INTER-MOUNTAIN BASINS MIXED SALT DESERT SCRUB

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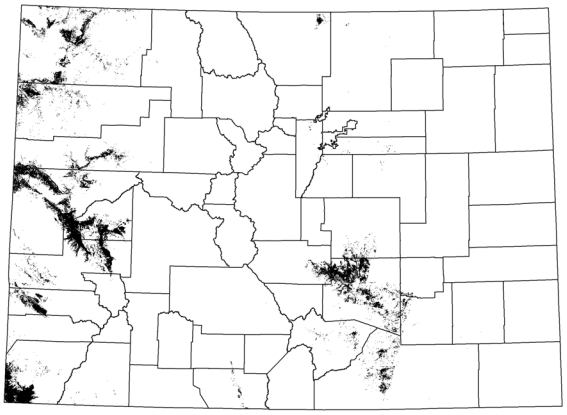

extent exaggerated for display

ATRIPLEX CANESCENS SHRUBLAND ALLIANCE
- *Atriplex canescens - Artemisia tridentata* Shrubland
- *Atriplex canescens / Bouteloua gracilis* Shrubland
- *Atriplex canescens / Pleuraphis jamesii* Shrubland
- *Atriplex canescens / Sporobolus airoides* Shrubland
- *Atriplex canescens* Shrubland

ATRIPLEX CONFERTIFOLIA SHRUBLAND ALLIANCE
- *Atriplex confertifolia - Sarcobatus vermiculatus* Shrubland
- *Atriplex confertifolia / Achnatherum hymenoides* Shrubland
- *Atriplex confertifolia / Leymus salinus* Shrubland
- *Atriplex confertifolia / Pleuraphis jamesii* Shrubland
- *Atriplex confertifolia / Pseudoroegneria spicata* Shrubland
- *Atriplex confertifolia* Wyoming Basins Shrubland

KRASCHENINNIKOVIA LANATA DWARF-SHRUBLAND ALLIANCE
- *Krascheninnikovia lanata / Achnatherum hymenoides* Dwarf-shrubland
- *Krascheninnikovia lanata / Hesperostipa comata* Dwarf-shrubland

Overview: This extensive ecological system includes open-canopied shrublands of typically saline desert basins, alluvial slopes and plains across the intermountain western U.S. Considered a matrix forming system to the west of Colorado, this type also extends in limited distribution into the southern Great Plains, where it is a large patch system. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils, but include some coarser-textured soils. The vegetation is characterized by a typically open to moderately dense shrubland composed of one or more *Atriplex* species.

Characteristic species: The sparse to moderately dense cover of woody species is dominated by *Atriplex canescens* (may codominate with *Artemisia tridentata*), *Atriplex confertifolia* (may codominate with *Lycium andersonii*), *Atriplex obovata, Picrothamnus desertorum,* or *Krascheninnikovia lanata*. Other shrubs include *Purshia stansburiana, Psorothamnus polydenius, Ephedra* spp., *Acacia greggii, Encelia frutescens, Tiquilia latior, Parthenium confertum, Atriplex polycarpa, Atriplex lentiformis, Picrothamnus desertorum (= Artemisia spinescens), Frankenia salina, Artemisia frigida, Chrysothamnus* spp., *Lycium* ssp., *Suaeda* spp., *Yucca glauca,* and *Tetradymia spinosa.* Dwarf-shrubs include *Gutierrezia sarothrae* and *Eriogonum* spp. Warm-season medium-tall and short perennial grasses dominate in the sparse to moderately dense graminoid layer. Species may include *Pleuraphis jamesii, Bouteloua gracilis, Sporobolus airoides, Sporobolus cryptandrus, Achnatherum hymenoides, Elymus elymoides, Distichlis spicata, Leymus salinus, Pascopyrum smithii, Hesperostipa comata, Pseudoroegneria spicata, Poa secunda, Leymus ambiguus,* and *Muhlenbergia torreyi*. A number of annual species may also grow in association with the shrubs and grasses of this system, although they are usually rare and confined to areas of recent disturbance (Blaisdell and Holmgren 1984). Forb cover is generally sparse. Perennial forbs that might occur include

Sphaeralcea coccinea, Chaetopappa ericoides, Xylorhiza venusta, and *Mentzelia* species. Annual natives include *Plantago* spp., *Vulpia octoflora,* or *Monolepis nuttalliana*. Associated halophytic annuals include *Salicornia rubra, Salicornia bigelovii*, and *Suaeda* species. Exotic annuals that may occur include *Salsola kali* and *Bromus tectorum*. Cacti such as *Opuntia* spp. and *Echinocereus* spp. may be present in some occurrences. Trees are not usually present but some scattered *Juniperus* spp. may be found.

Environment: This system is comprised of arid to semi-arid shrublands on lowland and upland sites usually at elevations between 4,980 and 7,220 ft (1,520-2,200 m). Sites can be found on all aspects and include valley bottoms, alluvial and alkaline flats, mesas and plateaus, playas, drainage terraces, washes and interdune basins, bluffs, and gentle to moderately steep sandy or rocky slopes. Slopes are typically gentle to moderately steep, but are sometimes unstable and prone to surface movement. Many areas within this system are degraded due to erosion and may resemble "badlands." Soil surface is often very barren in occurrences of this system. The interspaces between the characteristic plant clusters are commonly covered by a microphytic crust (West 1982).

This is typically a system of extreme climatic conditions, with warm to hot summers and freezing winters. Annual precipitation ranges from approximately 5-13 in (13-33 cm). In much of the ecological system, the period of greatest moisture will be mid- to late summer, although in the more northern areas a moist period is to be expected in the cold part of the year. However, seasonality of occurrence is probably of less importance on this desert system than in other ecosystems because desert precipitation comes with an extreme irregularity that does not appear in graphs of long-term seasonal or monthly averages (Blaisdell and Holmgren 1984). Soils are shallow to moderately deep, poorly developed, and a product of an arid climate and little precipitation. Soils are often alkaline or saline.

Dynamics: West (1982) stated that "salt desert shrub vegetation occurs mostly in two kinds of situations that promote soil salinity, alkalinity, or both. These are either at the bottom of drainages in enclosed basins or where marine shales outcrop." However, salt-desert shrub vegetation may be an indication of climatically dry as well as physiologically dry soils (Blaisdell and Holmgren 1984). Species of the salt-desert shrub complex have different degrees of tolerance to salinity and aridity, and they tend to sort themselves out along a moisture/salinity gradient (West 1982). Species and communities are apparently sorted out along physical, chemical, moisture, and topographic gradients through complex relations that are not understood and are in need of further study (Blaisdell and Holmgren 1984).

The winter months within this system are a good time for soil moisture accumulation and storage. There is generally at least one good snow storm per season that will provide sufficient moisture to the vegetation. The winter moisture accumulation amounts will affect spring plant growth. Plants may grow as little as a few inches to 3 ft. Unless more rains come in the spring, the soil moisture will be depleted in a few weeks, growth will slow and ultimately cease, and the perennial plants will assume their various forms of dormancy (Blaisdell and Holmgren 1984). If effective rain comes later in the warm season, some of the species will renew their growth from the stage at which it had stopped. Others, having died back, will start over as if emerging from winter dormancy (Blaisdell and Holmgren 1984). Other communities are maintained by intra- or inter-annual cycles of flooding followed by extended drought, which favor accumulation of transported salts. The moisture supporting these intermittently flooded wetlands is usually derived off-site, and they are dependent upon natural watershed function for persistence (Reid et al. 1999).

In summary, desert communities of perennial plants are dynamic and changing. The composition within this system may change dramatically and may be both cyclic and unidirectional. Superimposed on the compositional change is great variation from year to year in growth of all the vegetation – the sum of varying growth responses of individual species to specific conditions of different years (Blaisdell and Holmgren 1984). Desert plants grow when temperature is satisfactory, but only if soil moisture is available at the same time. Because amount of moisture is variable from year to year and because different species flourish under different seasons of soil moisture, seldom

do all components of the vegetation thrive in the same year (Blaisdell and Holmgren 1984).

Variation: Occurrences of this ecological system vary from almost pure occurrences of single species to fairly complex mixtures. The characteristic mix of low shrubs and grasses is sparse, with large open spaces between the plants (Blaisdell and Holmgren 1984). The species present depend on the geographic range of the grasses, alkalinity/salinity and past land use.

Blaisdell, J. P. and R. C. Holmgren. 1984. Managing Intermountain rangelands-salt-desert shrub ranges. USDA Forest ServiceGeneral Technical Report INT-163. Intermountain Forest and Range Experiment Station, Ogden, Utah. 52 pp

Reid, M. S., K. A. Schulz, P. J. Comer, M. H. Schindel, D. R. Culver, D. A. Sarr, and M. C. Damm. 1999. An alliance level classification of vegetation of the coterminous western United States. Unpublished final report to the University of Idaho Cooperative Fish and Wildlife Research Unit and National Gap Analysis Program, in fulfillment of Cooperative Agreement 1434-HQ-97-AG-01779. The Nature Conservancy, Western Conservation Science Department, Boulder, CO.

West, N.E. 1982. Approaches to synecological characterization of wildlands in the Intermountain West. Pages 633-643 in In-place Resource Inventories: Principles & Practices. A national workshop, Univ. of Maine, Orono. Soc. of Amer. Foresters, McClean, Va. August 9-14, 1981.

Rank:	A	B	C	D
① SIZE				
Acres (on eastern plains)	>30,000 >1,000 Sufficient internal variability to capture characteristic biophysical gradients and retain natural geomorphic disturbance. Buffered from edge effects.	10,000-30,000 100-1,000	5,000-10,000 30-100	< 5,000 <30 Too small to remain viable with altered natural geomorphic processes and contain insufficient area to maintain a diversity of plant associations. Susceptible to invasive exotics.
② CONDITION				
Community structure	A variety of structural stages are present that could provide habitat for shrubland and grassland birds.	Heterogenity of structure is present throughout the majority of the occurrence or easily re-established through management practices.	Much of the occurrence is dominated by a single structural stage, and may be lacking in vegetative species diversity.	Vegetation within the occurrence has little or no structural diversity and is likely to have low native species diversity. May be invaded by native woody species.
Native perennial increaser spp.	< 5% cover.	Community dominated by natives, native perennial increasers may be present and even dominant in spots, but not throughout the occurrence.		Dominant.
Invasive exotics with major potential to alter structure and composition (e.g., leafy spurge, Russian knapweed, diffuse knapweed, spotted knapweed, yellow toadflax)	Absent or < 1% cover.	1 to 3% of the occurrence, with no patches larger than 1 acre.	3-7% of the occurrence with some patches larger than 1 acre. May be having an impact on the stability of the system, but could be controlled with a sustained effort.	Present and widespread.
Other non-native annual spp. (e.g. *Halogeton glomeratus, Bromus tectorum, Salsola kali, S. paulsenii, Bassia hyssopifolia*)	Absent or incidental.	May be present in disturbed areas only, and are not found throughout the occurrence.	Can be present and quite abundant in small patches.	Present and abundant.
Disturbance	No surficial disturbance is evident or if present than in only small, isolated areas (e.g. ranch activities and buildings;	Surficial disturbances are limited to less than 20% of the occurrence area (e.g. mines or ranch activities and buildings;	Surficial disturbances occur on more than 20% of the area (e.g. mines or ranch activities and buildings; off-road vehicle	Surficial disturbances occur on more than 50% of the area (e.g. mines or ranch activities and buildings; off-road vehicle

	off-road vehicle use). There are few or no roads within the occurrence.	off-road vehicle use). There are only a few roads found within the occurrence.	use). There are more than a few roads found within the occurrence.	use). Many roads are found within the occurrence.
Ground cover	Microbiotic crusts are intact. Natural microrelief is undisturbed. Soil erosion is not accelerated by anthropogenic activities.	Microbiotic crusts are intact in at least 80% of the occurrence. Soil erosion may be accelerated in small patches, or lightly so throughout the occurrence.	Microbiotic crusts are removed from more than 25% of the area, or are in various stages of degradation throughout the occurrence.	Microbiotic crusts are >75% removed, occurring only in small pockets naturally protected from livestock and off-road vehicle use.
③ LANDSCAPE CONTEXT				
Connectivity	Occurrence is highly connected to the surrounding landscape, which has been little altered by agriculture or development (>90% natural).	Occurrence is moderately connected to the surrounding landscape, which has been somewhat altered by agriculture or development (70-90% natural).	The occurrence is moderately fragmented and isolated, and the surrounding landscape is a mosaic of agricultural or semi-developed areas with natural or semi-natural vegetation.	The occurrence is highly fragmented and isolated.
Surrounding land	The occurrence captures the characteristic ecological gradients (including nested patch communities, e.g. washes, saltbush scrub flats) and geomorphic processes, and is largely surrounded by other high quality communities.	The occurrence captures the characteristic ecological gradients (including nested patch communities, e.g. washes, saltbush scrub flats) and geomorphic processes, and the occurrence is surrounded by other natural and semi-natural communities of at least moderate quality, such as areas that may have been used extensively for heavy livestock grazing or military training currently or in the past.	The 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 (20-70% natural), with limited connectivity to other characteristic natural communities.	The area around the occurrence is entirely, or almost entirely, converted to agricultural or urban land use; occurrence is at best buffered on one side by natural communities. The surrounding landscape is primarily intensive agriculture or urban development.