Field Key to Ecological Systems and Target Alliances of the Map Zones 38, 42, 43 (Western Till Plains), United States

NatureServe
Terrestrial Ecology Department
April 2008

Contacts:
Jim Drake, Regional Vegetation Ecologist, 612-331-0729, jim_drake@natureserve.org
Shannon Menard, Senior Regional Ecologist, 651-772-7427, shannon_menard@natureserve.org

Introduction

The following keys to NatureServe ecological systems cover the areas found in NLCD map zones 38, 42, 43 (Western Till Plains). 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 in the keys 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, with one exception, which means the user follows the order of the 'couplets' and makes a choice between the two 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 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 strobus* Forest Alliance).

Systems do not include Latin species names in them, and always start with a Biogeographic region (e.g. North-Central Interior or Laurentian-Acadian), 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.

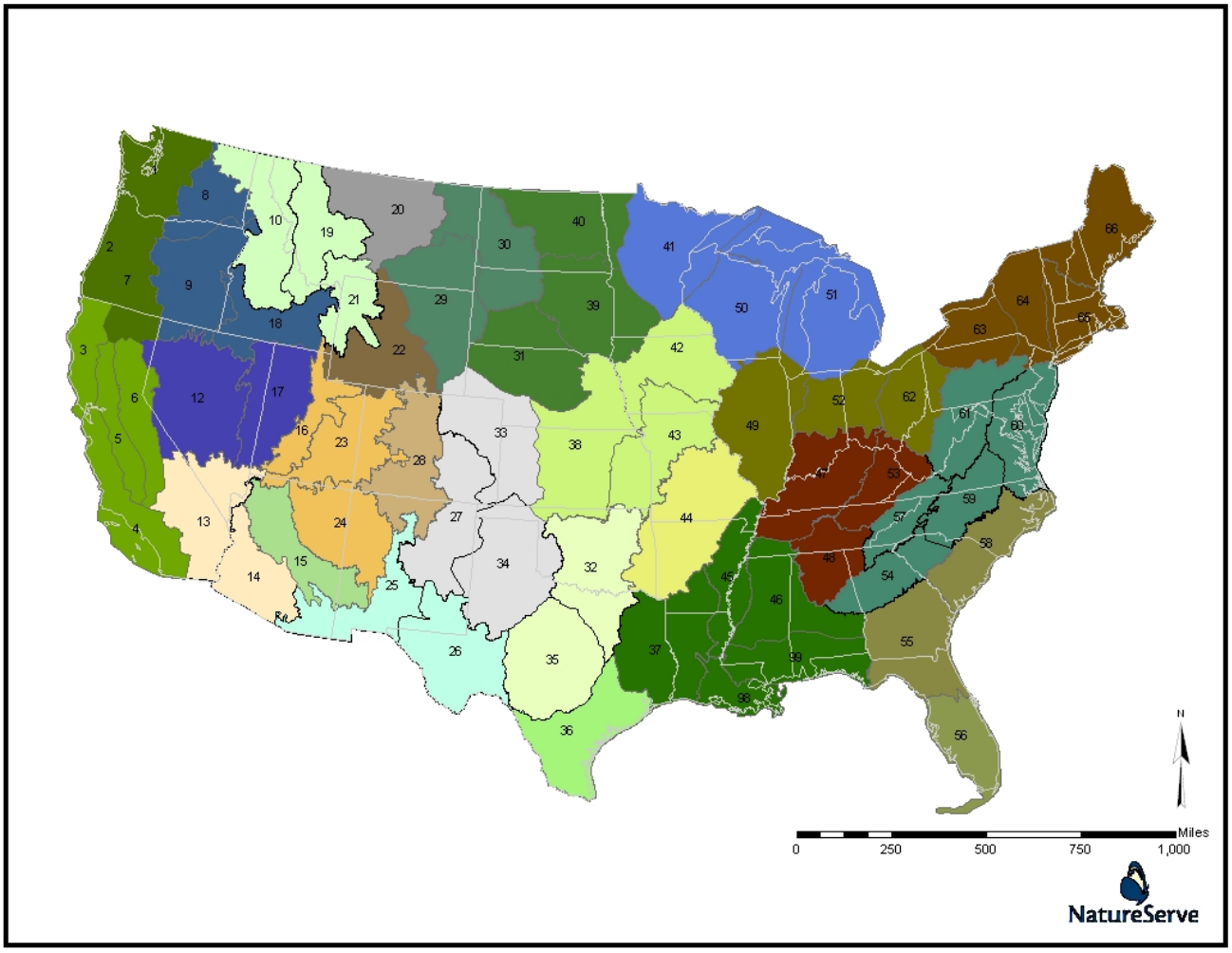

Figure 1. LANDFIRE map zone clusters with keys to ecological systems and selected alliances.

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 "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 may 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 or alliance will have two 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 Eastern Till Plains, elevation is of some use in distinguishing systems, but soil composition or latitude are of more importance across the entire area. 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 USFS Section and Subsection boundaries, 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.

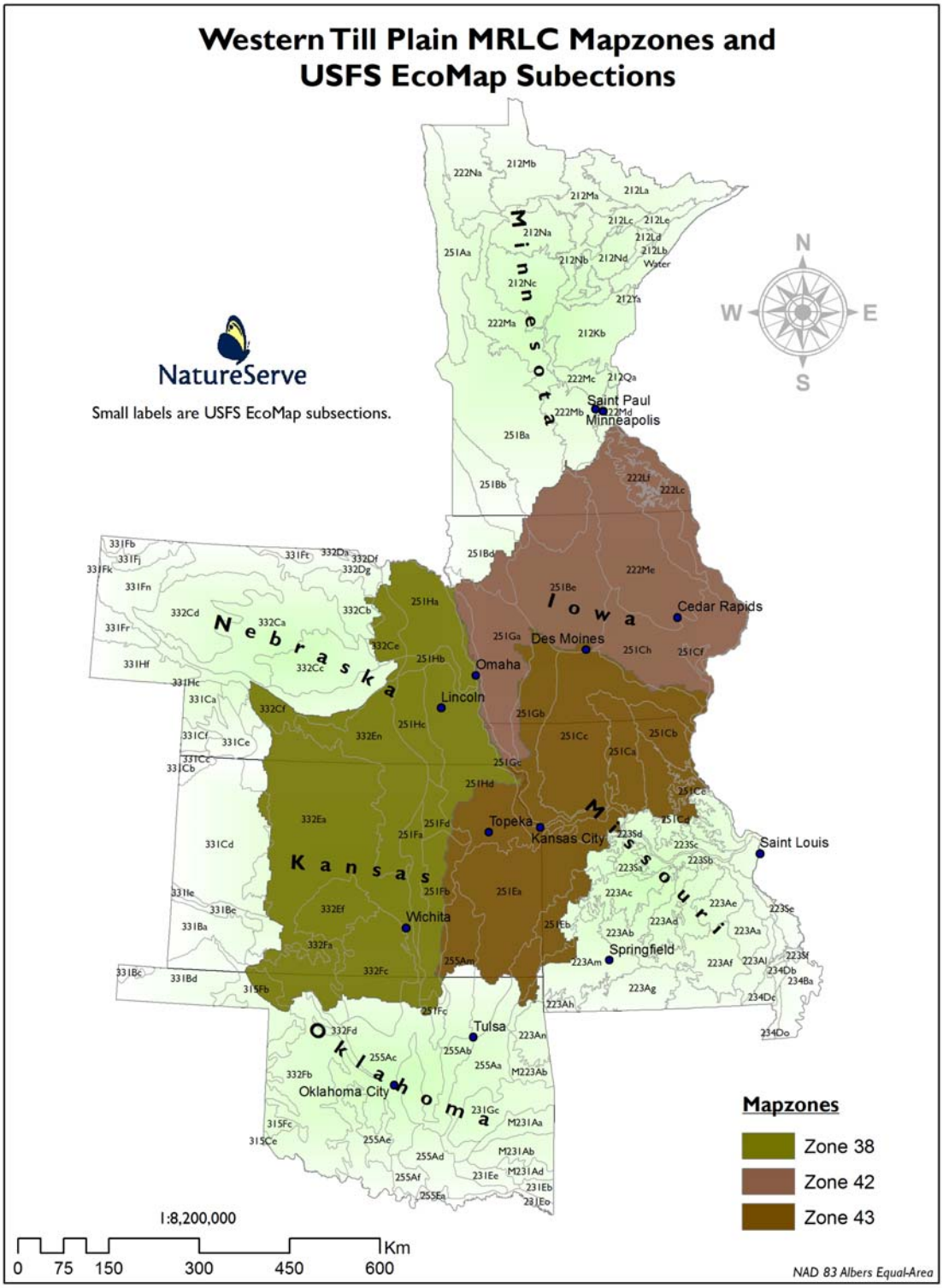

Figure 2 – USFS Subsections for Map Zones 38, 42, 43.

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.
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.

Key to Map Zones 38, 42, 43 Ecological Systems

This key is intended for identifying Ecological Systems and selected alliances that are found in the Eastern Till Plains (NLCD Map Zones 38, 42, 43), which covers eastern Nebraska (outside of the Sandhills), the eastern 2/3 of Kansas, extreme northern Oklahoma, northern Missouri (outside of the Ozarks), most of Iowa, and southeastern Minnesota.

Please note the following symbols:
***** indicates NS ecological system that has been grouped into broader LANDFIRE Map Unit. Included to help clarify key, but crews need to record broader LANDFIRE Map Unit(**)
****** indicates broader LANDFIRE Map Unit.
******* small patch ecological system, NOT being mapped by LANDFIRE and included for completeness of the key.

KEY TO GROUPS

1a. Trees and shrubs forming uppermost layer, woody canopy cover in that layer 10% or more **2**
1b. Total woody cover in the uppermost stratum less than 10-15%; though total woody cover may be greater; uppermost vegetation stratum strongly herbaceous **3**

2a. Upland forests, woodlands, and shrublands (stands whose composition is not affected by flooding or saturated soil conditions) .....**Key A**
2b. Wetland forests, woodlands, and shrublands (stands whose composition is affected by flooding or saturated soil conditions; including floodplains and bottomlands as well as seepage forests) .....**Key B**

3a. Total canopy cover (herbaceous) >10%, some woody species may be present **4**
3b. Total canopy cover (woody and herbaceous vascular plants) generally less than 10%.....**Key E**

4a. Uplands (e.g. prairies, some examples of scrub).....**Key C**
4b. Wetlands (including pond margins, marshes, sloughs, and wet depressions).....**Key D**

KEY A – FOREST AND WOODLAND SYSTEMS (>10% tree cover)

1a. Systems with >25% tree cover.....**2**
1b. Systems with <25% tree cover.....**12**

2a. Tree canopy dominated by *Quercus* spp.....**3**
2b. Tree canopy not dominated by *Quercus* spp.....**10**

3a. Soil shallow to deep; bedrock outcrops not prominent.....**4**
3b. Soil shallow and typically interspersed with bedrock outcrops/cliffs **8**

4a. Dry-mesic Systems characterized by *Quercus alba, Q. rubra, Q. macrocarpa*, and/or *Carya* spp. **5**
4b. Dry Systems characterized by *Quercus stellata, Q. marilandica, Q. velutina,* and/or Q. macrocarpa (*Q. macrocarpa* only in Nebraska) **6**

5a. Systems in Provinces 251 or 222 or Sections 332C or Subsection 332En; dry-mesic sites on loamy to sandy loam soils, overstory dominated by *Quercus alba, Q. rubra,* and/or *Q. macrocarpa*. *Carya* spp., especially *C. ovata, C. alba,* and *C. cordiformis*, are common associates..... **North-Central Interior Dry-Mesic Oak Forest and Woodland (2310)**
5b. Systems in Sections 223A or 223S (Ozarks); closed-canopy dry-mesic forests; canopy dominated by a combination of *Quercus alba, Q. rubra, Carya alba, C. cordiformis,* and *C. ovata*, often with smaller amounts of *Acer barbatum, A. saccharum, Fraxinus americana, Juglans nigra, Liquidambar styraciflua,* and *Ostrya virginiana* ....**Ozark-Ouachita Dry-Mesic Oak Forest (2304)**

6a. System characterized by *Quercus macrocarpa*, other common trees include *Juniperus virginiana, Fraxinus* spp., and *Tilia americana*.; in Nebraska only (in MZ38, 42, 43) .... **Western Great Plains Dry Bur Oak Forest and Woodland (2013)**
6b. System not characterized by *Quercus macrocarpa* **7**

7a. System in Provinces 251 or 222 or Sections 332C or Subsection 332En; canopy open to closed, trees not usually stunted, overstory usually dominated by *Quercus velutina* but sometimes by *Q. coccinea* and/or *Q. stellata*, especially in the southern parts of its range..... .....**North-Central Interior Dry Oak Forest and Woodland (2311)**
7b. System in Oklahoma and eastern Kansas only – Subsections 251Hd, 251Fa, 251Ea, 255Aa, 255Am; trees typically short and stunted; characterized by *Quercus stellata* and/or *Q.marilandica* .....**Crosstimbers Oak Forest and Woodland (2308)**

8a. Sites in Section 222L on cliffs, talus, or shallow soil over bedrock; physiognomy can vary from closed forest to open savanna; dominant trees also variable and can include *Quercus muehlenbergii* with *Pinus strobus, Abies balsamea, Betula alleghaniensis,* or *Juniperus virginiana*..... **Paleozoic Plateau Bluff and Talus (2517)**
8b. Sites in Sections 251C, 251E, 223A, and 223S in Missouri and Kansas **9**

9a. Substrate is acidic bedrock (sandstone, chert, igneous, flint); dominant trees include *Quercus prinus, Q. marilandica, Q. stellata* ..... **Central Interior Highlands Dry Acidic Glade and Barrens (2363)**

9b. Substrate is alkaline bedrock (dolostone, limestone); dominant trees include *Quercus stellata, Q. muehlenbergii, Juniperus* spp. ..... **Central Interior Highlands Calcareous Glade and Barrens (2401)**

10a. Mesic or dry-mesic with moderate to deep soil **11**

10b. Sites in Section 222L on cliffs, talus, or shallow soil over bedrock; physiognomy can vary from closed forest to open savanna; dominant trees also variable but typically *Quercus muehlenbergii, Pinus strobus, Abies balsamea, Betula alleghaniensis,* and/or *Juniperus virginiana* ..... **Paleozoic Plateau Bluff and Talus (2517)**

11a. Mesic sites characterized by a combination of *Acer saccharum* with *Fraxinus pennsylvanica, Quercus rubra,* and/or *Tilia americana* ..... **North-Central Interior Maple-Basswood Forest (2314)**

11b. Dry-mesic sites in Sections 251H or 332E, or 332C with little to no *Acer saccharum*; *Quercus alba* and *Q. macrocarpa* are common with abundant *Tilia americana, Fraxinus pennsylvanica,* and/or *Ostrya virginiana*..... **North-Central Interior Dry-Mesic Oak Forest and Woodland (2310)**

12a. Soil moderately deep to deep **13**

12b. Soil thin; bedrock outcrops, talus, and/or cliffs prominent..... **15**

13a. Trees >10% cover; *Quercus* spp. dominant in tree canopy **14**

13b. Trees <10% cover, shrubs >25% cover; sandy soil; sites in Nebraska or Kansas; common shrubs are *Artemisia filifolia, Prunus angustifolia,* and *Amorpha canescens*. ..... **Western Great Plains Sandhill Steppe (2094)**

14a. Soils rich, fine textured (loam, silt, clay); dominant trees typically *Quercus macrocapra* and/or *Q. alba*; herbaceous layer dominated by prairie grasses..... **North-Central Interior Oak Savanna (2394)**

14b. Soils coarse textured (sand, gravel); dominant trees typically *Quercus velutina* and/or *Q. ellipsoidalis*..... **North-Central Oak Barrens (2395)**

15a. Sites in Section 222L on cliffs, talus, or shallow soil over bedrock; physiognomy can vary from closed forest to open savanna; dominant herbaceous species are typically *Schizachyrium scoparium* and *Bouteloua curtipendula*. ..... **Paleozoic Plateau Bluff and Talus (2517)**

15b. Sites in Sections 251C, 251E, 223A, and 223S in Missouri and Kansas **16**

16a. Substrate is acidic bedrock (sandstone, chert, igneous, flint); dominant herbaceous species typically include *Danthonia spicata, Schizachyrium scoparium,* and *Sorghastrum nutans*..... **Central Interior Highlands Dry Acidic Glade and Barrens (2363)**

16b. Substrate is alkaline bedrock (dolostone, limestone); dominant herbaceous species typically include *Bouteloua curtipendula, Schizachyrium scoparium,* and *Sorghastrum nutans*. ..... **Central Interior Highlands Calcareous Glade and Barrens (2401)**

KEY B – WOODY WETLAND SYSTEMS

1a. Systems on floodplains of small, medium or large rivers or ephemeral streams.....**2**
1b. Systems in depressions, along lakeshores or intermittent streams, or in areas with seasonally or permanently high water tables **4**

2a. System on medium to large rivers.....**3**
2b. System on small rivers, streams, or ephemeral streams in Provinces 331 or 332; can be tree- or shrub-dominated; common trees include *Acer negundo, Fraxinus pennsylvanica,* or *Ulmus* spp. while common shrubs include *Crataegus* spp., *Prunus virginiana, Shepherdia argentea,* and *Symphoricarpos occidentalis*.....**Western Great Plains Wooded Draw and Ravine (2385)**

3a. Floodplain in Province 251 EXCEPT the Missouri and Mississippi Rivers .....
.....**Eastern Great Plains Floodplain Systems (2469)****
.....**North-Central Interior Floodplain***
3b. Floodplain in Province 222 AND the Missouri and Mississippi Rivers.....
..... **Central Interior and Appalachian Floodplain System (2471)****
.....**North-Central Interior Floodplain***
3c. Floodplain in Provinces 315, 331, or 332 .....
.....**Western Great Plains Floodplain Systems (2162)****
..... **Western Great Plains Floodplain***
3d. Floodplain in Province 255.....
.....**Central Interior and Appalachian Floodplain Systems (2471)****
.....**South-Central Interior Large Floodplain***

4a. Trees dominant (>25% cover).....**5**
4b. Trees not dominant (<25% cover), shrubs dominant (>25% cover).....**6**

5a. Flatwoods site; *Quercus macrocarpa* and *Quercus bicolor* dominant .....
.....**North-Central Interior Wet Flatwoods (2518)**
5b. Non-flatwoods swamp; *Acer rubrum, Acer saccharinum, Fraxinus nigra,* and *Ulmus americana* are typical dominants .....**Central Interior and Appalachian Swamp Systems (2479)****
.....**North-Central Interior and Appalachian Rich Swamp***

6a. Shrub fen with alkaline groundwater, substrate is marl or shallow peat; often with *Sphagnum* spp. present; abundant shrubs include *Dasiphora fruticosa, Cornus* spp., and/or *Salix* spp. .....
.....**North-Central Interior Shrub-Graminoid Alkaline Fen*****
6b. Shrub swamp in Provinces 222 or 251; dominated by *Cornus* spp., *Cephalanthus occidentalis,* or *Salix* spp.....
..... **Central Interior and Appalachian Herbaceous Wetland Systems (2493)****
.....**North-Central Interior Wet Meadow-Shrub Swamp***

KEY C – UPLAND HERBACEOUS SYSTEMS (<10% woody cover)

1a. System dominated by tallgrass species such as *Andropogon gerardii, Andropogon hallii, Sorghastrum nutans, Panicum virgatum*…. **2**

1b. Site dominated by a mixture of mid- and shortgrass species such as *Bouteloua* spp., *Buchloe dactyloides, Hesperostipa* spp., *Pascopyrum smithii, Schizachyrium scoparium,* **7**

2a. Soils deep, rich **3**

2b. Soils sandy, rocky, or gravelly **6**

3a. System in Province 331; sites more mesic than surrounding landscape **Western Great Plains Tallgrass Prairie (2150)**

3b. System not in Province 331 **4**

4a. System in the Flint Hills of Kansas; dominated by *Andropogon gerardii, Panicum virgatum, Schizachyrium scoparium,* and *Sorghastrum nutans* **Southeastern Great Plains Tallgrass Prairie (2423)**

4b. System not in the Flint Hills of Kansas **5**

5a. System in 222L, 222Me, 251C, 251G, 251H, 332En; dominated by tallgrass species such as *Andropogon gerardii, Sorghastrum nutans, Panicum virgatum,* often with midgrasses such as *Schizachyrium scoparium* and forbs such as *Liatris* spp., *Ratibida* spp., *Echinacea* spp., and *Solidago* spp. **Central Tallgrass Prairie (2421)**

5b. System in 222Mb, 251B; dominated by tallgrass species such as *Andropogon gerardii, Sorghastrum nutans,* and *Panicum virgatum,* often with midgrasses such as *Hesperostipa spartea, Muhlenbergia richardsonis,* and *Schizachyrium scoparium* **Northern Tallgrass Prairie (2420)**

6a. System in Provinces 251, 222, or 223; dominated by tall and mid-grasses, especially *Andropogon gerardii, Bouteloua curtipendula, Bouteloua gracilis, Schizachyrium scoparium,* and *Sorghastrum nutans* **North-Central Interior Sand and Gravel Tallgrass Prairie (2412)**

6b. System in Kansas or Nebraska; dominated by tall and mid-grasses, especially *Andropogon hallii* and *Calamovilfa longifolia* with some mid-grasses such as *Hesperostipa comata, Carex inops* ssp. *heliophila,* and *Panicum virgatum* **Western Great Plains Sand Prairie (2148)**

7a. Mixedgrass prairies in Provinces 315, 331, 332, and Sections 251B, 251E, 251F, 251G, 251H; dominated by a mix of tall, mid, and shortgrass species **Central Mixedgrass Prairie (2132)**

7b. Shortgrass prairies in Provinces 315, 331, 332; dominated by species such as *Aristida purpurea, Buchloe dactyloides, Bouteloua gracilis, Boutelous hirsuta* **Western Great Plains Tallgrass Prairie (2150)**

KEY D – HERBACEOUS WETLAND SYSTEMS

1a. Systems on floodplains of medium to large rivers.....**2**
1b. Systems in depressions, along lakeshores, or in areas with seasonally or permanently high water tables **3**

2a. Floodplain in Province 251 EXCEPT the Missouri and Mississippi Rivers .....
.....**Eastern Great Plains Floodplain Systems (2469)****
.....**North-Central Interior Floodplain***
2b. Floodplain in Province 222 AND the Missouri and Mississippi Rivers.....
..... **Central Interior and Appalachian Floodplain System (2471)****
.....**North-Central Interior Floodplain***
2c. Floodplain in Provinces 315, 331, or 332 .....
.....**Western Great Plains Floodplain Systems (2162)****
..... **Western Great Plains Floodplain***
2d. Floodplain in Province 255.....
.....**Central Interior and Appalachian Floodplain Systems (2471)****
.....**South-Central Interior Large Floodplain***

3a. Marsh Systems in Provinces 222 and 223; hydrophytes such as *Ceratophyllum* spp., *Nelumbo lutea, Nuphar lutea, Potamogeton* spp., *Schoenoplectus* spp., *Typha* spp. dominate.....
..... **Central Interior and Appalachian Herbaceous Wetland Systems (2493)****
.....**North-Central Interior Freshwater Marsh***
3b. Wetland Systems not in Sections 212 and 222 .....**4**

4a. System in Province 251; shallow marshes and wet meadows which can be dominated by a variety of species including *Carex aquatilis, Carex atherodes, Carex lacustris, Carex pellita, Carex stricta, Calamagrostis canadensis, Phalaris arundinacea, Schoenoplectus* spp., *Spartina pectinata, Typha* spp. .....
.....**Eastern Great Plains Wet Meadow, Prairie, and Marsh (2488)**
4b. Systems in Provinces 315, 331, or 332 .....**5**

5a. System characterized by saline water and species tolerant of high salinity, especially *Distichlis spicata, Sporobolus airoides*, and *Hordeum jubatum* though *Puccinellia nuttalliana, Salicornia rubra, Schoenoplectus maritimus, Schoenoplectus americanus, Suaeda calceoliformis, Spartina* spp., and *Triglochin maritima* can be common to dominant in some sites .....
.....**Western Great Plains Depressional Wetland Systems (2495)****
.....**Western Great Plains Saline Depression Wetland***
5b. System characterized by fresh or only slightly saline conditions.....**6**

6a. Playas with an impermeable sub-surface soil layer which results in flooding during wet periods but which dry out during seasonal or inter-annual droughts; *Eleocharis* spp., *Hordeum jubatum*, and *Polygonum* spp., are typical dominants while *Pascopyrum smithii* is characteristic of the drier edges of the System..... **Western Great Plains Depressional Wetland Systems (2495)****
..... **Western Great Plains Closed Depression Wetland***

6b. Marshes with permanent or nearly permanent surface water present; a variety of species may dominate including *Typha* spp., *Carex* spp., *Eleocharis* spp., *Juncus* spp., *Spartina* spp., and *Schoenoplectus* spp., as well as floating genera such as *Potamogeton, Sagittaria, Stuckenia,* or *Ceratophyllum*..... **Western Great Plains Depressional Wetland Systems (2495)****
..... **Western Great Plains Open Freshwater Depression Wetland***

KEY E – SPARSELY VEGETATED SYSTEMS (<10% vascular cover)

1a. Cliffs or talus in Province 223 or Section 251C **2**

1b. Cliffs or bedrock outcrops in Provinces 315, 331, or 332 .....
..... **Western Great Plains Cliff and Outcrop*****

2a. Substrate is alkaline (dolostone, limestone).. **Central Interior Calcareous Cliff and Talus*****

2b. Substrate is acidic (sandstone, chert, igneous) ..... **Central Interior Acidic Cliff and Talus*****