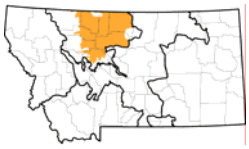
UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION



ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

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

Site ID: R052XN169MT

Major Land Resource Areas: 52XN – Northern Glaciated Plains

Physiographic Features: This site usually occurs on terraces and floodplain steppes, near springs or seeps, or other areas having a seasonal water table close enough to the surface to influence plant composition and production. These areas are rarely flooded or non-flooded. "Rare" indicates there is a 0- 5% chance of flooding in any year. The site has a seasonal water table at 24" – 42". Slopes vary from 0-2% and occur on all exposures. Elevations generally range from 2,000 to 3,100 feet.

Land Forms:
(1) terrace
(2) hillslope (near springs)
(3) floodplain

	Minimum	Maximum
Elevation (feet):	1875	3500
Slope (percent):	0	2
Water Table Depth (inches):	24	42

Flooding:

Frequency:	None to rare
Duration:	None to brief

Ponding:

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

Runoff Class: Negligible to low

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

Soils are deep to very deep with a seasonal water table within about three feet of the surface. These soils are non-hydric. Soils are somewhat poorly drained, and more than 72 inches deep. Permeability varies from moderately slow to slow. The surface layer of these soils vary from 3-12 inches in depth and are typically a loam, silt loam, clay loam, or sandy loam. Textures of underlying layers also vary since these are alluvial soils, having been deposited by flowing water. Soil ph varies from 6.6-8.4. The following soil components characterize this site: Bearlake, Gallatin and Novary.

Predominant Parent Materials:
Kind: alluvium
Origin: mixed
Surface Texture: (1) loam
(2) sandy loam
(3) clay loam
Surface Texture Modifier: (1) None

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

Drainage Class: somewhat poorly
Permeability Class: moderately slow to very slow

	Minimum	Maximum
Depth (inches):	40	> 72
Electrical Conductivity (mmhos/cm):	0	2
Sodium Adsorption Ratio:	0	8
Calcium Carbonate Equivalent (percent):	0	10
Soil Reaction (1:1 Water):	6.6	8.4
Soil Reaction (0.1M CaC12):	---	---
Available Water Capacity (inches):	5	7

Plant Communities

Ecological Dynamics of the Site

This ecological site developed under Northern Great Plains climatic conditions. At the time that North America was settled by Europeans, the Glaciated Plains was the home of nomadic tribes and large numbers of bison, prairie dogs, elk, pronghorn, bighorn sheep and deer. These herbivores have been present on the plains since the retreat of the Pleistocene glaciers and greatly influenced the mixed grass prairie ecosystem. Much of the landscape burned at intervals of 5-7 years, either as a result of lightning or environmental manipulations by the Native Americans (Frost 1998).

Plant community interpretations are based on the Historic Climax Plant Community (HCPC). The HCPC is the plant community that is best adapted to the unique combination of factors associated with this ecological site. It was in a natural dynamic equilibrium with the historic biotic, abiotic, and climatic factors at the time of European immigration and settlement. This site is highly resilient to disturbance.

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, prairie dogs, noxious weed invasions, etc. Continual adverse impacts to the site over a period of years results in a departure from the HCPC. As the HCPC regresses to lower seral stages, the deep-rooted perennial grasses are replaced by the introduced bluegrasses (Kentucky and Canada) and lower successional species (Baltic rush, sedges, foxtail barley, curlydock, and annual forbs). The dominance of these short grasses, low successional warm season forbs and half-shrubs, and invasive species 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.

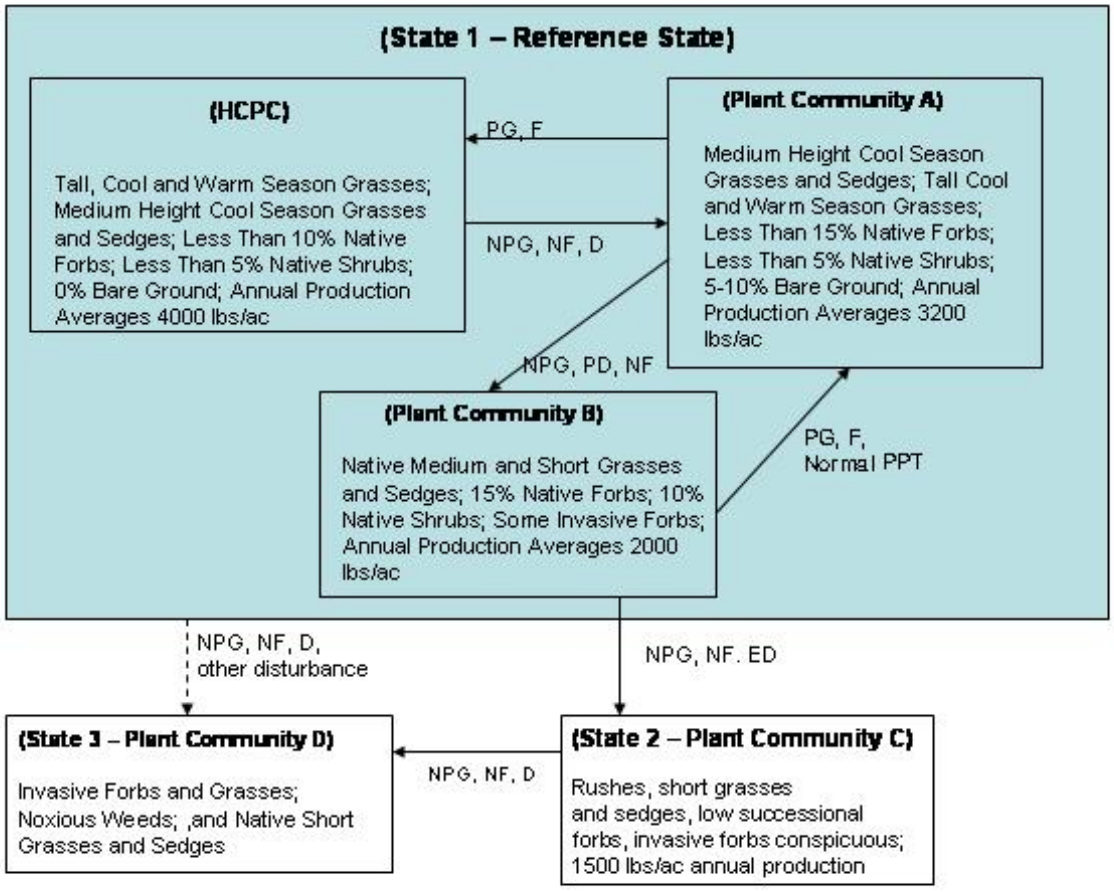
State and Transition Diagram

Traditional theories of plant succession leading to a single climax community are inadequate for understanding the complex successional pathways of Subirrigated 10-14" p.z. ecological sites in the northern Glaciated Plains. The 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 (Stringham 2003). 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 associated successional pathways for the Reference state (State #1) are illustrated below for the Subirrigated 10-14" p.z. ecological site in the Glaciated Plains. The diagram also depicts a transition from Plant Community B to State 2 (Community C) and a possible transition from the Reference State to State 3 (Community D).

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



Legend:
NF- No Fire
F – Fire (natural interval 5-7 years)
NPG – Non-Prescribed Grazing
PG – Prescribed Grazing
PPT -- Precipitation
D – Drought
PD – Prolonged Drought (5-7 years)
ED – Extended Drought (> 7 years)

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 prairie cordgrass, western wheatgrass, slender wheatgrass, bearded wheatgrass, mat muhly, tall reedgrasses, and tufted hairgrass) dominate the HCPC. These grasses represent about 80% of the total annual plant production in the community. Short grasses, sedges and rushes make up another 5% of the total annual production.

Dotted blazing-star, meadow hawksbeard, lance-leaf goldenweed, goldenrods, maximilian sunflower, cinquefoil, and blue-eyed grass are important forbs. Total forb production normally represents less than 10% of the total annual production.

Buffaloberry, willows, chokecherry, snowberry, shrubby cinquefoil, and rose are important shrubs. Overall, shrubs account for about 10% of the annual plant production.

Historic NRCS data indicate that total annual production on this site varies from 5000 lbs/ac in favorable years to 3500 lbs/ac in unfavorable years. Annual production averages 4000 lbs/ac. Average annual production is expected to be slightly higher or lower, respectively on more mesic and xeric portions of the northern Glaciated Plains.

This plant community is well adapted to the climatic conditions of the glaciated plains and to the presence of a permanent water table. The diversity of plant species helps make the site resistant to environmental changes. The functional and structural diversity of plant species (perennials, cool and warm season grasses, sedges, 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. Continued adverse disturbances reduce the competitiveness of perennial plants, and precipitate the replacement of high successional species with lower successional grasses, forbs, shrubs, and annual species. With proper grazing management and a "natural" fire regime, more species found at HCPC will replace these lower successional species within a few years.

Litter is in contact with 55% of the soil surface. Plant litter remains in place and is not moved by erosional forces. Less than 1% 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.

(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 moisture cycle.

Historic Climax Plant Community Plant Species Composition:

GRASSES /GRASSLIKES		
80% of Community	Group Allowable	Annual Production in

Common Name	Scientific Name	Group	Pounds Per Acre		Pounds Per Acre	
			Low	High	Low	High
Prairie cordgrass	*Spartina pectinata*				400	1200
Western wheatgrass	*Pascopyrum smithii*				400	800
Slender wheatgrass	*Elymus trachycaulus*				200	600
Tufted hairgrass	*Deschampsia cespitosa*				600	1200
Narrow-spiked reedgrass	*Calamagrostis stricta*				200	600
Mat muhly	*Muhlenbergia richardsonis*				0	400
Ticklegrass	*Agrostis scabra*				0	400
Sedge	*Carex spp.*				200	400
Other native grasses					200	400
Baltic rush	*Scirpus, spp.*				200	400

FORBS

10% of Community

Common Name	Scientific Name	Group	Group Allowable Pounds Per Acre		Annual Production in Pounds Per Acre	
			Low	High	Low	High
Dotted blazing-star	*Liatris ligustistylis*				40	200
Maximilian sunflower	*Helianthus maximilian*				40	200
Lance-leaf goldenweed	*Haplopappus lanceolatus*		400 lbs/ac is		0	200
Meadow hawksbeard	*Crepis runcinata*		maximum allowed		0	200
Prairie thermopsis	*Thermopsis rhombifolia*		for all forbs.		0	200
Arrowgrass	*Triglochin spp.*				0	200
Other native forbs					0	200
	.				No more than 150 lbs/ac for any one species.	

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
Chokecherry	*Prunus virginiana*				40	200
Willow	*Salix spp.*				40	200
Shrubby cinquefoil	*Dasiphora floribunda*				0	200
Snowberry	*Symphoricarpos spp.*		200 lbs/ac is the max		0	200
Rose	*Rosa spp.*		allowed for all shrubs;		0	200
Buffaloberry	*Shepherdia spp.*		No more than 100		0	200
Other native shrubs			lbs/ac for any one species.		0	200

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								
35	5-10	1-5	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	50-55	0-T	0-T	0	T	0

Structure of Canopy Cover (%)

	Grass/Grasslike	Forb	Shrub/Vine	Tree
<= 0.5 feet	10	10	5	0
>0.5 - <=1 feet	10	30	25	0
>1 - <=2 feet	40	40	30	0
>2 - <=4.5 feet	35	20	30	0
>4.5 - <=13 feet	5	0	10	0

Annual Production by Plant Type:

Plant Type	Annual Production (lbs/AC) Low	RV*	High
Grasses /Grasslike	2975	3400	4250
Forb	350	400	500
Shrub/Vine	175	200	250
Total	3500	4000	5000

*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 invasions, etc. As communities regress from HCPC, medium and short grasses increase at the expense of mid and tall, cool season grasses. Total annual production decreases.

Plant Community A (State #1):

Total plant production averages about 3200 lbs/ac in this Plant Community. Annual production of the tall, more palatable grasses (tufted hairgrass, prairie cordgrass and narrow-spiked reedgrass) declines by about 20%. In response, western wheatgrass, mat muhly, and lower successional sedges have increased. Exact response by these lower successional species varies with the kind and intensity of disturbance (drought, grazing, etc.) and with precipitation (amount and timing).

Production of native forbs increases relative to the HCPC and now accounts for more than 10% of the total production. Dotted blazing-star and Maximilian sunflower decrease in abundance while meadow hawksbeard, prairie thermopsis, and cinquefoil increase.

Shrubs account for about 5% of the total annual production. Species such as snowberry, rose and shrubby cinquefoil increase at the expense of chokecherry and willows. Litter cover decreases to 50% and bare ground increases to about 5%. In contrast to the HCPC, range conservationists have slight to moderate

concerns regarding lower infiltration rates and potentially higher runoff rates, plant functional/structural group shifts, and decreasing amount of litter. There shouldn't be any, or only a trace of invasive plants present.

The tall cool season grasses have poor vigor, with reduced seed production. Most of the seedlings and young plants appear to represent short grasses and warm season forbs.

***Successional Pathway from Community A to HCPC:**
Plant Community A is highly resistant to disturbance. It is also resilient. With prescribed grazing, the high successional species are able to replace the lower-successional species and also expand into the bare areas.

***Successional Pathway from Community A to Community B:**
Non-prescribed grazing, prolonged or extended drought, and the prolonged elimination of the natural fire regime from the system results in regression to Plant Community B. The effects of poor grazing management are readily apparent with careful observation. However, the influence of fire is more difficult to verify. It is believed that these sites burned naturally at 5 – 7 year intervals (Frost 1998). Without fire and/or grazing, litter accumulation becomes excessive and adversely impacts plant vigor, seedling establishment, and nutrient cycling.

Plant Community B (State #1):

Mid and short grasses and grasslike plants dominate this Community. A few western wheatgrass, tufted hairgrass plants persist with reduced vigor in the community. Mat muhly, sedges and Baltic rush are common species. Grasses and grass-like plants contribute 75% of total annual production. Arrowgrass, white-prairie aster, cudweed sagewort, cinquefoil, prairie thermopsis, and other native low successional forbs make up about 15% of the total annual production. Dandelions, salsify, Canada thistle, and other invasive forbs may be present in this community. Total vegetative production declines to about 2000 lbs/ac in a normal year.

Litter provides cover for about 40% of the ground, while bare ground increases to about 10%. Rills, water flow patterns and litter movement are evident on the site.

(Insert Plant Community B photo)

***Succession and Regression from Plant Community B:**
Plant Community B should be recognized as the pre-threshold community. It is generally resilient but it is not highly resistant to stress. Under prescribed grazing this Community can return to Community A through succession. However, it will regress under the influence of NPG to lower successional Plant Community C (State #2). Regression also occurs to Community D (State #3). However, it is theorized that the pathways for this transition originate from within the Reference State, and not necessarily from Community B.

Plant Community C (State #2):

Baltic rush, western wheatgrass, clustered field sedge, ticklegrass, mat muhly, Kentucky bluegrass, meadow barley and other short grasses and grass-like plants dominate this Community. HCPC dominant species such as prairie cordgrass and tufted hairgrass may persist as individual plants. Normally there is minimal regeneration of these species.

Wooly plantain, cudweed sagewort, arrowgrass, cinquefoil, dandelion, and western yarrow are common forbs. These low successional forbs contribute about 20% of the annual production. In comparison to the HCPC, fringed sagewort, snowberry and rose tend to increase and may contribute about 10% of the total annual production.

Soil erosion is not a serious problem because of the cover provided by the short native grasses and the rhizomatous grasses. However, the loss of the tall cool season bunchgrasses, results in a simplification of the compositional and structural plant communities. The hydrologic cycle (capture, storage and redistribution of precipitation), energy flow, and nutrient cycles are believed to be adversely impacted. Total vegetative production averages about 1500 lbs/ac.

In contrast to the HCPC, range conservationists express moderate concerns about plant community composition, functional/structural groups, litter, annual production, and invasive plants. Each of the primary processes: 1) hydrology (the capture, storage and redistribution of precipitation), 2) energy capture (conversion of sunlight to plant and animal matter), and 3) nutrient cycling (the cycle of nutrients through the physical and biotic components of the environment) has been degraded beyond the point of self-repair within a reasonable length of time. For example, when tall, high producing, cool season grasses are replaced by short grasses (Kentucky bluegrass, mat muhly and Baltic rush), the abilities of the plant community to maximize the conversion of solar energy to plant biomass and efficiently utilize available precipitation are impaired. Less solar energy is captured and converted to carbohydrates for plant growth. Plant growth declines, and there are less plant canopy and less litter to protect the soil. 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. Thus, the transitions from Plant Community B in State #1 to either Communities C (State #2) or D (State #3) represent thresholds. Thresholds are defined as 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.

(Insert Plant Community C photo)

***Transition from Plant Community C to Community B:**

Succession from Community C to Community B is not likely without significant input of energy into the system. Many of the rhizomatous species are resistant to fire and grazing. Therefore, it is not logical for nutrient cycling and other ecological processes to be restored after a single fire or immediately following the implementation of prescribed grazing.

***Successional Pathways from Community C to Community D:**
Plant community C is not a precise assemblage of species that remain constant from place to place or from year to year. Variability is apparent in productivity and occurrence of individual species. Changes in climate, fire patterns and frequency, and grazing all play a role in determining which plant species express dominance.

Plant community C can regress into Community D with non-prescribed grazing and/or the absence of a natural fire regime.

Plant Community D (State #3):

This plant community is dominated by invasive forbs, Kentucky and Canada bluegrasses, and noxious weeds. Some native short grasses and sedges remain in the Community.

***Transition from Plant Community D to Community C:**
The noxious weeds and introduced rhizomatous grasses are competitive. Succession to Plant Community C is not likely to occur without a pro-active management of a significant input of energy into the natural system. Practical experience indicates that Garrison Creeping Foxtail (GCF) can be introduced into this community by feeding livestock GCF on the site, or by scattering seed and allowing livestock to trample it into the soil. Within a few years, the GCF often dominates the community. The seasonal water table and extensive below ground biomass that characterizes this restricts the use of conventional tillage. Research suggests that desirable species can be seeded into the site with a no-till drill following the application of Roundup^{R} to control undesirable plants. In most situations, these agronomic approaches are usually economically and ecologically prohibitive.

Ecological Site Interpretations

Animal Community

Livestock Management

This site evolved with trampling, defoliation (ungulates, grasshoppers and jackrabbits, and other herbivores), fire and drought. In comparison to upland ecological sites, water is relatively more accessible to grazing animals on this site. Therefore, it is theorized that this site evolved with more animal impact than did the normal upland ecological sites. This site has the potential to produce an

abundance of high quality forage. Total annual production varies from 3500 – 5000 lbs/ac.

The Subirrigated 10-14" p.z. site is normally highly resistant to disturbances which may alter its ecological processes. However, grazing early in the season when the upper part of the soil is wet can cause compaction and hummocks. Proper stocking rates, along with adequate recovery periods following grazing events, are needed to ensure that this site remains in a high seral or HCPC state. Following perturbations such as drought or poor grazing management, which allows mat muhly and other low successional species to increase at the expense of the mid and tall grasses, succession occurs with subsequent rainfall and prescribed grazing.

Forage production is greatly reduced in Plant communities C and D. Once these communities occupy this site, the presence of non-native grasses and undesirable plants significantly impede succession. Species such as Kentucky bluegrass, leafy spurge and Canada thistle are difficult to remove from the site.

Arrowgrass, death camas, and horsetail are poisonous plants that often occur on this site. However, livestock losses are unusual unless the range is overstocked and livestock are forced to consume the poisonous plants.

This site is suitable for livestock grazing from May through October. Because of topographic position, proximity to water, and species composition (grasses comprise about 85% of the production) the site is better-suited for cattle, rather than sheep grazing.

Wildlife Interpretations

The Subirrigated 10-14" p.z. ecological site has high biodiversity in the northern Glaciated Plains. High forage yields and the diversity of shrubs, grasses and forbs provide food and cover for resident and migratory wildlife species. The narrow irregular, meandering drainage patterns serve as a corridor allowing big game and other species to move between upland habitats.

State #1 supports the highest abundance of insects, invertebrates, amphibians, reptiles, upland game birds and small mammals. It also provides forage for mule deer and antelope during most of the year.

States #2 and #3 are much less suitable for big game, upland birds and most species of small mammals. The simplification of the plant community reduces the number of wildlife habitat niches. Because of less plant growth and litter, soil surface temperatures rise and soil moisture decreases. As the site becomes more xeric the insect and invertebrate population becomes less diverse, and there are less cover and food resources for upland birds, and mammals.

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 negligible to low, varying with landscape and ground cover.

Good hydrologic conditions exist on overflow sites that are either in a high seral state or are at HCPC (State #1). Canopy cover (grasses, forbs and shrubs) is greater than 100% in these communities, which is conducive to high infiltration rates and minimal runoff and erosion.

Communities in the early seral state (Communities B & C) are generally considered to be in poor hydrologic condition. Concerns are valid, not because of the amount of bare ground, but because the short grasses have replaced the tall high yielding species. Thus, there is much less opportunity for the plant community to effectively utilize available moisture.

Recreational Uses

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

Wood Products

This site has no significant value for wood products.

Other Products

Other Information

At high seral states, the Subirrigated 10-14" p.z. 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 desirable plants declines and annual production decreases as the site moves toward the threshold separating State #1 from State #2. Production in the latter state is less than 50% 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 Subirrigated 10-14" p.z. ecological site. The Site ID indicates in which Rangeland Resource Unit (RRU) these sites occur. For example, Site ID R052XN162MT occurs in RRU 52XN.

Site Name	Site ID	Site Narrative
Clayey 10-14" p.z.	R052XN162MT	Different landscape position; different species composition and soil texture.
Sandy 10-14" p.z.	R052XN163MT	Different landscape position, different species composition and soil texture.

Silty-Steep 10-14" p.z.	R052XN168MT	Slopes >15%; less forage production; different species composition.
Saline Overflow 10-14" p.z.	R052XN171MT	Similar landscape position, receives additional run-in moisture from surrounding landscape; different species composition, saline or sodic affected, lower productivity.
Shallow 10-14" p.z.	R052XN178MT	Soil depth 10-20 inches; 20 inches to a restrictive layer; less forage production, different landscape position.
Overflow 10-14" p.z.	R052XN166MT	Site receives extra moisture, but it is not in floodplain, no permanent water table at less than 42 inches.

Similar Sites

Site Name	Site ID	Site Narrative
Subirrigated 10-14" p.z.	R052XC218MT	More switchgrass and big bluestem present in HCPC.
Subirrigated 10-14" p.z.	R053AE070MT	Switchgrass and big bluestem are dominant species in HCPC.

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				
Modified Double Sampling	1	2001	MT	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

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.

Heidel, B. S.,V. Cooper, and C. Jean. Plant species of special concern and plant associations of Sheridan County, Montana. Report to the U.S. Fish and Wildlife Service. Montana Natural Heritage Program, Helena. 22pp. plus appendices.

Stringham, T. k., W. C. Krueger, and P. L. Shaver. 2003. State and transition modeling: an ecological process approach. J. Range Manage. 56(2):106-113.

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

Site Description Revisions

The 2005 Subirrigated 10-14" p.z. ecological site description replaces earlier dated versions of Subirrigated 10-14" p.z. description 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.

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.

Authors	Date	Approval	Date
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