Field Key to Ecological Systems of LANDFIRE Map Zones 32 and 35

NatureServe
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Introduction

The following keys to NatureServe ecological systems were developed relying on keys developed for surrounding map zones, specifically map zones 37 and 34. The keys cover the areas found in MRLC & LANDFIRE map zones 32 and 35. The distributions of ecological systems are often described on the basis of EPA Level IV ecoregions. Figure 1 provides a map of the zones and Level IV ecoregions within the zones in Texas, Oklahoma, and Kansas. The systems 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.

The field keys have been organized into map zone 'clusters' that are similar ecologically and geographically (Figure 1). This key is for ecological systems that occur in the southern part of the Eastern Great Plains. Peripheral ecological systems common in adjacent map zones are included in the keys to facilitate inclusiveness.

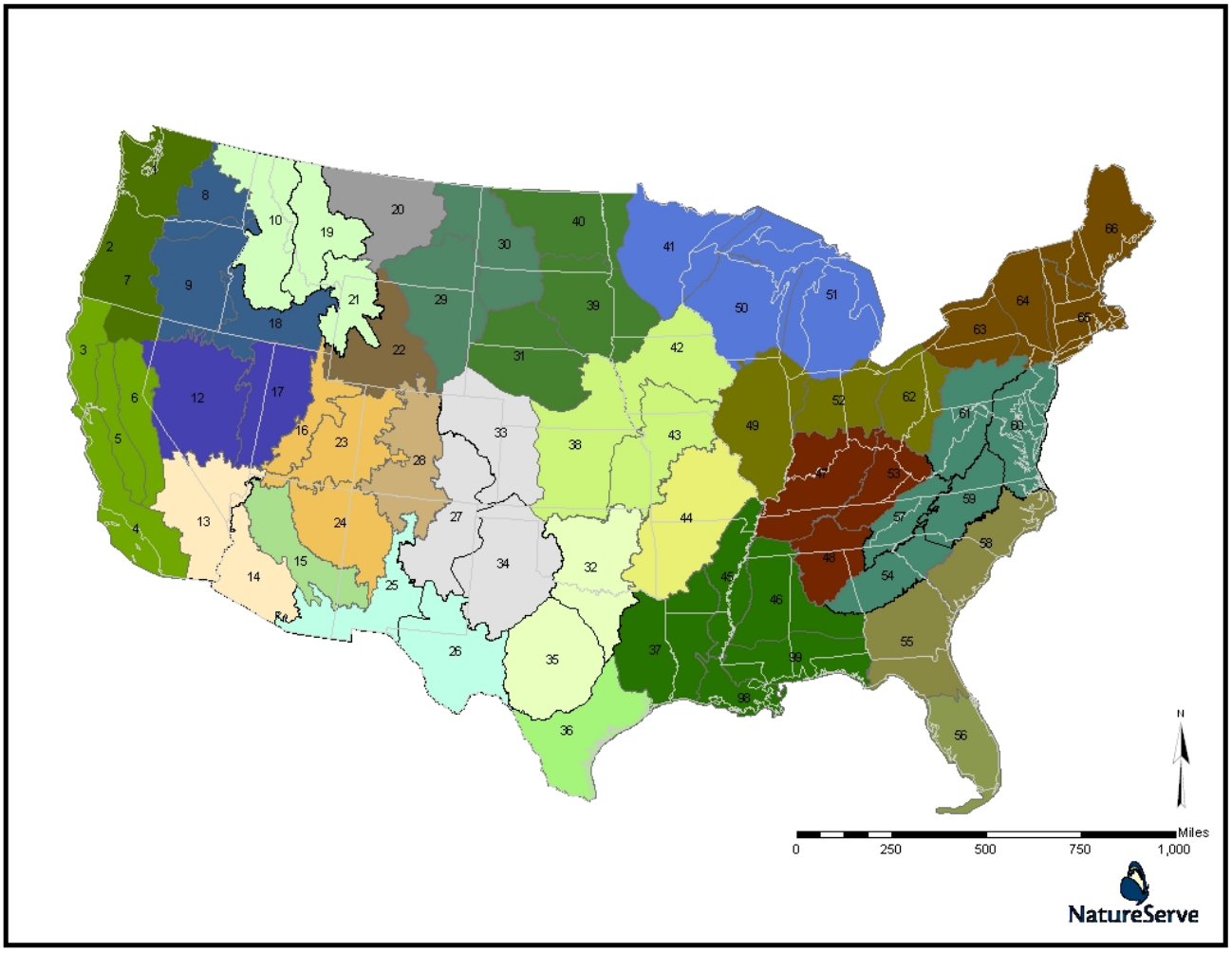

Figure 1. LANDFIRE map zone clusters with keys to ecological systems and selected alliances.

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). If the choice the user makes leads to a "result," then an Ecological System or one of the aggregates is named. An aggregate can be distinguished from an Ecological System by having a name that ends in "Systems."

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

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 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 "savanna" physiognomy (especially when disturbed) and hence will be in the key both as wooded 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.'

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 usually not 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 may be 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.
Managed Tree Plantation	These areas are used for production of products from tree crops, including fruits, nuts, and wood. This includes orchards and plantations.
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	Within these map zones, *Juniperus virginiana, Prosopis glandulosa,* or *Acacia*

	farnesiana may form conspicuous woody cover.
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 *Cirsium vulgare, Leucanthemum vulgare, Carduus nutans, Centaurea melitensis, Melilotus officinalis*, *Soliva sessilis, Stellaria media, Trifolium repens* and *Erodium cicutarium.*
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. tectorum,* and *Eragrostis cilianensis.*
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 *Bothriochloa ischaemum* var. *songarica, Cynodon dactylon, Dichanthium* sp., *Eragrostis curvula, Paspalum dilatatum, Pennisetum ciliare* and *Lolium arundinaceum[=Festuca arundinacea]*. Forbs may include: *Cichorium intybus, Cirsium arvense, Lespedeza cuneata, Lepidium* spp*., Melilotus* spp., and *Scabiosa atropurpurea.*
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, Melia azedarach, Tamarix* spp., *Triadica sebifera,* etc.
Introduced Wetland Vegetation	Land cover is altered/disturbed and dominated by introduced wetland vegetation. Species may include *Arundo donax, Echinochloa crus-galli, Paspalum urvillei,* 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.
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 the Ecological Systems of LANDFIE Map Zones 32 and 35 (Including Edwards Plateau, Texas Blackland Prairie, Cross Timbers, and portions of the Central Great Plains, Flint Hills, Central Irregular Plains, Arkansas Valley, South Central Plains, and East Central Texas Plains, Southern Texas Plains, and Southwestern Tablelands)

This key is intended for identifying Terrestrial Ecological Systems that are found in the EPA Level III ecoregions: Edwards Plateau, Cross Timbers, Texas Blackland Prairie (Map Zone 35), and Cross Timbers, Texas Blackland Prairie and southern part of the Central Great Plains (Map Zone 35). Other Level III ecoregions intersect these map zones to a lesser degree, including Southern Texas Plains, East Central Texas Plains, South Central Plains, Ouachita Mountains, Arkansas Valley, Ozark Highlands, Central Irregular Plains, Flint Hills, and Southwestern Tablelands. Several peripheral and small patch Ecological Systems were added to the key for comparison, although they may not be mapped by LANDFIE.

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

a **indicates** a broader LANDFIRE Map Unit (aggregate system group).

b **indicates a** typically small patch ecological system type not being mapped by LANDFIRE.

c **indicates** a type that is peripheral map zones 32 and 35 that would only occur in transition areas near boundaries of these map zones.

1a. Total canopy cover generally less than 10%. ..... **Western Great Plains Sparsely Vegetated Systems[a]**

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. Forests, woodlands, and/or shrublands restricted to drainages, floodplains, riparian or semi-riparian flats, saline basins, springs, or seeps ..... **KEY A: Riparian or Wetland Associated Forest, Woodland and Shrubland Systems**

3b. Forests, 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 B: Upland Forest, Woodland and Savanna Systems**

4b. Upland shrublands, including shrub-steppe (10 to 25% cover of shrubs and >20% cover of perennial graminoids)..... **KEY C: Upland Shrubland and Shrub-steppe Systems**

5a. Herbaceous vegetation of uplands..... **KEY D: Upland Herbaceous Systems**

5b. Herbaceous vegetation restricted to wetland sites associated with drainages, closed or open depressions, seeps, lakes, or ponds..... **6**

6a. Herbaceous vegetation associated with acidic hillside seeps, typically adjacent to deep sands. *Dichanthelium scoparium, Boehmeria cylindrica, Juncus effusus, J. interior,* and *Panicum anceps* are often present and *Sphagnum* sp. moss is characteristic. This small patch system is restricted to map zone 32 and EPA Level IV Ecoregion 35d (Cretaceous Dissected Uplands) of Atoka, Choctaw, and Pushmataha counties of Oklahoma. ..... **Western Gulf Coastal Plain Seepage Swamp and Baygall[b]**

6b. Herbaceous vegetation NOT associated with acidic hillside seeps adjacent to deep sands of the southeastern part of map zone 32 in Oklahoma. **7**

7a. Herbaceous vegetation associated with drainages such as creeks rivers and streams. **8**

7b. Herbaceous vegetation associated with closed or open depressions. If associated with a drainage, then vegetation occurs at the margin of a pond or lake. This system aggregate represents playas of the Great Plains and Edwards Plateau, as well as anthropogenic herbaceous wetlands..... ..... **Western Great Plains Depressional Wetland Systems**[a]

8a. Herbaceous vegetation associated with drainages of EPA Level III Ecoregion 30 (Edwards Plateau) and dominated or co-dominated by species such as *Andropogon glomeratus, Panicum virgatum, Cladium mariscus* ssp. *jamaicense*, and/or *Justicia americana*. .... **Edwards Plateau Riparian System**[b]

8b. Herbaceous vegetation associated with drainages of EPA Level III Ecoregions 27 (Central Great Plains) and 29 (Cross Timbers) and often dominated by *Andropogon gerardii*, *Typha* sp., *Schoenoplectus americanus*, *Scirpus* sp., *Carex* sp., and *Juncus* sp..... ..... **Western Great Plains Floodplain Systems**[a,b]

KEY A: Riparian or Wetland Associated Forest, Woodland and Shrubland Systems

(Woody cover >10% present and occurring on wetland or riparian sites, generally dominated or co-dominated by one or more of a suite of species including: *Acer negundo, Baccharis salicina, Betula nigra, Carya aquatica, Carya illinoinensis, Celtis laevigata, Elaeagnus angustifolia, Fraxinus* sp., *Gleditsia triacanthos, Juglans* sp., *Melia azedarach, Platanus occidentalis, Populus deltoides, Quercus lyrata, Quercus macrocarpa, Quercus nigra, Quercus phellos, Sapindus saponaria, Salix* sp., *Taxodium distichum, Tamarix* sp., *Ulmus americana, Ulmus crassifolia* or *Ulmus rubra*)

1a. Woodlands or shrublands restricted to drainages and semi-riparian flats that are dominated by introduced species such as *Melia azedarach, Elaeagnus angustifolia* or *Tamarix* spp. ..... **Invasive Riparian Woodland and Shrubland**

1b. Forests, woodlands, or shrublands restricted to drainages and semi-riparian flats that are NOT dominated by introduced species such as *Melia azedarach, Elaeagnus angustifolia* or *Tamarix* spp. **2**

2a. Forests, woodlands, or shrublands associated with streams and rivers occurring within the EPA Level III Ecoregion 30 (Edwards Plateau, largely south and west of the Colorado River, and north of US Highway 90) or the Level IV Ecoregion 29e (Limestone Cut Plain, southwest of the Brazos River, west of IH-35, and largely south and east of US Highway 67). **3**

2b. Forests, woodlands, and shrublands associated with streams and rivers not located within EPA Level III Ecoregion 30 (Edwards Plateau) or adjacent portions Level IV Ecoregion 293 (Limestone Cut Plain) **4**

3a. Forests, woodlands, or shrublands associated with large rivers, with broad alluvial floodplains ..... **Edwards Plateau Floodplain Terrace**

3b. Forests, woodlands, or shrublands associated with small, generally higher gradient rivers..... **Edwards Plateau Riparian**

4a. Forests, woodlands, or shrublands associated with drainages and occurring within EPA Level III Ecoregion 35 (South Central Plains), primarily south and east of Atoka, OK and along the Red River in Texas west to about Grayson County..... **Gulf and Atlantic Coastal Plain Floodplain Systems[a]**

4b. Forests, woodlands, or shrublands associated with drainages and occurring within EPA Level III Ecoregions other than 35 (South Central Plains) **5**

5a. Forests, woodlands, or shrublands associated with drainages and occurring within EPA Level III Ecoregions 32, 33, 36, 37, 38, 39, or 40 or Level IV Ecoregions 29g and 29i. In Texas, this is generally east of IH 35 and Fort Worth. In Oklahoma, this includes areas along the eastern edge of the map zone and including the Lower Canadian Hills, the Arbuckle Uplift, and Arbuckle Mountains (south and west to about Ardmore, OK). **6**

5b. Forests, woodlands, or shrublands associated with drainages located within EPA Level III Ecoregion 26, 27, 28, or 29 (except Level IV Ecoregions 29e, 29g, and 29i). This includes all but the eastern ¼ of Oklahoma within the map zone, most of the map zone in Kansas, and much of the northwestern ¼ of the map zones in Texas. ..... **Western Great Plains Floodplain Systems[a]**

6a. Forests, woodlands, or shrublands along large rivers, with broad alluvial floodplains and terraces. ..... **Central Interior and Appalachian Floodplain Systems[a]**

6b. Forests, woodlands, or shrublands along smaller, generally higher gradient, streams where erosional process dominate. ..... **Central Interior Appalachian Riparian Systems[a]**

KEY B: Upland Forest, Woodland and Savanna Systems

(Tree cover >10% and occurring on upland sites)

1a. Forest or woodland with naturally occurring *Pinus* sp. significantly represented in the canopy (> 20%) **2**

1b. Forest, woodland or savanna without *Pinus* sp. as a significant component of the canopy, or if so, then planted. **4**

2a. *Pinus taeda* present in the canopy. If found in the map zones, then located near the town of Bastrop, Texas on the eastern edge of map zone 35. ..... **Crosstimbers Southern Pine Forest and Woodland**[b,c]

2b. *Pinus echinata* present in the canopy. Located in map zone 32 ..... **3**

3a. Forest or woodland located in EPA Level IV Ecoregion 35d (Cretaceous Dissected Uplands) in the southeast corner of map zone 32 in Oklahoma. ..... **Western Gulf Coastal Plain Pine-Hardwood Forest**

3b. Forest or woodland located in EPA Level IV Ecoregion 37e (Lower Canadian Hills, east of Ada in Oklahoma) or Level III Ecoregion 39 (Ozark Highlands, along the northeastern margin of map zone 32 in Oklahoma) ..... **Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland**

4a. Open woodland occupying xeric, sandy sites, and often containing *Quercus incana* or *Quercus margarettiae* in the overstory. Herbaceous species that may be present include: *Brazoria truncata, Dalea villosa* var. *grisea, Gaillardia aestivalis* var. *winkleri, Helianthus occidentalis* ssp. *plantagineus, Hymenopappus carrizoanus, Lithospermum caroliniense, Loeflingia squarrosa, Minuartia drummondii, Monarda viridissima, Paronychia drummondii, Paronychia setacea, Penstemon murrayanus, Polygonella parksii, Rhododon ciliatus, Scutellaria cardiophylla, Stylisma pickeringii, Tradescantia reverchonii, Valerianella florifer*a. If found in these map zones, located along the eastern edge of map zone 35. **Crosstimbers Southern Xeric Sandhill**[b,c]

4b. Forests, woodlands, or savannas lacking the above composition **5**

5a. *Acer saccharum* with a canopy cover greater than or equal to 10%. Located on the far eastern edge of map zone 32 in Oklahoma. ..... **Ozark-Ouachita Mesic Hardwood Forest**

5b. *Acer saccharum* absent from the canopy, or present but with cover < 10%. **6**

6a. Forest with *Carya alba, Carya ovata, Quercus falcata, Quercus velutina, Quercus alba,* and/or *Quercus rubra* making up more than 30% of the canopy cover. **7**

6b. Forest, woodland, or savanna lacking the above composition. **8**

7a. Forest located in EPA Level IV Ecoregion 35d (Cretaceous Dissected Uplands, in the southeast corner of map zone 32 in Oklahoma). ..... **Western Gulf Coastal Plain Pine-Hardwood Forest**

7b. Forest located in EPA Level IV Ecoregion 37e (Lower Canadian Hills, east of Ada in Oklahoma) or Level III Ecoregion 39 (Ozark Highlands, along the northeastern margin of map zone 32 in Oklahoma) ..... **Ozark-Ouachita Dry-Mesic Oak Forest**

8a. Woodland or savanna occurring on sandy to loamy soils and characterized and dominated by *Quercus stellata, Quercus marilandica, Quercus velutina,* and/or *Carya texana*. Occurrences may be invaded by *Juniperus virginiana* and *Prosopis glandulosa.* **9**

8b. Woodland, forest, or savanna NOT dominated by *Quercus stellata, Quercus marilandica, Quercus velutina* and/or *Carya texana.* **10**

9a. Woodland or savanna located in EPA Level III Ecoregions 32 (Texas Blackland Prairie) or 33 (East Central Texas Plains), or Level IV Ecoregion 35c (Pleistocene Fluvial Terraces), generally east of IH-35 in Texas. ..... **East-Central Texas Plains Post Oak Savanna and Woodland**

9b. Woodland or savanna located in other EPA ecoregions, but primarily found in EPA Level III Ecoregion 29 (Cross Timbers). ..... **Crosstimbers Oak Forest and Woodland**

10a. Forest, woodland, or savanna found on granitic substrate within EPA Level IV Ecoregion 30b (Llano Uplift, much of Mason and Llano Counties, Texas and nearby areas). *Quercus stellata, Q. fusiformis,* and *Prosopis glandulosa* are common components of the canopy. Igneous intrusions may create significant openings with little or no vegetative cover..... ..... **Llano Uplift Granitic Forest, Woodland, and Glade**

10b. Forest, woodland, or savanna found on substrates other than granite and located outside of EPA Level IV Ecoregion 30b (Llano Uplift)..... **11**

11a. Woodland or savanna dominated by *Prosopis glandulosa*. *Prosopis glandulosa* is a common native invader of prairie systems under certain fire and grazing regimes. Natural occurrences of this system are generally restricted to the western half of these two map zones, but mesquite invaded prairie will also key here..... ..... **Western Great Plains Mesquite Woodland and Shrubland**

11b. Forest, woodland, or savanna found on substrate derived from limestone and located within EPA Level III Ecoregion 30 (Edwards Plateau, largely south and west of the Colorado River, and north of US Highway 90) or the Level IV Ecoregion 29e (Limestone Cut Plain, southwest of the Brazos River, west of IH35, and largely south and east of US Highway 67)..... **12**

12a. Forest or woodland found on lower slopes and adjacent flats of mesic canyons and often dominated by *Acer grandidentatum, Juglans major, Prunus serotina, Quercus buckleyi, Quercus laceyi, Quercus muehlenbergii,* and/or *Ulmus crassifolia*. Located within EPA Level IV Ecoregion 30c (Balcones Canyonlands) or 29e (Limestone Cut Plains)..... ..... **Edwards Plateau Mesic Canyon**

12b. Forest or woodland NOT dominated by any or a combination of the above species OR found on sites other than lower slopes and adjacent flats of mesic canyons. **13**

13a. Forest or woodland found on slopes greater than 12% and having a canopy cover of at least 25% for the deciduous species *Quercus laceyi, Quercus buckleyi, Fraxinus texensis,* and/or *Ulmus crassifolia* (though *U. crassifolia* should make up less than 20% of the canopy cover)..... ..... **Edwards Plateau Dry-Mesic Slope Forest and Woodland**

13b. Forest, woodland, or savanna usually occupying high topographic positions with little or no slope (<12%) and generally dominated by *Juniperus ashei* and/or *Quercus fusiformis*. Some deciduous species such as *Quercus laceyi, Quercus buckleyi,* or *Ulmus crassifolia* may be present. Found on substrates derived from Cretaceous limestone. .... **Edwards Plateau Limestone Savanna and Woodland**

KEY C: Upland Shrubland and Shrub-steppe Systems

(Tree cover < 10% and shrub cover > 10%, on upland sites)

1a. Shrubland dominated or co-dominated by *Artemisia filifolia, Quercus havardii, Prunus angustifolia,* and/or *Rhus trilobata,* and occupying deep sands in Ellis or Woodward Counties, Oklahoma (map zone 32) or Jones, Fisher, Mitchell, or Coke Counties, Texas (map zone 35). ..... **Western Great Plains Sandhill Steppe**

1b. Shrubland dominated by species other than those listed above..... **2**

2a. Shrubland located in EPA Level III Ecoregion 31 (Southern Texas Plains, within 40 km of US90 in Medina, Uvalde, Kinney, Val Verde, Zavala, or Frio Counties, Texas). **3**

2b. Shrubland located elsewhere. **4**

3a. Shrubland dominated or co-dominated by *Acacia berlandieri*, *Acacia rigidula, Castela erecta, Eysenhardtia texana, Guajacum angustifolium, Leucophyllum* sp., and *Salvia ballotiflora* and occupying thin-soiled sites over calcareous parent material. *Prosopis glandulosa* may be present but if so, has a canopy cover less than 50%. ..... **Tamaulipan Calcareous Thornscrub**

3b. Shrubland dominated by *Prosopis glandulosa* (canopy cover >50%) .... **Tamaulipan Mesquite Upland Scrub**

4a. Shrubland occupying sites with thin soils over calcareous parent material and dominated or co-dominated by *Quercus sinuata* var. *breviloba, Diospyros texana, Mahonia trifoliata, Sophora secundiflora, Rhus virens*, and/or *Rhus lanceolata*. *Juniperus ashei* may also be present. .... **Edwards Plateau Limestone Shrubland**

4b. Shrubland dominated by *Prosopis glandulosa*. *Prosopis glandulosa* is a common native invader of prairie systems under certain fire and grazing regimes. . Natural occurrences of this system are generally restricted to the western half of these two map zones, but mesquite invaded prairie will also key here..... **Western Great Plains Mesquite Woodland and Shrubland**

KEY D: Upland Herbaceous Systems

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

1a. Grasslands of basins and swales that may occasionally flood, lack wetland soil characteristics, and typical have tight clay soils. Sites are typically dominated by *Pleuraphis mutica* (tobosa swales), with other mesic graminoids such as *Pascopyrum smithii* or *Panicum obtusum* present but not dominant. A sparse canopy of *Prosopis glandulosa* may be present. Located in EPA Level III Ecoregions 26 (Southwestern Tablelands), 27 (Central Great Plains), or 30 (Edwards Plateau).... ..... **Chihuahuan-Sonoran Desert Bottomland and Swale Grassland**

1b. Grasslands occurring in sites other than basins and swales with tight clay soils and NOT dominated by *Pleuraphis mutica*..... **2**

2a. Grasslands occurring in EPA Level III Ecoregions 26 (Southwestern Tablelands), 27 (Central Great Plains), and 28 (Flint Hills) and dominated by mid-grass species such as *Bouteloua curtipendula, Bouteloua hirsuta* var. *pectinata, Pascopyrum smithii* or *Schizachyrium scoparium.* Species such as *Andropogon gerardii* or *Sorghastrum nutans* may be present, but are not dominant. Grasslands dominated by the above species in Level III Ecoregion 29 (Cross Timbers) may represent grazed occurrences of Southeastern Great Plains Tallgrass Prairie System. ....**Central Mixedgrass Prairie**

2b. Herbaceous vegetation not dominated by *Bouteloua curtipendula, Bouteloua hirsuta* var. *pectinata, Pascopyrum smithii*, or *Schizachyrium scoparium*, or if dominated by these species, occurring in EPA Level III Ecoregions other than 26, 27, or 28. Grasslands dominated by the above species in Level III Ecoregion 29 (Cross Timbers) may represent grazed occurrences of Southeastern Great Plains Tallgrass Prairie System.....**3**

3a. Herbaceous vegetation of xeric sites on deep sands occurring in EPA Level IV Ecoregion 33b (Southern Post Oak Savanna). Woody species such as *Quercus incana, Q. margarettiae*, or *Q. stellata* may be present. Forbs such as *Brazoria truncata, Dalea villosa* var. *grisea, Gaillardia aestivalis* var. *winkleri, Helianthus occidentalis* ssp. *plantagineus, Hymenopappus carrizoanus, Lithospermum caroliniense, Loeflingia squarrosa, Minuartia drummondii, Monarda viridissima, Paronychia drummondii, Paronychia setacea, Penstemon murrayanus, Polygonella parksii, Rhododon ciliatus, Scutellaria cardiophylla, Stylisma pickeringii, Tradescantia reverchonii, Valerianella florifera* are characteristic of this vegetation. Not present in map zone 35, if present in map zone 32, restricted to far eastern edge. ..... **Crosstimbers Southern Xeric Sandhill[c]**

3b. Herbaceous vegetation of sites other than xeric areas on deep sands, or if on such sites, lacking the above species and/or occurring away from the far eastern edge of map zone 32.....**4**

4a. Grasslands dominated by shortgrass species such as *Bouteloua gracilis, Buchloe dactyloides, Bouteloua hirsuta* and occurring within EPA Level IV Ecoregions 30a (Edwards Plateau Woodland) or 30d (Semiarid Edwards Plateau)..... **Western Great Plains Shortgrass Prairie**

4b. Herbaceous vegetation dominated other species and occurring elsewhere within the map zones. **5**

5a. Grasslands occupying deep sands (such as sand sheets or sandhills) and dominated by *Andropogon hallii, Calamovilfa longifolia,* and/or *Sporobolus cryptandrus*. If present in these map zones, then restricted to Ellis or Woodward Counties, Oklahoma (map zone 32) or Jones, Fisher, Mitchell, or Coke Counties, Texas (map zone 35). .....**Western Great Plains Sand Prairie[c]**

5b. Herbaceous vegetation occupying sites other than deep sands, or if occupying deep sands then found in areas other than Ellis or Woodward Counties, Oklahoma or Jones, Fisher, Mitchell, or Coke Counties, Texas. **6**

6a. Grasslands dominated by species such as *Schizachyrium scoparium, Bouteloua curtipendula, Muhlenbergia reverchonii, Leucotrichum scoparium,* or *Sporobolus compositus* and occurring

within EPA Level III Ecoregion 30 (Edwards Plateau). Occurrences of vegetation of this type in Level IV Ecoregion 29e (Limestone Cut Plain) may difficult to distinguish from Central Mixedgrass Prairie. ..... **Edwards Plateau Limestone Savanna and Woodland**

6b. Tallgrass grasslands of ecoregions other than EPA Level III Ecoregion 30 (Edwards Plateau). .. **7**

7a. Tallgrass grasslands generally occupying vertisols and dominated by *Andropogon gerardii, Panicum virgatum, Sorghastrum nutans, Tripsacum dactyloides* and/or *Schizachyrium scoparium.* Microtopographic features such as gilgai and mima mounds are sometimes conspicuous. These grasslands occur within EPA Level III Ecoregions 32 (Texas Blackland Prairie) and 33 (East-central Texas Plains), largely east of IH-35 in Texas. Occurrences of tallgrass prairie representing this system in these ecoregions may also occupy acidic, sandy loams that are interspersed with vertisols. .... **Southern Blackland Tallgrass Prairie**

7b. Tallgrass grasslands dominated by *Andropogon gerardii, Panicum virgatum, Sorghastrum nutans, Tripsacum dactyloides* and/or *Schizachyrium scoparium*. Legumes such as *Dalea aurea, D. multiflorum, D. nana, D. tenuis, Lespedeza capitata, Psoralidium tenuiflorum,* and *Pediomelum linearifolium* may be common, and forbs such as *Liatris punctata, Mentzelia oligosperma,* and *Oligoneuron rigidum* may also be present. In Texas, these grasslands occur in ecoregions west of EPA Level III Ecoregions 32 and 33 (largely west of IH-35). In Oklahoma and Kansas, these grasslands throughout most of map zone 32. .... **Southeastern Great Plains Tallgrass Prairie**