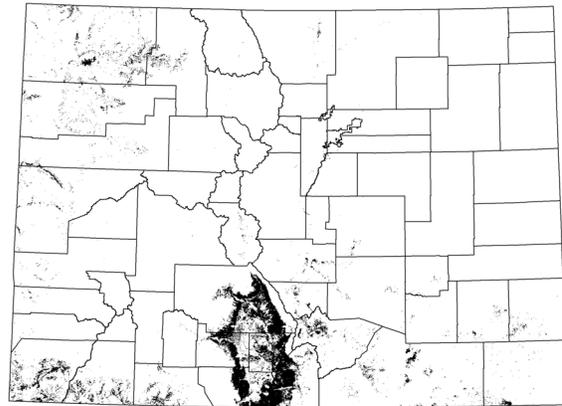


## INTER-MOUNTAIN BASINS SEMI-DESERT SHRUB-STEPPE



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extent exaggerated for display

- ERICAMERIA NAUSEOSA SHRUB SHORT HERBACEOUS ALLIANCE  
*Ericameria nauseosa* / *Muhlenbergia pungens* - *Achnatherum hymenoides* Shrub Herbaceous Vegetation
- ERICAMERIA NAUSEOSA SHRUBLAND ALLIANCE  
*Ericameria nauseosa* / *Bromus tectorum* Semi-natural Shrubland
- KRASCHENINNIKOVIA LANATA DWARF-SHRUB HERBACEOUS ALLIANCE  
*Krascheninnikovia lanata* / *Bouteloua gracilis* Dwarf-shrub Herbaceous Vegetation  
*Krascheninnikovia lanata* / *Pascopyrum smithii* - *Bouteloua gracilis* Dwarf-shrub Herbaceous Vegetation
- KRASCHENINNIKOVIA LANATA DWARF-SHRUBLAND ALLIANCE  
*Krascheninnikovia lanata* / *Pleuraphis jamesii* Dwarf-shrubland  
*Krascheninnikovia lanata* / *Poa secunda* Dwarf-shrubland

**Overview:** This ecological system occurs throughout the intermountain western U.S., typically at lower elevations on alluvial fans and flats with moderate to deep soils. In Colorado, this system is generally a large-patch type, except in the San Luis Valley, where it is matrix forming. The general aspect of occurrences may be either open shrubland with patchy grasses or patchy open herbaceous layer. Pinyon-juniper woodlands and sagebrush shrublands commonly are adjacent to this system at the upper elevations

**Characteristic species:** This semi-arid shrub-steppe is typically dominated by graminoids (>25% cover) with an open shrub layer. Characteristic grasses include *Achnatherum hymenoides*, *Bouteloua gracilis*, *Distichlis spicata*, *Hesperostipa comata*, *Pleuraphis jamesii*, *Poa secunda*, and *Sporobolus airoides*. The woody layer is often a mixture of shrubs and dwarf-shrubs. Characteristic species include *Atriplex canescens*, *Artemisia tridentata*, *Chrysothamnus Greenei*, *Chrysothamnus viscidiflorus*, *Ephedra* spp., *Ericameria nauseosa*, *Gutierrezia sarothrae*, and *Krascheninnikovia lanata*. Annual grasses, especially the exotics *Bromus japonicus* and *Bromus tectorum*, may be present to abundant. Forbs are generally of low importance and are highly variable across the range, but may be diverse in some occurrences. Mosses and lichens may be important ground cover. Forbs are common on disturbed weedy sites. Weedy annual forbs may include the exotics *Descurainia* spp., *Halogeton glomeratus*, *Lactuca serriola*, and *Lepidium perfoliatum*.

**Environment:** In Colorado, semi-desert shrub steppe occurs between 7,500-9,500 ft (2,280-2,900 m) in elevation, on windswept mesas, valley floors, gentle slopes, or shoulders of ridges. Sites are generally alluvial fans and flats with moderate to deep soils. Some sites can be flat, poorly drained and intermittently flooded with a shallow or perched water table often within 3 ft (1 m) depth (West 1983). Substrates are generally shallow, calcareous, fine-textured soils (clays to silt-loams), derived from alluvium; or deep, fine to medium-textured alluvial soils with some source of sub-irrigation during the summer season. Soils may be alkaline and typically moderately saline (West 1983). Some occurrences occur on deep, sandy soils, or soils that are highly calcareous (Hironaka

et al. 1983). Temperatures are continental with large annual and diurnal variation. Summers are hot and winters cold, with low annual precipitation, ranging from 7-16 in (18-40 cm) and high inter-annual variation. Much of the precipitation falls as snow, and growing-season drought is characteristic.

**Dynamics:** This ecological system is maintained by large-scale natural ecological processes such as fire and grazing by large mammals. Anthropogenic changes including fire suppression and historic heavy livestock grazing have altered most occurrences of this shrub-steppe type. Disturbance may be important in maintaining the woody component. Microphytic crust is very important in some occurrences.

**Variation:** Historically, *Krascheninnikovia lanata* was typically dominant in this dwarf-shrub system. This shrub, together with the grasses *Hesperostipa comata*, and *Oryzopsis hymenoides* are considered decreaseers under grazing. As a consequence of anthropogenically induced changes in grazing, *Chrysothamnus Greenei* is now the dominant shrub in the San Luis Valley, although the wetter areas still have significant amounts of *Krascheninnikovia lanata*. Other shrubs that have increased from historic heavy livestock grazing include *Chrysothamnus parryi*, *C. viscidiflorus*, and *Gutierrezia sarothrae* (Johnston 1997).

Hironaka, M., M. A. Fosberg, and A. H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Forestry, Wildlife, and Range Experiment Station Bulletin No. 15, University of Idaho, Moscow. 44 pp.

Johnston B. C. 1997. Ecological types of the Upper Gunnison Basin. Review draft. USDA, Forest Service, Gunnison, CO. 539 pp.

West, N.E. 1983. Overview of North American temperate deserts and semi-deserts. Pages 321-330 in N.E. West, ed., Temperate deserts and semi-deserts. Ecosystems of the world, Volume 5. Elsevier Publishing Company. Amsterdam.

Rank:	A	B	C	D
<b>① SIZE</b>				
<b>Acres</b> (in San Luis Valley)	>5000 >90,000	2000-5000 50,000-90,000	1000-2000 30,000-50,000	<1000 < 30,000
<b>② CONDITION</b>				
<b>Community structure</b>	<i>Krascheninnikovia lanata</i> is dominant at least in large patches. If trees or rabbitbrush are present, these are widely scattered and mature. Species richness is often high and includes several native grasses as well as a diverse forb component. Plant vigor is high.	<i>Krascheninnikovia lanata</i> is dominant in large patches. If trees or rabbitbrush are present, these are scattered and mature. Species richness is often high, and native bunchgrasses are dominant. Non-native species may be present but in small amounts (< 5% total canopy cover).	<i>Krascheninnikovia lanata</i> is limited to small patches or scanty cover throughout occurrence. Non-native species are present and may dominate small patches, although native species still dominate. Total canopy cover is at least 20% grasses. Seedlings, juveniles, or saplings of trees and shrubs may be present.	Non-native species are dominant, native species have less than 10% canopy cover and 20% relative cover. Alteration is extensive and restoration potential is low.
<b>Invasive exotics with major potential to alter structure and composition</b>	Absent.	May be present, but <1% cover.	May be present although still manageable if attended to within the next few years.	Present.
<b>Native increaser spp.</b> (e.g. <i>Koeleria macrantha</i> , <i>Artemisia frigida</i> )	< 3% cover.	<5% cover.	May be co-dominant or dominant.	May be dominant.
<b>Disturbance</b> (Off-road vehicle use, livestock grazing)	Minimal or non-existent.	Vehicle use, if present, occupies less than 1% of the occurrence. Livestock grazing is well	Vehicle use, if present, occupies less than 5% of the occurrence. Livestock grazing is well	Vehicle use or livestock grazing disturbance, if present, is extensive and significant enough to

<b>Ground cover &amp; soils</b>	Soils have a distinct A-horizon and are very stable (low erosion rate). Soils are not compacted. Drainages are natural stable channels with no signs of unnatural erosion. Fairly uniform distribution of litter is present. Surface soil is stabilized by organic matter decomposition products and/ or a biological crust. The soil surface should show slight to no evidence of rills, wind scoured areas, or pedestaled plants. Plant cover is adequate to protect from excess soil erosion.	managed with less than 3% of the occurrence showing signs of a C condition.	Soils may be slightly modified but still have a distinct A-horizon. Soil compaction moderately widespread. Water flow pattern nearly matches what is expected for the site; erosion is minor. Soil surface loss or degradation is moderate in plant interspaces with some degradation beneath plant canopies. Slight active pedestalling. Bare areas are of moderate size and sporadically connected. Litter buildup may be present in some areas. Soil structure is degraded and soil organic matter content is significantly reduced.	managed with less than 10% of the occurrence showing signs of a D condition.	Deposition and cut areas common; occasionally connected. Soil surface resistance to erosion significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Moderately active pedestalling. Bare ground is moderate to much higher than expected for the site. Bare areas are large and often connected. Soil surface loss or degradation may be severe throughout the site. Soil compaction may be widespread.	have notable impact on species composition, soil compaction and stability.	Water flow patterns unstable with active erosion. Soil surface resistance to erosion may be extremely reduced throughout the site. Abundant active pedestalling and numerous terracettes. Bare ground is much higher than expected for the site. Bare areas are large and generally connected. Soil compaction is extensive throughout the occurrence.
<b>Natural processes</b>	Fires are still part of this system.	Major natural ecological processes are still able to function or be simulated.	Fire frequency may have been altered, although easily restored. Some ecological processes have been altered and are no longer able to function or be fully restored.	Fire frequency may be greatly altered and difficult to restore. System remains fundamentally compromised despite restoration of some processes.			

### ③ LANDSCAPE CONTEXT

<b>Connectivity</b>	Connectivity of adjacent systems allows natural ecological processes (e.g., fire), and species migrations to occur. No unnatural barriers present.	Limited or minor human-caused alteration of landscape. Adjacent systems surrounding occurrence retain much connectivity. Few non-natural barriers present.	Adjacent systems surrounding occurrence are fragmented by alteration with limited connectivity. Some non-natural barriers are present.	Connectivity is severely hampered
<b>Surrounding land</b>	Occurrence surrounded by a native and unaltered landscape with very little to no urban development or agriculture (>90% natural).	Surrounding landscape composed of at least 75% natural or semi-natural vegetation, with little urban development within or adjacent to the occurrence.	Surrounding landscape is a mosaic of agricultural or semi-developed areas with natural or semi-natural vegetation. Adjacent systems surrounding occurrence are fragmented by alteration (20-60% natural). Significant disturbance, but easily restorable.	Major human-caused alteration of surrounding landscape. Adjacent systems surrounding occurrence are mostly converted to agricultural or urban uses.