Field Key to Ecological Systems of Map Zone 44
Ozark and Ouachita Mountains and
Adjacent Areas, United States

NatureServe
Terrestrial Ecology Department
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Sugarloaf Mountain, Sylamore Ranger District, Ozark National Forest, August 1998. photo by Alan Weakley

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Introduction

The following keys to NatureServe ecological systems cover the areas found in NLCD map zone 44. This area includes virtually all of these EPA Level III Ecoregions: Ozark Highlands (39), Boston Mountains (38), Arkansas Valley (37), and Ouachita Mountains (36) and parts of these peripheral EPA Level III Ecoregions: Mississippi Alluvial Plain (73), South Central Plains (35), Central Irregular Plains (40), Interior River Valleys and Hills (72). These units as well as the EPA Level IV Ecoregions are referred to in the key. The systems included in these keys are intended to represent the legend that LANDFIRE will be striving to map for existing vegetation (Figure 1). 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.

Plant names are almost always in Latin and follow the nomenclature of Kartesz (1999). In limited cases, we have included synonyms and/or common names 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. The users should carefully read both couplets before making the best choice of the two available leads. 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 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 taeda* Forest Alliance).

Systems do not include Latin species names in them, and always start with a Biogeographic region (e.g. Southern Coastal Plain or Atlantic Coastal Plain), and may include plant species or genus common names (e.g. Pine, Oak). Numbers in parentheses placed after the System Name are the EVT (Existing Vegetation Type) codes assigned by Landfire to the Systems.

Some keys or portions of keys may follow a different logic from one another, depending on what ecological or biogeographic variable is best suited to the types included in the key. A group of higher-order couplets or choices guides the user to one of several individual keys for a more specific group of systems. Some systems include a variety of manifestations on the landscape, and these may appear more than once in the key or keys. These examples will be noted by reference to the other examples.

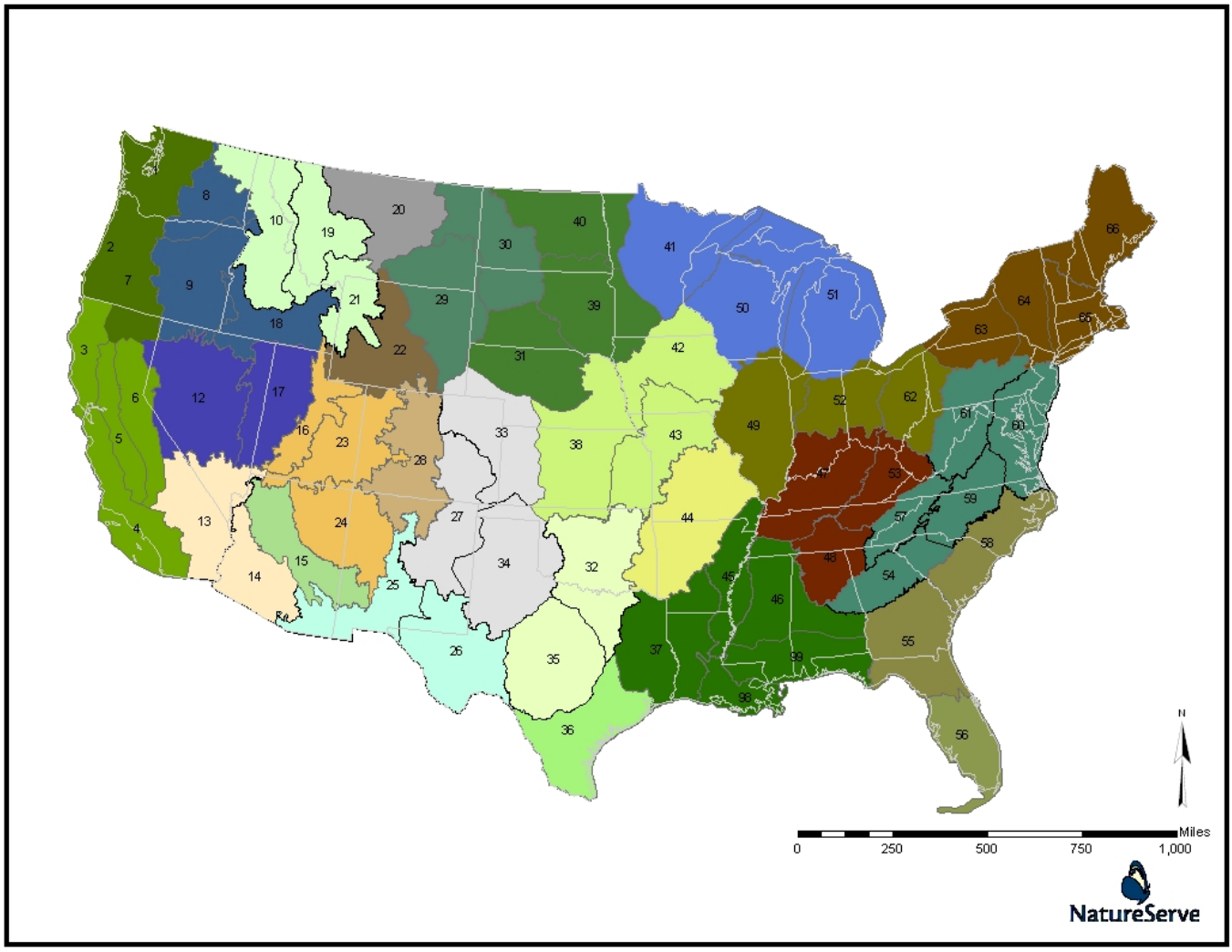

Figure 1. LANDFIRE map zone clusters with keys to ecological systems and selected alliances.

The keys to ecological systems use a variety of different variables, which are applied in various sequences, depending on the relative significance of the variable. Variables that are less ambiguous in their application will ideally be used earlier or "higher" in the key. The principal (and more-or-less "universal") variables that help provide the upper structure for the key include broad physiognomy (e.g. forested vs. non-forested), broad biogeography (where a map zone is heterogeneous in this respect), and general hydrology (e.g. upland and wetland). Common terms instead of overly jargonistic or technical language is preferred in the key where possible, but some terms may require definition. In our sense of meaning, "wetland" vegetation is that which "whose composition is affected by flooding or saturated soil conditions." The term is not used in the sense of a "jurisdictional wetland" which is a more limited as well as a legal meaning of this term.

Systems might occur in the key in several places, if their range of variability would require this. In more detailed (or "lower") places in the key, dominance within vegetation strata may play a role. Tree cover is generally considered first, then that of shrubs, then the herbaceous component. Codominant species within a given strata are important as well, in some cases a system type or alliances will have 2 or more codominant species, which may or may not be present in all stands.

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, which represent specific environments within the larger ‘matrix.’ In the southeastern coastal plains, elevation is not of much use in distinguishing systems, but soil composition or latitude may be of some importance. These variables and others are used to provide the framework for the key.

Ideally, the user of the key will be able to locate themselves in relation to the EPA Level IV Ecoregions, as in some cases this may be the determining factor between two otherwise similar systems. These ecoregional limits are in a sense a general guide, and different systems of classifying ecoregions vary in terms of precisely where these boundaries occur. In many cases, the ecoregional line correlates well with an observable variable in vegetation, topography, soil type, etc., but this may not always be the case and ecotonal areas may occur in some cases near a boundary. If difficulties arise, the first step to be taken would be to read the detailed description of the Ecological System(s) in question. These are available from http://www.natureserve.org/explore.

The Southern US Office of NatureServe has also developed range map shapefiles for most Ecological Systems that are being employed as Landfire target map units. These were developed with funding and support from, and in collaboration with, the USGS BDR Southeastern GAP Analysis Project. Please contact Milo Pyne (milo_pyne@natureserve.org) 919.484.7857 ext. 136 for more information.

Users of this key should also contact the Southern US Office of NatureServe (at the phone number and email given above) if any issues arise with the use and interpretation of the key presented here. It is the sincere hope of NatureServe that this key will be of use to field workers in the location and interpretation of examples of Ecological Systems. Any factual errors or other information contained herein that is incorrect or misleading is entirely our responsibility, and we would hope to correct or improve it in the future.

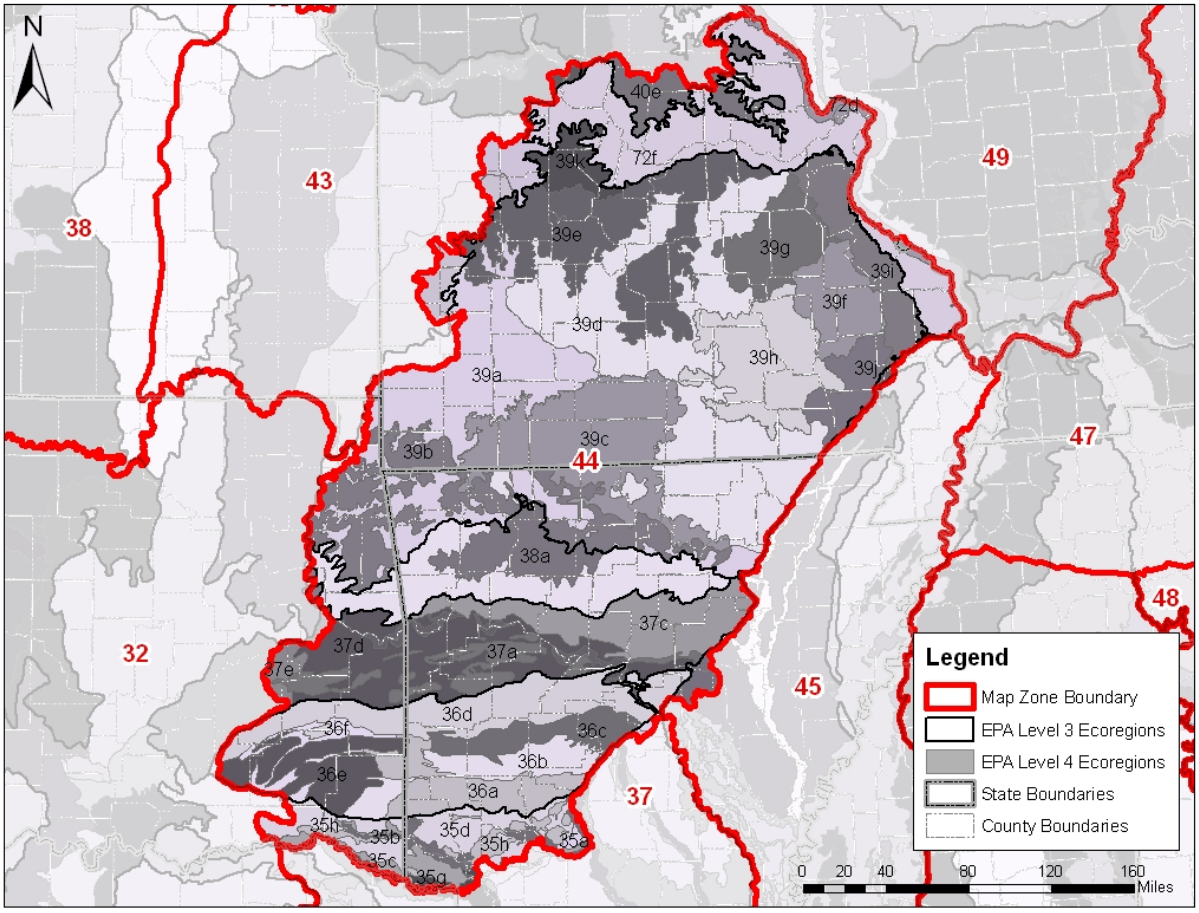

Figure 2– EPA Level III and Level IV Ecoregions for Map Zone 44 [insert new map]

In the section of the document immediately following, 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 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.
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 (including .
Introduced Upland Vegetation – Annual and Biennial Forbland	Land cover is significantly altered/disturbed by introduced annual and biennial forbs. Natural vegetation types are no longer recognizable.
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.
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, 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.

Map Zone 44 Ecological Systems

This key is intended to aid in the identification of Ecological Systems and selected semi-natural or altered vegetation types that are found in the Ozarks and Ouachita Mountains (NLCD Map Zone 44), which covers the central and northwestern half of Arkansas, central and southern Missouri, eastern Oklahoma and extreme southeastern Kansas.

KEY TO KEYS

1a. Herbaceous vegetation, trees if present are sparse and widely scattered ..... **KEY B**
1b. Forest or woodland, trees in the dominant vegetation layer **2**

2a. Upland forest or woodland, trees in the dominant vegetation layer ..... **KEY A**
2b. Wetland forest or woodland, trees in the dominant vegetation layer ..... **KEY C**

KEY A: Upland Forest and Woodland Ecological Systems of Map Zone 44

1a. Trees in planted stands, generally with >70% relative cover of *Pinus palustris, Pinus elliottii, Pinus echinata* or *Pinus taeda* ..... **Managed Tree Plantation - Southeast Conifer & Hardwood Plantation Group (2502)**
1b. Not a tree plantation or planted stand of trees **2**

2a. Stand dominated by introduced exotic trees (i.e. *Melia azedarach, Ailanthus altissima, Broussonetia papyrifera*) ... . **Introduced Upland Vegetation – Treed (2187)**
2b. Stand dominated by native trees, not introduced exotic trees **3**

3a. Forests or woodlands in the South Central Plains (35) of SW Arkansas or SE Oklahoma, Red River area **6**
3b. Forests or woodlands outside the South Central Plains (35) of SW Arkansas or SE Oklahoma **4**

4a. Forests or Woodlands in eastern Oklahoma in the Lower Canadian Hills (37e) or Osage Cuestas (40b), distinguished by the dominance of short, stunted *Quercus stellata* and *Quercus marilandica*. Other tree species, such as *Carya texana, Carya cordiformis, Quercus prinoides*, and *Quercus* spp., can also be present. The understory often contains species typical of the surrounding prairies, in particular, *Schizachyrium scoparium* .... **Crosstimbers Oak Forest and Woodland (2308)**
4b. All other Forests and Woodlands in Map Zone 44 ..... **5**

5a. Forests or woodlands found in the Ozark Highlands (39), Boston Mountains (38), Arkansas Valley (37), or Ouachita Mountains (36), these areas which make up the majority of Map Zone 44 ..... **11**
5b. Forests, woodlands or savanna found in the Central Irregular Plains (40), Western Corn Belt Plains (47) or River Hills (72f), in areas on the periphery of Map Zone 44 ..... **8**

6a. Mesic Hardwood Forests of ravines and sideslopes. Vegetation indicators are mesic hardwoods such as *Fagus grandifolia, Quercus alba*, and *Ilex opaca* ..... **West Gulf Coastal Plain Mesic Hardwood Forest (2323)**
6b. Dry to dry-mesic forests or woodlands of pine, pine and hardwoods, or open oak woodlands **7**

7a. Open woodlands on deep coarse sands, characteristic trees include *Quercus arkansana, Quercus incana, Quercus margarettiae, Quercus falcata, Quercus stellata, Quercus marilandica, Pinus echinata, Carya texana*, and less commonly *Pinus taeda* ..... **West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland (2378)**
7b. Forests or woodlands dominated by *Pinus taeda* and/or *Pinus echinata* in combination with a host of dry to dry-mesic site hardwood species ..... **West Gulf Coastal Plain Pine-Hardwood Forest (2371)**

8a.. Mesic deciduous forest with *Acer saccharum* as the most common tree species. Associates include *Tilia americana, Quercus rubra*, and *Ostrya virginiana* ..... **North-Central Interior Maple-Basswood Forest (2314)**
8b. Dry to dry-mesic oak forest, woodland or prairie like savanna with scattered trees **9**

9a. Savanna of scattered trees over a continual tallgrass prairie. *Quercus macrocarpa* is the most common tree species and can range from 10-60% cover. The understory is dominated by tallgrass prairie species such as *Andropogon gerardii* and *Schizachyrium scoparium* ..... **North-Central Interior Oak Savanna (2394)**

9b. Forests and woodlands dominated by *Quercus* spp..... **10**

10a. Dry oak forest or woodland in which *Quercus velutina, Quercus macrocarpa,* or *Quercus coccinea* dominate the overstory sometimes with *Carya glabra, Prunus serotina,* and *Sassafras albidum.* If *Quercus macrocarpa* is dominant, then *Quercus velutina* and *Quercus coccinea* are more abundant than *Quercus alba* and *Quercus rubra.* ..... **North-Central Interior Dry Oak Forest and Woodland (2311)**

10b. Oak forest or woodland in which *Quercus macrocarpa, Quercus rubra,* and/or *Quercus alba* dominate the overstory. *Carya* spp. may also be important canopy trees. If *Quercus macrocarpa* is dominant, then *Quercus alba* and *Quercus rubra* more abundant than *Quercus velutina* and *Quercus coccinea.*..... ..... **North-Central Interior Dry-Mesic Oak Forest and Woodland (2310)**

11a. Forests or open woodlands restricted to the highest elevations of the Ouachita, Rich, and Black Fork mountains of Arkansas and Oklahoma (about 790-850 m [2600-2800 feet]), in the Fourche Mountains (36d), Central Mountain Ranges (36b) or Western Ouachitas (36e). Dominated by *Quercus alba* or *Quercus stellata*. Some examples may have *Quercus marilandica var. ashei*; herb layers may contain *Carex pensylvanica* and/or *Carex ouachitana.* Examples include Black Fork Mountain (Polk County, Oklahoma), Castle Rock Vista on Talimena Drive (LeFlore County, Oklahoma), and Winding Stair Mountain (Latimer County, Oklahoma) .... **Ouachita Montane Oak Forest (2312)**

11b. Forests or open woodlands found below 790 m (2600 feet) or not as described above **12**

12a. Mesic forests found on lower slopes, toeslopes and valley bottoms, as well as on north slopes. Dominant trees include *Quercus alba, Quercus rubra, Acer barbatum, Acer saccharum, Fagus grandifolia, Liquidambar styraciflua, Quercus muehlenbergii,* and *Tilia americana*. The understory may contain *Cercis canadensis, Magnolia tripetala*, and/or *Magnolia acuminata*. In the Ozark Highlands (39), *Quercus rubra* increases in abundance compared to dry-mesic habitats, and *Acer saccharum* is sometimes a leading dominant. On more alkaline moist soils, *Quercus muehlenbergii, Tilia americana,* and *Cercis canadensis* may be common. In the Boston Mountains (38), mesic forests may also be common on protected slopes and terraces next to streams. Here, *Fagus grandifolia* may be the leading dominant, with codominants of *Acer saccharum, Liquidambar styraciflua, Tilia americana, Magnolia acuminata, Magnolia tripetala*, and others. Similar habitats occur in the Western Ouachitas (36e). .... **Ozark-Ouachita Mesic Hardwood Forest (2334)**

12b. Dry or dry-mesic Oak or Shortleaf Pine (*Pinus echinata)* forests or woodlands **13**

13a. Dry to dry-mesic oak forest or woodland..... **15**

13b. Shortleaf Pine (*Pinus echinata*) or Shortleaf Pine – Oak forest or woodland **14**

14a. Woodlands in which *Pinus echinata* is the canopy dominant, and the understory is characterized by *Andropogon gerardii, Schizachyrium scoparium*, and other prairie elements..... ..... **Ozark-Ouachita Shortleaf Pine-Bluestem Woodland (2507)**

14b. Stand contains *Pinus echinata* with various oak species, including *Quercus alba, Quercus rubra, Quercus falcata, Quercus stellata, Quercus velutina*, and *Quercus marilandica*. In some examples, the aggregate importance of hardwoods may be greater than pine, especially on subxeric and mesic sites..... ..... **Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (2367)**

15a. *Quercus stellata, Quercus marilandica*, and *Quercus coccinea* dominant with an understory of grassland species such as *Schizachyrium scoparium* and shrub species such as *Vaccinium arboreum*. Found on southerly to westerly aspects or sometimes with a fragipan that causes "xero-hydric" moisture conditions. This system was historically woodland in structure, composition, and process but now includes areas of more closed canopy..... ..... **Ozark-Ouachita Dry Oak Woodland (2364)**

15b. Dry-mesic forest which occurs on dry-mesic to mesic, gentle to moderately steep slopes. Soils are typically moderately to well-drained and more fertile than those associated with oak woodlands. A closed canopy of oak species (*Quercus rubra* and *Quercus alba*) often associated with hickory species (*Carya* spp.) typifies this system. *Acer saccharum* (or *Acer barbatum* to the south) may occur on more mesic examples of this system..... ..... **Ozark-Ouachita Dry-Mesic Oak Forest (2304)**

KEY B: Herbaceous Ecological Systems of Map Zone 44

1a. Vegetation dominated by native plants, non-native perennial herbaceous plants or grasses having <20% relative cover **3**
1b. Vegetation with non-native perennial herbaceous plants or grasses having >20% relative cover **2**

2a. Vegetation with significant cover of non-native perennial herbaceous plants, riparian areas with moderate to high cover of invasive exotic plants, (i.e. >20% relative cover of *Ligustrum sinense, Alliaria petiolata, Lolium arundinaceum, Lolium pretense, Lygodium japonicum, Paspalum urvillei,* or *Cyperus entrerianus*) ..... **Introduced Riparian Vegetation (2180)**
2b. Vegetation with non-native perennial herbaceous plants or grasses having >20% relative cover and >20% relative cover with any combination of these species: *Paspalum notatum, Alliaria petiolata, Lolium arundinaceum, Lolium pretense, Cynodon dactylon, Sorghum halepense, Sporobolus indicus, Lespedeza cuneata, Eremochloa ophiuroides, Solanum viarum* ..... **Introduced Upland Vegetation - Perennial Grassland and Forbland (2182)**

3a. Deep to shallow areas of freshwater marsh found in Missouri in the Wooded Osage Plains (40c), Cherokee Plains (40d), Claypan Prairie (40e), Missouri Alluvial Plain (47d), Rolling Loess Prairies (47f), and River Hills (72f). The vegetation is dominated by emergent and submergent species that may be surrounded by a zone of wet meadow. Stands may be open ponds with floating or rooted aquatics, deep marsh with bulrush or cattails, or wet meadow. Dominant species may include *Carex spp., Calamagrostis canadensis, Cephalanthus occidentalis, Cornus spp., Salix spp., Schoenoplectus spp., Spartina pectinata, Typha spp*..... **Central Interior and Appalachian Herbaceous Wetland Systems (2493)**
3b. Generally herbaceous mostly upland vegetation of prairies, barrens or glades (note: West Gulf Coastal Plain Saline Glade (2402) is a wetland ecological system which keys here, see couplet 13)..... **4**

4a. Prairies, barrens or glades in the Ozark Highlands (39), Boston Mountains (38), Arkansas Valley (37) or Ouachita Mountains (36) **9**
4b. Prairies, barrens or glades peripheral to Map Zone 44, found outside the Ozark Highlands, Boston Mountains, Arkansas Valley or Ouachita Mountains..... **5**

5a. Prairies, natural grasslands dominated by native warm season grasses with no trees or savanna with few trees..... **6**
5b. Barrens or glades with scattered trees or rocky glades with thin soil and sometimes rock outcrops, in central to SW Arkansas or SE Oklahoma..... **13**

6a. Prairies in Arkansas or Oklahoma in the Arkansas Valley (37), Blackland Prairie (35h), or Cretaceous Dissected Uplands (35d) or in Arkansas in the Grand Prairie (73e) **7**
6b. Prairies in Missouri, north or west of the Ozark Highlands (39)..... **10**

7a. Prairies in Arkansas in the Grand Prairie (73e) between the White and Arkansas Rivers. Typical examples are dominated by *Panicum virgatum* and *Andropogon gerardii*. ..... **Lower Mississippi Alluvial Plain Grand Prairie (2432)**
7b. Prairies in Arkansas or Oklahoma, but not in the Grand Prairie (73e) between the White and Arkansas Rivers **8**

8a. Prairies in the Arkansas Valley (37) of Arkansas or Oklahoma..... **Arkansas Valley Prairie and Woodland (2415)**
8b. Prairies in the Blackland Prairie (35h), or Cretaceous Dissected Uplands (35d) in SW Arkansas or SE Oklahoma. Usually with some of these plants: *Sorghastrum nutans, Bouteloua curtipendula, Andropogon glomeratus, Leersia virginica, Panicum anceps, Panicum flexile, Sporobolus compositus, Fimbristylis puberula var. puberula, Carex cherokeensis, Carex microdonta, Echinacea pallida, Liatris aspera, Marshallia caespitosa, Silphium integrifolium, Silphium laciniatum, Solidago auriculata, Symphyotrichum lanceolatum, Packera tampicana, Thelesperma filifolium, Nemastylis geminiflora, Dalea purpurea, Lythrum alatum, Allium canadense var. mobilense, Zigadenus nuttallii* ..... **West Gulf Coastal Plain Northern Calcareous Prairie (2428)**

9a. Prairie or woodland in the Springfield Plateau (39a) ..... **Ozark Prairie and Woodland (2508)**
9b. Prairies, barrens or glades found outside the Springfield Plateau (39a)..... **12 (has 3 choices)**

10a. Savanna of scattered trees over a continual tallgrass prairie. *Quercus macrocarpa* is the most common tree species and can range from 10-60% cover. The understory is dominated by tallgrass prairie species such as *Andropogon gerardii* and *Schizachyrium scoparium* ..... **North-Central Interior Oak Savanna (2394)**

10b. Prairie with no or virtually no trees..... **11**

11a. Prairies of the Prairie Ozark Border (39k), Wooded Osage Plains (40c), or Cherokee Plains (40d)..... ..... **Southeastern Great Plains Tallgrass Prairie (2423)**

11b. Prairies of the Claypan Prairie (40e), Missouri Alluvial Plain (47d), Rolling Loess Prairies (47f), or River Hills (72f) ..... **Central Tallgrass Prairie (2421)**

12a. Glades or barrens on chert, igneous and/or sandstone bedrock with well- to excessively well-drained, shallow soils interspersed with rock and boulders. Grasses such as *Schizachyrium scoparium* and *Sorghastrum nutan*s dominate this system with stunted oak species (*Quercus stellata, Quercus marilandica*) and shrub species such as *Vaccinium* spp. occurring on variable depth soils. *Juniperus virginiana* can be present and often increases in the absence of fire ..... **Central Interior Highlands Dry Acidic Glade and Barrens (2363)**

12b. Glades or barrens on limestone and/or dolomite bedrock. *Schizachyrium scoparium* dominates this system and is commonly associated with *Andropogon gerardii, Bouteloua curtipendula,* and calcium-loving plant species. Stunted woodlands primarily dominated by *Quercus muehlenbergii* interspersed with *Juniperus virginiana* occur on variable-depth-to-bedrock soils ..... **Central Interior Highlands Calcareous Glade and Barrens (2401)**

12c. Glade or Woodland found on novaculite geology in the central Ouachita Mountains of western Arkansas and adjacent Oklahoma, in the Central Mountain Ranges (36b) or Central Hills, Ridges, and Valleys (36c). They are a mosaic of small woodlands scattered on ridges and upper slopes with outcrops and patches of talus scattered throughout. Some woodland or forest patches may appear as almost linear strips interspersed with grassy openings. may be characterized by sparse tree cover of dwarfed (1-3 m) *Quercus marilandica var. ashei,* which can sometimes occur in clumps. Herbaceous cover is 100%, except where bare rock is exposed or on talus. Lichens cover 40-70% of the exposed rock surface. Open community components of this system grade into more densely wooded types, with a variable structure, dominated by *Quercus stellata, Ulmus alata, Quercus marilandica, Juniperus virginiana var. virginiana, Pinus echinata,* and *Carya texana*. More submesic areas have *Quercus rubra*-dominated woodlands with *Carya texana* that may approach a forest physiognomy..... **Ouachita Novaculite Glade and Woodland (2505)**

13a. Glade system present only in Saline and Pulaski counties, Arkansas, on distinctive, massive outcrops of igneous substrate called nepheline syenite. Zonal vegetation communities are present around the outcrops. Interior herbaceous-dominated zones can be mesic to wet as springs and small ephemeral streams flow across the rock outcrops and water pools in flat areas. Some examples will have open stands of *Quercus stellata,* but trees may be absent. Some typical dominant grasses include *Schizachyrium scoparium, Piptochaetium avenaceum, Aristida purpurascens*, and *Sporobolus clandestinus*..... **West Gulf Coastal Plain Nepheline Syenite Glade (2405)**

13b. Glades in the Pleistocene Fluvial Terraces (35c), Arkansas Valley Plains (37d), or Western Lowlands Pleistocene Valley Trains (73g) on soils with high saline content, very poor drainage and a shallow hardpan, which in the most extreme examples are generally not conducive to woody plant growth. Thus, the vegetation forms a mosaic primarily consisting of open herbaceous or shrubby plant communities. Some characteristic plants in examples of this system include (in stands with trees) *Quercus stellata, Quercus marilandica, Quercus similis,* as well as shrubs *Baccharis halimifolia, Crataegus berberifolia, Iva angustifolia*; grasses and graminoids include *Aristida dichotoma, Aristida longispica, Aristida oligantha, Aristida purpurascens, Distichlis spicata, Eleocharis* spp., *Fimbristylis* spp., *Juncus* spp., *Muhlenbergia capillaris, Schoenoplectus* spp., *Schizachyrium scoparium, Tridens strictus*, and forbs *Krigia occidentalis, Houstonia rosea, Ambrosia artemisiifolia, Diodia teres, Euthamia leptocephala,* and *Bigelowia nuttallii* ..... **West Gulf Coastal Plain Saline Glade (2402)**

KEY C: Wetland Forest, Woodland, and Shrubland Ecological Systems of Map Zone 44

1a. Trees in planted stands generally with >70% relative cover of *Pinus palustris, Pinus elliottii, Pinus echinata* or *Pinus taeda* ..... **Managed Tree Plantation - Southeast Conifer & Hardwood Plantation Group (2502)**
1b. Not a tree plantation or planted stand of trees **2**

2a. Riparian areas with > 20% relative cover of non-native perennial shrubs or herbaceous plants, (i.e. >20% relative cover of *Ligustrum sinense, Paspalum urvillei, Lygodium japonicum*, or *Cyperus entrerianus*) ..... **Introduced Riparian Vegetation (2180)**
2b. Vegetation not dominated by or with significant cover of non-native shrubs or perennial herbaceous plants..... **3**

3a. Wetlands (riparian or influenced by flooding or saturation) with >20% relative cover of *Triadica sebifera* (Chinese tallow tree) ..... **Introduced Wetland Vegetation – Mixed (2185)**
3b. Wetlands (riparian or influenced by flooding or saturation) with <20% relative cover of *Triadica sebifera* (Chinese tallow tree)..... **4**

4a. Wetlands of the South Central Plains (35), and Mississippi Alluvial Plain (73), in central to SW Arkansas or SE Oklahoma **5**
4b. Wetlands of the rest of Map Zone 44 ..... **10**

5a. Flatwoods in inland portions of the South Central Plains (Ecoregions 35a,, 35b, 35c, 35d, 35e, 35f, and 35h) on nonriverine, Pleistocene high terraces. Local topography is a complex of ridges and swales, often in close proximity to one another. **6**
5b. Other forests, woodlands or shrublands, not flatwoods..... **7**

6a. The driest ridges support *Pinus taeda* and *Quercus stellata*; more mesic ridges have *Pinus taeda* with *Quercus alba* and understory species such as *Symplocos tinctoria* and *Viburnum dentatum*. Swales tend to support hardwood forests or swamps, often heavily oak-dominated with species tolerant of some inundation, such as *Quercus phellos, Quercus michauxii* and *Quercus laurifolia*..... **West Gulf Coastal Plain Pine-Hardwood Flatwoods (2458)**
6b. Examples generally lacking *Pinus taeda*, but support hardwood forests or swamps, which are often heavily oak-dominated. Important species are tolerant of inundation. They include *Quercus michauxii, Quercus phellos, Quercus laurifolia*, and *Liquidambar styraciflua*, with sparse coverage of wetland herbs such as *Carex glaucescens*. Some swales support unusual pockets of *Fraxinus caroliniana* and *Crataegus* spp. ..... **West Gulf Coastal Plain Nonriverine Wet Hardwood Flatwoods (2506)**

7a. Forests and shrublands on saturated soils associated with springs and seepage flow characterized by *Magnolia virginiana*, *Nyssa sylvatica*, *Nyssa biflora*, and *Acer rubrum*. Southerly examples generally consist of broad-leaved evergreen forests, while more northerly examples support more mixed evergreen-deciduous forests. In addition, evergreen species such as *Cyrilla racemiflora* and *Ilex coriacea* are especially pronounced in the shrub layer of southern examples ..... **West Gulf Coastal Plain Seepage Swamp and Baygall (2462)**
7b. Other forested wetlands along rivers, creeks or in non-alluvial flats with organic soils or organic upper soil horizons **8**

8a. Wetland and riparian forests along creeks or rivers **9**
8b. Wetlands in poorly drained, organic or mineral soil flats or basins, saturated by rainfall and seasonal high water tables. Not associated with river floodplains ..... **Gulf and Atlantic Coastal Plain Swamp Systems (2480)**

9b. Wetland and riparian forests along small streams..... **Gulf and Atlantic Coastal Plain Small Stream Riparian Systems (2474)**
9b. Wetland and riparian forests along rivers..... **Gulf and Atlantic Coastal Plain Floodplain Systems (2473)**

10a. Wetlands in basins, characterized by some of these species *Acer rubrum, Alnus spp., Carex spp., Cephalanthus occidentalis, Fraxinus nigra, Ilex spp., Nyssa sylvatica, Osmunda cinnamomea, Quercus bicolor, Quercus palustris* ..... **Central Interior and Appalachian Swamp Systems (2479)**
10b. Wetlands or bottomlands found along rivers or creeks **11**

11a. Found along medium to large river floodplains. Characteristic trees include *Acer saccharinum, Populus deltoides, Betula nigra, Celtis laevigata, Liquidambar styraciflua,* willows, especially *Salix nigra* in the wettest areas, and *Platanus occidentalis,* with *Fraxinus pennsylvanica, Ulmus americana, Liriodendron tulipifera, Quercus michauxii, Quercus pagoda,* and *Quercus macrocarpa* in more well-drained areas..... .....**Central Interior and Appalachian Floodplain Systems (2471)**

11b. Found on moderately to very high-gradient streams over a wide range of elevations. It develops on small floodplains and shores along river channels that lack a broad, flat floodplain due to steeper sideslopes, higher gradient, or both. Common trees include *Betula nigra, Platanus occidentalis*, and *Acer negundo*. Where somewhat more stable, linear forests develop; typical trees include *Liriodendron tulipifera, Liquidambar styraciflua, Acer rubrum, Celtis laevigata, Fraxinus pennsylvanica, Quercus michauxii*, and *Quercus pagoda*. .... **Central Interior and Appalachian Riparian Systems (2472)**