. 2005). The same authors concluded that grazing reduces herbage standing crop, whereas its effects on above ground net primary production varies with timing of grazing and precipitation events, along with the functional and structural composition of the plant community.

It is theorized that these lands burned on a natural interval of 10-12 years (Frost 1998). Fires were ignited by lightning and by early Americans whom were striving to manipulate their environment. Periodic burns would have favored grasses over shrubs, adversely impacted dense clubmoss, attracted herbivory into an area, and altered nutrient cycling and the hydrologic cycle.

The resultant historic climax plant community (HCPC) is the basis for plant community interpretations. The HCPC was determined by evaluating relic areas, and other areas protected from excessive disturbance. The HCPC is comprised of a mixture of tall and medium height cool and warm season grasses, native forbs and native shrubs. About 80% of the annual production is from grasses and grasslike plants, most of which are produced during the cool season. Forbs and shrubs contribute 15% and 5%, respectively to total annual production. Total vegetative production averages 1300 lbs/ac in normal years, 1800 lbs/ac during favorable years, and 900 lbs/ac during unfavorable years.

This ecological site is highly resistant and resilient to disturbance as it has only minor soil limitations for plant growth. Departures from HCPC generally result from management actions, drought, colonization and recruitment of noxious weeds, and a change in the natural fire regime. Under continued adverse impacts, vegetative vigor declines and the HCPC species are gradually out-competed by lower-successional species. This shift in species composition is most evident as the deep-rooted cool season perennial grasses (such as green needlegrass and western/thickspike wheatgrasses) are replaced by short warm season grasses (blue grama, sandberg bluegrass), fringed sagewort (a half-shrub), and forbs including western wallflower, scarlet globemallow, western

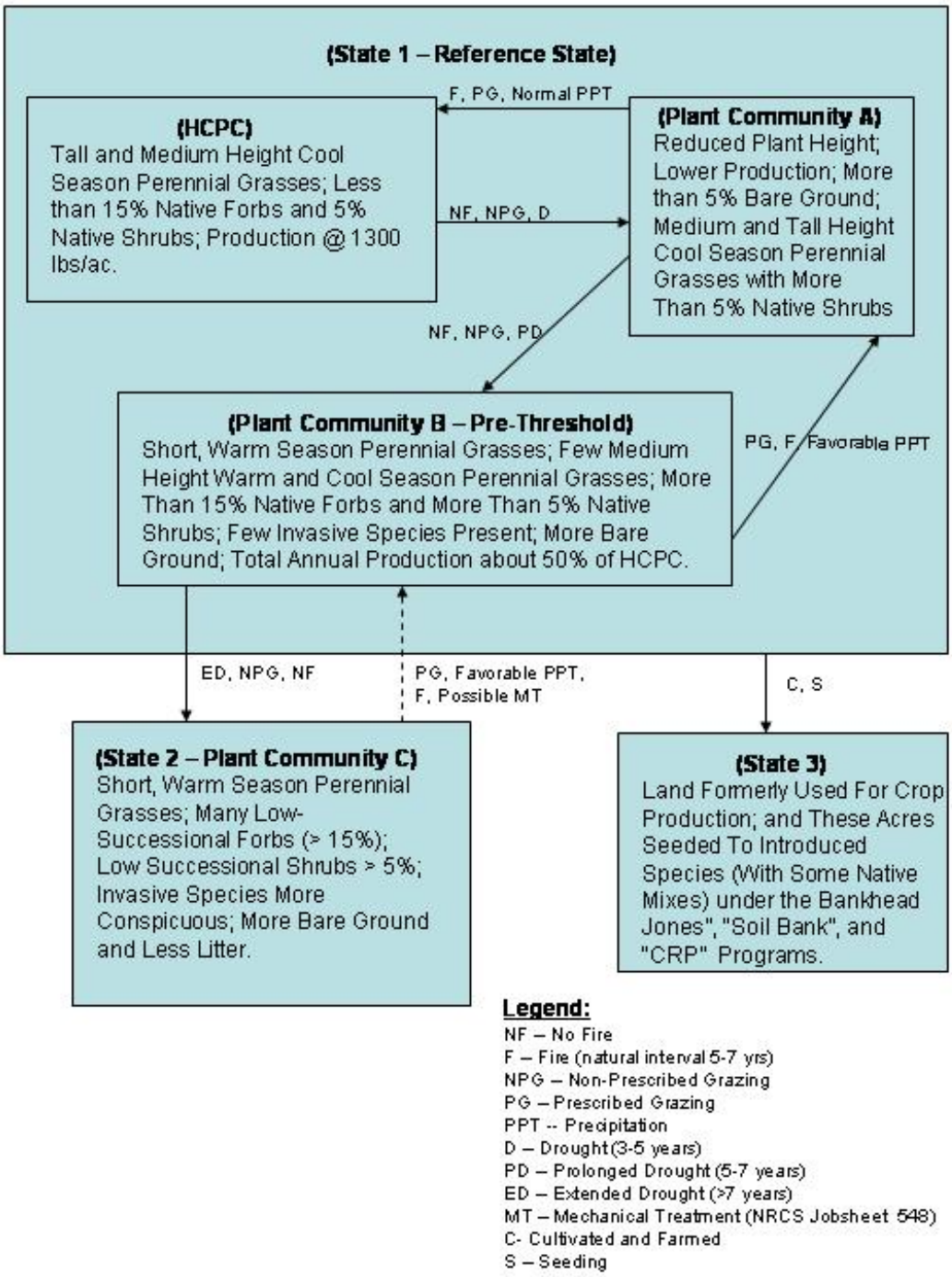
yarrow and biscuitroot. The dominance of these short grasses, non-nitrogenous-fixing forbs, and warm season half-shrubs disrupts ecological processes, impairs the biotic integrity of the site, and restricts the system's ability to recover to higher seral states. Thus, the site loses much of its resiliency.

State and Transition Diagram

Traditional theories of plant succession leading to a single climax community are inadequate for understanding the complex successional pathways of this ecological site in the glaciated plains (Briske et al 2005). This site is more aptly described using state-and-transition vegetation dynamics in a non-linear framework. A "state" is an alternative, persistent vegetation community that is not simply reversible in the linear successional framework. States are depicted as seral stages, while pathways between states are "transitions." The latter can be transient or persisting (crosses a threshold). Transitions are triggered by climatic events, fire, grazing, farming, burning, etc.

Three important plant communities and the successional pathways that commonly occur within the reference state (State #1), are shown in the following diagram. In addition, the transition from Plant Community B (State #1) to Plant Community C (State #2), and a transition from State #1 to State #3 are also illustrated. Ecological processes are discussed in the plant community descriptions which follow the diagram.

Clayey 10-14" p.z. RRUs 52XN, 52XC, 53AE



State #1: Historic Climax Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community (HCPC). Cool season, tall and mid-grasses (such as bluebunch wheatgrass, green needlegrass, western wheatgrass, and thickspike wheatgrass) dominate the HCPC. Prairie junegrass is the most common short grass. Other short grasses and sedges include plains reedgrass, threadleaf sedge and needleleaf sedge. Bluebunch wheatgrass is a dominant species on the Clayey 10-14" p.z. site in the northern Glaciated Plains. Blue grama is the only common warm season grass. The range inventories on Fort Peck and Fort Belknap Reservations (2001-2004) did not report any sideoats grama or little bluestem on this site. Grasses represent about 80% of the total annual production in the community.

Dotted gayfeather, American vetch, white prairie clover and purple prairie clover are warm season forbs that commonly occur on these Clayey 10-14" p.z. sites. American vetch and the prairie clovers are nitrogen-fixing species, and are also valuable forage producing plants. Groundplum milkvetch, scurfpea and prairie thermopsis are lower-successional forbs that have the ability to fix nitrogen. White milkwort, biscuitroot, wild onion and western yarrow may be present as minor components of the plant community. Forbs represent about 15% of the total annual production.

Winterfat and Nuttall's saltbush are common warm and cool season shrubs, respectively. They are valuable forage for wildlife and livestock. Silver sagebrush and fringed sagewort, two additional warm season shrub species, may represent a minor component of the HCPC. One would not expect to find more than a trace of broom snakeweed and pricklypear cactus in the HCPC. Very few cool season shrubs grow on the site. Overall, shrubs account for about 5% of the annual plant production.

Range inventory data collected (in 2001 and 2004) on the Fort Peck and Fort Belknap Indian Reservations, and previous clipping studies by the NRCS indicate total annual production averages 1300 lbs/ac during normal years. Production varies from 900 to 1800 lbs/ac in unfavorable and favorable years, respectively. Average annual production is expected to increase and decrease, respectively on more mesic and xeric portions of the Glaciated plains. Although similarity indices (SI) >75% are expected to be associated with the HCPC, none were recorded during the recent range inventories on the two Reservations.

This plant community is well adapted to the semi-arid, temperate climate that characterizes the glaciated plains. The predominance of cool season species has evolved to take advantage of the precipitation regime that peaks in late spring-early summer (June). Seventy-five percent of the annual precipitation usually falls as steady, soaking, frontal system rains. Summer rains usually come with thunderstorms. Precipitation is the most important factor influencing production. Severe drought occurs on average in two out of every ten years (Cooper, et al., 2001).

Annual bromes and other annual species may invade the HCPC following a drought or period of non-prescriptive grazing. Continual adverse impacts over a period of several years will cause a shift in species composition from the mid and tall cool season grasses to warm season grasses and forbs/half-shrubs such as prairie junegrass, plains reedgrass, white milkwort, fringed sagewort, etc. With

proper grazing management and/or normal precipitation, the desirable perennial plants regain vigor and competitiveness. The annual opportunistic species normally do not persist for more than a few years.

Litter is in contact with 50-60% of the soil surface. Less than 5-10% of the soil surface should be bare, or unprotected by litter, rock, moss, and plant canopy. Rills should not be present and water flow patterns should be barely observable. Soil erosion by wind and water should be minimal.

Historic Climax Plant Community Plant Species Composition:

GRASSES /GRASSLIKE

80% of Community			Group Allowable		Annual Production in	
Common Name	Scientific Name	Group	Pounds Per Acre		Pounds Per Acre	
			Low	High	Low	High
Bluebunch wheatgrass	*Pseudoroegneria spicata*				300	520
Green needlegrass	*Nassella viridula*				390	590
Western wheatgrass	*Pascopyrum smithii*	1	390	590	195	325
Thickspike wheatgrass	*Elymus macrourus*	1			195	325
Threadleaf sedge*	*Carex filifolia**				13	65
Needleleaf sedge*	*Carex duriuscula**		*No more than 130		13	65
Sandberg bluegrass*	*Poa secunda**		lbs for total of all		13	65
Prairie junegrass*	*Koeleria macrantha**		species, and no more		13	65
Plains reedgrass*	*Calamagrostis montanensis**		than 40 lbs for any		13	65
Blue grama*	*Bouteloua gracilis**		one species.		13	65
Other native grasses*					13	65

FORBS

15% of Community			Group Allowable		Annual Production in	
	Scientific Name	Group	Pounds Per Acre		Pounds Per Acre	
Common Name			Low	High	Low	High
Dotted gayfeather	*Liatris punctata*				13	65
Purple prairie clover	*Dalea purpurea*	3	26	130	13	65
White prairie clover	*Dalea candida*	3			13	65
American vetch	*Vicia americana*		195 lbs/ac is		13	65
Missouri goldenrod*	*Slidago missouriensis**		maximum allowed		0	65
Western yarrow*	*Achilea millefolium**		for all forbs.		0	65
Aster*	*Aster spp.**				0	65
Scarlet globemallow*	*Sphaeralcea coccinea**		*100 lbs/ac is max		0	65
Scurpea*	*Psoralidium spp.**		allowed for all		0	65
Hairy goldenaster*	*Heterotheca villosa**		species in this		0	65
Prairie coneflower*	*Ratibida columnifera**		group; no more than		0	65
Prairie thermopsis*	*Thermopsis rhombifolia**		25 lbs/ac for any one		0	65
Pussytoes*	*Antennaria spp.**		species.		0	65
Bastard toadflax*	*Comandra umbellate**				0	65
White milkwort*	*Polygala alba**				0	65
Milkvetch*	*Astragalus spp.**				0	65
Groundplum milkvetch*	*Astragalus crassicarpus**				0	65
Penstemon*	*Penstemmon spp.**				0	65
Hoods phlox*	*Phlox hoodii**				0	65

Eriogonum*	*Eriogonum spp.**	0	65
Dense clubmoss*	*Selaginella densa**	0	T
Other native forbs*		0	65

SHRUBS AND HALF-SHRUBS

5% of Community

Common Name	Scientific Name	Group	Group Allowable Pounds Per Acre		Annual Production in Pounds Per Acre	
			Low	High	Low	High
Winterfat	*Krascheninnikovia lanata*				13	65
Nuttall saltbush	*Atriplex nuttallii*				13	65
Rubber rabbitbrush*	*Ericameria nauseosa**		65 lbs/ac is the max		0	65
Silver sagebrush*	*Artemisia cana**		allowed for all shrubs.		0	65
Snowberry*	*Symphoricarpos spp.**				0	65
Fringed sagewort*	*Artemisia frigida**		*40 lbs/ac is total allowed		0	65
Rose*	*Rosa spp.**		for all species in this		0	65
Creeping juniper*	*Juniperus horizontalis**		group; no more than		0	65
Broom snakeweed*	*Gutierrezia sarothrae**		15 lbs/ac for any one		0	T
Plains pricklypear*	*Opuntia polyacantha**		species.		0	T
Fragile pricklypear*	*Opuntia fragilis**				0	T
Other native shrubs*					0	65

Structure and Cover

Soil Surface Cover (%)

Basal Cover				Non-Vascular Plants	Biological Crust	Litter	Surface Fragments >1/4 & <= 3"	Surface Fragments > 3"	Bedrock	Water	Bare Ground
Grass/ Grasslike	Forb	Shrub/ Vine	Tree								
20-25	5-10	T-5	0								

Ground Cover (%)

Vegetative Cover						Non-Vegetative Cover					
Grass/ Grasslike	Forb	Shrub/ Vine	Tree	Non-Vascular Plants	Biological Crust		Surface Fragments >1/4 & <= 3"	Surface Fragments > 3"	Bedrock	Water	Bare Ground
				0-5	0-2	65	0-3	0-2	0	T	5

Structure of Canopy Cover (%)

	Grass/Grasslike	Forb	Shrub/Vine	Tree
<= 0.5 feet	10	40	20	0
>0.5 - <=1 feet	30	50	40	0
>1 - <=2 feet	40	8	30	0
>2 - <=4.5 feet	20	2	10	0
>4.5 - <=13 feet	0	0	0	0

Annual Production by Plant Type:

Plant	Annual Production (lbs/AC)		
Type	Low	RV*	High
Grasses /Grasslike	720	1040	1440
Forb	135	195	270
Shrub/Vine	45	65	90
Tree	0	0	0
Total	900	1300	1800

*RV means "representative value".

*Successional Pathway to Plant Community A

Non-prescribed grazing, drought, insect infestations (grasshopper, etc) and/or a cessation of fire will cause regression from HCPC to Community A.

Plant Community A (State #1)

A plant height shift to lower stature plants distinguishes Community A from the HCPC. Although cool season perennial grasses (bluebunch wheatgrass, western/thickspike wheatgrass and green needlegrass) still dominate the vegetative community, the percentage of short stature cool and warm season perennial plants such as prairie junegrass and blue grama has increased. Fringed sagewort and silver sagebrush often increase in abundance and contribute more than 5% of the total production. Total vegetative production decreases to about 1050 lbs/ac, or 80% of HCPC.

Basal cover provided by plants decreases to 25%, while litter cover decreases to 40%. Careful examination will yield slight evidence of rills and surface water runoff.

*Successional Pathway from Plant Community A to HCPC

Favorable growing conditions, the implementation of prescribed grazing, or the reintroduction of periodic fire into the system will move Plant Community A to the HCPC. This succession can occur within a couple of years.

*Successional Pathway from Plant Community A to Plant Community B

Community A will regress to Community B under non-prescribed grazing, prolonged drought (5 to 7 years), or an extended period of no fire (greater than 7 years). The rate of regression varies with the intensity and frequency of disturbances

Plant Community B (State 1)

Vegetative production averages about 800 lbs/ac in this Community. The community is dominated by short, warm and cool season perennial grasses. Production of western and thickspike wheatgrass, green needlegrass, and bluebunch wheatgrass is greatly reduced. The production, composition and diversity of cool season mid and tall grasses in the plant community have been significantly reduced. Production of hairy goldenaster, western yarrow, hoods phlox, scurfpea, and other lower-successional native forbs increased. Fringed sagewort and silver sagebrush make up more than 5% of the total vegetative

production. Plant replacement (seedlings and young plants) will be weighted in favor of opportunistic warm season species. Recruitment of mid and tall height cool season grasses is limited to only be a few seedlings and young plants. Japanese brome and other annual grasses occur on the site. Japanese brome density will be highest in microsites, where there is excess moisture or an abundance of litter, or in disturbed areas (rodent mounds, roads, trails, etc.).

This community is characterized by a functional shift from a cool season dominant to a mix of warm and cool season species. The warm season plants are less well-adapted to exploit the precipitation and temperature conditions during May and June. Consequently, less solar energy is captured and converted to carbohydrates. The transfer of energy through the site has been adversely impacted. The site also tends to be more xeric as evaporation and runoff increases.

Plant community B is called the "pre-threshold community." It is critical that this community be recognized and management strategies implemented to prevent further regression. Although this community can improve to either Community A or HCPC through successional processes, further disturbances will result in regression to a lower state. Succession from a lower state (State #2) to State #1 is unlikely without significant inputs into the system.

***Successional Pathways from Community B to Community A and HCPC**

The Clayey 10-14" p.z. site is resistant within the reference state. It is also resilient. Prescribed grazing, the re-implementation of the natural fire regime and/or a period of favorable precipitation will induce successional changes toward the HCPC. Succession will normally occur within a few years.

***Transition from Community B to State 2**

Community B is not highly resistant to regression. In comparison to higher seral stages there is less vegetative production, less litter, and increased bare ground. Extended drought (longer than 7 consecutive years) and non-prescribed grazing can quickly cause regression to a lower state (State #2).

State #2: Early-mid Seral State:

State 2 is dominated by warm season species (blue grama, prairie junegrass, sandberg bluegrass and other short grasses). Both the percentage of total forbs on the site and the percentage of warm season forbs, with respect to percent of cool season forbs have increased. Curlycup gumweed, a warm season biennial plant will often establish in disturbed areas. Silver sagebrush may either increase or decrease in this State; however fringed sagewort normally increases. Prickly pear and brittle cacti usually increase in abundance. Broom snakeweed may encroach onto the site. Annual grasses such as Japanese brome and cheatgrass often increase in abundance until they actually dominate portions of the community. Dense clubmoss, a low growing, vascular cryptogam forms a carpet-like mat that provides up to 30% ground cover in some of these communities. Total vegetative production in a normal year is usually less than 500 lbs/ac.

Many resource concerns exist in this State. There is little or no regeneration of cool season perennial grasses and cool season forbs/shrubs. Litter is inadequate to protect the soil from erosion by wind and water. Surface erosion is moderate to severe, and there is more bare ground than expected. Rills, water flow patterns, and pedestals are evident.

***Transition from State #2 to higher successional state**

This plant community is resistant to change, it is a steady state. The short grasses tend to form a sod that prevents seedling establishment of higher successional species. Less than 10% of the seed bank in State #2 is comprised of seed from cool season perennial plants (Romo and Bai 2004). Thus, potential for succession is limited without significant inputs.

Prescribed grazing minimizes the risk of further regression and enhances the potential for succession to State #1. The combination of prescribed grazing, a natural fire regime, and a prolonged period of favorable precipitation may allow significant succession in communities that have less than 20% clubmoss cover. This potential is depicted with the dashed line in the state and transition model. .

Mechanical treatments may be feasible in areas where potential erosion is not a concern. However, mechanical treatments are not normally recommended on soils with a clay content > 60%. Grazing management practices following a mechanical treatment must be prescribed to address deferment, stocking rates, season of grazing, and other considerations (NRCS Conservation Practice 548). Failure to do so will adversely affect economic returns and is likely to result in retrogression rather than plant succession.

***Transition from State #1 to State #3 (Introduced Species)**

More than one million acres of former cropland in the Glaciated Plains have been seeded to introduced and native species. These seedings resulted from society's concerns regarding land stewardship and erosion, and have been largely funded by the Federal Government. The government programs have spanned from the 1940s (Bankhead Jones Act) to the present (Conservation Reserve Program - CRP).

Crested wheatgrass was the primary species seeded under the direction of the Bankhead Jones Act. Crested wheatgrass, intermediate wheatgrass, smooth brome and some native grasses were seeded during several Soil Bank Programs of the 1960-1970 era. Both introduced species and native species were seeded during the CRP (1985-present). There are over 220,000 acres of CRP in Valley County alone.

The future of these Communities is not predicted in the S&T model. Depending on government programs and agricultural prices, these lands could stay in permanent vegetation with limited haying and grazing, be used as pasture for grazing livestock, or be converted to cropland.

Ecological Site Interpretations

Animal Community

Livestock Management

This site evolved with trampling, defoliation (grasshoppers, jackrabbits, deer, elk, bison, antelope, prairie dogs and other herbivores), fire and drought. The site is highly resistant and resilient to disturbances which may alter its ecological processes. Following perturbations such as drought, which allows blue grama and other short grasses to increase at the expense of the mid and tall grasses, succession occurs during years of favorable precipitation. The site has the potential to produce 900-1800 lbs of forage per acre. Under typical grazing practices, very few livestock losses are reported from poisonous plants.

Forage production shows far greater variations in response to changes in annual precipitation than to different grazing intensities (Branson, 1985). However, proper stocking rates and a planned grazing system are needed to ensure that the site remains in a high seral or HCPC state. Without proper grazing management the mid-to-tall grass community will regress to an early seral state (blue grama, prairie junegrass, sandberg bluegrass, hoods phlox, wooly plantain, and annual bromes).

Suggested stocking rates decrease from about 2.8 acres/AUM in the HCPC to about 10 acres/AUM in the early seral state (State #2). Plant succession in communities that are inhabited with prairie dogs is unlikely until the prairie dogs are controlled.

This site is usually grazed by livestock from May through October. Some ranchers utilize the Clayey 10-14" p.z. ecological site for fall and early winter grazing. However, storms are a threat. It is recommended that livestock either have access to adjacent wooded draws, or provide a good animal trail leading to headquarters for protection in winter and during storm events. Because of the predominant wheatgrass composition, the site is better-suited for cattle, rather than sheep grazing.

Wildlife Interpretations

The Clayey 10-14" p.z. ecological site that is in the reference state (State #1) provides forage for mule deer and antelope during most of the year. However, the overall forage potential is limited by the relatively low production and diversity of forbs and shrubs. Low shrub cover also limits the potential of the site for thermal and escape cover. Most deer use on the site occurs along the edges where it borders woody draws, badland range sites, etc.

The species diversity and cover associated with the HCPC and with other communities in State #1 provides habitat for sharp-tailed grouse and other upland birds. Much of the use occurs along the ecotones between the Clayey 10-14" p.z. site and wooded draws where deciduous tree and shrub cover increase. The relative absence of big sagebrush limits the potential of this site for sage grouse habitat. The few sage grouse that exist in the Glaciated Plains are usually associated with silver sagebrush.

Species diversity and litter also provide favorable habitats for deer mice, rabbits and other small mammals. Golden eagles, redtail and ferruginous hawks are often circling over the landscape searching for prey.

Sites that are characterized by communities in mid to early seral stages are less suitable for big game, upland birds and small mammals. However, they are more suitable for prairie dogs. Prairie dog towns also have potential for use by burrowing owls, upland plovers, and other wildlife species.

Hydrology Functions

Soils series in the Clayey 10-14" p.z. fall into the C and D hydrologic groups. Runoff potential varies from low to high, depending on slope, ground cover, and rangeland health. Infiltration rates also vary with environmental conditions.

Good hydrologic conditions exist on this site when it is in State #1. Canopy cover (grass, forbs and shrubs) is greater than 90% in these communities. Plant cover and litter are adequate to optimize infiltration and minimize runoff and erosion. Sites in early or low seral state (State #2) are generally considered to be in poor hydrologic condition.

Recreational Uses

Hunters are probably the most common recreational user of Clayey 10-14" p.z. ecological sites. The site is also used by hikers and photographers.

Wood Products

None.

Other Products

None.

Other Information

Supporting Information

Associated Sites

Site Name	Site ID	Site Narrative
Silty 10-14" p.z.	R052XN161MT	Similar landscape position; different species composition and soil texture.
Clayey-Steep 10-14" p.z.	R052XN164MT	Slopes >15%; less forage production; different species composition.
Overflow 10-14" p.z.	R052XN166MT	Receives additional run-in moisture from surrounding landscape; different species composition, higher productivity.

Shallow 10-14" p.z.	R052XN178MT	Soil depth less than or equal to 20 inches to a restrictive layer; less forage production.

Similar Sites

Site Name	Site ID	Site Narrative
Clayey 10-14" p.z.	R052XC205MT	Decrease in total annual production of bluebunch wheatgrass, but bluebunch is a co-dominant grass. Increase in other wheatgrasses and/or needlegrass.
Clayey 10-14" p.z.	R053AE061MT	Decrease in total annual production of bluebunch wheatgrass (it becomes an insignificant grass). Increase in other wheatgrasses and/or needlegrass.

State Correlation

This site has been correlated with the following states: Montana

Inventory Data References

Data Source	Number of Records	Sample Period	State	County
SCS-Range-417 ECS-1	3	(1991-1992)	MT	Phillips
Modified Double Sampling	19	2001-2004	MT	Blaine, Roosevelt, Sheridan, Phillips Valley

Type Locality

State: MT
County:
Township:
Range:
Section:
UTM: Datum: NAD__ _____E ____N
General Description:
Sensitivity: Yes___ No___

Relationship to Other Classifications:

Other References

Branson, Farrel A. 1985. Vegetation changes on western rangelands. Society for Range Management. Denver, Colo.

Briske, D. D., S. D. Fuhlendorf, and F. E. Smeins. 2005. State-and-transition models, thresholds, and rangeland health: a synthesis of ecological concepts and perspectives. Rangeland Ecol. Manage. 58:1-10.

Cooper, S.V., C. Jean and P. Hendricks. 2001. Biological survey of a prairie landscape in Montana's glaciated plains. Report to the Bureau of Land Management. Montana Natural Heritage Program, Helena.

Heitschmidt, R. K., K. D. Klement, and M. R. Haferkamp. 2005. Interactive effects of drought and grazing on Northern Great Plains rangelands. Rangeland Ecol. Manage. 58:11-19.

Romo, J. T., and Y. Bai. 2004. Seed bank and plant community composition, mixed prairie of Saskatchewan. J. Range Manage. 57:300-304.

USDI BLM USGS and USDA NRCS. 2000. Interpreting indicators of rangeland health. Tech. Ref. 1734-6.

Site Description Revision(s)

This 2005 revision replaces the following technical range site descriptions in Section II-E-8 of the NRCS Field Office Technical Guide:

Clayey 10-14" p.z. – Western Glaciated Plains (RRU 52XN), dated August 1981.

This 2005 revision incorporates the State and Transition Model theory, additional data on site productivity, and an improved understanding of many rangeland health indicators.

Site Description Approval

This ecological site description is approved with the understanding that it is no more than another step in our continual effort to update the NRCS ecological database. In order to facilitate the process, NRCS field personnel are encouraged to forward existing information and/or new data that can be used to improve the utility of this site description. Please forward the information and data to the State Rangeland Management Specialist.

Author	Date	Approval	Date
Dr. John Lacey	02/23/2005	Loretta J. Metz	03/19/2005

Maxine Rasmussen, Area RMS, Glasgow, MT
Jon Siddoway, Area RMS, Great Falls, MT
Rick Bandy, Area RSS, Great Falls, MT
Greg Snell, Area RSS, Glasgow, MT