Field Key to Ecological Systems and Target Alliances of LandFire Map Zones 27, 33, and 34 (Southwestern Great Plains)

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Introduction

The following keys to NatureServe ecological systems and selected US-NVC vegetation alliances were developed relying on keys developed for surrounding map zones, specifically map zones 26 and 29 . The keys cover the areas found in MRLC & LANDFIRE map zones: 27, 33, and 34 (Figure 1). The systems and alliances included in these keys are intended to represent the legend that LANDFIRE will be striving to map for existing vegetation in the United States. Some types are in the keys that characteristically occur at small spatial scales (generally < 2 ha in size) and hence may not be mappable by the LANDFIRE project. However, we have chosen to be inclusive in the keys, so that the user will have information on these system types for comparison purposes. In some cases they may be important for modeling fire condition class and, given their relative distinctiveness on the landscape, they may indeed be mappable.

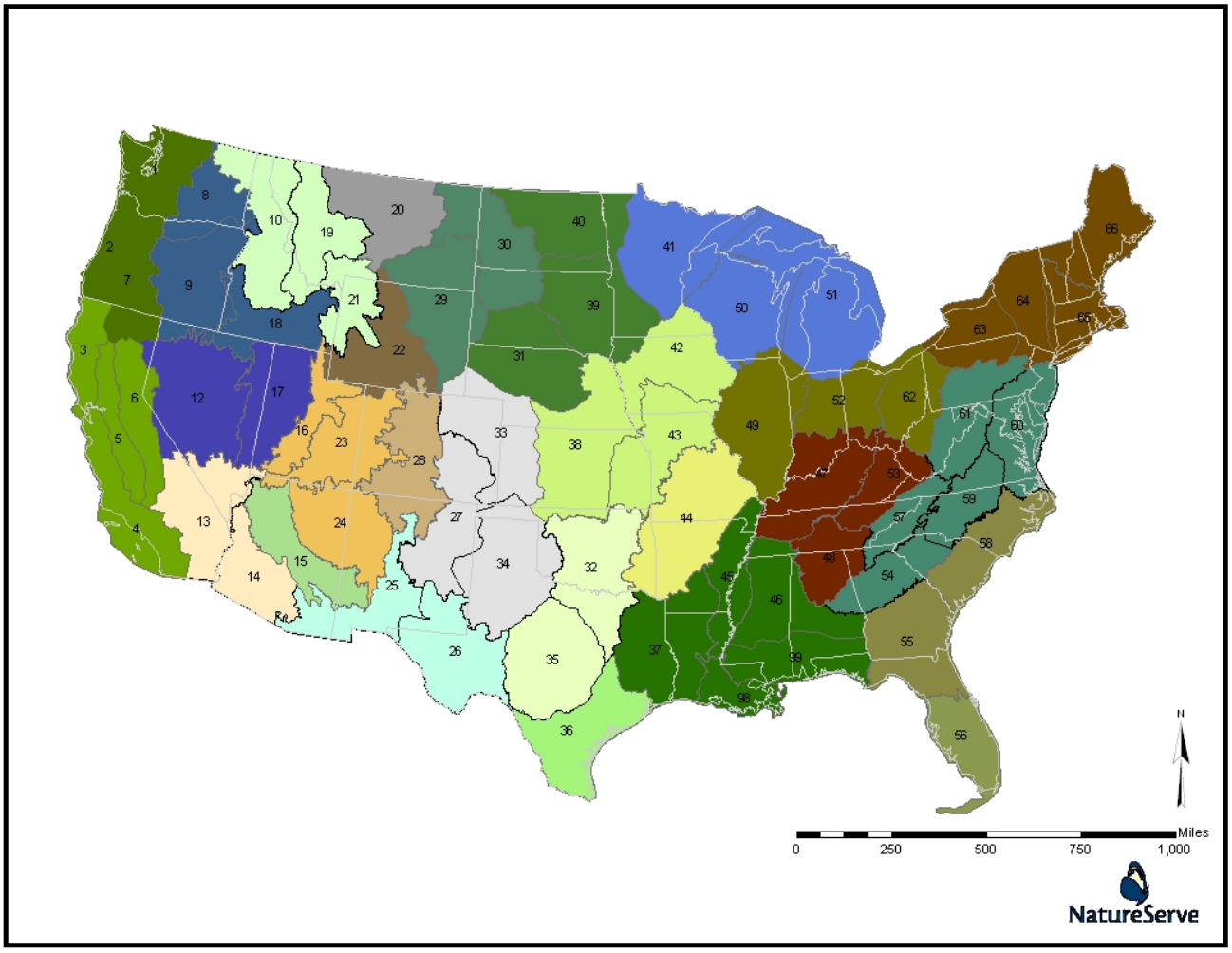

Figure 1. LANDFIRE map zone clusters with keys to ecological systems and selected alliances.

The field keys have been organized into map zone 'clusters' that are similar ecologically and geographically (Figure 1). This key is for ecological systems and mappable alliances that occur in the Southwestern Great Plains (map zones 27, 33, and 34). Peripheral ecological systems common in adjacent map zones are included in the keys to facilitate inclusiveness.

Plant names are almost always in Latin and follow the nomenclature of Kartesz (1999). In limited cases, we have included synonyms for some taxa.

The keys are "dichotomous," which means the user follows the order of the 'couplets' and makes a choice between the 2 options represented in the couplet. The ordering of the couplets in each key does matter, and the user should choose the option in each couplet that best fits the data or field situation. A choice leads the user to the next couplet to be utilized in the keying process, via a number at the far right, or else leads to a final result (an ecological system type or an alliance).

If the choice the user makes leads to a "result," then either an Ecological System is named or a Vegetation Alliance is named. Alliances are recognizable because "alliance" is in the name,

and they all start with one or more Latin names (e.g., *Pinus ponderosa* Woodland Alliance). Ecological Systems do not include Latin species names in them, and always start with a biogeographic region (e.g., Colorado Plateau Mixed Low Sagebrush Shrubland). If an ecological system name is followed by a number in parentheses, the couplet so numbered is to alliances that are part of the system and which may be mappable.

All keys follow the same logic. The first key directs the user to major keying groups (Key A: sparse vegetation, Key B: wooded wetlands, Key C: wooded uplands, etc.). Within these keying groups, users will be able to follow the keys directly to a system and/or alliance.

Keys are generally based on dominance within vegetation strata, with tree cover generally considered first, then that of shrubs, then the herbaceous component. Co-dominant species within a given strata are important as well, in some cases a system type or alliance will have 2 or more co-dominant species, which may or may not be present in all stands. Some ecological system types will have a variable physiognomy; where appropriate these variable systems have been placed into the keys in several places (i.e., some grassland systems have a "shrub steppe" physiognomy (especially when disturbed) and hence will be in the key both as shrub steppe and herbaceous).

Some terminology is commonly employed throughout the keys that distinguish general spatial characteristics of the vegetation or environmental setting. For example 'matrix' types of vegetation are dominant across the majority of a given landscape, while 'large patch' types tend to occur as distinctive patches within the larger 'matrix.' Elevation-based life zones are commonly employed, with reference to 'alpine,' 'subalpine,' 'montane,' or 'foothill' zones. These zones vary in actual elevational thresholds across multiple map zones, and within individual map zones. More precise definition of these elevation breaks by map zone could be accomplished with additional research.

In the next section of the document we have provided a table showing the LANDFIRE legend units that represent non-natural vegetation and a short description for each of them. They are not formally incorporated into the keys, since they are typically recognizable without the use of a key, or else their floristic composition is so variable as to be not useful in a field key. Our primary purpose was to provide keys for the natural and near-natural vegetation of these zones.

Land Use, Unvegetated, Semi-natural and Altered Vegetation

LAND USE OR UNVEGETATED SURFACES	
Open Water	Open water
Developed	Generally developed lands.
Developed, Open Space	Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.
Developed, Low Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units.

Developed, Medium Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-80% of the total cover. These areas most commonly include single-family housing units
Developed, High Intensity	Includes highly developed areas where people reside in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to100% of the total cover.
Agriculture	Generally developed for agricultural uses.
Pasture/Hay	These agriculture lands typically have perennial herbaceous cover (e.g. regularly-shaped plantings) used for livestock grazing or the production of hay. There are obvious signs of management such as irrigation and haying that distinguish it from natural grasslands. Identified CRP lands are included in this land cover type.
Cultivated Crops and Irrigated Agriculture	These areas are used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.
Perennial Ice/Snow	
SEMI-NATURAL / ALTERED VEGETATION	
Ruderal Vegetation	Vegetation resulting from succession following significant anthropogenic disturbance of an area. It is generally characterized by unnatural combinations of species (primarily native species, though they often contain slight or substantial numbers and amounts of species alien to the region as well)
Ruderal Upland - Old Field	
Ruderal Upland - Abandoned Tree Plantation	
Ruderal Wetland	
Introduced Vegetation	Vegetation dominated by introduced species. These are spontaneous, self-perpetuating, and not (immediately) the result of planting, cultivation, or human maintenance. Land occupied by introduced vegetation is generally permanently altered (converted) unless restoration efforts are undertaken.
Introduced Upland Vegetation - Treed	Land cover is significantly altered/disturbed by introduced tree species.
Introduced Upland Vegetation - Shrub	Land cover is significantly altered/disturbed by introduced woody and/or herbaceous vegetation.
Introduced Upland Vegetation - Annual and Biennial Forbland	Land cover is significantly altered or disturbed and dominated by introduced annual and biennial forbs. Natural vegetation types are no longer recognizable. Typical species that dominate these areas include *Acroptilon repens, Leucanthemum vulgare, Circium arvense, C. vulgare, Euphorbia esula, Lepidium latifolium, Carduus nutans, Centaurea* spp*. (melitensis, solstitialis), Kochia scoparia, Halogeton glomeratus, Melilotus officinalis*, *Trifolium repens* and *Erodium cicutarium.*
SEMI-NATURAL / ALTERED VEGETATION (Continued)	
Introduced Upland Vegetation - Annual Grassland	Land cover is significantly altered or disturbed and dominated by introduced annual grasses. Natural vegetation types are no longer recognizable. Typical species include *Bromus catharticus, B. japonicus, B. rigidus, B. rubens, B. tectorum, Eragrostis cilianensis*, and *Schismus barbatus*.
Introduced Upland Vegetation - Perennial Grassland and Forbland	Land cover is significantly altered/disturbed by introduced, non-native perennial grasses and forbs. Natural vegetation types are no longer recognizable. Grass species include *Agropyron cristatum, Eragrostis lehmanniana, E. curvula, Poa bulbosa, Bromus inermis, Phleum pratense*, and *Poa pratensis*. Forbs may include: *Centaurea* spp*., Cirsium arvense, Euphorbia esula, Lepidium* spp*., Melilotus* spp.
Introduced Riparian Vegetation	Land cover is altered/disturbed and dominated by introduced woody vegetation (woodlands and shrublands). Typical riparian trees and shrubs include *Elaeagnus angustifolia, Tamarix* spp., *Triadica sebifera,* etc.
Introduced Wetland Vegetation	Land cover is altered/disturbed and dominated by introduced wetland vegetation. Species may include *Lythrum salicaria, Phalaris arundinacea, Phragmites australis*, etc.
Modified/Managed Vegetation	Vegetation resulting from management or modification of natural/near natural; vegetation, but producing a structural and floristic combination not clearly known to have a natural analogue. Modified vegetation may be easily restorable by either management, restoration of ecological processes, and/or succession.
Modified/Managed Upland Vegetation	Land cover is apparently managed/modified and dominated by trees and/or shrubs. Vegetation is a mixture of herbaceous, shrub, and tree species.

Recently Burned Forest and Woodland	Land cover is apparently modified by recent fires which have burned forest and woodland vegetation. Vegetation is a mixture of herbaceous, shrub, and tree species.
Recently Burned Shrubland	Land cover is apparently modified by recent fires which have shrubland vegetation. Vegetation is a mixture of herbaceous and shrub species.
Recently Burned Grassland	Land cover is apparently modified by recent fires which have burned grassland vegetation. Vegetation is a mixture of herbaceous and shrub species.
Managed Tree Plantation	Land cover is apparently modified and appears as a managed tree plantation.
Recently Logged Timberland	Land cover is apparently modified and appears as logged timberland.
Modified/Managed Wetland Vegetation	These areas include created and obviously managed wetlands of varying size resulting from water diversion. Artificial Wetlands will be mapped where obvious built structures may be distinguished from imagery.

Key to LandFire Map Zones 27, 33, and 34 Ecological Systems and Target Alliances (Including Central and Southern High Plains, Arkansas Tablelands, Northern Pecos Valley, and Rolling Plains of Texas)

This key is intended for identifying Terrestrial Ecological Systems and selected alliances that are found in the Central High Plains, portions of the Ogallala High Plains, and southwestern edge of Nebraska Sandhills (Mapping Zone # 33), foothills of the Southern Rocky Mountains, Arkansas Tablelands, south to the Pecos River Valley (Map Zone #27), as well as the Southern High Plains and Rolling Plains of Texas (Mapping Zone # 34). Several peripheral and small patch Ecological Systems were added to the key for comparison, although they may not be mapped by LandFire. Additional alliance couplets are to proposed mappable or target alliances and are not intended to be comprehensive.

Please note the following conventions used to designate the systems and alliances:

- ***a*** **indicates** a NS ecological system that has been grouped into a broader LANDFIRE Map Unit (wetland, riparian, and sparsely vegetated circumstances). Included to help clarify key, but crews need to record broader LANDFIRE Map Unit ***(b)***
- ***b*** **indicates** a broader LANDFIRE Map Unit (system group).
- ***c*** **indicates a** typically small patch ecological system type not being mapped by LANDFIRE.
- ***d*** **indicates** an alliance not considered to be mappable for LANDFIRE purposes, but included to help characterize the vegetation.
- ***e*** **indicates** a type that is peripheral map zones 27, 33, and 34 that would only occur in transition areas near boundaries of these map zones.

1a. Total canopy cover generally less than 10%. ..... **KEY A: Sparse Vegetation**
1b. Total canopy cover greater than 10%. **2**

2a. Total woody canopy cover is greater than or equal to 10% **3**
2b. Total woody canopy cover less than 10% **5**

3a. Woodlands and/or shrublands restricted to drainages, floodplains, riparian or semi-riparian flats, saline basins, springs, or seeps ..... **KEY B: Wetland Associated Woodland and Shrubland Systems and Alliances**
3b. Woodlands and/or shrublands of upland sites **4**

4a. Upland forests and woodlands (generally >25% tree cover) OR upland savannas (10 to 25% cover of trees generally > 3m tall, and often >20% cover of perennial graminoids). ..... **KEY C: Upland Forest, Woodland and Savanna Systems and Alliances**
4b. Upland shrublands, including dwarf-shrublands and shrub-steppe (10 to 25% cover of shrubs and >20% cover of perennial graminoids). ..... **KEY D: Upland Shrubland, Dwarf-shrubland and Shrub-steppe Systems and Alliances**

5a. Herbaceous vegetation restricted to wetland sites associated with drainages, basins, springs, or seeps ..... **KEY E: Wetland Associated Herbaceous Systems and Alliances**
5b. Herbaceous vegetation of uplands..... **KEY F: Upland Herbaceous Systems**

KEY A: Sparsely Vegetated Systems
(Total canopy cover <10%)

1a. Land cover is active and/or partially vegetated (stabilized) dunes or sand sheet. **2**
1b. Land cover not active and/or stabilized dunes or sand sheet. **5**

2b. Barren or sparsely vegetated sand deposits in either extreme northwestern portion of MZ 33 or extreme southern Great Plains transition to deserts..... **3**
2a. Barren or sparsely vegetated inclusions (blowouts) in sand deposits in the Great Plains. **4**

3a. Active and/or partially vegetated (stabilized) dunes or sand sheet found in the extreme southern portion of MZ 27, south of US Highway 60. ..... **(North American Warm Desert Active and Stabilized Dune[a, e])** ..... **North American Warm Desert Sparsely Vegetated Systems[b]**
3b. Active and/or partially vegetated (stabilized) dunes or sand sheet found on the western edge of map zones 27 or 33, north of US Highway 60. Occurrence of this system in these map zones is not yet confirmed. ..... **(Inter-Mountain Basins Active and Stabilized Dune[a, e])** ..... **Inter-Mountain Basins Sparsely Vegetated Systems[b]**

4a. Surrounding vegetation dominated by a shrub-steppe grasslands that are characterized by the presence of shrub species such as *Artemisia filifolia* and/or *Quercus havardii*, though these shrub species may have low cover in some situations. Characteristic herbaceous species are *Psoralidium lanceolatum, Redfieldia flexuosa, Achnatherum oryzopsis* in blowouts. In adjacent plains *Andropogon hallii is* characteristically present with *Calamovilfa longifolia* common in northern MZ33, *Calamovilfa gigantea* and *Sporobolus giganteus c*ommon in MZ 34 and southern MZ 27 and western *Hesperostipa comata* and *Sporobolus cryptandrus* common in northern MZ 27 .... **Western Great Plains Sandhill Steppe**
4b. Surrounding vegetation dominated by grasslands, sometimes occurring as large patch sand prairie, such as in the Nebraska Sandhills. Significant shrub cover of the above species is generally lacking. Characteristic species are *Psoralidium lanceolatum* and *Redfieldia flexulosa*, are common in blowouts with *Andropogon hallii* and *Calamovilfa longifolia* common in adjacent sand prairie ..... **Western Great Plains Sand Prairie**

5a. Sparse woodland with scattered *Juniperus* (*monosperma, pinchotii*, or *virginiana*), associated with perennial or intermittent stream canyons and dissected mesa escarpments. *Pinus edulis* may be present but never dominant. A mosaic of shrub species on canyon walls and slopes may include *Artemisia bigelovii, Cercocarpus montanus, Rhus trilobata, Ribes* spp., *Prosopis glandulosa* (in Texas), *Ptelea trifoliata, Philadelphus microphyllus,* or *Yucca glauca.* .... **(Southwestern Great Plains Canyon[a])** ..... **Western Great Plains Sparsely Vegetated Systems[b]**
5b. Land cover not as above. If land cover is associated with drainages, then vegetation not a sparse juniper woodland..... **6**

6a. Barren to sparsely vegetated playas in saline intermittently flooded depressional basins of the plains. Salt tolerant and halophytic species such as *Distichlis spicata, Sporobolus airoides,* and *Hordeum jubatum* characterize this system. Other commonly encountered species include *Salicornia* spp., *Schoenoplectus maritimus, S. americanus, Spartina* spp., and *Suaeda* spp. Salt encrustations can occur on the soil surface. .... **(Western Great Plains Saline Depression Wetland[a])** ..... **Western Great Plains Depressional Wetland Systems[b]**
6b. Not as above. **7**

7a. Land cover occurs along springbranch or dry canyons in the northwestern plains. Limestone and sandstone rock outcrops and cliffs are common. These canyons typically sparse, but may contain elements of other systems that form a complex, small-patch or linear mosaic. Vegetation varies locally depending on aspect, slope position and substrate and can range from riparian vegetation to xeric or mesic woodlands. Dominant tree species include *Populus deltoides, Fraxinus pennsylvanica, Ulmus rubra, Pinus ponderosa,* and *Juniperus* spp.; shrub species may be present. If this occurs in this map zone, it will occur in the northern portions of MZ 33..... ..... **Northwestern Great Plains Canyon**

7b. Land cover not as above..... **8**

8a. Land cover is restricted to drainages (sometimes intermittently flooded) with a variety of sparse, intermittent, or patchy vegetation..... **9**

8b. Land cover in areas not restricted to drainages **10**

9a. Vegetation, though sparse or patchy, may include *Sarcobatus vermiculatus, Ericameria nauseousa, Fallugia paradoxa,* or *Grayia spinosa.* Herbaceous vegetation such as perennial grasses, *Distichlis spicata* or *Sporobolus airoides,* may also dominate wash. If found in these map zones, restricted to the western edge of MZ 27, north of U.S. Highway 60, and possibly the northwestern edge of MZ 33. Occurrence of this system in these map zones is not yet confirmed. ..... **(Inter-Mountain Basins Wash[a, e])** .....**Inter-Mountain Basins Sparsely Vegetated Systems[b]**

9b. Vegetation often includes denser clumps of discontinuous vegetation (shrubs, grasses and occasional trees), but overall washes are typically sparsely vegetated. Common species may include *Acacia greggii, Brickellia laciniata, Baccharis sarothroides, Chilopsis linearis, Fallugia paradoxa, Hymenoclea salsola, Hymenoclea monogyra, Juglans microcarpa, Prosopis* spp., *Psorothamnus spinosus, Prunus fasciculata, Rhus microphylla, Salazaria mexicana* or *Sarcobatus vermiculatus*. Herbaceous vegetation such as perennial grasses, *Distichlis spicata* or *Sporobolus airoides* may also dominate wash. Found in the extreme southern end of MZ 27, south of U. S. Highway 60. .....**(North American Warm Desert Wash[a])** .....**North American Warm Desert Sparsely Vegetated Systems[b]**

10a. Land cover is volcanic substrate (includes lava, cinder, ash deposits). Common in northeastern NM (Capulin NM).....**(Inter-Mountain Basins Volcanic Rock and Cinder Land[a])** .....**Inter-Mountain Basins Sparsely Vegetated Systems[b]**

10b. Land cover is not volcanic substrate, but of other consolidated rock (cliffs and/or outcrops). ... **11**

11a. Land cover is largely exposed bedrock and scree found in montane sites on the western edge of MZ 27 or 33, generally above 2000 m in elevation..... ..... **(Rocky Mountain Cliff, Canyon and Massive Bedrock[a])** ..... **Rocky Mountain Alpine/Montane Sparsely Vegetated Systems[b]**

11b. Land cover is exposed bedrock, cliffs, outcrops or scree, but found below 2000 m and not in montane sites. May be found in areas away from the western edge of MZ 27 and 33..... **12**

12a. Land cover is consolidated rock on cliffs or outcrops, found in desert conditions in the extreme southern end of MZ 27 (south of U. S. Highway 60). Occurrence of this system in any of these map zones has not been confirmed..... .....**(North American Warm Desert Bedrock Cliff and Outcrop[a])** .....**North American Warm Desert Sparsely Vegetated Systems[b]**

12b. Land cover is exposed bedrock and/or scree and may be widespread throughout the map zones. ..... (**Western Great Plains Cliff and Outcrop[a])** .....**Western Great Plains Sparsely Vegetated Systems[b]**

KEY B: Riparian or Wetland Associated Forest, Woodland and Shrubland Systems and Alliances
(Woody cover >10% present and occurring on wetland or riparian sites)

1a. Woodlands and shrublands restricted to drainages and semi-riparian flats that are dominated by the introduced species *Elaeagnus angustifolia* or *Tamarix* spp. **2**

1b. Woodlands and shrublands restricted to drainages and semi-riparian flats that are NOT dominated by the introduced species *Elaeagnus angustifolia* or *Tamarix* spp.. ..... **3**

2a. Woodlands restricted to drainages and semi-riparian flats that are dominated by introduced *Elaeagnus angustifolia*.....**(*Elaeagnus angustifolia* Semi-Natural Woodland Alliance[a])**
..... **Invasive Riparian Woodland and Shrubland[b]**

2b. Woodlands and shrublands restricted to drainages and semi-riparian flats that are dominated by introduced *Tamarix* spp.....
..... **(*Tamarix* spp. Semi-Natural Temporarily Flooded Shrubland Alliance[a])**
..... **Invasive Riparian Woodland and Shrubland[b]**

3a. Land cover is restricted to intermittently flooded drainages with vegetation forming an intermittent to continuous linear band along the sides of washes. Overall vegetation cover is relatively sparse (~10%), but patches may greatly exceed 10% cover..... **4**

3b. Not as above..... **5**

4a. Vegetation of desert drainages in the extreme southern portion of MZ 27 (south of U. S. Highway 60), characterized by shrub species such as *Acacia greggii, Brickellia laciniata, Chilopsis linearis, Fallugia paradoxa, Juglans microcarpa, Prosopis* spp., or *Rhus microphylla.*.....
..... **(North American Warm Desert Wash[a, e])**
.....**North American Warm Desert Sparsely Vegetated Systems[b]**

4b. Vegetation restricted to drainages and characterized by a variety of sparse, intermittent, or patchy shrubs including *Sarcobatus vermiculatus, Ericameria nauseosa,* or *Fallugia paradoxa.* Herbaceous vegetation such as perennial grasses, *Distichlis spicata* or *Sporobolus airoides*, may also dominate these washes. If found in these map zones, restricted to the western edge of MZ 27 or northwestern corner of MZ 33. Occurrence of this system in these map zones has not been confirmed. ..... **(Inter-Mountain Basins Wash[a, e])**
..... **Inter-mountain Basins Sparsely Vegetated Systems[b]**

5a. Shrublands of saline/alkaline basins or stream terraces. Halophytic species such as *Atriplex* spp. or *Sarcobatus vermiculatus* dominate the shrub layer..... **14**

5b. Woodlands or shrublands of drainages, floodplains, riparian or semi-riparian sites, not associated with saline/alkaline sites and not characterized by halophytic species **6**

6a. Woodlands and/or shrublands of higher elevation mountain sites, generally >2600 m in elevation (upper montane-subalpine-alpine). If found in these map zones, restricted to high elevations.... **7**

6b. Woodlands and/or shrublands of middle and lower elevations, generally <2600 m (lower montane to valley floor)..... **8**

7a. Woodlands restricted to drainages, stream terraces, semi-riparian flats and spring or seep fed slopes.....**(Rocky Mountain Subalpine – Montane Riparian Woodland[a])**
..... **Rocky Mountain Subalpine/Upper Montane Riparian Systems[b]**

7b. Shrublands restricted to drainages, stream terraces, semi-riparian flats, and spring or seep fed slopes. Species of *Salix, Alnus,* or *Betula* are commonly present. .....
..... **(Rocky Mountain Subalpine – Montane Riparian Shrubland)**
..... **Rocky Mountain Subalpine/Upper Montane Riparian Systems[b]**

8a. Woodlands or shrublands occurring in desert or desert mountain situations in the extreme southern portion of MZ 27, south of U. S. Highway 60.. ..... **9**

8b. Woodlands or shrublands occurring in montane sites away from desert situations, or woodland or shrubland occurring on the plains **10**

9a. Woodlands or shrublands of mid- to upper elevations (1100-1800 m) occurring on riparian corridors along perennial and seasonally intermittent streams. The vegetation is a mix of riparian woodlands and shrublands with dominant trees including *Populus angustifolia, Populus deltoides* ssp. *wislizeni, Fraxinus velutina* and *Sapindus saponaria*. Shrub dominants include *Salix exigua, Prunus* spp., and *Baccharis salicifolia*. Generally restricted to mountain canyons. Occurrence of this system in these map zones has not been confirmed..... **(North American Warm Desert Lower Montane Riparian Woodland and Shrubland[a, e])** ..... **North American Warm Desert Riparian Systems[b]**

9b. **10**

10a. Woodlands or shrublands of lower elevations (<1100 m) occurring on riparian corridors along perennial and seasonally intermittent streams. The vegetation is composed of woodlands and shrublands strongly dominated by *Prosopis glandulosa* or *Prosopis pubescens*, sometime with scattered *Populus deltoides* ssp. *wislizeni, Fraxinus velutina* and *Salix gooddingii,* and shrubs *Baccharis salicifolia, Pluchea sericea, and Salix exigua*..... **(North American Warm Desert Riparian Mesquite Bosque[a, e])** ..... **North American Warm Desert Riparian Systems[b]**

10b. Woodlands or shrublands, sometimes occurring as a mosaic, in low-elevation (<1200 m) riparian corridors along medium to large perennial streams in canyons or desert valleys (possibly along the Pecos River). Dominant trees include *Acer negundo, Fraxinus velutina, Populus deltoides* ssp. *wislizeni, Salix gooddingii*, and *Celtis laevigata* var. *reticulata. Salix exigua* may be a dominant of the shrub layer. ..... **(North American Warm Desert Riparian Woodland and Shrubland[a, e])** ..... **North American Warm Desert Riparian Systems[b]**

11a. Woodlands or shrublands occurring in riparian sites of the lower montane zone occupying a broad elevational range, from approximately 900 to 2800 m. This system often occurs as a mosaic of multiple communities that are tree-dominated with a diverse shrub component. Dominant trees often include *Populus angustifolia*, with *Acer negundo, Populus balsamifera, Populus deltoides, Pseudotsuga menziesii, Picea pungens, Salix amygdaloides,* or *Juniperus scopulorum* preset to co-dominant. Restricted to the western portions of MZ 27 and 33. ..... **(Rocky Mountain Lower Montane Riparian Woodland and Shrubland[a])** ..... **Rocky Mountain Montane Riparian Systems[b]**

11b. Woodlands or shrublands occurring in mesic riparian sites of the Great Plains, not associated with montane sites. **12**

12a. Woodlands or shrublands dominated by *Prosopis glandulosa*. *Ziziphus obtusifolia* or *Atriplex canescens* can co-dominate in some examples, as can *Opuntia* species in heavily grazed areas. Herbaceous cover is generally graminoid and may range from shortgrass to mid-grass species, as well as some introduced species. Historically, this system probably occurred as a natural component on more fertile soils and along drainages, but it has expanded its range into prairie uplands in recent decades. ..... **Western Great Plains Mesquite Woodland and Shrubland**

12b. Woodlands or shrublands occurring along drainages, floodplains, and semi-riparian flats and NOT dominated by *Prosopis glandulosa*. **13**

13a. Riparian woodlands or shrublands restricted to mesic draws and ravines along streams of small sizes, from small drainages to small rivers. Stands may occur on steep northern slopes or within canyon bottoms that do not experience periodic flooding, but where soil moisture and topography allow greater than normal moisture conditions compared to the surrounding areas. *Juniperus* spp., *Fraxinus* spp., *Ulmus rubra* or *Ulmus americana* are typically dominant. Species in the shrub layer may include *Cornus sericea, Crataegus douglasii, Crataegus chrysocarpa, Crataegus succulenta, Elaeagnus commutata, Prunus virginiana, Rhus* spp., *Rosa woodsii, Shepherdia argentea, Symphoricarpos occidentalis,* or *Viburnum lentago*. ..... **Western Great Plains Wooded Draw and Ravine**

13b. Riparian woodland or shrublands that are NOT restricted to mesic draws and ravines, but occur on small to large rivers **15**

14a. Woodlands or shrublands occurring in riparian areas of medium and small rivers. Communities types range from riparian forests and shrublands to gravel/sand flats, and may occur in highly variable settings, from deep cut ravines to wide, braided streambeds. Hydrologically, these sites tend to be more flashy with less developed floodplain than on larger rivers (see couplet 14b.), and may dry down for some portion of the year. Dominant species include *Populus deltoides* ssp. *monilifera*, *Salix* spp., *Artemisia cana* ssp. *cana, Pascopyrum smithii, Sporobolus cryptandrus,* and *Schizachyrium scoparium.* Degraded sites may have *Elaeagnus angustifolia* and/or *Tamarix* spp. present, but not dominated by them. ..... **(Western Great Plains Riparian Woodland and Shrubland[a])** ..... **Western Great Plains Riparian Systems[b]**

14b. Woodlands or shrublands occurring in riparian areas of medium to large rivers. Dominant communities range from floodplain forests to wet meadows to gravel/sand flats, and sites are typically on alluvial soils with periodic, intermediate flooding (every 5 to 25 years). Dominant woody species include *Populus deltoides* ssp. *monilifera* and *Salix* spp. Grass cover beneath the trees is important and is a mix of tallgrass species, including *Panicum virgatum* and *Andropogon gerardii*. Degraded sites may have *Elaeagnus angustifolia* and/or *Tamarix* spp. present, but are not dominated by them. ..... **(Western Great Plains Floodplain[a])** ..... **Western Great Plains Riparian Systems[b]**

15a. Open to moderately dense shrublands dominated by *Sarcobatus vermiculatus*. *Atriplex canescens, A. confertifolia,* or *Krascheninnikovia lanata* may be preset to co-dominant with patches of *Distichlis spicata* grasslands. ..... **Inter-Mountain Basins Greasewood Flat**

15b. Shrublands NOT dominated by *Sarcobatus vermiculatus*. **16**

16a. Desert scrub composed of *Atriplex canescens* along with *Allenrolfea occidentalis, Flourensia cernua, Salicornia* spp., *Suaeda* spp., or other halophytic plants. Graminoid species may include *Sporobolus airoides* or *Distichlis spicata*. Chihuahuan desert species such as *Larrea tridentata* may be present. If present in these map zones, then only in the extreme southern portion of MZ 27, south of U. S. Highway 60. ..... **Chihuahuan Mixed Salt Desert Scrub[e] (17)**

16b. Open to moderately dense shrublands typically composed of *Atriplex* species such as *A. canescens* or *A. confertifolia*, but not found in desert situations of the extreme southern portion of MZ 27 and lacking Chihuahuan desert species such as *Flourensia cernua* or *Larrea tridentata*. In these map zones, this system is restricted to the western portion of MZ 27. ..... **Inter-Mountain Basins Mixed Salt Desert Scrub[e] (17)**

17a. *Atriplex confertifolia* dominates the shrub layer ..... ***Atriplex confertifolia* Shrubland Alliance [d]**

17b. *Atriplex canescens* dominates the shrub layer. ..... ***Atriplex canescens* Shrubland Alliance[d]**

KEY C: Upland Forest, Woodland and Savanna Systems and Alliances (Woody cover >10% and occurring on upland sites)

1a. Woodlands occurring on irregular plains comprised of sandy to loamy soils and characterized and dominated by short, stunted *Quercus stellata* and *Quercus marilandica*. The understory often contains species of the surrounding prairie, in particular *Schizachyrium scoparium.* May be invaded by *Juniperus virginiana* and *Prosopis glandulosa.* Restricted to areas east of U. S. Highway 283 on the eastern edge of MZ 34. ..... **Crosstimbers Oak Forest and Woodland**

1b. Woodlands, forests, or savannas NOT dominated by short, stunted *Quercus stellata* or *Quercus marilandica* **2**

2a. Broadleaf woodlands dominated by Madrean oaks such as *Quercus arizonica, Q. emoryii, Q. gravesii, Q. grisea, Q. hypoleucoides, Q. oblongifolia*, and *Q. rugosa*. If present in these map zones, then restricted to the extreme southwestern edge of MZ 27..... **Madrean Encinal**[e]

2b. Forest, woodlands or savannas NOT dominated by species of the above Madrean oaks..... **3**

3a. Forests or woodlands dominated or co-dominated by *Populus tremuloides.* **4**

3b. Forests or woodlands NOT dominated or co-dominated by *Populus tremuloides.* **6**

4a. Broadleaf forest or woodland typically dominated by *Populus tremuloides* with possible inclusions of other broadleaf tree species and less than 25% relative cover of conifer trees. Common in montane situations in the western portions of MZ 27 and 33..... ..... **Rocky Mountain Aspen Forest and Woodland (5)**

4b. Mixed conifer-broadleaf forest or woodland co-dominated by *Populus tremuloides* and a conifer tree (broadleaf and conifer trees, each with cover over 25% of total tree canopy cover). If present in these map zones, then restricted to the western edge of MZ 27 and 33. .... **Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland**[e]

5a. Broadleaf forest (tree cover >60%) dominated by *Populus tremuloides*..... ..... ***Populus tremuloides*** **Forest Alliance**[d]

5b. Broadleaf woodland dominated by *Populus tremuloides*..... ..... ***Populus tremuloides*** **Woodland Alliance**[d]

6a. Forests or woodlands dominated by broadleaf or deciduous tree species **7**

6b. Forests, woodlands, or savannas dominated by conifer tree species (small patch inclusions of mixed conifer-broadleaf forests and woodlands may be present) **8**

7a. Forest or woodland dominated by *Quercus macrocarpa*. Other species, such as *Tilia americana, Juniperus virginiana*, and *Fraxinus* spp. may be present. This system is restricted to the northern portions of MZ 33. ..... **Western Great Plains Bur Oak Forest and Woodland**

7b. Woodland dominated by *Prosopis glandulosa*. *Ziziphus obtusifolia, Atriplex canescens, Juniperus* spp. may be present to co-dominant in these woodlands. *Prosopis glandulosa* dominated woodlands were once restricted to drainages with deeper alluvial soils, but have become prevalent in various sites, particularly in the southern 2/3 of MZ 34..... ..... **Western Great Plains Mesquite Woodland and Shrubland**

8a. Savannas with 10 to 25% cover of trees (generally > 3 m tall with a single main stem) over perennial grassland (25% or more herbaceous cover)..... **9**

8b. Forests or woodlands with generally >25% tree cover, or if between 10 and 25% cover, then herbaceous cover is less than 25%. **12**

9a. Savannas with the overstory dominated by *Pinus ponderosa*. **10**

9b. Savannas with the overstory dominated by *Juniperus* spp.... ..... **11**

10a. Savanna characterized by *Pinus ponderosa* often with sparse to dense cover of *Juniperus scopulorum* or species of *Cercocarpus*. The herbaceous layer typically contains species of the surrounding prairie, including *Andropogon gerardii, Bouteloua curtipendula, Carex inops* ssp. *heliophila, Carex filifolia, Danthonia, intermedia, Koeleria macrantha, Nassella viridula, Oryzopsis asperifolia, Pascopyrum smithii, Piptatherum micranthum,* and *Schizachyrium scoparium.* Common on gentle to steep slopes along escarpments, buttes, canyons, rock outcrops, ravines and canyons. Sometimes deciduous species such as *Fraxinus pennsylvanica, Betula papyrifera, Quercus macrocarpa, Ulmus americana, Acer negundo,* and *Populus tremuloides* may co-dominate. Restricted to the northern ½ of MZ 33 away from the Rocky Mountain foothills. .. .. **Northwestern Great Plains – Black Hills Ponderosa Pine Woodland and Savanna**

10b. Savanna of foothills of the Rocky Mountains that may extend out on the plains in MZ 27 and with the overstory dominated by *Pinus ponderosa*. *Pinus flexilis* or *Juniperus* spp. may be present to co-dominant. ..... **Southern Rocky Mountain Ponderosa Pine Savanna**

11a. Open tree layer typically dominated by *Juniperus monosperma* with a strong perennial grass layer. Common on dry foothills and plains in southern Colorado and north-central New Mexico and extending out onto limestone breaks in the Great Plains..... ..... **Southern Rocky Mountain Juniper Woodland and Savanna**

11b. Open tree layer dominated by *Juniperus coahuilensis, J. pinchotii,* and/or *J. deppeana* with a strong perennial grass layer. *Juniperus monosperma* may be present to co-dominant. In these map zones, restricted to the southern edge of MZ 27..... **Madrean Juniper Savanna**[e]

12a. Subalpine forests and woodlands dominated or co-dominated by *Pinus aristata, P. contorta, P. flexilis, Picea engelmannii,* and/or *Abies lasiocarpa* **13**

12b. Forests and woodlands of montane, foothills, and plains sites NOT dominated or co-dominated by the above high-elevation species. **17**

13a. Forests or woodlands strongly dominated by *Pinus contorta* (>2/3 total tree cover) or with *Populus tremuloides* co-dominating. Most forests in this system occur as early- to mid-successional forests which developed after fire. This system includes *P. contorta* dominated stands that, while typically persistent for >100 year time frames, may succeed to spruce-fir forests and woodlands. ..... **Rocky Mountain Lodgepole Pine Forest**

13b. Forests or woodlands NOT strongly dominated by *Pinus contorta.* **14**

14a. Subalpine conifer forests and woodlands dominated or co-dominated by *Pinus aristata* and/or *Pinus flexilis*..... **Rocky Mountain Subalpine Limber-Bristlecone Pine Woodland**[e]

14b. Subalpine conifer forests and woodlands NOT dominated by *Pinus aristata* or *Pinus flexilis*... **15**

15a. Large and small patch subalpine conifer forests and woodlands of mesic environments (north aspect toeslopes) that are dominated or co-dominated by *Abies lasiocarpa* and/or *Picea engelmannii* with mesic understory species such as *Actaea rubra, Amelanchier alnifolia, Erigeron eximius, Rubus parviflorus, or Trifolium dasyphyllum.* .... **Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland(16)**

15b. Widespread matrix subalpine conifer forests and woodlands of drier environments that are dominated or co-dominated by *Abies lasiocarpa* and/or *Picea engelmannii.* .... **Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland(16)**

16a. Conifer forests and woodlands dominated or co-dominated by *Abies lasiocarpa* and/or *Picea engelmannii* with less than 25% relative tree cover of *Populus tremuloides.* .... ***Abies lasiocarpa – Picea engelmannii* Forest Alliance**[d]

16b. Conifer forests and woodlands dominated or co-dominated by *Picea engelmannii* with less than 25% relative tree cover of *Populus tremuloides* and generally with *Abies lasiocarpa* absent or with low cover..... ***Picea engelmannii* Forest Alliance**[d]

17a. Conifer forests and woodlands composed of Madrean pines (*Pinus arizonica, Pinus engelmannii, P. leiophylla,* or *P. strobiformis*) and evergreen oaks (*Quercus arizonica, Q. emoryi,* or *Q. grisea)* intermingled with patchy shrublands on mid-elevation slopes (1500 to 2300 m elevation). Includes *Pinus ponderosa* stands if Madrean pines or oaks or present. Other tree species include *Cupressus arizonica, Juniperus deppeana, Pinus cembroides, P. discolor,* and *Pseudotsuga menziesii.* If present in these map zones, then restricted to extreme southern edge of MZ 27. ..... **Madrean Lower Montane Pine-Oak Forest and Woodland[e]**

17b. Conifer forests and woodlands dominated by species other than the above mentioned Madrean pines and oaks. **18**

18a. Woodlands dominated or co-dominated by *Pinus cembroides, P. discolor, P. monophylla, P. edulis, Juniperus coahuilensis, Juniperus monosperma,* and/or *Juniperus pinchotii*..... **19**

18b. Forests or woodlands dominated or co-dominated by species other than the above pine and/or juniper species. **24**

19a. Open to moderately dense woodlands distributed along rocky outcrops, canyon slopes, and dissected mesas. Scattered *Pinus edulis* may occur. *Juniperus monosperma* or *J. pinchotii* are the most common tree species with an understory of *Bouteloua eriopoda, B. gracilis, B. hirsuta, B. curtipendula,* and *Pleuraphis jamesii*. This system ranges from Palo Duro Canyon and similar canyons and escarpments to the south in Texas, north to Purgatoire and Chacuacu Canyons. Although this system occurs in both MZ 27 and 34, it was only modeled (BpS) by LandFire in MZ 34 where it represents *Juniperus monosperma* or *J. pinchotii* dominated woodlands along canyons and escarpments in the plains. ..... **Southwestern Great Plains Canyon**

19b. Woodlands of foothills or desert mountains, in some cases extending out into the plains, but not distributed along rocky outcrops, canyon slopes, or dissected mesas. **20**

20a. Woodlands of desert mountains with Madrean species such as *Pinus cembroides, P. discolor,* or *Juniperus coahuilensis* typically present. *Juniperus deppeana, J. pinchotii, J. monosperma,* and/or *Pinus edulis* may be present to dominant. Madrean oaks such as *Quercus arizonica, Q. emoryi, Q. grisea,* or *Q. mohriana* may be present to co-dominant. *Pinus ponderosa* is absent or sparse. Restricted in distribution to the southern end of MZ 27... **Madrean Pinyon-Juniper Woodland[e]**

20b. Woodlands of foothills, sometimes extending onto adjacent plains, but lacking Madrean species and not associated with desert mountains. **21**

21a. Woodlands of dry foothills and plains. Stands dominated by *Juniperus monosperma*, with *Pinus* spp. generally sparse to absent, and with a strong perennial grass layer. .... **Southern Rocky Mountain Juniper Woodland and Savanna (23)**

21b. Foothill woodlands with *Pinus* species as co-dominant. **22**

22a. Foothill woodlands dominated or co-dominated by *Pinus edulis* and/or *Juniperus* spp. with *Pinus ponderosa* co-dominant (usually > 10% cover). ..... **Southern Rocky Mountain Ponderosa Pine Woodland**

22b. Woodlands commonly encountered on dry mountains and foothills and dominated by *Pinus edulis* and/or *Juniperus monosperma*. If *Pinus ponderosa* is present, it is restricted to mesic microsites. ..... **Southern Rocky Mountain Pinyon-Juniper Woodland (23)**

23a. Woodland solely dominated by *Pinus edulis* or co-dominated with species of *Juniperus*..... ..... ***Pinus edulis* – (*Juniperus* spp.) Woodland Alliance[d]**

23b. Woodland dominated by *Juniperus monosperma*. *Pinus edulis* is absent or limited to a few scattered individuals (very low cover, <5%)..... ***Juniperus monosperma* Woodland Alliance[d]**

24a. Woodlands dominated by *Pinus ponderosa.* **25**

24b. Woodlands NOT dominated by *Pinus ponderosa,* though *P. ponderosa* may be present..... **26**

25a. Woodlands of foothills primarily dominated by *Pinus ponderosa* often with sparse to dense cover of *Juniperus scopulorum* or species of *Cercocarpus.* The herbaceous layer typically contains

species of the surrounding prairie, including *Andropogon gerardii, Bouteloua curtipendula, Carex inops* ssp. *heliophila, Carex filifolia, Danthonia intermedia, Koeleria macrantha, Nassella viridula, Oryzopsis asperifolia, Pascopyrum smithii, Piptatherum micranthum,* and *Schizachyrium scoparium.* Common on gentle to steep slopes along escarpments, buttes, canyons, rock outcrops, ravines and canyons. Sometimes deciduous species such as *Fraxinus pennsylvanica, Betula papyrifera, Quercus macrocarpa, Ulmus americana, Acer negundo,* and *Populus tremuloides* may co-dominate. Restricted to the northern ½ of MZ 33 away from the Rocky Mountain foothills. .. .. **Northwestern Great Plains – Black Hills Ponderosa Pine Woodland and Savanna**

25b. Woodland dominated by *Pinus ponderosa,* sometimes with inclusions of *Pseudotsuga menziesii* dominated woodlands on cool aspects. *Pinus edulis, Juniperus* spp., or *Populus tremuloides* may be present. Generally found in the western portions of map zones 27 and 33. .... **Southern Rocky Mountain Ponderosa Pine Woodland**

26a. Woodland of foothills or prairie-breaks dominated by *Pinus flexilis* and/or *Juniperus scopulorum* or *Juniperus osteosperma. Pinus ponderosa* is absent or only occasional (<5% cover), and *Pinus edulis* is never present. In these map zones, this system is restricted to the northern portions of MZ 33..... **Rocky Mountain Foothill Limber Pine-Juniper Woodland**

26b. Forests and woodlands of montane sites and NOT dominated by *Pinus flexilis, Juniperus scolpulorum* or *Juniperus osteosperma.*..... **27**

27a. Small to large patch forest or woodland of relatively mesic montane environments such as north aspects or toeslopes. Stands are dominated or co-dominates by *Abies concolor, Picea pungens,* or *Pseudotsuga menziesii*. Mesic species such as *Osmorhiza* spp., *Luzula* spp., *Thalictrum* spp., *Angelica* spp., *Vaccinium membranaceum, V. myrtillus,* and *Cornus sericea* commonly present in the understory..... ..... **Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland**

27b. Matrix forest or woodland of drier montane sites that are dominated or co-dominated by *Abies concolor* or *Pseudotsuga menziesii*, and sometimes co-dominated by *Pinus ponderosa* or *Pinus contorta* and/or *Populus tremuloides*. Scattered *Pinus aristida* or *P. flexilis* may be present..... ...**Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland(28)**

28a. Forest typically dominated or co-dominated by *Abies concolor*. Other tree species such as *Pseudotsuga menziesii, Pinus ponderosa*, and/or *Populus tremuloides* may be present. Significant *Abies concolor* understory is present if mature *Abies concolor* are not co-dominant in tree canopy. .....***Abies concolor* Forest Alliance**[d]

28b. Forest dominated or co-dominated by *Pseudotsuga menziesii* with *Abies concolor* absent. ..... ***Pseudotsuga menziesii* Forest Alliance**[d]

KEY D: Upland Shrubland, Dwarf-shrubland and Shrub-steppe Systems and Alliances

1a. *Artemisia tridentata, A. tripartita, A. nova, A. cana, A. arbuscula* or *A. bigelovii* dominate or co-dominate the shrub layer. *Symphoricarpos* spp. or *Purshia tridentata* may co-dominate some stands..... **2**

1b. None of the above *Artemisia* species dominate or co-dominate the shrub layer. **6**

2a. Montane or subalpine (>2000 m elevations) shrubland or shrub-steppe dominated or co-dominated by *Artemisia tridentata* ssp. *vaseyana, A. tridentata* ssp. *spiciformis*, non-riparian *A. cana* ssp. *viscidula, A. arbuscula* and/or *Purshia tridentata*. *Symphoricarpos* spp. may co-dominate some stands. Restricted to western edge of map zones 27 and 33. ....**Inter-Mountain Basins Montane Sagebrush Stepp[e] (3)**

2b. Shrubland or shrub-steppe dominated by other species or subspecies of *Artemisia*. 4

3a. *Artemisia tridentata* ssp. *vaseyana* typically dominates shrub layer of 10% or more absolute cover and with typically less than 20% total perennial herbaceous cover. .... ***Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance[d]**

3b. A*rtemisia arbuscula* ssp. *arbuscula* dominated shrubland. .... ***Artemisia arbuscula* ssp. *arbuscula* Dwarf-Shrubland Alliance[d]**

4a. Shrubland or shrub-steppe dominated or codominated by *Artemisia tridentata* ssp. *tridentata* and/or *Artemisia tridentata* ssp. *wyomingensis. Symphoricarpos spp.* or *Purshia tridentata* may codominate some stands..... **5**

4b. Low shrubland or shrub-steppe dominated or co-dominated by *Artemisia bigelovii, A. nova, A. tridentata* ssp. *wyomingensis*, or *A. tripartita* ssp. *rupicola* **6**

5a. Shrubland dominated or co-dominated by *Artemisia tridentata* ssp. *tridentata* and/or *Artemisia tridentata* ssp. *wyomingensis* with relative cover of shrub layer with 10% or more absolute cover and with less than 25% total perennial herbaceous cover; typically in broad basins between mountain ranges, plains and foothills. Soils are typically deep, well-drained and non-saline. If found in these map zones, this system is restricted to western edge of map zones 27 and northwestern corner of MZ 33 ....**Inter-Mountain Basins Big Sagebrush Shrubland[e]**

5b. Shrub steppe dominated or co-codominated by *Artemisia tridentata* ssp. *tridentata, Artemisia tridentata* ssp. *xericensis, Artemisia tridentata* ssp. *wyomingensis*, and/or *Purshia tridentata* with open to moderately dense (10-40% cover) shrub layer and with at least 25% total perennial herbaceous cover. The natural fire regime of this ecological system likely maintains a patchy distribution of shrubs, so the general aspect of the vegetation is a grassland. If found in these map zones, this system is restricted to western edge of map zones 27 and northwestern corner of MZ 33 ..... **Inter-Mountain Basins Big Sagebrush Steppe[e]**

6a. Low shrubland or shrub-steppe dominated or co-dominated by *Artemisia nova* or *Artemisia tripartita ssp. rupicola*. Common in dry habitats throughout the basins of central and southern Wyoming, and may extend into northern Colorado. Stands typically occur on windswept ridges and south and west facing slopes above 2135 m in elevation. Restricted to the northwestern quarter of map zone 33 in these map zones. (also referred to as Wyoming Basins Low Sagebrush Shrubland)..... **Wyoming Basins Dwarf Sagebrush Shrubland and Steppe[e]**

6b. Low shrubland or shrub-steppe dominated or co-dominated by *Artemisia bigelovii* on shallow, rocky soils. Restricted to escarpments and hills in the western portion of map zone 27 in the plains of SE Colorado and NE New Mexico on limestone and sandstone breaks. .... **Colorado Plateau Mixed Low Sagebrush Shrubland**

7a. Open shrubland or shrub-steppe restricted to gypsum outcrops or sandy gypsiferous and/or often alkaline soils in basins and slopes. Vegetation is characterized by gypsophilous species such as *Tiquilia hispidissima, Ephedra torreyana, Frankenia jamesii, Bouteloua breviseta, Nama carnosum, Selinocarpus lanceolatus, Sporobolus nealleyi,* and *Sartwellia flaveriae. Atriplex canescens, Calylophus hartwegii, Mentzelia perennis,* and *Sporobolus airoides* may also be important components on these sites. If present in these map zones, restricted to the southern portion of MZ 27. ..... **Chihuahuan Gypsophilous Grassland and Steppe**

7b. Shrubland or shrub-steppe on sites other than those associated with gypsum or alkaline sites AND lacking gypsophilous species. **8**

8a. Shrubland of saline/alkaline sites, typically dominated by halophytic species such as *Atriplex canescens, A. confertifolia,* or *Sarcobatus vermiculatus.* **9**

8b. Shrublands or shrub-steppe NOT on saline or alkaline sites, and NOT characterized by the above halophytic species **12**

9a. Open to moderately dense shrublands dominated by *Sarcobatus vermiculatus*. *Atriplex canescens, A. confertifolia,* or *Krascheninnikovia lanata* may be preset to co-dominant with patches of *Distichlis spicata* grasslands. ..... **Inter-Mountain Basins Greasewood Flat**

9b. Shrublands NOT dominated by *Sarcobatus vermiculatus*. **10**

10a. Desert scrub composed of *Atriplex canescens* along with *Allenrolfea occidentalis, Flourensia cernua, Salicornia* spp., *Suaeda* spp., or other halophytic plants. Graminoid species may include *Sporobolus airoides* or *Distichlis spicata*. Chihuahuan desert species such as *Larrea tridentata* may be present. If present in these map zones, then only in the extreme southern portion of MZ 27, south of U. S. Highway 60. ..... **Chihuahuan Mixed Salt Desert Scrub[e] (11)**

10b. Open to moderately dense shrublands typically composed of *Atriplex* species such as *A. canescens* or *A. confertifolia,* but not found in desert situations of the extreme southern portion of MZ 27 and lacking Chihuahuan desert species such as *Flourensia cernua* or *Larrea tridentata*. If found in these map zones, this system is restricted to the western edge of MZ 27 . ... **Inter-Mountain Basins Mixed Salt Desert Scrub[e] (11)**

11a. *Atriplex confertifolia* dominates the shrub layer ..... ***Atriplex confertifolia* Shrubland Alliance [d]**

11b. *Atriplex canescens* dominates the shrub layer. ..... ***Atriplex canescens* Shrubland Alliance[d]**

12a. Shrublands dominated by *Prosopis* spp. **13**

12b. Shrublands NOT dominated by species these species of *Prosopis*. **16**

13a. Shrubland of desert foothills or piedmont restricted to the southern edge of MZ 27 (south of U. S. Highway 60), and dominated by *Prosopis glandulosa* or *P. velutina* and succulents. Other shrubs present may include *Acacia neovernicosa, A. constricta, Juniperus monosperma,* or *Juniperus coahuilensis.* Perennial grass cover is low (<10%) and *Larrea tridentata* is absent or occasional (low cover) and never co-dominant. Stands occur above desert scrub (700 – 1500 m elevation). This system occupies more areas than it did historically, through invasion of desert grassland sites. ..... **Apacherian-Chihuahuan Mesquite Upland Scrub (15)**

13b. *Prosopis* dominated shrublands on sites other than desert foothills or piedmont and away from the southern edge of MZ 27. ..... **14**

14a. Desert scrub of coppice dunes and sandsheets found in the Chihuahuan Desert. Typically dominated by *Prosopis glandulosa* but includes *Atriplex canescens, Ephedra torreyana, E. trifurca, Poliomintha incana,* and *Rhus microphylla* with 10 to 30% total vegetation cover. *Yucca elata, Gutierrezia sarothrae,* and *Sporobolus flexuosus* are commonly present. Active eolian processes are diagnostic of this system. If present in these map zones, then restricted to the southern edge of MZ 27. ..... **Chihuahuan Stabilized Coppice Dune and Salt Flat Scrub[e] (14)**

14b. Shrublands of the plains, not associated with coppice dunes, sandsheets or desert foothills. This system may manifest itself in degraded shortgrass and mixedgrass grassland sites..... ..... **Western Great Plains Mesquite Woodland and Shrubland (15)**

15a. Shrubland dominated by *Prosopis glandulosa*..... ***Prosopis glandulosa*** **Shrubland Alliance**
15b. Shrubland dominated by *Prosopis pubescens.* ..... ***Prosopis pubescens*** **Shrubland Alliance** [d]

16a. Dense shrublands of foothills, mountain slopes and canyons in drier habitats, and dominated or co-dominated by *Quercus toumeyi, Q. turbinella, Q. intricata, Q. grisea, Arctostaphylos pungens, Ceanothus greggii, Cercocarpus montanus, Garrya wrightii* and/or *Purshia stansburiana*..... **17**
16b. Shrublands NOT dominated or co-dominated by the above species..... **19**

17a. Shrublands of sites associated with the Chihuahuan Desert with characteristic species such as *Arbutus arizonica, A. xalapensis, Fraxinus greggii, Fendlera rigida, Garrya ovata, Purshia mexicana, Rhus virens* var. *choriophylla, Salvia lycioides* or *Salvia regla.* If present in the these map zones, then restricted to the southern edge of MZ 27..... **Madrean Oriental Chaparral** [e]
17b. Shrublands of sites away from Chihuahuan Desert influence and lacking the above characteristic species. *Cercocarpus montanus, Canotia holacantha, Purshia stansburiana,* and *Rhus ovata* may be present. If present in the these map zones, then restricted to the southwestern edge of MZ 27 and have characteristic Madrean species present. Stands dominated by *Cercocarpus montanus* or *Purshia stansburiana* may be confused with the **Rocky Mountain Lower Montane – Foothill Shrubland**. ..... **Mogollon Chaparral** [e] **(18)**

18a. Shrubland dominated by *Quercus turbinella.* ..... ***Quercus turbinella*** **Shrubland Alliance** [d]
18b. Shrubland dominated by *Arctostaphylos pungens*. .... ***Arctostaphylos pungens*** **Shrubland Alliance** [d]

19a. Shrublands or shrub-steppe of Chihuahuan desert foothills, bajadas, alluvial fans, piedmont or mesas. Restricted to the southern portions of MZ 27, south of U. S. 60. ..... **20**
19b. Shrublands of other sites. **21**

20a. Desert scrub occurring on gravelly bajadas, foothills, and gravelly alluvial fans of the Chihuahuan Desert. Herbaceous layer is sparse (<20% cover). Vegetation is characterized by the presence of *Larrea tridentata,* typically mixed with species such as *Agave lechuguilla, Aloysia wrightii, Baccharis pteronioides, Koeberlinia spinosa, Parthenium incanum,* and *Mortonia scabrella.* Stands may be dominated by *Acacia constricta, A. neovernicosa,* or *A. greggii.* This system has recently expanded into former desert grassland and steppe. Restricted to the southern portion of MZ 27, south of U. S. 60..... **Chihuahuan Mixed Desert and Thorn Scrub**
20b. Desert steppe that typically includes an open mixed shrub-succulent or xeromorphic tree layer, but is characterized by lush (>20% cover) and typically diverse herbaceous layer dominated by grasses including *Bouteloua eriopoda, B. hirsuta, B. rothrockii, B. curtipendula, B. gracilis, Eragrostis intermedia, Muhlenbergia porteri, M. setifolia, Pleuraphis jamesii,* and/or *P. mutica.* Species of *Agave, Calliandra, Dasylirion, Mimosa, Yucca* and other shrubs may be present. *Larrea tridentata,* if present has low cover..... ..... **Apacherian-Chihuahuan Semi-Desert Grassland and Steppe**

21a. Shrublands occupying sites characterized by deep sands and dominated by *Artemisia filifolia* and/or *Quercus havardii*. *Yucca glauca, Prosopis glandulosa, Rhus trilobata, Prunus angustifolia* or *P. pumila* var. *besseyi* may also be present, sometimes representing significant cover. A sparse to moderately dense graminoid layer is usually present and includes species such as *Andropogon hallii, Schizachyrium scoparium, Sporobolus cryptandrus, Calamovilfa gigantean, Hesperostipa comata,* or *Bouteloua* spp..... **Western Great Plains Sandhill Steppe (22)**
21b. Shrublands NOT of deep sands and lacking the above species..... **23**

22a. *Artemisia filifolia* dominates the shrub layer..... ***Artemisia filifolia*** **Shrubland Alliance**
22b. *Quercus havardii* dominates the shrub layer..... ***Quercus havardii*** **Shrubland Alliance**

23a. Shrublands of foothill to montane sites. **24**
23b. Shrublands of plains and flats. **26**

24a. Montane shrubland or shrub-steppe, usually dominated or co-dominated by *Quercus gambelii*. *Q. gambelii* may be locally absent, but then the stand is mesic and dominated by *Amelanchier* spp. Other shrubs include *Acer grandidentatum, Cercocarpus montanus,* or *Symphoricarpos* spp., which may co-dominate some stands. ..... **Rocky Mountain Gambel Oak – Mixed Montane Shrubland**
24b. Shrubland of foothill to lower montane sites, with *Quercus gambelii* absent or with low cover (<5%). Shrub layer is dominated or co-dominated by *Amelanchier utahensis, Cercocarpus montanus, Purshia tridentata, Rhus trilobata, Ribes cereum, Symphoricarpos oreophilus,* and/or *Yucca glauca.* Common in Rocky Mountain foothills and in some of the larger canyons in the western Great Plains..... **Rocky Mountain Lower Montane – Foothill Shrubland (25)**

25a. *Cercocarpus montanus* dominates the shrub layer. ..... ***Cercocarpus montanus* Shrubland Alliance**[d]
25b. *Purshia tridentata* dominates the shrub layer. ..... ***Purshia tridentata* Shrubland Alliance**[d]

26a. Degraded shortgrass prairie with a significant shrub layer composed of *Gutierrezia sarothrae* and/or *Ericameria nauseosa*. This is a condition of shortgrass prairie sites that have been heavily grazed and/or have an inappropriate fire cycle.... **Western Great Plains Shortgrass Prairie (27)**
26b. Semi-desert shrub-steppe on alluvial fans and flats with moderate to deep soils on the western edge of MZ 27 and northwestern corner of MZ 33, typically with significant graminoid cover (>25%) Shrub and dwarf –shrubs include *Atriplex canescens, Artemisia tridentata, Chrysothamnus greenei, C. viscidiflorus, Ephedra* spp., and *Krascheninnikovia lanata.* Stands dominated by *Gutierrezia sarothrae* and/or *Ericameria nauseosa* may be difficult to distinguish from degraded Western Great Plains Shortgrass Prairie. Characteristic grasses include *Achnatherum hymenoides, Bouteloua gracilis, Distichlis spicata, Poa secunda, P. fendleriana, Sporobolus airoides, Hesperostipa comata, Pleuraphis jamesii,* and *Lymus salinus.* This system is widespread in the intermountain western US ..... **Inter-Mountain Basins Semi-Desert Shrub-Steppe (27)**

27a. *Krascheninnikovia lanata* dominates the shrub layer. ..... ***Krascheninnikovia lanata* Shrubland Alliance**[d]
27b. *Krascheninnikovia lanata* does not dominate the shrub layer. **28**

28a. *Gutierrezia sarothrae* dominates the shrub layer. ..... ***Gutierrezia sarothrae* Shrubland Alliance**[d]
28b. *Ericameria nauseosa* dominates the shrub layer. **29**

29a. Perennial herbaceous cover is less than 25%. ..... ***Ericameria nauseosa* Shrubland Alliance**[d]
29b. Perennial herbaceous cover is greater than 25%. ..... ***Ericameria nauseosa* Shrub Herbaceous Alliance**[d]

KEY E: Herbaceous Wetland Systems and Alliances
(Herbaceous cover >20% and woody cover <10% occurring on wetland sites)

1a. Herbaceous wetlands occurring at high elevations (subalpine-montane)..... ..... **Rocky Mountain Alpine-Montane Wet Meadow**

1b. Herbaceous wetlands occurring at lower elevations and on the plains..... **2**

2a. Herbaceous wetlands associated with saline lakes and saline intermittently flooded depressional basins (saline playa) of the plains. Salt tolerant and halophytic species such as *Distichlis spicata, Sporobolus airoides*, and *Hordeum jubatum* characterize this system. Other commonly encountered species include *Salicornia* spp., *Schoenoplectus maritimus, S. americanus, Spartina* spp., and *Suaeda* spp. Salt encrustations can occur on the soil surface..... ..... **(Western Great Plains Saline Depression Wetland[a])** ..... **Western Great Plains Depressional Wetland Systems[b]**

2b. Herbaceous wetlands not associated with saline lakes or saline intermittently flooded depressional basins..... **3**

3a. Grasslands of basins and swales that may occasionally flood (but sites may lack wetland soil characteristics). Clayey sites are typically dominated by *Pleuraphis mutica* (tobosa swales), with other mesic graminoids such as *Pascopyrum smithii* or *Panicum obtusum* present but not dominant. More saline/alkaline sites are typically dominated by *Sporobolus airoides* or *S. wrightii* (somewhat less saline/alkaline sites). In these map zones, this system is restricted to the southern portions of MZ 27 and 34. Landfire is mapping non-tobosa bottomland and swale wetlands separately so it is important to record dominant species..... ..... **Chihuahuan-Sonoran Desert Bottomland and Swale Grassland (4)**

3b. Herbaceous wetlands of other situations and NOT dominated by *Pleuraphis mutica, Sporobolus airoides,* or *S. wrightii*..... **6**

4a. *Pleuraphis mutica* dominated grasslands...***Pleuraphis mutica* Herbaceous Vegetation Alliance**

4b. *Sporobolus* spp. dominated grasslands..... **5**

5a. *Sporobolus wrightii* dominated grasslands..... .....***Sporobolus wrightii* Herbaceous Vegetation Alliance**

5b. *Sporobolus airoides* dominated grasslands..... ..... ***Sporobolus airoides* Herbaceous Vegetation Alliance**

6a. Herbaceous wetlands of closed depressions (playas) or rainwater basins commonly encountered on the plains. The herbaceous layer of wetter portions of the depressions are characterized by species such as *Eleocharis* spp., *Symphyotrichum subulatum, Polygonum pensylvanicum, P. amphibium,* and *Lythrum californicum.* Drier portions of the basins are characterized by species such as *Pascopyrum smithii, Buchloe dactyloides, Chenopodium leptophyllum, Helianthus ciliaris,* and *Amaranthus retroflexus.*..... **(Western Great Plains Closed Depression Wetland[a])** ..... **Western Great Plains Depressional Wetland Systems[b]**

6b. Herbaceous wetlands found in sites other than closed depressions (playas) or rainwater basins.... ..... **7**

7a. Herbaceous wetlands of deserts and intermountain western US. Vegetation is characterized by a variety of common emergent herbaceous species of *Eleocharis*, *Juncus*, *Schoenoplectus*, and *Typha*. This is the common marsh ecosystem that occurs throughout much of the arid and semi-arid western North America, except on the Great Plains. .... **North American Arid West Emergent Marsh**

7b. Herbaceous wetlands found in lowland depressions and along lake shores in the great plains, NOT in desert areas. Except during exceptional drought years there is a permanent water source throughout most of the year. Vegetation is characterized by a variety of emergent herbaceous species of *Typha, Carex, Eleocharis, Juncus, Spartina,* and *Schoenoplectus,* as well as floating genera such as *Potamogeton* and *Sagittaria.*..... ..... **(Western Great Plains Open Freshwater Depression Wetland[a])** ..... **Western Great Plains Depressional Wetland Systems[b]**

KEY F: Herbaceous Upland Systems

(Herbaceous vegetation cover >20% and woody cover <10% occurring on upland sites)

1a. Herbaceous uplands of alpine, subalpine, or montane sites. **2**

1b. Grasslands of foothills, piedmonts, dissected plains, or plains (NOT in alpine, subalpine, or montane sites. **3**

2a. Subalpine herbaceous vegetation found above 3000 m in elevation. Forbs typically contribute more to overall cover than graminoids. Important species include *Erigeron* spp., *Aster* spp., *Mertensia* spp., *Penstemon* spp., *Campanula* spp., *Lupinus* spp., *Solidago* spp., *Ligusticum* spp., *Balsamorhiza sagittata, Wyethia* spp., *Deschampsia caespitosa, Koeleria macrantha, Dasiphora fruticosa, Rosa woodsii,* and *Symphoricarpos* spp. Restricted to high elevation sites on the western edge of MZ 27 and 33. ..... **Rocky Mountain Subalpine Mesic Meadow**

2b. Montane or subalpine grasslands found between 2200 and 3000 m elevation (may extend up to 3350 m on warm aspects) on dry, flat to rolling plains or lower side slopes. Vegetation is dominated by bunch grasses such as *Danthonia* spp., *Festuca* spp., *Muhlenbergia filiculmis, M. montana* or *Pseudoroegneria spicata*. Restricted to the western higher elevation portions of MZ 27 and 33 ..... **Southern Rocky Mountain Montane – Subalpine Grassland**

3a. Grasslands, sometimes with an open shrub layer, restricted to gypsum outcrops or sandy gypsiferous and/or often alkaline soils in basins and slopes. Vegetation is characterized by gypsophilous species such as *Tiquilia hispidissima, Ephedra torreyana, Frankenia jamesii, Bouteloua breviseta, Nama carnosum, Selinocarpus lanceolatus, Sporobolus nealleyi,* and *Sartwellia flaveriae*. *Atriplex canescens, Calylophus hartwegii, Mentzelia perennis,* and *Sporobolus airoides* may also be important components on these sites. If present in these map zones, restricted to the southern portion of MZ 27 ..... **Chihuahuan Gypsophilous Grassland and Steppe**

3b. Grasslands of sites NOT associated with gypsum outcrops or sandy gypsiferous and/or often alkaline soils, and lacking gypsophilous species. **4**

4a. Grasslands of basins and swales that may occasionally flood, but that lack wetland soil characteristics). Clayey sites are typically dominated by *Pleuraphis mutica* (tobosa swales), with other mesic graminoids such as *Pascopyrum smithii* or *Panicum obtusum* present but not dominant. More saline/alkaline sites are typically dominated by *Sporobolus airoides* or *S. wrightii* (somewhat less saline/alkaline sites). In these map zones, this system is restricted to the southern portions of MZ 27 and 34. Landfire is mapping non-tobosa bottomland and swale wetlands separately so it is important to record dominant species. ..... **Chihuahuan-Sonoran Desert Bottomland and Swale Grassland (5)**

4b. Grasslands not of basins or swales, or if occurring in a basin or swale then NOT dominated by *Pleuraphis mutica*, *Sporobolus airoides,* or *S. wrightii*. **7**

5a. *Pleuraphis mutica* dominated grasslands. .. ***Pleuraphis mutica* Herbaceous Vegetation Alliance**

5b. *Sporobolus* spp. dominated grasslands. **6**

6a. *Sporobolus wrightii* dominated grasslands. ..... ***Sporobolus wrightii* Herbaceous Vegetation Alliance**

6b. *Sporobolus airoides* dominated grasslands. ..... ***Sporobolus airoides* Herbaceous Vegetation Alliance**

7a. Grasslands of desert sites. Either on gently sloping bajadas, mesas, piedmonts, foothills, loamy plains, or loamy alluvial flats. Found in the southern portion of MZ27, generally south of U. S. Highway 60. ..... **8**

7b. Grasslands of foothills, piedmonts, dissected plains, or plains, but not in desert sites..... **9**

8a. Desert grasslands usually on gently sloping bajadas, mesas, steeper piedmont, or foothill slopes in the southern portion of MZ 27, generally south of U. S. Highway 60. Common grasses include *Bouteloua eriopoda, B. hirsuta, B. rothrockii, B. curtipendula, B. gracilis, Eragrostis intermedia, Muhlenbergia porteri, Muhlenbergia setifolia, Pleuraphis jamesii, Pleuraphis mutica,* and *Sporobolus airoides*. Succulent species of *Agave, Dasylirion,* and *Yucca* may be present. An open shrub layer with species of Chihuahuan Desert affinities may be present. .... **Apacherian-Chihuahuan Semi-Desert Grassland and Steppe**

8b. Chihuahuan desert grassland on loamy plains in the northern Chihuahuan and occurring on alluvial flats and loamy (sandy loam to clay loam) plains and may extend up from into the lower piedmont slopes. It is characterized by open to lush (>20% cover) herbaceous layer dominated by *Bouteloua eriopoda* and/or *Pleuraphis mutica.* Cover of shrubs and succulents is typically sparse, although scattered *Larrea tridentata, Fleurensia cernua* and *Prosopis glandulosa* is common on degraded.sites. If present, mesic graminoids such as *Pascopyrum smithii, Panicum obtusum, Sporobolus airoides,* and *Sporobolus wrightii* typically have low cover and are restricted to drainages and moist depressions (inclusions). Once widespread in southern New Mexico and extending north and east into the southern Great Plains and southeast into Trans-Pecos Texas..... ..... **Chihuahuan Loamy Plains Desert Grassland**

9a. Mixed-grass to tallgrass grasslands on moderate to gentle slopes, usually at the base of footills of the Southern Rocky Mountains, and typically occurring as a narrow elevational band between foothill woodlands or shrublands and the plains. Stands are also found on piedmonts in the western Great Plains where relatively mesic conditions produce stronge mixed-grass grassland. Communities may be dominated by *Andropogon gerardii, Schizachyrium scoparium, Muhlenbergia montana, Nassella viridula, Pascopyrum smithii, Sporobolus cryptandrus, Bouteloua gracilis, B. curtipendula, Hesperostipa comata*, or *Hesperostipa neomexicana*.. Improper grazing will reduce mid and tall grasses leaving *Bouteloua gracilis*..... ..... **Western Great Plains Foothill and Piedmont Grassland**

9b. Grasslands of various sites, but not on foothill or piedmont slopes. **10**

10a. Grasslands or steppe on sites characterized by deep sands, such as sand sheets or sandhills. Grasses present to dominant include *Andropogon hallii, Calamovilfa longifolia,* and/or *Sporobolus cryptandrus*. **11**

10b. Grasslands on sites NOT characterized by deep sands..... **12**

11a. Shrub-steppe grasslands characterized by the presence of shrub species such as *Artemisia filifolia* and/or *Quercus havardii,* though these shrub species may have low cover in some situations. Herbaceous layer often dominated by *Andropogon hallii, Hesperostipa comata,* and *Sporobolus cryptandrus,* with *Sporobolus giganteus* and *Calamovilfa gigantea* common in the southern extent.. ..... **Western Great Plains Sandhill Steppe**

11b. Grasslands, sometimes occurring as large patch sand prairie, such as in the Nebraska Sandhills. Significant shrub cover of the above species is generally lacking. Vegetation often dominated by *Calamovilfa longifolia* and *Andropogon hallii*..... **Western Great Plains Sand Prairie**

12a. Shortgrass prairie usually on flat to rolling uplands with loamy, ustic soils ranging from sandy to clayey. *Bouteloua gracilis* and/or *Buchloe dactyloides* typically dominate this grassland, but other graminoids such as *Aristida purpurea, Bouteloua curtipendula, B. hirsuta, Hesperostipa comata, Koeleria macrantha, Pascopyrum smithii, Pleuraphis jamesii, Sporobolus airoides*, and *Sporobolus cryptandrus* may contribute significant cover. Although mid-height grass species may be present, especially on more mesic land positions and soils, they are secondary in importance to the sod-forming short grasses. Sandy soils have higher cover of *Hesperostipa comata*, *Sporobolus cryptandrus*, and *Yucca glauca*. Woody cover may be present, but is generally low, and consists of

species such as *Artemisia filifolia, Artemisia frigida, Artemisia tridentata, Atriplex canescens, Eriogonum effusum, Gutierrezia sarothrae, Prosopis glandulosa,* and *Lycium pallidum*. This is the matrix grassland of the western portions of these map zones..... ..... **Western Great Plains Shortgrass Prairie**

12b. Grasslands characterized by mixedgrass or tallgrass species, though shortgrass species may be present, especially under conditions of heavy grazing. **13**

13a. Tallgrass prairie, primarily found in more mesic conditions more typical of the Eastern Great Plains Division. Such conditions may be associated with upland terraces above a floodplain system, or some other edaphic or topographic position circumstance. These grasslands are often dominated by *Andropogon gerardii,* but other species commonly encountered and sometimes co-dominating stands include *Sorghastrum nutans, Schizachyrium scoparium, Pascopyrum smithii, Hesperostipa spartea,* and *Sporobolus heterolepis*. ..... **Western Great Plains Tallgrass Prairie**

13b. Mixed-grass prairie typically dominated by *Schizachyrium scoparium* or *Pascopyrum smithii*, but also including species such as *Bouteloua curtipendula, Andropogon gerardii, Hesperostipa comata, Sporobolus heterolepis,* and *Bouteloua gracilis.* Warm season grasses typically have significant cover. This is the matrix grasslands of the eastern portions of these map zones and a minor small patch type further west where it is restricted to deeper, loamy soils. .... **Central Mixed Grass Prairie**