

**V.A.5.N.I. INTERMITTENTLY FLOODED TEMPERATE OR SUBPOLAR GRASSLAND**

**V.A.5.N.i.5. *DISTICHLIS SPICATA* INTERMITTENTLY FLOODED HERBACEOUS ALLIANCE**

**Saltgrass Intermittently Flooded Herbaceous Alliance**

**Alliance Identifier:** A.1332

***Distichlis spicata* Herbaceous Vegetation**

**Saltgrass Herbaceous Vegetation**

***Inland Saltgrass Saline Prairie***

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**ELEMENT CONCEPT**

**GLOBAL SUMMARY:** These grasslands occur in semi-arid and arid western North America from southern Saskatchewan to Mexico. Stands are found in lowland habitats such as playas, swales and terraces along washes that are typically intermittently flooded. The flooding is usually the result of highly localized thunderstorms which can flood one basin and leave the next dry. However, this association may also occur in other flood regimes (temporarily, seasonally, and semipermanently). Soil texture ranges from clay loam to sandy clay. These soils are often deep, saline and alkaline. They generally have an impermeable layer and therefore are poorly drained. When the soil is dry, the surface usually has salt accumulations. Salinity is likely more important than flooding as an environmental factor. Vegetation cover is sparse to dense and is dominated by *Distichlis spicata*, occurring in nearly pure stands. Minor cover of associated graminoids may include *Muhlenbergia asperifolia*, *Hordeum jubatum*, *Pascopyrum smithii*, *Sporobolus airoides*, *Carex filifolia*, *Eleocharis palustris*, *Puccinellia nuttalliana*, and *Juncus balticus*. Associated forbs, such as *Iva axillaris*, *Helianthus* spp., *Aster* spp. (from lower salinity sites), *Salicornia rubra*, *Triglochin maritima*, and *Suaeda* spp., may also be present. Shrubs are rare, but scattered *Atriplex canescens* and *Sarcobatus vermiculatus* may be present.

**ENVIRONMENTAL DESCRIPTION**

**USFWS WETLAND SYSTEM:** LACUSTRINE, PALUSTRINE

**Ouray National Wildlife Refuge Environment:** Saltgrass Herbaceous Vegetation occupies alkaline, silty clay soils of low channels, depressions, and dike and levee embankments. These areas also receive surface water run-in following precipitation events. Cottontail rabbit and deer scat are commonly observed in this habitat.

**Global Environment:** These grasslands occur in the semi-arid and arid western North America from southern Saskatchewan to Mexico. Elevation ranges from 1000-2300 m. Stands are found in lowland habitats such as playas, swales and terraces along washes that are typically intermittently flooded. The flooding is usually the result of highly localized thunderstorms which can flood one basin and leave the next dry. However, this association may also occur in other flood regimes (temporarily, seasonally, and semipermanently). Soil texture ranges from clay loam to sandy clay (Johnston 1987). These soils are often deep, saline and alkaline. They generally have an impermeable layer and therefore are poorly drained. When the soil is dry, the surface usually has salt accumulations. Salinity is likely more important than flooding as an environmental factor.

**VEGETATION DESCRIPTION**

**Ouray National Wildlife Refuge Vegetation:** Saltgrass Herbaceous Vegetation occupies alkaline, floodplain flats and depressions that have near-to-surface ground water. *Distichlis spicata* is more resilient than *Sporobolus airoides* following disturbance and can re-invade sites, such as dikes and levees. This resilience is probably related to the saltgrass' ability to produce long rhizomes, while alkali sacaton is a bunchgrass. Total foliar cover for *Distichlis spicata* Herbaceous Vegetation stands ranges from 70-90%, saltgrass comprises 40-60% of that cover value. Other species associated with saltgrass include *Sporobolus airoides*, *Muhlenbergia asperifolia*, *Iva axillaris*, *Lepidium latifolium*, and *Kochia scoparia*. These stands are typically short-statured, less than 0.5 m in height, and are often invaded by salt-cedar.

**Global Vegetation:** Vegetation included in this association occurs in lowland sites throughout much of the semi-arid and arid western U.S. This is an intermittently flooded grassland of playas and intermittent and ephemeral streams. Cover is sparse to dense and is dominated by *Distichlis spicata*, occurring in nearly pure stands. Stands have higher diversity and cover during wet years and near boundaries with other vegetation types. Higher soil salinity favors *Distichlis spicata* over less salt-tolerant species. However, very high salinity will dwarf the *Distichlis spicata* and reduce cover. Generally, vegetation height and cover and species diversity tend to vary inversely with salinity on the plains, but may increase on very saline sites (Brotherson 1987). Minor cover of associated graminoids may include

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*Muhlenbergia asperifolia*, *Hordeum jubatum*, *Pascopyrum smithii*, *Sporobolus airoides*, *Carex filifolia*, *Eleocharis palustris*, *Puccinellia nuttalliana*, and *Juncus balticus*. Associated forbs, such as *Iva axillaris*, *Helianthus* spp. and *Aster* spp. (from lower salinity sites), *Salicornia rubra*, *Triglochin maritima*, and *Suaeda* spp., may also be present. Shrubs are rare, but scattered *Atriplex canescens* and *Sarcobatus vermiculatus* may be present. Introduced species are present in some stands and may include *Elymus repens*, *Lepidium latifolium*, *Lepidium perfoliatum*, *Bassia scoparia* (= *Kochia scoparia*), and occasionally *Tamarix* spp.

**Dynamics:** The intermittent flooding regime combined with the high evaporation rate in these dry climates causes accumulations of soluble salts in the soil. Total vegetation cover (density and height), species composition, and soil salinity depend on the amount and timing of precipitation and flooding. Growth-inhibiting salt concentrations are diluted when the soil is saturated allowing the growth of less salt-tolerant species and more robust growth of *Distichlis spicata*. As the saturated soils dry, the salt concentrates until it precipitates on the soil surface (Dodd and Coupland 1966, Ungar 1968). This osmotic stress of growing in alkaline and saline soils is compensated by the accumulation of proline by some halophytic species including *Distichlis spicata*. This aids the plants' water uptake by increasing the osmotic potential of the plant (Shupe et al. 1986). Vegetation forms zones at some saline sites, where species abundance is stratified by salt tolerance (Shupe et al. 1986, Ungar et al. 1969). In playas, the soil salinity at field capacity generally increases from the edge to the center allowing for several different vegetation stands to co-occur (Ungar 1967, 1970, Ungar et al. 1969). Microtopography can also affect vegetation structure. Where soil accumulates to form hummocks, less salt- and alkali-tolerant plants can occur (Ungar 1972, Johnston 1987).

Brotherson (1987) studied species in a saline meadow adjacent to the Great Salt Lake in Utah and found 5 vegetation zones all with *Distichlis spicata* present. The meadow sloped down and away from the shoreline for the first 4 zones, then up for the last. Soil pH and soluble salts levels followed the slope pattern with the lowest zone (4) having lower pH and salt concentrations and the highest cover of *Distichlis spicata* (99%) almost exclusively. The other higher salt zones were codominated by other species such as *Suaeda calceoliformis* (= *Suaeda depressa*), *Puccinellia nuttalliana*, *Salicornia rubra*, *Triglochin maritima*, *Glaux maritima*, or *Eleocharis palustris*. Zone 5 was dominated by *Eleocharis palustris* and had additional moisture from a nearby seep. The salts were concentrated in the higher elevation zones because of evaporation of the salt-laden water that was leached from the lower lying areas.

The warm-season grass *Distichlis spicata* is rhizomatous, tolerant of moderate grazing, and its roots resist trampling. Although relatively unpalatable, it can provide valuable winter forage for livestock, if needed. When grazed, *Distichlis spicata* generally increases because of reduced competition from other less grazing-tolerant species. If grazed heavily, *Distichlis spicata* will decline and may be replaced by less desirable warm-season grasses such as tumblegrass (*Schedonnardus paniculatus*), or *Hordeum jubatum* (Costello 1944b, Jones and Walford 1995). Weeds are generally not a problem because few grow well in saline soils. However, severely disturbed sites are susceptible to invasion by introduced species such as *Bromus tectorum*, *Lepidium latifolium*, *Lepidium perfoliatum*, and *Bassia hyssopifolia* (Franklin and Dyrness 1973).

### MOST ABUNDANT SPECIES

#### Ouray National Wildlife Refuge

Stratum	Species
SHORT SHRUB	<i>Tamarix ramosissima</i> , <i>Sarcobatus vermiculatus</i>
HERBACEOUS	<i>Distichlis spicata</i> , <i>Sporobolus airoides</i> , <i>Iva axillaris</i> , <i>Lepidium latifolium</i>

#### Global

Stratum	Species
GRAMINOID	<i>Distichlis spicata</i>

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### CHARACTERISTIC SPECIES

#### Ouray National Wildlife Refuge

##### Species

*Distichlis spicata*, *Sporobolus airoides*, *Iva axillaris*

#### Global

##### Species

*Distichlis spicata*

### OTHER NOTEWORTHY SPECIES

#### Ouray National Wildlife Refuge

##### Stratum

##### Species

N/A

#### Global

##### Stratum

##### Species

N/A

### OURAY NATIONAL WILDLIFE REFUGE SIMILAR ASSOCIATIONS:

*Sporobolus airoides* Herbaceous Vegetation occupies similar habitats

### GLOBAL SIMILAR ASSOCIATIONS:

*Leymus cinereus* - *Distichlis spicata* Herbaceous Vegetation (CEGL001481)

*Pascopyrum smithii* - *Distichlis spicata* Herbaceous Vegetation (CEGL001580)

*Sporobolus airoides* - *Distichlis spicata* Herbaceous Vegetation (CEGL001687)

*Distichlis spicata* Mixed Herb Herbaceous Vegetation (CEGL001771)

*Distichlis spicata* - *Lepidium perfoliatum* Herbaceous Vegetation (CEGL001772)

*Distichlis spicata* - (*Scirpus nevadensis*) Herbaceous Vegetation (CEGL001773)

*Eleocharis palustris* - *Distichlis spicata* Herbaceous Vegetation (CEGL001834)

*Distichlis spicata* - *Hordeum jubatum* - (*Poa arida*, *Iva annua*) Herbaceous Vegetation (CEGL002031)--currently described only from the Great Plains.

*Polygonum* spp. - *Echinochloa* spp. - *Distichlis spicata* Playa Lake Herbaceous Vegetation (CEGL002039)--currently described only from the Great Plains.

*Distichlis spicata* - (*Hordeum jubatum*, *Poa arida*, *Sporobolus airoides*) Herbaceous Vegetation (CEGL002042)--currently described only from the Great Plains.

*Distichlis spicata* - *Schoenoplectus maritimus* - *Salicornia rubra* Herbaceous Vegetation (CEGL002043)--currently described only from the Great Plains.

*Distichlis spicata* - *Hordeum jubatum* - *Puccinellia nuttalliana* - *Suaeda calceoliformis* Herbaceous Vegetation (CEGL002273)--currently described only from the Great Plains.

*Distichlis spicata* - *Spartina* spp. Herbaceous Vegetation (CEGL002275)--currently described only from the Great Plains.

*Distichlis spicata* - *Hordeum jubatum* - *Puccinellia nuttalliana* - *Plantago maritima* Herbaceous Vegetation (CEGL002551)--currently described only from the Great Plains.

### SYNONYMY:

*Distichlis stricta* Habitat Type (Daubenmire 1970)

*Distichlis spicata* ssp. *stricta* Salt Meadow Plant Association (Baker 1984a) B

Saltgrass Zone (4) (Brotherson 1987)

*Distichlis stricta* Associations on Saline-Alkaline Soils (Franklin and Dyrness 1973) B

*Distichlis* Meadow (Graham 1937) B

*Distichlis spicata* Habitat Type (Hansen et al. 1995)

Inland Saltgrass (*Distichlis spicata*) Dominance Type (Jones and Walford 1995)

*Distichlis spicata* Herbaceous Vegetation Association (Kittel et al. 1999)

*Distichlis spicata*/Monotype Community Type (Muldavin et al. 2000a)

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*Distichlis spicata* Vegetation Zone I, in part (Ralston 1969)  
Saltgrass Series B (Sawyer and Keeler-Wolf 1995)  
The Salt-grass Association (Vestal 1914)

### CLASSIFICATION COMMENTS

**Ouray National Wildlife Refuge:** N/A

**Global Comments:** This graminoid association is characteristically dominated by *Distichlis spicata*. Closely related communities include *Pascopyrum smithii* - *Distichlis spicata* Herbaceous Vegetation (CEGL001580), *Sporobolus airoides* - *Distichlis spicata* Herbaceous Vegetation (CEGL001687), and several others.

### ELEMENT DISTRIBUTION

**Ouray National Wildlife Refuge Range:** *Distichlis spicata* Herbaceous Vegetation occupies flats on floodplain terraces within the Green River floodplain. This vegetation type is readily invaded by salt-cedar, and the most open stands observed were in Brennan Flats, Leota Bottom, and Sheppard Bottom.

**Global Range:** This grassland association occurs in low areas in semi-arid and arid western North America from southern Saskatchewan to Mexico.

**Nations:** CA MX? US

**States/Provinces:** AZ CA CO ID MT NM NV OR SK UT WA WY

**TNC Ecoregions:** 10:C, 11:C, 17:C, 19:C, 20:C, 26:C, 27:C, 6:C

**USFS Ecoregions:** 313D:CC, 315A:CC, 321A:CC, 322A:CC, 322B:CC, 322C:CC, 331A:CC, 331B:CC, 331C:C?, 331D:CC, 331F:CC, 331G:CC, 331H:CC, 331I:CC, 341B:CC, 341C:CC, 341D:CC, 341E:CC, 342A:CC, 342B:CC, 342C:CC, 342F:CC, 342G:CC, 342H:CC, 342I:CC, M332E:CC, M341B:CC

**Federal Lands:** USFWS (Ouray)

### ELEMENT SOURCES

**Identifier:** CEGL001770 **Confidence:** 2 **Conservation Rank:** G5

**REFERENCES:** Baker 1984a, Beatley 1976, Brotherson 1987, Bunin 1985, Costello 1944b, Crouch 1961a, Daniels 1911, Daubenmire 1970, Dodd and Coupland 1966, Franklin and Dyrness 1973, Graham 1937, Hansen et al. 1991, Hansen et al. 1995, Hyder et al. 1966, Johnston 1987, Jones and Walford 1995, Kittel and Lederer 1993, Kittel et al. 1994, Klipple and Costello 1960, Muldavin et al. 2000a, Osborn 1974, Ralston 1969, Ramaley 1942, Rogers 1953, Shanks 1977, Shupe et al. 1986, Soil Conservation Service 1978, Stearns-Roger Inc. 1978, Tuhy and Jensen 1982, Ungar 1967, Ungar 1968, Ungar 1970, Ungar et al. 1969, Vestal 1914, Von Loh 2000, Weaver and Albertson 1956