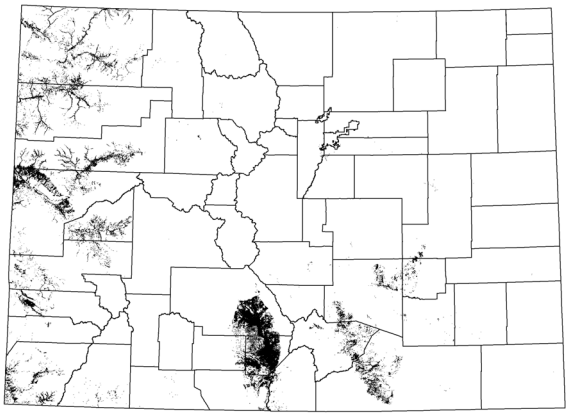
INTER-MOUNTAIN BASINS GREASEWOOD FLAT

S. Spackman



extent exaggerated for display

DISTICHLIS SPICATA INTERMITTENTLY FLOODED HERBACEOUS ALLIANCE
- *Distichlis spicata - (Scirpus nevadensis)* Herbaceous Vegetation
- *Distichlis spicata* Herbaceous Vegetation

ELEOCHARIS PALUSTRIS SEASONALLY FLOODED HERBACEOUS ALLIANCE
- *Eleocharis palustris* Herbaceous Vegetation

LEYMUS CINEREUS HERBACEOUS ALLIANCE
- *Leymus cinereus* Herbaceous Vegetation

PUCCINELLIA NUTTALLIANA INTERMITTENTLY FLOODED HERBACEOUS ALLIANCE
- *Puccinellia nuttalliana* Herbaceous Vegetation

SALICORNIA RUBRA SEASONALLY FLOODED HERBACEOUS ALLIANCE
- *Salicornia rubra* Herbaceous Vegetation

SARCOBATUS VERMICULATUS INTERMITTENTLY FLOODED SHRUBLAND ALLIANCE
- *Sarcobatus vermiculatus - Artemisia tridentata* Shrubland
- *Sarcobatus vermiculatus / Distichlis spicata* Shrubland
- *Sarcobatus vermiculatus / Suaeda moquinii* Shrubland
- *Sarcobatus vermiculatus* Shrubland

SARCOBATUS VERMICULATUS INTERMITTENTLY FLOODED SPARSELY VEGETATED ALLIANCE
- *Sarcobatus vermiculatus / Juncus balticus* Sparse Vegetation
- *Sarcobatus vermiculatus / Sporobolus airoides* Sparse Vegetation

SARCOBATUS VERMICULATUS SHRUBLAND ALLIANCE
- *Sarcobatus vermiculatus / Bouteloua gracilis* Shrubland

SPOROBOLUS AIROIDES HERBACEOUS ALLIANCE
- *Sporobolus airoides* Southern Plains Herbaceous Vegetation

SPOROBOLUS AIROIDES INTERMITTENTLY FLOODED HERBACEOUS ALLIANCE
- *Sporobolus airoides - Distichlis spicata* Herbaceous Vegetation

Overview: The Greasewood Flats ecological system occurs throughout much of the western U.S. in intermountain basins and extends onto the western Great Plains. In eastern Colorado, occurrences are primarily in the southwestern portion of plains. Large occurrences are also found in the lower elevations of Colorado's western valleys and throughout much of the San Luis Valley. Greasewood flats are large patch systems confined to specific environments defined by hydrologic regime, soil salinity and soil texture.

Characteristic species: This ecological system usually occurs as a mosaic of multiple communities, with open to moderately dense shrublands dominated or codominated by *Sarcobatus vermiculatus*. *Atriplex canescens, Atriplex confertifolia, Chrysothamnus nauseosus, Cylindropuntia candelabra,* or *Krascheninnikovia lanata* may be present to codominant. The herbaceous layer, if present, is usually dominated by graminoids such as *Sporobolus arioides, Distichlis spicata,* and *Bouteloua gracilis*. Small patches of *Sporobolus airoides, Distichlis spicata* (where water remains ponded the longest), or *Eleocharis palustris* herbaceous types may be found within the shrubland system.

Environment: Greasewood flats are typically found near drainages on stream terraces and flats, on alluvial fans along streams or arroyos, or they may form rings around playas. Sites usually have saline soils, a shallow water table and flood intermittently, but remain dry for most of the growing season.

Dynamics: Because greasewood flats are tightly associated with saline soils and groundwater that is near the surface, the primary ecological process that maintains greasewood flats is groundwater recharge, rather than surface water. *Sarcobatus vermiculatus* is often found on sites with high water tables that are intermittently flooded. Groundwater flows and depth are one of the most important driving factors in maintaining this system. *Sarcobatus vermiculatus*, like many facultative halophytes, is tolerant of alkaline and saline soil conditions that allow the species to occur in sites with less interspecific competition (Ungar et al. 1969, Bransen et al. 1976). The shrub also occurs on extremely arid non-saline sites.

Although most studies indicate that *Sarcobatus vermiculatus* is relatively unharmed by fire, the degree of damage may vary according to season of burn, fuel loading, and intensity of fire. Fire will top kill *S. vermiculatus*, but the shrub will promptly resprout from the root crown (Daubenmire 1970).

Sarcobatus vermiculatus is not ordinarily browsed, but Daubenmire (1970) found that under heavy stocking rates, the shrubs will develop a compact canopy.

R. Rondeau

Variation: This system occurs as a mosaic of communities with open to moderately dense shrublands dominated or codominated by *Sarcobatus vermiculatus*. Greasewood dominated vegetation can occur as a narrow band along a channel, or in a mosaic of communities where composition and density of the shrub and understory species vary with depth to water table, salinity and alkalinity, soil texture, and past land use or disturbance. Occurrences may be surrounded by grasslands, stabilized sand dunes, wet meadow systems, mixed salt desert scrub, sandsage, or shortgrass prairie. Hanson (1929) described stands in south-central Colorado and found that pure stands of *S. vermiculatus* and *Distichlis spicata* are more common on strongly saline/alkaline sites with fine-textured soil and shallow water tables, whereas stands with mixed shrubs such as *Chrysothamnus* or *Artemisia* are more common on drier, coarser textured, low-alkaline sites. *Sporobolus airoides* is found on dry, strongly alkaline sites, and *Pascopyrum smithii* is most common on less alkaline, moist, sites in low lying areas.

Branson, F. A., R. F. Miller, and I. S. McQueen. 1976. Moisture relationships in twelve northern desert shrub communities near Grand Junction, Colorado. Ecology 57:1104-1124.

Daubenmire, R. F. 1970. Steppe vegetation of Washington. Washington State University Agricultural Experiment Station Technical Bulletin No. 62. 131 pp.

Hanson, H. C. 1929. Range resources of the San Luis Valley. Pages 5-61 in: Range resources of the San Luis Valley. Bulletin 335. Colorado Experiment Station, Fort Collins, CO.

Ungar, I. A., W. Hogan, and M. McClennand. 1969. Plant communities of saline soils at Lincoln, Nebraska. The American Midland Naturalist 82(2):564-577.

Rank:	A	B	C	D
① CONDITION				
Natural hydrologic regime (Note that the hydrologic regime for this system can potentially be affected by off-site factors many miles away)	Natural hydrologic regime intact. No or little evidence of alteration due to drainage, flood control, irrigation canals, livestock grazing, digging, burming, vehicle use, etc.	Natural hydrologic regime intact or slightly altered (within 60-140% of historic means for timing and magnitude). Alteration is easily restorable by ceasing such activities.	Natural hydrologic regime altered by local drainage, diking, filling, digging, or dredging. Alteration is extensive but potentially restorable over several decades.	Natural hydrologic regime or disturbance to site not restorable. System remains fundamentally compromised despite restoration of some processes.
Invasive exotics with major potential to alter structure and composition (e.g., whitetop, leafy spurge, Russian knapweed, diffuse knapweed, spotted knapweed, yellow toadflax)	Absent to minimal (<1% cover), with no potential for expansion.	Few (1-3% cover), with little potential for expansion if restoration occurs.	May be widespread (3-7% of the occurrence with some patches larger than 1 acre) but potentially manageable with restoration of most natural processes.	May be dominant over significant portions of the area, with little potential for control.
Native increaser spp.	Not abnormally predominant.	May form dense stands over <10% of the occurrence, but do not appear to be expanding.	>10% cover, may be dominant in some areas.	
Disturbance	Livestock grazing, if present, appears to mimic native herbivory levels and patterns.	Livestock grazing appears to be compatible and in general mimics native herbivory levels and patterns.	Vehicle use or grazing disturbance is extensive and significant enough to have notable impact on species composition.	
② SIZE				
Acres A rank: Wide range of plant associations showing a range of variation in hydrology, salinity, and soil texture. Large enough to buffer most of occurrence from edge effects and small hydrologic alterations.	>1,000	100-1,000	50-100	< 50
③ LANDSCAPE CONTEXT				
Surrounding land	Wet meadows and grasslands within 1 mile of the occurrence are unaltered by urban or agricultural uses (> 90% natural).	Grasslands, shrublands and wet meadows within ½ mile of the occurrence may have moderate urban or agricultural alteration (60-90% natural).	Adjacent grasslands, shrublands, and wet meadows are fragmented by alteration (20-60% natural). Landscape restorable over years or decades.	Adjacent lands mostly converted to agricultural or urban uses. Landscapes missing fundamental system components that render restoration unfeasible.
Landscape hydrology	No evidence of human-caused alteration of hydrology.	Limited or minor human-caused alteration of hydrology, especially groundwater pumping and canals.	Local or moderate human-caused alteration of hydrology.	Major human-caused alteration of hydrology.
Timing and depth of high and low groundwater	Little affected by groundwater pumping. Remains from 90-110% of historic patterns.	Little affected by groundwater pumping, remains from 75-90% of historic patterns.		Groundwater pumping is affecting greater than 20% of the area.
Invasive species (e.g. *Cardaria*)	None present on adjacent lands.	No or very few invasive species present on adjacent lands, and if present, easily controlled.	May be abundant on adjacent wet meadows, altering species composition.	
Connectivity Extent to which patches of natural and semi-natural vegetation allow movement of water and species across the landscape.	Connectivity allows natural ecological processes (e.g., flooding and species migration) to occur. No barriers present.	Substantial connectivity among patches of natural and semi-natural vegetation remains. Few barriers present.	Limited connectivity. Some barriers present restrictng movement across system boundaries.	Connectivity is severely hampered.