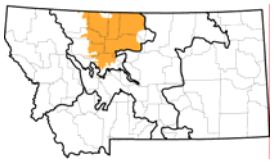
UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION



ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

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

Site ID: R052XN168MT

Major Land Resource Area: 52XN – Northern Glaciated Plains

Physiographic Features: This site occurs on slopes of rolling till plains**,** hills and hill slopes. Slopes are in excess of 15%. This site occurs on all exposures. Elevations normally range from 2000 to 3500 feet.

Land Forms: (1) till plain
(2) hill
(3)

	Minimum	Maximum
Elevation (feet):	1875	3800
Slope (percent):	15	60

Water Table Depth (inches):

Flooding:

Frequency: None
Duration: Non applicable

Ponding:

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

Runoff Class: Medium to very high

Aspect: No significant influence

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	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 glacial till. The surface layer of these soils vary from 0-3 inches in depth and typically have loam, silt loam, gravelly loam or silty clay loam texture. Underlying material, to a depth of 60 inches or more, has a clay loam texture. Permeability is moderate to moderately slow, and available water capacity is high. Effective rooting depth is >60 inches. Where this soil is under native vegetation, the average wetting depth is about 24 inches. Runoff is medium to very high rapid, and the hazard of water erosion is high. The hazard of soil blowing is also high. Soils are often calcareous. The following soil taxonomic units characterize this site: Zahill and Hillon. Soil ph normally ranges from 7.4 to 8.4.

Predominant Parent Materials:
Kind: till
Origin: glacial
Surface Texture: (1) loam
(2) silt loam
(3) clay loam
Surface Texture Modifier: (1) gravelly

Subsurface Texture Group: Loamy
Surface Fragments < = 3" (% cover): 0 to 35%
Surface Fragments >3" (% cover): 0-5%

Subsurface Fragments < = 3" (% Volume): 0-10%
Subsurface Fragments > 3" (% Volume): 0-5%
Drainage Class: Well
Permeability Class: Moderate

	Minimum	Maximum
Depth (inches):	20	>72
Electrical Conductivity (mmhos/cm):	0	4
Sodium Adsorption Ratio:	0	8
Calcium Carbonate Equivalent (percent):	0	15
Soil Reaction (1:1 Water):	7.4	8.4
Soil Reaction (0.1M CaC12):	---	---
Available Water Capacity (inches):	4	7

Plant Communities

Ecological Dynamics of the Site

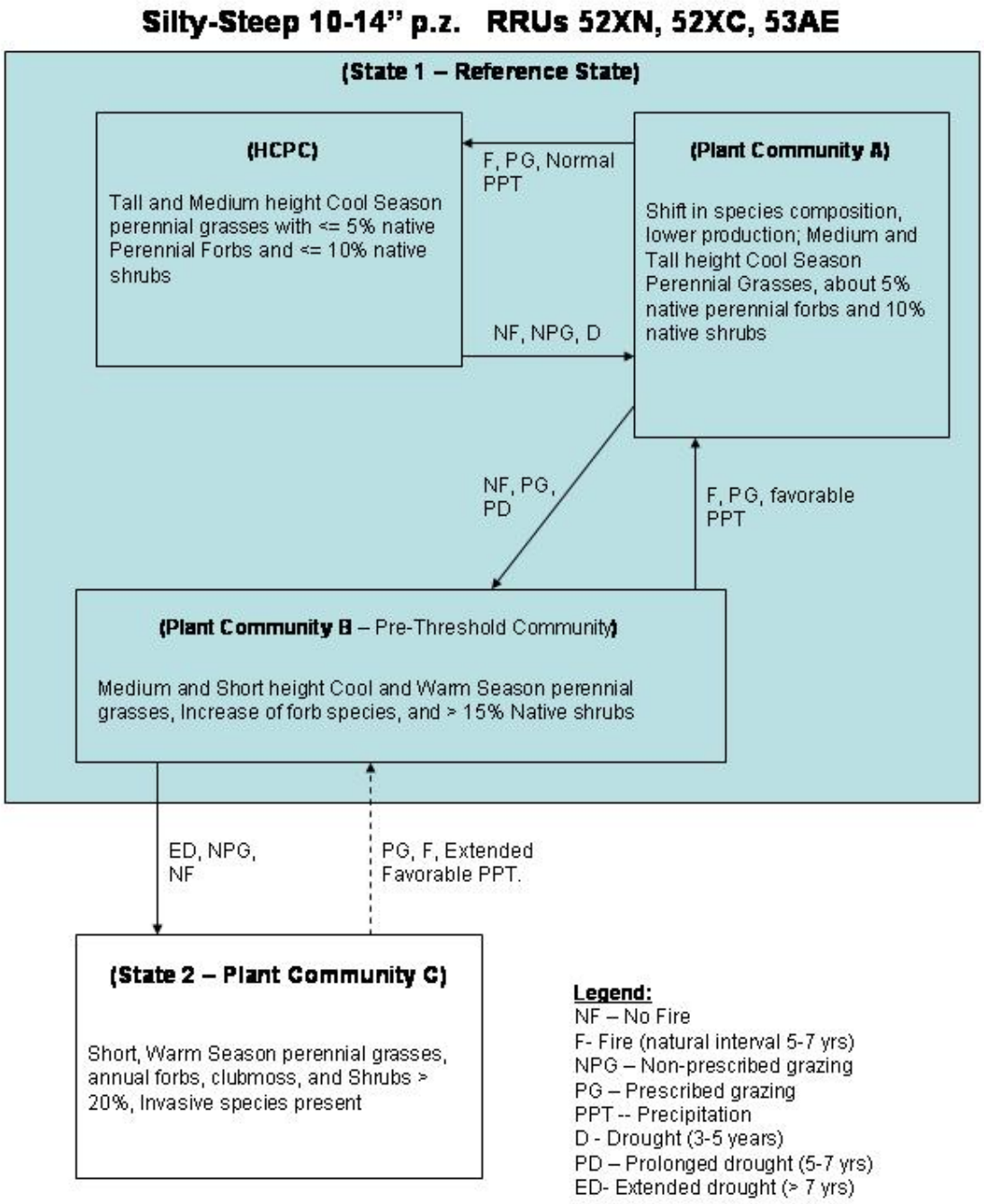
This ecological site developed under Northern Great Plains climatic conditions, the natural influence of herbivory and a fire frequency of 5-7 years (Frost 1998). Plant community interpretations are based on the Historic Climax Plant Community (HCPC).

Changes in the HCPC are brought about by frequency, timing and intensity of past grazing use, series of dry or wet years, or disturbances by fire, insect infestations, noxious weed colonization and recruitment, etc. As the HCPC regresses to lower seral stages, the deep-rooted perennial grasses are replaced by blue grama, sandberg bluegrass, fringed sagewort, hoods phlox, threadleaf sedge, hairy gold aster, and dense clubmoss. The dominance of these short grasses, warm season forbs and half-shrubs in the plant community disrupts ecological processes, impairs the biotic integrity of the site, and adversely affects resiliency. The system's ability to recover to higher seral states is restricted or impeded.

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 (Stringham et al. 2003). This ecological 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 may be triggered by climatic events, fire, grazing, farming, etc.

Three important plant communities and associated successional pathways for the Reference state (State #1), and the transitions across a threshold to State #2 are illustrated below for the Silty-Steep 10-14" p.z. site in the Glaciated Plains.



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, thickspike wheatgrass, porcupine grass and needleandthread grass) dominate the HCPC. These cool season grasses represent about 75% of the total annual plant production in the community. Bluebunch wheatgrass is the dominant bunchgrass on Silty-Steep sites in the northern Glaciated plains.

Less common species in the HCPC include short grasses and sedges (plains muhly, prairie junegrass, threadleaf sedge, plains reedgrass and blue grama). These short grasses and grasslike plants contribute about 10% of the annual production. Dotted gayfeather, scurfpeas, and prairie clovers are important warm season forbs. American vetch may be the most important cool season forb. In addition to being desirable forage, it also fixes nitrogen. Total forb production normally represents less than 5% of the total annual production.

Winterfat is a common warm season shrub that is highly prized as browse for livestock and wildlife. Rose and snowberry, two cool season shrubs often are present on the site. Silver sagebrush and fringed sagewort, two warm season shrubs may also be found on the site. Overall, shrubs account for about 10% of the annual plant production.

Annual production of the Historic Climax Plant Community (HCPC) on Silty-Steep 10-14" p.z. ecological sites in the Glaciated Plains is not fully documented by either range inventory data collected (in 2001 and 2004) on the Fort Peck or Fort Belknap Indian Reservations, or with soil-vegetation correlation data (NRCS-417 Forms) in Northeastern Montana. Inventory data indicates that Similarity indices (SI) of 55-75% were associated with annual production estimates of 925 lbs/ac. Thus, 1200 lb/ac is accepted as a reasonable average production estimate for the HCPC, as inventoried and reported in the August 1981 range site description. Average annual production is expected to increase and decrease, respectively on more mesic and xeric portions of the northern Glaciated plains.

The HCPC is well adapted to the Glaciated Plains. Precipitation is the most important factor influencing production (Heitschmidt et al 2005). The functional and structural diversity of plant species (annuals, perennials, cool and warm season grasses, forbs and shrubs) optimize the capture of solar energy and maximize subsequent plant growth through the efficient use of available soil water and nutrient cycling. When disturbances reduce the competitiveness of tall cool season grasses of the HCPC, warm season perennial forbs (hairy golden aster, scurfpea), annual forbs (wooly plantain, etc.) half-shrubs (fringed sagewort, etc.) and annual bromes often invade the community. The HCPC is resilient. With proper grazing management and non-drought conditions, the species characteristic of the HCPC will replace these lower successional species within a few years.

Litter is in contact with 50-60% of the soil surface. About 10% of the soil surface is bare ground (i.e., unprotected by litter, rock, moss, and plant canopy). Because of the slope, vegetation and soils, rills, water flow patterns, and some movement of litter are noticeable following a rainfall event.

(Insert HCPC Plant Community photo)

The major plant species composition and production by dry weight are shown for the HCPC in the following table. Total annual production has been derived from several sources, and has been adjusted to represent a typical annual precipitation cycle.

Historic Climax Plant Community Plant Species Composition:

GRASSES /GRASSLIKES

85% 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	720
Little bluestem	*Schizachyrium scoparium*				0	120
Western wheatgrass	*Pascopyrum smithii*	1	180	360	90	180
Thickspike wheatgrass	*Elymus macrourus*	1			90	180
Green needlegrass	*Nassella viridula*				90	180
Porcupine grass	*Hesperostipa spartea*				90	180
Needle and thread	*Hesperostipa comata*				120	240
Plains muhly	*Muhlenbergia cuspida*		*120 lbs/ac is max		90	180
Threadleaf sedge*	*Carex filifolia**		allowed for all		0	60
Sandberg bluegrass*	*Poa secunda**		species in this group;		0	60
Praire junegrass*	*Koeleria macrantha**		no more than 40		0	60
Blue grama*	*Bouteloua gracilis**		lbs/ac for any one		0	60
Plains reedgrass*	*Calamagrostis montanensis**		species.		0	60
Other native grasses*					0	60

FORBS

5% of Community			Group Allowable		Annual Production in	
Common Name	Scientific Name	Group	Pounds Per Acre		Pounds Per Acre	
			Low	High	Low	High
Dotted gayfeather	*Liatris punctata*				12	60
Purple prairie clover	*Dalea purpurea*	2	24	120	12	60
White prairie clover	*Dalea candida*	2			12	60
American vetch	*Vicia americana*				12	60
Missouri goldenrod*	*Solidago missouriensis**				0	60
Aster*	*Aster spp.**				0	60
Scarlet globemallow*	*Sphaeralcea coccinea**				0	60
Scurpea*	*Psoralidium spp.**				0	60
Hairy goldenaster*	*Heterotheca villosa**				0	60
Prairie coneflower*	*Ratibida columnifera**				0	60
Prairie thermopsis*	*Thermopsis rhombifolia**				0	60
Pussytoes*	*Antennaria spp.**		60 lbs/ac is		0	60
Bastard toadflax*	*Comandra umbellate**		maximum allowed		0	60
Milkvetch*	*Astragalus spp.**		for all forbs.		0	60
Penstemon*	*Penstemmon spp.**				0	60
Hoods phlox*	*Phlox hoodii**				0	60
Eriogonum*	*Eriogonum spp.**				0	60
Dense clubmoss	*Selaginella densa*				0	T
Pricklypear cactus	*Opuntia polyacantha*				0	T
Other native forbs*					0	60

*No more than 10 lbs/ac for any one species in this

SHRUBS AND HALF-SHRUBS						
10% of Community			Group Allowable		Annual Production in Pounds Per Acre	
Common Name	Scientific Name	Group	Low	High	Low	High
Winterfat	*Krascheninnikovia lanata*				15	60
Snowberry*	*Symphoricarpos spp.**				0	60
Rose*	*Rosa spp.**				0	60
Rubber rabbitbrush*	*Ericameria nauseosa**				0	60
Silver sagebrush*	*Artemisia cana**				0	60
Fringed sagewort*	*Artemisia frigida**				0	60
Creeping juniper*	*Juniperus horizontalis**				0	60
Broom snakeweed*	*Gutierrezia sarothrae**				0	T
Plains pricklypear*	*Opuntia polyacanta**				0	T
Other native shrubs*					0	60
			120 lbs/ac is the max allowed for all shrubs.		*No more than 30 lbs/ac for any one species in this group.	

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	1-5	5-10	0								

Ground Cover (%)

Vegetative Cover						Non-Vegetative Cover					
Grass/ Grasslike	Forb	Shrub/ Vine	Tree	Non-Vascular Plants	Biological Crust	Litter	Surface Fragments >1/4 & <= 3"	Surface Fragments > 3"	Bedrock	Water	Bare Ground
				0-5	0-2	55	0-3	0-2	0	T	10

Structure of Canopy Cover (%)

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

Annual Production by Plant Type:

Plant	Annual Production (lbs/AC)		
Type	Low	RV*	High
Grasses /Grasslike	725	1020	1230

Forb	40	60	70
Shrub/Vine	85	120	150
Tree			
Total	850	1200	1450

*RV means "representative value".

***Successional pathway from HCPC to Community A (State #1):**
Successional pathways from the HCPC are influenced by frequency, timing and intensity of grazing, precipitation patterns, fire, insect infestations, noxious weed colonization and recruitment, etc. As communities regress from HCPC, medium and short grasses increase at the expense of mid and tall cool season grasses. The medium and short grasses consist of cool (prairie junegrass, upland sedges, and sandberg bluegrass) and warm season grasses (blue grama and plains reedgrass) and grasslike plants.

Plant Community A (State #1):

Total plant production averages about 1,000 lbs/ac in this Plant Community, or about 80% of the production in the HCPC. The decrease in production results from a shift in species composition. Needleandthread grass, threadleaf sedge, blue grama and plains reedgrasss increased at the expense of the tall, more palatable grasses (bluebunch wheatgrass, green needlegrass, and western/thickspike wheatgrasses). In comparison to the HCPC, production of blue grama, prairie junegrass, plains reedgrass, threadleaf sedge and other short grasses increased. They now account for about 20% of the total annual production. Exact response by these species varies with the kind of disturbance (drought, grazing, etc.) and with precipitation (amount and timing).

Total production of native forbs remains at about 5% of annual production of the site. However, the palatable species (prairie clovers, American vetch and dotted gayfeather) decrease in abundance (relative to the HCPC). The open niches allow hairy goldenaster, bastard toadflax, prairie thermopsis, etc. to become more abundant. Shrubs continue to account for about 10% of the total production. However, species such as fringed sagewort and silver sagebrush increase (relative to the HCPC). Similarity index values from 55-75% are associated with this community. In contrast to the HCPC, range conservationists have moderate concerns regarding lower successional plants, lower infiltration rates and potentially higher runoff rates, plant functional/structural group shifts, and decreasing amount of litter.

(Insert Plant Community A photo)

***Successional Pathway from Community A to HCPC:**
Plant Community A is resilient. Successional processes can readily return Plant Community A to the HCPC during normal precipitation cycles. Succession is facilitated by prescribed grazing, the incorporation of the natural fire regime into the system, etc.

***Successional Pathway from Community A to Community B:**
Plant community A is resistant. However, prolonged drought, non-prescribed grazing, and the removal of fire from the system will result in retrogression to Community B. The causative factors of regression are usually apparent with careful observation.

Plant Community B (State #1):

Plant Community B is dominated by needleandthread grass, blue grama, plains reedgrass, prairie junegrass and upland sedges. However, individual plants of bluebunch wheatgrass, green needlegrass, and western/thickspike wheatgrass remain in the Community. The short grass and grass-like plants make up about 30% of the total production. Total vegetative production declines to about 800 lbs/ac in a normal year.

Hairy goldenaster, scarlet globemallow, scurfpeas and other warm season forbs increase at the expense of the prairie clovers and American vetch. Forbs account for about 10% total annual production. Fringed sagewort, a half-shrub increases at the expense of winterfat. Silver sagebrush and rose also increase on some sites. Shrubs account for about 15% of the total plant production. SI values for this community vary from 35-55%.

Litter provides cover for about 30% of the ground, while bare ground increases to about 25%. Rills, water flow patterns and litter movement are evident on the site.

The tall cool season grasses have poor vigor, with little seed production. Most of the seedlings and young plants appear to represent short grasses and warm season forbs. Lower successional plant species and some invasive species are a significant part of the community. Japanese brome and cheatgrass are usually present wherever rodents or other disturbances create an open niche.

Plant Community B is fairly resilient, but it is not highly resistant to disturbance. It is the "pre-threshold" community. Therefore, it is critical that this community be recognized and strategies implemented to prevent further regression. Community B can readily regress to a lower state, from which succession back to the HCPC community or Plant Community A would be restricted.

(Insert Plant Community B photo)

***Successional Pathway from Community B to Higher Communities:**
Favorable precipitation and prescribed grazing are normally required for succession to higher successional communities (Community A or HCPC). Management strategies should focus on grazing deferment to increase vigor and seed production of desirable plants, and to increase litter cover. Increasing litter is extremely critical because of the steep slopes.

***Transition from Community B to State #2:**
Plant Community B will regress to a lower state with any combination of extended drought, non-prescribed grazing and unfavorable climatic patterns. This transition from Community B to State #2 represents a threshold, or a point in space and time at which one or more of the primary ecological processes responsible for maintaining the sustained equilibrium of the state degrades beyond the point of self-repair.

Plant Community C (State #2):

State #2 is dominated by blue grama, prairie junegrass, sandberg bluegrass, prairie sandreed, other short grasses, and clubmoss. However, a few individual western wheatgrass, bluebunch wheatgrass, etc. plants seem to persist longer than they do on surrounding ecological sites. The ability of these palatable plants to persist on the Silty-Steep 10-14" p.z site is probably a reflection of lighter grazing use. Cattle prefer grazing areas with less than 15% slope, and those areas adjacent to livestock water developments. Red threeawn, Japanese brome and cheatgrass often invade this Community.

Wooly plantain, hoods phlox, hairy goldenaster and bastard toadflax are common forbs. Fringed sagewort usually increases. Silver sagebrush and rose may also increase. The most palatable shrubs are nearly absent. SI values of less than 25% are associated with State #2.

Surface runoff and soil erosion are a serious concern on the Silty-Steep 10-14" p.z. site. The decrease in plant cover and litter increases the susceptibility to erosion. Less vegetative growth is available for transfer to litter, and nutrient cycling is delayed or impeded. As bare ground increases, infiltration decreases and/or surface runoff and soil evaporation increases. Because ecological processes of the site are no longer balanced and sustained, shallow rooted, warm season species continue to gain a competitive advantage over the deep rooted, cool season species. The biotic integrity of the site is degraded.

In comparison to the State #1 communities, State #2 is less efficient in capturing solar energy and converting it to carbohydrates for plant growth. Total vegetative production averages about 400 lbs/ac. The absence of tall and mid cool season perennial grasses, plus the shift from cool season plants to warm season plants, indicates that the structural and functional processes of this site have been disrupted. However, if the soil surface is stable and does not erode, site potential may not be significantly impaired.

(Insert Plant Community C photo)

***Transition from State #2 to State #1:**
Plant community succession across a threshold to a higher state is ecologically difficult in most ecosystems. A significant input of energy is often required for succession to occur. In instances of prolonged favorable climatic conditions combined with proper management, the significant input of energy that is normally required to move this site across the threshold (from State #2 to State #1) may not be needed.

Because of the steep slopes, mechanical treatments and range seeding are not recommended. Ranchers should be aware of the limitations of this site. Rather than trying to change nature, managers must learn to live within the

environmental boundaries of this site. Prescribed grazing management should be a requirement for this site.

Ecological Site Interpretations

Animal Community

Livestock Management

This site evolved with trampling, defoliation (ungulates, grasshoppers and jackrabbits, and other herbivores), fire and drought. Its plant communities are moderately resistant to disturbances which may alter ecological processes. They are also moderately resilient. Following perturbations such as drought, which allows blue grama and other increasers to increase at the expense of the mid and tall grasses, succession occurs with subsequent rainfall. Thus, the HCPC, or Communities A and B may be present at any given time in State #1. During "average" years, the site has the potential to produce 1200 lbs of forage per acre.

Forage production shows far greater variations in response to changes in annual precipitation than to different grazing intensities (Heitschmidt et al 2005) However, proper stocking rates and prescribed grazing is 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 a blue grama, prairie junegrass, dense clubmoss community. In comparison to the high seral state, suggested stocking rates on sites in the early seral state represent a 4-fold reduction. Experience indicates that prescribed grazing prevents further deterioration in State #2. Furthermore, significant plant succession may occur within a reasonable time frame. Very few livestock losses are reported from poisonous plants.

Similarity index values of 35-55% characterized most of the Silty-Steep 10-14" p.z. sites inventoried on the Fort Peck and Fort Belknap Reservations in 2001-2004. SI values of less than 25% were not encountered. In contrast, SI's of less than 25% were frequently associated with adjacent Silty 10-14" p.z. sites. Similar observations occur on other ranches in the Glaciated Plains. In contrast to adjacent Silty 10-14" p.z. site (often near water) where very few highly palatable cool season grasses remain because of repeated, frequent grazing events, a fairly diverse mix of desirable, cool season plants often grow on the Silty-Steep 10-14" p.z. site. The higher range health rating of this site probably results from less livestock grazing. Utilization of plants growing on slopes and on sites more distant from water developments is normally less than it is for plants growing on lower, more gently sloping terrain that is situated near watering facilities.

This site is suitable for livestock grazing from May through October. The grass-dominant plant community is better suited for cattle, rather than sheep grazing. However, sheep are better adapted to grazing the steep slopes, especially if watering facilities are relatively distant. Therefore, a mix of cattle and sheep usage often merits consideration.

Wildlife Interpretations

State #1 of the Silty-Steep 10-14" p.z. ecological site includes the HCPC and two additional communities. This state provides forage for mule deer 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 occurs along the edges of the site where it borders deciduous wooded draws, badland sites, etc.

Species diversity and cover associated with the HCPC or other communities in the Reference State also provide habitat for sharp-tailed grouse and other upland birds. Most wildlife usage occurs along the "ecotones" between the Silty-Steep 10-14" p.z. site and wooded draws. 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 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.

Communities that are in State #2 are much less suitable for big game, upland birds and most species of small mammals. Prairie dogs usually are not a problem on Silty-Steep 10-14" p.z. sites because slopes are greater than 15%. Prairie dogs prefer slopes of 1-10%.

Plant Preferences by Animal Kind

Refer to NRCS Field Office Technical Guide, Section IIE, General Information, for tables displaying plant preferences by livestock and wildlife.

Hydrology Functions

Soils associated with this ecological site are in Hydrologic Soil Groups B and C. Infiltration rates are generally moderate. The runoff potential is medium to very high, varying with slope and ground cover.

Good hydrologic conditions exist on Silty-Steep 10-14" p.z. sites that are either in a high seral state or at the HCPC (State #1). Canopy cover (grass, forbs and shrubs) is greater than 90% in these communities, which is conducive to high infiltration rates and minimizes runoff and erosion.

Communities in early seral states (State #2) are generally considered to be in poor hydrologic condition. Concerns are valid. The excessive amount of bare ground results from inadequate plant cover and litter. Therefore, infiltration decreases and surface runoff increases. The desirable tall and mid-grasses are unable to effectively utilize available moisture. Water and wind erosion are major concerns on Silty-Steep 10-14" p.z. sites. Prescribed grazing management is needed to restore vigor of the higher-successional plants and to replenish or maintain about 50% litter to protect the soil resource.

Recreational Uses

Hunters are probably the most common recreational user this ecological sites. The site is also used by hikers and photographers. Many of these sites show

symptoms of exuberant off-road ATV use. ATV use should be discouraged on these sites.

Wood Products

This site has no significant value for wood products.

Other Products

Other Information

The Silty-Steep 10-14" p.z. ecological site in the northern Glaciated Plains is resistant to perturbations. However, the site loses its resiliency when the plant community regresses from State #1 to State #2. Reproductive capability of the higher successional plants and annual production declines as the site moves toward the threshold separating State #1 from State #2. Annual production in early seral states is less than 1/4 of the potential at HCPC. Thus, litter and the number of structural/functional groups are adversely affected.

Supporting Information

Associated Sites The following sites may be found in association with the Silty-Steep 10-14" p.z. ecological site. The Site ID indicates in which Rangeland Resource Unit (RRU) these sites occur. For example, Site ID R052XN163MT occurs in RRU 52XN.

Site Name	Site ID	Site Narrative
Sandy 10-14" p.z.	R052XN163MT	Is not located on steep slopes, different species composition and soil texture.
Silty 10-14" p.z.	R052XN161MT	Slopes <15%; more 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
Silty-Steep 10-14" p.z.	R052XC203MT	Less bluebunch wheatgrass, and little bluestem is still present in HCPC.

Silty-Steep 10-14" p.z.	R053AE058MT	Little bluestem more persistent in HCPC. Still have bluebunch wheatgrass, but not as prevalent.
Clayey-Steep 10-14" p.z.	R052XN164MT	Similar landscape position; different species composition and soil texture.

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	2 (#513, #514)	1991--1992	MT	Phillips
ECS-1				
Modified Double Sampling	18	2001-2004	MT	Blaine, Roosevelt, Sheridan, Phillips, Valley

USDA-SCS-MT. 1981. Technical Range Site Description

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, F. A., and R. F. Miller. 1981. Effects of increased precipitation and grazing management on Northeastern Montana rangelands. J. Range Manage. 34: 3-10.

Dyksterhuis, E. J. 1949. Condition and management of rangeland based on quantitative ecology. J. Range Manage.2:104-115.

Frost, Cecil C. 1998. Presettlement fire frequency regimes of the United States: a first approximation. Pages 70-81 in Teresa L. Pruden and Leonard A. Brennan (eds.). Fire in ecosystem management: shifting the paradigm from suppression to prescription. Tall Timbers Fire Ecology Conference Proceedings, No. 20. Tall Timbers Research Station, Tallahassee, Fl.

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.

Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2003. State and transition modeling: an ecological process approach. J. Range Manage. 56:106-113.

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

Site Description Revisions

The 2005 Silty-Steep 10-14" p.z. ecological site description replaces earlier dated versions of Silty-Steep 10-14" p.z., Thin Silty 10-14" p.z. and Thin Hilly 10-14" p.z. descriptions in Rangeland Resource Unit 52XN. This 2005 revision incorporates the State and Transition Model theory, additional data on site productivity, and an improved understanding of many rangeland health indicators.

The USDA-SCS-MT Technical Range Site Description (August 1981), which this site description partially replaces, reports that total annual production averages about 1200 lbs/ac on the Thin Hilly 10-14" p.z. ecological site. Production varies from 850 lbs/ac in an unfavorable year to 1450 lbs in a favorable year. The Thin Hilly site was based on the concept that slope was the key factor characterizing the site, soil texture and other factors were considered less important. Because the earlier approach did not provide the site specific information required for management of some landscapes, the current effort of separating the Thin Hilly site into Silty-Steep 10-14" p.z., Clayey-Steep 10-14" p.z., and Sandy-Steep 10-14" p.z. ecological sites is justified.

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 technical guide. 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.

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