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## OVERVIEW OF VEGETATIVE DESCRIPTIONS

Descriptions begin with the various names of the association :

- Global Scientific Name
- Translated Scientific Name
- Common Name
- USNVC Identification Code

After the nomenclature, there is a description of the location of the association within the **full USNVC hierarchy**, beginning with higher, more inclusive levels:

- Physiognomic Class
- Physiognomic Subclass
- Physiognomic Group
- Physiognomic Subgroup
- Formation
- Alliance
- Alliance (English name)
- Association
- Association (English name)
- Association (Common name)

USNVC hierarchical information is followed by a list of **ecological systems** to which the association belongs:

- ONSR Community Type
- ONSR Ecological System(s)
- Global Ecological System(s)

The ONSR Community Types and ONSR Ecological Systems were developed exclusively for this project based upon discussions with resource managers within the park. Community Types are less inclusive than Ecological systems, and function to identify ecologically related types that often may be managed as a unit. There may be significant structural and/or vegetative differences between associations included within a common Community Type or Ecological System.

The **Element Concept** summarizes the environmental parameters and vegetation structure and composition common to the type throughout its range. This description is much more general than both the local (ONSR) description components and the global descriptions components that will follow.

The **Environmental Description** begins with the **US Fish and Wildlife Service wetland classification** for the type. It is followed by a description of the **ONSR Environment**, which describes the ecological parameters for the type within the study area. This section usually includes information on the Ecological Landtype (Nigh *et al.* 2000) where the association can most commonly be found. The final component of the Environmental Description is the **Global Environment**, which describes the environmental parameters for the type throughout its range.

The **Vegetation Description** begins with a description of the **ONSR Vegetation**. This includes information on the structure and composition of each vegetative stratum, usually beginning with the tallest stratum. Emphasis is placed on dominant species and those species that are considered diagnostic for the type within the mapping area. This same system is carried through to the subsequent **Global Vegetation** component, which describes the vegetative structure and composition for the type throughout its range. It may include species and expressions of the community not found within the ONSR mapping area.

A table of **Dominant Species** follows. Within each stratum, it identifies one to three of the most abundant species and describes the lifeform of each. This is divided into subgroups for the ONSR mapping area and for the global range.

Lists of **Characteristic Species** follow for both the ONSR mapping area and for the global expression of the

type. The species included here are often low in abundance or rare, and are typically restricted to a narrow set of environmental conditions typical for the association.

A list of **Other Noteworthy Species** follows for both the ONSR mapping area and for the association globally. This list may include other commonly abundant species not included in the above lists. It may also include rare or endangered species that are associated with the type, or conversely, exotic invasive species that could be or commonly are problematic when they occur in the type. This list often includes non-vascular plants, mosses and lichens, as well as invertebrates and vertebrate fauna.

Vascular plant nomenclature follows the nationally standardized list of Kartesz (1999), and is checked against the continually updated USDA PLANTS database (USDA 2005).

The **Conservation Status Rank** section gives the global conservation status rank of the association. The global rank is a numerical assessment of the rarity and imperilment of the association across its entire range of distribution. Ranks are primarily based on the number of occurrences, state conservation status rank(s), the geographic range of the type, and its long-term decline in abundance (e.g., pre-European settlement abundance versus current abundance). Other factors include permanence, intrinsic fragility and vulnerability, threats, and the number of occurrences that are protected (see Appendix D in Grossman *et al.* 1998). The regional ecologists, working with the Natural Heritage Network of ecologists, assign these ranks. The ranks are defined as follows:

GH—PRESUMED ELIMINATED (HISTORIC) throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration (e.g., *Castanea dentata* Forest).

G1—CRITICALLY IMPERILED. Generally 5 or fewer occurrences and/or very few remaining acres or very vulnerable to elimination throughout its range due to other factor(s). G2—IMPERILED. Generally 6-20 occurrences and/or few remaining acres or very vulnerable to elimination throughout its range due to other factor(s).

G3—VULNERABLE. Generally 21-100 occurrences. Either very rare and local throughout its range or found locally, even abundantly, within a restricted range or vulnerable to elimination throughout its range due to specific factors.

G4—APPARENTLY SECURE. Uncommon, but not rare (although it may be quite rare in parts of its range, especially at the periphery). Apparently not vulnerable in most of its range.

G5 SECURE. Common, widespread, and abundant (though it may be quite rare in parts of its range, especially at the periphery). Not vulnerable in most of its range.

GU—UNRANKABLE. Status cannot be determined at this time.

G?—UNRANKED. Status has not yet been assessed.

There are a number of modifiers to the Conservation Rank Status:

?—A question mark added to a rank expresses an uncertainty about the rank in the range of 1 either way on the 1-5 scale. For example, a G2? rank indicates that the rank is thought to be a G2, but could be a G1 or a G3.

G#G#—Greater uncertainty about a rank is expressed by indicating the full range of ranks which may be appropriate. For example, a G1G3 rank indicates the rank could be a G1, G2, or a G3.

Q—A “Q” added to a rank denotes questionable taxonomy. It modifies the degree of imperilment and is only used in cases where the type would have a less imperiled rank if it were not recognized as a valid type (i.e., if it were combined with a more common type). A GUQ rank often indicates that the type is unrankable because of daunting taxonomic/definitional questions.

The **Classification** section begins with a statement concerning the **Status** of the association: Within this study

there are only two types:

Standard—Type is recognized as a unique, identifiable type

Provisional—Type is tentatively recognized, but more data is necessary

The **Classification Confidence** field first gives the level of confidence in the association, ranked from 1 (highest confidence) to 3 (lowest). The definition for each level is as follows:

1 = **STRONG**. Classification based on recent field data. Information is based on Element Occurrences or other data based on occurrences that can be relocated. Classification considers information collected across the entire range or potential range of the Element. Classification may be based on quantitative or qualitative data.

2 = **MODERATE**. Classification is based on data that is of questionable quality, limited numbers of sample points, or data from a limited range.

3 = **WEAK**. Classification is based on secondary or anecdotal information or a new type for which data has only been collected at a very small number of sites.

The Classification section ends with comments on the classification issues related to the association both with the ONSR mapping area and globally. In many cases, other similar or related associations are referred to in this segment of the description; these are referenced by global name or a common name followed by the USNVC global identification code. Related concepts may also be included.

The **Distribution** fields present a variety of information on distribution. A general statement is provided on the **ONSR range** and **global range** of the type. This is followed by lists of the **Nations, States and/or Provinces**, and **Federal Lands** where the type is known or believed to exist. Also included is a list of the **USFS Ecoregions**, which gives information on the presumed pre-European settlement distribution of the type using the province, section, and subsection levels of the U.S. Forest Service ECOMAP (Bailey et al. 1994, Keys et al. 1995). Each ecoregion is followed by a colon and one of four confidence level codes.

C = Confident: > 95% certain that the type occurs in the specified ecoregion

P = Probable: 80-95% certain that the type occurs in the specified ecoregion

? = Questionable: 10-80% certain that the type occurs in the specified ecoregion

X = Extirpated/presumed extirpated from the specified ecoregion.

For example, 47:C in the Conservation Regions field means that the association confidently occurs in the Conservancy's ecoregion 47. For USFS Ecoregions, the first character after the colon goes with the Forest Service province, the second with the Forest Service section within that province, and the third with the subsection within that section. Thus, "212He:CC?" means that the association confidently occurs in province 212, confidently occurs in section 212H, and questionably occurs in subsection 212He.

The description for each vegetation association ends with the **Element Sources** section. Included are **notes from the ONSR mapping area** that may indicate how the community was treated during the mapping process, how the association relates to other type, or any other information critical to understanding how the type was classified. It is followed by a list of **plots from the ONSR mapping area** from which data were used for quantitative analysis. Also included are **lists of authors** for both the local, ONSR description and the global description, as well as any **references** that may have been used.

***Pinus echinata* / *Vaccinium (arboreum, pallidum, stamineum)* Forest****Shortleaf Pine / (Farkleberry, Hillside Blueberry, Deerberry) Forest****Interior Highlands Shortleaf Pine / Blueberry Forest****Identifier: CEG002400****USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Evergreen forest (I.A.)
Physiognomic Group	Temperate or subpolar needle-leaved evergreen forest (I.A.8.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)
Formation	Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b.)
Alliance	<i>Pinus echinata</i> Forest Alliance (A.119)
Alliance (English name)	Shortleaf Pine Forest Alliance
Association	<i>Pinus echinata</i> / <i>Vaccinium (arboreum, pallidum, stamineum)</i> Forest
Association (English name)	Shortleaf Pine / (Farkleberry, Hillside Blueberry, Deerberry) Forest
Association (Common name)	Interior Highlands Shortleaf Pine / Blueberry Forest

**Ecological System(s):**

<b>ONSR Community Type:</b>	Pine and Pine-Oak Forests
<b>ONSR Ecological System:</b>	Upland Pine and Pine-Oak Forests
<b>Global Ecological System:</b>	Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (CES202.313)

**ELEMENT CONCEPT**

**Global Summary:** This shortleaf pine / blueberry forest type is found in the Interior Highlands region of the United States, including the Ouachita Mountains and Ozarks of Arkansas, Oklahoma, and Missouri. Stands occur on dry, thin-soil slopes. Soils may be somewhat acidic, often overlaying a variety of acidic bedrock substrates, including chert, igneous or sandstone material. This is a mid-successional to mature forest with the canopy dominated by *Pinus echinata*. A subcanopy of oaks, such as *Quercus alba*, *Quercus stellata*, and *Quercus falcata*, may be present and may succeed into the canopy in the prolonged absence of fire. *Cornus florida* is also typically present. Shrub and herbaceous strata may be sparse to dense, with any of *Vaccinium arboreum*, *Vaccinium pallidum*, *Vaccinium stamineum*, or *Aesculus glabra* present. Dry forest herbs are typical. In northern Arkansas (Springfield Plateau), these forests occur naturally on steep slopes, over cherty residuum of the Boone Formation. They also occur on sandstone shelf bluffs in the Ozarks.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Terrestrial**Ozark National Scenic Riverways Environment:** This is a rare community, occurring only xeric sites with acid soils. Typically these sites occur on shoulder or on steep to moderate slopes with exposed aspects (ELT's 2, 3, 23 and 25; Nigh *et al.* 2000).**Global Environment:** Stands occur on dry, thin-soil slopes. Soils may be somewhat acidic, often overlaying a variety of acidic bedrock substrates, including chert, igneous or sandstone material. In northern Arkansas (Springfield Plateau), these forests occur naturally on steep slopes, over cherty residuum of the Boone Formation. They also occur on sandstone shelf bluffs in the Ozarks.**VEGETATION DESCRIPTION****Ozark National Scenic Riverways Vegetation:** The somewhat open, though fully developed canopy is dominated by *Pinus echinata*, with scattered oaks, including *Quercus alba*, *Quercus velutina*, *Quercus stellata*, *Quercus coccinea*, and *Quercus shumardii*. With *Carya texana*, these oaks may be common in the subcanopy.

The most common tall shrubs are *Cornus florida* and *Vaccinium arboreum*, the latter being a good diagnostic species. *Vaccinium vacillans* and *Vaccinium stamineum* are the most common diagnostic short shrubs. The most common woody vines are *Parthenocissus quinquefolia* and *Vitis aestivalis*, though neither is diagnostic. Diagnostic herbaceous flora include those plants that prefer acid soils, such as *Lespedeza procumbens*, *Carex nigromarginata*, *Clitoria mariana*, *Cunila organoides*, *Desmodium laevigatum*, *Panicum boscii*, *Panicum linearifolium*, *Tephrosia virginiana*, and *Euphorbia corollata*.

**Global Vegetation:** This is a mid-successional to mature forest with the canopy dominated by *Pinus echinata*. A subcanopy of oaks, such as *Quercus alba*, *Quercus stellata*, and *Quercus falcata*, may be present and may succeed into the canopy in the prolonged absence of fire. *Cornus florida* is also typically present. Shrub and herbaceous strata may be sparse to dense, with any of *Vaccinium arboreum*, *Vaccinium pallidum*, *Vaccinium stamineum*, or *Aesculus glabra* present. Dry forest herbs are typical.**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i>

## Appendix 15. ONSR USNVC Natural Community Descriptions

Tree canopy	Needle-leaved evergreen tree	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cornus florida</i>
Short shrub	Broad-leaved deciduous	<i>Vaccinium stamineum</i>
Herb	Graminoid	<i>Carex nigromarginata</i>
Herb	Forb	<i>Desmodium nudiflorum</i>

### **Global Stratum**

### **Lifeform**

### **Species**

#### **CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Pinus echinata*, *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, *Lespedeza procumbens*, *Carex nigromarginata*, *Cunila origanoides*, *Desmodium laevigatum*, *Panicum linearifolium*, *Tephrosia virginiana*  
**Global:**

#### **OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**  
**Global:**

#### **CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G3G4 (24-Oct-2002). This type is found within the Interior Highlands region west of the Mississippi River on dry, thin-soil slopes with somewhat acidic soils. In northern Arkansas, these forests occur naturally over cherty residuum of the Boone Formation. They also occur on sandstone shelf bluffs in the Ozarks. Fire intensity is likely lower but more intense in this type compared to similar types (D. Zollner pers. comm. 1999). Lack of fire in some areas is leading to the succession of this type to a more oak-dominated canopy. Few EOs of this type have been documented.

#### **CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** The canopy structure of this community may make it difficult to distinguish from the *Pinus echinata-Quercus velutina-Quercus stellata* / *Vaccinium* spp. Forest (CEGL002401). From a management perspective, they can be treated as a single mixed type with varying amounts of pine. Much of the distinction between the two types depends upon how one distinguishes between emergent trees (in this case, usually pines) and the rest of the canopy.

The NVCS sets a standard whereby a layer of trees that exceed ten percent cover is considered the canopy, rather than an emergent layer (TNC 1996). Using that standard, many of the forests that we called mixed-types might more appropriately be called evergreen (pine), because pine typically grows taller and faster than the deciduous trees. However, in those communities that we called mixed (and even in most that we called evergreen) oaks usually comprise the bulk of the subcanopy and even much of the canopy. In either case, the deciduous trees are a significant component of the community and it would be difficult to classify any of them as strictly evergreen even if one were to stretch the USNVC standard for emergent trees to 25 % cover.

On another note, most of the examples that we encountered appeared to be uniformly aged and heavily managed, either through the use of prescribed fire or through selective removal of hardwoods. While it is well documented that true pine forests existed prior to the major milling operations of the early 20<sup>th</sup> century, this community may not exist today without significant management activities. Within the study area and in current conditions, it may not represent a “natural” type.

#### **Global Comments:**

#### **Global Similar Associations:**

- *Pinus echinata - Quercus (alba, rubra) / Vaccinium (arboreum, pallidum) / Schizachyrium scoparium - Chasmanthium sessiliflorum - Solidago ulmifolia* Forest (CEGL007489)--a related mixed forest.
- *Pinus echinata - Quercus stellata - Quercus marilandica / Schizachyrium scoparium* Woodland (CEGL002393)--in the Ouachitas and Boston Mountains, with an oak component.
- *Pinus echinata* / Rock Outcrop Interior Highland Woodland (CEGL002402)--drier and more open woodland.
- *Pinus echinata / Schizachyrium scoparium - Solidago ulmifolia - Monarda russeliana - Echinacea pallida* Woodland (CEGL007815)--a related evergreen woodland.
- *Pinus echinata* Crowley's Ridge Forest [Provisional] (CEGL007919)

#### **Global Related Concepts:**

- Shortleaf Pine - Oak: 76 (Eyre 1980) B

#### **OTHER COMMENTS**

**Other Comments:**

#### **ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is a rare community within the study area, occurring on xeric, acid-soiled landscape positions, usually on the Roubidoux Formation.

**Global Range:** This shortleaf pine / blueberry forest type is found in the Interior Highlands region of the United States, including the Ouachita Mountains and Ozarks of Arkansas, Oklahoma, and Missouri.

**Nations:** US

Appendix 15. ONSR USNVC Natural Community Descriptions

**States/Provinces:** AR, MO, OK

**USFS Ecoregions:** 221:C, 222A:CC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, M222A:CC, M231A:CC

**Federal Lands:** NPS (Buffalo, Ozark); USFS (Mark Twain, Ouachita, Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_08\_08, BS\_02.1\_06, BS\_02.1\_21, BS\_02.1\_22, BS\_03.1\_21

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen and K.D. Patterson

**References:** Bruner 1931, Duck and Fletcher 1945, Eyre 1980, Hoagland 2000, Johnson 1986, Kreiter 1995, Masters *et al.* 1995, Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000, Rice 1963, Rice and Penfound 1959, TNC 1996, Zollner 1999



**Figure 1.** This Shortleaf Pine / (Farkleberry, Hillside Blueberry, Deerberry) Forest (CEGL002400) has a fairly dense shrub layer thanks to a robust layer of dogwood that has come in beneath the pine. Note the near complete absence of herbaceous groundflora.





**Figure 2. This Shortleaf Pine / (Farkleberry, Hillside Blueberry, Deerberry) Forest (CEGL002400) has a few hardwood species present in the subcanopy and a somewhat dense shrub layer due to canopy openings. Typically, this community has an open canopy with between 60 and 80 percent foliar cover.**

***Quercus alba* - *Quercus rubra* - *Quercus muehlenbergii* / *Cercis canadensis* Forest****White Oak - Northern Red Oak - Chinquapin Oak / Redbud Forest****White Oak - Mixed Oak Dry-Mesic Alkaline Forest****Identifier: C EGL002070****USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus alba</i> - ( <i>Quercus rubra</i> , <i>Carya</i> spp.) Forest Alliance (A.239)
Alliance (English name)	White Oak - (Northern Red Oak, Hickory species) Forest Alliance
Association	<i>Quercus alba</i> - <i>Quercus rubra</i> - <i>Quercus muehlenbergii</i> / <i>Cercis canadensis</i> Forest
Association (English name)	White Oak - Northern Red Oak - Chinquapin Oak / Redbud Forest
Association (Common name)	White Oak - Mixed Oak Dry-Mesic Alkaline Forest

**Ecological System(s):**

<b>ONSR Community Type:</b>	White Oak Forests
<b>ONSR Ecological System:</b>	Upland Oak Forests
<b>Global Ecological System:</b>	Ozark-Ouachita Dry-Mesic Oak Forest (CES202.708) Southern Interior Low Plateau Dry Oak Forest (CES202.898) Southern Ridge and Valley Dry Calcareous Forest (CES202.457)

**ELEMENT CONCEPT**

**Global Summary:** This dry-mesic white oak - mixed oak alkaline forest community is found in unglaciated areas of the Interior Highlands of the east-central United States. Stands occur on gentle to steep slopes with moderately to well-drained moist loamy/sandy, relatively neutral to basic soils, which are underlain by bedrock of limestone and less commonly sandstone, siltstone, or shale. Soils may be shallow to somewhat deep (20-100 cm), with rock fragments present. The canopy is dense, yet enough scattered light penetrates to encourage a rich and diverse herbaceous layer, especially in the spring. Typical tree dominants include *Quercus alba*, *Quercus rubra*, *Quercus velutina*, and *Quercus muehlenbergii*. Typical associates include *Carya ovata*, *Carya alba*, and *Liriodendron tulipifera*. Other shade-tolerant tree associates that may dominate the subcanopy include *Acer saccharum* (or possibly *Acer barbatum* to the south), *Ulmus rubra*, *Juglans nigra*, *Fraxinus americana*, *Ostrya virginiana*, *Carpinus caroliniana*, and *Amelanchier arborea*. *Quercus muehlenbergii* is a key, but perhaps uncommon, indicator of the more neutral to alkaline soil characteristics of this type. Typical shrubs include *Aesculus glabra*, *Asimina triloba*, *Cercis canadensis*, *Cornus florida*, *Euonymus americana*, *Frangula caroliniana*, and *Viburnum rufidulum*. Woody vines include *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Anemone virginiana*, *Arisaema triphyllum*, *Botrychium virginianum*, *Carex jamesii*, *Actaea racemosa* (= *Cimicifuga racemosa*), *Desmodium glutinosum*, *Desmodium rotundifolium*, *Dioscorea quaternata*, *Goodyera pubescens*, *Hybanthus concolor*, *Iris cristata*, *Maianthemum racemosum*, *Passiflora lutea*, and *Sanicula canadensis*. These forests occur in habitats transitional between mesic to wet riparian and floodplain communities and the drier ridgetop ecosystems.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This community is common and occurs on low dry-mesic slopes on the lower Gasconade Dolomite and Eminence Dolomite. It is most frequently found on slopes with protected aspects where calcium rich bedrock is exposed or near the surface (ELT's 7 and 8; Nigh *et al.*, 2000). Soils are basic. The slope is stepped in profile.

**Global Environment:** Stands occur on gentle to steep slopes with moderately to well-drained moist loamy/sandy, relatively neutral to basic soils, which are underlain by bedrock of limestone and less commonly sandstone, siltstone, or shale. Soils may be shallow to somewhat deep (20-100 cm), with rock fragments present. In Illinois, this community occurs on thin, sandy/loamy soils underlain by sedimentary rock (mostly Pennsylvanian age sandstone). Limestone and shale are commonly found where erosion has removed resistant sandstone layers near the surface (TNC 1995a). In Missouri, non-cherty limestones and dolomites prevail (Nelson 1985). In Alabama, this type occurs on mixed limestone and sandstone substrate, providing a subcalcareous substrate.

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy is typically well developed and over 20 meters tall. However, exposed bedrock can create canopy gaps, particularly on steep slopes, giving this community a less homogenous canopy structure. Floristically, the canopy is dominated by *Quercus alba*, *Quercus rubra*, and *Quercus muehlenbergii*, with varying amounts of calciphiles such as *Fraxinus americana*, *Carya cordiformis*, and *Juglans nigra*. *Platanus occidentalis* may be abundant near geologic contact points in upland waterways subject to infrequent flooding. *Ulmus rubra* is a frequent dominant in the subcanopy and understory. Common diagnostic shrubs include *Cornus florida*, *Lindera benzoin*, *Ostrya virginiana*, *Asimina triloba*, *Carpinus*

## Appendix 15. ONSR USNVC Natural Community Descriptions

*caroliniana*, *Cercis canadensis*, and *Staphylea trifolia*. *Smilax bona-nox* is a common diagnostic woody vine. Other woody vines frequently include *Parthenocissus quinquefolia*, *Rhus radicans*, *Vitis* spp., and *Menispermum canadense*. Common diagnostic herbaceous species include *Muhlenbergia sobolifera*, *Cimicifuga racemosa*, *Desmodium pauciflorum*, and *D. glutinosum*. Other diagnostic species may include *Asarum canadense*, *Geranium maculatum*, and *Cryptotaenia canadensis*.

**Global Vegetation:** The canopy is dense, yet enough scattered light penetrates to encourage a rich and diverse herbaceous layer. Typical tree dominants include *Quercus alba*, *Quercus rubra*, *Quercus velutina*, and *Quercus muehlenbergii*. Typical associates include *Carya ovata* and *Carya alba*. Other shade-tolerant tree associates that may dominate the subcanopy include *Acer saccharum* (and/or *Acer barbatum* or *Acer leucoderme* to the south), *Ulmus rubra*, *Juglans nigra*, *Fraxinus americana*, *Ostrya virginiana*, *Carpinus caroliniana*, and *Amelanchier arborea*. *Quercus muehlenbergii* is a key, but perhaps uncommon, indicator of the more neutral to alkaline soil characteristics of this type. *Juniperus virginiana* may be present. Typical shrubs include *Aesculus glabra*, *Asimina triloba*, *Cercis canadensis*, *Cornus florida*, *Euonymus americana*, *Frangula caroliniana*, and *Viburnum rufidulum*. Woody vines include *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Anemone virginiana*, *Arisaema triphyllum*, *Botrychium virginianum*, *Carex jamesii*, *Actaea racemosa* (= *Cimicifuga racemosa*), *Desmodium glutinosum*, *Desmodium rotundifolium*, *Dioscorea quaternata*, *Goodyera pubescens*, *Hybanthus concolor*, *Iris cristata*, *Maianthemum racemosum*, *Passiflora lutea*, and *Sanicula canadensis*. These forests occur in habitats transitional between mesic to wet riparian and floodplain communities and the drier ridgetop ecosystems (Nelson 1985, TNC 1995a).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus muehlenbergii</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Asimina triloba</i> , <i>Cornus florida</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i> , <i>Ostrya virginiana</i>
	Vine	<i>Smilax</i> spp.
Herb	Graminoid	<i>Muhlenbergia sobolifera</i>
Herb	Forb	<i>Cimicifuga racemosa</i> , <i>Brachyelytrum erectum</i> , <i>Amphicarpa bracteata</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus muehlenbergii</i> , <i>Quercus rubra</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer saccharum</i>
Shrub/sapling (tall & short)	Vine/Liana	<i>Parthenocissus quinquefolia</i> , <i>Smilax bona-nox</i> , <i>Toxicodendron radicans</i>
Herb	Forb	<i>Arisaema dracontium</i> , <i>Hybanthus concolor</i>
Herb	Graminoid	<i>Carex jamesii</i>

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Quercus alba*, *Quercus muehlenbergii*, *Asimina triloba*, *Lindera benzoin*, *Smilax bona-nox*, *Desmodium glutinosum*, *Cimicifuga racemosa*, *Asarum canadense*, *Desmodium pauciflorum*, *Cryptotaenia canadensis*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:** *Fraxinus americana*, *Carya cordiformis*, *Platanus occidentalis*

**Global:** *Agkistrodon contortrix*, *Callirhytis quercuspunctata*, *Caprimulgus vociferus*, *Chionaspis corni*, *Cyanocitta cristata*, *Dendroica cerulea*, *Dryocopus pileatus*, *Eumeces laticeps*, *Eurytides marcellus*, *Glaucomys volans*, *Hylocichla mustelina*, *Isotria medeoloides*, *Juglans cinerea*, *Lynx rufus*, *Melanerpes carolinus*, *Melanerpes erythrocephalus*, *Meleagris gallopavo*, *Myotis sodalis*, *Nymphalis antiopa*, *Odocoileus virginianus*, *Piranga olivacea*, *Sayornis phoebe*, *Schizura badia*, *Sciurus carolinensis*, *Sciurus niger*, *Tamias striatus*, *Thryothorus ludovicianus*

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4G5 (22-Jun-1998).

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** This community is distinguishable from the *Quercus alba* / *Cornus florida* Unglaciated Forest (CEGL002066) and the *Quercus alba-Quercus rubra-Carya (alba, ovata) / Cornus florida* Acid Forest (CEGL002067) by the abundance of calciphiles throughout all strata. It is more likely to be confused with the *Quercus alba-Quercus rubra-Acer saccharum-Carya cordiformis / Lindera benzoin* Forest (CEGL002058), with which it shares many diagnostic species and structural characteristics. The presence of *Acer saccharum*, *Carya cordiformis*, *Juglans nigra*, and especially *Tilia americana* may be indicative of this latter type, particularly when these species occur in great abundance. An abundance of *Quercus muehlenbergii* and/or *Fraxinus americana* without the above species is more typical of the type described here.

## Appendix 15. ONSR USNVC Natural Community Descriptions

The presence of sycamore (*Platanus occidentalis*) in upland waterways may indicate past disturbance (most likely grazing) as much as the influence of natural disturbance events such as flooding. However, the presence of sycamore seems to be limited to areas where all the other calciphilic elements for this community are present. Other species that are frequently present in these communities and that suggest past human disturbance include *Carex jamesii*, *Senecio obovatus*, and *Festuca subverticillata* (*F. obtusa*). Communities where sycamore is abundant may need to be described separately.

Open examples of this type may approach woodland conditions under the system used by Nelson (1985). In such cases, they may begin to resemble a Chinkapin Oak-Ash/Bluestem Woodland (CEGL002143).

**Global Comments:** Concept of this type relies, in part, on Missouri's "dry-mesic limestone/dolomite forest" (Nelson 1985). Stands in Illinois and Indiana may not have strongly contrasting alkaline and acidic rocks compared to those in the Ozarks. This type may also occur in the south-central glaciated portion of Illinois. Examples from Arkansas may lack *Quercus rubra*. Neither *Quercus muehlenbergii* nor *Cercis canadensis* may be very common in this type. Extensive selective logging of *Quercus alba* and *Quercus rubra* for sawtimber has severely impacted this community. Stands placed in this type in northern Alabama (Bankhead National Forest) and the Nashville Basin of Tennessee are not a perfect match, but seem similar enough to classify here.

### Global Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Cornus florida* Forest (CEGL007881)--contains a high concentration of *Fagus grandifolia* in the canopy.
- *Quercus alba* - *Quercus rubra* - *Carya (alba, ovata)* / *Cornus florida* Acid Forest (CEGL002067)--is very similar, but has a more acidic character.
- *Quercus alba* - *Quercus rubra* - *Carya ovata* / *Cercis canadensis* - *Juniperus virginiana* var. *virginiana* Forest (CEGL007240)
- *Quercus alba* - *Quercus rubra* - *Carya ovata* Glaciated Forest (CEGL002068)
- *Quercus alba* - *Quercus stellata* / *Ostrya virginiana* - *Acer barbatum* / *Chasmanthium sessiliflorum* Forest (CEGL008443)
- *Quercus alba* / *Cornus florida* Unglaciated Forest (CEGL002066)
- *Quercus falcata* - *Quercus alba* - *Quercus stellata* - *Quercus velutina* Forest (CEGL005018)--occurs on drier sites and contains *Quercus falcata*, which this community does not have in large amounts.
- *Quercus muehlenbergii* - *Quercus shumardii* - *Carya (carolinae-septentrionalis, ovata)* Forest (CEGL007808)
- *Quercus prinus* - *Quercus rubra* - *Carya* spp. - *Fraxinus americana* / *Cercis canadensis* / *Solidago sphacelata* Forest (CEGL008549)
- *Quercus rubra* / *Ostrya virginiana* / *Ptelea trifoliata* - *Ribes curvatum* / *Helianthus divaricatus* Woodland (CEGL007828)
- *Quercus velutina* - *Quercus alba* - *Carya (glabra, ovata)* Forest (CEGL002076)--occurs where soils are drier and thick to very thin over bedrock which is often exposed, and on hillsides with clay soils where sand is absent.

### Global Related Concepts:

- *Quercus rubra* - *Quercus alba* mesic lower slope community type (Robertson *et al.* 1984) =
- Dry-Mesic Limestone/Dolomite Forest (Nelson 1985) B
- Dry-mesic Upland Forest (S) (White and Madany 1978) B
- Eastern Broadleaf Forests: 100: Oak-Hickory Forest (*Quercus-Carya*) (Kuchler 1964) B
- Northern Red Oak: 55 (Eyre 1980) B Terrestrial: Forest: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: I.B.3a (UNESCO 1973) B
- White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980) B
- White Oak: 53 (Eyre 1980) B

## OTHER COMMENTS

### Other Comments:

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is common and most frequently occurs on low slopes with protected aspects on the lower Gasconade Dolomite and Eminence Dolomite and in upland waterways (ELT's 7, 8, 11 and 12; Nigh *et al.*, 2000).

**Global Range:** This white oak - red oak, dry-mesic alkaline forest community is found in calcareous regions of Interior Highlands of the east-central United States, ranging from Missouri and Arkansas east to Indiana, south to Kentucky, Tennessee and northern Alabama, and possibly in Oklahoma. Moisture availability and geologic characteristics are largely responsible for the distribution of this community.

**Nations:** US

**States/Provinces:** AL, AR, IL, IN, KY, MO:S4S5, OK?, TN

**USFS Ecoregions:** 221Hc:CCC, 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ae:CCP, 222Af:CC?, 222Ag:CCC, 222Ak:CCC, 222Am:CCC, 222An:CCC, 222Ao:CCC, 222Aq:CCC, 222Ch:CCC, 222De:CC?, 222Df:CCC, 222Dh:CCC, 222Di:CCC, 222Ec:CCC, 222Ed:CCC, 222Eg:CCC, 222Ej:CCP, 222Ek:CCC, 222Em:CCP, 222Eo:CCC, 222Fa:CCP, 222Fb:CCC, 222Fe:CCC, 231Cd:CCC, 231Gb:CCC, 251Cd:CCC, 251Ce:CCC, 251Ea:CCC, M222Aa:PPP

**Federal Lands:** NPS (Buffalo, Fort Donelson, Lincoln Birthplace, Mammoth Cave, Natchez Trace, Ozark, Russell Cave); USFS (Bankhead, Daniel Boone, Mark Twain, Ouachita?, Ozark, Shawnee)

### ELEMENT SOURCES

### Ozark National Scenic Riverways Inventory Notes:

Appendix 15. ONSR USNVC Natural Community Descriptions

**Ozark National Scenic Riverways Plots:** AS\_06.2\_02, AS\_07\_02, BS\_06.2\_03, BS\_19\_14, ECS\_AS23, ECS\_BS03, ECS\_BS04, ECS\_BS05, ECS\_BS06, ECS\_BS07, ECS\_BS08, ECS\_BS70, ECS\_FL08, ECS\_FL09, ECS\_FL22, ECS\_FL52, ECS\_FL71, RIP\_RS2A, RIP\_RS2D

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** M. Guetersloh, mod. M. Pyne and D. Faber-Langendoen

**References:** Evans 1991, Eyre 1980, Fralish 1987, Fralish *et al.* 1991, Kuchler 1964, Midwestern Ecology Working Group n.d., NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1985, Nigh *et al.* 2000, Robertson and Heikens 1994, Robertson *et al.* 1984, TNC 1985, TNC 1995a, TNDH unpubl. data, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978



**Figure 3. A relatively open White Oak-Northern Red Oak-Chinquapin Oak / Redbud Forest (CEGL002070) in an upland waterway. This appearance in such a location is typical and probably reflects the impact of past grazing.**



**Figure 4. Typical understory of White Oak Northern Red Oak Chinquapin Oak / Redbud Forest (CEGL002070) on a steep slope with dolomite outcrops, which can create a heterogeneous canopy (note bright area toward top of photo). Examples of this type with a relatively open canopy might be better classified as a Chinquapin Oak - Ash / Little Bluestem Woodland (CEGL002143).**



**Figure 5. Typical dense, spindly understory of a White Oak-Northern Red Oak-Chinquapin Oak / Redbud Forest (CEGL002070) on a steep slope with dolomite outcrops. High stem density in the shrub layers typically results from the combined effects of canopy gaps and bedrock outcrops. This example included the indicator species *Asimina triloba* and *Smilax bona-nox* and typically, even for deciduous types like this, *Juniperus virginiana*.**



**Figure 6. Typical White Oak-Northern Red Oak-Chinquapin Oak / Redbud Forest (CEGL002070) with little or no dolomite outcrops visible. Such examples tend have fuller canopies, more upright tree growth, and more dense, homogeneous shrub and groundflora layers and may resemble a White Oak/Dogwood Unglaciaded Forest (CEGL002066).**

## ***Quercus alba* / *Cornus florida* Unglaciated Forest**

**White Oak / Flowering Dogwood Unglaciated Forest**

**White Oak / Dogwood Dry-Mesic Forest**

**Identifier: CEGL002066**

### **USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus alba</i> - ( <i>Quercus rubra</i> , <i>Carya</i> spp.) Forest Alliance (A.239)
Alliance (English name)	White Oak - (Northern Red Oak, Hickory species) Forest Alliance
Association	<i>Quercus alba</i> / <i>Cornus florida</i> Unglaciated Forest
Association (English name)	White Oak / Flowering Dogwood Unglaciated Forest
Association (Common name)	White Oak / Dogwood Dry-Mesic Forest

### **Ecological System(s):**

**ONSR Community Type:** White Oak Forests

**ONSR Ecological System:** Upland Oak Forests

**Global Ecological System:** Ozark-Ouachita Dry-Mesic Oak Forest (CES202.708)  
Southern Interior Low Plateau Dry Oak Forest (CES202.898)

### **ELEMENT CONCEPT**

**Global Summary:** This white oak type is found in the Interior Low Plateau and Ozarks region of the midwestern United States. Stands may occur on fairly rich sites with a strong clay component in the soil, or on steep slopes, where soils are silty, well-drained and formed from cherty limestone. The vegetation is dominated by closed-canopy trees. Historically stands may have had a woodland structure. The vegetation is strongly dominated by *Quercus alba*. Stands in Illinois and Indiana contain 80-90% *Quercus alba*, and *Quercus prinus* and *Pinus virginiana* are minor components. In Kansas, associated tree species include *Carya cordiformis*, *Carya ovata*, *Ostrya virginiana*, and *Sassafras albidum*. Shrubs include *Staphylea trifolia* and *Vaccinium arboreum* and *Cornus florida* is not very constant.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This community is common and occurs on low moist slopes on the lower Gasconade Dolomite and Eminence Dolomite (ELT's 5 and 6). It is most frequently found on slopes with protected aspects, but can also be found on geologic benches and in upland waterways (ELT's 9 and 12; Nigh *et al.*, 2000). Soils tend to be basic, reflecting the high calcium carbonate content of parent material.

**Global Environment:** Stands may occur on fairly rich sites with a strong clay component in the soil, or on steep slopes, where soils are silty, well-drained, and formed from cherty limestone (Lauver *et al.* 1999).

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy is fully developed and typically exceeds 20 meters in height. It is dominated by *Quercus alba*. Other species that may be present in low abundances in the canopy include *Quercus rubra*, *Carya glabra*, *Carya alba* (*C. tomentosa*), and more calciphilic species such as *Juglans nigra*, *Quercus muehlenbergii*, and *Carya cordiformis*. *Ulmus rubra* is a frequent dominant in the subcanopy and understory. Common shrubs include *Cornus florida* with lesser amounts of *Corylus americana*, *Viburnum rufidulum*, and *Dirca palustris*. *Lindera benzoin* may be abundant. *Vitis* spp., *Rhus radicans*, and *Parthenocissus quinquefolia* are common abundant vines.

Common dominant herbaceous species include *Desmodium nudiflorum* and *D. glutinosum*, *Amphicarpa bracteata*, *Cimicifuga racemosa*, *Podophyllum peltatum*, *Polystichum acrostichoides*, and *Galium concinnum*. *Carex rosea*, *Agrimonia rostellata*, *Geranium maculatum*, *Dioscorea quaternata*, and *Brachyelytrum erectum* may also be abundant. Calciphiles may be present in the shrub, sapling and groundflora layers, but should be absent from canopy.

**Global Vegetation:** The vegetation is dominated by closed-canopy trees. Historically stands may have had a woodland structure. The vegetation is strongly dominated by *Quercus alba*. Stands in Illinois and Indiana contain 80-90% *Quercus alba*, and *Quercus prinus* and *Pinus virginiana* are minor components. In Kansas, associated tree species include *Carya cordiformis*, *Carya ovata*, *Ostrya virginiana*, and *Sassafras albidum*. Shrubs include *Staphylea trifolia* and *Vaccinium arboreum*, and *Cornus florida* is not very constant (Lauver *et al.* 1999).

### **MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

## Appendix 15. ONSR USNVC Natural Community Descriptions

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cornus florida</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i> , <i>Corylus americana</i>
	Vine	<i>Parthenocissus quinquefolia</i>
Herb	Graminoid	<i>Brachyelytrum erectum</i> , <i>Carex rosea</i>
Herb	Forb	<i>Desmodium nudiflorum</i> , <i>Desmodium glutinosum</i> , <i>Amphicarpa bracteata</i> , <i>Cimicifuga racemosa</i>

### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

#### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Quercus alba*, *Ulmus rubra*, *Cornus florida*, *Lindera benzoin*, *Corylus americana*, *Desmodium glutinosum*, *Cimicifuga racemosa*, *Geranium maculatum*

**Global:**

#### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:** *Asimina triloba*, *Polystichum acrostichoides*, *Phryma leptostachya*

**Global:**

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** GNR (6-May-1999).

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** Our work suggests that this community a variant of the *Quercus alba-Quercus rubra-Carya (alba, ovata) / Cornus florida* Acid Forest (CEGL002067), as suggested by Mike Leahy in the current USNVC description (Faber-Langendoen 2001). We have lumped the two associations under the type described here, which more frequently occurs within the study area. Both descriptions suggest dry-mesic woods on low slopes with few or no calciphiles present in the canopy or subcanopy. Similar communities with high quantities of calciphiles in the canopy or understory should be placed in the *Quercus alba-Quercus rubra-Quercus muehlenbergii / Cercis canadensis* Forest (CEGL002070).

**Global Comments:** In Indiana, stands may occur in the Knobstone Escarpment region on lower foothills east of escarpments on deeper soils. In Illinois, stands occur at Rock Cave, Effingham County. (222Ga). However, it may be that this type is just a variant of *Quercus alba - Quercus rubra - Carya (alba, ovata) / Cornus florida* Acid Forest (CEGL002067), as suggested for Missouri (M. Leahy pers. comm. 1999). In Illinois and Indiana, stands may better fit with *Quercus alba - Carya alba - (Quercus velutina) / Desmodium nudiflorum - (Carex picta)* Forest (CEGL007795).

#### Global Similar Associations:

- *Quercus alba - Carya alba - (Quercus velutina) / Desmodium nudiflorum - (Carex picta)* Forest (CEGL007795)
- *Quercus alba - Quercus rubra - Carya (alba, ovata) / Cornus florida* Acid Forest (CEGL002067)
- *Quercus alba - Quercus rubra - Quercus muehlenbergii / Cercis canadensis* Forest (CEGL002070)

#### Global Related Concepts:

#### OTHER COMMENTS

**Other Comments:**

#### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is common throughout the park, though most frequently occurs on low slopes with protected aspects on the lower Gasconade Dolomite and Eminence Dolomite (ELT 6; Nigh *et al.*, 2000).

**Global Range:** This white oak type is found sporadically across the central midwestern United States, extending from Kansas and possibly Arkansas to Indiana, and possibly Ohio.

**Nations:** US

**States/Provinces:** AR, IL, IN, KS:S1?, MO

**USFS Ecoregions:** 222Ad:CC?, 222Ae:CC?, 222Af:CC?, 222Ag:CC?, 222Ai:CC?, 222Am:CCC, 222Aq:CCP, 222Di:CPP, 251Ce:CCC

**Federal Lands:** NPS (Ozark); USFS (Ozark)

#### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** BS\_06.2\_09, BS\_12\_18, ECS\_AS01, ECS\_AS05, ECS\_AS06, ECS\_AS22, ECS\_AS26, ECS\_AS31, ECS\_AS45, ECS\_FL25, ECS\_FL26, ECS\_FL27, ECS\_FL34, ECS\_FL51, ECS\_FL59, ECS\_FL62, ECS\_FL65, ECS\_FL69, PM\_13\_06

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen



**References:** Faber-Langendoen 2001, Lauver *et al.* 1999, Midwestern Ecology Working Group n.d., Nigh *et al.* 2000



**Figure 7. Typical White Oak/Dogwood Unglaciaded Forest (CEGL002066) with dense understory, shrub, and groundflora layers.**



**Figure 8. White Oak/Dogwood Unglaciaded Forest (CEGL002066) with relatively sparse shrub layer and dense herbaceous groundflora due to prescribed burning.**



**Figure 9. White Oak/Dogwood Unglaciaded Forest (CEGL002066) with dense understory dominated by sugar maple (*Acer saccharum*)**



**Figure 10. White Oak/Dogwood Unglaciaded Forest (CEGL002066) with relatively open appearance due to significant chert or igneous hillslope sediment overlay. Note the sparse shrub and groundflora layers, even though shading and white oak dominance are both above 90 percent.**

## ***Quercus alba* - *Quercus rubra* - *Acer saccharum* - *Carya cordiformis* / *Lindera benzoin* Forest**

**White Oak - Northern Red Oak - Sugar Maple - Bitternut Hickory / Northern Spicebush Forest**

**White Oak - Red Oak - Sugar Maple Mesic Forest**

**Identifier: CEGL002058**

### **USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus rubra</i> - ( <i>Acer saccharum</i> ) Forest Alliance (A.251)
Alliance (English name)	Northern Red Oak - (Sugar Maple) Forest Alliance
Association	<i>Quercus alba</i> - <i>Quercus rubra</i> - <i>Acer saccharum</i> - <i>Carya cordiformis</i> / <i>Lindera benzoin</i> Forest
Association (English name)	White Oak - Northern Red Oak - Sugar Maple - Bitternut Hickory / Northern Spicebush Forest
Association (Common name)	White Oak - Red Oak - Sugar Maple Mesic Forest

### **Ecological System(s):**

<b>ONSR Community Type:</b>	Oak-Mixed Hardwood Mesic Upland Forests
<b>ONSR Ecological System:</b>	Mesic Upland Forests
<b>Global Ecological System:</b>	Ozark-Ouachita Dry-Mesic Oak Forest (CES202.708)

### **ELEMENT CONCEPT**

**Global Summary:** This mesic white oak - red oak - maple forest type is known from the south-central United States, particularly the Ozark/Ouachita region of Arkansas, Missouri, and eastern Oklahoma. Stands occur on gentle to moderately steep lower slopes in ravines, valleys, bases of bluffs, and sinkhole basins, generally with northern or eastern aspects. The soils are moderately well-drained and shallow to deep. The substrate is various types of bedrock (and colluvium derived from the bedrock), typically limestone or dolomite, but also sandstone or igneous material. The bedrock may be exposed directly or present as residual rock fragments or talus boulders. The canopy is dominated by *Quercus rubra* with *Quercus alba*, *Acer saccharum*, *Fraxinus americana*, and *Tilia americana* (var. *americana*), with lesser amounts of *Carya alba*, *Carya cordiformis*, *Fraxinus americana*, *Juglans nigra*, and *Ulmus rubra*. The understory closure varies with the moisture status of the site, being more closed under greater moisture conditions. Other characteristic woody species include *Aesculus glabra*, *Asimina triloba*, *Carya cordiformis*, *Carpinus caroliniana*, *Celtis laevigata*, *Cercis canadensis*, *Cornus florida*, *Euonymus atropurpurea*, *Ilex decidua*, *Juglans cinerea*, *Magnolia acuminata*, *Morus rubra*, *Ostrya virginiana*, *Prunus serotina*, *Quercus muehlenbergii*, and *Staphylea trifolia*. Shrubs and woody vines include *Euonymus americana*, *Castanea pumila* var. *ozarkensis*, *Frangula caroliniana*, *Hamamelis virginiana*, *Hydrangea arborescens*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Viburnum rufidulum*. Characteristic herbs include *Amphicarpaea bracteata*, *Aplectrum hyemale*, *Aralia racemosa*, *Aristolochia serpentaria*, *Asarum canadense*, *Brachyelytrum erectum*, *Cardamine concatenata*, *Carex albursina*, *Chasmanthium latifolium*, *Actaea racemosa* (= *Cimicifuga racemosa*), *Circaea lutetiana* ssp. *canadensis*, *Collinsonia canadensis*, *Cynoglossum virginianum*, *Desmodium nudiflorum*, *Dicentra canadensis*, *Dicentra cucullaria*, *Dioscorea quaternata*, *Elymus virginicus*, *Erigenia bulbosa*, *Erythronium rostratum*, *Hepatica nobilis* var. *obtusata*, *Hybanthus concolor*, *Hydrastis canadensis*, *Hydrophyllum* spp., *Iris cristata*, *Panax quinquefolius*, *Phryma leptostachya*, *Podophyllum peltatum*, *Polygonum virginianum*, *Sanguinaria canadensis*, *Silene ovata*, *Solidago flexicaulis*, *Stylophorum diphyllum*, *Uvularia grandiflora*, and *Melanthium woodii* (= *Veratrum woodii*). Numerous ferns may be found in examples of this association, including *Adiantum pedatum*, *Asplenium platyneuron*, *Cystopteris protrusa*, *Dennstaedtia punctilobula*, *Deparia acrostichoides* (= *Athyrium thelypteroides*), *Diplazium pycnocarpon* (= *Athyrium pycnocarpon*), *Phegopteris hexagonoptera*, and *Polystichum acrostichoides*.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This community is infrequent and occurs on low mesic slopes on the lower Gasconade Dolomite and Eminence Dolomite. It is most frequently found on toe slopes with protected aspects (ELT 6; Nigh *et al.* 2000) and in upland waterways (ELT 12; Nigh *et al.* 2000). Soils are basic.

**Global Environment:** Stands occur on gentle to moderately steep lower slopes in ravines, valleys, bases of bluffs, and sinkhole basins, generally with northern or eastern aspects. The soils are moderately well-drained and shallow to deep. The substrate is various types of bedrock (and colluvium derived from the bedrock), typically limestone or dolomite, but also sandstone or igneous material. The bedrock may be exposed directly or as residual rock fragments or talus boulders (Nelson 1985, Campbell *et al.* 1996).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy of this community is well developed and is usually 20-25 meters in height. Where this type occurs along upland waterways, canopy gaps may occur in areas of intense flooding, though generally canopy cover is above 80 percent.

The canopy is dominated by *Quercus alba*, *Quercus muehlenbergii*, and *Carya cordiformis*. The best diagnostics for this community are *Acer saccharum* and *Tilia americana*, though these may be minimally represented in the canopy. *Acer saccharum* will frequently be abundant in the subcanopy or tall shrub layers. Other good diagnostics include *Fraxinus americana* and *Juglans nigra*. Along upland waterways *Platanus occidentalis* may be present. Diagnostic shrub species include *Lindera benzoin*, *Asimina triloba*, *Aesculus glabra*, and *Carpinus caroliniana*. Commonly abundant vines include *Parthenocissus quinquefolia*, *Vitis vulpina*, and *Smilax bona-nox*. Diagnostic herbaceous species include *Circaea quadriflora*, *Hybanthus concolor*, *Desmodium pauciflorum*, and *D. glutinosum*. Other diagnostic species may include *Asarum canadense*, *Geranium maculatum*, *Cryptotaenia canadensis*, *Sanguinaria canadensis*, *Uvularia grandiflora*, and *Phryma leptostachya*.

**Global Vegetation:** The canopy is dominated by *Quercus rubra* with *Quercus alba*, *Acer saccharum*, *Fraxinus americana*, and *Tilia americana* var. *americana*, with lesser amounts of *Carya alba*, *Carya cordiformis*, *Fraxinus americana*, *Juglans nigra*, and *Ulmus rubra*. The understory closure varies with the moisture status of the site, being more closed under greater moisture conditions. Other characteristic woody species include *Aesculus glabra*, *Asimina triloba*, *Carya cordiformis*, *Carpinus caroliniana*, *Celtis laevigata*, *Cercis canadensis*, *Cornus florida*, *Euonymus atropurpurea*, *Ilex decidua*, *Juglans cinerea*, *Magnolia acuminata*, *Morus rubra*, *Ostrya virginiana*, *Prunus serotina*, *Quercus muehlenbergii*, and *Staphylea trifolia*. Shrubs and woody vines include *Euonymus americana*, *Castanea pumila* var. *ozarkensis*, *Frangula caroliniana*, *Hamamelis virginiana*, *Hydrangea arborescens*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Viburnum rufidulum*. Characteristic herbs include *Amphicarpaea bracteata*, *Aplectrum hyemale*, *Aralia racemosa*, *Aristolochia serpentaria*, *Asarum canadense*, *Brachyelytrum erectum*, *Cardamine concatenata*, *Carex albursina*, *Chasmanthium latifolium*, *Actaea racemosa* (= *Cimicifuga racemosa*), *Circaea lutetiana* ssp. *canadensis*, *Collinsonia canadensis*, *Cynoglossum virginianum*, *Desmodium nudiflorum*, *Dicentra canadensis*, *Dicentra cucullaria*, *Dioscorea quaternata*, *Elymus virginicus*, *Erigenia bulbosa*, *Erythronium rostratum*, *Hepatica nobilis* var. *obtusata*, *Hybanthus concolor*, *Hydrastis canadensis*, *Hydrophyllum* spp., *Iris cristata*, *Panax quinquefolius*, *Phryma leptostachya*, *Podophyllum peltatum*, *Polygonum virginianum*, *Sanguinaria canadensis*, *Silene ovata*, *Solidago flexicaulis*, *Stylophorum diphyllum*, *Uvularia grandiflora*, and *Melanthium woodii* (= *Veratrum woodii*). Numerous ferns may be found in examples of this association, including *Adiantum pedatum*, *Asplenium platyneuron*, *Cystopteris protrusa*, *Dennstaedtia punctilobula*, *Deparia acrostichoides* (= *Athyrium thelypteroides*), *Diplazium pycnocarpon* (= *Athyrium pycnocarpon*), *Phegopteris hexagonoptera*, and *Polystichum acrostichoides* (Nelson 1985, Campbell *et al.* 1996, Hoagland 1997).

**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Carya Cordiformis</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Asimina triloba</i> , <i>Cornus florida</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i> , <i>Corylus americana</i>
	Vine	<i>Parthenocissus quinquefolia</i>
Herb	Graminoid	<i>Carex jamesii</i> , <i>Carex rosea</i>
Herb	Forb	<i>Amphicarpa bracteata</i> , <i>Senecio obovatus</i> , <i>Eupatorium rugosum</i>

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Carya cordiformis*, *Acer saccharum*, *Juglans nigra*, *Asimina triloba*, *Lindera benzoin*, *Circaea quadriflora*, *Hybanthus concolor*, *Phryma leptostachya*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:** *Tilia americana*, *Fraxinus americana*, *Aesculus glabra*

**Global:** *Castanea pumila* var. *ozarkensis*, *Silene ovata*

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G3? (24-Oct-2002). This community has a moderately restricted range, found primarily in the western portions of the Interior Highlands of the south-central United States. Site factors are not particularly specific, but it may require a combination of thin soils, occasional ground fires, and infrequent catastrophic fires to persist. Extensive clearing and use of oaks for lumber have contributed to the large decline in this forest type. Remaining parcels of this type are subject to timber harvesting, but conversion to non-forest is less likely. There are few areas where old forest (100- to 150-year-old stands) or old-growth forest (>150 years) conditions are present. Many stands have also been grazed in the past, resulting in ground and shrub layers that are simplified or prone to invasion by exotics. Stands may require low-intensity surface fires to maintain the quality of the ground layer, and these are often lacking.

**CLASSIFICATION****Status:** Standard**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** This community shares many elements with the *Acer saccharum-Quercus rubra-Carya cordiformis / Asimina triloba* Forest (CEGL002060). The two communities have been separated almost exclusively by landform, the latter designation reserved for those communities fitting this description that are found on floodplains and terraces along the main river stems. This community also shares many features with the *Quercus alba-Quercus rubra-Quercus muehlenbergii / Cercis canadensis* Forest (CEGL002070), but includes more mesic species such as sugar maple, bitternut hickory, basswood, and walnut in the canopy.

The high abundances of the woody species *Ulmus rubra*, as well as herbaceous species such as *Carex jamesii*, *Senecio obovatus*, and *Elephantopus caroliniana* reflect the fact that these communities frequently occur on abandoned grazing lands.

**Global Comments:** This type fits in with a moist oak - maple group, and many sites may succeed to more sugar maple-dominated stands. In Arkansas, this vegetation is closely related to *Acer (saccharum, barbatum) - Quercus rubra - Carya cordiformis / Asimina triloba* Forest (CEGL002060). Douglas Zollner (pers. comm. 1999) suggests that fire frequency may account for the differences, since *Acer saccharum* is more susceptible to fire. Mike Homoya (pers. comm. 1996) thought this type could be in Indiana as described. This type is described by Hoagland (1997) as occurring on mesic slopes and floodplains in the easternmost tier of Oklahoma counties (Adair, Cherokee, Delaware, LeFlore, Mayes, McCurtain, Muskogee, Ottawa, and Sequoyah). Missouri's Mesic Igneous Forest (Nelson 1985) is a poorly understood variant that needs further study.

**Global Similar Associations:**

- *Acer (barbatum, saccharum) - Juglans nigra - Fraxinus americana / Hybanthus concolor* Forest (CEGL007811)
- *Acer (saccharum, barbatum) - Quercus rubra - Carya cordiformis / Asimina triloba* Forest (CEGL002060)
- *Fagus grandifolia - Quercus rubra - Tilia americana var. caroliniana / Magnolia tripetala / Podophyllum peltatum* Forest (CEGL007823)
- *Quercus alba - Quercus rubra - Acer saccharum* Sand Forest (CEGL005187)
- *Quercus rubra - Acer saccharum - Tilia americana var. heterophylla - Aesculus flava - (Cladrastis kentukea)* Forest (CEGL007698)

**Global Related Concepts:**

- Mesic Forest, Mesic Limestone/Dolomite Forest, Mesic Igneous Forest, Mesic Sandstone Forest (Nelson 1985) ?
- Mesic oak - hickory community (Tucker 1989) ?
- T1B4aII3a. *Acer saccharum - Quercus* spp. (*alba, rubra*) - *Carya* spp. (*ovata, tomentosa, cordiformis*) (Foti *et al.* 1994) ?

**OTHER COMMENTS****Other Comments:****ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This community is infrequent and most frequently occurs on low slopes with protected aspects (ELT 6) and in upland waterways (ELT 12) on the lower Gasconade Dolomite and Eminence Dolomite. It sometimes occurs higher on very steep slopes.

**Global Range:** This mesic white oak - red oak - maple forest type is known from the south-central United States, particularly the Ozark and Ouachita regions of Arkansas, Missouri, and eastern Oklahoma.

**Nations:** US**States/Provinces:** AR, MO, OK**USFS Ecoregions:** 222Ac:CCC, 222Ad:CC?, 222Ae:CC?, 222Aj:CCP, 222Ak:CCC, 222Am:CC?, 222Ao:CCC, 222Ap:CCC, 222Ke:CCC, 222Kf:CCC, 222Kg:CCC, 231:C, 251Cb:CCC, 251Cc:CCC, 251Cd:CC?, 251Ce:CCC, 251Cg:CCC**Federal Lands:** NPS (Ozark); USFS (Ouachita, Ozark)**ELEMENT SOURCES****Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_06.2\_09, AS\_06.2\_13, AS\_06.2\_18, BS\_12\_07, BS\_12\_12, BS\_12\_16, BS\_13\_19, BS\_14-16\_04, BS\_19\_07, BS\_19\_15, ECS\_AS07, ECS\_FL04, ECS\_FL05, ECS\_FL06, ECS\_FL07, ECS\_FL10, PM\_12\_05, PM\_13.3\_17, PM\_13\_02, PM\_14-16\_18, PM\_14-16\_19

**Local Description Authors:** M. Struckhoff**Global Description Authors:** D. Faber-Langendoen

**References:** Blair 1938, Campbell *et al.* 1996, Foti *et al.* 1994, Hoagland 1997, Hoagland 2000, Homoya 1996, Midwestern Ecology Working Group n.d., NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1985, Nigh *et al.* 2000, Parker 1989, Tucker 1989, Zollner 1999.



**Figure 11. Typical White Oak-Northern Red Oak-Sugar Maple-Bitternut Hickory / Northern Spicebush Forest (CEGL002058) with a dense understory, shrub, and groundflora layers dominated by plants that thrive in basic, mesic soils. As is often the case, this example occurs in an upland waterway and adjacent toeslopes.**



**Figure 12. Typical dense shrub layer of a White Oak-Northern Red Oak-Sugar Maple-Bitternut Hickory / Northern Spicebush Forest (CEGL002058) dominated by plants that thrive in mesic, base-saturated soils.**



**Figure 13. A White Oak-Northern Red Oak-Sugar Maple-Bitternut Hickory / Northern Spicebush Forest (CEGL002058) growing in a high slope position on a step protected slope with dolomite outcrops. This type of slope might more typically be associated with a *Quercus alba-Quercus rubra-Quercus muehlenbergii* / *Cercis canadensis* Forest (CEGL002070), but in this instance, sugar maple was sufficiently dominant to suggest the more mesic type that we applied.**

## ***Quercus stellata* - *Quercus marilandica* - *Carya (glabra, texana)* / *Vaccinium arboreum* Forest**

**Post Oak - Blackjack Oak - (Pignut Hickory, Black Hickory) / Farkleberry Forest**

**Midwest Post Oak - Blackjack Oak Forest**

**Identifier: CEGLO02075**

### **USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus stellata</i> - <i>Quercus marilandica</i> Forest Alliance (A.253)
Alliance (English name)	Post Oak - Blackjack Oak Forest Alliance
Association	<i>Quercus stellata</i> - <i>Quercus marilandica</i> - <i>Carya (glabra, texana)</i> / <i>Vaccinium arboreum</i> Forest
Association (English name)	Post Oak - Blackjack Oak - (Pignut Hickory, Black Hickory) / Farkleberry Forest
Association (Common name)	Midwest Post Oak - Blackjack Oak Forest

### **Ecological System(s):**

<b>ONSR Community Type:</b>	Igneous Woodlands
<b>ONSR Ecological System:</b>	Upland Oak Woodlands
<b>Global Ecological System:</b>	Ozark-Ouachita Dry Oak Woodland (CES202.707) Southern Interior Low Plateau Dry Oak Forest (CES202.898)

### **ELEMENT CONCEPT**

**Global Summary:** This post oak - blackjack oak forest is found most commonly in the Interior Highlands and Interior Low Plateau regions. Stands occur in isolated patches on dry, rapidly drained, shallow soils. Bedrock can be sandstone, chert, or igneous material, and rock fragments, cobbles, or boulders are commonly strewn over the surface. This forest is best developed on south- and west-facing slopes and ridgetops of steep-walled valleys and canyons. Typical tree species dominants include *Quercus stellata*, mixed with a variety of other oaks, including *Quercus marilandica*, *Quercus alba*, *Quercus falcata*, and *Quercus velutina*. The tree canopy is short (20-50 feet), slow-growing, and open. Tree crowns are spreading, open, and limby. The understory is poorly developed and consists of widely scattered shrubs. Typical species include *Vaccinium arboreum*, *Amelanchier arborea*, and *Ostrya virginiana*. Herbaceous cover is sparse, and mosses and lichens are abundant. In Kentucky, common herbaceous species include *Tephrosia virginiana*, *Euphorbia corollata*, and *Danthonia spicata*. In Arkansas, herbaceous species include *Carex umbellata* and *Carex hirsutella*.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a relatively uncommon community, usually occurring only on xeric to dry sites where soils are acidic to neutral (ELT's 3, 4 and 7; Nigh *et al.*, 2000). Slopes are gentle to moderate. It appears to be associated with the upslope edge of areas where dolomite bedrock is at or near the surface.

**Global Environment:** This community is found on dry, upper slopes and ridgetops. Bedrock is most often igneous materials or chert which suggests neutral to slightly acid pH. Soils are typically shallow, droughty, and infertile. Bedrock pavement, boulders, cobble, gravel, and sand are strewn over the surface, contributing significantly to soil droughtiness and increased soil temperatures (Nelson 1985, TNC 1995a).

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** This community is open, with stunted or gnarled trees forming the canopy. Canopy cover may frequently be at or near 60 percent, suggesting a woodland classification. The most common canopy species include *Quercus velutina*, *Pinus echinata*, and *Quercus stellata*. *Quercus alba* and *Quercus marilandica* are infrequent components, though the former may be more abundant on igneous substrates. The understory tends to be dominated by *Ulmus alata* and *Carya texana*. Common diagnostic shrubs *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, and *Rhus* spp. Woody vines are negligible. Herbaceous flora is dominated by species that thrive in acid soils, including *Lespedeza repens*, *Danthonia spicata*, *Carex umbellata*, *Carex nigromarginata*, *Euphorbia corollata*, *Solidago radula*, and *Clitoria mariana*.

**Global Vegetation:** This community is a broad-leaved deciduous forest type. Canopy closure is often incomplete but may be more than 60%. Typical tree species dominants include *Quercus stellata*, mixed with a variety of other oaks, including *Quercus marilandica*, *Quercus alba*, *Quercus falcata*, and *Quercus velutina*. The tree canopy is short (8-20 m), slow-growing, and open. The understory is poorly developed and consists of widely scattered shrubs. Typical species include *Amelanchier arborea*, *Ostrya virginiana*, and *Vaccinium arboreum*. Dwarf-shrubs include *Hypericum punctatum*, *Hypericum hypericoides* ssp. *multicaule* (= *Hypericum stragulum*), *Rosa carolina*, and *Toxicodendron radicans*. Herbaceous cover is sparse. Species include *Antennaria*



## Appendix 15. ONSR USNVC Natural Community Descriptions

*plantaginifolia*, *Symphytotrichum patens* (= *Aster patens*), *Danthonia spicata*, *Dichanthelium commutatum*, *Dichanthelium laxiflorum*, *Helianthus divaricatus*, *Hieracium gronovii*, *Lespedeza hirta*, and *Schizachyrium scoparium*. Mosses and lichens are abundant (Nelson 1985, TNC 1995a). The presence of *Vaccinium arboreum* is part of what distinguishes this type from the related CEGL002074 of the Crosstimbers to the west (B. Hoagland pers. comm.).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus velutina</i> , <i>Carya texana</i>
Tree canopy	Needle-leaved evergreen	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Ulmus alata</i> , <i>Vaccinium arboreum</i>
Short shrub	Broad-leaved deciduous	<i>Vaccinium stamineum</i>
Herb	Graminoid	<i>Carex nigromarginata</i>
Herb	Forb	<i>Lespedeza repens</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus falcata</i> , <i>Quercus marilandica</i> , <i>Quercus stellata</i> , <i>Quercus velutina</i>
Tall shrub/sapling	Needle-leaved tree	<i>Juniperus virginiana</i>
Tall shrub/sapling	Broad-leaved deciduous tree	<i>Amelanchier arborea</i> , <i>Crataegus phaenopyrum</i>
Tall shrub/sapling	Broad-leaved evergreen tree	<i>Vaccinium arboreum</i>
Herb	Semi-shrub	<i>Cunila origanoides</i>
Herb	Forb	<i>Helianthus divaricatus</i>
Herb	Graminoid	<i>Danthonia spicata</i>

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Quercus velutina*, *Quercus stellata*, *Pinus echinata*, *Carya texana*, *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, *Rhus aromatica*, *Carex nigromarginata*, *Lespedeza repens*, *Carex umbellata*, *Danthonia spicata*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:** *Accipiter cooperii*, *Caprimulgus carolinensis*, *Caprimulgus vociferus*, *Coragyps atratus*, *Glaucomys volans*, *Helmitheros vermivorum*, *Lynx rufus*, *Meleagris gallopavo*, *Odocoileus virginianus*, *Piranga rubra*, *Sciurus carolinensis*, *Tamias striatus*

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4 (3-Oct-1996).

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** The description above is informed primarily by data from examples occurring on dolomite substrate. There, this association frequently occurs as a spatially transitional community between the *Quercus velutina-Quercus coccinea-Carya texana* Ozark Forest (CEGL002399) and the *Quercus stellata-Quercus marilandica-Quercus velutina-Carya texana / Schizachyrium scoparium* Woodland (CEGL002149). In this geologic context, the type described here shares many features with, and may more accurately be considered a subtype of the *Quercus velutina-Quercus coccinea-Carya texana* Ozark Forest (CEGL002399). Where canopy cover approaches 60 percent, this type might be better classified as *Quercus stellata-Quercus marilandica-Quercus velutina-Carya texana / Schizachyrium scoparium* Woodland (CEGL002149).

Identification of this type was confounded by the presence of a distinct subtype that occurs on igneous substrates. That type, called the *Quercus stellata-Quercus marilandica-Carya (glabra, texana) / Vaccinium arboreum* Igneous Forest (CEGL002075i) in this study, features scattered large post and white oaks among a nearly full canopy of shorter black hickory and black oak. That type may more closely resemble the existing USNVC description (Faber-Langendoen 2001) than the type described here, though we believe that it reflects the combined effects of past grazing and fire suppression on an igneous substrate.

**Global Comments:** The presence of *Vaccinium arboreum* is part of what distinguishes this type from the related CEGL002074 of the Crosstimbers to the west (B. Hoagland pers. comm.). In Kentucky this is a common forest on sandstone ridges in the Shawnee Hills (222Da, 222De, 222Dg, 222Dj). Kentucky occurrences are often old-growth, gnarly woodlands. Concept and distribution of this association in the Southeast needs assessment. Distinguishing this community from *Quercus stellata - Quercus marilandica - Quercus velutina - Carya texana / Schizachyrium scoparium* Woodland (CEGL002149) can be difficult when canopy cover is at or near 60%. Black hickory is diagnostic for this community, which is most common west of the Mississippi Alluvial Basin. Where *Quercus alba* is codominant with either post oak or blackjack oak, suggesting types are less xeric, stands belong in the *Quercus alba - (Quercus rubra, Carya spp.)* Forest Alliance (A.239) or the *Quercus velutina - Quercus alba - (Quercus coccinea)* Forest Alliance (A.1911).

## Appendix 15. ONSR USNVC Natural Community Descriptions

Braun (1950) summarizes information on this type in the Ozarks of Missouri and Arkansas. Anderson (1996) notes that this type may be found in southwestern Ohio, but further review is needed.

### Global Similar Associations:

- *Quercus muehlenbergii* - *Quercus (falcata, shumardii, stellata)* / *Cercis canadensis* / *Viburnum rufidulum* Forest (CEGL007699)
- *Quercus stellata* - *Quercus marilandica* - (*Carya texana*) Forest (CEGL002074)--this type is more westerly in distribution (ECO32 and ECO37).
- *Quercus stellata* - *Quercus marilandica* - *Quercus velutina* - *Carya texana* / *Schizachyrium scoparium* Woodland (CEGL002149)

### Global Related Concepts:

- *Quercus stellata* - *Quercus marilandica* / *Danthonia* community (Voigt and Mohlenbrock 1964) B
- Eastern Broadleaf Forests: 100: Oak-Hickory Forest (*Quercus-Carya*) (Kuchler 1964) B
- Post Oak - Blackjack Oak: 40 (Eyre 1980) B
- Terrestrial: Forest: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: I.B.3a (UNESCO 1973) B

## OTHER COMMENTS

### Other Comments:

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is an uncommon community within the study area, occurring on xeric landscape positions with acidic or neutral soils. It is usually associated with glades on dolomite geology.

**Global Range:** This community is found in Arkansas, Illinois, Indiana, Kentucky, Missouri, and Oklahoma. Reports from southwest Ohio need verification. This community occurs on isolated patches of rocky, gravelly, dry, upper slopes and ridgetops. Black hickory occurs most commonly in association with chert or igneous rock. This community occurs in narrow strips and isolated patches within the larger oak-hickory complexes of the southern United States found west of the Mississippi Alluvial Basin (TNC 1995a).

**Nations:** US

**States/Provinces:** AR, IL, IN, KY, MO, OK

**USFS Ecoregions:** 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ad:CCC, 222Af:CCC, 222Ag:CCC, 222Ak:CCC, 222Aq:CCC, 222Dc:CCC, 222De:CCC, 222Df:CCP, 222Dh:CCC, 222Di:CCC, 222Ei:CCC, 222Ga:CCC, 255A:PP, 255C:PP, M222A:PP, M231A:PP

**Federal Lands:** NPS (Mammoth Cave?, Ozark); USFS (Ouachita?, Ozark)

### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_03.1\_23, CB1131, ECS\_BS33, GN2000

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** M. Guetersloh

**References:** Anderson 1996, Braun 1950, Buck 1964, Evans 1991, Eyre 1980, Faber-Langendoen 2001, Fralish 1987, Fralish 1988, Fralish *et al.* 1991, Hoagland 1997, Hoagland 2000, Hoagland pers. comm., Kennedy 1973, Kuchler 1964, McCoy 1958, Midwestern Ecology Working Group n.d., Nigh *et al.* 2000, Nelson 1985, Rice and Penfound 1959, Roe 1998, TNC 1985, TNC 1995a, Taylor 1967, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978



**Figure 14.** Typical Post Oak-Blackjack Oak-(Pignut Hickory, Black Hickory) / Farkleberry Forest (CEGL002075). Note the stunted and open canopy (to the right) and the landscape position on an exposed (south or west facing) shoulder above a steep slope.



**Figure 15. Typical Post Oak-Blackjack Oak-(Pignut Hickory, Black Hickory) / Farkleberry Forest (CEGL002075). Note the well developed, but somewhat open canopy and the dark-barked *Quercus marilandica* specimens behind the large Roubidoux sandstone boulders in the foreground.**

***Quercus stellata - Quercus marilandica - Carya (glabra, texana) / Vaccinium arboreum***  
**Forest – Igneous Phase**

Post Oak - Blackjack Oak - (Pignut Hickory, Black Hickory) / Farkleberry Forest – Igneous Phase

Midwest Post Oak - Blackjack Oak Forest – Igneous Phase

Identifier: CEGL002075i

**USNVC Classification**

**Alliance:** *QUERCUS STELLATA-QUERCUS MARILANDICA* FOREST ALLIANCE (I.B.2.N.a)

**Alliance (English name):** Post Oak-Blackjack Oak Forest Alliance

**Ecological System(s):**

**ONSR Community Type:** Igneous Woodlands

**ONSR Ecological System:** Upland Oak Woodlands

**Global Ecological System:** Ozark-Ouachita Dry Oak Woodland (CES202.707)

Southern Interior Low Plateau Dry Oak Forest (CES202.898)

**ENVIRONMENTAL DESCRIPTION**

**Ozark National Scenic Riverways Environment:** This is a relatively uncommon community, usually occurring only on dry sites on igneous substrate (ELT's 21, 22, 23, 24, and 25; Nigh *et al.* 2000). Slopes are gentle to moderate.

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy is nearly closed. The dominant tree species is *Carya texana*, with lesser amounts of larger, often emergent specimens of *Quercus stellata*, *Quercus alba* and *Quercus rubra*. The understory is dominated almost exclusively by *Carya texana* and *Ulmus alata*. Common tall shrubs include *Amelanchier arborea* and *Viburnum rufidulum*. Commonly abundant short shrubs include *Rhus aromatica*, *Rosa carolina* and *Vaccinium stamineum*. Common diagnostic herbaceous species include *Panicum linearifolium*, *Lespedeza procumbens*, *Antennaria plantaginifolia*, *Aster anomalus*, *Danthonia spicata*, *Solidago buckleyi* and *Helianthus hirsutus*. This association also exhibits a high abundance of herbaceous flora that respond well to human disturbance, notably *Rubus* spp. and *Symphoricarpos orbiculatus*. The presence of these species may be the best indicator that this type is the result of human disturbance, especially grazing and fire suppression.

**MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Carya texana</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Ulmus alata</i>
Short shrub	Broad-leaved deciduous	<i>Rhus aromatica</i>
Herb	Graminoid	<i>Panicum linearifolium</i>
Herb	Forb	<i>Lespedeza procumbens</i> , <i>Antennaria plantaginifolia</i>

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways :** *Quercus velutina*, *Carya texana*, *Quercus stellata*, *Ulmus alata*, *Vaccinium stamineum*, *Rhus aromatica*, *Lespedeza procumbens*, *Antennaria plantaginifolia*, *Danthonia spicata*, *Helianthus hirsutus*

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways**

**CLASSIFICATION**

**Status:** Provisional

**Classification Confidence:** 3-Low

**Ozark National Scenic Riverways Comments:** The type described here might more readily fit the existing NVCS description for the *Quercus stellata-Quercus marilandica-Carya (glabra, texana) / Vaccinium arboreum* Forest (CEGL002075) than does the type currently occupying that name within this study. We identified the type described here as a distinct type that appears to be limited to igneous substrate. We suspect that it reflects the impacts of past grazing and the absence of fire in the landscape, and may have once been a more open, woodland type that has developed into a black hickory dominated forest.

**Global Comments:** This community is a phase of the global *Quercus stellata-Quercus marilandica-Carya (glabra, texana) / Vaccinium arboreum* Forest (CEGL002075). These two phases are retained separately for this project based on floristic and probably past land use differences. Further data are needed to resolve whether to formally separate or merge these.

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is an uncommon community within the study area, occurring on igneous substrates with acidic to neutral soils. Soil moisture is dry but not xeric.

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** PM\_21\_18, PM\_21\_20, PM\_22\_06, PM\_22\_13, PM\_23\_17

**Local Description Authors:** M. Struckhoff

**References:** Nigh *et al.* 2000



**Figure 16. Post Oak-Blackjack Oak-(Pignut Hickory, Black Hickory) / Farkleberry Igneous Forest (CEGL002075i). Note the cedar (*Juniperus virginiana*) to the left of the photo and the large-boled post oak (*Quercus stellata*) that, due to its spreading limbs, appears to have grown in an open environment. Both may be indications that this community type reflects the impact of past human activity, probably grazing.**



**Figure 17. This example of a Post Oak-Blackjack Oak-(Pignut Hickory, Black Hickory) / Farkleberry Igneous Forest (CEGL002075i) demonstrates the fairly uniform, short growth of black oak and black hickory (about 10-15 meters tall) below scattered large post oaks, black oaks, and less frequently, white oaks (about 20 meters tall, with spreading limbs).**



**Figure 18. Post Oak-Blackjack Oak-(Pignut Hickory, Black Hickory) / Farkleberry Igneous Forest (CEGL002075i). Note the small blackjack oak in the foreground. The road to the left is further evidence that these communities may exist as a result of human influence.**



**Figure 19. Another example of a Post Oak-Blackjack Oak-(Pignut Hickory, Black Hickory) / Farkleberry Igneous Forest (CEGL002075i) showing short, uniformly-sized black oak, blackjack oak and black hickory below taller oaks (to left of photo). The lighter area in the distance is most likely a glade opening.**

***Quercus stellata* / *Cinna arundinacea* Flatwoods Forest****Post Oak / Stout Woodreed Flatwoods Forest****Post Oak Flatwoods****Identifier: CEGL002405****USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus stellata</i> Flatwoods Forest Alliance (A.261)
Alliance (English name)	Post Oak Flatwoods Forest Alliance
Association	<i>Quercus stellata</i> / <i>Cinna arundinacea</i> Flatwoods Forest
Association (English name)	Post Oak / Stout Woodreed Flatwoods Forest
Association (Common name)	Post Oak Flatwoods

**Ecological System(s):****ONSR Community Type:** Post Oak Flatwoods**ONSR Ecological System:** Upland Oak Forests**Global Ecological System:** Ozark-Ouachita Dry Oak Woodland (CES202.707)

South-Central Interior / Upper Coastal Plain Flatwoods (CES203.479)

**ELEMENT CONCEPT**

**Global Summary:** This dry post oak flatwoods type is found in the central midwestern United States. Stands occur on both glaciated and unglaciated areas, with the majority of the range over glacial till of Illinoian age, to the north of the Ohio River. Stands occur on level or nearly level sites. Soils contain a well-developed subsurface hardpan that is impermeable or nearly impermeable, causing a shallowly perched water table. The soil moisture fluctuates widely throughout the growing season. Depressions may form seasonal or ephemeral (vernal) ponds. The vegetation contains a dominant tree layer with an average canopy cover of 80% or more. Trees may be stunted due to the unfavorable soil conditions. The canopy is typically strongly dominated by *Quercus stellata*, but may include *Quercus alba*, *Quercus bicolor*, *Quercus falcata*, *Quercus marilandica*, and, more rarely, *Quercus palustris*. In Illinois, the shrub and woody vine strata may contain *Parthenocissus quinquefolia*, *Rosa carolina*, *Rubus allegheniensis*, *Rubus flagellaris*, and *Toxicodendron radicans*. The shrub strata may not be distinct. The herbaceous layer can be fairly disparate from one stand to the next. Some stands can be dominated by *Cinna arundinacea*, *Chasmanthium latifolium* and *Eleocharis tenuis* var. *verrucosa* (= *Eleocharis verrucosa*). Plants more typical of dry and dry-mesic soil grow on slight rises, including *Carex festucacea*, *Carex pennsylvanica*, *Danthonia spicata*, *Helianthus divaricatus*, et al.. In Kentucky, this community occurs on relatively high flat areas that are no longer flooded, such as ancient Quaternary or Tertiary post-glacial meltwater lakebeds and high terraces of the Upper Gulf Coastal Plain and Shawnee Hills. In addition to the nominal species, the canopy in Kentucky may have *Quercus alba* and *Carya texana*. Herbaceous cover is sparse to moderate; leaf litter is the dominant ground cover. A fragipan layer leads to 'xerohydric' conditions. Local dominance in depressions is of wetland species (*Juncus*, etc.). Dry areas in Kentucky will have *Manfreda virginica*, *Croton willdenowii*, *Danthonia spicata*, *Porteranthus stipulatus*, *Pycnanthemum tenuifolium*, and *Prenanthes aspera* (characteristic of open areas). In Kentucky, stands grade downslope into bottomland hardwood forest and cypress swamp and upslope into mesic upland or dry oak-hickory forest.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System: Terrestrial****Ozark National Scenic Riverways Environment:**

**Global Environment:** This community occurs on level or nearly level sites. Soils have a well-developed hardpan that causes a shallowly perched water table (White and Madany 1978). The soil moisture fluctuates widely throughout the growing season. Depressions often contain seasonal or ephemeral (vernal) ponds. This community usually is found over glacial till of Illinoian age, but its distribution south of glacial deposits in Kentucky is uncertain. In Missouri, these flatwoods once occupied broad, flat ridges of the Salem Plateau in the Ozarks, where thin loess soils occur over Ordovician residuum of cherty clay loam (M. Leahy pers. comm. 1999). In Kentucky, this community occurs on relatively high flat areas that are no longer flooded, such as ancient Quaternary or Tertiary post-glacial meltwater lakebeds and high terraces of the Upper Gulf Coastal Plain and Shawnee Hills.

**VEGETATION DESCRIPTION****Ozark National Scenic Riverways Vegetation:**

**Global Vegetation:** The vegetation contains a dominant tree layer with an average canopy cover of 80% or more. Trees may be stunted due to the unfavorable soil conditions. The canopy is typically strongly dominated by *Quercus stellata*, but may include *Quercus alba*, *Quercus bicolor*, *Quercus falcata*, *Quercus marilandica* and, more rarely *Quercus palustris*. In the Jackson Purchase

## Appendix 15. ONSR USNVC Natural Community Descriptions

region of Kentucky *Quercus velutina* is important in the overstory (Hendricks *et al.* 1991). In Illinois, the shrub and woody vine strata may contain *Parthenocissus quinquefolia*, *Rosa carolina*, *Rubus allegheniensis*, *Rubus flagellaris*, and *Toxicodendron radicans* (Taft *et al.* 1995). The shrub strata may not be distinct. In Indiana, shrubs include *Rhus copallinum* and *Hypericum prolificum*. The herbaceous layer can be fairly disparate from one stand to the next. Some stands can be dominated by *Cinna arundinacea*, *Chasmanthium latifolium* and *Eleocharis tenuis* var. *verrucosa* (= *Eleocharis verrucosa*). Plants more typical of dry and dry-mesic soil grow on slight rises, including *Carex festucacea*, *Carex pensylvanica*, *Danthonia spicata*, *Helianthus divaricatus*, *et al.* (Aldrich and Homoya 1986, Taft *et al.* 1995). In addition to the nominal species, the canopy in Kentucky may have *Quercus alba* and *Carya texana*. Herbaceous cover is sparse to moderate; leaf litter is the dominant ground cover. A fragipan layer leads to 'xerohydric' conditions. Local dominance in depressions is of wetland species (*Juncus*, etc.). Dry areas in Kentucky will have *Manfreda virginica*, *Croton willdenowii*, *Danthonia spicata*, *Porteranthus stipulatus*, *Pycnanthemum tenuifolium*, and *Prenanthes aspera* (characteristic of open areas). These areas grade downslope into bottomland hardwood forest and cypress swamp and upslope into mesic upland or dry oak-hickory forest.

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

##### Stratum

##### Lifeform

##### Species

#### Global

##### Stratum

##### Lifeform

##### Species

Tree canopy

Broad-leaved deciduous tree

*Quercus alba*, *Quercus bicolor*, *Quercus falcata*, *Quercus palustris*, *Quercus stellata*

### CHARACTERISTIC SPECIES

#### Ozark National Scenic Riverways:

**Global:** *Cinna arundinacea*, *Quercus palustris*, *Quercus stellata*

### OTHER NOTEWORTHY SPECIES

#### Ozark National Scenic Riverways:

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G2G3 (22-Jun-1998). There are probably fewer than 50 occurrences of this community rangewide. Currently 23 occurrences have been documented in Illinois, Indiana, and Missouri. The community is ranked S2 in Illinois, Indiana, and Missouri, and S? in Kentucky; it may also occur in Arkansas. There are probably fewer than 10,000 acres rangewide; currently over 3150 acres have been documented. Some occurrences have been destroyed or degraded by clearing and selective logging, and some have been degraded by grazing. In Missouri most examples have been converted to fescue pastures. This community occurs in a fairly broad range, but it has somewhat restricted environmental requirements.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

#### Ozark National Scenic Riverways Comments:

**Global Comments:** Rangewide review may find that, apart from the post oak dominance and flatwoods environment, understory composition may vary widely [see Taft *et al.* (1995)]. In Kentucky, this type is thought to be fire-suppressed; structure varies from forest to woodland (M. Evans pers. comm. 1999). The former is thought to represent the fire-suppressed condition, the latter the more natural state, remnants of which still exist in the Jackson Purchase area [see Hendricks *et al.* (1991)]. Many noteworthy herbaceous species are characteristic of prairie barrens. Compare also with other Kentucky "Flatwoods" types. In Missouri stands also may contain a large prairie flora [see Ladd and Heumann (1994)]. See Taft *et al.* (1995) for an excellent review of this type in Illinois. Clay barrens in Indiana, *Quercus stellata* / (*Danthonia spicata*, *Croton willdenowii*) Woodland (CEGL005057), may be a variant of this type.

#### Global Similar Associations:

- *Quercus palustris* - (*Quercus stellata*) - *Quercus pagoda* / *Isoetes* spp. Forest (CEGL002101)
- *Quercus stellata* - *Quercus velutina* / *Schizachyrium scoparium* Woodland (CEGL005281)
- *Quercus stellata* / (*Danthonia spicata*, *Croton willdenowii*) Woodland (CEGL005057)

#### Global Related Concepts:

- *Quercus stellata* - *Cinna arundinacea* (Fralish 1987) =

### OTHER COMMENTS

**Other Comments:** One example of this type is recorded in the Missouri Natural Heritage Database (Missouri Department of Conservation 2000) as occurring very close to the boundary of the mapping area, though no field confirmation of its classification was performed.

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** The Missouri Natural Heritage Database reports within the mapping area near Charcoal Pond in the Doniphan Ranger District of Mark Twain National Forest (Missouri Department of Conservation 2000).



Appendix 15. ONSR USNVC Natural Community Descriptions

**Global Range:** This dry post oak flatwoods type is found in the central midwestern United States in both glaciated and unglaciated areas, with the majority of the range over glacial till of Illinoisan age, to the north of the Ohio River. States include Illinois, Indiana, Kentucky, Missouri, and possibly in the Mississippi Delta of Arkansas.

**Nations:** US

**States/Provinces:** AR, IL, IN:S2, KY, MO

**USFS Ecoregions:** 222Ab:CCC, 222Ae:CC?, 222Af:CCP, 222Db:CCC, 222Dc:CCC, 222Ga:CCC, 222Gb:CCC, 222Gc:CCC, 222Ge:CCC, 231Ga:???, 231Gc:???, 234Ac:CCC, 234Ae:CC?, 251D:PP

**Federal Lands:** NPS (Ozark); TVA (West Kentucky)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** J. Drake, D. Faber-Langendoen, and D. Ambrose, mod. M. Pyne and D. Faber-Langendoen

**References:** Aldrich and Homoya 1986, Campbell and Grubbs 1992, Evans 1991, Evans 1999, Fralish 1976, Fralish 1987, Fralish 1988, Hendricks *et al.* 1991, Homoya *et al.* 1988, Ladd and Heumann 1994, Leahy 1999, Midwestern Ecology Working Group n.d., Missouri Department of Conservation 2000, Taft *et al.* 1995, White and Madany 1978

***Quercus velutina* - *Quercus alba* - *Carya (glabra, ovata)* Forest****Black Oak - White Oak - (Pignut Hickory, Shagbark Hickory) Forest****Black Oak - White Oak - Hickory Forest****Identifier: CEGL002076****USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus velutina</i> - <i>Quercus alba</i> - ( <i>Quercus coccinea</i> ) Forest Alliance (A.1911)
Alliance (English name)	Black Oak - White Oak - (Scarlet Oak) Forest Alliance
Association	<i>Quercus velutina</i> - <i>Quercus alba</i> - <i>Carya (glabra, ovata)</i> Forest
Association (English name)	Black Oak - White Oak - (Pignut Hickory, Shagbark Hickory) Forest
Association (Common name)	Black Oak - White Oak - Hickory Forest

**Ecological System(s):**

<b>ONSR Community Type:</b>	Mixed Oak-Hickory Forests
<b>ONSR Ecological System:</b>	Upland Oak Forests
<b>Global Ecological System:</b>	Ozark-Ouachita Dry-Mesic Oak Forest (CES202.708)
	North-Central Interior Dry Oak Forest and Woodland (CES202.047)
	Southern Interior Low Plateau Dry Oak Forest (CES202.898)

**ELEMENT CONCEPT**

**Global Summary:** This black oak - white oak forest community is found throughout the northern and central midwestern United States and adjacent Canada. Stands occur on dry to dry-mesic mid to upper slopes and terraces where soils are more sandy and/or rocky. Bedrock is sandstone, siltstone, chert, or shale, and northward is covered by thin loess or glacial till. Trees in this community often have moderate to short trunks and spreading crowns, and canopy can vary from open to closed (50-100 %). *Quercus velutina*, *Quercus alba*, *Carya glabra*, and *Carya ovata* are typical tree dominants. Associated oaks can include *Quercus ellipsoidalis* (northward), *Quercus muehlenbergii*, and southward, *Quercus coccinea*, *Quercus prinus*, and *Quercus stellata*. Typical shrubs and small trees include *Cornus florida* (southward), *Cornus foemina*, *Corylus americana* (northward), *Ostrya virginiana*, and *Sassafras albidum*. Vines include *Toxicodendron radicans*, *Parthenocissus quinquefolia*, and *Vitis* spp. The herbaceous layer can include *Agrimonia gryposepala*, *Agrimonia rostellata*, *Amphicarpaea bracteata*, *Botrychium virginianum*, *Carex blanda*, *Carex pensylvanica*, *Desmodium glutinosum*, *Desmodium nudiflorum*, *Dioscorea quaternata*, *Galium circaeans*, *Geranium maculatum*, *Polystichum acrostichoides*, *Maianthemum racemosum*, and *Maianthemum stellatum*, among others. More southern stands may contain *Danthonia spicata*.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is the most common community found in the study area and occurs on all geologic formations. It can occur on summits and shoulders with protected aspects, slopes with protected aspects on the Roubidoux Formation and upper Gasconade Dolomite, and throughout slopes on the lower Gasconade Dolomite. It most frequently occurs on ELT's 4, 2, 6 and 9 (Nigh *et al.*, 2000). Soils tend to be neutral and dry to dry-mesic.

**Global Environment:** This community is often found on ridge crests or upper slopes that are well-drained to excessively drained. Soils are often sandy loam, thin and rocky, with outcroppings of exposed bedrock. Bedrock is sandstone, siltstone, chert, or shale, or northward covered by thin loess or glacial till (Curtis 1959, White and Madany 1978, Nelson 1985).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy is well developed and is consistently greater than 20 meters tall. The understory and shrub layers are complex and well developed. The canopy typically includes a mix of *Quercus velutina*, *Quercus alba*, *Quercus coccinea*, *Quercus stellata*, *Carya alba* (*C. tomentosa*), and *C. glabra* with no one species consistently dominating. *Pinus echinata* may be present in small amounts. More mesic examples may have some *Quercus rubra*, while drier example may have *C. texana*. *Cornus florida* is by far the most common dominant large shrub, followed by *Frangula caroliniana* (= *Rhamnus caroliniana*), *Amelanchier arborea* and, in more mesic pockets, *Corylus americana*. Short shrubs may include *Rhus aromatica* and *Vaccinium stamineum*. *Parthenocissus quinquefolia*, *Rhus radicans*, and *Vitis aestivalis* are all common vines.

The herbaceous layer typically includes a mix of plants that thrive in acidic soils and generalists. It may best be described as lacking a high abundance of species with restrictive ecological needs. Total herbaceous vegetative cover is extremely variable. At the drier, more acidic end, total cover may be below 25 percent, while more mesic types can have over 75 percent cover. *Desmodium nudiflorum* and *Amphicarpa bracteata* are frequently abundant species. Also frequent, but usually in low quantities, are *Aristolochia*

Appendix 15. ONSR USNVC Natural Community Descriptions

*serpentaria*, *Smilacina racemosa*, *Galium circaeans*, *Desmodium dillenii*, *Solidago ulmifolia*, and *Phryma leptostachya*. The most commonly abundant graminoid species are *Panicum boscii* and *Carex nigromarginata*.

**Global Vegetation:** Trees in this community often have moderate to short trunks and spreading crowns, and canopy can vary from open to closed (50-100%). *Quercus velutina*, *Quercus alba*, *Carya glabra*, and *Carya ovata* are typical tree dominants. Associated oaks can include *Quercus ellipsoidalis* (northward), *Quercus muehlenbergii*, and southward, *Quercus coccinea*, *Quercus prinus* and *Quercus stellata*. Typical shrubs and small trees include *Cornus florida* (southward), *Cornus foemina*, *Corylus americana* (northward), *Ostrya virginiana*, and *Sassafras albidum*. Vines include *Toxicodendron radicans*, *Parthenocissus quinquefolia*, and *Vitis* spp. The herbaceous layer can include *Agrimonia gryposepala*, *Agrimonia rostellata*, *Amphicarpaea bracteata*, *Botrychium virginianum*, *Carex blanda*, *Carex pennsylvanica*, *Desmodium glutinosum*, *Desmodium nudiflorum*, *Dioscorea quaternata*, *Galium circaeans*, *Geranium maculatum*, *Polystichum acrostichoides*, *Maianthemum racemosum* (= *Smilacina racemosa*), and *Maianthemum stellatum* (= *Smilacina stellata*), among others (Curtis 1959, White and Madany 1978, Nelson 1985, TNC 1995a).

**MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus velutina</i> , <i>Quercus coccinea</i>
Tree canopy	Needle-leaved evergreen	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cornus florida</i>
Short shrub	Broad-leaved deciduous	<i>Corylus americana</i>
	Vine	<i>Parthenocissus quinquefolia</i>
Herb	Graminoid	<i>Panicum boscii</i> , <i>Carex nigromarginata</i>
Herb	Forb	<i>Desmodium nudiflorum</i> , <i>Amphicarpa bracteata</i>

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Carya alba</i> , <i>Carya glabra</i> , <i>Carya ovalis</i> , <i>Carya ovata</i> , <i>Quercus alba</i> , <i>Quercus velutina</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer saccharum</i> , <i>Sassafras albidum</i>
Shrub/sapling (tall & short)	Vine/Liana	<i>Parthenocissus quinquefolia</i> , <i>Toxicodendron radicans</i> , <i>Vitis vulpina</i>
Tall shrub/sapling	Broad-leaved deciduous tree	<i>Cornus florida</i> , <i>Cornus foemina</i>
Herb	Semi-shrub	<i>Galium circaeans</i>
Herb	Vine/Liana	<i>Amphicarpaea bracteata</i>
Herb	Forb	<i>Agrimonia rostellata</i> , <i>Desmodium nudiflorum</i> , <i>Dioscorea quaternata</i> , <i>Maianthemum racemosum</i> , <i>Maianthemum stellatum</i>
Herb	Graminoid	<i>Carex blanda</i>
Herb	Fern	<i>Botrychium virginianum</i> , <i>Polystichum acrostichoides</i>

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Quercus alba*, *Quercus velutina*, *Quercus coccinea*, *Cornus florida*, *Desmodium nudiflorum*, *Amphicarpa bracteata*, *Panicum boscii*, *Carex nigromarginata*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:** *Agkistrodon contortrix*, *Callirhytis quercuspunctata*, *Caprimulgus vociferus*, *Chionaspis corni*, *Cyanocitta cristata*, *Dendroica cerulea*, *Dryocopus pileatus*, *Eumeces laticeps*, *Eurytides marcellus*, *Glaucomys volans*, *Hylocichla mustelina*, *Lynx rufus*, *Melanerpes carolinus*, *Melanerpes erythrocephalus*, *Meleagris gallopavo*, *Myotis sodalis*, *Nymphalis antiopa*, *Odocoileus virginianus*, *Piranga olivacea*, *Sayornis phoebe*, *Schizura badia*, *Sciurus carolinensis*, *Sciurus niger*, *Tamias striatus*, *Thryothorus ludovicianus*

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4? (3-Oct-1996).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Though apparently intended to describe a glacial till plains forest type, the description in the current USNVC fits well for this Ozark forest that fails to match well to any other existing USNVC description in the Missouri subset (Faber-Langendoen 2001). We do not agree with the comments of the current USNVC description, which suggest that this community may belong in the *Quercus alba-Quercus stellata-Quercus velutina / Schizachyrium scoparium* Woodland (CEGL002150). That type is a woodland type with a more open canopy structure, while the type we encountered is clearly a “forest”.

## Appendix 15. ONSR USNVC Natural Community Descriptions

Nor do we agree that the community described here is a variant of the *Quercus velutina-Quercus coccinea-Carya texana* Ozark Forest (CEGL002399). That type is typically dominated by species that thrive in more acidic soils and tends to have less foliar cover in all strata, while the community described here has a mix of species that includes more generalists with most strata being well developed. That being said, these two communities share many of the same species and are generally similar in structure, such that both field and remote sensing classification of them proved difficult. The USNVC alliance to which these two associations belong (*Quercus velutina-Quercus alba-(Quercus coccinea)* Forest Alliance; I.B.2.N.a) can reasonably be considered the matrix forest of the study area.

**Global Comments:** It is possible that unglaciated stands may differ sufficiently from glaciated stands to warrant separating into two types, but this depends on resolving the types distribution southward. Is there a thin acid soil, non-glaciated type (i.e., *Quercus alba - Carya alba - (Quercus velutina) / Desmodium nudiflorum - (Carex picta)* Forest (CEGL007795)) versus deeper, glacial soil type? This type appears to go as far north as northern Illinois, Indiana, and southern Michigan, and probably into southern Wisconsin in section 222K, but not 222L (H. Dunevitz pers. comm. 2000, E. Epstein pers. comm. 1999). The type concept in Wisconsin remains to be resolved. Indiana suggested that the unglaciated stands have more *Quercus coccinea*. In Michigan this could fit the interlobate region. Types on sand and typically more dominated by *Quercus velutina* are placed in either *Quercus velutina - Quercus alba / Vaccinium (angustifolium, pallidum) / Carex pensylvanica* Forest (CEGL005030) or *Quercus velutina / Carex pensylvanica* Forest (CEGL002078). This type has been described in southern Illinois by Robertson *et al.* (1984), Fralish (1988), and Fralish *et al.* (1991). Braun (1950, p. 145-146) also noted the prominence of black and white oaks in the Ozark Hills and Illinois, the Mammoth Cave area of Kentucky, and throughout the oak - hickory forest region, especially the Mississippi Valley and Prairie Peninsula regions. In Minnesota, the Bigwoods Southeast section may not contain consistent enough black oak to fit this type, but northern pin oak may be common. In the Ozarks this type may exist, but, based on the recommendations from D. Ladd, T. Nigh, D. Zollner, and B. Heumann, stands are placed either in *Quercus alba - Quercus stellata - Quercus velutina / Schizachyrium scoparium* Woodland (CEGL002150) or in *Quercus velutina - Quercus coccinea - Carya texana* Ozark Forest (CEGL002399). *Quercus alba - (Quercus velutina) - Carya ovata / Ostrya virginiana* Forest (CEGL002011) may be equivalent to this type, at least in northern Missouri (M. Leahy pers. comm. 1999)

### Global Similar Associations:

- *Quercus (alba, rubra, velutina) / Cornus florida / Viburnum acerifolium* Forest (CEGL006336)
- *Quercus alba - (Quercus velutina) - Carya ovata / Ostrya virginiana* Forest (CEGL002011)--This more western oak-hickory type is at or near the range limits of white, black and red oak, and only shagbark hickory is present.
- *Quercus alba - Carya alba - (Quercus velutina) / Desmodium nudiflorum - (Carex picta)* Forest (CEGL007795)
- *Quercus alba - Carya alba / Ostrya virginiana / Carex pensylvanica - Schizachyrium scoparium* Forest (CEGL007818)
- *Quercus alba - Quercus rubra - Carya (alba, ovata) / Cornus florida* Acid Forest (CEGL002067)--can also be found under environmental conditions which support this community.
- *Quercus alba - Quercus rubra - Quercus muehlenbergii / Cercis canadensis* Forest (CEGL002070)
- *Quercus alba - Quercus stellata - Quercus velutina / Schizachyrium scoparium* Woodland (CEGL002150)
- *Quercus falcata - Quercus alba - Quercus stellata - Quercus velutina* Forest (CEGL005018)--is restricted to sandy loam soils in the Interior Low Plateau and Appalachian Plateau.
- *Quercus rubra - Quercus alba - (Quercus velutina, Acer rubrum) / Viburnum acerifolium* Forest (CEGL002462)
- *Quercus velutina - Carya (alba, glabra) / Vaccinium arboreum* Forest (CEGL004987)
- *Quercus velutina - Quercus alba / Vaccinium (angustifolium, pallidum) / Carex pensylvanica* Forest (CEGL005030)--is typically on deep sandy substrates.
- *Quercus velutina - Quercus coccinea - Carya texana* Ozark Forest (CEGL002399)
- *Quercus velutina / Carex pensylvanica* Forest (CEGL002078)--found on deeper sands, more mono-dominant.

### Global Related Concepts:

- *Quercus velutina - Quercus alba* upper slope community type (Robertson *et al.* 1984) =
- Black Oak: 110 (Eyre 1980) B
- Dry Forest, Dry Acid (Chert, Igneous, Sandstone) Forest (Nelson 1985) ?
- Dry-mesic Upland Forest (White and Madany 1978) B
- Eastern Broadleaf Forests: 100: Oak-Hickory Forest (*Quercus-Carya*) (Kuchler 1964) B
- Oak-Hickory Forests (Anderson 1996) B
- Southern Dry Forest (Curtis 1959) =
- T1B4aII4c. *Quercus alba - Quercus velutina - Quercus falcata* (Foti *et al.* 1994) ?
- Terrestrial: Forest: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: I.B.3a (UNESCO 1973) B
- White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980) B
- White Oak-Black Oak-Hickory Association (Gordon 1969) =
- White Oak: 53 (Eyre 1980) B

## OTHER COMMENTS

### Other Comments:

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is the most common in the park. It most frequently occurs in protected slopes on the Roubidoux Formation and upper Gasconade Dolomite (ELT's 4 and 2).

**Global Range:** This oak forest community is found throughout the northern and central midwestern United States and adjacent Canada, ranging from Ohio and Ontario, west to possibly southern Wisconsin, south to northern Missouri, and east to Indiana and possibly Kentucky. This community tends to occur on sandy loam soils and middle slope positions in the central United States and on upland sandy-sandy loam soils in the north. Its distribution throughout this region is not clear.

**Nations:** CA, US

**States/Provinces:** AR?, IA?, IL, IN, KY?, MI, MO, OH, ON

**USFS Ecoregions:** 221:P, 222Ca:CCC, 222De:CCC, 222Df:CCC, 222Dh:CCP, 222Di:CCP, 222Ek:CCC, 222Em:CCC, 222Fe:CCC, 222Ga:CCC, 222Gb:CCC, 222Gd:CCC, 222Ha:CCC, 222Hb:CCP, 222Hf:CCP, 222Jb:CCP, 222Jg:CCC, 222Jh:CCC, 222Ji:CCP, 222Jj:CCC, 222Kf:CCC, 222Kj:CCC, 231:C, 251Cf:CCC, 251Ci:CCC, 251Cj:CCC, 251Ck:CCC, 251Dc:CCC, 251Dd:CCC, 251Df:CCC, 251Dh:CCP

**Federal Lands:** NPS (Mammoth Cave, Ozark)

### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** ECS\_AS02, ECS\_AS03, ECS\_AS25, ECS\_AS27, ECS\_AS28, ECS\_AS30, ECS\_AS32, ECS\_AS33, ECS\_AS36, ECS\_AS41, ECS\_AS53, ECS\_AS57, ECS\_AS58, ECS\_AS59, ECS\_AS60, ECS\_AS67, ECS\_AS68, ECS\_AS69, ECS\_AS71, ECS\_AS72, ECS\_AS73, ECS\_AS74, ECS\_AS77, ECS\_AS78, ECS\_AS82, ECS\_AS83, ECS\_AS84, ECS\_AS85, ECS\_AS86, ECS\_AS87, ECS\_AS88, ECS\_AS89, ECS\_AS90, ECS\_AS91, ECS\_AS96, ECS\_BS27, ECS\_BS30, ECS\_BS34, ECS\_BS35, ECS\_BS48, ECS\_BS52, ECS\_BS66, ECS\_BS67, ECS\_BS73, ECS\_BS75, ECS\_BS81, ECS\_FL21, ECS\_FL23, ECS\_FL33, ECS\_FL41, ECS\_FL64, ECS\_FL68, ECS\_FL70, PM\_08\_02

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** M. Guetersloh

**References:** Anderson 1996, Braun 1950, Clark and Hutchinson 1994, Curtis 1959, Dunevitz 2000, Epstien 2000, Eyre 1980, Faber-Langendoen 2001, Faircloth 1971, Foti 1994, Foti *et al.* 1994, Fralish 1987, Fralish 1988, Fralish *et al.* 1991, Gordon 1969, INNAI unpubl. data, Illinois Nature Preserve Commission 1973, Jenkins and Pallardy 1993, Kuchler 1964, McNab and Avers 1994, Midwestern Ecology Working Group n.d., Mohlenbrock 1986, Nelson 1985, Nigh *et al.* 2000, Robertson *et al.* 1984, SAF 1967, TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, Wharton 1989, White and Madany 1978



**Figure 20.** A typical example of a Black Oak-White Oak-(Pignut Hickory, Shagbark Hickory) Forest (CEGL002076). Note the moderately sparse groundflora and the nearly complete cover by dogwood that tends to block visibility of the canopy.



**Figure 21. Another excellent example of a Black Oak-White Oak-(Pignut Hickory, Shagbark Hickory) Forest (CEGL002076). Note again the nearly complete cover by dogwood. Here, the groundflora layer is much denser than in the previous example.**



**Figure 22. A somewhat dense example of a Black Oak-White Oak-(Pignut Hickory, Shagbark Hickory) Forest (CEGL002076). High shrub density is likely a function of water availability in this example.**

## ***Quercus velutina* - *Quercus coccinea* - *Carya texana* Ozark Forest**

**Black Oak - Scarlet Oak - Black Hickory Ozark Forest**

**Ozark Black Oak - Scarlet Oak Forest**

**Identifier: CEGL002399**

### **USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus velutina</i> - <i>Quercus alba</i> - ( <i>Quercus coccinea</i> ) Forest Alliance (A.1911)
Alliance (English name)	Black Oak - White Oak - (Scarlet Oak) Forest Alliance
Association	<i>Quercus velutina</i> - <i>Quercus coccinea</i> - <i>Carya texana</i> Ozark Forest
Association (English name)	Black Oak - Scarlet Oak - Black Hickory Ozark Forest
Association (Common name)	Ozark Black Oak - Scarlet Oak Forest

### **Ecological System(s):**

**ONSR Community Type:** Mixed Oak-Hickory Forests

**ONSR Ecological System:** Upland Oak Forests

**Global Ecological System:** Ozark-Ouachita Dry Oak Woodland (CES202.707)

### **ELEMENT CONCEPT**

**Global Summary:** This oak - hickory forest community is found in the United States in the Ozarks of southeastern Missouri and possibly northeastern Arkansas. Stands occur on dry slopes, with thin soils and primarily a cherty bedrock near the surface. The canopy is dominated by *Quercus velutina*, *Quercus coccinea*, and *Carya texana*. Other associates and understory characteristics have yet to be described, but *Quercus alba* may also be present, along with minor amounts of *Pinus echinata* and shrubs such as *Vaccinium arboreum*. Sources indicate that this type primarily occurs on former *Pinus echinata* woodland sites that were completely logged, then grazed and burned, leading to a degraded oak forest.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a common community found primarily on the Roubidoux Formation and upper Gasconade Dolomite. It most frequently occurs on dry, acid-soil summits, shoulders, and slopes with exposed aspects (ELT's 2 and 3; Nigh *et al.*, 2000). Soils are generally acidic.

**Global Environment:** Stands occur on dry slopes, with thin soils (15-40 cm deep), with primarily a cherty bedrock near the surface (Nelson 1985).

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** Canopy structure is relatively open, usually between 60 and 80 percent, though tends to be fully developed and greater than 15 meters in height. This community can occasionally meet the canopy cover criterion established for woodland communities. The canopy typically includes a mix of *Quercus velutina* and *Quercus coccinea*. *Pinus echinata*, *Quercus stellata*, and *Quercus alba* are frequent components in low quantities. *Carya texana* is abundant, but will frequently be limited to the subcanopy or tall shrub layers. The tall shrub layer is usually dominated by *Cornus florida* and *Sassafras albidum*, though neither is particularly diagnostic nor should these provide much cover. Diagnostic tall shrubs may include *Ulmus alata*, *Rhus copallina*, *Rhus glabra*, and *Vaccinium arboreum*. Diagnostic short shrubs include *Vaccinium stamineum* and *Vaccinium vacillans*. Common woody vines include *Parthenocissus quinquefolia* and *Smilax bona-nox*, though neither is diagnostic.

The herbaceous layer is typically sparse (<25 percent) and includes plants that thrive in acidic soils. The most common diagnostic graminoid species are *Carex nigromarginata*, *Carex umbellata*, *Panicum linearifolium*, *Danthonia spicata*, and *Panicum commutatum* var. *hispidum*. Common diagnostic forbs include *Tephrosia virginiana*, *Lespedeza repens*, *Lespedeza procumbens*, *Desmodium rotundifolium*, *Antennaria plantaginifolia*, and *Desmodium nuttallii*. Less common diagnostic include *Desmodium laevigatum*, *Cunila origanoides*, *Coreopsis palmata*, *Baptisia leucophaea*, *Aster patens*, *Schizachyrium scoparium*, *Andropogon gerardii*, *Parthenium integrifolium*, *Lespedeza hirta*, *Krigia biflora*, and *Hieracium gronovii*.

**Global Vegetation:** The canopy is dominated by *Quercus velutina*, *Quercus coccinea*, and *Carya texana*. Other associates and understory characteristics have yet to be described, but *Quercus alba* may also be present, along with minor amounts of *Pinus echinata* and shrubs such as *Vaccinium arboreum* (Nelson 1985).

### **MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

## Appendix 15. ONSR USNVC Natural Community Descriptions

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus velutina</i> , <i>Quercus coccinea</i>
Tree canopy	Needle-leaved evergreen	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cornus florida</i> , <i>Carya texana</i> , <i>Sassafras albidum</i>
Short shrub	Broad-leaved deciduous	<i>Vaccinium stamineum</i>
	Vine	<i>Smilax bona-nox</i>
Herb	Graminoid	<i>Carex nigromarginata</i> , <i>Panicum linearifolium</i>
Herb	Forb	<i>Desmodium nudiflorum</i>

### Global Stratum

### Lifeform

### Species

#### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Quercus velutina*, *Quercus coccinea*, *Carya texana*, *Vaccinium arboreum*, *Vaccinium stamineum*, *Vaccinium vacillans*, *Carex nigromarginata*, *Panicum linearifolium*, *Danthonia spicata*, *Tephrosia virginica*, *Cunila origanoides*, *Desmodium laevigatum*, *Aster patens*

**Global:**

#### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** GNR (3-Oct-1996). Pending further historical review, this type may need to be treated as a semi-natural type, as it may only have originated following heavy logging of shortleaf pine-oak forest sites followed by grazing and burning, before abandonment.

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** Where *Quercus stellata* is a significant component of the overstory, a better classification would be either the *Quercus stellata-Quercus marilandica-Carya (glabra, texana) / Vaccinium arboreum* Forest (CEGL002075) if the community is forested or the *Quercus stellata-Quercus marilandica-Quercus velutina-Carya texana / Schizachyrium scoparium* Woodland (CEGL002149) if woodland-like in structure. (Canopy cover can frequently approach 60 percent, suggesting the latter woodland type.) These communities are uncommon and should have a significant warm-season grass component in the groundflora, while the type described here has only a small warm-season grass component.

At the mesic end of its expression, this type begins to resemble the *Quercus velutina-Quercus alba-Carya (glabra, ovata)* Forest (CEGL002076) as we have applied to this study area. The community described here should be comparatively open throughout all vegetative strata, except where tree falls have created openings that allow light to reach the lower strata.

**Global Comments:** Little is known about this type and further work is needed to characterize its composition. The type is narrowly circumscribed by the western limits of *Quercus coccinea* and the eastern limits of *Carya texana*. It is possible that this type, along with the unglaciated portions of *Quercus velutina - Quercus alba - Carya (glabra, ovata)* Forest (CEGL002076), could be combined into one type. *Quercus coccinea* could have served as a differential in this regard, but it is taxonomically problematic, and its distribution, once restricted more-or-less south of glaciation, has recently been broadened northward by the Flora of North American treatment. *Vaccinium arboreum* is another potential differential species for the possible unglaciated type, but its presence in black oak - white oak stands in Illinois and Indiana needs to be checked. This type may historically have been a *Pinus echinata - Quercus alba / Schizachyrium scoparium* Woodland (CEGL002394) prior to human impacts.

#### **Global Similar Associations:**

- *Pinus echinata - Quercus alba / Schizachyrium scoparium* Woodland (CEGL002394)
- *Quercus velutina - Carya (alba, glabra) / Vaccinium arboreum* Forest (CEGL004987)
- *Quercus velutina - Quercus alba - Carya (glabra, ovata)* Forest (CEGL002076)

#### **Global Related Concepts:**

#### OTHER COMMENTS

**Other Comments:**

#### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is common in the park. It most frequently occurs on summits and exposed shoulders and slopes on the Roubidoux Formation and upper Gasconade Dolomite (ELT's 2 and 3; Nigh *et al.*, 2000).

**Global Range:** This oak-hickory forest community is found in the Ozarks of southeastern Missouri and possibly northeastern Arkansas.

**Nations:** US

**States/Provinces:** AR?, MO

**USFS Ecoregions:** 222Aa:CCC, 222Ab:CCP, 222Ad:CCP, 222Ae:CCP, 222Af:CCP, 222Ag:CCP, 222Aj:CCP, 222Am:CCP



**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** ECS\_AS29, ECS\_AS35, ECS\_AS49, ECS\_AS50, ECS\_AS70, ECS\_AS79, ECS\_AS81, ECS\_AS92, ECS\_AS93, ECS\_BS28, ECS\_BS44, ECS\_BS45, ECS\_BS78, ECS\_BS83, ECS\_BS89, ECS\_FL77, ECS\_FL78, PM\_08\_18, PM\_19\_11

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Leahy 1999 pers. comm., Nigh *et al.* 2000, Midwestern Ecology Working Group n.d., Nelson 1985



**Figure 23.** A typical example of a Black Oak-Scarlet Oak-Black Hickory Ozark Forest (CEGL002399) on a summit. Where this community occurs on flat terrain, it may have a denser shrub layer, however, it should still be dominated by plants that like acidic soils.



**Figure 24.** An excellent example of a Black Oak-Scarlet Oak-Black Hickory Ozark Forest (CEGL002399).



**Figure 25. When a Black Oak-Scarlet Oak-Black Hickory Ozark Forest (CEGL002399) is as dense as this in the shrub layer, it might better be classified as a Black Oak-White Oak-(Pignut Hickory, Shagbark Hickory) Forest (CEGL002076). However, the community shown here will lack white oak in the canopy and should be dominated by plants that thrive in acidic soils.**



**Figure 26. This Black Oak-Scarlet Oak-Black Hickory Ozark Forest (CEGL002399) has heavy shading due to significant cover provided by white oaks in the subcanopy. However, shrubs are only moderately dense, and herbaceous cover in the groundflora is sparse.**

***Acer negundo* Forest****Box-elder Forest****Box-elder Floodplain Forest****Identifier:** CEGL005033**USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Temporarily flooded cold-deciduous forest (I.B.2.N.d.)
Alliance	<i>Acer negundo</i> Temporarily Flooded Forest Alliance (A.278)
Alliance (English name)	Box-elder Temporarily Flooded Forest Alliance
Association	<i>Acer negundo</i> Forest
Association (English name)	Box-elder Forest
Association (Common name)	Box-elder Floodplain Forest

**Ecological System(s):****ONSR Community Type:** Riverfront and Bottomland Forests**ONSR Ecological System:** Bottomland Forests

**Global Ecological System:** Central Appalachian Floodplain (CES202.608)  
 East Gulf Coastal Plain Large River Floodplain Forest (CES203.489)  
 Mississippi River Riparian Forest (CES203.190)  
 South-Central Interior Large Floodplain (CES202.705)  
 Atlantic Coastal Plain Large River Floodplain Forest (CES203.066)

**ELEMENT CONCEPT**

**Global Summary:** This box-elder floodplain forest is found on floodplains in the southern, eastern, and midwestern United States. Stands occur on large rivers in the active floodplain and on sandbars, and may form farther from the riverfront following disturbance. They are typically temporarily flooded in the spring. These early successional forests are dominated by *Acer negundo*. Other characteristic species include *Platanus occidentalis*, *Celtis laevigata*, *Acer rubrum*, *Liquidambar styraciflua*, *Acer saccharinum*, *Ulmus alata*, *Ulmus rubra*, *Carpinus caroliniana*, *Morus rubra*, and *Populus deltoides*. The shrub and herb layers range from sparse to relatively lush, and the vine component often is heavy. The range, dynamics, and variability of this type is complicated by the 'weedy' nature of *Acer negundo*. For example, disturbed stands in the *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis (occidentalis, laevigata)* Temporarily Flooded Forest Alliance (A.286) often become dominated by *Acer negundo*. In Kentucky, *Acer negundo* may also dominate in old fields, with *Dichanthelium clandestinum* and *Carex* spp. in the ground layer.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** This is a common community occurring on generally flat floodplains that receive annual flooding (ELT's 15 and 16; Nigh *et al.*, 2000). Surface soils tend to be sandy or silty and are generally basic. Though we did not specifically measure subsurface soils, we suspect they may be compacted due to past grazing in the floodplains and that this community represents a disturbed type within the study area

**Global Environment:** Stands occur on large rivers in the active floodplain and on sandbars, and may form farther from the riverfront following disturbance. They are typically temporarily flooded in the spring. In Kentucky, these forests may also occur in old fields.

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy is closed and typically uniform in height at about 10-15 meters. It is dominated by *Acer negundo* with lesser amounts of *Ulmus americana* and *Celtis occidentalis*. *Platanus occidentalis* may be part of the canopy or may be a common emergent tree. Later successional trees such as *Fraxinus* spp., *Juglans* spp., *Quercus* spp., and *Carya cordiformis* may be present in low quantities and should not form a significant part of the canopy or understory. The most common diagnostic shrub species is *Asimina triloba*, with lesser amounts of *Lindera benzoin*. Other shrub species may include *Aesculus glabra*, *Staphylea trifolia*, and *Ptelea trifoliata* in small quantities. *Parthenocissus quinquefolia* and *Smilax tamnoides* are common woody vines. Common herbaceous groundflora include *Laportea canadensis*, *Elymus virginicus*, *Viola striata*, *Rudbeckia laciniata*, and *Polygonum virginianum*. These are good diagnostic species, though may not help to distinguish this community from other floodplain forest types.

**Global Vegetation:** These early successional forests are dominated by *Acer negundo*. Other characteristic species include *Platanus occidentalis*, *Celtis laevigata*, *Acer rubrum*, *Liquidambar styraciflua*, *Acer saccharinum*, *Ulmus alata*, *Ulmus rubra*, *Carpinus caroliniana*, *Morus rubra*, and *Populus deltoides*. The shrub and herb layers range from sparse to relatively lush, and the vine component often is heavy. The range, dynamics, and variability of this type are complicated by the 'weedy' nature of *Acer negundo*,

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e.g., in Kentucky, *Acer negundo* may be dominant in old fields, with *Dichanthelium clandestinum* and *Carex* spp. in the ground layer. Elsewhere in the Midwest, logged and grazed stands of *Fraxinus pennsylvanica* and *Ulmus americana* may be dominated by *Acer negundo*.

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Acer negundo</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Asimina triloba</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i>
	Vine	<i>Parthenocissus quinquefolia</i>
Herb	Graminoid	<i>Elymus virginicus</i>
Herb	Forb	<i>Laportea canadensis</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Acer negundo*, *Asimina triloba*, *Lindera benzoin*, *Smilax tamnoides*, *Laportea canadensis*, *Elymus virginicus*, *Viola striata*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4G5 (28-Mar-2003). As currently defined this is a broad-ranging community type. However, the range, dynamics, and variability of this type is complicated by the "weedy" nature of *Acer negundo*. More information may be needed to clarify the extent to which this type represents purely natural vegetation. Some stands may develop following disturbance of other natural bottomland communities.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Within the study area, this type probably occurs exclusively on former grazing lands that may or may not have been cleared of trees. Nearly all examples include a high abundance of species that thrive in response to those human activities. As such, most exhibit the "beaten" appearance common to other deciduous old fields in the area. Frequently, they are encircled by rusting fences. Within the field key developed for this study, this community can be found in both the "natural" and "significantly altered" sections.

**Global Comments:** The range, dynamics, and variability of this type is complicated by the 'weedy' nature of *Acer negundo*. For example, disturbed stands in the *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis (occidentalis, laevigata)* Temporarily Flooded Forest Alliance (A.286) often become dominated by *Acer negundo*. And in the upper Midwest *Acer negundo*-dominated stands are treated as part of the *Fraxinus pennsylvanica* - (*Ulmus americana*) / *Symphoricarpos occidentalis* Forest (CEGL002088). Thus, some consistency is needed in the application of this type across its range. In Arkansas, these forests can be pure *Acer negundo* or have *Acer rubrum* and *Platanus occidentalis* as associates (T. Foti pers. comm. 1999). Composition is variable. In central Kentucky, a simple strip of *Acer negundo* and *Platanus occidentalis*, plus *Ulmus americana*, etc., is common along all medium-sized streams, with almost no *Acer saccharinum* or *Populus deltoides* (J. Campbell pers. comm. 1999). This type occurs along the Arkansas River in Arkansas (D. Zollner pers. comm. 1999). In Missouri, stands would probably be combined with *Betula nigra* - *Platanus occidentalis* Forest (CEGL002086) (M. Leahy pers. comm. 1999). In Kentucky, this may be found at the Licking River impoundment (Cave Run Lake).

#### Global Similar Associations:

- *Acer negundo* - (*Platanus occidentalis*, *Populus deltoides*) Forest (CEGL004690)
- *Betula nigra* - *Platanus occidentalis* Forest (CEGL002086)
- *Fraxinus pennsylvanica* - (*Ulmus americana*) / *Symphoricarpos occidentalis* Forest (CEGL002088)
- *Fraxinus pennsylvanica* - *Ulmus americana* - (*Acer negundo*, *Tilia americana*) Northern Forest (CEGL002089)
- *Fraxinus pennsylvanica* - *Ulmus* spp. - *Celtis occidentalis* Forest (CEGL002014)

#### Global Related Concepts:

### OTHER COMMENTS

**Other Comments:**

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is common in the park. It occurs on flat to gently undulating floodplains that receive annual flooding (ELT's 15 and 16; Nigh *et al.*, 2000). Its presence may be tied to past grazing practices, which would explain its restriction to fairly stable floodplains where grazing would have been feasible.

**Global Range:** This *Acer negundo* floodplain forest is found sporadically on floodplains in the southern, eastern, and midwestern United States, ranging from Maryland west to Iowa (and possibly southeastern South Dakota), south to Louisiana and possibly Texas, and east to Georgia.

**Nations:** US

**States/Provinces:** AL, AR, DE, GA, IA, KY, LA, MD, MO, MS, NJ, OK, PA, SC, SD?, TN, TX?, VA, WV

**USFS Ecoregions:** 221Ha:CC?, 221Hc:CC?, 221Hd:CC?, 221He:CC?, 221Ja:CP?, 221Jb:CP?, 221Jc:CP?, 222Ca:CC?, 222Cb:CC?, 222Cd:CC?, 222Ce:CC?, 222Cf:CC?, 222Cg:CCC, 222Ch:CC?, 222Ea:CCP, 222Eb:CCP, 222Ec:CCP, 222Ed:CCP, 222Ee:CCP, 222Ef:CCP, 222Eg:CCP, 222Eh:CCP, 222Ei:CCP, 222Ej:CCP, 222Ek:CCP, 222En:CCP, 222Eo:CCC, 222Fa:CP?, 222Fb:CP?, 222Fc:CP?, 222Fd:CP?, 222Ff:CP?, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCP, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCC, 231Bi:CCP, 231Bj:CCP, 231Bk:CCP, 231Bl:CCP, 231Ca:CCP, 231Cb:CCP, 231Cc:CCP, 231Cd:CCC, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCP, 231Db:CCP, 231Dc:CCP, 231Dd:CCP, 231De:CCP, 231Ea:CC?, 231Eb:CCP, 231Ec:CC?, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ei:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:C??, 231Fb:C??, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ac:CCC, 234Aa:CCC, 234Ab:CCC, 234Ac:CCC, 234Ad:CCC, 234Ae:CCC, 234Af:CCC, 234Ag:CCC, 234Ah:CCC, 234Ai:CCC, 234Aj:CCC, 234Ak:CCC, 234Al:CCC, 234Am:CCC, 234An:CCC

**Federal Lands:** NPS (Mammoth Cave, Natchez Trace, Ozark, Shiloh, Vicksburg); USFS (Daniel Boone, St. Francis); USFWS (Little River)

### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_14-16\_06, BS\_17\_06, PM\_14-16\_14, PM\_17\_03, PM\_17\_17, RIP\_AS1a, RIP\_AS2B, RIP\_BC1B, RIP\_TR1B, RIP\_TR2A

**Local Description Authors:** M. Struckhoff

**Global Description Authors:**

**References:** Blair 1938, Campbell 1999, Fleming *et al.* 2001, Foti 1999, Hoagland 2000, INNAI unpubl. data, Leahy 1999, Nigh *et al.* 2000, Patterson and DeSelm 1989, Southeastern Ecology Working Group n.d., TNDH unpubl. data, Zollner 1999.



**Figure 27.** An excellent example of a Box Elder Forest (CEGL005033). Note the uniform, short tree growth over a relatively species poor herbaceous layer. In this example the shrub layer is moderately developed, though it can be quite thick.



**Figure 28. This Box Elder Forest (CEGL005033) exhibits a denser shrub layer. Note the abundance of vines and stinging nettle (*Laportea canadense*).**



**Figure 29. This photo includes all of the classic indicators of a Box Elder Forest (CEGL005033); Short, uniform growth of a box elder and hackberry dominated canopy, abundant vines, variable shrub density, and a species poor herbaceous layers dominated by stinging nettle and wild rye.**



**Figure 30. This Box Elder Forest (CEGL005033) included an emergent layer of sycamore, a feature that is typical for this community.**

***Acer (saccharum, barbatum) - Quercus rubra - Carya cordiformis / Asimina triloba* Forest**  
**(Sugar Maple, Southern Sugar Maple) - Northern Red Oak - Bitternut Hickory / Common Pawpaw Forest**  
**Sugar Maple - Oak - Bitternut Hickory Mesic Bottomland Forest**  
**Identifier: CEG002060**

**USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Temporarily flooded cold-deciduous forest (I.B.2.N.d.)
Alliance	<i>Acer saccharum - Carya cordiformis</i> Temporarily Flooded Forest Alliance (A.302)
Alliance (English name)	Sugar Maple - Bitternut Hickory Temporarily Flooded Forest Alliance
Association	<i>Acer (saccharum, barbatum) - Quercus rubra - Carya cordiformis / Asimina triloba</i> Forest
Association (English name)	(Sugar Maple, Southern Sugar Maple) - Northern Red Oak - Bitternut Hickory / Common Pawpaw Forest
Association (Common name)	Sugar Maple - Oak - Bitternut Hickory Mesic Bottomland Forest

**Ecological System(s):**

<b>ONSR Community Type:</b>	Mixed Hardwood Mesic Bottomland Forests
<b>ONSR Ecological System:</b>	Bottomland Forests
<b>Global Ecological System:</b>	Ozark-Ouachita Mesic Hardwood Forest (CES202.043) Ozark-Ouachita Riparian (CES202.703)

**ELEMENT CONCEPT**

**Global Summary:** This dry-mesic to mesic bottomland forest is found in the south-central United States, especially in the Ozark/Ouachita regions. Stands are largely restricted to narrow valleys and floodplains of small to medium-sized, high-energy streams in hilly topography. Soils are well-drained to moderately drained, somewhat deep (40-100 cm) to very deep (>100 cm). Parent material in dry-mesic bottomlands is alluvium, often with massive, but scattered, deposits of gravel and boulders. Overstory canopy is generally open because of flash flooding, but on more mesic sites it may be closed. The understory is open and weakly structured in dry-mesic sites, but more closed in mesic ones. The tree layer is dominated by *Acer saccharum*, *Carya cordiformis*, *Celtis occidentalis*, *Fraxinus americana*, *Quercus alba*, and *Quercus rubra*. Associates include *Juglans nigra*, *Liquidambar styraciflua*, and *Platanus occidentalis*. Stands in the Ouachita Mountains contain *Acer barbatum* as a codominant instead of *Acer saccharum*. Subcanopy trees include *Aesculus glabra*, *Carpinus caroliniana*, *Cornus florida*, *Diospyros virginiana*, and *Ostrya virginiana*. The shrub layer includes *Asimina triloba*, *Corylus americana*, *Dirca palustris*, *Hypericum prolificum* (= *Hypericum spathulatum*), and *Lindera benzoin*. Vines such as *Vitis riparia* may be present. The herbaceous layer, which ranges from more open in dry-mesic sites to more closed in mesic ones, is quite diverse. Species present, as described from Missouri, include *Anemone canadensis*, *Aplectrum hyemale*, *Arundinaria gigantea*, *Campanulastrum americanum* (= *Campanula americana*), *Carex davisii*, *Carex jamesii*, *Cystopteris fragilis*, *Elephantopus carolinianus*, *Erythronium albidum*, *Enemion biternatum*, *Mertensia virginica*, *Nothoscordum bivalve*, *Phacelia ranunculacea*, *Scrophularia marilandica*, *Silene nivea*, *Tradescantia subaspera* and *Viola striata*. In Oklahoma, other characteristic species are *Celtis laevigata*, *Elymus virginicus*, *Euonymus atropurpurea*, *Ilex decidua*, *Sapindus saponaria* var. *drummondii*, and *Staphylea trifolia*.

**ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** This community is rare and occurs on floodplains and terraces along the main rivers (ELT 14; Nigh *et al.*, 2000). Flooding occurs annually to once every ten years.

**Global Environment:** This type is largely restricted to narrow valleys and floodplains of small to medium-sized, high-energy streams in hilly topography. During heavy rainstorms, rapid watershed drainage results in high-velocity stream waters. Soils are well-drained to moderately drained, somewhat deep (40-100 cm) to very deep (>100 cm), with soils generally moist through much of the year. Parent material in dry-mesic bottomlands is alluvium, often with massive, but scattered, deposits of gravel and boulders (Nelson 1985).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy is full and typically exceeds 20 meters in height. It is dominated by species that thrive in mesic conditions such as *Carya cordiformis*, *Juglans nigra*, and *Fraxinus* spp. Oak species may include *Quercus macrocarpa*, *Quercus rubra*, or *Quercus alba*. Good diagnostics for this community are *Acer saccharum*, *Tilia americana*, and *Aesculus glabra*, though these may be minimally represented in the canopy. *Acer saccharum* will frequently be abundant in the subcanopy or tall shrub layers. Diagnostic shrub species include *Lindera benzoin*, *Asimina triloba*, *Aesculus glabra*, and *Carpinus caroliniana*. *Smilax* spp. and *Parthenocissus quinquefolia* are common vines. Diagnostic herbaceous species include *Hydrophyllum*



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*virginianum* or any other member of the family Hydrophyllaceae, *Elymus virginicus*, *Stylophorum diphyllum*, *Osmorhiza* spp., *Viola striata*, and *Viola pensylvanica*. Other common species include *Asarum canadense*, *Circaea quadrisulcata*, *Verbesina alternifolia*, and *Carex blanda*.

**Global Vegetation:** Overstory canopy is generally open because of flash flooding, but on more mesic sites it may be closed. The understory is open and weakly structured in dry-mesic sites, but more closed in mesic ones. The tree layer is dominated by *Acer saccharum*, *Carya cordiformis*, *Celtis occidentalis*, *Quercus alba*, and *Quercus rubra*. Associates include *Juglans nigra*, *Liquidambar styraciflua*, and *Platanus occidentalis*. Stands in the Ouachita Mountains contain *Acer barbatum* as a codominant instead of *Acer saccharum*. Subcanopy trees include *Aesculus glabra*, *Carpinus caroliniana*, *Cornus florida*, *Diospyros virginiana*, and *Ostrya virginiana*. The shrub layer includes *Asimina triloba*, *Corylus americana*, *Dirca palustris*, *Hypericum prolificum* (= *Hypericum spathulatum*), and *Lindera benzoin*. Vines, such as *Vitis riparia*, may be present. The herbaceous layer, which ranges from more open in dry-mesic sites to more closed in mesic ones, is quite diverse. Species present, as described from Missouri, include *Anemone canadensis*, *Aplectrum hyemale*, *Arundinaria gigantea*, *Campanulastrum americanum* (= *Campanula americana*), *Carex davisii*, *Carex jamesii*, *Cystopteris fragilis*, *Elephantopus carolinianus*, *Erythronium albidum*, *Enemion biternatum* (= *Isopyrum biternatum*), *Mertensia virginica*, *Nothoscordum bivalve*, *Phacelia ranunculacea*, *Scrophularia marilandica*, *Silene nivea*, *Tradescantia subaspera*, and *Viola striata* (Nelson 1985). In Oklahoma, other characteristic species are *Celtis laevigata*, *Elymus virginicus*, *Euonymus atropurpurea*, *Ilex decidua*, *Sapindus saponaria* var. *drummondii*, and *Staphylea trifolia*.

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Carya Cordiformis</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Asimina triloba</i> , <i>Carpinus caroliniana</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i>
	Vine	<i>Smilax</i> spp.
Herb	Graminoid	<i>Carex jamesii</i> , <i>Elymus virginicus</i>
Herb	Forb	<i>Sanicula gregaria</i> , <i>Verbesina alternifolia</i> , <i>Viola striata</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Carya cordiformis*, *Acer saccharum*, *Asimina triloba*, *Lindera benzoin*, *Hydrophyllum* spp., *Osmorhiza* spp., *Stylophorum diphyllum*, *Viola striata*, *Viola pensylvanica*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G3 (31-Mar-2000). The total number of occurrences is unknown. Eight have been documented in Missouri, where the community is ranked S3,S3. Although no other occurrences have been documented, the community is also reported in Arkansas (S?), Oklahoma (S?), and possibly Kentucky (SP). It is found in 8 ecoregional subsections. This type is largely restricted to narrow valleys and floodplains of small to medium-sized, high-energy streams in hilly topography. Soils are well drained to moderately drained, somewhat deep (40-100 cm) to very deep (>100 cm), with soils generally moist through much of the year. Most sites have been heavily grazed or logged in the past.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** This community shares many elements with the *Quercus alba-Quercus rubra-Acer saccharum-Carya cordiformis / Lindera benzoin* Forest (CEGL002058). The two communities have been separated almost exclusively by landform, with the designation used here reserved for those communities found on floodplains and terraces along the main river stems. This community also shares many features with the *Quercus alba-Quercus rubra-Quercus muehlenbergii / Cercis canadensis* Forest (CEGL002070), but includes more mesic species such as sugar maple, bitternut hickory, basswood, and walnut in the canopy. That type should also occur on low slope and upland waterways and not in the main river floodplains.

This community can be distinguished from both the Sycamore Floodplain Forest (CEGL007334) and the Ash-Oak-Sycamore Floodplain Forest (CEGL002410) by its greater diversity throughout the canopy and by its complex structure. That latter two communities tend to be dominated by *Lindera benzoin* in the shrub layer and *Elymus virginicus*, *Laportea canadense*, *Verbesina alternifolia*, *Viola striata*, and *Viola pensylvanica* in the herbaceous layer. While these same species can also be found in the type described here, they are usually less dominant due to the higher diversity.

**Global Comments:** The concept of this type is derived from Missouri's Dry-mesic and Mesic Bottomland Forest types (Nelson 1985). Dry-mesic stands are more oak-dominated (and may need their own type), mesic stands are more maple-oak-hickory-dominated. See Floodplain equivalent *Acer saccharum - Carya cordiformis / Asimina triloba* Floodplain Forest (CEGL005035). This

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association needs to be distinguished from other western mesophytic forests (M. Evans pers. comm. 1997). Compare to *Acer (nigrum, saccharum) - Carya cordiformis* Forest (CEGL004411). According to Hoagland (1997), this community occurs on mesic slopes and floodplains in the eastern tier of Oklahoma counties (Adair, Cherokee, Delaware, LeFlore, Mayes, McCurtain, Muskogee, Ottawa, and Sequoyah). Compare also to *Liquidambar styraciflua - (Quercus alba, Acer saccharum) / Carpinus caroliniana / Lindera benzoin* Forest (CEGL007826). In Arkansas, this vegetation is closely related to *Quercus alba - Quercus rubra - Acer saccharum - Carya cordiformis / Lindera benzoin* Forest (CEGL002058). Douglas Zollner (pers. comm. 1997) suggests that fire frequency may account for the differences, since *Acer saccharum* is more susceptible to fire. Stands in the Ouachita Mountains contain *Acer barbatum* as a codominant instead of *Acer saccharum* (D. Zollner pers. comm. 1997).

### Global Similar Associations:

- *Acer (nigrum, saccharum) - Carya cordiformis* Forest (CEGL004411)
- *Acer saccharum - Carya cordiformis / Asimina triloba* Floodplain Forest (CEGL005035)
- *Fraxinus pennsylvanica - Celtis* spp. - *Quercus* spp. - *Platanus occidentalis* Bottomland Forest (CEGL002410)
- *Liquidambar styraciflua - (Quercus alba, Acer saccharum) / Carpinus caroliniana / Lindera benzoin* Forest (CEGL007826)
- *Quercus alba - Quercus rubra - Acer saccharum - Carya cordiformis / Lindera benzoin* Forest (CEGL002058)
- *Quercus alba - Quercus rubra - Acer saccharum* Sand Forest (CEGL005187)
- *Quercus rubra - Acer saccharum - Tilia americana* var. *heterophylla - Aesculus flava - (Cladrastis kentukea)* Forest (CEGL007698)

### Global Related Concepts:

## OTHER COMMENTS

### Other Comments:

## ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is very rare and most frequently occurs in small patches on narrow terraces (ELT 14; Nigh *et al.* 2000) along the main rivers. Most historical occurrences of this type were probably converted to agricultural fields. As often as not, remnants of this type can be found on steep, narrow escarpments between high, stable floodplain terraces (usually cleared for agricultural purposes) and lower, more frequently flooded floodplains (which may also have been cleared for agriculture). Most examples display some evidence of past disturbance, usually grazing.

**Global Range:** This dry-mesic to mesic bottomland forest is found in the south-central United States, especially in the Ozark/Ouachita regions.

**Nations:** US

**States/Provinces:** AR, MO, OK

**USFS Ecoregions:** 222Aa:CCC, 222Af:CCC, 222Ag:CCC, 222Aj:CCP, 222Ak:CCP, 222Al:CCC, 222An:CCC, M222:C, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC

**Federal Lands:** NPS (Ozark)

## ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_14-16\_21, BS\_14-16\_02, BS\_14-16\_20, PM\_14-16\_15, PM\_14-16\_20, PM\_14-16\_21, RIP\_TR1A, RIP\_TR1D

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Blair 1938, Evans 1997, Hoagland 2000, Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000, Zollner 1997.



**Figure 31. Typical Sugar Maple-Northern Red Oak-Bitternut Hickory / Common Pawpaw Forest (CEGL002060). Note the large-boled *Acer saccharum* to the right of the photo and the dense, complex understory dominated by *Asimina triloba*.**



**Figure 32. A small example of a Sugar Maple-Northern Red Oak-Bitternut Hickory / Common Pawpaw Forest (CEGL002060). As is often the case, these remnants of mesic bottomland forest occur on escarpments that border and delimit the edges of fields on terraces and high floodplains.**

## ***Fraxinus pennsylvanica* - *Celtis* spp. - *Quercus* spp. - *Platanus occidentalis* Bottomland Forest**

**Green Ash - Hackberry species - Oak species - Sycamore Bottomland Forest**

**Ash - Oak - Sycamore Mesic Bottomland Forest**

**Identifier: CEG002410**

### **USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Temporarily flooded cold-deciduous forest (I.B.2.N.d.)
Alliance	<i>Platanus occidentalis</i> - ( <i>Fraxinus pennsylvanica</i> , <i>Celtis laevigata</i> , <i>Acer saccharinum</i> ) (A.288) Temporarily Flooded Forest Alliance
Alliance (English name)	Sycamore - (Green Ash, Sugarberry, Silver Maple) Temporarily Flooded Forest Alliance Association <i>Fraxinus pennsylvanica</i> - <i>Celtis</i> spp. - <i>Quercus</i> spp. - <i>Platanus occidentalis</i> Bottomland Forest
Association (English name)	Green Ash - Hackberry species - Oak species - Sycamore Bottomland Forest
Association (Common name)	Ash - Oak - Sycamore Mesic Bottomland Forest

### **Ecological System(s):**

**ONSR Community Type:** Riverfront and Bottomland Forests

**ONSR Ecological System:** Bottomland Forests

**Global Ecological System:** North-Central Interior Floodplain (CES202.694)

### **ELEMENT CONCEPT**

**Global Summary:** This ash - oak - sycamore mesic bottomland forest is found in Missouri and possibly other parts of the southeastern United States. Stands occur on level to gently sloping terraces and levees of stream and river floodplains, typically on larger streams. Soils are moderately well-drained and moist throughout the year, but only wet in spring. Ponding is typically absent. The species in the dominant tree layer include *Celtis occidentalis*, *Fraxinus pennsylvanica*, *Platanus occidentalis*, *Quercus macrocarpa* (or more rarely *Quercus alba*). *Laportea canadensis* is common in the ground layer.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** This community is common and occurs on floodplains and terraces along the main rivers (ELT's 15 and 16; Nigh *et al.* 2000). Infrequently, it will occur up the mouth of upland waterways. Flooding occurs annually.

**Global Environment:** Stands of this forest association occur on level to gently sloping terraces and levees of stream and river floodplains, typically on larger streams. Soils are moderately well-drained and moist throughout the year, but only wet in spring. Ponding is typically absent (Nelson 1985).

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The canopy typically exceeds 20 meters in height, with cover greater than 80 percent. It is dominated by *Fraxinus pennsylvanicus*, *Platanus occidentalis*, *Acer negundo*, *Celtis occidentalis*, and *Acer saccharinum*. Oak species may be absent or present in small amount and may include *Quercus macrocarpa*, *Quercus rubra*, or *Quercus alba*. The most commonly abundant shrub species are *Lindera benzoin*, *Asimina triloba*, *Aesculus glabra*, and *Carpinus caroliniana*. *Parthenocissus quinquefolia*, *Vitis* spp., and *Rhus radicans* are common woody vines and may frequently provide significant foliar cover in the canopy. Woody vines commonly found in the groundflora and shrub layers include *Smilax tamnoides*, *Smilax bona-nox*, and *Menispermum canadense*. Common diagnostic herbaceous species include *Elymus virginicus*, *Laportea canadense*, *Diarrhena americana*, *Verbesina alternifolia*, *Rudbeckia laciniata*, *Viola striata*, and *Viola pensylvanica*. Other common species include *Asarum canadense*, *Circaea quadrifida*, and *Carex blanda*.

**Global Vegetation:** The species in the dominant tree layer include *Celtis occidentalis*, *Fraxinus pennsylvanica*, *Platanus occidentalis*, *Quercus macrocarpa* (or more rarely *Quercus alba*). *Laportea canadensis* is common in the ground layer.

### **MOST ABUNDANT SPECIES**

#### **Ozark National Scenic Riverways**

<b><u>Stratum</u></b>	<b><u>Lifeform</u></b>	<b><u>Species</u></b>
Tree canopy	Broad-leaved deciduous tree	<i>Platanus occidentalis</i> , <i>Acer negundo</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Asimina triloba</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i>
	Vine	<i>Parthenocissus quinquefolia</i> , <i>Smilax tamnoides</i> , <i>Rhus radicans</i>

Appendix 15. ONSR USNVC Natural Community Descriptions

Herb	Graminoid	<i>Elymus virginicus</i> , <i>Diarrhena americana</i>
Herb	Forb	<i>Laportea canadense</i> , <i>Verbesina alternifolia</i> , <i>Viola striata</i>

**Global  
Stratum**

**Lifeform**

**Species**

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Fraxinus pennsylvanicus*, *Platanus occidentalis*, *Celtis occidentalis*, *Acer saccharinum*, *Asimina triloba*, *Lindera benzoin*, *Smilax* spp., *Laportea canadense*, *Elymus virginicus*, *Viola striata*, *Viola pensylvanica*, *Rudbeckia laciniata*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:** *Glechoma hederacea* (exotic)

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G3G4 (31-Mar-2000). Most sites have been cleared for agriculture (M. Leahy pers. comm. 1999).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** The presence of ash and oaks separate this community from the *Platanus occidentalis*-*Acer saccharinum*-*Juglans nigra*-*Ulmus rubra* Forest (CEGL007334), which is typically found closer to the river than the community described here. The description for this type is very similar to the *Fraxinus pennsylvanicus*-*Ulmus* spp.-*Celtis occidentalis* Floodplain Forest (CEGL002014), which might better describe some of the communities mapped in this study as the type described here. However, the latter community seems intended to describe a Great Plains type (Faber-Langendoen 2001). The high abundance of *Acer negundo* probably reflects the fact that most floodplains within the study area were once cleared and used for grazing.

**Global Comments:** See similar concept of bottomland forest *Fraxinus pennsylvanica* - *Celtis occidentalis* - *Tilia americana* - (*Quercus macrocarpa*) Forest (CEGL002081), but that type is in an upland formation. Compare to *Acer (saccharum, barbatum)* - *Quercus rubra* - *Carya cordiformis* / *Asimina triloba* Forest (CEGL002060), which occurs on smaller streams. More information on this type in Missouri is available from T. Nigh (pers. comm. 1998).

**Global Similar Associations:**

- *Acer (saccharum, barbatum)* - *Quercus rubra* - *Carya cordiformis* / *Asimina triloba* Forest (CEGL002060)
- *Fraxinus pennsylvanica* - *Celtis occidentalis* - *Tilia americana* - (*Quercus macrocarpa*) Forest (CEGL002081)
- *Platanus occidentalis* - *Acer saccharinum* - *Juglans nigra* - *Ulmus rubra* Forest (CEGL007334)

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is one of the most common floodplain communities within the study area, occurring on nearly every floodplain (ELT's 15 and 16; Nigh *et al.* 2000). Most examples have been cleared and used for grazing and this may account for the high abundance of *Acer negundo* in this type.

**Global Range:** This ash - oak - sycamore mesic bottomland forest is found in Missouri and possibly other parts of the southeastern United States.

**Nations:** US

**States/Provinces:** MO

**USFS Ecoregions:** 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Aj:CCC, 222Ak:CCC, 222Am:CCC, 251Cd:CPP, 251Eb:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** BS\_14-16\_14, BS\_17\_01, PS231, RIP\_AS1C, RIP\_AS3a, RIP\_AS3B, RIP\_CH1A, RIP\_CM3B, RIP\_CM3C, RIP\_CM3D, RIP\_CM3F, RIP\_RS1A, RIP\_RS3A, RIP\_TR2B

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Faber-Langendoen 2001, Leahy 1999, Midwestern Ecology Working Group n.d., Nelson 1985, Nigh 1998, Nigh *et al.* 2000



**Figure 33. A typical Green Ash-Hackberry Species-Oak Species-Sycamore Bottomland Forest (CEGL002410) with relatively open subcanopy and shrub layers. Note the abundant vines and herbaceous cover, as well as the mounding that results from flood deposition. The shrub layer can be quite dense, usually with pawpaw, spicebush, and bamboo.**



**Figure 34. Mature ash trees like that on the left should create a canopy above early successional species such as box elder, as in this Green Ash-Hackberry Species-Oak Species-Sycamore Bottomland Forest (CEGL002410).**



**Figure 35.** A Green Ash-Hackberry Species-Oak Species-Sycamore Bottomland Forest (CEGL002410) may include canopy gaps (due to flooding or windfall) where herbaceous growth explodes. Here, wingstem and wild rye occupy an open area (foreground), while bamboo fills in below the canopy (rear).



**Figure 36.** This Green Ash-Hackberry Species-Oak Species-Sycamore Bottomland Forest (CEGL002410) includes mature oaks and grape vines, as well as pawpaw in the shrub layer. Typically, Virginia wild rye (*Elymus virginicus*) is abundant.

## ***Platanus occidentalis* - *Acer saccharinum* - *Juglans nigra* - *Ulmus rubra* Forest**

**Sycamore - Silver Maple - Black Walnut - Slippery Elm Forest**

**Sycamore - Silver Maple Calcareous Floodplain Forest**

**Identifier: CEGLO07334**

### **USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Temporarily flooded cold-deciduous forest (I.B.2.N.d.)
Alliance	<i>Platanus occidentalis</i> - ( <i>Fraxinus pennsylvanica</i> , <i>Celtis laevigata</i> , <i>Acer saccharinum</i> ) (A.288) Temporarily Flooded Forest Alliance
Alliance (English name)	Sycamore - (Green Ash, Sugarberry, Silver Maple) Temporarily Flooded Forest Alliance
Association	<i>Platanus occidentalis</i> - <i>Acer saccharinum</i> - <i>Juglans nigra</i> - <i>Ulmus rubra</i> Forest
Association (English name)	Sycamore - Silver Maple - Black Walnut - Slippery Elm Forest
Association (Common name)	Sycamore - Silver Maple Calcareous Floodplain Forest

### **Ecological System(s):**

<b>ONSR Community Type:</b>	Riverfront and Bottomland Forests
<b>ONSR Ecological System:</b>	Bottomland Forests
<b>Global Ecological System:</b>	Central Appalachian Floodplain (CES202.608) South-Central Interior Large Floodplain (CES202.705)

### **ELEMENT CONCEPT**

**Global Summary:** This sycamore - silver maple floodplain forest occurs along riverfronts in calcareous areas of the east-central United States. Stands are dominated by *Platanus occidentalis*, with a mixture of other species, including *Acer negundo*, *Acer saccharinum*, *Fraxinus americana*, *Fraxinus pennsylvanica*, *Juglans nigra*, *Ulmus americana*, and *Ulmus rubra*. Shrubs include *Asimina triloba* and *Lindera benzoin*. Vines may be abundant, including *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Arisaema triphyllum*, *Asarum canadense*, *Boehmeria cylindrica*, *Elymus virginicus*, *Pilea pumila*, *Polygonum virginianum*, et al..

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** This community is common and occurs on floodplains along the main river stems (ELT 16, and less frequently on ELT 15; Nigh et al., 2000). These communities are flooded annually.

**Global Environment:** This association occurs along riverfronts in calcareous areas, including forests along small streams (Weakley et al. 1998). The creation in 2000 of *Platanus occidentalis* - *Celtis laevigata* - *Liriodendron tulipifera* / *Lindera benzoin* - *Arundinaria gigantea* / *Amphicarpaea bracteata* Forest (CEGL008429) may dictate that the use of this type (CEGL007334), at least in their range of overlap, would be more appropriate for large rivers rather than "small streams."

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** *Platanus occidentalis*, and *Ulmus americana* dominate canopy, with lesser amounts of *Acer negundo*. Good diagnostic species include early successional trees such as *Populus deltoides*, *Celtis occidentalis*, *Acer saccharinum*, and *Betula nigra*. Trees typically exceed 20 meters in height, except in areas where intense flooding suppresses tree growth. These are the same areas where canopy cover deviates from nearly complete. The most commonly abundant shrub species are *Salix* spp. (near interface of gravel bars and floodplain), *Lindera benzoin*, *Hamamelis vernalis*, and *Carpinus caroliniana*. *Parthenocissus quinquefolia*, *Vitis* spp., and *Rhus radicans* are common woody vines and may frequently provide significant foliar cover in the canopy. Woody vines commonly found in the groundflora and shrub layers include *Smilax tamnoides* and *Smilax bona-nox*. Common diagnostic herbaceous species include *Chasmanthium latifolium* (= *Uniola latifolia*), *Elymus virginicus*, *Laportea canadense*, *Verbesina alternifolia*, *Rudbeckia laciniata*, *Viola striata*, and *Aster lateriflorus*.

**Global Vegetation:** Stands are dominated by *Platanus occidentalis*, with a mixture of other species, including *Acer negundo*, *Acer saccharinum*, *Fraxinus americana*, *Fraxinus pennsylvanica*, *Juglans nigra*, *Ulmus americana*, and *Ulmus rubra*. Shrubs include *Asimina triloba* and *Lindera benzoin*. Vines may be abundant, including *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Arisaema triphyllum*, *Asarum canadense*, *Boehmeria cylindrica*, *Elymus virginicus*, *Pilea pumila*, *Polygonum virginianum*, et al. (Van Kley et al. 1995, Weakley et al. 1998). *Acer saccharinum* may be a differential species in relation to some of the other associations in this alliance, as it is apparently absent from the southeastern Atlantic Coastal Plain and at the edge of its range in the southern Piedmont.



**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Platanus occidentalis</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Salix</i> spp., <i>Rhus glabra</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i>
	Vine	<i>Vitis</i> spp., <i>Rhus radicans</i> , <i>Parthenocissus quinquefolia</i>
Herb	Graminoid	<i>Chasmanthium latifolia</i> , <i>Elymus virginicus</i>
Herb	Forb	<i>Laportea canadense</i> , <i>Rudbeckia laciniata</i> , <i>Verbesina alternifolia</i>

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Platanus occidentalis*, *Celtis occidentalis*, *Acer saccharinum*, *Lindera benzoin*, *Laportea canadense*, *Chasmanthium latifolia*, *Elymus virginicus*, *Viola striata*, *Rudbeckia laciniata*

**Global:** *Acer negundo*, *Acer saccharinum*, *Alliaria petiolata*, *Asimina triloba*, *Chaerophyllum procumbens*, *Fraxinus pennsylvanica*, *Mertensia virginica*, *Platanus occidentalis*, *Verbesina alternifolia*

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:** *Erythronium albidum*, *Maianthemum stellatum*

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4 (4-Jan-2001). This type is apparently somewhat restricted in habitat, but with a wide range, and not highly threatened. Timber removal will cause disruption, but permanent conversion to other forest types is less likely. This community, and other types of floodplain forests, are threatened by alteration of the hydroperiod by artificial impoundments or river diversion projects, or the disruption of the floodplain communities by forestry or agriculture.

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Pockets of this type may have high abundances of silver maple and therefore may closely resemble the *Acer saccharinum-Ulmus americana*-(*Populus deltoides*) Forest (CEGL002586). Other pockets may have high quantities of river birch and therefore resemble the *Betula nigra-Platanus occidentalis* Forest (CEGL002086). One example of that type is recorded from the Missouri Natural Heritage Database (Missouri Department of Conservation 2000). In either case, these instances are infrequent and tend to be below the minimum mapping size, so we have excluded these types from the list of communities within the study area. Similar communities to the one described here with a high abundance of *Acer negundo* are classified as the *Acer Negundo* Forest (CEGL005033), though they are probably the result of past last clearing and grazing, and may more accurately be classified and a non-natural type.

**Global Comments:** This type could be in Illinois and Missouri. It is not well characterized yet and may be difficult to distinguish from other floodplain forests where *Platanus* is conspicuous without being dominant. For example, see *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest (CEGL002586), *Fraxinus pennsylvanica - Celtis* spp. - *Quercus* spp. - *Platanus occidentalis* Bottomland Forest (CEGL002410), *Fraxinus pennsylvanica - Ulmus americana - Celtis laevigata / Ilex decidua* Forest (CEGL002427), and *Fraxinus pennsylvanica - Ulmus* spp. - *Celtis occidentalis* Forest (CEGL002014). It is possible that CEGL002410 could be merged with this type, depending on level of dominance required for *Platanus*.

**Global Similar Associations:**

- *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest (CEGL002586)
- *Fraxinus pennsylvanica - Celtis* spp. - *Quercus* spp. - *Platanus occidentalis* Bottomland Forest (CEGL002410)
- *Fraxinus pennsylvanica - Ulmus americana - Celtis laevigata / Ilex decidua* Forest (CEGL002427)
- *Fraxinus pennsylvanica - Ulmus* spp. - *Celtis occidentalis* Forest (CEGL002014)
- *Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica* Forest (CEGL004073)--is found in Maryland, Virginia, West Virginia, and possibly Pennsylvania.
- *Platanus occidentalis - Celtis laevigata - Liriodendron tulipifera / Lindera benzoin - Arundinaria gigantea / Amphicarpaea bracteata* Forest (CEGL008429)--on small to medium-sized terraces of small streams.

**Global Related Concepts:**

- ELTP 61: *Platanus / Asarum*, Wet-mesic Bottomlands (Van Kley *et al.* 1995) =
- IIA6e. Southern Appalachian Alluvial Forest (Allard 1990) B
- Silver Maple - Sycamore Forest on Base-rich Alluvium (Palmer-Ball *et al.* 1988) =
- Sycamore-green ash floodplain forest (CAP pers. comm. 1998) ?

**OTHER COMMENTS**

**Other Comments:**

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is one of the most common floodplain communities within the study area, occurring on nearly every floodplain close to the river (ELT 16; Nigh *et al.* 2000).

**Global Range:** This association occurs in river and large stream floodplains in calcareous areas of the east-central United States from Indiana and Kentucky and possibly Ohio, south to Tennessee and Missouri.

**Nations:** US

**States/Provinces:** IN, KY, MO, OH, TN, VA

**USFS Ecoregions:** 221Ec:CC, 221Ed:CCP, 221Ef:CCP, 221Eg:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 222Cg:CCC, 222De:CCP, 222Eb:CCC, 222Eg:CCC, 222Em:CCP, 222En:CCC, 222Eo:CCC, 222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Hb:CCC, 222Hf:CCC, 231Aa:PPP

**Federal Lands:** NPS (Blue Ridge Parkway, Fort Donelson, Mammoth Cave, Natchez Trace, Ozark, Shiloh); USFS (Daniel Boone)

### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** GNPL1, RIP\_AS1D, RIP\_BC2A, RIP\_BC2B, RIP\_BC2G, RIP\_CH1B, RIP\_CH2A, RIP\_GN3A, RIP\_GN3B, RIP\_GN3F, RIP\_PS2B, RIP\_PS2C, RIP\_RS1B, RIP\_RS2B, RIP\_RS3B

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen, mod. K.D. Patterson

**References:** Allard 1990, Faber-Langendoen 2001, CAP 1998, Missouri Department of Conservation 2000, Nigh *et al.* 2000, Palmer-Ball *et al.* 1988, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d., TNDH unpubl. data, Van Kley *et al.* 1995, Weakley *et al.* 1998



**Figure 37.** This excellent example of a Sycamore-Silver Maple-Black Walnut-Slippery Elm Forest (CEGL007334) occurs on a relatively high floodplain, but is on the upstream end of a cut-bank, an area that receives intense flooding. Note the poorly developed shrub layer.



**Figure 38. Copious flood debris and sandy soils are typical of the Sycamore-Silver Maple-Black Walnut-Slippery Elm Forest (CEGL007334).**



**Figure 39. Uniform tree growth and nearly complete shade are typical of the Sycamore-Silver Maple-Black Walnut-Slippery Elm Forest (CEGL007334). Flood events can create large canopy gaps where the shrub and herbaceous layers will explode with growth.**



**Figure 40. More mature versions of a Sycamore-Silver Maple-Black Walnut-Slippery Elm Forest (CEGL007334) usually exhibit a more developed shrub layer.**

## *Quercus muehlenbergii* - *Juniperus virginiana* - *Acer saccharum* / *Frangula caroliniana* Forest

**Chinquapin Oak - Eastern Red-cedar - Sugar Maple / Carolina Buckthorn Forest**

**Chinquapin Oak - Red Cedar Dry Alkaline Forest**

**Identifier: C EGL002108**

### USNVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Mixed evergreen-deciduous forest (I.C.)
Physiognomic Group	Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.)
Physiognomic Subgroup	Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.)
Formation	Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a.)
Alliance	<i>Juniperus virginiana</i> - <i>Quercus (muehlenbergii, stellata)</i> Forest Alliance (A.382)
Alliance (English name)	Eastern Red-cedar - (Chinquapin Oak, Post Oak) Forest Alliance
Association	<i>Quercus muehlenbergii</i> - <i>Juniperus virginiana</i> - <i>Acer saccharum</i> / <i>Frangula caroliniana</i> Forest
Association (English name)	Chinquapin Oak - Eastern Red-cedar - Sugar Maple / Carolina Buckthorn Forest
Association (Common name)	Chinquapin Oak - Red Cedar Dry Alkaline Forest

### Ecological System(s):

**ONSR Community Type:** Dolomite Woodlands

**ONSR Ecological System:** Upland Oak Woodlands

**Global Ecological System:** Central Interior Highlands Calcareous Glade and Barrens (CES202.691)

### ELEMENT CONCEPT

**Global Summary:** This chinquapin oak - red-cedar forest is found in the Ozark region of the United States. Stands are typically found on moderate to steep mid and upper slopes of hills and plains, crests of bluffs, and ridges, generally with a southern and western aspect. Soils are shallow and well-drained, and the parent material is limestone or dolomite bedrock with fragments or boulders at or near the surface. Tree canopies are short and slow-growing with slow replacement. The understory may be poorly developed, with shrubs sometimes dominant. Mosses may dominate the ground layer. The canopy contains *Quercus muehlenbergii*, *Quercus alba*, and *Acer saccharum*. The subcanopy contains *Acer saccharum*, *Juniperus virginiana*, *Cornus florida*, and *Celtis laevigata* var. *texana*. Other tall shrubs include *Chionanthus virginicus*, *Cotinus obovatus*, *Frangula caroliniana*, *Ilex decidua*, *Sideroxylon lanuginosum*, and *Viburnum rufidulum*. Herbs include *Anemone virginiana*, *Arabis missouriensis*, *Astragalus distortus*, *Berlandiera betonicifolia* (= *Berlandiera texana*), *Erysimum capitatum*, *Galium arkansanum*, *Hexaletris spicata*, *Hybanthus concolor*, *Penstemon arkansanus*, *Polygala senega*, and *Tragia cordata*. This vegetation is associated with limestone or dolomite glades.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a common community found on the Gasconade Dolomite and Eminence Dolomite. It is limited to exposed slopes where dolomite bedrock is at or near the surface (ELT's 7 and 19; Nigh *et al.* 2000). This bedrock creates a stair-stepped slope profile. Soil acidity is basic, though acidic chert or sandstone hillslope sediment can create conditions conducive to the drier examples described below. Soil moisture is variable, as bedrock can cause perching of water just below or at the soil surface.

**Global Environment:** Stands are typically found on moderate to steep mid and upper slopes of hills and plains, crests of bluffs, and ridges, generally with a southern and western aspect. Soils are shallow and well-drained, and the parent material is limestone or dolomite bedrock with fragments or boulders at or near the surface (Nelson 1985).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** The canopy cover can range from about 25 to 100 percent and can be locally heterogeneous. Intergradation between strata can make delineation of canopy, subcanopy and tall shrubs difficult. Canopy height ranges from 5 to 15 meters. Diagnostic dominants include *Juniperus virginiana* combined with *Quercus stellata*, *Pinus echinata*, and *Ulmus alata* in drier examples, or with *Quercus muehlenbergii* and *Quercus rubra* in moister examples. *Quercus shumardii* and *Fraxinus americana* are good diagnostics that are less common in the canopy. *Juniperus virginiana* and *Ulmus alata* are commonly abundant in the shrub layers as well. *Cornus florida* is the most common dominant large shrub, followed by *Frangula caroliniana* (= *Rhamnus caroliniana*) and the diagnostic species *Cercis canadensis* and *Bumelia lanuginosa* var. *oblongifolia*. *Celtis tenuifolia* is an infrequent diagnostic shrub. *Smilax bona-nox* is the most abundant diagnostic woody vine. *Parthenocissus quinquefolia* is also common. The herbaceous layer can be very diverse, with a mix of graminoid and forb species and highly variable overall cover. Commonly abundant diagnostic species include *Schizachyrium scoparium*, *Andropogon gerardii*, *Scleria triglomerata*, and *Helianthus hirsutus*. Drier areas with less basic soils may have an abundance of *Parthenium integrifolium*, *Panicum linearifolium*, *Silphium asteriscus*, *Antennaria plantaginifolia*, and *Aster patens*. Areas with more basic soils may have high abundances of the

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diagnostic species *Anemone virginiana*, *Aster laevis*, *Silphium integrifolium*, *Silphium terebinthinaceum*, *Berlandiera texana*, *Lithospermum canescens*, and *Ruellia humilis*. This vegetation is associated with limestone or dolomite glades.

**Global Vegetation:** Tree canopies are short and slow-growing with slow replacement. The understory may be poorly developed, with shrubs sometimes dominant. Mosses may dominate the ground layer. The canopy contains *Quercus muehlenbergii*, *Quercus alba*, and *Acer saccharum*. The subcanopy contains *Acer saccharum*, *Juniperus virginiana*, *Cornus florida*, and *Celtis laevigata* var. *texana*. Other tall shrubs include *Chionanthus virginicus*, *Cotinus obovatus*, *Frangula caroliniana*, *Ilex decidua*, *Sideroxylon lanuginosum*, and *Viburnum rufidulum*. Herbs include *Anemone virginiana*, *Arabis missouriensis*, *Astragalus distortus*, *Berlandiera betonicifolia* (= *Berlandiera texana*), *Erysimum capitatum*, *Galium arkansanum*, *Hexalectris spicata*, *Hybanthus concolor*, *Penstemon arkansanus*, *Polygala senega*, and *Tragia cordata*. This vegetation is associated with limestone or dolomite glades.

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

##### ONSR

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus stellata</i> , <i>Quercus muehlenbergii</i>
Tree canopy	Needle-leaved evergreen	<i>Juniperus virginiana</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cornus florida</i>
Short shrub	Broad-leaved deciduous	<i>Rhus aromatica</i>
	Vine	<i>Parthenocissus quinquefolia</i> , <i>Smilax bona-nox</i>
Herb	Graminoid	<i>Scleria triglomerata</i> , <i>Schizachyrium scoparium</i>
Herb	Forb	<i>Helianthus hirsutus</i>

##### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Juniperus virginiana*, *Quercus muehlenbergii*, *Quercus stellata*, *Frangula caroliniana*, *Ulmus alata*, *Celtis tenuifolia*, *Smilax bona-nox*, *Scleria triglomerata*, *Schizachyrium scoparium*, *Andropogon gerardii*, *Aster laevis*, *Anemone virginiana*, *Lithospermum canescens*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:** *Celtis tenuifolia*, *Berlandiera texana*, *Ruellia humilis*

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G3G4 (31-Mar-2000). Few high-quality occurrences of this type have been reported, but this is complicated by the fact that stands of this type are sometimes treated as fire-suppressed chinquapin oak woodlands.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** This type more often than not meets the canopy cover criterion for woodland types. As such, it closely resembles the *Juniperus virginiana* Alkaline Bluff Woodland (CEGL002426), with which it shares many elements of both species composition and structure. Therefore, we treated these two as a single type, recognizing the more broadly described type described here rather than the ecologically and structurally limited Alkaline Bluff Woodland type. In our field keys, one can reach this type through both the woodland and forest sections.

It is conceivable the community described here should be divided into a drier, more acidic type that includes *Quercus stellata* and *Pinus Echinata*, and a more mesic type that includes *Quercus muehlenbergii* and *Quercus rubra*. However, they tend to occur together, usually with interspersed glades, and the individual components of such complexes are often smaller than the standard NVCS minimum mapping unit of 0.5 ha (TNC 1996). Therefore, we have continued to treat these as a single type, often including glade-like openings within the complex. Glades large enough to be mapped individually are classified as the *Schizachyrium scoparium*-*Sorghastrum nutans*-*Bouteloua curtipendula*-*Rudbeckia missouriensis*-*Hedyotis nigricans* Wooded Herbaceous Vegetation (CEGL002398).

**Global Comments:** The type concept is taken in part from the Missouri state classification - dry limestone/dolomite forest (Nelson 1985), which often occurs adjacent to glades. It may be entirely synonymous with *Quercus muehlenbergii* - *Fraxinus (quadrangulata, americana)* / *Schizachyrium scoparium* Woodland (CEGL002143), and Missouri recommends combining it with that type (M. Leahy pers. comm. 1999). Related vegetation of Tennessee's Nashville Basin has been interpreted as a *Quercus muehlenbergii* - *Quercus* spp. forest in which subcanopy dominance by *Juniperus virginiana* is regarded as a symptom of fire suppression. See *Quercus muehlenbergii* - *Quercus (falcata, shumardii, stellata)* / *Cercis canadensis* / *Viburnum rufidulum* Forest (CEGL007699) in the *Quercus muehlenbergii* - (*Acer saccharum*) Forest Alliance (A.1912).

#### Global Similar Associations:

- *Juniperus virginiana* Alkaline Bluff Woodland (CEGL002426)
- *Quercus muehlenbergii* - *Fraxinus (quadrangulata, americana)* / *Schizachyrium scoparium* Woodland (CEGL002143)

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- *Quercus muehlenbergii* - *Quercus (falcata, shumardii, stellata)* / *Cercis canadensis* / *Viburnum rufidulum* Forest (CEGL007699)
- *Quercus muehlenbergii* / *Schizachyrium scoparium* - *Bouteloua curtipendula* Wooded Herbaceous Vegetation (CEGL005284)

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This community is common on slopes on the Gasconade Dolomite and Eminence Dolomite where bedrock is at or near the surface (ELT's 7 and 19; Nigh *et al.* 2000).

**Global Range:** This chinquapin oak - red-cedar forest is found in the Ozark region of the United States, ranging from southern Missouri to Arkansas and possibly Oklahoma.

**Nations:** US

**States/Provinces:** AR?, MO:S4S5, OK?

**USFS Ecoregions:** 222Ac:CCC, 222Af:CCC, 222Ag:CCP, 222Am:CC?, 251Ce:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_07\_01, AS\_07\_10, AS\_09\_13, AS\_19\_17, BS\_07\_14, ECS\_AS39, ECS\_AS40, ECS\_AS42, ECS\_AS46, ECS\_AS47, ECS\_AS56, ECS\_AS62, ECS\_AS63, PM\_07\_12, PM\_07\_16, PM\_08\_03, PM\_22\_19

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Dooley 1983, Dooley and Collins 1984, Hoagland 2000, Kohlbacher 1978, Leahy 1999, Little 1938, Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000, Rice and Penfound 1959, TNC 1996, Zaroni *et al.* 1979



**Figure 41. Typical Chinquapin Oak Eastern Red-cedar Sugar Maple / Carolina Buckthorn Forest/Woodland (CEGL002108).**



**Figure 42. Typical Chinquapin Oak-Eastern Red-cedar-Sugar Maple / Carolina Buckthorn Forest/Woodland (CEGL002108). Dolomite outcrops like that on the left are nearly always present. Behind it is a typical small glade-like opening. This photograph includes two diagnostic species: *Silphium terebinthinaceum* (the large, heart-shaped leaves in the foreground), and *Smilax bona-nox* (heart-shaped leaves on a vine stretching across the center). *Juniperus virginiana* is also visible.**



**Figure 43. A Chinquapin Oak-Eastern Red-cedar-Sugar Maple / Carolina Buckthorn Forest/Woodland (CEGL002108) with canopy cover more typical of a forest. Forest-like expressions of this community usually occur on the margins of areas with dolomite outcrops where soils are somewhat deeper.**



***Pinus echinata* - *Quercus (alba, rubra)* / *Vaccinium (arboreum, pallidum)* / *Schizachyrium scoparium* – *Chasmanthium sessiliflorum* – *Solidago ulmifolia* Forest**

**Shortleaf Pine – (White Oak, Northern Red Oak) / (Farkleberry, Hillside Blueberry) / Little Bluestem – Longleaf Spikegrass – Elmleaf Goldenrod Forest**

**Interior Highlands Shortleaf Pine - Oak Dry-Mesic Forest**

**Identifier: CEGLO07489**

**USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Mixed evergreen-deciduous forest (I.C.)
Physiognomic Group	Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.)
Physiognomic Subgroup	Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.)
Formation	Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a.)
Alliance	<i>Pinus echinata</i> - <i>Quercus (alba, falcata, stellata, velutina)</i> Forest Alliance (A.394)
Alliance (English name)	Shortleaf Pine - (White Oak, Southern Red Oak, Post Oak, Black Oak) Forest Alliance
Association	<i>Pinus echinata</i> - <i>Quercus velutina</i> - <i>Quercus stellata</i> / <i>Vaccinium</i> spp. Forest
Association (English name)	Shortleaf Pine - Black Oak - Post Oak / Blueberry species Forest
Association (Common name)	Interior Highlands Shortleaf Pine - Black Oak Forest

**Ecological System(s):**

**ONSR Community Type:** Pine and Pine-Oak Forests

**ONSR Ecological System:** Pine and Pine-Oak Forests

**Global Ecological System:** Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (CES202.313)

**ELEMENT CONCEPT**

**Global Summary:** This upland, subxeric to submesic shortleaf pine - oak forest community is the matrix forest community of the Ouachita Mountains and surrounding areas, ranging from eastern Oklahoma to western Arkansas and southern Missouri. Stands occur on upper to middle, south-facing slopes, saddles, and flatter ridgelines. Soils are shallow to deep (25-100 cm). Parent material is a variety of sandstone and mixed sandstone-shale-derived substrates, or, in parts of the Missouri Ozarks, chert substrates. The canopy is dominated by *Pinus echinata* codominating with *Quercus alba*, *Quercus rubra*, or *Quercus velutina*, either singly or in combination. Shortleaf pine often forms an emergent canopy over the oaks. *Carya texana* or *Cornus florida* are typical subcanopy components. Other trees in the canopy and subcanopy can include *Acer rubrum*, *Amelanchier arborea*, *Carya alba*, *Nyssa sylvatica*, *Ostrya virginiana*, *Quercus falcata*, and *Quercus stellata*. There is little understory, and the shrub layer is typically open with *Vaccinium pallidum* common as a low shrub and *Vaccinium arboreum* as a locally abundant tall shrub. Other species in the shrub stratum vary among occurrences but can include *Callicarpa americana*, *Lyonia ligustrina*, *Morus rubra*, *Sassafras albidum*, *Styrax americanus*, and *Ulmus alata*, and the vines *Smilax glauca*, *Smilax bona-nox*, *Smilax rotundifolia*, *Toxicodendron radicans*, and *Vitis rotundifolia*. The density of the herbaceous stratum varies with age of the stand and disturbance history but increases with fire. Composition of the herbaceous stratum in these forests can be quite diverse but tends to vary among occurrences. Most examples of this association exist with sparse shrub and herb strata and ground cover dominated by leaf litter. Typical herbaceous species include *Antennaria parlinii*, *Antennaria plantaginifolia*, *Symphyotrichum anomalum* (= *Aster anomalus*), *Symphyotrichum patens* (= *Aster patens*), *Brachyelytrum erectum*, *Chasmanthium latifolium*, *Chasmanthium sessiliflorum*, *Danthonia spicata*, *Desmodium glabellum*, *Desmodium laevigatum*, *Desmodium nudiflorum*, *Desmodium rotundifolium*, *Dichantherium linearifolium*, *Dichantherium boscii*, *Dichantherium commutatum*, *Helianthus divaricatus*, *Helianthus hirsutus*, *Helianthus X laetiflorus*, *Hieracium gronovii*, *Hypericum hypericoides* ssp. *hypericoides*, *Piptochaetium avenaceum*, *Schizachyrium scoparium*, *Solidago hispida*, *Solidago odora*, *Solidago ulmifolia*, and *Viola pedata*. Fire increases coverage by grasses (*Schizachyrium scoparium* and *Andropogon gyrans* (= *Andropogon elliottii*)) and legumes. Although this is one of the most widespread forest types in the region, high quality, mature examples are uncommon. Mature, fire-suppressed examples lose the shortleaf pine and fire-tolerant species and show increases in stem density and fire-intolerant species. Mature, fire-maintained examples are extremely rare. Much of this forest community is managed to maintain specific tree densities and overstory composition.

**ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a frequently encountered community and can be found throughout the landscape. It most frequently occurs on shoulders and slopes of the Gasconade Dolomite with exposed aspects. Soils are neutral and soil moisture is variable, though not xeric.

**Global Environment:** Stands occur on upper to middle, south-facing slopes, saddles, and flatter ridgelines. Soils are shallow to deep (25-100 cm). Parent material is a variety of sandstone and mixed sandstone-shale-derived substrates, or, in parts of the Missouri Ozarks, chert substrates (Zollner pers. comm. 1994, Nelson 1985).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** This community includes a broad variety of plants that thrive in both dry, acid soils as well as generalists. The canopy provides nearly complete cover and typically exceeds 20 meters in height. The canopy and subcanopy are typically dominated by *Pinus echinata* in combination with a variety of oak species, most frequently *Quercus alba*. Other oak species commonly encountered include, *Quercus stellata*, *Quercus coccinea*, and *Quercus velutina*. Hickories such as *Carya alba* (= *Carya tomentosa*), *Carya glabra*, and *Carya texana* may also be present. The tall shrub layer is dominated by *Cornus florida*, together with lesser amounts of *Sassafras albidum* and *Nyssa sylvatica*. *Parthenocissus quinquefolia* is the most common vine, though it is not particularly diagnostic. The most common herbaceous species was *Desmodium nudiflorum* followed by *Amphicarpa bracteata*. *Carex nigromarginata*, *Cunila origanoides*, *Monarda russeliana* and *Panicum boscii* were all fairly abundant, though no truly diagnostic species could be identified.

**Global Vegetation:** The canopy is dominated by *Pinus echinata* codominating with *Quercus alba*, *Quercus rubra*, or *Quercus velutina*, either singly or in combination. Shortleaf pine often forms an emergent canopy over the oaks. *Carya texana* or *Cornus florida* are typical subcanopy components. Other trees in the canopy and subcanopy can include *Acer rubrum*, *Amelanchier arborea*, *Carya alba*, *Nyssa sylvatica*, *Ostrya virginiana*, *Quercus falcata*, and *Quercus stellata*. There is little understory, and the shrub layer is typically open with *Vaccinium pallidum* common as a low shrub and *Vaccinium arboreum* as a locally abundant tall shrub. Other species in the shrub stratum vary among occurrences but can include *Callicarpa americana*, *Lyonia ligustrina*, *Morus rubra*, *Sassafras albidum*, *Styrax americanus*, and *Ulmus alata*, and the vines *Smilax glauca*, *Smilax bona-nox*, *Smilax rotundifolia*, *Toxicodendron radicans*, and *Vitis rotundifolia*. The density of the herbaceous stratum varies with age of the stand and disturbance history but increases with fire. Composition of the herbaceous stratum in these forests can be quite diverse but tends to vary among occurrences. Most examples of this association exist with sparse shrub and herb strata and ground cover dominated by leaf litter. Typical herbaceous species include *Antennaria parlinii*, *Antennaria plantaginifolia*, *Symphytotrichum anomalum* (= *Aster anomalus*), *Symphytotrichum patens* (= *Aster patens*), *Brachyelytrum erectum*, *Chasmanthium latifolium*, *Chasmanthium sessiliflorum*, *Danthonia spicata*, *Desmodium glabellum*, *Desmodium laevigatum*, *Desmodium nudiflorum*, *Desmodium rotundifolium*, *Dichantheium linearifolium*, *Dichantheium boscii*, *Dichantheium commutatum*, *Helianthus divaricatus*, *Helianthus hirsutus*, *Helianthus X laetiflorus*, *Hieracium gronovii*, *Hypericum hypericoides* ssp. *hypericoides*, *Piptochaetium avenaceum*, *Schizachyrium scoparium*, *Solidago hispida*, *Solidago odora*, *Solidago ulmifolia*, and *Viola pedata*. Fire increases coverage by grasses (*Schizachyrium scoparium* and *Andropogon gyrans* (= *Andropogon elliotii*)) and legumes (Zollner pers. comm. 1994, Nelson 1985).

**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i>
Tree canopy	Needle-leaved evergreen tree	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cornus florida</i>
Short shrub	broad-leaved deciduous	<i>Corylus americana</i>
	Vine	<i>Parthenocissus quinquefolia</i>
Herb	Graminoid	<i>Carex nigromarginata</i>
Herb	Forb	<i>Desmodium nudiflorum</i>

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus echinata</i>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus rubra</i>
Tree subcanopy	Needle-leaved tree	<i>Pinus echinata</i>
Short shrub/sapling	Broad-leaved evergreen tree	<i>Vaccinium arboreum</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium pallidum</i>
Herb	Graminoid	<i>Schizachyrium scoparium</i> , <i>Chasmanthium sessiliflorum</i> , <i>Solidago ulmifolia</i>

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Pinus echinata*, *Quercus alba*, *Carya alba*, *Cornus florida*, *Sassafras albidum*, *Parthenocissus quinquefolia*, *Desmodium nudiflorum*, *Amphicarpa bracteata*, *Carex nigromarginata*, *Monarda russeliana*, *Panicum boscii*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G3. The harvesting and management of this forest community, combined with long-term fire suppression, have blurred what, under historical ecosystem processes, would likely be several association-level communities. Although this is one of the most widespread forest types in the region, high-quality mature examples are uncommon. In mature, fire-suppressed examples, the component of *Pinus echinata* and other fire-tolerant species declines, being replaced by greater canopy closure, higher stem

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density, and greater coverage of fire-intolerant species. Mature fire-maintained examples are extremely rare. Much of this forest community is managed to maintain specific tree densities and overstory composition.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** This represents the most mesic of the pine-mixed oak communities within the study area. The presence of pine with significant amounts of white oak and dogwood is a dependable identifying feature for this type. However, those conditions might also suggest classification as a *Pinus echinata-Quercus alba/Cornus florida* Forest (CEGL002395), a type omitted from this study but recorded as in the study area in the Missouri Natural Heritage Database (Missouri Department of Conservation 2000). The most similar pine-mixed oak community would be the *Pinus echinata-Quercus velutina-Quercus stellata / Vaccinium* spp. Forest (CEGL002401). That type has virtually no white oak and usually has little or no dogwood. As a general rule it is drier and more open, with black and scarlet oak dominating instead of white oak. Where frequent burning has occurred, this type might resemble a Shortleaf Pine – Oak Dry-mesic Woodland (CEGL002394), a type not included in this study.

**Global Comments:** The harvesting and management of this forest community, combined with long-term fire suppression, has blurred what, under historical ecosystem processes, would likely be several association-level communities. It may be better ranked as GM (D. Zollner pers. comm. 1998). Examples of this community are known from throughout the Ouachita National Forest, including Beech Creek Special Interest Area (LeFlore County, Oklahoma), Roaring Branch RNA (Polk County, Arkansas), Lake Winona RNA (Saline County, Arkansas), Dismal Hollow RNA (Newton County, Arkansas), McCurtain County Wilderness Area (McCurtain County, Oklahoma) *et al.*. See related pure evergreen woodland associations, *Pinus echinata / Schizachyrium scoparium - Solidago ulmifolia - Monarda russeliana - Echinacea pallida* Woodland (CEGL007815) and the mixed pine - oak associations *Pinus echinata - Quercus alba / Schizachyrium scoparium* Woodland (CEGL002394) and *Pinus echinata - Quercus alba - Quercus falcata* Forest (CEGL004444). This forest type has been suggested to be a fire-suppressed version of these mixed pine - oak woodlands (M. Leahy pers. comm. 1999).

#### Global Similar Associations:

- *Pinus echinata - Quercus alba / Schizachyrium scoparium* Woodland (CEGL002394)
- *Pinus echinata / Vaccinium (arboreum, pallidum, stamineum)* Forest (CEGL002400)
- *Pinus echinata - Quercus velutina - Quercus stellata / Vaccinium* spp. Forest (CEGL002401)
- *Pinus echinata - Quercus alba - Quercus falcata* Forest (CEGL004444)
- *Pinus echinata / Schizachyrium scoparium - Solidago ulmifolia - Monarda russeliana - Echinacea pallida* Woodland (CEGL007815)

#### Global Related Concepts:

- *Quercus alba - Pinus echinata - Quercus (velutina, falcata)* Forest (Foti *et al.* 1994) Undetermined
- Eastern Broadleaf and Needleleaf Forests: 111: Oak-Hickory-Pine Forest (*Quercus-Carya-Pinus*) (Kuchler 1964) B
- IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) B
- Shortleaf Oak - Pine: 76 (Eyre 1980) B
- Terrestrial: Forest: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: I.B.2a (UNESCO 1973) B

### OTHER COMMENTS

#### Other Comments:

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This represents the most mesic of the pine-mixed oak communities within the study area. The presence of pine with significant amounts of white oak and dogwood is a dependable identifying feature for this type. The most similar pine-mixed oak community would be the *Pinus echinata-Quercus velutina-Quercus stellata / Vaccinium* spp. Forest (CEGL002401). That type has virtually no white oak and usually has little or no dogwood. As a general rule it is drier and more open, with black and scarlet oak dominating instead of white oak.

**Global Range:** This upland, subxeric to submesic forest community is the matrix forest community of the Ouachita Mountains and surrounding areas, ranging into areas adjacent to the Ouachitas and into the Ozarks of northern Arkansas, Oklahoma, and Missouri.

**Nations:** US

**States/Provinces:** AR, MO, OK

**USFS Ecoregions:** 222A:CC, 231G:PP, M222A:CC, M231ACC

**Federal Lands:** NPS (Ozark); USFS (Ouachita, Ozark, Shawnee)

### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_02.2\_11, AS\_02.2\_14, AS\_07\_06, BS\_08\_06, ECS\_AS04, ECS\_AS52, ECS\_AS54, ECS\_AS65, ECS\_AS66, ECS\_AS95, ECS\_BS72, ECS\_BS76, ECS\_BS87

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** A.S. Weakley and K.D. Patterson, mod D. Zollner and K.D. Patterson

**References:** Allard 1990, Behler 1988, Braun 1950, Bruner 1931, Bull and Farrand 1977, Cantwell 1981, Clark and Hutchinson 1994, Craighead 1949, Duck and Fletcher 1945, Duncan and Duncan 1988, Eyre 1980, Foti *et al.* 1994, Fountain and Sweeney 1985,

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Hoagland 2000, Illinois Nature Preserve Commission 1973, Johnson 1986, Kennedy 1973, Kuchler 1964, Leahy 1999, Little 1938, Little 1980a, Masters *et al.* 1995, Midwestern Ecology Working Group n.d., Miller and Tehon 1929, Missouri Department of Conservation 2000, Mohlenbrock 1986, Mohlenbrock and Voigt 1959, Nelson 1985, Niering 1979, Osborn 1941, Powell 1985, Rice 1963, Rice and Penfound 1959, Rosson 1995, SAF 1967, Schwartz and Schwartz 1959, Smith *et al.* 2000, TNC 1985, TNC 1995a, Taylor 1965, Thornbury 1965, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978, Zanoni *et al.* 1979, Zollner 1994, 1998.



**Figure 44. White oak and pine codominate in this Shortleaf Pine-(White Oak, Northern Red Oak) / (Farkleberry, Hillside Blueberry) / Little Bluestem-Longleaf Spikegrass-Elmleaf Goldenrod Forest (CEGL007489). Note the dense shrub layer that distinguishes this community from other pine-oak communities.**



**Figure 45. An excellent example of a Shortleaf Pine-(White Oak, Northern Red Oak) / (Farkleberry, Hillside Blueberry) / Little Bluestem-Longleaf Spikegrass-Elmleaf Goldenrod Forest (CEGL007489).**



**Figure 46.** Though the groundflora is sparse in this Shortleaf Pine-(White Oak, Northern Red Oak) / (Farkleberry, Hillside Blueberry) / Little Bluestem-Longleaf Spikegrass-Elmleaf Goldenrod Forest (CEGL007489), the shrub layer is dominated by dogwood that provides significant foliar cover.



**Figure 47.** In this Shortleaf Pine-(White Oak, Northern Red Oak) / (Farkleberry, Hillside Blueberry) / Little Bluestem-Longleaf Spikegrass-Elmleaf Goldenrod Forest (CEGL007489), both the shrub and groundflora layers are sparse, probably due to prescribed burning. However, the abundance of white oak in conjunction with pine should help to identify this type.

***Pinus echinata* – *Quercus velutina* – *Quercus stellata* / *Vaccinium* spp. Forest****Shortleaf Pine - Black Oak - Post Oak / Blueberry species Forest****Interior Highlands Shortleaf Pine - Black Oak Forest****Identifier: CEG002401****USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Mixed evergreen-deciduous forest (I.C.)
Physiognomic Group	Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.)
Physiognomic Subgroup	Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.)
Formation	Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a.)
Alliance	<i>Pinus echinata</i> - <i>Quercus</i> ( <i>alba</i> , <i>falcata</i> , <i>stellata</i> , <i>velutina</i> ) Forest Alliance (A.394)
Alliance (English name)	Shortleaf Pine - (White Oak, Southern Red Oak, Post Oak, Black Oak) Forest Alliance
Association	<i>Pinus echinata</i> - <i>Quercus velutina</i> - <i>Quercus stellata</i> / <i>Vaccinium</i> spp. Forest
Association (English name)	Shortleaf Pine - Black Oak - Post Oak / Blueberry species Forest
Association (Common name)	Interior Highlands Shortleaf Pine - Black Oak Forest

**Ecological System(s):****ONSR Community Type:** Pine and Pine-Oak Forests**ONSR Ecological System:** Pine and Pine-Oak Forests**Global Ecological System:** Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (CES202.313)**ELEMENT CONCEPT**

**Global Summary:** This shortleaf pine - oak forest is found primarily in the Interior Highlands of the United States, ranging from eastern Oklahoma to the southwestern corner of Illinois. Stands occur on gentle to moderately steep, mid and upper slopes of hills and plains, especially on southern and western aspects of steep-walled valleys and canyons. Soils are thin, somewhat rapidly to rapidly drained, and dry, rocky, and sandy. Bedrock is primarily sandstone and chert, although this forest can also occur on igneous rock, their commonality being acidic pH. Bedrock and rock fragments are often exposed near the surface. The tree canopy is short, spreading, open, and limby. It is dominated by *Pinus echinata*, which often forms an emergent canopy over a shorter canopy of oaks comprised of various combinations of *Quercus stellata*, *Quercus velutina*, *Quercus marilandica*, and *Quercus alba*. *Carya texana* is a common subcanopy component. *Vaccinium arboreum* and *Sassafras albidum* are common tall shrubs, while *Vaccinium pallidum* often dominates the short-shrub stratum. Other characteristic shrubs can include *Castanea pumila* var. *ozarkensis* (= *Castanea ozarkensis*) and *Hypericum hypericoides*. Woody vines include *Smilax glauca* and *Vitis rotundifolia*. The ground cover is sparse and can be dominated by leaf litter with only scattered herbaceous species such as *Antennaria plantaginifolia*, *Baptisia alba* var. *macrophylla*, *Baptisia bracteata* var. *leucophaea*, *Clitoria mariana*, *Cunila origanoides*, *Danthonia spicata*, *Desmodium nudiflorum*, *Dichantherium commutatum*, *Dichantherium linearifolium*, *Elymus hystrix*, *Helianthus divaricatus*, *Helianthus hirsutus*, *Liatris aspera*, *Pityopsis graminifolia*, *Schizachyrium scoparium*, *Solidago odora*, *Solidago ulmifolia*, and *Tephrosia virginiana*. Numerous lichens and mosses can be found on rocks and stumps.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a common community found most frequently on drier landforms, such as exposed slopes and shoulders on the upper Gasconade Dolomite (ELT's 2, 3 and 4; Nigh *et al.* 2000). It can occasionally be found on slopes on the lower Gasconade Dolomite (ELT's 5 and 6; Nigh *et al.* 2000). Soils are dry and acidic.

**Global Environment:** Stands occur on gentle to moderately steep, mid and upper slopes of hills and plains, especially on southern and western aspects of steep-walled valleys and canyons. Soils are thin, somewhat rapidly to rapidly drained, and dry, rocky, and sandy. Bedrock is primarily sandstone and chert, although this forest can also occur on igneous rock, their commonality being acidic pH. Bedrock and rock fragments are often exposed near the surface (Nelson 1985, TNC 1995a). In the central Ouachita Mountains of eastern Oklahoma and western Arkansas, this community usually occurs on bands of friable shale embedded within the novaculite uplift formation.

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** This community includes plants that thrive in dry, acidic soils. The canopy and subcanopy are somewhat open and stunted, though canopy closure can be almost complete. Canopy height is typically greater than 15 meters and may exceed 20. Diagnostic canopy species include *Pinus echinata* in combination with *Quercus velutina* and *Quercus coccinea*. *Quercus stellata*, *Quercus alba*, and *Carya texana* form a lesser component of the canopy and subcanopy. Shrubs are generally sparse. Among tall shrubs, *Cornus florida* is slightly more abundant than the more diagnostic species *Vaccinium arboreum* and *Sassafras albidum*. *Vaccinium vacillans*, *Vaccinium stamineum*, and *Rhus aromatica* are the best diagnostic short shrubs. *Parthenocissus quinquefolia* and *Vitis aestivalis* are the most abundant woody vines, though neither is particularly diagnostic. The most common diagnostic herbaceous species are *Tephrosia virginiana*, *Solidago radula*, *Panicum linearifolium*, *Carex*

Appendix 15. ONSR USNVC Natural Community Descriptions

*nigromarginata*, *Aster patens*, *Lespedeza repens*, *Carex umbellata*, *Desmodium nuttallii*, *Danthonia spicata*, *Panicum commutatum* var. *hispidum*, and *Euphorbia corollata*.

**Global Vegetation:** The tree canopy is short, spreading, open, and limby. It is dominated by *Pinus echinata*, which often forms an emergent canopy over a shorter canopy of oaks comprised of various combinations of *Quercus stellata*, *Quercus velutina*, *Quercus marilandica*, and *Quercus alba*. *Carya texana* is a common subcanopy component. *Vaccinium arboreum* and *Sassafras albidum* are common tall shrubs, while *Vaccinium pallidum* often dominates the short-shrub stratum. Other characteristic shrubs can include *Castanea pumila* var. *ozarkensis* (= *Castanea ozarkensis*) and *Hypericum hypericoides*. Woody vines include *Smilax glauca* and *Vitis rotundifolia*. The ground cover is sparse and can be dominated by leaf litter with only scattered herbaceous species such as *Antennaria plantaginifolia*, *Baptisia alba* var. *macrophylla*, *Baptisia bracteata* var. *leucophaea*, *Clitoria mariana*, *Cunila organoides*, *Danthonia spicata*, *Desmodium nudiflorum*, *Dichantheium commutatum*, *Dichantheium linearifolium*, *Elymus hystrix*, *Helianthus divaricatus*, *Helianthus hirsutus*, *Liatrix aspera*, *Pityopsis graminifolia*, *Schizachyrium scoparium*, *Solidago odora*, *Solidago ulmifolia*, and *Tephrosia virginiana*. Numerous lichens and mosses can be found on rocks and stumps (Nelson 1985, TNC 1995a).

**MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus velutina</i>
Tree canopy	Needle-leaved evergreen tree	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cornus florida</i> , <i>Sassafras albidum</i>
Short shrub	Broad-leaved deciduous	<i>Vaccinium vacillans</i>
	Vine	<i>Parthenocissus quinquefolia</i>
Herb	Graminoid	<i>Carex nigromarginata</i>
Herb	Forb	<i>Desmodium nudiflorum</i>

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus echinata</i>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus marilandica</i> , <i>Quercus stellata</i> , <i>Quercus velutina</i>
Tree subcanopy	Needle-leaved tree	<i>Pinus echinata</i>
Short shrub/sapling	Broad-leaved evergreen tree	<i>Vaccinium arboreum</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium angustifolium</i> , <i>Vaccinium pallidum</i>
Herb	Semi-shrub	<i>Cunila organoides</i>
Herb	Forb	<i>Antennaria plantaginifolia</i> , <i>Hieracium gronovii</i>
Herb	Graminoid	<i>Danthonia spicata</i> , <i>Dichantheium dichotomum</i> var. <i>dichotomum</i>

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Pinus echinata*, *Quercus velutina*, *Quercus coccinea*, *Sassafras albidum*, *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, *Tephrosia virginiana*, *Panicum linearifolium*, *Carex nigromarginata*, *Carex umbellata*, *Euphorbia corollata*, *Lespedeza repens*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:** *Accipiter striatus*, *Agkistrodon contortrix*, *Asio otus*, *Baeolophus bicolor*, *Bonasa umbellus*, *Carpodacus purpureus*, *Castanea pumila* var. *ozarkensis*, *Cladina subtenuis*, *Cladonia furcata*, *Crotalus horridus*, *Dendroica coronata*, *Dendroica pinus*, *Desmodium humifusum*, *Dicranum scoparium*, *Flavoparmelia baltimorensis*, *Heterodon platirhinos*, *Lampropeltis calligaster*, *Lampropeltis getula*, *Leucobryum glaucum*, *Loxia curvirostra*, *Lynx rufus*, *Lyonia mariana*, *Masticophis flagellum*, *Meleagris gallopavo*, *Odocoileus virginianus*, *Phlox bifida* ssp. *stellaria*, *Piranga rubra*, *Potentilla canadensis*, *Scaphiopus holbrookii*, *Sceloporus undulatus*, *Sciurus carolinensis*, *Silene caroliniana* ssp. *wherryi*, *Sitta canadensis*, *Tamias striatus*, *Terrapene carolina*, *Tradescantia longipes*, *Troglodytes troglodytes*, *Ursus americanus*, *Vireo olivaceus*

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G3 (20-May-2000). There are probably over 100 occurrences of this community rangewide. It is reported from Missouri (where it is ranked from S3 to S4S5), Illinois (S4), and the central Ouachita Mountains of Arkansas and Oklahoma. Currently there are 10 occurrences documented in Missouri. In Arkansas and Oklahoma high-quality examples are uncommon, but it is more common in the Ouachita Mountains than in the Ozarks. Throughout its range, this community is under severe pressure from fire suppression and silvicultural activities. There are probably over 3000 acres rangewide, and there may be more than 10,000 acres, but there has been an overall reduction in its aerial extant in the past 50 years. Currently over 260 acres are documented in Missouri, and all occurrences are less than 60 acres. This community was more widespread prior to heavy harvesting of shortleaf pine and the practice of fire suppression.

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Of the pine-mixed oak communities within the study area, this occupies a middle zone in terms of canopy development and closure, and overall soil moisture. Trees are not particularly stunted, nor is there a significant abundance of oaks that thrive in xeric conditions (such as blackjack oak) or oaks that like more mesic soils (such as white oak). The shrub and groundflora layers are fairly open, though canopy gaps can cause a flush of vegetative growth that may increase overall density. The most abundant plants seem to prefer acidic soils, though some generalists, such as *Desmodium nudiflorum* may be present.

**Global Comments:** The relation of this type to other dry shortleaf pine-oak forests in the Southeast needs further clarification, e.g., compare with *Pinus echinata-Quercus (alba, rubra) / Vaccinium (arboreum, pallidum) / Schizachyrium scoparium-Chasmanthium sessiliflorum - Solidago ulmifolia* Forest (CEGL007489). More open, fire-maintained stands may be classified as *Pinus echinata - Quercus stellata - Quercus marilandica / Schizachyrium scoparium* Woodland (CEGL002393). Logging of shortleaf pine may cause some classification difficulties when all or most of the mature specimens of this species have been removed. Compare to associations in *Pinus echinata - Quercus stellata - Quercus marilandica* Woodland Alliance (A.680) and *Pinus (echinata, taeda) - Quercus (stellata, marilandica, falcata)* Woodland Alliance (A.2011).

**Global Similar Associations:**

- *Pinus echinata - Quercus (alba, rubra) / Vaccinium (arboreum, pallidum) / Schizachyrium scoparium - Chasmanthium sessiliflorum - Solidago ulmifolia* Forest (CEGL007489)
- *Pinus echinata - Quercus stellata - Quercus marilandica / Schizachyrium scoparium* Woodland (CEGL002393)
- *Pinus echinata* Crowley's Ridge Forest [Provisional] (CEGL007919)

**Global Related Concepts:**

- *Pinus echinata - Quercus velutina / Vaccinium arboreum / Danthonia spicata - Baptisia alba var. microphylla - Solidago odora* Dry South-slope Woodland (Smith *et al.* 2000) ?
- Eastern Broadleaf and Needleleaf Forests: 111: Oak-Hickory-Pine Forest (*Quercus-Carya-Pinus*) (Kuchler 1964) B
- IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) B
- Shortleaf Oak - Pine: 76 (Eyre 1980) B
- Terrestrial: Forest: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: I.B.2a (UNESCO 1973) B

#### OTHER COMMENTS

**Other Comments:**

#### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is a somewhat common community within the study area, occurring on moderately xeric to dry landscape positions. It most frequently occurs on exposed slopes and shoulders on the Roubidoux Formation and the upper Gasconade Dolomite (ELT's 2 and 3; Nigh *et al.* 2000).

**Global Range:** This shortleaf pine - oak forest is found primarily in the Interior Highlands of the United States, ranging from eastern Oklahoma to the southwestern corner of Illinois. This community reaches its westernmost extension in the central Ouachitas of Oklahoma, but may have been widespread prior to excessive harvest of shortleaf pine. This community is still known from Missouri, southern Illinois, Arkansas, and Oklahoma.

This community occupies dry, rocky, and sandy uplands, most often on mid to upper slopes along moderate to steeply sloping canyons and ravines. Bedrock is of sandstone, chert, or igneous material, and soil pH is acidic. Occurrences occur as a mosaic of the mixed oak - hickory - pine complex where conditions favor plant species adapted to thin, infertile, and droughty soils. These forests are generally small in size (2-8 ha).

**Nations:** US

**States/Provinces:** AR, IL, MO, OK

**USFS Ecoregions:** 222Aa:CCC, 222Af:CCC, 222Ag:CC?, 222Aj:CCC, 222Ak:CCC, 222Aq:CCC, 222D:CP, 231G:PP, M221:?, M222A:CC, M231Ab:CCC, M231Ac:CCC

**Federal Lands:** NPS (Ozark); USFS (Ouachita, Ozark, Shawnee)

#### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** ECS\_AS34, ECS\_AS37, ECS\_AS38, ECS\_AS43, ECS\_AS44, ECS\_AS48, ECS\_AS61, ECS\_AS94, ECS\_BS21, ECS\_BS47, ECS\_BS55, ECS\_BS56, ECS\_BS62, ECS\_BS79, ECS\_BS99

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** M. Guetersloh, mod. K.D. Patterson

**References:** Allard 1990, Behler 1988, Braun 1950, Bruner 1931, Bull and Farrand 1977, Cantwell 1981, Clark and Hutchinson 1994, Craighead 1949, Duck and Fletcher 1945, Duncan and Duncan 1988, Eyre 1980, Foti *et al.* 1994, Fountain and Sweeney 1985, Hoagland 2000, Illinois Nature Preserve Commission 1973, Johnson 1986, Kennedy 1973, Kuchler 1964, Little 1938, Little 1980a, Masters *et al.* 1995, Midwestern Ecology Working Group n.d., Miller and Tehon 1929, Mohlenbrock 1986, Mohlenbrock and Voigt 1959, Nelson 1985, Niering 1979, Nigh *et al.* 2000, Osborn 1941, Powell 1985, Rice 1963, Rice and Penfound 1959, Rosson 1995,



Appendix 15. ONSR USNVC Natural Community Descriptions

SAF 1967, Schwartz and Schwartz 1959, Smith *et al.* 2000, TNC 1985, TNC 1995a, Taylor 1965, Thornbury 1965, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978, Zanoni *et al.* 1979



**Figure 48.** An excellent example of a Shortleaf Pine-Black Oak-Post Oak / Blueberry Species Forest (CEGL002401). Note the open canopy and sparse shrub and groundflora layers.



**Figure 49.** An excellent example of a Shortleaf Pine-Black Oak-Post Oak / Blueberry Species Forest (CEGL002401). Note the open canopy and sparse shrub and groundflora layers.



**Figure 50.** This example of a Shortleaf Pine-Black Oak-Post Oak / Blueberry Species Forest (CEGL002401) has a somewhat dense shrub layer dominated by dogwood. However the canopy (not shown) is still relatively open and lacks a white oak component. The ground flora is sparse and dominated by plants that compete well in acidic soils.



**Figure 51.** A nearly ideal Shortleaf Shortleaf Pine-Black Oak-Post Oak / Blueberry Species Forest (CEGL002401). Note the canopy gaps, the relatively open shrub layers and the sparse groundflora.

## ***Pinus echinata* / Rock Outcrop Interior Highland Woodland**

**Shortleaf Pine / Rock Outcrop Interior Highland Woodland**

**Shortleaf Pine / Little Bluestem Woodland**

**Identifier: CEGL002402**

### **USNVC Classification**

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Evergreen woodland (II.A.)
Physiognomic Group	Temperate or subpolar needle-leaved evergreen woodland (II.A.4.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.)
Formation	Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a.)
Alliance	<i>Pinus echinata</i> Woodland Alliance (A.515)
Alliance (English name)	Shortleaf Pine Woodland Alliance
Association	<i>Pinus echinata</i> / Rock Outcrop Interior Highland Woodland
Association (English name)	Shortleaf Pine / Rock Outcrop Interior Highland Woodland
Association (Common name)	Shortleaf Pine / Little Bluestem Woodland

### **Ecological System(s):**

<b>ONSR Community Type:</b>	Pine and Pine-Oak Woodlands
<b>ONSR Ecological System:</b>	Pine and Pine-Oak Woodlands
<b>Global Ecological System:</b>	Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (CES202.313)

### **ELEMENT CONCEPT**

**Global Summary:** This shortleaf pine rock outcrop woodland type is found in the Interior Highlands region of the United States. Stands occur on shallow rocky soils, especially on south-facing slopes and cliffs. Characteristic tree species include *Pinus echinata*, *Juniperus virginiana* var. *virginiana*, *Quercus marilandica* and *Quercus stellata*. Shrubs and vines include *Toxicodendron radicans* and *Vaccinium pallidum*. Herbaceous species include *Antennaria parlinii* and *Danthonia spicata*. This community type has been much reduced in extent.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a very rare community, occurring only on xeric sites with acid soils. Slopes are steep to moderate with exposed aspects (ELT's 3, 23 and 25; Nigh *et al.* 2000). More often than not, it is associated with igneous bedrock at or near the surface.

**Global Environment:** Stands occur on shallow rocky soils, especially on south-facing slopes and cliffs.

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** Only one example was documented during this study. The canopy is open, stunted and limby. Dominant species included *Pinus echinata*, *Quercus stellata*, *Quercus velutina*, and scattered *Quercus alba*. The shrub layer is very sparse, with *Vaccinium arboreum* and *Vaccinium vacillans* and scattered *Cornus florida*, a not very diagnostic type. The groundflora cover is sparse and dominated by plants that prefer acidic soils, including *Danthonia spicata* and *Carex nigromarginata*.

**Global Vegetation:** Characteristic tree species in stands of this type include *Pinus echinata*, *Juniperus virginiana* var. *virginiana*, *Quercus marilandica* and *Quercus stellata*. Shrubs and vines include *Toxicodendron radicans* and *Vaccinium pallidum*. Herbaceous species include *Antennaria parlinii* and *Danthonia spicata* (Hoagland 2000).

### **MOST ABUNDANT SPECIES**

#### **Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus stellata</i>
Tree canopy	Needle-leaved evergreen tree	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Vaccinium arboreum</i>
Short shrub	Broad-leaved deciduous	<i>Vaccinium vacillans</i>
Herb	Graminoid	<i>Schizachyrium scoparium</i>
Herb	Forb	<i>Desmodium nudiflorum</i>

#### **Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### **CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Pinus echinata*, *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, *Schizachyrium scoparium*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G2G3 (23-Oct-2002). There may be fewer than 100 occurrences of this community rangewide; it is reported from Missouri (where it is ranked S3 to S4S5), Arkansas (S?), and Oklahoma (S?). Currently no occurrences have been documented; current acreage, condition, and trends are unknown. Shortleaf pine (*Pinus echinata*) populations seem to have undergone rangewide declines in vigor and extent. This phenomenon is primarily due to changes in fire regime and to depredations of the Southern Pine Beetle (*Dendroctonus frontalis*). Stands are threatened by the effects of continued fire suppression, which would inhibit the reproduction of *Pinus echinata*.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** No data exists for this community from the current study, and the description above is taken from a single example encountered while sampling in the summer of 2005 ("High pt"; approximate NAD 83 Zone 15N UTM coordinates: E 619942, N 4101563). Some glade-woodland complexes on igneous substrates (where it is more likely to occur) may include small examples of this type, but these usually include sufficient deciduous trees to be classified as the *Pinus echinata-Quercus stellata-Quercus marilandica / Schizachyrium scoparium* Woodland (CEGL002393).

This type is highly dependent on fire in order to maintain an open, woodland structure and to eliminate fire-intolerant species. As few locations within the study area have received the frequent prescribed burning associated with this site, it may be the only example of this community type within the study area.

**Global Comments:** This community is uncommon in Arkansas and Oklahoma, where it is restricted to McCurtain and LeFlore counties (B. Hoagland pers. comm. Date unknown). Fire and extreme habitat are thought to inhibit invasion by deciduous species. Type should be compared against another pure evergreen type, *Pinus echinata / Vaccinium (arboreum, pallidum, stamineum)* Forest (CEGL002400). Type occurs at Big Springs Natural Area, Stegall Mountain Natural Area, and Hawn State Park, Missouri, and at Hot Spring National Park, Arkansas.

**Global Similar Associations:**

- *Pinus echinata - Quercus stellata - Quercus marilandica / Schizachyrium scoparium* Woodland (CEGL002393)
- *Pinus echinata / Schizachyrium scoparium - Solidago ulmifolia - Monarda russeliana - Echinacea pallida* Woodland (CEGL007815)
- *Pinus echinata / Vaccinium (arboreum, pallidum, stamineum)* Forest (CEGL002400)

**Global Related Concepts:**

### OTHER COMMENTS

**Other Comments:**

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is an extremely rare community within the study area, occurring on xeric, acid-soiled landscape positions.

**Global Range:** This shortleaf pine rock outcrop woodland type is found in the Interior Highlands region of the United States.

**Nations:** US

**States/Provinces:** AR, MO, OK

**USFS Ecoregions:** 222A:CC, 231Gb:CCC, M222A:CC

**Federal Lands:** NPS (Hot Springs, Ozark); USFS (Ouachita, Ozark)

### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** None (One very small (below MMU of 0.5 ha) example at sample point "High pt" from 2005 data)

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Blair and Hubbell 1938, Hoagland 2000, Hoagland (date unknown), Leahy 1999, Midwestern Ecology Working Group n.d., Nigh *et al.* 2000, Rice 1963, Zollner 1994,1998.

## *Quercus muehlenbergii* - *Fraxinus (quadrangulata, americana)* / *Schizachyrium scoparium* Woodland

**Chinquapin Oak - (Blue Ash, White Ash) / Little Bluestem Woodland**

**Chinquapin Oak - Ash / Little Bluestem Woodland**

**Identifier: CEG002143**

### USNVC Classification

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Deciduous woodland (II.B.)
Physiognomic Group	Cold-deciduous woodland (II.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous woodland (II.B.2.N.)
Formation	Cold-deciduous woodland (II.B.2.N.a.)
Alliance	<i>Quercus muehlenbergii</i> Woodland Alliance (A.621)
Alliance (English name)	Chinquapin Oak Woodland Alliance
Association	<i>Quercus muehlenbergii</i> - <i>Fraxinus (quadrangulata, americana)</i> / <i>Schizachyrium scoparium</i> Woodland
Association (English name)	Chinquapin Oak - (Blue Ash, White Ash) / Little Bluestem Woodland
Association (Common name)	Chinquapin Oak - Ash / Little Bluestem Woodland

### Ecological System(s):

**ONSR Community Type:** Dolomite Woodlands

**ONSR Ecological System:** Upland Oak Woodlands

**Global Ecological System:** Central Interior Highlands Calcareous Glade and Barrens (CES202.691)

### ELEMENT CONCEPT

**Global Summary:** This chinquapin oak - ash woodland community is found in the Ozark region of the United States, particularly Missouri and Arkansas. Stands occur on moderately steep to steep upper slopes of hills, ridges, and plains, and on steep slopes and bluffs along streams and rivers. Aspect can be in any direction. Soils are rapidly drained to well-drained, and very shallow to shallow (0-100 cm). The parent material is limestone, cherty limestone, or dolomite with bedrock at or near the surface. The tree canopy is open, sometimes somewhat stunted or limby, and occasionally complex in pattern due to the bedrock influence. Typical dominants include *Quercus muehlenbergii*, *Fraxinus americana*, and *Fraxinus quadrangulata*, along with *Juniperus virginiana*. Shrubs may include *Rhus aromatica*, *Frangula caroliniana* (= *Rhamnus caroliniana*), *Crataegus* spp., or more rarely, *Cotinus obovatus*. Dominant ground layer species include *Schizachyrium scoparium*, *Sorghastrum nutans*, and *Bouteloua curtipendula*. Other characteristic species include *Astragalus crassicaarpus* var. *berlandieri* (= *Astragalus mexicanus*), *Galium arkansanum*, *Ophioglossum engelmannii*, *Polygala senega*, *Smilax bona-nox*, and, in more western stands of the Springfield Plateau, *Astragalus distortus*, *Berlandiera betonicifolia* (= *Berlandiera texana*), and *Erysimum capitatum*.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is an uncommon community found on the lower Gasconade Dolomite and Eminence Dolomite. It is limited to exposed slopes where dolomite bedrock is at the surface (ELT 7; Nigh *et al.* 2000). This bedrock creates a stair-stepped slope profile. Soils are basic. Soil moisture is generally low, though bedrock can cause perching of water just below or at the soil surface.

**Global Environment:** Stands occur on moderately steep to steep upper slopes of hills, ridges, and plains, and on steep slopes and bluffs along streams and rivers. Aspect can be in any direction. Soils are rapidly drained to well-drained, and very shallow to shallow (0-100 cm). The parent material is limestone, cherty limestone, or dolomite with bedrock at or near the surface (Nelson 1985).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** This is an uncommon community found on the lower Gasconade Dolomite and Eminence Dolomite. It is limited to exposed slopes where dolomite bedrock is at the surface (ELT 7; Nigh *et al.* 2000). This bedrock creates a stair-stepped slope profile. Soils are basic. Soil moisture is generally low, though bedrock can cause perching of water just below or at the soil surface.

**Global Vegetation:** The tree canopy is open, sometimes somewhat stunted or limby, and occasionally complex in pattern due to the bedrock influence. Typical dominants include *Quercus muehlenbergii*, *Fraxinus americana*, and *Fraxinus quadrangulata*, along with *Juniperus virginiana*. Shrubs may include *Rhus aromatica*, *Frangula caroliniana* (= *Rhamnus caroliniana*), *Crataegus* spp., or more rarely, *Cotinus obovatus*. Dominant ground layer species include *Schizachyrium scoparium*, *Sorghastrum nutans*, and *Bouteloua curtipendula*. Other characteristic species include *Astragalus crassicaarpus* var. *berlandieri* (= *Astragalus mexicanus*), *Galium arkansanum*, *Ophioglossum engelmannii*, *Polygala senega*, *Smilax bona-nox*, and, in more western stands of the Springfield Plateau, *Astragalus distortus*, *Berlandiera betonicifolia* (= *Berlandiera texana*), and *Erysimum capitatum* (Nelson 1985). Arkansas occurrences are often moderately steep, with associated species including *Cotinus obovatus* and *Sideroxylon lanuginosum*.

**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus muehlenbergii</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Frangula caroliniana</i> ,
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i> , <i>Cornus drummondii</i>
	Vine	<i>Smilax bona-nox</i> , <i>Amphicarpa bracteata</i>
Herb	Graminoid	<i>Andropogon gerardii</i>
Herb	Forb	<i>Desmodium glutinosum</i>

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Quercus muehlenbergii*, *Quercus rubra*, *Fraxinus americana*, *Frangula caroliniana*, *Lindera benzoin*, *Crataegus* spp., *Smilax bona-nox*, *Desmodium glutinosum*, *Schizachyrium scoparium*, *Andropogon gerardii*, *Tridens flavus*, *Scleria triglomerata*, *Sorghastrum nutans*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:** *Celtis tenuifolia*, *Berlandiera texana*, *Ruellia humilis*

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G3G4 (31-Mar-2000). Numerous small fire-suppressed sites exist, but there are few high-quality sites currently known or reported in the Missouri state databases.

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** This community is uncommon. It was probably more common prior to widespread fire-suppression efforts initiated during the twentieth century. If that is indeed the case, most historical examples have probably succeeded to either the *Quercus muehlenbergii*-*Juniperus virginiana*-*Acer saccharum* / *Frangula caroliniana* Forest (CEGL002108) or the *Quercus alba*-*Quercus rubra*-*Quercus muehlenbergii* / *Cercis canadensis* Forest (CEGL002070). Mesic, closed-canopy examples will resemble this latter type.

**Global Comments:** The concept of this type is taken in part from the Missouri state type - limestone/dolomite savanna (Nelson 1985). *Juniperus virginiana* increases without fire, and its relative dominance in this type can be variable. Closed forest chinquapin oak - red-cedar stands are tracked as *Quercus muehlenbergii* - *Juniperus virginiana* - *Acer saccharum* / *Frangula caroliniana* Forest (CEGL002108). Pure red-cedar woodlands along bluffs or cliffs are treated as a distinct type, *Juniperus virginiana* Alkaline Bluff Woodland (CEGL002426). More open limestone - dolomite savannas are placed in *Quercus muehlenbergii* / *Schizachyrium scoparium* - *Bouteloua curtipendula* Wooded Herbaceous Vegetation (CEGL005284).

**Global Similar Associations:**

- *Juniperus virginiana* Alkaline Bluff Woodland (CEGL002426)
- *Quercus muehlenbergii* - *Juniperus virginiana* - *Acer saccharum* / *Frangula caroliniana* Forest (CEGL002108)
- *Quercus muehlenbergii* / *Schizachyrium scoparium* - *Bouteloua curtipendula* Wooded Herbaceous Vegetation (CEGL005284)

**Global Related Concepts:****OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This community is rare and is limited to slopes on the lower Gasconade Dolomite and Eminence Dolomite where bedrock is at or near the surface (ELT 7; Nigh *et al.* 2000). Usually, examples are smaller than the minimum mapping unit.

**Global Range:** This chinquapin oak - ash woodland community is found in the Ozark region of the United States, particularly Missouri and Arkansas.

**Nations:** US

**States/Provinces:** AR, MO

**USFS Ecoregions:** 222Ab:CCC, 222Ac:CCC, 222Af:CCP, 222Ag:CCC, 222Ak:CC?, 222Am:CC?, 222An:CCC, 222Ao:CCC, M222Aa:CCC

**Federal Lands:** NPS (Buffalo, Ozark); USFS (Mark Twain, Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:** A few sampled types approach forest conditions, but contained all of the species elements necessary for this classification. These have been noted in the data as poor examples of the type.

Appendix 15. ONSR USNVC Natural Community Descriptions

**Ozark National Scenic Riverways Plots:** BS\_07\_19, BS\_07\_21, BS\_19\_04, ECS\_BS64, ECS\_BS90, ECS\_FL53, ECS\_FL76, FLAA, PSNEW1

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. D. Faber-Langendoen

**References:** Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000



**Figure 52.** Typical opening in a Chinquapin Oak-(Blue Ash, White Ash) / Little Bluestem Woodland (CEGL002143). Note how the trees are stunted. This community is very similar to the preceding Chinquapin Oak-Eastern Red-cedar-Sugar Maple / Carolina Buckthorn Forest / Woodland (CEGL002108), except for the absence of cedar, which may invade in the absence of fire.



**Figure 53.** Another opening within a Chinquapin Oak-(Blue Ash, White Ash) / Little Bluestem Woodland (CEGL002143). Note the abundance of forbs.



**Figure 54.** A nearly full-canopied expression of the Chinquapin Oak-(Blue Ash, White Ash) / Little Bluestem Woodland (CEGL002143). Despite the foliar cover, trees are stunted and much of the canopy is composed of shrub species.



**Figure 55.** A Chinquapin Oak-(Blue Ash, White Ash) / Little Bluestem Woodland (CEGL002143) where manual cedar reduction and prescribed burning has reduced canopy cover and increased forb abundance. Such manipulations appear to create an outward appearance that approximates both the historical appearance and the idealized concept for this community type, though it may take many years for the species composition to change.



***Quercus marilandica* / *Vaccinium arboreum* / *Danthonia spicata* Scrub Woodland****Blackjack Oak / Farkleberry / Poverty Oatgrass Scrub Woodland****Blackjack Oak Xeric Scrub****Identifier: CEGL002425****USNVC Classification**

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Deciduous woodland (II.B.)
Physiognomic Group	Cold-deciduous woodland (II.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous woodland (II.B.2.N.)
Formation	Cold-deciduous woodland (II.B.2.N.a.)
Alliance	<i>Quercus stellata</i> - <i>Quercus marilandica</i> Woodland Alliance (A.625)
Alliance (English name)	Post Oak - Blackjack Oak Woodland Alliance
Association	<i>Quercus marilandica</i> / <i>Vaccinium arboreum</i> / <i>Danthonia spicata</i> Scrub Woodland
Association (English name)	Blackjack Oak / Farkleberry / Poverty Oatgrass Scrub Woodland
Association (Common name)	Blackjack Oak Xeric Scrub

**Ecological System(s):**

<b>ONSR Community Type:</b>	Igneous Woodlands
<b>ONSR Ecological System:</b>	Upland Oak Woodlands
<b>Global Ecological System:</b>	East Gulf Coastal Plain Jackson Plain Prairie and Barrens (CES203.353) Central Interior Highlands Dry Acidic Glade and Barrens (CES202.692) Ozark-Ouachita Dry Oak Woodland (CES202.707)

**ELEMENT CONCEPT**

**Global Summary:** This xeric blackjack oak type is found in the Interior Highlands region and western edge of the Interior Low Plateau of the United States. Stands occur on xeric bedrock outcrops on moderately steep to steep south- or southwest-facing slopes and ridgetops of hills and mountains. Soils are rapidly drained and very shallow (0-40 cm). Parent material may be igneous or sandstone. The bedrock is often exposed with fragments of rocks and boulders strewn over the surface. The canopy is stunted (3-8 m) and forms a scrub woodland dominated by *Quercus marilandica*. Some *Quercus stellata* is present. The shrub layer is typically sparse (<50% cover) and contains *Vaccinium arboreum*, or occasional *Vaccinium pallidum*. The herb layer is sparse (<50% cover). Typical species include *Danthonia spicata*, along with *Allium canadense* var. *mobile* (= *Allium mutabile*), *Cunila organoides*, *Dichantherium acuminatum*, *Diodia teres*. Mosses and lichens are often prevalent, including the mosses *Polytrichum* spp. and the lichens *Cladina subtenuis*, *Flavoparmelia baltimorensis* (= *Pseudoparmelia baltimorensis*), and *Myelochroa obsessa* (= *Parmelina obsessa*).

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a relatively uncommon community, usually occurring only on xeric sites where soils are acidic and bedrock may be close to the surface. It is most frequently found on igneous summits and exposed shoulders and slopes (ELT's 21, 22, 23, and 25; Nigh *et al.* 2000).

**Global Environment:** Stands occur on xeric bedrock outcrops on moderately steep to steep south- or southwest-facing slopes and ridgetops of hills and mountains. Soils are rapidly drained and very shallow (0-40 cm). Parent material may be igneous or sandstone. The bedrock is often exposed with fragments of rocks and boulders strewn over the surface (Nelson 1985).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** This community tends to be patchily distributed over local areas. The canopy of *Quercus marilandica* and *Carya texana* is open and stunted (5-8 meters). *Quercus stellata* may also be present. Common diagnostic shrubs include *Ulmus alata* and *Vaccinium arboreum*. Common diagnostic short shrubs include *Vaccinium vacillans*, *Vaccinium stamineum* and *Rhus* spp. Woody vines are negligible. Herbaceous flora is dominated by species that thrive in acid soils, including *Schizachyrium scoparium*, *Panicum linearifolium*, *Lespedeza repens*, *Andropogon gerardii*, *Danthonia spicata*, *Helianthus hirsutus*, *Carex umbellata*, *Euphorbia corollata*, *Solidago nemoralis*, and *Lespedeza procumbens*.

**Global Vegetation:** The canopy is stunted (3-8 m) and forms a scrub woodland dominated by *Quercus marilandica*. Some *Quercus stellata* is present. The shrub layer is typically sparse (<50% cover) and contains *Vaccinium arboreum*, or occasional *Vaccinium pallidum*. The herb layer is sparse (<50% cover). Typical species include *Danthonia spicata*, along with *Allium canadense* var. *mobile* (= *Allium mutabile*), *Cunila organoides*, *Dichantherium acuminatum*, and *Diodia teres*. Mosses and lichens are often prevalent, including the mosses *Polytrichum* spp. and the lichens *Cladina subtenuis*, *Flavoparmelia baltimorensis* (= *Pseudoparmelia baltimorensis*), and *Myelochroa obsessa* (= *Parmelina obsessa*) (Nelson 1985).

**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

## Appendix 15. ONSR USNVC Natural Community Descriptions

### Stratum

Tree canopy

Tall shrub/sapling

Short shrub

Herb

Herb

### Lifeform

Broad-leaved deciduous tree

Broad-leaved deciduous

Broad-leaved deciduous

Graminoid

Forb

### Species

*Carya texana*, *Quercus marilandica*

*Ulmus alata*, *Vaccinium arboreum*

*Vaccinium stamineum*

*Schizachyrium scoparium*, *Panicum linearifolium*

*Lespedeza repens*

### Global

#### Stratum

Tree canopy

Short shrub/sapling

Herb

#### Lifeform

Broad-leaved deciduous tree

Broad-leaved evergreen tree

Graminoid

#### Species

*Quercus marilandica*, *Quercus stellata*, *Quercus velutina*

*Vaccinium arboreum*

*Carex pensylvanica*, *Danthonia spicata*, *Koeleria macrantha*,

*Schizachyrium scoparium*

## CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Carya texana*, *Quercus marilandica*, *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, *Rhus aromatica*, *Schizachyrium scoparium*, *Lespedeza procumbens*, *Carex umbellata*, *Panicum linearifolium*, *Danthonia spicata*

**Global:** *Clitoria mariana*, *Danthonia spicata*, *Liatis squarrosa*, *Quercus marilandica*, *Quercus stellata*, *Quercus velutina*, *Schizachyrium scoparium*, *Vaccinium arboreum*

## OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

## CONSERVATION STATUS RANK

**Global Rank & Reasons:** G3G4 (24-Oct-2002). This type has been defined based primarily on the Missouri state classification. Although this type requires somewhat restricted environmental conditions, it likely occurs in other portions of the Interior Highland region and Interior Low Plateau where these conditions exist. It is primarily located on xeric bedrock outcrops with rapidly drained, shallow soils and igneous or sandstone parent material. This type may be associated with a glade/forest mosaic. More information on the status of this type is needed.

## CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** This is a fairly simple community to identify, though it rarely occurs in units large enough to map. Usually it occurs in mappable complexes with the *Schizachyrium scoparium-Sorghastrum nutans-Coreopsis lanceolata-Croton willdenowii* Wooded Herbaceous Vegetation (CEGL002243) and the *Quercus stellata-Quercus marilandica-Quercus velutina-Carya texana / Schizachyrium scoparium* Woodland (CEGL002149). Within the study area, it would be appropriate to include *Carya texana* in the name of the community, though its presence may reflect past fire suppression activities.

**Global Comments:** The concept of the type is mainly taken from the Missouri state classification - xeric acid (igneous, sandstone) forest (Nelson 1985). Chert substrates are unlikely to contain this type. This scrub woodland type may also be treated as a phase of either sandstone or igneous glades. *Quercus stellata* can be present. Compare with *Quercus stellata - Quercus marilandica var. ashei* Interior Highlands Scrub Woodland (CEGL003884). Pure *Quercus marilandica* vegetation is uncommon in the Arkansas Ozarks (D. Zollner pers. comm. 2000).

### **Global Similar Associations:**

- *Quercus alba / Carex pensylvanica - Carex ouachitana* Dwarf Forest (CEGL002433)--montane (high-elevation) type.
- *Quercus stellata - Quercus marilandica var. ashei* Interior Highlands Scrub Woodland (CEGL003884)--montane (high-elevation) type.
- *Schizachyrium scoparium - Sorghastrum nutans - Coreopsis lanceolata - Croton willdenowii* Wooded Herbaceous Vegetation (CEGL002243)

### **Global Related Concepts:**

- Xeric Chert Forest, Xeric Igneous Forest, Xeric Sandstone Forest (Nelson 1985) ?

## OTHER COMMENTS

**Other Comments:**

## ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is an uncommon community within the study area, occurring on xeric, acid-soiled landscape positions. It is usually associated with glades on igneous bedrock. Where it occurs on sandstone or cherty substrates, it is usually smaller than the minimum mapping unit.

**Global Range:** This xeric blackjack oak type is found in the Interior Highlands of the central United States, including the Ozarks, Ouachitas, and Interior Low Plateau regions.

**Nations:** US

**States/Provinces:** AR, IL:S2, MO, OK?

**USFS Ecoregions:** 222Aa:CCC, 222Ac:CCC, 222Ae:CCC, 222Af:CCC, 222Aj:CCC, 222Ak:CCC, 222Am:CCC, 222Aq:CCP, 222Ca:CPP, 222Dh:CCC, 222Di:CCP, 231Gb:CCC, 231Gc:CCC, M231Aa:CCC

**Federal Lands:** NPS (Ozark); USFS (Ouachita, Ozark)

#### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_03.1\_22, PM\_22\_11, PM\_23\_03, PM\_24\_09

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Madany 1981, Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000, White and Madany 1978, Zollner 2000.



**Figure 56.** An excellent example of a Blackjack Oak / Farkleberry / Poverty Oatgrass Scrub Woodland (CEGL002425), exhibiting the typical short canopy (about 5 m tall) and dense growth of black hickory, blackjack oak, and stunted post oaks.



**Figure 57.** Grasses may be abundant in a Blackjack Oak / Farkleberry / Poverty Oatgrass Scrub Woodland (CEGL002425), even under the sometimes dense canopy. Note the large igneous boulder, as this type typically only occurs in units large enough to be mapped upon igneous substrate.



**Figure 58.** It may be appropriate to include black hickory (*Carya texana*) in the name of the Blackjack Oak / Farkleberry / Poverty Oatgrass Scrub Woodland (CEGL002425). Black hickory is often the dominant species in the canopy, as in this photo.



**Figure 59.** The Blackjack Oak / Farkleberry / Poverty Oatgrass Scrub Woodland (CEGL002425) may include glade openings such as this one.

## *Quercus stellata* - *Quercus marilandica* - *Quercus velutina* - *Carya texana* / *Schizachyrium scoparium* Woodland

Post Oak - Blackjack Oak - Black Oak - Black Hickory / Little Bluestem Woodland

Ozark - Ouachita Post Oak - Blackjack Oak / Little Bluestem Woodland

Identifier: CEGL002149

### USNVC Classification

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Deciduous woodland (II.B.)
Physiognomic Group	Cold-deciduous woodland (II.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous woodland (II.B.2.N.)
Formation	Cold-deciduous woodland (II.B.2.N.a.)
Alliance	<i>Quercus stellata</i> - <i>Quercus marilandica</i> Woodland Alliance (A.625)
Alliance (English name)	Post Oak - Blackjack Oak Woodland Alliance
Association	<i>Quercus stellata</i> - <i>Quercus marilandica</i> - <i>Quercus velutina</i> - <i>Carya texana</i> / <i>Schizachyrium scoparium</i> Woodland
Association (English name)	Post Oak - Blackjack Oak - Black Oak - Black Hickory / Little Bluestem Woodland
Association (Common name)	Ozark - Ouachita Post Oak - Blackjack Oak / Little Bluestem Woodland

### Ecological System(s):

**ONSR Community Type:** Igneous Woodlands  
Dolomite Woodlands (less common)

**ONSR Ecological System:** Upland Oak Woodlands

**Global Ecological System:** East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland (CES203.482)  
East Gulf Coastal Plain Jackson Plain Prairie and Barrens (CES203.353)  
Central Interior Highlands Dry Acidic Glade and Barrens (CES202.692)  
Ozark-Ouachita Dry Oak Woodland (CES202.707)

### ELEMENT CONCEPT

**Global Summary:** This post oak - blackjack oak woodland type occurs in the central United States, particularly in the Interior Low Plateau and Interior Highlands region. Stands occur on gentle to steep hills and plains, bluff escarpments, and broad ridges and flats with any aspect, but primarily south- and west-facing slopes. Soils are rapidly to very rapidly drained, shallow, and strewn with boulders, cobbles, gravel, and sand. Soil pH is neutral to slightly acid. Bedrock can be sandstone, chert, or igneous rock and is often exposed. The tree canopy is short to medium (7-20 m), spreading, open, and limby. Dominant species include *Quercus stellata* and/or *Quercus marilandica*. Other species may form a minor canopy component, scattered in the canopy, and include (e.g., *Quercus velutina*, *Quercus rubra*, *Quercus alba*, and *Carya alba*). The understory is very poorly developed, consisting of a few widely scattered shrubs and small trees, including, in addition to the dominant trees, *Ulmus alata* and *Vaccinium* spp. (*Vaccinium arboreum*, *Vaccinium stamineum*, or *Vaccinium pallidum*). Coverage of the herbaceous stratum can vary from quite sparse to moderately dense, consisting of mixed grasses and forbs. Typical species include *Helianthus divaricatus*, *Porteranthus stipulatus*, *Danthonia spicata*, *Schizachyrium scoparium*, *Cunila origanoides*, *Andropogon gerardii*, and *Liatris aspera*, but others may occur. Lichens and mosses can be abundant.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is an uncommon community most frequently found on dry, exposed slopes and shoulders on the Roubidoux Formation and the upper Gasconade Dolomite (ELT's 2, 3 and 5; Nigh *et al.* 2000), or on igneous substrates (ELT's 21-26; Nigh *et al.* 2000). Soils are acidic. It may frequently be found along the upslope margin of areas where dolomite bedrock is at or near the surface (ELT 7; Nigh *et al.* 2000).

**Global Environment:** Stands occur on gentle to steep hills and plains, bluff escarpments, and broad ridges and flats with any aspect, but primarily south- and west-facing slopes. Soils are rapidly to very rapidly drained, shallow, and strewn with boulders, cobbles, gravel, and sand. Soil pH is neutral to slightly acid. Bedrock can be sandstone, chert, or igneous rock and is often exposed (Nelson 1985, TNC 1995a).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** Canopy structure is stunted and open, with usually less than 60 percent cover. Canopy height rarely exceeds 15 m. Diagnostic canopy species include *Quercus stellata* and *Carya texana*. *Quercus marilandica*, *Quercus velutina*, and *Quercus coccinea* are diagnostic in low quantities. On igneous substrates, *Quercus rubra* may be abundant. Diagnostic shrub species include *Sassafras albidum*, *Ulmus alata*, *Rhus aromatica*, *Vaccinium arboreum*, *Vaccinium stamineum*, and *Vaccinium vacillans*. Common woody vines include *Parthenocissus quinquefolia* and *Vitis aestivalis*, though neither is diagnostic. The herbaceous layer is typically sparse (<25 percent) and includes plants that thrive in acidic soils. The most common diagnostic

## Appendix 15. ONSR USNVC Natural Community Descriptions

graminoid species are *Danthonia spicata*, *Panicum linearifolium*, *Panicum dichotomum*, *Andropogon gerardii*, *Carex umbellata*, and *Schizachyrium scoparium*. Common diagnostic forbs include *Helianthus hirsutus*, *Tephrosia virginiana*, *Lespedeza procumbens*, *Coreopsis palmata*, *Lespedeza repens*, *Antennaria plantaginifolia*, and *Desmodium nuttallii*. Less common diagnostic include *Desmodium laevigatum*, *Cunila organoides*, *Baptisia leucophaea*, *Aster patens*, *Parthenium integrifolium*, *Lespedeza hirta*, *Krigia biflora*, and *Hieracium gronovii*.

**Global Vegetation:** The tree canopy is short to medium (7-20 m), spreading, open, and limby. Dominant species include *Quercus stellata* and/or *Quercus marilandica*. Other species may form a minor canopy component, scattered in the canopy, and include *Quercus velutina*, *Quercus rubra*, *Quercus alba*, and *Carya alba*. The understory is very poorly developed, consisting of a few widely scattered shrubs and small trees, including, in addition to the dominant trees, *Ulmus alata* and *Vaccinium* spp. (*Vaccinium arboreum*, *Vaccinium stamineum*, or *Vaccinium pallidum*). Coverage of the herbaceous stratum can vary from quite sparse to moderately dense, consisting of mixed grasses and forbs. Typical species include *Helianthus divaricatus*, *Porteranthus stipulatus*, *Danthonia spicata*, *Schizachyrium scoparium*, *Cunila organoides*, *Andropogon gerardii*, and *Liatris aspera*, but others may occur. Lichens and mosses can be abundant (Nelson 1985, TNC 1995a).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Carya texana</i> , <i>Quercus stellata</i>
Tree canopy	Needle-leaved evergreen	<i>Carya texana</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Sassafras albidum</i>
Short shrub	Broad-leaved deciduous	<i>Vaccinium stamineum</i> , <i>Rhus aromatica</i>
	Vine	<i>Vitis aestivalis</i>
Herb	Graminoid	<i>Carex nigromarginata</i> , <i>Panicum linearifolium</i>
Herb	Forb	<i>Desmodium nudiflorum</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Quercus velutina*, *Quercus coccinea*, *Carya texana*, *Vaccinium arboreum*, *Vaccinium stamineum*, *Vaccinium vacillans*, *Carex nigromarginata*, *Panicum linearifolium*, *Danthonia spicata*, *Tephrosia virginica*, *Cunila organoides*, *Desmodium laevigatum*, *Aster patens*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G2G3 (22-Jun-1998). There are probably fewer than 100 occurrences rangewide. Currently 29 occurrences have been documented in Missouri where it is ranked S2; the community is also reported from Arkansas, Oklahoma, and Indiana where it is ranked S?, S?, and S1, respectively. This community may also occur in Illinois. There are probably less than 15,000 acres rangewide. Currently there are about 4700 acres documented from Missouri, and most occurrences are less than 1500 acres. This community was once widespread throughout its range. It has been significantly impacted and continues to be threatened by grazing, overseeding with non-native grasses, and conversion to forest due to fire suppression. Some expansion of individual occurrences may have occurred due to extensive logging of pines. About half the currently documented occurrences are ranked A or B, with sizes ranging from 30 to 1200 acres.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:**

**Global Comments:** The concept of this type is somewhat related to the Missouri state type - acid (chert, igneous, sandstone) savanna (Nelson 1985), and also includes woodland phases of Illinois' dry barrens, including those in the Cretaceous Hills (White and Madany 1978). Illinois prefers *Danthonia spicata* as an herb layer nominal species (they have no *Schizachyrium scoparium* in this community). This type has been managed with fire in the Shawnee National Forest, forming a "woodland barrens" type [see *Quercus stellata* - *Quercus marilandica* / *Schizachyrium scoparium* Wooded Herbaceous Vegetation (CEGL002391) for the "open barrens" type]. This association should be compared with and distinguished from *Quercus stellata* - *Quercus marilandica* - *Carya (glabra, texana)* / *Vaccinium arboreum* Forest (CEGL002075). *Quercus alba* - *Quercus stellata* - *Quercus velutina* / *Schizachyrium scoparium* Woodland (CEGL002150) is a similar, moister type. Several related types are documented in the West Gulf Coastal Plain.

**Global Similar Associations:**

- *Quercus alba* - *Quercus stellata* - *Quercus velutina* / *Schizachyrium scoparium* Woodland (CEGL002150)
- *Quercus marilandica* - (*Juniperus virginiana*) / *Schizachyrium scoparium* - *Danthonia spicata* Wooded Herbaceous Vegetation (CEGL002428)

## Appendix 15. ONSR USNVC Natural Community Descriptions

- *Quercus marilandica* - *Juniperus virginiana* var. *virginiana* / *Schizachyrium scoparium* - *Hypericum gentianoides* Wooded Herbaceous Vegetation (CEGL004062)
- *Quercus muehlenbergii* - *Juniperus virginiana* / *Schizachyrium scoparium* - *Manfreda virginica* Wooded Herbaceous Vegetation (CEGL005131)
- *Quercus stellata* - *Quercus alba* - (*Quercus falcata*) / *Schizachyrium scoparium* Woodland (CEGL004217)
- *Quercus stellata* - *Quercus marilandica* - *Carya* (*glabra*, *texana*) / *Vaccinium arboreum* Forest (CEGL002075)
- *Quercus stellata* - *Quercus marilandica* / *Schizachyrium scoparium* Wooded Herbaceous Vegetation (CEGL002391)
- *Quercus stellata* - *Quercus marilandica* / *Schizachyrium scoparium* Woodland (CEGL002147)
- *Schizachyrium scoparium* - *Sorghastrum nutans* - *Coreopsis lanceolata* - *Croton willdenowii* Wooded Herbaceous Vegetation (CEGL002243)

### Global Related Concepts:

- Eastern Broadleaf Forests: 100: Oak-Hickory Forest (*Quercus-Carya*) (Kuchler 1964) ?
- Post Oak - Blackjack Oak: 40 (Eyre 1980) B
- Terrestrial: Woodland: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: II.B.3a (UNESCO 1973) B

## OTHER COMMENTS

### Other Comments:

## ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is uncommon in the park. It most frequently occurs on summits and exposed shoulders and slopes on the Roubidoux Formation and upper Gasconade Dolomite (ELT's 2, 3, 5 and 7; Nigh *et al.* 2000) or on igneous substrates (ELT's 21-16; Nigh *et al.* 2000). Where it occurs on sandstone or cherty substrates, it is often smaller than the minimum mapping unit.

**Global Range:** This post oak - blackjack oak woodland type occurs in the central United States, particularly in the Interior Low Plateau and Interior Highlands region, ranging from southern parts of both Indiana and Illinois south and west to Missouri, Arkansas, and Oklahoma. This community is distributed throughout all aspects where soils are thin and droughty over parent material of sandstone, chert, shale, or igneous rock. Once widespread, this community is now rare or threatened throughout its range due to grazing, exotics, and fire suppression. This woodland is part of a complex mosaic of vegetative communities which includes glades, cliffs, dry forests, and prairies. This community becomes more prevalent in western extensions of its range, where it often intergrades with prairie.

**Nations:** US

**States/Provinces:** AR, IL, IN, MO, OK

**USFS Ecoregions:** 222Ab:CCC, 222Ac:CCC, 222Ag:CCC, 222Ak:CCC, 222Am:CCC, 222An:CCC, 222Aq:CCP, 222Ca:CPP, 222Ch:CPP, 222De:CCC, 222Dh:CCP, 222Di:CCP, 222E:CP, 222Gc:CPP, 222Gd:CPP, 231E:CP, 231G:CC, M222A:CC, M231A:CC

**Federal Lands:** DOD (Fort Chaffee); NPS (Ozark); USFS (Ouachita, Ozark, Shawnee)

## ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_19\_09, BS\_09\_04, ECS\_BS41, ECS\_FL38, PM\_21\_01, PM\_21\_13, PM\_21\_16, PM\_22\_10, PM\_23\_01, PM\_23\_10, PM\_23\_11, PM\_23\_13, PM\_24\_08, PM\_24\_16, PM\_25\_06, PM\_26\_01, PM\_26\_14

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** M. Guetersloh, mod. M. Pyne and D. Faber-Langendoen

**References:** Allred and Mitchell 1955, Bruner 1931, Collins and Klahr 1991, Diamond 1993, Ewing *et al.* 1984, Eyre 1980, Fralish 1987, Fralish 1988, Fralish *et al.* 1991, Heikens and Robertson 1994, Hoagland 2000, Hutchison 1994, Johnson and Risser 1975, Kennedy 1973, Klahr 1989, Kuchler 1964, Luckhardt and Barclay 1937, Midwestern Ecology Working Group n.d., Nelson 1985, Penfound 1962, Rice and Penfound 1959, Robertson and Heikens 1994, TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978

***Pinus echinata - Quercus stellata - Quercus marilandica / Schizachyrium scoparium*****Woodland****Shortleaf Pine - Post Oak - Blackjack Oak / Little Bluestem Woodland****Ozark/Ouachita Shortleaf Pine - Oak Dry Woodland****Identifier: CEG002393****USNVC Classification**

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Mixed evergreen - deciduous woodland (II.C.)
Physiognomic Group	Mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.)
Physiognomic Subgroup	Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.N.)
Formation	Mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.N.a.)
Alliance	<i>Pinus echinata - Quercus stellata - Quercus marilandica</i> Woodland Alliance (A.680)
Alliance (English name)	Shortleaf Pine - Post Oak - Blackjack Oak Woodland Alliance
Association	<i>Pinus echinata - Quercus stellata - Quercus marilandica / Schizachyrium scoparium</i> Woodland
Association (English name)	Shortleaf Pine - Post Oak - Blackjack Oak / Little Bluestem Woodland
Association (Common name)	Ozark/Ouachita Shortleaf Pine - Oak Dry Woodland

**Ecological System(s):****ONSR Community Type:** Pine and Pine-Oak Woodlands**ONSR Ecological System:** Pine and Pine-Oak Woodlands**Global Ecological System:** Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (CES202.313)**ELEMENT CONCEPT**

**Global Summary:** This shortleaf pine - oak woodland is found in the Ozark/Ouachita region of the United States. Stands occur along ridges and on upper south- to southwest-facing slopes. The vegetation contains an open canopy dominated by *Pinus echinata* codominating with *Quercus stellata* and *Quercus marilandica*, either singly or in combination. *Pinus echinata* may form an emergent canopy over the oaks. Common woody associates include *Carya texana*, *Quercus velutina*, and *Diospyros virginiana*. Grassy openings are dominated by *Schizachyrium scoparium*. Other abundant herbs include *Baptisia bracteata*, *Helianthus hirsutus*, *Liatris aspera*, *Solidago nemoralis*, *Solidago petiolaris*, and *Tephrosia virginiana*. This type represents the driest shortleaf pine - oak communities in the Ozarks.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is an infrequently encountered community found only in the most xeric landscape positions. It is limited to exposed slopes on the Roubidoux Formation and the upper Gasconade Dolomite, and Igneous bedrock (ELT's 3, 19, 23 and 25; Nigh *et al.* 2000). Soils are dry and acidic.

**Global Environment:** Stands occur along ridges and on upper south- to southwest-facing slopes. This type represents the driest shortleaf pine - oak communities in the Ozarks.

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** This community includes plants that thrive in dry, acidic soils. The canopy is open and stunted, rarely exceeding 10 meters in average height. The diagnostic species *Pinus echinata* often exceeds that height, and may be emergent over deciduous species. These may include the diagnostic oaks *Quercus stellata*, *Quercus velutina*, and *Quercus marilandica*. *Carya texana* is the only diagnostic hickory, though it may be limited to the subcanopy with blackjack oak. Shrubs are generally sparse. *Vaccinium arboreum* is the best diagnostic tall shrub, while *Vaccinium vacillans*, *Vaccinium stamineum*, and *Ceanothus americanus* are the best diagnostic short shrubs. *Vitis aestivalis* is the most abundant woody vine, though it is not particularly diagnostic. Diagnostic herbaceous species should include *Tephrosia virginiana*, *Cunila organoides*, *Schizachyrium scoparium*, *Solidago radula*, *Panicum linearifolium*, *Carex nigromarginata*, *Antennaria plantaginifolia*, *Hieracium gronovii*, *Helianthus strumosus*, *Baptisia leucophaea*, *Aster patens*, *Galactia volubilis*, *Desmodium nuttallii*, *Andropogon gerardii*, *Lespedeza hirta*, *Solidago hispida*, and *Solidago nemoralis*.

**Global Vegetation:** The vegetation contains an open canopy dominated by *Pinus echinata* codominating with *Quercus stellata* and *Quercus marilandica*, either singly or in combination. *Pinus echinata* may form an emergent canopy over the oaks. Common woody associates include *Carya texana*, *Quercus velutina*, and *Diospyros virginiana*. Grassy openings are dominated by *Schizachyrium scoparium*. Other abundant herbs include *Baptisia bracteata*, *Helianthus hirsutus*, *Liatris aspera*, *Solidago nemoralis*, *Solidago petiolaris*, and *Tephrosia virginiana*.

**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**



## Appendix 15. ONSR USNVC Natural Community Descriptions

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus velutina</i>
Tree canopy	Needle-leaved evergreen tree	<i>Pinus echinata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Amelanchier arborea</i>
Short shrub	Broad-leaved deciduous	<i>Vaccinium stamineum</i>
	Vine	<i>Vitis aestivalis</i>
Herb	Graminoid	<i>Schizachyrium scoparium</i>
Herb	Forb	<i>Tephrosia virginiana</i>

### Global Stratum

### Lifeform

### Species

#### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Pinus echinata*, *Quercus stellata*, *Quercus velutina*, *Quercus marilandica*, *Carya texana*, *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, *Galactia volubilis*, *Andropogon gerardii*, *Lespedeza hirta*, *Tephrosia virginiana*, *Cunila origanoides*, *Schizachyrium scoparium*, *Solidago radula*, *Panicum linearifolium*

**Global:**

#### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G2G3 (22-Oct-2002). High-quality examples of this community are rare throughout its range, most sites having been chronically fire-suppressed, resulting in a loss of the characteristic open canopy cover and the grassy understory. This community is also threatened by forest type conversion, and residential, agricultural, and commercial development. The final resolution of its rank and its rarity depends on the determination of its total global range. It is vulnerable to logging, development, invasion by exotic plant species, and fire exclusion. Shortleaf pine (*Pinus echinata*) populations seem to have undergone rangewide declines in the vigor and extent. Stands of this association are threatened by the effects of continued fire suppression, which would inhibit the reproduction of *Pinus echinata* and cause the grass-dominated herbaceous layer to deteriorate.

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 1 - Strong

**Ozark National Scenic Riverways Comments:** This represents the most xeric of the pine-oak communities within the study area. The presence of pine with significant amounts of post and blackjack oak in an open canopy is the best identifying feature of this community. The most similar pine-mixed oak community would be the *Pinus echinata-Quercus velutina-Quercus stellata* / *Vaccinium* spp. Forest (CEGL002401). That type will have a more fully closed and taller canopy. Black oak and scarlet oak will dominate rather than post oak, though compositionally the two are quite similar. The shrub and groundflora layers will be fuller in the forest type.

**Global Comments:** See related oak-dominated vegetation in the *Quercus stellata - Quercus marilandica* Woodland Alliance (A.625), and see *Pinus echinata - Quercus velutina - Quercus stellata* / *Vaccinium* spp. Forest (CEGL002401), a similar dry forest type. The equivalent dry-mesic pine - oak type is *Pinus echinata - Quercus alba* / *Schizachyrium scoparium* Woodland (CEGL002394).

#### **Global Similar Associations:**

- *Pinus echinata - Quercus alba* / *Schizachyrium scoparium* Woodland (CEGL002394)--the dry-mesic pine - oak equivalent.
- *Pinus echinata - Quercus velutina - Quercus stellata* / *Vaccinium* spp. Forest (CEGL002401)
- *Pinus echinata* / Rock Outcrop Interior Highland Woodland (CEGL002402)
- *Pinus echinata* / *Vaccinium (arboreum, pallidum, stamineum)* Forest (CEGL002400)

#### **Global Related Concepts:**

- Shortleaf Pine - Oak: 76 (Eyre 1980) B

#### OTHER COMMENTS

**Other Comments:**

#### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is an infrequent community within the study area, occurring only in the most xeric landscape positions (ELT's 3, 19, 23 and 25; Nigh *et al.* 2000).

**Global Range:** This shortleaf pine - oak woodland is found in the Ozark-Ouachita region of the United States, ranging from southern Missouri to Arkansas and eastern Oklahoma.

**Nations:** US

**States/Provinces:** AR, MO, OK

**USFS Ecoregions:** 222Am:CP?, 231G:CC, M222A:CC, M231A:CC

**Federal Lands:** NPS (Ozark); USFS (Ouachita, Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** AS\_19\_21, CB1087, GN1965, PM\_19\_01, SL351B

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Bruner 1931, Cantwell 1981, Duck and Fletcher 1945, Eyre 1980, Hoagland 2000, Johnson 1986, Kennedy 1973, Masters *et al.* 1995, Nigh *et al.* 2000, Osborn 1941, Rice 1963, Rice and Penfound 1959, Rosson 1995, Southeastern Ecology Working Group n.d., TNDH unpubl. data, Taylor 1965, Turner *et al.* 1997, Zandoni *et al.* 1979



**Figure 60.** This Shortleaf Pine-Post Oak-Blackjack Oak / Little Bluestem Woodland (CEGL002393) occurs on the upslope side of an area with dolomite outcrops. Therefore, eastern red cedar (*Juniperus virginiana*) and other calciphiles are present in a community typically dominated by plants that thrive in acidic soils.



**Figure 61.** This Shortleaf Pine-Post Oak-Blackjack Oak / Little Bluestem Woodland (CEGL002393) occurs on a ridge top and has a canopy foliar cover toward the upper limit for this community. Note that nearly all of the groundflora cover is provided by woody species and not by herbaceous species.



**Figure 62. This Shortleaf Pine-Post Oak-Blackjack Oak / Little Bluestem Woodland (CEGL002393) occurs on a south or west facing shoulder. One should expect the canopy to become more fully developed as the slope levels off toward the summit (right). The canopy should become more open down slope (left).**



**Figure 63. This Shortleaf Pine-Post Oak-Blackjack Oak / Little Bluestem Woodland (CEGL002393) has benefited from repeated prescribed burning that has reduced canopy cover by eliminating fire-intolerant and less vigorous trees. Note the steep slope, dead woody stems, and copious resprouting of top-killed woody stems.**

***Hamamelis vernalis* - *Cornus obliqua* - *Hypericum prolificum* Shrubland****Spring Witch-hazel - Pale Dogwood - Shrubby St. John's-wort Shrubland****Witch-hazel - Dogwood Gravel Wash****Identifier: CEGL003898****USNVC Classification**

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Temporarily flooded cold-deciduous shrubland (III.B.2.N.d.)
Alliance	<i>Hamamelis vernalis</i> Temporarily Flooded Shrubland Alliance (A.944)
Alliance (English name)	Spring Witch-hazel Temporarily Flooded Shrubland Alliance
Association	<i>Hamamelis vernalis</i> - <i>Cornus obliqua</i> - <i>Hypericum prolificum</i> Shrubland
Association (English name)	Spring Witch-hazel - Pale Dogwood - Shrubby St. John's-wort Shrubland
Association (Common name)	Witch-hazel - Dogwood Gravel Wash

**Ecological System(s):**

<b>ONSR Community Type:</b>	Active Channel/Gravel Bar Communities
<b>ONSR Ecological System:</b>	Riverine Shrublands/Herbaceous Communities
<b>Global Ecological System:</b>	Ozark-Ouachita Riparian (CES202.703)

**ELEMENT CONCEPT**

**Global Summary:** This witch-hazel - dogwood gravel wash occurs in the Ozarks-Ouachita region of the United States. This shrubland occurs as narrow strips (1-10 m wide) in the upper scour zones of small to medium-sized streams. It is typically found in a substrate of loose cobble, but on larger streams and rivers may occur on bedrock shelves or alluvial silt, where it intergrades with other vegetation types. *Hamamelis vernalis*, *Cornus obliqua* (= *Cornus amomum* ssp. *obliqua*), and *Hypericum prolificum* are common and characteristic. Several other species may be locally abundant in the diverse microhabitats of this shrubland, including *Salix caroliniana* in more open streambeds, *Leptopus phyllanthoides* (= *Andrachne phyllanthoides*) in drier scour zones, *Juniperus virginiana* var. *virginiana* in upper scour zones, *Ilex vomitoria* on bedrock and boulders on larger streams, and *Alnus serrulata* and *Cephalanthus occidentalis* in low, wet areas. On more stable substrates *Platanus occidentalis*, *Acer rubrum*, and *Liquidambar styraciflua* may be locally abundant. Other shrub and tree species that may occur include *Amorpha fruticosa*, *Amorpha ouachitensis*, *Betula nigra*, *Crataegus* spp., *Diospyros virginiana*, *Ulmus alata*, *Hypericum prolificum*, *Ilex decidua*, *Styrax grandifolius*, and *Vaccinium virgatum*. Herbaceous species include *Amsonia illustris*, *Amsonia hubrichtii*, *Ambrosia* spp., *Apios americana*, *Boltonia diffusa*, *Chasmanthium latifolium*, *Commelina erecta*, *Diodia virginiana*, *Eupatorium fistulosum*, *Ludwigia decurrens*, *Polygonum pennsylvanicum*, *Vernonia lettermannii*, *Panicum virgatum*, *Panicum anceps*, and *Perilla frutescens* (exotic). *Trachelospermum difforme* is a common vine of this community.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Riverine

**Ozark National Scenic Riverways Environment:** This is an uncommon community. Along the main rivers it appears to be limited to gravel bars where the underlying bedrock provides additional stability and a more basic soils substrate (ELT 17; Nigh *et al.* 2000). Gravel may be present or absent. The same relationships may exist in intermittent streams where this community also occurs (ELT 13; Nigh *et al.* 2000). Flooding occurs at least once annually.

**Global Environment:** This shrubland occurs as narrow strips (1-10 m wide) in the upper scour zones of small to medium-sized streams. It is typically found in a substrate of loose cobble, but on larger streams and rivers may occur on bedrock shelves or alluvial silt, where it intergrades with other vegetation types (J. Campbell pers. comm. 1994, D. Zollner pers. comm. 1994).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** Trees are generally absent, though scattered sycamore (*Platanus occidentalis*) may be emergent. Diagnostic shrubs include *Salix caroliniana*, *Hamamelis vernalis*, *Alnus serrulata*, and *Amorpha fruticosa*. The frequent occurrence of *Cercis canadensis* and *Carpinus caroliniana* may indicate high base saturation in the soils. Diagnostic woody vines include *Vitis rupestris*, while *Rhus radicans* and *Parthenocissus quinquefolia* may also be present. The most abundant herbaceous species include *Andropogon gerardii*, *Panicum virgatum*, *Vernonia crinita*, and *Isanthus brachiatus*. Other common species that may be diagnostic include *Kuhnia eupatorioides*, *Chasmanthium latifolium*, *Saponaria officinalis*, *Hedyotis nigricans*, and *Dichantheium clandestinum* (= *Panicum clandestinum*).

**Global Vegetation:** *Hamamelis vernalis*, *Cornus obliqua* (= *Cornus amomum* ssp. *obliqua*), and *Hypericum prolificum* are common and characteristic. Several other species may be locally abundant in the diverse microhabitats of this shrubland, including *Salix caroliniana* in more open streambeds, *Leptopus phyllanthoides* (= *Andrachne phyllanthoides*) in drier scour zones, *Juniperus virginiana* var. *virginiana* in upper scour zones, *Ilex vomitoria* on bedrock and boulders on larger streams, and *Alnus serrulata* and

## Appendix 15. ONSR USNVC Natural Community Descriptions

*Cephalanthus occidentalis* in low, wet areas. On more stable substrates *Platanus occidentalis*, *Acer rubrum*, and *Liquidambar styraciflua* may be locally abundant. Other shrub and tree species that may occur include *Amorpha fruticosa*, *Amorpha ouachitensis*, *Betula nigra*, *Crataegus* spp., *Diospyros virginiana*, *Ulmus alata*, *Hypericum prolificum*, *Ilex decidua*, *Styrax grandifolius*, and *Vaccinium virgatum*. Herbaceous species include *Amsonia illustris*, *Amsonia hubrichtii*, *Ambrosia* spp., *Apios americana*, *Boltonia diffusa*, *Chasmanthium latifolium*, *Commelina erecta*, *Diodia virginiana*, *Eupatorium fistulosum*, *Ludwigia decurrens*, *Polygonum pennsylvanicum*, *Vernonia lettermannii*, *Panicum virgatum*, *Panicum anceps*, and *Perilla frutescens* (exotic). *Trachelospermum difforme* is a common vine of this community (J. Campbell 1994, D. Zollner 1994).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Emergent Tree canopy	Broad-leaved deciduous tree	<i>Platanus occidentalis</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Salix caroliniana</i>
	Vine	<i>Vitis rupestris</i>
Herb	Graminoid	<i>Andropogon gerardii</i> , <i>Panicum virgatum</i>
Herb	Forb	<i>Isanthus brachiatus</i> , <i>Vernonia crinita</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Hamamelis vernalis*, *Salix caroliniana*, *Alnus serrulata*, *Cornus obliqua*, *Amorpha fruticosa*, *Vitis rupestris*, *Rhus radicans*, *Andropogon gerardii*, *Panicum virgatum*, *Isanthus brachiatus*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:** *Centaurea maculosa*

**Global:** *Amorpha ouachitensis*, *Amsonia hubrichtii*, *Vernonia lettermannii*

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G3 (11-Jan-1998). This association is geographically restricted, occurring only in the Interior Highlands of Arkansas, Oklahoma, and Missouri. Degradation of streambanks due to grazing and other agricultural influences can have a detrimental impact on this community type.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Our data suggest many similarities between this community and the *Salix caroliniana* Temporarily Flooded Shrubland (CEGL003899). These similarities may support the idea of combining the two types into one. However, The community described here appears to be limited to gravel bars where dolomitic bedrock is at or near the surface, where it increases base saturation sufficiently to significantly alter species composition.

**Global Comments:** This association was defined from a TNC Arkansas Field Office survey in the Ouachita Mountains, Oklahoma and Arkansas, covering areas that are not part of the Ouachita National Forest (J. Campbell pers. comm. 1994, D. Zollner pers. comm. 1994). In Missouri it may be difficult to separate this type from *Salix caroliniana* Temporarily Flooded Shrubland (CEGL003899). See also *Juniperus virginiana* var. *virginiana* - *Leptopus phyllanthoides* - (*Quercus nigra*, *Ilex vomitoria*) Shrubland (CEGL003942), which may be a zone of this type.

**Global Similar Associations:**

- *Alnus serrulata* - *Amorpha fruticosa* Shrubland (CEGL007807)
- *Juniperus virginiana* var. *virginiana* - *Leptopus phyllanthoides* - (*Quercus nigra*, *Ilex vomitoria*) Shrubland (CEGL003942)
- Midwest Gravel Wash River Sparse Vegetation (CEGL002408)
- *Salix caroliniana* Temporarily Flooded Shrubland (CEGL003899)

**Global Related Concepts:**

### OTHER COMMENTS

**Other Comments:**

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is uncommon in the park. It occurs on gravel bars and sand bars near the river channel and on gravel washes of intermittent streams where flooding occurs at least once annually (ELT's 13 and 17, respectively; Nigh *et al.* 2000).

**Global Range:** This witch-hazel - dogwood gravel wash occurs in the Ozarks-Ouachita region of the United States, from Missouri to Arkansas and Oklahoma.

**Nations:** US

**States/Provinces:** AR, MO, OK

**USFS Ecoregions:** 222A:CC, 231Gb:CCC, M231A:CC

**Federal Lands:** NPS (Ozark); USFS (Mark Twain, Ouachita, Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** PM\_17\_06, RIP\_AS2C, RIP\_AS2E

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Zollner and J. Campbell

**References:** Campbell 1994., Hoagland 1997, Hoagland 2000, Nigh *et al.* 2000, Southeastern Ecology Working Group n.d., Zollner 1994.



**Figure 64.** This Spring Witch-hazel-Pale Dogwood-Shrubby St. John's Wort Shrubland (CEGL003898) exhibits the abundant shrubs typical of the community type. Note how young sycamore saplings are also present (left). Rarely will these reach maturity in actively flooded areas.



**Figure 65.** Dolomite outcrops provide stability for shrubby species in an area with frequent high-intensity flood events. While this particular example of a Spring Witch-hazel-Pale Dogwood-Shrubby St. John's Wort Shrubland (CEGL003898) occurred along the main river, they will frequently occur in upland waterways. In either case, whether or not dolomite is visible at the surface, one can expect to see plants that thrive in basic soils, such as the redbud on the left.

## ***Salix caroliniana* Temporarily Flooded Shrubland**

**Carolina Willow Temporarily Flooded Shrubland**

**Carolina Willow Shrubland**

**Identifier: CEG003899**

### **USNVC Classification**

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Temporarily flooded cold-deciduous shrubland (III.B.2.N.d.)
Alliance	<i>Salix caroliniana</i> Temporarily Flooded Shrubland Alliance (A.946)
Alliance (English name)	Carolina Willow Temporarily Flooded Shrubland Alliance
Association	<i>Salix caroliniana</i> Temporarily Flooded Shrubland
Association (English name)	Carolina Willow Temporarily Flooded Shrubland
Association (Common name)	Carolina Willow Shrubland

### **Ecological System(s):**

<b>ONSR Community Type:</b>	Active Channel/Gravel Bar Communities
<b>ONSR Ecological System:</b>	Riverine Shrublands/Herbaceous Communities
<b>Global Ecological System:</b>	Florida River Floodplain Marsh (CES203.055)
	Floridian Highlands Freshwater Marsh (CES203.077)
	Florida Rivers Freshwater Marsh (CES203.198)
	Southern Piedmont Small Floodplain and Riparian Forest (CES202.323)
	Atlantic Coastal Plain Large River Floodplain Forest (CES203.066)
	South-Central Interior Large Floodplain (CES202.705)
	Atlantic Coastal Plain Small Blackwater River Floodplain Forest (CES203.249)
	East Gulf Coastal Plain Large River Floodplain Forest (CES203.489)

### **ELEMENT CONCEPT**

**Global Summary:** This carolina willow shrubland type is found widely throughout the southeastern United States. This is a broadly defined type for riverside and streamside thickets dominated by *Salix caroliniana*. Further information is needed to characterize this type.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Riverine

**Ozark National Scenic Riverways Environment:** This is a common community on gravel bars along the major rivers (ELT 17; Nigh *et al.* 2000). These communities are flooded at least once annually. Surface soils are composed of gravel and sand.

**Global Environment:** This is a broadly defined type accommodates *Salix caroliniana* stands in a variety of temporarily flooded habitats, including riverside and streamside thickets. Some examples may be somewhat ruderal or successional, e.g., where *Salix caroliniana* thickets develop along streams in pastures or other wet areas where the natural forest canopy has been removed.

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** This community consists of a short, dense canopy of *Salix caroliniana* and *Platanus occidentalis*. *Salix interior* and *Salix rigida* may also be present in lesser amounts. *Platanus occidentalis* may be emergent and include many large diameter stems frequently damaged by flooding. It is present frequently enough and abundantly enough to warrant inclusion in the association name. *Hamamelis vernalis* may be present in small amounts. Vines are relatively rare, but may include *Rhus radicans*, *Parthenocissus quinquefolia*, and *Vitis* spp. Diagnostic vines include *Ampelopsis chordata*, *Aristolochia tomentosa*, and *Vitis rupestris*, though none occur frequently. Groundflora is composed primarily of early successional species that respond well to disturbance, with no particularly dominant species. Common diagnostic species include *Amsonia illustris*, *Chasmanthium latifolium* (= *Uniola latifolia*), *Justicia americana*, *Saponaria officinalis*, *Eupatorium coelestinum*, *Diodea teres*, *Pilea pumila*, *Boehmeria cylindrica*, *Xanthium strumarium*, *Lespedeza cuneata*, and members of the genera *Polygonum* and *Bidens*.

**Global Vegetation:** This is a broadly defined community covering thickets dominated by *Salix caroliniana*. A number of other shrub species may also be present, with some variability between geographic location and specific habitat type. In north-central Florida other shrubs include *Sambucus canadensis*, *Baccharis halimifolia*, and *Morella cerifera* (= *Myrica cerifera*) (Patton and Judd 1986). Further information is needed to characterize this type.

### **MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Emergent Tree canopy	Broad-leaved deciduous tree	<i>Platanus occidentalis</i>

Appendix 15. ONSR USNVC Natural Community Descriptions

Tall shrub/sapling	Broad-leaved deciduous	<i>Salix caroliniana</i>
	Vine	<i>Rhus radicans</i>
Herb	Graminoid	<i>Chasmanthium latifolium</i>
Herb	Forb	<i>Justicia americana</i>

**Global**

**Stratum**

**Lifeform**

**Species**

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Platanus occidentalis*, *Salix caroliniana*, *Salix interior*, *Salix rigida*, *Hamamelis vernalis*, *Justicia americana*, *Saponaria officinalis*, *Eupatorium coelestinum*, *Diodea teres*, *Xanthium strumarium*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4? (19-Sep-2001).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Our data suggest many similarities between this community and the *Hamamelis vernalis*-*Cornus obliqua*-*Hypericum prolificum* Shrubland (CEGL003898). These similarities may support the idea of combining the two types into one. However, while the community described here is common throughout the park, the *Hamamelis vernalis*-*Cornus obliqua*-*Hypericum prolificum* Shrubland (CEGL003898) appears to be restricted in its distribution and may warrant its own description. It appears limited to gravel bars where dolomitic bedrock is at or near the surface such that base saturation of soils affects species composition.

**Global Comments:** Missouri suggests that this type be lumped with *Hamamelis vernalis* - *Cornus obliqua* - *Hypericum prolificum* Shrubland (CEGL003898) as part of a more complex gravel wash shrub type.

**Global Similar Associations:**

- *Alnus serrulata* - *Amorpha fruticosa* Shrubland (CEGL007807)
- *Hamamelis vernalis* - *Cornus obliqua* - *Hypericum prolificum* Shrubland (CEGL003898)
- *Salix interior* - *Salix eriocephala* Sandbar Shrubland (CEGL005078)
- *Salix nigra* / *Carex torta* Temporarily Flooded Shrubland (CEGL006065)

**Global Related Concepts:**

- Gravel Bar Type (Dale and Kuroda 1979) I

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This community is common in the park. It occurs on gravel bars and sand bars near the river channel where flooding occurs at least once annually (ELT 17; Nigh *et al.* 2000).

**Global Range:** This carolina willow shrubland type is found widely throughout the southeastern United States, from Arkansas (and possibly Missouri), east to North Carolina and possibly Virginia, and south to Florida.

**Nations:** US

**States/Provinces:** AL?, AR, FL, GA, KY, MO?, NC, SC, TN, VA?

**USFS Ecoregions:** 221H:PP, 222Aa:CPP, 222Ae:CP?, 222Af:CPP, 222Ag:CP?, 231:C, 232Bq:CCC, M222Aa:CPP, M231:C

**Federal Lands:** DOD (Fort Gordon); NPS (Buffalo, Ozark, Stones River); USFS (Daniel Boone?, Ouachita, Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** BS\_17\_17, RIP\_BC1C, RIP\_BC2E, RIP\_BC3C, RIP\_CM2E, RIP\_GN3D, RIP\_PS2E, RIP\_RS1D, RIP\_RS3C, RIP\_RS3D, RIP\_TR3D

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** K.D. Patterson?

**References:** Dale and Kuroda 1979, NatureServe Ecology - Southeastern U.S. unpubl. data, Nigh *et al.* 2000, Patton and Judd 1986, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d., TNDH unpubl. Data





**Figure 66. This is the typical appearance of a Carolina Willow Temporarily Flooded Shrubland (CEGL003899). Frequently, sycamore stems that have been repeatedly broken off by flooding events will form an emergent canopy layer. The diameters of the trunks of these stems may be quite large near the ground.**



**Figure 67. Usually, the Carolina Willow Temporarily Flooded Shrubland (CEGL003899) occurs in conjunction with herbaceous gravel bars. When large enough, each community should be mapped independently. Where neither is large enough to be mapped independently, they should be mapped as a complex. If one community is clearly dominant, the area should be mapped as that type, with a note indicating inclusions of the other.**

**(*Carex interior*, *Carex lurida*) - *Carex leptalea* - *Parnassia grandifolia* - *Rhynchospora capillacea* Herbaceous Vegetation****(Inland Sedge, Sallow Sedge) - Little Bog Sedge - Largeleaf Grass-of-Parnassus - Limestone Beaksedge****Herbaceous Vegetation****Ozark Fen****Identifier: CEGL002404****USNVC Classification**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Saturated temperate or subpolar grassland (V.A.5.N.m.)
Alliance	<i>Carex lurida</i> - <i>Carex leptalea</i> - ( <i>Carex atlantica</i> , <i>Carex interior</i> , <i>Parnassia grandifolia</i> ) Saturated Herbaceous Alliance (A.1452)
Alliance (English name)	Sallow Sedge - Little Bog Sedge - (Prickly Bog Sedge, Inland Sedge, Largeleaf Grass-of-Parnassus) Saturated Herbaceous Alliance
Association	( <i>Carex interior</i> , <i>Carex lurida</i> ) - <i>Carex leptalea</i> - <i>Parnassia grandifolia</i> - <i>Rhynchospora capillacea</i> Herbaceous Vegetation
Association (English name)	(Inland Sedge, Sallow Sedge) - Little Bog Sedge - Largeleaf Grass-of-Parnassus - Limestone Beaksedge Herbaceous Vegetation
Association (Common name)	Ozark Fen

**Ecological System(s):****ONSR Community Type:** Fens**ONSR Ecological System:** Fens**Global Ecological System:** Central Interior Acidic Cliff and Talus (CES202.689)

Ozark-Ouachita Fen (CES202.052)

Ozark-Ouachita Riparian (CES202.703)

**ELEMENT CONCEPT**

**Global Summary:** This fen community type is found in the Ozarks region of the United States. Stands occurs on the sideslopes of hills in narrow valleys, bases of bluffs, rock ledges, and terraces, where the soil or substrate is saturated by calcareous groundwater seepage. Soils are mucky peat or mineral, with pH above 6.5, and very shallow (0-40 cm), depending on natural disturbance and slope. The parent material is a mixture of gravel and dolomite with fragments of deeply weathered bedrock present. The bedrock strata are exposed, especially in hanging fens where the slope is greater than 35 degrees. Hydrophytic plants dominate this mixed grass or sedge fen that is a complex of zoned vegetation. Type 1) saturated areas dominated by tussock sedges such as *Carex interior* and *Carex lurida*; Type 2) deep muck saturated areas, dominated by those sedges and by *Carex hystericina*, *Carex subrecta*, and the shrub *Alnus serrulata*; Type 3) marly ooze areas dominated by *Carex leptalea*, *Rhynchospora capillacea*, and *Scleria verticillata*; Type 4) drier areas or margins dominated by *Andropogon gerardii*, *Rudbeckia fulgida* var. *umbrosa*, and *Parnassia grandifolia*. Characteristic species include *Menyanthes trifoliata* and *Pogonia ophioglossoides*. Other species present in most examples include *Carex hystericina*, *Castilleja coccinea*, *Fuirena simplex*, *Helenium autumnale*, *Lobelia siphilitica*, *Schoenoplectus americanus* (= *Scirpus americanus*), *Scirpus atrovirens*, *Scirpus pendulus* (= *Scirpus lineatus*), *Selaginella apoda*, *Packera aurea* (= *Senecio aureus*), and *Oligoneuron rigidum* var. *rigidum* (= *Solidago rigida* ssp. *rigida*). Deep muck fens may also contain *Thelypteris palustris* var. *pubescens*, *Lysimachia quadriflora*, *Selaginella eclipses*, *Rudbeckia fulgida* var. *umbrosa*, *Carex granularis*, *Oxypolis rigidior*, *Physocarpus opulifolius*, *Pedicularis lanceolata*, *Cardamine bulbosa*, and *Viola cucullata*.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Palustrine**Ozark National Scenic Riverways Environment:** This community occurs in saturated, often marly soils on Eminence Dolomite. Bedrock is usually exposed or just under the soil surface. The environmental parameters provided in the current USNVC are well documented (Faber-Langendoen 2001).**Global Environment:** This community occurs on the sideslopes or toeslopes of hills in narrow valleys, bases of bluffs, rock ledges, and terraces. It occurs on all aspects and on a slope of 5-45 degrees. The soil or substrate is saturated by groundwater seepage. The soil conditions are the result of the underlying substrate and vegetation. In this fen community, the soil moisture gradient ranges from moist to wet with seasonal fluctuations. The groundwater is calcareous. The soil is mucky peat or mineral, with pH above 6.5, and varies from very shallow (0-40 cm) to deep (>100 cm), depending on natural disturbance and slope. The parent material is a mixture of gravel and dolomite with fragments of deeply weathered bedrock present. The bedrock strata are exposed in more shallow soil

## Appendix 15. ONSR USNVC Natural Community Descriptions

examples, especially in hanging fens where the slope is greater than 35 degrees, they or may be undetectable in deeper muck examples (Nelson 1985).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** The vegetative description provided in the current USNVC is appropriate and well documented (Faber-Langendoen 2001). This community is dominated by herbaceous species, though woody stems can frequently be found along the margins and in deep soil pockets. We sampled only one example, in which we found *Salix caroliniana*, *Platanus occidentalis*, and *Juniperus virginiana*. Other woody calciphiles include *Fraxinus pennsylvanicus*, *Lindera benzoin*, and *Carpinus caroliniana*. Woody vines included *Campsis radicans* and *Rhus radicans*. Herbaceous cover was dominated by members of the family Cyperaceae, including *Carex lurida*, *C. hystericina*, *C. suberecta*, *C. annectens*, *C. normalis*, *Fuirena simplex*, *Juncus interior*, and *Scleria verticillata*. All of these are good diagnostic species. Species recorded from the family Poaceae include *Glyceria striata*, *Leersia oryzoides*, and *Dichanthelium clandestinum* (= *Panicum clandestinum*). Abundant herbaceous forbs included *Rudbeckia fulgida*, *Eupatorium perfoliatum*, and *Sagittaria latifolia*. *Parnassia grandiflora* and *Rhynchospora capillacea* are good diagnostic species, though we did not encounter any in our sampling.

**Global Vegetation:** Hydrophytic plants dominate this community. It is a mixed-grass or sedge fen that is composed of different types of vegetation. Type 1) saturated areas dominated by tussock sedges such as *Carex interior* and *Carex lurida*; Type 2) deep muck saturated areas, dominated by those sedges and by *Carex hystericina*, *Carex suberecta*, and the shrub *Alnus serrulata*; Type 3) marly ooze areas dominated by *Carex leptalea*, *Rhynchospora capillacea*, and *Scleria verticillata*; Type 4) drier areas or margins dominated by *Andropogon gerardii*, *Rudbeckia fulgida* var. *umbrosa*, and *Parnassia grandifolia*. Characteristic species include *Menyanthes trifoliata* and *Pogonia ophioglossoides*. Other species present in most examples include *Carex hystericina*, *Castilleja coccinea*, *Fuirena simplex*, *Helenium autumnale*, *Lobelia siphilitica*, *Schoenoplectus americanus* (= *Scirpus americanus*), *Scirpus atrovirens*, *Scirpus lineatus*, *Selaginella apoda*, *Packera aurea* (= *Senecio aureus*), and *Oligoneuron rigidum* var. *rigidum* (= *Solidago rigida* ssp. *rigida*). Deep muck fens may also contain *Thelypteris palustris* var. *pubescens*, *Lysimachia quadriflora*, *Selaginella eclipses*, *Rudbeckia fulgida* var. *umbrosa*, *Carex granularis*, *Oxypolis rigidior*, *Physocarpus opulifolius*, *Pedicularis lanceolata*, *Cardamine bulbosa*, and *Viola cucullata* (Nelson 1985, T. Nigh pers. comm. 1996).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Platanus occidentalis</i>
Tall shrub/sapling	Needle-leaved evergreen	<i>Juniperus virginiana</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Salix caroliniana</i>
Short shrub	Broad-leaved deciduous	<i>Lindera benzoin</i>
	Vine	<i>Campsis radicans</i> , <i>Rhus radicans</i>
Herb	Graminoid	<i>Juncus interior</i> , <i>Scirpus lineatus</i> , <i>Carex hystericina</i> , <i>Carex lurida</i> , <i>Carex suberecta</i> , <i>Fuirena simplex</i>
Herb	Forb	<i>Rudbeckia fulgida</i> , <i>Aster lateriflorus</i> , <i>Eupatorium perfoliatum</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb	Forb	<i>Parnassia grandifolia</i> , <i>Rudbeckia fulgida</i> var. <i>umbrosa</i>
Herb	Graminoid	<i>Andropogon gerardii</i> , <i>Carex interior</i> , <i>Carex leptalea</i> , <i>Carex lurida</i> , <i>Rhynchospora capillacea</i> , <i>Scleria verticillata</i>

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Rudbeckia fulgida*, *Juncus interior*, *Scirpus lineatus*, *Carex hystericina*, *Carex lurida*, *Carex suberecta*, *Fuirena simplex*, *Carex annectens*, *Parnassia grandiflora*, *Pycnanthemum virginianum*

**Global:** *Carex interior*, *Carex leptalea*, *Carex lurida*, *Menyanthes trifoliata*, *Parnassia grandifolia*, *Pogonia ophioglossoides*, *Rhynchospora capillacea*, *Rudbeckia fulgida* var. *umbrosa*, *Scleria verticillata*

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:** *Scleria verticillata*

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G2G3 (22-Jun-1998). Although numerous sites of this community remain, many are threatened by overgrazing. This community may suffer permanent loss of water because of local hydrologic changes. In Arkansas, occurrences are 0.5- to 1-acre areas along streams with exposed cliffline and seepage (P. Hyatt pers. comm. Date unknown).

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Only one example was sampled during this study. However, due to the rarity of this community and the subsequent concern that resource managers have for it, it is highly studied and its properties are well understood.

## Appendix 15. ONSR USNVC Natural Community Descriptions

**Global Comments:** This community type is based largely on work by S. Orzell *et al.* (1984, 1985a, 1985b). Although numerous sites of this community remain, many are threatened by overgrazing. This community may suffer permanent loss of water because of local hydrologic changes. In Arkansas, occurrences are 0.5- to 1-acre areas along streams with exposed cliffline and seepage (P. Hyatt pers. comm. Date unknown). The composition of Arkansas occurrences may vary sufficiently from this description to warrant another association. *Carex interior* is very restricted in Arkansas.

### **Global Similar Associations:**

- *Alnus serrulata* Saturated Southern Shrubland (CEGL003912)
- *Carex interior* - *Carex lurida* - *Andropogon gerardii* - *Parnassia grandifolia* Herbaceous Vegetation (CEGL002416)
- *Carex lurida* - *Carex leptalea* - *Parnassia grandifolia* - *Juncus brachycephalus* - (*Xyris tennesseensis*) Herbaceous Vegetation (CEGL004161)

### **Global Related Concepts:**

- IIE1b. Calcareous Fen Complex (Allard 1990) B
- P5B2c11a. *Parnassia grandifolia*-*Carex lurida* (Foti *et al.* 1994) ?
- Palustrine (Cowardin *et al.* 1979) B
- Sedge-Shrub Fen (Orzell *et al.* 1985) ?
- Streamside Seep-fen (Orzell *et al.* 1985) ?

### **OTHER COMMENTS**

**Other Comments:** Eight examples of this type are recorded in the Missouri Natural Heritage Database (Missouri Department of Conservation 2000). Of these, only two occur on NPS lands. Two other examples were encountered in this study. However, given the rarity of this type, it may be poorly mapped.

### **ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is one of the rarest communities within the study area. It is limited to slopes and drains where Eminence Dolomite is at or near the surface. It seems to be more abundant in the Igneous Knobs Landtype Association (Nigh *et al.* 2000). This association will frequently include areas that may appropriately be classified as the *Carex interior*-*Carex lurida*-*Andropogon gerardii*-*Parnassia grandifolia* Herbaceous Vegetation (CEGL002416). However, the current USNVC description for the community described here allows for the possibility that such inclusions may occur as part of an interwoven fen complex. If such is the case, it may be appropriate to combine these two types into the association described here. In most cases, such complexes as a whole are smaller than the minimum mapping unit and are treated as a single management unit. Therefore, these communities will typically be mapped as a point feature.

**Global Range:** This fen community type is found in the Ozarks region of the United States, particularly in the central part of southern Missouri and Arkansas.

**Nations:** US

**States/Provinces:** AR, MO

**USFS Ecoregions:** 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Al:CCC, 222An:CCC

**Federal Lands:** DOD (Bull Shoals Lake); NPS (Buffalo, Ozark); USFS (Mark Twain, Ozark)

### **ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:** Only one example was found during this study. Plot-level data were collected.

**Ozark National Scenic Riverways Plots:** PM\_18\_21

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. J. Drake, D. Faber-Langendoen, and D. Ambrose 03-94, mod. D. Faber-Langendoen

**References:** Allard 1990, Cowardin *et al.* 1979, Faber-Langendoen 2001, Foti 1994, Foti *et al.* 1994, Hyatt (date unknown), Midwestern Ecology Working Group n.d., Missouri Department of Conservation 2000, Nelson 1985, Nigh 1996, Nigh *et al.* 2000, Orzell 1983, Orzell 1984, Orzell and Pell 1985, Orzell *et al.* 1985



**Figure 68. This small example of a fen ((Inland Sedge, Sallow Sedge)-Little Bog Sedge-Largeleaf Grass-of-Parnassus-Limestone Beaksedge Herbaceous Vegetation (CEGL002404)) occurred at the point of contact with Eminence Dolomite. As is often the case, this example was below the minimum mapping unit of 0.5 ha.**

## ***Schizachyrium scoparium* - *Sorghastrum nutans* - *Bouteloua curtipendula* - *Rudbeckia missouriensis* - *Hedyotis nigricans* Wooded Herbaceous Vegetation**

**Little Bluestem - Yellow Indiangrass - Sideoats Grama - Missouri Coneflower - Narrowleaf Summer Bluets Wooded Herbaceous Vegetation**

**Ozark Dolomite Glade**

**Identifier: CEGL002398**

### **USNVC Classification**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland with a sparse tree layer (V.A.6.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland with a sparse tree layer (V.A.6.N.)
Formation	Bedrock temperate or subpolar grassland with a sparse tree layer (V.A.6.N.q.)
Alliance	( <i>Juniperus virginiana</i> ) / <i>Schizachyrium scoparium</i> - ( <i>Bouteloua curtipendula</i> ) Wooded (A.1919) Herbaceous Alliance
Alliance (English name)	(Eastern Red-cedar) / Little Bluestem - (Sideoats Grama) Wooded Herbaceous Alliance
Association	<i>Schizachyrium scoparium</i> - <i>Sorghastrum nutans</i> - <i>Bouteloua curtipendula</i> - <i>Rudbeckia missouriensis</i> - <i>Hedyotis nigricans</i> Wooded Herbaceous Vegetation
Association (English name)	Little Bluestem - Yellow Indiangrass - Sideoats Grama - Missouri Coneflower - Narrowleaf Summer Bluets Wooded Herbaceous Vegetation
Association (Common name)	Ozark Dolomite Glade

### **Ecological System(s):**

**ONSR Community Type:** Dolomite Woodlands

**ONSR Ecological System:** Upland Oak Woodlands

**Global Ecological System:** Central Interior Highlands Calcareous Glade and Barrens (CES202.691)

### **ELEMENT CONCEPT**

**Global Summary:** This bluestem graminoid dolomite glade community is found in the United States in the Ozark region of Missouri and Arkansas. Stands occur on moderate to steep slopes of dissected hills, steep valley slopes above large rivers and streams. Aspect is variable, but typically southern and western. Soils are rapidly drained (seasonally saturated in winter and spring) and shallow (0-40 cm). The parent material is dolomitic (dolostone) bedrock. The vegetation is dominated by medium-tall grasses and forbs, occasionally with stunted trees and shrubs. Stands are dominated *Schizachyrium scoparium*, *Bouteloua curtipendula*, *Sporobolus heterolepis*, occurring with *Andropogon gerardii*, *Rudbeckia missouriensis*, *Symphotrichum sericeum* (= *Aster sericeus*), *Buchnera americana*, *Oenothera macrocarpa* (= *Oenothera missouriensis*), *Clinopodium arkansanum* (= *Satureja arkansana*), *Sporobolus neglectus*, *Echinacea paradoxa*, *Evolvulus nuttallianus*, *Leavenworthia uniflora*, *Clematis fremontii* (= var. *riehlii*), *Centaurea americana*, *Valerianella ozarkana*, *Yucca glauca*, *Eriogonum longifolium*, *Acacia angustissima*, *Phyllanthus polygonoides*, *Cotinus obovatus*, *Stenosiphon linifolius*, *Palafoxia callosa*, *Centaureum texense*, *Scutellaria bushii*, *Penstemon cobaea* (= var. *purpureus*), *Marshallia caespitosa* var. *signata*, *Thelesperma filifolium* var. *filifolium* (= *Thelesperma trifidum*), *Juniperus ashei*, *Toxicodendron pubescens* (= *Rhus toxicodendron*), and lichens *Lecanora muralis*, *Caloplaca saxicola*, *Placidium lachneum* (= *Dermatocarpon lachneum*), *Psora russellii*, *Placynthium nigrum*. Some additional forbs and grasses from Arkansas occurrences include *Asclepias amplexicaulis*, *Asclepias viridiflora*, *Coreopsis lanceolata*, *Croton capitatus*, *Desmanthus illinoensis*, *Grindelia lanceolata*, *Hedyotis nigricans*, *Liatris cylindracea*, *Minuartia patula*, *Mirabilis albida*, *Onosmodium molle* ssp. *subsetosum*, *Rhynchosia latifolia*, and *Ruellia humilis*.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This community is limited to moderate to steep slopes where dolomitic bedrock is at or near the surface (ELT 7; Nigh *et al.* 2000). Soils are basic. Slopes nearly always have a southern or southwestern exposure. Soil moisture tends to be dry, though bedrock can cause perching of water. Slope profiles tend to be stair-stepped. Fire and marginal soils have typically limited the dense establishment of woody stems.

**Global Environment:** Stands occur on moderate to steep slopes of dissected hills, steep valley slopes above large rivers and streams. Aspect is variable, but typically southern and western. Soils are rapidly drained (seasonally saturated in winter and spring) and shallow (0-40 cm). The parent material is dolomitic (dolostone) bedrock interspersed with abundant rock fragments and often dissected by horizontal layers of exposed dolomite bedrock (Nelson 1985).

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The vegetation is dominated by medium-tall grasses and forbs, occasionally with stunted trees and shrubs. Woody species tend to occur in small clumps and rarely exceed 5 meters in height. Typical diagnostics trees

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and shrubs include *Juniperus virginiana*, *Quercus muehlenbergii*, *Celtis tenuifolia*, *Bumelia lanuginosa* var. *oblongifolia*, *Frangula caroliniana* (= *Rhamnus caroliniana*), and *Cercis canadensis*. *Smilax bona-nox* is a common, diagnostic woody vine. Herbaceous cover is typically diverse due to the variability of both soil moisture and depth. Common species may include *Schizachyrium scoparium*, *Andropogon gerardii*, *Bouteloua curtipendula*, *Sorghastrum nutans*, *Sporobolus heterolepis*, *Sporobolus neglectus*, *Sporobolus asper*, *Toxicodendron pubescens* (= *Rhus toxicodendron*), *Asclepias viridiflora*, and *Liatris cylindracea*. Other good diagnostic species include *Rudbeckia missouriensis*, *Carex crawei*, *Symphotrichum sericeum* (= *Aster sericeus*), *Symphotrichum oblongifolium* (= *Aster oblongifolius*), *Lithospermum canescens*, *Ratibida pinnata*, *Echinacea pallida*, *Berlandiera texana*, *Oenothera macrocarpa* (= *Oenothera missouriensis*), *Clinopodium arkansanum* (= *Satureja arkansana*), *Scutellaria bushii*, *Coreopsis lanceolata*, *Croton capitatus*, *Hedyotis nigricans*, and *Ruellia humilis*.

**Global Vegetation:** The vegetation is dominated by medium-tall grasses and forbs, occasionally with stunted trees and shrubs. Stands are dominated by *Schizachyrium scoparium*, *Bouteloua curtipendula*, *Sporobolus heterolepis*, occurring with *Andropogon gerardii*, *Rudbeckia missouriensis*, *Symphotrichum sericeum* (= *Aster sericeus*), *Buchnera americana*, *Oenothera macrocarpa* (= *Oenothera missouriensis*), *Clinopodium arkansanum* (= *Satureja arkansana*), *Sporobolus neglectus*, *Echinacea paradoxa*, *Evolvulus nuttallianus*, *Leavenworthia uniflora*, *Clematis fremontii* (= *Clematis fremontii* var. *riehlii*), *Centaurea americana*, *Valerianella ozarkana*, *Yucca glauca*, *Eriogonum longifolium*, *Acacia angustissima*, *Phyllanthus polygonoides*, *Cotinus obovatus*, *Stenosiphon linifolius*, *Palafoxia callosa*, *Centaureum texense*, *Scutellaria bushii*, *Penstemon cobaea* (= *Penstemon cobaea* var. *purpureus*), *Marshallia caespitosa* var. *signata*, *Thelesperma filifolium* var. *filifolium* (= *Thelesperma trifidum*), *Juniperus ashei*, *Toxicodendron pubescens* (= *Rhus toxicodendron*), and lichens (*Lecanora muralis*, *Caloplaca saxicola*, *Placidium lachneum* (= *Dermatocarpon lachneum*), *Psora russellii*, *Placynthium nigrum*) (Nelson 1985). Some additional forbs and grasses from Arkansas occurrences include *Asclepias amplexicaulis*, *Asclepias viridiflora*, *Coreopsis lanceolata*, *Croton capitatus*, *Desmanthus illinoensis*, *Grindelia lanceolata*, *Hedyotis nigricans*, *Liatris cylindracea*, *Minuartia patula*, *Mirabilis albida*, *Onosmodium molle* ssp. *subsetosum*, *Rhynchosia latifolia*, and *Ruellia humilis*.

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Emergent Tree canopy	Broad-leaved deciduous tree	<i>Juniperus virginianus</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Cercis canadensis</i>
	Vine	<i>Smilax bona-nox</i>
Herb	Graminoid	<i>Andropogon gerardii</i> , <i>Schizachyrium scoparium</i>
Herb	Forb	<i>Rudbeckia missouriensis</i> , <i>Hedyotis nigricans</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Juniperus virginiana*, *Schizachyrium scoparium*, *Andropogon gerardii*, *Bouteloua curtipendula*, *Sorghastrum nutans*, *Sporobolus* spp., *Asclepias viridiflora*, *Liatris cylindracea*, *Rudbeckia missouriensis*, *Carex crawei*, *Symphotrichum sericeum*, *Symphotrichum oblongifolium*, *Lithospermum canescens*, *Ratibida pinnata*, *Echinacea pallida*, *Berlandiera texana*, *Oenothera macrocarpa*, *Clinopodium arkansanum*, *Scutellaria bushii*, *Coreopsis lanceolata*, *Croton capitatus*, *Hedyotis nigricans*, *Ruellia humilis*.

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:** *Echinacea paradoxa*, *Scutellaria bushii*, *Valerianella ozarkana*

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G3G4 (24-Oct-2002). This dolomite glade community is found in the United States in the Ozark region of Missouri and Arkansas. Stands occur in relatively restricted dry, thin soil dolomitic habitats on moderate to steep slopes of dissected hills, steep valley slopes above large rivers and streams. Over 200 occurrences and 6000 acres have been documented in Missouri alone. At least two-thirds are A- or B-ranked. Many are protected in a variety of state natural areas, state parks, and other management units that include management of this type for its biodiversity value. Further work on its status in Arkansas is needed.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Though not sampled for this project, dolomite glades are a high management priority for resource managers at ONSR and the communities are much studied. Significant data exist on these communities. The description above was created by removing those species not found typically in ONSR from the existing USNVC global description (Faber-Langendoen 2001), then adding in additional species that frequently occur on dolomite glades within the study area. The species included are by no means exhaustive, given the diversity of these communities.

**Global Comments:** Concept of this type is based on the Missouri state type - dolomite glade (Nelson 1985). Missouri may split this type into three subtypes: (1) White River section: large glades (>10 acres) on Cotter Dolomite. Several endemics are present,

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including *Penstemon cobaea*. (2) Upper/Lower Ozark section: small to medium glades (1-5 acres) on Gasconade and Eminence Dolomite. Indicator species include *Scutellaria bushii*. (3) Ozark Border Section along the Missouri River: medium glades (5-20 acres) on Jefferson City-Cotter Dolomite. Indicator species include *Clematis fremontii*. (M. Leahy pers. comm. 1999)

### Global Similar Associations:

- *Quercus muehlenbergii* / *Schizachyrium scoparium* - *Bouteloua curtipendula* Wooded Herbaceous Vegetation (CEGL005284)
- *Schizachyrium scoparium* - *Bouteloua curtipendula* - *Rudbeckia missouriensis* - *Mentzelia oligosperma* Wooded Herbaceous Vegetation (CEGL002251)

### Global Related Concepts:

- Dolomite Glade (Nelson 1985) ?

## OTHER COMMENTS

### Other Comments:

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is common on the Gasconade Dolomite and Eminence Dolomite within the park, though it frequently occurs in patches below the minimum mapping size. It is limited to slopes where dolomitic bedrock is at or near the surface (ELT 7; Nigh *et al.* 2000).

**Global Range:** This bluestem graminoid dolomite glade community is found in the United States in the Ozarks region of Missouri and Arkansas.

**Nations:** US

**States/Provinces:** AR, MO:S3

**USFS Ecoregions:** 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Aj:CCC, 222Ak:CCC, 222Al:CCC, 222Am:CCC, 222An:CC?, 251:?

**Federal Lands:** NPS (Ozark); USFS (Ozark)

### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** None

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. D. Faber-Langendoen

**References:** Faber-Langendoen 2001, Foti 1994, Leahy 1999, Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000



**Figure 69.** A typical example of a Little Bluestem-Yellow Indiangrass-Sideoats Grama-Missouri Coneflower-Narrowleaf Summer Bluets Wooded Herbaceous Vegetation (CEGL002398). Note the dolomitic bedrock in the foreground, scattered woody shrub throughout the glade, and copious cedar and chinkapin oak around the margins.



***Schizachyrium scoparium - Sorghastrum nutans - Coreopsis lanceolata - Croton willdenowii*****Wooded Herbaceous Vegetation****Little Bluestem - Yellow Indiangrass - Longstalk Tickseed - Broadleaf Rushfoil Wooded Herbaceous Vegetation****Ozark Igneous Glade****Identifier: CEGL002243****USNVC Classification**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland with a sparse tree layer (V.A.6.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland with a sparse tree layer (V.A.6.N.)
Formation	Bedrock temperate or subpolar grassland with a sparse tree layer (V.A.6.N.q.)
Alliance	( <i>Quercus stellata</i> , <i>Quercus marilandica</i> ) / <i>Schizachyrium scoparium</i> Wooded Herbaceous Alliance (A.1920)
Alliance (English name)	(Post Oak, Blackjack Oak) / Little Bluestem Wooded Herbaceous Alliance
Association	<i>Schizachyrium scoparium - Sorghastrum nutans - Coreopsis lanceolata - Croton willdenowii</i> Wooded Herbaceous Vegetation
Association (English name)	Little Bluestem - Yellow Indiangrass - Longstalk Tickseed - Broadleaf Rushfoil Wooded Herbaceous Vegetation
Association (Common name)	Ozark Igneous Glade

**Ecological System(s):****ONSR Community Type:** Igneous Woodlands**ONSR Ecological System:** Upland Oak Woodlands**Global Ecological System:** Central Interior Highlands Dry Acidic Glade and Barrens (CES202.692)**ELEMENT CONCEPT**

**Global Summary:** This igneous glade type is found in the Missouri Ozarks region of the United States. Stands occur on gentle to moderately steep slopes of hills and broad mountain domes, upland ridges, and along drainages. Aspect is variable, but is best developed on south- and west-facing slopes. Soils are very rapidly drained, with seasonal saturation in winter or spring, and very shallow (0-40 cm). The parent material is igneous (felsite, rhyolite, dellenite, granite), with highly irregular exposed bedrock, often interspersed with massive outcrops of boulders and scattered rock fragments. Disturbances include extreme drought, frost-heave from winter-saturated soils, and infrequent fires. The vegetation is dominated by medium-tall herbaceous vegetation, with scattered, stunted and gnarled trees and shrubs typically less than 10% cover. Mosses and lichen are abundant on the exposed rock. Trees and shrubs include *Quercus stellata*, *Quercus marilandica* and *Rhus copallinum*. Dominant grasses include *Sorghastrum nutans*, *Schizachyrium scoparium* and *Sporobolus clandestinus*. Dominant forbs include *Ambrosia bidentata* and *Diodia teres*. Other characteristic species include *Aristida dichotoma*, *Coreopsis lanceolata*, *Croton willdenowii* (= *Crotonopsis elliptica*), *Dichanthelium acuminatum*, *Hypericum gentianoides*, *Lespedeza capitata*, *Oenothera linifolia*, *Polygala sanguinea*, *Polygonum tenue*, *Talinum calycinum*, and *Trichostema dichotomum*. Lichens include *Pleopsidium chlorophanum* (= *Acarospora chlorophana*), *Cladina* spp., *Cladonia caroliniana*, *Cladonia strepsilis*, *Placidium lachneum* (= *Dermatocarpon lachneum*), *Punctelia hypoleucites* (= *Parmelia hypoleucites*), and *Xanthoparmelia* spp.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This community is limited to summits, shoulders, and exposed slopes where igneous bedrock is at or near the surface (ELT's 22; Nigh *et al.* 2000). Soils are acidic. Slopes where this community occurs tend to have a southern or southwestern exposure. Soil moisture is variable as bedrock can cause perching of water. Slope profiles tend to be stair-stepped. Fire and marginal soils have typically limited the dense establishment of woody stems.

**Global Environment:** Stands occur on gentle to moderately steep slopes of hills and broad mountain domes, upland ridges, and along drainages. Aspect is variable, but is best developed on south- and west-facing slopes. Soils are very rapidly drained, with seasonal saturation in winter or spring, and very shallow (0-40 cm). The parent material is igneous (felsite, rhyolite, dellenite, granite), with highly irregular exposed bedrock, often interspersed with massive outcrops of boulders and scattered rock fragments (Nelson 1985).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The vegetation is dominated by medium-tall grasses and forbs, occasionally with stunted trees and shrubs. Typical trees and shrub species are *Quercus stellata*, *Quercus marilandica*, *Carya texana*, *Ulmus alata*, and *Rhus copallina*. Common herbaceous species may include *Schizachyrium scoparium*, *Andropogon gerardii*, *Sorghastrum nutans*, *Coreopsis lanceolata*, *Croton willdenowii* (= *Crotonopsis elliptica*), *Panicum lanuginosum*, *Danthonia spicata*, and *Panicum*

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*linearifolium*. Other good diagnostic species include *Diodea teres*, *Hypericum gentianoides*, *Talinum calycinum*, and *Oenothera linifolia*. Lichens form a significant portion of the biotic cover, though they were not measured in this study.

**Global Vegetation:** The vegetation is dominated by medium-tall herbaceous vegetation, with scattered, stunted and gnarled trees and shrubs typically less than 10% cover. Mosses and lichen are abundant on the exposed rock. Trees and shrubs include *Quercus stellata*, *Quercus marilandica* and *Rhus copallinum*. Dominant grasses include *Sorghastrum nutans*, *Schizachyrium scoparium* and *Sporobolus clandestinus*. Dominant forbs include *Ambrosia bidentata* and *Diodia teres*. Other characteristic species include *Aristida dichotoma*, *Coreopsis lanceolata*, *Croton willdenowii* (= *Crotonopsis elliptica*), *Dichanthelium acuminatum*, *Hypericum gentianoides*, *Lespedeza capitata*, *Oenothera linifolia*, *Polygala sanguinea*, *Polygonum tenue*, *Talinum calycinum*, and *Trichostema dichotomum*. Lichens include *Pleopsidium chlorophanum* (= *Acarospora chlorophana*), *Cladina* spp., *Cladonia caroliniana*, *Cladonia strepsilis*, *Placidium lachneum* (= *Catapyrenium lachneum*, = *Dermatocarpon lachneum*), *Punctelia hypoleucites* (= *Parmelia hypoleucites*), and *Xanthoparmelia* spp. (Nelson 1985).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Emergent Tree canopy	Broad-leaved deciduous tree	<i>Ulmus alata</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Rhus copallina</i>
Herb	Graminoid	<i>Andropogon gerardii</i> , <i>Panicum lanuginosum</i>
Herb	Forb	<i>Coreopsis lanceolata</i> , <i>Croton willdenowii</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Schizachyrium scoparium*, *Andropogon gerardii*, *Sorghastrum nutans*, *Coreopsis lanceolata*, *Croton willdenowii*, *Panicum lanuginosum*, *Danthonia spicata*, *Panicum linearifolium*, *Hypericum gentianoides*, *Talinum calycinum*, *Oenothera linifolia*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4? (31-Mar-2000). Fire suppression has caused many of these glades to be closed in by *Juniperus virginiana*.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Though only three examples were sampled for this project, igneous glades are a high management priority for resource managers at ONSR and the communities are much studied. Significant data exist on these communities and classification confidence is high. The description above was created by removing those species not found in ONSR from the existing USNVC global description, then adding in additional species that were most abundant in this study. The species included are by no means exhaustive, given the diversity of these communities.

**Global Comments:** The concept of the type is taken from the Missouri state classification - igneous glade (Nelson 1985). Actual glade openings range from 0.5-4 ha (1-10 acres) in size, but are usually embedded in a complex matrix of igneous woodland, including *Quercus marilandica* / *Vaccinium arboreum* / *Danthonia spicata* Scrub Woodland (CEGL002425) and *Quercus stellata* - *Quercus marilandica* - *Quercus velutina* - *Carya texana* / *Schizachyrium scoparium* Woodland (CEGL002149). Certain herbs tend to be associated with these glades, including *Hypericum gentianoides*, *Talinum calycinum* and *Trichostema dichotomum*. The largest known population of *Asclepias meadii* in Missouri occurs on an igneous glade.

**Global Similar Associations:**

- *Quercus marilandica* / *Vaccinium arboreum* / *Danthonia spicata* Scrub Woodland (CEGL002425)
- *Quercus stellata* - *Quercus marilandica* - *Quercus velutina* - *Carya texana* / *Schizachyrium scoparium* Woodland (CEGL002149)

**Global Related Concepts:**

### OTHER COMMENTS

**Other Comments:**

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is limited to locations where igneous bedrock is at or near the surface (ELT 22; Nigh *et al.* 2000).

**Global Range:** This igneous glade type is found in the Missouri Ozarks region of the United States, where it is restricted primarily to the igneous core of the St. Francois Mountains.

**Nations:** US

**States/Provinces:** MO

**USFS Ecoregions:** 222Aa:CCC, 222Af:CCC

**Federal Lands:** NPS (Ozark)

#### ELEMENT SOURCES

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** PM\_22\_21, PM\_24\_13, PM\_24\_15

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. D. Faber-Langendoen

**References:** Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000



**Figure 70. Glades such as this Little Bluestem-Yellow Indiangrass-Longstalk Tickseed-Broadleaf Rushfoil Wooded Herbaceous Vegetation (CEGL002243) are limited to igneous substrate. They may have small inclusions of the trees that are also found around the margins, especially blackjack oak, black hickory, and winged elm.**



**Figure 71. The underlying bedrock in igneous glades like this Little Bluestem-Yellow Indiangrass-Longstalk Tickseed-Broadleaf Rushfoil Wooded Herbaceous Vegetation (CEGL002243) may cause perching of water where soils can remain moist through most of the growing season.**

## ***Nuphar lutea* ssp. *advena* - *Nymphaea odorata* Herbaceous Vegetation**

**Broadleaf Pond-lily - White Water-lily Herbaceous Vegetation**

**Water-lily Aquatic Wetland**

**Identifier: CEGL002386**

### **USNVC Classification**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Hydromorphic-rooted vegetation (V.C.)
Physiognomic Group	Temperate or subpolar hydromorphic-rooted vegetation (V.C.2.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar hydromorphic-rooted vegetation (V.C.2.N.)
Formation	Permanently flooded temperate or subpolar hydromorphic-rooted vegetation (V.C.2.N.a.)
Alliance	<i>Nymphaea odorata</i> - <i>Nuphar</i> spp. Permanently Flooded Temperate Herbaceous Alliance (A.1984)
Alliance (English name)	White Water-lily - Yellow Pond-lily species Permanently Flooded Temperate Herbaceous Alliance
Association	<i>Nuphar lutea</i> ssp. <i>advena</i> - <i>Nymphaea odorata</i> Herbaceous Vegetation
Association (English name)	Broadleaf Pond-lily - White Water-lily Herbaceous Vegetation
Association (Common name)	Water-lily Aquatic Wetland

### **Ecological System(s):**

**ONSR Community Type:** Sloughs

**ONSR Ecological System:** Riverine Emergent Aquatic Communities

**Global Ecological System:** Atlantic Coastal Plain Northern Bog (CES203.893)  
 Eastern Great Plains Wet Meadow, Prairie, and Marsh (CES205.687)  
 Great Lakes Freshwater Estuary and Delta (CES202.033)  
 East Gulf Coastal Plain Large River Floodplain Forest (CES203.489)  
 North-Central Interior Floodplain (CES202.694)  
 Northern Great Lakes Coastal Marsh (CES201.722)  
 Texas-Louisiana Coastal Prairie Pondshore (CES203.541)  
 Laurentian-Acadian Freshwater Marsh (CES201.594)  
 Red River Large Floodplain Forest (CES203.065)  
 North-Central Interior Freshwater Marsh (CES202.899)  
 Central Interior Highlands and Appalachian Sinkhole and Depression Pond (CES202.018)  
 West Gulf Coastal Plain Large River Floodplain Forest (CES203.488)  
 South-Central Interior Large Floodplain (CES202.705)

### **ELEMENT CONCEPT**

**Global Summary:** This rooted aquatic or open marsh community occupies shallow water depressions, oxbow ponds, backwater sloughs of river floodplains, slow moving streams, ponds, and small lakes throughout the central and eastern United States. It is dominated by rooted, floating-leaved aquatic species, with both submergent and emergent aquatics also present. *Nuphar lutea* ssp. *advena* and *Nymphaea odorata* are dominants. Other species present may include *Brasenia schreberi*, various *Potamogeton* spp., *Polygonum amphibium*, and *Polygonum amphibium* var. *emersum* (= *Polygonum coccineum*). Submerged aquatics more common in the southern part of the range include *Cabomba caroliniana*, *Ceratophyllum demersum*, and *Heteranthera dubia*.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Lacustrine

**Ozark National Scenic Riverways Environment:** This is a community that is infrequently encountered at a size that facilitates mapping. It is more frequent in the lower portion of the Current River, where large, stable sloughs and backwaters more frequently occur. Soils are submerged or saturated and composed of fine silts and sands.

**Global Environment:** This community occupies shallow water depressions, oxbow ponds, and backwater sloughs of river floodplains, ponds, and small lakes. In pools and slow-flowing stretches of river, at Obed River (TN), *Nuphar lutea* ssp. *advena* is rooted in sandy substrate (Schmalzer and DeSelm 1982).

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** Only one example was sampled during this project. The most dominant species included *Nuphar lutea*, *Nymphaea odorata*, *Elodea nuttallii*, and *Myriophyllum heterophyllum*. Other species included *Justicia americana*, *Ludwigia alternifolia*, *Sagittaria latifolia*, and *Saururus cernuus*. All of these species may frequently occur in this community, along with species from the genera *Polygonum* and *Commelina*.

**Global Vegetation:** This community is dominated by rooted, floating-leaved aquatic species, with both submergent and emergent aquatics also present. *Nuphar lutea* ssp. *advena* and *Nymphaea odorata* are dominants. Other species present include *Brasenia schreberi*, various *Potamogeton* spp., *Polygonum amphibium*, and *Polygonum amphibium* var. *emersum* (= *Polygonum coccineum*) (Anderson 1982). Submerged aquatic species more common in the southern part of the range include *Cabomba caroliniana*,

Appendix 15. ONSR USNVC Natural Community Descriptions

*Ceratophyllum demersum*, and *Heteranthera dubia*. This broadly conceived type may include ponds, or zones of ponds, dominated by *Nymphaea odorata*, with or without *Nuphar lutea ssp. advena*.

**MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb	Forb	<i>Nuphar lutea</i>

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Nuphar lutea*, *Nymphaea odorata*, *Elodea nuttallii*, *Myriophyllum heterophyllum*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4G5 (15-Oct-2002). The dominant species in stands of this vegetation are widespread across the eastern and central United States and adjacent Canada. This is not a rare or imperiled vegetation type, even though its occurrence is poorly documented. Stands may occur in natural lakes and ponds or in artificial impoundments.

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** This community is not uncommon, but rarely occurs in sizes that meet the minimum mapping size. It is not likely to be confused with other community types.

**Global Comments:** This type occurs in borrow pits on Kisatchie National Forest. On the Conecuh National Forest (Alabama), vegetation of this association occurs in Gum Pond and Open Pond as a mix of *Nymphaea odorata* and *Nuphar lutea ssp. advena*.

**Global Similar Associations:**

- *Equisetum fluviatile* - (*Eleocharis palustris*) Herbaceous Vegetation (CEGL005258)
- *Nuphar lutea ssp. advena* Tidal Herbaceous Vegetation (CEGL004472)
- *Nuphar lutea ssp. polysepala* Herbaceous Vegetation (CEGL002001)

**Global Related Concepts:**

- L5D2a11a. *Nuphar lutea* (Foti *et al.* 1994) ?
- New England coastal plain pondshore (Rawinski 1984) ?
- Open Water/Aquatic Bed Veg., Natural Impoundment Pond (Ambrose 1990a) B
- Open water marsh with floating-leaved plants (NAP pers. comm. 1998) ?

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:**

**Global Range:** This rooted aquatic community occupies shallow, quiet waters throughout the central and eastern United States, extending from Maine to Ontario and Minnesota, south to Oklahoma and east to Georgia.

**Nations:** CA, US

**States/Provinces:** AL, AR, CT, DE, FL, GA, IA:SU, IL, IN, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, NH, NJ:S4, NY, OH, OK, ON, PA, RI, SC, TN, TX, VA, VT, WI, WV

**USFS Ecoregions:** 212Aa:CCC, 212Ba:CCC, 212Bb:CCC, 212Ca:CCC, 212Cb:CCC, 212Da:CCC, 212Db:CCP, 212Dc:CCC, 212Fa:CCP, 212Fb:CCP, 212Fc:CCP, 212Fd:CCP, 212Ga:CCP, 212Gb:CCP, 212Hb:CCP, 212Ja:CCP, 212Jb:CCP, 212Jc:CCP, 212Je:CCP, 212Jf:CCP, 212Jj:CCP, 212Jl:CCP, 212Jm:CCC, 212Ka:CCP, 221Ah:CCC, 221Ai:CCC, 221Al:CCC, 221Am:CCC, 221Bd:CCP, 221Da:CCC, 221Db:CCC, 221Ea:CCC, 221Ed:CC?, 221Ef:CCC, 221Hc:CCC, 221He:CCC, 222Ch:CCC, 222Db:CCC, 222Gc:C??, 222Ha:CCC, 222Ja:CCC, 222Jb:CCC, 222Ji:CCC, 222Jj:CCC, 222Kf:CCC, 222Kg:CCC, 222Kh:CCC, 222Kj:CCC, 222L:CC, 231Bc:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Bf:CCC, 232C:CC, 232D:CC, 234Aa:CCC, 234Ac:CCC, 234Ad:CCC, 234Af:CCC, 234Ag:CCC, 234Ai:CCC, 234Al:CCC, 234Am:CCC, 234An:CCC, 251Cf:CCC, 251Dd:CCC, 251Dg:CCC, 251Eb:CCC, M212Af:CCC, M212Bc:CCC, M212Bd:CCC, M212Cb:CCC, M212Cc:CCC, M212Ea:CCP, M212Eb:CCP, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Ba:CCC, M221Bb:CCC, M221Bc:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCC, M221Da:CCC, M221Dc:CCC

**Federal Lands:** DOD (Fort Benning); NPS (Acadia, Blue Ridge Parkway?, Carl Sandburg Home, Effigy Mounds, Minute Man, Natchez Trace, Obed, Ozark, Saint-Gaudens); USFS (Angelina, Conecuh, Davy Crockett, Kisatchie, Ocala, Ozark, Sabine NF, Sam Houston?, Talladega); USFWS (Back Bay, Great Swamp, Reelfoot)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** GN2386

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen, mod. C.W. Nordman

**References:** Ambrose 1990a, Anderson 1982, Breden *et al.* 2001, Clancy 1996, FNAI 1990, Fike 1999, Fleming *et al.* 2001, Foti *et al.* 1994, Gawler 2002, Hoagland 2000, INNAI unpubl. data, Midwestern Ecology Working Group n.d., NAP 1998, NatureServe Ecology - Southeastern U.S. unpubl. data, Peet *et al.* unpubl. data 2002, Penfound 1953, Rawinski 1984, Schafale and Weakley 1990, Schmalzer and DeSelm 1982, Sperduto and Nichols 2004, Swain and Kearsley 2001, TNDH unpubl. data, WINHIP unpubl. data, Zandoni *et al.* 1979



**Figure 72. Broadleaf Pondlily-White Waterlily Herbaceous Vegetation (CEGL002386) communities such as this are usually restricted to backwater sloughs in the lower portion of the watershed. Most examples will be relatively narrow and may be below the minimum mapping size.**

## Igneous Ozark Dry Cliff Sparse Vegetation

### Igneous Ozark Dry Cliff Sparse Vegetation

#### Ozark Dry Igneous Cliff

Identifier: CEGLO02286

### USNVC Classification

Physiognomic Class	Sparse Vegetation (VII)
Physiognomic Subclass	Consolidated rock sparse vegetation (VII.A.)
Physiognomic Group	Sparsely vegetated cliffs (VII.A.1.)
Physiognomic Subgroup	Natural/Semi-natural sparsely vegetated cliffs (VII.A.1.N.)
Formation	Cliffs with sparse vascular vegetation (VII.A.1.N.a.)
Alliance	Open Cliff Sparsely Vegetated Alliance (A.1836)
Alliance (English name)	Open Cliff Sparsely Vegetated Alliance
Association	Igneous Ozark Dry Cliff Sparse Vegetation
Association (English name)	Igneous Ozark Dry Cliff Sparse Vegetation
Association (Common name)	Ozark Dry Igneous Cliff

### Ecological System(s):

<b>ONSR Community Type:</b>	Cliffs
<b>ONSR Ecological System:</b>	Cliffs and talus
<b>Global Ecological System:</b>	Central Interior Calcareous Cliff and Talus (CES202.690)

### ELEMENT CONCEPT

**Global Summary:** This igneous dry cliff type is found in the Missouri Ozarks of the United States. Stands occur on extremely steep to vertical rock exposures along bluffs and mountain domes, often occurring in a series of irregular rock terraces and ledges or as highly weathered massive outcrops. Aspect is variable, but sites are best developed south and west. Soils are generally absent, except on ledges, where they are shallow, ephemeral, wet, but very rapidly drained. Parent material is igneous (dellenite, felsite, granite or rhyolite). The vegetation contains few, if any, tree species, but if present they are stunted, limby, and gnarled. Herbaceous cover is sparse (less than 20%) consisting of spring ephemerals and grasses on ledges. Lichens are common on the rock face. Sites are disturbed by droughts, wind and storm damage. Woody plants include *Juniperus virginiana* and *Ulmus alata*. Characteristic herbaceous species include *Symphyotrichum oblongifolium* (= *Aster oblongifolius*), *Cheilanthes lanosa*, *Coreopsis lanceolata*, *Danthonia spicata*, *Opuntia humifusa* (= *Opuntia compressa*), *Polypodium virginianum* (= *Polypodium vulgare* var. *virginianum*), and *Sporobolus clandestinus*. Lichens include *Pleopsidium chlorophanum* (= *Acarospora chlorophana*), *Cladonia caroliniana*, *Cladonia strepsilis*, *Placidium lachneum* (= *Dermatocarpon lachneum*) and *Punctelia hypoleucites* (= *Parmelia hypoleucites*).

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is an extremely rare community within the study area. It is limited to south and west facing igneous cliffs, which are limited in their distribution in the park.

**Global Environment:**

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** The vegetation contains few, if any, tree species, but if present they are stunted, limby, and gnarled. They may include species such as *Juniperus virginiana*, *Pinus echinata*, *Carya texana*, *Quercus stellata*, *Quercus marilandica*, and *Ulmus alata*. Woody shrubs may include *Vaccinium arboreum*, *Vaccinium vacillans*, *Vaccinium stamineum*, *Rhus aromatica*, and *Rhus glabra* all of which should be sparse. Typical woody vines include *Parthenocissus quinquefolia* and *Rhus radicans*. Characteristic herbaceous species include *Symphyotrichum oblongifolium* (= *Aster oblongifolius*), *Cheilanthes lanosa*, *Carex nigromarginata*, *Coreopsis lanceolata*, *Danthonia spicata*, and *Schizachyrium scoparium*.

**Global Vegetation:**

### MOST ABUNDANT SPECIES

**Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Carya texana*, *Pinus echinata*, *Ulmus alata*, *Vaccinium arboreum*, *Rhus radicans*, *Sporobolus clandestinus*, *Coreopsis lanceolata*, *Danthonia spicata*, *Symphyotrichum oblongifolium*, *Cheilanthes lanosa*, *Schizachyrium scoparium*.

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4 (31-Mar-2000).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** No examples of this community were sampled during this project. the Missouri Natural Heritage Database (Missouri Department of Conservation 2000) includes a community classified as this type at Prairie Hollow Natural Area near the confluence of the Jacks Fork and Current Rivers (Approximate NAD 83 Zone 15N UTM coordinates: E 653906, N 4116349). A visit to this site made early in the mapping process informs much of the local description above.

Nevertheless, classification confidence is high. Though it shares many features with igneous glades, the only community likely to be confused with this type is the Igneous Ozark Moist Cliff Sparse Vegetation (CEGL002289). That type should typically have at least part of its surface and any pockets of soil (if present) moist throughout the year.

**Global Comments:** The concept of the type is taken from the Missouri state classification - dry igneous cliff (Nelson 1985).

**Global Similar Associations:**

- Chert Ozark Dry Cliff Sparse Vegetation (CEGL002285)

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:** No examples of this community were sampled during this project. the Missouri Natural Heritage Database (Missouri Department of Conservation 2000) includes a community classified as this type at Prairie Hollow Natural Area near the confluence of the Jacks Fork and Current Rivers (Approximate NAD 83 Zone 15N UTM coordinates: E 653906, N 4116349). A visit to this site made early in the mapping process informs much of the local description above.

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is a rare community limited to the central part of the park where igneous bedrock is present.

**Global Range:** This igneous dry cliff type is found in the Missouri Ozarks region of the United States.

**Nations:** US

**States/Provinces:** MO:S4S5

**USFS Ecoregions:** 222Aa:CCP, 222Af:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. D. Faber-Langendoen

**References:** Midwestern Ecology Working Group n.d., Missouri Department of Conservation 2000, Nelson 1985



## Igneous Ozark Moist Cliff Sparse Vegetation

### Igneous Ozark Moist Cliff Sparse Vegetation

#### Ozark Moist Igneous Cliff

Identifier: CEG002289

#### USNVC Classification

Physiognomic Class	Sparse Vegetation (VII)
Physiognomic Subclass	Consolidated rock sparse vegetation (VII.A.)
Physiognomic Group	Sparsely vegetated cliffs (VII.A.1.)
Physiognomic Subgroup	Natural/Semi-natural sparsely vegetated cliffs (VII.A.1.N.)
Formation	Cliffs with sparse vascular vegetation (VII.A.1.N.a.)
Alliance	Open Cliff Sparsely Vegetated Alliance (A.1836)
Alliance (English name)	Open Cliff Sparsely Vegetated Alliance
Association	Igneous Ozark Dry Cliff Sparse Vegetation
Association (English name)	Igneous Ozark Dry Cliff Sparse Vegetation
Association (Common name)	Ozark Dry Igneous Cliff

#### Ecological System(s):

ONSR Community Type:	Cliffs
ONSR Ecological System:	Cliffs and talus
Global Ecological System:	Central Interior Calcareous Cliff and Talus (CES202.690)

### ELEMENT CONCEPT

**Global Summary:** This moist igneous cliff type is restricted to parts of the Ozarks in the south-central United States. Stands are found on extremely steep to vertical rock exposures, often occurring in a series of irregular rock terraces and ledges, with a northern or eastern aspect. The igneous parent material includes rhyolite, felsite, dellenite or granite. Soils are generally absent, except on ledges and rock terraces. These cliffs are rapidly drained, but are kept moist or wet for significant periods because of seepage, dense shading, or thick mats of mosses and lichens. Trees, when present, are scattered and short (8-20 m). *Pinus echinata* may be present, along with a variety of *Quercus* spp. Herbaceous cover is sparse (<20%), consisting of spring ephemerals and ferns. These include *Arisaema triphyllum* (= *Arisaema atrorubens*), *Arabis missouriensis*, *Asplenium trichomanes*, *Dryopteris goldiana*, *Dryopteris marginalis*, *Mitchella repens*, *Mitella diphylla*, and *Chasmanthium latifolium* (= *Uniola latifolia*). A nonvascular layer of mosses and lichens is usually present, including *Polytrichum* spp. and *Thuidium* spp.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a rare community within the study area. It is limited to north and east facing igneous rock cliffs, which are extremely limited in their distribution in the park.

**Global Environment:** Stands are found on extremely steep to vertical rock exposures, often occurring in a series of irregular rock terraces and ledges, with a north or east aspect. The igneous parent material includes rhyolite, felsite, dellenite or granite. Soils are generally absent, except on ledges and rock terraces. These cliffs are rapidly drained, but are kept moist or wet for significant periods because of seepage, dense shading, or thick mats of mosses and lichens (Nelson 1985).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** Tree species, if present, are stunted, limby, and gnarled. They may include species such as *Juniperus virginiana*, *Pinus echinata*, *Quercus stellata*, and *Quercus marilandica*. Woody shrubs may include *Vaccinium vacillans*, *Vaccinium stamineum* and *Rhus aromatica*, all of which should be sparse. Typical woody vines include *Parthenocissus quinquefolia* and *Rhus radicans*. Characteristic herbaceous species include *Arisaema triphyllum* (= *Arisaema atrorubens*), *Arabis missouriensis*, *Asplenium trichomanes*, *Dryopteris goldiana*, *Dryopteris marginalis*, *Mitchella repens*, *Mitella diphylla*, and *Chasmanthium latifolium* (= *Uniola latifolia*).

**Global Vegetation:** Trees, when present, are scattered and short (8-20 m). *Pinus echinata* may be present, along with a variety of *Quercus* spp. Herbaceous cover is sparse (<20%), consisting of spring ephemerals and ferns. These include *Arisaema triphyllum* (= *Arisaema atrorubens*), *Arabis missouriensis*, *Asplenium trichomanes*, *Dryopteris goldiana*, *Dryopteris marginalis*, *Mitchella repens*, *Mitella diphylla*, and *Chasmanthium latifolium* (= *Uniola latifolia*). A nonvascular layer of mosses and lichens is usually present, including *Polytrichum* spp. and *Thuidium* spp. (Nelson 1985).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

Global

**Stratum**

**Lifeform**

**Species**

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Pinus echinata*, *Vaccinium vacillans*, *Rhus radicans*, *Dryopteris goldiana*, *Dryopteris marginalis*, *Mitchella repens*, *Mitella diphylla*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4Q (03-Oct-1996).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** No examples of this community were sampled during this project. Communities matching this type are likely to exist only at Prairie Hollow Natural Area near the confluence of the Jacks Fork and Current Rivers (Approximate NAD 83 Zone 15N UTM coordinates: E 653906, N 4116349). A visit to this site made early in the mapping process informs much of the local description above. This area may more readily meet the description for the Igneous Ozark Dry Cliff Sparse Vegetation (CEGL002286), the only community likely to be confused with this type. That type should typically have its surface and pockets of soil (if present) dry throughout most of the year.

**Global Comments:** Description and type concept are from Nelson (1985). The northern igneous (granite/metamorphic) cliffs are separated from Ozark igneous cliff as Granite - Metamorphic Great Lakes Shore Cliff Sparse Vegetation (CEGL005244). In Missouri, Tim Nigh (pers. comm. 1996) suggested the following descriptive name for this type "*Mitella diphylla* - *Mitchella repens* - *Dryopteris goldiana* Igneous Cliff".

**Global Similar Associations:**

- Granite – Metamorphic Great Lakes Shore Cliff Sparse Vegetation (CEGL005244)

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:** No examples of this community were sampled during this project. Communities matching this type are likely to exist only at Prairie Hollow Natural Area near the confluence of the Jacks Fork and Current Rivers (Approximate NAD 83 Zone 15N UTM coordinates: E 653906, N 4116349). A visit to this site made early in the mapping process informs much of the local description above.

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is a rare community limited to the central part of the park where igneous bedrock is present.

**Global Range:** This moist igneous cliff type is restricted to parts of the Ozarks in the south-central United States, particularly Missouri and Kansas.

**Nations:** US

**States/Provinces:** KS?, MO

**USFS Ecoregions:** 222Aa:CCP, 222Af:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Midwestern Ecology Working Group n.d., Nelson 1985, Nigh 1996

## Limestone - Dolostone Midwest Dry Cliff Sparse Vegetation

### Limestone - Dolostone Midwest Dry Cliff Sparse Vegetation

#### Midwest Dry Limestone - Dolostone Cliff

Identifier: CEGLO02291

### USNVC Classification

Physiognomic Class	Sparse Vegetation (VII)
Physiognomic Subclass	Consolidated rock sparse vegetation (VII.A.)
Physiognomic Group	Sparsely vegetated cliffs (VII.A.1.)
Physiognomic Subgroup	Natural/Semi-natural sparsely vegetated cliffs (VII.A.1.N.)
Formation	Cliffs with sparse vascular vegetation (VII.A.1.N.a.)
Alliance	Open Cliff Sparsely Vegetated Alliance (A.1836)
Alliance (English name)	Open Cliff Sparsely Vegetated Alliance
Association	Limestone - Dolostone Midwest Dry Cliff Sparse Vegetation
Association (English name)	Limestone - Dolostone Midwest Dry Cliff Sparse Vegetation
Association (Common name)	Midwest Dry Limestone - Dolostone Cliff

### Ecological System(s):

<b>ONSR Community Type:</b>	Cliffs
<b>ONSR Ecological System:</b>	Cliffs and talus
<b>Global Ecological System:</b>	Central Interior Calcareous Cliff and Talus (CES202.690)
	Laurentian-Acadian Calcareous Cliff and Talus (CES201.570)
	Central Interior Highlands Calcareous Glade and Barrens (CES202.691)

### ELEMENT CONCEPT

**Global Summary:** This limestone - dolostone cliff community type is found throughout the midwestern United States and adjacent Canada. Stands occur as steep to vertical rock exposures of limestone bedrock. Aspect is variable, but stands are best developed on south- and west-facing slopes. Vegetation is restricted to shelves, cracks and crevices in the rock, generally averaging less than 20%, and typically consisting of vines and ferns. In the Ozarks and Interior Plateau region, ferns include *Cheilanthes feei*, *Argyrochosma dealbata* (= *Notholaena dealbata*), *Pellaea atropurpurea*, and *Pellaea glabella*. Herbaceous forbs and graminoids include *Aquilegia canadensis*, *Hedyotis nigricans* (= *Houstonia nigricans*), *Mentzelia oligosperma*, *Muhlenbergia cuspidata*, *Sedum pulchellum*, and *Solidago rugosa ssp. aspera* (= *Solidago drummondii*). Lichens include *Placidium lachneum* (= *Dermatocarpon lachneum*), *Lecanora muralis* and *Psora russellii*. In Ohio, stands contain the ferns *Pellaea atropurpurea*, and *Pellaea glabella*, and the forbs *Aquilegia canadensis*, *Arabis laevigata*, *Heuchera americana*, *Hydrangea arborescens*, and *Sedum ternatum*. Scattered woody plants across the range include *Celastrus scandens*, *Juniperus virginiana*, *Parthenocissus quinquefolia*, *Physocarpus opulifolius*, *Quercus prinus* (southward), and *Toxicodendron radicans* (= *Rhus radicans*), and farther north, *Taxus canadensis*, *Thuja occidentalis*, and *Tsuga canadensis*.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a common community within the study area. Typically, this community is associated with south and west facing bluffs. Soils, if present, are dry and basic. Bedrock provides the basic substrate.

**Global Environment:** Stands occur as steep to vertical rock exposures of limestone bedrock. Aspect is variable, but stands are best developed on south- and west-facing slopes. Soils are either absent or, along ledges and shelves, very shallow. The cliffs drain very rapidly, and can become very dry in summer (Nelson 1985).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** This community includes primarily herbaceous plants that thrive in dry, basic soils. If present, woody species will be sparse, stunted and limby. *Juniperus virginiana* may be a common emergent shrub. Diagnostic deciduous woody species that may grow here include *Quercus muehlenbergii*, *Fraxinus quadrangulata* and *Celtis tenuifolia*. Diagnostic vines may include *Smilax bona-nox* and *Berchemia scandens*. Herbaceous flora may include *Solidago rugosa ssp. aspera* (= *Solidago drummondii*), *Schizachyrium scoparium*, *Danthonia spicata*, *Panicum virgatum*, *Muhlenbergia capillaris*, *Aquilegia canadensis*, *Hedyotis nigricans* (= *Houstonia nigricans*), and *Heuchera americana*. Ferns may include *Cheilanthes feei* and *Pellaea atropurpurea*.

**Global Vegetation:** Vegetation is restricted to shelves, cracks and crevices in the rock, generally averaging less than 20%, and typically consisting of vines and ferns. In the Ozarks and Interior Plateau region, ferns include *Cheilanthes feei*, *Argyrochosma dealbata* (= *Notholaena dealbata*), *Pellaea atropurpurea*, and *Pellaea glabella*. Herbaceous forbs and graminoids include *Aquilegia canadensis*, *Hedyotis nigricans* (= *Houstonia nigricans*), *Mentzelia oligosperma*, *Muhlenbergia cuspidata*, *Sedum pulchellum*, and *Solidago rugosa ssp. aspera* (= *Solidago drummondii*). Lichens include *Placidium lachneum* (= *Dermatocarpon lachneum*), *Lecanora muralis* and *Psora russellii*. In Ohio, stands contain the ferns *Pellaea atropurpurea* and *Pellaea glabella*, and the forbs

## Appendix 15. ONSR USNVC Natural Community Descriptions

*Aquilegia canadensis*, *Arabis laevigata*, *Heuchera americana*, *Hydrangea arborescens*, and *Sedum ternatum*. Scattered woody plants across the range include *Celastrus scandens*, *Juniperus virginiana*, *Parthenocissus quinquefolia*, *Physocarpus opulifolius*, *Quercus prinus* (southward), and *Toxicodendron radicans* (= *Rhus radicans*), and farther north, *Taxus canadensis*, *Thuja occidentalis*, and *Tsuga canadensis* (Curtis 1959, Nelson 1985, MNNHP 1993, Anderson 1996).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
----------------	-----------------	----------------

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Juniperus virginiana*, *Solidago rugosa* ssp. *aspera*, *Heuchera americana*, *Panicum virgatum*, *Muhlenbergia capillaris*, *Cheilanthes feei*, *Pellaea atropurpurea*

**Global:**

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4G5 (2-Mar-2000). In Missouri many sites have been quarried (M. Leahy pers. comm. 1999). This issue should be examined range-wide. Other sites lack adequate buffers above and below the cliffs. Finally, rock-climbing can be disruptive to vegetation (Larson *et al.* 1999a).

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** No examples of this community were sampled during this project. Nevertheless, classification confidence is high. Though it shares many features with dolomite glades, the only community likely to be confused with this type is the Limestone - Dolostone Midwest Moist Cliff Sparse Vegetation (CEGL002292). That type should typically have at least some of its surface and pockets of soil (if present) wet or moist throughout the year.

**Global Comments:** Definitions of cliff types remain problematic. A minimum height of 3 m may be practical. Curtis (1959) in Wisconsin suggested that substrate was of secondary importance compared to moisture (shading vs. open) in determining floristic patterns. Furthermore some cliffs are a combination of layers of sandstone, shale and limestone or dolostone, making classification problematic. The combination of moisture and substrate is retained here, but a more systematic rangewide comparison of cliff floras is needed. Tim Nigh (pers. comm. 1996) has suggested that the Missouri type could be named "*Aquilegia canadensis* - *Solidago rugosa* ssp. *aspera* (= *Solidago drummondii*) - *Pellaea atropurpurea* Cliff." Ozark, southern Illinois, and Indiana cliffs may be better placed into a Southeastern/Interior Low Plateau type, separate from an upper Midwest type. Limestone cliffs along the Niagara Escarpment in central Ontario/Bruce Peninsula may be different from those in southern Ontario (Wasył Bakowsky pers. comm. 1998) and from other Great Lakes Limestone cliffs. A series of studies in Ontario's cliffs have led to a series of surprising biological discoveries, including a rich snail fauna, unusual cyanobacteria, and old growth *Thuja occidentalis* stands on the cliffs (Larson and Kelly 1991, Larson *et al.* 1999a, Larson *et al.* 1999b) [see also *Thuja occidentalis* Cliff Woodland (CEGL002451)]. In Kansas, limestone cliffs are particularly common in glaciated northeastern Kansas, on the western side of the Missouri River and perhaps other major rivers/creeks, and probably in the Osage Cuestas. Chalk breaks in west-central Kansas along the Smoky Hill River and associated terrain are cliff-like and probably need to be separated from the eastern cliffs (Lauver pers. comm. 1998). In Ohio, where limestone cliffs are found particularly in western Ohio, Lake Erie Islands, and unglaciated bluegrass region, Anderson (1996) cites a number of studies that describe the nonvascular vegetation. In Illinois see Winterringer and Vestal (1956).

#### Global Similar Associations:

- *Juniperus ashei* Ozark Clifftop Woodland (CEGL004672)
- Limestone - Dolostone Great Lakes Shore Cliff Sparse Vegetation (CEGL002504)
- Limestone - Dolostone Midwest Moist Cliff Sparse Vegetation (CEGL002292)
- *Pellaea atropurpurea* Cliff Sparse Vegetation (CEGL006527)
- Sandstone Dry Cliff Sparse Vegetation (CEGL002045)

#### Global Related Concepts:

- Cliff Communities (Anderson 1996) B
- Exposed Rock Cliffs (Curtis 1959) B

### OTHER COMMENTS

**Other Comments:**

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is a common community throughout the study area on dolomite cliffs facing south or west.

Appendix 15. ONSR USNVC Natural Community Descriptions

**Global Range:** This limestone/dolostone cliff community type is found throughout the midwestern United States and adjacent Canada, from Ohio and Ontario, west to Minnesota, south to Kansas, and possibly Arkansas, and east to Indiana.

**Nations:** CA, US

**States/Provinces:** IA:S4, IL, IN, KS:SU, MI, MN, MO:S4S5, OH, ON, TN

**USFS Ecoregions:** 212Jn:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCC, 222Ak:CCC, 222Am:CCC, 222Ap:CCC, 222Aq:CCC, 222Df:CCC, 222Di:CCP, 222Ek:CCC, 222Fd:CCC, 222Fe:CCC, 222Hc:CCC, 222Hf:CCP, 222Lc:CCC, 222Lf:CCC, 222Md:CCC, 251Ce:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** None

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Anderson 1996, Curtis 1959, INNAI unpubl. data, Larson and Kelly 1991, Larson *et al.* 1999a, Larson *et al.* 1999b, Lauver *et al.* 1999, Leahy 1999, MNNHP 1993, Midwestern Ecology Working Group n.d., Nigh 1996, Nelson 1985, TNDH unpubl. data, Winterringer and Vestal 1956

## Limestone - Dolostone Midwest Moist Cliff Sparse Vegetation

Limestone - Dolostone Midwest Moist Cliff Sparse Vegetation

Midwest Moist Limestone - Dolostone Cliff

Identifier: CEGL002292

### USNVC Classification

Physiognomic Class	Sparse Vegetation (VII)
Physiognomic Subclass	Consolidated rock sparse vegetation (VII.A.)
Physiognomic Group	Sparsely vegetated cliffs (VII.A.1.)
Physiognomic Subgroup	Natural/Semi-natural sparsely vegetated cliffs (VII.A.1.N.)
Formation	Cliffs with sparse vascular vegetation (VII.A.1.N.a.)
Alliance	Open Cliff Sparsely Vegetated Alliance (A.1836)
Alliance (English name)	Open Cliff Sparsely Vegetated Alliance
Association	Limestone - Dolostone Midwest Moist Cliff Sparse Vegetation
Association (English name)	Limestone - Dolostone Midwest Moist Cliff Sparse Vegetation
Association (Common name)	Midwest Moist Limestone - Dolostone Cliff

### Ecological System(s):

**ONSR Community Type:** Cliffs

**ONSR Ecological System:** Cliffs and talus

**Global Ecological System:** Central Interior Calcareous Cliff and Talus (CES202.690)  
 Laurentian-Acadian Calcareous Cliff and Talus (CES201.570)  
 Central Interior Highlands Calcareous Glade and Barrens (CES202.691)

### ELEMENT CONCEPT

**Global Summary:** This limestone - dolostone cliff community occurs in localized areas throughout the midwestern United States and southern Ontario, Canada. The cliffs are often very steep and found along rivers and strongly dissected hills. The aspect is typically northern and east, but is variable. Soils are generally absent, except on ledges or shelves. The cliff is moist due to seepage or shading due to aspect. The vegetation is generally quite sparse (<25% cover). Trees, when present, are scattered. Shrubs, herbs, and nonvascular species are more often present. Characteristic trees include *Acer saccharum*. Characteristic shrubs include *Hydrangea arborescens* and *Staphylea trifolia*. Common ferns include *Adiantum pedatum*, *Asplenium rhizophyllum* (= *Camptosorus rhizophyllum*), and *Cystopteris bulbifera*, as well as *Asplenium ruta-muraria* and *Asplenium resiliens*. Other herbs include *Aquilegia canadensis*, *Chenopodium simplex*, *Lysimachia quadriflora*, *Parnassia grandifolia*, *Pilea pumila*, *Selaginella apoda*, *Solidago caesia*, and *Solidago flexicaulis*. Mosses, liverworts and lichens are also present.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is a common community within the study area. Typically, this community is associated with north and east facing bluffs. Soils, if present, are moist and basic. Bedrock provides basic substrate and will typically be moist on at least part of its surface throughout the year..

**Global Environment:** The cliffs are often very steep and found along rivers and strongly dissected hills. The aspect is typically north and east, but is variable. Soils are generally absent, except on ledges or shelves. The cliff is moist due to seepage or shading due to aspect (Nelson 1985).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** This community includes primarily herbaceous plants that thrive in moist, basic soils. If present, woody species will be sparse, stunted and limby. Diagnostic deciduous woody species that may grow here include *Quercus muehlenbergii* and *Fraxinus quadrangulata*. Good diagnostic shrubs are *Hydrangea arborescens* and *Staphylea trifolia*. Diagnostic vines may include *Berchemia scandens*. Herbaceous flora may include *Aquilegia canadensis*, *Lysimachia quadriflora*, *Parnassia grandifolia*, *Pilea pumila*, *Solidago caesia*, *Solidago flexicaulis*, and *Heuchera americana*. Diagnostic ferns may include *Adiantum pedatum*, *Asplenium rhizophyllum* (= *Camptosorus rhizophyllum*), and *Cystopteris bulbifera*.

**Global Vegetation:** The vegetation is generally quite sparse (<25% cover). Trees, when present, are scattered. Shrubs, herbs, and nonvascular species are more often present. Characteristic trees include *Acer saccharum*. Characteristic shrubs include *Hydrangea arborescens* and *Staphylea trifolia*. Common ferns include *Adiantum pedatum*, *Asplenium rhizophyllum* (= *Camptosorus rhizophyllum*), and *Cystopteris bulbifera*, as well as *Asplenium ruta-muraria* and *Asplenium resiliens* in the southern part of the range. Other herbs include *Aquilegia canadensis*, *Chenopodium simplex*, *Lysimachia quadriflora*, *Parnassia grandifolia*, *Pilea pumila*, *Selaginella apoda*, *Solidago caesia*, and *Solidago flexicaulis*. Mosses, liverworts and lichens are also present (Curtis 1959, White and Madany 1978, Homoya *et al.* 1985, Nelson 1985). In Wisconsin, seepage areas include *Primula mistassinica* and *Campanula rotundifolia*.

**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Quercus muehlenbergii*, *Hydrangea arborescens*, *Staphylea trifolia*, *Aquilegia canadensis*, *Parnassia grandiflora*, *Solidago caesia*, *Adiantum pedatum*, *Asplenium rhizophyllum*, *Cystopteris bulbifera*

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4G5 (2-Mar-2000). In Missouri many sites have been quarried (M. Leahy pers. comm. 1999). This issue should be examined range-wide. Other sites lack adequate buffers above and below the cliffs. Finally, rock-climbing can be disruptive to vegetation (Larson *et al.* 1999a).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** No examples of this community were sampled during this project. Nevertheless, classification confidence is high. Though it shares many features with dolomite glades, the only community likely to be confused with this type is the Limestone-Dolostone Midwest Dry Cliff Sparse Vegetation (CEGL002291). That type should typically have its surface and pockets of soil (if present) dry throughout most of the year.

**Global Comments:** This moist cliff type is apparently less common across the region than the Limestone - Dolostone Midwest Dry Cliff Sparse Vegetation (CEGL002291). Definitions of cliff types remain problematic. Curtis (1959) in Wisconsin suggested that substrate was of secondary importance compared to moisture (shading versus open) in determining floristic patterns. Furthermore some cliffs are a combination of layers of sandstone, shale and limestone or dolostone, making classification problematic. Tim Nigh (pers. comm. 1996) has suggested that the Missouri type could be named "*Hydrangea arborescens* - *Adiantum capillus-veneris* - *Cystopteris bulbifera* - *Parnassia grandifolia* Alkaline Cliff". This type should also be compared with *Cystopteris bulbifera* - (*Asplenium rhizophyllum*) Sparse Vegetation (CEGL004394) in the Southeast. Ozark and southern Illinois and Indiana cliffs may be better placed into a Southeastern/Interior Low Plateau type, separate from a Midwest type, based on such species as *Asplenium ruta-muraria* and *Asplenium resiliens*. In southeastern Indiana, other rare calciphitic species include *Carex eburnea*, *Heuchera villosa*, *Phlox bifida* ssp. *stellaria*, *Hylotelephium telephioides* (= *Sedum telephioides*), and *Sullivantia sullivantii*. Limestone cliffs along the Niagara Escarpment in central Ontario/Bruce Peninsula may be different from those in southern Ontario (Wasył Bakowsky pers. comm. 1998) and from other Great Lakes Limestone cliffs. More northern examples of these cliffs in the Great Lakes region may also contain the *Thuja occidentalis* Cliff Woodland (CEGL002451), which may overlap in concept with this type.

**Global Similar Associations:**

- *Cystopteris bulbifera* - (*Asplenium rhizophyllum*) Sparse Vegetation (CEGL004394)--a southeastern type that may be very similar.
- *Cystopteris bulbifera* - *Asplenium rhizophyllum* Ozark Sparse Vegetation [Provisional] (CEGL008486)
- Igneous - Metamorphic Northern Dry Cliff Sparse Vegetation (CEGL002300)
- Limestone - Dolostone Great Lakes Shore Cliff Sparse Vegetation (CEGL002504)--Great Lakes limestone/dolostone cliffs.
- Limestone - Dolostone Midwest Dry Cliff Sparse Vegetation (CEGL002291)--the Midwest dry or open limestone/dolostone cliff type.
- Moderate Cliff Sparse Vegetation (CEGL002293)
- *Pellaea atropurpurea* Cliff Sparse Vegetation (CEGL006527)
- Sandstone Midwest Moist Cliff Sparse Vegetation (CEGL002287)
- *Thuja occidentalis* Cliff Woodland (CEGL002451)--limestone-dolostone cliffs that contain substantial cover >10% of white cedar.

**Global Related Concepts:**

- Shaded Cliff (Curtis 1959) B

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is a common community throughout the study area on dolomite cliffs facing north or east.

**Global Range:** This limestone/dolostone cliff community occurs in localized areas throughout the midwestern United States and southern Ontario, Canada, ranging from Ohio and southern Ontario west to Iowa, south to Kansas and possibly Arkansas, and east to Tennessee.

Appendix 15. ONSR USNVC Natural Community Descriptions

**Nations:** CA, US

**States/Provinces:** IA:S3?, IL, IN, KS:SU, KY, MI, MO:S4S5, OH, ON, TN

**USFS Ecoregions:** 212Ha:CCC, 212Hb:CCC, 212Hh:CCC, 212Hj:CCC, 212Hl:CCC, 212Pa:CCC, 222Ac:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Ak:CCC, 222Aq:CCC, 222Df:CCC, 222Di:CCP, 222Ek:CCC, 222Fc:CCC, 222Fe:CCC, 222Hb:CCC, 222Hc:CCC, 222Hf:CCC, 222Kf:CCC, 222Kg:CCC, 251Ci:CCC, 251Dd:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** None

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Curtis 1959, Homoya *et al.* 1985, INNAI unpubl. data, Larson *et al.* 1999a, Lauver *et al.* 1999, Leahy 1999, Midwestern Ecology Working Group n.d., Nelson 1985, TNDH unpubl. data, White and Madany 1978



## Limestone - Dolostone Talus Sparse Vegetation

### Limestone - Dolostone Talus Sparse Vegetation

#### Midwest Limestone - Dolostone Talus

Identifier: CEG002308

### USNVC Classification

Physiognomic Class	Sparse Vegetation (VII)
Physiognomic Subclass	Boulder, gravel, cobble, or talus sparse vegetation (VII.B.)
Physiognomic Group	Sparsely vegetated talus/scree slopes (VII.B.1.)
Physiognomic Subgroup	Natural/Semi-natural sparsely vegetated talus/scree slopes (VII.B.1.N.)
Formation	Lowland or submontane talus/scree (VII.B.1.N.a.)
Alliance	Lowland Talus Sparsely Vegetated Alliance (A.1847)
Alliance (English name)	Lowland Talus Sparsely Vegetated Alliance
Association	Limestone - Dolostone Talus Sparse Vegetation
Association (English name)	Limestone - Dolostone Talus Sparse Vegetation
Association (Common name)	Midwest Limestone - Dolostone Talus

### Ecological System(s):

<b>ONSR Community Type:</b>	Talus
<b>ONSR Ecological System:</b>	Cliffs and talus
<b>Global Ecological System:</b>	Central Interior Calcareous Cliff and Talus (CES202.690) Laurentian-Acadian Calcareous Cliff and Talus (CES201.570) Central Interior Highlands Calcareous Glade and Barrens (CES202.691)

### ELEMENT CONCEPT

**Global Summary:** This limestone-dolostone talus community is found throughout the central/upper midwestern United States, including the Ozark region, and adjacent Canada. Stands occur at the bases of steep cliffs along larger streams or rivers, or strongly dissected valleys. Aspect is variable, and moisture could be moist or dry. Soils are generally absent. Parent material could be limestone or dolostone with a mixture of rock fragments and large boulders. The vegetation is generally sparse but may vary depending on degree of slope, exposure (open versus shaded), and rock type. The composition of the type may be heavily influenced by adjacent forested stands. In Missouri, characteristic species include the ferns *Adiantum pedatum*, *Diplazium pycnocarpon* (= *Athyrium pycnocarpon*), *Asplenium rhizophyllum* (= *Camptosorus rhizophyllum*), and *Cystopteris bulbifera*. Other herbaceous species include *Aralia nudicaulis*, *Impatiens capensis*, *Pilea pumila*, *Polymnia canadensis*, and *Physalis missouriensis*. Scattered woody plants include *Hydrangea arborescens* and *Staphylea trifolia*. In Ontario open talus stands contain *Adiantum pedatum*, *Ageratina altissima* (= *Eupatorium rugosum*), *Geranium robertianum*, *Impatiens capensis*, *Poa pratensis*, and *Toxicodendron radicans*.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Terrestrial

**Ozark National Scenic Riverways Environment:** This is common community occurring at the base of dolomite cliffs, and sometimes on steep slopes between cliff faces. The substrate is dolomite, with little or no soils. If present, soils are basic. The community can be wet or dry, usually depending upon whether the exposure of the adjacent cliff is north or south facing.

**Global Environment:** Stands occur at the bases of steep cliffs along larger streams or rivers, or strongly dissected valleys. Aspect is variable, and moisture could be moist or dry. Soils are generally absent. Parent material could be limestone or dolostone with a mixture of rock fragments and large boulders. The vegetation is generally sparse, but may vary depending on degree of slope, exposure (open versus shaded) and rock type (Nelson 1985).

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** No examples of this type were sampled for this study. However, the description given in the current USNVC is quite accurate, as it was developed primarily from Missouri examples. Other species not mentioned in that description, but which are frequently present include *Platanus occidentalis*, *Betula nigra*, *Lindera benzoin*, *Asimina triloba*, *Corylus americana*, *Carpinus caroliniana*, and *Lobelia cardinalis*. Where close to the rivers, as is most common, frequent flooding prevents the development of a full canopy.

**Global Vegetation:** The vegetation is generally sparse, but may vary depending on degree of slope, exposure (open versus shaded) and rock type. The composition of the type may be heavily influenced by adjacent forested stands. In Missouri, characteristic species include the ferns *Adiantum pedatum*, *Diplazium pycnocarpon* (= *Athyrium pycnocarpon*), *Asplenium rhizophyllum* (= *Camptosorus rhizophyllum*), and *Cystopteris bulbifera*. Other herbaceous species include *Aralia nudicaulis*, *Impatiens capensis*, *Pilea pumila*, *Polymnia canadensis*, and *Physalis missouriensis*. Scattered woody plants include *Hydrangea arborescens* and *Staphylea trifolia* (Nelson 1985). In Ontario open talus stands contain *Adiantum pedatum*, *Ageratina altissima* (= *Eupatorium rugosum*), *Geranium robertianum*, *Impatiens capensis*, *Poa pratensis*, and *Toxicodendron radicans* (Lee et al. 1998).

**MOST ABUNDANT SPECIES****Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Hydrangea arborescens*, *Staphylea trifolia*, *Adiantum pedatum*, *Asplenium* spp., *Cystopteris bulbifera*, *Aralia nudicaulis*, *Impatiens capensis*, *Pilea pumila*, *Polymnia canadensis*, *Impatiens* spp, *Poa pratensis*, *Rhus radicans*, *Lobelia cardinalis*

Global:

**OTHER NOTEWORTHY SPECIES**

Ozark National Scenic Riverways:

Global:

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4G5 (3-Mar-2000). Many sites may not lack proper buffers along the clifftops or lower slopes.

**CLASSIFICATION****Status:** Standard**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** This type is associated with both the Limestone - Dolostone Midwest Moist Cliff Sparse Vegetation (CEGL002292) or the Limestone - Dolostone Midwest Dry Cliff Sparse Vegetation (CEGL002291) sparse vegetation associations. Nelson (2005) treats this as a distinct community in his revised "Terrestrial Natural Communities of Missouri", and indeed it is a unique and easily classified type. However, rarely does it occur at a size conducive to mapping and should probably be mapped as part of a dolostone cliff complex. This community can frequently be obscured by canopy from surrounding forests, if present. Typically, matrix forests may include the *Quercus alba-Quercus rubra-Quercus muehlenbergii / Cercis canadensis* Forest (CEGL002070) or the *Acer saccharum-Quercus rubra-Carya cordiformis / Asimina triloba* Forest (CEGL002060). The former is associated with mesic limestone outcrops and the latter is affiliated with mesic floodplains. In these cases, it would be appropriate to map this community at part of the matrix communities around it.

**Global Comments:** This type has not been described across its range, with the exception of Missouri (Nelson 1985) and somewhat in Ontario (Lee *et al.* 1998). Further study is needed to characterize the type. It may be very localized. Rare snails may also be found. The type is especially notable at the base of limestone and dolostone cliffs of the Niagara Escarpment, e.g. in eastern Wisconsin on the Door Peninsula (E. Epstein pers. comm. 1999).

**Global Similar Associations:**

- Sandstone Interior Highlands Talus Sparse Vegetation (CEGL002309)
- Sandstone Talus Northern Sparse Vegetation (CEGL005202)
- *Thuja occidentalis* Carbonate Talus Woodland (CEGL005172)

**Global Related Concepts:****OTHER COMMENTS**

**Other Comments:** Though frequently encountered, rarely if ever does this community reach the minimum mapping size.

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** Though frequently encountered, rarely if ever does this community reach the minimum mapping size. One known example that may be large enough to map exists at the mouth of Jam Up Cave (Approximate NAD 83 Zone 15N UTM coordinates: E 623978, N 4100073). A visit to this site made early in the mapping process informs much of the local description above..

**Global Range:** This limestone-dolostone talus community is found throughout the central/upper midwestern United States, including the Ozark region, and adjacent Canada, extending from Ontario west to Minnesota, south to Arkansas, and east to possibly Illinois.

**Nations:** CA, US**States/Provinces:** AR, IA:S5, IL, MI, MN, MO:S4S5, ON, VT, WI:S2**USFS Ecoregions:** 222Ac:CCC, 222Ae:CCC, 222Ag:CCC, 222Lc:CCC, 222Lf:CCC, 251Ce:CCC, 251Ch:CCC**Federal Lands:** NPS (Ozark); USFS (Ozark?)**ELEMENT SOURCES****Ozark National Scenic Riverways Inventory Notes:****Ozark National Scenic Riverways Plots:****Local Description Authors:** M. Struckhoff**Global Description Authors:** D. Faber-Langendoen

**References:** Epstein 1999, INNAI unpubl. data, Lee *et al.* 1998, Midwestern Ecology Working Group n.d., Nelson 1985, Nelson, P. 2005., WINHIP unpubl. Data

## Igneous Ozark Talus Sparse Vegetation

### Igneous Ozark Talus Sparse Vegetation

#### Ozark Igneous Talus

Identifier: CEGL005203

#### USNVC Classification

Physiognomic Class	Sparse Vegetation (VII)
Physiognomic Subclass	Boulder, gravel, cobble, or talus sparse vegetation (VII.B.)
Physiognomic Group	Sparsely vegetated talus/scree slopes (VII.B.1.)
Physiognomic Subgroup	Natural/Semi-natural sparsely vegetated talus/scree slopes (VII.B.1.N.)
Formation	Lowland or submontane talus/scree (VII.B.1.N.a.)
Alliance	Lowland Talus Sparsely Vegetated Alliance (A.1847)
Alliance (English name)	Lowland Talus Sparsely Vegetated Alliance
Association	Igneous Ozark Talus Sparse Vegetation
Association (English name)	Igneous Ozark Talus Sparse Vegetation
Association (Common name)	Ozark Igneous Talus

#### Ecological System(s):

<b>ONSR Community Type:</b>	Talus
<b>ONSR Ecological System:</b>	Cliffs and talus
<b>Global Ecological System:</b>	Central Interior Acidic Cliff and Talus (CES202.689)

#### ELEMENT CONCEPT

**Global Summary:** This igneous talus type is found in the Missouri Ozarks of the United States. Stands occur on moderately steep to extremely steep slopes at the bases of bluffs, cliffs, and steep valleys or sideslopes of mountain domes, especially along shut-ins. Aspect is in all directions. Soils are absent and the slope is dry. The parent material is igneous, with a large mass of accumulated angular rock fragments and boulders forming large (4 ha or 10 acres) rocky areas. Disturbances include falling rock fragments from adjacent cliffs and slumping of rock material. The vegetation is sparse, consisting of herbaceous plants, vines, mosses and lichens. Characteristic vines include *Celastrus scandens*, *Lonicera flava*, *Rhus aromatica*, *Smilax bona-nox*, *Toxicodendron radicans*, and *Vitis aestivalis*. Other characteristic species include the forb *Polymnia canadensis*, the moss *Dicranum scoparium*, and the lichens include *Pleopsidium chlorophanum* (= *Acarospora chlorophana*), *Cladonia caroliniana*, *Cladonia strepsilis*, *Placidium lachneum* (= *Dermatocarpon lachneum*), *Punctelia hypoleucites* (= *Parmelia hypoleucites*), and *Xanthoparmelia* spp.

#### ENVIRONMENTAL DESCRIPTION

##### USFWS Wetland System: Terrestrial

**Ozark National Scenic Riverways Environment:** This type is associated with steep igneous slopes, often at the base of of these slopes or igneous cliffs.

**Global Environment:** Stands occur on moderately steep to extremely steep slopes at the bases of bluffs, cliffs, and steep valleys or sideslopes of mountain domes, especially along shut-ins. Aspect is in all directions. Soils are absent, slope is dry. The parent material is igneous, with a large mass of accumulated angular rock fragments and boulders forming large (4 ha or 10 acres) rocky areas (Nelson 1985).

#### VEGETATION DESCRIPTION

##### Ozark National Scenic Riverways Vegetation:

**Global Vegetation:** The vegetation is sparse, consisting of herbaceous plants, vines, mosses and lichens. Characteristic vines include *Celastrus scandens*, *Lonicera flava*, *Rhus aromatica*, *Smilax bona-nox*, *Toxicodendron radicans*, and *Vitis aestivalis*. Other characteristic species include the forb *Polymnia canadensis*, the moss *Dicranum scoparium*, and the lichens include *Pleopsidium chlorophanum* (= *Acarospora chlorophana*), *Cladonia caroliniana*, *Cladonia strepsilis*, *Placidium lachneum* (= *Dermatocarpon lachneum*), *Punctelia hypoleucites* (= *Parmelia hypoleucites*), and *Xanthoparmelia* spp. (Nelson 1985).

#### MOST ABUNDANT SPECIES

##### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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##### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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#### CHARACTERISTIC SPECIES

##### Ozark National Scenic Riverways:

Global:

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G4 (31-Mar-2000).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** This type is more common in the St. Francois Mountains to the Northeast of the mapping area. Within the study area, rarely does this type occur in sizes large enough to map. Typically it is associated with dry igneous woodlands and steep slopes, or at the base of igneous slopes. Often, talus slopes are well forested, suggesting classification as another physiognomic type.

**Global Comments:** The concept of the type is taken from the Missouri state type - igneous talus (Nelson 1985).

**Global Similar Associations:**

- Sandstone Interior Highlands Talus Sparse Vegetation (CEGL002309)

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:** This type rarely occurs within the study area in mappable units. The few examples we saw were very small and were associated with woodlands, suggesting classification as a different physiognomic type.

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** Within the mapping area, this type occurs on and at the base of steep igneous slopes.

**Global Range:** This igneous talus type is found in the Missouri Ozarks of the United States.

**Nations:** US

**States/Provinces:** MO:S4S5

**USFS Ecoregions:** 222A:CC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. D. Faber-Langendoen

**References:** Midwestern Ecology Working Group n.d., Nelson 1985

## Riverine Sand Flats - Bars Sparse Vegetation

### Riverine Sand Flats - Bars Sparse Vegetation

#### Riverine Sand Flats

Identifier: CEGL002049

#### USNVC Classification

Physiognomic Class	Sparse Vegetation (VII)
Physiognomic Subclass	Unconsolidated material sparse vegetation (VII.C.)
Physiognomic Group	Sparsely vegetated sand flats (VII.C.2.)
Physiognomic Subgroup	Natural/Semi-natural sparsely vegetated sand flats (VII.C.2.N.)
Formation	Temporarily flooded sand flats (VII.C.2.N.c.)
Alliance	Sand Flats Temporarily Flooded Sparsely Vegetated Alliance (A.1864)
Alliance (English name)	Sand Flats Temporarily Flooded Sparsely Vegetated Alliance
Association	Riverine Sand Flats - Bars Sparse Vegetation
Association (English name)	Riverine Sand Flats - Bars Sparse Vegetation
Association (Common name)	Riverine Sand Flats

#### Ecological System(s):

<b>ONSR Community Type:</b>	Active Channel/Gravel Bar
<b>ONSR Ecological System:</b>	Riverine Shrublands/Herbaceous Communities
<b>Global Ecological System:</b>	Laurentian-Acadian Floodplain Forest (CES201.587)
	Northwestern Great Plains Floodplain (CES303.676)
	North-Central Interior Floodplain (CES202.694)
	Western Great Plains Floodplain (CES303.678)

#### ELEMENT CONCEPT

**Global Summary:** This community ranges from the western Great Plains to the eastern parts of the midwestern United States and Canada. It is a sparsely vegetated community that occurs along river shorelines, islands, pointbars, and flats. These sandbars form when receding floodwaters deposit sand and lesser amounts of clay, silt, and cobbles in the stream bed. Soils are often undeveloped due to the ephemeral nature of the stands. Drainage depends on depth above the water level. Herbaceous species shared in Missouri and Nebraska include *Cyperus* spp. (*Cyperus erythrorhizos*, *Cyperus odoratus*, *Cyperus squarrosus*), *Eragrostis hypnoides*, *Eragrostis trichodes*, *Leptochloa fusca* ssp. *fascicularis* (= *Leptochloa fascicularis*), *Polygonum* spp. (including *Polygonum lapathifolium*), *Rorippa sinuata*, *Sporobolus cryptandrus*, and *Xanthium strumarium*.

#### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** This is a common community on gravel bars along the major rivers (ELT 17; Nigh *et al.* 2000). Soils are typically gravel, though sand deposits are not uncommon. A less common, densely vegetated variety may occasionally be found further from the river on floodplains (ELT 16; Nigh *et al.* 2000). In these stands, sand and/or gravel soils typically overlay silty, compacted soils. As such, these stands may be either old fields or areas of recently forested land within which trees have been washed out due to extreme flooding. For both varieties, flooding occurs at least once annually.

**Global Environment:** This community is a sparsely vegetated community that occurs along river shorelines, islands, pointbars, and flats. These sandbars form when receding floodwaters deposit sand and lesser amounts of clay, silt, gravel, and cobbles in the stream bed. Soils are often undeveloped due to the ephemeral nature of the stands. Drainage depends on depth above the water level (Nelson 1985, Steinauer and Rolfsmeier 2000).

#### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** Trees and shrubs are generally absent, though scattered *Platanus occidentalis* and *Salix caroliniana* are often present. Diagnostic woody vines include *Aristolochia tomentosa* and *Vitis rupestris*. Other vines may include *Rhus radicans* and *Parthenocissus quinquefolia*.

For those stands within the active channel of the rivers (ELT 17; Nigh *et al.* 2000) and therefore dominated by gravel and sand, the groundflora composition is highly dependent on the flood timing, as this community tends to be dominated by “weedy” annuals that produce copious seeds. Despite the proximity of these stands to the river channels, they also have a high abundance of drought-tolerant species that thrive in the fast drying sands and gravels. Typical herbaceous dominants include *Saponaria officinalis*, *Diodea teres*, *Xanthium strumarium*, *Froelichia gracilis*, *Setaria viridis*, *Croton monanthogynus*, and *Euphorbia maculata*. Frequent dominants include weedy species from the family Asteraceae, including *Ambrosia trifida*, *Ambrosia artemisiifolia*, *Artemisia caudata*, *Centaurea maculosa*, and members of the genus *Bidens*.

For those stands that occur on floodplains, where gravel and sand may shroud a layer of silty soils, groundflora dominance may depend on past land use as well as how recently extreme flood events occurred. Typically, these areas are dominated by a mix of annuals and early successional perennials, including many listed above. Low species richness combined with high vegetative cover

## Appendix 15. ONSR USNVC Natural Community Descriptions

likely indicates that an area is an abandoned field, particularly if dominated by exotic species or species that respond favorably human disturbance.

**Global Vegetation:** Vegetation is very sparse, highly dynamic and irregular in structure because of constantly changing conditions on the river. Herbaceous species shared in Missouri and Nebraska include *Cyperus* spp. (*Cyperus erythrorhizos*, *Cyperus odoratus*, *Cyperus squarrosus*), *Eragrostis hypnoides*, *Eragrostis trichodes*, *Leptochloa fusca* ssp. *fascicularis* (= *Leptochloa fascicularis*), *Polygonum* spp. (including *Polygonum lapathifolium*), *Rorippa sinuata*, *Sporobolus cryptandrus*, and *Xanthium strumarium*. Other species listed for Nebraska and Missouri alone can be found in Nelson (1985) and Steinauer and Rolfsmeier (2000). Woody cover is generally absent in the first year of establishment but can increase if the site does not flood. A broader description including other Midwest and Great Plains sites is needed.

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Emergent Tree canopy	Broad-leaved deciduous tree	<i>Platanus occidentalis</i>
Emergent Tall shrub/sapling	Broad-leaved deciduous	<i>Salix caroliniana</i>
	Vine	<i>Vitis rupestris</i>
Herb	Graminoid	<i>Elymus virginicus</i>
Herb	Forb	<i>Artemisia caudata</i> , <i>Diodea teres</i> , <i>Saponaria officinalis</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb	Forb	<i>Polygonum lapathifolium</i>
Herb	Graminoid	<i>Cenchrus longispinus</i> , <i>Eragrostis trichodes</i> , <i>Sporobolus cryptandrus</i>

### CHARACTERISTIC SPECIES

#### Ozark National Scenic Riverways:

**Global:** *Cyperus erythrorhizos*, *Cyperus odoratus*, *Cyperus squarrosus*, *Eragrostis hypnoides*, *Eragrostis trichodes*, *Leptochloa fusca* ssp. *fascicularis*, *Polygonum lapathifolium*, *Rorippa sinuata*, *Sporobolus cryptandrus*, *Xanthium strumarium*

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:** *Centaurea maculosa*

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4G5 (22-Jun-1998).

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** Originally, we had divided this community into the sparse herbaceous stands with gravel and sand soils and the dense herbaceous stands with more silty soils which are typically found on more stable floodplains. The former type may better fit the description for the *Justicia americana* Herbaceous Vegetation (CEGL004286), a type that was not included in this study. The latter association may better fit the community described here, but it frequently resembles an abandoned field in structure and composition, and may provide a distinct habitat from the nearly bare gravel bars. Due to similarities in the photo signature for these types, and given the fact that these type can co-occur in a complex fashion, we opted to treat these two types as one.

**Global Comments:** This type will need to be separated into at least a Great Plains versus a Midwest type. The current description is based primarily on work available in Missouri (Nelson 1985) and Nebraska (Steinauer and Rolfsmeier 2000). See also the Riverine Gravel Flats Great Plains Sparse Vegetation (CEGL005223).

#### Global Similar Associations:

- Riverine Gravel Flats Great Plains Sparse Vegetation (CEGL005223)
- *Salix exigua* / Mesic Graminoids Shrubland (CEGL001203)

#### Global Related Concepts:

### OTHER COMMENTS

**Other Comments:** Within the study area, this type matches well the Ozark subtype of Nelson's (2005) Gravel Wash community type and appears to be a distinct type from either the Riverine Sandflats (CEGL002049) as described in the existing USNVC. That former community appears intended to described consistently sandy or muddy beaches more common in Great Plains river systems.

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This community is common in the park. It occurs on gravel bars and sand bars near the river channel where flooding occurs at least once annually (ELT 17, sometimes 16; Nigh *et al.* 2000).

**Global Range:** This community is found from the western Great Plains to the eastern parts of the midwestern United States and Canada, ranging from Indiana northwest to Saskatchewan, and south to Kansas.

Appendix 15. ONSR USNVC Natural Community Descriptions

**Nations:** CA, US

**States/Provinces:** IL, IN, KS, MB:S3, MN:SU, MO:S1, ND, NE:S5, ON, SK?, WY

**USFS Ecoregions:** 212Mb:CPP, 212Na:CPP, 212Nb:CPP, 212Nc:CPP, 222Ad:CC?, 222Ae:CC?, 222Af:CC?, 222Ak:CC?, 222Ap:CCC, 222Md:CCC, 251Cg:CCC, 251D:CC, 331:C, 332C:CC, 332E:CC

**Federal Lands:** NPS (Fort Laramie, Ozark, Scotts Bluff, Theodore Roosevelt)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** BS\_17\_21, RIP\_AS3F, RIP\_CM3E, RIP\_GN3E, RIP\_RS1C, RIP\_RS1E, RIP\_RS1F

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Greenall 1996, Lauver *et al.* 1999, MNNHP 1993, Midwestern Ecology Working Group n.d., Nelson 1985, Nigh *et al.* 2000, Steinauer and Rolfmeier 2000



**Figure 73.** A small, sparsely vegetated Riverine Sand Flats-Bars Sparse Vegetation (CEGL002049).



**Figure 74.** A Riverine Sand Flats-Bars Sparse Vegetation (CEGL002049) with small inclusions of Willow-Sycamore thicket.



**Figure 75. This Riverine Sand Flats-Bars Sparse Vegetation (CEGL002049) occurs on a floodplain that had been covered in gravel. The structure and composition resemble that of a recently abandoned field, and densely vegetated gravel bars such as this may in fact be old fields.**



## Other Communities

The communities included here were not encountered within the mapping area. However, they are known to occur either in or near the mapping area and therefore may be of interest to resource managers at the park. These vegetation associations are retained in the field key in order to enable users to identify them in the field.

### ***Quercus lyrata* Pond Forest**

**Overcup Oak Pond Forest**

**Overcup Oak Pond Forest**

**Identifier: CEGL004642**

#### **USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Seasonally flooded cold-deciduous forest (I.B.2.N.e.)
Alliance	<i>Quercus lyrata</i> - ( <i>Carya aquatica</i> ) Seasonally Flooded Forest Alliance (A.328)
Alliance (English name)	Overcup Oak - (Water Hickory) Seasonally Flooded Forest Alliance
Association	<i>Quercus lyrata</i> Pond Forest
Association (English name)	Overcup Oak Pond Forest
Association (Common name)	Overcup Oak Pond Forest

#### **Ecological System(s):**

**ONSR Community Type:** Sinkhole Pond Forests

**ONSR Ecological System:** Wet Forests

**Global Ecological System:** Central Interior Highlands and Appalachian Sinkhole and Depression Pond (CES202.018)

#### **ELEMENT CONCEPT**

**Global Summary:** This overcup oak pond forest is found in the south-central United States in southern Missouri and Arkansas. Stands occur in basins of sinkholes or other isolated depressions on uplands. Soils are very poorly drained, and surface water may be present for extended periods of time, rarely becoming dry. Water depth may average close to 0.5 m in depth. Soils may be deep (100 cm or more), consisting of peat or muck, with parent material of peat, muck or alluvium. These forests are *Quercus lyrata*-dominated and occur in seasonally flooded ponds in upland situations. These ponds may also have *Liquidambar styraciflua* and *Nyssa biflora* in the canopy. These canopy species also occur in the shrub layer with *Acer rubrum*. Herbaceous species, such as *Eleocharis obtusa*, can be present in the center of the pond, along with hummocks of *Sphagnum*. When these ponds draw down, leaf litter can comprise 60-70% of the ground cover, with only scattered herbs on the *Sphagnum* hummocks and at the bases of trees. Small thickets of *Smilax rotundifolia* occur around the edges of these ponds and on hummocks, with occasional *Vaccinium pallidum*. Additional species that occur on hummocks and tree bases include *Toxicodendron radicans*, *Asplenium platyneuron*, and moss species.

#### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:**

**Global Environment:** This community is a small, isolated, upland feature, occurring in basins of sinkholes or other isolated depressions on uplands. Soils are very poorly drained, and surface water may be present for extended periods of time. These small ponds can dry out completely, but can fill again with a single rain event. Water depth may average close to 0.5 m in depth. Soils may be deep (100 cm or more), consisting of peat or muck, with parent material of peat, muck or alluvium (Nelson 1985).

#### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:**

**Global Vegetation:** These forests are *Quercus lyrata*-dominated and occur in seasonally flooded ponds in upland situations. These ponds may also have *Liquidambar styraciflua* and *Nyssa biflora* in the canopy. These canopy species also occur in the shrub layer with *Acer rubrum*. Herbaceous species, such as *Eleocharis obtusa*, can be present in the center of the pond, along with hummocks of *Sphagnum*. When these ponds draw down, leaf litter can comprise 60-70% of the ground cover, with only scattered herbs on the *Sphagnum* hummocks and at the bases of trees. Small thickets of *Smilax rotundifolia* occur around the edges of these ponds and on hummocks, with occasional *Vaccinium pallidum*. Additional species that occur on hummocks and tree bases include *Toxicodendron radicans*, *Asplenium platyneuron*, and moss species.

#### **MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

**Stratum**

**Lifeform**

**Species**

**Global**

**Stratum****Lifeform****Species****CHARACTERISTIC SPECIES****Ozark National Scenic Riverways:****Global:****OTHER NOTEWORTHY SPECIES****Ozark National Scenic Riverways:****Global:****CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G1G3 (3-Jan-2001). While incompletely known and defined, this association is restricted to isolated locations at the edge of the range of the primary nominal oak (*Quercus lyrata*). This type was very likely always rare, as it occurs in a rare geologic feature. This community is a small, isolated, upland feature, occurring in basins of sinkholes or other isolated upland depressions. Examples are threatened by timber removal and hydrological alteration (draining and filling of wetlands), including changes to the surrounding upland landscape (land-use change, development).

**CLASSIFICATION****Status:** Standard**Classification Confidence:** 2 - Moderate**Ozark National Scenic Riverways Comments:**

**Global Comments:** This description is based on an example in the Arkansas Ozarks, at the edge of *Quercus lyrata*'s range. Similar isolated, upland oak ponds dominated by *Quercus lyrata*, *Quercus phellos*, *Quercus palustris*, or combinations of these three species also occur in the Arkansas Ozarks (at the edge of all three species' ranges) [see *Quercus phellos* Seasonally Flooded Ozark Pond Forest [Provisional] (CEGL007402) and *Quercus palustris* Pond Forest (CEGL007809)]. Dominance by any one species can be related to length of hydroperiod, with *Quercus lyrata* having the longest, and *Quercus palustris* the shortest, and with related differences in vascular species richness. However, field application of three separate oak pond associations based on dominance can be problematic. Consideration should be given to creating one or two alliances for oak ponds that each cover large geographic areas (i.e., southern vs. northern), rather than having them split up by dominance. CEGL007809 has a shorter hydroperiod and more diverse vascular flora. For related vegetation in Kentucky, see *Quercus lyrata* - *Quercus (palustris, phellos)* - *Liquidambar styraciflua* - (*Populus heterophylla*) Forest (CEGL004421).

**Global Similar Associations:**

- *Nyssa aquatica* / *Cephalanthus occidentalis* Pond Forest (CEGL004712)
- *Quercus lyrata* - *Quercus (palustris, phellos)* - *Liquidambar styraciflua* - (*Populus heterophylla*) Forest (CEGL004421)--is a similar type found in Kentucky.
- *Quercus lyrata* / *Betula nigra* / *Pleopeltis polypodioides* ssp. *michauxiana* Forest (CEGL004975)
- *Quercus palustris* Pond Forest (CEGL007809)
- *Quercus phellos* Seasonally Flooded Ozark Pond Forest [Provisional] (CEGL007402)

**Global Related Concepts:****OTHER COMMENTS**

**Other Comments:** This type is reported by NatureServe as being in the Ozarks, and has been anecdotally reported from the Current River Hills Subsection of the Ozark Highlands. There are no records in the Missouri Natural Heritage database from the mapping area (Missouri Department of Conservation 2000).

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This community is anecdotally reported from the mapping area, but no records are in the Missouri Natural Heritage Database (Missouri Department of Conservation 2000) and we encountered no examples during this study. NatureServe reports this type from the Missouri Ozarks.

**Global Range:** This overcup oak pond forest is found in the south-central United States in southern Missouri and Arkansas.

**Nations:** US**States/Provinces:** AR, MO**USFS Ecoregions:** M222Aa:CCC**Federal Lands:** NPS (Ozark); USFS (Ozark)**ELEMENT SOURCES****Ozark National Scenic Riverways Inventory Notes:****Ozark National Scenic Riverways Plots:****Local Description Authors:** M. Struckhoff**Global Description Authors:** D. Faber-Langendoen**References:** Missouri Department of Conservation 2000, Nelson 1985, Southeastern Ecology Working Group n.d.

***Acer rubrum* - *Fraxinus pennsylvanica* / *Carex* spp. / *Climacium americanum* Forest**

Red Maple - Green Ash / Sedge species / Tree Moss Forest

Red Maple Forested Seep

Identifier: CEGL002407

**USNVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Saturated cold-deciduous forest (I.B.2.N.g.)
Alliance	<i>Fraxinus nigra</i> - <i>Acer rubrum</i> Saturated Forest Alliance (A.347)
Alliance (English name)	Black Ash - Red Maple Saturated Forest Alliance
Association	<i>Acer rubrum</i> - <i>Fraxinus pennsylvanica</i> / <i>Carex</i> spp. / <i>Climacium americanum</i> Forest
Association (English name)	Red Maple - Green Ash / Sedge species / Tree Moss Forest
Association (Common name)	Red Maple Forested Seep

**Ecological System(s):****ONSR Community Type:** Forested Seep**ONSR Ecological System:** Wet Forests**Global Ecological System:** Interior Highlands Forested Acid Seep (CES202.321)**ELEMENT CONCEPT**

**Global Summary:** This red maple forested seep community type can be found in the Ozarks region of the midwestern United States. Stands occur on terraces or floodplains that are relatively flat to gently sloping. The source of water is from a combination of groundwater seepage and rainwater. The soils in this forested fen are somewhat poorly drained, ranging seasonally from saturated to moist with a pH above 6.0. They are deep (100+ cm) and equivalent to wet-mesic bottomland soils. The parent material is alluvium. Hydrophytic plants dominate the vegetation. The overstory is composed of mixed deciduous bottomland hardwoods closed canopy that is 20-30 m tall. Typical tree dominants include *Acer rubrum*, *Fraxinus pennsylvanica*, and *Carpinus caroliniana*. Other tree associates include *Ulmus rubra* and *Diospyros virginiana*. The subcanopy is medium to tall in height (5-10 m) and is generally well-developed. Vines and shrubs are often present and they form entangled thickets. Species present include *Lindera benzoin*. The ground cover is composed of mixed sedges, ferns, and forbs. Species present include *Carex lurida*, *Carex tribuloides*, *Gentiana andrewsii*, *Onoclea sensibilis*, *Dichanthelium clandestinum*, *Pedicularis lanceolata*, *Rudbeckia fulgida* var. *umbrosa*, *Scirpus polyphyllus*, *Solidago gigantea*, and *Solidago rugosa*. Dense hummocks of mosses are often prominent in areas of shallow ponding. Species include *Climacium americanum* and *Thuidium delicatulum*.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** Two examples of this type exist just outside of the mapping area. One is at the base base of the south slope of Stegall Mountain. That area is dominated by exposed igneous bedrock. Soils are saturated and acidic. Slope is level. The other community is located near Cave Fork Creek in the Doniphan Ranger District of Mark Twain National Forest (Missouri Department of Conservation 2000).

**Global Environment:** Stands occur on terraces or floodplains that are relatively flat to gently sloping. Soils are at least partially saturated with water, which originates from a combination of groundwater seepage and rainwater. Soils are somewhat poorly drained, ranging from seasonally saturated to moist with a pH above 6.0. They are deep (100+ cm) and equivalent to wet-mesic bottomland soils. The parent material is alluvium. Bedrock is not detectable (Nelson 1985).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** This is the only community within the study area within which *Acer rubrum* is a dominant tree species. In other communities, red maple is typically limited to the tall shrub layer, or less frequently to the subcanopy. Other dominant tree species include *Fraxinus* spp. and *Ulmus* spp. Dominant shrub species include *Lindera benzoin* and *Carpinus caroliniana*. The groundflora is dominated by the following species, taken from the current USNVC description (Faber-Langendoen 2001): *Carex lurida*, *Carex tribuloides*, *Gentiana andrewsii*, *Onoclea sensibilis*, *Dichanthelium clandestinum* (= *Panicum clandestinum*), *Pedicularis lanceolata*, *Rudbeckia fulgida* var. *umbrosa*, *Scirpus polyphyllus*, *Solidago gigantea*, and *Solidago rugosa*. Dense hummocks of the mosses *Climacium americanum* and *Thuidium delicatulum* are often present (Nelson 1985).

**Global Vegetation:** The overstory is composed of mixed deciduous bottomland hardwoods that form a closed canopy 20-30 m tall. Typical tree dominants include *Acer rubrum*, *Fraxinus pennsylvanica*, and *Carpinus caroliniana*. Other tree associates include *Ulmus rubra* and *Diospyros virginiana*. The subcanopy is medium to tall in height (5-10 m) and is generally well-developed. Vines and shrubs are often present and they form entangled thickets. Species present include *Lindera benzoin*. The ground cover is composed of mixed sedges, ferns, and forbs. Species present include *Carex lurida*, *Carex tribuloides*, *Gentiana andrewsii*, *Onoclea sensibilis*, *Dichanthelium clandestinum* (= *Panicum clandestinum*), *Pedicularis lanceolata*, *Rudbeckia fulgida* var. *umbrosa*, *Scirpus*

## Appendix 15. ONSR USNVC Natural Community Descriptions

*polyphyllus*, *Solidago gigantea*, and *Solidago rugosa*. Dense hummocks of mosses are often prominent in areas of shallow ponding. Species include *Climacium americanum* and *Thuidium delicatulum* (Nelson 1985).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Acer rubrum</i>
Tall shrub/sapling	Broad-leaved deciduous	<i>Lindera benzoin</i>
Herb	Graminoid	<i>Carex lurida</i>
Herb	Forb	<i>Rudbeckia fulgida</i>
Herb	Fern	<i>Onoclea sensibilis</i>
Non-vascular	Moss	<i>Climacium americanum</i>

#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> , <i>Carpinus caroliniana</i> , <i>Fraxinus pennsylvanica</i>
Nonvascular	Moss	<i>Climacium americanum</i>

### CHARACTERISTIC SPECIES

**Ozark National Scenic Riverways:** *Acer rubrum*, *Fraxinus* spp., *Carpinus caroliniana*, *Lindera benzoin*, *Onoclea sensibilis*, *Carex lurida*, *Carex tribuloides*, *Pedicularis lanceolata*, *Scirpus polyphyllus*, *Climacium americanum*

**Global:** *Acer rubrum*, *Carpinus caroliniana*, *Climacium americanum*, *Fraxinus pennsylvanica*

### OTHER NOTEWORTHY SPECIES

**Ozark National Scenic Riverways:**

**Global:**

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** GU (31-Mar-2000). Most of the examples of this type of forested fen have been lost to logging and grazing, but the type is localized and classification is not clear. Stands may in fact arise through modifications to more natural Ozark fens.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Ozark National Scenic Riverways Comments:** This is an extremely easy community to identify, as it is the only one within the study area where red maple is a dominant tree in the canopy. Also, the saturated, moss-covered, hummocky soils are a good indicator of this type. Most of the description above is taken from the current USNVC and visits to the example noted above. The USNVC description is based primarily upon Nelson's description of this type, which likely was based (at least in part) upon the same example of this community noted above (Nelson 1985). No plot data were collected for this type.

**Global Comments:** The concept of the type is taken from the Missouri state classification - forested fen (Nelson 1985). This type may better fit in the *Acer rubrum* - *Nyssa sylvatica* Saturated Forest Alliance (A.348). The concept of this type is not clear, as the type may represent a human-modified fen (M. Leahy pers. comm. 1999). This type may be a special feature of other, more extensive wetlands.

**Global Similar Associations:**

**Global Related Concepts:**

### OTHER COMMENTS

**Other Comments:** No examples were encountered within the study area, but a great example exists at the base of the south slope of Stegal Mountain (approximate NAD 83 Zone 15N UTM coordinates: E 658992, N 4103379). This type is also reported from near Cave Fork Creek in the Doniphan Ranger District of Mark Twain National Forest (Missouri Department of Conservation 2000; Approximate NAD 83 Zone 15N UTM coordinates: E 676170, N 4082657).

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This is an extremely rare community with only two known examples near the mapping area. One is at the base of the south slope of Stegall Mountain. That area is dominated by exposed igneous bedrock. The other community is located near Cave Fork Creek in the Doniphan Ranger District of Mark Twain National Forest (Missouri Department of Conservation 2000). This latter classification was not field confirmed during this study.

**Global Range:** This red maple forested fen community type can be found in the Ozarks region of the midwestern United States, and perhaps in localized parts of the Interior Plateau, such as Indiana and Illinois.

**Nations:** US

**States/Provinces:** AR, IL?, IN?, MO:S1

**USFS Ecoregions:** 222Aa:CCC, 222Ad:CC?, 222Ae:CC?, 222Af:CCC, 222Al:CCC, M221:?

**Federal Lands:** NPS (Ozark); USFS (Ozark?)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:** None

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. J. Drake and D. Faber-Langendoen 12-93, mod. D. Faber-Langendoen

**References:** Faber-Langendoen 2001, Leahy 1999, Midwestern Ecology Working Group n.d., Missouri Department of Conservation 2000, Nelson 1985

## *Arundinaria gigantea* ssp. *gigantea* Shrubland

Giant Cane Shrubland

Floodplain Canebrake

Identifier: CEGL003836

### USNVC Classification

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Evergreen shrubland (III.A.)
Physiognomic Group	Temperate broad-leaved evergreen shrubland (III.A.2.)
Physiognomic Subgroup	Natural/Semi-natural temperate broad-leaved evergreen shrubland (III.A.2.N.)
Formation	Temporarily flooded temperate broad-leaved evergreen shrubland (III.A.2.N.g.)
Alliance	<i>Arundinaria gigantea</i> Temporarily Flooded Shrubland Alliance (A.795)
Alliance (English name)	Giant Cane Temporarily Flooded Shrubland Alliance
Association	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i> Shrubland
Association (English name)	Giant Cane Shrubland
Association (Common name)	Floodplain Canebrake

### Ecological System(s):

<b>ONSR Community Type:</b>	Floodplain Communities
<b>ONSR Ecological System:</b>	Riverine Shrublands/Herbaceous Communities
<b>Global Ecological System:</b>	Central Appalachian Floodplain (CES202.608)
	Atlantic Coastal Plain Nonriverine Swamp and Wet Hardwood Forest (CES203.304)
	Mississippi River Riparian Forest (CES203.190)
	South-Central Interior Large Floodplain (CES202.705)
	South-Central Interior Small Stream and Riparian (CES202.706)
	Atlantic Coastal Plain Large River Floodplain Forest (CES203.066)
	Mississippi River High Floodplain (Bottomland) Forest (CES203.196)

### ELEMENT CONCEPT

**Global Summary:** This association is characterized by dense, often monospecific thickets of the bamboo shrub *Arundinaria gigantea* occupying large areas referred to as canebrakes. The canebrake shrubland type was historically widespread, but is now rare and occupies very little of its former acreage. It was best developed in streamside flats and alluvial floodplains on ridges and terraces where it was protected from prolonged inundation. Historically, this community covered large areas of many floodplains and streambanks in the Coastal Plain from North Carolina to Texas, Mississippi River Alluvial Plain, Interior Highlands, Interior Low Plateau, Southern Blue Ridge and possibly the Central Appalachians of the southeastern United States. Stands occur on alluvial and loess soils and are often associated with bottomland hardwood forest vegetation. This association is successional and is thought to be maintained by periodic fires. It may have originated following abandonment of aboriginal agricultural fields or other natural and anthropogenic disturbances such as blow-downs and catastrophic floods. Historical accounts report cane as abundant along the Wabash and Ohio drainage systems, as well as common along larger rivers (Buffalo, White, Norfork) in the Ozarks and Ouachitas. It was also reported as common along the Red and Mississippi rivers in Louisiana, Coastal Prairie rivers in Texas, and the Black, Washita, Arkansas, Sabine, Pearl, Tombigbee, Yazoo, Savannah, and St. Mary's rivers. Large, extant canebrakes still exist and have been documented from the Ocmulgee Basin, south of Macon, Georgia. In the Central Appalachians various wetlands, including those on alluvial or loess substrates (streamside flats, bottomlands), were dominated by *Arundinaria*, without an overstory, or with widely scattered trees.

### ENVIRONMENTAL DESCRIPTION

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** Stands of *Arundinaria gigantea* within the mapping area are limited to stable floodplains. These tend to be flat or undulating, with alluvial soils. All stands encountered in this study occur below a canopy of deciduous trees common to the bottomlands, all of which are therefore classified as bottomland forest types.

**Global Environment:** Stands of this association occur on alluvial and loess soils often affiliated with bottomland hardwood forest vegetation. Historically, it was best developed in streamside flats and alluvial floodplains on ridges and terraces where it was protected from prolonged inundation.

### VEGETATION DESCRIPTION

**Ozark National Scenic Riverways Vegetation:** Stands of cane within the mapping area nearly always occur below a canopy of deciduous bottomland tree species and are therefore classified as forest types. These examples include species consistent with bottomland forest communities. Examples of cane growing without a tree canopy occasionally occur at the periphery of old fields. These usually include species common to old fields in the area and are better classified as an altered community type.

**Global Vegetation:** The vegetation is dominated by *Arundinaria gigantea*. Little else is known about its vegetational characteristics. However, information on its historic patterns of distribution provides some clues as to its ecology. General Land Office surveys and other historical accounts indicate that canebrakes were present in southern Illinois, southern Indiana, Kentucky, Missouri, Arkansas,

## Appendix 15. ONSR USNVC Natural Community Descriptions

eastern Texas, Louisiana, Tennessee, Mississippi, Alabama, Georgia, and South Carolina. Historical accounts refer to both "pure" stands of cane without an overstory of trees (cane shrublands) and areas with variable overstory closure (woodlands or forests) but with a dense understory dominated by cane as "canebrakes." As currently described, this association refers only to the former, cane shrublands. Cane was abundant along the Wabash and Ohio drainage systems (B. McClain pers. comm. 2000). In Missouri, these canebrakes were also thought to be common in the Ozark Highlands, particularly in southward-draining rivers and streams with finer-textured, more developed soils on upper floodplain terraces (T. Nigh pers. comm. 2000). Stands may be found along larger rivers (Buffalo, White, Norfork) in the Arkansas Ozarks in addition to the Ouachitas. In the Central Appalachians various wetlands, including those on alluvial or loess substrates (streamside flats, bottomlands), were dominated by *Arundinaria*, without an overstory, or with widely scattered trees (Central Appalachian Forest Ecoregional Team pers. comm. 1998). Historic accounts describe large expanses (one area was described as 75 miles long by 1-3 miles wide) of an "ocean of cane" in bottomlands of the Coastal Prairie of Texas (Smeins *et al.* 1992). No extant occurrences of this vegetation are known from this area today.

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

##### Stratum

##### Lifeform

##### Species

#### Global

##### Stratum

##### Lifeform

##### Species

Tall shrub/sapling

Graminoid

*Arundinaria gigantea*

### CHARACTERISTIC SPECIES

#### Ozark National Scenic Riverways:

**Global:** *Arundinaria gigantea*

### OTHER NOTEWORTHY SPECIES

#### Ozark National Scenic Riverways:

**Global:** *Limnotheryptis swainsonii*, *Vermivora bachmanii*

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G2? (15-Feb-1999). Stands of this vegetation type were historically widespread, but now are rare or occupy very little acreage. It is thought to be maintained by frequent fire and may have historically resulted from aboriginal agriculture and burning. Dense, monospecific stands of *Arundinaria gigantea ssp. gigantea* were historically found in bottomland sites throughout the southeastern United States. Today, this vegetation exists as small remnants, and high-quality examples are extremely rare.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:** Stands of cane within the mapping area nearly always occur below a canopy of deciduous bottomland tree species and are therefore classified as forest types. These examples include species consistent with bottomland forest communities. Examples of cane growing without a tree canopy occasionally occur at the periphery of old fields. These usually include species common to old fields in the area and are better classified as an altered community type.

**Global Comments:** This is a general placeholder, covering a broad geographic range, and several associations may ultimately be recognized. Dense, monospecific stands of *Arundinaria gigantea ssp. gigantea* were historically found in bottomland sites in the southeastern United States. Today, high-quality examples are extremely rare, if not absent. Historical accounts refer to both "pure" stands of cane without an overstory of trees (cane shrublands) and areas with variable overstory closure (woodlands or forests) but with a dense understory dominated by cane as "canebrakes." As currently described, this association refers only to the former, cane shrublands.

**Global Similar Associations:**

**Global Related Concepts:**

- P5A4bIII4a. *Arundinaria gigantea* (Foti *et al.* 1994) ?
- Piedmont/Mountain Canebrake (Schafale 1998b) ?

### OTHER COMMENTS

**Other Comments:** True, open-growing stands of cane are anecdotally reported from the mapping area, but none were encountered in this study. No examples of this type are reported in the mapping area from the Missouri Natural Heritage Database (Missouri Department of Conservation 2000).

### ELEMENT DISTRIBUTION

**Ozark National Scenic Riverways Range:** This type is anecdotally reported in the mapping area, though no examples were encountered in this study. Victoria Grant (2003) reports this from the edges of old fields where populations are well established in adjacent forests. Such instances are probably better considered as old field types resulting from human disturbance.

**Global Range:** This association was widespread historically but now occupies very little acreage. It may be found along rivers and streamsides in Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and possibly Virginia (?).

**Nations:** US

**States/Provinces:** AL, AR, FL?, GA, IL, KY, LA, MO, MS, NC, OK, SC, TN, TX, VA?

**USFS Ecoregions:** 221Ha:CC?, 221Hc:CCP, 221Hd:CCP, 221He:CC?, 221Ja:CCC, 221Jb:CCP, 221Jc:CCP, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Ca:CCP, 222Cb:CCP, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CCP, 222Cg:CCP, 222Ch:CCP, 222Da:CCP, 222Db:CCP, 222Dc:CCP, 222Dd:CCP, 222De:CCP, 222Dg:CCP, 222Di:CCP, 222Dj:CCP, 222Ea:CCC, 222Eb:CCC, 222Ec:CCC, 222Ed:CCC, 222Ef:CCP, 222Eg:CCP, 222Eh:CCC, 222Ei:CCP, 222Ej:CC?, 222Ek:CCP, 222El:CCP, 222Em:CCP, 222En:CC?, 222Eo:CC?, 222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Ff:CC?, 231Aa:CCP, 231Ab:CC?, 231Ac:CCP, 231Ad:CCP, 231Ae:CCP, 231Af:CCP, 231Ag:CC?, 231Ah:CC?, 231Ai:CCP, 231Am:CC?, 231An:CC?, 231Ao:CCP, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCP, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCP, 231Bk:CCP, 231Bl:CCP, 231Ca:CCP, 231Cb:CCP, 231Cc:CCP, 231Cd:CCP, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCP, 231Db:CCP, 231Dc:CCP, 231Dd:CCP, 231De:CCP, 231Ea:CCP, 231Eb:CCP, 231Ec:CCC, 231Ed:CCC, 231Ee:CCP, 231Ej:CCP, 231Ek:CCP, 231Em:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 234Aa:CCC, 234Ab:CC?, 234Ac:CCP, 234Ad:CCP, 234Ae:CCC, 234Af:CCP, 234Ag:CCC, 234Ah:CC?, 234Ai:CCC, 234Aj:CC?, 234Ak:CC?, 234Al:CCP, 234Am:CCC, 234An:CCC, 255Da:PPP, 255Db:PPP, M221Dc:CCC, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

**Federal Lands:** NPS (Blue Ridge Parkway?, Buffalo, Cowpens, Great Smoky Mountains, Ninety Six, Ozark); USFS (Cherokee?, Mark Twain, Ouachita?, Ozark, St. Francis); USFWS (Little River, San Bernard?)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** K.D. Patterson, mod. D. Faber-Langendoen, mod. J. Teague

**References:** Barden 1997, Blair 1938, CAP 1998, Campbell 1980, Campbell 1989b, Davidson 1950, Flores 1984, Foti *et al.* 1994, Grant 3003, Heineke 1987, Hoagland 1997, Hoagland 1998, Hoagland 2000, Hughes 1966, McClain 2000, McInteer 1952, Meanley 1972, Missouri Department of Conservation 2000, Mohr 1901, Nigh 2000, Nuttall 1821, Peet *et al.* unpubl. data 2002, Platt and Brantley 1992, Platt and Brantley 1997, Schafale 1998b, Schafale 2002, Smeins *et al.* 1992, Southeastern Ecology Working Group n.d., TNDH unpubl. data, West 1934



## ***Cephalanthus occidentalis* / *Hibiscus moscheutos* ssp. *moscheutos* Depression Pond Shrubland**

**Buttonbush / Eastern Rosemallow Depression Pond Shrubland**

**Buttonbush Sinkhole Pond Swamp**

**Identifier: CEGL004742**

### **USNVC Classification**

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Seasonally flooded cold-deciduous shrubland (III.B.2.N.e.)
Alliance	<i>Cephalanthus occidentalis</i> Seasonally Flooded Shrubland Alliance (A.988)
Alliance (English name)	Buttonbush Seasonally Flooded Shrubland Alliance
Association	<i>Cephalanthus occidentalis</i> / <i>Hibiscus moscheutos</i> ssp. <i>moscheutos</i> Depression Pond Shrubland
Association (English name)	Buttonbush / Eastern Rosemallow Depression Pond Shrubland
Association (Common name)	Buttonbush Sinkhole Pond Swamp

### **Ecological System(s):**

**ONSR Community Type:** Marshes

**ONSR Ecological System:** Marshes

**Global Ecological System:** Central Interior Highlands and Appalachian Sinkhole and Depression Pond (CES202.018)  
East Gulf Coastal Plain Northern Depression Pondshore (CES203.558)

### **ELEMENT CONCEPT**

**Global Summary:** This buttonbush sinkhole pond type occurs in the south-central United States. This shrubland occupies the central portions of small shallow water depressions which have little or no arborescent overstory; adjacent trees are commonly *Quercus phellos* and *Liquidambar styraciflua*. *Cephalanthus occidentalis* and *Hibiscus moscheutos* ssp. *moscheutos* comprise the shrub stratum in water less than 1 m deep. Other woody species commonly encountered along drier margins of Tennessee examples include *Cornus amomum*, *Cornus foemina*, *Cornus racemosa*, *Nyssa biflora*, *Vaccinium fuscatum*, *Acer rubrum*, *Carpinus caroliniana*, *Oxydendrum arboreum*, *Itea virginica*, *Smilax rotundifolia*, and *Salix humilis*. Sedges and grasses are the dominant herbaceous species present and may include *Juncus repens*, *Rhynchospora corniculata*, *Carex gigantea*, *Carex intumescens*, *Leersia hexandra*, *Saccharum baldwinii*, *Glyceria septentrionalis*, *Panicum hemitomon*, and *Dulichium arundinaceum*. The last two species may develop into separate associations forming a mosaic within the small open depressions. Other herbs which may occur include *Polygonum hydropiperoides*, *Polygonum amphibium*, *Proserpinaca pectinata*, *Triadenum walteri*, and *Ludwigia* spp. In Missouri, species include *Bidens discoidea*, *Carex alata*, *Carex comosa*, *Decodon verticillatus*, *Galium tinctorium*, *Glyceria acutiflora*, *Hibiscus moscheutos* ssp. *lasiocarpus*, *Triadenum walteri* (= *Hypericum walteri*), and *Hottonia inflata*. State-rare species that may be found in Tennessee examples of this community include *Ludwigia sphaerocarpa*, *Carex barrattii*, *Panicum hemitomon*, and *Dichantheium dichotomum* var. *ensifolium* (= *Dichantheium ensifolium*). Inundation is usually continuous throughout the year, but these sites can become dry in mid or late summer or during periods of prolonged drought. Soils are silt loams, which are poorly drained soils derived from a thin layer of loess-like silt overlying cherty limestone residuum. They are also underlain by fragipans which may occur as little as 30 cm below the surface or up to 1 m deep. This layer is rarely uniform in thickness, ranging from 15-75 cm thick, or in development, ranging from weakly to strongly developed. These soils have variable chemistry, but can be very acidic and low in nutrients.

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:**

**Global Environment:** Inundation is usually continuous throughout the year, but these sites can become dry in mid or late summer or during periods of prolonged drought. Soils are silt loams, which are poorly drained soils derived from a thin layer of loess-like silt overlying cherty limestone residuum. They are also underlain by fragipans which may occur as little as 30 cm below the surface or up to 1 meter deep. This layer is rarely uniform in thickness, ranging from 15-75 cm thick, or in development, ranging from weakly to strongly developed. These soils have variable chemistry, but can be very acidic and low in nutrients (Nelson 1985, TNC 1998a).

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:**

**Global Vegetation:** This shrubland occupies the central portions of small shallow water depressions which have little or no arborescent overstory; adjacent trees are commonly *Quercus phellos* and *Liquidambar styraciflua*. *Cephalanthus occidentalis* and *Hibiscus moscheutos* ssp. *moscheutos* comprise the shrub stratum in water less than 1 m deep. Other woody species commonly encountered along drier margins of Tennessee examples include *Cornus amomum*, *Cornus foemina*, *Cornus racemosa*, *Nyssa biflora*, *Vaccinium fuscatum*, *Acer rubrum*, *Carpinus caroliniana*, *Oxydendrum arboreum*, *Itea virginica*, *Smilax rotundifolia*, and *Salix humilis*. Sedges and grasses are the dominant herbaceous species present and may include *Juncus repens*, *Rhynchospora corniculata*,

## Appendix 15. ONSR USNVC Natural Community Descriptions

*Carex gigantea*, *Carex intumescens*, *Leersia hexandra*, *Saccharum baldwinii*, *Glyceria septentrionalis*, *Panicum hemitomon*, and *Dulichium arundinaceum*. The last two species may develop into separate associations forming a mosaic within the small open depressions. Other herbs which may occur include *Polygonum hydropiperoides*, *Polygonum amphibium*, *Proserpinaca pectinata*, *Triadenum walteri*, and *Ludwigia* spp. In Missouri, species include *Bidens discoidea*, *Carex alata*, *Carex comosa*, *Decodon verticillatus*, *Galium tinctorium*, *Glyceria acutiflora*, *Hibiscus moscheutos* ssp. *lasiocarpos*, *Triadenum walteri* (= *Hypericum walteri*), and *Hottonia inflata* (Nelson 1985). State-rare species that may be found in Tennessee examples of this community include *Ludwigia sphaerocarpa*, *Carex barrattii*, *Panicum hemitomon*, and *Dichantheium dichotomum* var. *ensifolium* (= *Dichantheium ensifolium*) (TNC 1998a).

### MOST ABUNDANT SPECIES

#### Ozark National Scenic Riverways

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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#### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### CHARACTERISTIC SPECIES

#### Ozark National Scenic Riverways:

#### Global:

### OTHER NOTEWORTHY SPECIES

#### Ozark National Scenic Riverways:

#### Global:

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G3? (19-Sep-2001). There are probably fewer than 100 occurrences rangewide. Currently 22 occurrences have been documented from Missouri (where it is ranked S1). The community may also occur in Indiana. There are probably fewer than 500 acres rangewide. Currently 85 acres have been documented at 17 of the 22 known sites. This community is documented from 6 ecoregion subsections in the Ozark Highlands section. This community has fairly narrow habitat requirements and may have always been rare. Very few high-quality examples are known in Tennessee.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

#### Ozark National Scenic Riverways Comments:

**Global Comments:** Type concept of the former CEGL002414 was taken from the Missouri state type - "pond shrub swamp" (Nelson 1985). The herbaceous equivalent of Missouri examples of this type (Nelson's "pond shrub swamp") is *Carex comosa* - *Carex decomposita* - *Dulichium arundinaceum* - *Lycopus rubellus* Herbaceous Vegetation (CEGL002413), and distinctions between the two may be difficult to make. Type needs continuing rangewide review and integration. At Arnold Air Force Base, Coffee and Franklin counties, Tennessee, examples of this community can be found at Clay Pond, Cow Pond, Lemm Pond, and Heron Ponds. Will this type require geographic subdivision as more information becomes available?

#### Global Similar Associations:

- *Carex comosa* - *Carex decomposita* - *Dulichium arundinaceum* - *Lycopus rubellus* Herbaceous Vegetation (CEGL002413)
- *Cephalanthus occidentalis* / *Carex* spp. - *Lemna* spp. Southern Shrubland (CEGL002191)
- *Decodon verticillatus* Seasonally Flooded Shrubland (CEGL003905)
- *Nyssa aquatica* / *Cephalanthus occidentalis* Pond Forest (CEGL004712)

#### Global Related Concepts:

### OTHER COMMENTS

**Other Comments:** The Missouri Natural Heritage Database (Missouri Department of Conservation 2000) reports this type from the vicinity of the study area, but outside the mapping area. Those records refer to its former designation, CEGL002414, taken from the Missouri state type - "pond shrub swamp" (Nelson 1985).

### ELEMENT DISTRIBUTION

#### Ozark National Scenic Riverways Range:

**Global Range:** This buttonbush sinkhole pond type occurs in the south-central United States, ranging from Missouri, Illinois, and Indiana, south to Tennessee and Georgia, and possibly Alabama and Mississippi.

**Nations:** US

**States/Provinces:** AL?, GA, IL, IN, KY, MO:S1, MS?, TN

**USFS Ecoregions:** 222Eb:CCC

**Federal Lands:** DOD (Arnold); NPS (Ozark); USFS (Mark Twain)

### ELEMENT SOURCES

#### Ozark National Scenic Riverways Inventory Notes:

#### Ozark National Scenic Riverways Plots:

Appendix 15. ONSR USNVC Natural Community Descriptions

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** M. Pyne, mod. D. Faber-Langendoen

**References:** Missouri Department of Conservation 2000, Nelson 1985, Southeastern Ecology Working Group n.d., TNC 1998a, TNDH unpubl. data

***Carex comosa* - *Carex decomposita* - *Dulichium arundinaceum* - *Lycopus rubellus***

**Herbaceous Vegetation**

**Comosa Sedge - Decomposite Sedge - Threeway Sedge - Stalked Water-Horehound Herbaceous Vegetation**

**Sinkhole Pond Marsh**

**Identifier: CEG002413**

**USNVC Classification**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Semipermanently flooded temperate or subpolar grassland (V.A.5.N.I.)
Alliance	<i>Carex comosa</i> - ( <i>Carex decomposita</i> ) Semipermanently Flooded Herbaceous Alliance (A.1439)
Alliance (English name)	Comosa Sedge - (Decomposite Sedge) Semipermanently Flooded Herbaceous Alliance
Association	<i>Carex comosa</i> - <i>Carex decomposita</i> - <i>Dulichium arundinaceum</i> - <i>Lycopus rubellus</i> Herbaceous Vegetation
Association (English name)	Comosa Sedge - Decomposite Sedge - Threeway Sedge - Stalked Water-Horehound Herbaceous Vegetation
Association (Common name)	Sinkhole Pond Marsh

**Ecological System(s):**

**ONSR Community Type:** Marshes

**ONSR Ecological System:** Marshes

**Global Ecological System:** Central Interior Highlands and Appalachian Sinkhole and Depression Pond (CES202.018)

**ELEMENT CONCEPT**

**Global Summary:** This sinkhole pond marsh type is found in the Interior Highlands region of the United States. Stands occur in sinkholes and depressions of terraces and broad level uplands, including those with karst topography. Soils are very poorly drained, with surface water present for extended periods of the year, sometimes up to 1 m in depth. Soils are deep (>100 cm) consisting of peat, muck, or mineral. The parent material may be sand, rock or loess, where depressions occur on hardpans. The vegetation is variable, depending on water fluctuations, with zones of tall emergents, submerged aquatics, or vegetative mats. Dominant emergents include *Typha latifolia*, *Schoenoplectus tabernaemontani* (= *Scirpus tabernaemontani*) and *Nelumbo lutea*. In Missouri, other characteristic plants include *Carex comosa*, *Glyceria acutiflora*, *Potamogeton diversifolius*, *Alopecurus aequalis*, *Galium tinctorium*, *Sagittaria rigida*, *Dulichium arundinaceum*, *Hottonia inflata*, *Ceratophyllum echinatum*, *Viola lanceolata*, *Wolffia brasiliensis* (= *Wolffia papulifera*), *Isoetes engelmannii*. Sand ponds are characterized by *Iris fulva*, *Carex crus-corvi*, *Rhynchospora corniculata*, *Juncus nodatus*, *Saururus cernuus*, and *Hydrolea uniflora*. Indiana ponds may contain *Sparganium androcladum*, *Nuphar lutea ssp. advena* (= *Nuphar advena*), *Cephalanthus occidentalis*, *Decodon verticillatus*, *Utricularia gibba*, and *Carex comosa*.

**ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:**

**Global Environment:** Stands occur in sinkholes and depressions of terraces and broad level uplands, including those in karst topography. Soils are very poorly drained, with surface water present for extended periods of the year, sometimes up to 1 m in depth. Soils are deep (>100 cm) consisting of peat, muck, or mineral. The parent material may be sand, rock or loess, where depressions occur on hardpans (Nelson 1985).

**VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:**

**Global Vegetation:** The vegetation is variable, depending on water fluctuations, with zones of tall emergents, submerged aquatics, or vegetative mats. Dominant emergents include *Typha latifolia*, *Schoenoplectus tabernaemontani* (= *Scirpus tabernaemontani*) and *Nelumbo lutea*. In Missouri, other characteristic plants include *Carex comosa*, *Glyceria acutiflora*, *Potamogeton diversifolius*, *Alopecurus aequalis*, *Galium tinctorium*, *Sagittaria rigida*, *Dulichium arundinaceum*, *Hottonia inflata*, *Ceratophyllum echinatum*, *Viola lanceolata*, *Wolffia brasiliensis* (= *Wolffia papulifera*), *Isoetes engelmannii*. Sand ponds are characterized by *Iris fulva*, *Carex crus-corvi*, *Rhynchospora corniculata*, *Juncus nodatus*, *Saururus cernuus*, and *Hydrolea uniflora*. Indiana ponds may contain *Sparganium androcladum*, *Nuphar lutea ssp. advena* (= *Nuphar advena*), *Cephalanthus occidentalis*, *Decodon verticillatus*, *Utricularia gibba*, and *Carex comosa* (Homoya et al. 1985, Nelson 1985).

**MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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**Global**

**Stratum**

**Lifeform**

**Species**

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:**

**Global:**

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:** *Carex decomposita*

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G3G4 (22-Mar-2000). The SRANK for Missouri will be revisited (M. Leahy pers. comm. 1999).

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:**

**Global Comments:** Concept of the type is taken from Indiana state classification - sinkhole pond (Homoya *et al.* 1985) and Missouri state classification - pond marsh (Nelson 1985). Nelson provides lists of additional species in Missouri that are restricted to, but potentially not consistently found in, this type. See also thesis work by Haefner (1993), a survey of sinkhole ponds in karst plain topography. This type ought to be in Kentucky and Tennessee, e.g., Kentucky Broadhead Swamp. Other sinkhole pond types, *Decodon verticillatus* Seasonally Flooded Shrubland (CEGL003905) and *Cephalanthus occidentalis* / *Hibiscus moscheutos* ssp. *moscheutos* Depression Pond Shrubland (CEGL004742) may overlap floristically with this type.

**Global Similar Associations:**

- *Cephalanthus occidentalis* / *Hibiscus moscheutos* ssp. *moscheutos* Depression Pond Shrubland (CEGL004742)
- *Decodon verticillatus* Seasonally Flooded Shrubland (CEGL003905)
- *Scirpus cyperinus* - *Panicum rigidulum* - *Rhynchospora corniculata* - (*Dulichium arundinaceum*) Herbaceous Vegetation (CEGL004719)

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:** Though no examples were encountered in this study, two examples are recorded in the Missouri Natural Heritage Database (Missouri Department of Conservation 2000). Both occur on private lands in flat uplands on the Jacks Fork River (Approximate NAD 83 Zone 15N UTM coordinates: E 623360, N 4102841 and Gilmore Pond at E 621943, N 4101980).

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:**

**Global Range:** This sinkhole pond marsh type is found in the Interior Highlands region of the United States, ranging from southern Indiana and southeastern Missouri to possibly Kentucky and Tennessee.

**Nations:** US

**States/Provinces:** IN, KY?, MO:S4S5, TN?

**USFS Ecoregions:** 222Ab:CCC, 222Af:CCC, 222Ag:CCC, 222Am:CCC, 222Ek:CCC, 234:P, 251Ce:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** D. Faber-Langendoen

**References:** Haefner 1983, Homoya *et al.* 1985, Midwestern Ecology Working Group n.d., Missouri Department of Conservation 2000, Nelson 1985, TNDH unpubl. data

## ***Carex interior* - *Carex lurida* - *Andropogon gerardii* - *Parnassia grandifolia* Herbaceous Vegetation**

### **Inland Sedge - Sallow Sedge - Big Bluestem - Largeleaf Grass-of-Parnassus Herbaceous Vegetation**

#### **Ozark Prairie Fen**

**Identifier:** CEGL002416

#### **USNVC Classification**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Saturated temperate or subpolar grassland (V.A.5.N.m.)
Alliance	<i>Carex lurida</i> - <i>Carex leptalea</i> - ( <i>Carex atlantica</i> , <i>Carex interior</i> , <i>Parnassia grandifolia</i> ) Saturated (A.1452) Herbaceous Alliance
Alliance (English name)	Sallow Sedge - Little Bog Sedge - (Prickly Bog Sedge, Inland Sedge, Largeleaf Grass-of-Parnassus) Saturated Herbaceous Alliance
Association	<i>Carex interior</i> - <i>Carex lurida</i> - <i>Andropogon gerardii</i> - <i>Parnassia grandifolia</i> Herbaceous Vegetation
Association (English name)	Inland Sedge - Sallow Sedge - Big Bluestem - Largeleaf Grass-of-Parnassus Herbaceous Vegetation
Association (Common name)	Ozark Prairie Fen

#### **Ecological System(s):**

<b>ONSR Community Type:</b>	Fens
<b>ONSR Ecological System:</b>	Fens
<b>Global Ecological System:</b>	Ozark-Ouachita Fen (CES202.052) Ozark-Ouachita Riparian (CES202.703)

#### **ELEMENT CONCEPT**

**Global Summary:** This prairie fen community type is found in the Ozarks region of the United States. Stands occur on the valley terraces of larger streams and rivers. Soils are moist to wet, and seasonally saturated by calcareous internal groundwater seepage. Soils are muck or mucky peat, alkaline (pH above 6.5), and shallow (40-100 cm), or, locally, very shallow with gravel at the surface. The parent material is a gravelly alluvium or colluvium over dolomite bedrock. The bedrock strata are detectable. Fires are possible in some of the larger fens. A mix of tallgrass and herbaceous calciphiles dominate the vegetation. Scattered shrubs may occur. Dominant graminoids include *Andropogon gerardii*, *Sorghastrum nutans*, and *Spartina pectinata*. Other characteristic graminoids include *Carex interior*, *Carex lurida* and *Panicum virgatum*. Characteristic forbs include *Castilleja coccinea*, *Helianthus grosseserratus*, *Helianthus mollis*, *Lysimachia quadriflora*, *Lythrum alatum*, *Oxypolis rigidior*, *Pycnanthemum tenuifolium*, *Pycnanthemum virginianum*, *Rudbeckia fulgida* var. *umbrosa*, *Silphium integrifolium*, *Silphium terebinthinaceum*, and *Veronicastrum virginicum*. More rarely, *Platanthera leucophaea* may occur.

#### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** No examples were sampled for this study. However, due to the rarity of this community and its subsequent concern to resource managers in the Ozarks, it is highly studied and its properties are well understood. The environmental parameters provided in the current USNVC are well documented (Faber-Langendoen 2001). This community occurs in saturated, often marly soils on Eminence Dolomite. Bedrock is usually exposed on just under the soil surface.

**Global Environment:** Stands occur on the valley terraces of larger streams and rivers. Soils are moist to wet, and seasonally saturated by calcareous internal groundwater seepage. Soils are muck or mucky peat, alkaline (pH above 6.5), and shallow (40-100 cm), or, locally, very shallow with gravel at the surface. The parent material is a gravelly alluvium or colluvium over dolomite bedrock. The bedrock strata are detectable (Nelson 1985).

#### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The vegetative description provided in the current USNVC is appropriate and well documented (Faber-Langendoen 2001). We did not sample this community during our study.

**Global Vegetation:** A mix of tallgrass and herbaceous calciphiles dominate the vegetation. Scattered shrubs may occur. Dominant graminoids include *Andropogon gerardii*, *Sorghastrum nutans*, and *Spartina pectinata*. Other characteristic graminoids include *Carex interior*, *Carex lurida* and *Panicum virgatum*. Characteristic forbs include *Castilleja coccinea*, *Helianthus grosseserratus*, *Helianthus mollis*, *Lysimachia quadriflora*, *Lythrum alatum*, *Oxypolis rigidior*, *Pycnanthemum tenuifolium*, *Pycnanthemum virginianum*, *Rudbeckia fulgida* var. *umbrosa*, *Silphium integrifolium*, *Silphium terebinthinaceum*, and *Veronicastrum virginicum*. More rarely, *Platanthera leucophaea* may occur (Orzell and Kurz 1984, Nelson 1985).

#### **MOST ABUNDANT SPECIES**

**Ozark National Scenic Riverways**

**Stratum**

**Lifeform**

**Species**

**Global**

**Stratum**

Herb  
Herb

**Lifeform**

Forb  
Graminoid

**Species**

*Parnassia grandifolia*, *Rudbeckia fulgida* var. *umbrosa*  
*Andropogon gerardii*, *Carex interior*, *Carex leptalea*, *Carex*  
*lurida*, *Rhynchospora capillacea*, *Scleria verticillata*

**CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:**

**Global:** *Carex interior*, *Carex leptalea*, *Carex lurida*, *Menyanthes trifoliata*, *Pogonia ophioglossoides*, *Rhynchospora capillacea*, *Rudbeckia fulgida* var. *umbrosa*, *Scleria verticillata*

**OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:**

**Global:** *Platanthera leucophaea*

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** G1G2 (31-Mar-2000). There are probably fewer than 20 occurrences rangewide. Currently 13 occurrences have been documented from Missouri, where it is ranked S1. There are probably fewer than 100 acres rangewide. Currently 37 acres have been documented for 12 occurrences, with sizes ranging from 1 to 13 acres. This community is reported from four ecoregion subsections in the Ozark Highlands section in southern Missouri. These fens usually have fairly restricted hydrological requirements, and this community may have always been rare.

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Ozark National Scenic Riverways Comments:**

**Global Comments:** Concept of this type is based on Missouri state classification - prairie fen (Nelson 1985). This community often has inclusions of (*Carex interior*, *Carex lurida*) - *Carex leptalea* - *Parnassia grandifolia* - *Rhynchospora capillacea* Herbaceous Vegetation (CEGL002404).

**Global Similar Associations:**

- (*Carex interior*, *Carex lurida*) - *Carex leptalea* - *Parnassia grandifolia* - *Rhynchospora capillacea* Herbaceous Vegetation (CEGL002404)

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:** One example of this type, Shut-in Mountain Fen, is located just outside the mapping area and is owned by The Nature Conservancy (Approximate NAD 83 Zone 15N UTM coordinates: E 657335, N 4108361). This site was visited during preliminary mapping efforts and informs some of the vegetative and ecological comments in the description above.

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** This is one of the rarest communities within the study area. It is limited to slopes and drains where Eminence Dolomite is at or near the surface. It may frequently be found in a complex with the (*Carex interior*, *Carex lurida*)-*Carex leptalea*-*Parnassia grandifolia*-*Rhynchospora capillacea* Herbaceous Vegetation (CEGL002404). However, the current USNVC description for the community described here allows for the possibility that such inclusions may occur as part of an interwoven fen complex. If such is the case, it may be appropriate to combine these two types into a single type or to map them as a complex. In most cases, such complexes are smaller than the minimum mapping unit and are treated as a single management unit. Therefore, these communities will typically be mapped as a point feature.

**Global Range:** This prairie fen community type is found in the Ozarks region of the United States, particularly in south-central Missouri.

**Nations:** US

**States/Provinces:** MO:S1

**USFS Ecoregions:** 222Ab:CCC, 222Af:CCC, 222Ag:CCC, 222Al:CCC

**Federal Lands:** NPS (Ozark)

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:** M. Struckhoff

**Global Description Authors:** P. Nelson, mod. D. Faber-Langendoen

**References:** Midwestern Ecology Working Group n.d., Nelson 1985, Orzell and Kurz 1984

Faber-Langendoen, D., editor. 2001. Plant communities of the Midwest: Classification in an ecological context. Association for Biodiversity Information, Arlington, VA. 61 pp. + appendix (705 pp.).

## ***Vegetated Spring Branch***

N.B. No USNVC type exists for this community, so all descriptions are based upon local information, though this is sparse. This type was encountered late in the project, so no plot data exists, though Nelson (2005) describes a Limestone/Dolomite Spring community that is appropriate. Inclusion of this community type is intended as a place holder.

### **Vegetated Spring Branch**

**Identifier:** N/A

### **USNVC Classification**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Hydromorphic-rooted vegetation (V.C.)
Physiognomic Group	Temperate or subpolar hydromorphic-rooted vegetation (V.C.2.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar hydromorphic-rooted vegetation (V.C.2.N.)
Formation	Permanently flooded temperate or subpolar hydromorphic-rooted vegetation (V.C.2.N.a.)
Alliance	N/A
Alliance (English name)	N/A
Association	N/A
Association (English name)	N/A
Association (Common name)	Vegetated Spring Branch

### **Ecological System(s):**

<b>ONSR Community Type:</b>	Springs
<b>ONSR Ecological System:</b>	Riverine Emergent Aquatic Communities
<b>Global Ecological System:</b>	N/A

### **ELEMENT CONCEPT**

**Global Summary:** N/A

### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Ozark National Scenic Riverways Environment:** This community is limited to perennial springs.

**Global Environment:** N/A

### **VEGETATION DESCRIPTION**

**Ozark National Scenic Riverways Vegetation:** The few examples of this type encountered during this study generally had two expressions: a type dominated by watercress (*Cardamine bulbosa*), and a type dominated by bur-reed (*Sparganium americanum*). Nelson (2005) includes both in his description of the Limestone/Dolomite Spring, so this pattern may not hold across many examples. Nelson includes *Ranunculus longirostris*, *Potamogeton illinoensis*, *Zannichellia palustris*, *Lemna valdiviana*, *Veronica catenata*, *Polygonum hydropiperoides*, *Alisma subcordatum*, *Potamogeton filiosus*, *Heteranthera dubia* and *Ceratophyllum demersum* as characteristic plants. Smaller, shaded springs that we encountered included *Lysimachia nummularia*, though these springs had minimal flow, and may represent a different type.

**Global Vegetation:** N/A

### **MOST ABUNDANT SPECIES**

#### **Ozark National Scenic Riverways**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herbaceous	Emergent Aquatic	<i>Sparganium americanum</i> , <i>Myriophyllum heterophyllum</i> , <i>Callitriche heterophylla</i> , <i>Anacharis nuttallii</i> (Nelson 2005)

#### **Global**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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### **CHARACTERISTIC SPECIES**

**Ozark National Scenic Riverways:** *Ranunculus longirostris*, *Potamogeton illinoensis*, *Zannichellia palustris*, *Lemna valdiviana*, *Veronica catenata*, *Polygonum hydropiperoides*, *Alisma subcordatum*, *Potamogeton filiosus*, *Heteranthera dubia* and *Ceratophyllum demersum* (Nelson 2005)

**Global:**

### **OTHER NOTEWORTHY SPECIES**

**Ozark National Scenic Riverways:** *Lemna trisulca*, *Dryopteris celsa* (Nelson 2005)

**Global:**



**CONSERVATION STATUS RANK**

**Global Rank & Reasons:**

**CLASSIFICATION**

**Status:**

**Classification Confidence:**

**Ozark National Scenic Riverways Comments:** Only two examples were encountered in this study, though many other vegetated spring branches are known to exist in the area. This type needs to be developed and included in the USNVC.

**Global Comments:**

**Global Similar Associations:**

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Ozark National Scenic Riverways Range:** Two examples were encountered in this study, one near Long Bay below Big Spring (approximate NAD83 Zone 15 UTM coordinates: E, 683465, N 4089015), and the other in McCubbin Hollow on the upper section of the Jacks Fork River (approximate NAD83 Zone 15 UTM coordinates: E, 619666, N 4100638). Other possible examples exist at Alley Spring and Pulltite Spring.

**Global Range:**

**Nations:** US

**States/Provinces:**

**USFS Ecoregions:**

**Federal Lands:**

**ELEMENT SOURCES**

**Ozark National Scenic Riverways Inventory Notes:**

**Ozark National Scenic Riverways Plots:**

**Local Description Authors:**

**Global Description Authors:**

**References:** Nelson 2005

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Appendix 15. ONSR USNVC Natural Community Descriptions

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