



Chapter 10: The Rolling Plains

The Rolling Plains is a large region extending from southwestern Oklahoma south to the boundary of the Edwards Plateau, characterized by dry, hot summers and from 16 to 28 inches of annual rainfall. The Rolling Plains are famously recognizable by the "Redbed" soils derived from red-colored, weathered Permian shales and clay sediments. The most important land use in the region is cattle ranching, with much acreage in large holdings (Heerwagen and Aandahl 1961, Correll and Johnston 1970).

Havard (1885, 464) described the region as containing extensive "treeless plains." Overgrazing in the early twentieth century likely encouraged

the spread of mesquite, prickly pears, and other undesirable species (Nelle 1993). The vegetation of the Rolling Plains today is dominated by mesquite, which grows in varying forms ranging from scattered, low stands to open woodlands. Dominant grasses are midgrasses and shortgrasses.

The western edge of the Rolling Plains meets the High Plains at the Caprock Escarpment, a vast line of cliffs and canyons 500-800 feet in height. The Caprock and other exposed bluffs and canyon breaks are characterized by savanna vegetation of junipers and mesquite. Several streams have cut dramatic canyons along the Caprock Escarpment (e.g. Palo Duro, Tule, Los Linguas, and Quitaque canyons) containing small seepage areas (Hutchins 1968). The Canadian River valley or "Canadian Breaks" bisects the High Plains and has similar topography and vegetation to the Caprock. Other types of vegetation in the Rolling Plains include areas of dwarf oak scrub or "shinnery" on drift sands (Wiedeman and Penfound 1960) and narrow corridors of riparian woodland. On the more arid southern plains and Permian Basin (annual rainfall 13-15 inches), mesquite savannas become shorter and less dense and grade into desert scrub codominated by creosotebush, tarbush, and other species (Havard 1885).

Plant Communities of the Rolling Plains

81. Upland mesquite-midgrass savannas.

Synonyms: Mesquite Shrub/Grassland, Mesquite Brush, Mesquite-Lotebush Shrub, Mesquite-Lotebush Brush (McMahan et al. 1984); Mesquite-Midgrass Series (Diamond 1993); Honey Mesquite Woodland Alliance (Weakley et al. 2000).

Description: The dominant vegetation of most of the Rolling Plains consists of open stands of mesquite among range grasses such as grammas, buffalograss, bluestems, Texas wintergrass, purple threeawn, red lovegrass, tobosa, hooded windmillgrass, sand dropseed, and Hall's panicum, as well as abundant forbs

and exotic grasses (Tharp 1939, Whisenant 1981, Heitschmidt and Schultz 1985). Historical accounts suggest that large areas of mesquite-dominated grassland existed prior to Anglo-American settlement and cattle grazing, but grazing pressure has encouraged growth of mesquite, lotebush, prickly pears, and weedy forbs. Reduced grazing, prescribed burning, and brush control can encourage grasses such as bluestems, gramas, and Indiangrass (Nelle 1993).

Status: The extent of mesquite savannas prior to the nineteenth century is uncertain, but this dominant vegetation type now covers millions of acres and occurs in a number of conservation areas (TPWD 1996).

Suggested Priority for Further Protection of Community: Low

82a. Upland mixed grasslands (Rolling Plains).

Synonyms: High Plains Bluestem Postclimax Community (Allred 1956); Bluestem-grama prairie (Küchler 1974); Little Bluestem-Sideoats Grama Herbaceous Alliance, in part; Sideoats Grama Herbaceous Alliance, in part; Blue Grama Herbaceous Alliance, in part (Weakley et al. 2000).

Descriptions: Sandy and sandy loam soils of the Rolling Plains (the Redbeds) support grassland communities of tallgrasses and midgrasses such as sideoats grama. Similar communities extend westward into the High Plains on slopes and sandy areas of concentrated moisture. Other grasses include Canada wildrye, sand bluestem, red lovegrass, Arizona cottontop, and rough tridens, though "increasers" such as purple threeawn, buffalograss, sand dropseed, tobosa, silver bluestem, blue and hairy grama, and tumble windmillgrass are now more prevalent. Forbs may be diverse and abundant; some forbs are more abundant on gypseous soils. Brush species (mesquite, redberry juniper, lotebush, prickly pears) and invasive grasses and annuals are now dominant in many sites (Allred 1956, Heerwagen and Aandahl 1961, Box 1967a, Brown and Schuster 1969, Darrow 1971, Kuchler 1974, Pace and Riskind 1974, Neuenschwander et al. 1978, Barber 1979, Maxwell 1979).

Status: Shortgrasses and brush species increase dramatically with overstocking of cattle, and native midgrasses have been greatly discouraged by overgrazing (Wood and Blackburn 1984). Non-native grasses are widely dominant. Somewhat degraded examples of this vegetation type occur at Copper Breaks State Park and other conservation areas (TPWD 1989b).

Suggested Priority for Further Protection of Community: Medium

82b. Deep sand grasslands (Caprock/High Plains).

Synonyms: High Plains Bluestem (Allred and Mitchell 1955, Rowell 1967); Little Bluestem-Sideoats Grama Herbaceous Alliance (Weakley et al. 2000).

Description: Sand areas, loessal breaks, and canyon slopes in the western Rolling Plains and High Plains may support midgrass communities similar to the more widespread type of the eastern Rolling Plains, with sideoats grama, blue grama, and other grammas, little bluestem, sand bluestem, Indiangrass, red lovegrass, and dropseeds and big sandreed on very fine sands. Sand dropseed, purple threeawn, common sandbur, plains bristlegrass, buffalograss, and tobosa increase with grazing. Sand ridges (e.g. adjacent to stream valleys) may support thickets of Chickasaw plum and skunkbush sumac (Tharp 1928, Rowell 1957, Rowell 1967, Helm and Box 1970, Box 1967b, Darrow 1971).

Status: Examples are protected at Gene Howe WMA, Lake Meredith National Recreation Area and other areas (TPWD 1996).

Suggested Priority for Further Protection of Community: Medium

83. Switchgrass-gamma grass mesic tall grasslands (Great Plains).

Synonyms: Gammagrass-Switchgrass Series (Diamond 1993); Switchgrass-Eastern Gammagrass Herbaceous Alliance, in part (Weakley et al 2000).

Description: Swales and bottomlands in the Rolling Plains may contain tall grass communities with switchgrass, Indiangrass, bluestems, various forbs, and some eastern gammagrass, tall dropseed, prairie cordgrass, and western wheatgrass. Alkali sacaton may be present in somewhat saline sites.

Status: Most remnants have been overgrazed, with short and mid grasses, non-native grasses, and woody species usually increasing. However, examples are protected at Gene Howe WMA, Caprock Canyons State Park, and Buffalo Lake National Wildlife Refuge (TPWD 1996, Nymeyer pers. comm.).

Suggested Priority for Further Protection of Community: Fairly High

84. Sand sage shrub grassland.

Synonyms: Sandsage prairie (Kuchler 1974); Sandsage-Mesquite Brush (McMahan et al. 1984); Sand Sage Shrubland Alliance (Weakley et al. 2000).

Description: Sandy uplands of the Rolling Plains (e.g. Donley and Collingsworth counties) and areas of the High Plains and northeastern Trans-Pecos support grasslands dominated by sand sage and midgrasses such as sand bluestem, little bluestem, big sandreed, and gramas (Darr and Klebenow 1975, Hutchins 1968, Dhillion and Mills 1999, Weakley et al. 2000).

Status: More than 10,000 acres are protected within the Gene Howe WMA, Matador WMA, and other conservation sites (TPWD 1996).

Suggested Priority for Further Protection of Community: Fairly Low

85. Havard shin oak brush.

Synonyms: Havard Shin Oak-Mesquite Brush, Sandsage-Havard Shin Oak Brush (McMahan et al. 1984); Havard Shin Oak-Tallgrass Series (Diamond 1993); Havard Shin Oak Shrubland Alliance (Weakley et al. 2000).

Description: Stabilized sand dunes on level areas of the Rolling Plains and High Plains may be covered by low brush (2-3 feet) or "shinnery" dominated by Havard shin oak. Stands may be almost monospecific or mixed with little bluestem, purple threeawn, sand and giant dropseed, gramas, sand sage, common sandbur, plains and narrowleaf yucca, and other grasses; abundant forbs in sandy prairies include annual wild buckwheat, lazy-daisies, plains sunflower, stiffstem flax, erect dayflower, and many others (Tharp 1939, Wiedeman and Penfound 1960, Hoagland 1997, Dhillion and Mills 1999).

Interdunal drainages are usually dominated by tallgrasses (Weakley et al. 2000). Whether there is a successional relationship between this community and grass-dominated dune communities is unclear.

Status: This community is widespread in the Panhandle and adjacent Oklahoma, though a sizeable percentage has been converted to grassland or rangeland (Dhillon and Mills 1999). Approximately 3,500 acres are protected at Caprock Canyons and Palo Duro Canyon State Parks and Matador WMA (TPWD 1996).

Suggested Priority for Further Protection of Community: Medium

86a. Upland juniper-mesquite savannas.

Synonyms: Juniper-Mixed Brush; Mesquite-Juniper Shrub; Mesquite-Juniper Brush; Mesquite Brush, in part (McMahan et al. 1984); Redberry Juniper Woodland Alliance, in part; One-seed Juniper Woodland Alliance, in part (Weakley et al. 2000).

Description: Breaks (valleys), steep slopes, and shallow upland soils of the southern and western Rolling Plains, Caprock Escarpment, and Canadian Breaks support transitional plant communities between the Rolling Plains and High Plains flora (Rowell 1967). Woody vegetation usually includes scattered redberry or oneseed junipers, Mohr shin oak (especially on more mesic slopes and in canyons), scrub oak, skunkbush sumac, netleaf hackberry, lotebush, agarito, feather dalea, and mesquite, with midgrasses and shortgrasses including sideoats grama, blue grama, sand and little bluestem, purple threeawn, slim tridens, and plains lovegrass, and forbs such as babywhite aster, broomweeds, and many others (Rowell 1967, Ellis and Schuster 1968, Kuchler 1974, Sikes and Smith 1975b, Dye et al. 1995). Havard oak is common on exposed sandstone (Weakley et al. 2000).

Status: Juniper-mesquite savannas are widespread in northwestern Texas, but some sites are artifacts of overgrazing. Good examples occur on the Caprock in Palo Duro Canyon and Caprock Canyons State Parks and on Redbed breaks at Matador WMA; other sites include Copper Breaks State Park, Lake Meredith

National Recreation Area, and Alibates Flint Quarries National Monument. Protected acreage is more than 30,000 acres (TPWD 1996, National Park Service 1996).

Suggested Priority for Further Protection of Community: Low

86b. Rocky Mountain juniper woodlands.

Synonyms: Rocky Mountain Juniper Series (Diamond 1993); Rocky Mountain Juniper Woodland Alliance (Weakly et al. 2000).

Description: Rocky Mountain juniper grows in protected, mesic canyons along the Caprock Escarpment with Mohr shin oak, junipers, elbowbush, other shrubs, gramas, purple threeawn, and sometimes true mountain-mahogany or plains cottonwood (Sikes and Smith 1975b, Adams 1979).

Status: Many seepage areas along the Caprock have dried up, but Rocky Mountain juniper survives in canyon bottoms at Palo Duro Canyon and Caprock Canyons State Parks (TPWD 1996).

Suggested Priority for Further Protection of Community: High

87. Mesquite floodplain brush.

Synonyms: Mesquite-hackberry (McMahan et al. 1984)

Description: Smaller bottomlands and drainages in the southern Rolling Plains contain woodlands of mesquite, western soapberry, netleaf hackberry, skunkbush and littleleaf sumac, tasajillo, lotebush, and saltbushes (Barkley 1936, Darr and Klebenow 1975, Maxwell 1979 McMahan et al. 1984).

Status: Most sites have been overutilized by livestock, with alteration to vegetation resulting. Many drainages and streams are now completely dominated by exotic saltcedar.

Suggested Priority for Further Protection of Community: Low

88. Cottonwood-willow riparian woodlands.

Synonyms: Floodplain forest and savanna (Kuchler 1974); Cottonwood-Hackberry-Saltcedar Brush/Woods, Mesquite-Saltcedar Brush/Woods (McMahan

et al. 1984); Cottonwood-Tallgrass Series (Diamond 1993); Eastern Cottonwood Temporarily Flooded Alliance Woodland (Weakley et al. 2000).

Description: Prior to Anglo-American settlement and cattle grazing, draws and river bottoms in the Rolling Plains were dominated by mixed grasses, including sideoats grama, Indiangrass, sand bluestem, western wheatgrass, switchgrass, and buffalograss, and forbs (e.g. milkvetches, evening-primroses, composites). Woodlands or groves of plains cottonwood, black willow, hackberries, sandbar willow, and western soapberry grow around streams and springs (Havard 1885, Tharp 1939, Rowell 1967, Darrow 1971, McMahan et al. 1984). Creeks, seeps, and a few semipermanently wet playas on the High Plains also support cottonwood and willow woodlands (Rowell 1967).

Status: Most bottomlands have been cleared or extensively grazed, and few examples of this community exist in good condition. Today, many river and stream banks have been colonized by exotic saltcedar to the exclusion of most other plants, though switchgrass, Indiangrass, grammas, bluestems, dropseeds, barnyardgrass, vine-mesquite, and non-native grasses may be common (Sikes and Smith 1975b, Barber 1979). Some riparian areas of variable quality are protected in Caprock Canyons and Palo Duro Canyon State Parks, Matador WMA, and Lake Meredith National Recreation Area, together totalling more than 3,000 acres (National Park Service 1996, TPWD 1996).

Suggested Priority for Further Protection of Community: Medium

Table 10. Conservation areas in the Rolling Plains, with types of vegetation occurring within each area.

Conservation Area	Vegetation Types Occurring in Area	Acreage in Area	Source
Abilene State Park (TPWD)	66,81,82a	622	TPWD 1996
Alibates Flint Quarries National Monument and Lake Meredith National Recreation Area (NPS)	82b,86a,89	9,139 (land)	NPS 1996
Big Spring State Park (TPWD)	82,86a (25%)	383	TPWD 1996
Caprock Canyons State Park and Trailway (TPWD)	81,82a (40%),82b (20%),83,84 (<1%),85 (5%),86a (18%),86b (1%),88 (1%),89 (15%)	16,376	TPWD 1996
Copper Breaks State Park (TPWD)	81,82 (42%),82b,86a (45%),88	1,889	Darrow 1971, Pace and Riskind 1973, TPWD 1996
Fort Griffin State Historical Park (TPWD)	81 (42%),82 (45%)	507	TPWD 1996
Fort Richardson State Historical Park (TPWD)	26 (4%),80 (47%),82 (35%)	396	TPWD 1996
Gene Howe State WMA (TPWD)	29 (1%), 82,83 (33%?),84 (51%),89 (5%)	6,713	TPWD 1996, 1997
Lake Colorado City State Park (TPWD)	82 (69%),86a (30%)	500	TPWD 1996
Matador State WMA (TPWD)	84 (25%),85 (5%),86a (64%),88 (5%)	28,184	TPWD 1996
Palo Duro Canyon State Park (TPWD)	85 (8%),86a (60%),86b (1%),88 (8%),89 (23%)	16,402	TPWD 1996
San Angelo State Park (TPWD)	76b (5%?),87 (28%?)	7,667	TPWD 1996
Total: 88,778 acres (.34 percent of region)			
Abbreviations of Managing Entities: TPWD=Texas Parks and Wildlife Dept. NPS=National Park Service			