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THE FLORA AND PLANT COMMUNITIES OF CADDO LAKE WILDLIFE MANAGEMENT AREA, TEXAS

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ABSTRACT

Caddo Lake Wildlife Management Area (CLWMA) consists of 3591 hectares in Harrison and Marion counties, Texas. CLWMA straddles Caddo Lake, one of Texas's few natural lakes. CLWMA is ecologically diverse with intact natural plant community associations that are representative of the Upper West Gulf Coastal Plain Region. CLWMA contains mature large intact habitats of bottomland, hardwood slope, swamp, and pine-oak forests in addition to unique small-patch plant communities such as saline prairies and seepage bogs. This annotated checklist documents 744 species, 403 genera, and 134 families. There are 698 native taxa, 46 introduced, and an extraordinary number of *Carex* species at 41. The checklist includes three species endemic to the West Gulf Coastal Plain, including *Amorpha paniculata*, *Monarda luteola*, and *Senecio ampullaceus* with the former two being globally rare. The checklist also includes three additional globally rare species, *Carex decomposita*, *Cypripedium kentuckiense*, and *Solidago auriculata*. Four species documented at CLWMA are reported as additions and/or confirmation to the flora of Texas -- *Nymphoides cristata*, *Quercus imbricaria*, *Rhynchospora careyana*, and *Sagittaria subulata*.

Caddo Lake Wildlife Management Area (CLWMA) is located in northeast Texas (Figs. 1, 2) and is 3591 hectares (8,874 acres) in size. The vegetation of these public lands is within the Pineywoods Ecoregion, which occupies 6,038,915 hectares (14,922,485 acres) along the eastern edge of the state. As the name implies, this region is defined by the presence of pine-dominated forests or woodlands. Loblolly pine (*Pinus taeda*) is ubiquitous, occurring in a broad spectrum of habitats throughout the region; it is also widely utilized in commercial pine plantations. Shortleaf pine (*P. echinata*) is most conspicuous on drier sites in the north, while longleaf pine (*P. palustris*) is restricted to the southeastern part of the region. In some areas, pines are mixed with various hardwoods such as oaks (*Quercus falcata*, *Q. stellata*, *Q. shumardii*, and others), hickories (*Carya* spp.), maples (*Acer* spp.), and sweetgum (*Liquidambar styraciflua*). Other matrix communities include bottomland forests composed of

swamp chestnut oak (*Q. michauxii*), overcup oak (*Q. lyrata*), water oak (*Q. nigra*), willow oak (*Q. phellos*), and many other hardwoods. Somewhat more localized but still large-scale vegetation types include forests of white oak (*Q. alba*), southern red oak (*Q. falcata*), Shumard red oak (*Q. shumardii*) and other hardwoods occur on sandier sites (Marks & Harcombe 1981; Bezanson 2000). Bald cypress (*Taxodium distichum*) - tupelo (*Nyssa aquatica*) swamp forests occur along some mature streams in various parts of the region with Big Cypress Bayou, Black Cypress Bayou, Little Cypress Bayou, Kitchens Creek, and Caddo Lake area, comprising one of the largest concentrations of swamp forest in Texas.

Figure 1. Caddo Lake Wildlife Management Area, Harrison and Marion counties, Texas.

The CLWMA was purchased to protect and enhance natural bald cypress (*Taxodium distichum*) habitats and its associated flora and fauna and the cultural and archaeological resources. The management area is primarily used for public hunting and fishing but also offers non-consumptive recreational activities considered compatible with the protection and management of the resources.

Between March of 1992 and June, 1996, Texas Parks and Wildlife Department purchased 3108 hectares (7,681.101 acres) of primarily bald cypress swamp and flooded hardwood bottomland located on the shores of Big Cypress Bayou and Caddo Lake near Karnack. Between August 1998 and July 1999, 50.05 hectares (124 acres) were purchased for the inclusion of CLWMA. These purchases were made through the Texas Nature Conservancy using funds from TPWD, Texas Nature Conservancy, United States Fish and Wildlife Service (USFWS), General Land Office (GLO) and funds granted by the North American Wetlands Conservation Council as a Federal Challenge Grant. In November 2006, Texas Parks and Wildlife Department acquired 131 hectares (324 acres) in Marion County from the General Land Office. In 2021, an additional 301 hectares (745 acres) was acquired through a wetland impact mitigation settlement and is called the Horse Creek Unit. This acquisition added to the

contiguity of the CLWMA. On October 23, 1993, the CLWMA was designated a Ramsar Site by the Ramsar Convention, recognizing the CLWMA as "A Wetland of International Importance Especially as Waterfowl Habitat." The Convention is an intergovernmental treaty that provides a framework for international cooperation for the conservation of wetland habitats. Presently, there are 40 other such sites in the United States with CLWMA being the first and only one in Texas.

DESCRIPTION OF STUDY SITE

CLWMA is located on Caddo Lake in the Pineywoods Ecoregion of northeast Texas. The CLWMA lies east of State Highway 43 and 1 mile north of Karnack. The majority of the CLWMA is north of Big Cypress Bayou in Marion County while a small portion is south of the Bayou in Harrison County. Within CLWMA, Caddo Lake and its associated wetlands receive water from Big Cypress Bayou, Black Cypress Bayou, Kitchens Creek, and Little Cypress Bayou.

The climate within CLWMA is relatively mild with hot and humid summers and mild winters. Mean annual precipitation is 67 inches (Larkin & Bomar 1983), with periods of heaviest precipitation occurring in April and May. First and last freeze dates occur in early November and mid-late March, respectively. The average annual low temperature is 64 degrees F and the average annual high temperature is 87 degrees F is the average annual temperature (Larkin & Bomar 1983) with 214-254 days in the growing season.

The WMA consists primarily of a permanently flooded bald cypress swamp and seasonally flooded bottomland hardwoods as well as upland hardwood and pine-hardwood mixed forest. Water levels usually range from 165-172 feet (above mean sea level) with the highest levels occurring in the late winter and early spring months of January, February, and March. The weir on Caddo Lake is at an elevation of 168.5 feet. The water level in Caddo Lake is influenced by the Army Corp of Engineers upstream water management of Lake O' The Pines Reservoir on the Big Cypress Bayou as well as area precipitation. Both Little Cypress Bayou and Black Cypress Bayous are unobstructed. Land elevations rise from lake level to greater than 300 feet on some upland sites. Most of the upland sites are less than 200 feet in elevation. The highest elevation on CLWMA occurs on Potters Bluff, a suite of highly intact and relatively steep hardwood slope ravines. Predominant soil types of CLWMA include Cypress, Guyton-Cart, Latch-Mollville, Moreville, Sardis, Scottsville and Socagee (Golden et al. 1994; Griffith 2009).

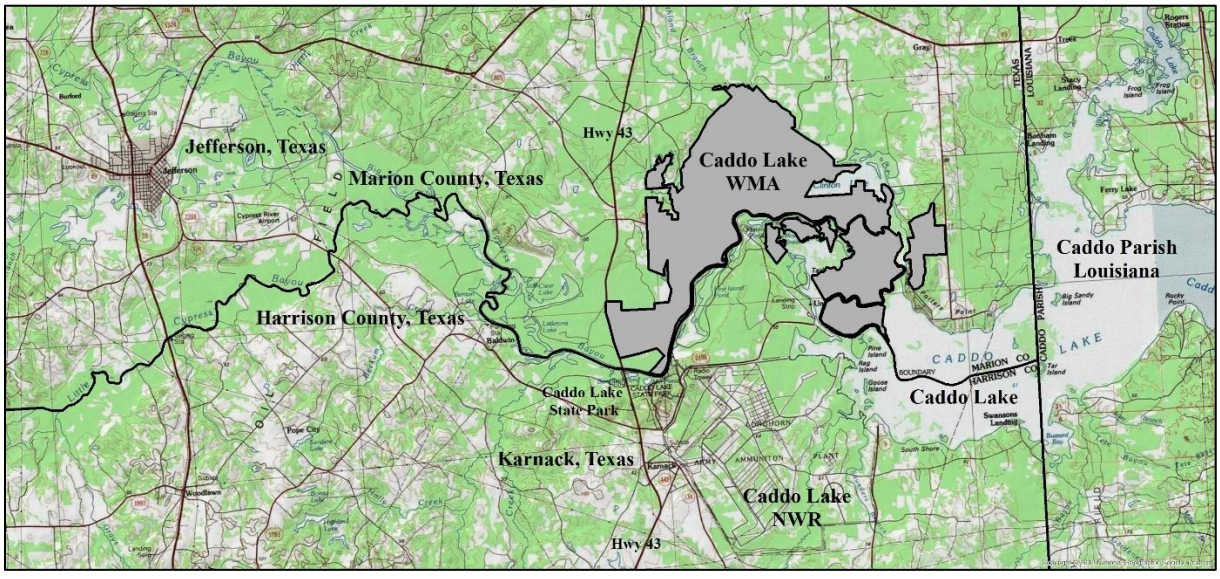

Figure 2. Location of Caddo Lake Willdife Management Area, Harrison and Marion counties, Texas.

METHODS AND MATERIALS

The checklist is based upon specimens collected between 2006 and 2021. Voucher specimens were verified at and deposited in the Baylor University Herbarium (BAYLU) and a duplicate set of specimens are housed at Caddo Lake Wildlife Management Area Herbarium. General classification follows Correll & Johnston (1970) with corrections and revisions as needed from Hatch et al. (1990), Jones et al. (1997), Turner et al. (2003), and USDA, NRCS (2022).

FLORISTIC RESULTS

This study documents 744 species, 403 genera, and 134 families. Families with the greatest number of taxa are the Asteraceae (97), Cyperaceae (71), Poaceae (71), Fabaceae (62), Rosaceae (18), and Lamiaceae (18). These six families comprise 45 % (337 species) of the flora. Other large families include Rubiaceae (18), Apiaceae (15), Fagaceae (15), Onagraceae (13), and Scrophulariaceae (13). Genera with the greatest number of taxa are *Carex* (41), *Quercus* (15), *Juncus* (10), *Rhynchospora* (10), *Desmodium* (10), *Cyperus* (9), *Dichanthelium* (9), *Ludwigia* (10), *Panicum* (8), and *Eupatorium* (8).

The following includes comments on unusual or interesting plant distributions and percentage of invasive flora documented at CLWMA. Five species (Table 1), *Amorpha paniculata*, *Amorpha laevigata*, *Carex decomposita*, *Cypripedium kentuckiense*, and *Monarda luteola*, are tracked as species of greater conservation need in Texas (Carr 2002; Carr 2005; Poole et al. 2007). *Amorpha paniculata*, *Monarda luteola* (Fig 3), and *Senecio ampullaceus* (Table 1) are West Gulf Coastal Plain endemics (Sorrie & Weakly 2001; Singhurst & Holmes 2011). *Cypripedium kentuckiense*, *Solidago auriculata*, and *Triosteum angustifolia* (Table 1) are rare peripheral species documented as small single populations in steep slope ravines within the West Gulf Coastal Plain Subcalcareous White Oak Forest. *Senecio ampullaceus* was documented at a single disturbed xeric sandy edge of a West Gulf Coastal Plain Shortleaf Pine – Post Oak site. *Amorpha laevigata* was documented along a utility line opening on a high upland ridge with iron ore outcropping within a West Gulf Coastal Plain Shortleaf Pine – Post Oak site. Four species documented at CLWMA are reported as additions and/or confirmation to the flora of Texas which include *Nymphoides cristata*, *Quercus imbricaria*, *Rhynchospora careyana*, and *Sagittaria subulata*. None of these four are included in the Manual of the Vascular Flora of Texas (Correll & Johnson 1970) or UDSA Plants Database (2022). *Nymphoides cristata*, *Rhynchospora careyana*, and *Sagittaria subulata* are not included in Biota of North America Program (BONAP 2015). *Quercus imbricaria* is included in BONAP (2015) based upon a 1970 collection by Correlll and Correll (LL 39713) in Cass County -- the CLWMA collecton confirms that it is a persistent member of the Texas flora. There are 46 introduced species (Nesom 2009) recorded at CLWMA, comprising 6.1% of the flora.

Table 1. Rare plants documented in the flora of Caddo Lake Wildlife Management Area. Nature Serve Explorer (2022) global and state rank.

Species	Nature Serve Rank
Amorpha laevigata	G3S1
Amorpha paniculata	G2G3S2
Carex decomposita	G3G4S2
Cypripedium kentuckiense	G3S2
Monarda luteola	G2S2
Solidago auriculata	G4S2
Triosteum angustifolia	G5S2

Figure 3. *Monarda luteola* Singhurst & Holmes — a West Gulf Coastal Plain endemic species restricted to Arkansas and Texas and a rare plant documented at Caddo Lake Wildlife Management Area.

PLANT COMMUNITY RESULTS

The plant community classification of CLWMA follows the United States National Vegetation Classification System (USNVC 2022) and associations generally follow the name and a brief description of each, with emphasis on major characteristic plant species. An association is defined as "a plant community of definite floristic composition, uniform habitat conditions, and uniform physiognomy." Based on dominant species, landscape position, and soil-water content, 12 plant community associations were documented. CLWMA is species rich, with the primary species herbaceous annuals and perennials, while a diverse array of the flora consists of trees, shrubs, and woody vines, due to the number of forest types present. We targeted each of the plant community associations multiple times to maximize the overall plant diversity (number of plant species) that occurs on CLWMA. For organizational purposes, the plant community association descriptions are discussed by system categories (aquatic and terrestrial vegetation classes).

NATURAL AQUATIC ASSOCIATIONS

1. **Overcup Oak - Water Hickory Bottomland Forest**

This bottomland forest vegetation association (Fig. 4) ranges from the Mid-Atlantic Coastal Plain west to the Mississippi River Alluvial Plain. The canopy at CLWMA is typically dominated by *Quercus lyrata* and *Carya aquatica*. Other canopy associates may include *Gleditsia* (*aquatica, tricanthos*), *Liquidambar styraciflua, Acer rubrum, Taxodium distichum,* and *Diospyros virginiana.* Shrubs include *Cephalanthus occidentalis* and *Planera aquatica*. The subcanopy contains *Ilex decidua* in addition to canopy species. Shrubs include *Carpinus caroliniana, Crataegus marshallii,* and *Ilex*

decidua. Prominent herbs include *Leersia oryzoides* and *Phanopyrum gymnocarpon.* Other herbs include *Boehmeria cylindrica*, *Carex crus-corvi*, and *Polygonum hydropiperoides*. Subcanopy, shrub, herbaceous, and vine density and diversity are directly affected by the timing, duration, and depth of seasonal flooding. Herbaceous growth and diversity will be limited in areas of consistently longer hydroperiod.

Figure 4. Overcup Oak - Water Hickory Bottomland Forest

2. **Caddo Lake Bottomland Oak Flat**

This vegetation association (Fig. 5) occurs on lower portions of islands and levees that gently slope downward into wetter swamps of Caddo Lake and likely includes related vegetation of adjacent Louisiana and Arkansas. The description is based on the work of Van Kley & Hine (1998). These areas are seasonally flooded on poorly drained soils. Stands are typically dominated by *Quercus .phellos* with lesser amounts of *Quercus lyrata*, *Nyssa sylvatica*, and *Quercus nigra*. Important shrubs include *Crataegus opaca*, *Diospyros virginiana*, *Styrax americanus*, *Ilex decidua*, and *Forestiera acuminata*. Diagnostic understory species are *Carex joorii* and *Saccharum baldwinii*. The understory vegetation may also include *Acalypha virginica*, *Berchemia scandens*, *Boehmeria cylindrica*, *Brunnichia ovata*, *Dichanthelium dichotomum*, *Hibiscus moscheutos*, *Hypericum hypericoides*, *Toxicodendron radicans*, and *Trachelospermum difforme*. Sometimes the understory is invaded by *Triadica sebiferum*.

Figure 5. Caddo Lake Bottomland Oak Flat

3. **Bald-cypress Floodplain Forest and Open Lake**

This vegetation type (Fig. 6) represents bald-cypress dominated swamp forests found in the Mississippi River Alluvial Plain and adjacent areas of the Gulf Coastal Plain of the southern United States, apparently extending northeast to the Interior Low Plateau. Stands are characterized by the presence of shallow standing water all or most of the year. The vegetation is dominated by *Taxodium distichum*. In some instances *Carya aquatica* and (rarely) *Quercus lyrata* may also be present. Dominant trees exhibit tall, straight growth and swelled buttresses. The subcanopy is sparse, consisting primarily of *Cephalanthus occidentalis*, *Forestiera acuminata*, and *Planera aquatica*. Other shrubs and seedling trees may include *Itea virginica, Acer negundo, Acer rubrum*, *Cornus racemosa*, *Fraxinus pennsylvanica, Ilex decidua*, and *Liquidambar styraciflua*, mostly occurring around the slough margins. Woody vines are uncommon but may include *Nekemias arborea* and *Berchemia scandens*. The herbaceous layer is also very sparse, being restricted to rotting logs, buttresses of trees, and small mounds and ridges that remain dry most of the growing season. *Tillandsia usneoides* and *Pleopeltis polypodioides* subsp. *polypodioides* are present on canopy trees and woody shrubs.

Figure 6. Bald-cypress Floodplain Forest and Open Lake

4. **Southern Coastal Plain Bald-cypress - Tupelo Swamp Forest**

This vegetation association (Figure 7) includes seasonally flooded swamps dominated by *Taxodium distichum* with *Nyssa aquatica* and other hardwood species, especially *Acer rubrum* and *Ulmus americana.* A common shrub species is *Itea virginica*. Cover of the herbaceous stratum varies from sparse to moderate and is often characterized by *Saururus cernuus* and may also include *Acorus americanus, Carex* spp., *Boehmeria cylindrica, Peltandra virginica, Sagittaria latifolia, Smilax* spp, and *Woodwardia areolata*. In the Mississippi River Alluvial Plain and Gulf Coastal Plain, this community primarily occurs in sloughs that flood for 3-4 months annually.

Figure 7. Southern Coastal Plain Bald-Cypress - Tupelo Swamp Forest with abundance of *Woodwardia areolata*.

5. **Coastal Plain Planertree Floodplain Swamp Forest**

This vegetation association (Fig. 8) consists of forests of the southeastern USA Coastal Plain in which *Planera aquatica* is dominant and may form an essentially monospecific canopy. Relatively few additional species are present in other vegetational strata, although these short-statured forests sometimes have a scattered emergent canopy of other tree species typical of flooded swamps. The herbaceous and vine/liana strata are sparse, and no species are known to be diagnostic of this type relative to other bottomlands. Due in part to extreme periods of inundation, this habitat is typically very low in species diversity.

Figure 8. Coastal Plain Planertree Floodplain Swamp Forest

6. **Narrow Plumegrass - Southern Waxy Sedge - Short-bristle Horned Beaksedge Marsh**

This seasonally flooded upland depressional vegetation association (Fig. 9) occurs on clays in the Inner Coastal Plain and is dominated by *Saccharum baldwinii*, *Carex glaucescens*, and *Rhynchospora corniculata*. Species present includes *Carex glaucescens*, *Cyperus pseudovegetus*, *Erechtites hieraciifolius*, *Juncus repens*, *Juncus validus*, *Ludwigia linearis*, *Panicum rigidulum*, *Saccharum baldwinii*, *Saccharum giganteum*, *Rhynchospora corniculata*, *Rhynchospora glomerata*, *Rhynchospora inexpansa*, *Rhexia mariana*, *Scirpus cyperinus*, and *Smilax rotundifolia*.

Figure 9. Narrow Plumegrass - Southern Waxy Sedge - Short-bristle Horned Beaksedge Marsh

7. **Oklahoma and Texas Acidic Hillside Seep**

This acidic hillside seepage vegetation association (Fig. 10) of the southeastern Oklahoma and northeastern Texas Coastal Plain herbaceous wetland formed over beds of decaying vegetable matter, which is loosely consolidated and contains so much water that the surface shakes under foot. These communities occur mainly on the Antlers Sand Formation in Oklahoma and Carrizo Sand Formation in Texas and are characterized by their topographic position at the base of slopes and on the sides of sandhills (Hoagland 2000; Nature Serve Explorer 2017). The seep community is dissected by slowly flowing water or small stagnant pools. The composition of these stands is variable but is characterized by dominance by a variety of grasses, sedges, and aster family members. *Dichanthelium scoparium* is characteristic. This or related vegetation may also be found in sandy or peaty depressions.

The composition of stands of this type is variable but is characterized by dominance by a variety of grasses, sedges, and aster family members. *Dichanthelium scoparium, Drosera brevifolia, Osmunda regalis, Woodwardia virginica,* and *Xyris* spp. are the characteristic dominants. Some other vascular plants include *Boehmeria cylindrica, Eleocharis tuberculosa, Eupatorium perfoliatum, Helianthus angustifolius, Hypericum mutilum, Juncus effusus, Juncus scirpoides, Lycopodiella appressa, Lobelia puberula, Lyonia ligustrina, Panicum anceps, Pluchea feotida, Rhexia mariana, Rhynchospora glomerata, Rhynchospora rariflora, Scleria reticularis, Utricularia subulata,* and *Viola lanceolata.*

Figure 10. Oklahoma and Texas Acidic Hillside Seep with abundance of *Osmunda regalis*.

8. **Watershield Eastern Aquatic Vegetation**

This vegetation association type (Fig. 11) is found throughout the southeastern USA, from Georgia to Texas and in the interior to Kentucky, Oklahoma, and Arkansas. This vegetation occurs in a range of natural ponds and impoundments, including ponds, beaver ponds, and lake margins. *Brasenia schreberi* is the dominant plant species; other species may include *Leersia oryzoides, Lemna valdiviana, Juncus effusus*, and *Spirodela polyrhiza*. Other floating aquatics present include *Nelumbo lutea, Spirodela polyrhiza,* and *Utricularia* spp., along with submersed aquatics such as *Cabomba caroliniana* and *Najas guadalupensis* and emergent aquatics such as *Zizaniopsis miliacea*. Additional information is needed on the full range and variability of expression of this vegetation.

Figure 11. Watershield Eastern Aquatic Vegetation with abundant carnivorous floating *Utricularia inflata.*

NATURAL TERRESTRIAL ASSOCIATIONS

9. **West Gulf Coastal Plain Subcalcareous White Oak Forest**

This *Quercus alba* dominated forest vegetation association (Fig. 12) occurs on steep, moist slopes, over slightly calcareous or subcalcareous substrates west of the Mississippi River. The subcanopy is characterized by two other dominants which include *Acer saccharum* and *Ostrya virginiana*. Diagnostic herbaceous species include *Solidago auriculata* and *Phegopteris hexagonoptera*. The subcanopy and herbaceous species listed above are believed to indicate the rich nutrient or high pH and moisture status of this community. In addition to *Quercus alba*, the canopy of this association includes other strong associates -- *Carya cordiformis*, *Carya tomentosa*, *Pinus taeda*, *Fraxinus americana*, *Quercus shumardii,* and *Q. michauxii*. The subcanopy is dominated by *Acer saccharum*, *Acer rubrum*, *Tilia americana*, and *Ostrya virginiana*, with lesser frequency of *Nyssa sylvatica* and *Cornus florida*. The shrub layer is sparse, with patches of *Arundinaria gigantea*, *Erythrina herbacea* and *Frangula caroliniana* dominant, along with occasional *Vaccinium elliottii*, *Callicarpa americana*, *Viburnum rufidulum*, *Cercis canadensis*, and regenerating overstory species. Diagnostic herbaceous species include *Arabis canadensis*, *Asimina triloba*, *Aureolaria grandiflora*, *Corallorhiza wisteriana*, *Cypripedium kentuckiense*, *Pedicularis canadensis*, *Phaseolus polystachios*, *Phegopteris hexagonoptera*, *Podophyllum peltatum*, *Polystichum acrostichoides*, *Silene stellata*, *Solidago auriculata*, *Thalictrum dasycarpum*, *Tipularia discolor*, *Triosteum angustifolium*, and

Verbesina helianthoides. The herbaceous stratum also includes *Botrychium virginianum*, *Carex* spp., *Chasmanthium laxum*, *Dioscorea quaternata*, *Dichanthelium boscii*, *Elephantopus tomentosus*, *Mitchella repens*, and *Phryma leptostachya*.

Figure 12. West Gulf Coastal Plain Subcalcareous White Oak Forest with abundance of *Podophyllum peltatum*.

10. **West Gulf Coastal Plain Pine - Oak Flatwoods**

This nonriverine woodland vegetation association (Figure 13) of the West Gulf Coastal Plain and Upper West Gulf Coastal Plain ecoregions is dominated by *Pinus taeda* with some combination of *Pinus echinata* and the oaks *Quercus pagoda, Q. phellos*, and *Q. stellata*. These are natural woodlands or forests that occur in nonriverine flatwoods environments. They occur on sites with a "hydroxeric" moisture regime, that is, significant intra-annual variation in site moisture - very wet in wet season (winter-spring) to very dry in the dry season (summer-fall). These sites typically occur on Pleistocene terraces with pimple mounds and depressions that are primarily along the Ouachita and Red rivers and their tributaries. They are typically but not always above the current floodplain. In frequently-burned sites, this type occurs as a woodland, but in most cases today has succeeded to forest without sufficiently frequent fire. Open-land plant and animal species are typically high priority for conservation. Stands are dominated by *Pinus taeda* with some combination of *Pinus echinata, Quercus pagoda, Quercus phellos*, and/or *Quercus stellata*. Associated woody species include the trees *Quercus alba*, *Q. marilandica*, and *Q. similis*, with the shrubs *Callicarpa americana* and *Vaccinium arboreum*. Herbaceous species include *Croton michauxii*, *Dichanthelium aciculare*, *Dichanthelium scoparium*, and *Schizachyrium scoparium*.

Figure 13. West Gulf Coastal Plain Pine - Oak Flatwoods

11. **Upper West Gulf Coastal Plain Saline Prairie**

This edaphically controlled grass-forb prairie vegetation association (Fig. 14) occurs on saline-sodic soils of alluvial origin in the northern West Gulf Coastal Plain and Mississippi River Alluvial Plain of Arkansas, Louisiana, and Texas. The topsoil is thin silt with toxic levels of sodium and/or magnesium salts in the subsoil, and some areas are often exposed as "slick spots," which are denuded of vegetation. Although the subsoil is silt, it is essentially cemented into an impervious hardpan by calcium or other minerals. Sites therefore alternate between extremely dry and extremely wet, a condition that has been described as xerohydric. Genesis is uncertain, but salts may be "wicked" to the surface through evaporation. The so-called slick spots are rimmed by a "cryptogamic lip" of lichens, algae and diminutive vascular plants. The globally rare *Geocarpon minimum* occurs in this zone in the West Gulf Coastal Plain -- although not yet found at CLWMA, it occurs in saline prairies a few miles away. Farther back from the lip, *Cladonia* lichens, *Aristida longespica, Aristida oligantha,* and *Schizachyrium scoparium* sequentially become dominant, along with *Sabal minor* in the West Gulf Coastal Plain. *Schoenolirion wrightii* is a regionally rare species in this zone that also has not been documented at CLWMA. The role of fire in maintaining this community is not understood; some areas may support relatively frequent fire, and others are too thinly vegetated to carry fire.

Figure 14. Upper West Gulf Coastal Plain Saline Prairie

12. **West Gulf Coastal Plain Shortleaf Pine - Post Oak Forest**

This West Gulf Coastal Plain vegetation association (Fig. 15) is dominated by *Pinus echinata* and *Pinus taeda* and is further characterized by a significant component of *Quercus stellata* in the overstory. It is found on ridgetops and side slopes with relatively shallow loamy soils over dense clay. *Pinus echinata* tends to be more important than *Pinus taeda* in the overstory, and *Pinus palustris* may be occasionally encountered within its natural range. Hardwood trees, such as *Quercus stellata*, *Quercus falcata*, *Carya texana*, *Quercus marilandica*, and others, may also reach the canopy. The shrub stratum is usually well-developed; species abundance varies somewhat with soil pH. Typical species include *Callicarpa americana*, *Chionanthus virginicus*, *Cornus florida*, *Crataegus marshallii*, *Crataegus spathulata*, *Ilex vomitoria*, *Morus rubra*, *Prunus mexicana*, *Rhus aromatica*, *Rhus copallinum*, *Sassafras albidum*, *Sideroxylon lanuginosum*, *Vaccinium arboreum*, and *Viburnum rufidulum.* The herbaceous understory varies considerably within this association depending upon management history. Historically, this community may have been a woodland on non-topographically isolated, frequently burned sites, but due to fire suppression, CLWMA sites have a forest structure.

Figure 15. West Gulf Coastal Plain Shortleaf Pine - Post Oak Forest.

DISCUSSION

The goal of this research was to describe and document the flora and plant communities of CLWMA. While data on the flora of bottomland hardwood forests and swamps has been collected on a few sites in Texas, study of additional similar sites is needed. This work will also serve as an invitation to conduct additional studies on bottomland forests and swamps in other watersheds in eastern Texas such as North Toledo Bend Wildlife Management Area on the middle Sabine River; the Dam B Wildlife Management Area in the middle Neches River, and Blue Elbow Swamp along the lower Neches River. CLWMA is an important conservation site that contains a high diversity of flora, several Texas endemic and globally rare plants, and several globally rare plant community associations.

ANNOTATED CHECKLIST OF VASCULAR PLANT TAXA AND NON-VASCULAR PLANTS

Taxa are arranged by divisions, with flowering plants subdivided into classes. Within these groups, taxa are listed alphabetically by family, genus, species, and infraspecific rank. Introduced taxa are annotated by an asterisk (*).

COLLECTOR ABBREVIATIONS INCLUDE: **JL** = Jared Laing; **JN**= Jim Neal; **JM** = Jeff Mink; **KF** = Kyle Fitch; **JL** = J. Lowe; **JS** = Jason Singhurst; **LA** = Larry Allain; **RS** = Rosanna Salmon; **SP** = Stephan Price; **VA** = Vanessa Adams; and **VN** = Vanessa Neace. All collections with CLWMA assigned are housed at Caddo Lake Wildlife Management Area Herbarium (CLWMA); all other collectons are housed at Baylor University Herbarium (BAYLU).

BRYOPHYTA
Sphagnaceae
Sphagnum carolinianum R.E. Andrus; JS, VA, and KF 15136 and 17184

LYCOPODIOPHYTA
Isoetaceae
Isoetes melanopoda Gay & Durieu ex Durieu; VA, SP, and BMM CLWMA070484 and CLWMA070485; JS, LA, BMM, VA, SP, and JN 18871

Lycopodiaceae
Lycopodiella alopecuroides (L.) Cranfill ; VA and KF CLWMA070355 and CLWMA070356

PTERIDOPHYTA
Aspleniaceae
Asplenium platyneuron (L.) B.S.P.; JS, VA, and KF 15305 & 17051

Azollaceae
Azolla caroliniana Willd.; JS, VA, SP, and JL 19277

Blechnaceae
Woodwardia areolata (L.) T. Moore; VN and SP CLWMA070554, CLWMA070555, and CLWMA070556
Woodwardia virginica (L.) Sm.; VN and SP CLWMA070486, CLWMA070487, CLWMA070488, CLWMA070489, and CLWMA070490

Dennstaedtiaceae
Pteridium aquilinum (L.) Kuhn; JS, VA, and KF 15303

Dryopteridaceae
Athyrium filix-femina (L.) Roth; JS, VA, and KF 15048; JS & VA 18913; VA and KF CLWMA070342
Onoclea sensibilis L.; JS, VA, and KF 15105, 15114, 15304, 17069, 15105
Polystichum acrostichoides (Michx.) Schott; JS, VA, and KF 15098
Woodsia obtusa (Spreng.) Torr.; JS, VA, and KF 15320

Equisetaceae
Equisetum hyemale L.; VA CLWMA070681, CLWMA070682, CLWMA070683, CLWMA070684

Lygodiaceae
Lygodium japonicum* (Thunb.) Sw.; JS, VA, and KF 17162; VA and KF CLWMA070270, CLWMA070271, and CLWMA070272

Ophioglossaceae
Botrychium biternatum (Sav.) Underw.; JS, VA, and KF 17134; VN CLWMA070579
Botrychium dissectum Spreng.; VA and KF CLWMA070045
Botrychium virginianum (L.) Sw.; JS, VA, and KF 15109 & 15446
Ophioglossum crotalophoroides Walt.; JS, LA, BMM, VA, SP, and JN CLWMA070397
Ophioglossum vulgatum L.; VA and KF CLWMA070010 and CLWMA070011; JS, VA, and KF 15334

Osmundaceae
Osmunda cinnamomea L.; JS, VA, and KF 17034
Osmunda regalis L.; JS, VA, and KF 15129, 17033, and 17164

Polypodiaceae
Pleopeltis polypodioides (L.) Andrews & Windham subsp. michauxiana (Weath.) Andrews & Windham; JS, VA, and KF 15361

Salviniaceae
Salvinia molesta* Mitchell; VA and KF CLWMA070273

Thelypteridaceae
Phegopteris hexagonoptera (Michx.) Fée; JS, VA, and KF 15055
Thelypteris palustris Schott; VA CLWMA070678, CLWMA070679, and CLWMA070680

CONIFEROPHYTA
Cupressaceae
Juniperus virginiana L.; JS, VA, and KF 15078
Taxodium distichum (L.) Rich.; JS, VA, and KF 15120; JS, VA, and KF 17111; BMM 8820

Pinaceae
Pinus echinata Mill.; JS, VA, and KF 17125
Pinus taeda L.; BMM 8823 and JS, VA, SP, and JL 18675

MAGNOLIOPHYTA: Monocotyledonae
Acoraceae
Acorus americanus (Raf.) Raf.; JS, VA, and KF 15113, 17037, and 17100

Agavaceae
Manfreda virginica (L.) Salisb. ex Rose; VA and KF CLWMA070194
Yucca louisianensis Trel.; VN and SP CLWMA070514 and CLWMA070515

Alismataceae
Echinodorus cordifolius (L.) Griseb.; JS and VA 18954 and VN CLWMA070565, CLWMA070566, and CLWMA070567
Sagittaria calycina Engelm.; VA and KF CLWMA070141
Sagittaria graminea Michx.; JS, VA, and KF 17074
Sagittaria latifolia Willd.; JS, VA, and KF 17193; VA and KF CLWMA070139 and CLWMA070140
Sagittaria platyphylla (Engelm.) J.G. Sm.; JS, VA, SP, and JL
Sagittaria subulata (L.) Buchenau; JS, VA, and KF 17077

Araceae
Arisaema dracontium (L.) Schott; VN CLWMA070527 & CLWMA070622
Arisaema triphyllum (L.) Schott; JS, VA, and KF 15127 and 15377; VN and SP CLWMA070512 & CLWMA070513
Peltandra virginica (L.) Schott; JS, VA, and KF 15141 and 17110

Arecaceae
Sabal minor (Jacq.) Pers.; JS, VA, and KF 17203

Commelinaceae
Commelina erecta L.; VA and KF CLWMA070316, CLWMA070317, and CLWMA070318
Commelina diffusa Burm. f.; JS and VA 18999
Tradescantia hirsutiflora Bush; JS, VA, and KF 15071 and 15392; VA and KF CLWMA070002, CLWMA070003, and CLWMA070004

Cyperaceae
Carex albicans Willd. ex Spreng.; JS, VA, and KF 15426
Carex albolutescens Schwein.; JS, VA, and KF 15458
Carex amphibola Steud.; JS, VA, and KF 15083
Carex atlantica L.H. Bailey; JS, VA, and KF 15365
Carex austrina (Small) Mack; JS, VA, and KF 17124
Carex basiantha Steud.; JS, VA, and KF 15314
Carex blanda Dewey; JS, VA, and KF 17202
Carex brevior (Dewey) Mack.; JS, VA, and KF 15142
Carex bushii Mack.; JS, VA, and KF 15393
Carex caroliniana Schwein.; VA and KF CLWMA070410 and CLWMN070411
Carex cephalophora Muhl. ex Willd.; JS, VA, and KF 15332 and 15417
Carex cherokeensis Schwein.; JS, VA, and KF 15420; VA and KF CLWMA070220, CLWMA070221, CLWMA070222 and CLWMA070223; JS and VA 22266
Carex complanata Torr. & Hook.; JS, VA, and KF 17131
Carex crus-corvi Shuttlw. ex Kunze; JS, VA, and KF 17138
Carex debilis Michx.; JS, VA, and KF 15085, 15442, and 22265
Carex decomposita Muhl.; JS, VA, SP, and JL 18681
Carex digitalis Willd.; JS, VA, and KF 15404
Carex festucacea Schkuhr ex Willd.; VA and KF CLWMA070409 and BMM 8814
Carex flaccosperma Dewey; JS, VA, and KF 15420 and JS, VA, and KF 15314
Carex frankii Kunth; VA and KF CLWMA070292, CLWMA070293 and CLWMA070294; JS, VA, and KF 17121
Carex gigantea Rudge; BMM 8870
Carex glaucescens Elliott; JS, VA, and KF 17012
Carex glaucodea Tuck. ex Olney; JS, VA, and KF 15134
Carex granularis Muhl. ex Willd.; JS, VA, SP, and JL 18879
Carex hyalinolepis Steud.; JS, VA, SP, and JL18870
Carex intumescens Rudge; VA and KF CLWMA070290 and CLWMA070291; JS, VA, and KF 17185
Carex joorii L.H. Bailey; JS, VA, and KF 17036
Carex leavenworthii Dewey; JS, VA, and KF 17096
Carex leptalea Wahlenb; JS, VA, and KF 15335
Carex longii Mack.; JS, VA, and KF 15302, 15439, 17078, 17097, 17108
Carex louisianica L.H. Bailey; JS, VA, and KF17132
Carex lupulina Muhl. ex Willd.; JS, VA, and KF 17195
Carex lurida Wahlenb.; JS, VA, and KF 17128 and 17201
Carex muehlenbergii Schkuhr ex Willd.; JS, VA, and KF 15387
Carex oxylepis Torr. & Hook.; JS, VA, and KF 17129
Carex typhina Michx.; JS and VA 18946
Carex retroflexa Muhl. ex Willd.; JS, VA, and KF 15364
Carex striatula Michx; JS, VA, and KF 15135
Carex styloflexa Buckley; JS, VA, and KF 15130
Carex tribuloides Wahlenb.; JS and VA 19012
Carex vulpinoidea Michx.; JS, VA, and KF 15432 and 15307
Cyperus echinatus (L.) Alph. Wood; JS and VA s.n.

Cyperus flavescens L.; JS and VA 18909
Cyperus odoratus L.; JM, JS, and VN s.n. and JS and VA 18936
Cyperus plukenetii Fernald; JS, VA, and KF 17172
Cyperus pseudovegetus Steud.; JM, JS, and VN s.n.
Cyperus squarrosus L.; JS, VA, SP, and JL 18682
Cyperus strigosus L.; JS and VA 18978
Cyperus retroflexus Buckley; JM, JS, and VN s.n.
Cyperus virens Michx.; JS and VA s.n.
Eleocharis equisetoides (Elliott) Torr.; JS, VA, and KF 17006
Eleocharis obtusa (Willd.) Schult.; JS, VA, and KF 17149 and JS, VA, and KF 15328
Eleocharis tortilis (Link) Schult. Cyperaceae; JM, JS, and VN s.n.
Eleocharis tuberculosa (Michx.) Roem. & Schult.; JM, JS, and VN s.n. VA and KF CLWMA 070386, CLWMA 070387, and CLWMA070388; JS, VA, and KF 16133; BMM 8876
Eleocharis vivipara Link; JS, VA, and KF 17102; JS and VA 18929
Eleocharis wolfii (A. Gray) A. Gray ex Britton; JS, VA, and KF 17182
Fimbristylis annua (All.) Roem. & Schult.; JS and VA 18911
Fimbristylis vahlii (Lam.); JS and VA 18907
Isolepis carinata Hook. & Arn. ex Torr.; VA and SP CLWMA070502
Kyllingia odorata Vahl; VA, and KF 17007
Rhynchospora caduca Elliott; JS, VA and KF 17081
Rhynchospora careyana Fernald; BMM 8879, 8880, 8881
Rhynchospora globularis (Chapm.) Small; VA CLWMA070389 and CLWMA070390
Rhynchospora corniculata (Lam.) A. Gray; JS, VA, and KF 17026, 17204; BMM 8895
Rhynchospora gracilenta A. Gray; JM, JS, and VN s.n.
Rhynchospora glomerata (L.) Vahl; JS, VA, and KF 16136 and JS, VA, and KF 17159
Rhynchospora harveyi W. Boott ; VA, and KF 17169
Rhynchospora inexpansa (Michx.) Vahl; JS, VA, and KF 1613; VA and KF CLWMA070501
Rhynchospora rariflora (Michx.) Elliott; JM, JS, and VN s.n.
Rhynchospora recognita (Gale) Kral; JS, VA, and KF 17158
Scirpus cyperinus (L.) Kunth; JS, VA, and KF 17025; BMM 8781; VA and KF CLWMA070281

Iridaceae
Alophia drummondii (Graham) R.C. Foster; VA and KF CLWMA070552; CLWMA070553, CLWMA070556, CLWMA070557
Iris virginica L.; VN CLWMA070516, CLWMA070517, and CLWMA070518
Sisyrinchium rosulatum E.P. Bicknell; VA and KF CLWMA070038
Sisyrinchium langloisii Greene; JS, VA, and KF 17047
Sisyrinchium minus Engelm. & Gray; VA and KF CLWMA070039

Juncaceae
Juncus acuminatus Michx.; JS, VA, and KF 15358 and 17035
Juncus brachycarpus Engelm.; JS, VA, and KF 17113
Juncus coriaceus Mack. Juncaceae; JS, VA, and KF 17016
Juncus diffusissimus Buckley; JS, VA, and KF 17099 and JS, VA, SP, and JL 18684
Juncus effusus L.; JS, VA, and KF 15317; JS, VA, and KF 15436 and 17028
Juncus marginatus Rostk.; JS, VA, and KF 17183
Juncus repens Michx.; JM, JS, and VN s.n. and JS, VA, SP, and JL 18674
Juncus scirpoides Lam.; JS, VA, and KF 16138
Juncus tenuis Willd.; JS, VA, and KF 15445 and 17044
Juncus validus Coville; JS, VA, and KF 16135 and 17176; VA and KF CLWMA070302

Luzula bulbosa (Alph. Wood) Smyth & Smyth; JS, VA, and KF 15082 and VA and KF CLWMA070311

Lemnaceae
Lemna obscura (Austin) Daubs; JS, VA, and KF 15363
Spirodela polyrhiza (L.) Schleid.; JS, VA, and KF 15362

Liliaceae
Allium drummondii Regel; JS, VA, and KF 15301& 15449
Allium canadense L.; JS, VA, and KF 15453
Allium ampeloprasum L.; VA and KF CLWMA070033
Hymenocallis occidentalis (Leconte) Kunth var. eulae (Shinners) Lom. Sm. & Flory; VA and KF CLWMA070343, and CLWMA 070072 and CLWMA070073
Hypoxis hirsuta (L.) Coville; CLWMA070382, CLWMA070383, and CLWMA070384
Leucojum aestivum* L.; VN and SP CLWMA070542
Narcissus papyraceus* Ker Gawl.; VN CLWMA070541
Nothoscordum bivalve (L.) Britton; JS, VA, and KF 15298 and 15455
Polygonatum biflorum (Walt.) Elliott; JS, VA, and KF 15051; JS and VA s.n.; VN and SP CLWMA070533, CLWMA070534 CLWMA070535

Menyanthaceae
Nymphoides cristata* (Roxb.) Kuntze; VN and SP CLWMA070470 and CLWMA070471

Najadaceae
Najas guadalupensis (Spreng.) Magnus; JS, VA, SP, and JL 18683

Nymphaeaceae
Nuphar lutea (L.) Sm. subsp. advena (Ait.) Kartesz & Gandhi; VN CLWMA070633, CLWMA070633B, CLWMA070634B, CLWMA070634 and CLWMA070635
Nymphaea odorata Ait.; VA and KF CLWMA070307 and CLWMA070308; JS, VA, SP, and JL 19289

Orchidaceae
Corallorhiza wisteriana Conrad; VA and KF CLWMA070380 and CLWMA070381
Cypripedium kentuckiense C.F. Reed; JS photo
Listera australis Lindl.; JS, VA, and KF 15331; VA and KF CLWMA070398 and CLWMA07003
Malaxis unifolia Michx.; VN, SP, and JL CLWMA070528, CLWMA070529, and CLWMA070530
Spiranthes lacera (Raf.) Raf.; VA and KF CLWMA070102 and CLWMA070103
Spiranthes vernalis Engelm. & Gray; JS, VA, and KF 17109; VA and KF CLWMA070082
Tipularia discolor (Pursh) Nutt.; VA and KF CLWMA070367

Poaceae
Aira caryophyllea* L.; JS, VA, SP, and JL18679
Alopecurus carolinianus Walt.; JS, VA, and KF 17170
Andropogon gerardii Vitman; VN CLWMA070673
Andropogon glomeratus (Walt.) B.S.P.; JS and VA 18975
Andropogon virginicus L. var. virginicus; JS and VA 18965
Anthoxanthum odoratum* L.; VN CLWMA070623, CLWMA070624, and CLWMA070625
Aristida lanosa Muhl. ex Elliott; JS and VA 18940
Aristida longespica Poir.; JM, JS, and VN s.n.
Aristida oligantha Michx.; JS and VA 18974
Aristida purpurascens Poir.; JS and VA 18947

Axonopus furcatus (Flueggé) Hitchc.; JS and VA 18908
Bothriochloa laguroides (DC.) Herter; VA and KF CLWMA070360 & CLWMA070361
Brachyelytrum erectum (Schreb. ex Spreng.) P. Beauv.; JS, VA, and KF15108
Briza minor* L.; JS, VA, and KF 15341
Bromus catharticus* Vahl; JS, VA, and KF 17105
Bromus pubescens Muhl. ex Willd.; JS, VA, SP, and JL 19279
Chasmanthium latifolium (Michx.) Yates; JS, VA, and KF 17107, 17130
Chasmanthium laxum (L.) Yates; VA and KF CLWMA070117, CLWMA070118, and CLWMA070119
Dichanthelium acuminatum (Sw.) Gould & Clark; JS, VA, and KF 15418 and 17143; JS and VA 18931; VA and KF CLWMA070499 and CLWMA070500
Dichanthelium aciculare (Desv. ex Poir.) Gould & C.A. Clark; JS, VA, and KF 17093
Dichanthelium dichotomum (L.) Gould; JS, VA, and KF 17024
Dichanthelium laxiflorum (Lam.) Gould; JS, VA, and KF 17008
Dichanthelium linearifolium (Scribn. ex Nash) Gould; JS, VA, SP, and JL 18893 and JS, VA, and KF17001
Dichanthelium oligosanthes (Schult.) Gould; JS, VA, and KF 15086
Dichanthelium ravenelii (Scribn. & Merr.) Gould; JS, VA, and KF 17116
Dichanthelium sphaerocarpon (Elliott) Gould; VA, and KF 17152
Dichanthelium scoparium (Lam.) Gould; JS and VA 18968
Digitaria ischaemum* (Schreb.) Schreb. ex Muhl.; JS and VA 18963
Echinochloa walteri (Pursh) Heller; JS and VA 18962 and VA and SP CLWMA070495, CLWMA070496, and CLWMA070497
Eragrostis spectabilis (Pursh) Steud.; JM, JS, and VN ????; JS and VA 18980; VA and KF CLWMA070357 and CLWMA070358; VA and SP CLWMA070456, CLWMA070457, and CLWMA070458.
Hordeum jubatum L.; JS, VA, and KF 17045
Hordeum pusillum Nutt.; JS, VA, and KF 15375
Leersia hexandra Sw.; JS, VA, and KF17029
Leersia oryzoides (L.) Sw.; JS, VA, and KF 17030; VA and KF CLWMA 070334, CLWMA070335, and CLWMA070336
Leersia virginica Willd. Poaceae; JS and VA 18923
Leptochloa panicea (Retz.) Ohwi; VN CLWMA070660, CLWMA070661, and CLWMA070662
Lolium perenne* L.; VN CLWMA070656, CLWMA070657 and CLWMA070610
Luziola fluitans (Michx.) Terrell & Rob.; JS and VA 18961
Melica mutica Walt.; JS, VA, and KF 15097 and JS, VA, and KF 15427 & 15428
Microstegium vimineum* (Trin.) A. Camus; JS and VA 18998
Oplismenus hirtellus (L.) P. Beauv.; VA and KF CLWMA070196 and CLWMA07019; JS and VA 19000
Panicum anceps Michx.; JS, VA, and KF 17194
Panicum brachyanthum Steud.; JS, VA, and KF 17021 and 17022
Panicum capillare L.; JS, VA, and KF 17165
Panicum dichotomiflorum Michx.; JS and VA s.n.
Panicum hemitomon Schult.; JS and VA 19291
Panicum rigidulum Bosc ex Nees; JS, VA, and KF 17015 and JS and VA 18982
Panicum verrucosum Muhl.; JS, VA, and KF 17027; BMM 8927
Panicum virgatum L.; JS and VA 18966
Paspalum floridanum Michx.; JS and VA 18967
Paspalum urvillei* Steud.; JS and VA 18986
Phanopyrum gymnocarpon (Elliott) Nash; VA and KF CLWMA070337, and CLWMA070338, and CLWMA070339; JS and VA 18937

Piptochaetium avenaceum (L.) Parodi; JS, VA, and KF s.n.
Poa annua* L.; JS, VA, and KF 15443
Poa pratensis L.; JS, VA, and KF 17090
Saccharum giganteum (Walte.) Pers.; VA and KF CLWMA070677
Saccharum alopecuroides (L.) Nutt.; VA and KF CLWMA070328, CLWMA070329 and CLWMA070330
Sacciolepis striata (L.) Nash; JS and VA 19294; VA and KF CLWMA070362 and CLWMA070363
Schedonorus arundinaceus (Schreb.) Dumort., nom. cons.; JS, VA, and KF 17153
Schizachyrium scoparium (Michx.) Nash; JS, VA, and KF 17140; JS and VA 18942
Setaria parviflora (Poir.) Kerguélen; JS and VA 18969
Sorghum halapense* (L.) Pers.; JS and VA 18990
Sporobolus silveanus Swallen; JS, VA, and KF17002
Steinchisma hians (Elliott) Nash; BMM 8872
Stenotaphrum secundatum* (Walt.) Kuntze; JS, VA, SP, and JL 18894
Tridens flavus (L.) Hitchc.; VA and KF CLWMA070322, CLWMA070323, and CLWMA070324
Tridens strictus (Nutt.) Nash; JS, VA, and KF17003
Triplasis purpurea (Walt.) Chapm.; JS and VA 18933
Tripsacum dactyloides (L.) L.; VN and SP CLWMA070508, CLWMA070509, CLWMA070510, and CLWMA070511
Vulpia octoflora (Walt.) Rydb.; JS, VA, and KF 17052
Zizaniopsis miliacea (Michx.) Döll & Asch.; JS, VA, SP, and JL 18882

Potamogetonaceae
Potamogeton diversifolius Raf.; JS, VA, and KF 17188
Potamogeton illinoensis Morong; JS, VA, and KF 17076
Potamogeton nodosus Poir.; JS, VA, and KF 17066 and 17177
Potamogeton pusillus L.; JS, VA, and KF 17103
Potamogeton pulcher Tuck.; JS, VA, and KF 17101

Smilacaceae
Smilax bona-nox L.; JS, VA, and KF 15079 and 15310
Smilax glauca Walt.; JS, VA, and KF 15062
Smilax tamnoides L.; JS, VA, and KF s.n.
Smilax rotundifolia L.; JS, VA, and KF 15440 and BMM 8823
Smilax smallii Morong; JS, VA, and KF 15322 and JS, VA, and KF 17118

Typhaceae
Typha domingensis Pers.; JS, VA, SP, and JL 18885

Xyirdaceae
Xyris ambigua Bey. ex Kunth; JM, JS, and VN s.n.
Xyris baldwiniana Schult.; JM, JS, and VN s.n.
Xyris difformis Chapm. var. difformis; JS and VA 18910; VA and KF CLWMA070344, CLWMA070345
Xyris jupicai Rich.; JS, VA, and KF 17155; VA and KF CLWMA070472 and CLWMA070473

MAGNOLIOPHYTA: Dicotyledonae
Acanthaceae
Justicia ovata (Walt.) Lindau; JS, VA, and KF 17115; JS, VA, SP, and JL 18686 and 18895
Ruellia caroliniensis (J.F. Gmel.) Steud.; JS, VA, and KF 15099 CLWMA070050
Ruellia humilis Nutt.; VA and KF CLWMA070050, CLWMA070051 and CLWMA070052

Aceraceae
Acer rubrum L.; JS, VA, and KF 15047 & 15367; and BMM 8826
Acer negundo L.; VN CLWMA070519 & CLWMA070520
Acer saccharum Marshall; JS and VA 18989
Acer saccharinum L.; JS, VA, and KF 17072 & VA and SP CLWMA0704026, CLWMA0704027, & CLWMA0704028

Amaranthaceae
Alternanthera philoxeroides* (Mart.) Griseb; JS, VA, and KF 17104; VA and KF CLWMA070005, CLWMA070006, CLWMA070120, CLWMA070121, CLWMA070122, and CLWMA070123
Froelichia floridana (Nutt.) Moq.; VA and KF CLWMA070313, CLWMA070314, CLWMA070315, CLWMA070416, CLWMA070417 and CLWMA070418
Iresine rhizomatosa Standl.; JS, VA, and KF 17054

Anacardiaceae
Rhus aromatica Ait.; VA, and KF 15139; VA and KF CLWMA070374 and CLWMA070352
Rhus copallinum L.; JS, VA, and KF 15394 and JS, VA, and KF 15080
Rhus glabra L.; JS and VA 18912
Toxicodendron radicans (L.) Kuntze; VN CLWMA070592, CLWMA070593, and CLWMA070594

Annonaceae
Asimina parviflora (Michx.) Dunal; VN CLWMA070670, CLWMA070671, and CLWMA070672
Asimina triloba (L.) Dunal; JS, VA, and KF 15049; VA and KF CLWMA070039

Apiaceae
Chaerophyllum tainturieri Hook.; BMM s.n.
Cicuta maculata L.; VA and KF CLWMA070310; VN and SP CLWMA070432
Cynosciadium digitatum DC.; JS, VA, SP, and JL 18896
Eryngium prostratum Nutt. ex DC.; VA and KF CLWMA070234 and JS, VA, and KF 17079
Eryngium yuccifolium Michx.; VN and SP CLWMA070546, CLWMA070547, and CLWMA070548
Hydrocotyle ranunculoides L.; VA and KF CLWMA070136, CLWMA070137, and CLWMA070138
Hydrocotyle umbellata L.; JS, VA, and KF 17139
Lilaeopsis carolinensis* Coult. & Rose; JS, VA, and KF 15407
Limnosciadium pinnatum (DC.) Mathias & Constance; JS, VA, and KF 17112
Ptilimnium costatum (Elliott) Raf.; BMM 8873
Ptilimnium nuttallii (DC.) Britton; VN CLWMA070663, CLWMA070664 and CLWMA070665
Sanicula canadensis L.; JS, VA, and KF 15106 and 17168; VA and KF CLWMA070224, CLWMA070225 and CLWMA070226
Sanicula odorata (Raf.) Pryer & Phillippe; JS, VA, and KF 15407
Spermolepis divaricata (Walt.) Raf. ex Ser.; JS and VA 18941
Trepocarpus aethusae Nutt. ex DC.; JS, VA, and KF 15112

Apocynaceae
Trachelospermum difforme (Walt.) A. Gray; JS, VA, and KF 17082; VA and KF CLWMA070359

Aquifoliaceae
Ilex ambigua (Michx.) Torr.; JS, VA, and KF 17123
lex decidua Walt.; JS, VA, and KF 15329 JS, VA, and KF 17072
Ilex opaca Ait.; JS, VA, and KF 15323
Ilex vomitoria Ait.; VN CLWMA070637, CLWMA070638, and CLWMA070639

Araliaceae
Aralia spinosa L.; JS, VA, and KF 15421 & 17063

Aristolochiaceae
Aristolochia reticulata Jacq.; JS, VA, and KF 15397; VA and SP CLWMA0704025
Aristolochia serpentaria L.; JS, VA, and KF 15100
Aristolochia tomentosa Sims; JS, VA, and KF 15076

Asclepiadaceae
Asclepias tuberosa L.; VN CLWMA070189; VN CLWMA070702
Asclepias variegata L.; JS, VA, and KF 15061; VN and KF CLWMA070188
Asclepias verticillata L.; VN and SP CLWMA070503 & CLWMA070504
Asclepias viridis Walt.; VA and KF CLWMA070187
Matelea decipiens (Alexander) Woodson; VA and KF CLWMA070107 CLWMA070108 CLWMA070109, and CLWMA070227
Matelea gonocarpos (Walt.) Shinners; JS, VA, SP, and JL 18677

Asteraceae
Achillea millefolium L.; VA and KF CLWMA070341
Acmella oppositifolia (Lam.) R.K. Jansen; VA and KF CLWMA070331, CLWMA070332, & CLWMA070331
Ageratina altissima (L.) King & Rob. var. altissima; JS and VA 19008
Ambrosia artemisiifolia L.; JS and VA 18917
Antennaria parlinii Fernald; JS, VA, and KF 15398
Antennaria plantaginifolia (L.) Richardson; VA and KF CLWMA070043
Arnoglossum plantagineum Raf.; VN CLWMA070636
Baccharis halimifolia L.; JS, VA, and KF 17186
Berlandiera pumila (Michx.) Nutt.; VA and KF CLWMA070348 and CLWMA070349
Bidens aristosa (Michx.) Britton; JS, VA, SP, and JL18884
Bidens bipinnata L.; VA and SP CLWMA70493 & CLWMA70494
Bidens laevis (L.) B.S.P.; VA and SP CLWMA70498
Bidens frondosa L.; JS and VA19278
Chrysopsis pilosa Nutt.; JS, VA, and KF 17000; JS and VA18971; VA and KF CLWMA070253, CLWMA070254, and CLWMA070255
Cirsium horridulum Michx.; JS, VA, and KF 17161
Carduus nutans L.; VA and KF CLWMA070068; CLWMA070069; and CLWMA070096
Conoclinium coelestinum (L.) DC.; VA and KF CLWMA070235 and CLWMA070236; JS and VA 18987
Conyza canadensis (L.) Cronq.; JS and VA 19282
Coreopsis lanceolata L.; JS, VA, and KF 14543
Croptilon divaricatum (Nutt.) Raf.; JM, JS, and VN s.n. and JS and VA 18944
Eclipta prostrata (L.) L.; JS, VA, and KF 16129; JS, VA, and KF 17020; and JS, VA, SP, and JL 18890
Elephantopus nudatus A. Gray; VA and KF CLWMA070298, CLWMA070299, and CLWMA070300
Elephantopus carolinianus Raeusch.; JS and VA 19283 and 19284
Elephantopus tomentosus L.; VA and SP CLWMA070445 and CLWMA070446
Erechtites hieraciifolius (L.) Raf. ex DC.; JS, VA, and KF 17013; JS, VA, and KF 16139; JM, JS, and VN s.n.; and VA and KF CLWMA070405
Erigeron philadelphicus L.; JS, VA, and KF 15313
Erigeron pulchellus Michx.; JS, VA, and KF 15065 and 15414
Erigeron tenuis Torr. & Gray; JS, VA, and KF 17145

Erigeron strigosus Muhl. ex Willd.; JS, VA, and KF 15386
Eupatorium altissimum L.; JS, VA, and KF 16128
Eupatorium capillifolium (Lam.) Small; JS and VA 18956
Eupatorium compositifolium Walt.; JS, VA, and KF 17032
Eupatorium glaucescens Elliott; JS and VA 18970; VA and SP CLWMA070491 and CLWMA070492
Eupatorium perfoliatum L.; JS and VA 19001
Eupatorium semiserratum DC.; JM, JS, and VN s.n.
Eupatorium serotinum Michx. ; JS, VA, and KF 17010
Eupatorium ×pinnatifidum Elliott [capillifolium × perfoliatum]; JM, JS, and VN s.n.
Eurybia hemispherica (Alexander) Nesom; VA and KF CLWMS070156, CLWMA070157, and CLWMA070158
Euthamia leptocephala (Torr. & Gray) Greene ex Porter & Britton; JS and VA 18959
Evax candida (Torr. & Gray) A. Gray; JS, VA, and KF 15146
Facelis retusa (Lam.) Sch. Bip.; VA, and KF 15444 and JS, VA, and KF 17087
Gamochaeta argyrinea Nesom; JS, VA, and KF 17091
Gamochaeta pensylvanica (Willd.) Cabrera; JS, VA, and KF15447
Gamochaeta purpurea (L.) Cabrera; JS, VA, and KF 15403
Helenium amarum (Raf.) H. Rock; JS, VA, and KF 17160
Helenium flexuosum Raf; JS, VA, and KF 17192
Helianthus angustifolius L.; VA and KF CLWMA070173
Helianthus debilis Nutt.; VA and KF CLWMA070064
Helianthus hirsutus Raf.; JS and VA 18997
Helianthus mollis Lam.; VA and KF CLWMA070062 and CLWMA070061
Helianthus strumosus L.; VA and KF CLWMA070063
Heterotheca subaxillaris (Lam.) Britton & Rusby; JS and VA 18952; VN CLWMA070658 and CLWMA070659
Hieracium gronovii L.; JS and VA 18950
Hymenopappus artemisiifolius DC.; VA and KF CLWMA070007, CLWMA070083 and CLWMA070084
Hypochaeris glabra* L.; VN CLWMA070600 and CLWMA070601
Iva angustifolia Nutt. ex DC.; JS and VA 18993
Iva annua L.; JS and VA 18995
Krigia caespitosa (Raf.) Chambers; BMM 8815 and JS, VA, SP, and JL 18872
Krigia dandelion (L.) Nutt.; JS, VA, and KF 17142
Krigia occidentalis Nutt.; JS, VA, and KF 17174
Krigia virginica (L.) Willd.; JS, VA, and KF 15309
Lactuca canadensis L.; JS and VA s.n.
Lactuca floridana (L.) Gaertn.; JS and VA 19286
Liatris aspera Michx.; VA and KF CLWMA070288
Liatris punctata Hook.; JS, VA, and KF 16132
Liatris pycnostachya Michx; VN CLWMA070667
Mikania scandens (L.) Willd.; JS, VA, and KF15050 and 15124; JS and VA 18976; BMM 8824; VA and KF CLWMA070246, CLWMA070247, and CLWMA070248
Packera glabella (Poir.) Jeffrey; VN CLWMA070704, CLWMA070705, CLWMA070706, and CLWMA070707
Packera obovata (Muhl. ex Willd.) W.A. Weber & Á. Löve; JS, VA, SP, and JL 19290
Parthenium hispidum Raf.; JS, VA, and KF 14545
Pityopsis graminifolia (Michx.) Nutt.; VN and SP CLWMA070505, CLWMA070506, and CLWMA070507; JM, JS, and VN s.n.
Pluchea camphorata (L.) DC.; JS, VA, and KF 16131

Pluchea foetida (L.) DC.; JS and VA 18934; VA and SP CLWMA070447, CLWMA070448, and CLWMA070449
Pluchea odorata (L.) Cass.; BMM 8885
Pluchea rosea Godfrey; JS, VA, and KF 17031
Pseudognaphalium obtusifolium (L.) Hilliard & Burtt; JS, VA, and KF 17073
Pseudognaphalium helleri (Britton) Anderb.; VA and RS CLWMA070414 and CLWMA070415
Pyrrhopappus carolinianus (Walt.) DC.; JS, VA, and KF 15088 and 15450
Rudbeckia hirta L.; VA and KF CLWMA070049
Senecio ampullaceus Hook.; JS, VA, and KF 15138, 15333, and 17095
Smallanthus uvedalius (L.) Mack. ex Small; VA and KF CLWMA070180
Solidago altissima L.; JS and VA 18921
Solidago auriculata Shuttlw. ex Blake; VA and KF-CLWMA070149, CLWMA070150 and CLWMA070151; JS and VA 19011
Solidago caesia L.; JS and VA 19002
Solidago canadensis L.; BMM 8914
Solidago ludoviciana (A. Gray) Small; JS and VA s.n.
Solidago odora Ait.; JS and VA s.n.
Solidago radula Nutt.; JS and VA s.n.
Soliva sessilis* Ruiz & Pav.; JS, VA, and KF 15441
Sonchus asper* (L.) Hill; JS, VA, SP, and JL 18680
Symphyotrichum drummondii (Lindl.) Nesom; VA and KF CLWMA070163
Symphyotrichum dumosum (L.) Nesom; JS and VA 18994
Symphyotrichum lateriflorum (L.) Löve & Löve; JS and VA 18927 and 18972; VA and KF CLWMA070366; VA and KF CLWMA070259; VA and KF CLWMA070260; JS and VA s.n.
Verbesina helianthoides Michx.; JS, VA, and KF s.n.
Verbesina virginica L.; VA and KF CLWMA070168
Vernonia missurica Raf.; VA and KF CLWMA070074, CLWMA070075, and CLWMA070076

Balsaminaceae
Impatiens capensis Meerb.; JS, VA, and KF 17059 and VA and SP CLWMA070430 and CLWMA070431

Betulaceae
Alnus serrulata (Ait.) Willd.; JS, VA, and KF 15121
Betula nigra L.; JS, VA, and KF 17127
Carpinus caroliniana Walt.; JS, VA, and KF 15054 and 17058
Ostrya virginiana (Mill.) Koch; JS, VA, SP, and JL 18883; VN and SP CLWMA070549, and CLWMA070551, and CLWMA070550

Berberidaceae
Nandina domestica* Thunb.; JS, VA, and KF 15066 and 17049; JS, VA, and KF 15433; JS and VA 18985
Podophyllum peltatum L.; JS, VA, and KF 15380

Bignoniaceae
Bignonia capreolata L.; JS, VA, and KF 17198
Campsis radicans (L.) Seem. ex Bureau; JS and VA 19280; V. Adams, S. Price CLWMA070443 & CLWMA070444

Boraginaceae
Heliotropium indicum L.; JS and VA s.n. and VA CLWMA070391, CLWMA070392, and CLWMA070393
Lithospermum caroliniense (Walt. ex Gmel.) MacMill.; VA and KF CLWMA070413
Myosotis macrosperma Engelm.; VA and KFCLWMA070009, CLWMA070089, and CLWMA070090, and CLWMA070399; JS, VA, and KF 15311

Brassicaceae
Arabis canadensis L.; JS, VA, and KF 15053; VA and KF CLWMA070375
Cardamine pensylvanica Muhl. ex Willd.; JS, VA, and KF 15315
Lepidium virginicum L.; VA and KF CLWMA070012, CLWMA070013, and CLWMA070014
Sibara virginica (L.) Rollins; JS, VA, and KF 17084

Bromeliaceae
Tillandsia usneoides (L.) L.; VA, and KF 15372; VA and KF CLWMA070070, CLWMA070071, CLWMA070112, and CLWMA070113

Buddlejaceae
Polypremum procumbens L.; VA and KF CLWMA070264, CLWMA070265, and CLWMA070266; JS and VA 18928

Cabombaceae
Brasenia schreberi J.F. Gmel.; JS, VA, and KF 15428
Cabomba caroliniana A. Gray; VA and KF CLWMA070015 & CLWMA070016

Cactaceae
Opuntia humifusa (Raf.) Raf.; VA, SP, and JL 18892

Callitrichaceae
Callitriche peploides Nutt.; JS, VA, and KF 15454
Callitriche heterophylla Pursh; BMM 8783; VN CLWMA070564

Campanulaceae
Lobelia appendiculata A. DC.; VA and KF CLWMA070208, CLWMA070209, and CLWMA070210; JS, VA, SP, and JL 18900; VN CLWMA070646 and CLWMA070647
Lobelia cardinalis L.; VA and KF CLWMA070152 and CLWMA070153
Lobelia puberula Michx.; VA and KF CLWMA070159, CLWMA070160, CLWMA070161 and CLWMA070162; JS, VA, and KF 14432
Triodanis perfoliata (L.) Nieuwl.; VA and KF CLWMA070028, CLWMA070029, and CLWMA070036

Caprifoliaceae
Lonicera japonica* Thunb.; JS, VA, and KF 15068; VA, and KF 15068; JS, VA, and KF 17061; VA and KF CLWMA070037 and CLWMA070077
Lonicera sempervirens L.; JS, VA, SP, and JL 19287
Sambucus nigra L. subsp. canadensis (L.) R. Bolli; CLWMA070640, CLWMA070641 and CLWMA070642
Triosteum angustifolium L.; JS, VA, and KF 17167
Viburnum rufidulum Raf.; JS, VA, and KF 15405 and 17117

Caryophyllaceae
Arenaria serpyllifolia L.; JS, VA, and KF 15340
Cerastium brachypodum (Engelm. ex Gray) B.L. Rob.; JS, VA, and KF 15312
Minuartia patula (Michx.) Mattf.; VN CLWMA07089, CLWMA07090, and CLWMA07091
Petrorhagia dubia* (Raf.) López & Romo; VN CLWMA070598 and CLWMA070599
Sagina decumbens (Elliott) Torr. & A. Gray; JS, VA, SP, and JL 18876
Silene stellata (L.) W.T. Ait.; VA and KF CLWMA070183
Stellaria media* (L.) Vill.; JS, VA, and KF 5296

Chenopodiaceae
Dysphania ambrosioides (L.) Mosyakin & Clemants; JS and VA 18935

Cistaceae
Helianthemum carolinianum (Walt.) Michx.; VA and KF s.n. and VA and KF CLWMA070413
Helianthemum georgianum Chapm.; VA and KF CLWMA070190 and CLWMA070191
Helianthemum rosmarinifolium Pursh; VN CLWMA070576, CLWMA070577, and CLWMA070578
Lechea mucronata Raf.; JS and VA 18915
Lechea tenuifolia Michx.; JS, VA, and KF 17178; VA and KF CLWMA070296 and CLWMA070297

Clusiaceae
Hypericum drummondii (Grev. & Hook.) Torrey & Gray; JS, VA, and KF 16130 and 17180; CLWMA070261 CLWMA070262; VA and KF CLWMA070263
Hypericum hypericoides (L.) Crantz; JS, VA, and KF 17187; JS and VA 18981; VA and KF CLWMA070228; CLWMA070229; CLWMA070230
Hypericum mutilum L.; JS, VA, and KF 17023
Triadenum virginicum (L.) Raf.; JS, VA, and KF 17137; VN and SP CLWMA070420, CLWMA070421, CLWMA070422, and CLWMA070423
Triadenum walteri (J.G. Gmel.) Gleason; JS, VA, and KF 15132, 16137, 17068, and 17014

Convolvulaceae
Dichondra carolinensis Michx.; JS, VA, and KF 15300
Ipomoea triloba L.; VA and KF CLWMA070325, CLWMA070326 and CLWMA070327
Stylisma aquatica (Walt.) Raf.; VA and SP CLWMA070433, CLWMA070434, and CLWMA070435
Stylisma humistrata (Walt.) Chapm.; JS, VA, and KF 17181; VA and KF CLWMA070114, CLWMA070115, and CLWMA070116

Cornaceae
Cornus florida L.; JS, VA, and KF 15438 and VA and KF CLWMA070400, CLWMA070401 and CLWMA070402
Cornus foemina Mill.; JS and VA 18916
Nyssa aquatica L.; JS, VA, and KF 15116; JS, VA, and KF 15325
Nyssa sylvatica Marshall; VN CLWMA070616, CLWMA070617, and CLWMA070618

Crassulaceae
Penthorum sedoides L.; JS and VA s.n.

Cuscutaceae
Cuscuta gronovii Willd. ex Schult.; VA and KF CLWMA070231; CLWMA070232 and CLWMA070233

Dioscoreaceae
Dioscorea villosa L.; JS, VA, and KF 15067, 15102, and 15448; VN CLWMA070653, CLWMA070654 and CLWMA070655

Droseraceae
Drosera brevifolia Pursh; VN CLWMA070536, CLWMA070537, CLWMA070538, and CLWMA070539

Ebenaceae
Diospyros virginiana L.; JS, VA, and KF 15123, 15429, and 17088; BMM 8813; JS and VA18983; VA CLWMA070249, CLWMA070250, CLWMA070251 and CLWMA070252

Ericaceae
Lyonia ligustrina (L.) DC.; JS, VA, and KF 15125
Vaccinium arboreum Marshall; JS, VA, and KF 15381 and 17080; VA and KF CLWMA070034
Vaccinium corymbosum L; JS, VA, and KF 15110, 15128, and 15413
Vaccinium elliottii Chapm.; JS, VA, and KF 15437
Vaccinium fuscatum Ait.; JM, JS, and VN s.n.

Euphorbiaceae
Acalypha gracilens A. Gray; JM, JS, and VN s.n.
Acalypha rhomboidea Raf.; JS, VA, and KF 16140
Acalypha virginica L.; JS and VA 18919
Chamaesyce cordifolia (Elliott) Small; VA and KF CLWMA070242
Cnidoscolus texanus (Müll. Arg.) Small; JS and VA 18991
Croton capitatus Michx. var. *lindheimeri* (Engelm. & Gray) Müll. Arg.; VA and KF CLWMA070174 and CLWMA070175
Croton glandulosus L.; JS and VA 18932
Croton michauxii G.L. Webster; JS and VA 18943
Euphorbia corollata L.; JS and VA 18979 and 18951
Euphorbia spathulata Lam.; JS, VA, and KF 15379 and VN CLWMA070557
Triadica sebifera* (L.) Small; JS, VA, and KF 15431

Fabaceae
Albizia julibrissin* Durazz.; JS, VA, and KF 17056
Amorpha fruticosa L.; JS, VA, SP, and JL 18880
Amorpha laevigata Nutt.; JS, VA, and KF 15415
Amorpha paniculata Torr. & Gray; VA and KF CLWMA070058, CLWMA070059, & CLWMA070060
Amphicarpaea bracteata (L.) Fernald; JS, VA, and KF 15101
Apios americana Medik.; JS and VA s.n.
Astragalus canadensis L.; VN and SP CLWMA070466
Astragalus distortus Torr. & Gray var. engelmannii (Sheldon) M.E. Jones; VA and KF CLWMA070412
Astragalus leptocarpus Torr. & Gray; JS, VA, and KF 17141 and 15144; VN and SP CLWMA070540
Baptisia nuttalliana Small; VA and KF s.n.; VN CLWMA070020, CLWMA070531 and CLWMA070532
Boltonia diffusa Elliott; JS, VA, and KF17018; VA and KF CLWMA070407 & CLWMA070408
Centrosema virginianum (L.) Benth.; VA and KF CLWMA070055, CLWMA070053, and CLWMA070054
Cercis canadensis L. var. canadensis; JS, VA, and KF 15409

Chamaecrista fasciculata (Michx.) Greene; JS and VA 18945; VA and KF CLWMA070199, CLWMA070200, and CLWMA070201
Chamaecrista nictitans (L) Moench; VN and S. Price CLWMA070463, CLWMA070464 and CLWMA070465
Clitoria mariana L.; VA and KF CLWMA070145 and CLWMA070146
Crotalaria sagittalis L.; JS, VA, and KF 17147; VA CLWMA070668 & CLWMA070669
Dalea phleoides (Torr. & Gray) Shinners; VN and SP CLWMA070481; CLWMA070482 and CLWMA070483
Desmodium canescens (L.) DC.; VA and KF CLWMA070148
Desmodium ciliare (Muhl. ex Willd.) DC.; VA and KF CLWMA070155
Desmodium laevigatum (Nutt.) DC.; VA and KF CLWMA070241
Desmodium marilandicum (L.) DC.; VA and KF CLWMA070008
Desmodium rotundifolium DC. Fabaceae; VA and KF CLWMA070154
Desmodium nuttallii (Schindl.) B.G. Schub.; JS and VA 18918
Desmodium nudiflorum (L.) DC.; JS and VA 18914
Desmodium paniculatum (L.) DC.; VA and KF s.n.
Desmodium pauciflorum (Nutt.) DC.; VA and KF CLWMA070128 and CLWMA070129
Desmodium sessilifolium (Torr.) Torr. & Gray; JS and VA 18906
Dioclea multiflora (Torr. & Gray) C. Mohr; JS, VA, and KF 17070
Erythrina herbacea L.; VA and KF CLWMA070181 and CLWMA070182; JS and VA 19004
Galactia volubilis (L.) Britton; JS, VA, SP, and JL 19296
Galactia regularis (L.) B.S.P.; VA and SP CLWMA070439, CLWMA070440, and CLWMA070441
Gleditsia aquatica Marshall; VA and SP CLWMA070474, CLWMA070475, CLWMA070476, and CLWMA070477
Gleditsia triacanthos L.; JS, VA, and KF 15434
Kummerowia striata* (Thunb.) Schindl.; VA CLWMA070674, CLWMA070675, CLWMA070676
Lathyrus hirsutus* L.; JS, VA, and KF 15395
Lathyrus venosus Muhl. ex Willd.; JS, VA, and KF 15366
Lespedeza procumbens Michx.; JM, JS, and VN s.n.
Lespedeza stuevei Nutt.; JS and VA 18953
Lespedeza virginica (L.) Britton; VA and KF CLWMA070312
Medicago lupulina* L.; JS, VA, and KF 15338
Melilotus officinalis (L.) Lam.; VN CLWMA070697
Mimosa nuttallii (DC. ex Britton & Rose) B.L. Turner; VA and KF CLWMA070133, CLWMA070134, and CLWMA070135; JS, VA, and KF 17150
Orbexilum pendunculatum (Mill.) Rydb. var. pendunculatum; VA and KF CLWMA070377, CLWMA070378, and CLWMA070379
Pediomelum hypogaeum (Nutt. ex Torr. & Gray) Rydb.; VN CLWMA070703
Phaseolus polystachios (L.) B.S.P.; JS and VA 19009
Rhynchosia latifolia Nutt. ex Torr. & Gray; JS, VA, and KF 17148
Robinia pseudoacacia L.; VA and KF CLWMA070001, CLWMA070030 and CLWMA070031; JS and VA 18924
Senna marilandica (L.) Link; VA and KF CLWMA070195
Sesbania drummondii (Rydb.) Cory; JS and VA 18920, CLWMA070450; CLWMA070451, and CLWMA070452; JS, VA, SP, and JL 18685
Sesbania herbacea (Mill.) McVaugh; VA and SP CLWMA070453, CLWMA070454, and CLWMA070455
Strophostyles helvola (L.) Elliott; VA and KF CLWMA070147
Stylosanthes biflora (L.) B.S.P.; JS, VA, and KF 15118
Tephrosia onobrychoides Nutt.; VN and SP CLWMA070543, and CLWMA070544, and CLWMA070545

Tephrosia virginiana (L.) Pers.; VA and KF CLWMA070353 and CLWMA070354
Trifolium campestre* Schreb.; JS, VA, and KF 15090
Trifolium incarnatum* L.; VN CLWMA070613, CLWMA070614, and CLWMA070615
Trifolium repens* L.; JS, VA, and KF 15385
Vicia caroliniana Walt.; JS, VA, and KF 15376 and 15419
Vicia ludoviciana Nutt.; VA and KF CLWMA070403
Vicia sativa* L.; VN CLWMA070611 and CLWMA070612
Wisteria frutescens (L.) Poir.; VA and KF CLWMA070017, CLWMA070018, and CLWMA070078

Fagaceae
Quercus alba L.; JS, VA, and KF 15324
Quercus falcata Michx.; JS, VA, and KF 15410
Quercus incana W. Bartram; JS, VA, and KF 15140
Quercus imbricaria Michx.; VN CLWMA070688 and CLWMA070689
Quercus laurifolia Michx.; JS, VA, and KF 17071
Quercus lyrata Walt.; JS, VA, and KF 17126
Quercus marilandica Münchh.; JS, VA, and KF 15087, 15390
Quercus michauxii Nutt.; VA and KF CLWMA070176, CLWMA070177, and CLWMA070178; JS and VA 19013
Quercus muehlenbergii Engelm.; JS and VA 19010
Quercus nigra L.; VN CLWMA070648, CLWMA070649 and CLWMA070650
Quercus pagoda Raf.; JS, VA, and KF 15389 and 17135
Quercus phellos L.; JS, VA, and KF 15069 and 15133
Quercus shumardii Buckley; JS, VA, and KF 15423; VA and KF CLWMA070364 and CLWMA070365
Quercus similis Ashe; JS and VA s.n.
Quercus stellata Wangenh.; JS, VA, and KF 15401

Gentianaceae
Sabatia angularis (L.) Pursh; VA and KF CLWMA070179; VN CLWMA070666

Geraniaceae
Geranium carolinianum L.; JS, VA, and KF 15451

Grossulariaceae
Itea virginica L.; JS, VA, and KF 15111 and JS, VA, and KF 17075

Haloragaceae
Myriophyllum aquaticum* (Vell.) Verdc.; JS, VA, and KF 17065; VA and KF CLWMA070024 CLWMA070025, and CLWMA070026
Myriophyllum heterophyllum Michx.; JS, VA, and KF 15358
Myriophyllum pinnatum (Walt.) B.S.P.; JS, VA, and KF 17085; BMM 8784
Myriophyllum verticillatum L.; JM, JS, and VN s.n.
Proserpinaca palustris L.; JS, VA, and KF 17199

Hamamelidaceae
Liquidambar styraciflua L.; JS, VA, and KF 15369 and BMM 8817

Hippocastanaceae
Aesculus pavia L. var. pavia; JS, VA, and KF 15321

Hydrocharitaceae
Egeria densa* Planch.; CLWMA070021, CLWMA070022, and CLWMA070023
Hydrilla verticillata* (L. f.) Royle; JS, VA, and KF 17038
Limnobium spongia (Bosc) Rich. ex Steud.; JS, VA, and KF 17039 and VA and KF CLWMA070376

Hydrophyllaceae
Hydrolea ovata Nutt. ex Choisy; VA and KF CLWMA070256, CLWMA070257, and CLWMA070258; JS and VA 19285
Hydrolea uniflora Raf.; VA s.n.
Phacelia strictiflora (Engelm. & Gray) A. Gray; JS, VA, and KF 15137

Juglandaceae
Carya aquatica (Michx. f.) Nutt.; VA, and KF 17136
Carya cordiformis (Wangenh.) K. Koch; VN CLWMA070595, CLWMA070596 and CLWMA070597
Carya texana Buckley; JS, VA, and KF 15057; JS and VA 18926
Carya tomentosa (Lam.) Nutt.; JS, VA, and KF 15046 and 17060; JS and VA 19006
Juglans nigra L.; VA and SP CLWMA070372 and CLWMA070373

Lamiaceae
Hedeoma hispida Pursh; JS, VA, SP, and JL 18897
Lycopus rubellus Moench; JS, VA, and KF 17011 and JS and VA 18961
Mecardonia acuminata (Walt.) Small; VA and KF CLWMA070280; VA and SP CLWMA070460 and CLWMA070461; JS and VA 19288
Monarda fistulosa L.; VA and KF CLWMA070046, CLWMA070047, and CLWMA070048
Monarda luteola Singhurst & Holmes; JS, VA, and KF 17189
Monarda punctata L.; VA and KF CLWMA070238, CLWMA070239, and CLWMA070240
Perilla frutescens (L.) Britton; VA and KF CLWMA070166 CLWMA070167
Prunella vulgaris L.; JS, VA, and KF 15373 and 17046
Pycnanthemum albescens Torr. & Gray; VA and KF-CLWMA070267, CLWMA070268, CLWMA070269, CLWMA070301
Pycnanthemum tenuifolium Schrad.; JS, VA, and KF 17048; VA and KF CLWMA070110, CLWMA070111, and CLWMA070289
Salvia lyrata L.; JS, VA, and KF 15052
Salvia azurea Michx. ex Lam.; JS, VA, and KF 15308; VA and KF CLWMA070350
Scutellaria cardiophylla Engelm. & Gray; VA and KF CLWMA070097
Scutellaria integrifolia L.; VN CLWMA070651 and CLWMA070652
Scutellaria parvula Michx.; VN CLWMA070571, CLWMA070572, and CLWMA070586
Stachys crenata Raf.; JS, VA, and KF 15093
Teucrium canadense L.; VA and KF CLWMA070065, CLWMA070066, and CLWMA070067
Trichostema dichotomum L.; VA and KF CLWMA070169 and CLWMA070170

Lauraceae
Sassafras albidum (Nutt.) Nees; JS, VA, and KF 15063, 17009, and 17050; VA and KF CLWMA070041

Lentibulariaceae
Utricularia gibba L.; VA and KF CLWMA070424; VA and KF CLWMA070278
Utricularia inflata Walt.; VA and KF CLWMA070091, CLWMA070274, CLWMA070027, and CLWMA070404
Utricularia subulata L.; JS, VA, and KF 17119

Linaceae
Linum medium (Planch.) Britton; JS, VA, and KF17146
Linum striatum Walt.; JS, VA, and KF 14431

Loganiaceae
Gelsemium sempervirens (L.) W.T. Aiton; JS s.n.

Magnoliaceae
Liriodendron tulipifera* L.; VA and SP CLWMA070478, CLWMA070479 and CLWMA070480
Magnolia virginiana L.; JS, VA, and KF 15126

Malvaceae
Hibiscus laevis All.; JS, VA, SP, and JL 18887 and JS and VA 18955
Hibiscus lasiocarpos Cav.; JS and VA 18977
Hibiscus moscheutos L.; JS, VA, and KF 17196; BMM 8818; VA and KF CLWMA070303, CLWMA070305, and CLWMA070306

Melastomataceae
Rhexia mariana L. var. interior (Pennell) Kral & Bostick; VA and KF CLWMA070171, CLWMA070172 and CLWMA070237; JS and VA 19014

Meliaceae
Melia azedarach* L.; JS and VA 18996

Menispermaceae
Cocculus carolinus (L.) DC.; VN CLWMA070607, CLWMA070608, and CLWMA070609

Moraceae
Maclura pomifera (Raf.) C.K. Schneid.; VN CLWMA070524, CLWMA070525, and CLWMA070526
Morus rubra L.; JS, VA, and KF 15058, 15424, and 17157; VA and KF CLWMA070040

Myricaceae
Morella cerifera (L.) Small; JS, VA, and KF 15299 and JS, VA, and KF 16127

Nelumbonaceae
Nelumbo lutea Willd.; JS, VA, and KF 17064 and 17171

Oleaceae
Chionanthus virginicus L.; JS, VA, and KF 15327 VN and SP; CLWMA070522 and CLWMA070523
Forestiera acuminata (Michx.) Poir.; JS, VA, and KF 15430 and JS, VA, and KF 17191
Fraxinus americana L.; JS, VA, and KF 15074 and 15406
Fraxinus caroliniana Mill.; VN and SP CLWMA070467, CLWMA070468, and CLWMA070469
Fraxinus pennsylvanica Marshall; JS, VA, and KF 15378, 17094 and 17190
Ligustrum lucidum* W.T. Aiton.; JS and VA 18984; VA and KF CLWMA070100 and CLWMA070101
Ligustrum sinense* Lour.; JS, VA, and KF 17041; VA and KF CLWMA070098 and CLWMA070099

Onagraceae
Ludwigia alternifolia L.; VA and KF CLWMA070126 and CLWMA070127
Ludwigia decurrens Walt.; JS, VA, and KF 17019
Ludwigia glandulosa Walt.; VN ??? and JM, JS, and VN s.n.

Ludwigia leptocarpa (Nutt.) H. Hara; JS, VA, and KF 17200
Ludwigia linearis Walt.; JS, VA, and KF 17004
Ludwigia palustris (L.) Elliott; VA and KF CLWMA070124 and CLWMA070125
Ludwigia peploides (Kunth) Raven; JS, VA, SP, and JL 18891
Ludwigia pilosa Walt.; VA and SP CLWMA070462
Ludwigia repens J.R. Forst.; JS, VA, SP, and JL 18869
Oenothera filiformis (Small) Wagner & Hoch; VA and KF CLWMA070285, CLWMA070286, CLWMA070287
Oenothera laciniata Hill; JS, VA, and KF 15094 and 15342; VN and SP CLWMA070574 and CLWMA070575
Oenothera linifolia Nutt.; VN and SP CLWMA070574 and CLWMA070575
Oenothera villosa Thunb.; JS and VA 18939

Oxalidaceae
Oxalis corniculata L.; JS, VA, and KF 15297 and 15456
Oxalis dillenii Jacq.; s.n.
Oxalis violacea L.; JS, VA, and KF 15092

Passifloraceae
Passiflora incarnata L.; JS, VA, and KF 15384 and 17179; VA and KF CLWMA070202, CLWMA070203, and CLWMA070204
Passiflora lutea L.; JS, VA, and KF 15064 and VA and KF CLWMA070347

Phytolaccaceae
Phytolacca americana L.; JS, VA, SP, and JL 18881

Plantaginaceae
Plantago aristata Michx.; VN CLWMA070701
Plantago pusilla Nutt; JS, VA, and KF 15360
Plantago virginica L.; JS, VA, and KF 15457

Platanaceae
Platanus occidentalis L.; JS, VA, and KF 17040

Polemoniaceae
Phlox pilosa L.; JS, VA, and KF 15371

Polygalaceae
Polygala incarnata L.; CLWMA070217, CLWMA070218 and CLWMA070219
Polygala polygama Walt.; JS, VA, and KF 17156
Polygala sp; VA and KF CLWMA070346
Polygala sp; VA and SP CLWMA070429

Polygonaceae
Brunnichia ovata (Walt.) Shinners; JS, VA, and KF 17062; JS and VA 18905; VA and KF CLWMA070243, CLWMA070244, and CLWMA070243
Polygonum hydropiperoides Michx.; BMM 8822 and JS, VA, and KF 17017
Polygonum orientale* L.; JS and VA 18988
Polygonum virginianum L.; JS and VA 19005 and JS, VA, and KF 15104
Rumex crispus L.; JS, VA, and KF s.n.; VN CLWMA070558 and CLWMA070626
Rumex hastatulus Baldw.; VA, and KF 15337; VA and SP CLWMA070559 and CLWMA070560

Pontederiaceae
Eichhornia crassipes* (Mart.) Solms; VA and KF CLWMA070277

Portulacaceae
Phemeranthus parviflorus (Nutt.) Kiger; JS, VA, SP, and JL 18888 and 18973

Primulaceae
Anagallis minima (L.) Krause; JS, VA, and KF 17114 & 17175
Hottonia inflata Elliott; VA and KF CLWMA070275 and CLWMA070276; JS, VA, and KF 15435

Ranunculaceae
Clematis glaucophylla Small; VA and KF CLWMA070192 and CLWMA070193
Clematis crispa L.; JS, VA, and KF 15145; VA CLWMA070710
Clematis virginiana L.; VA and KF CLWMA070319, CLWMA070320, and CLWMA070321
Delphinium carolinianum Walt.; VA and KF CLWMA070130, CLWMA070131, and CLWMA070132
Ranunculus pusillus Poir.; JS, VA, and KF 17173; BMM 8782; VN CLWMA070569 and CLWMA070570
Ranunculus fascicularis Muhl. ex Bigelow; JS, VA, and KF 17042
Thalictrum dasycarpum Fisch. & Avé-Lall.; JS, VA, and KF 15425

Rhamnaceae
Berchemia scandens (Hill) K. Koch; JS, VA, and KF 17059; VA and KF CLWMA07008 & CLWMA070085
Frangula caroliniana (Walt.) A. Gray; JS, VA, and KF 15081 and JS, VA, and KF 15400

Rosaceae
Agrimonia rostellata Wallr.; JS, VA, and KF15084; VA and KF CLWMA070368 & CLWMA070369
Crataegus marshallii Eggl.; JS, VA, and KF 15383 and VA and KF CLWMA070042
Crataegus opaca Hook. & Arn.; JS, VA, and KF 17083
Crataegus crus-galli L.; JS, VA, and KF 15356
Crataegus spathulata Michx.; JS, VA, and KF 15077
Crataegus viridis L.; JS, VA, and KF 15388
Duchesnea indica (Andrews) Teschem.; VN CLWMA070708 and CLWMA070709
Geum canadense Jacq.; JS, VA, and KF 15408
Gillenia stipulata (Muhl. ex Willd.) Baill.; JS, VA, and KF 17166
Potentilla recta L.; VN CLWMA070700
Prunus caroliniana Ait.; JS and VA 19293
Prunus mexicana S. Wats.; JS, VA, and KF 15370
Prunus serotina Ehrh.; VN CLWMA070690, CLWMA070691, and CLWMA070692
Pyrus calleryana* Decne.; VN CLWMA070587 and CLWMA070588
Rosa multiflora Thunb. Rosaceae; VN CLWMA070603 and CLWMA070604
Rubus argutus Link; JS, VA, and KF 15117
Rubus trivialis Michx.; VA, and KF 15391
Rubus flagellaris Willd.; JS, VA, and KF 15336

Rubiaceae
Cephalanthus occidentalis L.; JS and VA 19281, CLWMA070436, CLWMA070437, and CLWMA070438
Diodia teres Walt.; VA and KF CLWMA070282, CLWMA070283 and CLWMA070284; JS and VA 18938
Diodia virginiana L.; JS, VA, and KF 17098 and 17122; BMM 8868; JS and VA 18922

Galium aparine* L.; JS, VA, and KF 17106
Galium circaezans Michx.; JS, VA, and KF 15396; VA and KF CLWMA070164
Galium obtusum Bigelow; BMM 8819
Galium pilosum Ait.; JS, VA, and KF 15399
Galium uniflorum Michx.; JS, VA, and KF 15306
Galium obtusum Bigelow; VA and KF CLWMA070165
Galium tinctorium (L.) Scop.; JS, VA, and KF 17086
Houstonia pusilla Schoepf; JS, VA, SP, and JL 18875
Houstonia micrantha (Shinners) Terrell; JS, VA, SP, and JL 18874
Houstonia rosea (Raf.) Terrell; JS, VA, SP, and JL 18878
Mitchella repens L.; JS and VA 18925
Oldenlandia boscii (DC.) Chapm.; JS, VA, SP, and JL 18898
Oldenlandia uniflora L.; JS and VA 18948; JS, VA, and KF 17154
Sherardia arvensis* L.; JS, VA, and KF 15368

Rutaceae
Zanthoxylum clava-herculis L; VN CLWMA070619, CLWMA070620, and CLWMA070621

Salicaceae
Populus deltoides W. Bartram ex Marshall; JM, JS, and VN s.n.
Salix nigra Marshall; JS, VA, and KF 15122, 15143 and 17163; BMM 8825

Sapotaceae
Sideroxylon lanuginosum Michx.; JS, VA, and KF 15059; VA and KF CLWMA070351

Saururaceae
Saururus cernuus L.; JS, VA, and KF 15107 and 17197; BMM 8871; VA and KF CLWMA070211, CLWMA070212, and CLWMA070213

Saxifragaceae
Lepuropetalon spathulatum Elliott; JS, VA, SP, and JL 18873

Scrophulariaceae
Agalinis fasciculata (Elliott) Raf.; VA and KF CLWMA070142, CLWMA070143, & CLWMA070144
Agalinis purpurea (L.) Pennell; JS and VA 18992
Agalinis viridis (Small) Pennel; JS, VA, and KF 17005
Aureolaria grandiflora (Benth.) Pennell; JS and VA 19007
Bacopa rotundifolia (Michx.) Wettst.; VA and KF CLWMA070394, CLWMA070395, & CLWMA070396
Castilleja indivisa Engelm.; VN CLWMA070699
Gratiola brevifolia Raf.; JS, VA, and KF s.n.
Gratiola neglecta Torr.; JS, VA, and KF 17043
Nuttallanthus canadensis (L.) D.A. Sutton; JS, VA, and KF 15344 and 15374
Parentucellia viscosa* (L.) Caruel; VN CLWMA070581, CLWMA070582 and CLWMA070583
Pedicularis canadensis L.; JS, VA, and KF 15096 and 15412
Penstemon laxiflorus Pennell; VA and KF CLWMA070198 and CLWMA070340
Veronica peregrina L.; JS, VA, and KFs.n.

Solanaceae
Physalis pubescens L.; JS, VA, SP, and JL 18678

Solanum carolinense L.; VA and KF CLWMA070205, CLWMA070206, and CLWMS070207; MM 8867
Solanum elaeagnifolium Cav.; VA and KF CLWMA070214, CLWMA070215, and CLWMA070216
Solanum rostratum Dunal; JS and VA 18957

Symplocaceae
Symplocos tinctoria (L.) L'Hér.; JS, VA, and KF 15452

Styracaceae
Styrax americanus Lam.; JS, VA, and KF 15115, 15330, and 17067; VA and KF CLWMA070032, CLWMA070104, CLWMA070105, and CLWMA070106; BMM 8828

Tiliaceae
Tilia americana L.; JS and VA 19003; VA and KF CLWMA070385

Ulmaceae
Celtis laevigata Willd. var. laevigata; JS, VA, and KF 15056
Celtis laevigata var. smallii (Beadle) Sarg.; JS, VA, and KF 15411
Planera aquatica J.F. Gmel.; JS, VA, and KF 15359
Ulmus alata Michx.; JS, VA, and KF 15075 and BMM 8827
Ulmus americana L.; JS, VA, SP, and JL 19295
Ulmus crassifolia Nutt.; JS, VA, SP, and JL s.n.
Ulmus rubra Muhl.; JS, VA, and KF 15422

Urticaceae
Boehmeria cylindrica (L.) Sw.; JS, VA, and KF 15119 & 17089; BMM 8875; VA and KF CLWMA070295

Valerianaceae
Valerianella radiata (L.) Dufr.; JS, VA, and KF 15072 and 15091; VN and SP CLWMA070573

Verbenaceae
Callicarpa americana L.; VA and KF CLWMA070309; BMM 8874; JS and VA 18949
Glandularia canadensis (L.) Nutt.; JS, VA, and KF s.n.; VN CLWMA070561, CLWMA070562 and CLWMA070563
Phryma leptostachya L.; JS, VA, and KF 15060; VA and KF CLWMA070184, CLWMA070185 and CLWMA070186
Phyla lanceolata (Michx.) Greene; JS and VA 19292
Verbena brasiliensis Vell.; VN CLWMA070627, CLWMA070628, and CLWMA070629
Verbena halei Small; VA and KF CLWMA070019, CLWMA070092, and CLWMA070093; JS, VA, and KF 15339, 15382, and 17144

Violaceae
Viola lanceolata L.; VA, and KF 15316; VA and KF CLWMA070044; BMM 8780
Viola septemloba Leconte; JS, VA, and KF 15089, 15319
Viola sororia Willd.; JS, VA, and KF 15131, 17053 and 17092; VA, and KF 15318
Viola sagittata Ait.; JS, VA, and KF 15402
Viola walteri House; JS, VA, and KF 15070 and VN and SP CLWMA070580

Viscaceae
Phoradendron tomentosum (DC.) Engelm. ex Gray; VA and KF CLWMA070079, CLWMA 070080 and CLWMA070081

Vitaceae
Nekemias arborea (L.) Wen & Boggan; JS, VA, and KF 17120; VN CLWMA070605 and CLWMA070606
Parthenocissus quinquefolia (L.) Planch.; VA and KF CLWMA070087 and CLWMA070088
Vitis aestivalis Michx.; JS, VA, SP, and JL 18676
Vitis cinerea (Engelm.) Engelm. ex Millard; VA and KF CLWMA070094 and CLWMA070095
Vitis mustangensis Buckley; JS, VA, and KF 17057
Vitis riparia Michx.; JS, VA, and KF 17133
Vitis rotundifolia Michx.; JS, VA, and KF 15103; JS, VA, and KF 15326 and 17151

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REFERENCES

Bezanson, D. 2000. Natural vegetation types of Texas and their representation in conservation areas. M.S. thesis, Univ. of Texas at Austin.

Kartesz, J.T. The Biota of North America Program (BONAP). 2015. North American Plant Atlas. (http://bonap.net/napa). Chapel Hill, N.C. [maps generated from Kartesz, J.T. 2015. Floristic Synthesis of North America, Version 1.0.

Carr, W.R. 2002. Plant taxa endemic to the state of Texas. Unpublished report. The Nature Conservancy of Texas, Austin.

Carr, W.R. 2005. An annotated list of the G3/T3 and rarer plant taxa of Texas. Unpublished report. Texas Conservation Data Center, The Nature Conservancy of Texas, Austin.

Correll, D.S and M.C. Johnston. 1970. Manual of the Vascular Plants of Texas. Texas Research Foundation, Renner.

Golden, M.L., A.C. Peer, and S.E. Brown, Jr. 1994. Soil survey of Harrison County, Texas. U.S. Dept. of Agriculture, Soil Conservation Service.

Griffith, K. 2009. Soil survey of Marion and Cass County, Texas. U.S. Dept. of Agriculture, Soil Conservation Service.

Hatch, S.L., K.N. Gandhi, and L.E. Brown. 1990. Checklist of the Vascular Plants of Texas. Agricultural Experiment Station, Texas A&M University, College Station.

Hoagland, B. 2000. The vegetation of Oklahoma: A classification for landscape mapping and conservation planning. Southw. Nat. 45: 385–420.

Jones, S.D., J.K. Wipff, & P.M. Montgomery. 1997. Vascular plants of Texas. Univ. of Texas Press, Austin.

Larkin, E.J. and G.W. Bomar. 1983. Climatic Atlas of Texas. Texas Department of Water Resources, Austin.

Marks, P.L. and P.A. Harcombe. 1981. Forest vegetation of the Big Thicket, southeast Texas. Ecol. Monogr. 51: 287–305.

National Vegetation Classification System (NVCS). 2017. Nature Serve Explorer, Ecological Classifications. <http://www.natureserve.org/explorer/classeco.htm>

Nature Serve. 2022. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <http://explorer.natureserve.org> Accessed Jan 2022.

Nesom, G.L. 2009. Assessment of invasiveness and ecological impact in non-native plants of Texas. J. Bot. Res. Inst. Texas 3: 971–991.

Poole, J.M., W.R. Carr, D. Price, and J.R. Singhurst. 2007. A Field Guide to the Rare Plants of Texas. Texas A&M Press, College Station.

Singhurst, J.R. and W.C. Holmes. 2011. *Monarda luteola* (Lamiaceae): A new species from northeast Texas and southwest Arkansas. Phytoneuron 2011-41: 1–5.

Sorrie, B.A. and A.S. Weakley. 2001. Coastal Plain vascular plant endemics: Phytogeographic patterns. Castanea 66: 50-82.

Turner, B.L., H. Nichols, G. Denny, and O. Doron. 2003. Atlas of the Vascular Plants of Texas. Sida, Bot. Misc. 24. (2 vols.). Bot. Res. Inst. of Texas, Fort Worth.

USNVC (United States National Vegetation Classification) Database Version 2.04. 2022. Federal Geographic Data Committee, Vegetation Subcommittee, Washington D.C.

USDA, NRCS. 2022. The PLANTS Database National Plant Data Team, Greensboro, North Carolina. <http://plants.usda.gov> Accessed January 2022.

Van Kley, J.E. and D.N. Hine. 1998. The wetland vegetation of Caddo Lake. Texas J. Sci. 50: 267-290.