

## Blacktailed Prairie Dog Town Grassland Complex

COMMON NAME Blacktailed Prairie Dog Town Grassland Complex  
SYNONYM Blacktailed Prairie Dog Town Grassland Complex  
PHYSIOGNOMIC CLASS ()  
PHYSIOGNOMIC SUBCLASS ()  
PHYSIOGNOMIC GROUP ()  
PHYSIOGNOMIC SUBGROUP ()  
FORMATION ()  
ALLIANCE ()

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM Terrestrial

### RANGE

#### **Badlands National Park**

Black-tailed prairie dog (*Cynomys ludovicianus*) towns are widespread within Badlands NP and its environs, where soils are deep enough and have sufficient structure to support burrowing activity. Towns may range in size from less than one hectare to several hundred hectares; the largest occur adjacent to and contiguous with the Conata Basin. A black-footed ferret (*Mustela nigripes*) reintroduction program is underway within Badlands NP, to help return this predator of prairie dogs to portions of its former range.

#### **Globally**

This complex occurs widely throughout the Great Plains of the central United States. The blacktailed prairie dogs (*Cynomys ludovicianus ludovicianus*) occur on the Great Plains and the whitetailed prairie dogs (*Cynomys leucurus*) occur in the Great Basin (Knight 1994). Prairie dog towns historically covered millions of hectares in the Great Plains; currently their towns range in size from tens to hundreds of hectares, with an average density of 10 to 55 animals/ha (Whicker and Detling 1988).

### ENVIRONMENTAL DESCRIPTION

#### **Badlands National Park**

Prairie dog towns are located on clay, clay loam, silty loam and some sandy loam soils deposited following erosion from adjacent uplands, including badlands formations. The soils are primarily derived from the Brule, Chadron, and Pierre Shale formations. Soils are deep, structured and not easily eroded. This type is found on level sites along drainages, in broad valleys, on gentle to moderately sloping hillslopes, and flats on tables and buttes.

#### **Globally**

Prairie dog towns are located on a wide variety of soils, including clay, clay loam, silty loam and some sandy loam soils deposited following erosion from adjacent uplands, including badlands formations. Soils are deep, structured and not easily eroded. This type is found on level sites along drainages, in broad valleys, on gentle to moderately sloping hillslopes, and flats on tables and buttes (Von Loh *et al.* 1999). Prairie dogs create extensive burrows in their towns. Large volumes of soil are moved, improving filtration, hastening the incorporation of organic matter, facilitating nutrient cycling, and increasing the spatial heterogeneity of vegetation, soils, and other ecosystem components (Knight 1994).

### MOST ABUNDANT SPECIES

#### **Badlands National Park**

<u>Stratum</u>	<u>Species</u>
Herbaceous	<i>Verbena bracteata</i> , <i>Conyza ramosissima</i> , <i>Hedeoma hispida</i> , <i>Dyssodia papposa</i> , <i>Aristida purpurea</i> , <i>Buchloe dactyloides</i> , <i>Pascopyrum smithii</i>

#### **Globally**

<u>Stratum</u>	<u>Species</u>
Short Shrub	<i>Artemisia frigida</i>
Forb	<i>Dyssodia papposa</i>
Graminoid	<i>Aristida purpurea</i> , <i>Bouteloua gracilis</i> , <i>Buchloe dactyloides</i> , <i>Pascopyrum smithii</i>

### CHARACTERISTIC SPECIES

#### **Badlands National Park**

*Pascopyrum smithii*, *Aristida purpurea*, *Dyssodia papposa*, *Hedeoma hispida*, *Conyza ramosissima*, *Verbena bracteata*

#### **Globally**

*Aristida purpurea*, *Artemisia frigida*, *Bouteloua gracilis*, *Conyza ramosissima*, *Dyssodia papposa*, *Hedeoma hispida*, *Pascopyrum smithii*, *Verbena bracteata*

### OTHER NOTABLE SPECIES

## USGS-NPS Vegetation Mapping Program

### Badlands National Park

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#### VEGETATION DESCRIPTION

##### **Badlands National Park**

The prairie dog towns are extremely variable in their vegetation characteristics, which are dependent largely on age of town, soil type, and population density (as it relates to grazing frequency). Vegetation cover averages between 30-80% with frequent patches of 100% cover. The vegetation sometimes occurs in relatively concentric zones, relating to outward expansion of town boundaries over time. Abandoned towns, towns with sparse prairie dog populations, and the outer edges of most towns are typically dominated by western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), and/or buffalograss (*Buchloe dactyloides*). Vegetation is typically patchy in distribution, and towns may encompass other plant associations as they expand, including emergent wetlands and badlands complex vegetation (no burrows are dug in these types, they merely become surrounded). The more common patches of vegetation within towns include purple three-awn (*Aristida purpurea*), fetid dogweed (*Dyssodia papposa*), dwarf conyza (*Conyza ramosissima*), field bindweed (*Convolvulus arvensis*), and large-bract verbena (*Verbena bracteata*).

Prairie dog towns are patchy in terms of species distribution, with dominance varying locally within a stand of vegetation. This is typical of early successional species on disturbed sites.

##### **Globally**

Blacktailed prairie dog towns are located in open mixedgrass or shortgrass prairie habitat, and their activity has both direct and indirect effects on the vegetation. The blacktailed prairie dogs keep the surrounding vegetation clipped close to the ground, presumably to improve their ability to detect stalking predators. This clipping gives the impression of a mowed lawn, or overgrazed rangeland. Cover averages between 30 and 80%, but some patches may be 100%. Prairie dogs repeatedly clip and graze plants, rarely allowing shoots to reach full size. Thus, canopy height within the colony is about 5-10 cm, compared to 20-50 cm in nearby, uncolonized grassland (Whicker and Detling 1988). Changes in plant species composition may begin as early as 2 or more years after colonization. Shortgrass species, such as *Bouteloua gracilis* and *Buchloe dactyloides*, and annual forbs become abundant and replace mid-height or tall grasses, such as *Pascopyrum smithii*. Continued heavy grazing may eventually result in complete dominance by a few species of forbs or dwarf shrubs, such as *Artemisia frigida*, *Dyssodia papposa*, and *Aristida purpurea* (Whicker and Detling 1988). Grazing may even cause genetic shifts within species. The shorter, more prostrate, growth forms of *Pascopyrum smithii* on prairie dog towns have been shown to be more abundant than those away from towns, suggesting that some genotypes within the species may tolerate grazing better than others (Jaramillo and Detling 1988, Whicker and Detling 1988).

Bison may be attracted to the prairie dog towns, and a series of studies found that bison preferentially graze them (Coppock *et al.* 1983, Coppock and Detling 1986, Day and Detling 1990). The forage on the colonies is more nutritious than off, with higher nitrogen content and younger shoots, apparently because the animal waste products are deposited there. In turn, the presence of bison waste products further increases the soil fertility and forage quality (Knight 1994). Pronghorns may also prefer the prairie dog towns (Knight 1994). Plant species diversity is increased by the small-scale disturbances caused by the digging of prairie dogs, and animal species diversity may also increase because of the habitat provided for the badger, rattlesnake, burrowing owl, black-footed ferret, and cottontail, in addition to the bison and pronghorn (Knight 1994).

Prairie dog towns also move over time, expanding and contracting, and, as larger towns can cover thousands of hectares at a time, the effect on the prairie landscape is substantial.

The plant community types on a prairie dog colony are roughly indicative of the extent of herbivore disturbance and reflect the cumulative impact of grazing intensity, grazing duration, activities of other animals, soil characteristics, and weather (Whicker and Detling 1988). Early stages of the town may have a typical mixed grass or shortgrass prairie type. With continued grazing and age of the town, the composition may shift to a mix of annual species and dwarf-shrubs. These latter stages have not been classified, but are treated here as a complex. Species richness appears to be highest under moderate levels of disturbance, because grass species have not yet begun to disappear, but forb species have begun to increase.

**CONSERVATION RANK** G4. This rank has been assigned based on the G4 rank that is currently assigned to the Blacktailed prairie dog itself. However, more careful review of the rank from a community perspective is needed.

**DATABASE CODE** CECX002003

**MAP UNITS** The Prairie Dog Town Complex is mapped as a separate unit, Map Class 1 (Prairie Dog Town Complex), on the vegetation map. Where prairie dogs occupy other plant associations, but have not yet altered the existing vegetation, their towns are mapped as the vegetation class present, overlain with a stippled pattern of dots. In this example, the area covered by prairie dog town is calculated as a plant community on the vegetation map, and it is also included in a second calculation that records the area of prairie dog town.

##### **SIMILAR ASSOCIATIONS**

*Pascopyrum smithii* - *Bouteloua gracilis* - *Carex filifolia* Herbaceous Vegetation

*Pascopyrum smithii* - *Nassella viridula* Herbaceous Vegetation

**USGS-NPS Vegetation Mapping Program**  
**Badlands National Park**

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COMMENTS

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The disturbance-related vegetation occurs on the naturally-disturbed soils of prairie dog towns. Prairie dog town disturbed vegetation is quite patchy in distribution, and variable in terms of species distribution, with dominance varying locally within a stand. This is typical of early successional species on disturbed sites.

Prairie dog towns at Badlands NP range from less than a hectare to over 200 hectares in size. The Prairie Dog Town Complex was well-surveyed during the preparation of the vegetation map.

REFERENCES

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- Day, T. A. and J. K. Detling. Grassland patch dynamics and herbivore grazing preference following urine deposition. *Ecology*. 71(1):180-188.
- Jaramillo, V. J. and J. K. Detling. 1988. Grazing history, defoliation, and competition: Effects on shortgrass production and nitrogen accumulation. *Ecology*. 69(5):1599-1608.
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