Bouteloua gracilis - Buchloe dactyloides Xeric Soil Herbaceous Vegetation

COMMON NAME	Blue Grama - Buffalo Grass Xeric Soil Herbaceous Vegetation
SYNONYM	Blue Grama - Buffalo Grass Xeric Soil Shortgrass Prairie
PHYSIOGNOMIC CLASS	Herbaceous Vegetation (V)
PHYSIOGNOMIC SUBCLASS	Perennial graminoid vegetation (V.A)
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland (V.A.5)
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural (V.A.5.N)
FORMATION	Short sod temperate or subpolar grassland (V.A.5.N.e)
ALLIANCE	BOUTELOUA GRACILIS HERBACEOUS ALLIANCE

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Terrestrial

RANGE

Badlands National Park

The blue grama grassland type is limited to the dry edges of buttes and dry hilltops within the North Unit and is more widespread because of soils and regular livestock grazing in the South Unit. In the South Unit, this type occupies hilltops, ridges, and sandy soils that are not dominated by yucca or sand sagebrush shrubs.

Globally

This community is found in western North Dakota, western South Dakota, extreme northwestern Nebraska, and Saskatchewan, and should also be in Wyoming and Montana.

ENVIRONMENTAL DESCRIPTION

Badlands National Park

Blue grama grasslands are limited to drier soils within the project area and areas with a consistent grazing regime, including that provided by prairie dogs. Most sites are relatively flat to undulating, typically on the edges of buttes/tables, ridgetops, and hilltops. Flat sites are typically clay and silty clay soils, while ridges and hilltops tend to be sandy soils. Blue grama and its associated species are common understory components of western wheatgrass grasslands. Grazing reduces the ground cover provided by western wheatgrass, a mid-grass, allowing the shorter blue grama and its associates to dominate.

Globally

This community is found on dry slopes or xeric soils with a high clay content. In Nebraska this type can occur on level to gently sloping ground on stream terraces. Soils are poorly drained silty clay and clay. In Badlands National Park, South Dakota, stands are limited to drier soils within the project area and areas with a consistent grazing regime, including that provided by prairie dogs. Most sites are relatively flat to undulating, typically on the edges of buttes/tables, ridgetops, and hilltops. Flat sites are typically clay and silty clay soils, while ridges and hilltops tend to be sandy soils. Blue grama and its associated species are common understory components of western wheatgrass grasslands. Grazing reduces the ground cover provided by western wheatgrass, a mid-grass, allowing the shorter blue grama and its associates to dominate (Von Loh *et al.* 1999).

MOST ABUNDANT SPECIES

Badlands National Park

Stratum	Species
Shrub	*Opuntia polyacantha*, *Artemisia filifolia*, *Yucca glauca*, *Gutierrezia sarothrae*
Herbaceous	*Bromus tectorum*, *Bromus japonicus*, *Pascopyrum smithii*, *Stipa comata*, *Buchloe dactyloides*, *Carex filifolia*, *Bouteloua gracilis*

Globally

Stratum	Species
Short Shrub	*Artemisia filifolia, Gutierrezia sarothrae, Opuntia polyacantha, Yucca glauca*
Graminoid	*Bouteloua gracilis, Buchloe dactyloides*

CHARACTERISTIC SPECIES

Badlands National Park

Bouteloua gracilis, *Carex filifolia*, *Pascopyrum smithii*, *Bromus japonicus*

Globally

Bouteloua gracilis, Buchloe dactyloides, Carex filifolia, Pascopyrum smithii

OTHER NOTABLE SPECIES

VEGETATION DESCRIPTION

Badlands National Park

The blue grama grassland type provides moderate to high vegetative cover, typically between 40-90%. Blue grama (*Bouteloua gracilis*) is usually strongly dominant on sandier soils, while threadleaf sedge (*Carex filifolia*) is a strong dominant on clay and

silty clay soils at the edge of bluffs and tables. Species commonly associated with blue grama on sandier soils include threadleaf sedge, western wheatgrass (*Pascopyrum smithii*), needle-and-thread (*Stipa comata*), buffalograss (*Buchloe dactyloides*), purple three-awn (*Aristida purpurea*), Japanese brome (*Bromus japonicus*), and a variety of forbs. Shrubs that are typically observed in this type include fringed sagewort (*Atremisia frigida*), poverty cactus (*Opuntia polyacantha*), yucca (*Yucca glauca*), and snakeweed (*Gutierrezia sarothrae*). On Red Shirt Table, blue grama grassland types are overgrown by horseweed (*Conyza canadensis*), which grows to 1.5 m tall by late summer.

Species commonly associated with threadleaf sedge on clay and silty clay soils include needle-and-thread, Japanese brome, cheatgrass, blue grama, and prairie coneflower (*Ratibida columnifera*). Typical shrubs are the same as those listed in the above paragraph.

Globally
The blue grama grassland type provides moderate to high vegetative cover, typically between 40-90%. *Bouteloua gracilis* is usually strongly dominant on sandier soils, while *Carex filifolia* is a strong dominant on clay and silty clay soils at the edge of bluffs and tables. In Badlands National Park, South Dakota, common associates on sandier soils include *Pascopyrum smithii, Stipa comata, Buchloe dactyloides, Aristida purpurea, Bromus japonicus*, and a variety of forbs, including *Conyza canadensis*. Shrubs that are typically observed in this type include *Atremisia frigida, Opuntia polyacantha, Yucca glauca*, and *Gutierrezia sarothrae*. Species commonly associated with *Carex filifolia* on clay and silty clay soils include *Stipa comata, Bouteloua gracilis, Bromus japonicus*, and *Ratibida columnifera*. Typical shrubs are the same as those listed on sandy soils. (Von Loh *et al.* 1999). Forbs in Nebraska include *Lomatium foeniculaceum, Monolepis nuttalliana, Musineon divaricatum, Oonopsis multicaulis*, and *Plantago elongata*. Shrubs are sparse to absent, and include *Artemisia tridentata, Artemisia cana, Artemisia frigida*, and, more westward in Nebraska, *Chrysothamnus nauseosus* and *Sarcobatus vermiculatus* (Steinauer and Rolfsmeier 1997).

CONSERVATION RANK G3G5. The natural distribution of this type may be limited to special xeric soil sites in the northwestern Great Plains. However, it is not clear how these sites compare floristically to similar looking stands on heavily grazed pastures that are widespread in the same region. Hence, the exact rank is uncertain.

DATABASE CODE CEGL002270

MAP UNITS The blue grama grassland type is presented as Map Class 18 (Blue Grama Grassland) on the Badlands NP vegetation map.

SIMILAR ASSOCIATIONS
Bouteloua gracilis - Buchloe dactyloides Herbaceous Vegetation (The more widespread shortgrass association of the southern Great Plains.)
Pascopyrum smithii - Bouteloua gracilis - Carex filifolia Herbaceous Vegetation (On heavily grazed sites, this type can be degraded to CEGL002270.)
Stipa comata - Bouteloua gracilis - Carex filifolia Herbaceous Vegetation (On degraded sites, or on intermediate habitats, this type can be confused with CEGL002270. Generally, it occupies less xeric sites than CEGL002270.)

COMMENTS
Badlands National Park
Many stands were visited in preparing the vegetation map. It is possible that the name of this type could be changed to the *Stipa comata - Bouteloua gracilis - Carex filifolia* Herbaceous Vegetation association, but all descriptions would remain the same under either title. Insufficient range-wide information is available to clarify how best to name the stands in Badlands NP.

The blue grama grassland type occupies butte/table margins and sandy ridges, flats, and hilltops. Along the butte and table tops, this type is rather narrow and ribbon-like in distribution. On sandy ridges, flats, and hilltops, this type is widespread, particularly in the heavily grazed South Unit and the surrounding project environs. Grazing helps to dry soils by removing/limiting mid and tall grass growth from the landscape and by the action of livestock hooves breaking the ground surface or by burrowing activities as with prairie dogs. Blue grama vegetation is common where heavy grazing and/or sandy soils are present and less common where the type is limited to butte/table margins.

Globally
Dave Ode (1998) makes the following comments with respect to CEGL002270 in southwestern South Dakota (Fall County) and its relation to CEGL001756, which at this time is not in South Dakota: "I looked at the NRCS Tech Guide and several county soil surveys to get a better idea of the extent and distribution of this range site [claypan range site]. It always occurs on sodium-affected soils with less than four inches of topsoil over an impervious hardpan. (There is also a claypan rangesite that has 40% midgrasses and only 25% shortgrasses). Thin claypans often occur in association with slickspots or rock outcrops (shale), i.e. areas that are so bad that they have no perennial vegetation. Topographically, thin claypans lie on footslopes, broad flats, alluvial fans, and linear strips along drainageways. They generally have very shallow slopes, i.e. less than 5%. These areas range from 10 to 400 acres in size."

"In terms of percent of the landscape, here are a few rough numbers that I calculated from the Soil Surveys: Fall River 6%, Custer/Pennington Prairie 2%, Shannon County 3%, Harding County is tough to estimate because of the mixed associations but

probably about 5%. My tendency would be to lump these in with the northern Badlands shortgrass community type and revise the definition to include these thin claypan flats. You could change the name to xeric soil rather than xeric slope. At an even coarser level I see the central shortgrass region as having the matrix occurrences of this type, as you move north you have these large patch occurrences on claypans and maybe other unique soils, and by the time you get to Saskatchewan you just have small patches on Badland slopes."

"Some complicating factors that would tend to split this one out are that many of these claypans are on floodplains and could end up being called riparian. In terms of species composition, because of the high salt content, many forbs don't grow on these soils and with overuse saltgrass (Distichlis) apparently can increase in abundance (I can' t tell from the NRCS data how constant or abundant saltgrass is on these range sites, except that they mention it increasing under over-grazing.) In terms of forb composition, it's pretty depauperate but probably would be more similar to dense clay habitats than even to this badlands slope communty. Several forbs, e.g. coneflower, globemallow, wild parsley that are mentioned in the central shortgrass type do occur on these claypans and everywhere else. In one sense it's handy to have two blue grama/buffalograss types, e.g. if you want to see patches of blue grama prairie go to the Northern Plains (CEGL002270), if you want to see blue grama prairie landscapes go to the Central Plains (CEGL001756)."

Others have observed that this type can also appear to occur in heavily grazed pastures; however, these heavily grazed pastures probably would have been classified as wheagrass - blue grama prairie (CEGL001579) prior to such grazing, and can revert back to that type fairly quickly (3-5 years?) if grazing is removed. In general it would be better to restrict CEGL002270 to only the xeric soil habitats.

REFERENCES

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Thilenius, J. F., G. R. Brown, and A. L. Medina. 1995. Vegetation on semi-arid rangelands, Cheyenne River Basin, Wyoming. General Technical Report RM-GTR-263. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 60 pp.

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