

Range Sites Grouped into Generalized Landscape Management Units

Llewellyn L. Manske PhD
Range Scientist
North Dakota State University
Dickinson Research Extension Center

Range site is the basic unit of rangeland with similar characteristics. Each named range site has similar soil characteristics, topographic position, environmental factors, and potential native vegetation composition. Range sites can be described and separated to a finer degree than is practical for application of specific management practices. Theoretically, enough differences exist among the range sites to warrant the use of different management and stocking rates for each range site. Such specific management requires that each range site be identified and considered separately but as a part of the entire grassland management unit.

Classification of individual range sites for a grassland management unit is a complex process that requires the use of soil survey maps, soil series descriptions, soil map unit descriptions, and range site descriptions. Most grassland managers have not had and most likely will not have a detailed range site identification completed for their land. However, completion of some level of range site identification is a critical step in the development of a pasture and forage inventory.

Management of each range site separately is impractical in most grazingland pasture situations. Range sites with similar levels of soil water and herbage production can be grouped into three generalized landscape site management units to simplify grazingland management of pastures in the Northern Plains.

This report attempts to simplify the process of range site identification by grouping categories of range sites into landscape sites with similar management requirements and similar stocking rates. Two major differences among the landscape site management units are the type of soil parent material and the average annual precipitation. The average annual precipitation and the types of parent material from which soils have developed are variable across the Northern Plains and form four distinct physiographic regions: the Red River Valley, the Drift Prairie, the Missouri Coteau, and the West River Regions.

The **Red River Valley Region**, part of the Central Lowland Physiographic Province, is an exceptionally flat plain of glacial lake sedimentary deposits and is characterized by very gentle slopes over 95% of the area. The region has poorly developed stream systems. The range of average annual precipitation is 18 to 20 inches. The major native vegetation is the Bluestem, Switchgrass, and Indiangrass Type of the Tall Grass Prairie. Most of this region has been converted to cropland, and only fragments of tall grass prairie vegetation remain. Management considerations for this region are not included in this report.

The **Drift Prairie Region**, part of the Central Lowland Physiographic Province, is characterized by rolling, hummocky, or hilly glacial till deposits; gentle slopes of less than 8% on more than 80% of the area; and relief generally of less than 100 feet. The hills are closely spaced, with valleys containing numerous closed depressions called pot holes. The region has poorly developed stream systems. The range of average annual precipitation is 16 to 20 inches. The major vegetation is the Wheatgrass, Bluestem, and Needlegrass Type of the Mixed Grass Prairie. This region is considered the transition zone between the Tall Grass Prairie and the Mixed Grass Prairie.

The **Missouri Coteau Region**, part of the Great Plains Physiographic Province, is the glaciated portion of the Missouri Plateau. This region is a hummocky plain of terminal moraine and dead-ice moraine deposits and is characterized by gentle slopes of less than 8% on 50 to 80% of the area and relief generally of 100 to 300 feet. Some portions of the region are well drained with streams, and other portions have depressions containing closed basins with small bodies of water. The range of average annual precipitation is 14 to 18 inches. The major native vegetation is the Wheatgrass and Needlegrass Type of the Mixed Grass Prairie.

The **West River Region**, part of the Great Plains Physiographic Province, is the unglaciated portion of the Missouri Plateau. In this region sedimentary deposits have been eroded and formed into a rolling to hilly plain with large buttes. The region is characterized by gentle slopes of less than 8% on 50 to

80% of the area and relief generally of 300 to 500 feet. The region is well drained with a developed stream system. On an 8- to 25-mile-wide and nearly 200-mile-long strip along the Little Missouri River exists a subregion of badlands. This subregion is a rugged, deeply eroded, hilly area with gentle slopes of less than 8% on 20 to 50% of the area and relief commonly over 500 feet. The range of average annual precipitation is 13 to 16 inches for the region. The major native vegetation is the Wheatgrass and Needlegrass Type of the Mixed Grass Prairie.

The range sites within each of the different physiographic regions of the Northern Plains can be grouped into three landscape site categories based on the soil water holding capacity and the position of the water table. These three landscape site categories are easily identified and can be used for pasture and forage inventories during the development of biologically effective pasture and forage management strategies. The three landscape site categories are lowland, upland, and xeric sites. The lowland landscape sites have high levels of soil water in the rooting zone of the soil for most of the year. Because of water run in, these sites receive greater amounts of water than the precipitation levels. The upland landscape sites have well-drained soils and are usually below field capacity for much of the growing season. The xeric landscape sites have restricted water infiltration or water-holding capacity, and for much of the growing season, available soil water is below the potential to be gained from precipitation.

Among the physiographic regions, the characteristics of a landscape site type differ slightly. Therefore, management requirements and stocking rates differ slightly for areas of a particular landscape site type located in different physiographic regions.

Lowland Landscape Sites for the Drift Prairie Region

Topography is nearly level, low-lying swales, depressions, shallow basins, and drainageways. Slopes are less than 3%. Soils are deep and are poorly drained to moderately well drained. Permeability is very slow, slow, moderately slow, or moderate. Available water capacity is moderate, high, or very high. Lowland landscape sites receive additional amounts of water from run in from higher land, surface runoff, flooding, and/or underground seepage.

Upland Landscape Sites for the Drift Prairie Region

Topography is nearly level to rolling, with some areas gently sloping to moderately steep. Slopes are mostly 1 to 15%, with some 3 to 25%. Soils are deep to moderately deep; most are moderately well drained to well drained, and some are excessively well drained. Permeability is slow, moderate, moderately rapid, or rapid. Available water capacity is low, moderate, or high.

Xeric Landscape Sites for the Drift Prairie Region

Topography is nearly level, undulating, or gently sloping. Slopes are 1 to 6%. Soils are mostly very shallow or shallow; some are deep. Most are poorly drained or moderately well drained; some are excessively drained. Permeability is very slow, moderate, moderately rapid, or rapid. Available water capacity is very low, low, or moderate. Most xeric landscape sites have thin surface soils with an underlying hardpan that is nearly impervious to water.

Lowland Landscape Sites of the Missouri Coteau Region

Topography is nearly level swales, basins, and depressions, or nearly level and gently undulating low-lying bottomlands and stream terraces. Slopes are less than 3%. Soils are deep and poorly drained. Permeability is very slow to moderate. Available water capacity is moderate, high, or very high. Lowland landscape sites receive additional amounts of water from run in from higher land, surface runoff, flooding, and/or underground seepage. Lowland landscape sites are usually briefly flooded, with water standing over the surface for part of the growing season, and have a high water table for the majority of the growing season. Some lowland landscape sites have surface areas with salts, and some have sodium effects throughout the profile.

Upland Landscape Sites of the Missouri Coteau Region

Topography is nearly level, rolling, undulating, gently sloping, strongly sloping, or steep. Slopes are 1 to 35%. Soils are deep and moderately deep to shallow and are moderately well drained, well drained, or excessively drained. Permeability is slow, moderate, moderately rapid, or rapid. Available water capacity is low, moderate, or high. Upland landscape sites are usually underlain by sand, gravel, or weathered bedrock that restricts plant root penetration.

Xeric Landscape Sites of the Missouri Coteau Region

Topography is nearly level, undulating, gently sloping, or strongly sloping. Slopes are 1 to 9%. Soils are very shallow, shallow, or deep, and are well drained or excessively drained. Permeability is very slow, slow, moderate, or rapid. Available water capacity is low to moderate. Xeric landscape sites are usually underlain by sand or gravel or by hardpan that contains high accumulations of sodium and is nearly impervious to water.

Lowland Landscape Sites of the West River Region

Topography is slightly concave basins and depressions or nearly level low terraces and flood plains along streams and channels. Slopes are 1 to 3%. Soils are deep and are poorly drained to well drained. Permeability is very slow, slow, or moderate. Available water capacity is low, moderate, high, or very high. Lowland landscape sites receive additional amounts of water from run in from higher land, surface runoff, flooding, and/or underground seepage. The water table is at the surface for the early part of the growing season and remains high for most of the growing season. Some lowland landscape sites are saline and/or alkaline and calcareous with salts at the surface and sodium effects throughout the profile.

Upland Landscape Sites of the West River Region

Topography is nearly level, undulating, rolling, gently sloping, or strongly sloping. Slopes are mostly 1 to 15%, with some 25 to 50%. Soils are deep, moderately deep, or shallow, and are well drained to excessively drained. Permeability is moderately slow, moderate, moderately rapid, or rapid. Available water capacity is low, moderate, or high. Upland landscape sites are underlain by shale, siltstone, or sandstone that restricts root depth.

Xeric Landscape Sites of the West River Region

Topography is nearly level, undulating, gently sloping, moderately sloping, or steep plains. Slopes are mostly 1 to 9%, and some are 2 to 35%. Soils are very shallow or shallow. Permeability is moderate to very rapid near the surface and very slow to slow in the substratum. Available water capacity is very low, low, or moderate. Xeric landscape sites have thin surface soils underlain by coarse sand, gravel, weathered bedrock, scoria, or by a hardpan that has a high accumulation of sodium and is nearly impervious to water. These substratum materials restrict plant root depth.

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Table 1. Range sites composing landscape site management units.

Lowland Landscape Sites

Wetland range site

Wet Meadow range site

Subirrigated range site

Overflow range site

Closed Depression range site

Saline Lowland range site

Upland Landscape Sites

Sands range site

Sandy range site

Silty range site

Clayey range site

Shallow range site

Thin Upland range site

Thin Sands range site

Xeric Landscape Sites

Shallow to Gravel range site

Shallow Clay range site

Claypan range site

Thin Claypan range site

Very Shallow range site

Table 2. Major grasses of landscape sites.

| Lowland Landscape Sites | |
|--------------------------------|----------------------------------|
| Western wheatgrass | <i>Agropyron smithii</i> |
| Big bluestem | <i>Andropogon gerardi</i> |
| Northern reedgrass | <i>Calamagrostis stricta</i> |
| Canada wildrye | <i>Elymus canadensis</i> |
| Switchgrass | <i>Panicum virgatum</i> |
| Reed canarygrass | <i>Phalaris arundinacea</i> |
| Sprangletop | <i>Scolochloa festucacea</i> |
| Indiangrass | <i>Sorghastrum nutans</i> |
| Prairie cordgrass | <i>Spartina pectinata</i> |
| Slough sedge | <i>Carex atherodes</i> |
| Wooly sedge | <i>Carex lanuginosa</i> |
| Lowland sedges | <i>Carex spp.</i> |
| Saline Lowland Landscape sites | |
| Inland saltgrass | <i>Distichlis spicata</i> |
| Foxtail barley | <i>Hordeum jubatum</i> |
| Nuttall alkaligrass | <i>Puccinellia nuttalliana</i> |
| Tumblegrass | <i>Schedonnardus paniculatus</i> |
| Squirreltail | <i>Sitanion hystrix</i> |
| Alkali cordgrass | <i>Spartina gracilis</i> |

Table 2. (Continued) Major grasses of landscape sites.

Upland Landscape Sites

| | |
|--------------------|----------------------------------|
| Western wheatgrass | <i>Agropyron smithii</i> |
| Sand bluestem | <i>Andropogon hallii</i> |
| Sideoats grama | <i>Bouteloua curtipendula</i> |
| Blue grama | <i>Bouteloua gracilis</i> |
| Plains reedgrass | <i>Calamagrostis montanensis</i> |
| Prairie sandreed | <i>Calamovilfa longifolia</i> |
| Prairie junegrass | <i>Koeleria pyramidata</i> |
| Little bluestem | <i>Schizachyrium scoparium</i> |
| Sand dropseed | <i>Sporobolus cryptandrus</i> |
| Needle and thread | <i>Stipa comata</i> |
| Porcupine grass | <i>Stipa spartea</i> |
| Green needlegrass | <i>Stipa viridula</i> |
| Upland sedges | <i>Carex spp.</i> |

Xeric Landscape Sites

| | |
|--------------------|--------------------------------|
| Western wheatgrass | <i>Agropyron smithii</i> |
| Blue grama | <i>Bouteloua gracilis</i> |
| Buffalograss | <i>Buchloe dactyloides</i> |
| Prairie junegrass | <i>Koeleria pyramidata</i> |
| Plains muhly | <i>Muhlenbergia cuspidata</i> |
| Sandberg bluegrass | <i>Poa sandbergii</i> |
| Little bluestem | <i>Schizachyrium scoparium</i> |
| Needle and thread | <i>Stipa comata</i> |
| Green needlegrass | <i>Stipa viridula</i> |
| Upland sedges | <i>Carex spp.</i> |
