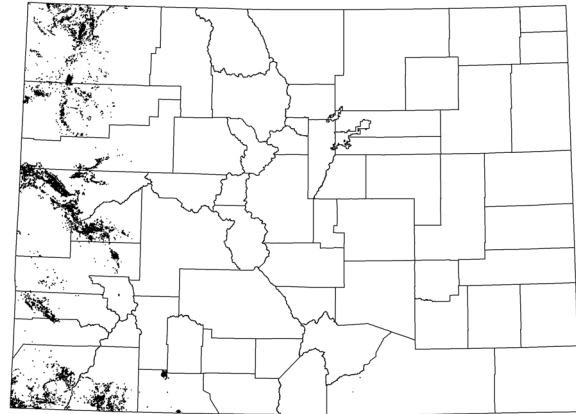


INTER-MOUNTAIN BASINS SHALE BADLAND



- ACHNATHERUM HYMENOIDES HERBACEOUS ALLIANCE
 - Achnatherum hymenoides* Shale Barren Herbaceous Vegetation
- ARTEMISIA BIGELOVII SHRUBLAND ALLIANCE
 - Artemisia bigelovii* / *Achnatherum hymenoides* Shrubland
- ATRIPLEX CORRUGATA DWARF-SHRUBLAND ALLIANCE
 - Atriplex corrugata* Dwarf-shrubland
- ATRIPLEX CUNEATA SHRUBLAND ALLIANCE
 - Atriplex cuneata* - *Frankenia jamesii* / *Sporobolus airoides* Shrubland
- ATRIPLEX GARDNERI DWARF-SHRUBLAND ALLIANCE
 - Atriplex gardneri* / *Achnatherum hymenoides* Dwarf-shrubland
 - Atriplex gardneri* / *Leymus salinus* Dwarf-shrubland
 - Atriplex gardneri* / *Pleuraphis jamesii* Dwarf-shrubland
 - Atriplex gardneri* Dwarf-shrubland
- LEYMUS SALINUS SSP. SALMONIS SPARSELY VEGETATED ALLIANCE
 - Leymus salinus* Shale Sparse Vegetation

Overview: This widespread ecological system of the Intermountain western U.S. is composed of barren and sparsely vegetated substrates (<10% plant cover) typically derived from marine shales, but also including substrates derived from siltstones and mudstones (clay). Landforms are typically rounded hills and plains that form a rolling topography, or steep talus slopes. The harsh soil properties and high rate of erosion and deposition are driving environmental variables supporting the sparse *Atriplex* or *Artemisia* dwarf-shrub and herbaceous vegetation.

Characteristic species: The vegetation in this ecological system is very sparse and may be naturally absent in some places. When vegetation is present it may be dominated by either dwarf shrubs such as *Atriplex corrugata*, *Atriplex cuneata* and *Atriplex gardneri*, or graminoid/forb herbaceous vegetation with scattered shrubs and trees. Small mature trees (pinyon or juniper) may be present. The dominant grass is often the perennial bunchgrass *Achnatherum hymenoides*, or *Leymus salinus*. A sparse forb layer may also be present and will vary by topography and geography. Total vegetation cover is often less than 10%.

Although this ecological system is generally sparsely vegetated it is also where many of the Green River formation shale endemic forbs occur. Green River shale endemics found in this system include: *Physaria obcordata*, *Lesquerella congesta*, *Lesquerella parviflora*, *Gilia stenothrysa*, *Thalictrum heliophilum*, *Gentianella tortuosa*, *Festuca dasyclada*, *Astragalus lutosus*, *Aquilegia barnebyi*, *Mentzelia argillosa*, and *Penstemon debilis* (not all occur in Colorado).

Environment: Shale badlands often occur on exposed ridges and steep (35-70%) colluvial slopes that are gravelly and cobbly to the surface. This system is often comprised of unstable talus slopes at the base of cliffs but may also be found above the escarpment, especially on the Roan Plateau. Shale badlands

may take the form of fans or aprons at the base of steep areas or as barren badland hills with rolling topography.

The rock types that form the dominant landscape are shale, sandstone, marlstone, and minor amounts of slate. The talus is very highly permeable. Bedrock is usually deeper than 40 inches but rock outcrops may occupy about 30% of the area. This ecological system generally occurs on southeast to west aspects. The soils are derived from shales or mudstones and are typically shallow, calcareous, alkaline, and clayey, often capped by a thin gravel layer. Total vegetative cover is relatively sparse and bare soil ranges from 75 to near 100 percent.

Dynamics: Shale badland surface soils are subject to yearly gravitational down-slope movement, especially after a rainstorm. Many plants actually get buried or uprooted due to silt movement. The loose colluvium, especially if over shale bedrock, is likely to result in landslides. The harsh soil properties and high rate of erosion and deposition are driving environmental variables maintaining these sparse dwarf-shrublands.



P. Lyon

Variation: Although these shrublands support communities and species similar to those found in the Inter-Mountain Basins Mat Saltbrush Shrubland ecological system, they are distinguished by the active erosion and soil characteristics that act to maintain sparse vegetation.

Rank:	A	B	C	D
① CONDITION				
Community structure	Native plants dominate the occurrence.	Native plants dominate the occurrence. Small patches (< 5% of occurrence) may show human disturbance in the form of non-native plants.		
Non-native spp.	<1% relative cover.	<3% relative cover.	Usually present, but not dominant except in small patches.	
Natural processes	Natural disturbances, generally landslides, have the ability to occur on a natural time frame.		Present	
Disturbance	Fragmentation from roads or human development (e.g., oil and gas) is non-existent or occurs on the edge of the occurrence.	Fragmentation from roads or human development, if present, is limited to a small area that occupies less than 0.5% of the occurrence.	Fragmentation from roads or human development are frequent enough to cause an increase in non-native plants. Unnatural erosion, compaction, and altered species composition is usually noticeable.	Human induced disturbance is >30% of occurrence.
② SIZE				
Acres	>2,000	1,000-2,000	100-1,000	< 100
③ LANDSCAPE CONTEXT				
Connectivity	Highly connected, with species interactions and natural processes occurring across communities.	Moderately connected; with species interactions and natural processes occurring across many communities.	Moderately fragmented. with barriers between species interactions and natural processes across natural communities.	Highly fragmented.
Surrounding land	Area around the occurrence is largely intact natural vegetation.	Area around the occurrence is moderately intact natural vegetation.	Area around the occurrence is largely a combination of cultural and natural vegetation.	Area around the occurrence is entirely, or almost entirely, surrounded by agricultural or urban land use and is at best buffered on one side by natural communities.